

Panasonic

1990

Semiconductors Selection Guide

Microcomputers, Memories, ASICs, Bipolar ICs, Discrete Semiconductors

**SEMICONDUCTOR
PRODUCTS**

MATSUSHITA ELECTRONICS CORPORATION

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△ MN171601	34	△ MN41C41000-08	39,42	EP15543	33	MN4047B/S	49,51	MN74HC42/S	52,54
MN178122	34	△ MN41C41000-10	39,42	EP15834	33	MN4049B/S	49,51	MN74HC51/S	52,54
MN178611	34	△ MN41C41000L-08	39,42	EP15864	33	MN4050B/S	49,51	MN74HC73/S	52,54
MN187124	23,34	△ MN41C41000L-10	39,42	EP17516	34	MN4051B/S	49,51	MN74HC74/S	52,54
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MN187204	19,34	△ MN41C41002-08	39,42	△ EP18881	35	MN4060B/S	49,51	MN74HC77/S	52,54
MN187610	34	△ MN41C41002-10	39,42	EP18884	35	MN4066B/S	49,51	MN74HC86/S	52,54
MN188161	35	△ MN41C41002L-08	39,42	EP18885	35	MN4068B/S	49,51	MN74HC107/S	52,54
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				EP152121	34	MN4070B/S	49,51	MN74HC112/S	52,54

CMOS Standard Logic Circuits

△ Tentative Specification (Note) For the CMOS 4000B and CMOS 74HC Series, Pana-flat package (SO package) is available besides standard DIP package. For Pana-flat Product, "S" is attached to the end of the type number.

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MN74HC133/S	52,54	MN74HCT574/S	53,54	DN74LS54/S	55,57	DN74LS279/S	56,57	AN608P	74
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MN74HC139/S	52,54	MN74HC688/S	53,54	DN74LS74A/S	55,57	DN74LS290/S	56,57	AN1081/S	59,60
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MN74HC375/S	53,54	DN74LS16-1/S	55,57	DN74LS195A/S	56,57	DN8640S	86	AN2602K	19,75
MN74HC377/S	53,54	DN74LS17-1/S	55,57	DN74LS197/S	56,57	DN8643S	86	AN2840	19,75
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△ Tentative Specification (Note) For the CMOS 4000B and CMOS 74HC Series, Pana-flat package (SO package) is available besides standard DIP package. For Pana-flat Product, "S" is attached to the end of the type number.

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AN8245K	66	○ AN7800R Series		AN8004/M	62	2SA1022	Mini 3P	89,98,107	MT4: MT4 type
AN8250N	27,66	AN7805R	62	AN8005/M	62	2SA1034	Mini 3P	89,97	N: N type
AN8253S	27,66	AN7809R	62	AN8006/M	62	2SA1035	Mini 3P	89,97	I: I type
AN8270K	19,66	AN7812R	62	AN8007/M	62	2SA1096/A	TO126	93,99	TO126: TO-126
AN8281S	66,81	○ AN78M00R Series		AN8008/M	62	2SA1110	TO126	23,93,100	TO202: TO-202
AN8285S	25,83	AN78M05R	62	AN8009/M	62	2SA1111	TO220	94,100	TO220: TO-220
AN8290S	66,81	AN78M08R	62	AN8010/M	62	2SA1112	TO220	94,100	TO220F:
AN8320NF	25,83	AN78M09R	62	AN8025/M	62	2SA1123	TO92	90,97	TO-220 Full Pack
AN8370NF	81	AN78M12R	62	AN8045/M	62	2SA1124	TO92L	91,97	TOP3: TOP-3
AN8371S	81	○ AN7900/F Series		AN8085/M	62	2SA1125	TO220	94,100	TOP3F:
AN8373S	23,81	AN7905/F	62	○ AN90B00/S Series		2SA1127	TO92	90,97	TOP-3 Full Pack
AN8374S	23,81	AN7906/F	62	AN90B00	64	2SA1128	TO92	90,97	TOP3L: TOP-3L
AN8375S	81	AN7907/F	62	AN90B01S	64	2SA1185	TOP3	96,102	Cross: Cross Pack
AN8376S	81	AN7908/F	62	AN90B10	64	2SA1254	M	91,98	Cera Cross:
AN8377	23,81	AN7909/F	62	AN90B20/S	64	2SA1254	M	91,98	Ceramic Cross Pack
○ AN7800/F Series		AN7910/F	62	AN90B21/S	64	2SA1309A	NS	90,97	SO-10/14:
AN7805/F	62	AN7912/F	62	AN90B22/S	64	2SA1310	NS	23,90,97	SO Package (10/14P)
AN7806/F	62	AN7915/F	62	AN90B60/S	64	2SA1323	NS	90,98	SIL8/SIL10:
AN7807/F	62	AN7918/F	62	AN90B70/S	64	2SA1487	TO92L	91,98	8Pin SIP/10Pin SIP
AN7808/F	62	AN7920/F	62	AN90B81/S	64	2SA1495	I	26,94,103	DO34: DO-34
AN7809/F	62	AN7924/F	62	○ AN90C00 Series		2SA1498	N	93,103	DO35: DO-35
AN7810/F	62	○ AN79M00/F Series		AN90C10	65	2SA1499	TO220F	95,103	DO41: DO-41
AN7812/F	62	AN79M05/F	62	AN90C21	65	2SA1500	I	94,103	
AN7815/F	62	AN79M06/F	62	AN90C22	65	2SA1501	TO220F	95,103	
AN7818/F	62	AN79M07/F	62	AN90C23	65	2SA1512	NS	90,97	
AN7820/F	62	AN79M08/F	62	○ AN90C00 Series		2SA1531/A	S Mini 3P	89,97	
AN7824/F	62	AN79M09/F	62	AN90C10	65	2SA1532	S Mini 3P	89,98	
○ AN78M00/F Series		AN79M10/F	62	AN90C21	65	2SA1533	TO92NL	91,97	
AN78M05/F	62	AN79M12/F	62	AN90C22	65	2SA1534/A	TO92NL	91,97	
AN78M06/F	62	AN79M15/F	62	AN90C23	65	2SA1535/A	TO220F	23,95,100	
AN78M07/F	62	AN79M18/F	62	OM200	84	2SA1550	I	26,94,103	
AN78M08/F	62	AN79M20/F	62			2SA1605	TO202	94,100	
AN78M09/F	62	AN79M24/F	62			2SA1614	TO220F	95,103	
AN78M10/F	62	○ AN79N00 Series				2SA1619/A	TO92NL	91,97	
AN78M12/F	62	AN79N04	62			2SA1674	MT2	23,92,97	
AN78M15/F	62	AN79N05	62			2SA1698	TO126	93,99	
AN78M18/F	62	AN79N06	62			2SA1698	TO126	93,99	
AN78M20/F	62	AN79N07	62			2SA1737	Mini Power	89,98	
AN78M24/F	62	AN79N08	62			2SA1738	Mini 3P	89,97	
○ AN78N00 Series		AN79N09	62			2SA1739	S Mini 3P	89,97	
AN78N04	62	AN79N10	62			2SA1747	Mini 3P	89,97	
AN78N05	62	AN79N12	62			2SA1748	S Mini 3P	89,97	
AN78N06	62					2SA1762	M	91,97	
AN78N07	62					2SA1767	TO92	90,98	
AN78N08	62					2SB621/A	TO92	90,97	
						2SB642	M	91,97	
						2SB643	TO92L	91,97	
						2SB644	TO92L	91,97	
						2SB709A	Mini 3P	24,89,97,107	

△ Tentative Specification

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2SB710/A	Mini 3P	89,97,107	2SB1174	I	94,101	2SC1047	TO92	90,98	2SC3130	Mini 3P	21,89,98,99,107
2SB725	TO92	90	2SB1175	I	94,101	2SC1215	TO92	90,98,99	2SC3171	TOP3F	96,103
2SB726	TO92	90	2SB1176	I	94,101	2SC1226/A	TO202	94,99	2SC3187	TO92	90,98
2SB745/A	M	91,97	2SB1177	I	94,101	2SC1317	TO92	90,97	2SC3210	TOP3F	96,103
2SB766/A	Mini Power	89,97	2SB1178/A◎	I	94,101	2SC1318/A	TO92	90,97	2SC3211/A	TOP3F	96,103
2SB767	Mini Power	89,97	2SB1179/A◎	I	94,101	2SC1359	TO92	90,98	2SC3212/A	TOP3F	96,103
2SB774	TO92	90,97	2SB1180/A◎	I	94,101	2SC1360/A	TO92L	91,98	2SC3276	Cross	99
2SB779	Mini 3P	89,97	2SB1191/A	N	93,101	2SC1383	TO92L	91,97	2SC3285	TOP3	103
2SB788	M	91,97	2SB1192/A	TO220F	95,101	2SC1384	TO92L	91,97	2SC3311A	NS	90,97
2SB789/A	Mini Power	89,98	2SB1193◎	TO220F	95,101	2SC1398/A	TO220	94,99	2SC3312	NS	23,90,97
2SB790	M	91,97	2SB1194◎	TO220F	95,101	2SC1473/A	TO92	22,90,98	2SC3313	NS	90,98
2SB792/A	Mini 3P	89,97	2SB1195◎	TO220F	95,101	2SC1501	TO126	93	2SC3314	NS	90,98
2SB793/A	M	91,97	2SB1206	NS	90,97	2SC1509	TO92L	91,97	2SC3315	NS	90,98
2SB819	M	91,97	2SB1207	NS	90,97	2SC1518	TO92L	91,97	2SC3352/A	TO220F	95,103
2SB835	M	91,97	2SB1208	Mini Power	97,108	2SC1567/A	TO126	93,99	2SC3353/A	TO220F	95,103
2SB873	TO92L	91,97	2SB1209	M	26,91,98	2SC1568	TO126	93,100	2SC3354	NS	90,98,99
2SB902	Mini 3P	89,97	2SB1218/A	S Mini 3P	89,97	2SC1573/A/B	TO92L	91,98	2SC3403	N	93,103
2SB928/A	N	93,101	2SB1219/A	S Mini 3P	89,97	2SC1685	TO92	90,97	2SC3477	Cross	99
2SB929/A	N	93,101	2SB1220/A	S Mini 3P	89,97	2SC1687◆	TO92	90,98	2SC3496/A	N	93,103
2SB930/A	N	93,101	2SB1221	TO92NL	91,98	2SC1688◆	TO92	90,98	2SC3506	TOP3F	96,103
2SB931	N	93,101	2SB1233/A	I	94,101	2SC1789	TO92	90,98	2SC3507	TOP3F	96,103
2SB932	N	93,101	2SB1250	TO220F	95,102	2SC1819M	TO220	94,100	2SC3508◎	TOP3F	96,102,103
2SB933	N	93,101	2SB1251◎	TO220F	95,102	2SC1846	TO126	93,99	2SC3509◎	TOP3F	96,102,103
2SB934	N	93,101	2SB1252◎	TO220F	95,102	2SC1847	TO126	93,99	2SC3526(H)	TO92L	91,98
2SB935/A	N	93,101	2SB1253◎	TOP3F	96,102	2SC1905(H)	TO220	94,100	2SC3527	TOP3F	96,103
2SB936/A	N	93,101	2SB1254◎	TOP3F	96,102	2SC1929	TO220	94	2SC3528	TOP3F	96,103
2SB937/A◎	N	93,101	2SB1255◎	TOP3F	96,102	2SC1953	TO126	93,100	2SC3577	TOP3F	96,103
2SB938/A◎	N	93,101	2SB1264	M	91,98	2SC1973	TO92L	91,98	2SC3610	TO220	94,100
2SB939/A◎	N	93,101	2SB1265	M	91	2SC1980	TO92	90,97	2SC3611	TO126	93,100
2SB940/A	TO220F	95,101,105	2SB1288	TO92NL	91,97	2SC2085	TO220	94	2SC3704	Mini 3P	89,98,99
2SB941/A	TO220F	95,99,101,105	2SB1297	TO92NL	91,98	2SC2188	M	91,98,107	2SC3707	Mini 3P	89,98
2SB942/A	TO220F	95,101,105	2SB1299	TO220F	95,101	2SC2206	M	91,98	2SC3737	TOP3F	96,104
2SB943	TO220F	95,101,105	2SB1317	TOP3L	23,96,102	2SC2209	TO126	93,99	2SC3738	TOP3L	96,104
2SB944	TO220F	95,101,105	2SB1319	M	91,97	2SC2258	TO126	93,100	2SC3743	TO220	95,103
2SB945	TO220F	95,101	2SB1320A	MT1	92,97	2SC2295	Mini 3P	89,98	2SC3757	Mini 3P	89,97
2SB946	TO220F	95,101	2SB1321A	MT1	92,97	2SC2360(H)	Cross	98,99	2SC3794/A	TO220F	95,103
2SB947/A	TO220F	95,101,105	2SB1322A	MT2	92,97	2SC2377	M	91,98	2SC3795/A	TO220F	95,103
2SB948/A	TO220F	95,101	2SB1347	TOP3F	96,102	2SC2404	Mini 3P	21,89,98,107	2SC3796/A	TOP3	96,103
2SB949/A◎	TO220F	95,100,101,105	2SB1361	TOP3F	96,102	2SC2405	Mini 3P	89,97	2SC3797/A	TOP3	96,103
2SB950/A◎	TO220F	95,101,105	2SB1362	TOP3	96,102	2SC2406	Mini 3P	89,97	2SC3798/A	TOP3F	96,103
2SB951/A◎	TO220F	95,101	2SB1371	TOP3F	23,96,102	2SC2480	Mini 3P	21,89,98,99,107	2SC3799/A	TOP3F	96,103
2SB952/A	N	93,101	2SB1372	TOP3F	96,102	2SC2497/A	TO126	93,99	2SC3811	TO92	90,97
2SB953/A	TO220F	95,101,105	2SB1373	TOP3	96,102	2SC2582	TO126	93,99	2SC3824/A	I	94,103
2SB954/A	TO220F	95,101	2SB1376	MT2	92,97	2SC2590	TO126	23,93,100	2SC3825	I	94,103
2SB956	Mini Power	89,97	2SB1377	MT2	92,97	2SC2591	TO220	94,100	2SC3829	Mini 3P	89,98,99
2SB970	Mini 3P	88,97,107	2SB1378	MT1	92,97	2SC2592	TO220	94,100	2SC3850	TOP3	96,103
2SB976	TO92	90,97	2SB1393/A	TO220F	95,101	2SC2594	TO126	93,100	2SC3868	TO220F	95,103
2SB987	TO92L	91,98	2SB1398	MT2	92,97	2SC2631	TO92	90,97	2SC3869	TO220F	95,103
2SB1011	TO126	26,93,100	2SB1413	MT3	92,99	2SC2632	TO92L	91,97	2SC3870	TO220F	95,103
2SB1030/A	NS	90,97	2SB1414	MT3	92,100	2SC2633	TO220	94,100	2SC3871	TO220F	95,103
2SB1036	NS	23,90,97	2SB1415	MT3	92,100	2SC2634	TO92	90,97	2SC3872	TOP3F	29,96,103
2SB1050	M	91,97	2SB1416	MT3	92,99	2SC2636	M	91,98,99	2SC3873	TOP3F	96,103
2SB1052	TO220F	95,101,105	2SB1417	MT4	92,99	2SC2647	M	91,98	2SC3874	TOP3L	96,103
2SB1054	TOP3F	96,102	2SB1418	MT4	92,100	2SC2653(H)	TO202	94,100	2SC3903	Cross	98,99
2SB1063	TO220F	95,101	2SB1419	TOP3L	96,102	2SC2671(H)◇	TO92	90,98,99	2SC3904	Mini 3P	89,98,99,107
2SB1070/A	N	93,101	2SB1421	TOP3	96,102	2SC2671(F)◇	TO92	90,98,99	2SC3910	TOP3L	96,103
2SB1071/A	TO220F	95,101	2SB1422	TO126	93,100	2SC2778	Mini 3P	89,98	2SC3929/A	S Mini 3P	89,97
2SB1073	Mini Power	89,97	2SB1434	MT2	92,97	2SC2834	TOP3	103	2SC3930	S Mini 3P	89,98
2SB1108◎	TO220F	95,101	2SB1435	MT3	92,99	2SC2841	TOP3	103	2SC3931	S Mini 3P	89,98
2SB1148/A	I	94,101	2SB1437	MT2	92,97	2SC2845	Mini 3P	89,98	2SC3932	S Mini 3P	89,98
2SB1154	TOP3F	96,102	2SB1438	MT2	92,97	2SC2851	TO92L	91,98	2SC3933	S Mini 3P	89,98,99
2SB1155	TOP3F	96,102	2SB1439	MT3	92,99	2SC2923	TO202	94,100	2SC3934	S Mini 3P	89,98,99
2SB1156	TOP3F	96,102	2SB1440	Mini Power	89,97	2SC2925	TO92	90,97	2SC3935	S Mini 3P	89,98,99
2SB1169/A	I	94,101	2SB1446	MT2	92,97	2SC2988	TO126	93,98	2SC3936	S Mini 3P	89,98
2SB1170/A	I	94,101	2SB1447	MT3	92,99	2SC3054◎	TOP3F	96,102	2SC3937	S Mini 3P	89,98,99
2SB1171/A	I	94,101	2SB1456	MT2	92,97	2SC3063	TO126	93,100	2SC3938	S Mini 3P	89,97
2SB1172/A	I	94,101	2SB1975	TOP3L	96	2SC3077	Mini 3P	21,89,98,99	2SC3939	TO92NL	91,97
2SB1173/A	I	94,101	2SC829	TO92	90,98	2SC3110	Mini 3P	89,98,99,107	2SC3940/A	TO92NL	91,97

◎ Darlington Transistors ◆ Center Emitter Transistor (1:C 2:E 3:B) ◇ Center Emitter Transistor (1:B 2:E 3:C)

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2SC3941	TO92NL	21,91,98	2SD814/A	Mini 3P	89,97,107	2SD1328	Mini 3P	89,97,107	2SD1736	TOP3F	96,104
2SC3942	TO220F	95,100	2SD874/A	Mini Power	89,97	2SD1330	M	91,97	2SD1737	TOP3F	96,104
2SC3943	TO220F	95,100	2SD875	Mini Power	89,97	2SD1336/A	TO220F	95,101	2SD1738	TOP3F	96,104
2SC3944/A	TO220F	23,95,100	2SD889	TO92	90,97	2SD1350/A	M	91,98	2SD1739	TOP3F	96,104
2SC3945	TO220F	95,100	2SD892/A	TO92	90,97	2SD1385	M	91,98	2SD1741/A	I	94,101
2SC3946	TO220F	21,95,100	2SD893/A	TO92	90,97	2SD1391	TOP3	96,104	2SD1742/A	I	94,101
2SC3965	TO92NL	91,98	2SD946/A/B	TO126	93,100	2SD1423/A	NS	90,97	2SD1743/A	I	94,101
2SC3966	Cross	98,99	2SD958	M	91,97	2SD1424	NS	90,97	2SD1744	I	94,101
2SC3967	Mini 3P	89,98,99	2SD965	TO92	90,97	2SD1439	TOP3	96,104	2SD1745	I	94,101
2SC3970/A	TO220F	95,103	2SD966	TO92L	91,97	2SD1440	TOP3	104	2SD1746	I	94,101
2SC3971/A	TO220F	95,103	2SD968/A	Mini Power	89,98	2SD1441	TOP3	96,104	2SD1747/A	I	94,101
2SC3972/A	TO220F	95,103	2SD973/A	M	91,97	2SD1444/A	TO220F	95,101,105	2SD1748/A	I	94,101
2SC3973/A	TO220F	95,103	2SD1010	TO92	90,97	2SD1445/A	TO220F	95,101	2SD1749/A	I	94,101
2SC3974	TOP3F	96,103	2SD1011	TO92	90,97,107	2SD1446	TO220F	95,101	2SD1750/A	I	94,101
2SC3975	TOP3F	96,103	2SD1030	Mini 3P	89,97	2SD1449	NS	23,90,97	2SD1751/A	I	94,101
2SC3976	TOP3L	96,103	2SD1051	M	91,97	2SD1450	NS	90,97	2SD1752/A	I	94,101
2SC3977/A	TO220F	95,103	2SD1119	Mini Power	89,97	2SD1457/A	TOP3F	96,102	2SD1753	I	94,101
2SC3978/A	TO220F	95,103	2SD1149	Mini 3P	89,97	2SD1458	M	91,97	2SD1754/A	I	94,101
2SC3979/A	TO220F	95,103	2SD1198/A	M	91,97	2SD1461	TOP3	96,102	2SD1755	I	94,101
2SC3980/A	TOP3F	96,103	2SD1199	M	91,97	2SD1474	TO220F	95,101	2SD1770/A	TO220	101
2SC3981/A	TOP3F	96,103	2SD1205/A	M	91,97	2SD1475	TO220F	95,101	2SD1771/A	N	93,101
2SC3982/A	TOP3L	96,103	2SD1211	TO92L	91,98	2SD1478/A	Mini 3P	89,97	2SD1772/A	TO220F	95,101
2SC4004	TO220F	95,103	2SD1244	M	91,97	2SD1479	TOP3	96,104	2SD1773	TO220F	95,101
2SC4026	TO220F	95,103	2SD1249/A	N	93,101	2SD1480	TO220F	95,101	2SD1774/A	TO220F	101
2SC4068	S Mini 3P	89,98,99	2SD1250/A	N	93,101	2SD1483	Mini Power	89,97	2SD1775/A	N	93,101
2SC4096	TOP3L	96,104	2SD1251/A	N	93,101	2SD1485	TOP3F	96,102	2SD1776/A	TO220F	95,101
2SC4111	TOP3L	96,104	2SD1252/A	N	93,101	2SD1499	TO220F	95,101	2SD1807	NS	90,97
2SC4152	TO220F	95,104	2SD1253/A	N	93,101	2SD1510	TO220F	95,101	2SD1808/A	NS	90,97
2SC4158	TO220F	95,100	2SD1254	N	93,101	2SD1511	Mini Power	89,97	2SD1819A	S Mini 3P	89,97
2SC4190	TO220F	95,100	2SD1255	N	93,101	2SD1512	NS	90,97	2SD1820/A	S Mini 3P	89,97
2SC4208/A	TO92NL	91,97	2SD1256	N	93,101	2SD1516	TO220	101	2SD1821/A	S Mini 3P	89,97
2SC4212	TO126	93	2SD1257/A	N	93,101	2SD1517	TO220F	95,101	2SD1823	S Mini 3P	89,97
2SC4238	Mini 3P	98,99	2SD1258	N	93,101	2SD1526	M	91,98	2SD1824	S Mini 3P	89,97
2SC4239	S Mini 3P	89,98,99	2SD1259/A	N	93,101	2SD1528	TO220	94,101	2SD1831	TOP3F	96,102
2SC4258	TOP3L	102	2SD1260/A	N	93,101	2SD1529	N	93,101	2SD1844	TOP3F	96,104
2SC4309	TOP3	96,103	2SD1261/A	N	93,101	2SD1530	TO220F	95,101	2SD1845	TOP3F	96,104
2SC4358	TO220F	95	2SD1262/A	N	93,101	2SD1534	N	93,101	2SD1846	TOP3F	96,104
2SC4359	TOP3F	96,103	2SD1263/A	TO220F	95,101	2SD1535	TO220F	95,101	2SD1847	TOP3F	96,104
2SC4379	TOP3F	96,103	2SD1264/A	TO220F	95,101,105	2SD1538/A	N	93,101	2SD1848	TOP3F	96,104
2SC4391	MT2	23,92,97	2SD1265/A	TO220F	95,101	2SD1539/A	TO220F	95,101	2SD1849	TOP3F	96,104
2SC4410	S Mini 3P	89,98	2SD1266/A	TO220F	95,99,101,105	2SD1541	TOP3F	96,104	2SD1850	TOP3F	96,104
2SC4417	S Mini 3P	89,98	2SD1267/A	TO220F	95,101,105	2SD1575	TO220F	95,104	2SD1890	TO220F	95,102
2SC4420	TOP3F	96,103	2SD1268	TO220F	95,101,105	2SD1576	TOP3F	96,104	2SD1891	TO220F	95,102
2SC4421	TO220F	95,103	2SD1269	TO220F	95,105	2SD1577	TOP3F	96,104	2SD1892	TO220F	95,102
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△ Tentative Specification

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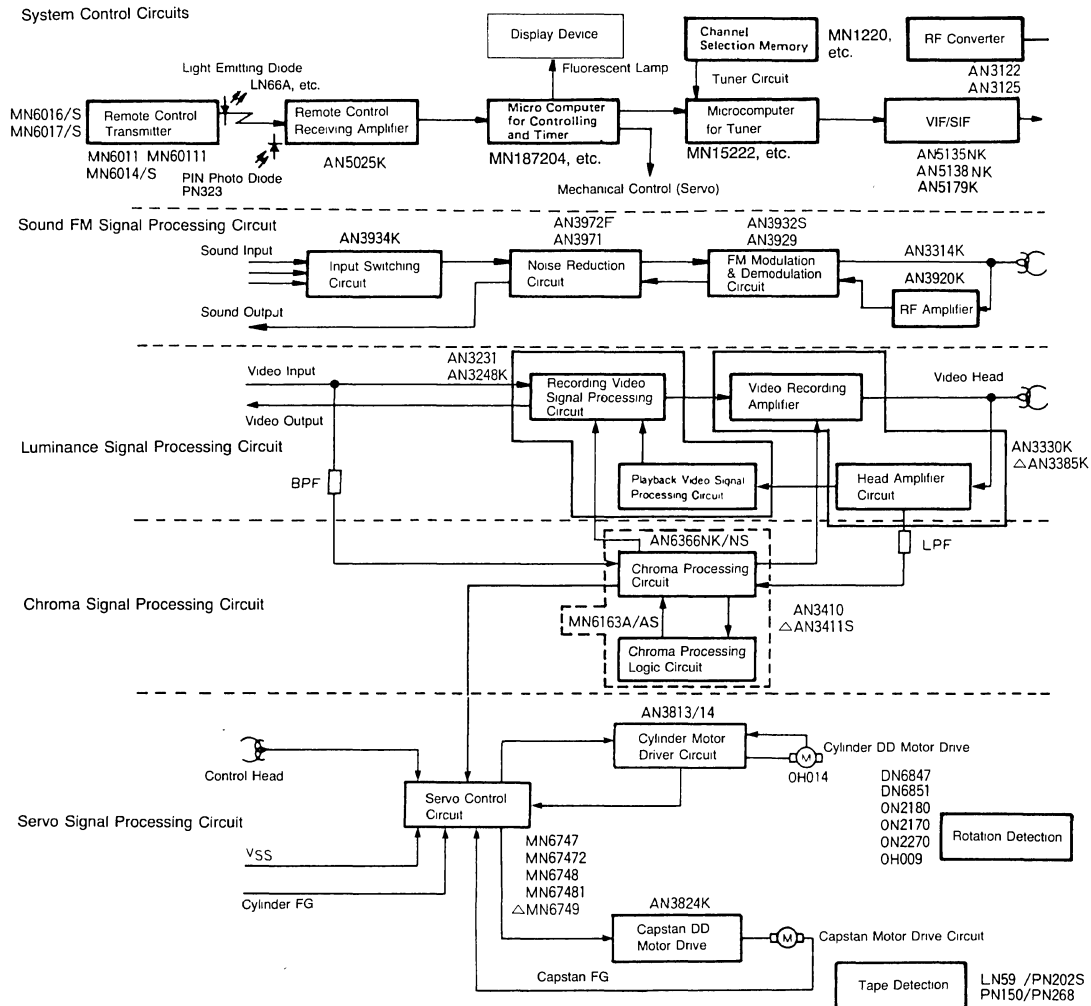
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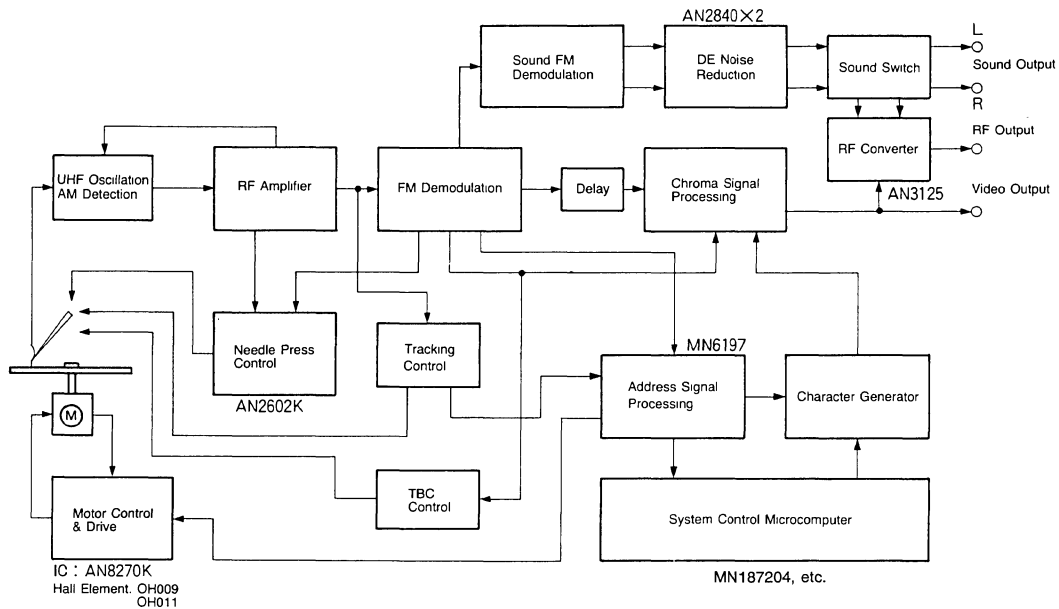
Application Block Diagrams

Video Applications

① VCR



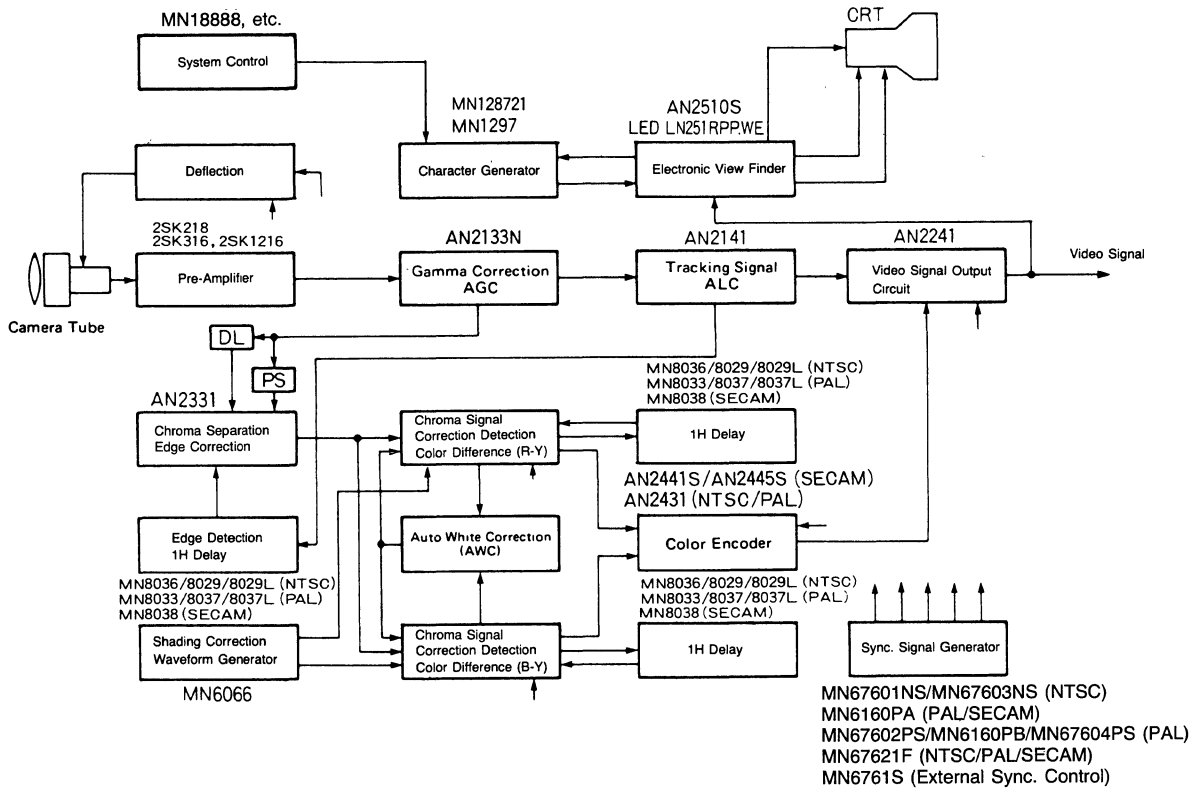
② VHD Video Disc Player



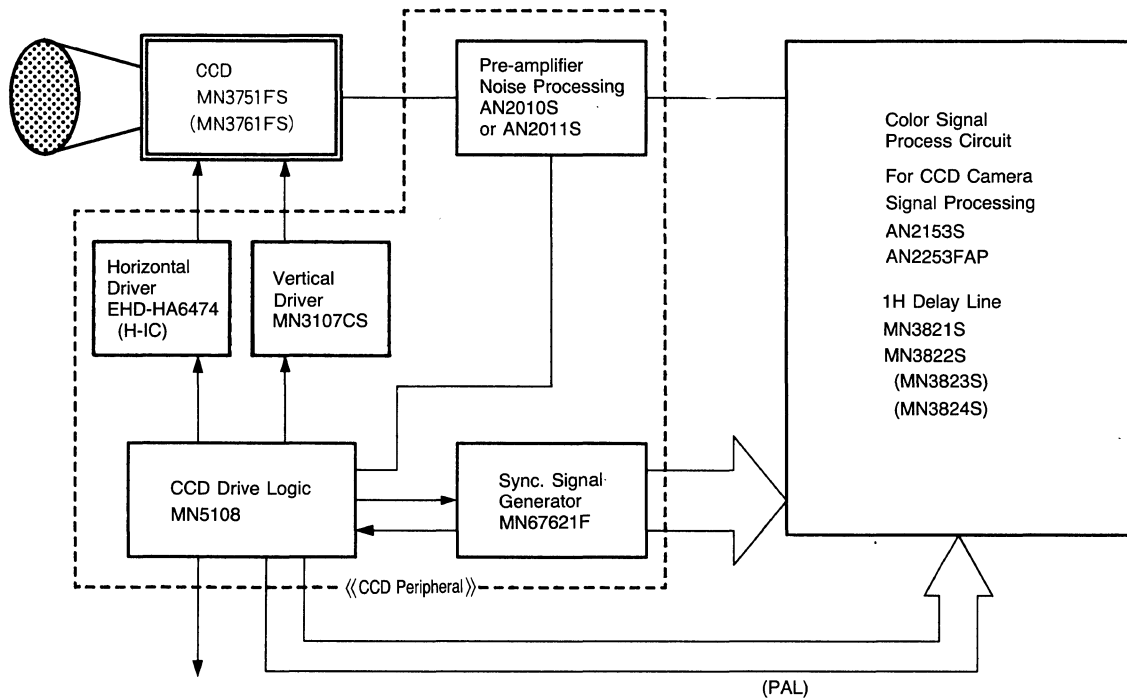
Application Block Diagrams

Video Applications

③ Video Camera



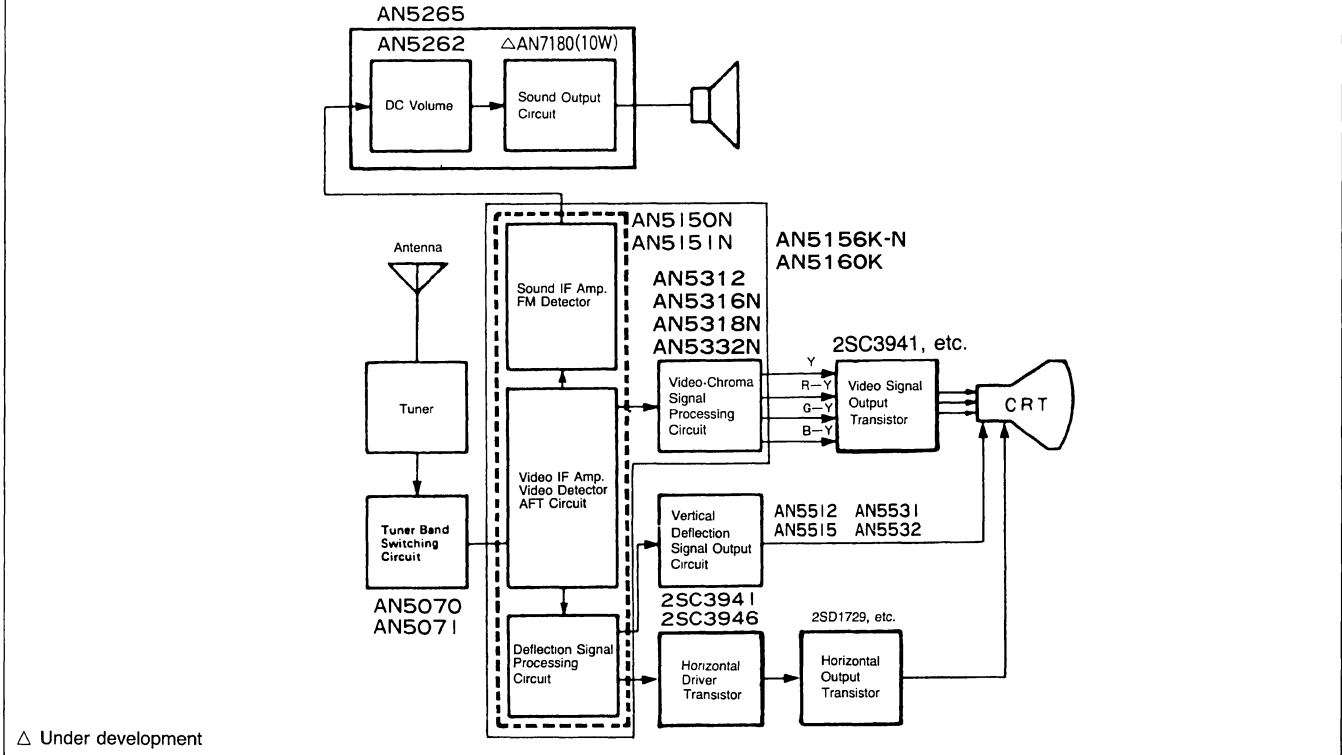
④ CCD Solid State Video Camera



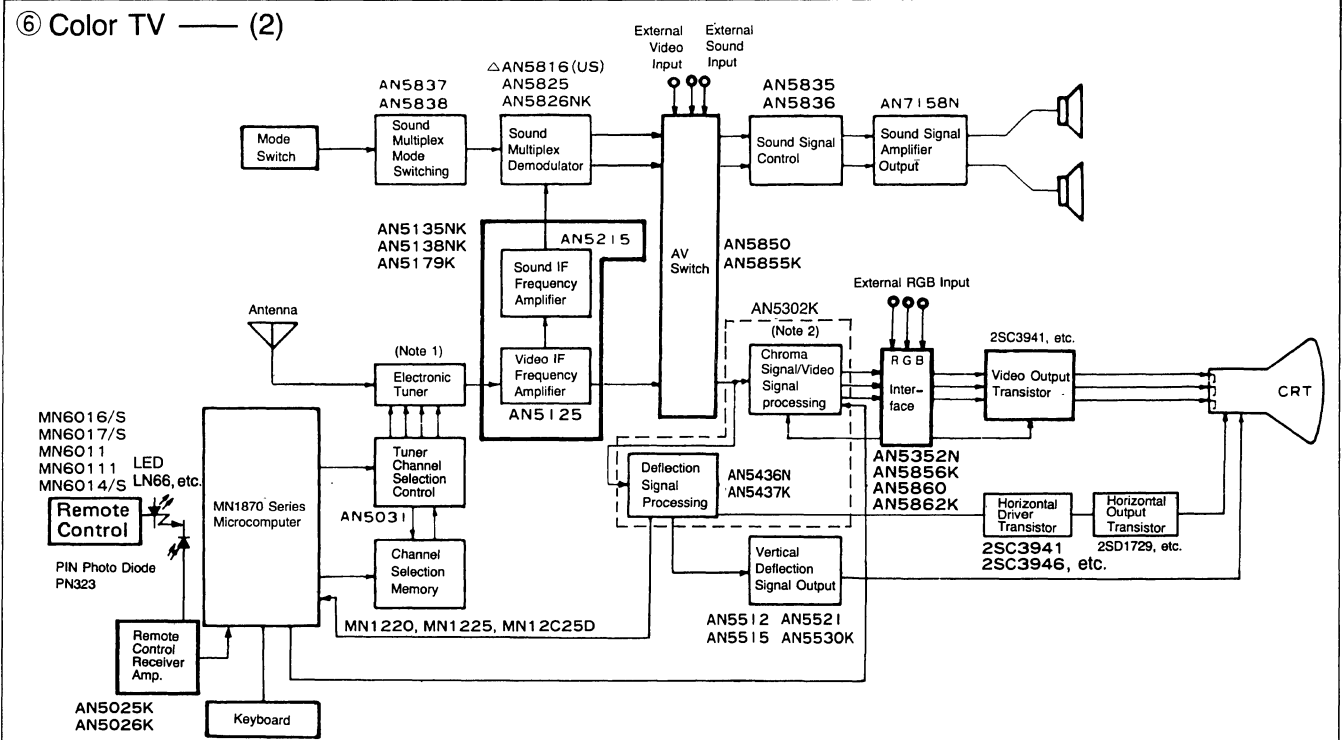
Application Block Diagrams

TV Applications

⑤ Color TV — (1)



⑥ Color TV — (2)



(Note 1) Recommended Discrete Devices for Electronic Tuner.

Product's Name	Type
Transistor	2SC2404, 2SC2480, 2SC3077, 2SC3130
FET	3SK142, 3SK143, 3SK144, 3SK169, 3SK183, 3SK184, 3SK201
Diode	MA73, MA77, MA79, MA339, MA353, MA371, MA372
Visible LED	LN524GA, LN526GA, LN21RCPH×4, LN21RPH×8, LN253RPL×12

(Note 2) Following ICs are recommended by the chroma system.

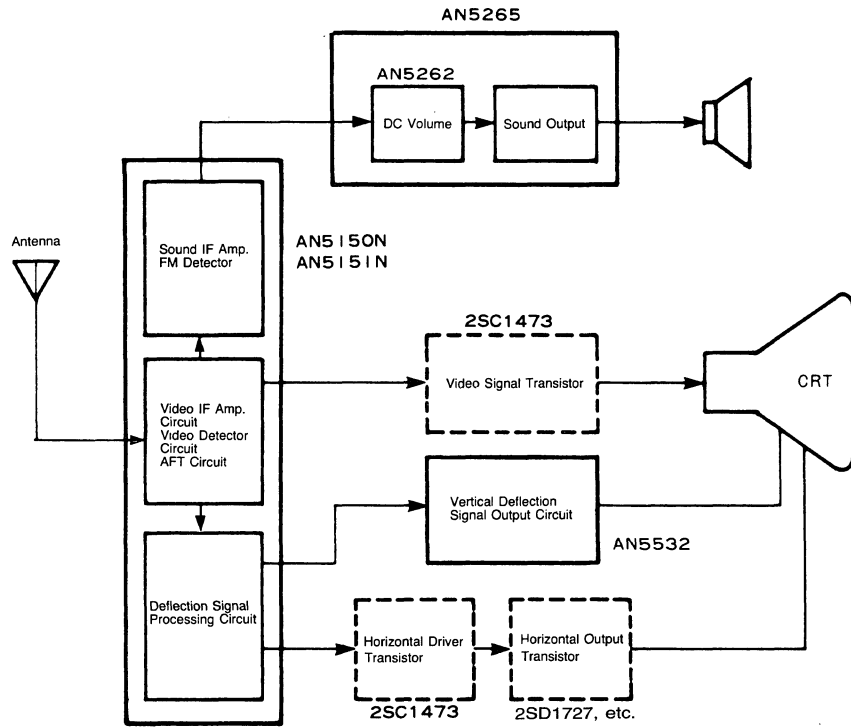
System	Type	AN5302K	AN5312 or AN5316N/18N	AN5601NK	AN5615	AN5625N	AN5633K	AN5635N
NTSC	A	B	C					
PAL			A	B	B			
SECAM				A				A
PAL/SECAM			A	B	B	A	B	
NTSC/PAL/SECAM			A			A		
Clock	Y, Co, J	Y, Co	Y, Co, J	Y	Co	Co	Co	Co

Y: Video Signal Processing, Co: Chroma Signal Processing, J: Deflection Signal Processing

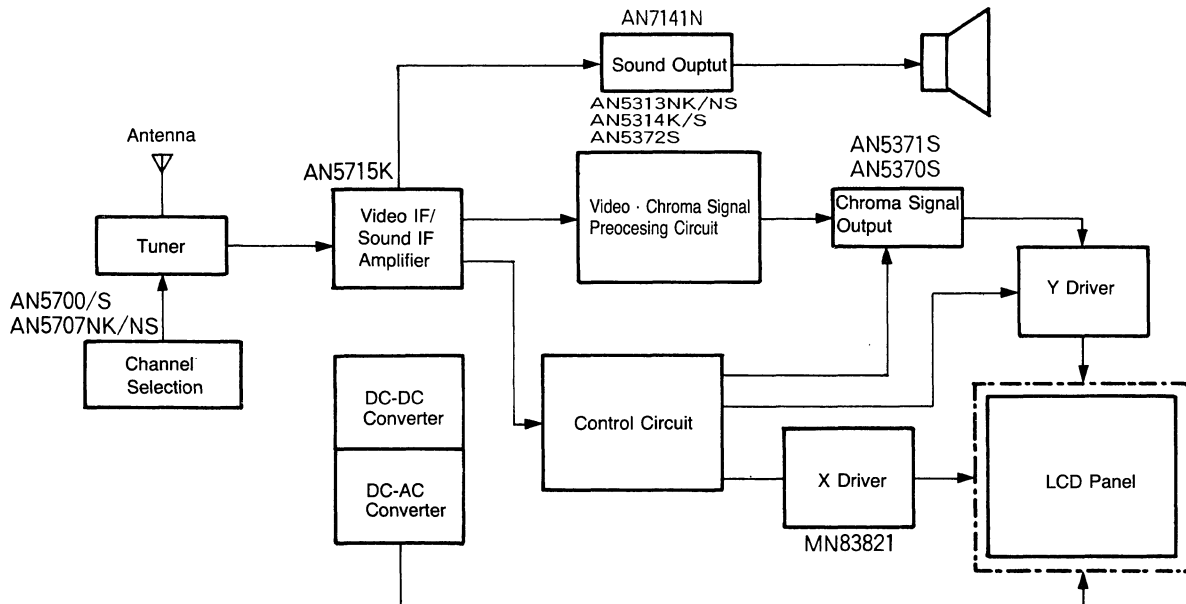
Application Block Diagrams

TV Applications

⑦ B/W TV



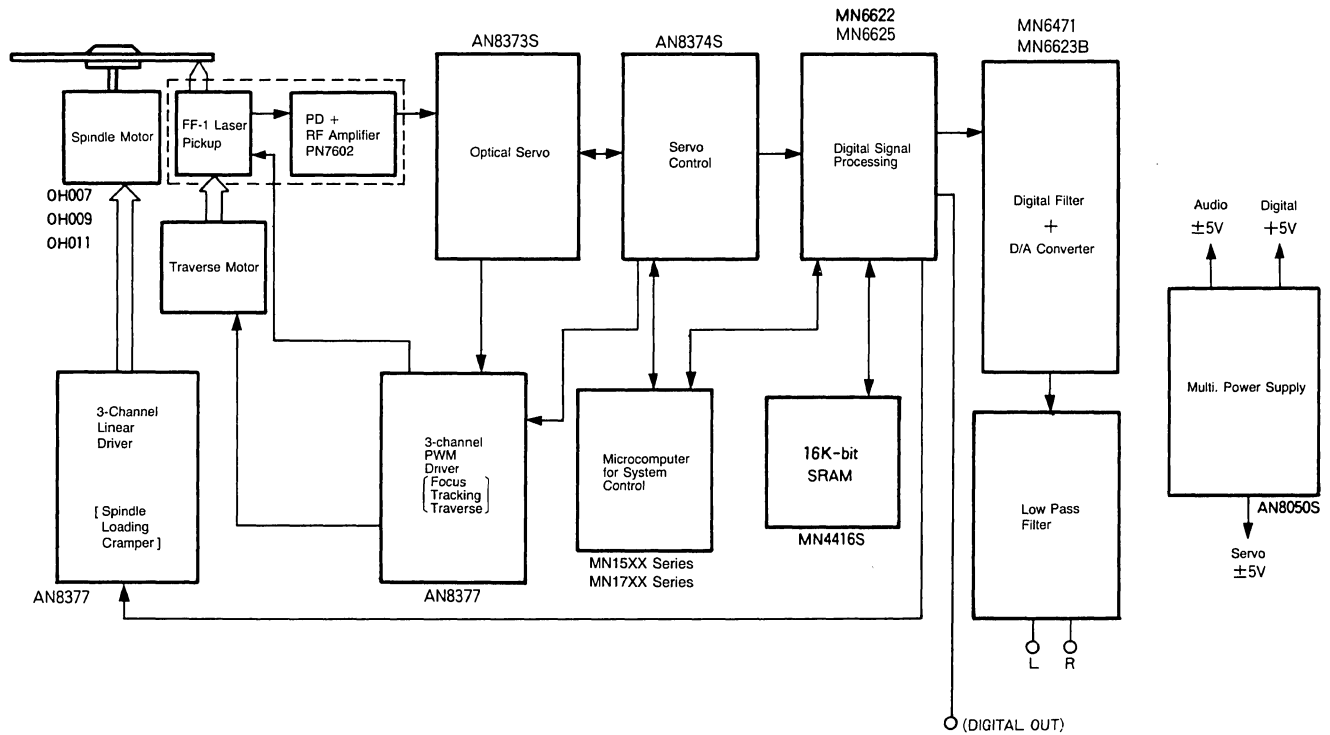
⑧ Liquid Crystal Display TV



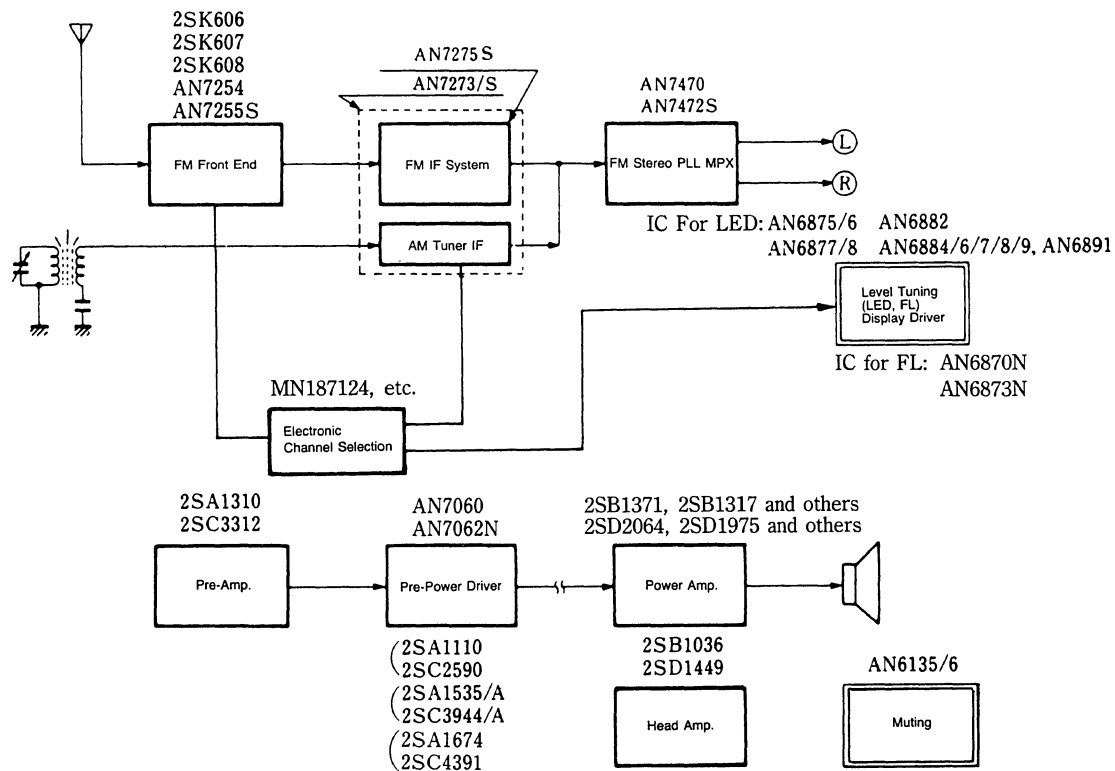
Application Block Diagrams

■ Audio Applications

① CD Player



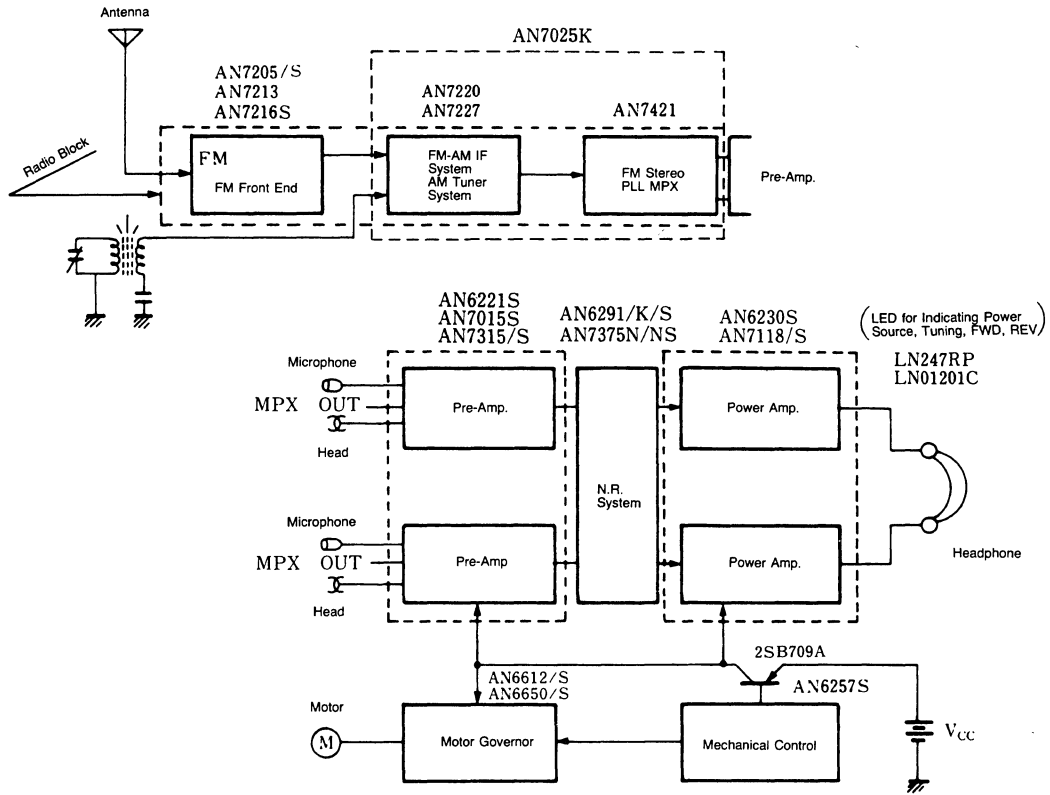
② Hi-Fi Stereo Tuner·Audio Amplifier



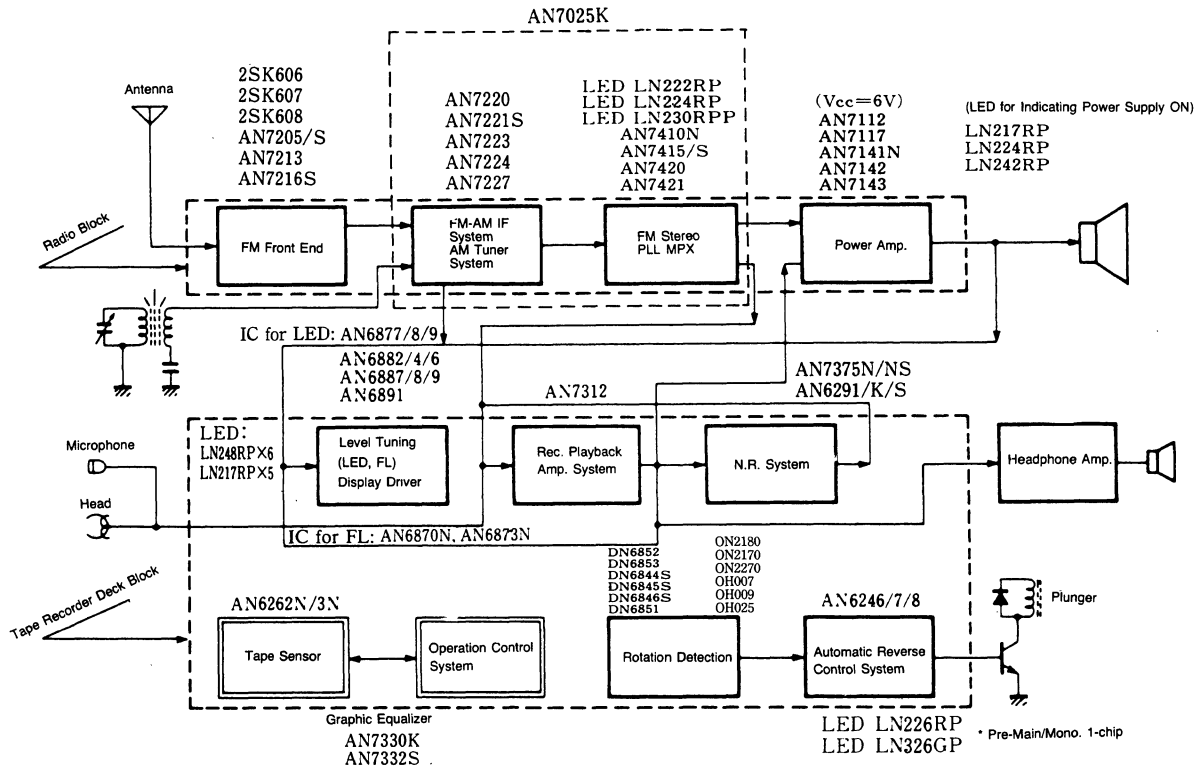
Application Block Diagrams

■ Audio Applications

③ Micro Radio Cassette Tape Recorder ($V_{CC}=3V$)



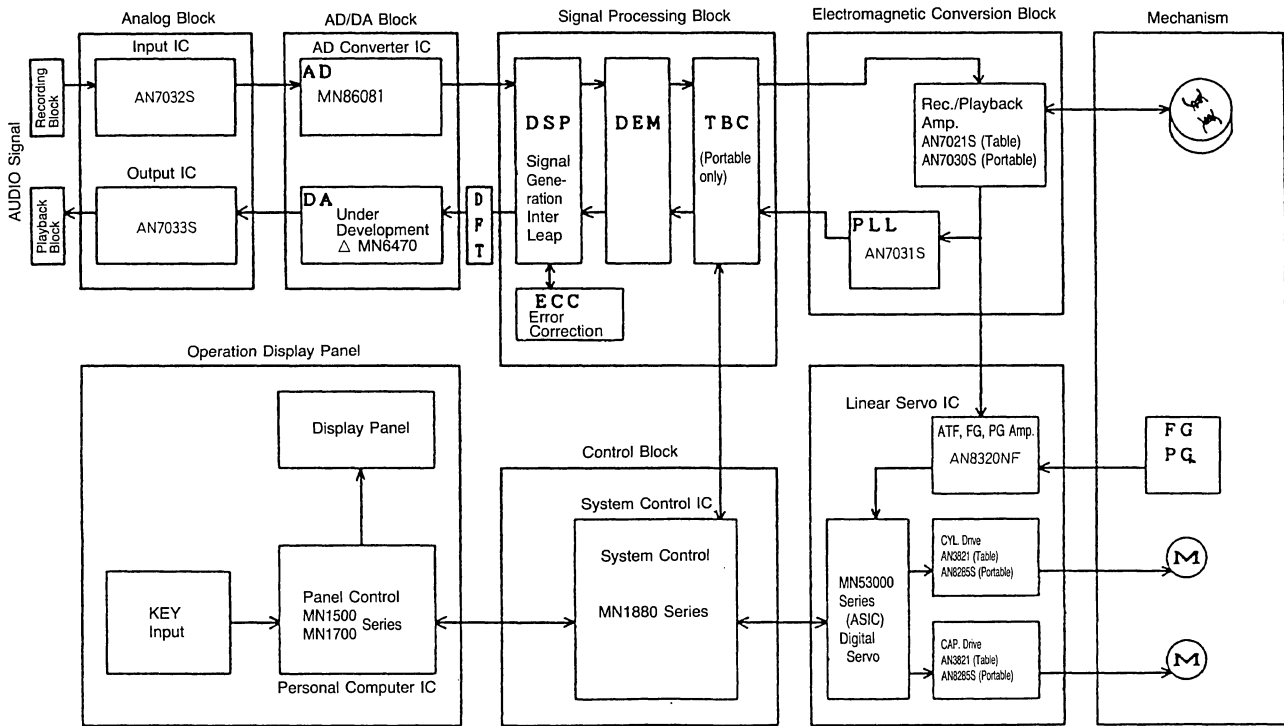
④ Radio Cassette Tape Recorder ($V_{CC}=6V$)



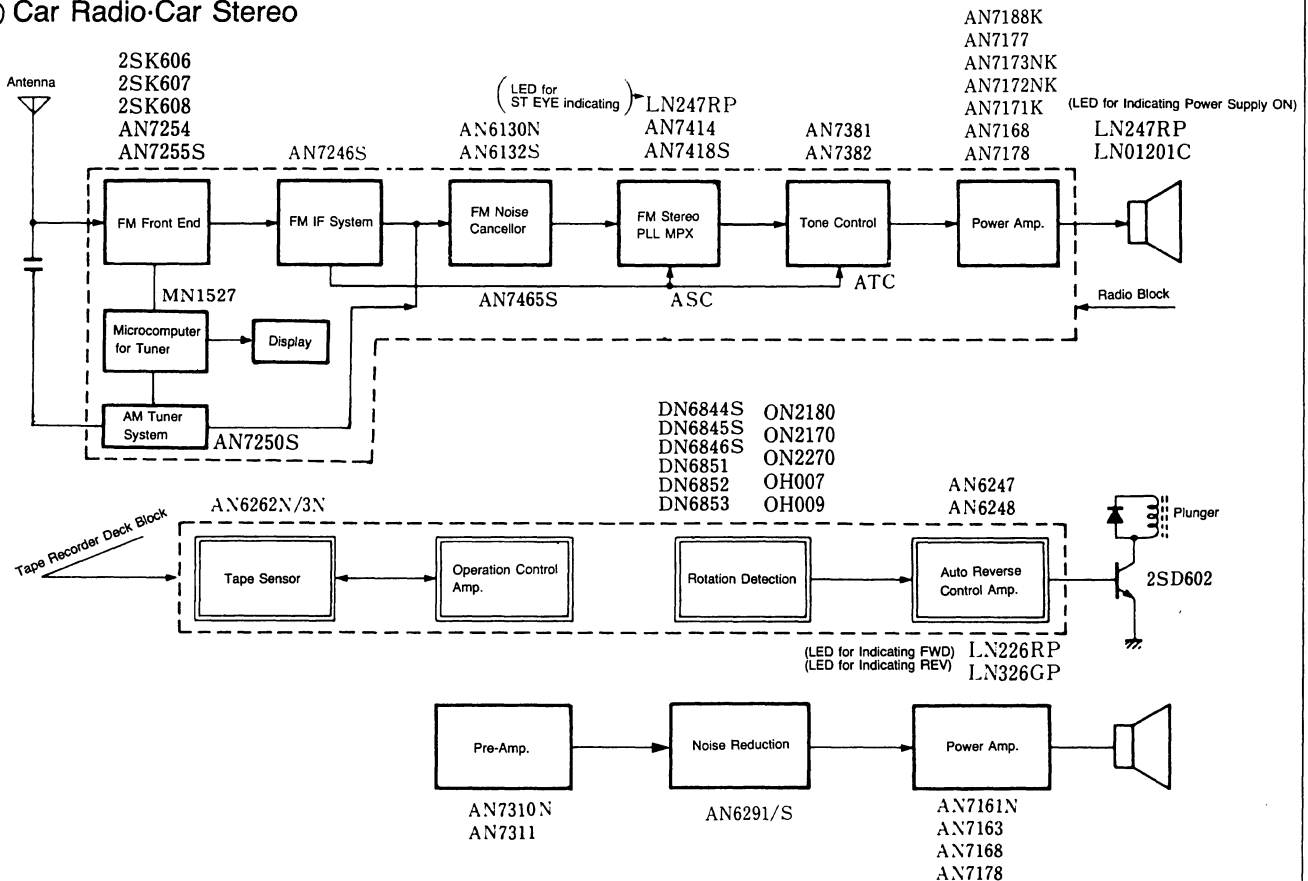
Application Block Diagrams

Audio Applications

⑤ DAT System



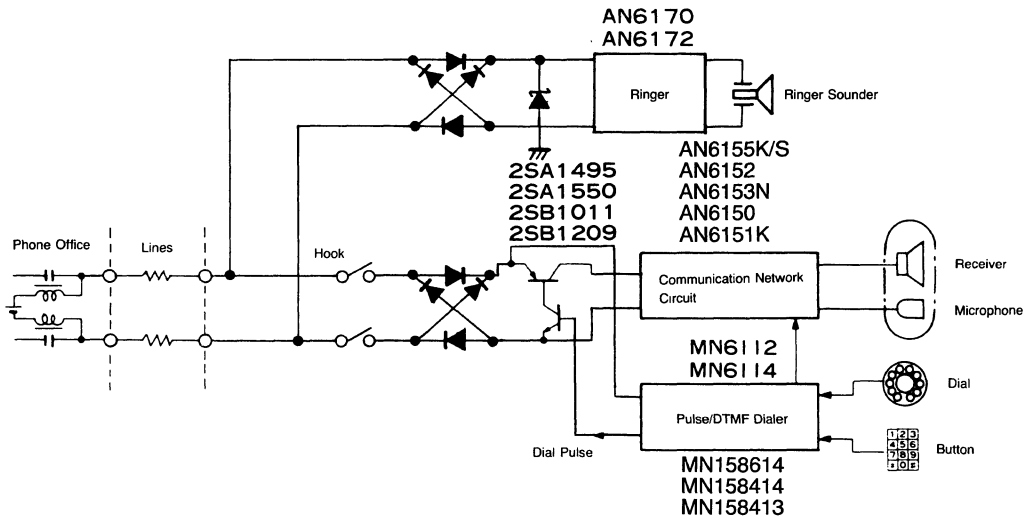
⑥ Car Radio-Car Stereo



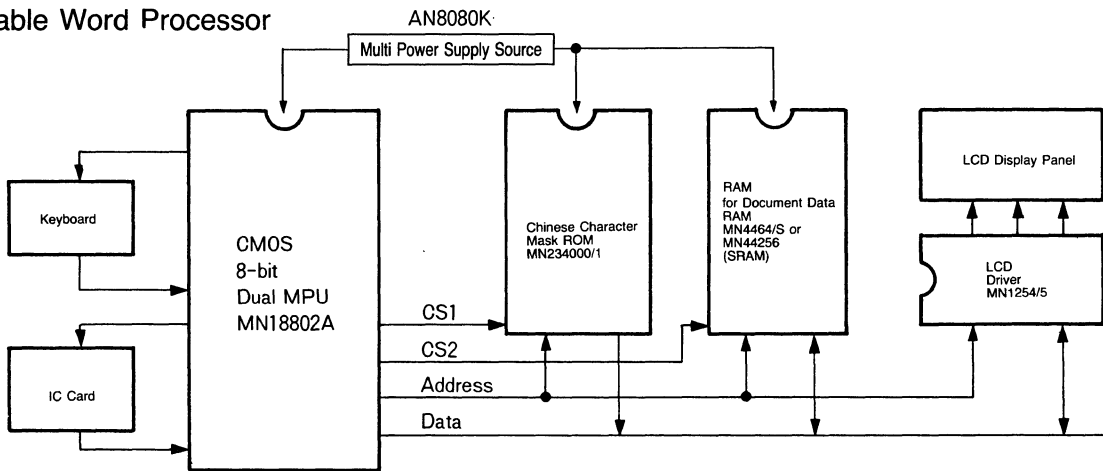
Application Block Diagrams

Industrial, Home Applications

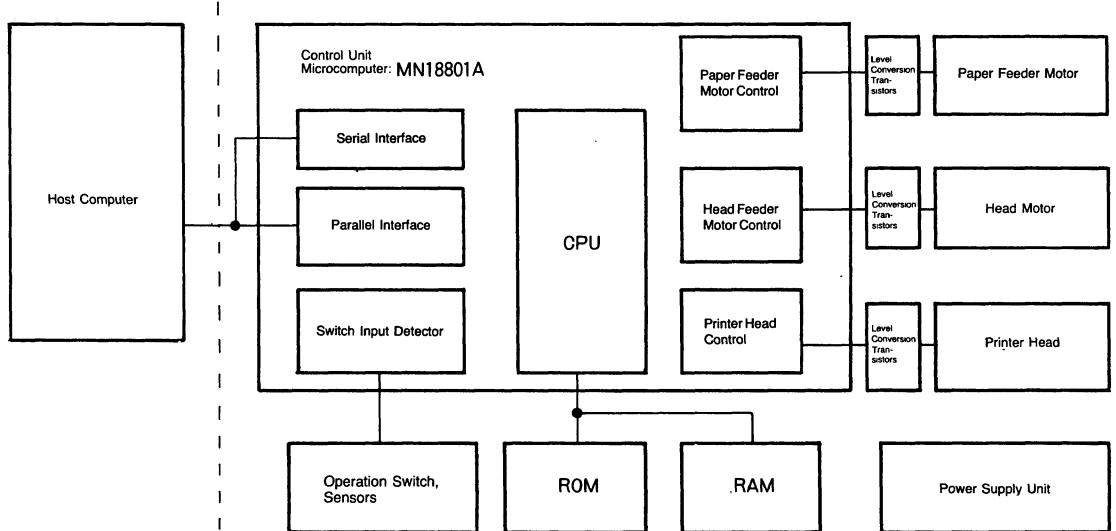
① Telephone



② Portable Word Processor



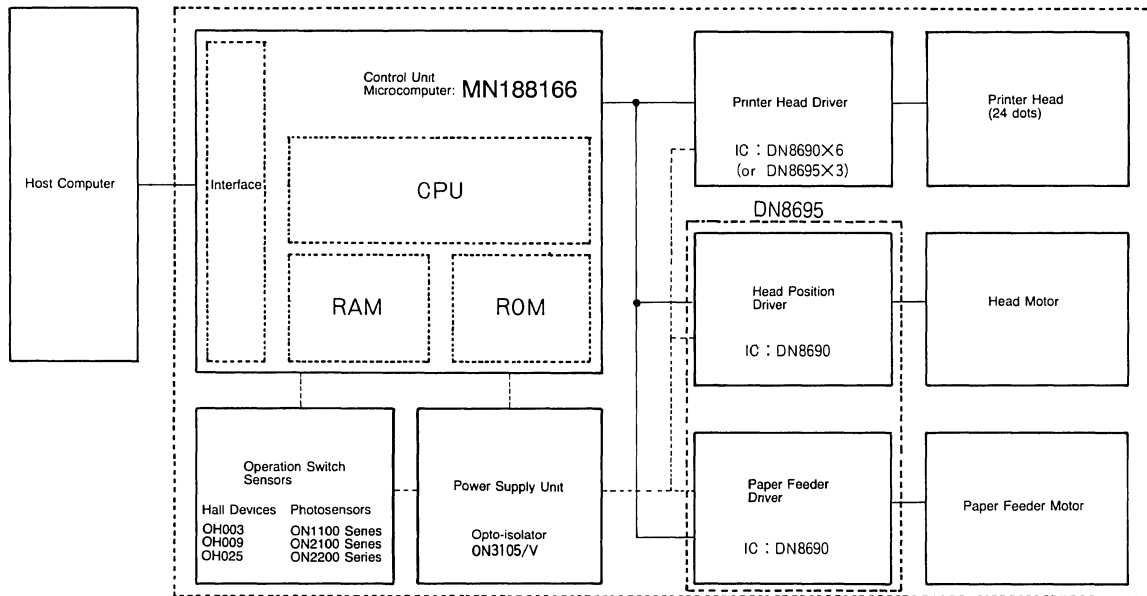
③ Printer (1)



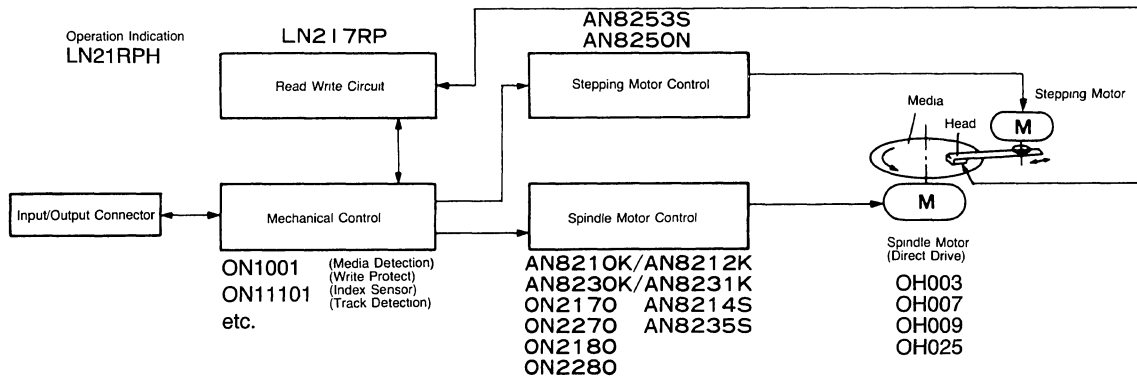
Application Block Diagrams

Industrial, Home Applications

④ Printer (2)



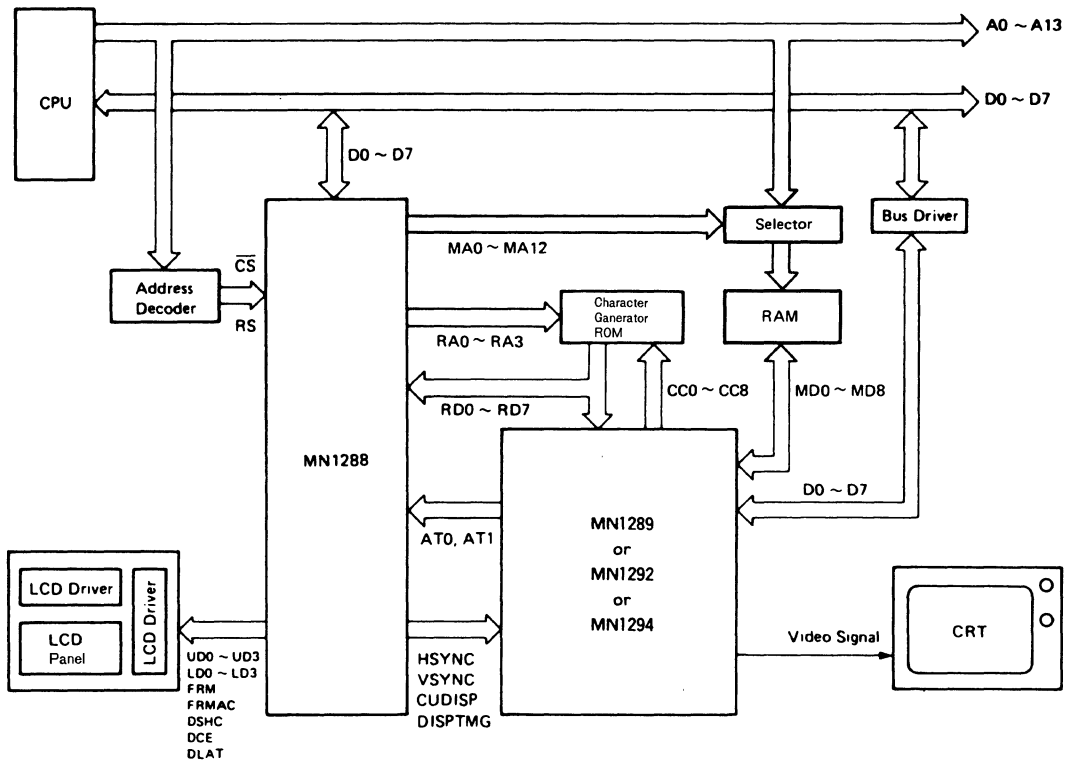
⑤ Floppy Disc Drive



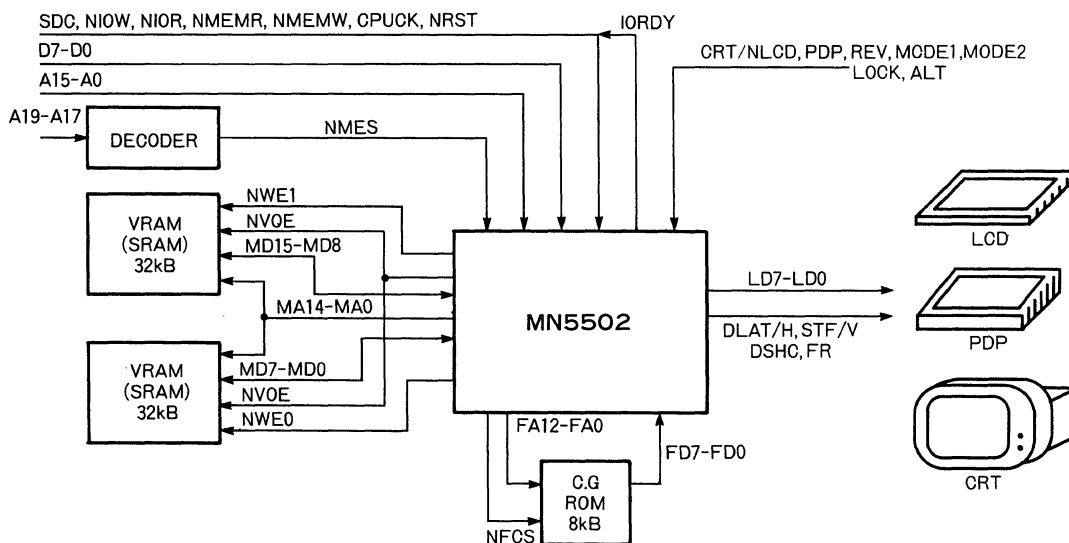
Application Block Diagrams

Industrial, Home Applications

⑥ LCD/CRT Display for Personal Computer, Word Processor
(MN1288+MN1289 (MN1292, MN1294)-cored System Block Diagram)



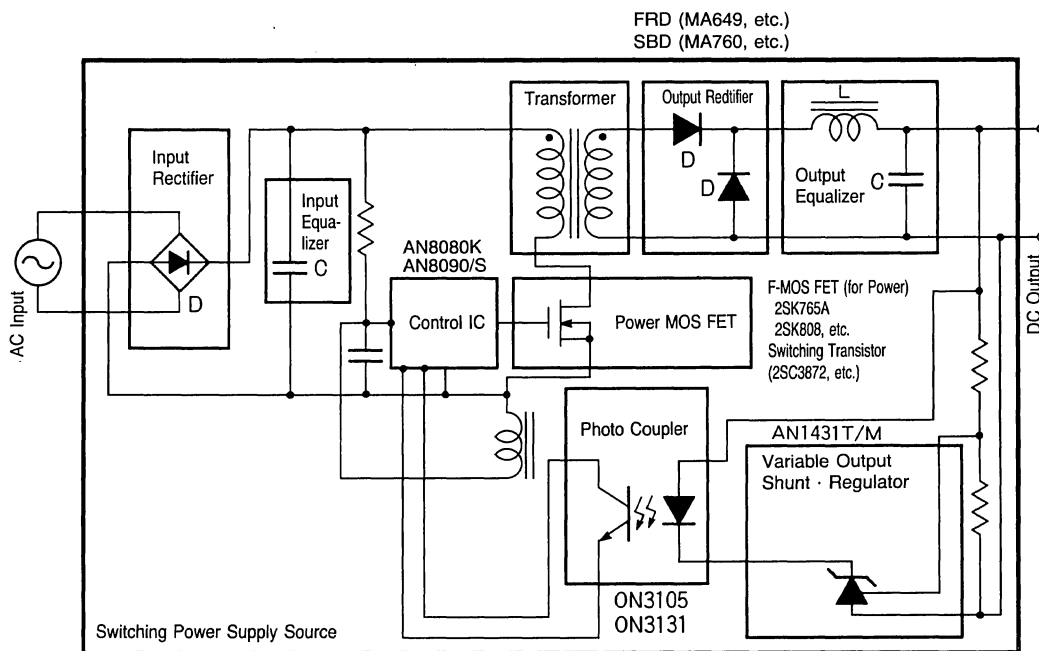
⑦ LCD/PDP/CRT Display for Personal Computer · Word Processor
(MN5502-cored System Block Diagram)



Application Block Diagrams

Industrial, Home Applications

⑧ Switching Power Supply



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Microcomputers

■ 4-Bit One Chip Microcomputers, MN1500 Family

Category	Type No.	Process	ROM (K Byte)	RAM (4×Bit)	Input/ Output (Lines)	Speed (μs)	Supply Voltage (typ.) (V)	Package		Piggy- back	Remarks
									No.		
General Purpose	MN1550	CMOS	0.5	16	12	2	4.5~5.5	18-DIP SO-18D	L10 L49	EP1550	
	MN1551A		1	96	23	1	4.5~5.5	28-SDIP	L26	EP1551A	LED Driver
	MN15514		1	48	11	$\frac{2}{8}$	$\frac{4.5}{2.5}$ ~ $\frac{5.5}{5.5}$	18-DIP SO-18D	L10 L49	EP15514	
	MN15522		2	128	23	2	3.0~5.5	28-SDIP	L26	EP15522	LED Driver
	MN1554		4	256	51	2	3.0~5.5	64-SDIP/ QFP	L30 L59, L60	EP1554	
	MN15542		4	256	34	2	3.0~5.5	42-SDIP/ QFP	L28 L57	EP15542	
	MN15543		4	192	32	2	4.5~6.5	42-SDIP/ QFP	L28 L57	EP15543	LED Driver
Analog Input Comparator & A/D Converter	MN158461	CMOS	4	168	51	2.23	3.0~5.5	64-SDIP	L30	EP158461	
	MN15864		6	256	52	1.91	3.0~5.5	64-SDIP	L30	EP15864	
	MN158481		4	256	30	$\frac{2}{8}$	$\frac{4.5}{2.5}$ ~ $\frac{5.5}{5.5}$	42-SDIP	L28	EP158481	LED Driver
	MN158281		2	128	23	$\frac{1.91}{7.64}$	$\frac{4.5}{2.5}$ ~ $\frac{5.5}{5.5}$	28-SDIP	L26	EP158281	
	△MN158486		4	128	23	$\frac{1.91}{7.64}$	$\frac{4.5}{2.5}$ ~ $\frac{5.5}{5.5}$	28-SDIP	L26	EP158486	
LCD Drive	MN158414	CMOS	4	768	36	$\frac{2}{8}$	$\frac{4.5}{2.5}$ ~ $\frac{5.5}{5.5}$	84-QFP	L61	EP158814	
	MN158614		6	1280	36	$\frac{2}{8}$	$\frac{4.5}{2.5}$ ~ $\frac{5.5}{5.5}$	84-QFP	L61	EP158814	
	MN158814		8	1280	36	$\frac{2}{8}$	$\frac{4.5}{2.5}$ ~ $\frac{5.5}{5.5}$	84-QFP	L61	EP158814	
	MN157451A		4	256	24	2	4.5~6.5	64-SDIP/ QFP	L30 L59	EP157451A	
	MN158631		6	488	19	1.91	4.5~5.5	64-SDIP	L30	EP158631	
	MN158453		4	256	16	8	2.2~5.5	64-QFP	L60	EP158453	Remote Control Output
	MN1584531		4	256	20	4	2.0~5.5	64-QFP	L60	EP1584531	Remote Control Output
	MN158851		8	256	30	$\frac{2}{8}$	$\frac{4.5}{2.5}$ ~ $\frac{5.5}{5.5}$	84-QFP	L61	EP158851	
LED Drive	MN15283A	CMOS	8	572	26	$\frac{1.91}{122}$	$\frac{4.0}{3.0}$ ~ $\frac{5.5}{5.5}$	64-SDIP/ QFP	L30 L59	EP15283	FL Driver
	MN1551A		1	96	23	1	4.5~5.5	28-SDIP	L26	EP1551A	
	MN15522		2	128	23	2	3.0~5.5	28-SDIP	L26	EP15522	
	MN15543		4	192	32	2	4.5~6.5	42-SDIP/ QFP	L28 L57	EP15543	
	MN158481		4	256	30	$\frac{2}{8}$	$\frac{4.5}{2.5}$ ~ $\frac{5.5}{5.5}$	42-SDIP	L28	EP158481	A/D converter
	MN158414		4	768	36	$\frac{2}{8}$	$\frac{4.5}{2.5}$ ~ $\frac{5.5}{5.5}$	84-QFP	L61	EP158814	LCD Drive DTMF Function
	MN158614		6	1280	36	$\frac{2}{8}$	$\frac{4.5}{2.5}$ ~ $\frac{5.5}{5.5}$	84-QFP	L61	EP158814	LCD Drive DTMF Function
	△MN158814		8	1280	36	2	4.5~5.5	84-QFP	L61	EP158814	LCD Drive DTMF Function
FL Drive	MN15283A	CMOS	8	572	26	$\frac{1.91}{122}$	$\frac{4.0}{3.0}$ ~ $\frac{5.5}{5.5}$	64-SDIP/ QFP	L30 L59	EP15283	LED Driver
	MN158682		6	320	20	1.91	4.5~5.5	52-SDIP	L29	EP158882	
	△MN158882		8	384	20	1.91	4.5~5.5	52-SDIP	L29	EP158882	(Under Development)
Remote Control Combination	MN15814	CMOS	1	32	18	17.6	2.0~3.5	28-SDIP SO-24D	L26 L52	—	Table ROM Built-in 256×4 bit
	MN158453		4	256	16	8	2.2~5.5	64-QFP	L60	EP158453	
	MN1584531		4	256	20	4	2.0~5.5	64-QFP	L60	EP1584531	
Combination for Telephone	MN15834A	CMOS	3	640	29	$\frac{2.23}{8}$	$\frac{4.5}{2.5}$ ~ $\frac{5.5}{5.5}$	42-SDIP	L28	EP15834	
	MN158341		3	1280	29	$\frac{2.23}{8}$	$\frac{4.5}{2.5}$ ~ $\frac{5.5}{5.5}$	42-SDIP	L28	EP15834	
	MN158412		4	1280	29	$\frac{2.23}{8}$	$\frac{4.5}{2.5}$ ~ $\frac{5.5}{5.5}$	42-SDIP/ QFP	L28 L57	EP15834	
	MN158413		4	768	30	$\frac{2.23}{8}$	$\frac{4.5}{2.5}$ ~ $\frac{5.5}{5.5}$	42-SDIP/ QFP	L28 L57	EP158413	
	MN158414		4	768	36	$\frac{2}{8}$	$\frac{4.5}{2.5}$ ~ $\frac{5.5}{5.5}$	84-QFP	L61	EP158814	LCD Driver
	MN158614		6	1280	36	$\frac{2}{8}$	$\frac{4.5}{2.5}$ ~ $\frac{5.5}{5.5}$	84-QFP	L61	EP158814	LCD Driver
	△MN158814		8	1280	36	$\frac{2}{8}$	$\frac{4.5}{2.5}$ ~ $\frac{5.5}{5.5}$	84-QFP	L61	EP158814	LCD Driver

△ Under Development

(Package Symbol) DIP=Dual-In-Line Plastic Package, SDIP=Shrunk Dual-In-Line Plastic Package
QFP=Quad Flat Package, SO=Small Outline, 18D=18 Pin Dual-In-Line (Example)

Microcomputers

■ 4-Bit One Chip Microcomputers, MN1500 Family (continued)

Category	Type No.	Process	ROM (K Byte)	RAM (Bit)	Input/ Output (Lines)	Speed (μ s)	Supply Voltage (typ.) (V)	Package		Piggy- back	Remarks
								No.			
Channel Selection	MN15222	Bi CMOS	2	96	9	2	4.5~5.5	28-SDIP	L26	EP15222	Bi-CMOS Process
	MN15224		2	96	12	2	4.5~5.5	28-SDIP	L26	EP15224	Bi-CMOS Process
	MN15287	C M O S	8	320	38	2	4.5~5.5	52-SDIP	L29	EP15287	
	MN15288		8	320	48	2	4.5~5.5	64-SDIP/ QFP	L30 L59	EP15288	
	MN152121		12	488	48	2	4.5~5.5	64-SDIP	L30	EP152121	

■ 4-Bit One Chip Microcomputers, MN1700 Family

Category	Type No.	Process	ROM (Byte)	RAM (Bit)	Input/ Output (Lines)	Speed (μ s)	Supply Voltage (V)	Package		Piggy- back	Remarks
								No.			
High Speed and Performance	MN17521	C M O S	2	128(+s96)	38	1 2	4.5~5.5 2.7~5.5	44-QFP	L58	EP17516	
	MN17541		4	256(+s96)	49	1 244	4.5~5.5 3.0~5.5	64-SDIP/ QFP	L30 L59	EP17516	
	MN17581		8	512(+s96)	49	1 244	4.5~5.5 3.0~5.5	64-SDIP/ QFP	L30 L59	EP17516	
	Δ MN170401		4	256(+s96)	44	0.5 92	4.5~5.5 3.0~5.5	64-SDIP/ QFP	L30 L59,L60	EP171601	
	Δ MN170801		8	512(+s96)	44	0.5 92	4.5~5.5 3.0~5.5	64-SDIP/ QFP	L30 L59,L60	EP171601	
	Δ MN171601		16	896(+s96)	44	0.5 92	4.5~5.5 3.0~5.5	64-SDIP/ QFP	L30 L59,L60	EP171601	
	MN178122		2	512(+s96)	15	1 244	4.5~5.5 3.0~5.5	64-SDIP/ QFP	L30 L59,L60	EP178122	
	MN178611		2	384(+s96)	26	1 244	4.5~5.5 3.0~5.5	84-QFP	L61	EP178611	
EPROM Version	MN17P58	CMOS	8	512	52	1	4.5~5.5	64-SDIC 64-SDIP/QFP	— L30,L59	—	EPROM built-in Version One Time Version

※ S: Stack

■ 8-Bit One Chip Microcomputers, MN1870 Family

Category	Type No.	Process	ROM (K Byte)	RAM (Bit)	Input/ Output (Lines)	Speed (μ s)	Supply Voltage (V)	Package		Piggy- back	Remarks
								No.			
General Use	MN18788	CMOS	8	2048	56	0.95 122	4.5~5.5 2.7~5.5	64-SDIP / QFP	L30 L60	EP18788	
A/D Input	MN1871610	C M O S	16	1024	59	0.475 122	4.5~5.5 2.7~5.5	100-QFP	L62	EP1873210	
	MN187167		16	320	38	0.95 122	4.5~5.5 2.7~5.5	64-SDIP / QFP	L30 L60	EP187167	
FL Drive	MN187124	C M O S	12	384	21	0.475 122	4.5~5.5 2.7~5.5	64-SDIP	L30	EP187324	
	MN187125		12	320	21	0.475 122	4.5~5.5 2.7~5.5	64-SDIP	L30	EP187324	
	MN187204		20	640	21	0.475 122	4.5~5.5 2.7~5.5	64-SDIP	L30	EP187324	
	MN187167		16	320	38	0.95 122	4.5~5.5 2.7~5.5	64-SDIP / QFP	L30 L60	EP187167	
LCD Drive	MN18762	C M O S	6	256	45	0.95 122	4.5~5.5 2.4~5.5	84-QFP	L61	EP18782	
	MN1871610		16	1024	59	0.475 122	4.5~5.5 2.7~5.5	100-QFP	L62	EP1873210	
LED Drive	MN18762	CMOS	6	256	45	0.95 122	4.5~5.5 2.4~5.5	84-QFP	L61	EP18782	
Remote Control Combination	MN18788	C M O S	8	2048	56	0.95 122	4.5~5.5 2.7~5.5	64-SDIP QFP	L30 L60	EP18788	
	MN1871610		16	1024	59	0.475 122	4.5~5.5 2.7~5.5	100-QFP	L62	EP1873210	
	MN187124		12	384	21	0.475 122	4.5~5.5 2.7~5.5	64-SDIP	L30	EP187324	
	MN187125		12	320	21	0.475 122	4.5~5.5 2.7~5.5	64-SDIP	L30	EP187324	
	MN187204		20	640	21	0.475 122	4.5~5.5 2.7~5.5	64-SDIP	L30	EP187324	
	MN18762		6	256	45	0.95 122	4.5~5.5 2.4~5.5	84-QFP	L61	EP18782	
Channel Selection Combination	Δ MN1872012	C M O S	20	320	30	0.667	4.5~5.5 3.0~5.5	64-SDIP	L30	EP1872012	
	Δ MN1872013		20	320	39	1.00	4.5~5.5 3.0~5.5	64-SDIP	L30	EP1872013	

(Package Symbol) SDIP=Shrunk Dual-In-Line Plastic Package, SDIC=Shrunk Dual-In-Line Ceramic Package
QFP=Quad Flat Package

Microcomputers

■ 8-Bit One Chip Microcomputers, MN1880 Family

Category	Type No.	Process	ROM (K Byte)	RAM (Bit)	Input/ Output (Lines)	Speed (μ s)	Supply Voltage (V)	Package		Piggy- back	Remarks
								No.	No.		
Consumer and Industrial Use	MN18801A	CMOS	External 2MB	External 2MB	59	0.4975 122	4.5~5.5 3.0~5.5	100-QFP	L62	MN18801A	
	MN18802A		External 1MB	External 1MB	53	0.4975	4.5~5.5	84-QFP	L61	MN18802A	
	MN18804A		External 128KB	External 128KB	45	0.4975	4.5~5.5	84-QFP	L61	MN18804A	
	MN18806		External 2MB	External 2MB	56	0.4975	4.5~5.5	100-QFP	L62	MN18805	
	MN18881		8	256	56	0.4975 122	4.5~5.5 3.0~5.5	64-SDIP	L30	EP18881	
	MN18884		8	256	45	0.4975	4.5~5.5	64-SDIP/ QFP	L30 L60	EP18884	A/D Input
	MN18885		8	256	60	0.4975 122	4.5~5.5 3.0~5.5	84-QFP	L61	EP18885	A/D Input
	MN18888		8	256	45	0.4975	4.5~5.5	64-SDIP/ QFP	L30 L59, L60	EP18888	A/D Input
	MN188161		16	640	56	0.4975 122	4.5~5.5 3.0~5.5	64-SDIP	L30	EP188161	
	MN188166		16	384	69	0.4975 122	4.5~5.5 3.0~5.5	84-QFP	L61	EP188166	A/D Input
	MN188167		16	384	62	0.4975 122	4.5~5.5 3.0~5.5	76-SDIP	L31	EP188167	A/D Input
	MN188321		32	448	56	0.4975 122	4.5~5.5 3.0~5.5	64-SDIP/ QFP	L30 L59	EP188321	
	MN188322		32	448	81	0.4975 122	4.5~5.5 3.0~5.5	100-QFP	L62	—	
EPROM Version	MN18P888	CMOS	8	256	45	0.4975	4.5~5.5	64-SDIP/QFP(a) 64-SDIC/QFC	L30, L59 —, —	—	One Time Version EPROM Built-in Version
	MN18P8166		16	384	77	0.4975 122	4.5~5.5 3.0~5.5	84-QFP/ QFC	L61 —	—	One Time Version EPROM Built-in Version
	MN18P832		32	448	56	0.4975 122	4.5~5.5 3.0~5.5	64-SDIP/QFP 64-SDIP/QFC	L30, L59 —, —	—	One Time Version EPROM Built-in Version

■ 16-Bit Microprocessors, MN1600 Family

Category	Type No.	Process	Functions	Package	No.
High Speed and Performance	MN1617A	CMOS	16-bit CPU, Memory Space 8M-byte, Instruction Execution Speed: 167ns	64-QFP(b)	L60

■ Digital Signal Processors (DSP), MN1900 Family

Category	Type No.	Process	ROM (K Byte)	RAM (Bit)	Input/ Output (Lines)	Speed (μ s)	Supply Voltage (V)	Package		Piggy- back	Remarks
								No.	No.		
MN1900 Series	MN1901	CMOS	2	66	3	0.25 160	4.5~5.5 3.5~5.5	84-QFP	L61	MN1909	
	MN1902		3	66	3	0.25 160	4.5~5.5 3.5~5.5	84-QFP	L61	MN1909	
	MN1902A		3	66	3	0.1 160	4.5~5.5 3.5~5.5	84-QFP	L61	MN1909A	High-Speed Version of MN1902
	MN1909		External 8	66	3	0.25 160	4.5~5.5 3.5~5.5	144-PGA	L66	MN1909	
	MN19011		2	258+512	3	0.2 160	4.5~5.5 3.5~5.5	84-QFP	L61	MN19091	
	MN19041		4	258+512	3	0.2 160	4.5~5.5 3.5~5.5	84-QFP	L61	MN19091	
	MN19041A		4	258+512	3	0.1 160	4.5~5.5 3.5~5.5	84-QFP	L61	MN19091A	High-Speed Version of MN19041
	MN19091		External 8	258+512	3	0.2 160	4.5~5.5 3.5~5.5	144-PGA	L66	MN19091	
	MN19091A		External 8	258+512	3	0.1 160	4.5~5.5 3.5~5.5	144-PGA	L66	MN19091A	High-Speed Version of 19091
MN1910 Series	MN1911	CMOS	2 *1	256+288	3	0.1	4.75~5.5	84-QFP	L61	MN1911	
MN1920 Series	△MN1920	CMOS	4 *2	514+1024*3	4	0.08	4.5~5.5	124-QFP	L63	—	

△ Under Development *1 (K×16 Bit) *2 (K×40 Bit) *3 (×24 Bit)

(Package Symbol) SDIP=Shrunk Dual-In-Line Plastic Package, QFP=Quad Flat Package
SDIC=Shrunk Dual-In-Line Ceramic Package, QFC=Quad Flat Ceramic Package

Peripheral LSIs

Microcomputer Peripheral LSIs

Category	Type No.	Process	Functions	Supply Voltage (V)	Package	No.
						No.
I/O Controller	MN1881	CMOS	MN1880/1890 Series I/O Extend LSI	+5	64-SDIP	L30
LCD Driver	MN1256	CMOS	8 digits 7 segments. FEM Type liquid crystal display	-5, -2.5	40-QFP(a)	L55
	MN1258		180 segments driver for Dot Matrix LCD panel	+5, -20	Chip	—
	MN1259		Display of 60 characters (5 rows×12 characters) 44 kinds. 5×7 dot display, with shadow.	+5	Chip	—
CRT Interface	MN128721	CMOS	On screen display for VCR (Built-in NTSC Sync. Signal generator and Analog SW.)	5 (typ)	22-DIP	L15
	MN1297		Display of 126 characters (7 rows×18 characters) 128 kinds. 7×11 dot display, with shadow, Chinese character display possible	+5	28-SDIP 42-QFP	L26 L57
	MN12972		Display of 54 characters (7 rows×18 characters) 128 kinds. 7×11 dot display. CRT display with I ² C bus.	+5	42-QFP	L57
	△MN12873		Display of 288 characters (12 rows×24 characters) 128 kinds. 24×18 dot display, with scrole function.	+5	42-QFP	L57
LCD/CRT Interface	MN1288	CMOS	CRT/LCD Controller LSI	+5	84-QFP	L61
	MN1289		Color graphic adaptor (CGA), 640×200 dot	+5	100-QFP	L62
	MN1292		Monochrome display adaptor (MDA). 720×350 dot	+5	100-QFP	L62
	MN1294		Color graphic adaptor (CGA). Gradation available	+5	124-QFP	L63
	MN5502		One chip LCD/PDP/CRT control LSI. Max. 720×512 dot.	+5	124-QFP	L63
Remote Control Transmitter	MN6011	CMOS	64 commands (fixed) + 32 unified commands (ROM)	+3	22-SDIP	L25
	MN60111		64 commands (fixed) + 32 unified commands (ROM)	+3	22-SDIP	L25
	MN6014/S		32 commands (ROM)	+3	18-DIP(c) SO-18D	L12 L49
	MN6016/S		72 commands (ROM)	+3	28-SDIP SO-24D	L26 L52
	MN6017/S		64 commands (ROM)	+3	22-SDIP SO-22D	L25 L51
LSI for Voltage Detection	MN1280	CMOS	LSI for voltage detection	+2.0~+4.9	M type	L43
	MN12801		LSI for voltage detection (Open collector Type)	+2.0~+4.9	M type	L43
	MN12802		LSI for voltage detection (CMOS Output inversion type)	+2.0~+4.9	M type	L43
	MN1281		LSI for voltage detection (CMOS Output type)	+2.0~+4.9	TO-92 type	L45
	MN12811		LSI for voltage detection (N-ch Open drain type)	+2.0~+4.9	TO-92 type	L45
	MN12812		LSI for voltage detection (CMOS Output inversion type)	+2.0~+4.9	TO-92 type	L45
	MN1282		LSI for voltage detection (CMOS Output type)	+2.0~+4.9	Mini 3P	L44
	MN12821		LSI for voltage detection (N-ch Open drain type)	+2.0~+4.9	Mini 3P	L44
	MN12822		LSI for voltage detection (CMOS Output inversion type)	+2.0~+4.9	Mini 3P	L44

16-Bit Microprocessor Peripheral LSIs

Category	Type No.	Process	Functions	Package	No.
16-Bit Peripheral LSIs	MN12861	CMOS	Clock Generator, Timer/Counter, Programmable I/O, Interrupt Controller	100-QFP	L62
	MN12862		Clock Generator, Timer/Counter, DMAC, Interrupt Controller	100-QFP	L62

(Package Symbol) DIP=Dual-In-Line Plastic Package, SDIP=Shrunk Dual-In-Line Plastic Package
QFP=Quad Flat Package, SO=Small Outline, 18D=18 Pin Dual-In-Line (Example)

MOS Memories

Dynamic RAMs

Memory size (bit)	Type No.	Memory Composition [Word×bit]	Access Time max. (ns)	Cycle Time min. (ns)	Supply Voltage (V)	Power Consumption max. (mW)		Package		Process	Remarks	
						Operating	Stand-by	No.	No.			
256K	MN41256A-08	262,144×1	80	160	5	440	16.5	16-DIP(c)	M9	NMOS	<ul style="list-style-type: none"> • Page mode • CAS before RAS refresh • RAS only refresh • Hidden refresh 	
	MN41256AJ-08							M26				
	MN41256AL-08							M2				
	MN41257A-08	262,144×1	80	160	5	440	16.5	16-DIP(c)	M9	NMOS	<ul style="list-style-type: none"> • Nibble mode • CAS before RAS refresh • RAS only refresh • Hidden refresh 	
	MN41257AJ-08							M26				
	MN41257AL-08							M2				
	MN41464A-08	65,536×4	80	160	5	440	16.5	18-DIP(a)	M10	NMOS	<ul style="list-style-type: none"> • Page mode • CAS before RAS refresh • RAS only refresh • Hidden refresh 	
	MN41464AJ-08							M26				
	MN41464AL-08							M3				
MN41464AZ-08	M4											
1 M	MN41C1000-08	1,048,576×1	80	160	5	385	0.28 (CMOS level)	18-DIP(c)	M12	CMOS	<ul style="list-style-type: none"> • High-speed page mode • CAS before RAS refresh • RAS only refresh • Hidden refresh 	
	MN41C1000SJ-08							M22				
	MN41C1000L-08							M4				
	MN41C1002-08	1,048,576×1	80	160	5	385	0.28 (CMOS level)	18-DIP(c)	M12	CMOS	<ul style="list-style-type: none"> • Static column mode • CAS before RAS refresh • RAS only refresh • Hidden refresh 	
	MN41C1002SJ-08							M22				
	MN41C1002L-08							M4				
	△MN41C1000A-06	1,048,576×1	60	120	5	440	0.28 (CMOS level)	18-DIP(c)	M12	CMOS	<ul style="list-style-type: none"> • High-speed page mode • CAS before RAS refresh • RAS only refresh • Hidden refresh 	
	△MN41C1000A-07		70	140								413
	△MN41C1000A-08		80	160								385
	△MN41C1000ASJ-06		60	120	440	SOJ-26/20D		M22				
	△MN41C1000ASJ-07		70	140	413							
	△MN41C1000ASJ-08		80	160	385							
	△MN41C1000AL-06		60	120	440	20-ZIP		M4				
	△MN41C1000AL-07		70	140	413							
	△MN41C1000AL-08		80	160	385							
	MN41C1002A-06	1,048,576×1	60	120	5	440	0.28 (CMOS level)	18-DIP(c)	M12	CMOS	<ul style="list-style-type: none"> • Static column mode • CAS before RAS refresh • RAS only refresh • Hidden refresh 	
	MN41C1002A-07		70	140								413
	MN41C1002A-08		80	160								385
	MN41C1002ASJ-06		60	120	440	SOJ-26/20D		M22				
	MN41C1002ASJ-07		70	140	413							
	MN41C1002ASJ-08		80	160	385							
MN41C1002AL-06	60		120	440	20-ZIP	M4						
MN41C1002AL-07	70		140	413								
MN41C1002AL-08	80		160	385								
MN42C1000SJ-08	1,048,576×1	80	160	5	385	0.28 (CMOS level)	SOJ-26/20D	M22	CMOS	<ul style="list-style-type: none"> • High-speed page mode • RAS only refresh • Hidden refresh • CAS before RAS refresh • CAS before RAS self refresh 		
△MN42C1000ASJ-06		60	120								440	
△MN42C1000ASJ-07		70	140								413	
△MN42C1000ASJ-08		80	160								385	
MN41C4256-08	262,144×4	80	160	5	413	0.28 (CMOS level)	20-DIP(a)	M13	CMOS	<ul style="list-style-type: none"> • High-speed page mode • CAS before RAS refresh • RAS only refresh • Hidden refresh 		
MN41C4256SJ-08							M22					
MN41C4256L-08							M4					

△ Preliminary

(Package Symbol) DIP=Dual-In-Line Plastic Package, ZIP=Zigzag Type Single-In-Line Plastic Package,
 PLCC=Plastic Leaded Chip Carrier, SOJ=Small-Outline Package (Wide-type)
 SOJ=Small-Outline-J Bend Package

MOS Memories

■ Dynamic RAMs (continued)

Memory size (bit)	Type No.	Memory Composition [Word×bit]	Access Time max. (ns)	Cycle Time min. (ns)	Supply Voltage (V)	Power Consumption max. (mW)		Package No.	Process	Remarks				
						Operating	Stand-by							
1 M	MN41C4258-08	262, 144 × 4	80	160	5	413	0.28 (CMOS level)	20-DIP(a)	M13	CMOS	<ul style="list-style-type: none"> • Static column mode • CAS before RAS refresh • RAS only refresh • Hidden refresh 			
	MN41C4258SJ-08							SOJ-26/20D	M22					
	MN41C4258L-08							20-ZIP	M4					
	MN41C4256A-06	262, 144 × 4	60	120	5	440	0.28 (CMOS level)	20-DIP(a)	M13	CMOS	<ul style="list-style-type: none"> • High-speed page mode • CAS before RAS refresh • RAS only refresh • Hidden refresh 			
	MN41C4256A-07											70	140	413
	MN41C4256A-08											80	160	385
	MN41C4256ASJ-06											60	120	440
	MN41C4256ASJ-07											70	140	413
	MN41C4256ASJ-08											80	160	385
	MN41C4256AL-06											60	120	440
	MN41C4256AL-07											70	140	413
	MN41C4256AL-08											80	160	385
	MN41C4258A-06	262, 144 × 4	60	120	5	440	0.28 (CMOS level)	20-DIP(a)	M13	CMOS	<ul style="list-style-type: none"> • Static column mode • CAS before RAS refresh • RAS only refresh • Hidden refresh 			
	MN41C4258A-07											70	140	413
	MN41C4258A-08											80	160	385
	MN41C4258ASJ-06											60	120	440
	MN41C4258ASJ-07											70	140	413
	MN41C4258ASJ-08											80	160	385
MN41C4258AL-06	60											120	440	
MN41C4258AL-07	70	140	413											
MN41C4258AL-08	80	160	385											
MN42C4256SJ-08	262, 144 × 4	80	160	5	413	0.28 (CMOS level)	SOJ-26/20D	M22	CMOS	<ul style="list-style-type: none"> • High-speed page mode • RAS only refresh • Hidden refresh • CAS before RAS auto refresh • CAS before RAS self refresh 				
ΔMN42C4256ASJ-06	262, 144 × 4	60	120	5	440	0.28 (CMOS level)	SOJ-26/20D	M22	CMOS					
ΔMN42C4256ASJ-07		70	140		413									
ΔMN42C4256ASJ-08		80	160		385									
4 M	ΔMN41C4000-08	4, 194, 304 × 1	80	160	5	467.5	0.55 (CMOS level)	18-DIP(b)	M11	CMOS	<ul style="list-style-type: none"> • High-speed page mode • CAS before RAS refresh • RAS only refresh • Hidden refresh 			
	ΔMN41C4000-10		100	190		412.5								
	ΔMN41C4000SJ-08		80	160		467.5								
	ΔMN41C4000SJ-10		100	190		412.5								
	ΔMN41C4000L-08		80	160		467.5								
	ΔMN41C4000L-10	100	190	412.5										
	ΔMN41C4001-08	4, 194, 304 × 1	80	160	5	467.5	0.55 (CMOS level)	20-DIP(a)	M13	CMOS	<ul style="list-style-type: none"> • Nibble mode • CAS before RAS refresh • RAS only refresh • Hidden refresh 			
	ΔMN41C4001-10		100	190		412.5								
	ΔMN41C4001SJ-08		80	160		467.5								
	ΔMN41C4001SJ-10		100	190		412.5								
	ΔMN41C4001L-08	80	160	467.5										
	ΔMN41C4001L-10	100	190	412.5										
	ΔMN41C4002-08	4, 194, 304 × 1	80	160	5	467.5	0.55 (CMOS level)	20-DIP(a)	M13	CMOS	<ul style="list-style-type: none"> • Static column mode • CAS before RAS refresh • RAS only refresh • Hidden refresh 			
	ΔMN41C4002-10		100	190		412.5								
ΔMN41C4002SJ-08	80		160	467.5										
ΔMN41C4002SJ-10	100		190	412.5										
ΔMN41C4002L-08	80		160	467.5										
ΔMN41C4002L-10	100	190	412.5											

Δ Preliminary

(Package Symbol) DIP=Dual-In-Line Plastic Package, ZIP=Zigzag Type Single-In-Line Plastic Package
SOJ=Small-Outline -J Bend Package

MOS Memories

■ Dynamic RAMs (continued)

Memory size (bit)	Type No.	Memory Composition [Word×bit]	Access Time max. (ns)	Cycle Time min. (ns)	Supply voltage (V)	Power Consumption max. (mW)		Package		Process	Remarks			
						Operating	Stand-by	No.						
4 M	△MN41C41000-08	1,048,576×4	80	160	5	467.5	0.55 (CMOS level)	20-DIP(a)	M13	CMOS	<ul style="list-style-type: none"> • High-speed page mode • CAS before RAS refresh • RAS only refresh • Hidden refresh 			
	△MN41C41000-10		100	190		412.5		SOJ-26/20D	M22					
	△MN41C41000SJ-08		80	160		467.5		20-ZIP	M4					
	△MN41C41000SJ-10		100	190		412.5								
	△MN41C41000L-08		80	160		467.5		20-DIP(a)	M13					
	△MN41C41000L-10		100	190		412.5								
	△MN41C41002-08		80	160		467.5		0.55 (CMOS level)	CMOS			<ul style="list-style-type: none"> • Static column mode • CAS before RAS refresh • RAS only refresh • Hidden refresh 		
	△MN41C41002-10		100	190		412.5							20-DIP(a)	M13
	△MN41C41002SJ-08		80	160		467.5							SOJ-26/20D	M22
	△MN41C41002SJ-10		100	190		412.5								
△MN41C41002L-08	80	160	467.5	20-ZIP	M4									
△MN41C41002L-10	100	190	412.5											

△ Preliminary

■ Dynamic RAM for Video

Memory size (bit)	Type No.	Memory Composition [Word×bit]	Access Time max. (ns)	Cycle Time min. (ns)	Supply voltage (V)	Power Consumption max. (mW)		Package		Process	Remarks
						Operating	Stand-by	No.			
10K	MN4760S	1,135×9	50	50	5	495	—	SOW-28D	M24	NMOS	• Line memory
21.6K	MN4780AK	920×12×2	50	33	5	495	—	40-SDIP	M19	NMOS	
1M	MN4700	262,144×4	20	30	5	825	110	40-DIP(b)	M17	NMOS	• Field memory
	MN4700K							40-SDIP	M19		
	MN4700F							64-QFP(a)	M25		
1.3M	MN4701F	327,680×4	20	30	5	825	110	64-QFP(a)	M25	NMOS	• Field memory

■ Dynamic RAM for Image Signal

Memory size (bit)	Type No.	Memory Composition [Word×bit]	Access Time max. (ns)	Cycle Time min. (ns)	Supply voltage (V)	Power Consumption max. (mW)		Package		Process	Remarks	
						Operating	Stand-by	No.				
256K	MN47464L-12	65,536×4	RAM Port 120 SAM Port 40	220 40	5	523 275	110	24-ZIP	M5	NMOS	• Multi port memory	
1M	△MN47C4256L-10	262,144×4	RAM/SAM Port 100/25 120/35	190/30	5	550	16.5	28-ZIP	※	CMOS	• Multi port memory	
	△MN47C4256L-12			220/40		495						
	△MN47C4256SJ-10			100/25		190/30		550	SOJ-28D			※
	△MN47C4256SJ-12			120/35		220/40		495				
	△MN47C8128SJ-10	131,072×8	100/25 120/35	190/30	5	550	16.5	SOJ-40D	※	CMOS	• Multi port memory	
	△MN47C8128SJ-12			220/40		495						

△ Preliminary * Package under development

■ Static RAMs

Memory size (bit)	Type No.	Memory Composition [Word×bit]	Access Time max. (ns)	Cycle Time min. (ns)	Supply voltage (V)	Power Consumption max. (mW)		Package		Process	Remarks
						Operating	Stand-by	No.			
64K	MN4464-08L	8,192×8	80	80	5	165*	0.55	28-DIP(b)	M15	Peripheral CMOS	
	MN4464-08LL		80	80			0.055				
	MN4464S-08L		80	80			0.55	SOW-28D	M24		
	MN4464S-08LL		80	80			0.055				

* Min. cycle operation

(Package Symbol) DIP=Dual- In- Line Plastic Package, SDIP=Shrunk Dual- In- Line Plastic Package
 ZIP=Zigzag Type Single- In- Line Plastic Package, QFP=Quad Flat Package
 SOW=Small- Outline Package (Wide-type), SOJ=Small- Outline- J Bend Package

MOS Memories

■ Static RAMs (continued)

Memory size (bit)	Type No.	Memory Composition [Word×bit]	Access Time max. (ns)	Cycle Time min. (ns)	Supply voltage (V)	Power Consumption max. (mW)		Package		Process	Remarks
						Operating	Stand-by	No.	No.		
256 K	MN44256-10L	32,768×8	100	100	5	165*	0.55	28-DIP(b)	M15	Peripheral CMOS	
	MN44256-10LL		100	100			0.22				
	MN44256S-10L		100	100			0.55	SOW-28D	M24		
	MN44256S-10LL		100	100			0.22				
	△MN44251-015	32,768×8	15	15	5	660*	0.55	28-Skiny	※	Peripheral CMOS	
	△MN44251-020		20	20							
	△MN44251-025		25	25							
	△MN44251SJ-015		15	15				SOJ-28D	※		
	△MN44251SJ-020	20	20								
	△MN44251SJ-025	25	25								
	△MN44252-015	65,536×4	15	15	5	660*	0.55	24-Skiny	※	Peripheral CMOS	
	△MN44252-020		20	20							
	△MN44252-025		25	25							
	△MN44252SJ-015		15	15				SOJ-24D	※		
	△MN44252SJ-020	20	20								
	△MN44252SJ-025	25	25								
△MN44253-015	262,144×1	15	15	5	660*	0.55	24-Skiny	※	Peripheral CMOS		
△MN44253-020		20	20								
△MN44253-025		25	25								
△MN44253SJ-015		15	15				SOJ-24D	※			
△MN44253SJ-020	20	20									
△MN44253SJ-025	25	25									

△ Preliminary * At min. cycle operation ※ Package under development

■ Mask ROMs

Memory size (bit)	Type No.	Memory Composition [Word×bit]	Access Time max. (ns)	Cycle Time min. (ns)	Supply voltage (V)	Power Consumption max. (mW)		Package		Process	Remarks
						Operating	Stand-by	No.	No.		
1 M	MN231001	131,072×8	150	150	5	550	165	28-DIP(b)	M15	NMOS	
	MN231002	16,384×8×8	200	200		550	165				
	MN231003	131,072×8	150	150		550	165	32-DIP	M16		
2 M	MN232001	262,144×8	150	150	5	550	165	32-DIP	M16	NMOS	
4 M	MN234000	524,288×8/ 262,144×16	200	200	5	220	1.1	40-DIP(b)	M17	CMOS	8/16-bit mode switchable
	MN234000F		200	200				64-QFP(a)	M25		
	MN234001		250	250	5	550	165	40-DIP(b)	M17	NMOS	
	MN234001F		250	250				64-QFP(a)	M25		
	MN234002	524,288×8	200	200	5	220	1.1	32-DIP	M16	CMOS	8-bit mode
8 M	MN238000	1,048,576×8/ 524,288×16	200	200	5	330	1.1	42-DIP	M18	CMOS	8/16-bit mode switchable
	MN238000F							42-DIP	M18		
16M	△MN2316000	2,097,152×8/ 1,048,576×16	200	200	5	330	1.1	42-DIP	M18	CMOS	8/16-bit mode switchable

△ Preliminary

(Package Symbol) DIP=Dual-In-Line Plastic Package, QFP=Quad Flat Package

SOW=Small-Outline Package (Wide-type), SOJ=Small-Outline-J Bend Package

MOS Memories

■ EPROMs

Memory size (bit)	Type No.	Memory Composition [Word×bit]	Access Time max. (ns)	Supply voltage (V)	Power Dissipation max. (mW)		Package	No.	Process	Remarks
					Operating	Stand-by				
64 K	MN27C64A-15FA	8,192×8	150	5	110	0.55 (CMOS level)	28-DIP	M20	CMOS	Manufactured by Signetics U.S.A.
256 K	MN27C256-15FA	32,768×8	150	5			28-DIP	M20	CMOS	
512 K	△MN27C512-15FA	65,536×8	150	5			28-DIP	M20	CMOS	

■ EAROMs

Memory size (bit)	Type No.	Memory Composition [Word×bit]	Access Time max. (ns)	Supply voltage (V)	Power Dissipation max. (mW)		Package	No.	Process	Remarks
					Operating	Stand-by				
32	MN1234	2×16	2	+5	165	55	8-DIP	M6	Nch MNOS	
256	MN1212A	16×16	20	+5, -5 -28	230	—	16-DIP(a)	M8	Pch MNOS	
272	MN1218A	17×16	20		350	—	18-DIP(a)	M10		
288	MN1224	18×16	20	+5, -28	231	—	16-DIP(a)	M8	Pch MNOS	
	MN1228						18-DIP(a)	M10		
304	MN12C28	19×16	10	+5	38.5	5.5	18-DIP(a)	M10	CMOS MNOS	
608	MN1219	38×16	20	+5, -28	280	—	18-DIP(a)	M10	Pch MNOS	
	MN1219S						SO-18D	M21		
	MN1225						16-DIP(a)	M8		
	MN12C25D				2	+5	38.5	5.5	9-SIP	M1
1 K	MN1231	128×8	450ns	+5, +22	298	—	14-DIP(a)	M7	Nch MNOS	
	MN1220	64×16	20	+5, -28	231	—	16-DIP(a)	M8	Pch MNOS	
	MN12C20		2	+5	38.5	1.1	9-SIP	M1	CMOS MNOS	
	MN12201		20	+5, -28	231	—	16-DIP(a)	M8	Pch MNOS	With 6-bit latch
	MN12C201D		2	+5	38.5	5.5			CMOS MNOS	With 6-bit latch
2 K	MN1226		128×16	20	+5, -28	281	—	16-DIP(a)	M8	Pch MNOS
	MN12261	297				—	CMOS MNOS			With 6-bit latch
	MN12C261D	2				+5	38.5			1.1
4 K	△MN12C401	256×16	0.9	+5	99	1.1	16-DIP(a)	M8	CMOS MNOS	With 6-bit latch

△ Preliminary MNOS=Metal Nitride-Oxide Semiconductor

(Package Symbol) DIP=Dual-In-Line Plastic Package, DIC=Dual-In-Line-Ceramic Package

SIP=Single-In-Line Plastic Package, SO=Small Outline, 18D=18 Pin Dual-In-Line (Example)

MOS Memories

Other Makers' Equivalents

Category	Memory size	Memory composition	Matsushita	NEC	Fujitsu	Hitachi	Toshiba	Mitsubishi	Oki	Remarks
Dynamic RAM	256K	262,144×1	MN41256A	μPD41256C	MB81256	HM50256	TMM41256	M5M4256	MSM41256	(Page)
		262,144×1	MN41257A	μPD41257C	MB81257	HM50257	TMM41257	M5M4257	MSM41257	(Nibble)
		65,536×4	MN41464A	μPD41464C	MB81464	HM50464	TMM41464	M5M4464		
	1M	1,048,576×1	MN41C1000	μPD421000	MB81C1000	HM511000	TC511000	M5M4C1000	MSM511000	(Fast Page)
		1,048,576×1	MN41C1002	μPD421002	MB81C1002	HM511002	TC511002	M5M4C1002	MSM511002	(Static Column)
		1,048,576×1	MN42C1000							(Low Pd Type)
		1,048,576×1	MN41C1000A							(Fast Page)
		1,048,576×1	MN41C1002A							(Static Column)
		1,048,576×1	MN42C1000A							(Low Pd Type)
		262,144×4	MN41C4256	μPD424256	MB81C4256	HM514256	TC514256	M5M44C256	MSM514256	(Fast Page)
		262,144×4	MN41C4258	μPD424258	MB81C4257	HM514258	TC514258	M5M44C258	MSM514258	(Static Column)
		262,144×4	MN42C4256							(Low Pd Type)
		262,144×4	MN41C4256A							(Fast Page)
		262,144×4	MN41C4258A							(Static Column)
	262,144×4	MN42C4256A							(Low Pd Type)	
	4M	4,194,304×1	MN41C4000							(Fast Page)
		4,194,304×1	MN41C4002							(Static Column)
		4,194,304×1	MN41C4001							(Nibble)
		1,048,576×4	MN41C41000							(Fast Page)
		1,048,576×4	MN41C41002							(Static Column)
for Video	1M	262,144×4	MN4700							
	1.3M	327,680×4	MN4701							
	10K	1,135×9	MN4760S							
	22K	920×12×2	MN4780AK							
	for Image	256K	65,536×4	MN47464L	μPD41264	MB81461	HM53461		M5M4C264	
1M		262,144×4	MN47C4256							
		131,072×8	MN47C8128							
Static RAM	64K	8,192×8	MN4464	μPD4364	MB8464	HM6264	TC5565P	M5M5165	MSM5165	
	256K	32,768×8	MN44251							
MN44252										
MN44253										
MN44256			μPD43256C	MB84256	HM62256	TC55257	M5M5256	MSM51257		
Mask RAM	1M	131,072×8	MN231001	μPD231000	MB831000	HM62301B	TC531000			
			MN231002	μPD23C10011CD						
			MN231003							
	2M	262,144×8	MN232001							
	4M	524,288×8/ 262,144×16	MN234000		MB834200	HM62404		M5M23C400		
MN234001			μPD23C4000	MB834000	HM62304	TC534000	M5M23C401			
8M	1,048,576×8/ 524,288×16	MN238000								
		MN238002								
16M	2,097,152×8/ 1,048,576×16	MN2316000	μPD23C16000							

■ CMOS Gate Arrays

● Series

Series	Delay Time ★	Functions
MN51000	2.5ns	Multi pins
MN53000	1.4ns	Ultra high speed, High integration, High drive ability (12mA)
MN55000	1.4ns	Multi-function, High speed memory built-in (RAM 2Kbit, 4Kbit)
MN56000	0.6ns	Ultra high speed, High drive ability (15mA)
MN59000	0.6ns	Ultra short delivery, Ultra high speed, High drive ability (15mA)

* F.O.=3, l=3mm for MN5100~MN54000 series, F.O.=2, l=2mm for MN56000~MN59000 series

● MN51000 Series

Type No.		MN51003	MN51005	MN51007	MN51010	MN51015	MN51020	MN51030	MN51040
Gate Size		312	520	732	1008	1530	2014	3013	4000
Max. Signal Pins	Input	46	60	70	80	96	114	140	164
	Output	46	60	70	80	96	114	140	164
	Total	46	60	70	80	96	114	140	164
Supply Pins		2	2	2	4	4	4	8	8
Package (See Package Outline)	DIP	22, 28, 40, 42	22, 28, 40, 42	22, 28, 40, 42	28, 40, 42	40, 42	40, 42	—	—
	SDIP	28, 40, 64	28, 40, 64	28, 40, 64	40, 64	40, 64	40, 64	64	64
	QFP	40, 44, 64	40, 44, 64	40, 44, 64, 84	40, 44, 64, 84	40, 64, 84, 100	40, 64, 84, 100	64, 84, 100, 124	64, 84, 100, 124
	SO	22, 28	28	—	—	—	—	—	—
	PGA	—	—	—	—	—	100, 144	100, 144, 180	100, 144, 180

● MN53000 Series

Type No.		53003	53005	53007	53010	53015	53020	53030	53040	53060	53080	53100	53150	53200	
Gate Size		315	500	732	1008	1547	2014	3164	4104	6026	8028	10000	15043	20121	
Max. Signal Pins	Input	42	50	58	64	78	90	108	124	152	180	198	238	256	
	Output	42	50	58	64	78	90	108	124	152	180	198	238	256	
	Total	42	50	58	64	78	90	108	124	152	180	198	238	256	
Supply Pins		2	2	2	4	6	4	8	8	16	16	16	20	24	
Package (See Package Outline)	DIP	16, 22, 28, 40, 42	22, 28, 40, 42	22, 28, 40, 42	22, 28, 40, 42	22, 28, 40, 42	28, 40, 42	40, 42	40, 42	—	—	—	—	—	
	SDIP	28, 40	28, 40	28, 40	28, 40, 64	28, 40, 64	40, 64	40, 64	40, 64	64, 76*	64	64	—	—	
	QFP	Sq.	40, 44	40, 44, 64	40, 44, 64	40, 44, 64	40, 44, 64, 84	40, 44, 64, 84, 100	40, 64, 84, 100, 124	40, 64, 84, 100, 124	64, 84, 100, 124, 148	64, 84, 100, 124, 148	64, 84, 100, 124, 148	100, 124, 148, 160*	124, 148
		Rec.	—	—	—	—	64*	80*	—	100*	—	—	—	—	—
	SO	22, 28	28	28	28	28	—	—	—	—	—	—	—	—	
	PLCC	—	—	—	—	—	68*	84*	—	—	—	—	—	—	
PGA	—	—	—	—	—	—	—	—	—	180	180, 224	180, 224	144, 180, 224	280*	

Packages marked with * are under development.

Note) Package QFP40 pin corresponds to L56 (40-QFP(b)) of outlines and QFP 64 pin to L59 (64-QFP(a)).

(Package Symbol) DIP=Dual-In-Line Plastic Package, SDIP=Shrunk Dual-In-Line Plastic Package, QFP=Quad Flat Package
SO=Small Type, 16D=16 Lead Dual-In-Line (Example), PGA=Pin Grid Array

ASICs

● MN55000 Series

Type No.		MN55020		MN55040	
Memory Size	bit	2048		4096	
Memory Access Time	ns	15 (typ.)			
Gate Size		2040		5352	
Max. Signal Pins	Input	108		180	
	Output	108		180	
	Total	108		180	
Supply Pins		8		16	
Package (See Package Outline)	SDIP	64		64	
	QFP	64, 84, 100, 124		64, 84, 100, 124, 148	
	PGA	—		180	

● MN56000 Series

Type No.	MN56020	MN56030	MN56050	MN56070	MN56100	MN56150	MN56200	MN56250	MN56300	
Gate Size	2000	3000	5000	7000	10000	15000	20000	25000	30000	
Basic Cell	2090	3220	4928	7128	9906	12760	16800	21280	25200	
Max. Signal Pins	Input	92	112	134	158	186	210	238	256	
	Output	92	112	134	158	186	210	238	256	
	Total	92	112	134	158	186	210	238	256	
Total number of built-in PAD	106	126	150	174	202	226	254	282	306	
Supply Pins	—	—	—	—	—	—	—	—	—	
Package (See Package Outline)	SDIP	64	64	64*	64, 76	64, 76	76	76	—	
	QFP	Sq.	40, 44, 64(S), 64, 84, 100*	40, 64(S), 64, 84, 100, 124*	40, 64(S), 64, 84, 100, 124	40, 64(S)*, 64, 84, 100, 124, 148*	64, 84, 100, 124, 148, 160*	64, 84, 100, 124, 148, 160*	64, 84, 100, 124, 148, 160*	124, 148, 160*
		Rec	64*80*	64*80*	64*80*	64*80*100*	64*80*100*	64*80*100*	—	—
	PLCC	68*	68*84*	68*84*	68*84*	68*84*	68*84*	84*	84*	84*
	Ceramic PGA	100, 144	100, 144	144, 180	144, 180	180, 224	180, 224	224, 280	280	280

* Packages marked with * are under development

● MN59000 Series

Type No.	MN59020	MN59040	MN59080	MN59100	MN59150	
Gate Size	2000	4000	8000	10000	15000	
Basic Cell	4060	8034	16200	20600	30096	
Max. Signal Pins	Input	107	148	208	256	
	Output	107	148	208	256	
	Total	107	148	208	232	256
Total number of built-in PAD	128	176	240	272	320	
Supply Pins	—	—	—	—	—	
For ES Ceramic Package (See Package Outline)	SDIC	64*	64*	—	—	
	QFC	128*	128*160*	128*160*	128*160*	
	PGA	144*	180*	224*280*	280*	280*
For MP Package (See Package Outline)	SDIP	64*	64	76*	—	
	QFP	40, 64(S), 64, 84, 100*124*	64(S), 64, 84, 100, 124, 148*	64, 84, 100, 124, 148, 160	124, 148, 160	124, 148*160
	Ceramic PGA	144	180	224, 280	280	280

Note 1) Gates converted into the gates of MN51000~MN53000 and Mn55000 series.

Note 2) Maximum number of cells obtained from basic cells listed in MACRE CELL list of MN56000/MN59000 series.

Note 3) Power supply pins are different by packages. Details should be asked semiconductor design center.

Note 4) Package QFP 40 pin corresponds to package outline 56 (40-QFP(b)), QFP64 pin to L59 (64-QFP(a) and QFP(s)) to 60 (64-QFP(b)).

(Package Symbol) SDIP=Shrunk Dual-In-Line Plastic Package, QFP=Quad Flat Plastic Package, PLCC=Plastic Leaded-Chip-Carrier
PGA=Pin-Grid Array. (S)=Shrunk type SDIC=Shrunk Dual-In-Line Ceramic Package, QFC=Quad Flat Ceramic Package
DIP=Dual-In-Line Plastic Package, SO=Small Outline (PANAFLET Package)

ASICs

■ CMOS Standard Cells

- MN73000 Series (compatible with MN53000 Series Gate Array)

Item	Functions		
Gate Size	Max. gates: 50,000 gates		
Gate Delay Time	1.4ns		
Technology	Silicon gates CMOS 1.5 μ m, 2-layer aluminum wire		
Basic Cell	200 types		
Functional Block Cell	Memory Cell, CPU Core, Peripheral Cell		
I/O Cell	3 types, 18 kinds each, Total 54 cells		
I/O Cell Level	CMOS, TTL		
Package (See Package Outline)	DIP	2.54mm	8, 14, 16, 18, 22, 28, 40, 42
	SDIP	1.778mm	18, 22, 28, 40, 42, 64
	S0	1.27mm	8, 14, 16, 18, 22, 28
	QFP	1.27mm	40, 42
		1.016mm	64
		0.8mm	64, 84, 124
		0.65mm	100, 148
	Ceramic PGA	2.54mm	100, 180, 224

(Package Symbol) DIP=Dual-In-Line Plastic Package, SDIP=Shrunk Dual-In-Line Plastic Package
 S0=Small Outline (PANAFLET Package) QFP=Quad Flat Plastic Package
 PGA=Pin-Grid Array, (S)=Shrunk type

■ For Image Signal Processing

Category	Type No.	Process	Functions	Package	No.
LIC	MN8617A	NMOS	High-Speed Image Signal Processing (LIC)	40-DIC(a)	L37
GRTP	MN83501ST/STF	CMOS	CRT Processor (CRTP)	64-SDIP 64-QFP	L30 L59
	MN83502		CRT Processor (CRTP)	124-QFP	L63
DPU	MN8355	CMOS	Display Processor Unit (DPU)	84-QFP	L61
EDPU	△MN8510	CMOS	High Performance Display Processor Unit (EDPU)	124-QFP	L63
HTP	MN8357	CMOS	Light-Dark Picture 2 Value Switching LSI Half Tone Processor	84-QFP	L61
HHTP	MN8361	CMOS	High-Speed Light-Dark Picture 2 Value Switching LSI (Half Tone Processor)	84-QFP	L61

■ For Image Signal Processing A/D, D/A Converter

Category	Type No.	Process	Operation voltage(V)	Functions	Package	No.
A/D Converter	MN6550B	CMOS	5	Conversion Rate 15MSPS, Resolution 7 bit	22-DIP SO-22D	L15 L51
	MN65531	CMOS	5	Resolution 6 bits, Conversion Rate 20MSPS	SO-22D	L51
D/A Converter	MN65523A/S	NMOS	5	Resolution 6 bits, Conversion Rate 20MSPS	16-DIP(c) SO-22D	L9 L51
	MN6556A	CMOS	5	Resolution 6 bits, Conversion Rate 20MSPS	22-DIP SO-22D	L15 L51
	MN6557A	CMOS	5	Resolution 6 bits, Conversion Rate 20MSPS	22-DIP	L15
	MN6559	CMOS	5	Resolution 6 bits, Conversion Rate 20MSPS	SO-28D	L53
	MN6570	CMOS	5	Resolution 6 bits, Conversion Rate 20MSPS	44-QFP	L58

(Package Symbol) DIP=Dual-In-Line Plastic Package, SDIP=Shrunk Dual-In-Line Plastic Package
 QFP=Quad Flat Plastic Package, DIC=Dual-In-Line Ceramic Package
 PGA=Pin Grid Array, SO=Mini Type, 18D=18 Pin Dual-In-Line (Example)

MOS LSIs

■ CCD Linear Image Sensors

Type No.	Process	Stages	Max. Frequency (MHz)	Package		Application	Drive Board	
					No.			
MN3642	CCD (Shrink Type)	1024	1.5	18-DIC	L32	Clock Driver Built-in	BS-806	
MN3643D		2048	1.2	22-DIC (c)	L34	For Bar Code Reader	BS-801	
MN3644		2048	1.5	22-DIC (c)	L34	For Bar Code Clock Driver Built-in	BS-809	
△MN3648		2048	1.5	22-DIC (c)	L34	Clock Driver Built-in	BS-810	
△MN3649		2048	1.5	22-DIC (c)	L34	Clock Driver Built-in	BS-807	
MN3651D		2048	1.2	22-DIC (c)	L34		BS-801	
MN3661		2592	10.0	22-DIC (b)	L33	High-speed Scanning Type	BS-802	
MN3662		3648	2.0	22-DIC (c)	L34	High Resolution Type	BS-801 alteration	
MN3664		5000	14.0	22-DIC (b)	L33	High-Speed · High-Resolution Type	BS-803	
△MN3666		7500	10.0	22-DIC (d)	L35	High-Speed · High-Resolution Type	BS-808	
△MN3661C		864×3	10.0	22-DIC (b)	L33	Color CCD RGB Filter	BS-802	
△MN3671		1024×3	5.0	22-DIC (c)	L34	Color CCD RGB Filter	
MN3656		CCD (Contact Type)	1212 (1 Chip)	2.0	12-FCB	L40	400dpi	BS-805
△MN3655A3			4864 (4 Chips)	2.0 (per one chip)	48-FCB(a)	L41	400dpi	BS-805
△MN3657B4	4096 (4 Chips)		2.0 (per one chip)	48-FCB(b)	L42	400dpi	BS-805	

△ Tentative Specification

■ CCD Area Image Sensors

Size (inch)	Color or B/W	System	Type No.	Number of Effective Pixels		Transmitting Method	S/N typ. (dB)	Color Carrier Saturation Output B/W Saturation Output typ. (mV)	Sensitivity $\frac{1}{2} \frac{\%}{\text{Color}}$ (F4.0) (F5.6) B/W (F5.6) (F8.0) Typ. (mV)	Vertical Smear Sm typ. (%)	Residual Image Lag typ. (%)	Vertical Resolution V.Res typ. (TV)	Horizontal Resolution H.Res typ. (TV)	Package		
				V	H										No.	
1/2	Color	NTSC	MN3734F	489	422	Inter-line	60	600	220	0.02	4.0	350	280	20-DIC (d)	L72	
		PAL	MN3740F	579	422		60	500	220	0.02	4.0	420	280	20-DIC (d)	L72	
		NTSC	MN3735F	492	512		63	700	400	0.02	4.0	350	330	20-DIC (d)	L72	
		PAL	MN3745F	582	512		63	600	350	0.02	4.0	420	330	20-DIC (d)	L72	
		NTSC	MN3751F	485	670		Q.FIT	62	700	350	0.02	4.0	350	430	20-DIC (b)	L71
		PAL	MN3761F	575	669			62	600	300	0.02	4.0	420	430	20-DIC (b)	L71
	B/W	EIA	MN3734SK	489	422	Inter-line	60	700	220	0.02	4.0	350	300	20-DIC (a)	L70	
		CCIR	MN3740SK	579	422		60	600	220	0.02	4.0	420	300	20-DIC (a)	L70	
		EIA	MN3735AC	492	512		63	900	350	0.02	4.0	350	360	20-DIC (d)	L72	
		CCIR	MN3745AC	582	512		63	800	300	0.02	4.0	420	360	20-DIC (d)	L72	
		EIA	MN3751SK	485	670		Q.FIT	62	900	300	0.02	4.0	350	480	20-DIC (b)	L71
		CCIR	MN3761SK	575	669			62	800	250	0.02	4.0	420	480	20-DIC (b)	L71
1/4	B/W	EIA	MN3720AC	242	302	FIT	62	900	250	0.0005	4.0	120	230	16-DIC	L69	

[Symbol] Q.FIT: Semi frame inter line transfer system. FIT: Frame inter line transfer system

(Package Symbol) DIC=Dual-In-Line Ceramic Package, FCB=Flat-Ceramic Base (Ceramic substrate)

MOS LSIs

■ BBDs for Audio Signal Delay

Type No.	Application Effects					Stages	Max. Delay Time (ms)	Package	No.	
	Vibrato	Echo	Reverb	Variable Playback Speed Tape Recorder	Ambience					
General Use ($V_{DD} = -15V$)	MN3003	●				64 *	6.4	14-DIP	M 9	
	MN3004		●		●	512	25.6	14-DIP	M 9	
	MN3005		●			4096	204.8	Special 8-DIP	M 7	
	MN3006	●				128	6.4	8-DIP	M 6	
	MN3007		●			1024	51.2	8-DIP	M 6	
	MN3008		●			2048	102.4	Special 8-DIP	M 7	
	MN3009	●				256	12.8	8-DIP	M 6	
	MN3010				●	512 *	51.2	14-DIP	M 9	
	MN3011		●	●		3328 (6 tap)	19.8~166.4	Special 12-DIP	M 8	
	MN3012					3, 5, 190	0.15/0.25/9.5	14-DIP	M 9	
	MN3101	Clock Generator/Driver								8-DIP
Low Voltage ($V_{DD} = +5V$)	MN3204		●		●	512	25.6	8-DIP	M 6	
	MN3205		●			4096	204.8	Special 8-DIP	M 7	
	MN3206	●				128	6.4	8-DIP	M 6	
	MN3207		●			1024	51.2	8-DIP	M 6	
	MN3208		●			2048	102.4	Special 8-DIP	M 7	
	MN3209	●				256	12.8	8-DIP	M 6	
	MN3210				●	512 *	51.2	14-DIP	M 9	
	MN3214		●	●		1024 (5 tap)	51.2	14-DIP	M 9	
	MN3102	Clock Generator/Driver								8-DIP
Ultra Low Voltage ($V_{DD} = +3V$)	MN3304		●		●	512	25.6	8-DIP	M 6	
	MN3305		●			4096	204.8	Special 8-DIP	M 7	
	MN3306	●				128	6.4	8-DIP	M 6	
	MN3307		●			1024	51.2	8-DIP	M 6	
	MN3308		●			2048	102.4	8-DIP	M 6	
	MN3309	●				256	12.8	8-DIP	M 6	
	MN3105	Clock Generator								8-DIP

※ Because of dual type, double stages are in series connection ● Mark in the application effects column is only a guide.

■ Other MOS LSIs

Category	Type No.	Functions	Package	No.
Divider	MN6269	16 stages binary divider	8 - DIP	M 6
	MN6280	$1/4$, $1/8$, $1/16$, $1/32$ divider	8 - DIP	M 6
	MN6281	$1/4$, $1/8$, $1/16$ divider	8 - DIP	M 6
	MN6282	$1/4$, $1/2$, $1/2048$, $1/131072$ divider	SO-8D	M56
	MN6283	$1/4$, $1/12$ or $1/15$ (terminal change) $1/120$ or $1/150$ (terminal change) divider, Crystal oscillator built-in	8 - DIP	M 6
Filter	MN6514	SCF type low pass filter	8 - DIP	M 6
	MN6515	SCF type band-pass filter	8 - DIP	M 6
	MN6516/S	SCF high-pass, low-pass filter	18-DIP/SO-18D	M15 M59
Melody	MN6221	Electronic melody, Alarm	18 - DIP	M15
	MN6225S	Low voltage melody	SO-8D	M56
Others	MN1275	Indication address	42 - DIP	M28
	MN6115	Full-duplex Modem LSI for Personal Computer	40-DIP/40-QFP	M26 M67
	MN86151	Shading correction LSI	44-QFP	M70

(Package Symbol) DIP=Dual-In-Line Plastic Package, QFP=Quad Flat Package, SO=Small Type, 8D=8 Lead Dual-In-Line (Example)

Standard Logic ICs

■ CMOS Logic · MN4000B Series

Type No.	Functions	Pins (Package No.)
MN4001B/S	Quad 2-Input NOR Gate	14 (L5/L47)
MN4006B/S	18-Bit Static Shift Register	14 (L5/L47)
MN4007UB/S	Dual Complementary Pair and Inverter	14 (L5/L47)
MN4011B/S	Quad 2-Input NAND Gate	14 (L5/L47)
MN4013B/S	Dual D-Type Flip-Flop	14 (L5/L47)
MN4014B/S	8-Stage Static Shift Register	16 (L9/L48)
MN4015B/S	Dual 4-Stage Static Shift Register	16 (L9/L48)
MN4016B/S	Quad Analog Switch	14 (L5/L47)
MN4017B/S	5-Stage Johnson Counter	16 (L9/L48)
MN4018B/S	Presetable Divide-by-N Counter	16 (L9/L48)
MN4019B/S	Quad 2-Input Multiplexer	16 (L9/L48)
MN4020B/S	14-Stage Binary Counter	16 (L9/L48)
MN4021B/S	8-Stage Static Shift Register	16 (L9/L48)
MN4022B/S	4-Stage Divide-by-8 Johnson Counter	16 (L9/L48)
MN4023B/S	Triple 3-Input NAND Gate	14 (L5/L47)
MN4024B/S	7-Stage Binary Counter	14 (L5/L47)
MN4025B/S	Triple 3-Input NOR Gate	14 (L5/L47)
MN4027B/S	Dual J-K Flip-Flop	16 (L9/L48)
MN4028B/S	BCD-to-Decimal/Binary-to-Octal Decoder	16 (L9/L48)
MN4029B/S	4-Bit Presetable Up/Down Counter	16 (L9/L48)
MN4030B/S	Quad Exclusive-OR Gate	14 (L5/L47)
MN4040B/S	12-Stage Binary Counter	16 (L9/L48)
MN4041B/S	Quad True/Complement Buffer	14 (L5/L47)
MN4042B/S	Quad D Latch	16 (L9/L48)
MN4043B/S	Quad R/S Latch	16 (L9/L48)
MN4044B/S	Quad R/S Latch	16 (L9/L48)
MN4046B/S	Phase Locked Loop	16 (L9/L48)
MN4047B/S	Monostable/Astable Multivibrator	14 (L5/L47)
MN4049B/S	Hex Inverting Buffer	16 (L9/L48)
MN4050B/S	Hex Non-Inverting Buffer	16 (L9/L48)
MN4051B/S	8-Channel Analog Multiplexer	16 (L9/L48)
MN4052B/S	Dual 4-Channel Analog Multiplexer	16 (L9/L48)
MN4053B/S	Triple 2-Channel Analog Multiplexer	16 (L9/L48)
MN4060B/S	14-Stage Ripple-Carry Binary Counter/Divider and Oscillator	16 (L9/L48)
MN4066B/S	Quad Analog Switch	14 (L5/L47)
MN4068B/S	8-Input NAND Gate	14 (L5/L47)
MN4069UB/S	Hex Inverter	14 (L5/L47)
MN4070B/S	Quad Exclusive-OR Gate	14 (L5/L47)
MN4071B/S	Quad 2-Input OR Gate	14 (L5/L47)
MN4072B/S	Dual 4-Input OR Gate	14 (L5/L47)
MN4073B/S	Triple 3-Input AND Gate	14 (L5/L47)
MN4075B/S	Triple 3-Input OR Gate	14 (L5/L47)
MN4076B/S	Quad D-Type Register with 3-State Output	16 (L9/L48)
MN4077B/S	Quad Exclusive-NOR Gate	14 (L5/L47)
MN4078B/S	8-Input NOR Gate	14 (L5/L47)
MN4081B/S	Quad 2-Input AND Gate	14 (L5/L47)
MN4082B/S	Dual 4-Input AND Gate	14 (L5/L47)
MN4085B/S	Dual 2-Wide 2-Input AND-OR-Invert Gate	14 (L5/L47)
MN4093B/S	Quad 2-Input NAND Schmitt Trigger	14 (L5/L47)
MN4094B/S	8-Stage Shift-and-Store Bus Register	16 (L9/L48)
MN4503B/S	Hex Non-Inverting 3-State Buffer	16 (L9/L48)
MN4510B/S	BCD Up/Down Counter	16 (L9/L48)
MN4511B/S	BCD-to-7-Segment Decoder/Driver/Latch	16 (L9/L48)
MN4512B/S	8-Input Multiplexer with 3-Stage Output	16 (L9/L48)
MN4514B/S	4-Bit Latch 4-to-16 Line Decoder (High)	24 (L16/L52)
MN4515B/S	4-Bit Latch 4-to-16 Line Decoder (Low)	24 (L16/L52)
MN4516B/S	4-Bit Binary Up/Down Counter	16 (L9/L48)
MN4517B	Dual 64-Bit Static Shift Register	16 (L9/ —)
MN4518B/S	Dual 4-Bit BCD Counter	16 (L9/L48)
MN4520B/S	Dual 4-Bit Binary Counter	16 (L9/L48)

Package: Standard DIP package Dual-In-Line Plastic Package and Pana-Flat package (SO package). "S" is attached to the type No. of Pana-Flat package.

Standard Logic ICs

■ CMOS Logic · MN4000B Series (continued)

Type No.	Functions	Pins (Package No.)
MN4521B/S	24-Stage Frequency Driver	16 (L9/L48)
MN4522B/S	Programmable BCD Down Counter	16 (L9/L48)
MN4526B/S	Programmable 4-Bit Binary Down Counter	16 (L9/L48)
MN4528B/S	Dual Monostable Multivibrator	16 (L9/L48)
MN4532B/S	8-Bit Priority Encode	16 (L9/L48)
MN4538B/S	Dual Precision Monostable Multivibrator	16 (L9/L48)
MN4539B/S	Dual 4-Input Multiplexer	16 (L9/L48)
MN4541B/S	Programmable Timer	14 (L5/L47)
MN4543B/S	BCD-to-7-Segment Decoder/Driver	16 (L9/L48)
MN4556B/S	Dual Binary to 1-of-4 Decoder/Demultiplexer	16 (L9/L48)
MN4584B/S	Hex Schmitt Trigger	14 (L5/L47)
MN4585B/S	4-Bit Magnitude Comparator	16 (L9/L48)
MN4720B	256-Bit, 1-Bit per Word RAM	16 (L9/ —)
MN40098B/S	Hex Inverting 3-Stage Buffer	16 (L9/L48)
MN40174B/S	Hex D-Type Flip-Flop	16 (L9/L48)
MN40175B/S	Quad D-Type Flip-Flop	16 (L9/L48)

Package: Standard DIP Package (Dual-In-Line Plastic Package) and Pana-Flat Package (SO package). "S" is attached to the type No. of Pana-Flat package.

Standard Logic ICs

■ Function List of CMOS Logic · MN4000B Series

Functions			Type No.				
Gates Buffers	NAND		MN4011B,	MN4023B,	MN4068B		
	NOR		MN4001B,	MN4025B,	MN4078B		
	AND		MN4073B,	MN4081B,	MN4082B		
	OR		MN4071B,	MN4072B,	MN4075B		
	Buffer		MN4041B,	MN4050B,	MN4503B		
	Inverter		MN4007UB,	MN4049B,	MN4069UB,	MN40098B	
	Complex Gate		MN4085B				
	Exclusive-OR		MN4030B,	MN4070B			
	Exclusive-NOR		MN4077B				
Schmitt Trigger		MN4093B,	MN4584B				
Flip-Flops			MN4013B,	MN4027B,	MN40174B,	MN40175B,	
Latches			MN4042B,	MN4043B,	MN4044B		
Multivibrators			MN4047B,	MN4528B,	MN4538B		
Timers			MN4541B				
Decoders	Seven Segment	LED	MN4511B				
		LED	MN4543B				
			MN4028B,	MN4514B,	MN4515B,	MN4556B	
Registers	Shift		MN4006B,	MN4014B,	MN4015B,	MN4021B,	MN4094B,
	Storage		MN4517B				
Counters	Binary		MN4020B,	MN4022B,	MN4024B,	MN4040B,	MN4060B,
			MN4516B,	MN4520B,	MN4521B		
		Decade	MN4017B,	MN4029B,	MN4510B,	MN4518B	
Multiplexers	Divide-By-N		MN4018B,	MN4522B,	MN4526B		
		Analog	MN4016B,	MN4051B,	MN4052B,	MN4053B,	MN4066B
		Digital	MN4019B,	MN4512B,	MN4539B		
Arithmetics	Comparator		MN4585B				
	Encoder		MN4532B				
Memories			MN4720B				
PLL			MN4046B				

Package: Standard DIP Package (Dual-In-Line Plastic Package) and Pana-Flat package (SO package), "S" is attached to the type No. of Pana-Flat package.

Standard Logic ICs

■ High Speed CMOS Logic · MN74HC Series

Type No.	Functions	Pins (Package No.)
MN74HC00/S	Quad 2-Input NAND Gate	14 (L5/L47)
MN74HC02/S	Quad 2-Input NOR Gate	14 (L5/L47)
MN74HC03/S	Quad 2-Input NAND Gate (Open Drain)	14 (L5/L47)
MN74HC04/S	Hex Inverter (Buffered)	14 (L5/L47)
MN74HCT04/S	Hex Inverter (TTL Input)	14 (L5/L47)
MN74HCU04/S	Hex Inverter (Unbuffered)	14 (L5/L47)
MN74HC08/S	Quad 2-Input AND Gate	14 (L5/L47)
MN74HC10/S	Triple 3-Input NAND Gate	14 (L5/L47)
MN74HC11/S	Triple 3-Input AND Gate	14 (L5/L47)
MN74HC14/S	Hex Inverting Schmitt Trigger	14 (L5/L47)
MN74HC20/S	Dual 4-Input NAND Gate	14 (L5/L47)
MN74HC21/S	Dual 4-Input AND Gate	14 (L5/L47)
MN74HC27/S	Triple 3-Input NOR Gate	14 (L5/L47)
MN74HC30/S	8-Input NAND Gate	14 (L5/L47)
MN74HC32/S	Quad 2-Input OR Gate	14 (L5/L47)
MN74HC42/S	BCD-to-Decimal Decoder	16 (L9/L48)
MN74HC51/S	Dual AND-OR Invert Gate	14 (L5/L47)
MN74HC73/S	Dual J-K Flip-Flop with Clear	14 (L5/L47)
MN74HC74/S	Dual-D-Type Flip-Flop with Preset and Clear	14 (L5/L47)
MN74HC75/S	4-Bit Bistable Latch	16 (L9/L48)
MN74HC76/S	Dual J-K Flip-Flop with Preset and Clear	16 (L9/L48)
MN74HC77/S	4-Bit Bistable Latch	14 (L5/L47)
MN74HC86/S	Quad 2-Input Exclusive-OR Gate	14 (L5/L47)
MN74HC107/S	Dual J-K Flip-Flop with Clear	14 (L5/L47)
MN74HC109/S	Dual J-K Flip-Flop with Preset and Clear	16 (L9/L48)
MN74HC112/S	Dual J-K Flip-Flop with Preset and Clear	16 (L9/L48)
△ MN74HC123/S	Dual Retriggerable Monostable Multivibrator with Clear	16 (L9/L48)
△ MN74HCT123/S	Dual Retriggerable Monostable Multivibrator with Clear (TTL Input)	16 (L9/L48)
MN74HC125/S	Quad TRI-STATE Buffer	14 (L5/L47)
MN74HC126/S	Quad TRI-STATE Buffer	14 (L5/L47)
MN74HC132/S	Quad 2-Input NAND Schmitt Trigger	14 (L5/L47)
MN74HC133/S	13-Input NAND Gate	16 (L9/L48)
MN74HC137/S	3-to-8 Line Decoder with Address Latch	16 (L9/L48)
MN74HC138/S	3-to-8 Line Decoder	16 (L9/L48)
MN74HC139/S	Dual 2-to-4 Line Decoder	16 (L9/L48)
MN74HC147/S	10-to-4 Line Priority Encoder	16 (L9/L48)
MN74HC148/S	8-to-3 Line Priority Encoder	16 (L9/L48)
MN74HC151/S	8 Channel Digital Multiplexer	16 (L9/L48)
MN74HC153/S	Dual 4-Input Multiplexer	16 (L9/L48)
MN74HC155/S	Dual 2-to-4 Line Decoder/Demultiplexer	16 (L9/L48)
MN74HC157/S	Quad 2-Input Multiplexer	16 (L9/L48)
MN74HC158/S	Quad 2-Input Multiplexer with Inverting Output	16 (L9/L48)
MN74HC160/S	Synchronous Decade Counter with Asynchronous Clear	16 (L9/L48)
MN74HC161/S	Synchronous Binary Counter with Asynchronous Clear	16 (L9/L48)
MN74HC162/S	Synchronous Decade Counter with Synchronous Clear	16 (L9/L48)
MN74HC163/S	Synchronous Binary Counter with Synchronous Clear	16 (L9/L48)
MN74HC164/S	8-Bit Serial-Input Parallel-Output Shift Register	14 (L5/L47)
MN74HC165/S	8-Bit Parallel-Input Serial-Output Shift Register	16 (L9/L48)
MN74HC166/S	8-Bit Parallel-Input Serial-Output Shift Register with Clear	16 (L9/L48)
MN74HCT166/S	8-Bit Parallel-Input Serial-Output Shift Register with Clear (TTL Input)	16 (L9/L48)
MN74HC173/S	Quad TRI-STATE D-Type Flip-Flop	16 (L9/L48)
MN74HC174/S	Hex D-Type Flip-Flop with Clear	16 (L9/L48)
MN74HC175/S	Quad D-Type Flip-Flop with Clear	16 (L9/L48)
MN74HC183/S	Dual Carry-Save Full Adder	14 (L5/L47)
MN74HC194/S	4-Bit Bidirectional Universal Shift Register	16 (L9/L48)
MN74HC195/S	4-Bit Parallel Shift Register	16 (L9/L48)
MN74HC221/S	Dual Monostable Multivibrator with Clear	16 (L9/L48)
MN74HC237/S	3-to-8 Line Decoder with Address Latch	16 (L9/L48)
MN74HC238/S	3-to-8 Line Decoder/Demultiplexer	16 (L9/L48)
MN74HCT238/S	3-to-8 Line Decoder/Demultiplexer (TTL Input)	16 (L9/L48)

Package: Standard DIP Package (Dual-In-Line Plastic Package) and Pana-Flat package (SO package), "S" is attached to the type No. of Pana-Flat package.

Standard Logic ICs

■ High Speed CMOS Logic · MN74HC Series (continued)

Type No.	Functions	Pins (Package No.)
MN74HC240/S	Octal TRI-STATE Inverting Buffer	20 (L14/L50)
MN74HC241/S	Octal TRI-STATE Buffer	20 (L14/L50)
MN74HC242/S	Quad TRI-STATE Inverting Transceiver	14 (L5/L47)
MN74HC243/S	Quad TRI-STATE Transceiver	14 (L5/L47)
MN74HC244/S	Octal TRI-STATE Buffer	20 (L14/L50)
MN74HC245/S	Octal TRI-STATE Transceiver	20 (L14/L50)
MN74HC251/S	8-Channel TRI-STATE Multiplexer	16 (L9/L48)
MN74HC253/S	Dual 4-Channel TRI-STATE Multiplexer	16 (L9/L48)
MN74HC257/S	Quad 2-Channel TRI-STATE Multiplexer	16 (L9/L48)
MN74HC258/S	Quad 2-Channel TRI-STATE Multiplexer with Inverting Output	16 (L9/L48)
MN74HC266/S	Quad 2-Input Exclusive NOR Gate	14 (L5/L47)
MN74HC273/S	Octal D-Type Flip-Flop with Clear	20 (L14/L50)
MN74HC280/S	9-Bit Odd/Even Parity Generator/Checker	14 (L5/L47)
MN74HCT280/S	9-Bit Odd/Even Parity Generator/Checker (TTL Input)	14 (L5/L47)
MN74HC352/S	Dual 4-Channel Multiplexer with Inverting Output	16 (L9/L48)
MN74HC353/S	Dual 4-Channel TRI-STATE Multiplexer with Inverting Output	16 (L9/L48)
MN74HC365/S	Hex TRI-STATE Buffer	16 (L9/L48)
MN74HC366/S	Hex TRI-STATE Inverting Buffer	16 (L9/L48)
MN74HC367/S	Hex TRI-STATE Buffer	16 (L9/L48)
MN74HC368/S	Hex TRI-STATE Inverting Buffer	16 (L9/L48)
MN74HC373/S	Octal TRI-STATE D-Type Latch	20 (L14/L50)
MN74HC374/S	Octal TRI-STATE D-Type Flip-Flop	20 (L14/L50)
MN74HC375/S	Quad 4-Bit Bistable Latch	16 (L9/L48)
MN74HC377/S	Octal D-Type Flip-Flop with Data Enable	20 (L14/L50)
MN74HCT377/S	Octal D-Type Flip-Flop with Data Enable (TTL Input)	20 (L14/L50)
MN74HC386/S	Quad 2-Input Exclusive OR Gate	14 (L5/L47)
MN74HC390/S	Dual 4-Bit Decade Counter	16 (L9/L48)
MN74HC393/S	dual 4-Bit Binary Counter	14 (L5/L47)
MN74HC533/S	Octal TRI-STATE D-Type Latch with Inverting Output	20 (L14/L50)
MN74HC534/S	Octal TRI-STATE D-Type Flip-Flop with Inverting Output	20 (L14/L50)
MN74HC540/S	Octal TRI-STATE Inverting Buffer	20 (L14/L50)
MN74HC541/S	Octal TRI-STATE Buffer	20 (L14/L50)
MN74HC563/S	Octal TRI-STATE D-Type Latch with Inverting Output	20 (L14/L50)
MN74HCT563-S	Octal TRI-STATE Latch with Inverting Output (TTL Input)	20 (L14/L50)
MN74HC564/S	Octal TRI-STATE D-Type Flip-Flop with Inverting Output	20 (L14/L50)
MN74HCT564/S	Octal TRI-STATE D-Type Flip-Flop with Inverting Output (TTL Input)	20 (L14/L50)
MN74HC573/S	Octal TRI-STATE D-Type Latch	20 (L14/L50)
MN74HCT573/S	Octal TRI-STATE D-Type Latch (TTL Input)	20 (L14/L50)
MN74HC574/S	Octal TRI-STATE D-Type Flip-Flop	20 (L14/L50)
MN74HC5T574/S	Octal TRI-STATE D-Type Flip-Flop (TTL Input)	20 (L14/L50)
MN74HC640/S	Octal TRI-STATE Inverting Transceiver	20 (L14/L50)
MN74HC643/S	Octal TRI-STATE True Inverting Transceiver	20 (L14/L50)
MN74HC688/S	8-Bit Magnitude Comparator (Equality Detector)	20 (L14/L50)
MN74HC4002/S	Dual 4-Input NOR Gate	14 (L5/L47)
MN74HC4015/S	Dual 4-Stage Shift Register with Serial Input/Parallel Output	16 (L9/L48)
MN74HC4020/S	14-Stage Binary Counter	16 (L9/L48)
MN74HC4024/S	7-Stage Binary Counter	14 (L5/L47)
MN74HC4040/S	12-Stage Binary Counter	16 (L9/L48)
MN74HC4049A/S	Hex Inverting Logic Level Down Converter	16 (L9/L48)
MN74HC4050/S	Hex Logic Level Down Converter	16 (L9/L48)
MN74HC4051A/S	Single 8-Channel Analog Multiplexer/Demultiplexer	16 (L9/L48)
MN74HCT4051A/S	Single 8-Channel Analog Multiplexer/Demultiplexer (TTL Input)	16 (L9/L48)
MN74HC4052A/S	Dual 4-Channel Analog Multiplexer/Demultiplexer	16 (L9/L48)
MN74HCT4052A/S	Dual 4-Channel Analog Multiplexer/Demultiplexer (TTL Input)	16 (L9/L48)
MN74HC4053A/S	Triple 2-Channel Analog Multiplexer/Demultiplexer	16 (L9/L48)
MN74HCT4053A/S	Triple 2-Channel Analog Multiplexer/Demultiplexer (TTL Input)	16 (L9/L48)
MN74HC4060/S	14-Stage Binary Counter	16 (L9/L48)
MN74HCT4060/S	14-Stage Binary Counter (TTL Input)	16 (L9/L48)
MN74HC4066/S	Quad Analog Switch	14 (L5/L47)
MN74HC4075/S	Triple 3-Input OR Gate	14 (L5/L47)

Package: Standard DIP Package (Dual-In-Line Plastic Package) and Pana-Flat package (SO package), "S" is attached to the type No. of Pana-Flat package.

Standard Logic ICs

■ High Speed CMOS Logic · MN74HC Series (continued)

Type No.	Functions	Pins (Package No.)
MN74HC4078/S	8-Input NOR Gate	14 (L5/L47)
MN74HC4301/S	TTL Input Octal TRI-STATE D-Type Latch with Inverting Output	20 (L14/L50)
MN74HC4302/S	TTL Input Octal TRI-STATE D-Type Latch	20 (L14/L50)
MN74HC4303/S	TTL Input Octal TRI-STATE D-Type Flip-Flop with Inverting Output	20 (L14/L50)
MN74HC4304/S	TTL Input Octal TRI-STATE D-Type Flip-Flop	20 (L14/L50)
MN74HC4305/S	TTL Input Octal TRI-STATE Inverting Buffer	20 (L14/L50)
MN74HC4306/S	TTL Input Octal TRI-STATE Buffer	20 (L14/L50)
MN74HC4520/S	Dual Binary UP Counter	16 (L9/L48)
△ MN74HC4538/S	Dual Precision Retriggerable Monostable Multivibrator	16 (L9/L48)
△ MN74HCT4538/S	Dual Precision Retriggerable Monostable Multivibrator (TTL Input)	16 (L9/L48)
MN74HC40104/S	4-Bit TRI-STATE Bidirectional Universal Shift Register	16 (L9/L48)
MN74HCT40104/S	4-Bit TRI-STATE Bidirectional Universal Shift Register (TTL Input)	16 (L9/L48)

■ Function List of High Speed CMOS Logic · MN74HC Series

Functions		Type No.					
Gates Buffers	NAND	MN74HC00,	MN74HC03,	MN74HC10,	MN74HC20,	MN74HC30,	MN74HC133
	NOR	MN74HC02,	MN74HC27,	MN74HC4002,	MN74HC4078		
	AND	MN74HC08,	MN74HC11,	MN74HC21			
	OR	MN74HC32,	MN74HC4075				
	Buffer	MN74HC125,	MN74HC126,	MN74HC241	MN74HC244,	MN74HC365,	
		MN74HC367,	MN74HC541,	MN74HC4050,	MN74HC4306		
	Inverter	MN74HC04,	MN74HCU04,	MN74HCT04,	MN74HC240,	MN74HC366,	MN74HC368,
		MN74HC540,	MN74HC4049A,	MN74HC4305			
	Exclusive-OR	MN74HC86,		MN74HC386			
	Exclusive-NOR	MN74HC266					
Complex-Gate	MN74HC51						
Schmitt Trigger	MN74HC14,	MN74HC132					
Transceivers		MN74HC242,	MN74HC243,	MN74HC245,	MN74HC640,	MN74HC643	
Flip-Flops		MN74HC73,	MN74HC74,	MN74HC76,	MN74HC107,	MN74HC109,	MN74HC112,
		MN74HC173,	MN74HC174,	MN74HC175,	MN74HC273,	MN74HC374,	MN74HC377,
		MN74HCT377,	MN74HC534,	MN74HC564,	MN74HCT564,	MN74HC574,	MN74HCT574,
		MN74HC4303,	MN74HC4304				
Latches		MN74HC75,	MN74HC77,	MN74HC373,	MN74HC375,	MN74HC533,	MN74HC563,
		MN74HCT563,	MN74HC573,	MN74HCT573,	MN74HC4301,	MN74HC4302	
Decoders		MN74HC42,	MN74HC137,	MN74HC138,	MN74HC139,	MN74HC155,	MN74HC237,
		MN74HC238,	MN74HCT238,				
Shift-Registers		MN74HC164,	MN74HC165,	MN74HC166,	MN74HCT166,	MN74HC194,	MN74HC195,
		MN74HC4015,	MN74HC40104,	MN74HCT40104			
Counters	Binary	MN74HC161,	MN74HC163,	MN74HC393,	MN74HC4020,	MN74HC4024,	MN74HC4040,
		MN74HC4060,	MN74HCT4060,	MN74HC4520			
Multiplexers	Analog	MN74HC4051A,	MN74HCT4051A,	MN74HC4052A,	MN74HCT4052A,	MN74HC4053A,	MN74HCT4053A,
		MN74HC4066					
	Digital	MN74HC151,	MN74HC153,	MN74HC157,	MN74HC158,	MN74HC251,	MN74HC253,
		MN74HC257,	MN74HC258,	MN74HC352,	MN74HC353		
Encoders		MN74HC147,	MN74HC148				
Multivibrators		△ MN74HC123,	△ MN74HCT123,	MN74HC221,	△ MN74HC4538,	△ MN74HCT4538	
Comparators		MN74HC688					
Adders		MN74HC183					
Arithmetic Circuits		MN74HC280,	MN74HCT280				

△ Under development. Package: Standard DIP Package (Dual-In-Line Plastic Package) and Pana-Flat package (SO package), "S" is attached to the type No. of Pana-Flat package.

Standard Logic ICs

■ TTL DN74 LS Series

Type No.	Functions	Pins (Package No.)
DN74LS00/S	Quad 2-input Positive NAND Gates	14 (B34/B63)
DN74LS01/S	Quad 2-input Positive NAND Gates (with Open Collector Outputs)	14 (B34/B63)
DN74LS02/S	Quad 2-input Positive NOR Gates	14 (B34/B63)
DN74LS03/S	Quad 2-input Positive NAND Gates (with Open Collector Outputs)	14 (B34/B63)
DN74LS04/S	Hex Inverters	14 (B34/B63)
DN74LS05/S	Hex Inverters (with open Collector Outputs)	14 (B34/B63)
DN74LS08/S	Quad 2-input Positive AND Gates	14 (B34/B63)
DN74LS09/S	Quad 2-input Positive AND Gates (with Open Collector Outputs)	14 (B34/B63)
DN74LS10/S	Triple 3-input Positive NAND Gates	14 (B34/B63)
DN74LS11/S	Triple 3-input Positive AND Gates	14 (B34/B63)
DN74LS12/S	Triple 3-input Positive NAND Gates (with Open Collector Outputs)	14 (B34/B63)
DN74LS13/S	Dual 4-input Positive NAND Schmitt Triggers	14 (B34/B63)
DN74LS14/S	Hex Schmitt Trigger Inverters	14 (B34/B63)
DN74LS15/S	Triple 3-input Positive AND Gates (with Open Collector Outputs)	14 (B34/B63)
DN74LS16-1/S	Hex Inverter Buffers/Drivers (with Open Collector Outputs), $I_{OL} = 48mA$	14 (B34/B63)
DN74LS17-1/S	Hex Buffers/Drivers (with Open Collector Outputs), $I_{OL} = 48mA$	14 (B34/B63)
DN74LS20/S	Dual 4-input Positive NAND Gates	14 (B34/B63)
DN74LS21/S	Dual 4-input Positive AND Gates	14 (B34/B63)
DN74LS22/S	Dual 4-input Positive NAND Gates (with Open Collector Outputs)	14 (B34/B63)
DN74LS26/S	Quad 2-input High-Voltage Interface Positive NAND Gates	14 (B34/B63)
DN74LS27/S	Triple 3-input Positive NOR Gates	14 (B34/B63)
DN74LS28/S	Quad 2-input Positive NOR Buffers	14 (B34/B63)
DN74LS30/S	8-input Positive NAND Gates	14 (B34/B63)
DN74LS32/S	Quad 2-input Positive OR Gates	14 (B34/B63)
DN74LS33/S	Quad 2-input Positive NOR Buffers (with Open Collector Outputs)	14 (B34/B63)
DN74LS37/S	Quad 2-input Positive NAND Buffers	14 (B34/B63)
DN74LS38/S	Quad 2-input Positive NAND Buffers (with Open Collector Outputs)	14 (B34/B63)
DN74LS38-1/S	Quad 2-input Positive NAND Buffers (with Open Collector Outputs), $I_{OL} = 48mA$	14 (B34/B63)
DN74LS42/S	BCD to Decimal Decoders	16 (B36/B64)
DN74LS51/S	2-wide 3-input, 2-wide 2-input AND-OR INVERT Gates	14 (B34/B63)
DN74LS54/S	4-wide AND-OR INVERT Gates	14 (B34/B63)
DN74LS55/S	2-wide 4-input AND-OR INVERT Gates	14 (B34/B63)
DN74LS73A/S	Dual J-K Flip-Flops (with Reset)	14 (B34/B63)
DN74LS74A/S	Dual D-type Positive Edge-Triggered Flip-Flops (with Set and Reset)	14 (B34/B63)
DN74LS75/S	4-bit Bistable Latches	16 (B36/B64)
DN74LS76A/S	Dual J-K Flip-Flops (with Set and Reset)	16 (B36/B64)
DN74LS78A/S	Dual J-K Flip-Flops (with Set, Common Reset and Common Clock)	14 (B34/B63)
DN74LS83A/S	4-bit Binary Full Adders (with Fast Carry)	16 (B36/B64)
DN74LS85/S	4-bit Magnitude Comparators	16 (B36/B64)
DN74LS86/S	Quad 2-input Exclusive-OR Gates	14 (B34/B63)
DN74LS90/S	Decade Counters	14 (B34/B63)
DN74LS92/S	Divide-by-Twelve Counters	14 (B34/B63)
DN74LS93/S	4-bit Binary Counters	14 (B34/B63)
DN74LS95B/S	4-bit Parallel-Access Shift Registers	14 (B34/B63)
DN74LS96/S	5-bit Shift Registers	16 (B36/B64)
DN74LS107A/S	Dual J-K Negative Edge-Triggered Flip-Flops (with Reset)	14 (B34/B63)
DN74LS109/S	Dual J-K Positive Edge-Triggered Flip-Flops (with set and Reset)	16 (B36/B64)
DN74LS112A/S	Dual J-K Negative Edge-Triggered Flip-Flops (with Set and Reset)	16 (B36/B64)
DN74LS113A/S	Dual J-K Negative Edge-Triggered Flip-Flops (with Set and Reset)	14 (B34/B63)
DN74LS114A/S	Dual J-K Negative Edge-Triggered Flip-Flops (with Set, Common Reset and Common Clock)	14 (B34/B63)
DN74LS123/S	Dual Retriggerable Monostable Multivibrators (with Reset)	16 (B36/B64)
DN74LS125A/S	Quad Bus Buffer Gates (with 3-state Outputs)	14 (B34/B63)
DN74LS126A/S	Quad Bus Buffer Gates (with 3-state Outputs)	14 (B34/B63)
DN74LS132/S	Quad 2-input Positive NAND Schmitt Triggers	14 (B34/B63)
DN74LS136/S	Quad 2-input Exclusive-OR Gates (with Open Collector Outputs)	14 (B34/B63)
DN74LS138/S	3-line to 8-line Decoders/Demultiplexers	16 (B36/B64)
DN74LS139/S	Dual 2-line to 4-line Decoders/Demultiplexers	16 (B36/B64)
DN74LS145/S	BCD to Decimal Decoders/Drivers	16 (B36/B64)
DN74LS148/S	8-line to 3-line Octal Priority Encoders	16 (B36/B64)
DN74LS151/S	8-line to 1-line Data Selectors/Multiplexers (with Strobe)	16 (B36/B64)

△ Under development. Package: Standard DIP Package (Dual-In-Line Plastic Package) and Pana-Flat package (SO package), "S" is attached to the type No. of Pana-Flat package.

Standard Logic ICs

■ TTL DN74 LS Series (continued)

Type No.	Functions	Pins (Package No.)
DN74LS153/S	Dual 4-line to 1-line Data Selectors/Multiplexers	16 (B36/B64)
DN74LS154/S	4-line to 16-line Decoders/Demultiplexers	24 (B45/B70)
DN74LS155/S	Dual 2-line to 4-line Decoders/Demultiplexers	16 (B36/B64)
DN74LS156/S	Dual 2-line to 4-line Decoders/Demultiplexers (with Open Collector Outputs)	16 (B36/B64)
DN74LS157/S	Quad 2-line to 1-line Data Selectors/Multiplexers Noninverted Data Output	16 (B36/B64)
DN74LS158/S	Quad 2-line to 1-line Data Selectors/Multiplexers Inverted Data Output	16 (B36/B64)
DN74LS160A/S	Synchronous Decade Counters	16 (B36/B64)
DN74LS161A/S	Synchronous 4-bit Binary Counters	16 (B36/B64)
DN74LS162A/S	Synchronous 4-bit Decade Counters	16 (B36/B64)
DN74LS163A/S	Synchronous 4-bit Binary Counters	16 (B36/B64)
DN74LS164/S	8-bit Parallel-out Serial Shift Registers	14 (B34/B63)
DN74LS165/S	Parallel Load 8-bit Shift Registers	16 (B36/B64)
DN74LS166/S	8-bit Shift Registers	16 (B36/B64)
DN74LS170/S	4-by-4 Register Files (with Open Collector Outputs)	16 (B36/B64)
DN74LS173/S	4-bit D-type Registers (with 3-state Outputs)	16 (B36/B64)
DN74LS174/S	Hex D-type Flip-Flops (with Reset)	16 (B36/B64)
DN74LS175/S	Quad D-type Flip-Flops (with Reset)	16 (B36/B64)
DN74LS181/S	4-bit Arithmetic Logic Units/Function Generators	24 (B45/B70)
DN74LS191/S	Synchronous Up/Down 4-bit Binary Counters (with Dual Clock Line)	16 (B36/B64)
DN74LS192/S	Synchronous BCD Up/Down Dual Clock Counters (with Reset)	16 (B36/B64)
DN74LS193/S	Synchronous 4-bit Binary Up/Down Dual Clock Counters (with Reset)	16 (B36/B64)
DN74LS195A/S	4-bit Parallel Access Shift Registers	16 (B36/B64)
DN74LS197/S	30MHz Presettable Binary Counters/Latches	14 (B34/B63)
DN74LS221/S	Dual Monostable Multivibrators	16 (B36/B64)
DN74LS240/S	Octal Buffers and Line Drivers (with 3-state Outputs)	20 (B43/B67)
DN74LS241/S	Octal Buffers and Line Drivers (with 3-state Outputs)	20 (B43/B67)
DN74LS242/S	Quad Bus Transceivers (with 3-state Outputs)	14 (B34/B63)
DN74LS243/S	Quad Bus Transceivers (with 3-state Outputs)	14 (B34/B63)
DN74LS244/S	Octal Buffers and Line Drivers (with 3-state Outputs)	20 (B43/B67)
DN74LS245/S	Octal Bus Transceivers (with 3-state Outputs)	20 (B43/B67)
DN74LS251/S	8 to 1-line Data Selectors/Multiplexers (with 3-state Outputs)	16 (B36/B64)
DN74LS253/S	Dual 4-line to 1-line Data Selectors/Multiplexers (with 3-state Outputs)	16 (B36/B64)
DN74LS257A/S	Quad 2-line to 1-line Data Selectors/Multiplexers (with 3-state Outputs)	16 (B36/B64)
DN74LS258A/S	Quad 2-line to 1-line Data Selectors/Multiplexers (with 3-state Outputs)	16 (B36/B64)
DN74LS259/S	8-bit Addressable Latches	16 (B36/B64)
DN74LS260/S	Dual 5-input Positive NOR Gates	14 (B34/B63)
DN74LS266/S	Quad 2-input Exclusive NOR Gates (with Open Collector Outputs)	14 (B34/B63)
DN74LS273/S	Octal D-type Flip-Flops (with Reset)	20 (B43/B67)
DN74LS279/S	Quad S-R Latches	16 (B36/B64)
DN74LS280/S	9-bit Odd/Even Parity Generators/Checkers	14 (B34/B63)
DN74LS283/S	4-bit Binary Full Adders (with Fast Carry)	16 (B36/B64)
DN74LS290/S	Decade Counters	14 (B34/B63)
DN74LS293/S	4-bit Binary Counters	14 (B34/B63)
DN74LS298/S	Quad 2-input Multiplexers (with Storage)	16 (B36/B64)
DN74LS363/S	Octal Transparent Latches (with 3-state Outputs)	20 (B43/B67)
DN74LS364/S	Octal D-type Flip-Flops (with 3-state Outputs)	20 (B43/B67)
DN74LS365A/S	Hex Bus Drivers (with 3-state Outputs)	16 (B36/B64)
DN74LS366A/S	Hex Bus Drivers (with 3-state Outputs)	16 (B36/B64)
DN74LS367A/S	Hex Bus Drivers (with 3-state Outputs)	16 (B36/B64)
DN74LS368A/S	Hex Bus Drivers (with 3-state Outputs)	16 (B36/B64)
DN74LS373/S	Octal D-type Transparent Latches (with 3-state Outputs)	20 (B43/B67)
DN74LS374/S	Octal D-type Edge-Triggered Flip-Flops (with 3-state Outputs)	20 (B43/B67)
DN74LS375/S	Quad Bistable Latches	16 (B36/B64)
DN74LS377/S	Octal D-type Flip-Flops (with Enable)	20 (B43/B67)
DN74LS378/S	Hex D-type Flip-Flops (with Enable)	16 (B36/B64)
DN74LS386/S	Quad 2-input Exclusive OR Gates	14 (B34/B63)
DN74LS390/S	Dual Decade Counters	16 (B36/B64)
DN74LS393/S	Dual 4-bit Binary Counters	14 (B34/B63)
DN74LS540/S	Octal Buffers and Line Drivers (with 3-state Outputs)	20 (B43/B67)
DN74LS541/S	Octal Buffers and Line Drivers (with 3-state Outputs)	20 (B43/B67)

△ Under development. Package: Standard DIP Package (Dual-In-Line Plastic Package) and Pana-Flat package (SO package), "S" is attached to the type No. of Pana-Flat package.

Standard Logic ICs

■ TTL DN74 LS Series (continued)

Type No.	Functions	Pins (Package No.)
DN74LS640/S	Octal Bus Transceivers (with 3-state Outputs)	20 (B43/B67)

■ Function List of TTL DN74 LS Series

Functions	DN74LS Series					
Gates	DN74LS00,	DN74LS01,	DN74LS02,	DN74LS03,	DN74LS04,	DN74LS05,
	DN74LS08,	DN74LS09,	DN74LS10,	DN74LS11,	DN74LS12,	DN74LS13,
	DN74LS14,	DN74LS15,	DN74LS20,	DN74LS21,	DN74LS22,	DN74LS26,
	DN74LS27,	DN74LS30,	DN74LS32,	DN74LS51,	DN74LS54,	DN74LS55,
	DN74LS86,	DN74LS132,	DN74LS136,	DN74LS260,	DN74LS266,	DN74LS386
Buffers	DN74LS28,	DN74LS33,	DN74LS37,	DN74LS38,	DN74LS38-1	
Drivers	DN74LS16-1,	DN74LS17-1,	DN74LS125A,	DN74LS126A,	DN74LS240,	DN74LS241
	DN74LS244,	DN74LS365A,	DN74LS366A,	DN74LS367A,	DN74LS368A,	DN74LS540,
	DN74LS541					
Transceivers	DN74LS242,	DN74LS243,	DN74LS245,	DN74LS640		
Flip-Flops	DN74LS73A,	DN74LS74A,	DN74LS76A,	DN74LS78A,	DN74LS107A,	DN74LS109,
	DN74LS112A,	DN74LS113A,	DN74LS114A,	DN74LS123,	DN74LS174,	DN74LS175,
	DN74LS221,	DN74LS273,	DN74LS364,	DN74LS374,	DN74LS377,	DN74LS378
Latches	DN74LS75,	DN74LS173,	DN74LS259,	DN74LS279,	DN74LS363,	DN74LS373,
Decoders	DN74LS42,	DN74LS138,	DN74LS139,	DN74LS145,	DN74LS148,	DN74LS154,
	DN74LS155,	DN74LS156				
Shift Registers	DN74LS95B,	DN74LS96,	DN74LS164,	DN74LS165,	DN74LS166,	DN74LS195A
Counters	DN74LS90,	DN74LS92,	DN74LS93,	DN74LS160A,	DN74LS161A,	DN74LS162A,
	DN74LS163A,	DN74LS191,	DN74LS192,	DN74LS193,	DN74LS197,	DN74LS290,
	DN74LS293,	DN74LS390,	DN74LS393			
Data Selectors	DN74LS151,	DN74LS153,	DN74LS157,	DN74LS158,	DN74LS251,	DN74LS253,
	DN74LS257A,	DN74LS258A,	DN74LS298			
Arithmetic Logic Units	DN74LS83A,	DN74LS181,	DN74LS280,	DN74LS283		
Memories	DN74LS170					
Comparators	DN74LS85					

Package: Standard DIP Package (Dual-In-Line Plastic Package) and Pana-Flat package (SO package), "S" is attached to the type No. of Pana-Flat package.

Bipolar Digital ICs

■ Driver Arrays

Type No.	Functions	Input Resistor (Ω)	Output Breakdown Voltage $V_{CE(SUS)}$ (V)	Output Current (mA)	Output Clamp Diode	Numbers of Circuits	Package	
								No.
DN8650	"L" input active driver (Emitter common)	LS TTL Compatible	35	500	No	7	16-DIP	B35
DN8661	Darlington driver (Emitter common)	No	50	500	Yes	7	16-DIP	B35
DN8663	Darlington driver (Emitter common)	2.7k	50	500	Yes	7	16-DIP	B35
DN8664	Darlington driver (Emitter common)	10.5k	50	500	Yes	7	16-DIP	B35
DN8690	Darlington driver (Emitter common)	8k+Diode	60	1.5A	Yes	4	16-DIP	B35
DN8695	Darlington driver (Emitter common)	LS TTL Compatible	50	1.5A	No	9	23-ZIP(F)	B29

■ Hall ICs

Application	Type No.	Functions	Package	
				No.
Hall IC for switch/ sensor	DN6837	Switch type, open collector	3-SIP	B1
	DN6838	Switch type, DTL/TTL direct drive	3-SIP	B1
	DN6839	Switch type, open collector, wide operating voltage ($V_{CC}=8.5\sim 16V$)	3-SIP	B1
	DN6844S	Switch type, TTL MOS IC direct drive, Operating voltage ($V_{CC}=3.6\sim 16V$)	SOH-4D	B58
	DN6845S	Switch type, Open collector, Operating voltage ($V_{CC}=3.6\sim 16V$) One way magnetic field operation	SOH-4D	B58
	DN6846S	Switch type, Open collector, Operating power supply voltage ($V_{CC}=3.6\sim 16V$) Alternative magnetic field operation	SOH-4D	B58
	DN6847/S	Switch type, TTL MOS IC direct drive, Operating voltage (max.=100°C)	3-SIP/SOH-4D	B1 B58
	DN6848/S	Open collector, One way magnetic field operation, Operating temperature (max.=100°C)	3-SIP/SOH-4D	B1 B58
	DN6849/S	Open collector, Alternative magnetic field operation, Operating temperature (max.=100°C)	3-SIP/SOH-4D	B1 B58
	DN6851	Switch type, TTL MOS IC direct drive, operating voltage ($V_{CC}=3.6\sim 16V$)	3-SIP	B1
	DN6852	Switch type, Open collector, Operating voltage ($V_{CC}=3.6\sim 16V$) One way magnetic field operation	3-SIP	B1
	DN6853	Switch type, open collector, operating power supply voltage ($V_{CC}=3.6\sim 16V$) Alternative magnetic field operation	3-SIP	B1
	DN8897/S	Zero cross, Operating temperature (max.=100°C)	3-SIP/SOH-4D	B1 B58
	DN8899/S	Open collector, Zero cross, Operating temperature (max.=100°C)	3-SIP/SOH-4D	B1 B58

■ Prescalers

Category	Type No.	Output		Package		Remarks
		Frequency Demultiplying Ratio	Output Format		No.	
1GHz High-Speed Prescaler	DN8500	1/256	ECL	8-DIP(a)	B31	
	DN8502	1/64	ECL	8-DIP(a)	B31	
	DN8503	1/64	ECL	8-DIP(a)	B31	With output buffer amp.
	DN8505	1/128, 1/136	ECL	8-DIP(b)	B32	Pulse swallow type
	DN8506	1/128, 1/136	ECL	8-DIP(b)	B32	Pulse swallow type Low power dissipation
	DN8506S			SO-8D	B61	
	DN8510	1/256	ECL	7-SIP	B10	
	DN8512	1/64	ECL	7-SIP	B10	
	DN8530	1/256	ECL	9-SIP	B12	
	DN8532	1/64	ECL	9-SIP	B12	

■ Others

Application	Type No.	Functions	Package	
				No.
Decoder	DN852P	Binary, Octal decoder	16-DIP (a)	B35

(Package Symbol) SIP=Single-In-Line Plastic Package, DIP=Dual-In-Line Plastic Package, (F)=with Fin

ZIP=Zigzag type Shrunk Single-In-Line Plastic Package, SOH=Small Outline Package for Hall ICs

SO=Small Outline, 8D=8 Pin Dual-In-Line (Example)

General Purpose Linear ICs

Operational Amplifier Series ($V_{CC}=15V$, $V_{EE}=-15V$)

Category	Functions	Type No.	Package		Operating Power Supply Voltage		Power Consumption max. (mW)	Input Offset Voltage max. (mV)	Input Offset Current max. (nA)	Input Bias Current max. (nA)	Output Voltage min. (V)	Slewing Rate typ. (V/ μ s)	Noise Voltage Converted to Input typ. (μ Vrms)					
			No.		(V)	(V)												
Single Power Supply	General Use	Dual	AN6561	9-SIP	B12	$\pm 1.5 \sim \pm 15$	3 ~ 30	6	7 ^{*1}	50 ^{*1}	250 ^{*1}	$V_{CC}-1.5$	0.3 ^{*1}	6.0 ^{*1}				
			AN1358(AN6562)	8-DIP	B32			6										
			AN1358S(AN6562S)	SO-8D	B61			6										
		Quad	AN1324(AN6564)	14-DIP	B33			10										
			AN1324NS(AN6564NS)	SO-14D	B63			10										
	High Output	Dual	AN6567	9-SIP*	B13	$\pm 1.5 \sim \pm 7.5$	3 ~ 15	35 ^{*1}	5 ^{*1}	100 ^{*1}	500 ^{*1}	3.3 ^{*1} ($V_{CC}=5V$)	1.0 ^{*1}	—				
			AN6568	8-DIP	B31													
			AN6568S	SO-8D	B61													
	Reference Volt Built-in	Single	AN6500	8-DIP	B32	$\pm 1.5 \sim \pm 12$	3 ~ 24	20 ^{*1}	7 ^{*1}	300 ^{*1}	500 ^{*1}	3.5 ^{*1} ($V_{CC}=5V$)	0.6 ^{*1}	—				
			AN6500S	SO-8D	B61													
AN6501			7-SIP	B10														
2-Power Supplies	Audio Band	Dual	AN6550	9-SIP	B12	$\pm 2 \sim \pm 12$	4 ~ 24	15	6 ^{*2}	200 ^{*2}	500 ^{*2}	$\pm 1*2$	0.8 ^{*2}	2.5 ^{*2}				
			AN6551					500			± 10		1.0	2.5				
			AN6555					500			± 10		2.0	1.5				
			AN6557	9-SIP*	B13			240			3		—	± 10	6.0	0.9		
			AN1833	8-DIP	B31			$\pm 4 \sim \pm 18$			8 ~ 36		210	3	1000	± 10	6.0	0.9
			AN4558(AN6552)										170	6	500	± 10	1.0	2.5
			AN6553										170	6	500	± 10	2.0	2.5
			AN6556	170	6			500			± 10		2.0	1.5				
			AN6558	240	3			—			± 10		6.0	0.9				
			AN1833S	SO-8D	B61			$\pm 4 \sim \pm 18$			8 ~ 36		210	3	1000	± 10	6.0	0.9
			AN4558S(AN6552S)										170	6	500	± 10	1.0	2.5
			AN6553S										170	6	500	± 10	2.0	2.5
			AN6556S	170	6			500			± 10		2.0	1.5				
			AN6558S	240	3			—			± 10		6.0	0.9				
			General Use	Quad	AN6554			14-DIP			B33		$\pm 2 \sim \pm 15$	4 ~ 30	240	5	50	300
	AN6574	360			3	200	1000		± 10	6.0		0.9						
	AN6554NS	SO-14D			B63	240	5	50	300	± 10	1.6	2.5						
	AN6574S					360	3	200	1000	± 10	6.0	0.9						
	General Use	Single	AN6573	7-SIP	B10	$\pm 2 \sim \pm 15$	4 ~ 30	85	4	100	250	± 10	0.7	4.0				
			AN1741(AN6570)	8-DIP	B31			85										
AN1741S(AN6570S)			SO-8D	B61	85													
Dual		AN6571	9-SIP*	B13	170													
		AN1458(AN6572)	8-DIP	B31	170													
		AN1458S	SO-8D	B61	170													
High Input Impedance (FET Input)	Single	AN6583	7-SIP	B10	$\pm 5 \sim \pm 15$	10 ~ 30	85	10	0.2	0.4	± 10	11	4.0					
		AN1081	8-DIP	B31			85											
		AN1081S	SO-8D	B61			85											
	Dual	AN6581	9-SIP*	B13			170											
		AN1082	8-DIP	B31			170											
		AN1082S	SO-8D	B61			170											
	Quad	AN1084	14-DIP	B33			340											
AN1084S		SO-18D	B66															
Low Power Consumption	Single	AN6593	9-SIP*	B13	$\pm 1 \sim \pm 18$	2 ~ 36	3	6	20	75	± 10	0.2	6.0					
		AN4250	8-DIP	B31														
		AN4250S	SO-8D	B61														
	Dual	AN6592	8-DIP	B31														
		AN6592S	SO-8D	B61														

Δ Under development *1 $V_{CC}=5V$, $V_{EE}=0V$, *2 $V_{CC}=2.5V$, $V_{EE}=-2.5V$

(Package Symbol) SIP=Single-In-Line Plastic Package, DIP=Dual-In-Line Plastic Package, (SO)=Small Outline, 8D=8 Pin-Dual-in-Line (Example)

* Smaller (Lower in Height) than Conventional 9-SIP Package

General Purpose Linear ICs

Comparison Table of Op Amps

Category	Maker	Panasonic	NEC	Shin Nihon Musen	Toshiba	Hitachi	Fairchild	T.I	N.S	Motorola	RCA	Package					
												No.					
Single Power Supply	General Purpose	Dual	AN6561		NJM2904S	TA75358S							9-SIP	B12			
			AN1358 (AN6562)	μ PC358C μ PC1251C	NJM2904D	TA75358P	HA17904PS	LM358	LM358P	LM358	LM358P	CA358		8-DIP	B32		
			AN1358S (AN6562S)	μ PC358G μ PC1251G	NJM2904M	TA75358F						LM358D			SO-8D	B61	
		Quad	AN1324 (AN6564)	μ PC324C μ PC451C	NJM2902D	TA75902P	HA17902PS	μ A324P	LM324N	LM324	LM324N	CA324		14-DIP	B33		
			AN1324NS (AN6564NS)	μ PC324G μ PC451G	NJM2902M	TA75902F						LM324D			SO-14D	B63	
	2-Power Supply Sources	Audio Band	Dual	AN6551		NJM4558S	TA75558S							9-SIP	B12		
				AN4558 (AN6552)	μ PC258C μ PC4558C	NJM4558D	TA75558P	HA17558PS	μ A4558TC	RC4558P		MC4558CP1			8-DIP	B31	
				AN4558S (AN6552S)	μ PC258G μ PC4558G	NJM4558M	TA75558F						MC4558CD			SO-8D	B61
				AN6553	μ PC4559C	NJM4559D	TA75559P									8-DIP	B31
				AN6553S		NJM4559M	TA75559F									SO-8D	B61
				AN6555		NJM4559S	TA75559S									9-SIP	B12
AN6556				μ PC4559C	NJM4559D	TA75559P				TL4558A					8-DIP	B31	
AN6556S					NJM4559M	TA75559F									SO-8D	B61	
AN6557					NJM2043S										9-SIP※	B13	
AN6558					NJM2043D										8-DIP	B31	
AN6558S					NJM2043M										SO-8D	B61	
AN1833/S				μ PC4570	NJM2068							LM833			8-DIP/ SO-8D	B31 B61	
General Purpose		Quad	AN6554	μ PC458C μ PC4741C	NJM2058D			μ A4136	RC4136	LM4741	MC4741CP			14-DIP	B33		
			AN6554NS	μ PC458G μ PC4741G	NJM2058M						MC4741CD			SO-14D	B63		
			AN6574											14-DIP	B33		
General Purpose		Single	AN6573			TA7504S								7-SIP	B10		
			AN1741 (AN6570)	μ PC151C μ PC741C	NJM741D	TA7504P	HA17741PS	μ A741TC	μ A741CP	LM741CN	MC1741CP1	CA741		8-DIP	B31		
			AN1741S (AN6570S)	μ PC151G μ PC741G	NJM741M							MC1741CD			SO-8D	B61	
	Dual	AN6571			TA75458S									9-SIP※	B13		
		AN1458 (AN6572)	μ PC251C μ PC1458C	NJM1458D	TA75458P	HA17458PS	μ A1458TC	MC1458P	LM1458	MC1458CP1	CA1458		8-DIP	B31			
		AN1458S	μ PC251G μ PC1458G	NJM1458M	TA75458F						MC1458CD			SO-8D	B61		
Bi-FET type	Single	AN6583											7-SIP	B10			
		AN1081	μ PC801C μ PC4081C			HA17080PS		TL-081CP		TL081CP	CA081		8-DIP	B31			
		AN1081S	μ PC801G μ PC4081G								TL081CD			SO-8D	B61		
	Dual	AN6581		NJM082S										9-SIP※	B13		
		AN1082	μ PC803C μ PC4082C	NJM082D		HA17082PS		TL-082C		TL082CP	CA082		8-DIP	B31			
		AN1082S	μ PC803G μ PC4082G	NJM082M							TL082CD			SO-8D	B61		
Quad	AN1084	μ PC804C μ PC4084C	NJM084D		HA17084P		TL-084C		TL084CN	CA084		14-DIP	B33				
	AN1084S								TL084CD				SO-18D	B66			
Low Power Consumption	Single	AN6593											9-SIP※	B13			
		AN4250	μ PC4250C μ PC802C	NJM4250D					LM4250CN				8-DIP	B31			
		AN4250S	μ PC4250G μ PC802G	NJM4250M										SO-8D	B61		
	Dual	AN6592/S											8-DIP/ SO-8D	B31 B61			

Note) Type numbers in () are old type number. ※ Resin thickness: Small size

General Purpose Linear ICs

■ Comparator Series ($V_{CC}=5V$)

Classification	Functions	Type No.	Package		Operating Power Supply Voltage		Power Supply Current max. (mA)	Input Offset Voltage max. (mV)	Input Offset Current max. (nA)	Input Bias Current max. (nA)	Output Current mm (mA)	Response Time typ. (μ s)
			No.	No.	(V)	(V)						
High Speed	Single	AN1311	8-DIP	B31	$\pm 2.5 \sim \pm 18$	$+5 \sim +36$	7.5	7.5	50	250	70	0.12
		AN1311S	SO-8D	B61								
	Dual	AN1319	14-DIP	B33	$\pm 1 \sim \pm 18$	$+5 \sim +18$	12.5	8	200	1000	30	0.08
		AN1319S	SO-14D	B63								
General Use	Dual	AN1393(AN6914)	8-DIP	B32	$\pm 1 \sim \pm 18$	2~36	1.5	5	50	250	10	1.3
		AN1393S(AN6914S)	SO-8D	B61							10	
		AN6913	9-SIP	B12							10	
	Quad	AN1339(AN6912N)	14-DIP	B33							10	
		AN1339S	SO-14D	B63							10	
		AN6912	14-DIP	B33							6	
		AN6912S	SO-14D	B63							6	
High Current	Dual	AN6915	9-SIP	B12	$\pm 1 \sim \pm 18$	2~36	5.3	5	50	200	70	2
		AN6916	8-DIP	B31			5.3					
		AN6916S	SO-8D	B61			5.3					
	Quad	AN6918	14-DIP	B33			10.0					

■ Comparison Table of Comparators

Maker Category	Panasonic	NEC	Shin Nihon Musen	Toshiba	Hitachi	Mitsubishi	Sanyo	N.S	Fairchild	T.I	Package	No.
	Single	AN1311	μ PC311C μ PC271C	NJM311D					LM311N	μ A311TC	LM311P	8-DIP
AN1311S		μ PC311G μ PC271G	NJM311M								SO-8D	B61
Dual	AN1319	μ PC319C μ PC272C	NJM319					LM319N			14-DIP	B33
	AN1319S	μ PC272G									SO-14D	B63
	AN6913		NJM2903S	TA75393S		M5233L	LA6393S				9-SIP	B12
	AN1393 (AN6914)	μ PC393C μ PC277C	NJM2903D	TA75393P	HA17393	M5233P	LA6393D	LM393N LM2903	μ A393 μ A2903	LM393P LM2903	8-DIP	B32
	AN1393S (AN6914S)	μ PC393G μ PC277G	NJM2903M	TA75393F		M5233FP	LA6393M				SO-8D	B61
	AN6915		NJM2403S			M51207L					9-SIP	B12
	AN6916		NJM2403D								8-DIP	B31
	AN6916S										SO-8D	B61
Quad	AN6912	μ PC177	NJM2901D	TA75339P	HA17901P	M5234P	LA6339D	LM339N LM2901	μ A3302P	LM339N	14-DIP	B33
	AN6912S	μ PC177G	NJM2901M	TA75339F		M5234FP	LA6339M				SO-14D	B63
	AN1339 (AN6912N)	μ PC339C			HA17339	M5234P			μ A339P	LM339N	14-DIP	B33
	AN1339S	μ PC339G				M5234FP					SO-14D	B63
	AN6918					M51209L					14-DIP	B33

Note) Type numbers in () are old type numbers.

(Package Symbol) SIP=Single-In-Line Plastic Package, DIP=Dual-In-Line Plastic Package, SO=Small Outline, 8D=8 Lead Dual-In-Line (Example)

General Purpose Linear ICs

■ Voltage Regulator Series

● 3-Terminal Positive Output (AN7800/AN7800F/AN78M00/AN78M00F/AN78N00/AN78L00 Series)

Output Current	Output Voltage (V)											
	4	5	6	7	8	9	10	12	15	18	20	24
1 A	—	AN7805/F	AN7806/F	AN7807/F	AN7808/F	AN7809/F	AN7810/F	AN7812/F	AN7815/F	AN7818/F	AN7820/F	AN7824/F
0.5A	—	AN78M05/F	AN78M06/F	AN78M07/F	AN78M08/F	AN78M09/F	AN78M10/F	AN78M12/F	AN78M15/F	AN78M18/F	AN78M20/F	AN78M24/F
0.3A	AN78N04	AN78N05	AN78N06	AN78N07	AN78N08	AN78N09	AN78N10	AN78N12	AN78N15	AN78N18	AN78N20	AN78N24
0.1A	AN78L04	AN78L05	AN78L06	AN78L07	AN78L08	AN78L09	AN78L10	AN78L12	AN78L15	AN78L18	AN78L20	AN78L24

Package: AN7800/AN78M00 Series = TO-220 (No.B4), AN7800F/AN78M00F Series = TO-220Ⓔ (No.B5), AN78N00 Series = TO-126 (No.B3), AN78L00 Series = TO-92 (No.B2)

● 3-Terminal Negative Output (AN7900/AN7900F/AN79M00/AN79M00F/AN79N00/AN79L00 Series)

Output Current	Output Voltage (V)											
	-4	-5	-6	-7	-8	-9	-10	-12	-15	-18	-20	-24
1 A	—	AN7905/F	AN7906/F	AN7907/F	AN7908/F	AN7909/F	AN7910/F	AN7912/F	AN7915/F	AN7918/F	AN7920/F	AN7924/F
0.5A	—	AN79M05/F	AN79M06/F	AN79M07/F	AN79M08/F	AN79M09/F	AN79M10/F	AN79M12/F	AN79M15/F	AN79M18/F	AN79M20/F	AN79M24/F
0.3A	AN79N04	AN79N05	AN79N06	AN79N07	AN79N08	AN79N09	AN79N10	AN79N12	AN79N15	AN79N18	AN79N20	AN79N24
0.1A	AN79L04	AN79L05/M	AN79L06	AN79L07	AN79L08/M	AN79L09/M	AN79L10	AN79L12/M	AN79L15/M	AN79L18	AN79L20	AN79L24

Package: AN7900/AN79M00 Series = TO-220 (No.B2), AN7900F/AN79M00F Series = TO-220 Ⓔ (No.B5), AN79N00 Series = TO-126 (No.B3), AN79L00 Series = TO-92 (No.B2)

● 3-Terminal Low Voltage Drop Positive Output (AN8000 Series)

Output Current	Output Voltage (V)											
	2	2.5	3	4	4.5	5	6	7	8	8.5	9	10
50mA	AN8002/M	AN8025/M	AN8003/M	AN8004/M	AN8045/M	AN8005/M	AN8006/M	AN8007/M	AN8008/M	AN8085/M	AN8009/M	AN8010/M

$V_{DIF}=0.3V$ $I_{Bas}=0.6mA$ $RR=60dB$ Package: AN8000 Series=TO-92(No. B2), AN8000M Series=TO-243 (No. B79)

● 4-Terminal with Reset Terminal (AN7800R/AN78M00R Series)

Output Current (A)	Output Voltage (V)				Package	No.
	5	8	9	12		
1	AN7805R	—	AN7809R	AN7812R	4-SIP(F)	B7
0.5	AN78M05R	AN78M08R	AN78M09R	AN78M12R	4-SIP(F)	B7

● 3-Terminal Variable Positive Output Shunt Regulator

Type No.	Function	Package	No.
AN1431/T	$V_0=2.5\sim 36V$, $I_0=1\sim 100mA$, Allowance -2% , $V_{REF}=2.5V$, $I_{REF}=2\mu A$	8-DIP/ TO-92	B2 /B79

● 4-Terminal Variable Output Voltage Type

Type No.	Function	Package	No.
AN6530	$V_0=5\sim 30V$, $I_0=0.5A$	6-DIP (F)	B30
AN6531	$V_0=5\sim 30V$, $I_0=0.5A$	4-SIP (F)	B7
AN6535	$V_0=-5\sim -30V$, $I_0=0.5A$	4-SIP (F)	B7

● Input/Output Voltage Difference 0.6V Regulator

Type No.	Function	Package	No.
AN6545/SP	$V_0=5V$, $I_0=300mA$	TO-126/ SP-5S	B3/ B77
AN6546/SP	$V_{01}=5V$, V_{02} = Variable	TO-126/ SP-5S	B3/ B77
AN6548S	$V_0=3.2V$, I_0 = External Tr.	SO-8D	B61

● 4-Terminal Variable Rise Time Input/Output Voltage Difference 0.3V Type

Type No.	Function	Package	No.
AN6540	$V_0=8.5V$, $I_0=0.25A$	4-SIP (F)	B7

● 3-Terminal Input/Output Voltage Difference 0.3V Type

Type No.	Output Current(A)	Output Voltage(V)	Package	No.
AN6541	0.3	9	TO-220	B4

● Low Voltage Drop Negative Output Regulator with Reset Terminal

Type No.	Function	Package	No.
AN8060	$V_0=-4V$, $I_{0max}=30mA$ Built-in reduced voltage sensing comparator	8-DIP	B32
AN8062	$V_0=-4V$, $I_{0max}=30mA$ Built-in reduced voltage sensing comparator	8-DIP	B32

● Switching Regulator

Type No.	Function	Package	No.
AN8080K	Switching power supply for raising voltage with memory back-up power supply switch	20-SDIP	B49
AN8090/S	FET power Tr direct drive f_{osc} max.=500kHz	16-DIP /SONF-20D	B36/ B68

(Package Symbol) SIP=Single-In-Line Plastic Package, DIP=Dual-In-Line Plastic Package, SO=Small Outline, 8D=8 Lead Dual-In-Line (Example) (F)=with Fin TO-220(F)=TO-220 type with Full Pack package.

General Purpose Linear ICs

■ Voltage Regulator Series (continued)

● Multi Output

Type No.	Functions	Output 1	Output 2	Output 3	Output 4	Output 5	Package	No.
AN8050S	Built-in four fixed positive and negative outputs. Built-in thermal detector and decrease voltage detector.	±5V, 80mA	±5V, 200mA *	±5V, 50mA	-4.3V, 10mA	—	SO-18D	B66
AN8072N	Built-in five fixed positive output. With ON/OFF function over current protector.	+8V, 200mA	+8V, 100mA	+10V, 12mA	+5V, 60mA	+5V, 60mA	12-SIP(F)	B21

* By external transistor

■ For Display Drivers

Category	Type No.	Operation Voltage (V)	Division		Functions				Remarks	Package	No.
			Logarithm	Linear	5 points	7 points	12 points	Built-in input amp.			
F	AN6870N	16~24	●						With 18 points × 2ch. peak hold	28-DIP	B47
L	AN6873N	max. -55							Segment driver 8 circuits	18-DIP	B40
L E D	AN6875	12~16	●		●					9-SIP	B12
	AN6876	12~16		●	●					9-SIP	B12
	AN6877	5~16		●		●		●		16-DIP(F)	B38
	AN6878	5~16	●			●		●		16-DIP(F)	B38
	AN6879	4.4~12	●			●		●		16-DIP	B35
	AN6882	6.2~16	●			●		●	With dot/bar display switching terminal	16-DIP	B37
	AN6884	3.5~16	●		●			●		9-SIP	B12
	AN6886	4~16	●		●			●	Priority to bigger input among 2 input amplifier	14-DIP	B33
	AN6887	5~16	●			●		●	Priority to bigger input among 2 input amplifier, 2 LED in series	16-DIP	B37
	AN6888	5~16	●		● (×2)			●	5 point × 2ch., 2 LED in series	18-DIP	B40
	AN6889	5~16	●		● (×2)			●	Optional model of AN6888, variation of input level	18-DIP	B39
	AN6891	7~16	●				●	●	3-LEDs serial	18-DIP	B39
	AN6892K/S	4.5~5.5	●				● (×2)		Peak hold	22-SDIP SO-22D	B50 B69
AN6997K	4.5~16							7 digits segment decoder driver	24-SDIP	B51	

(Package Symbol)

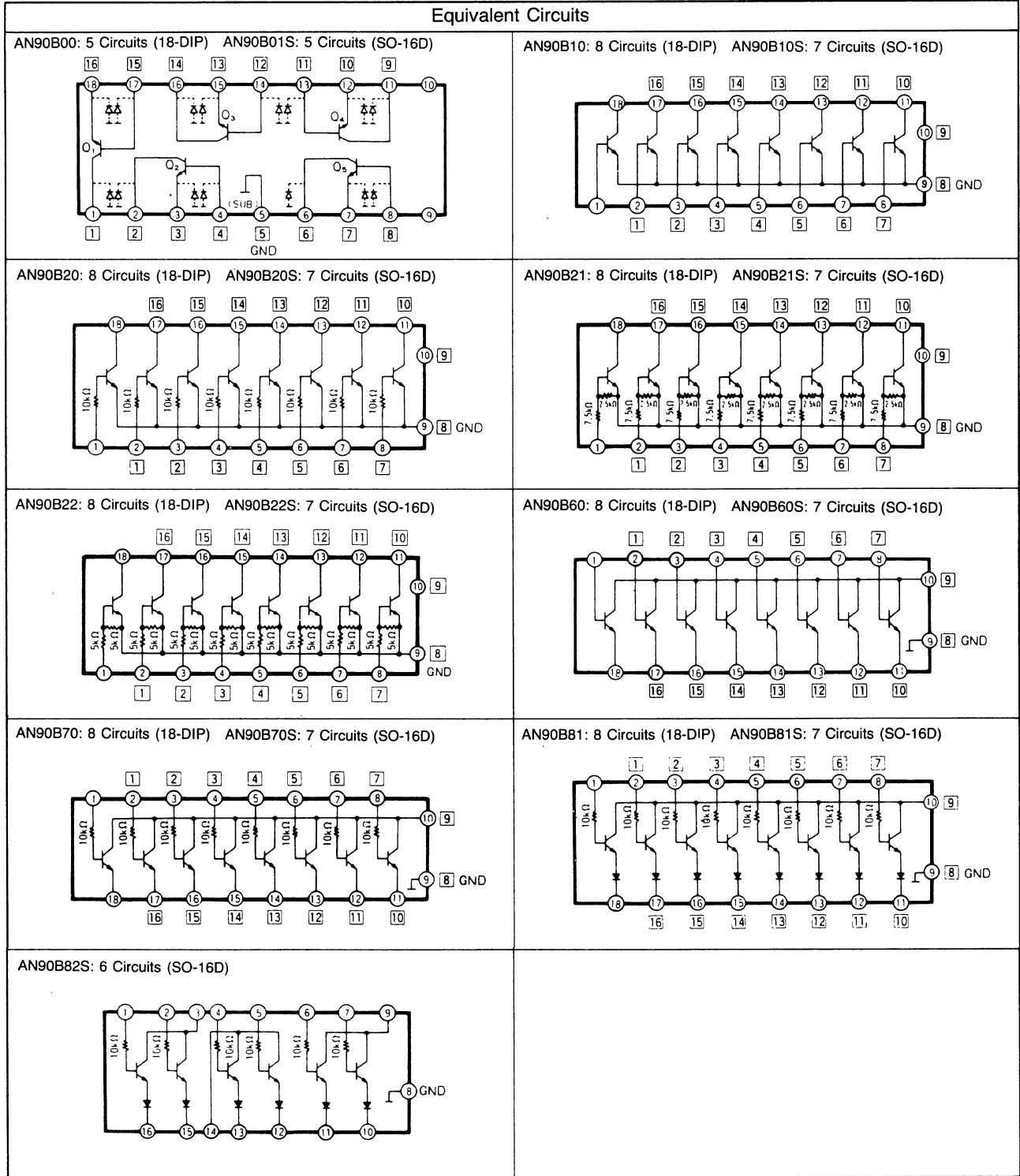
SIP=Single-In-Line Plastic Package, DIP=Dual-In-Line Plastic Package, SDIP=Shrunk Dual-In-Line Plastic Package, (F)=with Fin, SO=Small Outline

General Purpose Linear ICs

■ Transistor Arrays

● AN90B00/S Series ($V_{CE}=24V$, $I_C=25mA$)

(Note) Pin numbers in □ show those of SO package



(Package No.) 18-DIP=No.B39, SO-16D=No.B64

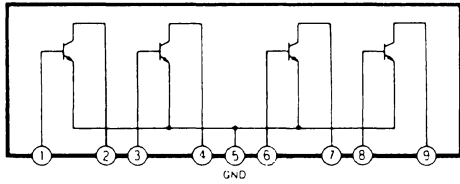
(Package Symbol) DIP=Dual-In-Line Plastic Package, SO=Small Outline, 16D=16 Pin Dual-In-Line (Example)

General Purpose Linear ICs

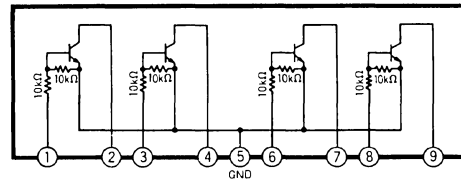
- AN90C00 Series ($V_{CE0}=24V$, $I_C=50mA$)

Equivalent Circuits

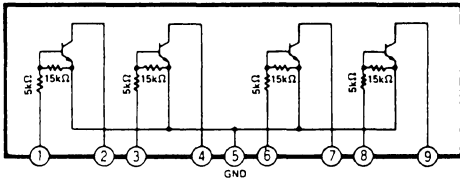
AN90C10: 4 Circuits (9-SIP)



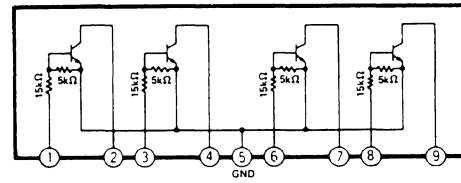
AN90C21: 4 Circuits (9-SIP)



AN90C22: 4 Circuits (9-SIP)



AN90C23: 4 Circuits (9-SIP)



(Package No.) 9-SIP=No.B12

General Purpose Linear ICs

Motor Control Series

Category	Type No.	Functions	Application	Package	No.
One Chip DD Motor Control	AN8270K	3-phase all wave, PLL speed control, $V_{CC} = 12V$, $V_M = 22V$ max, I_O max = 1.5A	Video disk, etc.	24-SDIP(P)	B52
Spindle Motor Control	AN8210K	3-phase all wave, FG control, Digital servo type, $V_{CC} = 12V$, I_O max = 900mA	FDD spindle	24-SDIP(P)	B52
	AN8212K	3-phase all wave, FG control, Digital servo type, $V_{CC} = 12V$, I_O max = 900mA, Speed switching	FDD spindle	24-SDIP(P)	B52
	AN8214S	3 phase, Digital F/V conversion type, $V_{CC}=9V\sim 15V$	FDD spindle	USONF-36D	B73
	AN8230K	3-phase all wave, FG control, Sample hold type, $V_{CC} = 12V$, I_O max = 500mA	FDD spindle	28-SDIP	B53
	AN8231K/S	3-phase all wave, FG control, Sample hold type, $V_{CC} = 5V$, I_O max = 500mA	FDD spindle	28-SDIP SO-28D	B53 B71
	AN8235S	3-phase Digital F/V conversion type, Built-in FG and EA amp. $V_{CC}=4.2V\sim 5.8V$	FDD spindle	SD-16D	B64
	AN8245K	3-phase, Reverse detection, Stop detection $V_{CC1}=12V$, $V_{CC2}=20V$, I_O max=1.5A	Laser Disk player spindle	24-SDIP(P)	B52
	AN8270K	3-phase all wave, Reverse detection, Stop detection $V_{CC1}=12V$, $V_{CC2}=20V$, I_O max=1.5A	Laser Disk player spindle	24-SDIP(P)	B52
	AN8281S	2-phase all wave, Electronic brake, Reverse detection, $V_{CC} = 12V$, Power Tr. outside fitting	CD player	SO-24D	B70
	AN8290S	3-phase all wave, PWM drive hall device $\times 2$, $V_{CC} = 4.5V\sim 20V$	CD player	SO-24D	B70
DD Motor Output Drive	AN6387	3-phase half wave, Electronic Brake, Lock detection protection, Hall element position detection, I_O max = 1A $V_{CC} = 12V$, V_M max = 24V	DD cylinder of VCR	24-DIP(P)	B46
	AN6386/K	SW Drive, Capstan/cylinder Motor $V_{CC} = 5V$, V_M max = 24V, I_O max = 1.5A	VCR cylinder (8 m/m) capstan	24-DIP(P)/ 24-SDIP(P)	B46 B52
	AN3810K	3-phase half wave, Electronic Brake, $V_{CC} = 5V$, V_M max = 24V, I_O max = 1.5A	VCR cylinder	24-SDIP(P)	B52
	AN3821K	3-phase all wave, Positive/reverse rotation, Electronic Brake $V_{CC} = 5V$, V_M max = 24V, I_O max = 1.5A	VCR capstan	24-SDIP(P)	B52
	AN3830K	3-phase wave, $V_{CC} = 5V$, V_M max = 24V, I_O max = 1.5A	VCR real	24-SDIP(P)	B52
	AN6664S	TTL level input, $V_{IL}=\leq 0.8V$, $V_{IH}=\geq 2V$ $V_{CC}=3V\sim 16V$, $I_O=100\sim 150mA$	Video camera lens drive	SONF-16D	B65
	AN6666S	TTL level input, Positive/reverse rotation $V_{CC}=2.5V\sim 7V$, I_O max=1A	Camera lens drive, Shutter drive, Iris drive	SO-28D	B71
	AN6667S	TTL level input, Positive/reverse rotation $V_{CC}=2.5V\sim 7V$, I_O max=500mA		SO-18D	B66
Electronic Governor	AN6607S	16 pins, External power Tr. $V_{CC}=8V\sim 16V$, I_O max=1A	Cassette deck Radio cassette recorder	SONF-16D	B65
	AN6609N	16 pins, 3 bit input $V_{CC}=8V\sim 16V$, I_O max=1A	Cassette deck Radio cassette recorder	16-DIP(F)	B38
	AN6610	3 pins, Proportional current control (20:1), I_O max = 1A, $V_{CC} = 4.5\sim 6V$	Cassette tape recorder Player (for 9V, 12V)	TO-126	B 3
	AN6650/S	8 pins, Resistor bridge control (10:1), $V_{CC} = 1.8V\sim 6V$, I_O max = 1A	Headphone stereo (for 3V)	8-DIP/ SO-8D	B31 B61
	AN6651	4 pins, Proportional current control (40:1), $V_{CC} = 4.5\sim 16V$, I_O max=1A	Cassette deck Radio cassette tape recorder (for 6V, 9V)	TO-126 (4 Pin)	B 8
	AN6652	4 pins, Proportional current control (20:1), $V_{CC} = 6V\sim 20V$, I_O max = 1A	Cassette tape recorder Player (for 9V, 12V)	TO-126 (4 Pin)	B 8
	AN6653S	8 pins, Resistor bridge control, $V_{CC}=1V\sim 5V$	Head phone stereo Micro cassette	SO-8D	B61
	AN6656S	16 pins, External power Tr. Stop function. $V_{CC}=1.8V\sim 6V$	Radio cassette recorder Micro cassette	SO-16D	B64
	AN6612/S	8 terminals, Resistor bridge control, Power TR. outside fitting $V_{CC} = 1.8\sim 8V$	Headphone stereo (for 3V)	8-DIP/ SO-8D	B31 B61
	Stepping Motor Drive	AN6660/K	Positive/reverse bridge driver $V_{CC} = 4.5\sim 16V$, I_O max = 1A	VCR Loading, etc.	9-SIP(F)/ 9-SSIP(F)
AN6662		Positive/Negative bridge driver, 2 motors can be switched by 3-bit input, $V_{CC} = 4V\sim 20V$	VCR Loading	10-SIP	B17
AN8253S		Bipolar 1 phase drive, Power save function. $V_{CC}=5V$, I_O max=330mA	FDD stepping	SO-18D	B66
AN8250N		Bipolar 2 phase drive, Power save function, $V_{CC} = 12V$, I_O max. = 330mA	FDD	16-DIP	B36

(Package Symbol) SIP=Single-In-Line Plastic Package, SSIP=Shrunk Single-In-Line Plastic Package, DIP=Dual-In-Line Plastic Package, SDIP=Shrunk Dula-In-Line Dula-In-Line Plastic Package, (P)=Power type, SO=Small Outline, 24D=24 Pin-Dula-In-Line (Example)

General Purpose Linear ICs

■ A/D and D/A Converter Series

Type No.	AN6855T	AN6856	AN8120K	△ AN8110
Items				
Resolution (bit)	4	6	8	10
Circuit type	Flash	Flash	Flash	Flash
Output data format	Binary (TTL)	Binary (ECL)	Binary (TTL)	Binary (ECL)
Power supply voltage (V)	5, -6	-5.2	5	-5.2
Power consumption (mW)	170	250	400	1,000
Max. conversion speed(MSPS)	20	35	30	20
Linearity allowance (LSB)	$\pm \frac{1}{4}$	$\pm \frac{1}{2}$	$\pm \frac{1}{2}$	± 1
Input level	(Clock) TTL	(Clock) ECL	(Clock) TTL	(Clock) ECL
Package (No.)	16-DIP (C) (B37)	24-DIP (B45)	28-SDIP (B53)	68-LCC (B75)
Equivalent of other companies	TDC1021J (TRW)	TDC1014J (TRW) CA3300D (RCA) MB40576 (Fujitsu) MSM6229AS (Oki)	MB40578 (Fujitsu) HA19209 (Hitachi) HA19210 (Hitachi) HA19211 (Hitachi) HA19212 (Hitachi) CXA1096 (SONY)	CX20200 (SONY)

△: Under development

■ Others

Type No.	Supply Voltage (V)	Functions	Package	
				No.
AN829P	8 ~ 16	Dual attenuator	14-DIP	B33
AN5733	12	Dual attenuator	9-SIP	B12
AN5900	12	Switching regulator control circuit	9-SIP	B12
AN5902S	3.5 ~ 14.4	Switching regulator control circuit	SO-16D	B64
AN5905/S	12	Switching regulator control circuit	18-DIP/SO-18D	B39 B66
AN6410	6.2 ~ 17	Modulation low frequency amp. for transmitting	9-SIP	B12
AN6701S	5 ~ 15	Temperature sensor	SO-8D	B61
AN6880	6	Servo motor control circuit	7-SIP	B10

(Package Symbol) SIP=Single-In-Line Plastic Package, DIP=Dual-In-Line Plastic Package, SDIP=Shrunk Dual-In-Line Plastic Package, SO=Small Outline, 8D=8 Lead Dual-In-Line (Example)

Dedicated ICs/LSIs Selection Guide

MOS Digital LSIs (MNXXXX(X))
Bipolar Linear ICs (ANXXXX(X))

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ICs/LSIs for VCR and Camera

■ For VCRs

Category	Type No.	Supply Voltage (V)	Process	Functions	Package		
						No.	
Brightness Signal Processing Circuit	AN304	9, 12	Bipolar	Video FM limiter circuit	14-DIC	B57	
	AN3211K/NK	4.5~5.5		Brightness signal record processing circuit (Non linear emphasis: 5.5dB)	28-SDIP	B53	
	AN3211S/NS	4.5~5.5		Brightness signal record processing circuit	SO-28D	B71	
	AN3215K/N	4.5~5.5		Brightness signal record processing circuit (non linear emphasis: 7dB)	28-SDIP	B53	
	AN3215S/NS	4.5~5.5		Brightness signal record processing circuit	SO-28D	B71	
	AN3220K	9		Record amp. (4 head)	20-SDIP	B49	
	AN3224K	11~12.5		Recording amp. for HiFi VCR	20-SDIP	B49	
	AN3310K	5		Head amp. (4 head)	22-SDIP	B50	
	AN3311K	5		Head amp. (4 head)	22-SDIP	B50	
	AN3313/S	5		Video signal head amp. (2 head)	14-DIP/SO-14D	B33 B63	
	AN3314K	11~12.5 4.5~5.5		HiFi VCR rec. amp. playback amp. (2 head)	18-SDIP	B48	
	AN3320K	5		Playback video signal processing circuit (Inc. Picture Adj)	28-SDIP	B53	
	AN3320S	5		Playback video signal processing circuit (Inc. Picture Adj)	SO-28D	B71	
	AN6306/S	5		Record video signal processing circuit	22-DIP/SO-22D	B44 B69	
	AN6320N	9, 12		Head amp. (2 head)	14-DIP	B33	
	AN6326N	5		Head amp. (2 head)	18-DIP	B39	
	AN6337	5		Playback video signal processing circuit (FM Dem, Double Lin)	22-DIP	B44	
	Chroma Signal Processing Circuit	MN6163A/S		5	CMOS	Chroma signal processing circuit	18-SDIP/SO-18D
AN3594K		5	Bipolar	Chroma arrangement	20-SDIP	B49	
AN6360/S		9, 12		Chroma ACC (BM. R/P switching circuit)	18-DIP/SO-22D	B39 B69	
AN6361N/S		9, 12		Chroma APC (BM. killer, R/P switching)	16-DIP/SO-22D	B35 B69	
AN6362/S		9, 12		Chroma AFC (NTSC-PAL)	18-DIP/SO-22D	B39 B69	
AN6363S		9, 12		Chroma AFC (PAL)	SO-22D	B69	
AN6364S		12		PAL/SECAM signal discrimination	SO-14D	B63	
AN6366NK		5		Chroma signal processing circuit (NTSC, 2H/4H/6H)	22-SDIP	B50	
AN6366NS		5		Chroma signal processing circuit (NTSC, 2H/4H/6H)	SO-22D	B69	
AN6367K		5		Chroma signal processing circuit (PAL/quasi SECAM/quasi NTSC)	22-SDIP	B50	
AN6367S		5		Chroma signal processing circuit (PAL/quasi SECAM/quasi NTSC)	SO-22D	B69	
AN6368/S		5		PAL/SECAM signal discrimination	14-DIP/SO-14D	B33 B63	
AN6371		9, 12		Chroma APC (PAL)	16-DIP	B35	
AN6397		5		SECAM color signal processing circuit	24-DIP	B45	
AN6398		5		SECAM color killer circuit	20-DIP	B42	
Servo Signal Processing Circuit		MN6745		5	CMOS	One chip digital servo (PFG 3 value input)	28-SDIP
	MN67451	5		One chip digital servo (PG/FG 2 value input)		28-SDIP	L26
	MN6747	5	One chip digital servo with tape sensor	42-SDIP		L28	
	MN67471	5	One chip digital servo for one body video	44-QFP		L58	
	MN67472	5	One chip digital servo (Tape sensor writing control)	28-SDIP		L26	
	MN6748	5	One chip digital servo (High preciseness analog function)	28-SDIP		L26	
	MN67481	5	One chip digital servo (FM Audio)	28-SDIP		L26	
	△MN6749	5	One chip digital servo (digital tracking)	42-SDIP		L28	
	MN61752	5	Fine slow control	28-SDIP		L26	
	MN617521	5	Fine slow control	28-SDIP		L26	
	AN3790K	5	Bipolar	X value compensation, FM audio head switch	20-SDIP	B49	
	AN3791	5		X value compensation	9-SIP	B12	
	AN3792/S	5		Sylinder servo interface circuit	18-DIP/SO-18D	B39 B66	
	AN3794N	5		VCR capstan servo interface (2H/4H/6H discriminator built-in)	18-DIP	B39	
	AN3795N/S	5		VCR capstan servo interface (3H/6H discriminator built-in)	18-DIP/SO-18D	B39 B66	
	AN3810K	8~13		VCR sylinder DD motor drive circuit	24-SDIP (P)	B52	
	AN3821K	5		VCR capstan DD motor drive circuit (PNP power Tr. built-in)	24-SDIP (P)	B52	
	AN3824K	5		VCR capstan DD motor drive circuit (with external PNP power Tr.)	28-SDIP	B53	
	AN3912	5		FM audio head switch	7-SIP	B10	
	AN6342N	9		Reference divider circuit	7-SIP	B10	

(Package Symbol) SIP=Single-In-Line Plastic Package, DIP=Dual-In-Line Plastic Package, SSIP=Shrunk Single-In-Line Plastic Package, SDIP=Shrunk Dual-In-Line Plastic Package, SO=Small Outline, 22D=22 pin Dual-In-Line (Example) (P)=Power type (F)=with Fin

ICs/LSIs for VCR and Camera

■ For VCRs (continued)

Category	Type No.	Supply Voltage (V)	Process	Functions	Package		
						No.	
Servo Signal Processing Circuit	AN6344	9, 12	Bipolar	Cylinder servo control circuit (Builtin Vss signal rec./playback switch)	28-DIP	B 47	
	AN6345	9, 12		FG divider	16-DIP	B 35	
	AN6346N	5		Cylinder servo interface circuit (2PG-MM System)	18-DIP	B 39	
	AN6350	9, 12		Cylinder servo control circuit (with external Vss signal rec./playback switch)	28-DIP	B 47	
	AN6356N	5		Cylinder servo interface circuit (1PG-MM System)	18-DIP	B 39	
	AN6357N	5		Capstan servo interface circuit	20-DIP (a)	B 42	
	AN6359N	5		Capstan servo interface circuit	20-DIP (a)	B 42	
	AN6386K	5		Capstan/cylinder motor drive	24-SDIP (P)	B 52	
	AN6387	9, 12		Cylinder DD motor drive circuit	24-SDIP (P)	B 52	
	AN6660/K	4~20		Loading motor drive	9-SIP(F)/9-SSIP(F)	B 14 B 15	
	AN6662	4~20		Loading motor drive (2-motor drive)	10-SIP	B 17	
Sound Signal Processing Circuit	AN3920K	5	Bipolar	RF Amplifier	20-SDIP	B 49	
	AN3922K	5		Sound FM processing circuit	20-SDIP	B 49	
	AN3928K	5		Sound FM processing circuit (stereo)	28-SDIP	B 53	
	AN3932S	4.5~5.5		FM MODEM for HiFi VCR	VSO-32D	B 72	
	AN3972F	7.5~12.5		Noise reduction · Output switching for HiFi VCR	48-QFP	B 77	
	AN3990K	4.3~12		Rec. Playback circuit	18-SDIP	B 48	
	AN3991NS	4~12		Rec. Playback circuit with microphone amp.	SO-20D	B 67	
	AN6209/S	9		Rec. Playback circuit	22-DIP/SO-22D	B 44 B 69	
	AN6295NK	12		VCR Dual Hi-Fi Sound noise reduction system (Stereo)	30-SDIP	B 54	
	AN6298NK/NS	12		VCR Hi-Fi Sound noise reduction system	28-SDIP/SO-28D	B 53 B 71	
	AN6391NK	5		VHS VCR, FM audio rec./playback circuit	28-SDIP	B 53	
	AN6391NS	5		VHS VCR, FM audio rec./playback circuit	SO-28D	B 71	
CCD Video Signal Delay Device	MN3801/S	5, 6	NMOS	1H (906 stages, NTSC, 4fsc)	14-DIP(a)/SO-18D	L 4 L 49	
	MN3802A/S	5, 6		1H (1131 stage, PAL, 4fsc)	14-DIP(a)/SO-18D	L 4 L 49	
	MN3803	5, 6		0.5H (452 stages, NTSC, 4fsc)	14-DIP (a)	L 4	
	MN3810K/S	5, 9	CMOS	1H (454 stages, NTSC, 2fsc) clock freq. multiplier circuit built-in	18-SDIP/SO-18D	L 24 L 49	
	MN3811K/S	5, 9		1H (556.5 stages, PAL, 2fsc) clock freq. multiplier circuit built-in	18-SDIP/SO-18D	L 24 L 49	
	MN3814/S	5, 9		1H (906 stages, NTSC, 4fsc), Low EMI.	8-DIP/SO-18D	L 1 L 46	
	MN8028A	12	NMOS	0.5H×2 (455×, NTSC) Best combination with clock generator MN3104	16-DIP	L 7	
	MN3830S	5, 9	CMOS	1H (454 stages, NTSC, 2fsc), Built-in clock multiplier circuit, Low EMI.	SO-16D	L 48	
MN8040	5	NMOS	CCD video signal delay device (906 stages, NTSC, 4fsc, 5V single operation)	14-DIP	L 4		
Others	MN3104	12	CMOS	Clock generator/driver for CCD video signal delay device	14-DIP(F)	L 6	
	MN3106/S	5		CCD video signal delay device (4 multiplier clock generator)	8-DIP/SO-8D	L 1 L 46	
	MN3109/S	5		Clock multiplier (fsc→4fsc) for CCD video signal delay device.	8-DIP/SO-8D	L 1 L 46	
	MN6011	3		64 commands (fixed)+32 commands (ROM), remote control transmitter	22-SDIP	L 25	
	MN60111	3		64 commands (fixed)+32 commands (ROM), remote control transmitter	22-SDIP	L 25	
	MN6014/S	3		32 commands (ROM), remote control transmitter	18-DIP/SO-18D	L 12 L 49	
	MN6016K/S	3		Remote control · 72 keys (ROM)	28-SDIP/SO-24D	L 26 L 52	
	MN6017K/S	3		Remote control · 64 keys (ROM)	22-SDIP/SO-22D	L 25 L 51	
	MN6280	5		Clock signal generation circuit	8-DIP	L 1	
	MN65523A/S	5		NMOS	Video signal processing D/A converter (Resolution: 6-bits)	16-DIP/SO-22D	L 9 L 51
	MN6555A	5		CMOS	Video signal processing D/A converter (Resolution: 6-bits)	18-DIP	L 10
	△MN6556A	5			Video signal processing D/A converter (Resolution: 8-bits)	22-DIP	L 15
	△MN6557A	5			Video signal processing D/A converter (Resolution: 10-bits)	22-DIP/SO-22D	L 15 L 51
	AN3912	5		Bipolar	Analog switch circuit	7-SIP	B 10
	AN6308/S	5			Analog switch circuit	8-DIP(b)/SO-8D	B 32 B 61

ICs/LSIs for VCR and Camera

■ For 8mm VCRs

Category	Type No.	Supply Voltage (V)	Process	Functions	Package	
						No.
Video Signal Processing Circuit	MN6173S	5	CMOS	Chroma signal processing	SO-18D	L 49
	AN3211S/NS	5	Bipolar	Brightness signal recording processing circuit	SO-28D	B 71
	AN3320S	5		Brightness signal recording processing circuit	SO-28D	B 71
	AN6366NS	5		Chroma signal recording and playback processing	SO-22D	B 69
Audio Signal Processing Circuit	MN4416/S	5	CMOS	16K-bit SRAM memory	24-DIP(b)/SOW-24D	M14 M23
	AN6297S	5	Bipolar	NR for FM/PCM	SO-20D	B 67
	AN6391NS	5		Audio signal FM processing	SO-28D	B 71
Servo Control	MN6170AS	5	CMOS	ATF recording processing	SO-18D	L 49
	MN6181S	5	Bi-CMOS	Servo control	SO-28D	L 53
	AN3821K	5	Bipolar	Capstan motor drive	24-SDIP (P)	B 52

■ For Video Cameras

Category	Type No.	Supply Voltage (V)	Process	Functions	Package	
						No.
Brightness Signal Processing Circuit	AN2110S	4.8	Bipolar	γ -correction AGC circuit	SO-24D	B 70
	AN2133N	5		γ -correction AGC circuit (For new cosvicon, AGC gain variable)	18-SIP	B 27
	AN2141	5		White tracking ALC circuit	18-SIP	B 27
	AN2150S	5		γ , correction, AGC circuit (CCD camera)	SO-28D	B 71
	AN2210S	4.8		NTSC output circuit	SO-24D	B 70
	AN2241	5		NTSC output circuit	18-SIP	B 27
	AN2250S	5		NTSC output circuit (CCD camera)	SO-28D	B 71
	AN2010S	4.8		CCD sample hold	SO-16D	B 64
	AN2151S	4.8		Signal process (CCD camera)	VSO-32D	B 72
	AN2352S	4.8		Vertical aperture correction (CCD camera)	SO-16D	B 64
Chroma Signal Processing Circuit	AN2310S	4.8	Bipolar	Chroma signal correction, Edge correction circuit	SO-24D	B 70
	AN2320S	4.8		Chroma signal separation detector circuit	SO-24D	B 70
	AN2331	5		Chroma separation edge correction circuit	18-SIP	B 27
	AN2350S	5		Chroma signal detection (CCD camera)	SO-28D	B 71
	AN2251S	4.8		Video output (CCD camera)	VSO-42D	B 74
	AN2351S	4.8		Chroma difference signal processing (CCD camera)	VSO-42D	B 74
	AN2410S	6		Chroma encoder circuit	SO-22D	B 69
	AN2431	5		Chroma encoder circuit	18-SIP	B 27
	AN2441S	5		Chroma encoder circuit (SECAM)	SO-28D	B 71
	AN2445S	5		SECAM color difference signal processing circuit	SO-18D	B 66
	AN2450S	5		Chroma encoder (CCD camera)	SO-28D	B 71
	AN2510S	4.8		Electronic view finder circuit	SO-24D	B 70
	AN2560S	4.8		Battery detection, Fader control circuit	SO-24D	B 70
	AN6040	9		Chroma encoder circuit (CW, SG)	9-SIP	B 12
CRT Interface	MN128721	5	CMOS	Quasi NTSC sync. signal CRT display control circuit	22-DIP	L 15
	MN1297	5		Chinese character CRT display control circuit	28-SDIP/42-QFP	L 26 L 57
	MN12972	5		I ² C bus CRT display control circuit	42-QFP	L 57

(Package Symbol) SIP=Single-In-Line Plastic Package, DIP=Dual-In-Line Plastic Package, SSIP=Shrunk Single-In-Line Plastic Package

SDIP=Shrunk Dual-In-Line Plastic Package, QFP=Quad Flat Package, SO=Small Outline Package, SWO=Small Outline Package (Wide Type)

VSO=Very Short Pitch Small Outline Package, 14D=14 Pin Dual-In-Line (Example), (P)=Power type, (F)=with fin

ICs/LSIs for VCR and Camera

■ For Video Cameras (continued)

Category	Type No.	Operation Voltage (V)	Process	Functions	Package	
						No.
Sync. Signal Processing Circuit	MN5126	5	CMOS	PAL, SECAM, External Sync. Control	SO-28D	L 53
	MN5117	5		PLL unit, NTSC, PAL, 510H, 670H, 710H, CCD pixel	SO-22D	L 51
	MN5108	5		NTSC, PAL, 670H CCD pixel drive pulse generator	44-QFP	L 58
	MN6160PA/S	5.7~6.7		Color video camera (PAL/SECAM)	22-DIP/SO-22D	L 15 L 51
	MN6160PB/S	5.7~6.7		Color video camera (PAL)	22-DIP/SO-22D	L 15 L 51
	MN67601NS	5		for NTSC	SO-28D	L 53
	MN67602PS	5		for PAL	SO-28D	L 53
	MN67603NS	5		NTSC, with electronic shutter (VD output)	SO-22D	L 51
	MN67604PS	5		PAL, with electronic shutter (VD output)	SO-22D	L 51
	MN6761S	5		External sync. control	SO-28D	L 53
MN67621F	5	420H, 510H, 590H, 670H CCD Image sensor (NTSC/PAL/SECAM)	44-QFP	L 58		
CCD Video Signal Delay Line	MN3810K/S	5, 9	CMOS	1H (454 stages, NTSC, 2fsc) clock freq. multiplier circuit	18-SDIP/SO-18D	L 24 L 49
	MN3811K/S	5, 9		1H (556.5 stages, PAL, 2fsc) clock freq. multiplier circuit	18-SDIP/SO-18D	L 24 L 49
	MN3817S	5, 8.5		1H (605 stages, NTSC brightness signal, 510H image sensor)	SO-16D	L 48
	MN3818S	5, 8.5		1H×3 (201.5 stages×3, NTSC color difference signal, 510H image sensor)	SO-16D	L 48
	MN3819S	5, 8.5		1H (617 stages, PAL brightness signal, 510H image sensor)	SO-16D	L 48
	MN3820S	5, 8.5		1H×3 (205.5 stages×3, PAL color difference signal, 510H image sensor)	SO-16D	L 48
	MN3821S	5, 8.5		1H (807 stages NTSC brightness signal 670H image sensor)	SO- 16D	L 48
	MN3822S	5, 8.5		1H×3 (201: 5 stages× NTSC color difference signal, 670H)	SO- 16D	L 48
	MN3823S	5, 8.5		1H (823 stages, PAL bright signal 670H image sensor)	SO- 16D	L 48
	MN3824S	5, 8.5		1H×3 (205.5 stage×3, PAL color difference, 670H image sensor)	SO- 16D	L 48
	MN3801/S	5, 6	NMOS	1H (906 stage, NTSC, 4fsc)	14-DIP(a)/SO-18D	L 4 L 49
	MN8040	5		1H (906 stages, NTSC, 4fsc, 5V single operation)	14-DIP(a)	L 4
	MN3802A/S	5, 6		1H (1131 stage, PAL, 4fsc)	14-DIP(a)/SO-18D	L 4 L 49
	MN3803	5, 6		0.5H (452 stages, NTSC, 4fsc)	14-DIP (a)	L 4
	MN3804YS/CS	5, 9		1H (504 stages, 5 stages, NTSC, 420H image sensor)	SO-8D	L 46
	MN3805YS/CS	5, 9		1H (514 stages, 5 stages, PAL, 420H image sensor)	SO-8D	L 46
	MN8029/S	9		1H (226 stage, NTSC, fsc)	8-DIP/SO-8D	L 1 L 46
	MN8029LS	5		1H (226 stages, NTSC, fsc, 5V single operation)	SO-8D	L 46
	MN8037/S	9		1H (282 stage, PAL, fsc)	8-DIP/SO-8D	L 1 L 46
	MN8037LS	5		1H (282 stages, PAL, fsc, 5V single operation)	SO-8D	L 46
	MN8038/S	9		1H (280 stage, SECAM, fsc)	8-DIP/SO-8D	L 1 L 46
	MN8036/S	9		1H (112 stage, NTSC, 0.5fsc)	8-DIP/SO-8D	L 1 L 46
	MN8033/S	9		1H (140 stage, PAL, 0.5fsc)	8-DIP/SO-8D	L 1 L 46
MN8028A	12	0.5H×2 (455 stage×2, NTSC, 4fsc)	16-DIP(a)	L 7		
Others	MN3104	12	CMOS	Clock driver for CCD delay device	14-DIP (F)	L 6
	MN3106/S	5		Clock multiplier for CCD delay device (fsc→2fsc, 4fsc)	8-DIP/SO-8D	L 1 L 46
	MN3107CS	5		V driver for CCD solid-state imaging device	SO-20D	L 50
	MN3109/S	5		Clock multiplier (fsc→4fsc) for CCD delay device, Low EMI	8-DIP/SO-8D	L 1 L 46
	MN6066	5, 9	Bipolar	Shading correction waveform genertor	24-DIC	L 36
	AN607P	9		Video amp. (phase inversion)	4-SIP	B 6
	AN608P	9		Video amp. (same phase)	4-SIP	B 6
	AN614	9		Video amp. demodulator	7-SIP	B 10
	AN2020S	5		Dual modulator demodulator	SO-18D	B 66
	AN6040	9		Color encoder	9-SIP	B 12
AN6041	9	Dual modulator demodulator	9-SIP	B 12		

(Package Symbol) SIP=Single-In-Line Plastic Package, DIP=Dual-In-Line Plastic Package, DIC=Dual-In-Line Ceramic Package
 QFP=Quad Flat Package, SO=Small Outline Type, 18D=18 pin Dual-In-Line (Example), (F)=with Fin

ICs/LSIs for VCR and Camera

■ For VHD Video Disc Player

Category	Type No.	Operation Voltage (V)	Process	Functions	Package	
						No.
Sound signal processing circuit	AN2840	10.8~13.2	Bipolar	DE NR	16-DIP	B35
Others	MN6192	4.5~5.5	NMOS	Address signal processing circuit	22-DIP	L15
	MN6194	4.5~5.5		Reference signal generator	22-DIP	L15
	MN6197	4.5~5.5	CMOS	Address signal processing circuit, Reference signal generator	40-SDIP	L27
	AN2602K	11~13	Bipolar	Stylus force control	20-DIP (b)	B43

■ Others

Category	Type No.	Operation Voltage (V)	Process	Functions	Package	
						No.
Converter	AN3122	6.2	Bipolar	RF converter (for NTSC, video mod., sound mod. white clip)	16-DIP	B36
	AN3125	5		RF converter (for NTSC, video mod., sound mod. voltage reg.)	16-DIP	B36
	AN3131	9		RF converter (for SECAM, sound modulation circuit)	14-ZIP	B25
	AN3132	9		RF converter (for PAL, sound modulation circuit with TPGS)	18-ZIP	B28
	AN3133K	5		RF converter (PAL, sound modulation circuit)	10-SSIP	B18

(Package Symbol) DIP=Dual-In-Line Plastic Package SDIP=Shrunk Dual-In-Line Plastic Package, SSIP=Shrunk Single-In-Line Plastic Package, ZSIP=Zigzag type Shrunk Single-In-Line Plastic Package,

ICs/LSIs for TV

■ Tuner Circuits

Type No.	Operation Voltage (V)	Functions	Package	
				No.
AN5010	6	Electronic channel selection circuit (16ch)	24-DIP	B 45
AN5015K	5	Electronic channel selection circuit (14ch), Up/Down	24-SDIP	B 51
AN5070	12	TV tuner power supply switching circuit, Built-in 31V zener power supply	9-SIP	B 12
AN5071	12	TV tuner power supply switching circuit, Built-in 31V zener power supply	9-SIP	B 12
AN5700/S	33	Tuner band switching circuit (VHF Hi/Lo)	9-SIP/SO-14D	B 12 B 63
AN5707NS	—	LCD TV channel selection circuit	SO-28D	B 71
AN5031	—	Electronic channel selection power supply circuit (Built-in 31V zener power supply, BS switching input positive)	20-DIP	B 42
AN5033	—	Electronic channel selection control power supply circuit (Built-in 31V zener power supply)	20-DIP	B 42
AN5036	—	Electronic channel selection control power supply circuit (Built-in 31V zener power supply)	22-DIP	B 44

■ Signal Processing Circuits

Type No.	Operation Voltage (V)	Functions	Package	
				No.
AN5156K-N	9.3	One chip IC for color TV (NTSC)	42-SDIP	B 55
AN5160K	—	One chip IC for color TV (NTSC)	42-SDIP	B 55

■ Video IF, Sound IF, Deflection Jungle Circuits

Type No.	Operation Voltage (V)	Functions	Package	
				No.
AN5150N	10	VIF amp., video detection, AFC, AGC (R), SIF, Deflection jungle	28-DIP	B 47
AN5151N	10	VIF amp., video detection, AFC, AGC (F), SIF, Deflection jungle	28-DIP	B 47

■ Video IF Signal Processing Circuits

Type No.	Operation Voltage (V)	Functions									Package	
		IF Amp.	Video Det.	Video Out.	Sound Det.	RF AGC	IF AGC	Tuner AFC	Noise Inverter	Noise Canceller		No.
AN5125	12	●	●	● (Nega.)		● (R)	●	●	●	●	22-DIP	B 44
AN5132	12	●	●	● (Nega.)		● (R, F)	●	●		●	16-DIP(F)	B 38
AN5135NK	12	●	●	● (Posi.)	●※	● (R)	●	●	●	●	28-SDIP	B 53
AN5136K	12	●	●	● (Nega.)	●※	● (R)	●	●	●	●	28-SDIP	B 53
AN5138NK	12	●	●	● (Posi.)	●※	● (R)	●	●	●	●	28-SDIP	B 53
AN5179K	12	●	●	● (Posi.)	●※	● (R)	●	●	●	●	30-SDIP	B 54
AN5715K	5	●	●	● (Posi.)	●※	● (F)	●	●	●	●	24-SDIP	B 51

(Pcsi.)=Positive polarity , (Nega.)=Negative polarity , (R)=Reverse, (F)=Forward,

※ : SIF circuit incorporated

(Package Symbol) SIP=Single-In-Line Plastic Package, DIP=Dual-In-Line Plastic Package, SDIP=Shrunk Dual-In-Line Plastic Package, (F)=with Fin

ICs/LSIs for TV

■ Sound Signal Processing Circuits

Type No.	Operation Voltage (V)	Functions									Package	
		SIF Amp.	FM Det.	Pre-Amp.	AF Out.	DC Vol.	DC Tone	Sound Mute	Ripple Filter	Shunt Reg.	No.	
AN5215	12	●	●								7-SIP	B10
AN5250	12 (AF Out 17V)	●	●	●	●	●					16-DIP (F)	B38
AN5256	12 (AF Out 17V)	●	●	●	●	●					16-DIP (F)	B38
AN5262	10			●		●		●			7-SIP	B10
AN5265	10			●	●	●		●			9-SIP (F)	B14
AN5730	6	●	●								7-SIP	B10
AN5732	12	●	●								7-SIP	B10
AN5743	12			●	●						9-SIP (F)	B14

■ Chroma Signal/Video Signal Processing Circuits

Type No.	Operation Voltage (V)	Color Signal Processing Circuit			Flesh tone Control	Picture Quality Correction	Video Jungle Circuit		Remarks	Package	
		Chroma Amp.	Chroma Sync.	Chroma Demodulation			D C Reproduction	Video Amp.		No.	
AN5301NK	12	●	●	●		●	● (100% max.)	●	NTSC/PAL/SECAM	52-SDIP	B56
AN5302S	$V_{c11}=7.6\sim 13.2$ $V_{c12}=7.6\sim 9.9$	●	●	●	●	●	● (105% max.)	●	NTSC	52-SDIP	B56
AN5311	12	●	●	●		●	● (82% max.)	●	NTSC, primary color	28-DIP	B47
AN5312	12	●	●	●		●	● (87% max.)	●	NTSC, color difference	22-DIP	B44
AN5313NK/NS	5	●	●	●		●	● (97% max.)	●	NTSC, color difference	24-SDIP SO-24D	B51 B70
AN5314K/S	5	●	●	●	●	●	● (98% max.)	●	NTSC, color difference	24-SDIP	B51
AN5315	12	●	●	●		●	● (85% max.)	●	NTSC, color difference	24-DIP	B45
AN5316N	12	●	●	●		●	● (95% max.)	●	NTSC, color difference	24-DIP	B45
AN5318N	12	●	●	●	● (Color track)	●	● (95% max.)	●	NTSC, color difference	28-DIP	B47
AN5332N	12	●	●	●		●	● (93% max.)	●	NTSC, color difference	22-DIP	B44
AN5352N	12								CRT interface	22-DIP	B44
AN5355/6	12								CRT interface	18-DIP	B39
AN5371S	$V_{c11}=4.5\sim 5.5$ $V_{c12}=9\sim 11$								Character signal input	SO-22D	B69
AN5372S	4.2~5.2								PAL/NTSC	SO-28D	B71
AN5600K	12	●	●	●		●	● (100% max.)	●	Including deflection	42-SDIP	B55
AN5601NK	12	●	●	●		●	● (100% max.)	●	PAL/SECAM	42-SDIP	B55
AN5612	12						● (69% max.)	●	PAL/SECAM	18-DIP (b)	B40
AN5613	12						● (100% max.)	●	PAL/SECAM	18-DIP (b)	B40
AN5615	12					●	● (96% max.)	●	Black level expansion NTSC/PAL/SECAM	12-SIP	B20
AN5622	12	●	●	●					PAL	16-DIP (F)	B38
AN5625N	12	●	●	●					NTSC/PAL, color difference	22-DIP	B44
AN5630N	12	●	●	●					SECAM	24-DIP	B45
AN5632K	12	●							SECAM	28-SDIP	B53
AN5633K	12	●							PAL/SECAM	28-SDIP	B53
AN5635N	12	●	●	●			●		SECAM	24-DIP	B45

(Package Symbol) SIP=Single-In-Line Plastic Package, DIP=Dual-In-Line Plastic Package, SDIP=Shrunk Dual-In-Line Plastic Package, (F)=with Fin, (P)=Power type

ICs/LSIs for TV

■ Deflection Processing/Vertical Output Circuits

Type No.	Operation Voltage (V)	Functions								Deflection Current (Ap-p)	Package	
		Syne Sep	Noise Canceller	Hor AFC	Hor OSC	X-Ray Protector	Vert OSC	Vert Drive	Vert Out		No.	
AN5411	12	●	●	●	●	●	●	●			24-DIP	B45
AN5416	12	●	●	●	●	●	●	●			18-DIP	B39
AN5421	12	●	●	●	●						9-SIP	B12
AN5435	12	●	●	●	●	●	●	●			18-DIP (b)	B40
AN5436N	12	●	●	●	●	●	●	●			18-DIP (b)	B40
AN5437K	12	●	●	●	●	●	●	●			24-SDIP	B51
AN5512	24								●	●	9-SIP(F)	B14
AN5515	24								●	●	7-SIP(FP)	B11
AN5521	24								●	●	7-SIP(FP)	B11
AN5530K	24								●	●	9-ZIP(F)	B16
AN5531	24								●	●	9-ZIP(F)	B14
AN5532	24								●	●	9-SIP(F)	B14
AN5750	6	●		●	●						9-SIP	B12
AN5753	12	●		●	●	●					9-SIP	B12
AN5755	5	●		●	●		●	●	●	0.325	18-ZIP	B28
AN5762	12						●	●	●	0.195	12-SIP	B20
AN5763	12						●	●	●	0.75	12-SIP(F)	B21

■ Sound Multiplex Signal Processing Circuits

Type No.	Operation Voltage (V)	Functions - Features	Package	
			No.	
AN5825	12	Stereo switching, Multiplex detector, Sub-sound signal detector, Weak electric field detector etc., Lead filter is not necessary	20-DIP (a)	B42
AN5826NK	12		28-SDIP	B53

■ Others

Type No.	Operation Voltage (V)	Functions	Package	
			No.	
AN5020	12	Remote control receiver amp.	9-SIP	B12
AN5025K	5	Remote control receiver amp.	10-SSIP	B18
AN5026K	5	Remote control receiver amp.	10-SSIP	B18
AN5790N	12	CRT display horizontal signal processing circuit	12-SIP	B20
AN5791	12	CRT display phase shift adjustment circuit	9-SIP	B12
AN5835	12	2 ch. DC tone, DC volume control, Balance control circuit	12-SIP	B20
AN5836	12	2 ch. DC tone, DC volume control, Balance control circuit	12-SIP	B20
AN5837	12	Remote control interface (Remote control pulse input, mode switching input, LED driver)	9-SIP	B12
AN5838	12	Remote control interface (Remote control pulse input, mode switching input, LED driver)	9-SIP	B12
AN5855K	12	AV signal switch (3ch), clamp circuit	28-SDIP	B53
AN5856K	12	R.G.B. signal switch (3ch), Y _s /Y _M signal switch	28-SDIP	B53
AN5860	12	Analog switch (2 inputs 3 circuits, DC playback circuit built-in)	14-DIP	B33
AN5862K	12	Analog switch (2 inputs 3 circuits)	13-SSIP	B24
AN5900	12	Switching regulator control	9-SIP	B12

■ MOS LSI for TV

Type No.	Operation Voltage (V)	Process	Functions	Package	
				No.	
MN83021	5	NMOS	Picture-in Picture processor unit (PPU)	84-QFP	L61

(Package Symbol) SIP=Single-In-Line Plastic Package, SSIP=Shrunk Single-In-Line Plastic Package

ZSIP=Zigzag type Shrunk Single-In-Line Plastic Package, DIP=Dual-In-Line Plastic Package

SDIP=Shrunk Dual-In-Line Plastic Package, (F)=with Fin, (P)=Power Type, (EP)=Power Type with Fin

ICs/LSIs for Audio

■ For Radios/Radio Cassette Tape Recorders

● FM Front End

Type No.	Operation Voltage (V)	Process	Functions				Package	
			RF	Mix	OSC	IF		No.
AN7202S	1 ~ 4	Bipolar	●	●	●	●	SO-10D	B 62
AN7205/S	1.5 ~ 7		●	●	●		9-SIP/SO-8D	B 12 B 61
AN7213	2 ~ 7		●	●	●		7-SIP	B 10
AN7216S	2 ~ 7		●	●	●		SON-8S	B 59

● FM-AM IF Systems

Type No.	Operation Voltage (V)	Process	Functions												Package		
			FM						AM						No.		
			IF	Det	Level Meter	Mute	AFC	Post Amp.	Other	Conv	IF	Det	AGC	Level Meter		Post Amp.	
AN7220	2 ~ 6.5	Bipolar	●	●	●*1		●			●	●	●	●	●*2	●	18-DIP	B 39
AN7221S	2 ~ 6		●	●	●*1		●			●	●	●	●	●*2	●	SO-18D	B 66
AN7223 *3	2.8 ~ 12		●	●	●	●	●			●	●	●	●	●	●	18-DIP	B 39
AN7224 *4	2.8 ~ 9.6		●	●	●		●			●	●	●	●	●	●	18-DIP (b)	B 40
AN7227 *4	2 ~ 6.6		●	●	●		●	●	●	●	●	●	●	●	●	18-DIP	B 39
AN7230S	1 ~ 4		●	●		●				●	●	●	●		●	SO-18D	B 66

*1 Tuning indicator output *2 Double converter OSC (pulse count Det), Noise PLL FM stereo multiplex demodulator amp. (Mute), Recording calibration *3 Radio cassette recorder/stereo *4 Radio cassette recorder

● PLL FM Stereo Multiplex Demodulator

Type No.	Operating Voltage (V)	Process	Application	Functions			Package	
				Sep. Cont.	VCO stop	Forced Monaural		No.
AN7400S	1 ~ 4	Bipolar	Radio, Radio cassette recorder		●	●	SO-16D	B 64
AN7410N	4 ~ 14		●	●	●	16-DIP (c)	B 37	
AN7420N	3.5 ~ 12		●	●		9-SIP	B 12	
AN7421	1.8 ~ 6		●	●		9-SIP	B 12	

● Low Frequency Pre-Amplifier

Type No.	Operating Voltage (V)	Process	Application	Single	Dual	Functions		Package	
						Ripple filter	Mute		No.
AN6221S	1.8 ~ 6	Bipolar	Radio cassette recorder	●		●	●	SO-20D	B 67
AN7310N	4 ~ 16		Radio cassette recorder, Car stereo		●	●	●	9-SIP	B 12
AN7312	5 ~ 12		Radio cassette recorder, stereo		●**	●	●	14-DIP	B 34

** with ALC amp. * Resin block dimension is small (short)

● Others

Type No.	Operating Voltage (V)	Process	Functions	Package	
					No.
AN6262N	4.5 ~ 16	Bipolar	Program interval detection circuit for cassette tape recorder (Low output at interval)	9-SIP	B 12
AN6263N	4.5 ~ 16		Program interval detection circuit for cassette tape recorder (High output at interval)	9-SIP	B 12
AN6291	1.8 ~ 14		dbx noise reduction for cassette tape recorder and radio cassette tape recorder	22-DIP	B 44
AN6291S	1.8 ~ 14			SO-22D	B 69
AN7015S	1.8 ~ 6		Rec/playback amplifier for radio cassette tape recorder	SO-22D	B 69
AN7025K	1.8 ~ 6.6		Radio, FM/AM-IF + MPX 1 chip IC for radio cassette tape recorder	22-SDIP	B 50

(Package Symbol) SIP=Single-In-Line Plastic Package, DIP=Dual-In-Line Plastic Package
SDIP=Shrunk Dual-In-Line Plastic Package, SO=Small Outline, 8D=8 Lead Dula-In-Line (Example)

ICs/LSIs for Audio

■ For Car Radios

● FM Front End

Type No.	Operating Voltage (V)	Process	Functions					Package	
			RF	Mix	OSC	IF	AGC	No.	
AN7244S	7.6~8.4	Bipolar		●	●	●	●	SO-18D	B 66
AN7254	6.5~9.8			●	●	●	●	9-SIP	B12
AN7255S	8~13			●	●	●	●	SO-20D	B 67

● AM Tuner System

Type No.	Operating Voltage (V)	Process	Functions					Package	
			RF	Mix	IF	AGC	Det	No.	
AN7250S	6.5~9.6	Bipolar	●	●	●	●	●	SO-18D	B 66

● FM IF System

Type No.	Operating Voltage (V)	Process	Functions								Remarks	Package	
			IF	Det	Level Meter	Mute	AFC	Post Amp.	Other	No.			
AN7246S	6.6~9	Bipolar	●	●		●	●	●	*1.2	*1 Signal control output *2 Stop signal output for DTS	SO-18D	B 66	

● PLL FM Stereo Multiplex Demodulator

Type No.	Operating Voltage (V)	Process	Functions							Package		
			Sep. Cont.	VCD Stop	Forced Monaural	ASC	Hi-Cut Control	Post Amp.	De-emphasis OFF	No.		
AN7414	6~16	Bipolar	●	●	●	●					18-ZIP	B28
AN7418S	5~9				●	●	●	●		●		SO-18D

● FM Noise Suppressor Circuit

Type No.	Operating Voltage (V)	Process	Application	Package	
				No.	
AN6132S	8~13	Bipolar	Pulse noise rejection	SO-18D	B 66

■ For Stereo

● FM-AM IF System

Type No.	Operating Voltage (V)	Process	Functions												Package		
			FM						AM						No.		
			IF	Det	Level Meter	Mute	AFC	Post Amp.	Other	Conv	IF	Det	AGC	Level Meter			Post Amp.
AN7223	2.8~12	Bipolar	●	●	●	●	●	●		●	●	●	●	●	●	18-DIP	B 39
AN7273/S	2.8~12		●	●	●	●	●	●	*1	●	●	●	●	●	●	18-DIP(b)/SO-18D	B 40 B 66
AN7275S	4~7.5/7~10.8			● ^{*2}					● ^{*3}							SO-28D	B71

*1 Stop signal output for DTS *2 Pulse count detector *3 Signal generator for sample hold MPX *4 Double converter OSC (for pulse count), Noise amp (for Mute), Recording calibration *Pair with FM MPX AN7471S * Maintenance

● PLL FM Stereo Multiplex Demodulator

Type No.	Operating Voltage (V)	Process	Functions							Package		
			Sep. Cont.	VCD Stop	Forced Monaural	ASC	Hi-cut Control	Post Amp.	De-emphasis OFF	No.		
AN7470	9~14	Bipolar	●	●	●			●			16-DIP(c)	B 37
AN7472S	4.5~9			●	●	●			●		SO-28D	B71

(Package symbol) SIP=Single-In-Line Plastic Package, DIP=Dual-In-Line Plastic Package, SO=Small Outline Type, 18D=18 pin · Dual-In-Line (Example)

ICs/LSIs for Audio

■ For Stereo (continued)

● Low Frequency Pre-amplifier

Type No.	Operation Voltage (V)	Process	Single	Dual	Functions		Package	No.	
					Ripple Filter	Mute			
AN7060	15 ~ 80	Bipolar	●				9-SIP	B12	
AN7062N	15 ~ 80			●				18-DIP (b)	B40
AN7072	15 ~ 74						●	7-SIP	B10
AN7312	5 ~ 12				● *1	●		14-DIP	B34

*1 With ALC Amp.

● Rec. · Playback Pre-amplifier

Type No.	Operation Voltage (V)	Process	Application	Package	No.
AN7010K	± 5 ~ ± 12	Bipolar	Mini-compo, Double cassette tape recorder	28-SDIP	B53

■ For Car Stereo

● Low Frequency Pre-amplifier

Type No.	Operation Voltage (V)	Process	Single	Dual	Functions		Package	No.	
					Ripple filter	Mute			
AN360	5 ~ 16	Bipolar	●				7-SIP	B10	
AN7310N	4 ~ 16			●	●	●		9-SIP	B12
AN7311	6.5 ~ 16			●	●			9-SIP	B12

● Auto-reverse Circuit

Type No.	Operation Voltage (V)	Process	Functions	Package	No.
AN6246	8 ~ 16	Bipolar	Output cycle (ON cycle): 1/16, with forced inversion terminal	7-SIP	B10

■ For Compact Disc Player

Type No.	Operation Voltage (V)	Process	Functions	Package	No.
MN6471	4.5 ~ 5.5	CMOS	DF built-in DA converter for CD (internal resolution 18 bit) clock 768fs (MASH*)	40-QFP (b)	L56
MN6617	4 ~ 5.5		Digital signal processing LSI for mid and popular CD.	84-QFP	L61
MN6618A	4.5 ~ 5.5		Digital filter LSI	42-QFP	L57
MN6625	4.0 ~ 5.5		Digital signal processing LSI, Digital signal processing LSI for mid and popular CD.	64-QFP (a)	L59
MN66181	4.5 ~ 5.5		Digital filter LSI	42-QFP	L57
MN6622	4 ~ 5.5		Digital signal processing LSI for mid and high class CD.	84-QFP	L61
MN6623B	4.5 ~ 5.5		DF built-in converter for CD (internal resolution 17 bit) clock 768 fs (MASH*)	40-QFP (b)	L56
AN8050S	Max ± 9		Bipolar	Multi power supply	SO-18D
AN8281S	9 ~ 18	Spindle driver, 2 phase full wave external PNP		SO-24D	B70
AN8290S	4.5 ~ 20	Spindle PWM driver, 3 phase full wave		SO-24D	B70
AN8370S	± 3.5 ~ ± 5.5	RF Amp., focus servo, tracking servo, laser APC		VSO-42D	B74
AN8371S	± 3.5 ~ ± 5.5	Data slice, clock regeneration PLL		SO-24D	B70
AN8373S	4.5 ~ 5.5	Servo amp.		VSO-42D	B74
AN8374S	4.75 ~ 5.25	Bi-CMOS	Servo control	VSO-42D	B74
AN8375S	± 3.5 ~ ± 11	Bipolar	3ch PWM driver	VSO-42D	B74
AN8376S	± 4.5 ~ ± 6.5		Audio output amp.	SO-28D	B71
AN8377	12		3 channel linear driver	16-DIP (F)	B38

* NTT is registering the trade mark for MASH.

(Package Symbol) SIP=Single-In-Line Plastic Package, DIP=Dual-In-Line Plastic Package, SDIP=Shrunk Dual-In-Line Plastic Package, SO=Small Outline, 24D=24 pin Dual-In-Line (Example), VSO=Very Small Outline (F)=with Fin

ICs/LSIs for Audio

■ For Tape Recorder

Type No.	Operation Voltage (V)	Process	Functions	Package	
					No.
AN3990K	4.3~12	Bipolar	Tape recorder, VCR Rec./playback circuit	18-SDIP	B 48
AN3991NS	4~12		Tape recorder, VCR Rec./playback circuit (with MIC amp.)	SO-20D	B 67
AN6209	7~14		VCR/tape recorder Rec./playback circuit (with AGC)	22-DIP	B 44
AN6209S	7~14		VCR/tape recorder Rec./playback circuit	SO-22D	B 69
AN6230S	1.6~4.5		Cassette tape recorder AF power amplifier	SO-18D	B 66
AN6247	8~16		Automatic reverse control circuit for cassette tape recorder, with forced reverse terminal, Duty:1/4	7-SIP	B 10
AN6248	8~16		Automatic reverse control circuit for cassette tape recorder, with forced reverse terminal, Duty:1/8	7-SIP	B 10
AN6251	4.5~5.5		Operation control circuit for tape recorder	24-DIP	B 45
AN6256	±6~±12		Automatic tape selection circuit for tape recorder	16-DIP (c)	B 37
AN6257S	1.6~4.5		Auto stop circuit for microcassette	SO-8D	B 61
AN7010K	±5~±12		Mini component, recording for double cassette, playback pre-amplifier circuit	28-SDIP	B 53
AN7375N	1.8~4.5		Dolby-B type noise reduction for low voltage cassette tape recorder	18-DIP (b)	B 40
AN7375NS	1.8~4.5		Dolby-B type noise reduction for low voltage cassette tape recorder	SO-18D	B 66

■ For Cassette Deck, Open Deck

Type No.	Operation Voltage (V)	Process	Functions	Package	
					No.
AN6203	±5~±12	Bipolar	Cassette tape recorder output amplifier	16-DIP	B 35
AN6208N	±7~±12		Stereo cassette tape recorder recording circuit	16-DIP (c)	B 37
AN6262N	4.5~16		Program interval detection circuit for cassette tape recorder (Low output at interval)	9-SIP	B 12
AN6263N	4.5~16		Program interval detection circuit for cassette tape recorder (High output at interval)	9-SIP	B 12
AN6291	1.8~14		dbx noise reduction for cassette tape recorder and radio cassette tape recorder	22-DIP	B 44
AN6291S	1.8~14		dbx noise reduction for cassette tape recorder and radio cassette tape recorder.	SO-22D	B 69
AN7373K	8~14		Dolby B/C NR for cassette deck	28-SDIP	B 53
AN6292K	±4~±7		dbx NR (low gain) for cassette deck	28-SDIP	B 53
AN6294K	±4~±7		dbx NR (high gain) for cassette deck	28-SDIP	B 53

■ For Common Use

- Low Frequency Power Amp. (f=1kHz, THD=10%)

Type No.	Operation Voltage (V)	Process	Single	Dual	BTL	Condition		Output Power (W)					Package	
						V _{CC} (V)	R _L (Ω)	≥ 1	> 2	> 4	> 5	10~20	Package	No.
								< 1	< 1	< 1	< 1	< 1		
AN7100S	1~3	Bipolar		●		1.5	150	< 1					SO-18D	B 66
AN7105	4.2~9			●	○	6	8	< 1					18-DIP	B 39
AN7106K	1.8~4.5			●	○	3	4	< 1					24-SDIP	B 51
AN7108	1.8~6			●		3	32	< 1					16-DIP	B 36
AN7112	4~14		●			6	8	< 1					9-SIP	B 12
AN7117	2.5~9		●			6	4	●					9-SIP	B 12
AN7118/S	1.8~4.5			●	○	3	4	< 1					16-DIP/SO-18D	B 35 B 66

- Standard, ○ Applicable

(Package Symbol) SIP=Single-In-Line Plastic Package, DIP=Dual-In-Line Plastic Package, SDIP=Shrunk Dual-In-Line Plastic Package, SO=Small Outline Type, 24D=24 pin · Dual-In-Line (Example) (F)=with Fin

ICs/LSIs for Audio

■ For Common Use (continued)

● Low Frequency Power Amp. (continued)

Type No.	Operation Voltage (V)	Process	Single	Dual	BTL	Condition		Output Power (W)					Package	
						V _{CC} (V)	R _L (Ω)	≥ 1	> 2	> 4	> 5	10~20	No.	
AN7139	6 ~ 18	Bipolar		○		9	4		○				12-SIP (F)	B21
AN7141N	3.8 ~ 18		●			6	4	●					9-SIP	B12
AN7142	3.8 ~ 18			●	○	6	4	●					16-DIP (F)	B38
AN7143	4.8 ~ 24			●	○	9	4		●				12-SIP (F)	B21
AN7147N/49N	5 ~ 22			●	○	12	3				●		12-SIP (FP)	B22
AN7148	6 ~ 18			●	○	9	8		●				12-SIP (FP)	B22
AN7158N	5 ~ 20			●	○	16	8				●	○	12-SIP (P)	B23
AN7161N	6 ~ 24				●	15	4				●		12-SIP (P)	B23
AN7163	7 ~ 20				●	13.2	4				●		12-SIP (FP)	B22
△AN7164	8.3 ~ 30				●	21	6				●		12-SIP (FP)	B22
AN7168	7 ~ 24			●	○	13.2	4				●	○	12-SIP (FP)	B22
AN7169	5 ~ 24			●	○	13.2	4				●	○	12-SIP (FP)	B22
AN7170	10 ~ 32			●		26.4	8					●	11-SIP (P)	B19
AN7171K	7 ~ 18				●	13.2	4					○	16-ZIP (F)	B26
AN7172NK	7 ~ 18				●	13.2	4					○	9-SSIP (F)	B15
AN7173NK	7 ~ 18				●	13.2	4					○	16-ZIP (F)	B26
AN7177	8 ~ 18				●	13.2	4					○	23-ZIP (F)	B29
AN7178	8 ~ 18				●	13.2	4				●		12-SIP (FP)	B22
AN7188K	8 ~ 18				○	13.2	4					●	16-ZIP (F)	B26

● Standard, ○ Applicable, △ Preliminary

■ For DAT

Type No.	Operation Voltage (V)	Process	Functions	Package	
				No.	
AN7021S	4.75 ~ 5.25	Bipolar	Magneto-electric conversion block Rec./playback amp. (for table use)	VSO-42D	B74
AN7030S	4.5 ~ 5.5 4.5 ~ 9.5		Magneto-electric conversion block Rec./playback amp. (for portable use)	VSO-42D	B74
AN7031S	4.5 ~ 5.5		Magneto-electric conversion block PLL	VSO-32D	B72
AN7032S	4 ~ 8		Recording block input amp.	VSO-42D	B74
AN7033S	4.2 ~ 7.5		Playback output stage amp.	VSO-32D	B72
AN8285S	4.5 ~ 7.5		IC's for linear servo CYL/CDP drive (for portable use)	SO-28D	B71
AN8320NF	4.5 ~ 7.5		IC's for linear servo AFT, FG, PG amp.	48-QFP(a)	B76
△MN6460	4.75 ~ 5.25	CMOS	DF built-in AD converter for DAT (internal resolution 16 bit) clock 512fs (MASH*)	VSO-42D	—
△MN6470	4.5 ~ 5.5		DF built-in DA converter for DAT (internal resolution 18 bit) clock 512fs (MASH*)	40-QFP(b)	L56
MN86081	4.75 ~ 5.25		DF built-in AD converter for DAT (internal resolution 16 bit) clock 512fs (MASH*)	VSO-42D	B74

* NTT is registering the trade mark for MASH.

(Package Symbol) SIP=Single-In-Line Plastic Package, DIP=Dual-In-Line Plastic Package, (P)=Power Type, (F)=with Fin
 SO=Small Outline, T8D=18 Lead Dual-In-Line (Example), SDIP=Shrunk Dual-In-Line Plastic Package
 SSIP=Shrunk Single-In-Line Plastic Package, ZSIP=Zigzag type Shrunk Single-In-Line Plastic Package

ICs/LSIs for Audio

■ Others

Type No.	Operation Voltage (V)	Process	Functions	Package	
					No.
MN6631A	±15, 5	MOS	5 channel CMOS analog electronic switch	18-DIP(a)	L 10
MN6632A	5		2 channel CMOS electronic volume	18-DIP(a)	L 10
MN6633	5		1 channel CMOS electronic volume	16-DIP(a)	L 7
OM200	1 ~ 15	Bipolar	Low frequency amplifier for hearing aid	U-38 (4 pins)	B 9
AN6130N	6 ~ 16		FM noise suppressor	18-DIP	B 39
AN6135	7 ~ 14		Hi-Fi pop noise suppressor (Shocking noise elimination at function switching)	9-SIP	B 12
AN6136	7 ~ 14		Hi-Fi pop noise suppressor	9-SIP	B 12
AN6280	10 ~ 34		FL counter/driver	16-DIP	B 35
AN7330K	3 ~ 14.4		2-channel 3-element graphic equalizer (Quasi 5-element)	22-SDIP	B 50
AN7332S	3 ~ 14.4		2-channel 4-element graphic equalizer (Quasi 5-element)	SO-24D	B 70
AN7381	6 ~ 12		Tone control circuit	9-SIP	B 12
AN7382	8 ~ 16		DC volume, Tone control circuit	18-SIP	B 39

(Package Symbol) SIP=Single-In-Line Plastic Package, DIP=Dual-In-Line Plastic Package, SDIP=Shrunk Dual-In-Line Plastic Package, SO=Small Outline Type, 24D=24 pin · Dual-In-Line (Example) (F)=with Fin

■ For Analog Clocks (MOS LSIs)

Motor Type	Type No.	Oscillating Frequency (MHz)	Supply Voltage (V)	Supply Current max. (μ A)	Motor driving pulse output		Alarm Signal Output Waveform	Package	No.	Remarks
					Frequency (Hz)	Pulse Width (ms)				
Step Motor	MN6057	4.19	1.5	35	0.5	1s		8-DIP	L1	
	MN6251			35	0.5	31.25		8-DIP	L1	
	MN6252			35	0.5	31.25		8-DIP	L1	
	MN6255			500	0.5	46.875	—	8-DIP	L1	For car clock
	MN6253B	32kHz	1.5	10	0.5	31.25		8-DIP	L1	
	MN6260B			10	0.5	31.25		8-DIP	L1	
	MN6260C			10	0.5	31.25		8-DIP	L1	
	MN6263			10	0.5	15.625		8-DIP	L1	
	MN6275AS			3	0.5	31.25		SO-8D	L46	
Synchronous Motor	MN6092	4.19	1.5	50	16	31.25	—	8-DIP	L1	
	MN6093			1mA	64	7.8125	—	8-DIP	L1	For car clock
	MN6094			35	16	31.25		8-DIP	L1	
	MN6095			35	16	31.25		8-DIP	L1	
Step Synchronous Motor	MN6220	4.19	1.5	70	0.5/16	1s/31.25	—	18-DIP (a)	L10	Timer indication

(Package Symbol) DIP=Dual-In-Line Plastic Package, SDIP=Sheulk Dual-In-Line Plastic Package, SO=Small Outline Type, 8D=8 Lead Dual-In-Line (Example)

ICs/LSIs for Industrial and Home Use

■ For Telephones

Type No	Operating voltage (V)	Process	Functions	Package	
					No.
MN6106A	2.5~5.5	CMOS	High-function dialer LSI, (DTMF/Outpulse switching) with shorten dial and auto-flash re-dial	42-QFP	L 57
MN6112	2~7	MOS	Dialer CMOS LSI (popular type, DTMF/Outpulse switching)	22-SDIP	L 25
MN6114	2~7		Dialer CMOS LSI (high end, DTMF/Outpulse switching) with shorten dial and auto-flash re-dial	28-SDIP	L 26
△MN6118	5±0.5		Tone receiver LSI for telephone	18-DIP(a)	L 10
AN6150	3~11.5	Bipolar	Speech network	16-DIP	B 36
AN6151K	3~10		Speech network	22-SDIP	B 50
AN6157NK	3~11.5		Speech network	22-SDIP	B 50
AN6170	10~22		Telephone ringer 1 call tone (tremolo), Rumbling starting current variable system	8-DIP	B 31
AN6171	10~22		Telephone ringer 4 kinds of a call tone tremolo (High end.)	14-DIP	B 33
AN6172	10~22		Telephone ringer 1 call tone (tremolo), Rumbling starting voltage variable system	8-DIP	B 31
AN6425K	3~12		Speaker phone speech network	28-SDIP	B 53
AN6426K	3~12		Hands-free telephone circuit	42-SDIP	B 55
AN6480	5.6~8.4		IF amp. for car telephone	18-DIP	B 39

■ For Communications

Type No.	Operating Voltage (V)	Process	Functions	Package	
					No.
MN1295	15	MOS	Communication switching, 4×4 cross point switch	16-DIP(b)	L 8
MN6105	15		Communication switching, 4×8 cross point switch	22-DIP	L 15
MN6126	5		Tone squelch for communication control	40-QFP(a)	L 55
MN6126A	5		Full duplex communication modulator and demodulator	40-DIP(a)	L 21
MN6127A	5		Communication modulator and demodulator	28-DIP(a)	L 18
MN61113	3~3.5	CMOS EEPROM	EEPROM for serial input/output 2K bit ID code	SO-8D/8-DIP	L 46 L 1

■ For Timers

Type No.	Operating Voltage (V)	Process	Functions	Package	
					No.
MN6076	-12	MOS	Two operation digital AC clock timer (Fluorescent lamp drive)	40-DIP(a)	L 21
MN6139	4.5~5.5	CMOS	Utensil dryen timer	14-DIP(a)	L 4
AN6780	4.5~12	Bipolar	Long hour CR timer	7-SIP	B10
AN6781	4.5~12		Residual time indication CR timer	16-DIP	B 35
AN1555/N	4.5~16		General use timer	8-DIP	B31

■ Others

Type No.	Operation Voltage (V)	Process	Functions	Package	
					No.
DN8600	4.5~5.5	Bi-CMOS	Sound generator · printer interface for personal computer	64-QFP	B 78
DN8601	4.5~5.5		Sound generator · printer interface for personal computer	64-QFP	B 78
DN8640S	4~6		3×8 bit Shift register latch driver	USONF-36D	B 73
DN8643S	4~6		24 bit Shift register latch driver	USONF-36D	B 73

(Package Symbol) DIP=Dual-In-Line Plastic Package, SDIP=Shrunk Dual-In-Line Plastic Package, QFP=Quad Flat Package
SO=Small Outline Type, 8D=8 Lead Dual-In-Line (Example)

Discrete Semiconductors Selection Guide

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Transistors (Selection Guide by Packages)

■ S Mini Type Packages (D3)

Pc:150m W

V_{CE0} (V) \ I_c (A)	7 * 10 ** 12	* 15 20	25 * 35 ** 40	45 * 50 ** 55	100 * 150 ** 185
15m	2SC4410 ($I_c=10mA$)	2SC3931			
20m		2SC3933, 2SC4068			2SD1824
30m	**2SC3934	(2SA1532 2SC3930 2SC3936			
50m	*2SC3935 *2SC4239	*2SA1739 2SC3932	(* 2SA1531 * 2SC3929 * 2SC4417 ** 2SD1823	(* 2SA1748 * 2SC4562 * * 2SA1531A * * 2SC3929A	(* 2SB1220 * 2SD1821 * * 2SB1220A * * 2SD1821A
80m	*2SC3937				
100m		2SD1979 ($I_c=300mA$)	** 2SC3938 ¹⁾	(2SB1218A * 2SD1819A	
500m			(2SB1219 2SD1820	(* 2SB1219A * 2SD1820A	

1) V_{CES} (: Complementary pair

■ Mini Type Packages (Standard Type (D5), Pc: 200mW Power Type (D10*), Pc: 1W (with PCB)

V_{CE0} (V) \ I_c (A)	7 * 10 * * 12 * * * 18	15 * 20 * * 25	35 * 40	45 * 50	55 * 80 * * 85	100 * 120	150 * 185 * * 200	300	500
10m	2SC3707								
15m		*2SC2404							
20m		*2SC3077 *2SC3967				2SD1149			
30m	*2SC3110	(* 2SA1022 * 2SC2295 * 2SC2778							
50m	*2SC3130 *2SC3904	2SA1738 *2SC2480	(2SA1034 2SC2405 * 2SD1030 2SC4444	(* 2SA1747 * 2SC4561	(2SA1035 2SC2406 * * 2SA1737		(2SB792 2SD814 * 2SB792A * 2SD814A		
70m	**2SC2845								
80m	*2SC3704 *2SC3829								
100m		* 2SD1304 ¹⁾ 2SC3757 ²⁾ * * 2SB902		(2SB709A * 2SD601A					
150m						2SC4543 ³⁾			
200m		*2SD1938 ($I_c=300mA$)							
500m	* 2SB970 * * * 2SD1679	* 2SB779 * 2SD1328 (* * 2SB710 * * 2SD602 * * 2SD1478 [◎] * 2SD2210*		(* 2SB710A * 2SD602A * 2SD1478A [◎]	(* 2SB767* * 2SD875*	(2SB789* 2SD968* (* 2SB789A* * 2SD968A*			
700m		2SD1483*							
1		(* 2SB956* * 2SD1280* * * 2SB766* * * 2SD874*		(* 2SB766A* * 2SD874A*	* 2SD1511* [◎]				
2				* 2SB1440* * 2SD2185*					
3		* * 2SD1119*							
4		* 2SB1073*							

*Mini Power Type ◎ Darlington Transistor 1) Built-in Zener Diode 2) V_{CES} 3) V_{CER} (: Complementary pair

Transistors (Selection Guide by Packages)

■ TO-92 Packages (D37)

Pc:400m W (Example)

$V_{CE0}(V)$ $I_C(A)$	12 *18	20 *25	40 *45	50 *55	60 *70	80 *100	120 *150	200 *300
20m		2SC1047				*2SD1011	(2SA921 2SC1980)	
30m		(2SA838 2SC1359 2SC829 *◆2SC1687	◆2SC1688					
50m	*2SC1789	2SC1215	2SD1010				(*2SA1123 *2SC2631	
70m	◇2SC2671(H)							(2SA1018 2SC1473 *2SA1767 *2SC1473A
80m	◇2SC2671(F)*1)							
100m		(*2SB774 *2SD889	*2SA564A ★2SC3811 ($V_{CES}=40V$)	2SC1685 (*2SA1127 *2SC2634	2SB725	2SB726		*2SC3187
500m		(*2SA719 *2SC1317 2SA1128 *2SD892◎ 2SD1302		(2SA720 2SC1318 2SD892A◎	(*2SA720A *2SC1318A			
700m				2SC2925				
1		*2SD893◎ (*2SB621 *2SD592		(2SB621A 2SD592A 2SD893A◎				
5	*2SB976	2SD965						

◆ Center Emitter (1:C 2:E 3:B) ◇ Center Emitter (1:B 2:E 3:C) ☆ Center Base (1:C 2:B 3:E) ★ Center Base (1:E 2:B 3:C) ◎ Darlington Transistor
(: Complementary pair. *1) $V_{CER}=14V$

■ New S Type Packages (D29)

Pc:300m W

$V_{CE0}(V)$ $I_C(A)$	10	20	25	40	50 *55	100	120
15m		2SC3315					
20m						2SD1512	(2SB1036 2SD1449
30m		(2SA1323 2SC3314 2SC3313					
50m		2SC3354		2SD1424			
100m			(2SB1206 2SD1807		(2SA1309A 2SC3311A *2SA1310 *2SC3312		
300m		2SD1915					
500m	2SB1207	2SA1512 2SD1450	2SB1030 2SD1423 2SD1808◎		(2SB1030A 2SD1423A		

◎ Darlington Transistor (: Complementary pair

Transistors (Selection Guide by Packages)

■ TO-92L Packages (D38)

Pc:1W

$V_{CE0}(V)$ $I_c(A)$	* 16 20	25 * 45	50 * 60	80 * 85	120	150	200	300	400
70m		*2SC1360 ($I_c=50mA$)	*2SC1360A ($I_c=50mA$)	*2SA1487 ($I_c=50mA$)		(2SA1124 ($I_c=50mA$) 2SC2632 ($I_c=50mA$))	(2SA879 2SC1573)	2SC1573A	2SC1573B
150m			2SC3526(H)						
300m	* 2SC2851								
500m		*2SC1973 ¹⁾		(2SA777 2SC1509)	(2SB987 2SD1211)				
1	2SC1518	(2SA683 2SC1383)	(2SA684 2SC1384)						
5	(2SB873 2SD966)								

1) V_{CE0} (: Complementary pair.

■ TO-92NL Packages (D39)

Pc:1W

$V_{CE0}(V)$ $I_c(A)$	20 * 25	50	60±10 *80	120	200	300
70m					2SB1221	2SC3941
100m						2SC3965
500m	(*2SA1619 *2SC4208	(2SA1619A 2SC4208A	(*2SA1533 *2SC3939	(2SB1297 2SD1937		
1	(*2SA1534 *2SC3940	(2SA1534A 2SC3940A	2SD2068			
5	(2SB1288 2SD1934					

Marked with (is complementary pair

■ M Type Mold Packages (D30)

Pc:400m W (Example)

$V_{CE0}(V)$ $I_c(A)$	18 * 20	25	35	40	50 * 55	80	120	200	* 300 400	500
20m	2SC2377 (15mA)						(2SB788 2SD958)			
30m	(* 2SA1254 * 2SC2206 * 2SC2647									
50m	* 2SC2636		2SB745 2SC2188	2SD1199	* 2SB745A					
70m							(2SD662 2SB1264	* 2SD662A 2SD662B		
100m			2SD661		(2SB642 2SD637 * 2SD661A				(2SB1209 2SD1385 2SB1265	
500m	* 2SB790 * 2SD1330	(2SB643 2SD638 2SD1205◎			(2SB644 2SD639 2SD1205A◎	2SA1762 2SC4606			2SD1350	2SD1350A
1	*2SD1458 ($I_c=700mA$) 2SB835	(2SB793 2SD973 2SD1198◎		(2SD1526 2SB819 ($I_c=1.5A$) 2SD1051 ($I_c=1.5A$)	(2SB793A 2SD973A 2SD1198A◎					
5	(* 2SB1050 * 2SD1244 * 2SB1319									

Marked with (is Complementary pair.

Transistors (Selection Guide by Packages)

■ MT1 Type Packages (D31) ... Package (0.4/0.6W Type) Exclusively Used for Radial Taping

V_{CE0} (V) I_C (A)	20	40	50	55	
50m		2SD1995			
100m			(2SB1320A 2SD1991A)	2SD1993	
500m	2SB1378 2SD1996		(2SB1321A 2SD1992A)		

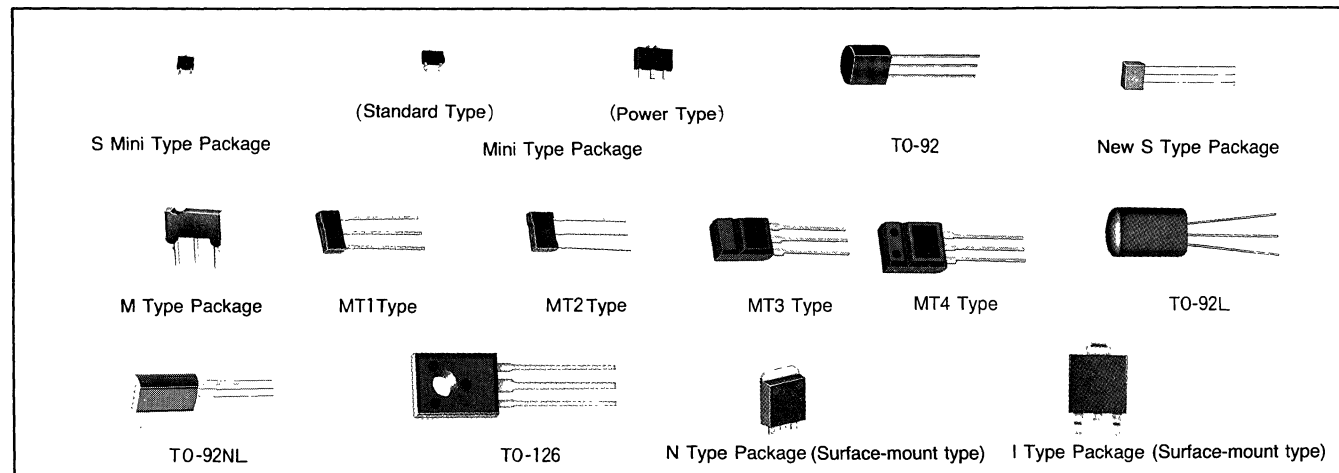
■ MT2 Type Packages (D32) ... Package (1W Type) Exclusively Used for Radial Taping

V_{CE0} (V) I_C (A)	20 *25	40 *45	50 *55	80	100 *150
50m		2SD2073, *2SC4502			
100m			(2SB1376 2SD2070 *2SD2072)		
500m	2SD2074		(2SB1377 2SD2071)		
1			(2SB1322A 2SD1994A)	(2SA1674 2SC4391)	(2SB1437 2SD2181 *2SB1456 *2SD2184)
2			(2SB1434 2SD2177 2SB1446 2SD2179)		2SD2067, (2SB1438 2SD2182)
5	*2SB1398				

■ MT3 Type/MT4 Type Package (D33·D34☆)...Package (Pc: 1.5W/2.0W) Exclusively Used for Radial Taping

V_{CE0} (V) I_C (A)	35	40	50	60	60±10	100	180
1	(2SB1413 2SD2133)				(2SB1415◎ 2SD2135◎)	(2SB1439 2SD2183)	(2SB1414 2SD2134)
1.5		2SC4545					
2			(2SB1435 2SD2178)	(2SB1418◎☆ 2SD2138◎☆)			
3				(2SB1416 2SD2136 2SB1417☆ 2SD2137☆ 2SD2139☆)			
5			(2SB1447 2SD2180)				

◎: Darlington ☆: MT4 type



Transistors (Selection Guide by Packages)

■ TO-126 Packages (TO-126(a) : D40※, TO-126(b) : D41)

Pc:1.2W

V _{CE0} (V) I _C (A)	16 * 18 ** 20	25	35 * 40	50 * 60 ** 80	100 * 120	150 * 180	200 * 250	300 * 400
50m						(2SA914 2SC1953		
100m							* 2SC2258 2SA1698 (I _c =70mA)	* 2SB1011 2SC1501 ¹⁾ ※ 2SC3063
150m				2SC3611				
500m	2SC2988				(2SA794 2SC1567 * 2SA794A * 2SC1567A * 2SA1110 * 2SC2590			* 2SD1971 2SC4212 (I _c =200mA)
1	(* 2SA900 * 2SC1568	2SD946 [⊙]	2SC2582※ (2SA885 2SC1846	2SD946A [⊙] * * 2SD946B [⊙] * 2SD1645 ^{⊙2)} (* 2SB1422 ^{⊙2)} * 2SD2018 ^{⊙2)}				
1.5			(* 2SA886 * 2SC1847 * 2SA963※ * 2SC2209※	* 2SC2497A				
2				(2SA1096 2SC2497 * 2SA1096A	2SD1640 [⊙]			
5	** 2SC2594							

⊙ Darlington Transistor 1) V_{CEr} 2) Built-in Zener Diode (: Complementary pair

■ N Type Packages (D35)

Pc:1.3W

V _{CE0} (V) I _C (A)	20	30	40	60	80	* 100 150	180	250	300 * 400 * * 800	900
0.6									* 2SA1498	
0.75								2SD1249	2SD1249A	
1						(2SB1191 2SD1771 2SD1258	(2SB1191A 2SD1771A		** 2SC3496	2SC3496A
2		2SD1316 ^{⊙1)}		(2SB937 [⊙] 2SD1260 [⊙] 2SD1319 ^{⊙1)} 2SD1775	(2SB937A [⊙] 2SD1260A [⊙] 2SD1775A	(2SB928 2SD1250	(2SB928A 2SD1250A		* 2SC3403	
3				(2SB929 2SD1252 2SD1259	(2SB929A 2SD1252A 2SB931 2SD1254 2SD1259A 2SD1529					
4	(2SB1070 2SD1538	2SD1317 ^{⊙1)}	(2SB1070A 2SD1538A	2SD1251 (2SB930 2SD1253 (2SB938 [⊙] 2SD1261 [⊙] 2SD1320 ^{⊙1)}	2SD1251A (2SB930A 2SD1253A (2SB932 2SD1255 (2SB938A [⊙] 2SD1261A [⊙]					
5				2SD1719 (I _c =6A)	(2SB933 2SD1256				* 2SD1611 [⊙] (I _c =6A)	
7	2SB952		2SB952A		(2SB934 2SD1257	* 2SD1257A			* 2SD1534 [⊙]	
8		2SD1318 ^{⊙1)}		(2SB939 [⊙] 2SD1262 [⊙] 2SD1321 ^{⊙1)}	(2SB939A [⊙] 2SD1262A [⊙]					
10	2SB935 2SB936		2SB935A 2SB936A							

Transistors (Selection Guide by Packages)

■ I Type Packages (D36)

Pc:1.3W

V_{CE0} (V) / I_c (A)	20	40	60	80	100 * 150	180 * 250	300 * 400	800 * 900
0.5							*2SA1550	
0.6							*2SA1495	
0.75						*2SD2215	2SD2215A	
1			2SB1169	2SB1169A	*2SD1753 *2SB1233	2SB1233A		2SC3824 *2SC3824A
2			(2SB1170 2SD1751 2SB1178◎ 2SD1748◎)	(2SB1178A◎ 2SD1748A◎)	(*2SB1171 *2SD1741)	(2SB1171A 2SD1741A)	*2SC3825	
3			(2SB1172 2SD1742 2SD1754)	(2SB1172A 2SD1742A 2SB1174 2SD1744 2SD1754A)				
4			(2SB1173 2SD1743 2SB1179◎ 2SD1749◎)	(2SB1173A 2SD1743A 2SB1179A◎ 2SD1749A◎ 2SB1175 2SD1745)				
5				(2SB1176 2SD1746)				
6			2SD1755					
7				(2SB1177 2SD1747)	2SD1747A			
8			(2SB1180◎ 2SD1750◎)	(2SB1180A◎ 2SD1750A◎)				
10	2SB1148 2SD1752	2SB1148A 2SD1752A						

◎ Darlington Transistor 1) Built-in Zener Diode (: Complementary pair

■ TO-202 Packages (D42※), TO-220 Packages (D44)

Pc:1.2W/2W

V_{CE0} (V) / I_c (A)	32 * 40	50 * 60	70 * 80	150	180	250 * 300	400	1400 * 1500
0.05				(2SA1125 2SC2633)		2SA1605* ($I_c=0.07A$)		
0.1						*2SC1819M *2SC2085 ²⁾ *2SC2923※		
0.15		2SC3610						
0.2						*2SC1905(H) *2SC2653(H)※		
0.4						*2SC1929		
1				(2SA1111 2SC2591)	(2SA1112 2SC2592)			2SC4576 ($I_c=0.3A$)
1.5	(2SA699※ 2SC1226※ *2SA699A※ *2SC1226A※)							*2SD2001 ⁴⁾
2		(2SA748 2SC1398)	2SC1398A					
3			*2SD1528					
4		*2SD1990						
5			*2SD812				2SA1500	

※ TO:202 (No mark is TO-220) ◎ Darlington Transistor 1) Built-in Zener Diode 2) V_{CER} 3) V_{CES} 4) V_{CBO} (: Complementary pair

Transistors (Selection Guide by Packages)

TO-220 Full Pack Packages (D46, D47※)

Pc:2W

$V_{CE(sat)}$ (V) I_C (A)	20 * 25 ** 30	40 * 50	60	80	90 * 100 * * 120 * * * 150	180 * 200 * * 250	300 * 400 * * 500	800 * 900	1000 * 1400 * * 1500
0.1						** 2SC4158	2SC3942 2SC3945		
0.15		*2SC3943							
0.2	*2SC4358 ($I_C=0.3A$)	2SC4190 ($I_C=0.3A$)					2SC3946		*2SC4152 ($I_C=0.3A$)
0.6							*2SA1499 *2SA1614 ($I_C=0.5A$)		
0.75						**2SD1263	2SD1263A		
1			2SB954 2SD2051◎	2SB954A	(** *2SA1535 * * *2SC3944 * * *2SD1272 * * *2SB1192 * * *2SD1772	(2SA1535A 2SC3944A 2SB1192A 2SD1772A		*2SC3977 ³⁾ *2SC4004 ³⁾	2SC3977A ³⁾
1.5								2SC3352 ³⁾ *2SC3352A ³⁾ 2SC3794 ³⁾ *2SC3794A ³⁾ 2SC3970 ³⁾ *2SC3970A ³⁾	**2SD1734 ^{3)※}
2	**2SD1322◎ ¹⁾		(2SB949◎ 2SD1275◎ 2SD1325◎ ¹⁾ 2SB1052 2SD1480 2SD1776 2SD2158	(2SB949A◎ 2SD1275A◎ 2SD1517 2SD1776A	(** *2SB940 * * *2SD1264	(2SB940A 2SD1264A	**2SC3868 ³⁾	2SC3978 ³⁾	2SC3978A ³⁾ * * 2SD1575 ^{3)※}
3			(2SB941 2SD1266 2SD1273 2SB1299 (2SB1393 2SD1985 2SD2156	(2SB941A 2SD1266A (2SB943 2SD1268 (2SB1393A 2SD1985A 2SD1273A 2SD1530 (2SB1250◎ 2SD1890◎			*2SC4421 *2SC4533	2SC3743 2SC3971 ³⁾ *2SC3971A ³⁾ *2SC3979 ³⁾	2SC3979A ³⁾
4	(2SB1071 2SD1539 **2SD1323◎ ¹⁾	(2SB1071A 2SD1539A	2SD1265 (2SB942 2SD1267 (2SB950◎ 2SD1276◎ ¹⁾ 2SD1326◎ 2SD1475 2SD1510◎ 2SD2000 2SD2157	2SD1265A (2SB942A 2SD1267A (2SB944 2SD1269 (2SB950A◎ 2SD1276A◎	(2SB1251◎ 2SD1891◎		*2SC4442		
5				(2SB945 2SD1270 2SD1315◎	(*2SB1194◎ *2SD1633◎ (*2SB1063 *2SD1499 (*2SB1252◎ *2SD1892◎ ***2SD1274 ²⁾	*2SD1274A ²⁾ * * 2SD1274B ²⁾	*2SA1501 *2SC3869 *2SC4026	2SC3972 ³⁾ *2SC3972A ³⁾ 2SC3353 ³⁾ *2SC3353A ³⁾ 2SC3795 ³⁾ *2SC3795A ³⁾	
6			2SD1474		*2SD1336◎ * * 2SD1336A◎		*2SD1446◎ 2SD1909◎		
7	(2SB953 2SD1444	(2SB953A 2SD1444A		(2SB946 2SD1271	*2SD1271A		*2SD1535◎ *2SC3870 *2SC4559	2SC3973 ³⁾ *2SC3973A ³⁾	
8	**2SD1324◎ ¹⁾		(2SB951◎ 2SD1277◎ 2SD1327◎ ¹⁾	(2SB951A◎ 2SD1277A◎	(*2SB1195◎ (* * 2SB1108◎ * * 2SD1608◎ *2SD1634◎ (* * 2SB1193◎ * * 2SD1773◎			2SC4471 *2SC4471A	
10	2SB947 (2SB948 2SD1445	2SB947A (2SB948A 2SD1445A		2SD2151 2SD1964 ($I_C=15A$)			*2SC3871		

◎ Darlington Transistor 1) Built-in Zener Diode 2) V_{CES} 3) V_{CBO} (: Complementary pair

Transistors (Selection Guide by Packages)

■ TOP-3 Packages (D49, D50※) / TOP-3L Packages (D57☆)

P_c:2.5W/3.5W

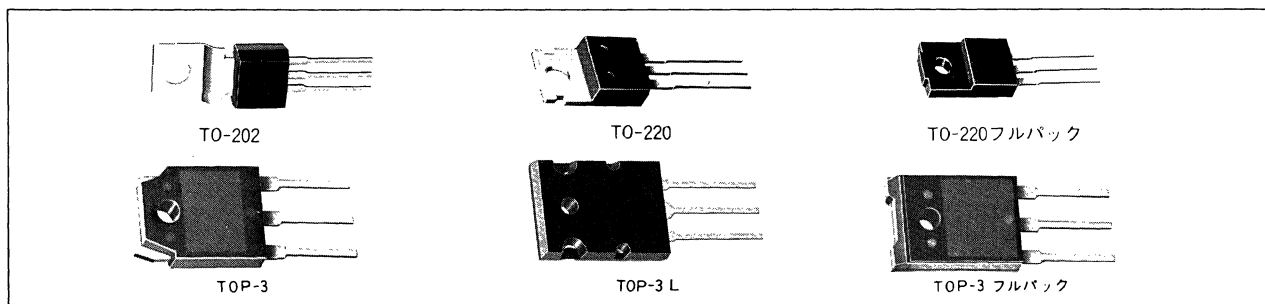
V _{CE0} (V) / I _C (A)	50 *55	140	150 *160 **180	400 *500	800	900	1000 *1200	1400	1500
1.5									2SD1727' ○*
2.5									2SD1479' * 2SD1728' ○*
3									2SD1439' ○*
3.5									2SD1729' ○*
4	*2SD1641								2SD1441' ○*
5				2SD1461' ②	2SC3796'	2SC3796A'			2SD1391' *
6									2SD1731' ○*
7	2SA1185	(2SB1421 2SD2140)			2SC3797'	2SC3797A'			2SD1732' ○*
10			(2SB1362 (I _C =9A) 2SD2053 (I _C =9A))	*2SC4528☆	2SC4309	2SC3982'' ☆	2SC3982A'' ☆ *2SC3738☆	2SC4096☆	2SC4111☆
12			(*2SB1373 *2SD2066 *2SB1347☆ *2SD2029☆ *2SB1419☆)		2SC3976'' ☆				
15			(* *2SB1317☆ * *2SB1975☆)	*2SC3874'' ☆		2SC3910'' ☆			
20				*2SC3850'					

■ TOP-3 Full Pack Packages (D51, D52※, D53☆)

P_c:3W

V _{CE0} (V) / I _C (A)	60 *80	**100 ***120	140 *150	160 *200	400 *500	800 *850	900 *1000	*1200 1500
1.5								2SD1735'' ☆ 2SD1844' ○☆
2.5								2SD1576'' ☆ 2SD1736'' ☆ 2SD1845'' ○☆
3	2SD1643	*2SD1643A				2SC4359※ 2SC4420※	*2SC3506' *	2SD1541'' ○☆
3.5								2SD1846'' ○☆ 2SD1737'' ☆
4							2SC3980''※ *2SC3980A' *	2SD1632'' ○☆
5	(* *2SB1054 * *2SD1485)					2SC3211''※ 2SC3798''※ *2SC3577''※	2SC3211A''※ 2SC3798A'※ *2SC3507''※ 2SC3981''※ *2SC3981A''※	2SD1577'' ☆ *2SC3737' 2SD1663'' ☆ 2SD1738'' ☆ 2SD1847'' ○☆
6	(* * *2SB1371 * * *2SD2064) (*2SB1253③ (V _{CE0} =110V) *2SD1893③ (V _{CE0} =110V))		*2SD1457①	*2SD1457A①		2SC3508③※		2SD1739'' ○☆ 2SD1848'' ○☆
7			(2SB1254④ 2SD1894④ 2SB1372 2SD2065)	*2SD1680	2SC4621	2SC3212''※ 2SC3799''※ 2SC3974''※	2SC3212A''※ 2SC3799A'※	2SD1849'' ○☆ 2SD1850'' ☆ 2SD2057'' ☆
9			(*2SB1361 *2SD2052 2SB1255 (I _C =8A) ③ 2SD1895 (I _C =8A) ③)					
10	(*2SB1154 *2SD1705)				*2SC3872' * *2SC3210' * *2SC3171' * *2SC3873' *	2SC3509①' * 2SC3975' *		
12	2SD1831							
15	(*2SB1155 *2SD1706)				*2SC3527' * *2SC4379※			
20	(*2SB1156 *2SD1707)				2SC3054④※ *2SC3528' *			

◎ Darlington Transistor ○ Built-in Damper Diode 1) V_{CE0} 2) V_{CER} (: Complementary pair)



Transistors (Selection Guide by Applications and Functions)

■ Silicon Small Signal Transistors

● Low Frequency Amplifiers and Others

Application Functions	Package (No.)										V _{CE0} (V)	I _c (mA)	f _T (MHz)	
	SMini Type (D 3)	Mini Type (D 5)	NewS Type (D29)	TO-92 (D37)	M Type (D30)	TO-92NK (D39)	TO-92L (D38)	MiniPower Type (D10)	MT1 Type (D31)	MT2 Type (D32)			h _{FE} * NV(mV) ※ V _{CE} (V)	I _e * I _c (mA)
General AF Amp.	(2SB1218A 2SD1819A)	(2SB709A 2SD601A)	(2SA1309A 2SC3311A)	(2SA564A 2SC1685)	(2SB642 2SD637)				(2SB1320A 2SD1991A)	(2SB1376 2SD2070)	50	100	●160~460	* 2
	(2SB1219/A 2SD1820/A)	(2SB710/A 2SD602/A)	(2SB1030/A 2SD1425/A)	(2SA719/720 2SC1317/1318)	(2SB643/644 2SD638/639)	(2SA1619/A 2SC4208/A)			(2SB1321A 2SD1992A)	(2SB1377 2SD2071)	25/50	500	●85~340	* 150
				(2SB621/A 2SD592/A)	(2SB793/A 2SD973/A)	(2SA1534/A 2SC3940/A)	(2SA683/684 2SC1383/1384)	(2SB766/A 2SD874/A)		(2SB1322A 2SD1994A)	25/50	1A	●85~340	* 500
	(2SA1748 2SC4562)	(2SA1747 2SC4561)									50	50	●200~500	* 2
								(2SB1440 2SD2185)		(2SB1434 2SD2177)	50	2A	●120~340	* 200
										(2SB1446 2SD2179)	50	5A	●120~340	* 500
				(2SA720A 2SC1318A)	(2SA1762 2SC4606)	(2SA1533 2SC3939)	(2SA777 2SC1509)	(2SB767 2SD875)			80	500	●90~330	* 150
					(2SB819 2SD1051)						40	1.5A	●80~220	* 1A
										(2SA1674 2SC4391)	80	1A	●120~340	* 100
										(2SB1437 2SD2181)	100	1A	●120~340	* 500
										(2SB1438 2SD2182)	100	2A	●120~340	* 200
								2SC4543			100 (V _{CEr})	150	300	10
										(2SB1456 2SD2184)	150	1A	●120~340	* 500
High Speed Switch	2SA1739	2SA1738									15	50	t _s =10ns	10
	2SC3938	2SC3757			2SC3811						40	100	t _s =10ns	10
High-h _{FE} (High V _{BE0})		2SB902	(2SB1206 2SD1807)	(2SB774 2SD889)							25	100	V _{BE0} =15V	—
	2SD1823	2SD1030	2SD1424	2SD1010	2SD1199			2SD1995	2SD2073	40	50	●400~2000	* 2	
				2SC2925	2SD1458		2SD1483			20	700	●1000~2500	* 150	
	2SD1824	2SD1149	2SD1512	2SD1011						100	20	●400~2000	* 2	
		2SD1478/A	2SD1808/A	2SD892/A	2SD1205/A					25/50	500	●2000~2000	* 500	
Darlington				2SD893	2SD1198/A			2SD1511		25/50	1A	●2000~20000	* 1A	
									2SD2067	100	2A	●4000~40000	* 1A	
						2SD2068				60±10	1A	●4000~40000	* 1A	
Low Frequency Low Noise Amp.			(2SB1036 2SD1449)	(2SA921 2SC1980)	(2SB788 2SD958)						120	20	* 100	—
	(2SB1220/A 2SD1821/A)	(2SB792/A 2SD814/A)		(2SA1123 2SC2631)			(2SA1124 2SC2632)			150/185	50	* 150	—	
	(2SA1531/A 2SC3929/A)	(2SA1034/1035 2SC2405/2406)	(2SA1310 2SC3312)	(2SA1127 2SC2634)	(2SB745/A 2SD661/A)				2SD1993	2SD2072	35/55	50	* 110	—
Low V _{CE(sat)}		(2SB970 2SD1328)	(2SB1207 2SD1450)	2SD1302	2SD1330			2SD2210	2SD1996	2SD2074	10	500	※< 0.3	* 400
		2SB779	2SA1512	2SA1128	2SB790				2SB1378		20	500	※< 0.4	* 500
	2SD1979	2SD1938	2SD1915								20	300	V _{BE0} =25V ●200~2500	* 4
					2SB835			(2SB956 2SD1280)			18	1A	※< 0.5	* 500
Built-in R _{EB} 10kΩ					2SB1319		2SC1518	2SB1208			20	2A	※< 0.4	* 1A
				(2SB976 2SD965)	(2SB1050 2SD1244)	2SB1288 2SD1934	(2SB873 2SD966)	(2SB1073 2SD1119)		2SB1398	20	5A	※< 1.0	* 3
Built-in Zener		2SD1304									20±3	100	●160~460	2

Transistors (Selection Guide by Applications and Functions)

• Low Frequency Amplifiers and Others (continued)

Application Function	Package (No.)											V _{CE0} (V)	I _c (mA)	f _T (MHz)	
	S Mini Type (D 3)	Mini Type (D 5)	New S Type (D29)	TO-92 (D37)	M Type (D30)	TO-92NL (D39)	TO-92L (D38)	Mini Power Type (D10)	MT1 Type (D31)	MT2 Type (D32)	MT3 Type (D33)			• hFE * NV (mV) ** V _{CE(sat)} (I _E * I _c (mA)
High Breakdown Voltage							(2SB789/A 2SD968/A)					100/120	500	• 65~330	* 150
						(2SB1297 2SD1937)	(2SB987 2SD1211)					120	500	• 90~330	* 150
					(2SB1209 2SD1385)							400	100	• 30~	* 30
					2SD1350/A							400/500	500	• 30~	* 30
Display							2SC2851					16	300	2000	100
	2SC4417	2SC4444			2SC2188							35	50	500	10
							2SC1360/A			2SC4502		45/60	50	500	10
							2SC3526(H)					50	150	350	110
TV Chroma Output				(2SA1018 2SC1473)	(2SB1264 2SD662)	2SB1221	(2SA879 2SC1573)					200	70	80	10
				(2SA1767 2SC1473A)	2SD662A/B	2SC3941	2SC1573A/B					300/400	70	50 80	10
				2SC3187		2SC3965						300	100	140	20
	Horizontal Output				2SD1526							V _{CE0} 130	1A	200	50

• High Frequency Amplifier and Others

Application Function	Package (No.)						V _{CE0} (V)	I _c (mA)	f _T (MHz)	I _E (mA)	
	S Mini Type (D 3)	Mini Type (D 5)	New S Type (D29)	TO-92 (D37)	M Type (D30)	Cross pack (D27)					
A M • F M	Mix. OSC. Amp.	2SC3936	2SC2778	2SC3313	2SC829	2SC2647		20	30	230	1
	Amp.	(2SA1532 2SC3930)	(2SA1022 2SC2295)	(2SA1323 2SC3314)	(2SA838 2SC1359)	(2SA1254 2SC2206)		20	30	250	1
Video IF FM RF Amp.						2SC2188		35	50	500	10
					◆2SC1687			25	30	550	5
					◆2SC1688			40	30	550	5
V H F	OSC.				2SC1789			18	50	980	10
	OSC. Amp.	2SC3932	2SC2480	2SC3354	2SC1215	2SC2636		20	50	1200	15
	Mix.		2SC4238					15	50	1500	15
U H F	RF	2SC3933	2SC3077				2SC2360(H)	20	20	1100	3
			2SC2845		◇2SC2671(H)			12	70	4500	20
	OSC.	2SC3935	2SC3130					10	50	1900	5
		2SC4239						10	50	2000	5
Micro tuner	2SC4068	2SC3967				2SC3966	20	20	1500	1.8	
1V RF Amp.	2SC4410	2SC3707					7	10	4000	1	
Wide Band Amp. SHF IF Amp.		2SC3934	2SC3110					12	30	4500	10
		2SC3937	2SC3704		◇2SC2671(F)			14	80	5500	40
			2SC3829					10	80	7600	30
			2SC3904				2SC3903	10	65	9000	20

◆ Center Emitter (1:C 2:E 3:B) ◇ Center Emitter (1:B 2:E 3:C)

• High Frequency Silicon Transistors for Transmitters

Frequency Band · Application		Type No.	V _{CE0} * V _{CEr} (V)	I _c (A)	P ₀ min. (W)	f _T min. (MHz)	Package	No.
V H F	27/50MHz	2SC1973	* 45	0.5	0.7	300	TO-92L	D38
	175MHz	2SC2851	16	0.3	0.6	1500	TO-92L	D38
		2SC2988	16	0.5	1.8	600	TO-126	D41

Transistors (Selection Guide by Applications and Functions)

● High Frequency Silicon Transistors for Tuners (FETs included)

Band	Application	Package (No.)							
		TO-92 (D37)	New S Type (D29)	M Type (D30)	Cross Pack (D27)	Cross Pack (Ceramic) (D28(a), D28(b)※)	Mini Type (D3)	Mini Type (3 Pin) (D5)	Mini Type (4 Pin) (D6(a))
V H F	RF Amp.								3SK144
	Mix.	2SC1215	2SC3354	2SC2636				2SC2480 2SC4238	3SK169
	OSC.	2SC1215	2SC3354	2SC2636				2SC2480	
	IF Amp.	2SC1215	2SC3354	2SC2636				2SC2480	
U H F	RF Amp.				2SC2360 (H) 2SC3966 3SK142 3SK183		2SC3933 2SC4068	2SC3077 2SC3967	3SK143 3SK184
	Mix.				2SC2360 (H)		2SC3933	2SC3077	
	OSC.						2SC3935 2SC4239	2SC3130	
S H F	RF Amp.						2SK1100, 2SK1196		
	OSC.						2SK649※		
	IF Amp.	2SC2671 (H)/(F)			2SC3903		2SC3934 2SC3937	2SC3904 2SC3704 2SC3829 2SC3110	
Wide Band	RF Amp.	2SC2671 (H)/(F)			2SC3276 2SC3477 3SK125		2SC3934 2SC3937	2SC3110 2SC3704	3SK139 3SK193 3SK219 3SK220

■ Silicon Medium Power Transistors

Application Function	Package (No.)						V _{CEO} (V)	I _C (A)	V _{CE (sat)} typ. (V)	h _{FE}			
	TO-126 (D40※, D41)	MT3 Type (D33)	MT4 Type (D34)	TO-202 (D42)	TO-220 (D44)	TO-220 (F) (D46)				I _C (A)	I _B (mA)	※V _{CE (sat)} (V) ● f _T (MHz)	I _C * I _E (A)
General Use Low Frequency Amp.				(2SA699 2SC1226)			32	1.5	0.4	-1.5 2	-150 200	50~220	1
	2SC2582※						35	1	< 0.5	0.5	50	85~340	0.5
	(2SA885 2SC1846)	(2SB1419 2SD2133)					35	1	< 0.5	0.5	50	85~340	0.5
	(2SA886 2SC1847)			(2SA699A 2SC1226A)			40	1.5	0.4	-1.5 2	-150 200	50~220	1
	(2SA963※ 2SC2209※)						40	1.5	< 1.0	1.5	150	30~220	1
		2SC4545					40	1.5	1.0	2.0	200	30~220	1
	(2SA1096/A 2SC2497/A)				(2SA748 2SC1398)		50/60	2	< 1.0	1.5	150	50~220	1
		(2SB1435 * 2SD2178 *)					50	2	< 0.3	1.0	50	120~340	0.2
		(2SB1447 * 2SD2180 *)					50	5	< 0.3	2.0	100	120~340	0.5
					2SC1398A		50/70	2	0.6	1.0	100	50~160	1
		(2SB1416 2SD2136)	(2SB1417 2SD2137)			2SB941 2SD1266	60	3	< 1.2	3.0	375	40~250	1
	(2SA794/A 2SC1567/A)						100/120	0.5	0.2	0.5	50	65~330	0.15
		(2SB1439 2SD2183)					100	2	< 0.3	1.0	50	120~340	0.2
	2SA1698						200	0.07	< -1.5	-0.05	-5	● 80	* 0.01

* New product

Transistors (Selection Guide by Applications and Functions)

■ Silicon Medium Power Transistors (continued)

Application Function	Package (No.)						V _{CE0} (V)	I _c (A)	V _{CE(sat)} typ. (V)	I _c (A)	I _B (mA)	h _{FE}		
	TO-126 (D40※, D41)	MT3 Type (D33)	MT4 Type (D34)	TO-202 (D42)	TO-220 (D44)	TO-220(F) (D46)						※V _{CE(sat)} (V) ● f _T (MHz)	I _c * I _E (A)	
Audio Drive	(2SA1110 2SC2590)						120	0.5	1.0	0.3	30	65~330	0.15	
		(2SB1414 2SD2134)			(2SA1111/2 2SC2591/2)	(2SA1535/A 2SC3944/A)	150/180	1	0.5	0.5	50	90~330	0.15	
Low V _{CE(sat)}	(2SA900 2SC1568)						18	1	0.3	1.0	50	※0.3	1	
	2SC2594※						20	5	0.7	3.0	100	※0.7	3	
Pre-Amp.	(2SA914 2SC1953)						150	0.05	< 1.0	0.03	3.0	90~450	0.01	
Darlington	2SD946/A/B						30/60/100	1	< 1.8	1.0	1	4000~40000	1	
			(2SB1418 2SD2138)			(2SB949 2SD1275)	60	2	< 2.5	2.0	8	1000~10000	2	
	2SD1640						100	2	< 1.5	1.0	1	4000~40000	1	
	2SD1645					2SD2051	60±10	1	< 1.8	1.0	1	4000~40000	1	
	(2SB1422 2SD2018)	(2SB1415 2SD2135)					60 ⁺²⁵ ₋₁₀	1	< 1.8	1.0	1	4000~40000	1	
High Breakdown Voltage	(2SA914 2SC1953)				(2SA1125 2SC2633)		150	0.05	< 1.0	0.03	3	90~450	0.01	
	2SB 1011						400	0.1	< 2.5	0.05	5	30~	0.03	
	2SD1971						400	0.5	< 1.5	0.25	50	30~	0.03	
Display	2SC3611					2SC3610	V _{CE0} 110	0.15	< 0.5	0.15	15	● 350	* 0.11	
						2SC4190	40	0.3	< 0.3	0.05	5	● 2000	* 0.05	
T V	Chroma Output			2SA1605			200	0.07	< -1.5	-0.05	-5	● 80	* 0.01	
		2SC2258					250	0.1	< 1.2	0.05	5	● 100	* 0.01	
		2SC3063			2SC2923		2SC3942	300	0.1	< 1.5	0.03	3	● 140	* 0.02
						2SC1819M	2SC3945	300	0.1	< 1.5	0.05	5	● 100	* 0.02
	Horizontal Drive			2SC2653/(H)	2SC1905(H)	2SC3946	300	0.2	< 1.0	0.05	5	● 70	* 0.01	
High h _{FE}			2SD2139		2SD1273	60	3	< 1.0	2.0	50	500~2500	0.5		

Transistors (Selection Guide by Applications and Functions)

■ Silicon Power Transistors

Application Function	V _{CE0} *V _{CEBR} (V)	I _C (A)	V _{CE(sat)} typ. (V)	I _C (A) I _B (mA)		Package (No.)							
						TO-220 (D44)		TO-220 (F) (D 46)		N Type (D35)		I Type (D36)	
						NPN	PNP	NPN	PNP	NPN	PNP	NPN	PNP
General Use	60/80	2	< 2	2	200		2SB1052	2SD1480			2SB1170/A	2SD1751/A	
	60/80	4	< 1	2	400			2SD1265/A		2SD1251/A			
			< 1.5	2	200			2SD1475					
	60/80	1	< 1.5	4	400	2SD1990		2SD2000					
			< -1	-1	-125		2SB954/A				2SB1169/A		
	60/80	3	< 1.2	3	375		2SB941/A	2SD1266/A	2SB929/A	2SD1252/A	2SB1172/A	2SD1742/A	
			< 1.2	3	375		2SB1393/A	2SD1985/A					
	60/80	4	< 1.5	4	400		2SB942/A	2SD1267/A	2SB930/A	2SD1253/A	2SB1173/A	2SD1743/A	
	80	2	< 0.5	2	100	2SD1516		2SD1517					
	80	5	< 2	3	300	2SD812							
	80	10	< 0.5	6	300			2SD2151					
	100	5	< 2	3	300		2SB1063	2SD1499					
	150/180	1	< 1	0.5	50	2SD1770/A	2SB1192/A	2SD1772/A	2SB1191/A	2SD1771/A	2SB1233/A		
150/180	2	< 1	0.5	50		2SB940/A	2SD1264/A	2SB928/A	2SD1250/A	2SB1171/A	2SD1741/A		
250/300	0.75	< 1	1	200			2SD1263/A		2SD1249/A		2SD2215/A		
Low V _{CE(sat)}	20/40	4	0.25	2	100		2SB1071/A	2SD1539/A	2SB1070/A	2SD1538/A			
	20/40	7	0.32	5	160		2SB953/A	2SD1444/A	2SB952/A				
	20/40	10	0.4	10	330		2SB948/A	2SD1445/A	2SB936/A		2SB1148/A	2SD1752/A	
			0.32	7	230		2SB947/A		2SB935/A				
	80	3	0.3	2	100		2SB943	2SD1268	2SB931	2SD1254	2SB1174	2SD1744	
			0.12	2	100	2SD1528		2SD1530		2SD1529			
	80	4	0.25	3	150		2SB944	2SD1268	2SB932	2SD1255	2SB1175	2SD1745	
	80	5	0.3	1	125		2SB945	2SD1270	2SB933	2SD1256	2SB1176	2SD1746	
80	15	0.18	7	350							2SD1964		
80/100	7	0.25	5	250		2SB946	2SD1271/A	2SB934	2SD1257/A	2SB1177	2SD1747/A		
High	60	6	< 1	5	100			2SD1474		2SD1719		2SD1755	
	60/80	2	< 1	1	25	2SD1774/A		2SD1776/A		2SD1775/A			
h _{FE}	60	2	< 1	1	25			2SD2158					
	60/80	3	< 1	2	50		2SB1299/A	2SD1273/A		2SD1259/A		2SD1754/A	
	60	3	< 1	2	50			2SD2156					
	150	1	< 1	0.5	20			2SD1272		2SD1258		2SD1753	
Darlington	60	4	< 2	3	12			2SD1510					
	60/80	2	< 2.5	2	8		2SB949/A	2SD1275/A	2SB937/A	2SD1260/A	2SB1178/A	2SD1748/A	
	60/80	4	< 2	3	12		2SB950/A	2SD1276/A	2SB938/A	2SD1261/A	2SB1179/A	2SD1749/A	
	60	4	< 2	3	12			2SD2157					
	60/80	8	< 1.5	4	8		2SB951/A	2SD1277/A	2SB939/A	2SD1262/A	2SB1180/A	2SD1750/A	
	80	5	< 1	1.5	50			2SD1315					
	100	5	< 1.5	3	3		2SB1194	2SD1633					
	100	8	< 1.5	5	5		2SB1195	2SD1634					
	100/120	6	< 1.5	5	12.5			2SD1336/A					
	120	8	< 1.5	4	8		2SB1108 2SB1193	2SD1608 2SD1773					
	300	6	< 2	4	40			2SD1909					
	400	6	< 1.5	3	60			2SD1446		2SD1611			
400	7	< 2	7	70			2SD1535		2SD1534				
Darlington Built-in Zener	30±5	2	< 2.5	2	8			2SD1322		2SD1316			
	30±5	4	< 2.5	3	12			2SD1323		2SD1317			
	30±5	8	< 1.5	4	8			2SD1324		2SD1318			
	60±10	2	< 2.5	2	8			2SD1325		2SD1319			
	60±10	4	< 2.5	3	12			2SD1326		2SD1320			
	60±10	8	< 1.5	4	8			2SD1327		2SD1321			

TO-220 (F) = TO-220 Type Full Pack Package

Transistors (Selection Guide by Applications and Functions)

■ Silicon Large Power Transistors

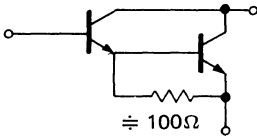
Application · Function	V_{CE0} * V_{CB0} (V)	I_C (A)	$V_{CE(sat)}$ (V)	I_C (A)	I_B (mA)	Package (No.)	
						TOP-3 (D 49)	TOP-3F (D 51, D 52 ※)
General Use	50	7	< 0.8	7	700	2SA1185	
	100	5	< 2	3	300		2SB1054/2SD1485
	140	7	< 2	5	500	2SB1421	
Low $V_{CE(sat)}$	80	10	0.2	6	300		2SB1154/2SD1705
		15	0.2	7	350		2SB1155/2SD1706
		20	0.25	8	400		2SB1156/2SD1707
Darlington	150	6	< 1.5	3	60		2SD1457
	200	6	< 1.5	3	60		2SD1457A
	400	5	< 1.5	5	100	2SD1461	
		20	< 2	20	800		2SC3054 ※
	500	10	< 2	10	1 (A)		2SC4258 (TOP-3L)
	800	6	< 1.5	3	600		2SC3508 ※
10		< 1.5	5	1 (A)		2SC3509 ※	
High- h_{FE}	55	4	< 2	0.5	2	2SD1641	
	60	10	< 0.5	5	100		2SD1831
	80/100	3	< 1	2	50		2SD1643/A

■ Silicon Power Transistors for Audio

● Single

Application	V_{CE0} (V)	I_C (A)	$V_{CE(sat)}$ (V)	I_C (A)	I_B (mA)	P_C (W)	Package (No.)		
							TOP-3 (D 49)	TOP-3F (D 51)	TOP-3L (D 57)
Audio Output	120	6	< 2	4	400	70		2SB1371/2SD2064	
	140	7	< 2	5	500	80	2SB1421/2SD2140	2SB1372/2SD2065	
	150	9	< 2	7	700	100	2SB1362/2SD2053	2SB1361/2SD2052	
	160	12	< 1.8	8	800	120			2SB1419
	160	12	< 2	8	800	120	2SB1373/2SD2066		2SB1347/2SD2029
	180	15	< 2.5	10	1 (A)	150			2SB1317/2SD1975

● Darlington

Application	V_{CE0} (V)	I_C (A)	$V_{CE(sat)}$ (V)	I_C (A)	I_B (mA)	P_C (W)	Package (No.)	
							TO-220 (F) (D 46)	TOP-3F (D 51)
Audio Output (Including-Driver) Darlington	80	3	< 2.5	2	2	35	2SB1250/2SD1890	
	90	4	< 3	3	3	40	2SB1251/2SD1891	
	100	5	< 2.5	4	4	45	2SB1252/2SD1892	
	110	6	< 2.5	5	5	50		2SB1253/2SD1893
	140	7	< 2.5	6	6	70		2SB1254/2SD1894
	140	8	< 2.5	7	7	100		2SB1255/2SD1895
Equivalent Circuit	 <p style="text-align: center;">≅ 100Ω</p> <p style="text-align: right;">Direct drive by IC is possible.</p>							

Complementary pair marked / between products (Example 2SB1054/2SD1485)
(Package Symbol) TOP-3F=TOP-3 Type Full Pack Package, TOP-3L=TOP-3 Type Large Package

Transistors (Selection Guide by Applications and Functions)

■ Switching Power Transistors

Application	V _{CE0} (V)	V _{CE0} (V)	I _C (A)	V _{CE(sat)} (V)	I _C		t _r (μs)	Package (No.)										
					I _C (A)	I _B (mA)		TO-220 (D 44)	TO-220(F) (D 46)	N Type (D 35)	I Type (D 36)	TOP-3 (D 49)	TOP-3F (D 51※, D 52)	TOP-3L (D 57)				
Switching	150/200/250	80	5	<1.6	5	1 (A)	1		2SD1274/A/B									
	330	200	7	<1	5	500	0.75							2SD1680※				
	500	400	2	<1	1	200	1			2SC3403	2SC3825							
	500	400	7	<1	3	600	1					2SC2841						
	500	400	10	<1	5	1 (A)	1								2SC3210			
	500	400	10	<1	5	1 (A)	1								2SC3171			
	500	400	15	<1	7	1.4 (A)	1								2SC3527			
	500	400	20	<1	10	2 (A)	1						2SC3850		2SC3528			
	800/900	500	1.5	<1	1	200	1		2SC3352/A									
	800/900	500	1.5	<1	1	200	1		2SC3794/A									
	800/900	500	5	<1	3	600	1		2SC3353/A									
	800/900	500	5	<1	3	600	1		2SC3795/A									
	800/900	500	5	<1	3	600	1									2SC3211		
	800/900	500	5	<1	3	600	1						2SC3796/A	2SC3798/A				
	800/900	500	7	<1	5	1 (A)	1						2SC2834/A	2SC3212/A				
	800/900	500	7	<1	5	1 (A)	1						2SC3797/A	2SC3799/A				
	900	800	6	<1.5	3	600	0.7									2SC3508		
	900	800	10	<1.5	5	1 (A)	0.7									2SC3509		
	850	650	5	<1.5	3	600	0.5									2SC3577		
	900	500	15	<1	8	1.6 (A)	1											2SC3910
900	800	1	<1.5	0.2	40	1		2SC4004										
900	800/900	1	<1.5	0.2	40	1			2SC3496/A	2SC3824/A								
1000	800	3	<0.6	0.8	160	1	2SC3743								2SC4359			
1000	800	3	<1.5	2	400	0.5						2SC3285	2SC3506					
1000	800	5	<1.5	3	600	0.5							2SC3507					
Switching	-400	-400	0.5	<-1.5	-0.2	-40	1		2SA1614		2SA1550							
	-400	-400	0.6	<-1	-0.3	-60	1		2SA1499	2SA1498	2SA1495							
	-400	-400	5	<-1	-2	-400	1	2SA1500	2SA1501									
High-Speed Switching	500	400	2	<1	1	200	0.3		2SC3868									
	500	400	3	<1	1.5	300	0.3		2SC4533									
	500	400	5	<1	2	400	0.3		2SC3869									
	500	400	5	<1	2	400	0.3		2SC4026									
	500	400	7	<1	3	600	0.3		2SC3870					2SC4621				
	500	400	7	<1	3	600	0.3		2SC4559									
	500	400	10	<1	5	1 (A)	0.3		2SC3871					2SC3872				
	500	400	12	<1	7	1.4 (A)	0.3							2SC3873				
	500	400	15	<1	10	2 (A)	0.3										2SC3874	
	800/900	500	1.5	<1	0.6	170	0.3		2SC3970/A									
	800/900	500	3	<1	1.2	350	0.3		2SC3971/A									
	800/900	500	5	<1	2	570	0.3		2SC3972/A									
	800/900	500	7	<1	4	800	0.3		2SC3973/A					2SC3974				
	800	500	10	<1	6	1.7 (A)	0.3							2SC3975				
	800	500	12	<1	7	2 (A)	0.3										2SC3976	
	900/1000	800	1	<1.5	0.2	40	0.3		2SC3977/A									
	900/1000	800	2	<1.5	0.5	100	0.3		2SC3978/A									
900/1000	800	3	<1.5	0.8	160	0.3		2SC3979/A						2SC4420				
900/1000	800	4	<1.5	2	400	0.3							2SC3980/A					
900/1000	800	5	<1.5	3	600	0.3							2SC3981/A					
900/1000	800	10	<1.5	4	800	0.3										2SC3982/A		
Ultra High-Speed Switching	500	400	3	<1.5	1.5	300	0.1		2SC4421									
	500	400	4	<1.5	2	400	0.1		2SC4442									
	500	400	15	<1	7	1.4 (A)	0.1							2SC4379				
	800/900	500	8	<2	2	400	0.1		2SC4471/A									
	800	800	10	<2.5	3	600	0.13					2SC4309						

Transistors (Selection Guide by Applications and Functions)

■ Silicon Power Transistors for TV and Display

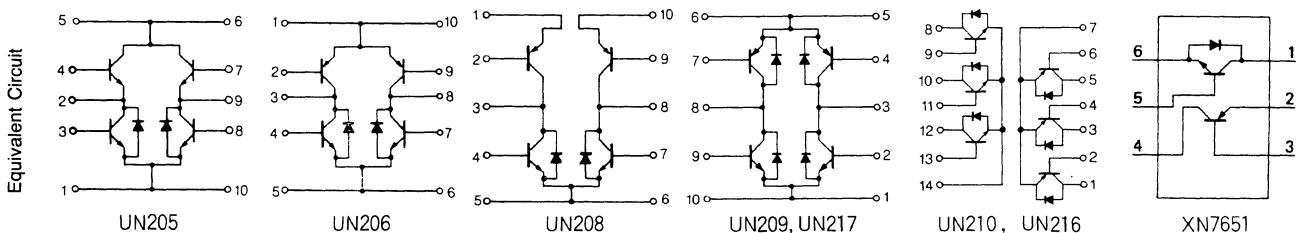
Application	V _{CE0} (V)	I _c (A)	t _r max. (μs)	Package (No.)							
				TOP-3 (D50)		TOP-3F (D52※,D53)		TOP-3L(D57)	T0-220(F)(D47)	T0-220 (D44)	
				Built-in damper diode		Built-in damper diode					
Horizontal Output	1200	5	0.3			2SC3737※					
		10	0.3					2SC3738			
	1400	0.3	1							2SC4576	
		10	0.5						2SC4096		
	1500	1.5	0.8		2SD1727	2SD1735	2SD1844				
		1.5	1							2SD1734	
		2	1							2SD1575	
		2.5	0.8		2SD1479	2SD1728	2SD1576 2SD1736	2SD1845			
		3	0.8		2SD1439			2SD1541			
		3.5	0.8		2SD1440 2SD1729	2SD1737		2SD1846			
		4	0.8		2SD1441			2SD1632			
		5	0.8		2SD1391	2SD1730	2SD1577,2SD1738	2SD1847			
		6	0.8		2SD1731	2SD1739		2SD1848			
		7	0.8		2SD1732	2SD1850		2SD1849 2SD2057			
10	0.6							2SC4111			

TOP-3F=TOP-3 Type Full Pack Package, TOP-3L=TOP-3 Type Large Package, T0-220(F)=T0-220 Type Full Pack Package

■ Transistor Arrays

● Small Signal Transistor Arrays

Application	Type No.	Polarity	V _{CE0} (V)	I _c (A)	h _{FE}	V _{CE} (V)		V _{CE(sat)} (V)		I _B (mA)	Package (No.)
						V _{CE}	I _c	V _{CE}	I _c		
Motor Drive	UN205	NPN×4	20	3	200~	1	0.85	~0.2	0.85	24	SO-10B(D63(a))
	UN206	PNP×2	-18	-1	90~	-2	-0.5	~-0.2	-0.3	-10	SO-10C (D63(b))
		NPN×2	18	1	90~	2	0.5	~0.2	0.3	10	
	UN208	PNP×2	-18	-1	90~	-2	-0.5	~-0.2	-0.3	-10	SO-10C (D63(b))
		NPN×2	18	1	90~	2	0.5	~0.2	0.3	10	
	UN209	PNP×2	-10	-1	200~600	-1	-0.5	-0.2	-1	-30	SO-10C (D63(b))
		NPN×2	10	1	200~600	1	0.5	0.1	1	30	
	UN210	PNP×3	-10	-1	200~600	-1	-0.5	-0.2	-1	-30	SO-14 (D64)
		NPN×3	10	1	200~600	1	0.5	0.1	1	30	
	UN216	PNP×3	-10	-3	200~800	-1	-0.5	-0.45	-2	-50	SO-14 (D64)
NPN×3		10	3	200~800	1	0.5	0.25	2	50		
UN217	PNP×3	-10	-1	200~800	-1	-0.5	~-0.3	-1	-30	SO-10C (D63(b))	
	NPN×3	10	1	200~800	1	0.5	~0.3	1	30		
XN7651	PNP (2SB970)	-10	-0.5	100~350	-2	-0.5	-0.16	-0.4	-8	6 Terminals Mini Type (D8)	
	NPN (D _i , λ _i)	20	0.5	200~800	2	0.5	0.13	0.5	20		



SO=Small Outline Package













Equivalent Circuit	Series Name	PU3000 Series	PUA3000 Series	PU4000 Series						Main Characteristics										Remark				
	Package (No.)	8-Pin · SIL Package (D 58)		10 Pin · SIL Package (D60)						(Ta=25°C)														
	Equivalent Circuit	I		II	III		IV	V													Basic Type			
	Structure	NPN	PNP	PNP	NPN	PNP	PNP	NPN-NPN	PNP-PNP	NPN-PNP	Ic	VcBo	VcEO	VEBO	hFE		VCE(sat)				NPN	PNP		
Application										(A)	(V)	(V)	(V)	min.	max.	Ic (A)	Ib (A)	max. (V)	Ic (A)	Ib (A)				
<p>I</p> <p>Example (NPN)</p>	General Use	PU3110	PU3210		PU4110	PU4210		PU4410	PU4510	PU4310	3/-3	60/-60	60/-60	6/-6	70	250	4/-4	1/-1	±1.2	3/-3	0.375/-0.375	2SD1266	2SB941	
		PU3111	PU3211		PU4111	PU4211		PU4411	PU4511	PU4311	4/-4	60/-60	60/-60	5/-5	70	250	4/-4	1/-1	±1.5	4/-4	0.4/-0.4	2SD1267	2SB942	
	Low	PU3112	PU3212		PU4112	PU4212		PU4412	PU4512	PU4312	3/-3	130/-130	80/-80	7/-7	60	260	2/-2	0.1/-0.1	±0.5	2/-2	0.1/-0.1	2SD1268	2SB943	
		PU3113	PU3213		PU4113	PU4213		PU4413	PU4513	PU4313	4/-3	130/-130	80/-80	7/-7	60	260	2/-2	0.1/-0.1	±0.5	3/-3	0.15/-0.15	2SD1269	2SB944	
	VCE(sat)	PU3114	PU3214		PU4114	PU4214		PU4414	PU4514	PU4314	7/-7	40/-40	20/-20	5/-5	60	260	2/-2	2/-2	±0.6	5/-5	0.16/-0.16	2SD1444	2SB953	
			PU3215			PU4215			PU4515		-10	-40	-20	5	60	260	-2	-2	-0.6	-7	-0.23		2SB947	
	General Use	PU3116	PU3216		PU4116	PU4216		PU4416	PU4516	PU4316	2/-2	200/-200	150/-150	6/-6	60	240	10/-10	0.15/-0.15	±1	0.5/-0.5	0.05/-0.05	2SD1264	2SB940	
			PU3226					PU42C26			-2	-60	-60	-6	100	280	-4	-1	±2	-2	-0.2		2SB1052	
	High	PU3117			PU4117				PU4417			3	80	60	6	500	2500	4	0.5	1	2	0.05	2SD1273	
		hFE	PU3118			PU4118			PU4418			1	200	150	6	500	2000	4	0.2	1	0.5	0.02	2SD1272	
Darlington	PU3119	PU3219		PU4119	PU4219		PU4419	PU4519	PU4319	2/-2	60/-60	60/-60	5/-5	1000	10000	4/-4	2/-2	±2.5	2/-2	8mA/-8mA	2SD1275	2SB949		
	PU3120	PU3220		PU4120	PU4220		PU4420	PU4520	PU4320	4/-2	60/-60	60/-60	5/-5	1000	10000	3/-3	3/-3	±2	3/-3	12mA/-12mA	2SD1276	2SB950		
Darlington with Zener	PU3121			PU4121				PU4421			2	30±5	30±5	5	1000	10000	4	2	2.5	2	8mA	2SD1322		
	PU3122			PU4122				PU4422			4	30±5	30±5	5	1000	10000	3	3	2	3	12mA	2SD1323		
	PU3123			PU4123				PU4423			2	60±10	60±10	5	1000	10000	4	2	2.5	2	8mA	2SD1325		
	PU3124			PU4124				PU4424			4	60±10	60±10	5	1000	10000	3	3	2	3	12mA	2SD1326		
Example (PNP)	<p>* □ : Without Transistor chip. Example (PNP)</p>																							
Example (NPN)	<p>Example (NPN) (NPN)</p>																							
Hi-hfe Built-in Zener	PU3127			PU4127							3	35±5	35±5	6	500	2500	4	0.5	1.0	2	0.05			
											(NPN) 2	60±10	60±10	5	1000	10000	4	2	2.5	2	8mA	2SD1325	2SB941	
											(PNP) 3	-60	-60	6	70	250	-4	-1	-1.2	-3	-0.375			

Transistors (Selection Guide by Applications and Functions)

■ 5-Terminal Mini Type (D7) · 6-Terminal Mini Type (D8) Package Transistors, FETs










● Transistors

(to Page 107)




Application	5 Terminals Mini Type (D7)						6 Terminals Mini Type (D8)					
												
	PNP× 2	NPN× 2	PNP+NPN	PNP+NPN	PNP+NPN	PNP× 2	NPN× 2	PNP× 2	NPN× 2	PNP+NPN	NPN× 2	PNP+NPN
General Use	XN1401	XN1501	XN1601	XN1B301	XN1C301	XN2401	XN2501	XN4401	XN4501	XN4601	XN5501	XN5601
Low V _{CE} (sat)		XN1504						XN4404	XN4504	XN4604		
High Frequency		XN1531					XN2531					XN5531
Low Noise		XN1507										
Low V _{CE} (sat) + General Use										XN4608		
General Use + Low V _{CE} (sat)										XN4609		
High h _{FE}												XN5553

● Resistor Built-in Transistors

(to Page 107)




Application	5 Terminals Mini Type (D7)				6 Terminals Mini Type (D8)				
									
	PNP× 2	NPN× 2	NPN× 2	PNP+NPN	PNP× 2	NPN× 2	PNP+NPN	PNP× 2	NPN× 2
General Use Switching	XN1111	XN1211	XN2211		XN4111	XN4211	XN4311	XN6111	XN6211
	XN1112	XN1212		XN1A312	XN4112	XN4212	XN4312	XN6112	XN6212
	XN1113	XN1213			XN4113	XN4213		XN6113	XN6213
	XN1114	XN1214							XN6214
	XN1115	XN1215	XN2215		XN4115	XN4215	XN4315	XN6115	XN6215
	XN1116	XN1216			XN4116	XN4216	XN4316	XN6116	XN6216
		XN1217							
	XN1119								
	XN1110	XN1210	XN2210			XN4210			
	XN111F					XN421F			
	XN111H								
								XN611FH	
								XN4322	
							XN4381		

● FETs

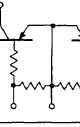
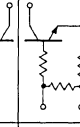

Application	5 Terminals Mini (D7)		Main Characteristics								Basic Type	
			V _{DS} *V _{DSX} (V)	I _D (A)	V _{th} (V)	V _{DS} (V)	I _D (μA)	I _{loss} (mA)	g _m (mS)	V _{DS} (V)		I _D (mA)
Low Noise Amp. Switching	XN1871		*30	0.02				0.5~12	4~	10	0.5	2SK198
		XN1872	50	0.1	1.5~3.5	V _{DS}	100	—	20~	5	20	2SK621
Application		Nch 2 element	V _{DS} (V)	I _D (A)	I _{loss} (mA)	g _m (mS)		Basic Type				
Low noise amp. Switching	XN1D873		50	0.02	2	V _{DS} (V)	I _D (mA)	10	1	2SK1103		

Transistors (Selection Guide by Applications and Functions)


• Transistors (continued)

6 Terminals Mini Type (D8)			Main Characteristics										Basic Type			
			V _{CB0}	V _{CE0}	I _c	h _{FE}		V _{CE(sat)}			f _T		PNP	NPN		
						V _{CE}	I _c	typ	I _c	I _B	typ	V _{CB}			I _E	
PNP×2	NPN×2	PNP+NPN	(V)	(V)	(A)	(V)	(mA)	(V)	(A)	(mA)	(MHz)	(V)	(mA)			
XN6401	XN6501		±60	±50	±0.1	160~460	±10	±2	±0.3	±0.1	±10	80/150	-10/10	1/-2	B709A	D601A
			±60	±50	±0.5	85~340	±10	±150	±0.35	±0.3	±30	200	-10/10	-50/50	B710A	D602A
			50	50	0.05	200~500	10	2	0.3max	0.01	1	250	10	-2		C4561
		XN7651	-15/25	-10/20	-0.5/0.5	100~350/ 200~800	-2/2	-500/ 500	-0.16/ 0.13	-0.4/ 0.5	-8/20	130/200	-10/10	50/-50	B970	D1328
			15	10	0.05	75~400	4	5	0.5max	0.02	4	1900	4	-5		C3130
	XN6537		15	12	0.03	40~	10	10	—	—	—	4500	10	-10		C3110
XN6435			-30	-20	-0.03	50~220	-10	1	-0.1	-10	-1	300	-10	1	A1022	
	XN6534		30	20	0.015	40~260	6	-1	—	—	—	650	6	-1		C2404
	XN6542		45/ 30	35/ 20	0.05	20~100/ 25~250	10	-10/ -15	0.5max /—	0.02/ —	2/-	500/ 1200	10	-10/ -15		C2188/ C2480
	XN6543		15	10	0.065	50~300	8	20	—	—	—	8500	V _{CE} 8V	I _c 20mA		C3904
			150	150	0.05	90~450	5	10	1 max	0.03	3	150	10	-10		D814
			-15/60	-10/50	-0.5/ 0.1	100~350/ 160~460	-2/10	-500/ 2	-0.16/ 0.3	-0.4/ 0.1	-8/10	130/150	-10/10	50/-2	B970	D601A
			-60/25	-50/20	-0.1/ 0.5	160~460/ 200~800	-10/2	-2/ 500	-0.3/ 0.13	-0.1/ 0.5	-10/20	80/200	-10/10	1/-50	B709A	D1328
			100	100	0.02	400~2000	10	2	0.05	0.01	1	150	10	-10		D1011

• Resistor Built-in Transistors (continued)

									Main Characteristics						Basic Type	
PNP×2	NPN×2	PNP×2	V _{CB0}	V _{CE0}	I _c	h _{FE}		R _B	R _{BE}	PNP	NPN					
						V _{CE}	I _c					(kΩ)	(kΩ)			
(V)	(V)	(A)	(V)	(mA)	(kΩ)	(kΩ)										
			50	50	0.1	35~	10	5	10	10	UN2111	UN2211				
		60~				22			22	UN2112	UN2212					
		80~				47			47	UN2113	UN2213					
		80~				10			47	UN2114	UN2214					
		160~460				10			∞	UN2115	UN2215					
		160~460				4.7			∞	UN2116	UN2216					
		160~460				22			∞	UN2117						
		30~				1			10	UN2119						
		160~460				47			∞	UN2110	UN2210					
		30~				4.7			10	UN211F						
			50	50	0.1	30~	10	5	2.2	10	UN211H					
			50	50	0.1	30~	10	5	4.7/2.2	10	UN211F/H					
			50	50	0.5	50~	10	100	4.7	4.7	UN2122	UN2222				
XN1101	XN1201		40	40	0.03	80~	10	5	10	500	UN5101	UN5201				
		XN4130	-15	-10	-0.5	100~350	-2	-500	10	∞	2SB970+R					
			50	50	0.5/0.1	50~/80~	10/10	100/5	4.7/47	4.7/47	UN2122	UN2213				

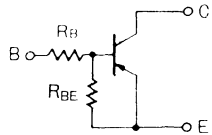
• FET + Transistors

Application	Type Name	Equivalent Circuit	Main Characteristics								Basic Type	
Low Noise Amp. Switching	XN8081		Transistors	V _{CB0}	V _{CE0}	I _c	h _{FE}	V _{CE}	I _c	R _B	R _{BE}	UN2213
				(V)	(V)	(A)		(V)	(A)	(KΩ)	(KΩ)	
			-50	50	0.1	80~	10	5	47	4.7		
FET			V _{DS}	I _D	I _{DSS}	gm	V _{DS}	I _D	2 SK1103			
			(V)	(A)	(mA)	(mS)	(V)	(mA)				
50	0.02	2	1.8~	10	1							

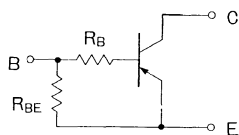
Series Name		UN1000 Series		UN2000 Series		UN4000 Series		UN5000 Series		UN6000 Series		Series UN7000	UN8000 Series		Main Characteristics (Ta=25°C)				
Package (No.)		M Type (D35)		Mini Type (D5)		New S Type (D34)		S Mini Type (D3)		MT1 Type (D36)		Mini Power Type (D10)	MT2 Type (D37)		V _{CE0} (V)	I _c (mA)	h _{FE} min.		
Resistance Value		(P _c =400mW,600mW,*1W*2)		(P _c =200mW)		(P _c =300mW)		(P _c =150mW)		(P _c =400mW,600mW*1)		(P _c =1W)	(P _c =1W)					V _{CE} (V)	I _c (mA)
R _B (kΩ)	R _{BE} (kΩ)	PNP	NPN	PNP	NPN	PNP	NPN	PNP	NPN	PNP	NPN	NPN	PNP	NPN					
10	10	UN1111	UN1211	UN2111	UN2211	UN4111	UN4211	UN5111	UN5211	UN6111	UN6211	—	UN8111	UN8211			35		
22	22	UN1112	UN1212	UN2112	UN2212	UN4112	UN4212	UN5112	UN5212	UN6112	UN6212	—	UN8112	UN8212			60		
47	47	UN1113	UN1213	UN2113	UN2213	UN4113	UN4213	UN5113	UN5213	UN6113	UN6213	—	UN8113	UN8213			80		
10	47	UN1114	UN1214	UN2114	UN2214	UN4114	UN4214	UN5114	UN5214	UN6114	UN6214	—	UN8114	UN8214			80		
10	∞	UN1115	UN1215	UN2115	UN2215	UN4115	UN4215	UN5115	UN5215	UN6115	UN6215	—	UN8115	UN8215			160		
4.7	∞	UN1116	UN1216	UN2116	UN2216	UN4116	UN4216	UN5116	UN5216	UN6116	UN6216	—	UN8116	UN8216			160		
22	∞	UN1117	UN1217	UN2117	UN2217	UN4117	UN4217	UN5117	UN5217	UN6117	UN6217	—	UN8117	UN8217			160		
0.51	5.1	UN1118	UN1218	UN2118	UN2218	UN4118	UN4218	UN5118	UN5218	UN6118	UN6218	—	UN8118	UN8218	50	100	20	10	5
1	10	UN1119	UN1219	UN2119	UN2219	UN4119	UN4219	UN5119	UN5219	UN6119	UN6219	—	UN8119	UN8219	—50	—100	30	—10	—5
47	∞	UN1110	UN1210	UN2110	UN2210	UN4110	UN4210	UN5110	UN5210	UN6110	UN6210	—	UN8110	UN8210			160		
47	10	UN111D	UN121D	UN211D	UN221D	UN411D	UN421D	UN511D	UN521D	UN611D	UN621D	—	UN811D	UN821D			30		
47	22	UN111E	UN121E	UN211E	UN221E	UN411E	UN421E	UN511E	UN521E	UN611E	UN621E	—	UN811E	UN821E			60		
4.7	10	UN111F	UN121F	UN211F	UN221F	UN411F	UN421F	UN511F	UN521F	UN611F	UN621F	—	UN811F	UN821F			30		
2.2	10	UN111H	—	UN211H	—	UN411H	—	UN511H	—	UN611H	—	—	UN811H	—			30		
10	4.7	—	UN121K	—	UN221K	—	UN421K	—	UN521K	—	UN621K	—	—	UN821K			20		
4.7	4.7	UN111L	UN121L	UN211L	UN221L	UN411L	UN421L	UN511L	UN521L	UN611L	UN621L	—	UN811L	UN821L			20		
2.2	2.2	UN1121*1	UN1221*1	UN2121	UN2221	UN4121	UN4221	—	—	UN6121*1	UN6221*1	—	UN8121	UN8221			40		
4.7	4.7	UN1122*1	UN1222*1	UN2122	UN2222	UN4122	UN4222	—	—	UN6122*1	UN6222*1	—	UN8122	UN8222			50		
10	10	UN1123*1	UN1223*1	UN2123	UN2223	UN4123	UN4223	—	—	UN6123*1	UN6223*1	—	UN8123	UN8223	50	500	60	10	100
2.2	10	UN1124*1	UN1224*1	UN2124	UN2224	UN4124	UN4224	—	—	UN6124*1	UN6224*1	—	UN8124	UN8224	—50	—500	60	—10	—100
0.27	5.0	UN112X*1	—	UN212X	—	UN412X	—	—	—	UN612X	—	—	UN812X	—			20		
3.1	4.6	UN112Y*1	—	UN212Y	—	UN412Y	—	—	—	UN612Y	—	—	UN812Y	—			50		
1	47	—	UN1231*2	—	—	—	—	—	—	—	—	UN7231	—	—	20	700	800	10	150
1	47	—	UN1231A*2	—	—	—	—	—	—	—	—	—	—	—	50	700	800	10	150
∞	10	—	—	—	—	—	—	—	—	—	—	2SB1208	—	—	—20	—2A	70	—2	—500
10	500	—	—	—	—	—	—	UN5101	UN5201	—	—	—	—	—	40/—40	100/—100	80	10/—10	5/—5

Equivalent Circuit

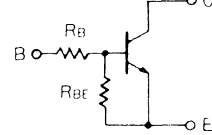
(PNP Type)



(NPN Type)



(UN5101)



(UN5201)

■ Silicon Junction FETs

Application	Package (No.)				Absolute Maximum Rating (Ta=25°C)		Electrical Characteristics (Ta=25°C)			
	S Mini Type (D3)	Mini Type (D5)	New S Type (D29)	TO-92 (D37)	V _{DS0} * V _{GDS} (V)	I _D (mA)	NV	※NF	gm	loss
							V _{DS} (V)	max. * typ. (mV)	min. * typ. (mS)	max. (mA)
General Use Low Frequency Amp.		2SK1103	2SK1104		* -50	20	—	—	* 4.5	17
		2SJ163	2SJ164		50	-20	—	—	* 3.5	-12
General Use			2SJ129		* 15	-20	-10	80	3	-12
	2SK662 2SK663	2SK198 2SK374	2SK652	2SK301	30 55	30	30	* 60	4	12
High Frequency Amp		2SK608	2SK607	2SK606	* 30	20	5	* ※1.7dB	5	20
Condenser Microphone		2SK123	2SK624		20	2	4.5	4	0.9	0.5
			2SK65*		12	2	4.5	4	0.3	0.8
Video Camera Pre-Amp.		2SK316 2SK1216 2SK321			* -10	50	5	C _{ISS} 3.5pF	15	24
				2SK218	* -15	50	5	C _{ISS} 8pF	* 30	42

* S Type Package

■ Silicon MOS FETs

● For High Frequency

Application	Type No.	Absolute Maximum Rating (Ta=25°C)			Electrical Characteristics (Ta=25°C)							Package	
		V _{DS} (V)	V _{G1S} V _{G2S} (V)	P _D (mW)	PG typ. (dB)	NF typ. (dB)	PG, NF Condition				No.		
							V _{DS} (V)	V _{G2} (V)	I _D (mA)	f(GHz)			
VHF RF Amp.	3SK202	15	± 8	250	>20	< 3.0	8	3	8	0.2	Cross Pack Mini Type (4 Terminals)	D27	
	3SK144	15	± 8	200	22	< 2.5	10	4	10	0.2		D6(a)	
UHF	3SK142	15	± 8	250	18	2.0	8	3	8	0.8	Cross Pack Mini Type (4 Terminals)	D27	
	3SK143	15	± 8	200	18	2.0	8	3	8	0.8		D6(a)	
UHF, CATV RF Amp.	3SK125	15	± 8	250	15	< 3.3	10	5	10	0.8	Cross Pack Mini Type (4 Terminals) Mini Type (4 Terminals)	D27	
	3SK139	15	± 8	200	15	< 3.3	10	5	10	0.8		D6(a)	
	3SK193	15	± 8	200	15	< 3.3	10	5	10	0.8		D6(a)	
	3SK219 *	15	± 8	150	19	< 1.8	8	3	8	0.2		D6(a)	
	3SK220 *	15	± 8	150	21	1.0	8	4	8	0.2		D6(a)	
VHF Mixer	3SK169	15	± 8	200	35	—	10	4	10	0.2	Mini Type (4 Terminals)	D6(a)	

* New Product

● For Small Signal

Application	Structure	Type No.	Absolute Maximum Rating (Ta=25°C)				Electrical Characteristics (Ta=25°C)				Package	
			V _{DS} * V _{DSS} (V)	V _{GSO} (V)	I _D (A)	P _D (mW)	g _m min. typ.* (mS)	R _{DS(on)} typ. (Ω)	t _{on} max. typ.* (μs)	t _{off} max. typ.* (μs)	No.	
Digital/Analog Switching	Nch	2SK601	80	20	0.5	1000	* 300	2	* 15	* 20	Mini Power Type	D10
		2SK614	80	20	0.5	750	* 300	2	* 15	* 20	TO-92	D37
		2SK615	80	20	0.5	1000	* 300	2	* 15	* 20	M Type	D30
		2SK620	20	8	0.1	150	20	40	0.015	0.015	Mini Type (3 Terminals)	D 5
		2SK621	20	8	0.1	150	20	40	1	1	Mini Type (3 Terminals)	D 5
		2SK655	20	8	0.1	300	20	40	0.015	0.015	New S Type	D29
		2SK656	20	8	0.1	300	20	40	1	1	New S Type	D29
		2SK657	20	8	0.1	400	20	40	0.015	0.015	M Type	D30
		2SK658	20	8	0.1	400	20	40	1	1	M Type	D30
		2SK664	20	8	0.1	150	20	40	0.015	0.015	SMini Type(3 Terminals)	D 3
		2SK665	20	8	0.1	150	20	40	1	1	S Mini Type(3 Terminals)	D 3
		2SK1228*	50	10	0.5	150	* 39	27	1	1	Mini Type (3 Terminals)	D 5
	2SK1374*	50	10	0.5	150	* 39	27	1	1	S Mini Type (3 Terminals)	D 3	
	Pch	2SJ146	* -50	- 8	-0.1	150	13	< 150	0.04	0.06	Mini Type (3 Terminals)	D 5

* 2.5V Drive

Field Effect Transistors

Power F-MOS FETs

Type No.	Package		Application	Absolute Maximum Rating (Ta=25°C)				Electric Characteristics (Ta=25°C)						
	No.			V _{DSS} (V)	V _{GSS} (V)	I _D (A)	P _D (Tc=25°C) (W)	R _{DS(on)} (max.) (Ω)	Yfs (typ.) (S)	ton (typ.) (ns)	tf (typ.) (ns)	td(off) (typ.) (ns)		
2SK1255	TO-220F	D46	Relay DC-DC Converter Solenoid Printer Battery Charger Motor Drive	60	±20	5/3*	30	0.2/0.3*	4.0	29	53	97		
2SK1256	TO-220F	D46				10/6*	40	0.11/0.165*	7.4	46	95	235		
2SK1033	TO-220F	D46				15/12*	45	0.07/0.1*	12	85	180	390		
2SK1257	TO-220F	D46				40/20*	50	0.035/0.05*	22	200	320	690		
2SK1258	TOP-3	D49				50/25*	100	0.03/0.045*	25	200	350	580		
2SK1223	TOP-3L	D57				50/25*	130	0.03/0.045*	25	200	350	580		
2SK1259	TOP-3L	D57				100/50*	150	0.016/0.023*	45	420	700	1200		
2SK1214	TO-220F	D46		80	±20	20/12*	45	0.1/0.15*	11.5	70	115	300		
2SK1260	TO-220F	D46	Relay DC-DC Converter Solenoid Control Apparatus Motor Drive	100	±20	5/3*	30	0.47/0.6*	3.8	26	38	84		
2SK1261	TO-220F	D46				8/6*	40	0.22/0.3*	7.0	33	56	224		
2SK1034	TO-220F	D46				15/12*	45	0.135/0.18*	9.0	50	85	300		
2SK1262	TO-220F	D46				30/20*	50	0.07/0.85*	20	130	190	700		
2SK1263	TOP-3	D49				40/25*	100	0.06/0.075*	25	130	195	570		
2SK1264	TO-220F	D46				150	±20	3*	30	1.1/1.3*	3.4	24	36	96
2SK1265	TO-220F	D46						6*	40	0.5/0.6*	6.0	29	63	240
2SK1035	TO-220F	D46						12*	45	0.3/0.35*	8.5	50	100	320
2SK1266	TO-220F	D46						20*	50	0.12/0.135*	20	90	180	770
2SK1267	TOP-3	D49						25*	100	0.11/0.13*	18	90	180	650
2SK804	TOP-3F (a Type)	D51				25	100	0.12	9.0	120	150	320		
2SK755	TO-220F	D46				200	±20	5	40	0.5	3.0	30	45	100
2SK782	N Type	D35						5	40	0.5	3.0	30	45	100
2SK757	TO-220F	D46						10	50	0.33	4.5	60	60	150
2SK805	TOP-3F (a Type)	D51						20	100	0.18	9.0	100	120	300
2SK758	TO-220F	D46				250	±20	5	40	0.7	3.0	30	45	90
2SK963	I Type	D36						5	15	0.7	3.0	30	45	90
2SK759	TO-220F	D46						8	50	0.4	4.5	55	55	145
2SK1478	TO-220F	D46						8	40	0.6	4.7	72	44	136
2SK1036	TO-220F	D46						10	50	0.3	7.0	60	100	400
2SK760	TOP-3	D46	15	100	0.22			9.0	100	120	320			
2SK761	TOP-3F (a Type)	D51	15	100	0.22			9.0	100	120	320			
2SK762/A	TO-220F	D46	400/450	±20	3			40	3.0	2.0	30	40	60	
2SK981/A	I Type	D36			3	15	3.0	2.0	30	40	60			
2SK763/A	TO-220F	D46			5	50	1.4	3.0	40	50	120			
2SK1308/A	N Type	D35			5	40	1.4	3.0	40	50	120			
2SK764/A	TOP-3	D49			10	100	0.75	5.5	70	90	230			
2SK765/A	TOP-3F (c Type)	D52			10	100	0.75	5.5	70	90	230			
2SK867/A	TOP-3	D49			15	120	0.45	8.0	120	120	340			
2SK868/A	TOP-3	D49			20	130	0.35	12	150	150	520			
2SK766	TO-220F	D46			500	±20	3	40	3.6	2.0	30	35	55	
2SK767	TO-220F	D46					5	50	1.8	3.0	40	50	120	
2SK768	TOP-3	D49	10	100			1.0	5.0	70	90	230			
2SK769	TOP-3F (c Type)	D52	10	100			1.0	5.0	70	90	230			
2SK869	TOP-3	D49	15	120			0.5	8.0	110	100	330			
2SK1331	TOP-3F (c Type)	D52	15	100			0.5	8.0	110	100	330			
2SK870	TOP-3	D49	20	130			0.4	12	150	140	480			
2SK1406	TOP-3F (c Type)	D52	20	100			0.4	12	150	140	480			
2SK995*	TOP-3F (c Type)	D52	550	±20	5	60	1.8	5.5	50	65	300			

* Low Voltage Driver (V_{GS} = 4V) Rating * Fast Recovery Diodes (FRD) Built-in Type

Field Effect Transistors

■ Power F-MOS FETs (continued)

Type No.	Package	Application	Absolute Maximum Rating (Ta=25°C)				Electric Characteristics (Ta=25°C)				
			V _{DSS} (V)	V _{GSS} (V)	I _D (A)	P _D (Tc=25°C) (W)	R _{DS(on)} (max.) (Ω)	Yfs (typ.) (S)	ton (typ.) (ns)	tf (typ.) (ns)	td(off) (typ.) (ns)
2SK770	TO-220F	D46	600	±20	2	40	5.0	1.5	25	30	70
2SK795	I Type	D36			2	15	5.0	1.5	25	30	70
2SK806	TO-220F	D46			3	50	2.7	2.5	35	40	120
2SK996	TO-220F	D46	600	±20	4	50	1.8	4.5	40	60	300
2SK807	TOP-3F (c Type)	D52			5	100	1.7	5.0	60	70	230
2SK808/A	TO-220F	D46			1	45	7.0	0.8	35	40	70
2SK796/A	TOP-3F (c Type)	D52	800/900	±20	3	90	5.0	1.7	55	40	110
2SK1030/A	TO-220F	D46			3	50	5.0	1.7	55	40	110
2SK809/A	TOP-3F (c Type)	D52			5	100	3.0	2.8	60	85	280
2SK818/A	TOP-3	D49			5	100	3.0	2.8	60	85	280
2SK1032/A	TOP-3	D49			8	120	1.7	3.5	110	120	300
2SK1330/A	TOP-3F (c Type)	D52			8	100	1.7	3.5	110	120	300

■ Selection Guide for F-MOS Power FETs

V _{DSS}	60V	80V	100V	150V	200V	250V	400V	450V	500V	550V	600V	800V	900V
1A												2SK808 220F _{7.0}	2SK808A 220F _{7.0}
2A											2SK170/195 220F/ I Type _{5.0}		
3A				2SK1264 220F _{1.1}			2SK762 220F _{3.0} 2SK981 I Type _{3.0}	2SK762A 220F _{3.0} 2SK981A I Type _{3.0}	2SK766 220F _{3.6}		2SK806 220F _{2.7}	2SK1030 220F _{5.0} 2SK796 TOP-3F _{5.0}	2SK1030A 220F _{5.0} 2SK796A TOP-3F _{5.0}
4A											2SK996 220F _{1.8}		
5A	2SK1255 220F _{0.2}		2SK1260 220F _{0.47}		2SK755 220F _{0.5} 2SK782 N Type _{0.5}	2SK758 220F _{0.7} 2SK963 I Type _{0.7}	2SK763 220F _{1.4} 2SK1308 N Type _{1.4}	2SK763A 220F _{1.4} 2SK1308A N Type _{1.4}	2SK767 220F _{1.8}	2SK995* TOP-3F _{1.8}	2SK807 TOP-3F _{3.0}	2SK809 TOP-3F _{3.0} 2SK818 TOP-3 _{3.0}	2SK809A TOP-3F _{3.0} 2SK818A TOP-3 _{3.0}
6A				2SK1265 220F _{0.5}									
8A			2SK1261 220F _{0.22}				2SK759 220F _{0.4}					2SK1032 TOP-3 _{1.7} 2SK1330 TOP-3F _{1.7}	2SK1032A TOP-3 _{1.7} 2SK1330A TOP-3F _{1.7}
10A	2SK1256 220F _{0.11}				2SK757 220F _{0.33}	2SK1036 220F _{0.3}	2SK764 TOP-3 _{0.75} 2SK765 TOP-3F _{0.75}	2SK764A TOP-3 _{0.75} 2SK765A TOP-3F _{0.75}	2SK768 TOP-3 _{1.0} 2SK769 TOP-3F _{1.0}				
12A				2SK1035 220F _{0.32}									
15A	2SK1033 220F _{0.07}		2SK1034 220F _{0.135}			2SK760 TOP-3 _{0.22} 2SK761 TOP-3F _{0.22}	2SK867 TOP-3 _{0.45}	2SK867A TOP-3 _{0.45}	2SK869 TOP-3 _{0.5} 2SK1331 TOP-3F _{0.5}				
20A		2SK1214 220F _{0.1}		2SK1266 220F _{0.12}	2SK805 TOP-3F _{0.18}		2SK868 TOP-3 _{0.35}	2SK868A TOP-3 _{0.35}	2SK870 TOP-3 _{0.4} 2SK1406 TOP-3F _{0.14}				
25A				2SK804 TOP-3F _{0.12}									
30A			2SK1262 220F _{0.07}										
40A	2SK1257 220F _{0.035}		2SK1263 TOP-3 _{0.06}										
50A	2SK1258 TOP-3 _{0.23} 2SK1223 TOP-3L _{0.23}												
100A	2SK1259 TOP-3L _{0.016}												

(Package Symbol) 220F: TO-220 Full Pack Package
TOP-3F: TOP-3 Full Pack Package

Note) The value in the list : Max. value (Ω) at R_{DS(ON)}
* Fast Recovery Diodes (FRD) Built-in Type

Field Effect Transistors

■ GaAs MES (Metal Semiconductor) FETs

- For VHF/UHF

Application	Type No.	Absolute Maximum Rating (Ta=25°C)				Electrical Characteristics (Ta=25°C)						Package	
		V _{DS} (V)	V _{G1S} *V _{GS} (V)	V _{G2S} (V)	P _D (mW)	PG typ. (dB)	NF typ. (dB)	PG, NF Condition					
								V _{DS} (V)	V _{G2} (V)	I _D (mA)	f(GHz)	No.	
UHF RF	3SK183	13	-3.5	-3.5	350	16	1.5	5	1.5	10	0.8	Cross Pack (4 Terminals) Mini Type (4 Terminals)	D27
	3SK184	13	-3.5	-3.5	200	16	1.5	5	1.5	10	0.8		D6(a)
Power Amp.	2SK690	10	*-6	-	1W	15	P ₀ =25dBm	6	-	100	0.94	Mini Power Type	D10
RF Amp.	3SK201	13	-6	-6	200	13	<2.8	5	1	10	0.8	Mini Type (4 Terminals)	D6(a)
Exclusively used for HIC	M91F	10	-6	-	-	-	P ₀ =32dBm	5.8	-	140	0.945	Special Ceramic	-

△ Tentative Specification

- For SHF

Application	Type No.	V _{DS} (V)	V _{GS} (V)	P _D (mW)	APG(dB)		NF(dB)		Package		
					f=4GHz	f=12GHz	f=4GHz	f=12GHz	No.		
SHF	HEMT	2SK1100	4	-3	200	-	11typ.	-	0.9typ.	Cross Pack (4 Terminals)	D27
	1st, 2nd. RF	2SK1196	5	-6	200	-	8~	~1.8	~1.8	Cross Pack (4 Terminals)	D27
	2nd. RF OSC.	2SK649	6	-6	300	13typ.	6typ.	~1.4	4.5typ.	Cross Pack*	D28(b)

* Ceramic Material

■ GaAs MMICs (Microwave Monolithic IC)

- Amplifiers

Applications	Type No.	NF (dB)	PG (dB)	Measuring Condition			Circuit Construction	Package	
				V _{DD} (V)	I _{DD} (mA)	f(MHz)		No.	
U/V CATV Wide Band Amp. Buffer Amp.	GN1010	1.6	8	3	25	0.1~2000	FET One-stage Amp. (with Band Control Terminal)	Mini Type (4 Terminals)	D6(a)
	GN1015	1.6	15	3	50	0.1~2000	FET Two-stage Amp. (with Band Control Terminal)	SO-10A	D61
	GN1041	2.4	8.5	12	40	50~800	FET One-stage Amp. Low distortion characteristic	Cross Pack	D27
	GN1042	2.2	10	3	40	50~800	FET One-stage Amp., Low distortion characteristic	Mini Type (4 Terminals)	D6(a)
	GN1043	2.5	9	3	40	50~800	FET One-stage Amp., Low distortion characteristic	Mini Type (4 Terminals)	D6(a)
SHF IF Amp.	GN1021	2	18	8	40	100~2000	FET Two-stage Amp. (Bias Resistor built-in)	SO-10A	D61
	GN1022	2	18	8	40	100~2000	Two-stage Amp. with AGC (Bias Resistor built-in)	SO-10A	D61

- Mixer

Application	Type No.	NF (dB)	CG (dB)	I.P. (dBm)	Measuring Condition				Circuit Construction	Package	
					V _{DD} (V)	I _{DD} (mA)	P _{LO} (dBm)	f (MHz)		No.	
Wide Band Mixer	GN2011	5	2	20	3	20	3	50~1000	Double Balance FET Mixer	Mini Type (6 Terminals)	D8

- Laser Driver

Applications	Type No.	V _{DD} (V)	I _{DD} (mA)	I _{out} (mA)	P _D (mW)	t _r (ns)	t _f (ns)	Package	No.
Laser Drive	GN8060	6	50	200	500	typ. 5	typ. 5	DIL-8	D68

■ Silicon Diodes (AVC)

Type No.	V _R (V)	I _{FM} (mA)	V _F (V)	ΔV _F /ΔT typ. (mV/C)	Package	
						NO.
MA27/29	6	150	0.56~0.64	2	DO-35/34	D21/17
MA27W/29W	6	100	1.81~1.36	4.6	DO-35/34	D21/17
MA27T/29T	6	70	1.76~2.04	6.5	DO-35/34	D21/17
MA27Q/29Q	6	50	2.20~2.54	8.8	DO-35/34	D21/17
MA28	6	150	0.56~0.64	2	Mini (3 Terminals)	D5
MA28W	6	100	1.18~1.36	4.6	Mini (3 Terminals)	D5
MA28T	6	70	1.76~1.92	6.5	Mini (3 Terminals)	D5
MA30	6	150	0.56~0.64	2	S Mini (2 Terminals)	D1
MA30W	6	100	1.18~1.36	4.6	S Mini (2 Terminals)	D1

■ Silicon Diodes (Band Switch)

Type No.	V _R (V)	I _F max. (mA)	C _D typ. (pF)	r _f typ. (Ω)		Package	No.
				V _R (V)			
MA57/72	30/35	100	1.3	0.55	15/6	Mini (3/2 Terminals)	D5/4
MA73	35	100	0.9	0.4	6	Mini (2 Terminals)	D4
MA75WA/WK	35	100	0.9	0.4	6	Mini (3 Terminals)	D4
MA77	35	100	0.9	0.65	6	S Mini (2 Terminals)	D2
MA78	35	100	0.9	0.4	0.6	Mini (6 Terminals)	D8
MA79	35	100	1.2	0.65	6	S Mini (2 Terminals)	D2
MA80WA/WK	35	100	0.9	0.4	6	S Mini (3 Terminals)	D3
MA856/858	30	100	1.3/1	0.55	15/6	DO-34	D17/18
MA859/860	35	100	0.8	0.4	6	DO-34/Leadless	D17/25
MA862	35	100	1	0.4	6	Mini (4 Terminals)	D6(b)

■ Variable Capacitance Diodes

Appli- -cation	Type No.	V _R (V)	V _R (V)	C _{D1} (pF)	V _R (V)	C _{D2} (pF)	r _D (Ω)	Packa- ge	No.
	MA334	30	3	10.33~12.90	25	2.01~2.51	<0.66	Mini (2 Terminals)	D4
	MA344	30	3	10.33~12.90	25	2.01~2.51	<0.66	Mini (6 Terminals)	D8
	MA360	30	2	13.66~16.66	25	2.10~2.56	<0.5	S Mini (2 Terminals)	D2
	MA339	30	2	14.009~15.940	25	2.1~2.391	<0.45	Mini (2 Terminals)	D4
	MA363	30	3	11.233~	25	2.02~	<0.72	S Mini (2 Terminals)	D2
	MA372	30	2	14.009~15.940	25	2.1~2.391	<0.45	S Mini (2 Terminals)	D2
All Band Tuning	MA329	32	3	26.00~32.47	25	2.60~3.18	<1.2	Mini (2 Terminals)	D4
	MA335	32	2	29.40~36.93	25	2.58~3.19	<0.8	Mini (2 Terminals)	D4
	MA338	34	2	27.13~32.15	25	2.60~3.15	<0.63	Mini (2 Terminals)	D4
	MA366	34	2	27.13~32.15	25	2.60~3.15	<0.63	S Mini (2 Terminals)	D2
	MA337	32	2	27.13~32.15	25	2.60~3.15	<0.7	Mini (2 Terminals)	D4
	MA365	32	2	27.13~32.15	25	2.60~3.15	<0.7	S Mini (2 Terminals)	D2
CATV Tuning	MA353	32	2	34.00~37.92	25	2.7~3.133	<0.75	Mini (2 Terminals)	D4
	MA371	32	2	34.00~37.92	25	2.7~3.133	<0.75	S Mini (2 Terminals)	D2
UHF/SHF Tuning	MA370	30	1	3.6~5.6	30	0.5~0.9	2	Mini (3 Terminals)	D5
	MA368	30	1	3.6~5.6	30	0.5~0.9	2	S Mini (2 Terminals)	D2
	MA333*	9	2	13.5~	6	~4.5	<0.35	Mini (2 Terminals)	D4
UHF/VHF AFC	MA341	30	2	10.5~16.0	10	3.3~5.7	<1.2	Mini (2 Terminals)	D4
	MA342	32	2	10.5~16.0	10	3.3~5.7	<1.2	Leadless	D26
	MA367	30	2	10.5~16.0	10	3.3~5.7	<1.2	S Mini (2 Terminals)	D2
	MA840	28	2	10.5~16.0	10	3.3~5.7	<1.2	DO-34	D18
FM-AM AFC	MA345	15	10	10~16	-	-	-	DO-35	D21
	MA346	15	10	10~16	-	-	-	DO-34	D17
	MA348	15	10	10~16	-	-	-	Mini (4 Terminals)	D6(b)
	MA351	15	10	10~16	-	-	-	Mini (6 Terminals)	D8

* GaAs

■ Silicon Diodes (Switching)

Type No.	V _R (V)	I _F *I _{R(AV)} (mA)	I _R max. (nA)	C _D max. * typ. (pF)	t _{rr} max. (ns)	Package	NO.
MA111※	80	100	100	1.2	3	S Mini (2 Terminals)	D1
MA112※	40	200	50	4	20	S Mini (2 Terminals)	D1
MA113※	80	200	50	4	20	S Mini (2 Terminals)	D1
MA116※	35	100	25	4	400	S Mini (2 Terminals)	D1
MA121	80	150 ¹⁾	100	2	3	Mini (6 Terminals)	D8
MA122	80	150 ¹⁾	100	15	10	Mini (6 Terminals)	D8
MA123	80	150 ¹⁾	100	2	3	Mini (6 Terminals)	D8
MA124	80	150 ¹⁾	100	2	3	Mini (6 Terminals)	D8
MA125	40	150 ¹⁾	100	5	-	Mini (6 Terminals)	D8
MA126 ²⁾	80	150 ¹⁾	100	15/2	10/3	Mini (6 Terminals)	D6(b)
MA127	40	150	100	15	10	Mini (6 Terminals)	D8
MA128	40	150	100	2	3	Mini (6 Terminals)	D8
MA141A※	40	100 ¹⁾	100	15	10	S Mini (3 Terminals)	D3
MA141K※	40	100 ¹⁾	100	2	3	S Mini (3 Terminals)	D3
MA141WA	40	150	100	15	10	S Mini (3 Terminals)	D3
MA141WK	40	150	100	2	3	S Mini (3 Terminals)	D3
MA142A※	80	100	100	15	10	S Mini (3 Terminals)	D3
MA142K※	80	100	100	2	3	S Mini (3 Terminals)	D3
MA142WA	80	150	100	15	10	S Mini (3 Terminals)	D3
MA142WK	80	150	100	2	3	S Mini (3 Terminals)	D3
MA143/A	40/80	100	100	5	-	S Mini (3 Terminals)	D3
MA151A※	40	100	100	15	10	Mini (3 Terminals)	D5
MA151K※	40	100	100	2	3	Mini (3 Terminals)	D5
MA152A※	80	100	100	15	10	Mini (3 Terminals)	D5
MA152K※	80	100	100	2	3	Mini (3 Terminals)	D5
MA151WA	40	150	100	15	10	Mini (3 Terminals)	D5
MA151WK	40	150	100	2	3	Mini (3 Terminals)	D5
MA152WA	80	150	100	15	10	Mini (3 Terminals)	D5
MA152WK	80	150	100	2	2	Mini (3 Terminals)	D5
MA153/A	40/80	150	100	5	-	Mini (3 Terminals)	D5
MA154WA	40	150	100	4	10	M Type	D30
MA154WK	40	150	100	4	3	M Type	D30
MA155WA	80	150	100	4	10	M Type	D30
MA155WK	80	150	100	4	3	M Type	D30
MA156	40	100	100	5	-	M Type	D30
MA157/A	40/80	100	100	2	3	Mini (3 Terminals)	D5
MA150※	35	100	25	2	10	DO-35	D21
MA159	40	100	100	2	3	Mini (4 Terminals)	D6(b)
MA160	40	100	100	2	3	Mini (4 Terminals)	D6(b)
MA161※	50	100	25	2	4	DO-35	D21
MA162※	75	100	25	2	4	DO-35	D21
MA165※	35	100	25	2	10	DO-34	D17
MA166※	50	100	25	2	4	DO-34	D17
MA167※	75	100	25	2	4	DO-34	D17
MA170/178※	40	100	50	4	20	DO-35/34	D22/18
MA171/179※	80	100	50	4	20	DO-35/34	D22/18
MA174	200	200	200	*1.5	-	Mini (4 Terminals)	D6(b)
MA175WA	40	150	100	4	10	New S Type	D29
MA175WK	40	150	100	4	3	New S Type	D29
MA176WA	80	150	100	4	10	New S Type	D29
MA176WK	80	150	100	4	3	New S Type	D29
MA177/A	40/80	100	100	5	-	New S Type	D29
MA180※	40	200	10	7	200(typ)	DO-34	D18
MA182/185※	200	200	200	*1.5	-	DO-35/34	D22/18
MA188※	200	200	200	*1.5	60	DO-34	D18
MA190/195※	35	100	25	4	400	DO-35/34	D22/18
MA193 ³⁾	80	100	100	2	3	Mini (4 Terminals)	D6(b)
MA194	35	100	25	4	400μs	Mini (4 Terminals)	D6(b)
MA196※	50	100	25	4	400	DO-34	D18
MA198	35	100	25	4	400	Mini (3 Terminals)	D5
MA199※	200	625	200	1	60	Mini (3 Terminals)	D5
MA204WA/WK	40	150	100	4	10/3	MT1	D31
MA205WA/WK	80	150	100	4	10/3	MT1	D31
MA206	40	100	100	5	-	MT1	D31
MA207	80	100	100	2	3	MT1	D31
MA221※	35	100	25	2	10	Leadless	D25
MA222※	50	100	25	2	4	Leadless	D25

1) Total current 2) MA152WA+MA152WK 3) Bridge circuit

* Contains single element, without marked contains multi elements

Diodes

■ Silicon Rectifiers

Type No.	V _{RM} (V)	I _{F(AV)} (mA)	I _{FRM} (mA)	I _{FSM} (A)	I _R max. (μ A)	V _F max. (V)	Package	NO.
MA158	200	100	225	0.5	0.2	1.3	Mini Type (3 Terminals)	D3
MA291	200	200	300	6	1	1.3	Mini Power (2 Terminals)	D9

■ Germanium Diodes

Applica- tions	Type No.	V _R (V)	I _F (mA)	I _F		V _R (V)	I _R max. (μ A)	f (MHz)	η * typ (%)	Package (NO.)
				V _F (V)	min. (mA)					
Detector	0A90-R/90A-R	15	50	1	4	10	150	30	50	DO-7/7A (D15/16)
	0A90-G/90A-G	15	50	1	4	10	150	30	*60	
	0A90-M/90A-M	35	50	1	4	10	40	10.7	76	
	2-0A90/90A	15	50	1	4	10	150	30	50	
	2-0A90-H/90A-H	15	50	1	4	10	150	30	*60	
	2-0A90-M/90A-M	35	50	1	4	10	40	10.7	76	
	0A99/99A	30	50	1	4	10	18	10.7	76	
General	0A91/91A	90	50	1	4	10	11			
	0A95/95A	90	50	1	4	10	7			

■ Zener Diodes

● MA1000 Series, MA4000 Series

Zener Voltage V _Z (V)	MA1000 Series		MA4000 Series		V _Z Rank Classification				
	Package (No)	* P _D =500mW P _{ZSM} =30W	D0-35(D-23)	* P _D =370mW P _{ZSM} =30W	D0-34(D-19)	I _Z (mA)	L Rank	M Rank	H Rank
1.88~ 2.24		MA1020		MA4020		5	1.88~ 2.12	—	2.01~ 2.24
2.08~ 2.45		MA1022		MA4022		5	2.08~ 2.33	—	2.20~ 2.45
2.28~ 2.70		MA1024		MA4024		5	2.28~ 2.56	—	2.40~ 2.70
2.50~ 2.90		MA1027		MA4027		5	2.50~ 2.75	—	2.65~ 2.90
2.80~ 3.20		MA1030		MA4030		5	2.83~ 2.97	2.93~ 3.08	3.02~ 3.18
3.10~ 3.50		MA1033		MA4033		5	3.12~ 3.28	3.22~ 3.38	3.32~ 3.49
3.40~ 3.80		MA1036		MA4036		5	3.41~ 3.59	3.51~ 3.69	3.61~ 3.79
3.70~ 4.10		MA1039		MA4039		5	3.71~ 3.90	3.80~ 4.00	3.90~ 4.10
4.00~ 4.60		MA1043		MA4043		5	4.03~ 4.26	4.17~ 4.40	4.31~ 4.54
4.40~ 5.00		MA1047		MA4047		5	4.45~ 4.69	4.59~ 4.83	4.74~ 4.99
4.80~ 5.40		MA1051		MA4051		5	4.87~ 5.12	5.00~ 5.26	5.14~ 5.40
5.30~ 6.00		MA1056		MA4056		5	5.30~ 5.58	5.48~ 5.76	5.66~ 5.95
5.80~ 6.60		MA1062		MA4062		5	5.85~ 6.15	6.05~ 6.36	6.24~ 6.56
6.40~ 7.20		MA1068		MA4068		5	6.44~ 6.77	6.64~ 6.98	6.85~ 7.20
7.00~ 7.90		MA1075		MA4075		5	7.07~ 7.43	7.29~ 7.67	7.51~ 7.89
7.70~ 8.70		MA1082		MA4082		5	7.77~ 8.17	8.03~ 8.43	8.29~ 8.70
8.50~ 9.60		MA1091		MA4091		5	8.58~ 9.02	8.87~ 9.33	9.14~ 9.60
9.40~10.60		MA1100		MA4100		5	9.44~ 9.92	9.75~10.25	10.07~10.59
10.40~11.60		MA1110		MA4110		5	10.40~10.94	10.73~11.28	11.05~11.60
11.40~12.70		MA1120		MA4120		5	11.40~11.96	11.73~12.33	12.06~12.68
12.40~14.10		MA1130		MA4130		5	12.40~12.99	12.73~13.40	13.25~14.08
—		MA1140-M		MA4140-M		5	—	13.65~14.35	—
13.90~15.60		MA1150		MA4150		5	13.90~14.76	14.60~15.35	14.95~15.60
15.30~17.10		MA1160		MA4160		5	15.30~16.09	15.70~16.50	16.26~17.10
16.90~19.10		MA1180		MA4180		5	16.90~17.76	17.55~18.45	18.20~19.10
18.80~21.20		MA1200		MA4200		5	18.85~19.81	19.50~20.50	20.15~21.19
20.80~23.30		MA1220		MA4220		5	20.80~21.86	21.45~22.55	22.10~23.24
22.80~25.60		MA1240		MA4240		5	22.80~23.97	23.50~24.70	24.35~25.60
25.10~28.90		MA1270		MA4270		2	25.30~26.70	26.30~27.70	27.30~28.70
28.00~32.00		MA1300		MA4300		2	28.30~29.70	29.30~30.80	30.20~31.80
31.00~35.00		MA1330		MA4330		2	31.20~32.80	32.20~33.80	33.20~34.90
34.00~38.00		MA1360		MA4360		2	34.10~35.90	35.10~36.90	36.10~37.90
37.00~41.00		△MA1390		MA4390		2	37.10~39.00	38.00~40.00	39.00~41.00

* With Printed-Circuit Board

Diodes

● MA3000 Series (Mini Type (D5))

Zener Voltage Vz (V)	Type Number	* Pd=200mW PzSM=15W			
		Iz (mA)	L Rank	M Rank	H Rank
2.28~2.60	MA3024	5	—	—	—
2.50~2.90	MA3027	5	2.50~2.75	—	2.65~2.90
2.80~3.20	MA3030	5	2.80~3.05	—	2.95~3.20
3.10~3.50	MA3033	5	3.10~3.35	—	3.25~3.50
3.40~3.80	MA3036	5	3.40~3.65	—	3.55~3.80
3.70~4.10	MA3039	5	3.70~3.97	—	3.87~4.10
4.00~4.60	MA3043	5	4.03~4.26	4.17~4.40	4.31~4.54
4.4~5.0	MA3047	5	4.45~4.69	4.59~4.83	4.74~4.99
4.8~5.4	MA3051	5	4.87~5.12	5.00~5.26	5.14~5.40
5.3~6.0	MA3056	5	5.30~5.58	5.48~5.76	5.66~5.95
5.8~6.6	MA3062	5	5.85~6.15	6.05~6.36	6.42~6.56
6.4~7.2	MA3068	5	6.44~6.77	6.64~6.98	6.85~7.20
7.0~7.9	MA3075	5	7.07~7.43	7.29~7.67	7.51~7.89
7.7~8.7	MA3082	5	7.77~8.17	8.03~8.43	8.29~8.70
8.5~9.6	MA3091	5	8.58~9.02	8.87~9.33	9.14~9.60

* With Printed-Circuit Board

Zener Voltage Vz (V)	Type Number	Iz (mA)	Vz Rank Classification		
			L Rank	M Rank	H Rank
9.4~10.6	MA3100	5	9.44~9.92	9.75~10.25	10.07~10.59
10.4~11.6	MA3110	5	10.40~10.94	10.73~11.28	11.05~11.60
11.4~12.7	MA3120	5	11.40~11.96	11.73~12.33	12.06~12.68
12.4~14.1	MA3130	5	12.40~12.99	12.73~13.40	13.25~14.08
—	MA3140	5	—	13.65~14.35	—
13.9~15.6	MA3150	5	13.90~14.76	14.60~15.35	14.95~15.60
15.3~17.1	MA3160	5	15.30~16.09	15.70~16.50	16.26~17.10
16.9~19.1	MA3180	5	16.90~17.76	17.55~18.45	18.20~19.10
18.8~21.2	MA3200	5	18.85~19.81	19.50~20.50	20.15~21.19
20.8~23.3	MA3220	5	20.80~21.86	21.45~22.55	22.10~23.24
22.8~25.6	MA3240	5	22.80~23.97	23.50~24.70	24.35~25.60
25.1~28.9	MA3270	5	25.30~26.70	26.30~27.70	27.30~28.70
28.0~32.0	MA3300	5	28.30~29.70	29.30~30.80	30.20~31.80
31.0~35.0	MA3330	5	31.20~32.80	32.20~33.80	33.20~34.90
34.0~38.0	MA3360	5	34.10~35.90	35.10~36.90	36.10~37.90

● MA2000 Series, MA7000 Series

Zener Voltage Vz (V)	MA2000 Series		MA7000 Series		Vz Rank Classification	
	Package No	* Pd=1W PzSM=75W	* Pd=800mW PzSM=60W	Iz (mA)	A Rank	B Rank
		DO-41 (D24)	DO-41 (D24)			
4.80~5.40	MA2051	MA7051	40	4.80~5.15	5.05~5.40	
5.20~6.00	MA2056	MA7056	40	5.30~5.70	5.60~6.00	
5.80~6.60	MA2062	MA7062	40	5.80~6.20	6.10~6.50	
6.40~7.20	MA2068	MA7068	40	6.40~6.80	6.70~7.10	
7.00~7.90	MA2075	MA7075	40	7.00~7.45	7.35~7.80	
7.70~8.70	MA2082	MA7082	40	7.70~8.20	8.10~8.60	
8.50~9.60	MA2091	MA7091	40	8.50~9.05	8.95~9.50	
9.40~10.60	MA2100	MA7100	40	9.40~10.00	9.90~10.50	
10.40~11.60	MA2110	MA7110	20	10.40~11.05	10.85~11.50	
11.40~12.70	MA2120	MA7120	20	11.40~12.10	11.90~12.60	
12.40~14.10	MA2130	MA7130	20	12.40~13.25	13.15~14.00	
13.80~15.60	MA2150	MA7150	20	13.80~14.70	14.50~15.40	
15.30~17.10	MA2160	MA7160	20	15.30~16.30	16.10~17.10	
16.80~19.10	MA2180	MA7180	20	16.80~18.00	17.80~19.00	
18.80~21.20	MA2200	MA7200	20	18.80~20.00	19.80~21.00	
20.80~23.30	MA2220	MA7220	10	20.80~22.15	21.85~23.20	
22.80~25.60	MA2240	MA7240	10	22.90~24.35	24.15~25.60	
25.10~28.90	MA2270	MA7270	10	25.10~27.00	26.90~28.90	
28.00~32.00	MA2300	MA7300	10	28.00~30.10	29.90~32.00	
31.00~35.00	MA2330	MA7330	10	31.00~33.14	32.86~35.00	
34.00~38.00	MA2360	MA7360	10	34.00~36.16	35.84~38.00	
37.00~41.00	MA2390	MA7390	10	—	—	
40.00~46.00	MA2430	MA7430	10	—	—	
44.00~50.00	MA2470	MA7470	10	—	—	
48.00~54.00	MA2510	MA7510	10	—	—	
52.00~60.00	MA2560	MA7560	10	—	—	

* With Printed-Circuit Board

● MA5000 Series (Mini Power Type (D9))

Zener Voltage Vz (V)	Type No.	Iz (mA)
	* Pd=500mW PzSM=30W	
4.4~5.0	MA5047	5
4.8~5.4	MA5051	5
5.2~6.0	MA5056	5
5.8~6.6	MA5062	5
6.4~7.2	MA5068	5
7.0~7.9	MA5075	5
7.7~8.7	MA5082	5
8.5~9.6	MA5091	5
9.4~10.6	MA5100	5
10.4~11.6	MA5110	5
11.4~12.7	MA5120	5
12.4~14.1	MA5130	5
13.9~15.6	MA5150	5
15.3~17.1	MA5160	5
16.9~19.1	MA5180	5
18.8~21.2	MA5200	5
20.8~23.3	MA5220	5
22.8~25.6	MA5240	5

Diodes

● Zener Diodes MA4000(N) Series (Low Noise, Low Operating Resistance)

Zener Voltage Vz (V)	Type Number	Pd (mW)	Pzsm (W)	IR		Rz		Rzk		Sz		Vz Rank Classification ^{Note)}			Package (No.)	
				max. (μ A)	V _R (V)	max. (Ω)	Iz (mA)	max. (Ω)	Iz (mA)	max. (mV/°C)	Iz (mA)	Iz (mA)	L Rank	M Rank		H Rank
4.42~ 4.90	MA4047(N)	400	—	2	1	80	5	800	0.5	-1.4	5	5	4.42~ 4.61	4.55~ 4.75	4.69~ 4.90	DO-34 (D19)
4.84~ 5.38	MA4051(N)			1	2.0	60	5	500	0.5	-0.8	5	5	4.84~ 5.04	4.98~ 5.21	5.15~ 5.38	
5.32~ 5.92	MA4056(N)			0.5	2.5	40	5	200	0.5	1.2	5	5	5.32~ 5.55	5.49~ 5.73	5.67~ 5.92	
5.86~ 6.53	MA4062(N)			0.2	4	30	5	100	0.5	2.3	5	5	5.86~ 6.12	6.06~ 6.33	6.26~ 6.53	
6.47~ 7.14	MA4068(N)			0.1	4	20	5	60	0.5	3	5	5	6.47~ 6.73	6.65~ 6.93	6.86~ 7.14	
7.07~ 7.83	MA4075(N)			0.1	5	20	5	60	0.5	4	5	5	7.07~ 7.35	7.29~ 7.59	7.53~ 7.83	
7.77~ 8.63	MA4082(N)			0.1	5	20	5	60	0.5	4.6	5	5	7.77~ 8.09	8.03~ 8.35	8.29~ 8.63	
8.57~ 9.53	MA4091(N)			0.1	6	20	5	60	0.5	5.5	5	5	8.57~ 8.93	8.86~ 9.22	9.15~ 9.53	
9.47~ 9.85	MA4100(N)			0.05	7	30	5	60	0.5	6.4	5	5	9.47~ 9.85	9.79~ 10.19	10.12~ 10.54	
10.45~ 11.56	MA4110(N)			0.05	8	30	5	60	0.5	7.4	5	5	10.45~ 10.87	10.77~ 11.21	11.10~ 11.56	
11.43~ 12.58	MA4120(N)			0.05	9	30	5	80	0.5	8.4	5	5	11.43~ 11.89	11.75~ 12.23	12.08~ 12.58	
12.46~ 13.96	MA4130(N)			0.05	10	35	5	80	0.5	9.4	5	5	12.46~ 13.02	12.90~ 13.48	13.36~ 13.96	
13.84~ 15.51	MA4150(N)			0.05	11	40	5	80	0.5	11.4	5	5	13.84~ 14.46	14.34~ 14.98	14.86~ 15.51	
15.38~ 17.08	MA4160(N)			0.05	12	50	5	80	0.5	12.4	5	5	15.38~ 16.00	15.86~ 16.50	16.36~ 17.08	
16.94~ 19.02	MA4180(N)			0.05	13	60	5	80	0.5	14.4	5	5	16.94~ 17.70	17.56~ 18.35	18.21~ 19.02	
18.88~ 21.08	MA4200(N)			0.05	15	80	5	100	0.5	16.4	5	5	18.88~ 19.68	19.53~ 20.37	20.22~ 21.08	
20.89~ 23.15	MA4220(N)			0.05	17	80	5	100	0.5	18.4	5	5	20.89~ 21.76	21.56~ 22.45	22.25~ 23.15	
22.93~ 25.57	MA4240(N)			0.05	19	100	5	120	0.5	20.4	5	5	22.93~ 23.96	23.76~ 24.78	24.56~ 25.57	
25.20~ 28.61	MA4270(N)			0.05	21	120	5	120	0.5	23.4	5	5	25.20~ 26.50	26.19~ 27.53	27.21~ 28.61	
28.22~ 31.74	MA4300(N)			0.05	23	160	5	160	0.5	26.6	5	5	28.22~ 29.66	29.19~ 30.69	30.20~ 31.74	
31.18~ 34.83	MA4330(N)			0.05	25	200	5	200	0.5	29.7	5	5	31.18~ 32.78	32.15~ 33.79	33.13~ 34.83	
34.12~ 37.91	MA4360(N)			0.05	27	250	5	250	0.5	33.0	5	5	34.12~ 35.86	35.07~ 36.87	36.07~ 37.91	
37.04~ 40.99	MA4390(N)			0.05	30	300	5	300	0.5	35.6	5	5	37.04~ 38.94	38.00~ 39.94	39.99~ 40.99	

● MA8000 Series (S Mini Power Type (D1))

Zener Voltage Vz (V)	Type	IR max. (μ A)	V _R (V)	Rz		Rzk		Sz		Vz Rank Classification ^{Note)}			
				max. (Ω)	Iz (mA)	max. (Ω)	Iz (mA)	typ. (mV/°C)	Iz (mA)	Iz (mA)	L Rank	IM Rank	IH Rank
2.28~ 2.60	MA8024	120	1.0	100	5	—	—	-1.6	5	5	—	—	—
2.50~ 2.90	MA8027	120	1.0	110	5	—	—	-2.0	5	5	2.50~ 2.75	—	2.65~ 2.90
2.80~ 3.20	MA8030	50	1.0	120	5	—	—	-2.1	5	5	2.80~ 3.05	—	2.95~ 3.20
3.10~ 3.50	MA8033	20	1.0	130	5	—	—	-2.4	5	5	3.10~ 3.35	—	3.25~ 3.50
3.40~ 3.80	MA8036	10	1.0	130	5	—	—	-2.4	5	5	3.40~ 3.65	—	3.55~ 3.80
3.70~ 4.10	MA8039	10	1.0	130	5	—	—	-2.5	5	5	3.70~ 3.97	—	3.87~ 4.10
4.00~ 4.60	MA8043	10	1.0	130	5	—	—	-2.5	5	5	4.03~ 4.26	4.17~ 4.40	4.31~ 4.54
4.40~ 5.00	MA8047	2.0	1.0	80	5	800	1.0	-1.4	5	5	4.45~ 4.69	4.59~ 4.83	4.74~ 4.99
4.80~ 5.40	MA8051	1.0	2.0	60	5	500	1.0	-0.8	5	5	4.87~ 5.12	5.00~ 5.26	5.14~ 5.40
5.30~ 6.00	MA8056	0.5	2.5	40	5	200	0.5	1.2	5	5	5.30~ 5.58	5.48~ 5.76	5.66~ 5.95
5.80~ 6.60	MA8062	0.2	4.0	30	5	100	0.5	2.3	5	5	5.85~ 6.15	6.05~ 6.36	6.24~ 6.56
6.40~ 7.20	MA8068	0.1	4.0	20	5	60	0.5	3.0	5	5	6.44~ 6.77	6.64~ 6.98	6.85~ 7.20
7.00~ 7.90	MA8075	0.1	5.0	20	5	60	0.5	4.0	5	5	7.07~ 7.43	7.29~ 7.67	7.51~ 7.89
7.70~ 8.70	MA8082	0.1	5.0	20	5	60	0.5	4.6	5	5	7.77~ 8.17	8.03~ 8.43	8.29~ 8.70
8.50~ 9.60	MA8091	0.1	6.0	20	5	60	0.5	5.5	5	5	8.58~ 9.02	8.87~ 9.33	9.14~ 9.60
9.40~ 10.60	MA8100	0.05	7.0	30	5	60	0.5	6.4	5	5	9.44~ 9.92	9.75~ 10.25	10.07~ 10.59
10.40~ 11.60	MA8110	0.05	8.0	30	5	60	0.5	7.4	5	5	10.40~ 10.94	10.73~ 11.28	11.05~ 11.60
11.40~ 12.70	MA8120	0.05	9.0	30	5	80	0.5	8.4	5	5	11.40~ 11.96	11.73~ 12.33	12.06~ 12.68
12.40~ 14.10	MA8130	0.05	10.0	35	5	80	0.5	9.4	5	5	12.40~ 12.99	12.70~ 13.40	13.25~ 14.08
13.65~ 14.35	MA8140-M	0.05	10.0	40	5	80	0.5	10.0	5	5	—	13.65~ 14.35	—
13.90~ 15.60	MA8150	0.05	11.0	40	5	80	0.5	11.4	5	5	13.90~ 14.76	14.60~ 15.35	14.95~ 15.60
15.30~ 17.10	MA8160	0.05	12.0	50	5	80	0.5	12.4	5	5	15.30~ 16.09	15.70~ 16.50	16.26~ 17.10
16.90~ 19.10	MA8180	0.05	13.0	60	5	80	0.5	14.4	5	5	16.90~ 17.76	17.55~ 18.45	18.20~ 19.10
18.80~ 21.20	MA8200	0.05	15.0	80	5	100	0.5	16.4	5	5	18.85~ 19.81	19.50~ 20.50	20.15~ 21.19
20.80~ 23.30	MA8220	0.05	17.0	80	5	100	0.5	18.4	5	5	20.80~ 21.86	21.45~ 22.55	22.10~ 23.24
22.80~ 25.60	MA8240	0.05	19.0	100	5	120	0.5	20.4	5	5	22.80~ 23.97	23.50~ 24.70	24.35~ 25.60
25.10~ 28.90	MA8270	0.05	21.0	120	2	120	0.5	23.4	2	2	25.30~ 26.70	26.30~ 27.70	27.30~ 28.70
28.00~ 32.00	MA8300	0.05	23.0	160	2	160	0.5	26.6	2	2	28.30~ 29.70	29.30~ 30.80	30.20~ 31.80
31.00~ 35.00	MA8330	0.05	25.0	200	2	200	0.5	29.7	2	2	31.20~ 32.80	32.20~ 33.80	33.20~ 34.90
34.00~ 38.00	MA8360	0.05	27.0	250	2	250	0.5	33.0	2	2	34.10~ 35.90	35.10~ 36.90	36.10~ 37.90

*With Printed-Circuit Board

Diodes

Fast Recovery Diodes (FRD)

Category	Type No.	Main Characteristics (Ta=25°C)				Package	NO.
		V _{RRM} (V)	I _F (AV) (A)	V _F max. (V)	t _{rr} max. (ns)		
Cathode Common Type	MA649/650	200	5/10	1.0	100	TO-220(F)	D46
	MA661/651	200	10/20	1.0	100	TOP-3F	D51
	MA653/654	300	5/10	1.0	100	TO-220(F)	D46
	MA655	300	20	1.0	100	TOP-3F	D51
	MA693/694	400	5/10	1.0	100	TO-220(F)	D46
	MA695	400	20	1.0	100	TOP-3F	D52
1 Chip Type	MA689/690	200	2.5/5	1.0	100	TO-220(F)	D48
	MA691	200	10	1.0	100	TOP-3F	D54

Package: (F)=Full Pack Package

Schottky Barrier Diodes (SBD) (For Power)

Category	Type No.	Main Characteristics (Ta=25°C)				Package	NO.
		V _R (V)	I _F (A)	V _F max.(V)	t _{rr} * typ.(ns)		
Cathode Common Type	MA749/A	40/45	5	0.55	11	TO-220(F)	D46
	MA750/A	40/45	10	0.55	15	TO-220(F)	D46
	MA752/A	40/45	20	0.55	30	TO-220(F)	D46
	MA751/A	40/45	20	0.55	30	TOP-3F	D51
	MA755	60	5	0.55	11	TO-220(F)	D46
	MA756	60	10	0.55	15	TO-220(F)	D46
	MA760	90	5	0.85	11	TO-220(F)	D46
	MA761	90	10	0.85	15	TO-220(F)	D46
	MA762	90	20	0.85	30	TOP-3F	D51
	MA768	150	5	0.85	—	TO-220(F)	D46
	MA769	150	10	0.85	—	TO-220(F)	D46

Schottky Barrier Diodes (for small current)

Application	Type No.	V _{RM} (V)	*C _D (pF) V _F max. (V)	I _F (mA)	Package	No.
Detector Switching	MA700/A*	15/30	0.4	30	DO-34	D17
	MA704/A*	15/30	0.4	30	Mini (3 Terminals)	D5
	MA704WA/WK	15	0.4	30	Mini (3 Terminals)	D5
	MA718	15	0.4	30	Mini (6 Terminals)	D8
Rectify	MA721*	30	0.55	200	Mini (3 Terminals)	D5
	MA723*	30	0.55	200	DO-34	D17
	MA701/A*	20/40	0.55	1 A	Mini Power (2 Terminals)	D9
	MA713	30	0.4	30	Mini (3 Terminals)	D6(b)
	MA714	30	0.4	30	Mini (4 Terminals)	D6(b)
	MA715	30	0.3	30	Mini (3 Terminals)	D5
	MA716	30	0.4	30	Mini (3 Terminals)	D5
	MA717*	30	0.3	30	Mini (3 Terminals)	D5
	MA719*	40	0.55	500	DO-34	D17
	MA720*	40	0.55	500	Mini (3 Terminals)	D5
	MA724	30	0.55	200	Mini (4 Terminals)	D6(b)
	MA726	30	0.55	200	Mini (4 Terminals)	D6(b)
	MA727*	50	0.36	200	Mini (3 Terminals)	D5
	MA728*	30	0.4	30	S Mini (2 Terminals)	D1
	MA729*	30	0.55	200	S Mini (2 Terminals)	D1
	MA735*	30	0.5	1000	New Mini power (2 Terminals)	D67
	MA736*	40	0.55	1000	New Mini power (2 Terminals)	D67
	MA737*	30	0.5	1500	New Mini power (2 Terminals)	D67
	MA738*	40	0.55	1500	New Mini power (2 Terminals)	D67
	MA739*	90	0.8	700	New Mini power (2 Terminals)	D67
SHF/UHF MIX	MA707*	5	0.85	—	—	D4
	MA730	5	0.85	(2 Elements)	Mini (2 Terminals)	D5

*Twin type

* Contains single element, without * contains multi elements

PIN Diodes

Type No.	V _R (V)	I _F (mA)	C _D max. (pF)	I _F (μA)	r ₁₁ typ. (kΩ)	I _F (mA)	r ₁₂ max. (Ω)	Package	No.
MA551	40	100	0.5	10	2	10	10	Mini Type (3 Terminals)	D5
MA553	40	100	0.4typ.	10	2	10	10	M Type	D30
MA555	40	100	0.5	10	2	10	10	Mini Type (3 Terminals) 2 elements contained	D5
MA556	40	100	0.5	10	2	10	10	Mini Type (6 Terminals) 3 elements contained	D8

Lambda Diodes

Application	Type No.	V _{FB} max. (V)	V _V (V)	I _P (mA)	I _L max. (nA)	Package	No.
Sensor	MA522	12	2.5~5.5	0.06~0.45	100	S Type	D66

Thyristors and Hall Elements

Thyristors

Silicon Control Rectifiers

Type No.	$I_{F(AV)}$ (A)	I_{surge} (A)	V_{FX} (V)	I_{GT}^*		V_{GT}^*		I_H^* typ. (mA)	toff typ. (μs)	Package	
				V_F (V)	max. (mA)	V_F (V)	max. (V)			No.	
M21C	0.3	8	200	6	1	6	0.8	3	15	TO-92	D37
M21CA	0.3	8	400	6	1	6	0.8	3	15	TO-92	D37

* $R_{GK} = 1 \text{ k } \Omega$

Trigger Element

Type No.	P_{DAV} (mW)	I_p (A)	T_{opr} ($^{\circ}C$)	V_{BO}			I_{BO}		
				I (μA)	min. (V)	max. (V)	V (V)	typ. (μA)	max. (μA)
MA62	150	2 ¹⁾	100	I_{BO}	28	36	V_{BO}	10	100

1) $T_a = 25^{\circ}C$, $t < 10 \mu s$, $f = 60 \text{ Hz}$ Package: DO-35(D21)

Silicon Control Switches

Type No.	Construction	V_{CBO} (V)	V_{CER} (V)	I_{CM} max. (mA)	P_D (mW)	V_{AE}		I_H		toff		Package	
						typ. (V)	max. (V)	typ. (mA)	max. (mA)	typ. (μs)	max. (μs)	No.	
3SF11	NPN	70	70 ¹⁾	100	250	1.05	1.4	0.5	1	6	12	TO-72	-
	PNP	-70	-	-									
M59C	NPN	70	70 ¹⁾	100	200	1.05	1.4	0.5	1	6	12	Mini (4 Terminals)	D6 (a)
	PNP	-70	-	-									

1) $R_{BE} = 10 \text{ k } \Omega$

GaAs Hall Elements (Magnetic Sensors)

Type No.	V_C max. (V)	T_{opr} ($^{\circ}C$)	V_H typ. (mV)	V_C		$V_{H0}(\text{mV})$ * V_{H0}/V_H max.(%)	β max. (%/ $^{\circ}C$)	Package	
				(V)	(G)			No.	
OH003	12	-55 ~ +125	150	6	1 k	* ± 12	-0.06	Mini (4 Terminals)	D6(a)
OH004	12		150			Mini (with Δ 4 Terminals)		D13	
OH007	12		110			Mini Thin Type		D11	
OH008	12		110			Mini Thin Type with Δ		D14	
OH009	12		110			Mini (4 Terminals)		D6(a)	
OH010	12		110			Mini (with Δ 4 Terminals)		D13	
OH011	12		180			Mini (4 Terminals)		D6(a)	
OH014	12		220			Mini Thick Type		D12	
OH015	8		260			Mini (4 Terminals)		D6(a)	
OH017	12		180			Mini Thin Type		D11	
OH018	12		180			Mini Thin Type with Δ		D14	
OH021	12		125			Mini (4 Terminals)		D6(a)	
OH023	12		185			Mini (4 Terminals)		D6(a)	
OH024	12		185			Mini (with Δ 4 Terminals)		D13	
OH025	12		185			Mini Thin Type		D11	

Opto-Electronic Devices Selection Guide

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Light Emitting Diodes

■ Infrared Light Emitting Diodes (for Optical-fiber, Control)

Application	Type No.	Package	No.	I _F (mA)	P _O min. (mW)	V _F max. (V)	λ _D typ. (nm)	θ _{1/2} typ. (deg.)	t _r , t _f typ. (ns)
For Sensors	LN71	TO-18	01	75	0.3	1.5	910	6	40
	LN122DL	TO-18	01	40	0.2	2.6	660	10	30
	LN122DF	TO-18	02	40	0.2	2.6	660	32	30
For Plastic Fiber	LN122CAL	TO-18 (Small)	03	40	0.2	2.4	680	80	120
	LN122D	TO-18 (Small)	03	40	0.4	2.6	660	80	30
	LN123DF	TO-18	018	50	0.4	2.6	660	40	30
	LN124D	5φ plastic	021	40	0.4	2.6	660	30	30
	LN124W	5φ plastic	021	50	1.0	2.6	660	30	30
	LN125D	Side View	017	40	0.4	2.6	660	80	30
For Glass Fiber	LN126D	3φ ceramic	06	30	0.2	2.6	660	80	130
	LN181*	TO-18	019	150	50μW	2.0	880	5	35※
	LN181L*	TO-18	019	100	3.0	2.0	880	6.5	35※
	LN183*	TO-18	020	75	40μW	1.9	880	25	35※
	LN183H*	TO-18	020	150	70μW	1.9	880	25	70※
	LN183HK*	TO-18	020	150	50μW	1.9	880	25	60※
	LN191*	TO-18	019	100	10μW	1.5	1300	5	100※
	LN193*	TO-18	020	100	0.2	1.5	1300	25	100※
LN193HK*	TO-18	020	150	0.35	1.5	1300	25	200※	

* Infrared light-emitting diode ※ MHz
No-marked: Visible light-emitting diode

■ Laser Diodes

Application	Type No.	Package	P _O max. (mW)	I _{th} typ. (mA)	I _{op} typ. (mA)	λ _L typ. (nm)	θ _{1/2} typ. (deg)	θ _⊥ typ. (deg)	V _{op} typ. (V)
For CD · VD	LN9705/P	022	5	40	50	788,805	10	33	1.8
	LN9705PR	022	5	40	50	788,805	10	33	1.8
	LN9705S/PS	023	5	40	50	788,805	10	33	1.8
	LN9705PSR	023	5	40	50	788,805	10	33	1.8
	LN9705D	024	5	40	50	805	10	33	1.8
	LN9705M	026	5	40	50	788	10	33	1.8
For Printer	LN9707/P	022	7	40	55	788,805	10	30	1.8
	LN9710/P	022	10	40	65	788,805	10	35	2.0
For Memory-Video	LN9825K	026	25	70	125	830	9	27	2.2
	LN9830/P	022	30	40	70	830	9	27	2.0
	LN9840/P	022	40	40	90	830	9	27	2.0
	LN9850/P	022	50	40	110	830	9	27	2.0

■ Infrared Light Emitting Diodes (for Remote Control, Auto Focus, Control)

Application	Type No.	Package	No.	I _F (mA)	P _O (mW)	P _O min. (mW)	V _F max. (V)	λ _D typ. (nm)	θ _{1/2} typ. (deg)
For Remote Control	LN66	5φ plastic	09	100	160	3	1.6	950	25
	LN66A	5φ plastic	09	100	160	12	1.6	950	25
	LN66(NC)	5φ (dark blue)	09	100	160	3	1.6	950	25
	LN66(L)	5φ (long lead)	010	100	160	5	1.6	950	25
	LN68	3φ plastic	07	50	75	2.5	1.5	940	20
	LN76	5φ plastic	09	100	180	14	1.8	880	25
For AF	LN166	5φ plastic	09	100	160	5	1.6	950	20
	LN64	Flat type	08	100	160	3.5	1.6	950	45
	LN155	Side view	017	100	160	3	1.6	950	80
	LN172	TO-18 (small)	04	100	170	7	1.7	900	100
	LN174	Flat type	011	100	170	7	1.7	900	120
	LN175	Side View	017	100	170	7	1.9	900	115
	LN182/(SC)	TO-18	05	100	190	3	1.9	880	20
	LN184	TO-18	05	100	190	3	1.9	880	20
	LN189L	Double end	087	100	190	3	1.9	880	20
	LN671	Flat package	031	70	130	7	1.8	880	50
For Control	LN51L	TO-18	01	100	150	3	1.5	950	8
	LN51F	TO-18	02	100	150	3	1.5	950	32
	LN52	TO-18 (small)	03	100	160	3.5	1.6	950	100
	LN54	Side view	012	50	75	2.5	1.5	950	17
	LN55	Side view	013	50	75	1.8	1.5	950	35
	LN57	Double end	015	50	75	3	1.5	950	18
	LN58	Side view	014	50	75	1.8	1.5	950	35
	LN59	Bidirectional type	016	50	75	1.8	1.5	940	
	LN62S	3φ ceramic	06	50	75	1.5	1.5	950	80
	LN65	Side view	013	100	160	4.3	1.6	950	35
	LN145W	Side view	017	40	120	2.5	2.2	700	80
	LN151L	TO-18	01	100	160	4	1.6	950	8
	LN151F	TO-18	02	100	160	4	1.6	950	32
	LN152	TO-18 (small)	03	100	160	5	1.6	950	100
	LN162S	3φ ceramic	06	50	75	1.5	1.5	950	80
	LN176	5φ plastic	09	100	180	6	1.8	900	25

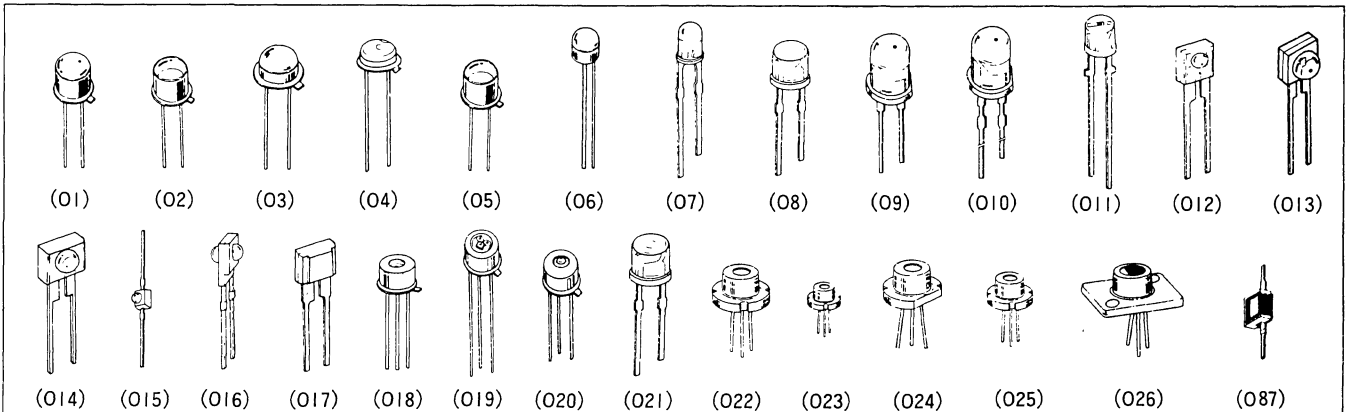


Photo Detectors/Photo Couplers

PIN Photo Diodes (for AF, CD, VD, Optical Communication and Control)

Application	Type No.	Package and Construction	No.	V _R (V)	I ₀ max. (nA)	I _L min. (μA)	λ _p typ. (nm)	tr,tf typ. (ns)	θ typ. (deg)
For AF	PN3206	Flat (Clear) 2-division	031	12	10	2	900	10	65
	PN312D	Flat (Visible light cut) 2-division	030	30	20	8	940	10	65
	PN322D	Flat (Visible light cut) 2-division	031	30	10	3	940	10	65
	PN3105	Flat (Visible light cut) PSD	030	30	2	14	940	8μ	65
	PN3107	Flat (Visible light cut) PSD	030	30	2	8	940	5μ	65
	ΔPN7202	Flat (Clear) PSD	—	30	5	5	900	10	65
For CD - VD	PN324E	Flat (Clear) 4-division	034	30	50	35	900	30	60
	PN3404	Flat (Clear) 4-division	—	30	10	8	900	20	65
	PN3405	Flat (Clear) 4-division	032	30	10	8	900	20	65
	PN316K1/CI	Flat (Clear) 6-division	033	30	1	0.1	900	3	65
			2	0.8					
	PN3608	Flat (Clear) 6-division	033	30	1	0.1	900	3	65
			2	0.8					
	PN3608K	Flat (Clear) chip slope 6-division	033	30	1	0.1	900	3	65
	PN3610	Flat (Clear) 6-division	033	12	10	0.3	900	3	65
			1	1.5					
PN3613	Flat (Clear) 6-division	033	12	1	0.1	900	5	65	
		2	1.0						
For PF	PN330CL	TO-18 (Resin mold)	03	30	10	7	850	2	70
	PN331	TO-18* (Resin mold)	03	30	10	7	900	2	70
	PN334	5 φ plastic	011	30	10	5	850	2	30
	PN335	Side view	017	30	10	5	850	2	70
For GF	PN331F	TO-18* (Flat Can)	018	30	10	4	900	2	40
	PN332F	TO-18* (Flat Can)	018	30	1	4	850	1	40
For Sensors	PN300	TO-18 (Resin Can)	01	50	10	30	800	1	10
	PN300F	TO-39 (Flat Can)	03	50	10	5	800	1	40
	PN302H	TO-39 (Flat Can)	027	30	30	15	900	10	55
	PN303	TO-39 (Flat Can)	028	30	50	50	900	50	55
	PN307	Double end	016	30	40	5	800	—	24
	PN313	Side view (Visible light cut)	035	30	50	35	900	50	65
	PN313B	Side View (Visible light cut)	035	30	50	15	960	50	65
	PN323	TO-92 (Visible light cut)	036	30	50	30	900	50	70
	PN323B	TO-92 (IR88 Suitable)	036	30	50	15	960	50	70
	PN328B	TO-92 (IR88 Suitable)	036	30	50	15	960	50	70
	PN331CL	TO-18 (3 Lead)	029	30	50	10	900	50 MHz	70

* With shielded terminal (For PF) For Plastic Fiber
(For GF) For Glass Fiber

Phototransistors

Type No.	Package No.	No.	V _{CE0} (V)	L (lx)	I _{CE(L)} min. (mA)	I _{CE0} max. (μA)	θ typ. (deg)
PN101/102*	TO-18	01/038	30	100	1.5	0.3	10
PN101F/102F*	TO-18	02/039	30	100	0.1	0.3	40
PN106*	TO-18	038	30	100	0.3	0.1	10
PN107/108*	TO-18	01/038	20	100	5	2	10
PN107F/108F*	TO-18	01/039	20	100	0.4	2	40
PN108CL*	TO-18 (Small)	040	20	500	3.5	2	80
PN109L*	TO-18 (Visible light cut)	01/038	20	100	3.5	2	10
PN109F*	TO-18 (Visible light cut)	02/039	20	100	0.3	2	40

Phototransistors (continued)

Type No.	Package No.	No.	V _{CE0} (V)	L (lx)	I _{CE(L)} min. (mA)	I _{CE0} max. (μA)	θ typ. (deg)
PN109CL	TO-18 (Visible light cut)	038	20	500	2.0	2	80
PN110*	5φ ceramic	041	20	500	0.8	1	80
PN111W*	5φ ceramic	041	20	500	4.5	2	80
PN115*	Side view	042	20	100	1.5	2	35
PN116*	Side view	043	20	100	0.2	2	70
PN120S	3φ ceramic	037	30	2	3μA	0.5	50
PN121S	3φ ceramic	037	20	1000	0.12	0.1	30
PN123S	3φ ceramic	037	20	1000	0.4	0.1	30
PN126S	3φ ceramic	037	20	1000	1.05	0.1	30
PN127	Double end	015	20	1000	0.80	0.1	14
PN147	Double end	015	20	2	3μA	0.5	24
PN150	Side view	013	20	500	1	1	35
PN154	Side view	012	20	100	1	1	27
PN155	Side view	016	20	100	1	1	70
PN158	Side view	014	20	100	1	1	40
PN168	3φ plastic	07	30	500	0.8	0.5	30
PN202S⊙	3φ ceramic	037	20	2	0.2	0.5	30
PN205⊙	Side view	013	20	2	0.2	0.5	30
PN207⊙	Double end	015	20	2	0.5	0.5	18
PN208⊙	Side view	014	20	2	0.2	0.5	40
PN268⊙	3φ plastic	07	20	2	0.1	0.5	30
PN268-(NC)⊙	3φ plastic	07	20	2	0.05	0.5	30

* with Base Terminal ⊙ Darlington Photo Transistor

Integrated Photosensors

Type No.	Package No.	V _{CC} (V)	V _{OL} (V)	I _{OH} (μA)	I _{Fth} (mA)
ON1402A/B	060	4.5~16	0.4	100	5
ON1403A/B	061	4.5~16	0.4	100	5

Photosensor Units

Type No.	Package No.	Characteristics	Output ON-State	V _{CC} (V)	I ₀ (mA)	V ₀ (V)	V _{OL} max. (V)
ON1501	071	Gap Width 5mm, Depth 14mm, Open-collector Output, High Resolution	Object undetected	24	50	40	0.6
ON1503	072	Gap Width 3.6mm, Depth 10mm, Open-collector Output, High Resolution	Object undetected	5, 10	100	20	0.6
ON1517HH-(A)	073	Gap Width 5mm, Depth 10mm, Open-collector Output, High Resolution	detected	5	20	30	0.4
ON2509	075	Reflection type, Open-collector output, Regular paper, OHP Film, second original detectable	Object detected	5	6	24	0.4
ON2521LA-(A)	076	Reflection type, Open-collector output, Detectable distance range=2.5~7.5mm	Un-detected	5	10	5	0.4

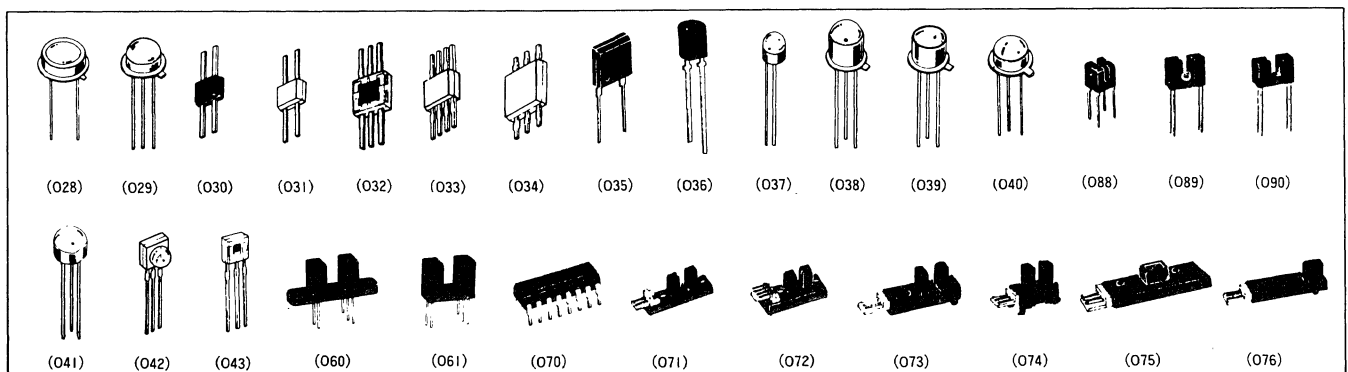


Photo Interrupters

Type No.	Package No.	Charac-teristics	If (mA)	V _{CE0} (V)	I _c min (mA)	I _{CE0} max (μA)	tr,tf typ (μs)	V _{CE(sat)} max (V)
ON1001	088	Very small type	50	30	0.065	200	20	0.4
ON1053	089	Small-thin type	50	20	0.5	200	6	0.5
ON1054	090	Small-thin type	50	20	0.1	200	6	0.5
ON1102	044	High output	50	30	2	200	4	0.4
ON1105	045	High resolution	50	30	0.3	200	6	0.3
ON1108	046	For PCB	50	30	2	200	4	0.4
ON1109	048	Deep and wide gap	50	30	0.3	200	6	0.3
ON1110	049	High resolution	50	30	0.3	200	6	0.3
ON1111	050		50	30	0.3	200	6	0.3
ON1112	051	High resolution, Thin type	50	30	0.3	200	6	0.3
ON1113	052		50	30	0.3	200	6	0.5
ON1114	051	High output	50	30	0.7	200	6	0.3
ON1120	—	Wide gap	50	20	1.0	200	6	0.4
ON1122*	044	General purpose	25	30	0.1	200	6	0.5
ON1128	046	For PCB	25	30	0.1	200	6	0.5
ON1128S*	047	With metal slit	25	30	0.05	200	6	0.5
ON1179	053	High resolution, Thin type	50	30	0.3	200	6	0.3
ON1215⊙*	045	Light scatter protection type	25	20	2	600	100	1.5

⊙ Darlington output * Visible red LED

Optoisolators

Type No.	Package No.	Characteristics	V _{CE0} * V _R ** V ₁ (V)	V _{iso} min. (VRMS)	CTR (%)	tr typ. (μs)
ON3100	063	High transfer efficiency	30	2500	50~600	5
ON3105	062	High voltage	30	5000	30typ.	4
ON3105V	062	High voltage	30	4000	15~60	4
ON3110	063	High transfer efficiency	30	2500	30~250	2
ON3111	064	High transfer efficiency	35	2500	50~250	2.5
ON3112	065	High transfer efficiency (2elm)	35	2500	50~250	2.5
ON3113	066	High transfer efficiency (3elm)	35	2500	50~250	2.5
ON3131	091	High voltage	35	5000	200typ.	2
ON3132	068	High voltage (2elm.)	35	5000	200typ.	2
ON3133	069	High voltage (3elm.)	35	5000	200typ.	2
ON3134	070	High voltage (4elm.)	35	5000	200typ.	2
ON3161	067	High voltage	35	5000	50~600	2.5
ON3171	093	High voltage	35	5000	50~600	4
ON3205⊙	062	High voltage	20	5000	700typ.	100
ON3301※	063	High speed	* 50	2500	0.35typ.	0.07
ON3401	063	High transfer efficiency	** 15	2500	15~60	0.4

⊙ Darlington output * PIN photo diode output Δ Preliminary

Reflective Photosensors (Photo Reflectors)

Type No.	Package No.	Charac-teristics	If (mA)	V _{CE0} (V)	I _c min. (mA)	I _{CE0} max. (μA)	tr,tf typ. (μs)	V _{CE(sat)} max (V)
ON2152	054	High speed	100	20	0.8	2	8	0.6
ON2153	055	High speed	50	30	0.1	0.2	6	0.5
ON2253⊙	055	High sensitivity	50	20	3	0.5	150	1.5
ON2160	056	Visible light cut super small	50	30	0.09	0.2	15	0.4
ON2170	057	Visible light cut super small Thin type	50	30	0.045	0.2	20	0.4
ON2173	058	High speed	50	20	0.1	0.2	6	0.3
ON2180	057	Visible light cut super small Thin type	50	30	0.045	0.2	20	0.4
ON2270⊙	057	Visible light cut super small Thin type	50	20	0.17	0.5	150	1.5
ON2280⊙	057	Visible light cut super small Thin type	50	20	0.17	1	150	1.5

⊙ Darlington output

Optical Fiber Units

Optical Fiber-Link

Type No.	Package No.	V _{CC} (V)	F (kbps)	Optical sensor level (dBm)	λ _p (nm)	Transmission distance (m) m:
△ON1631	077	5	—	Power consumption 50mA	660	—
△ON2631	078	5	—	Power consumption 50mA	660	—
ON3634W	081	5	1000	-30~-13	660	250*1, 40*2
ON3633W	081	5	100	-30~-13	660	250*1, 40*2
ON3631R/T	079	5	1000	-30~-13	880	2000*3

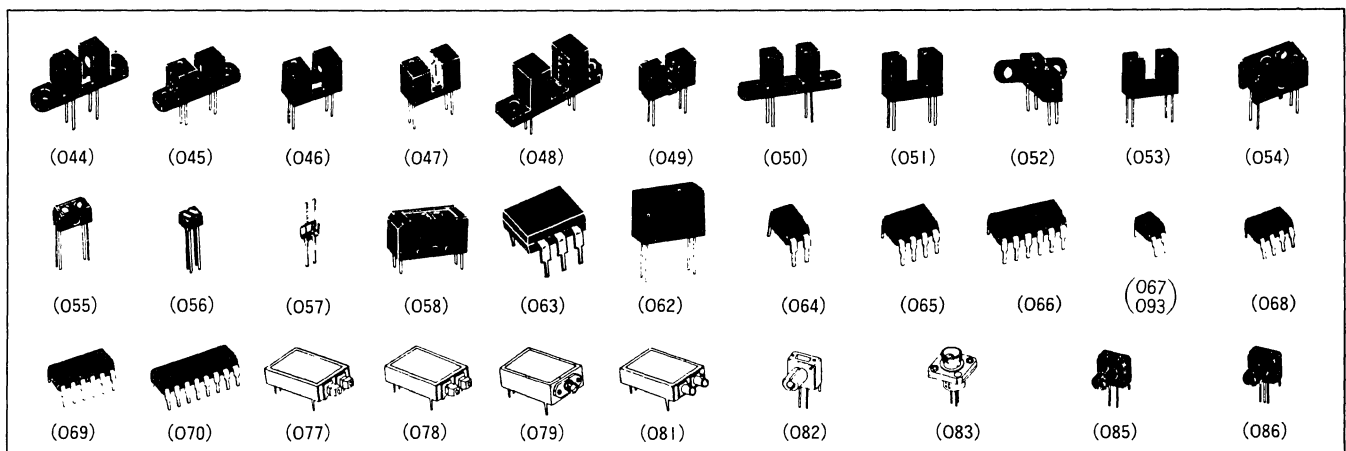
△ Preliminary *1 Glass Fiber (SI200) *2 Plastic Fiber (1mmφ)
d: Detecting distance

Optical Fiber Connector Modules

Element	Type No.	Package No.	Fiber total power P _F typ. (μW)	Emitting wave length λ _p typ. (nm)	Forward voltage V _F typ. (V)	Cut-off Frequency f _c (MHz)	
Emitter	△LN125D004	082	50*1	660	1.8	10	
Emitter	△LN183-001	083	40*2	880	1.6	35	
Element	Type No.	Package No.	Quantum effect η min. (%)	Peak sensitivity wave length λ _p typ. (nm)	Leakage current I _p max. (nA)	Cut-off Frequency f _c (MHz)	
Emitter	△PN332F001	083	60*2	850	1	300	
Emitter	△PN335-004	085	60	900	10	50	
Element	Type No.	Package No.	V _{CC} (V)	F (Kbps)	I _{OH} (μA)	V _{OL} (V)	I _{CC} (mA)
Receiver	△PN405A004*3	086	5~16	10	100	0.4	12






△: Preliminary *1 Plastic Fiber (1mmφ) *2 Glass Fiber (G150)

*3 Photo IC Module



Visible Light Emitting Diodes

Point LEDs

Radiation Color		Red		Green		Amber		Orange		GaAlAs		
		Red Diffusion	Red Clear	Green Diffusion	Green Clear	Amber Diffusion	Amber Clear	Red Diffusion	Red Clear	Clear		
Type	Lens Dimensions	Lens Color										
Round Type		φ 5.0	LN21RPHL		LN31GPHL		LN41YPHL		LN81RPHL		LN21CAL (U)	
			LN21RPH		LN31GPH		LN41YPH		LN81RPH		LN21CAL (US)	
			LN21RPL		LN31GPL		LN41YPL		LN81RPL		LN21CAL (UR)	
			LN21RPSL		LN31GPSL		LN41YPSL		ΔLN81RPSL			
			LN21RPSLH		ΔLN31GPSLH		ΔLN41YPSLH		ΔLN81RPSLH			
			LN21RPX		LN31GPX		LN41YPX		ΔLN81RPX			
		ΔLN21RPSLX		ΔLN31GPSLX		ΔLN41YPSLX		LN81RPSLX				
			ΔLN264RCP		LN364GCP		LN464YCP		LN864RCP			
											LN261CAL (UR)	
			φ 4.8		ΔLN21RCPSS		LN31GCPSS		LN41YCPSS		ΔLN81RCPSS	
			φ 4.4		ΔLN240RCP		LN340GCP		LN440YCP		LN840RCP	LN240CALF (U)
			φ 4.0	LN29RP		LN39GP		LN49YP		ΔLN89RP		
		LN29RPP			LN39GPP		LN49YPP		LN89RPP			
		LN29RPL			LN39GPL		LN49YPL		ΔLN89RPL			
		LN29RPX			LN39GPX		LN49YPX					
		φ 3.7	LN253RP		LN353GP		LN453YP		ΔLN853RP			
		φ 3.2		ΔLN276RCPX		ΔLN376GCPX		LN476YCPX		LN876RCPX		
		φ 3.0	LN28RP		LN38GP		LN48YP		LN88RP			
			LN28RPP		LN38GPP		LN48YPP		LN88RPP		LN28CAL (US)	
			LN28RPH		LN38GPH		LN48YPH		LN88RPH			
			LN28RPL		LN38GPL		LN48YPL		ΔLN88RPL			
			LN28RPX		LN38GPX		LN48YPX		LN88RPX			
			LN277RPX	LN277RCPX	LN377GPX	LN377GCPX	LN477YPX	LN477YCPX	LN877RPX	ΔLN877RCPX		
		φ 2.8		ΔLN263RCP		LN363GCP		LN463YCP		LN863RCP		
	φ 5.0	LN21RPXN		LN31GPXN		LN41YPXN		LN81RPXN				
		LN28RPPN		LN38GPPN		LN48YPPN		LN88RPPN				
	φ 3.0	LN23SRP(H)		LN33SGP(H)		LN43SYP						
		LN238RPH		LN338GPH		LN438YPH		LN838RPH				
Round-Top View Type		φ 3.0	LN231RP		ΔLN331GP		ΔLN431YP		LN831RP			
			LN221RP		LN321GP		LN421YP		ΔLN821RP			
		φ 2.6	LN221RPH		LN321GPH		LN421YPH		ΔLN821RPH			
			LN230RPP		LN330GPP		LN430YPP		LN830RPP			
			LN222RP		LN322GP		LN422YP		ΔLN822RP			
			LN222RPH		LN322GPH		LN422YPH		ΔLN822RPH			
	φ 2.0	LN222RPT		LN322GPT		ΔLN422YPT		ΔLN822RPT				
		LN282RPX		LN382GPX		LN482YPX						
	Round-side View Type		φ 3.5	LN25RP		LN35BP ※		LN45YP		LN85RP		
			φ 2.4	LN26RP		LN36BP ※		LN46YP		LN86RP		
Square Type		□ 5.0×5.0	LN250RP		LN350GP		LN450YP		ΔLN850RP			
			LN250RPH		LN350GPH		LN450YPH		ΔLN850RPH			
		□ 4.0×4.0	LN252RP		LN352GP		LN452YP		ΔLN852RP			
			LN252RPH		LN352GPH		LN452YPH		LN852RPH			
		□ 5.0×5.0	LN273RP		LN373GP		ΔLN473YP		ΔLN873RP			
			LN273RPH		LN373GPH		LN473YPH		LN873RPH			
		□ 3.0×7.0	LN216RP		LN316GP		LN416YP		LN816RP			
			LN249RP		LN349GP		LN449YP		ΔLN849RP			
		□ 2.7×5.7	LN249RPH		LN349GPH		LN449YPH		LN849RPH			
			LN213RP		LN313GP		LN413YP		LN813RP			
		□ 2.5×5.0	LN213RPP		LN313GPP		LN413YPP		LN813RPP			
			LN219RP		LN319GP		LN419YP		LN819RP			
		□ 2.0×5.0	LN248RP		LN348GP		LN448YP		LN848RP		ΔLN248CAL (U)	
			LN248RPH		LN348GPH		LN448YPH		LN848RPH			

※Blue Diffusion (Lens Color)

Visible Light Emitting Diodes

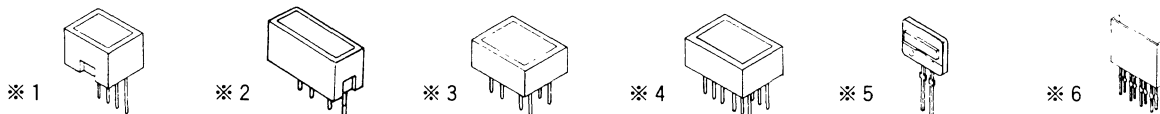
■ Point LEDs (continued)

Type	Lens Dimensions	Radiation Color		Red		Green		Amber		Orange		GaAlAs
		Lens Color	Red Diffusion	Clear	Green Diffusion	Clear	Amber Diffusion	Clear	Red Diffusion	Clear	Transparent	
Square Type		□1.8×5.3	LN217RP		LN317GP		LN417YP		ΔLN817RP			
			LN217RPH		LN317GPH		LN417YPH		ΔLN817RPH			
		□1.8×3.5	LN211RP		LN311GP		LN411YP					
			LN220RP		LN320GP		LN420YP		LN820RP			
		□1.75×7.0	LN220RPH		LN320GPH		LN420YPH		ΔLN820RPH			
			LN229RP		LN329GP		LN429YP		ΔLN829RP			
		□1.5×5.0	LN229RPH		LN329GPH		LN429YPH		ΔLN829RPH			
			LN224RP		LN324GP		LN424YP		ΔLN824RP			
		□1.0×5.0	LN224RPH		LN324GPH		LN424YPH		ΔLN824RPH			
			LN224RPL		LN324GPL		ΔLN424YPL		ΔLN824RPL			
	LN268RP			LN368GP		ΔLN468YP		ΔLN868RP				
	□1.0×4.0	LN233RP		LN333GP		LN433YP		ΔLN833RP				
		LN233RPH		ΔLN333GPH		ΔLN433YPH		ΔLN833RPH				
	□1.0×2.0	ΔLN281RPX		ΔLN381GPX		ΔLN481YPX		ΔLN881RPX				
		□2.5×5.0	LN210RP		LN310GP		LN410YP		LN810RP			
			LN242RP		LN342GP		LN442YP		LN842RP			
		□2.0×5.0	LN242RPH		LN342GPH		LN442YPH		LN842RPH			
			LN242RPL		LN342GPL		LN442YPL		ΔLN842RPL			
		□2.0×4.0	LN251RPP	LN251RCP	LN351GPP	LN351GCPP	LN451YPP	LN451YCPP	LN851RPP	LN851RCP	LN251CAL(U)	
				LN260RCP		LN360GCP		LN460YCP		ΔLN860RCP		
□2.0×3.0			ΔLN260RCPX		ΔLN360GCPX		LN460YCPX		ΔLN860RCPX			
□1.75×3.9	LN275RPX		ΔLN375GPX		ΔLN475YPX		LN875RPX					
	□1.8×1.8	LN265RP		LN365GP		ΔLN465YP		ΔLN865RP				
		LN265RPH		LN365GPH		LN465YPH		LN865RPH				
Two Head Type		□2-1.9×1.9	LN244RP		LN344GP		LN444YP					
			LN244RPH		LN344GPH		ΔLN444YPH					
	□2-1.0×2.0	LN245RP		LN345GP		LN445YP						
		LN245RPH		LN345GPH		ΔLN445YPH						
Triangle Type		△2.0×2.5	ΔLN235RP		LN335GP		ΔLN435YP					
			LN253RPH		LN335GPH		LN435YPH					
		△2.5×5.0	LN227RP		LN327GP		LN427YP					
			LN227RPH		LN327GPH		ΔLN427YPH					
		△3.0×5.0	LN226RP		LN326GP		LN426YP					
LN226RPH				LN326GPH		LN426YPH						
	△3.0×5.0	LN228RP		LN328GP		LN428YP						
	△4.0×4.5	LN212RP		LN312GP		LN412YP						
Small Type		Mini Bright		LN01201C		LN01301C		LN01401C		LN01801C	LN01201CAL(U)	
				LN01201C-(L)		LN01301C-(L)		LN01401C-(L)		LN01801C-(L)		
		Double End	LN247RP		LN347GP		LN447YP				Δ LN247CAL(U)	
		Grass Seal		LN2G		LN3G						
		Chip LED		LN1251C		LN1351C		LN1451C		LN1851C	LN1251CAL	
			LN1261C		LN1361C		LN1461C		LN1861C	LN1261CAL		

Visible Light Emitting Diodes

Surface LEDs

Type	Package	Radiation Color	Red		Green		Amber		Orange
			Red Diffusion	Transparent	Green Diffusion	Transparent	Amber Diffusion	Transparent	Red Diffusion
Area Lighting	※ 1	□ 7.0×9.0	LN0204RP2		LN0204GP3		LN0204YP4		LN0204RP8
	※ 2	□ 5.0×15.0	LN0202RP2		LN0202GP3		LN0202YP4		LN0202RP8
	※ 3	□ 12.0×15.0	LN0401RP2		LN0401GP3		LN0401YP4		LN0401RP8
	※ 4	□ 12.0×20.0	LN0603RP2		LN0603GP3		LN0603YP4		LN0603RP8
	※ 5	Tape residual quantity	LN0105RP2		LN0105GP3		LN0105YP4		LN0105RP8
	※ 6	Back light		LN0410CP2		△LN0410CP3		△LN0410CP4	



Two Color LEDs

Type	Lens Dimensions	Lens Color	White Diffusion	Transparent	Blue Diffusion	
Round Type	φ 8.0	□	△LN088WP38			
			LN11WP23	LN11CP23		
		φ 5.0	LN11WP24	△LN11CP24		
			LN11WP34	LN11CP34		
			LN11WP38			
			LN11WP68			
	φ 4.4	LN170WP38				
		φ 3.0	LN086WP38			
			LN138WP38			
		φ 3.0	LN15WP		LN15BP	
LN15WP-(F)						
φ 2.4	LN16WP		LN16BP			
	LN16WP-(F)					

Type	Lens Dimensions	Lens Color	White Diffusion	Transparent
Square Type	□ 5.0×5.0	□	△LN150WP38	
		■	LN173WP38	
	□ 5.0×5.0	□	LN173WP68	
		■	LN142WP24	
	□ 2.0×5.0	□	LN142WP34	
		■	LN142WP38	
Small Type	□ 1.8×5.3	□	LN117WP23	
		■	△LN117WP38	
	□ 1.5×5.0	□	△LN129WP38	
		■		LN02102C13
Mini Bright	■		LN02102C68	
	Chip LED	■		LN2152C13
				LN2162C13

Taping Goods

Lens Dimensions	φ 5.0 (TA Type)	φ 5.0 (TD Type)	φ 4.4 (TA Type)	φ 4.0 (TA Type)
Outline				
Radiation color	Red	LN21RPH-(TA)	△LN21RPH-(TD)	△LN240RPX-(TA)
	Green	LN31GPH-(TA)	△LN31GPH-(TD)	LN340GPX-(TA)
	Amber	△LN41YPH-(TA)	△LN41YPH-(TD)	LN440YPX-(TA)
	Orange	LN81RPH-(TA)	LN81RPH-(TD)	△LN840RPX-(TA)
△LN89RPX-(TA)				
Lens Dimensions	φ 3.2 (TA Type)	φ 3.0 (TA Type)	φ 3.0 (TD Type)	φ 2.6 (TA Type)
Outline				
Radiation color	Red	△LN276RGPX-(TA)	LN28RPH-(TA)	LN28RPH-(TD)
	Green	△LN376GCPX-(TA)	LN38GPH-(TA)	LN38GPH-(TD)
	Amber	LN476YCPX-(TA)	△LN48YPH-(TA)	△LN48YPH-(TD)
	Orange	LN876RGPX-(TA)	LN88RPH-(TA)	△LN88RPH-(TD)
				LN221RPH-(TA)
				LN321GPH-(TA)
				△LN421YPH-(TA)
				△LN821RPH-(TA)

Visible Light Emitting Diodes

■ Taping Goods (continued)

Lens Dimensions		φ 2.0 (TA Type)	φ 2.0 (TX Type)	□ 4.0×4.0 (TA Type)	□ 2.0×5.0 (TA Type)
Radiation color	Red	LN222RPX- (TA)	LN282RPX- (TX2)	LN252RPH- (TA)	LN242RPX- (TA)
	Green	△LN322GPX- (TA)	LN382GPX- (TX2)	LN352GPH- (TA)	LN342GPX- (TA)
	Amber	△LN422YPX- (TA)	LN482YPX- (TX2)	LN452YPH- (TA)	△LN442YPX- (TA)
	Orange	△LN822RPX- (TA)	△LN882RPX- (TX2)	△LN852RPH- (TA)	△LN842RPX- (TA)
		1.8×1.8 (TT Type)	1.75×3.9 (TT Type)	□ 1.5×5.0 (TA Type)	□ 1.0×5.0 (TA Type)
Outline					
Radiation color	Red	LN265RPH- (TT)	LN275RPX- (TT)	LN229RPH- (TA)	LN224RPH- (TA)
	Green	LN365GPH- (TT)	△LN375GPX- (TT)	△LN329GPH- (TA)	LN324GPH- (TA)
	Amber	△LN465YPH- (TT)	△LN475YPX- (TT)	△LN429YPH- (TA)	△LN424YPH- (TA)
	Orange	△LN865RPH- (TT)	△LN875RPX- (TT)	△LN829RPH- (TA)	△LN824RPH- (TA)
Lens Dimensions		Glass Seal	Mini Bright	Chip LED	
Outline					
Radiation color	Red	LN2G- (TA)	LN01201C(Q)- (TA)	LN1251C- (TR)	LN1261C- (TR)
	Green	LN3G- (TA)	LN01301C(Q)- (TA)	LN1351C- (TR)	LN1361C- (TR)
	Amber		LN01401C(Q)- (TA)	LN1451C- (TR)	LN1461C- (TR)
	Orange		LN01801C(Q)- (TA)		

■ Two Color LEDs (continued)

Lens Dimensions	φ 5.0 (TDA Type)	5.0×5.0 (TD Type)	Chip LED	
Outline				
	LN11WP23- (TDA)	LN173WP38- (TD)	LN2152C13- (TF)	LN2162C13- (TR)

■ Numerical Display Devices

Digits(Size)	+1 display (0.3 inch)	+1 display (0.4 inch)	+1 display (0.6 inch)	1 digit (0.3 inch)		1 digit (0.4 inch)	
Appearance							
Radiation color							
Red	LN503R	LN504R	LN506RA/RK	LN513RAM/RKM	LN513RAS/RKS	LN513RA/RK	LN514RA/RK
Green	LN503G	LN504G	LN506GA/GK	LN513GAM/GKM	LN513GAS/GKS	LN513GA/GK	LN514GA/GK
Amber	LN503Y	LN504Y	LN506YA/YK	LN513YAM/YKM	LN513YAS/YKS	LN513YA/YK	LN514YA/YK
Orange	LN503O	LN504O	LN506OA/OK	LN513OAM/OKM	LN513OAS/OKS	LN513OA/OK	LN514OA/OK
Digits(Size)	1 digit (0.6 inch)	1 digit (0.8 inch)	1 digit (1.0 inch)	2 digits (0.3 inch)		2 digits (0.4 inch)	
Appearance							
Radiation color							
Red	LN516RA/RK	LN518RA/RK	LN5110RAMR/RKMR	LN523RAMR/RKMR	LN524RAS/RKS	LN524RAMR/RKMR	LN524RA/RK
Green	LN516GA/GK	LN518GA/GK	LN5110GAMG/GKMG	LN523GAMG/GKMG	LN524GAS/GKS	LN524GAMG/GKMG	LN524GA/GK
Amber	LN516YA/YK	LN518YA/YK	LN5110YAMY/YKMY	LN523YAMY/YKMY	LN524YAS/YKS	LN524YAMY/YKMY	LN524YA/YK
Orange	LN516OA/OK	LN518OA/OK	LN5110OAM0/OKM0	LN523OAM0/OKM0	LN524OAS/OKS	LN524OAM0/OKM0	LN524OA/OK

Visible Light Emitting Diodes

■ Numerical Display Devices (continued)

Digits(Size)	2 digits (0.6 inch)	2 digits (0.8 inch)	3 digits (0.3 inch)	3 digits (0.4 inch)	3 digits (0.6 inch)
Appearance					
Radiation color					
Red	LN526RA/RK	LN528RA/RK	LN533RAMR/RKMR	LN534RAMR/RKMR	LN536RAMR/RKMR
Green	LN526GA/GK	LN528GA/GK	LN533GAMG/GKMG	LN534GAMG/GKMG	LN536GAMG/GKMG
Amber	LN526YA/YK	LN528YA/YK	LN533YAMY/YKMY	LN534YAMY/YKMY	LN536YAMY/YKMY
Orange	LN526OA/OK	LN528OA/OK	LN533OAMO/OKMO	LN534OAMO/OKMO	LN536OAMO/OKMO
Digits(Size)	4 digits (0.3 inch)				
Appearance					
Radiation color					
Red	LN543RAF	LN543RA/RK	LN543RAH/RKH	LN5431RAMR/RKMR	
Green	LN543GAF	LN543GA/GK	LN543GAH/GKH	LN5431GAMG/GKMG	
Amber	LN543YAF	LN543YA/YK	LN543YAH/YKH	LN5431YAMY/YKMY	

■ LED Lamps for Outdoor Use

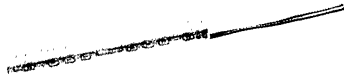
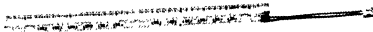

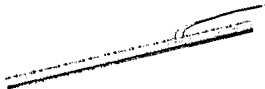



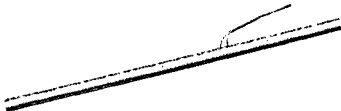
ϕ 24.0	ϕ 50.0	
LN015184UNB	LN0501142UN	LN0501172UN

■ Panel Displays (16×16 · 24×24 dots element)

\square 2.0×2.0	ϕ 3.0		
16×32 dots 	16×16 dots 	16×16 dots 	24×24 dots
LN5121149UNA	LN256144UNA	LN2561156UNAH	LN576146UNA
ϕ 3.0	ϕ 5.0		
24×24 dots 	16×16 dots 	16×16 dots 	24×24 dots
LN5761150UNAH	LN256166UNA	LN2561141UNA	LN5761111UNA
ϕ 8.0			
16×16 dots 	16×16 dots 		
LN2561171UNAH	LN2561151UNA		

Visible Light Emitting Diodes

■ LED Line Light Source (For reading, For illumination)

B8 size	A6 size
	
LN322114ALUN	LN483126UN
A4 size	
	
LN96322UN-1	LN803108UN-A4
B4 size	
	
LN112317UN-1	LN963106UN-B4
A3 size	
	
LN132344UN-1	LN1123107UN-A3

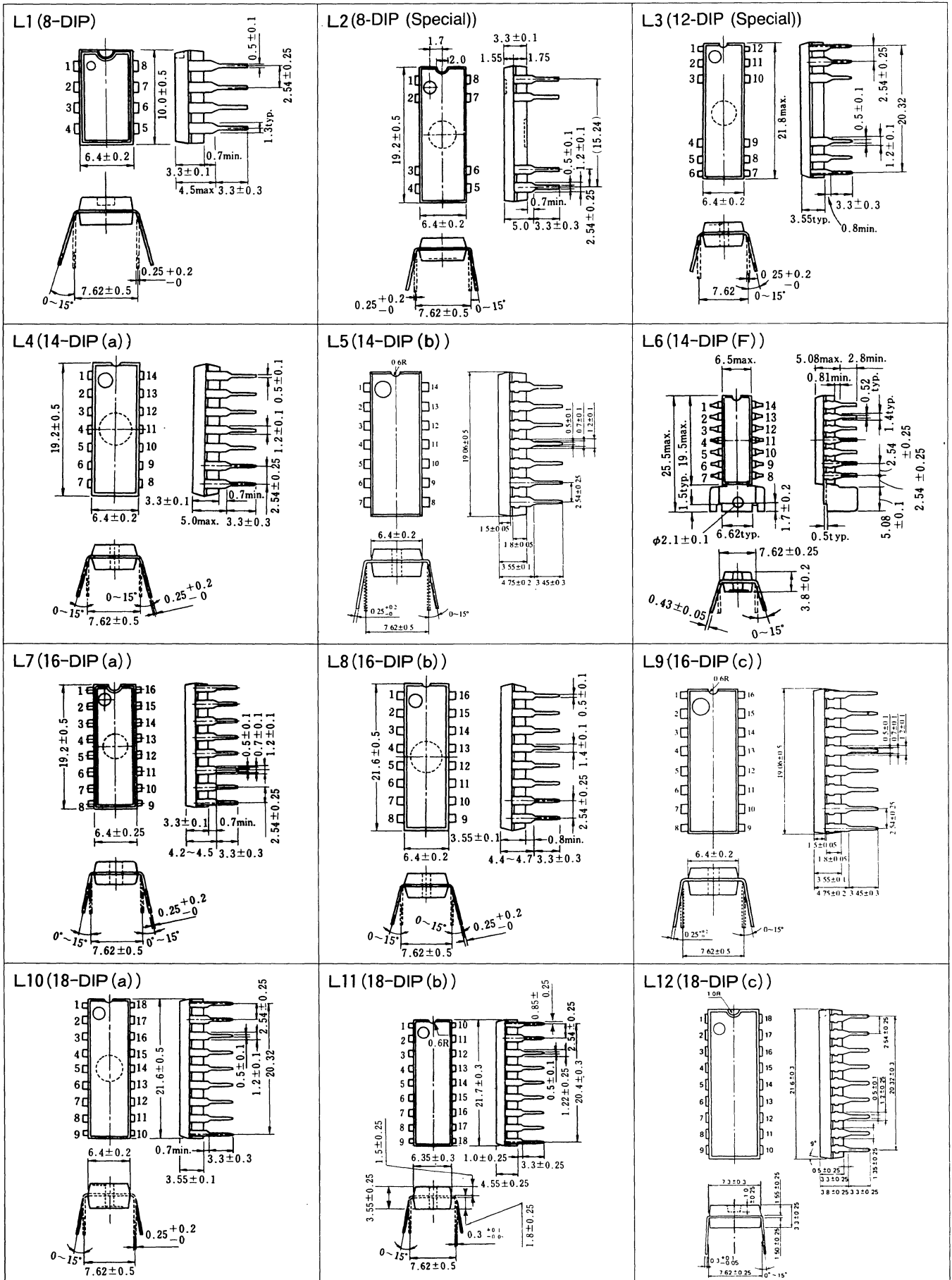
Package Outlines

MOS LSI (L □ □)	132
MOS Memory (M □ □)	140
Bipolar IC (B □ □)	143
Discrete (D □ □)	150

Package Outlines (MOS LSIs)

• DIL Packages

Unit: mm

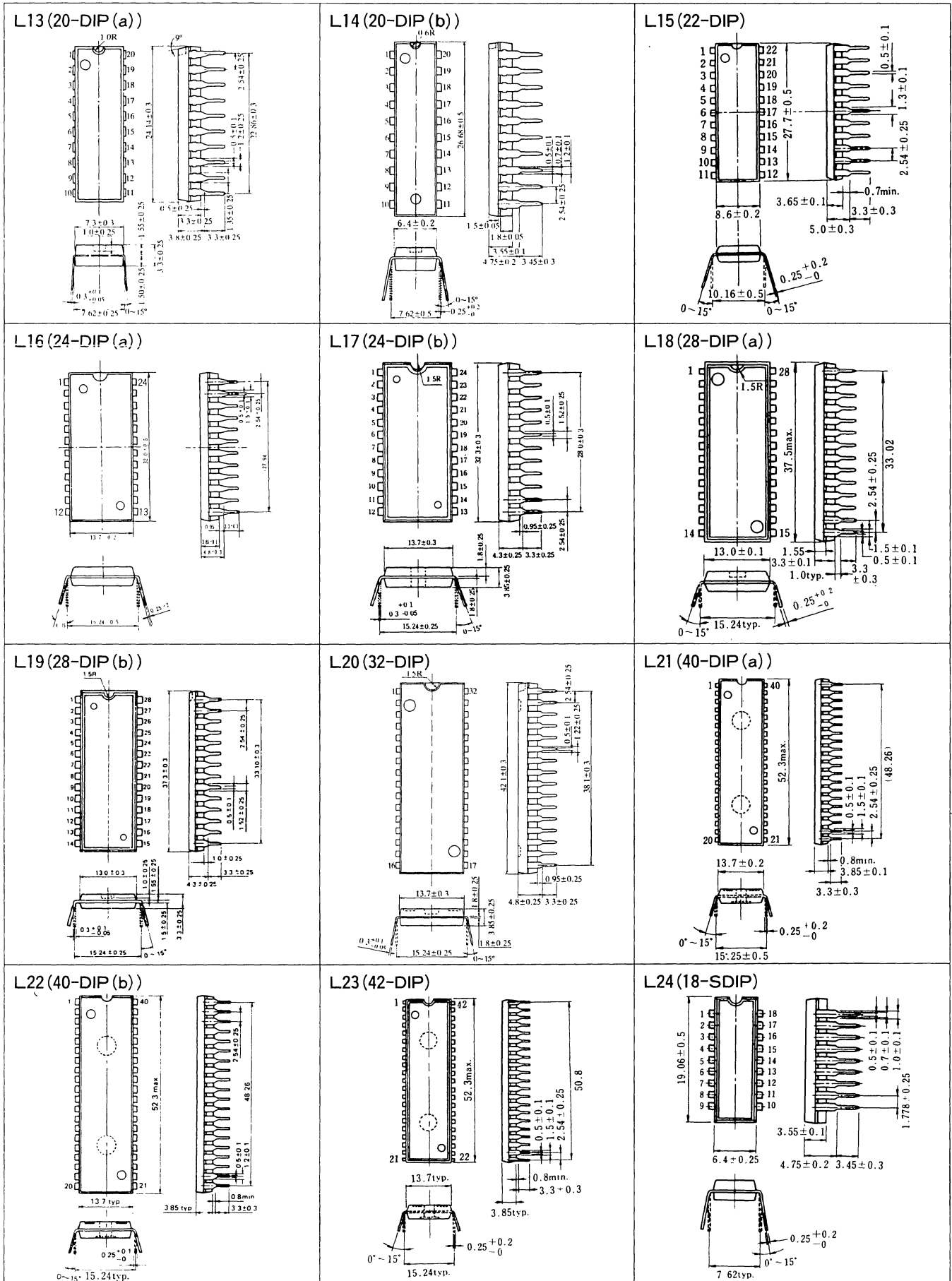


(Package Symbol) DIP=Dual-In-Line Plastic Package

Package Outlines (MOS LSIs)

• DIL Packages (continued)

Unit: mm

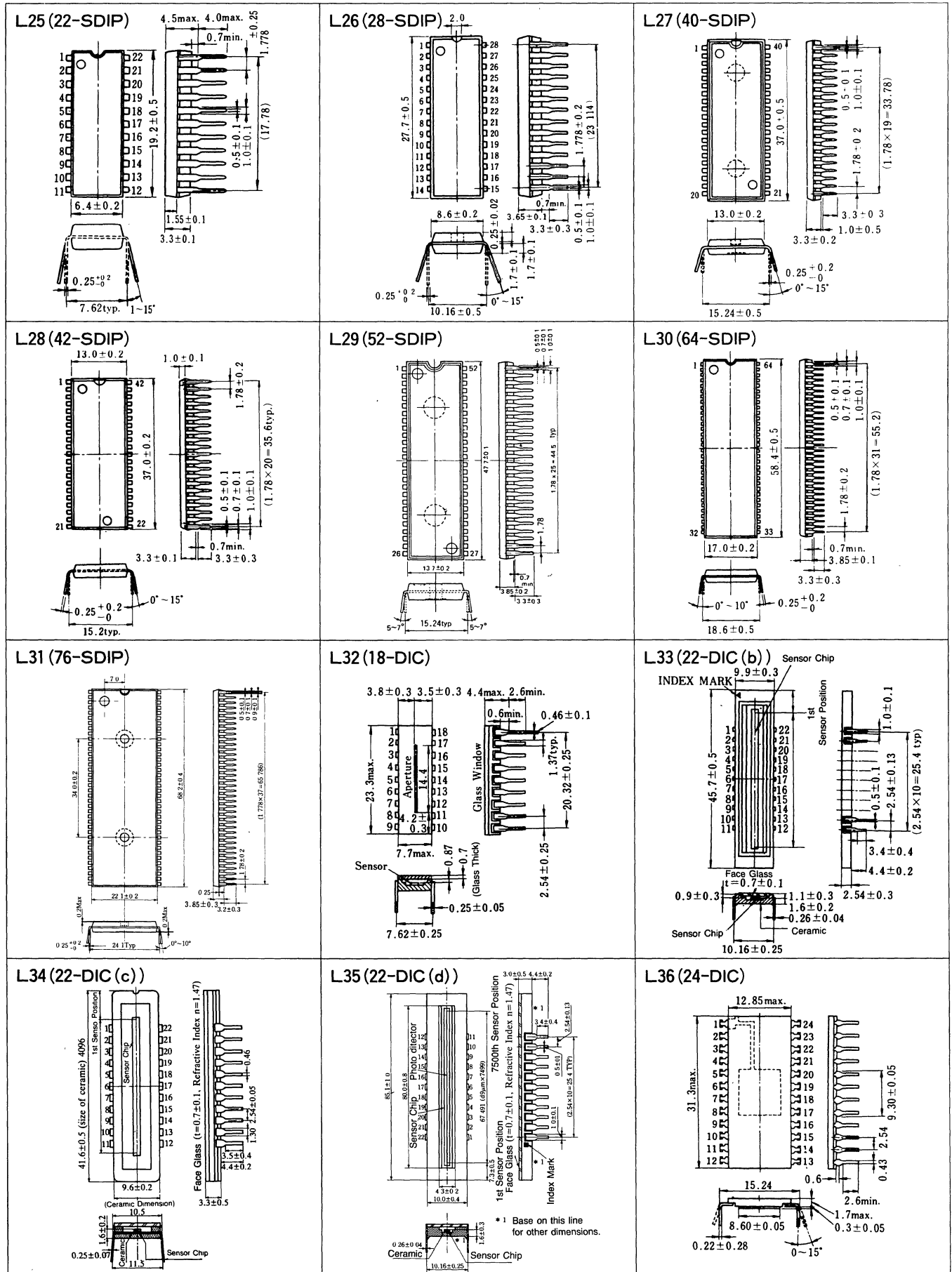


(Package Symbol) DIP=Dual-In-Line Plastic Package, SDIP=Shrunk Dual-In-Line Plastic Package

Package Outlines (MOS LSIs)

• DIL Packages (continued)

Unit: mm

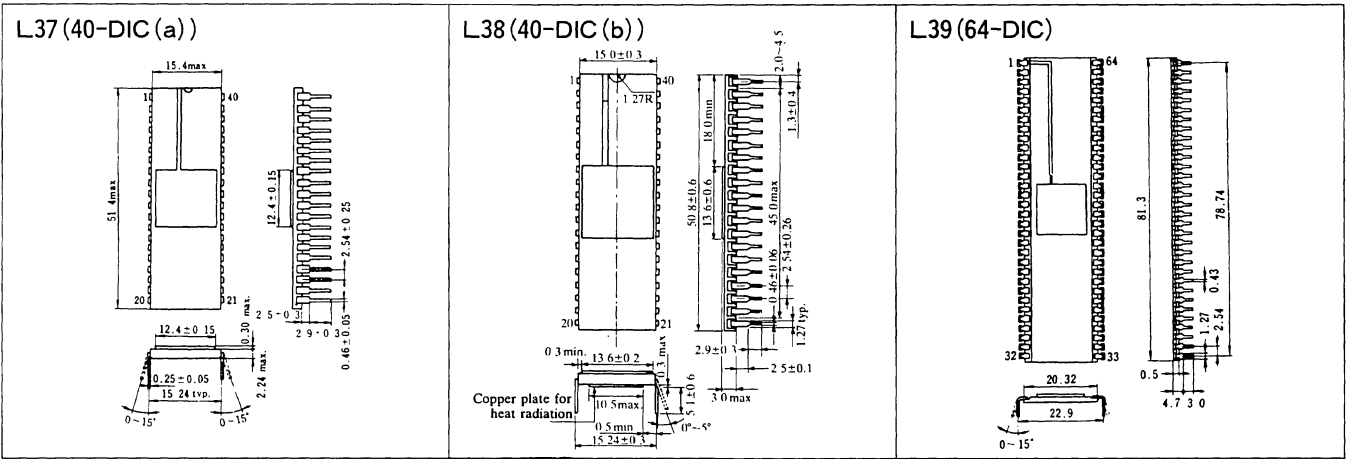


(Package Symbol) SDIP=Shrunk Dual In Line Plastic Package, DIC=Dual In Line Ceramic Package

Package Outlines (MOS LSIs)

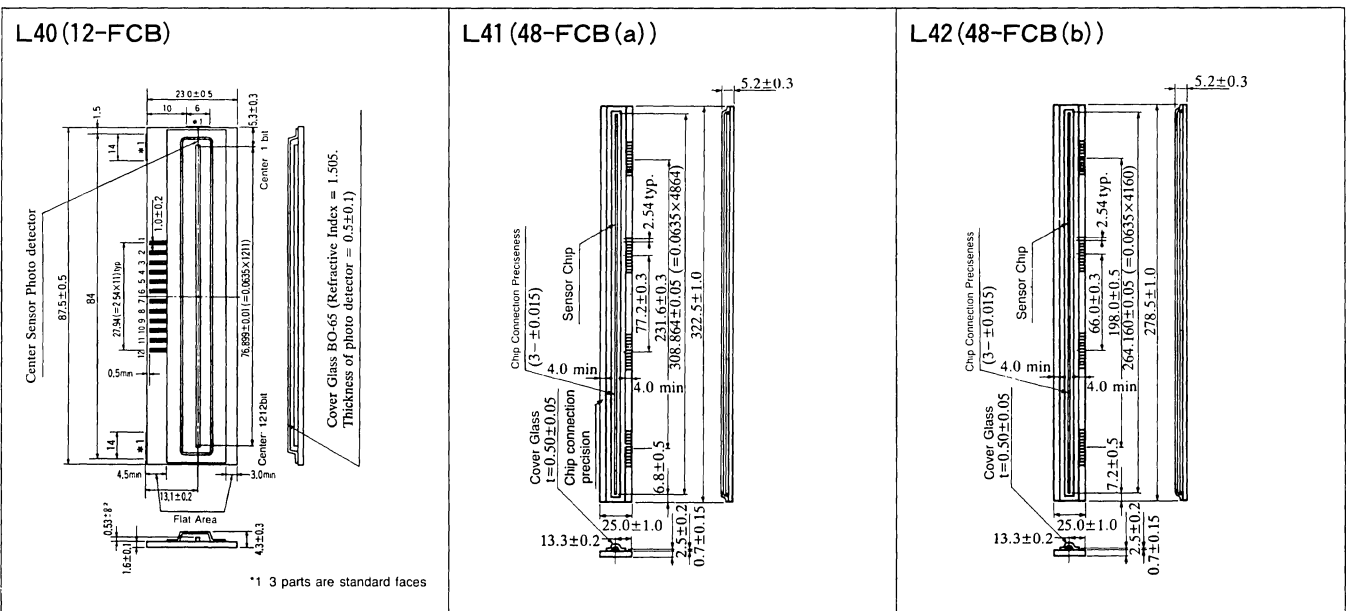
● DIL Packages (continued)

Unit: mm



● Flat Ceramic Board Package (FCB)

Unit: mm



● M Type Package

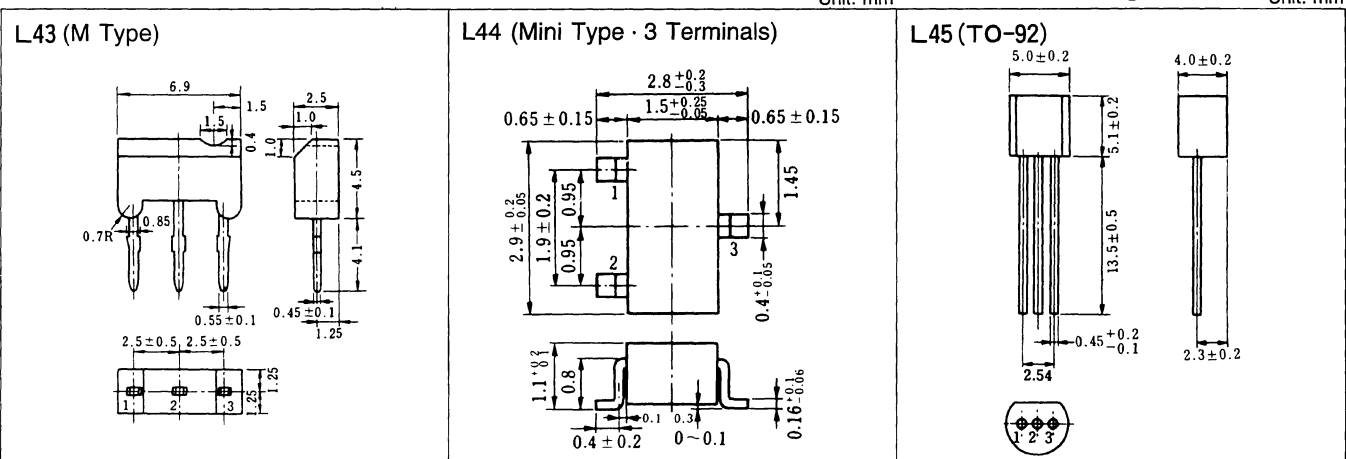
Unit: mm

● Mini Type Package

Unit: mm

● TO-92 Package

Unit: mm

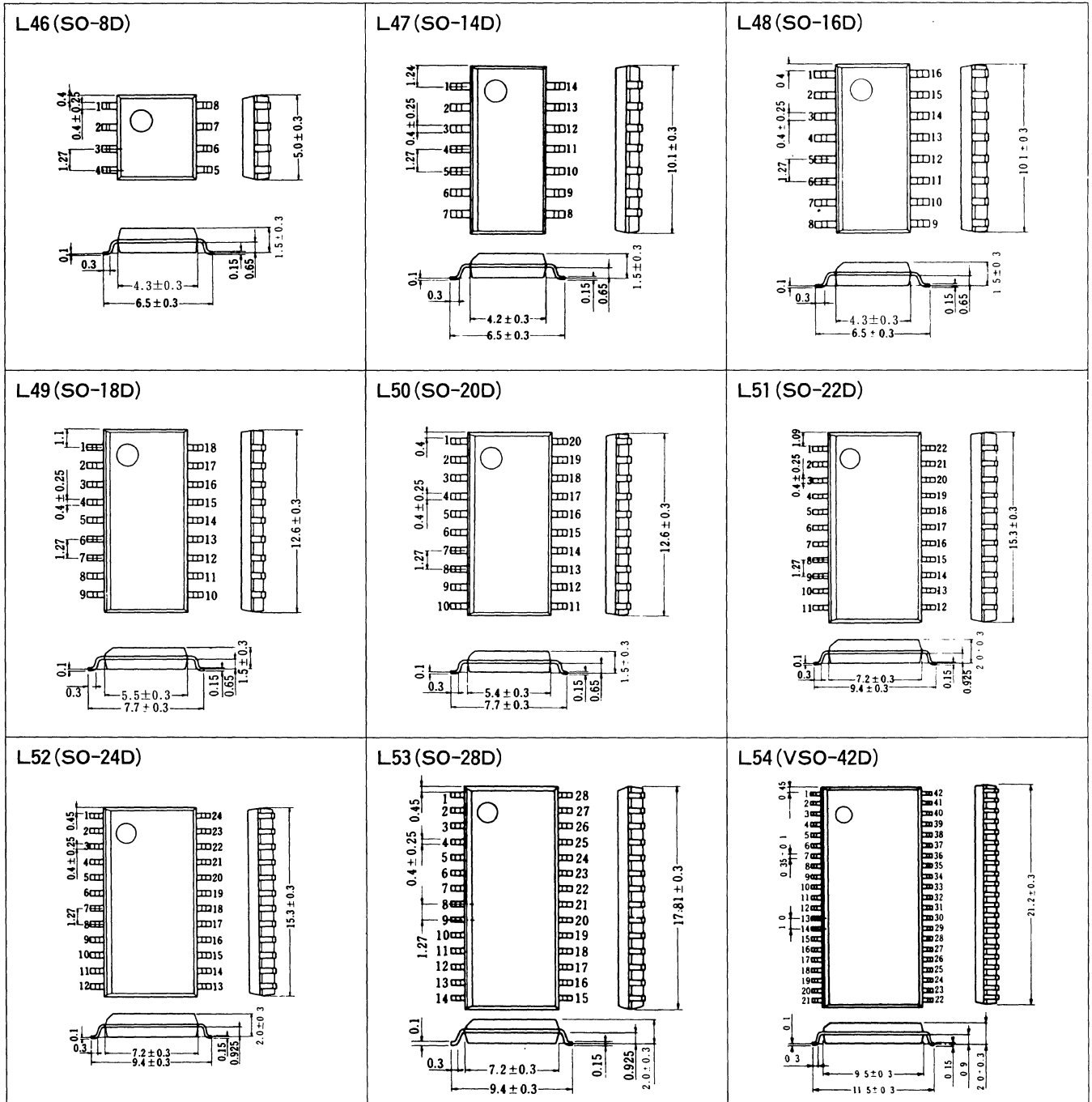


(Package Symbol) DIC=Dual In Line Ceramic Package, FCB=Flat Ceramic Base

Package Outlines (MOS LSIs)

SO Packages

Unit: mm

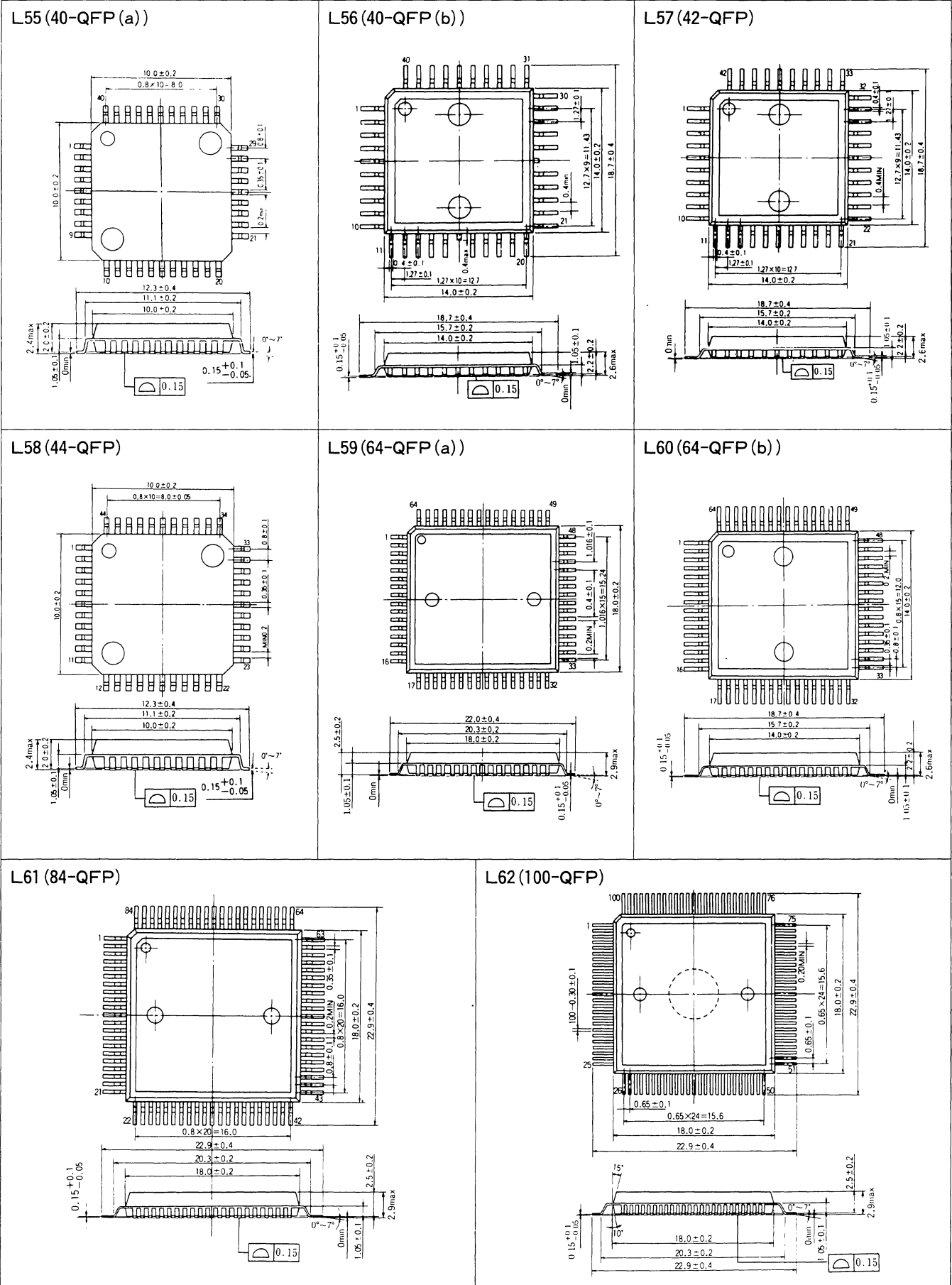


(Package Symbol) SO=Small Type, 8D=8 Lead-Dual-In-Line (Example),
VSO=Very Short Pitch Small Outline Package

Package Outlines (MOS LSIs)

● QFP Packages

Unit: mm



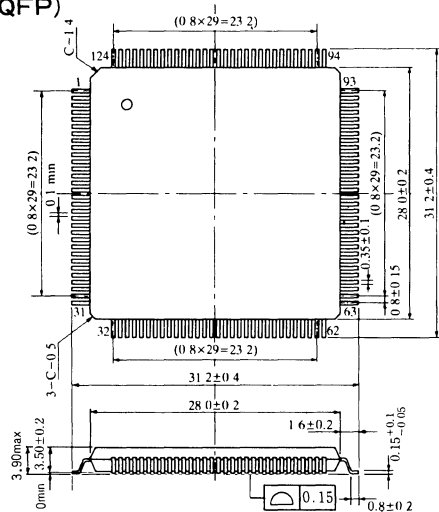
(Package Symbol) QFP=Quad Flat Package

Package Outlines (MOS LSIs)

● QFP Packages (continued)

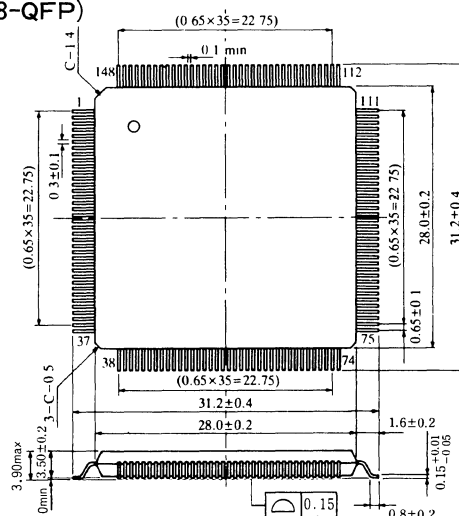
Unit: mm

L63 (124-QFP)



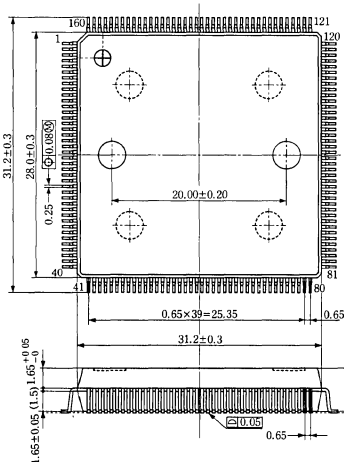
Note) Pin configuration is dissymmetric each other against center line.

L64 (148-QFP)



Note) Pin configuration is dissymmetric each other against center line.

L73 (160-QFP)

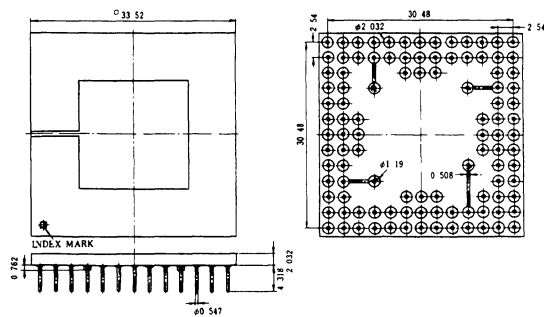


(Package Symbol) QFP=Quad Flat Package

● PGA Package

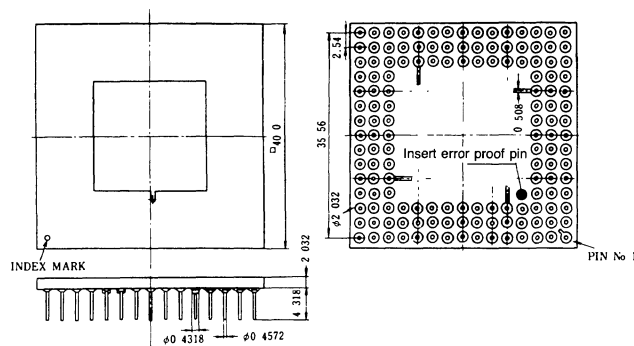
Unit: mm

L65 (100-PGA)



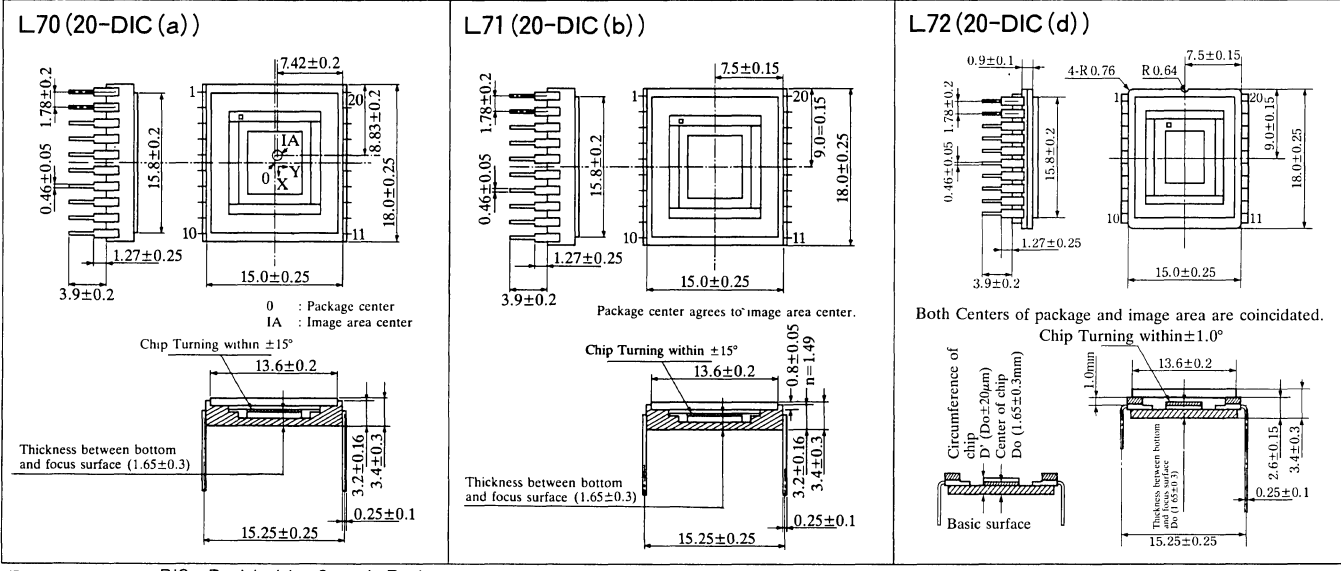
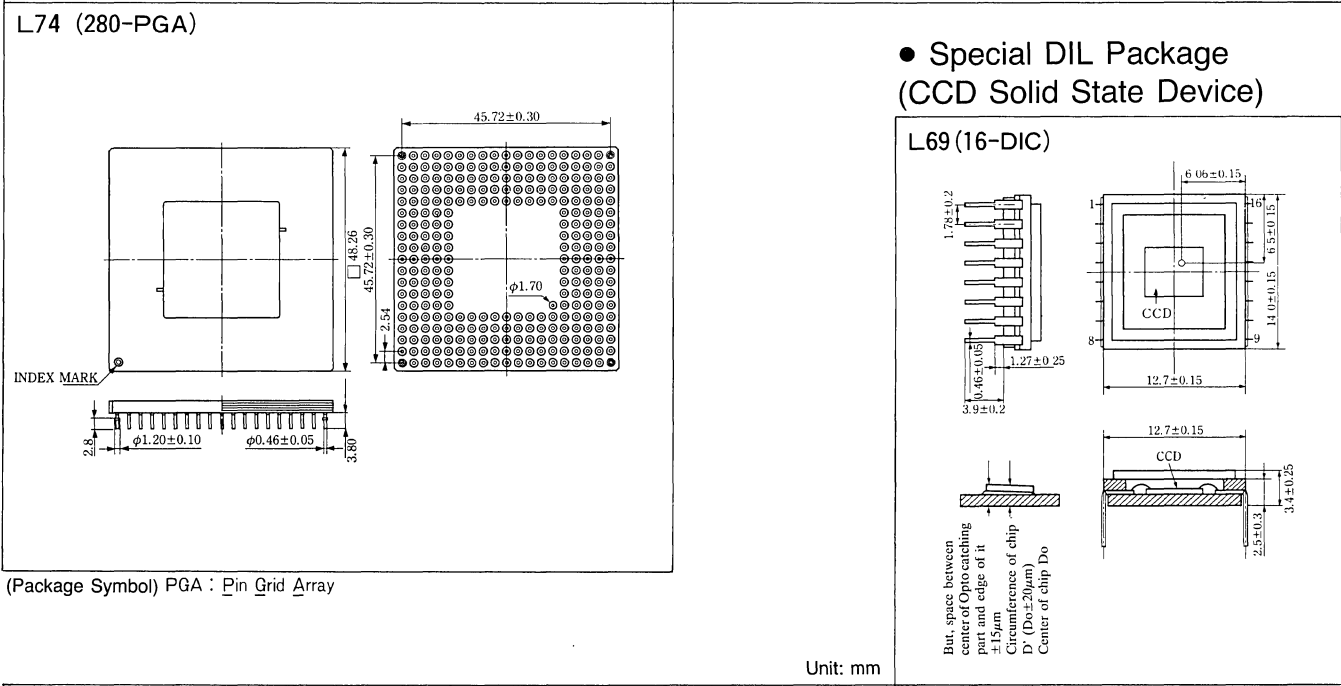
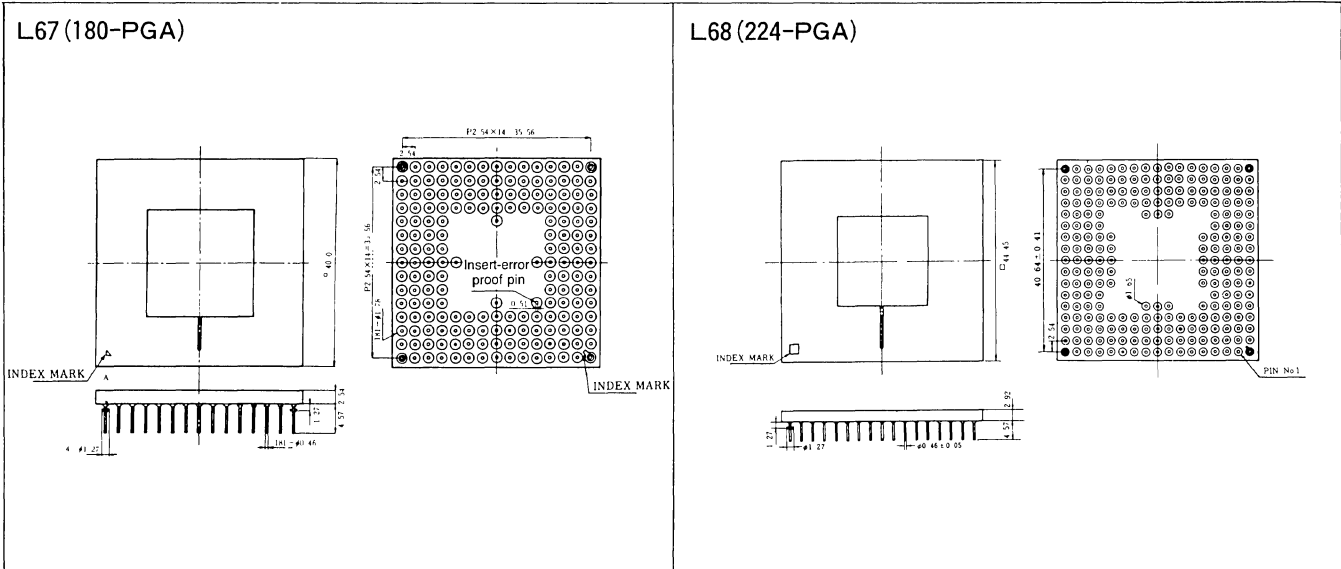
(Package Symbol) PGA=Pin Grid Array

L66 (144-PGA)



Package Outlines (MOS LSIs)

● PGA Package (continued)

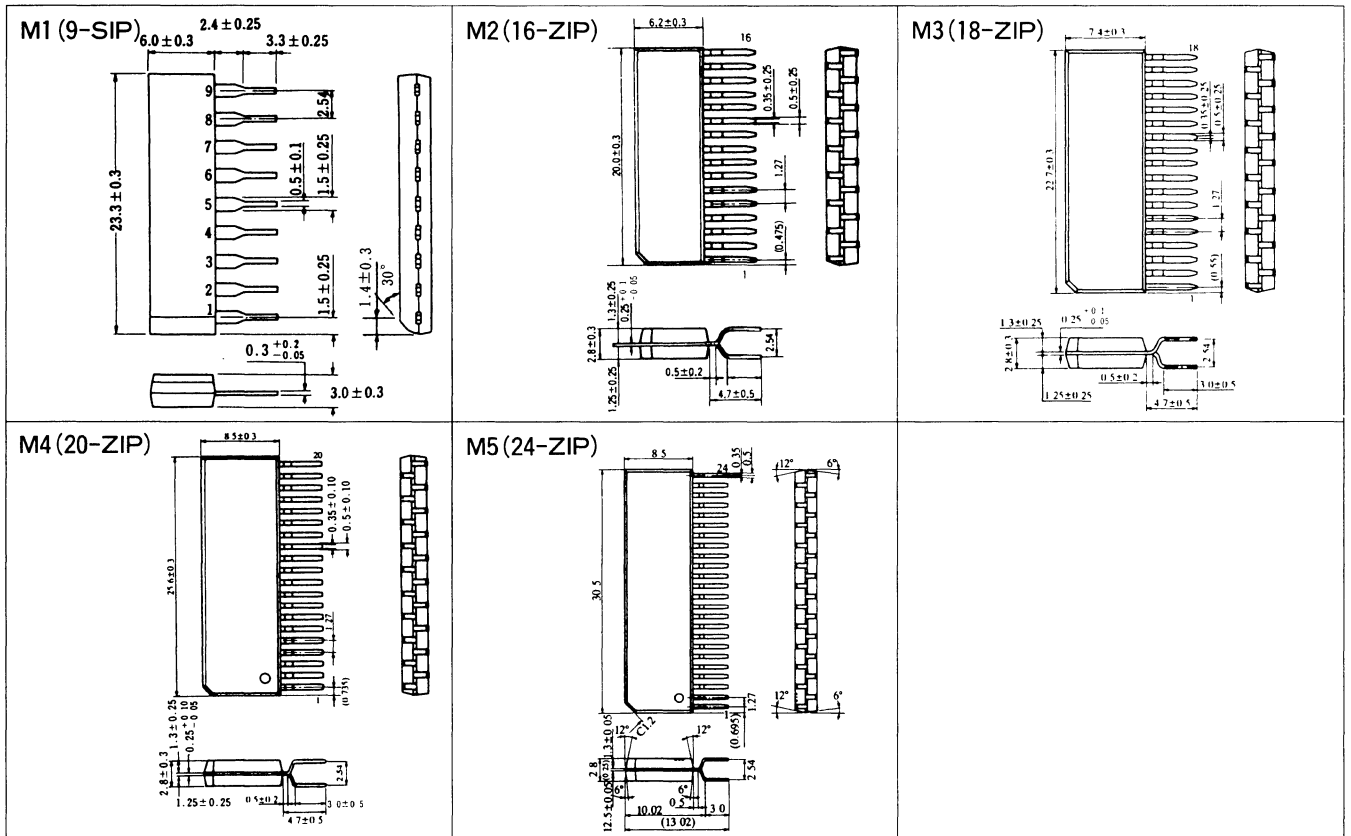


(Package Symbol) DIC = Dual-In-Line Ceramic Package

Package Outlines (MOS Memories)

● SIL Packages

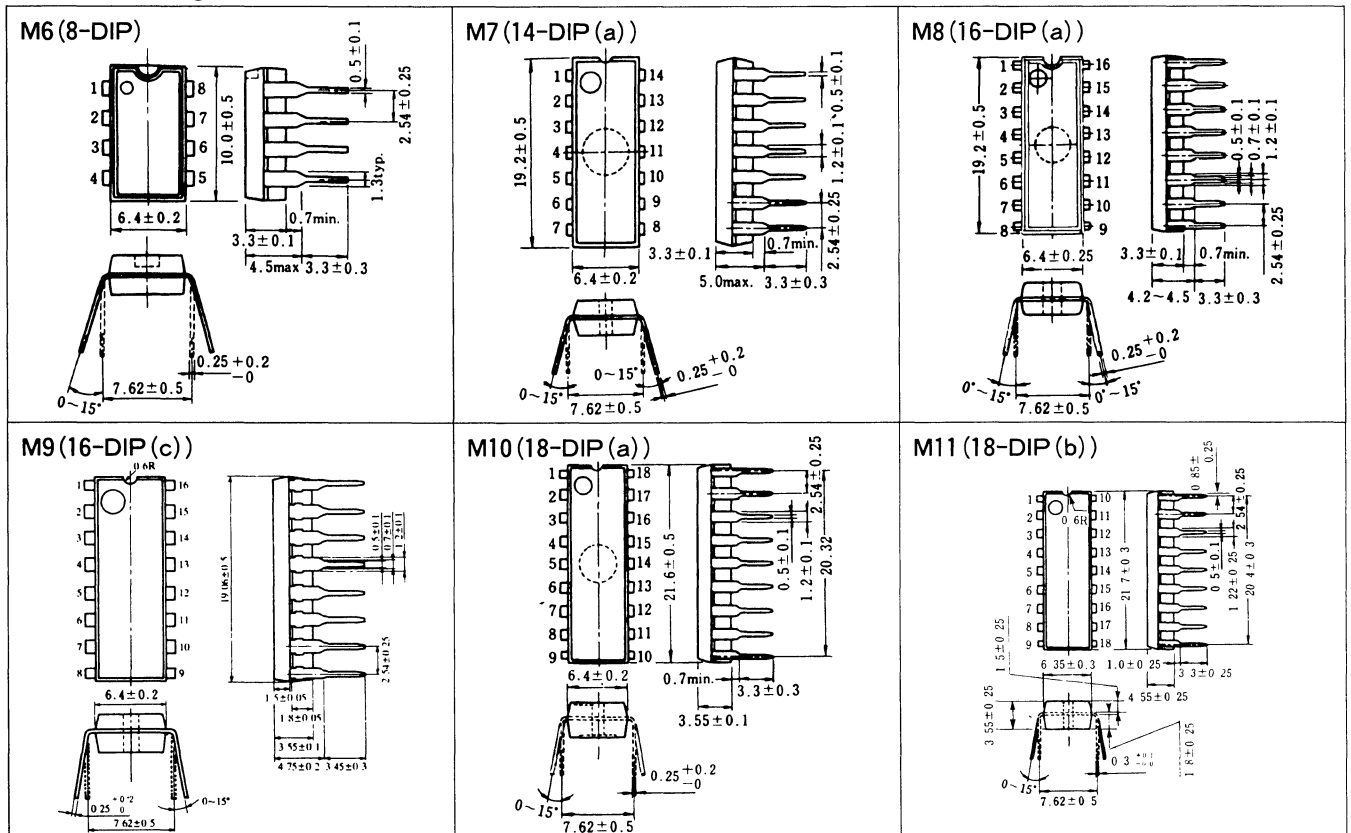
Unit: mm



(Package Symbol) SIP=Single-In-Line Plastic Package, ZIP=Zigzag type Shrunken Single-In-Line Plastic Package

● DIL Packages

Unit: mm

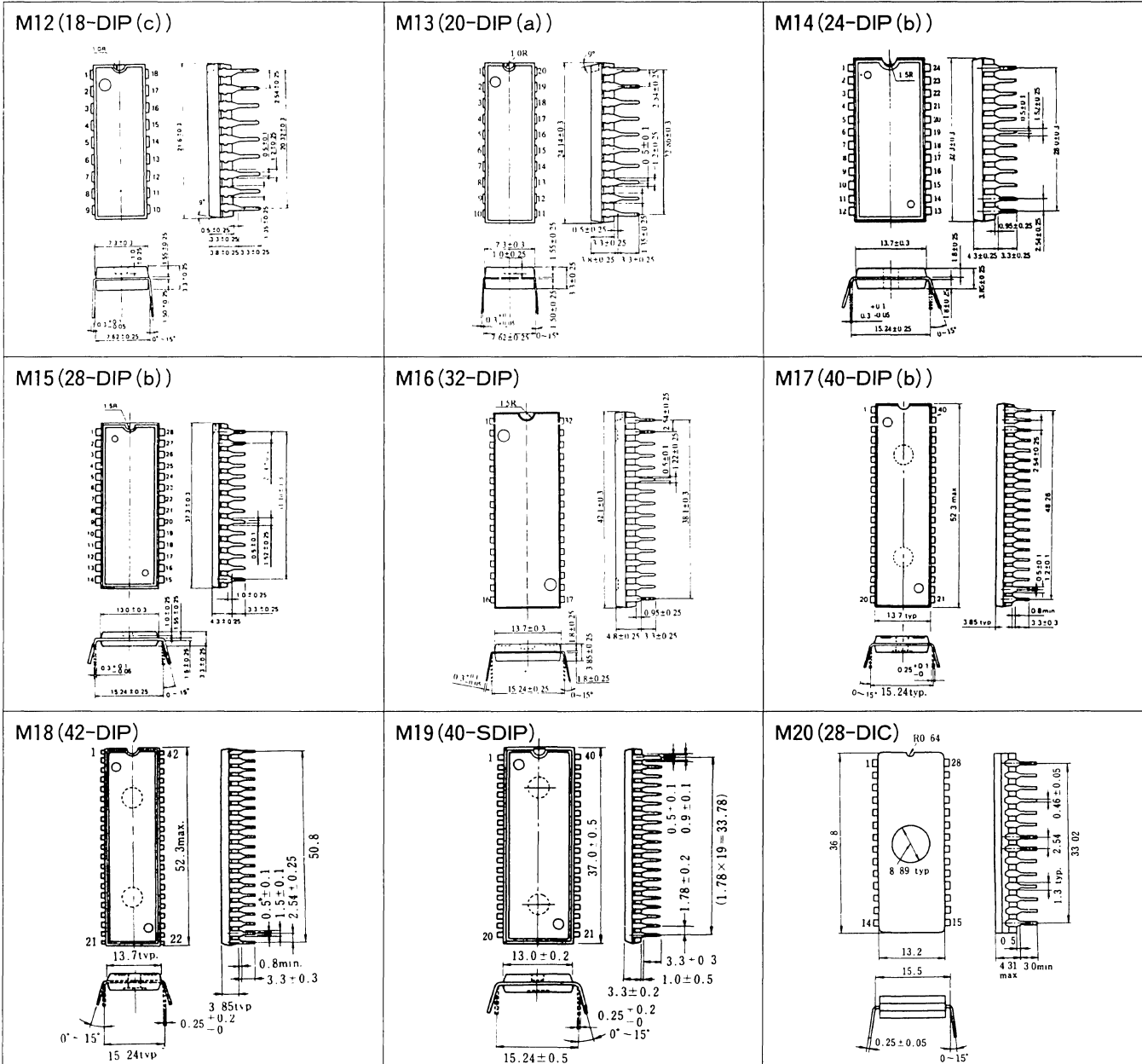


(Package Symbol) DIP=Dual-In-Line Plastic Package

Package Outlines (MOS Memories)

• DIL Packages (continued)

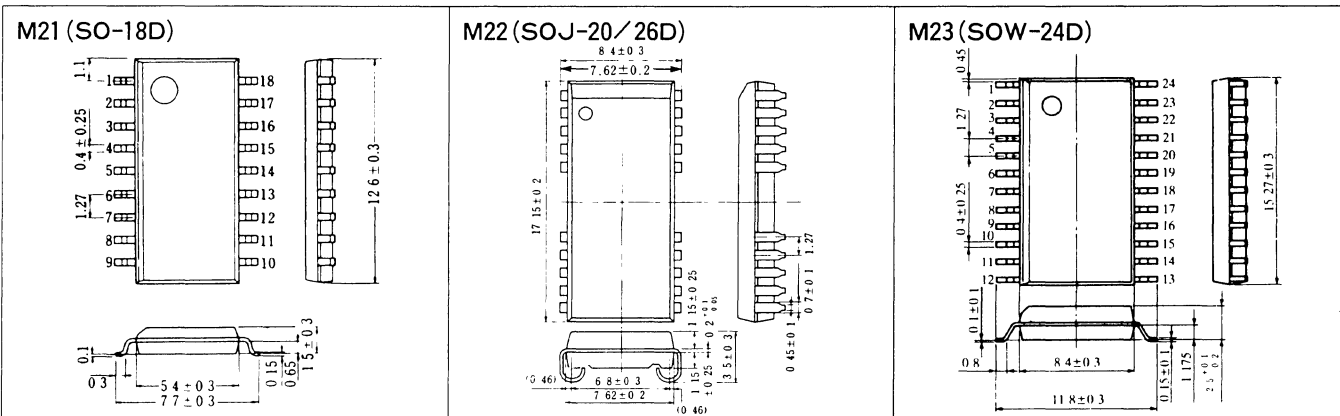
Unit: mm



(Package Symbol) DIP=Dual-In-Line Plastic Package, SDIP=Shrunk Dual-In-Line Plastic Package, DIC=Dual-In-Line Ceramic Package

• SO Package

Unit: mm

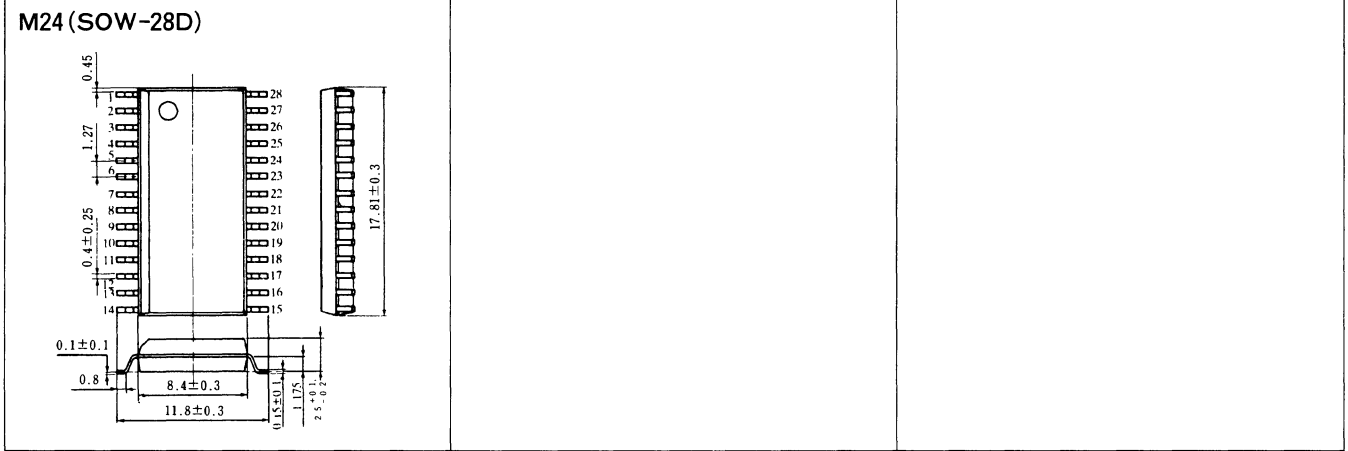


(Package Symbol) SO=Small, 18D=18 Pin Dual-In-Line (Example), SOJ=Small Outline J-Bend Package
SOW=Small Outline Package (Wide type)

Package Outlines (MOS Memories)

SO Package (continued)

Unit: mm



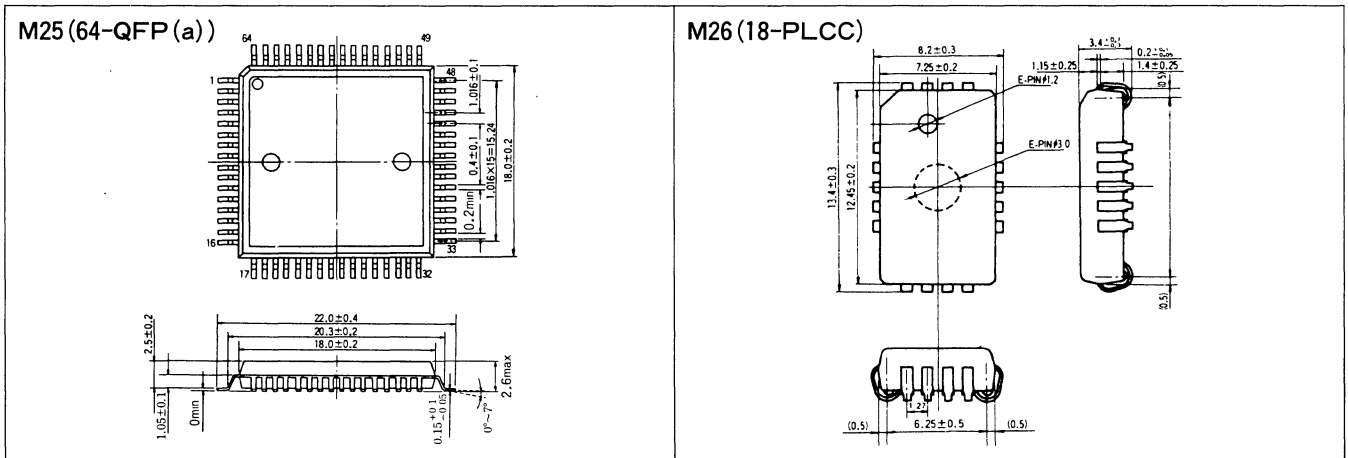
(Package Symbol) SOW=Small Outline Package (Wide type)

QFP Package

Unit: mm

PLCC Package

Unit: mm

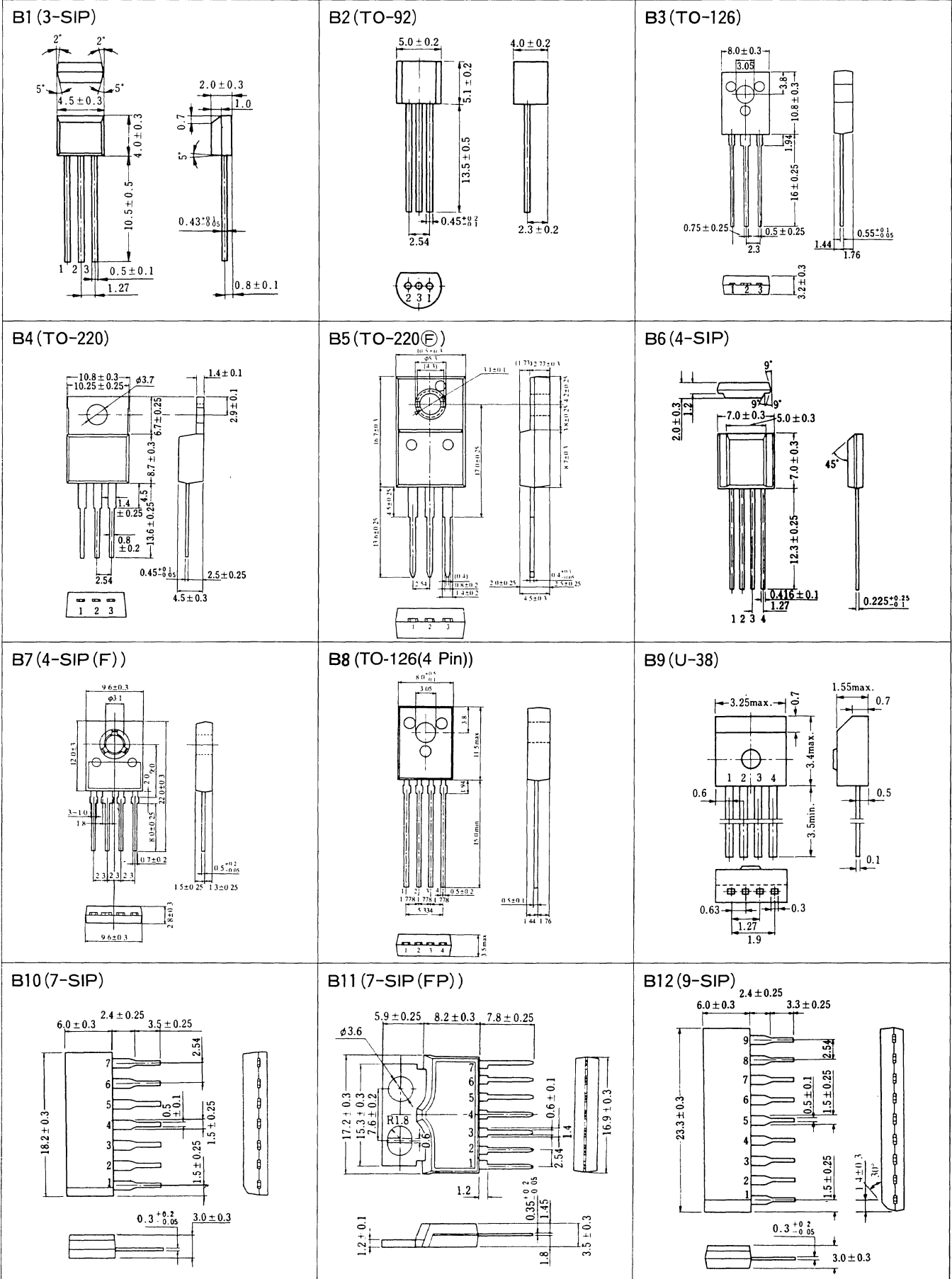


(Package Symbol) QFP=Quad Flat Package, PLCC=Plastic Leaded Chip Carrier

Package Outlines (Bipolar ICs)

• SIL Packages

Unit: mm

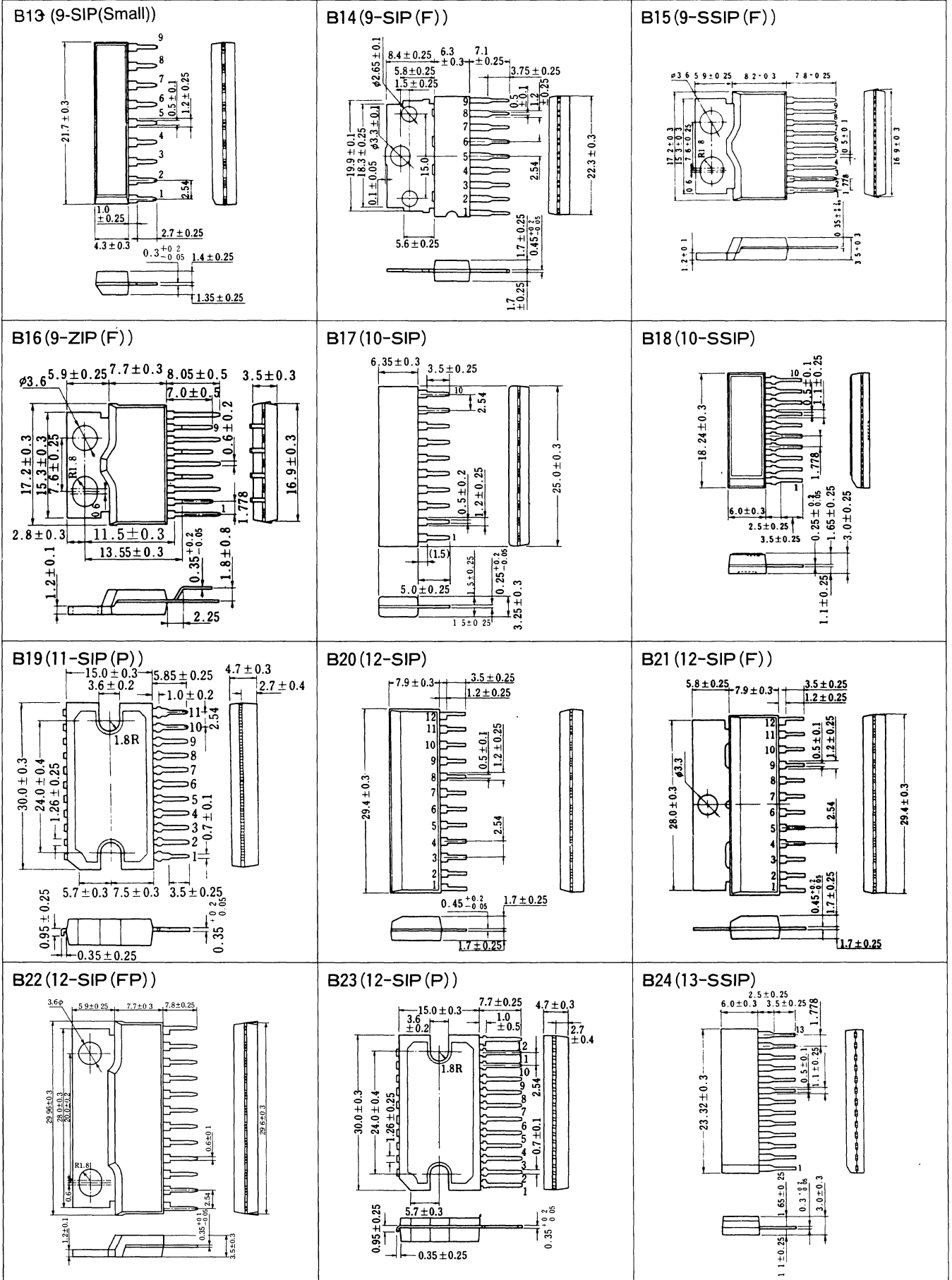


(Package Symbol) SIP=Single-In-Line Plastic Package, TO-220Ⓢ=TO-220 Full Pack Package, (F) = Fin-attached (FP)=Fin-attached Power Type

Package Outlines (Bipolar ICs)

● SIL Packages (continued)

Unit: mm

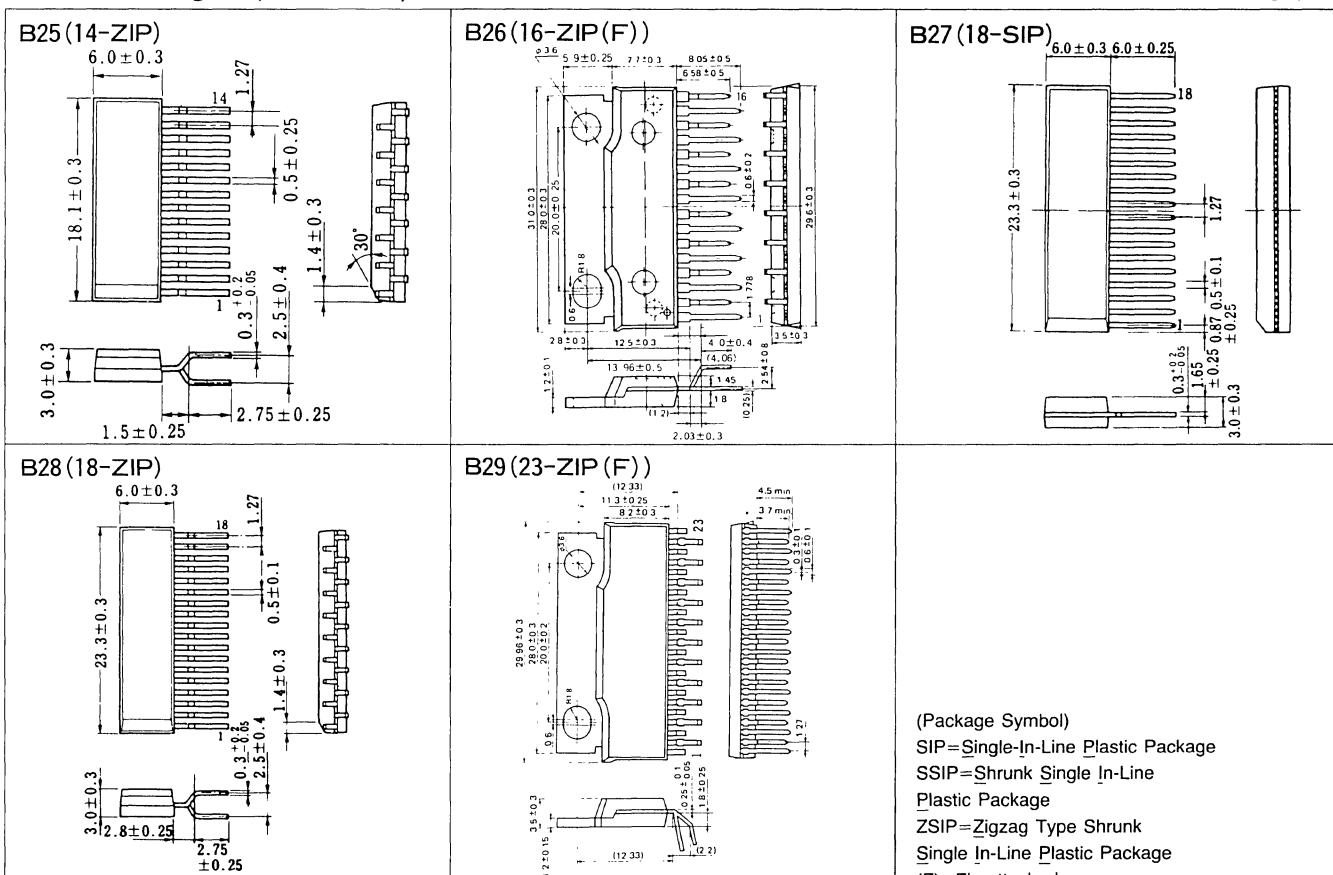


(Package Symbol) SIP=Single-In-Line Plastic Package, SSIP=Shrunk Single-In-Line Plastic Package
 ZSIP=Zigzag Type Shrunk Single-In-Line Plastic Package, (F)=Fin-attached, (P)=Power Type, (FP)=Fin-attached Power Type

Package Outlines (Bipolar ICs)

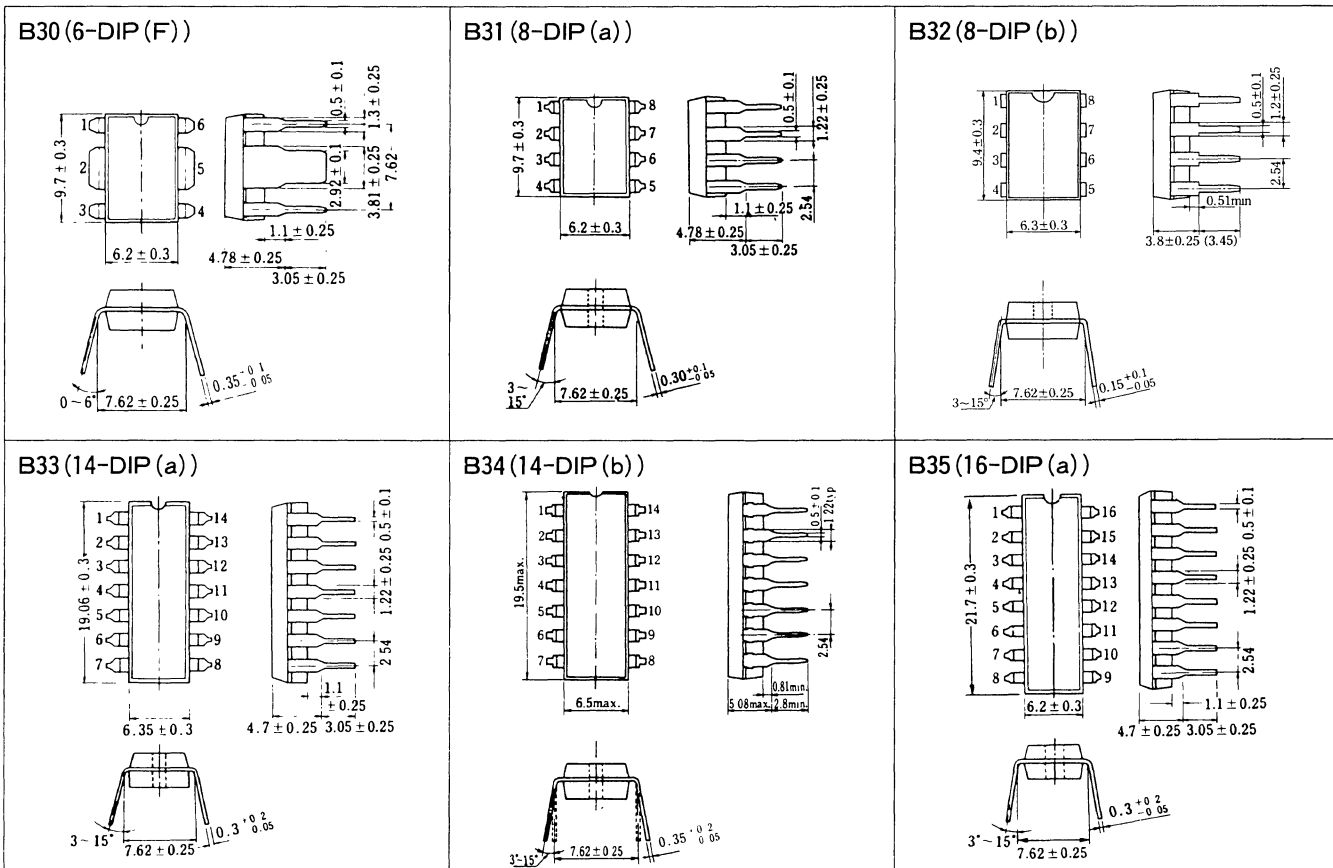
● SIL Packages (continued)

Unit: mm



● DIL Packages

Unit: mm



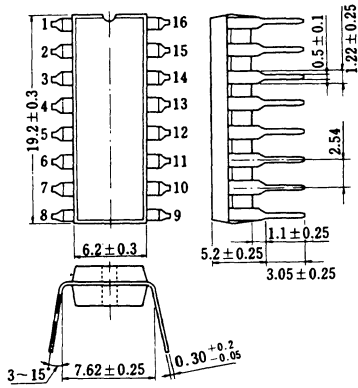
(Package Symbol) DIP=Dual-In-Line Plastic Package, (F)=Fin-attached

Package Outlines (Bipolar ICs)

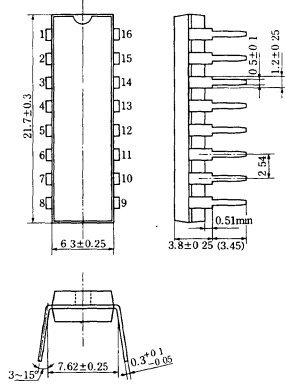
• DIL Packages (continued)

Unit: mm

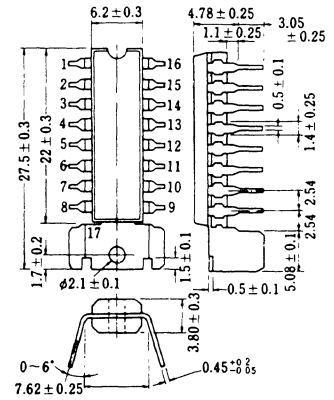
B36 (16-DIP (b))



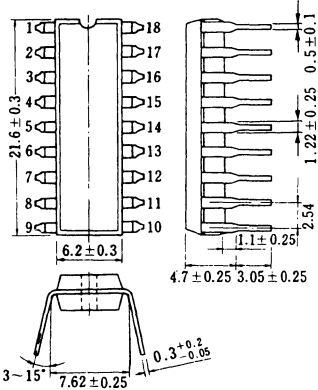
B37 (16-DIP (C))



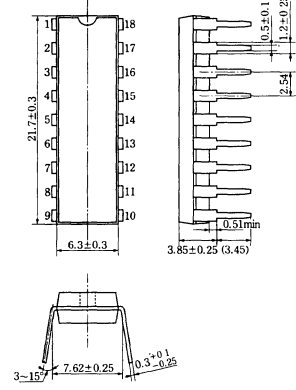
B38 (16-DIP (F))



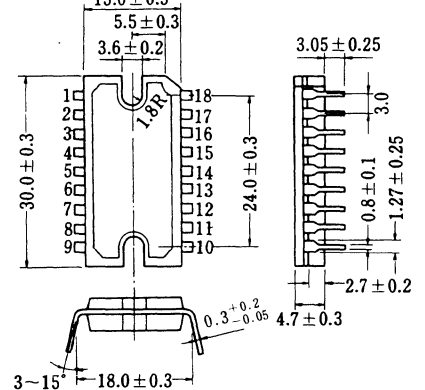
B39 (18-DIP (a))



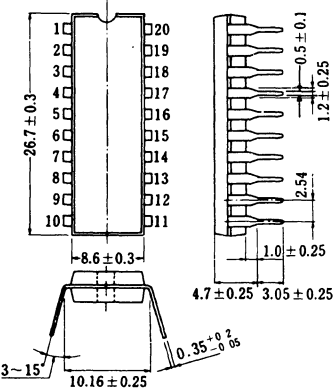
B40 (18-DIP (b))



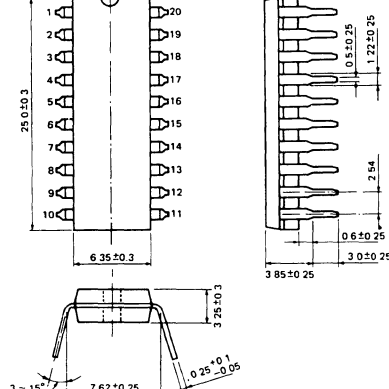
B41 (18-DIP (P))



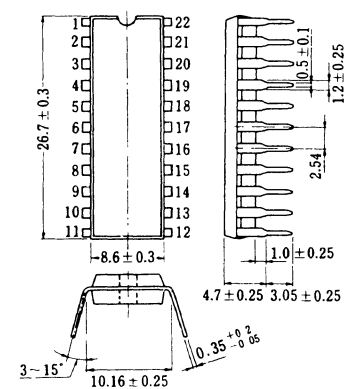
B42 (20-DIP (a))



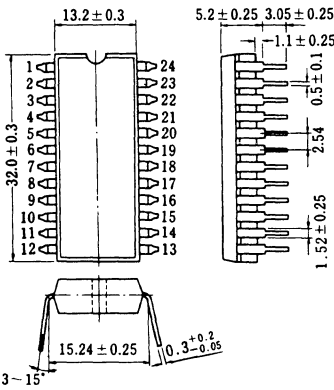
B43 (20-DIP (b))



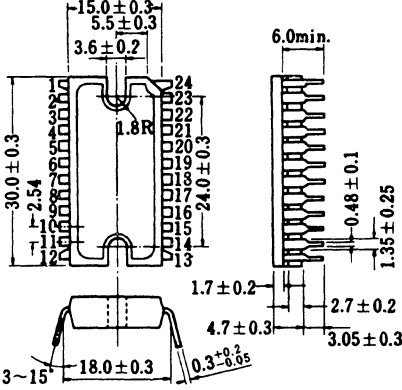
B44 (22-DIP)



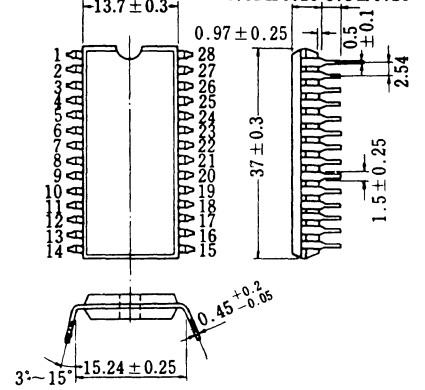
B45 (24-DIP)



B46 (24-DIP (P))



B47 (28-DIP)

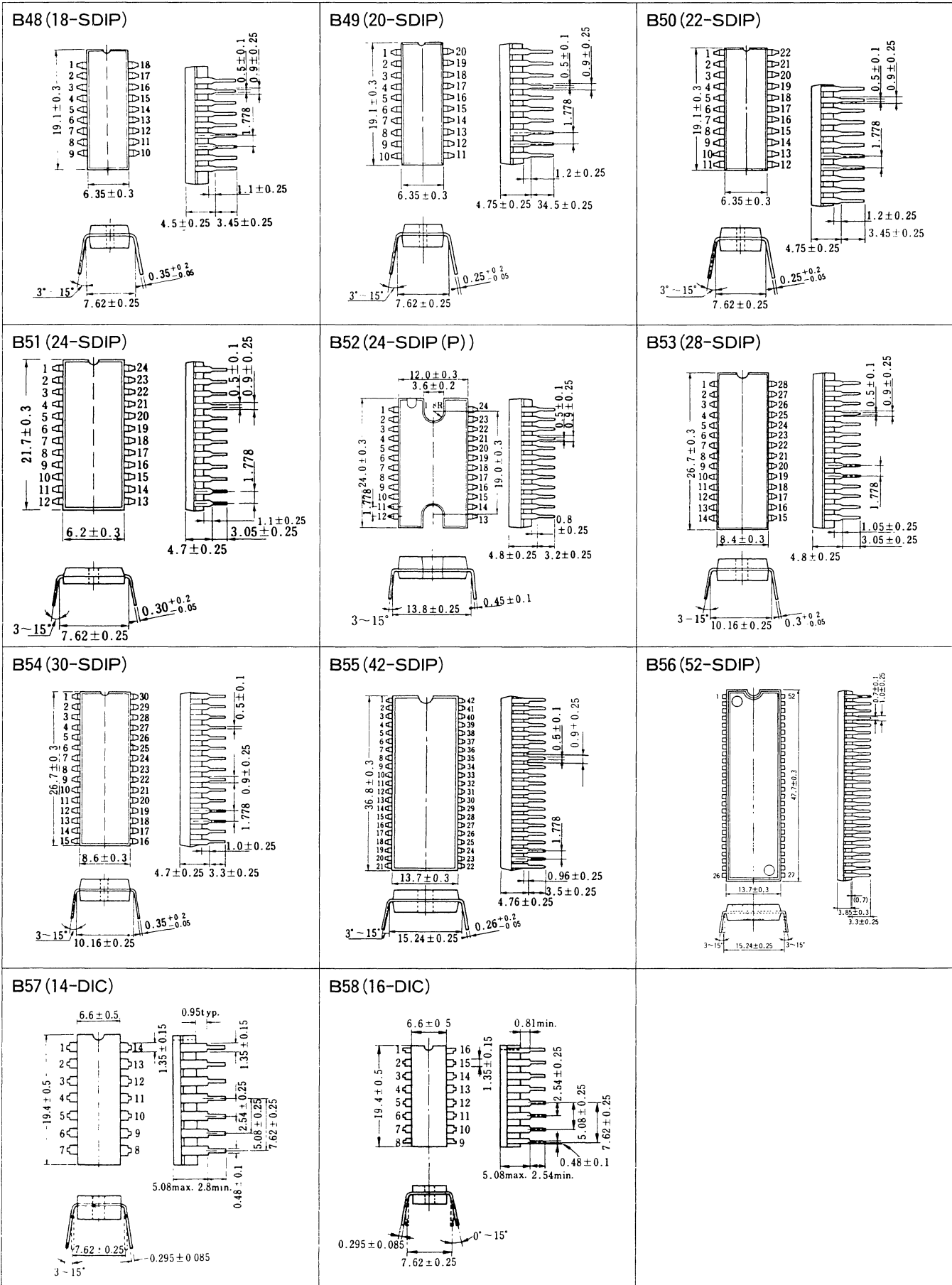


(Package Symbol) DIP=Dual-In-Line Plastic Package, SDIP=Shrunk Dual-In-Line Plastic Package
(F)=Fin-attached, (P)=Power Type

Package Outlines (Bipolar ICs)

● DIL Packages (continued)

Unit: mm



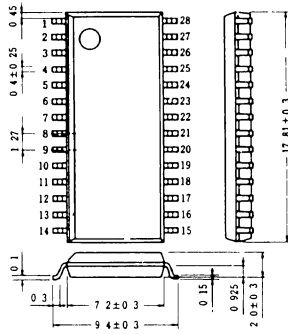
(Package Symbol) DIP=Dual-In-Line Plastic Package, SDIP=Shrunk Dual-In-Line Plastic Package (F)=Fin-attached, (P)=Power Type

Package Outlines (Bipolar ICs)

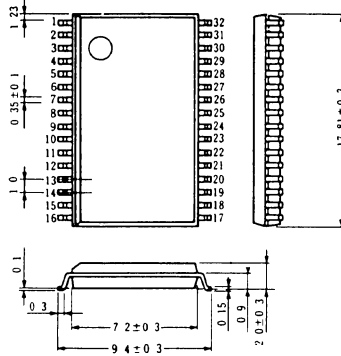
● SO Package (continued)

Unit: mm

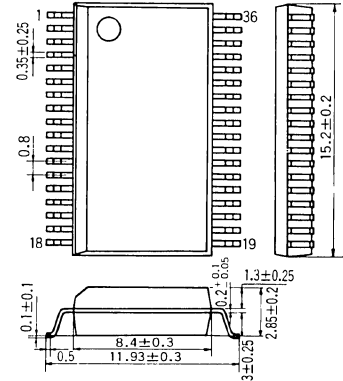
B71 (SO-28D)



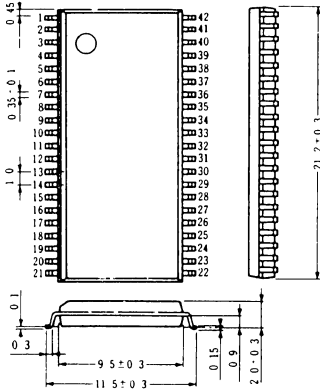
B72 (VSO-32D)



B73 (USONF-36D)



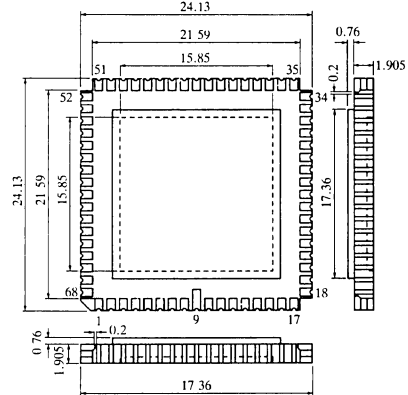
B74 (VSO-42D)



● Flat Package (chip carrier)

Unit: mm

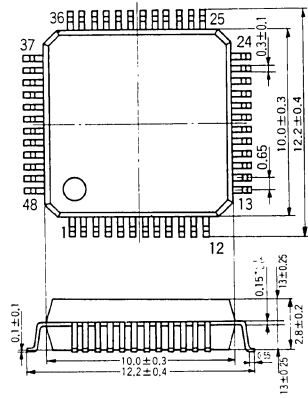
B75 (68-LCC)



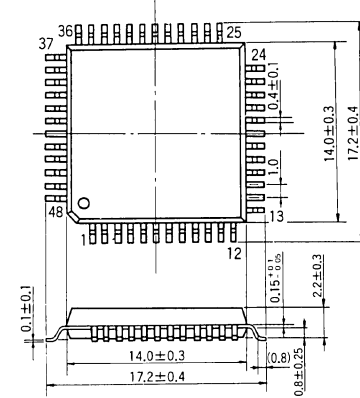
● Flat Package

Unit: mm

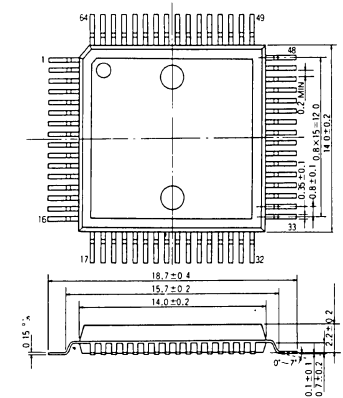
B76 (48-QFP (a))



B77 (48-QFP (b))



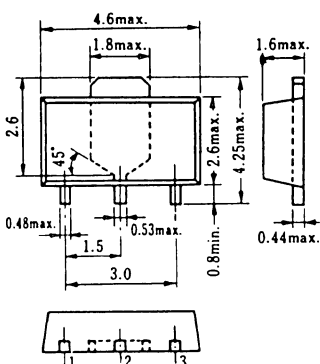
B78 (64-QFP)



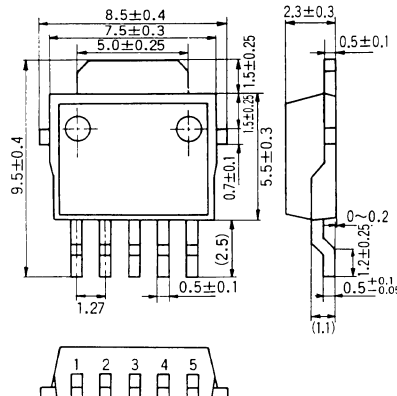
● TO-243 · SP-5S

Unit: mm

B79 (TO-243)



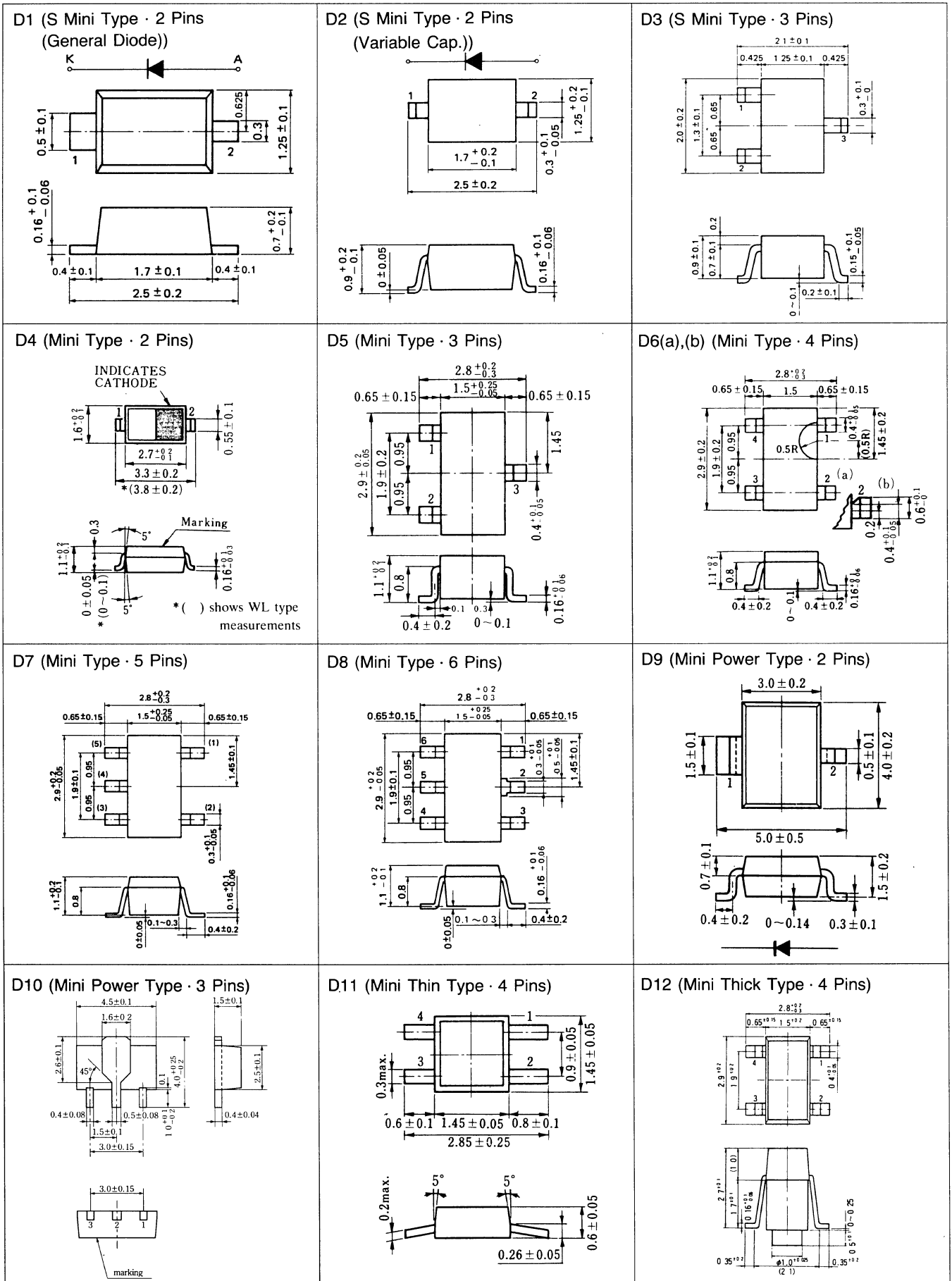
B80 (SP-5S)



(Package Symbol)
 SO=Mini, VSO=Ultra Mini,
 10D=10 Pin Dual-In-Line (Example)
 USONF=Ultra-Small Outline Non-Fin
 LCC=Leadless Chip Carrier
 QFP=Quad Flat Package
 5S=5-Pin Single-In-Line (Example)

Package Outlines (Discrete Semiconductors)

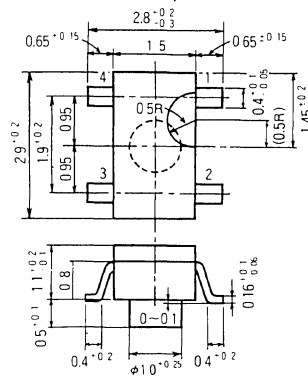
Unit: mm



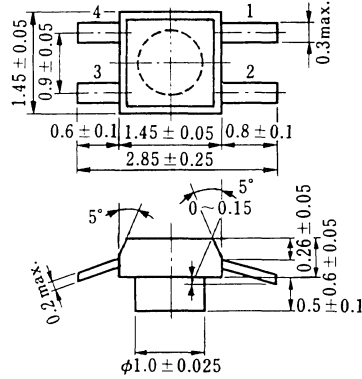
Package Outlines (Discrete Semiconductors)

Unit: mm

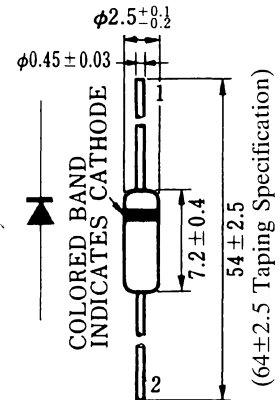
D13 (Mini Type · 4 Pins with convex surface)



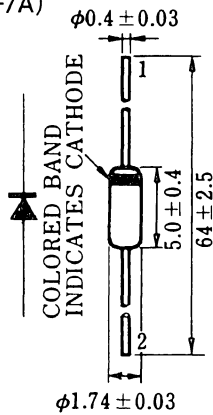
D14 (Mini Thin Type · 4 Pins with convex surface)



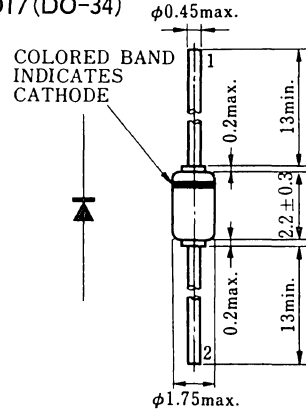
D15 (DO-7)



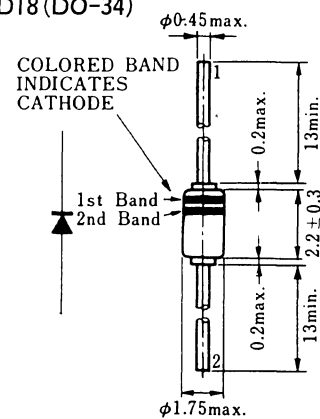
D16 (DO-7A)



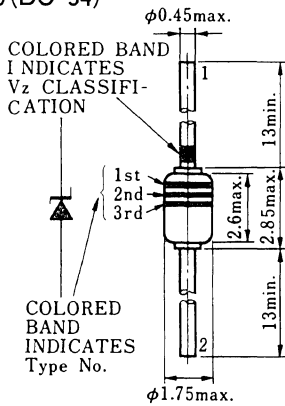
D17 (DO-34)



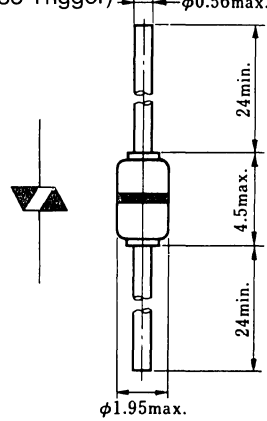
D18 (DO-34)



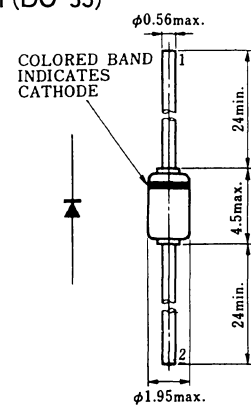
D19 (DO-34)



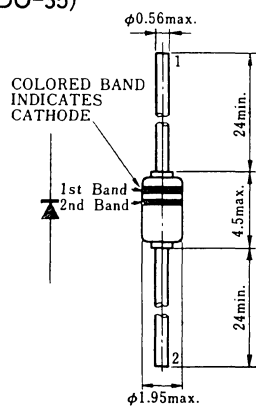
D20 (DO-35-Trigger)



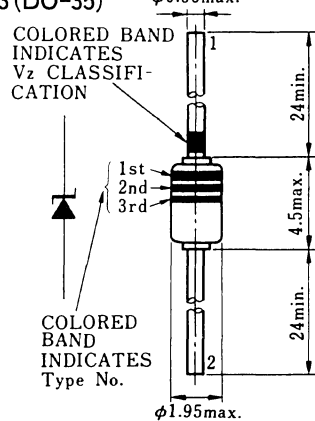
D21 (DO-35)



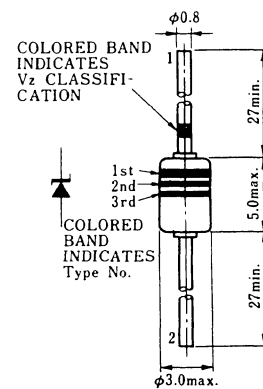
D22 (DO-35)



D23 (DO-35)

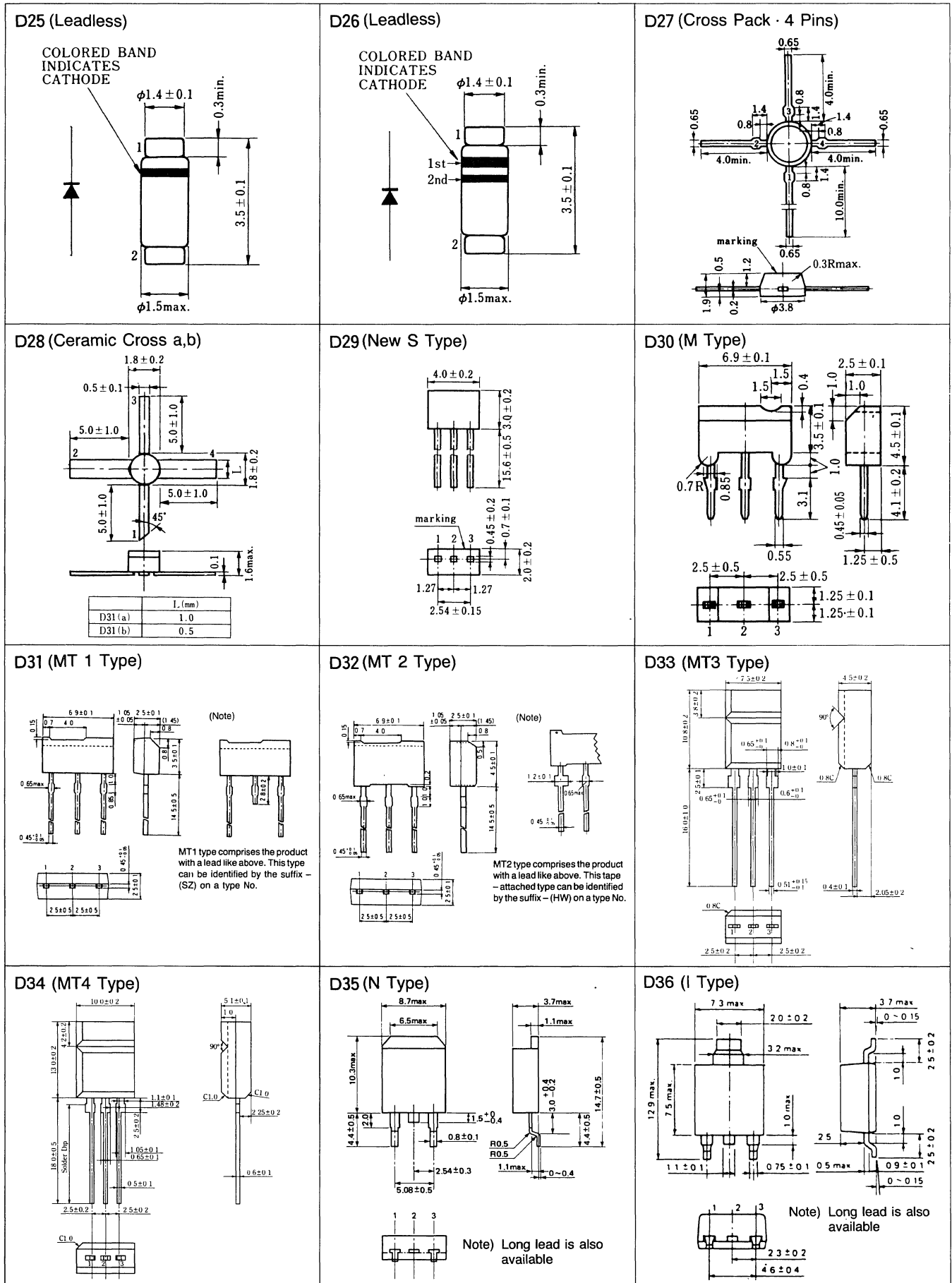


D24 (DO-41)



Package Outlines (Discrete Semiconductors)

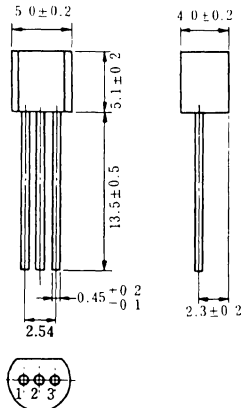
Unit: mm



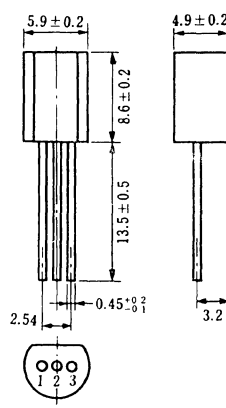
Package Outlines (Discrete Semiconductors)

Unit: mm

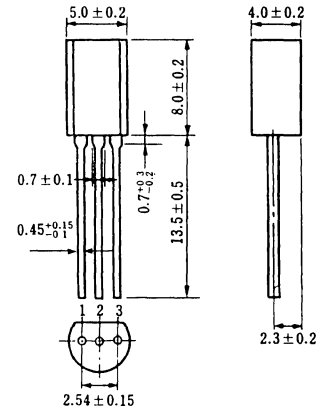
D37 (TO-92)



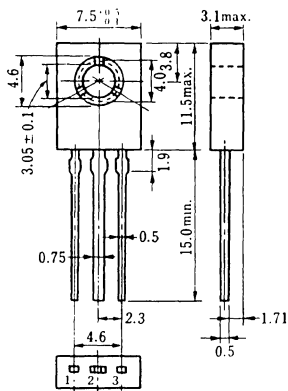
D38 (TO-92L)



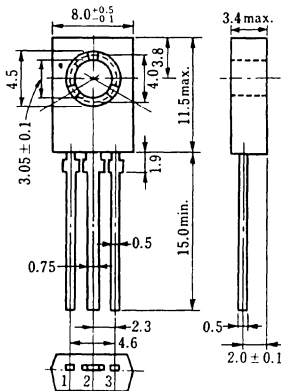
D39 (TO-92NL)



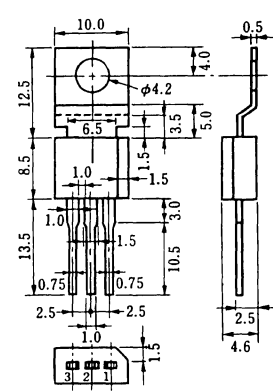
D40 (TO-126 (a))



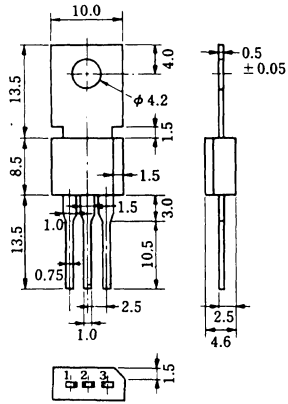
D41 (TO-126 (b))



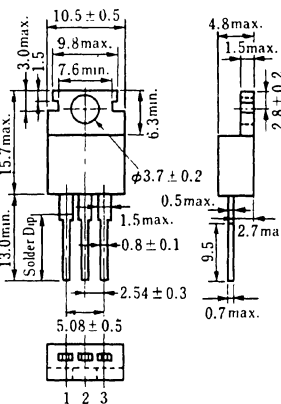
D42 (TO-202)



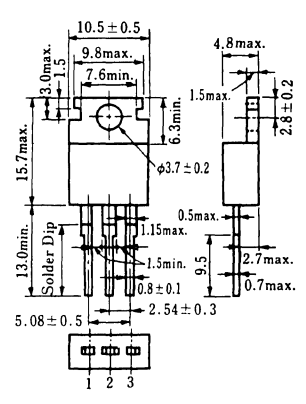
D43 (TO-202AA)



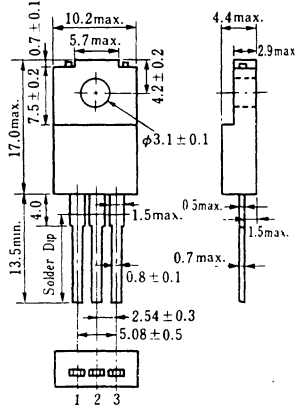
D44 (TO-220 (a))



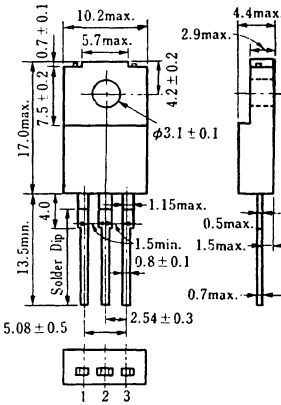
D45 (TO-220 (b))



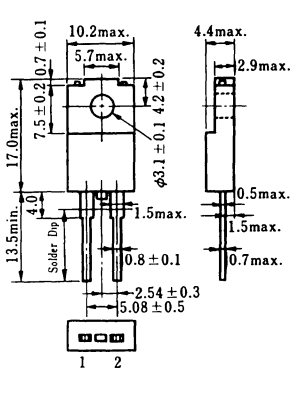
D46 (TO-220F (a))



D47 (TO-220F (b))



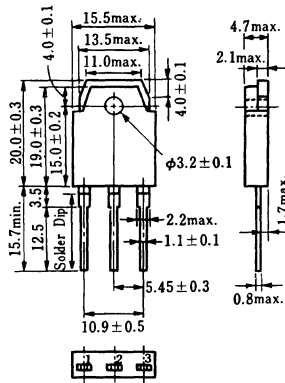
D48 (TO-220F (c))



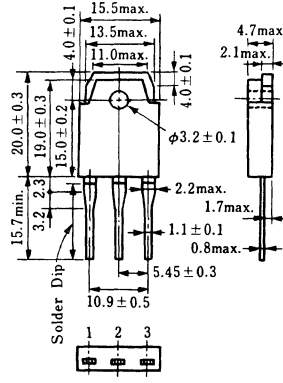
Package Outlines (Discrete Semiconductors)

Unit: mm

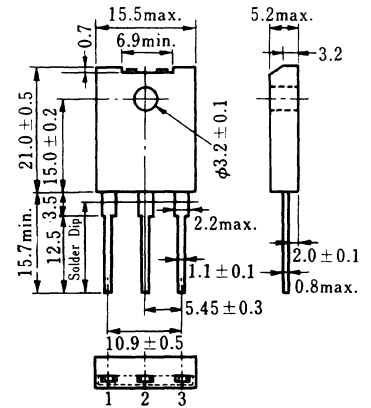
D49 (TOP-3 (a))



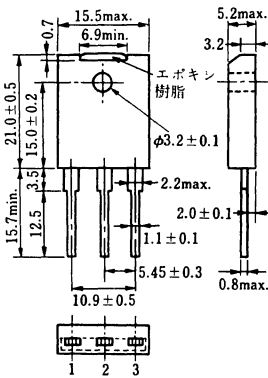
D50 (TOP-3 (b))



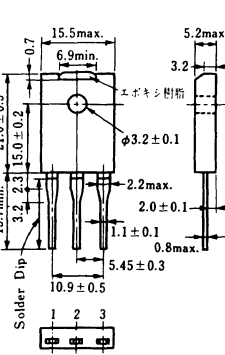
D51 (TOP-3F (a))



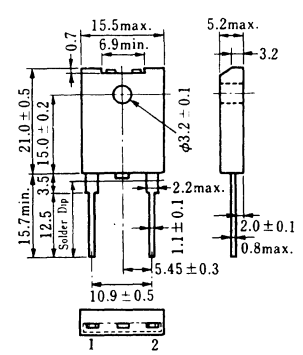
D52 (TOP-3F (c))



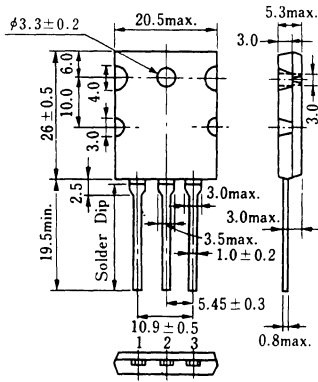
D53 (TOP-3F (d))



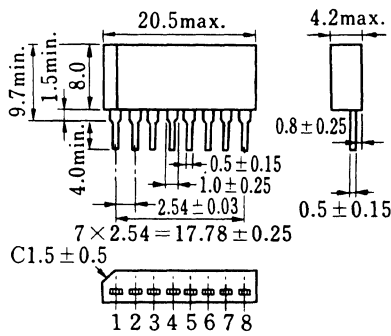
D54 (TOP-3F (e))



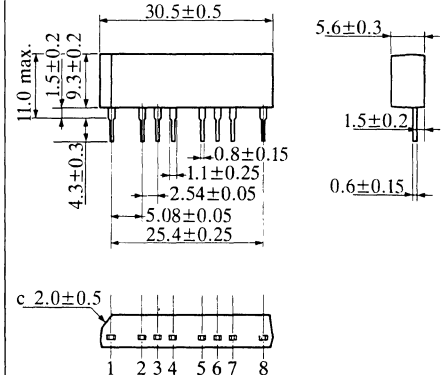
D57 (TOP-3L)



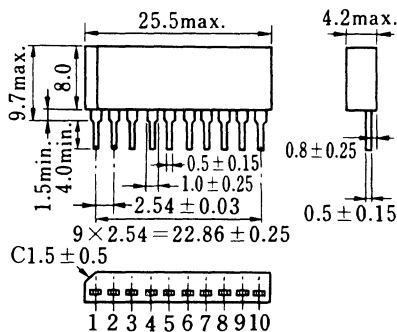
D58 (SIL-8)



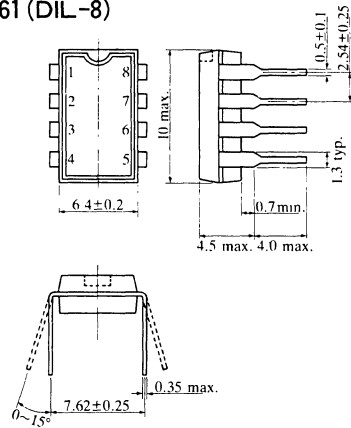
D59 (SIL-8 (Special))



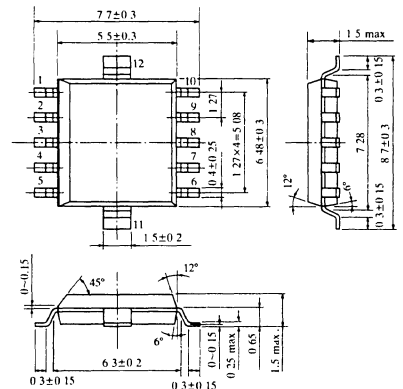
D60 (SIL-10)



D61 (DIL-8)



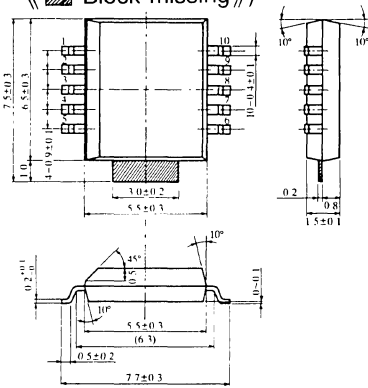
D62 (SO-10A)



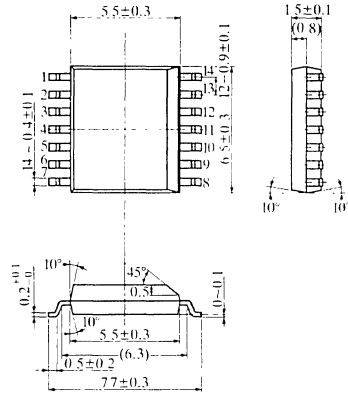
Package Outlines (Discrete Semiconductors)

Unit: mm

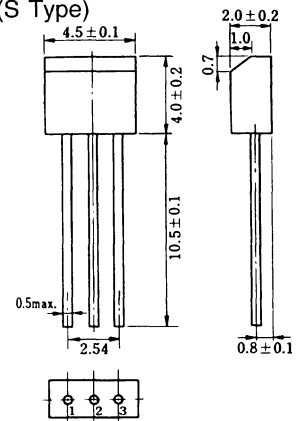
D63 ((a)SO-10B,(b)SO-10C
 《 Block missing 》)



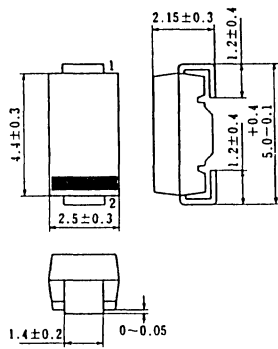
D64 (SO-14)



D66 (S Type)



D67 (New Mini Power Type · 2 Pins)



Maintenance/Discontinued Types

Maintenance Types

■ Maintenance-only Products

● MOS LSIs

Type No.	Alternative Product	Type No.	Alternative Product	Type No.	Alternative Product	Type No.	Alternative Product	Type No.	Alternative Product
MN115P	—	MN1976	—	MN6179/S	—	MN15845	—	MN41C1002SJ-10	—
MN116P	—	MN2114-2	—	MN6188	—	MN15881	—	MN41C1000SJ-10	—
MN512K	—	MN2114-3	—	MN6270	—	MN17861	MN178611	MN42C1000SJ-10	—
MN1204E	—	MN2114-4	—	MN6401	—	MN18781	—		
MN1205A	—	MN2114S-3	—	MN6410	—	MN18882	—	● MN50000 Series	
MN1205D	—	MN2332	—	MN6560	—	MN23128	—	MN50003	—
MN1205K	—	MN2364	—	MN6561	—	MN23256	—	MN50007	—
MN1206A	—	MN3001	—	MN8023A	—	MN23257	—	MN50010	—
MN1213	—	MN3002	—	MN8025	—	MN23258	—	MN50015	—
MN1214A	—	MN3551A	—	MN8027	MN3651D	MN41256A-10	—	MN50020	—
MN1215P	—	MN3659B4	—	MN8041S	—	MN41256A-12	—	MN50030	—
MN1215Q	—	MN3643	MN3643D	MN8051	MN3651D	MN41256AJ-10	—	MN50040	—
MN1215R	—	MN3651	MN3651D	MN8051A	MN3643D	MN41256AJ-12	—		
MN1215S	—	MN3654A6	—	MN8061A	MN3661	MN41256AL-10	—	● MN52000 Series	
MN1215T	—	MN3655A4	—	MN80C48	—	MN41256AL-12	—	MN52020	—
MN1219S	—	MN3658B4	—	MN80C49	—	MN41257A-10	—	MN52040	—
MN12C20	—	MN3731F	—	MN8090	MN3643D	MN41257A-12	—	MN52060	—
MN12C25C	—	MN3731SK	MN3731AC	MN8091	—	MN41257AJ-10	—	MN52080	—
MN12C35	—	MN3735SK	MN3735AC	MN8201SW	—	MN41257AJ-12	—	MN52100	—
MN1237A	—	MN3741F	—	MN8210W	—	MN41257AL-10	—		
MN1237AD	—	MN3741SK	MN3741AC	MN12871	—	MN41257AL-12	—	● MN72000 Series	
MN1250B	—	MN3745SK	MN3745AC	MN14021	—	MN41464A-10	—	MN146802	—
MN1252A	—	MN4164P-12A	—	MN14142	—	MN41464A-12	—	MN152611	—
MN1252B	—	MN4164P-15A	—	MN14143	—	MN41464AJ-10	—	MN157451	MN157451A
MN1254	—	MN4264-12	—	MN14531	—	MN41464AJ-12	—	MN158241	—
MN1255	—	MN4264-15	—	MN14532	—	MN41464AL-10	—	MN158321	—
MN1257C	—	MN4364-15	—	MN14821	—	MN41464AL-12	—	MN158452	—
MN1267A	—	MN4416-12	—	MN14822	—	MN41464AZ-10	—	MN158471	—
MN1275	—	MN4416-15	—	MN14823	—	MN41464AZ-12	—	MN187163	—
MN1277B	—	MN4416S-12	—	MN14824	—	MN41464AS-08	—	MN271000	—
MN1287	—	MN4416S-15	—	MN14826	—	MN41464AS-10	—	MN414256-10	—
MN1400	—	MN4864	—	MN14831	—	MN41464AS-12	—	MN414256-12	—
MN1402	—	MN6004	—	MN14832	—	MN44256-10	—	MN414256L-10	—
MN1403	—	MN6005	—	MN14833	—	MN44256S-10	—	MN414256L-12	—
MN1405	—	MN6021	—	MN14834	—	MN231000	—	MN414256SJ-10	—
MN1411	—	MN6031	—	MN14841	—	MN231000-CK1-CK6	—	MN414256SJ-12	—
MN1413	—	MN6032	—	MN15223	—	MN231000-RK1-RK6	—	MN41C4256-10	—
MN1414	—	MN6040	—	MN15245	—	MN411000-10	—	MN41C4256L-10	—
MN1415	—	MN6040Z	—	MN15261	—	MN411000-12	—	MN41C4256SJ-10	—
MN1416	—	MN6044	—	MN15263	—	MN411000L-10	—	MN41C4258-10	—
MN1418	—	MN6049	—	MN15266	—	MN411000L-12	—	MN41C4258L-10	—
MN1427	—	MN6061A	—	MN15281	—	MN411000SJ-10	—	MN41C4258SJ-10	—
MN1441	—	MN6063	—	MN15282	—	MN411000SJ-12	—	MN42C4256SJ-10	—
MN1442	—	MN6063A	—	MN15283	MN15283A	MN41C1000-10	—	MN1583412	—
MN1450B	—	MN6064	—	MN15284	—	MN41C1000L-10	—	EP15261	—
MN1451B	—	MN6064R/S	—	MN15312	—	MN41C1000SJ-10	—	EP15361	—
MN1453A	—	MN6080	—	MN15344	—	MN411001-10	—	EP15362	—
MN1455A/B	—	MN6125	—	MN15361	—	MN411001-12	—	EP15881	—
MN1499/A	—	MN6131S	—	MN15362	—	MN411001L-10	—	EP18882	—
MN1527	—	MN6149	—	MN15381	—	MN411001L-12	—		
MN1552	—	MN6164	—	MN15524	—	MN411001SJ-10	—		
MN1558	—	MN6169A	—	MN15745	—	MN411001SJ-12	—		
MN1591	—	MN6172A	—	MN15821	—	MN41C1002-10	—		
MN1613	—	MN6178/S	—	MN15832	—	MN41C1002L-10	—		

● Bipolar Digital ICs

Type No.	Alternative Product	Type No.	Alternative Product	Type No.	Alternative Product	Type No.	Alternative Product	Type No.	Alternative Product
DN811	—	DN835	—	DN839	DN6845S/6852	DN852	DN852P	DN6845	DN6845S/6852
DN819	—	DN837	DN6845S/6852	DN850	—	DN6835	—	DN6846	DN6846S/6853
DN834	DN6845S/6852	DN838	DN6844S/6851	DN851	—	DN6844	DN6844S/6851		

Maintenance Types

● Bipolar Linear ICs

Type No.	Alternative Product	Type No.	Alternative Product	Type No.	Alternative Product	Type No.	Alternative Product	Type No.	Alternative Product
AN101	—	AN363	—	AN3794/S	A3794N	AN6022	—	AN6996S	—
AN115	—	AN363N	—	AN3924K	—	AN6031	AN2300	AN6998S	—
AN127	OM220	AN366	—	AN3991K	AN3991NS	AN6045/S	—	AN7000	—
AN136	—	AN366P	—	AN3992K	—	AN6050	—	AN7001	—
AN179	—	AN374P	—	AN5011	—	AN6055	—	AN7045S	—
AN203	—	AN377	—	AN5013K	—	AN6140	—	AN7102CL	AN7102S
AN204	—	AN380	AN5311	AN5022S	—	AN6205	—	AN7116	—
AN210	—	AN603	—	AN5030	—	AN6208	AN6208N	AN7127	—
AN211	—	AN605	—	AN5035	—	AN6209K	AN6209/S	AN7130	—
AN214	—	AN606	—	AN5036S	AN5036	AN6212	—	AN7140	—
AN217	—	AN607	AN607P	AN5038	—	AN6213	—	AN7143	—
AN217P	—	AN608	AN608P	AN5072	—	AN6214	—	AN7145	—
AN222	—	AN610	—	AN5079	—	AN6249	AN6248	AN7146	—
AN223	—	AN610P	—	AN5111	—	AN6250	AN6247	AN7147	AN7147N
AN228W	—	AN612P	—	AN5120N	—	AN6258	—	AN7150	—
AN236	—	AN616	—	AN5122	—	AN6270	—	AN7151	—
AN239	—	AN660	—	AN5130	—	AN6291K	AN6291	AN7156	—
AN240	—	AN829/Y	AN829P	AN5155K	—	AN6295K	AN6295NK	AN7156N	—
AN240P	—	AN829S	AN829P	AN5210	—	AN6296/S	—	AN7172K	AN7172NK
AN240PD	—	AN902	—	AN5216	—	AN6298K	—	AN7200CL	—
AN241	—	AN904	—	AN5217	—	AN6299K	AN6299NK	AN7210	—
AN241P	—	AN905	—	AN5220	—	AN6300	—	AN7211	—
AN241PD	—	AN915	—	AN5221	—	AN6307	—	AN7213S	AN7213
AN245	—	AN1431	AN1431T/M	AN5222	—	AN6310	—	AN7216	—
AN247P	—	AN2130	—	AN5252	—	AN6321	—	AN7218	—
AN252	AN7140N	AN2131	—	AN5255	—	AN6327/S	—	AN7221	—
AN253	—	AN2140	—	AN5260	—	AN6328/S	—	AN7225	—
AN253P	—	AN2153S	AN2153F	AN5310	—	AN6330	—	AN7226/CL	AN7266S
AN260	—	AN2240	AN2241	AN5316S	AN5316	AN6331	—	AN7230CL	AN7230S
AN260P	—	AN2253S	AN2253F	AN5318A	AN5318N	AN6332	—	AN7236CL	AN7236S
AN262	—	AN2330	—	AN5320	—	AN6337S	AN6337	AN7248S	—
AN264	AN7311	AN2335S	—	AN5330	—	AN6340	—	AN7252	—
AN271	—	AN2340	—	AN5340	—	AN6341	—	AN7256	—
AN272	—	AN2341	—	AN5360	—	AN6341N	—	AN7258	—
AN272U	—	AN2360S	—	AN5410	—	AN6342	AN6342N	AN7277	—
AN274	—	AN2361S	AN2361	AN5415	—	AN6343	—	AN7315	—
AN277	—	AN2373/S	—	AN5429	—	AN6347	—	AN7320	—
AN278	—	AN2430	AN2431	AN5430	—	AN6352	—	AN7372K	—
AN282	—	AN2440S	—	AN5431N	—	AN6353	—	AN7383K	—
AN295	—	AN2581S	—	AN5440	—	AN6354	—	AN7400S	AN7400CL
AN301	—	AN2582S	—	AN5510	—	AN6358S	—	AN7410	AN7410N
AN302	—	AN2601	—	AN5520	—	AN6363	AN6363S	AN7411	—
AN303	—	AN2611K	—	AN5610N	—	AN6371S	AN6371	AN7415/S	—
AN305	—	AN2640K	—	AN5620K	—	AN6381/S	—	AN7417	—
AN306	—	AN2800K	—	AN5701N	—	AN6387K	AN6387	AN7418	—
AN307	—	AN2861K	—	AN5702	—	AN6391K/S	AN6391NK/NS	AN7471S	—
AN313	—	AN3111	—	AN5703	—	AN6396/S	—	AN7670	—
AN313U	—	AN3120	—	AN5710	—	AN6460K	—	AN7671	—
AN315	—	AN3210K	AN3210S	AN5712	—	AN6512	AN6512N	AN7672	—
AN316	—	AN3222	—	AN5720	—	AN6527	—	AN7673	—
AN318	—	AN3223K	—	AN5722	—	AN6601N	—	AN7674	—
AN320	—	AN3310S	AN3310K	AN5742	—	AN6617	—	AN7675	—
AN321	—	AN3313K	—	AN5760	—	AN6631	AN6631S	AN7676	—
AN325	—	AN3318S	—	AN5820	—	AN6632S	—	AN7677S	—
AN326	—	AN3400NK	AN3410K/NS	AN5821	—	AN6633	—	AN7678S	—
AN331	—	AN3492K	—	AN5822	—	AN6635	—	AN8250	AN8250N
AN337	—	AN3613K	—	AN5835S	AN5835	AN6640	—	AN8280	—
AN340	—	AN3616K	—	AN5836S	AN5836	AN6730	—	AN90B10S	AN90B10
AN340P	—	AN3713K	—	AN5850/S	—	AN6811	—	AN90B80/S	—
AN345V	—	AN3716K	—	AN6011	—	AN6817	—	AN90B82	AN90B82S
AN349	—	AN3717K	—	AN6012	—	AN6820	—	AN90C20	—
AN355	—	AN3720K	—	AN6014	—	AN6859	—	AN90D21	—
AN362	—	AN3793	—	AN6015	—	AN6881	—	—	—
AN362L	—	AN3793K	—	AN6020	—	AN6995	—	—	—

Maintenance Types

• Transistors, Field Effect Transistors

Type No.	Alternative Product	Type No.	Alternative Product	Type No.	Alternative Product	Type No.	Alternative Product	Type No.	Alternative Product
2SA887	2SA748	2SC1778	2SC1687	2SD767	2SC1685	2SD1390	2SD1734	2SK500	2SK1033
2SA1133/A	2SB940/A	2SC1779	—	2SD772/A/B	2SD1274/A/B	2SD1442/A	2SD1444/A	2SK501/A	2SK764/A
2SB747	—	2SC1788	2SD1302	2SD812	2SD1680	2SD1443/A	2SD1445/A	2SK502/A	2SK762/A
2SB750/A	2SB949/A	2SC1913	2SC2591	2SD837/A	2SD1276/A	2SD1476	2SD2000	2SK503/A	2SK762/A
2SB751/A	2SB950/A	2SC1913A	2SC2592	2SD850	2SD1737	2SD1487	2SD2065	2SK602/A	2SK808/A
2SB761/A	2SB941/A	2SC1913B	—	2SD856/A	2SD1266/A	2SD1488	2SD2052	2SK603/A	2SK796/A
2SB762/A	2SB942/A	2SC2076	2SC1359	2SD857/A	2SD1267/A	2SD1516	2SD1517	2SK604/A	2SK809/A
2SB807	—	2SC2153	2SC1215	2SD859/A	2SD1263/A	2SD1531	2SC1847	2SK605	2SK1100
2SB867	2SB943	2SC2264	—	2SD860/A	—	2SD1533	2SD1535	2SK610	2SK762
2SB868	2SB944	2SC2291	—	2SD866/A	2SD1271/A	2SD1537	2SD1539	2SK617/A	2SK808/A
2SB869	2SB945	2SC2292	—	2SD876	2SD1272	2SD1635	—	2SK626	2SK1033
2SB870	2SB946	2SC2556	—	2SD886/A	2SD1273/A	2SD1657	2SD1330	2SK627/A	2SK1033
2SB871/A	2SB948/A	2SC2637	—	2SD887	2SD1273	2SD1712	—	2SK628/A	2SK1260
2SB872/A	2SB951/A	2SC2660/A	2SD1264/A	2SD888	—	2SD1713	2SD2064	2SK629/A	2SK1262
2SB894	2SB774	2SC2738	2SC3868	2SD917	2SD1270	2SD1714	2SD2065	2SK630	2SK1265
2SB895/A	—	2SC2739	2SC3870	2SD959	2SD1268	2SD1715	2SD2052	2SK631	2SK1035
2SB896/A	2SB947/A	2SC2740	2SC3210	2SD960	2SD1269	2SD1716	2SD2066	2SK632/A	2SK755
2SB925/A	2SB953/A	2SC2831/A	2SC3352/A	2SD961	2SD1270	2SD1717	2SD2029	2SK633/A	2SK757
2SB968	2SA699	2SC2832/A	2SC3972/A	2SD969	2SD1330	2SD1718	2SD1975	2SK634/A	2SK765/A
2SB977	—	2SC2833/A	2SC3211/A	2SD1009	—	2SD1770/A	2SD1772/A	2SK635	2SK766
2SB1055	2SB1371	2SC2834/A	2SC3212	2SD1091	2SD1276	2SD1774/A	2SD1776/A	2SK636	2SK769
2SB1056	2SB1372	2SC2841	2SC3211	2SD1112	2SC1905	2SD1917	2SD2018	2SK637	2SK769
2SB1057	2SB1361	2SC2847	2SC2680	2SD1169	2SD1315	2SD1973	2SD1774	2SK638/A	2SK796/A
2SB1062	2SB970	2SC2989	—	2SD1171	2SD1728	2SJ43	—	2SK650	—
2SB1069	2SB1071	2SC3169	2SC3869	2SD1173	2SD1730	2SJ84	2SJ163	2SK651	—
2SB1075	2SA886	2SC3170	—	2SD1176/A	2SD1277/A	2SK83	2SK606	2SK667/A	2SK765/A
2SB1157	2SB1361	2SC3276	2SC2671(H)	2SD1206	2SD889	2SK321	2SK316	2SK691	M91F
2SB1158	2SB1371	2SC3285	2SC3506	2SD1214	2SD1322	2SK378	2SK593	2SK862	2SK1100
2SB1160	2SB1361	2SC3368	2SC3369	2SD1215	2SD1323	2SK379	2SK764	3SK119	3SK202
2SB1161	2SB1373	2SC3371	2SC4379	2SD1216	2SD1324	2SK380	2SK764A	3SK120	—
2SB1162	2SB1347	2SC3477	2SC3110	2SD1217	2SD1325	2SK437	2SK1196	GN1000	—
2SB1163	2SB1317	2SC3719	2SC3737	2SD1218	2SD1326	2SK437H	2SK1100	GN1011	GN1015
2SB1190/A	2SB1192/A	2SC3720	2SC3738	2SD1219	2SD1327	2SK438	2SK649	GN1013	—
2SB1206	2SB774	2SC3791	—	2SD1245	2SD1446	2SK495	2SK1255	GN2000	—
2SC901/A/B	2SD917	2SD380	2SD1850	2SD1290	2SD1728	2SK496	2SK1255	XN7602	XN7651
2SC1440	2SD1846	2SD389/A	2SD1266/A	2SD1291	2SD1729	2SK497	2SK1255	—	—
2SC1686	2SC1687	2SD692	—	2SD1305	—	2SK498	2SK1255	—	—
2SC1730	2SD1847	2SD762/A	2SD1266/A	2SD1307	2SD1909	2SK499	2SK1255	—	—

• Diodes, Thyristors, Hall Elements

Type No.	Alternative Product	Type No.	Alternative Product	Type No.	Alternative Product	Type No.	Alternative Product	Type No.	Alternative Product
M23C	—	MA74WK	MA75WK	MA325	MA334	MA522	—	MA771	—
M23CA	—	MA181	—	MA326	MA329	MA708	—	MA772	—
MA56	MA73	MA183	—	MA328	MA338	MA709	—	OH001	OH009
MA74WA	MA75WA	MA184	MA185	MA340	MA341	MA710	—	OH002	OH009

• Opto-Electronic Devices

Type No.	Alternative Product	Type No.	Alternative Product	Type No.	Alternative Product	Type No.	Alternative Product	Type No.	Alternative Product
LN21	LN21RPHL	LN23RP-(L)	—	LN33GP-(L)	—	LN9810K	LN9710	PN321C	PN3104
LN21CP	LN21CPHL	LN23S	—	LN37GP	LN39GP	LN9815K	LN9710	PN330F	PN331F
LN21CP-(L)	—	LN23SR	—	LN37GCP	LN39GCP	LN9820K	LN9825K	PN3104	—
LN21MC	—	LN25	LN25RCP	LN41YP	LN41YPH	PN103	PN101	PN3108	—
LN21RP	LN21RPH	LN25D	LN25RP	LN41YCP	LN41YCPH	PN110W	PN111W	PN3201	—
LN21RP-(L)	—	LN26D	LN26RP	LN51FT	—	PN112C	—	PN3205	—
LN21RPTV	—	LN27CP	LN29CP	LN51LT	—	PN204	PN207	PN3603(H)	—
LN21RCP	LN21RCPH	LN27RP	LN29RP	LN70	LN76	PN302C	PN302H	PN3611	—
LN21W	LN21WPHL	LN27RCP	LN29RCP	LN120	LN122D	PN302E	PN312E	ON1631/2631	—
LN21WP	LN21WPH	LN27WP	LN29WP	LN122CAL	LN122D	PN302H	PN312C	ON3632W	ON3633W
LN22	—	LN30	—	LN122L	LN122DL	PN304C	PN324E	LN123DF002	LN125D004
LN22(DT)	—	(MEL4720)	—	LN123DF	LN124D	PN304V	PN3404/3405	LN125D002	LN125D004
LN22-(L)	—	LN31	LN31GPHL	LN125	LN125D	PN308	—	PN330CLO02	PN108CLO02
LN22S	—	LN31GP	LN31GPH	LN161	—	PN311/KN	PN3107	PN330F002	PN335-004
LN22W	—	LN31GCP	LN31GCPH	LN163	LN162S	PN311H	—	PN334-002	PN335-004
LN23	—	LN31GCP(u)	LN31GCPH	LN164	—	PN313F	PN313B	PN335-002	PN335-004
LN23-(L)	—	LN32	—	LN9805	LN9705	PN314K	PN3404/3405	—	—

Discontinued Types

■ Discontinued Types

● MOS LSIs

Type No.	Alternative Product	Type No.	Alternative Product	Type No.	Alternative Product	Type No.	Alternative Product	Type No.	Alternative Product
MN110	—	MN1455ALS	—	MN2148H-5	—	MN6051A	—	MN15827	—
MN115	—	MN1455LF	—	MN2148H-7	—	MN6051B	—	MN15831	—
MN116	—	MN1456A	—	MN2148H-8	—	MN6053	—	MN15836	—
MN131A	—	MN1460	—	MN2716	—	MN6069	—	MN15844	—
MN1001	—	MN1463	—	MN2758	—	MN6070	—	MN15846	—
MN1040	—	MN1465	—	MN2764-20	—	MN6090A	—	MN15847	—
MN1101	—	MN1511	—	MN2764-25	—	MN6090B	—	MN17841	—
MN1200	—	MN1512	—	MN2764P-30	—	MN6096	—	MN18943	—
MN1201	—	MN1513	—	MN3660	MN3661	MN6140	—	MN18982	—
MN1202	—	MN1514	—	MN3663	MN3664	MN6141	—	MN27128-20	—
MN1203	—	MN1522	—	MN3812K/S	—	MN6143	—	MN27128-25	—
MN1204A	—	MN1534	—	MN4116	—	MN6201	—	MN27128-30	—
MN1204B	—	MN1541	—	MN4164P-10	—	MN6204	—	MN27128P-30	—
MN1205E	—	MN1542/H	—	MN4164P-10A	—	MN6205	—	MN41128-12	—
MN1205F	—	MN1544/H	—	MN4216-15	—	MN6208	—	MN41128-15	—
MN1205H	—	MN1562	—	MN4216-20	—	MN6209	—	MN41256-12	—
MN1205P	—	MN1564	—	MN4216-25	—	MN6250	—	MN41256-15	—
MN1208	—	MN1597	—	MN4264-20	—	MN6254	—	MN41257	—
MN1212	MN1212A	MN1598	—	MN4364-20	—	MN6305	—	MN41464-12	—
MN1217A	—	MN1599	—	MN4464-10	—	MN6802	—	MN41464-15	—
MN1217B	—	MN1610/A	—	MN4464-10L	—	MN8060A	MN3661	MN41C832-10	—
MN1217C	—	MN1611	—	MN4464S-10	—	MN8063	MN3664	MN158410	—
MN1218	MN1218A	MN1630	—	MN4464S-10L	—	MN12872	—	MN158482	—
MN1221	—	MN1640/A	—	MN5101	—	MN15241	—	MN158484	—
MN1227A	—	MN1650	—	MN5550	—	MN15243	—	MN189161	—
MN1230	—	MN1754	—	MN5600	—	MN15342	—	MN271000	—
MN1252	—	MN1758	—	MN5701	—	MN15343	—	MN41C4257-10	—
MN1271/F	—	MN1800/A	—	MN5710	—	MN15621	—	MN41C4257-12	—
MN1420	—	MN2114-2	—	MN5750	—	MN15731	—	EP158482	—
MN1421	—	MN2114-3	—	MN5751	—	MN15822	—		
MN1425	—	MN2147H-5	—	MN6024	—	MN15823	—		
MN1432	—	MN2147H-7	—	MN6045B	—	MN15824	—		
MN1450	—	MN2147H-8	—	MN6047	—	MN15826	—		

● Bipolar Digital ICs

Type No.	Alternative Product	Type No.	Alternative Product	Type No.	Alternative Product	Type No.	Alternative Product	Type No.	Alternative Product
DN803T	—	DN821	—	DN74LS147/S	—	DN74LS249/S	—	DN74LS668/S	—
DN804	—	DN822	—	DN74LS190/S	—	DN74LS261/S	—	DN74LS669/S	—
DN805	—	DN1930 Series	—	DN74LS194A/S	—	DN74LS295B/S	—	DN74LS670/S	—
DN806	—	DN74LS24/S	—	DN74LS196/S	—	DN74LS445/S	—	DN74LS673/S	—
DN807	—	DN74LS40/S	—	DN74LS247/S	—	DN74LS490/S	—	DN74LS674/S	—
DN820	—	DN74LS133/S	—	DN74LS248/S	—	DN74LS645/S	—	DN74LS84368/S	—

● Bipolar Linear ICs

Type No.	Alternative Product	Type No.	Alternative Product	Type No.	Alternative Product	Type No.	Alternative Product	Type No.	Alternative Product
AN103	—	AN221	—	AN237	—	AN332	—	AN7000	—
AN202	—	AN225	—	AN238S	—	AN333	—	AN7070	—
AN205	—	AN227	—	AN242	—	AN334	—	AN7071	—
AN206	—	AN228	—	AN248	—	AN342	—	AN7111	—
AN208	—	AN229	—	AN249	—	AN343	—	AN7114	—
AN209	—	AN230	—	AN258	—	AN370	—	AN7115	—
AN212	—	AN231	—	AN259	—	AN374	—	AN7154	—
AN213	—	AN232	—	AN281	—	AN903	—	AN7155	—
AN215	—	AN233	—	AN288	—	AN6130	AN6130N	AN7162K	—
AN219	—	AN234	—	AN289	—	AN6260	—	AN7149	—
AN220	—	AN235	—	AN328	—	AN6820	—	AN7370K	—

Discontinued Types

• Transistors, Field Effect Transistors

Type No.	Alternative Product	Type No.	Alternative Product	Type No.	Alternative Product	Type No.	Alternative Product	Type No.	Alternative Product
2SA100	—	2SB177	—	2SB979	—	2SC1326	—	2SC2671	2SC2671(H)
2SA101	—	2SB178	—	2SB980	2SB1371	2SC1327	2SC2634	2SC2680	—
2SA102	—	2SB232	—	2SB981	2SB1372	2SC1328	2SC2634	2SC2683	—
2SA103	—	2SB233	—	2SB982	2SB1361	2SC1346	2SC1317	2SC2684	—
2SA104	—	2SB234	—	2SB1222	—	2SC1347	2SC1318	2SC2685	—
2SA341	2SA838	2SB278	—	2SC34	—	2SC1354	—	2SC2686	—
2SA342	2SA838	2SB279	—	2SC35	—	2SC1405	2SC2989	2SC2687	—
2SA546	2SA1096	2SB280	—	2SC36	—	2SC1406	2SC1383	2SC2738	2SC3868
2SA546A	2SA1096A	2SB281	—	2SC50	2SC828	2SC1407	2SC1384	2SC2848	—
2SA547	2SA748	2SB282	—	2SC58	2SC2258	2SC1446	2SC2085	2SC2849	—
2SA547A	—	2SB283	—	2SC58A	2SC2258	2SC1450	2SD1264	2SC2860	2SC3315
2SA550	2SA564	2SB284	—	2SC98	—	2SC1478	2SC2634	2SC2924	—
2SA550A	2SA564A	2SB285	—	2SC99	—	2SC1478A	2SC2634	2SC2989	—
2SA637	2SA1018	2SB287	—	2SC316	2SC1359	2SC1547	2SC2360(H)	2SC2991	—
2SA666	2SA1127	2SB288	—	2SC456	—	2SC1550	2SC2258A	2SC2992	—
2SA666A	2SA1127	2SB289	—	2SC477	2SC1359	2SC1556	—	2SC3106	—
2SA685	2SA1018	2SB309	—	2SC478	2SC1318	2SC1565	2SC2591	2SC3107	—
2SA721	2SA1127	2SB310	—	2SC526	2SC2258	2SC1565A	2SC2591	2SC3108	—
2SA722	2SA1127	2SB311	—	2SC538	2SC1684	2SC1566	2SC2258	2SC3109	—
2SA730	2SA719	2SB312	—	2SC538A	2SC1685	2SC1620	2SC2291	2SC3111	—
2SA731	2SA720	2SB324	—	2SC539	2SC2634	2SC1667	2SD2064	2SC3526	2SC3526(H)
2SA749	2SA1018	2SB335	—	2SC562	2SC1686	2SC1683	2SC2591	2SD12	—
2SA749A	2SA1018	2SB336	—	2SC563	2SC1687	2SC1683A	2SC2591	2SD13	—
2SA751	2SA683	2SB345	—	2SC563A	2SC1687	2SC1780	2SC2671(H)	2SD14	—
2SA752	2SA684	2SB346	—	2SC571	2SC2988	2SC1787	2SC3312	2SD31	—
2SA766	2SB940	2SB347	—	2SC572	—	2SC1790	2SC2671(H)	2SD32	—
2SA774	2SA1127	2SB348	—	2SC573	2SC2990	2SC1818	—	2SD35	2SC828
2SA795	2SA1111	2SB371	—	2SC581	2SC829	2SC1858	—	2SD36	2SC828
2SA837	2SB1055	2SB376	—	2SC582	2SC2085	2SC1885	2SC2632	2SD178	2SC2497
2SA843	2SB940	2SB401	—	2SC583	2SC2671(H)	2SC1974	—	2SD178A	2SC2497A
2SA880	2SA1310	2SB402	—	2SC585	—	2SC1975	—	2SD178②	—
2SA882	2SB946	2SB403	—	2SC586	2SD1274	2SC1976	2SC2851	2SD189	—
2SA912	2SA1124	2SB448	—	2SC644	2SC2634	2SC1977	2SC2988	2SD189A	—
2SA913	2SA1111	2SB449	—	2SC645	2SC1359	2SC1978	2SC2989	2SD198	2SD859
2SA913A	2SB1112	2SB473	—	2SC646	—	2SC2034	—	2SD198A	2SD859A
2SA913B	—	2SB475	—	2SC647	2SD1712	2SC2077	—	2SD199	2SC3352
2SA972	2SA564	2SB476	—	2SC687	2SD1274	2SC2113	2SC1847	2SD200	2SD1390
2SA973	2SA1127	2SB481	—	2SC696	2SC2497	2SC2152	2SC2992	2SD226	2SD1266
2SA977	—	2SB493	—	2SC696A	2SC2497A	2SC2192	2SC2990	2SD266	2SD1985
2SA1060	2SB1054	2SB512	2SB941	2SC697	2SC1398	2SC2257	—	2SD266A	2SD1985A
2SA1063	2SB946	2SB512A	2SB941A	2SC697A	2SC1398A	2SC2263	2SC2634	2SD266B	2SD1985A
2SA1064	2SB1056	2SB513	2SB941A	2SC730	2SC2852	2SC2360	2SC2360(H)	2SD746	—
2SA1065	2SB1057	2SB513A	2SB941A	2SC731	2SC2852	2SC2361	2SD1267A	2SD299	2SD1391
2SA1092	—	2SB532	2SB945	2SC761	2SC1779	2SC2414	2SC2738	2SD300	2SD1391
2SA1375	—	2SB533	—	2SC762	2SC2360(H)	2SC2415	2SC2739	2SD312	2SC3353
2SB126	—	2SB604	—	2SC821	2SC2988	2SC2416	2SC2740	2SD317	2SD1266
2SB126A	—	2SB625	2SB1371	2SC822	2SC2988	2SC2447	—	2SD317A	2SD1266A
2SB127	—	2SB626	2SB1372	2SC840	2SD1264	2SC2454	—	2SD318	2SD1266
2SB127A	—	2SB668	2SB750	2SC840A	2SD1264	2SC2455	2SC2360(H)	2SD318A	2SD1266A
2SB128	—	2SB668A	2SB750A	2SC947	2SC1215	2SC2484	—	2SD319	2SD1488
2SB128A	—	2SB669	2SB751	2SC948	2SC1215	2SC2485	2SD2064	2SD321	2SD1680
2SB129	—	2SB669A	2SB751A	2SC1012	2SC2258	2SC2486	2SD2065	2SD324	2SD2085
2SB129A	—	2SB691	2SB1371	2SC1012A	2SC2258	2SC2487	2SD1487	2SD334	2SD2064
2SB130	—	2SB692	2SB1372	2SC1033	2SC1573	2SC2488	2SD1487	2SD350	2SD1577
2SB157	—	2SB695	2SB1361	2SC1033②	—	2SC2489	2SD1488	2SD351	2SD2833
2SB158	—	2SB713	2SB1362	2SC1033A	2SC1573	2SC2519	2SC3313	2SD365	2SD1266
2SB159	—	2SB714	—	2SC1033A②	—	2SC2557	—	2SD365A	2SD1266A
2SB160	—	2SB759A	2SA1309/A	2SC1073	2SC2991	2SC2561	2SC3314	2SD366	2SD1266
2SB170	—	2SB760	2SB1052	2SC1074	—	2SC2646	2SC3354	2SD366A	2SD1266A
2SB171	—	2SB760A	2SB1052	2SC1075	—	2SC2657	2SC2831	2SD367	—
2SB172	—	2SB763	—	2SC1076	2SC2993	2SC2657A	2SC2831A	2SD379	2SD1267
2SB173	—	2SB763A	—	2SC1190	2SC2990	2SC2658	2SC2832	2SD390	2SD1985
2SB174	—	2SB812	—	2SC1192	—	2SC2658A	2SC2832A	2SD390A	2SD1985A
2SB175	—	2SB812A	—	2SC1192A	—	2SC2659	2SC2834	2SD458	2SC2834
2SB176	—	2SB814	2SA1034	2SC1303	2SC2851	2SC2659A	2SC2834A	2SD470	2SD1390

Discontinued Types

• Transistors, Field Effect Transistors (continued)

Type No.	Alternative Product	Type No.	Alternative Product	Type No.	Alternative Product	Type No.	Alternative Product	Type No.	Alternative Product
2SD470B	2SD1390	2SD691	—	2SD861	2SC3169	2SD1295	—	3SK25	—
2SD517	2SD1439	2SD693	2SD1461	2SD861A	2SC3169	2SD1301	2SD1727	3SK32	—
2SD546	2SC3353A	2SD727	—	2SD890	—	2SD1333	2SD2064	3SK39	3SK202
2SD570	2SD1267/A	2SD728	2SD2064	2SD891	2SD892	2SD1334	2SD2065	3SK49	3SK202
2SD577	2SD1439	2SD731	2SD2065	2SD919	2SD1423	2SD1335	2SD2052	3SK66	3SK142
2SD589	2SD1175	2SD749	2SC2832	2SD950	2SD1541	2SK50	2SK65	3SK97	3SK183(3SK201)
2SD597	2SD1485	2SD750	2SD2052	2SD953	2SD1577	2SK56	2SK83	3SK100	3SK142
2SD598	2SD1486	2SD751	2SD2052	2SD967	2SD892	2SK66	2SK301	3SK116	3SK144
2SD603	2SC3311	2SD766	2SD860	2SD1032	—	2SK84	2SK301(2SK1104)	3SK117	3SK143
2SD632	2SD3170	2SD778	2SD636	2SD1032A	—	2SK127	2SK301(2SK1104)	3SK118	—
2SD649	2SD1632	2SD779	2SD637	2SD1043	2SD1461	2SK127A	2SK301A(2SK1104)	3SK129	3SK183(3SK201)
2SD671	2SD1302	2SD792	—	2SD1044	2SD1457	2SK128	2SK1104	M21F	—
2SD672	2SD860A	2SD803	2SD1608	2SD1044A	2SD1457A	2SK148	—	UN004	—
2SD678	2SD1275	2SD804	2SD1266	2SD1105	—	2SK165	2SK316	UN005	—
2SD678A	2SD1275A	2SD849	2SD1391	2SD1151	2SD1635	2SK199	—	UN006	—
2SD679	2SD1276	2SD855	—	2SD1154	2SD1680	2SK247	2SK316	UN015	—
2SD679A	2SD1276	2SD855A	—	2SD1172	2SD1440	3SK24	—	—	—

• Diodes, Thyristors, Hall Elements

Type No.	Alternative Product	Type No.	Alternative Product	Type No.	Alternative Product	Type No.	Alternative Product	Type No.	Alternative Product
OA70	OA90	MA53	—	MA251	—	MA381	—	2SF248	—
OA79	OA99	MA61	MA62	MA252	—	MA432	—	2SF248A	—
OA81	OA91	MA90	OA90	MA253	—	MA433	—	2SF940	M23C
OA85	OA95	MA101	—	MA261	—	MA520	MA522	2SF1060	M23C
MA11	—	MA102	—	MA262	—	MA521	MA522	2SF1168	—
MA13	—	MA103	—	MA263	—	MA550	MA551	2SF1168A	—
MA17	—	MA172	MA180	MA292	—	MA603	—	2SM58	—
MA18	—	MA186	—	MA301	MA325	MA604	—	2SM58A	—
MA21	—	MA203	—	MA302	MA325	MA605	—	2SM75	—
MA23	—	MA211	—	MA303	MA325	MA615	—	2SM79	—
MA25	—	MA215	—	MA320	MA334	MA619	—	2SM125	—
MA26	MA29	MA231	—	MA322	—	MA622	—	2SM151	—
MA26W	MA29W	MA232	—	MA323	MA329	MA625	—	2SM152	—
MA26WO	MA29W	MA233	—	MA324	MA339	MA630	—	OH005	—
MA26T	MA29T	MA241	—	MA327	MA339	MA667	—	OH006	—
MA47	—	MA242	—	MA330	MA339	MA702	MA707	M47F	—
MA48	—	MA242C	—	MA332	MA339	MA715	—	—	—
MA49	—	MA242CR	—	MA350	—	MA1000/A Series	MA1000/M Series	—	—
MA51A	—	MA242R	—	MA351	—	2SF229	MA21C	—	—

• Opto-Electronic Devices

Type No.	Alternative Product	Type No.	Alternative Product	Type No.	Alternative Product	Type No.	Alternative Product	Type No.	Alternative Product
LN10	—	LN61	LN182	LN323GP	—	ON1103	ON1122	ON3302	—
LN11	—	LN64	—	PN100	PN110	ON1104	ON1215	ON3500	—
LN11W	—	LN71	LN76	PN104	—	ON1106	ON1105	MEL4744	LN9825K
LN12	—	LN122	—	PN105	—	ON1107	ON1215	MEL4745R	LN9705
LN12W	—	LN122F	LN122DF	PN140	PN147	ON3101	—	MEL4760	PN300
LN13	—	LN126	LN126D	PN202	PN202S	ON3102	—	MEL4761	PN303
LN20CP	—	LN174	—	PN302C	—	ON3151	ON3131	MEL4777	—
LN24	LN247RP	LN182	—	PN302H	—	ON3152	—	MEL4781	ON1102
LN34	LN347GP	LN193(K)	—	PN316C/K	PN316C1/K1	ON3153	—	MEL4782	ON1215
LN50	LN66	LN223CP	—	PN316N	PN3610	ON3162	ON3132	—	—
LN53	LN57	LN223RR	—	PN328	—	ON3163	ON3133	—	—
LN60	LN62S	LN232CP	—	ON1101	—	ON3164	ON3134	—	—

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MATSUSHITA ELECTRONICS CORPORATION

SEMICONDUCTOR GROUP

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