Panasonic

Optoelectronic Devices Data Book

L.E.D.

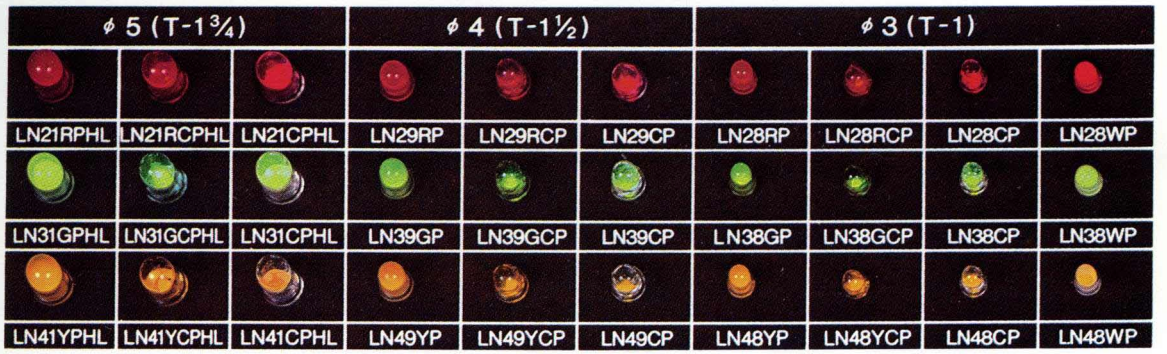
Lamps • Displays

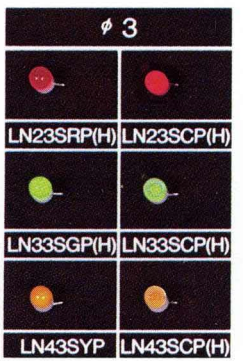
Optoelectronic Devices

Panasonic

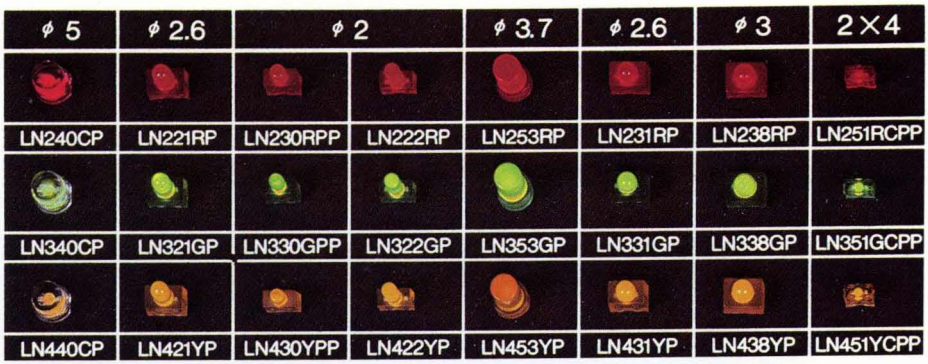
Panasonic Optoelectronics

L.E.D. LAMPS


φ 5 (T-1¾)
φ 4 (T-1½)
φ 3 (T-1)
LN21RPHL
LN21RCPHL
LN21CPHL
LN29RP
LN29RCP
LN29CP
LN28RP
LN28RCP
LN28CP
LN28WP
LN31GPHL
LN31GCPHL
LN31CPHL
LN39GP
LN39GCP
LN39CP
LN38GP
LN38GCP
LN38CP
LN38WP
LN41YPHL
LN41YCPHL
LN41CPHL
LN49YP
LN49YCP
LN49CP
LN48YP
LN48YCP
LN48CP
LN48WP


φ 3
LN23SRP(H)
LN23SCP(H)
LN33SGP(H)
LN33SCP(H)
LN43SYP
LN43SCP(H)

L.E.D. LAMPS



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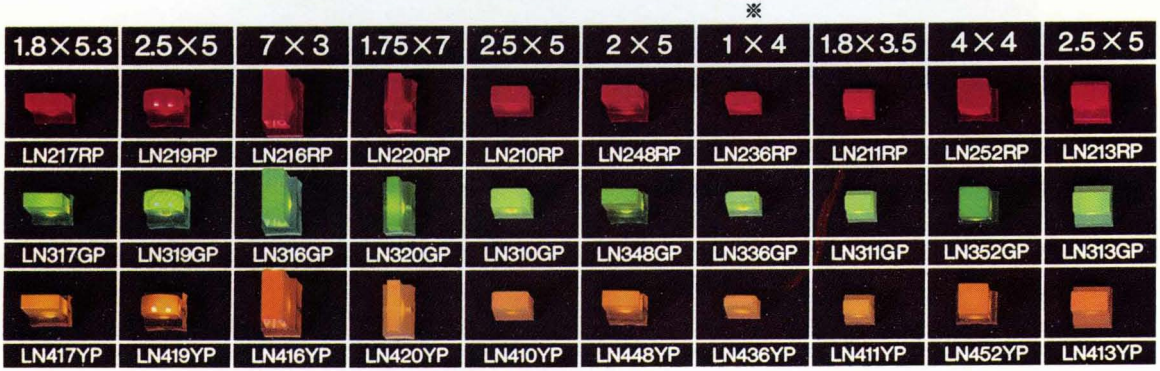

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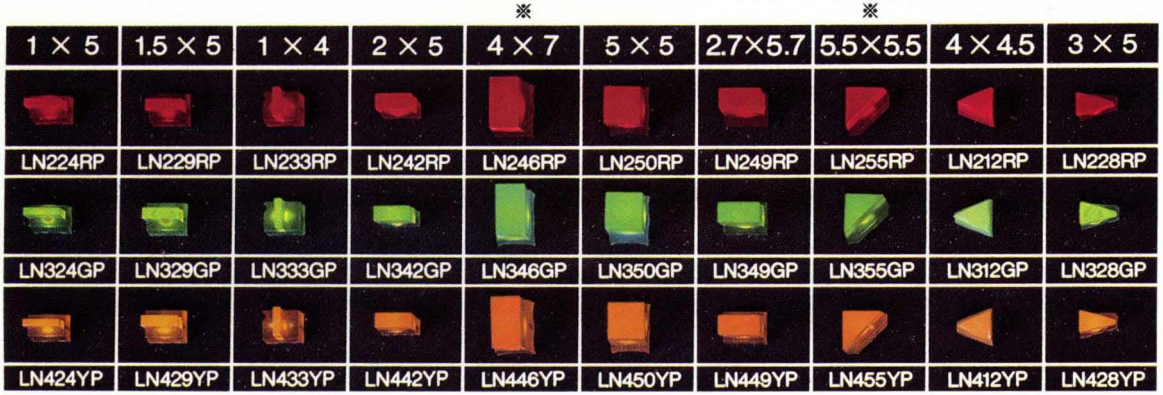
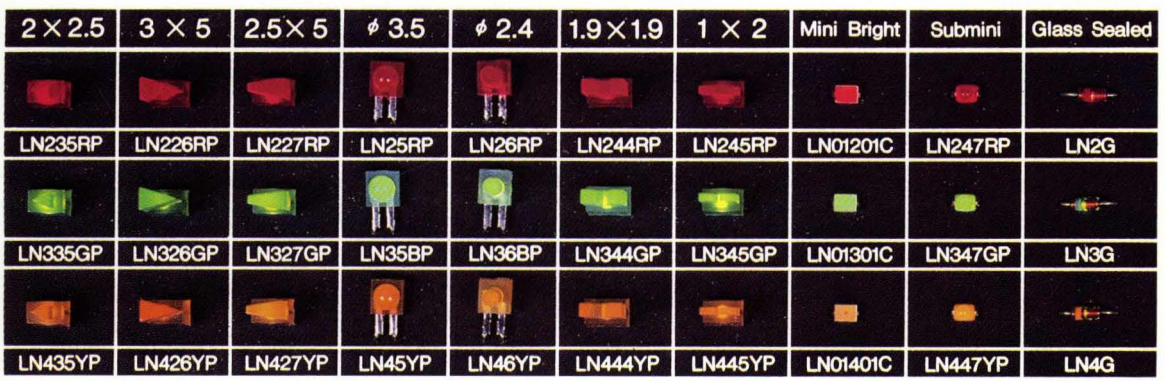
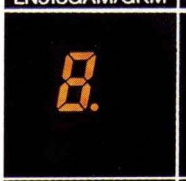
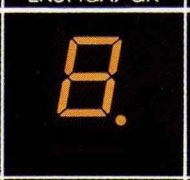


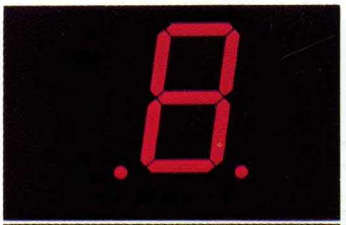


※ CUSTOM

SEVEN SEGMENT NUMERICAL DISPLAYS

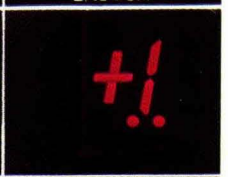
1 Digit (Mini)	1Digit(0.3inch)	1Digit(0.4inch)	1Digit(0.6inch)	2Digits(0.4inch)
				
LN513RAM/RKM	LN513RA/RK	LN514RA/RK	LN516RA/RK	LN524RA/RK
				
LN513GAM/GKM	LN513GA/GK	LN514GA/GK	LN516GA/GK	LN524GA/GK
				
LN513YAM/YKM	LN513YA/YK	LN514YA/YK	LN516YA/YK	LN524YA/YK

SEVEN SEGMENT NUMERICAL DISPLAYS

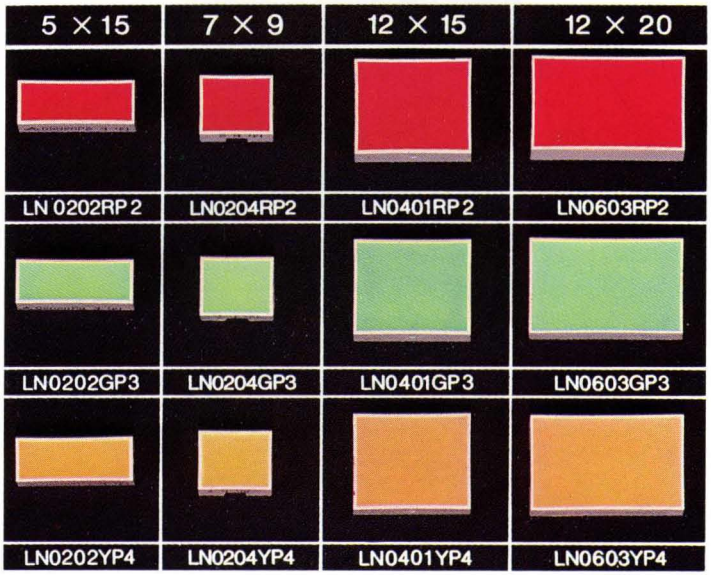


LN518RA

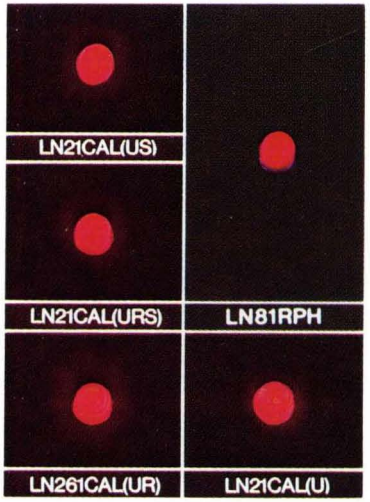
LN536RA.MR

2 Digits (0.6inch)	4 Digits (0.3inch)	NEW PRODUCTS
		
LN526RA/RK	LN543RA/RK	LN503R
		
LN526GA/GK	LN543GA/GK	LN504R
		
LN526YA/YK	LN543YA/YK	LN506RA/RK

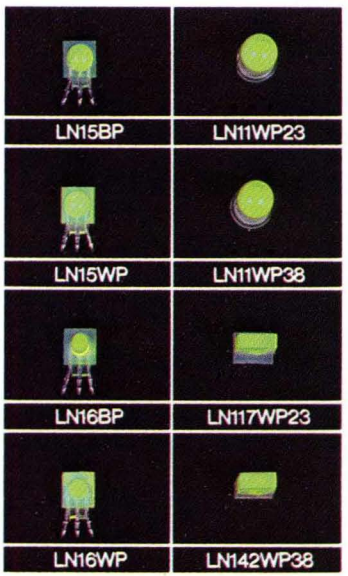
SURFACE DISPLAYS



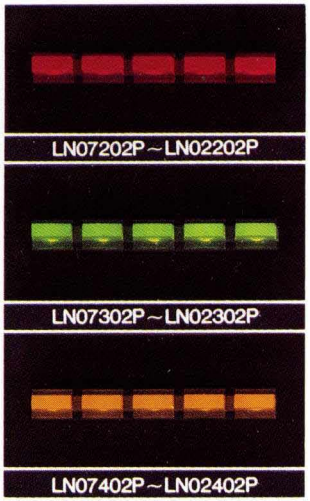
HIGH INTENSITY LAMPS



TWO COLOR LAMPS



LEVEL METERS



LN07202P ~ LN02202P

LN07302P ~ LN02302P

LN07402P ~ LN02402P

Panasonic

DEVICES FOR OPTO-ELECTRONICS

(Visible Light Emitting Diodes)

TABLE OF CONTENTS

Optoelectronic Visible-Light-Emitting-Diode Materials

Panasonic visible-light-emitting-diodes (LEDs) consist of III-V family compound semiconductor GaP, GaAsP, and GaAlAs, providing the optoelectronic characteristics listed below.

Color	Materials	Wavelength	Half-Width	Forward Voltage	Junction
Red	GaP· Zn, O	700 (nm)	100 (nm)	2.2 (V)	Solution-Grown
Green	GaP. N	565	30	2.2	Solution-Grown
Red	$GaAs_{0.6}P_{0.4}$	660	20	1.75	Diffusion
Amber	$GaAs_{0.15}P_{0.85}$ N	590	30	2.2	Diffusion
Orange	$GaAs_{0.35}P_{0.65}$:N	630	40	2 1	Diffusion
Blue	GaN	490	80	7.5	Gaseous Phase
Red	GaAlAs	660	30	1.8	Solution-Grown

The GaAsP LED is a Zn diffused, gaseous-phased p-n junction layer of epitaxial-grown n-type $GaAs_1$-xPx on the n-type GaAs or GaP substrate. A variety of colors, as shown above, can be obtained by changing the As and P concentration ratio.
The GaP LED is produced by forming an N and P type epitaxial layer using the solution-grown method on the n-type GaP substrate. Lighting color depends on doping impurities; red is obtained by a Zn-O dope, green is formed by an n-type dope. The light derived from a p-n junction layer can be obtained efficiently out of the device as GaP is a transparent material. The GaP (red) LED provides especially high luminance at low current, making it suitable for dc low current applications such as battery-operated products; as shown in the relative spectral characteristics, the luminance is apt to saturate in the area of high current. The GaP (green) and GaAsP light-emitting diodes are suitable for pulse driver applications, as the luminance can be increased in proportion to current.
The GaN LED is formed by a gaseous-phased epitaxial-grown GaN layer on a sapphire substrate. The GaN layer is an n-type, where the N empty lattice point is donor, and is an MIS construction of Zn doping insulated layer I. The GaAlAs light-emitting diode is a single hetero construction consisting of epitaxial-grown n-type Ga_1-yAlyAs formation in solution-grown p-type Ga_1-xAlxAs, on the GaAs substrate.

Units of Radiation

Lighting characteristics of Panasonic LEDs are evaluated by photometric quantity based on their visibility as appearing to normal human eyesight.

1) **Luminous Flux (lm, lumen)**
The time rate of flow of light. Luminous flux is related to radiant flux by the eye-response curve.

2) **Luminous Intensity (cd, candella)**
Luminous intensity is measured in the perpendicular direction, of a surface of 1/6 square centimeter of a black body, at the temperature of melting point (2042°K).

3) **Luminance B (fL, foot Lambert)**
The luminous intensity of a surface in a given direction per unit of projected area of the surface as viewed from that direction.

Symbol

I_F : Forward Current (DC)

I_{FM} : Peak Forward Current

I_{FP} : Forward Current (Pulse)
(Duty 1/10 Pulse width 1 msec.)

I_R : Reverse Current

V_F : Forward Voltage (DC)

V_R : Reverse Voltage

P_D : Power Dissipation

I_O : Luminous Intensity

$I_{O(dp)}$: Luminous Intensity of Decimal Point

$I_{O(seg)}$: Luminous Intensity of Segment

λ_p : Peak Emission Wavelength

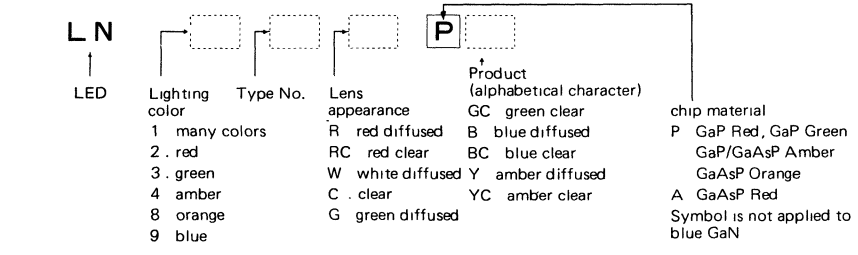
Ta : Ambient Temperature

Topr : Operating Ambient Temperature

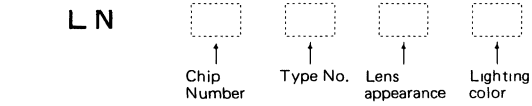
Tstg : Storage Temperature

Part Numbering Code

Point lighting Source

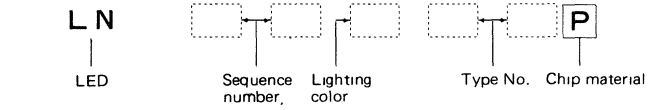


Surface lighting

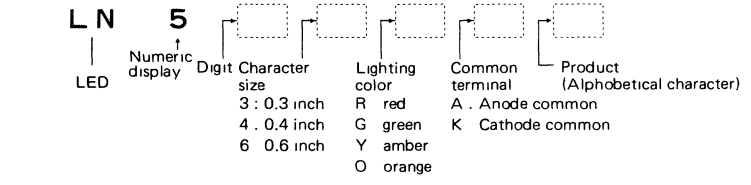


- The appearance of the lens and lighting color are same as them of points lighting diode.

Level Meter



Numeric display

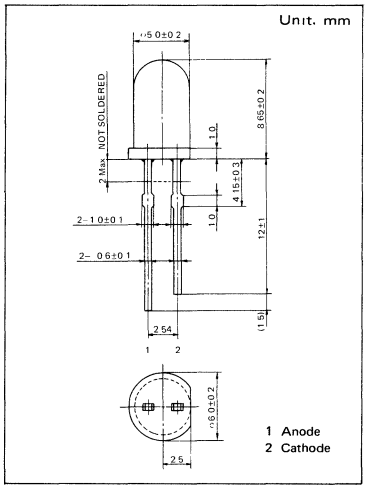


Alphanumeric Index

(Standard Lead Type)

T-1¾ HL Series (Red)

Characteristics: 1. Lighting surface T-1¾ round type
2. High radiation
3. High reliability, long life



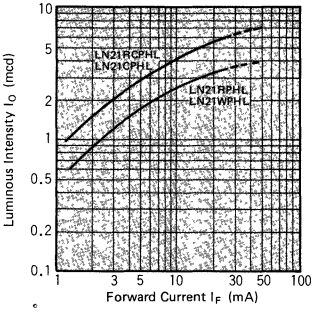
Absolute Maximum Ratings (Ta = 25°C)

Lighting Color	P_D(mW)	I_F(mA)	I_{FM}(mA)	V_R(V)	Topr(°C)	Tstg(°C)
Red	70	25	30	4	−25~+85	−30~+100

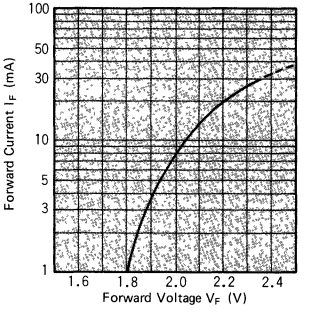
Electro-Optical Characteristics (Ta = 25°C)

Type No.	Lens Color	I_O			V_F		λ_P	$\Delta\lambda_P$		I_R	
		Typ.	Min.	I_F	Typ.	Max.	Typ.	Typ.	I_F	Max.	V_R
LN21RPHL	Red Diffused	3.0	1.0	15	2.2	2.8	700	100	20	5	4
LN21RCPHL	Red Clear	5.0	2.5	15	2.2	2.8	700	100	20	5	4
LN21WPHL	White Diffused	3.0	1.0	15	2.2	2.8	700	100	20	5	4
LN21CPHL	Clear	5.0	2.0	15	2.2	2.8	700	100	20	5	4
Unit	——	mcd	mcd	mA	V	V	nm	nm	mA	μA	V

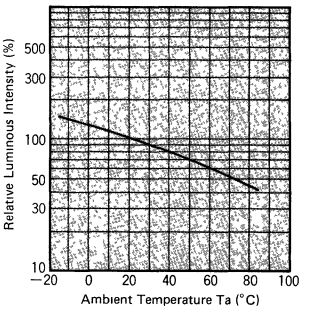
I_O — I_F



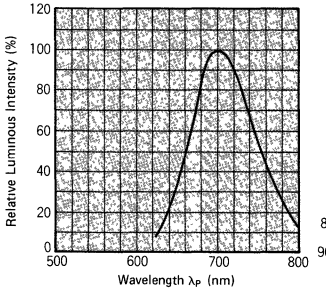
I_F — V_F



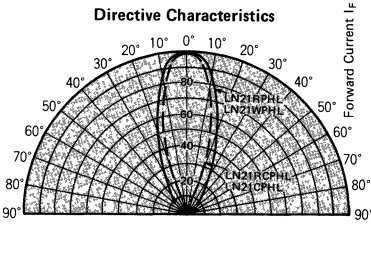
I_O — Ta



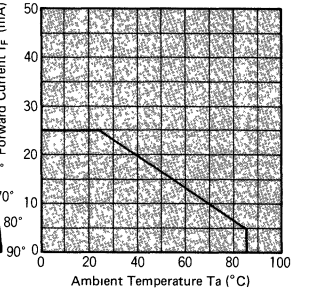
Relative Luminous Intensity
Wavelength Characteristics



Directive Characteristics



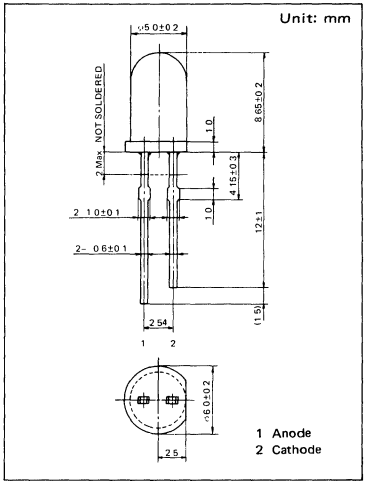
I_F — Ta



(Standard Lead Type)

T-1¾ HL Series (Green)

Characteristics: 1. Lighting surface T-1¾ round type
2. High radiation
3. High reliability, long life



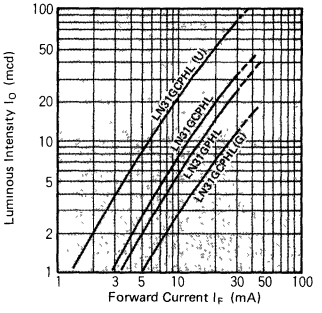
Absolute Maximum Ratings (Ta = 25°C)

Lighting Color	P_D(mW)	I_F(mA)	I_{FM}(mA)	V_R(V)	Topr(°C)	Tstg(°C)
Green	90	30	40	4	−25~+85	−30~+100

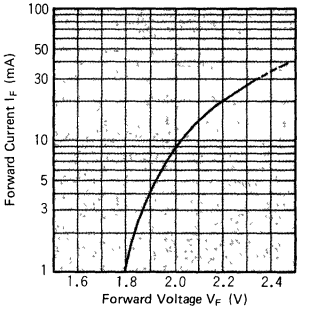
Electro-Optical Characteristics (Ta = 25°C)

Type No.	Lens Color	I_O			V_F		λ_P	$\Delta\lambda_P$		I_R	
		Typ.	Min.	I_F	Typ.	Max.	Typ.	Typ.	I_F	Max.	V_R
LN31GPHL	Green Diffused	15	3.0	20	2.2	2.8	565	30	20	10	4
LN31GCPHL	Green Clear	20	7.5	20	2.2	2.8	565	30	20	10	4
LN31GCPHL(U)	Green Clear	50	23	20	2.2	2.8	565	30	20	10	4
LN31GCPHL(G)	Green Clear	7.5	3.0	20	2.2	2.8	555	20	20	10	4
Unit	——	mcd	mcd	mA	V	V	nm	nm	mA	μA	V

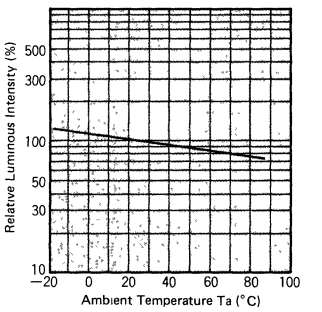
I_O — I_F



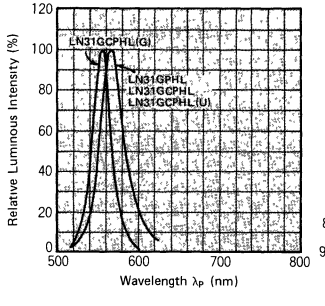
I_F — V_F



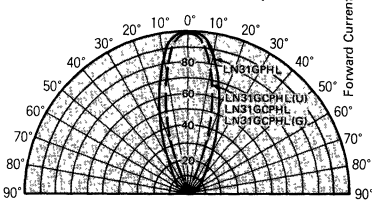
I_O — Ta



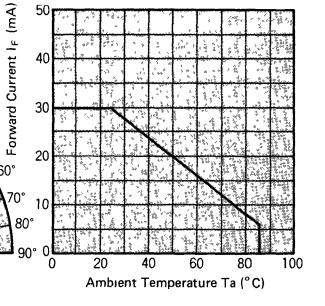
Relative Luminous Intensity Wavelength Characteristics



Directive Characteristics



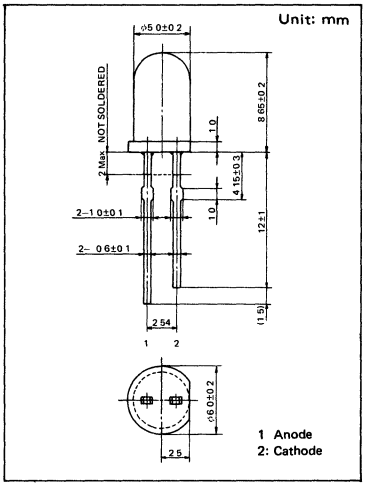
I_F — Ta



(Standard Lead Type)

T-1¾ HL Series (Amber Orange)

Characteristics: 1. Lighting surface T-1¾ round type
2. High radiation
3. High reliability, long life



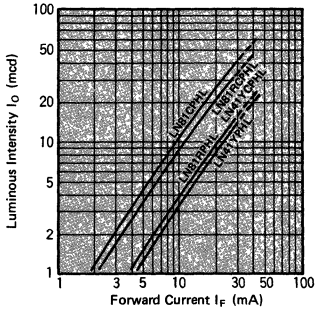
Absolute Maximum Ratings (Ta = 25°C)

Lighting Color	P_D(mW)	I_F(mA)	I_{FM}(mA)	V_R(V)	Topr(°C)	Tstg(°C)
Amber	90	30	40	4	−25~+85	−30~+100
Orange	90	30	40	3	−25~+85	−30~+100

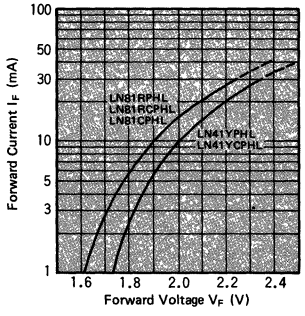
Electro-Optical Characteristics (Ta = 25°C)

Type No.	Lens Color	I_O			V_F		λ_P	$\Delta\lambda_P$		I_R	
		Typ.	Min.	I_F	Typ.	Max.	Typ.	Typ.	I_F	Max.	V_R
LN41YPHL	Amber Diffused	8	3	20	2.2	2.8	590	30	20	10	4
LN41YCPHL	Amber Clear	20	10	20	2.2	2.8	590	30	20	10	4
LN81RPHL	Red Diffused	10	5	20	2.1	2.8	630	40	20	10	3
LN81RCPHL	Red Clear	20	8	20	2.1	2.8	630	40	20	10	3
LN81CPHL	Clear	25	10	20	2.1	2.8	630	40	20	10	3
Unit	——	mcd	mcd	mA	V	V	nm	nm	mA	μA	V

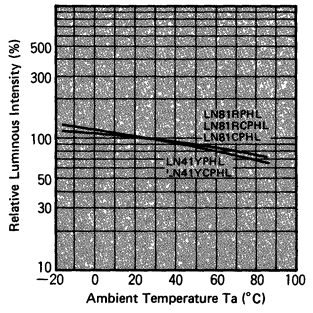
I_O — I_F



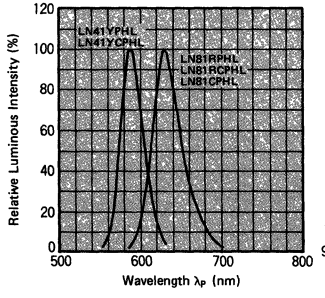
I_F — V_F



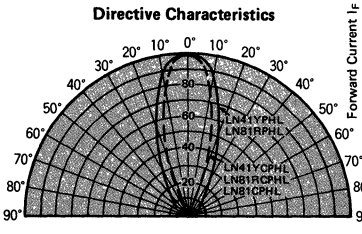
I_O — Ta



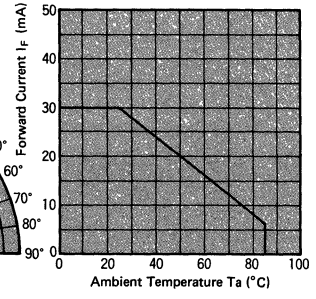
Relative Luminous Intensity Wavelenght Characteristics



Directive Characteristics



I_F — Ta

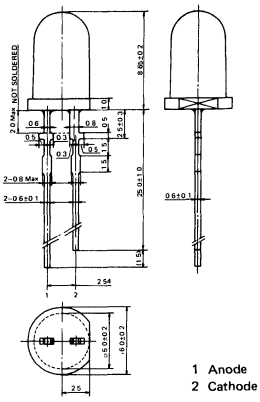


(Long Lead Type)

T-1¾ H Series (Red)

Characteristics: 1. Lighting surface T-¾ round type
2. Long lead wire, high radiation
3. High reliability, long life

Unit: mm



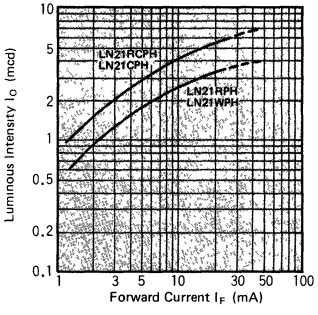
Absolute Maximum Ratings (Ta = 25°C)

Lighting Color	P_D(mW)	I_F(mA)	I_{FM}(mA)	V_R(V)	Topr(°C)	Tstg(°C)
Red	70	25	30	4	−25~+85	−30~+100

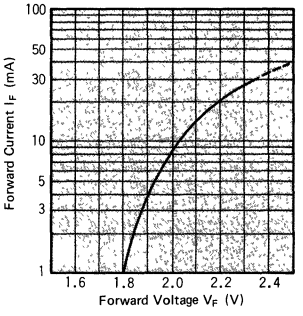
Electro-Optical Characteristics (Ta = 25°C)

Type No.	Lens Color	I_O			V_F		λ_P	$\Delta\lambda_P$		I_R	
		Typ.	Min.	I_F	Typ.	Max.	Typ.	Typ.	I_F	Max.	V_R
LN21RPH	Red Diffused	3.0	1.0	15	2.2	2.8	700	100	20	5	4
LN21RCPH	Red Clear	5.0	2.5	15	2.2	2.8	700	100	20	5	4
LN21WPH	White Diffused	3.0	1.0	15	2.2	2.8	700	100	20	5	4
LN21CPH	Clear	5.0	2.0	15	2.2	2.8	700	100	20	5	4
Unit	——	mcd	mcd	mA	V	V	nm	nm	mA	μA	V

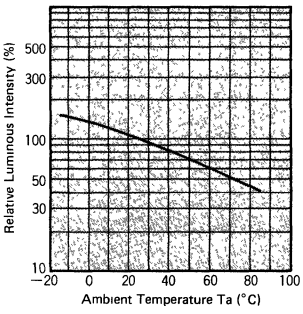
I_O — I_F



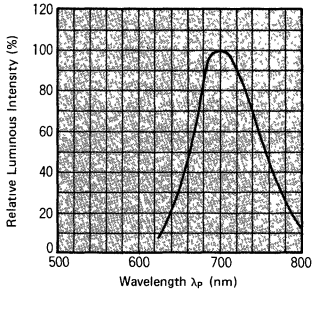
I_F — V_F



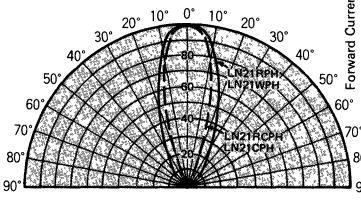
I_O — Ta



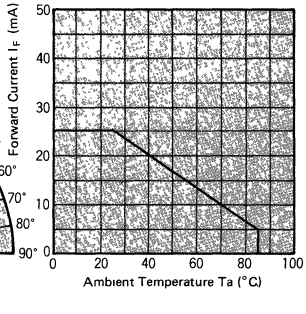
Relative Luminous Intensity Wavelength Characteristics



Directive Characteristics



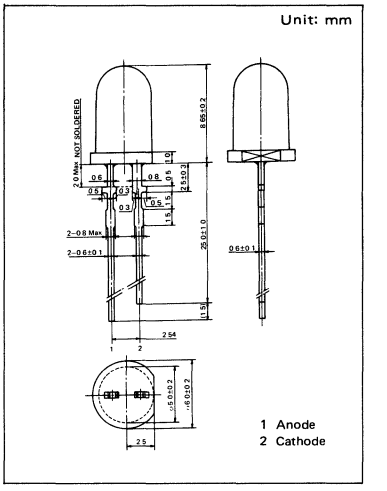
I_F — Ta



(Long Lead Type)

T-1¾ H Series (Green)

Characteristics: 1. Lighting surface T-1¾ round type
2. Long lead wire, high radiation
3. High reliability, long life



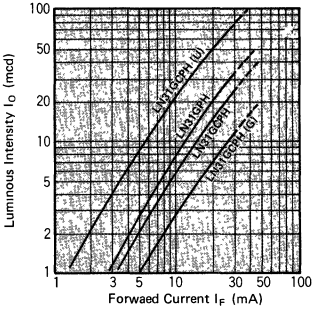
Absolute Maximum Ratings (Ta = 25°C)

Lighting Color	P_D(mW)	I_F(mA)	I_{FM}(mA)	V_R(V)	Topr(°C)	Tstg(°C)
Green	90	30	40	4	−25~+85	−30~+100

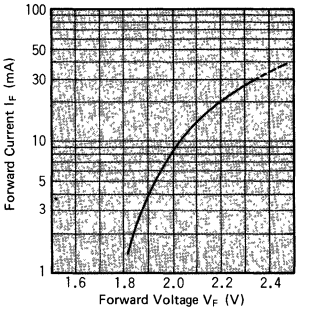
Electro-Optical Characteristics (Ta = 25°C)

Type No.	Lens Color	I_O			V_F		λ_P	$\Delta\lambda_P$		I_R	
		Typ.	Min.	I_F	Typ.	Max.	Typ.	Typ.	I_F	Max.	V_R
LN31GPH	Green Diffused	15	3.0	20	2.2	2.8	565	30	20	10	4
LN31GCPH	Green Clear	20	7.5	20	2.2	2.8	565	30	20	10	4
LN31GCPH(U)	Green Clear	50	23	20	2.2	2.8	565	30	20	10	4
LN31GCPH(G)	Green Clear	7.5	3.0	20	2.2	2.8	555	20	20	10	4
Unit	——	mcd	mcd	mA	V	V	nm	nm	mA	μA	V

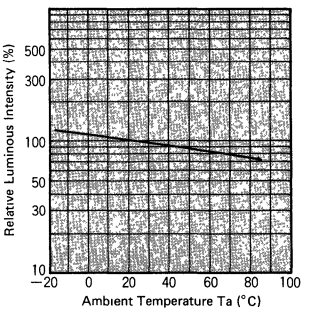
I_O — I_F



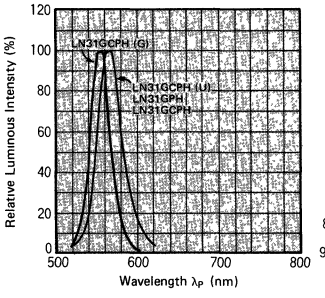
I_F — V_F



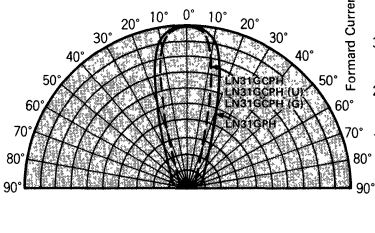
I_O — Ta



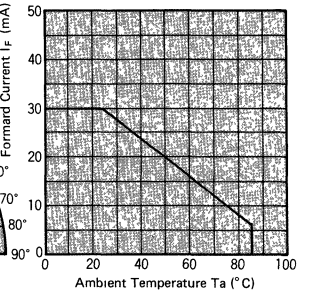
Relative Luminous Intensity Wavelength Characteristics



Directive Characteristics



I_F — Ta



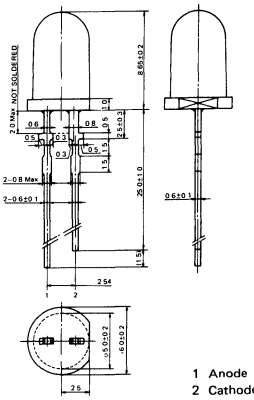
Round Type

(Long Lead Type)

T-1¾ H Series (Amber / Orange)

Characteristics: 1. Lighting surface T-¾ round type
2. Long lead wire, high radiation
3. High reliability, long life

Unit: mm



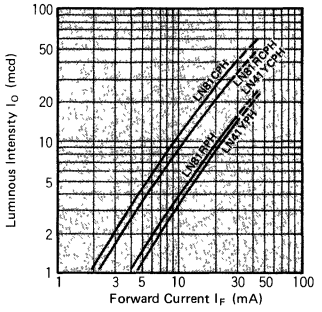
Absolute Maximum Ratings (Ta = 25°C)

Lighting Color	P_D(mW)	I_F(mA)	I_{FM}(mA)	V_R(V)	Topr(°C)	Tstg(°C)
Amber	90	30	40	4	−25~+85	−30~+100
Orange	90	30	40	3	−25~+85	−30~+100

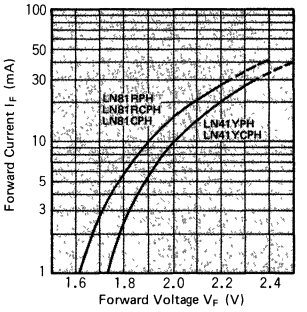
Electro-Optical Characteristics (Ta = 25°C)

Type No.	Lens Color	I_O			V_F		λ_P	$\Delta\lambda_P$		I_R	
		Typ.	Min.	I_F	Typ.	Max.	Typ.	Typ.	I_F	Max.	V_R
LN41YPH	Amber Diffused	8	3	20	2.2	2.8	590	30	20	10	4
LN41YCPH	Amber Clear	20	10	20	2.2	2.8	590	30	20	10	4
LN81RPH	Red Diffused	10	5	20	2.1	2.8	630	40	20	10	3
LN81RCPH	Red Clear	20	8	20	2.1	2.8	630	40	20	10	3
LN81CPH	Clear	25	10	20	2.1	2.8	630	40	20	10	3
Unit	——	mcd	mcd	mA	V	V	nm	nm	mA	μA	V

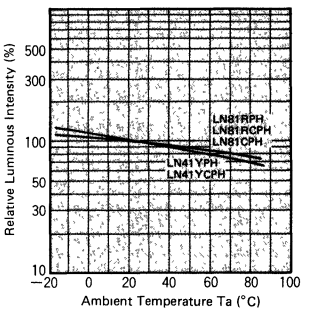
I_O − I_F



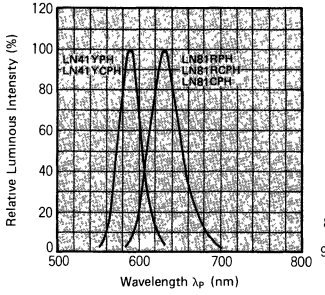
I_F − V_F



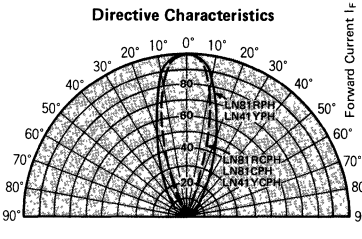
I_O − Ta



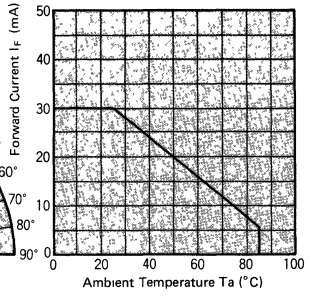
Relative Luminous Intensity
Wavelength Characteristics



Directive Characteristics



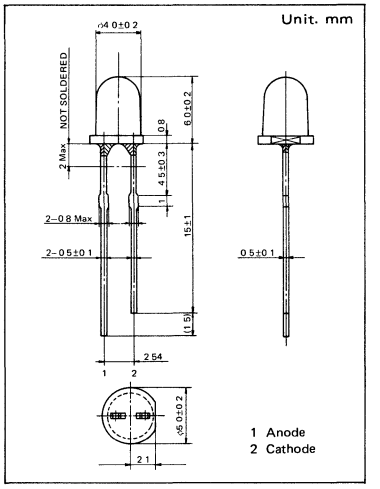
I_F − Ta



(Standard Lead Type)

T-1½ Series (Red)

Characteristics: 1. Lighting surface T-1½ round type
2. Many lens color variations
3. High reliability, long life



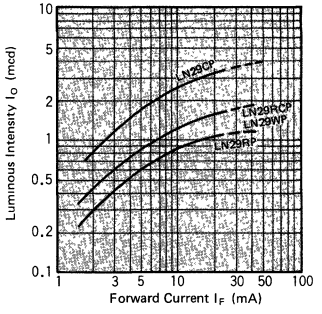
Absolute Maximum Ratings (Ta = 25°C)

Lighting Color	P_D(mW)	I_F(mA)	I_{FM}(mA)	V_R(V)	Topr(°C)	Tstg(°C)
Red	70	25	30	4	−25~+85	−30~+100

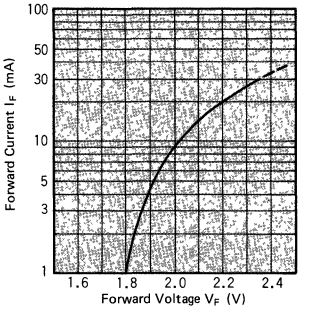
Electro-Optical Characteristics (Ta = 25°C)

Type No.	Lens Color	I_O		I_F	V_F		λ_P	$\Delta\lambda_P$	I_F	I_R	V_R
		Typ.	Min.		Typ.	Max.	Typ.	Typ.		Max.	
LN29RP	Red Diffused	1.0	0.3	15	2.2	2.8	700	100	20	5	4
LN29RCP	Red Clear	1.5	0.8	15	2.2	2.8	700	100	20	5	4
LN29WP	White Diffused	1.5	0.8	15	2.2	2.8	700	100	20	5	4
LN29CP	Clear	3.0	0.8	15	2.2	2.8	700	100	20	5	4
Unit	——	mcd	mcd	mA	V	V	nm	nm	mA	μA	V

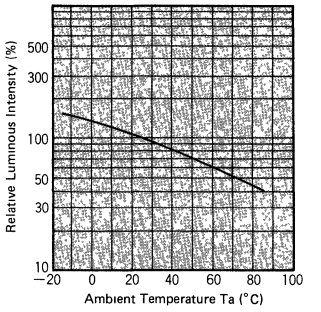
I_O — I_F



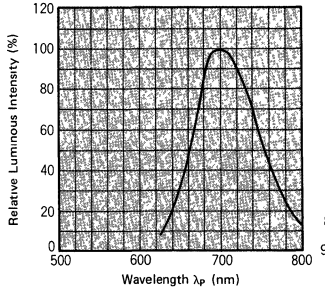
I_F — V_F



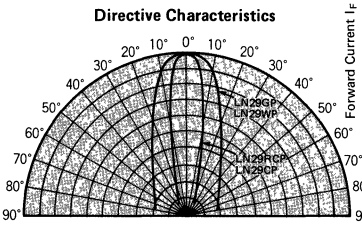
I_O — Ta



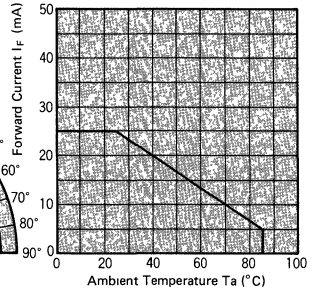
Relative Luminous Intensity Wavelength Characteristics



Directive Characteristics



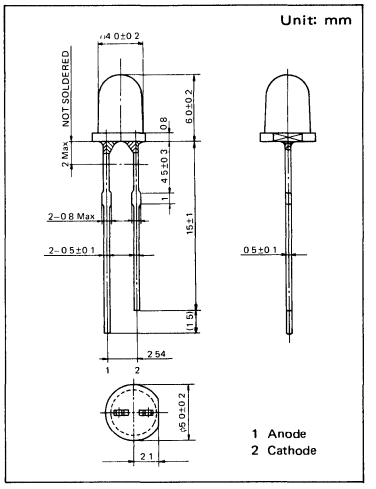
I_F — Ta



(Standard Lead Type)

T-1½ Series (Green Amber)

Characteristics: 1. Lighting surface T-½ round type
2. Many lens color variations
3. High reliability, long life



Absolute Maximum Ratings (Ta = 25°C)

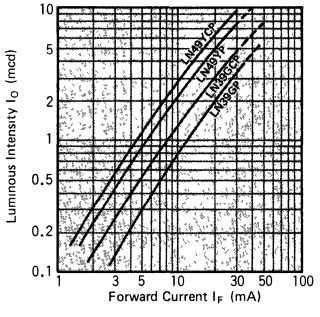
Lighting Color	P_D(mW)	I_F(mA)	I_{FM}(mA)	V_R(V)	Topr(°C)	Tstg(°C)
Green	90	30	40	4	−25~+85	−30~+100
Amber	90	30	40	4	−25~+85	−30~+100

Electro-Optical Characteristics (Ta = 25°C)

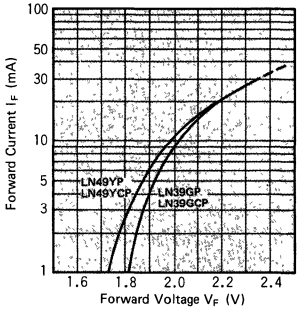
Type No.	Lens Color	I_O			V_F		λ_P	$\Delta\lambda_P$		I_R	
		Typ.	Min.	I_F	Typ.	Max.	Typ.	Typ.	I_F	Max.	V_R
LN39GP	Green Diffused	2.0	0.8	20	2.2	2.8	565	30	20	10	4
LN39GCP	Green Clear	3.0	1.0	20	2.2	2.8	565	30	20	10	4
LN49YP	Amber Diffused	5.0	1.5	20	2.2	2.8	590	30	20	10	4
△ LN49YCP	Amber Clear	6.0	—	20	2.2	2.8	590	30	20	10	4
Unit	——	mcd	mcd	mA	V	V	nm	nm	mA	μA	V

△ Tentative specification

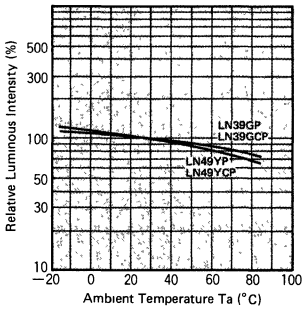
I_O — I_F



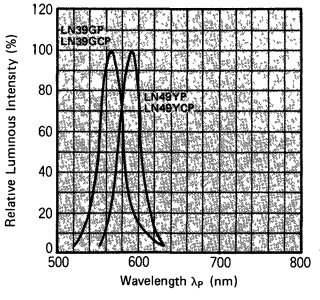
I_F — V_F



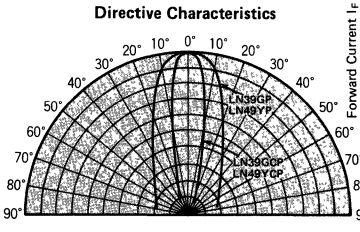
I_O — Ta



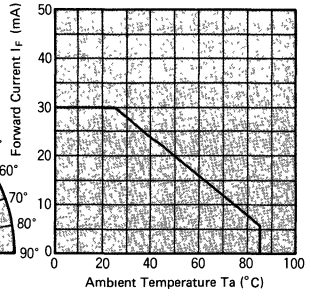
Relative Luminous Intensity Wavelength Characteristics



Directive Characteristics



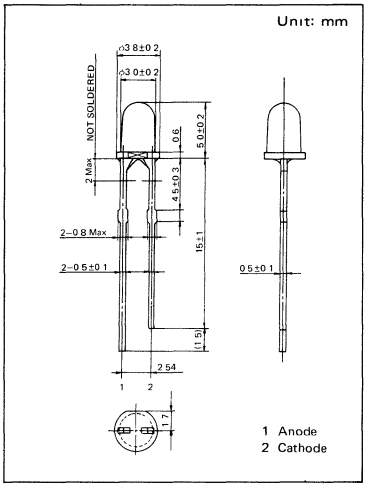
I_F — Ta



(Standard Lead Type)

T-1 Series (Red)

Characteristics: 1. Lighting surface T-1 round type
2. Many lens color variations
3. High reliability, long life



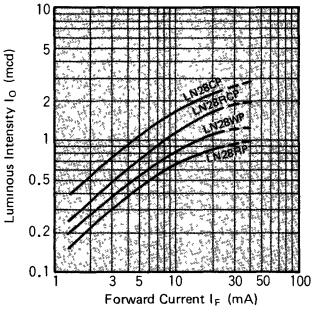
Absolute Maximum Ratings (Ta = 25°C)

Lighting Color	P_D(mW)	I_F(mA)	I_{FM}(mA)	V_R(V)	Topr(°C)	Tstg(°C)
Red	70	25	30	4	−25~+85	−30~+100

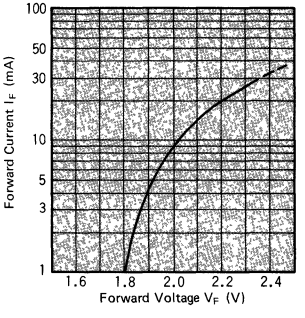
Electro-Optical Characteristics (Ta = 25°C)

Type No.	Lens Color	I_O			V_F		λ_P	$\Delta\lambda_P$		I_R	
		Typ.	Min.	I_F	Typ.	Max.	Typ.	Typ.	I_F	Max.	V_R
LN28RP	Red Diffused	0.8	0.3	15	2.2	2.8	700	100	20	5	4
LN28RCP	Red Clear	1.5	0.6	15	2.2	2.8	700	100	20	5	4
LN28WP	White Diffused	1.0	0.3	15	2.2	2.8	700	100	20	5	4
LN28CP	Clear	2.0	0.8	15	2.2	2.8	700	100	20	5	4
Unit	——	mcd	mcd	mA	V	V	nm	nm	mA	μA	V

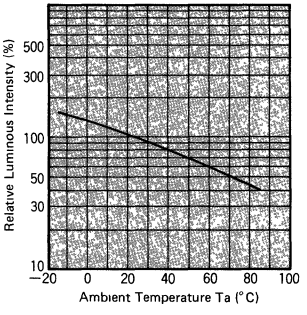
I_O — I_F



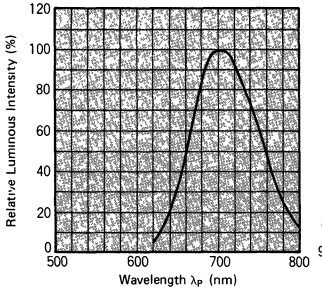
I_F — V_F



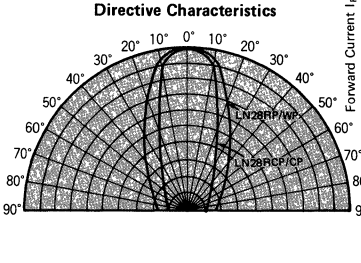
I_O — Ta



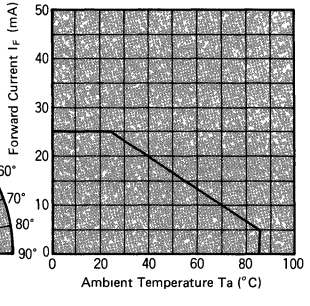
Relative Luminous Intensity Wavelenght Characteristics



Directive Characteristics



I_F — Ta

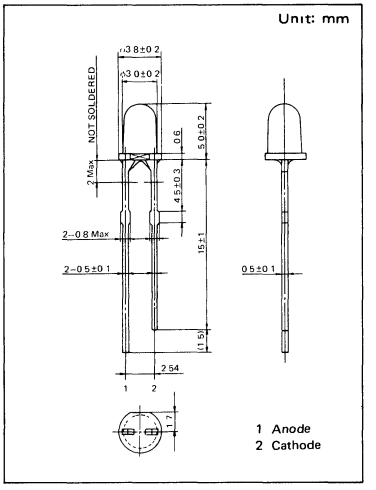


Round Type

(Standard Lead Type)

T-1 Series (Green / Amber)

Characteristics: 1. Lighting surface T-1 round type
2. Many lens color variations
3. High reliability, long life



Absolute Maximum Ratings (Ta = 25°C)

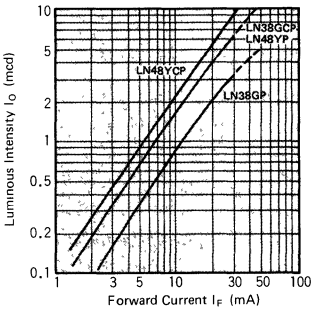
Lighting Color	P_D(mW)	I_F(mA)	I_{FM}(mA)	V_R(V)	Topr(°C)	Tstg(°C)
Green	90	30	40	4	−25~+85	−30~+100
Amber	90	30	40	4	−25~+85	−30~+100

Electro-Optical Characteristics (Ta = 25°C)

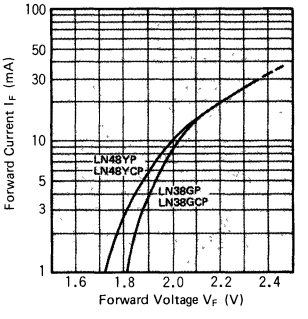
Type No.	Lens Color	I_O			V_F		λ_P	$\Delta\lambda_P$		I_R	
		Typ.	Min.	I_F	Typ.	Max.	Typ	Typ.	I_F	Max.	V_R
LN38GP	Green Diffused	2.0	0.7	20	2.2	2.8	565	30	20	10	4
LN38GCP	Green Clear	4.0	1.0	20	2.2	2.8	565	30	20	10	4
LN48YP	Amber Diffused	4.0	1.4	20	2.2	2.8	590	30	20	10	4
△ LN48YCP	Amber Clear	6.0	—	20	2.2	2.8	590	30	20	10	4
Unit	——	mcd	mcd	mA	V	V	nm	nm	mA	μA	V

△ Tentative specification

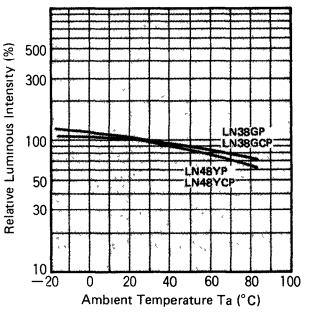
I_O — I_F



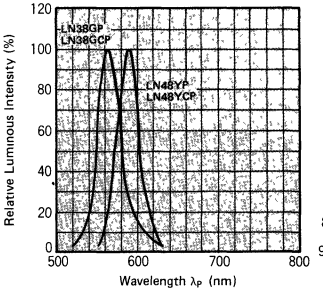
I_F — V_F



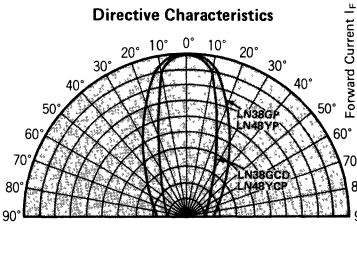
I_O — Ta



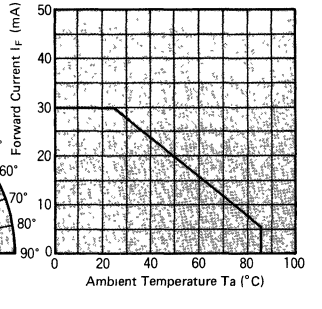
Relative Luminous Intensity
Wavelength Characteristics



Directive Characteristics

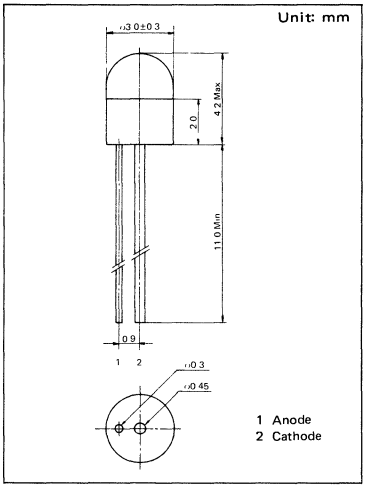


I_F — Ta



Mini T-1 Series

Characteristics: 1. Lighting surface T-1 round type
2. High radiation
3. High reliability, long life



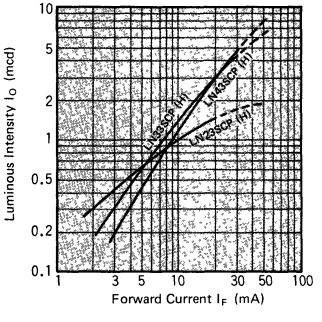
Absolute Maximum Ratings (Ta = 25°C)

Lighting Color	P_D(mW)	I_F(mA)	I_{FM}(mA)	V_R(V)	Topr(°C)	Tstg(°C)
Red	55	20	25	4	−25~+85	−30~+100
Green	90	30	40	4	−25~+85	−30~+100
Amber	90	30	40	4	−25~+85	−30~+100

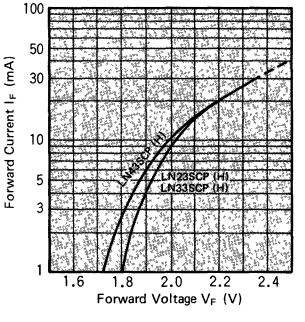
Electro-Optical Characteristics (Ta = 25°C)

Type No.	Lens Color	I_O			V_F		λ_P	$\Delta\lambda_P$		I_R	
		Typ.	Min.	I_F	Typ.	Max.	Typ.	Typ.	I_F	Max.	V_R
LN23SCP(H)	Clear	1.3	0.8	15	2.2	2.8	700	100	20	5	4
LN33SCP(H)	Green Clear	3.0	2.0	20	2.2	2.8	565	30	20	10	4
LN43SCP(H)	Clear	3.0	2.0	20	2.2	2.8	590	30	20	10	4
Unit	——	mcd	mcd	mA	V	V	nm	nm	mA	μA	V

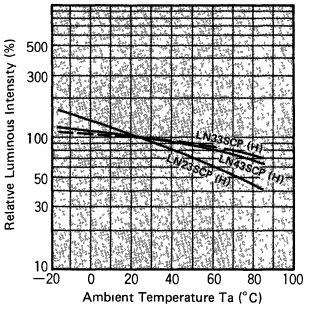
I_O — I_F



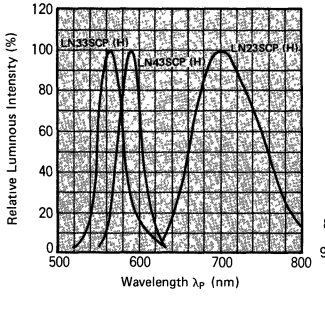
I_F — V_F



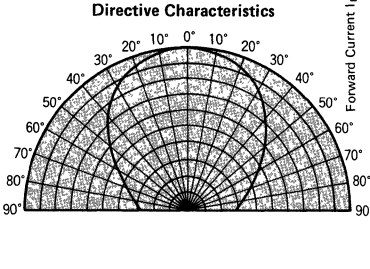
I_O — Ta



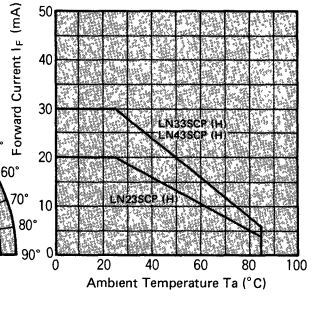
Relative Luminous Intensity
Wavelength Characteristics



Directive Characteristics



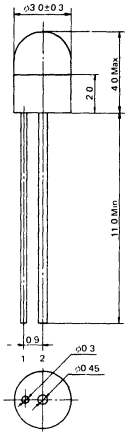
I_F — Ta



Mini T-1 Series

Characteristics: 1. Lighting surface T-1 round type
2. Wire directivity
3. High reliability, long life

Unit: mm



1. Anode
2. Cathode

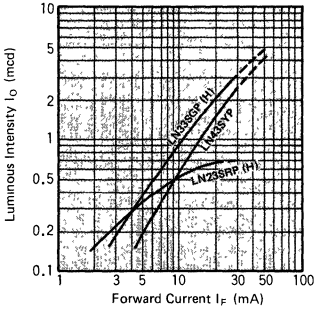
Absolute Maximum Ratings (Ta = 25°C)

Lighting Color	P_D(mW)	I_F(mA)	I_{FM}(mA)	V_R(V)	Topr(°C)	Tstg(°C)
Red	70	25	30	4	−25~+85	−30~+100
Green	90	30	40	4	−25~+85	−30~+100
Amber	90	30	40	4	−25~+85	−30~+100

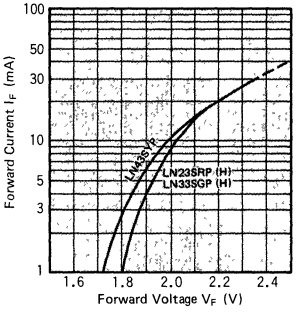
Electro-Optical Characteristics (Ta = 25°C)

Type No.	Lens Color	I_O			V_F		λ_P	$\Delta\lambda_P$		I_R	
		Typ.	Min.	I_F	Typ.	Max.	Typ.	Typ.	I_F	Max.	V_R
LN23SRP(H)	Red Diffused	0.6	0.3	15	2.2	2.8	700	100	20	5	4
LN33SGP(H)	Green Diffused	2.0	0.4	20	2.2	2.8	565	30	20	10	4
LN43SYP	Amber Diffused	1.5	0.2	20	2.2	2.8	590	30	20	10	4
Unit	——	mcd	mcd	mA	V	V	nm	nm	mA	μA	V

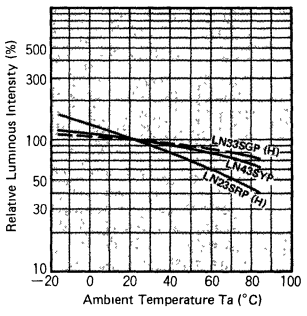
I_O — I_F



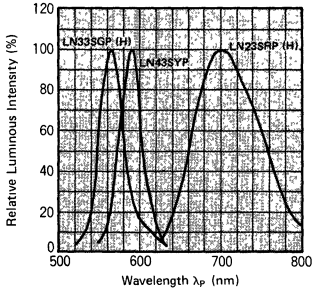
I_F — V_F



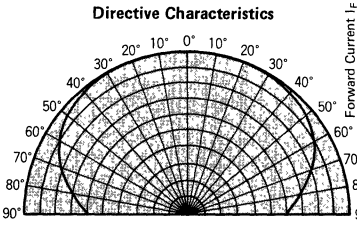
I_O — Ta



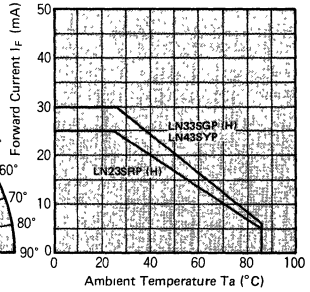
Relative Luminous Intensity Wavelength Characteristics



Directive Characteristics

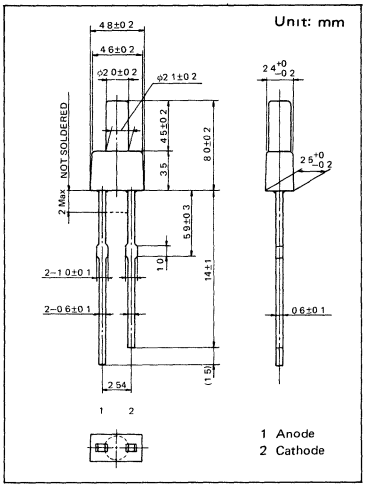


I_F — Ta



Round-Top View 2mm Series

Characteristics: 1. Lighting surface 2.0mm round-top view type
2. Suitable for many LED use
3. High reliability, long life



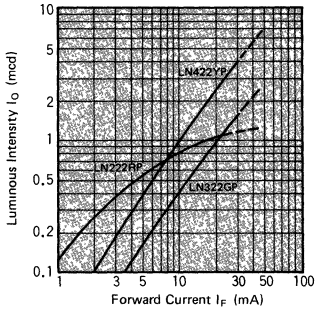
Absolute Maximum Ratings (Ta = 25°C)

Lighting Color	P_D(mW)	I_F(mA)	I_{FM}(mA)	V_R(V)	Topr(°C)	Tstg(°C)
Red	70	25	30	4	−25~+85	−30~+100
Green	90	30	40	4	−25~+85	−30~+100
Amber	90	30	40	4	−25~+85	−30~+100

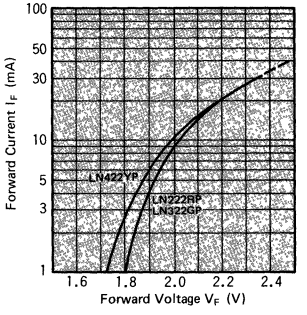
Electro-Optical Characteristics (Ta = 25°C)

Type No.	Lens Color	I_O			V_F		λ_P	$\Delta\lambda_P$		I_R	
		Typ.	Min.	I_F	Typ.	Max.	Typ.	Typ.	I_F	Max.	V_R
LN222RP	Red Diffused	1.0	0.4	15	2.2	2.8	700	100	20	5	4
LN322GP	Green Diffused	1.0	0.4	20	2.2	2.8	565	30	20	10	4
LN422YP	Amber Diffused	2.5	1.2	20	2.2	2.8	590	30	20	10	4
Unit	——	mcd	mcd	mA	V	V	nm	nm	mA	μA	V

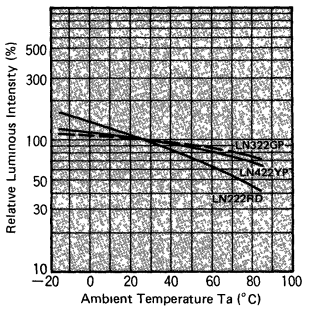
I_O − I_F



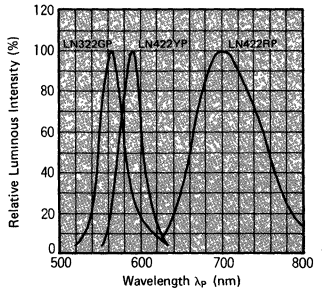
I_F − V_F



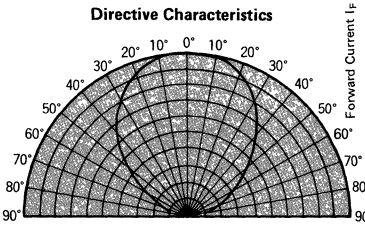
I_O − Ta



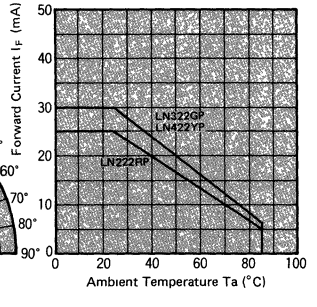
Relative Luminous Intensity Wavelength Characteristics



Directive Characteristics

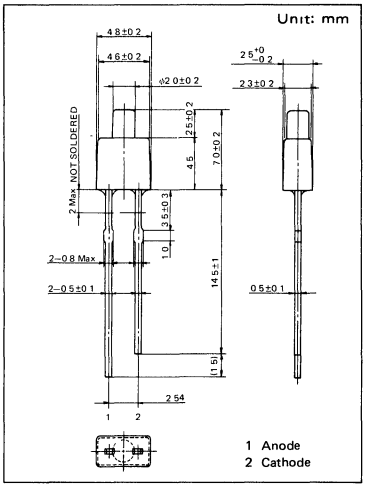


I_F − Ta



Round-Top View 2mm Series

Characteristics: 1. Lighting surface 2.0mm round-top view type
2. Suitable for many LED use
3. High reliability, long life



Absolute Maximum Ratings (Ta = 25°C)

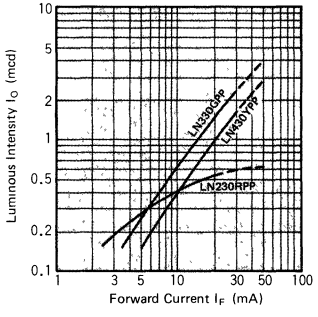
Lighting Color	P_D(mW)	I_F(mA)	I_{FM}(mA)	V_R(V)	Topr(°C)	Tstg(°C)
Red	70	25	30	4	−25~+85	−30~+100
Green	90	30	40	4	−25~+85	−30~+100
Amber	90	30	40	4	−25~+85	−30~+100

Electro-Optical Characteristics (Ta = 25°C)

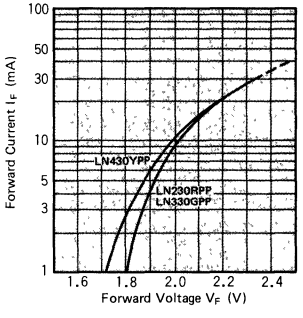
Type No.	Lens Color	I_O			V_F		λ_P	$\Delta\lambda_P$		I_R	
		Typ.	Min.	I_F	Typ.	Max.	Typ.	Typ.	I_F	Max.	V_R
LN230RPP	Red Diffused	0.5	0.2	15	2.2	2.8	700	100	20	5	4
LN330GPP	Green Diffused	1.5	0.6	20	2.2	2.8	565	30	20	10	4
△ LN430YPP	Amber Diffused	1.0	—	20	2.2	2.8	590	30	20	10	4
Unit	——	mcd	mcd	mA	V	V	nm	nm	mA	μA	V

△ Tentative specification

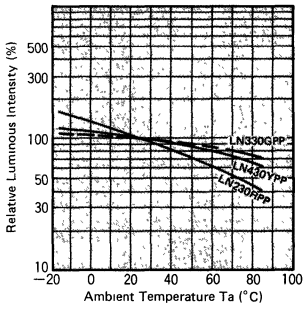
I_O — I_F



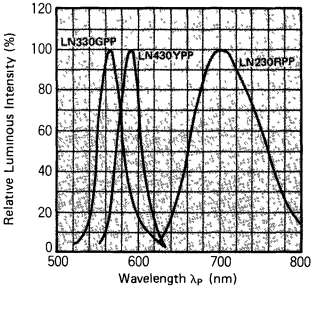
I_F — V_F



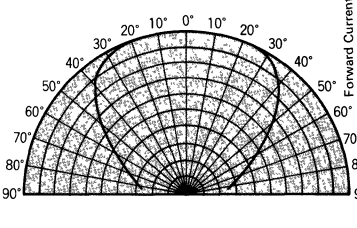
I_O — Ta



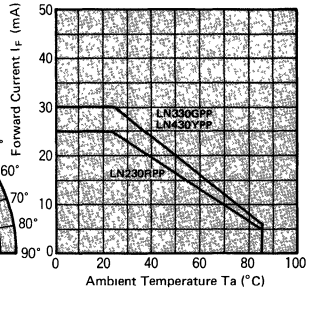
Relative Luminous Intensity Wavelength Characteristics



Directive Characteristics

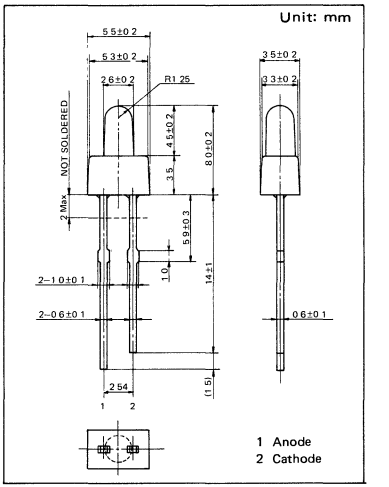


I_F — Ta



Round-Top View 2.6mm Series

Characteristics: 1. Lighting surface 2.6mm round-top view type
2. Suitable for many LED use
3. High reliability, long life



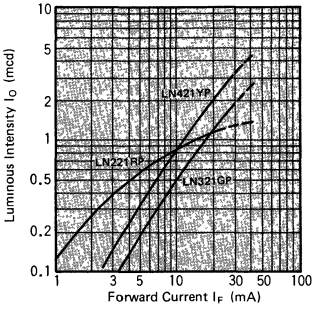
Absolute Maximum Ratings (Ta = 25°C)

Lighting Color	P_D(mW)	I_F(mA)	I_{FM}(mA)	V_R(V)	Topr(°C)	Tstg(°C)
Red	70	25	30	4	−25~+85	−30~+100
Green	90	30	40	4	−25~+85	−30~+100
Amber	90	30	40	4	−25~+85	−30~+100

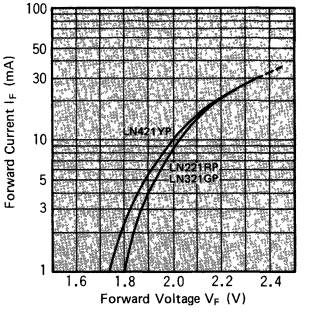
Electro-Optical Characteristics (Ta = 25°C)

Type No.	Lens Color	I_O			V_F		λ_P	$\Delta\lambda_P$		I_R	
		Typ.	Min.	I_F	Typ.	Max.	Typ.	Typ.	I_F	Max.	V_R
LN221RP	Red Diffused	1.0	0.5	15	2.2	2.8	700	100	20	5	4
LN321GP	Green Diffused	1.2	0.5	20	2.2	2.8	565	30	20	10	4
LN421YP	Amber Diffused	2.0	1.0	20	2.2	2.8	590	30	20	10	4
Unit	——	mcd	mcd	mA	V	V	nm	nm	mA	μA	V

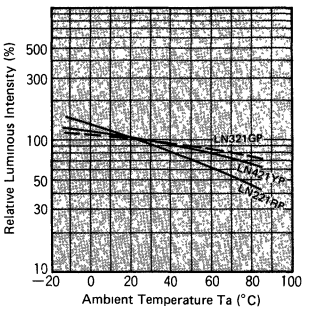
I_O — I_F



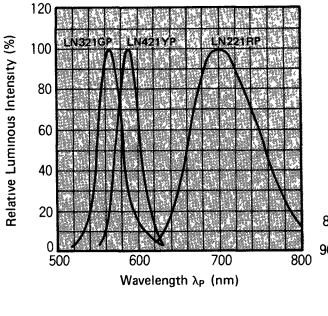
I_F — V_F



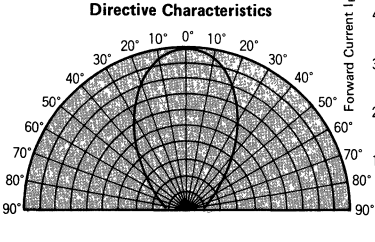
I_O — Ta



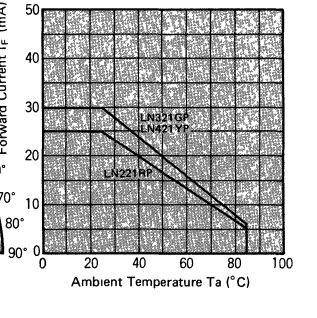
Relative Luminous Intensity Wavelenght Characteristics



Directive Characteristics

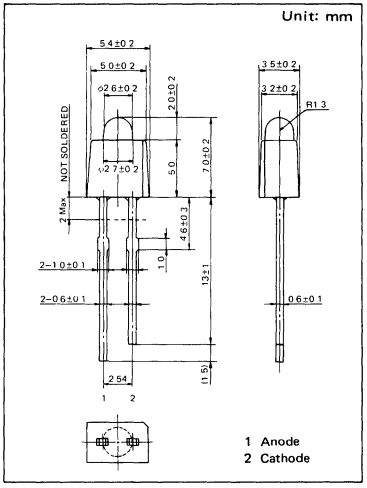


I_F — Ta



Round-Top View 2.6mm Series

Characteristics: 1. Lighting surface 2.6mm round-top view type
2. High radiation
3. High reliability, long life



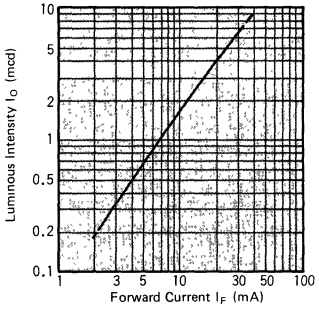
Absolute Maximum Ratings (Ta = 25°C)

Lighting Color	P_D(mW)	I_F(mA)	I_{FM}(mA)	V_R(V)	Topr(°C)	Tstg(°C)
Orange	90	30	40	3	−25~+85	−30~+100

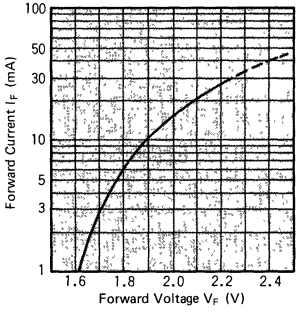
Electro-Optical Characteristics (Ta = 25°C)

Type No.	Lens Color	I_O			V_F		λ_P	$\Delta\lambda_P$		I_R	
		Typ.	Min.	I_F	Typ.	Max.	Typ.	Typ.	I_F	Max.	V_R
LN831RP	Red Diffused	4.0	1.5	20	2.1	2.8	630	40	20	10	3
Unit	——	mcd	mcd	mA	V	V	nm	nm	mA	μA	V

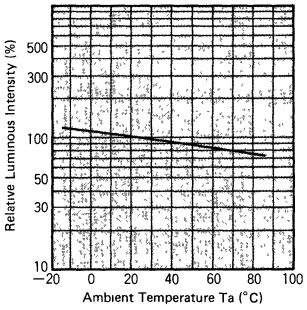
I_O — I_F



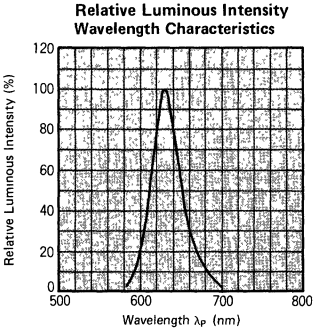
I_F — V_F



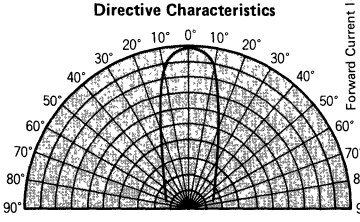
I_O — Ta



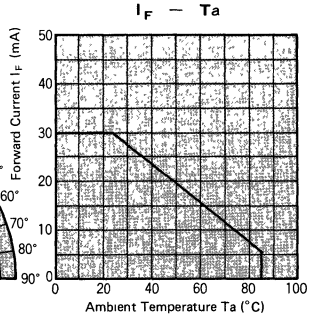
Relative Luminous Intensity Wavelength Characteristics



Directive Characteristics

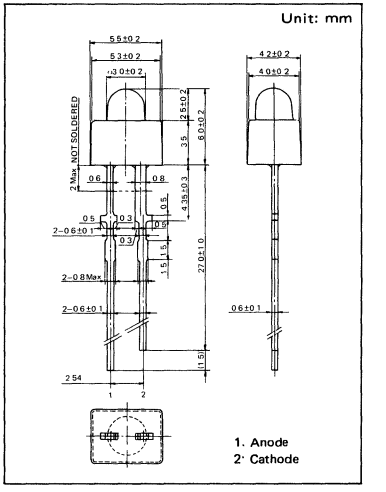


I_F — Ta



Round-Top View 3mm Series

Characteristics: 1. Lighting surface 2.0mm round-top view type
2. Long lead wire, high radiation
3. High reliability, long life



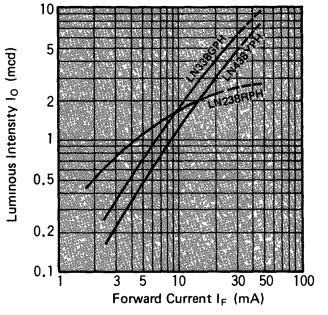
Absolute Maximum Ratings (Ta = 25°C)

Lighting Color	P_D(mW)	I_F(mA)	I_{FM}(mA)	V_R(V)	Topr(°C)	Tstg(°C)
Red	70	25	30	4	−25~+85	−30~+100
Green	90	30	40	4	−25~+85	−30~+100
Amber	90	30	40	4	−25~+85	−30~+100

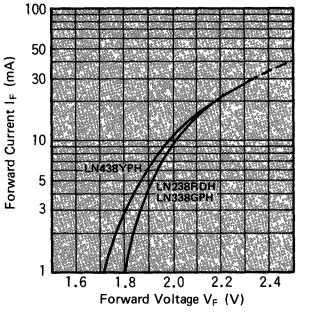
Electro-Optical Characteristics (Ta = 25°C)

Type No.	Lens Color	I_O			V_F		λ_P	$\Delta\lambda_O$		I_R	
		Typ.	Min.	I_F	Typ.	Max.	Typ.	Typ.	I_F	Max.	V_R
LN238RPH	Red Diffused	2.0	1.0	15	2.2	2.8	700	100	20	5	4
LN338GPH	Green Diffused	4.0	1.5	20	2.2	2.8	565	30	20	10	4
LN438YPH	Amber Diffused	3.0	1.0	20	2.2	2.8	590	30	20	10	4
Unit	——	mcd	mcd	mA	V	V	nm	nm	mA	μA	V

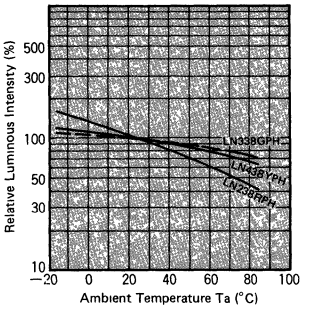
I_O — I_F



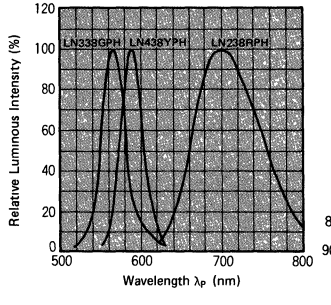
I_F — V_F



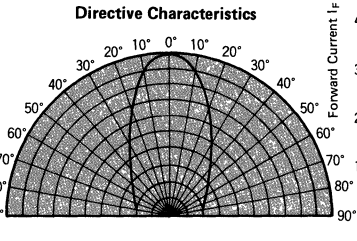
I_O — Ta



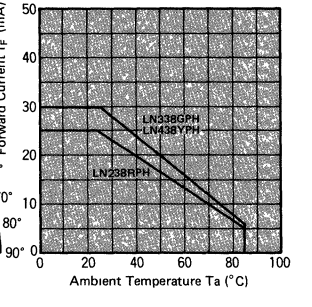
Relative Luminous Intensity
Wavelength Characteristics



Directive Characteristics

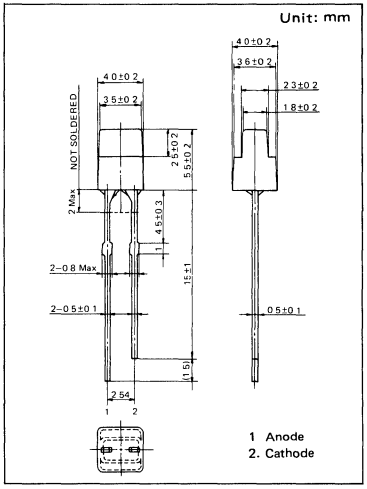


I_F — Ta



1.8mm X 3.5mm Series

Characteristics: 1. Lighting surface 1.8mm x 3.5mm rectangle
2. Uniform lighting surface
3. High reliability, long life



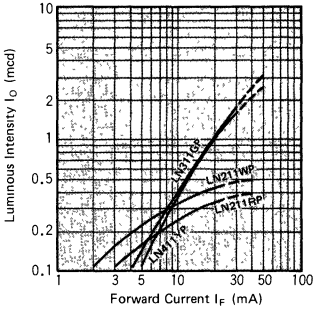
Absolute Maximum Ratings (Ta = 25°C)

Lighting Color	P_D(mW)	I_F(mA)	I_{FM}(mA)	V_R(V)	Topr(°C)	Tstg(°C)
Red	70	25	30	4	−25~+85	−30~+100
Green	90	30	40	4	−25~+85	−30~+100
Amber	90	30	40	4	−25~+85	−30~+100

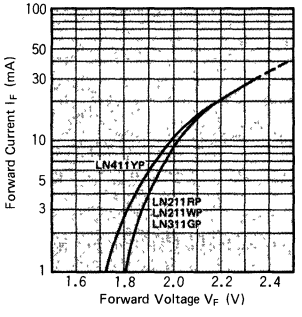
Electro-Optical Characteristics (Ta = 25°C)

Type No.	Lens Color	I_O			V_F		λ_P	$\Delta\lambda_P$		I_R	
		Typ.	Min.	I_F	Typ.	Max.	Typ.	Typ.	I_F	Max.	V_R
LN211RP	Red Diffused	0.3	0.15	15	2.2	2.8	700	100	20	5	4
LN211WP	White Diffused	0.4	0.10	15	2.2	2.8	700	100	20	5	4
LN311GP	Green Diffused	1.0	0.45	20	2.2	2.8	565	30	20	10	4
LN411YP	Amber Diffused	1.0	0.40	20	2.2	2.8	590	30	20	10	4
Unit	——	mcd	mcd	mA	V	V	nm	nm	mA	μA	V

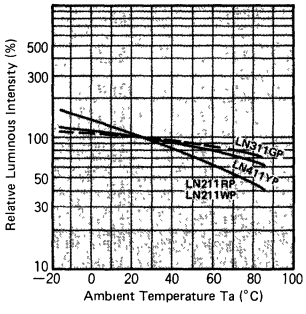
I_O − I_F



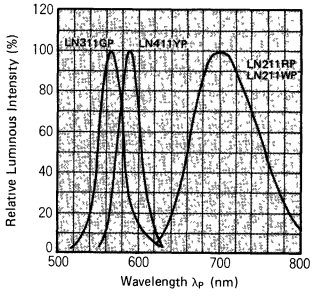
I_F − V_F



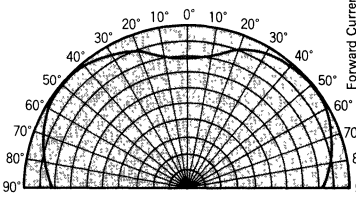
I_O − Ta



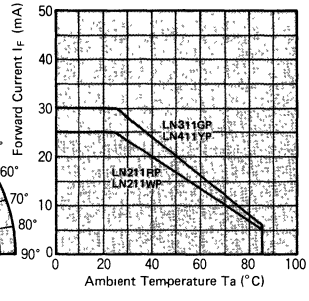
Relative Luminous Intensity Wavelength Characteristics



Directive Characteristics

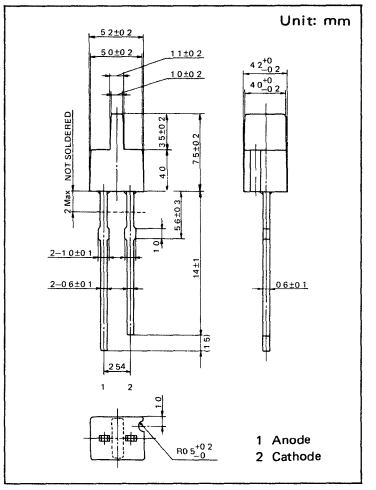


I_F − Ta



1mm X 4mm Series

Characteristics: 1. Lighting surface 1 mm x 4mm rectangle
2. Uniform lighting surface
3. High reliability, long life



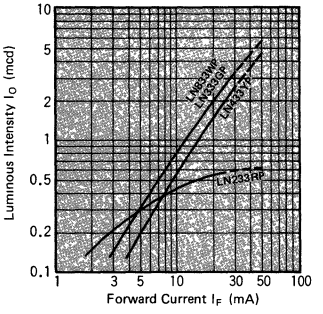
Absolute Maximum Ratings (Ta = 25°C)

Lighting Color	P_D(mW)	I_F(mA)	I_{FM}(mA)	V_R(V)	Topr(°C)	Tstg(°C)
Red	70	25	30	4	−25~+85	−30~+100
Green	90	30	40	4	−25~+85	−30~+100
Amber	90	30	40	4	−25~+85	−30~+100
Orange	90	30	40	3	−25~+85	−30~+100

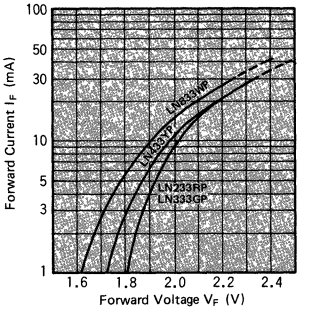
Electro-Optical Characteristics (Ta = 25°C)

Type No.	Lens Color	I_O			V_F		λ_P	$\Delta\lambda_P$		I_R	
		Typ.	Min.	I_F	Typ.	Max.	Typ.	Typ.	I_F	Max.	V_R
LN233RP	Red Diffused	0.5	0.10	15	2.2	2.8	700	100	20	5	4
LN333GP	Green Diffused	2.0	0.75	20	2.2	2.8	565	30	20	10	4
LN433YP	Amber Diffused	1.5	0.50	20	2.2	2.8	590	30	20	10	4
LN833WP	White Diffused	2.0	0.75	20	2.1	2.8	630	40	20	10	4
Unit	—	mcd	mcd	mA	V	V	nm	nm	mA	μA	V

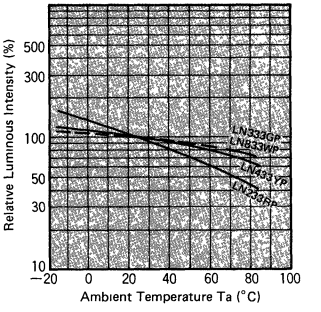
I_O — I_F



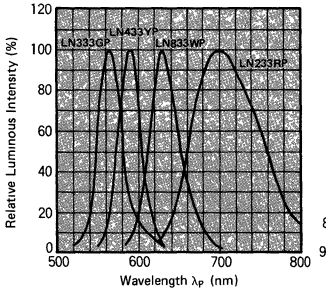
I_F — V_F



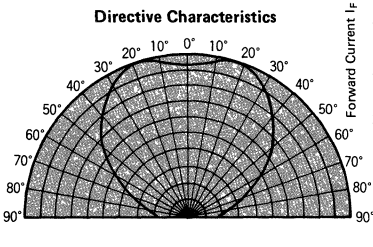
I_O — Ta



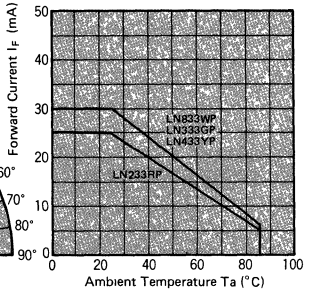
Relative Luminous Intensity Wavelength Characteristics



Directive Characteristics



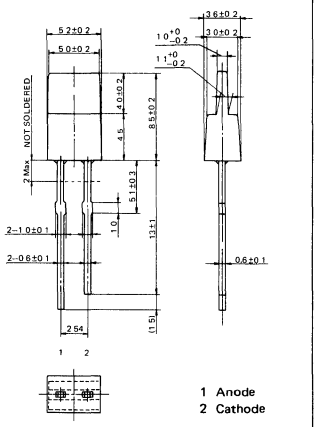
I_F — Ta



1mm X 5mm Series

Characteristics: 1. Lighting surface 1.mm x 5mm rectangle
2. Uniform lighting surface
3. High reliability, long life

Unit: mm



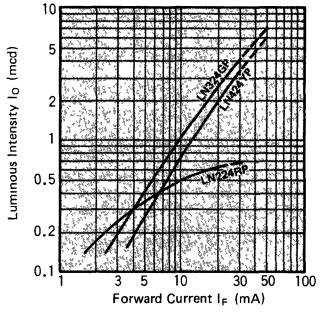
Absolute Maximum Ratings (Ta = 25°C)

Lighting Color	P_D(mW)	I_F(mA)	I_{FM}(mA)	V_R(V)	Topr(°C)	Tstg(°C)
Red	70	25	30	4	−25~+85	−30~+100
Green	90	30	40	4	−25~+85	−30~+100
Amber	90	30	40	4	−25~+85	−30~+100

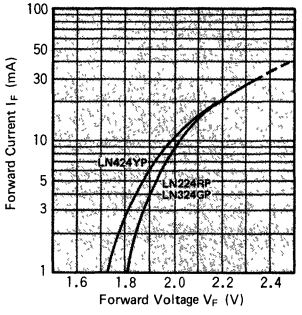
Electro-Optical Characteristics (Ta = 25°C)

Type No.	Lens Color	I_O			V_F		λ_P	$\Delta\lambda_P$		I_R	
		Typ.	Min.	I_F	Typ.	Max.	Typ.	Typ.	I_F	Max.	V_R
LN224RP	Red Diffused	0.6	0.3	15	2.2	2.8	700	100	20	5	4
LN324GP	Green Diffused	2.5	1.0	20	2.2	2.8	565	30	20	10	4
LN424YP	Amber Diffused	2.0	0.7	20	2.2	2.8	590	30	20	10	4
Unit	——	mcd	mcd	mA	V	V	nm	nm	mA	μA	V

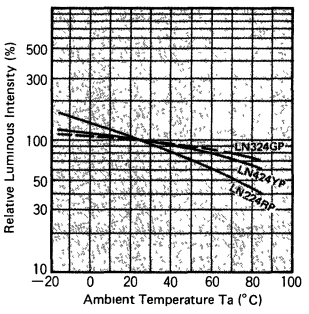
I_O — I_F



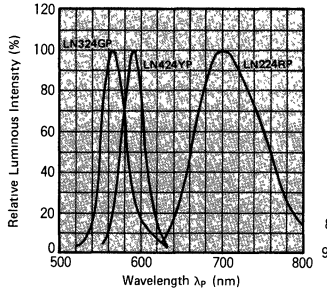
I_F — V_F



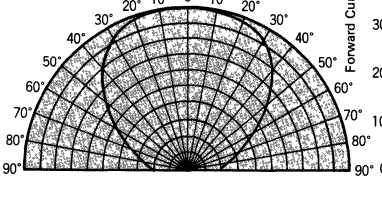
I_O — Ta



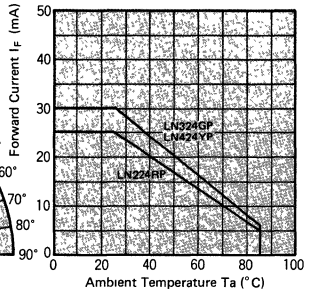
Relative Luminous Intensity Wavelength Characteristics



Directive Characteristics

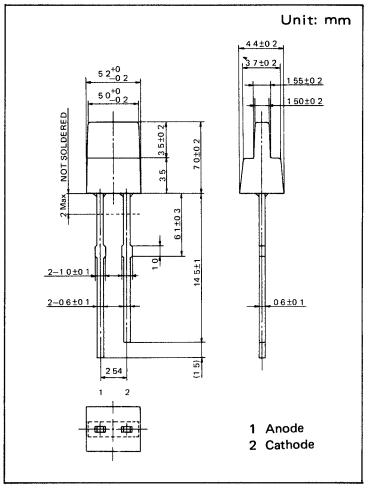


I_F — Ta



1.5mm X 5mm Series

Characteristics: 1. Lighting surface 1.5mm x 5mm rectangle
2. Uniform lighting surface
3. High reliability, long life



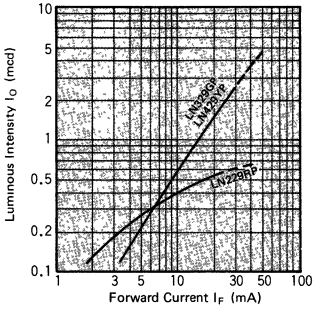
Absolute Maximum Ratings (Ta = 25°C)

Lighting Color	P_D(mW)	I_F(mA)	I_{FM}(mA)	V_R(V)	Topr(°C)	Tstg(°C)
Red	70	25	30	4	−25~+85	−30~+100
Green	90	30	40	4	−25~+85	−30~+100
Amber	90	30	40	4	−25~+85	−30~+100

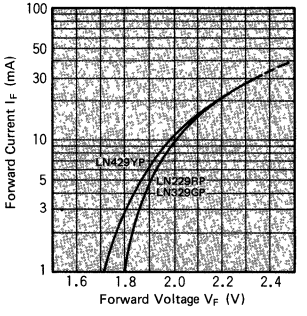
Electro-Optical Characteristics (Ta = 25°C)

Type No.	Lens Color	I_O			V_F		λ_P	$\Delta\lambda_P$		I_R	
		Typ.	Min.	I_F	Typ.	Max.	Typ.	Typ.	I_F	Max.	V_R
LN229RP	Red Diffused	0.5	0.2	15	2.2	2.8	700	100	20	5	4
LN329GP	Green Diffused	1.5	0.5	20	2.2	2.8	565	30	20	10	4
LN429YP	Amber Diffused	1.5	0.5	20	2.2	2.8	590	30	20	10	4
Unit	——	mcd	mcd	mA	V	V	nm	nm	mA	μA	V

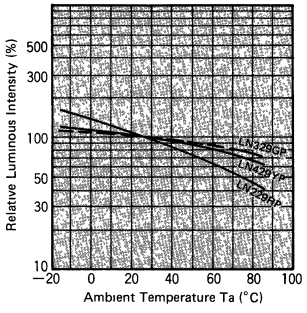
I_O — I_F



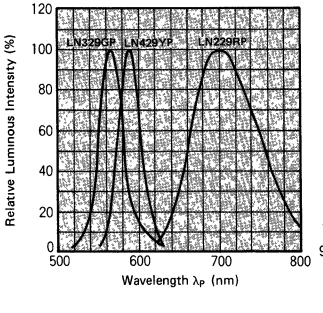
I_F — V_F



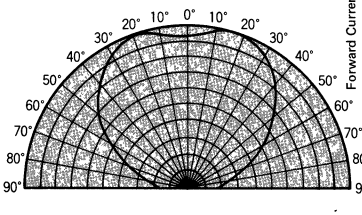
I_O — Ta



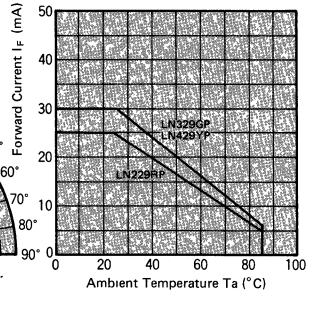
Relative Luminous Intensity Wavelenght Characteristics



Directive Characteristics



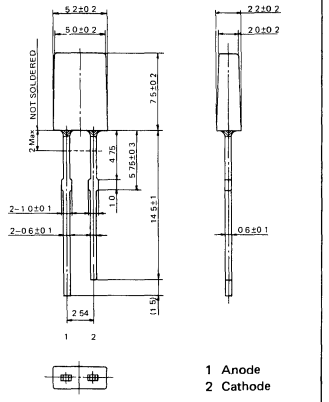
I_F — Ta



2mm X 5mm Series

Characteristics: 1. Lighting surface 2mm x 5mm rectangle
2. Shape for small space
3 High reliability, long life

Unit: mm



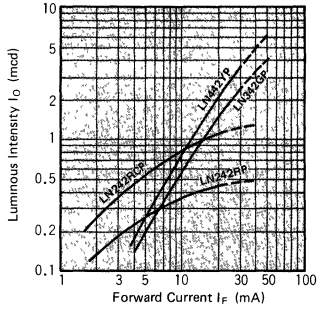
Absolute Maximum Ratings (Ta = 25°C)

Lighting Color	P_D(mW)	I_F(mA)	I_{FM}(mA)	V_R(V)	Topr(°C)	Tstg(°C)
Red	70	25	30	4	−25~+85	−30~+100
Green	90	30	40	4	−25~+85	−30~+100
Amber	90	30	40	4	−25~+85	−30~+100

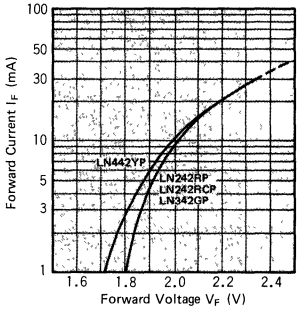
Electro-Optical Characteristics (Ta = 25°C)

Type No.	Lens Color	I_O			V_F		λ_P	$\Delta\lambda_P$		I_R	
		Typ.	Min.	I_F	Typ.	Max.	Typ.	Typ.	I_F	Max.	V_R
LN242RP	Red Diffused	0.4	0.15	15	2.2	2.8	700	100	20	5	4
LN242RCP	Red Clear	1.0	0.40	15	2.2	2.8	700	100	20	5	4
LN342GP	Green Diffused	1.5	0.50	20	2.2	2.8	565	30	20	10	4
LN442YP	Amber Diffused	2.0	0.75	20	2.2	2.8	590	30	20	10	4
Unit	——	mcd	mcd	mA	V	V	nm	nm	mA	μA	V

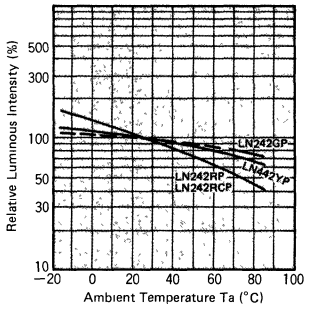
I_O − I_F



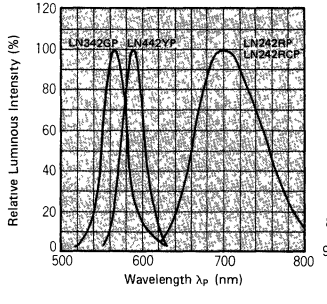
I_F − V_F



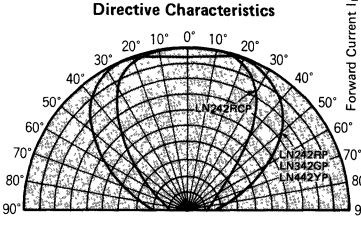
I_O − Ta



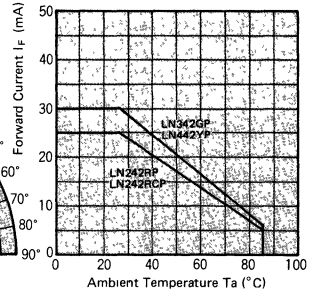
Relative Luminous Intensity Wavelength Characteristics



Directive Characteristics

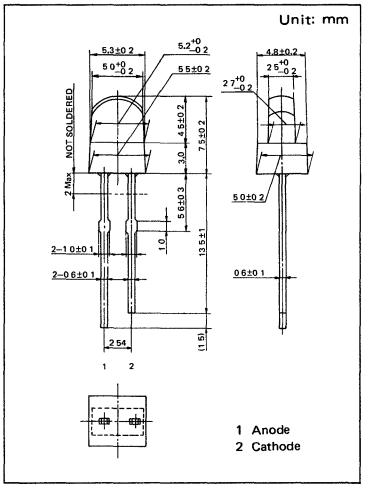


I_F − Ta



Segment 2.5mm Series

Characteristics: 1. Lighting surface 2.5mm x 5mm segment
2. Uniform lighting surface
3. High reliability, long life



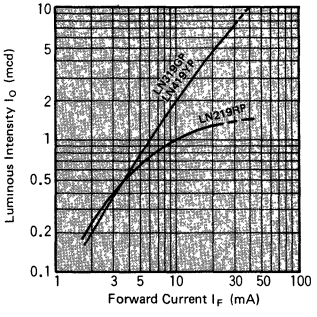
Absolute Maximum Ratings (Ta = 25°C)

Lighting Color	P_D(mW)	I_F(mA)	I_{FM}(mA)	V_R(V)	Topr(°C)	Tstg(°C)
Red	70	25	30	4	−25~+85	−30~+100
Green	90	30	40	4	−25~+85	−30~+100
Amber	90	30	40	4	−25~+85	−30~+100

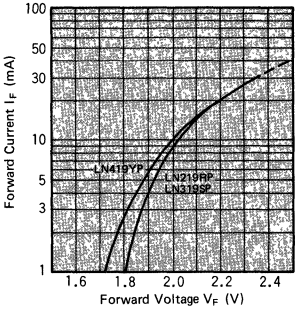
Electro-Optical Characteristics (Ta = 25°C)

Type No.	Lens Color	I_O		I_F	V_F		λ_P	$\Delta\lambda_P$	I_F	I_R	
		Typ.	Min.		Typ.	Max.	Typ.	Typ.		Max.	V_R
LN219RP	Red Diffused	1.2	0.6	15	2.2	2.8	700	100	20	5	4
LN319GP	Green Diffused	5.0	1.5	20	2.2	2.8	565	30	20	10	4
LN419YP	Amber Diffused	5.0	2.0	20	2.2	2.8	590	30	20	10	4
Unit	——	mcd	mcd	mA	V	V	nm	nm	mA	μA	V

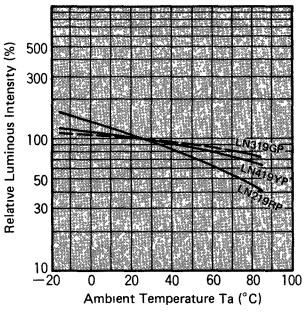
I_O — I_F



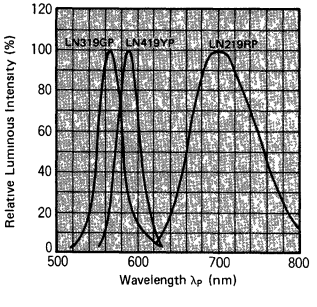
I_F — V_F



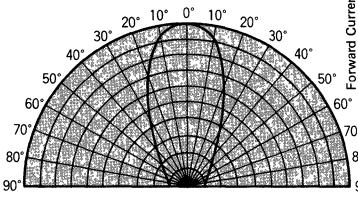
I_O — Ta



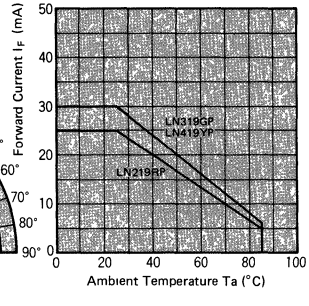
Relative Luminous Intensity Wavelength Characteristics



Directive Characteristics

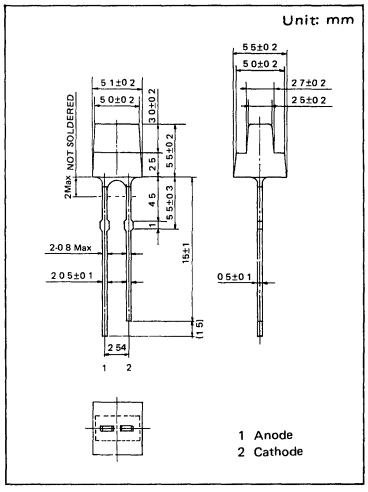


I_F — Ta



2.5mm X 5mm Series

Characteristics: 1. Lighting surface 2.5mm x 5mm rectangle
2. Uniform lighting surface
3. High reliability, long life



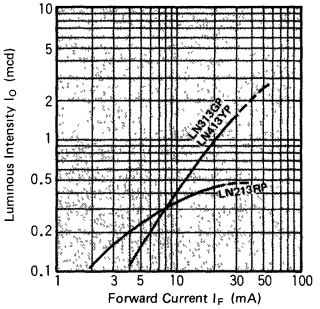
Absolute Maximum Ratings (Ta = 25°C)

Lighting Color	P_D(mW)	I_F(mA)	I_{FM}(mA)	V_R(V)	Topr(°C)	Tstg(°C)
Red	70	25	30	4	−25~+85	−30~+100
Green	90	30	40	4	−25~+85	−30~+100
Amber	90	30	40	4	−25~+85	−30~+100

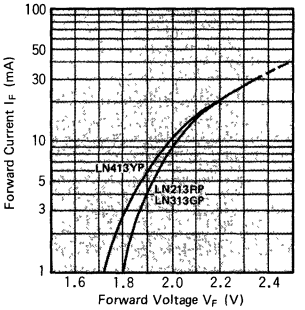
Electro-Optical Characteristics (Ta = 25°C)

Type No.	Lens Color	I_O			V_F		λ_P	$\Delta\lambda_P$		I_R	
		Typ.	Min.	I_F	Typ.	Max.	Typ.	Typ.	I_F	Max.	V_R
LN213RP	Red Diffused	0.4	0.1	15	2.2	2.8	700	100	20	5	4
LN313GP	Green Diffused	1.0	0.4	20	2.2	2.8	565	30	20	10	4
LN413YP	Amber Diffused	1.0	0.4	20	2.2	2.8	590	30	20	10	4
Unit	—	mcd	mcd	mA	V	V	nm	nm	mA	μA	V

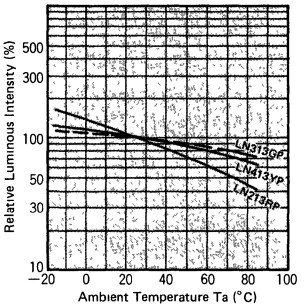
I_O — I_F



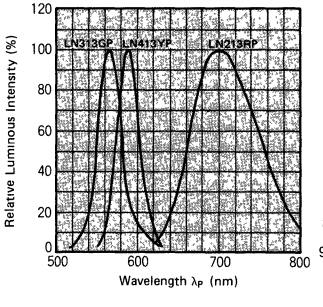
I_F — V_F



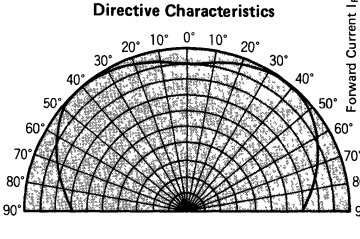
I_O — Ta



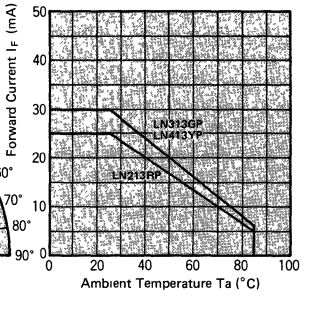
Relative Luminous Intensity Wavelength Characteristics



Directive Characteristics

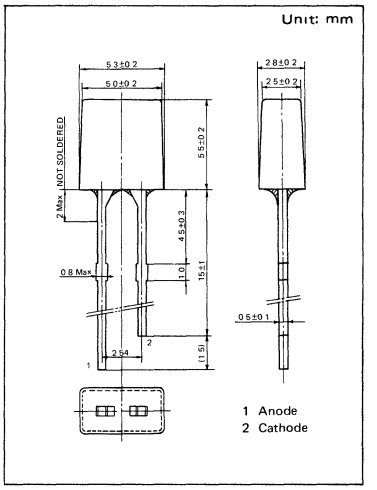


I_F — Ta



2.5mm X 5mm Series

Characteristics: 1. Lighting surface 2.5mm x 5mm rectangle
2. Uniform lighting surface
3. High reliability, long life



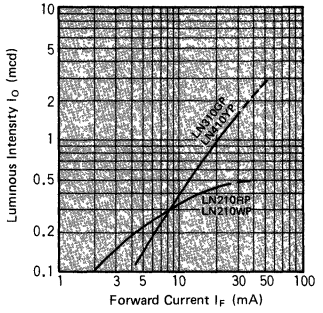
Absolute Maximum Ratings (Ta = 25°C)

Lighting Color	P_D(mW)	I_F(mA)	I_{FM}(mA)	V_R(V)	Topr(°C)	Tstg(°C)
Red	70	25	30	4	−25~+85	−30~+100
Green	90	30	40	4	−25~+85	−30~+100
Amber	90	30	40	4	−25~+85	−30~+100

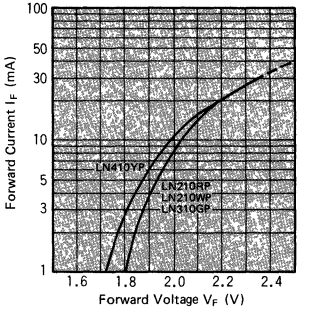
Electro-Optical Characteristics (Ta = 25°C)

Type No.	Lens Color	I_O			V_F		λ_P	$\Delta\lambda_P$		I_R	
		Typ.	Min.	I_F	Typ.	Max.	Typ.	Typ.	I_F	Max.	V_R
LN210RP	Red Diffused	0.4	0.10	15	2.2	2.8	700	100	20	5	4
LN210WP	White Diffused	0.4	0.10	15	2.2	2.8	700	100	20	5	4
LN3100P	Green Diffused	1.0	0.45	20	2.2	2.8	565	30	20	10	4
LN410YP	Amber Diffused	1.0	0.40	20	2.2	2.8	590	30	20	10	4
Unit	——	mcd	mcd	mA	V	V	nm	nm	mA	μA	V

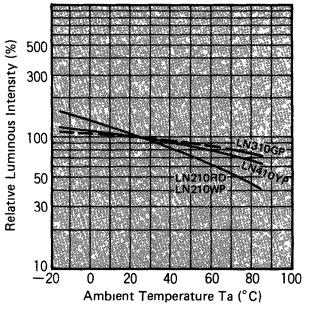
I_O − I_F



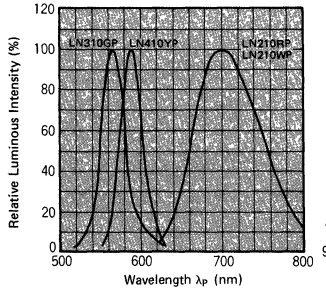
I_F − V_F



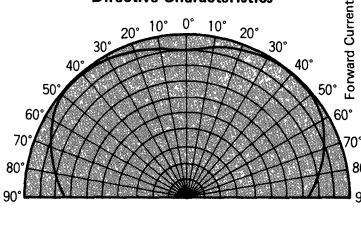
I_O − Ta



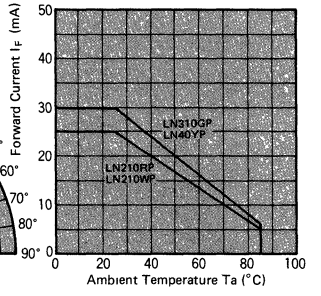
Relative Luminous Intensity
Wavelength Characteristics



Directive Characteristics

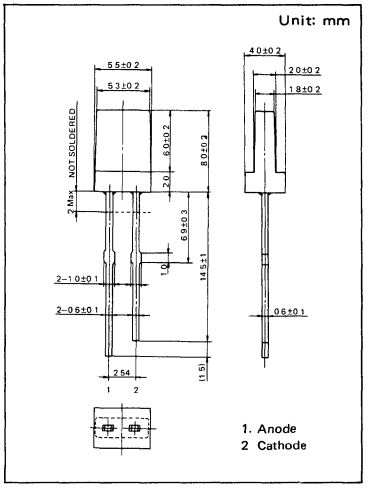


I_F − Ta



1.8mm X 5.3mm Series

Characteristics: 1. Lighting surface 1.8mm x 5.3mm rectangle
2. Uniform lighting surface
3. High reliability, long life



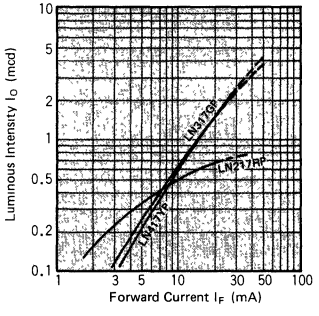
Absolute Maximum Ratings (Ta = 25°C)

Lighting Color	P_D(mW)	I_F(mA)	I_{FM}(mA)	V_R(V)	Topr(°C)	Tstg(°C)
Red	70	25	30	4	−25~+85	−30~+100
Green	90	30	40	4	−25~+85	−30~+100
Amber	90	30	40	4	−25~+85	−30~+100

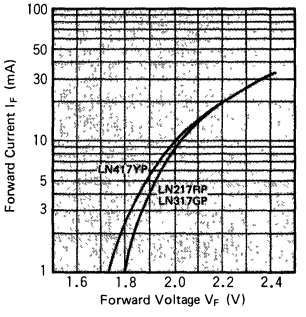
Electro-Optical Characteristics (Ta = 25°C)

Type No.	Lens Color	I_O			V_F		λ_P	$\Delta\lambda_P$		I_R	
		Typ.	Min.	I_F	Typ.	Max.	Typ.	Typ.	I_F	Max.	V_R
LN217RP	Red Diffused	0.6	0.3	15	2.2	2.8	700	100	20	5	4
LN317GP	Green Diffused	1.5	0.4	20	2.2	2.8	565	30	20	10	4
LN417YP	Amber Diffused	1.5	0.6	20	2.2	2.8	590	30	20	10	4
Unit	——	mcd	mcd	mA	V	V	nm	nm	mA	μA	V

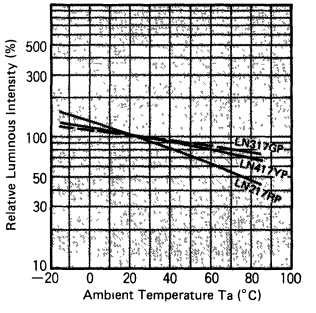
I_O — I_F



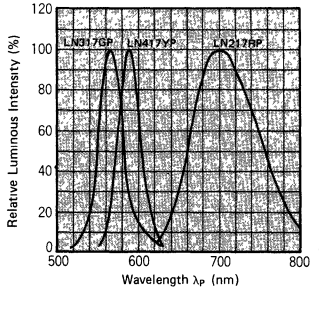
I_F — V_F



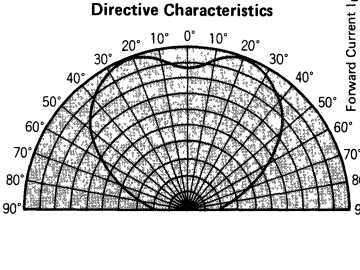
I_O — Ta



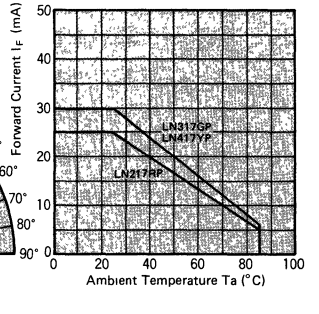
Relative Luminous Intensity
Wavelength Characteristics



Directive Characteristics



I_F — Ta

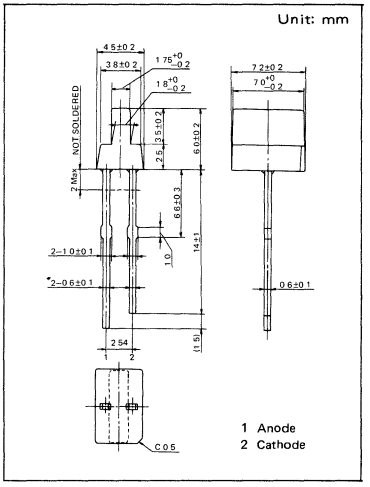


1.75mm X 7mm Series

Characteristics: 1. Lighting surface 1.75mm x 7mm rectangle

2. Lighting surface is formed at right angles with A.C. lead wire

3. High reliability, long life



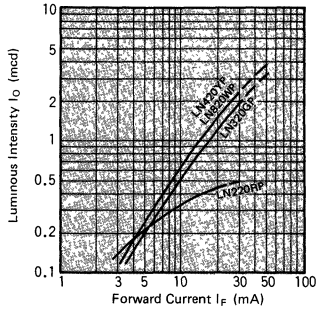
Absolute Maximum Ratings (Ta = 25°C)

Lighting Color	P_D(mW)	I_F(mA)	I_{FM}(mA)	V_R(V)	Topr(°C)	Tstg(°C)
Red	70	25	30	4	−25~+85	−30~+100
Green	90	30	40	4	−25~+85	−30~+100
Amber	90	30	40	4	−25~+85	−30~+100
Orange	90	30	40	3	−25~+85	−30~+100

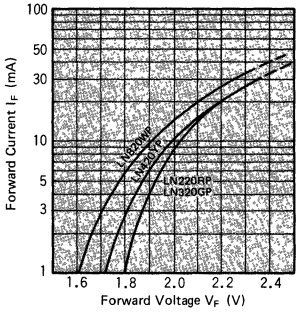
Electro-Optical Characteristics (Ta = 25°C)

Type No.	Lens Color	I_O			V_F		λ_P	$\Delta\lambda_P$		I_R	
		Typ.	Min.	I_F	Typ.	Max.	Typ.	Typ.	I_F	Max.	V_R
LN220RP	Red Diffused	0.4	0.15	15	2.2	2.8	700	100	20	5	4
LN320GP	Green Diffused	1.2	0.50	20	2.2	2.8	565	30	20	10	4
LN420YP	Amber Diffused	1.5	0.50	20	2.2	2.8	590	30	20	10	4
LN820WP	White Diffused	1.5	0.60	20	2.1	2.8	630	40	20	10	3
Unit	——	mcd	mcd	mA	V	V	nm	nm	mA	μA	V

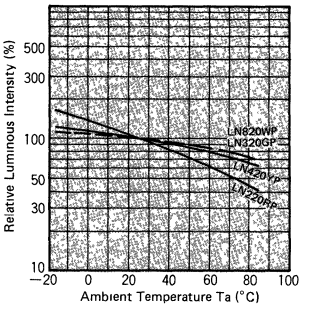
I_O − I_F



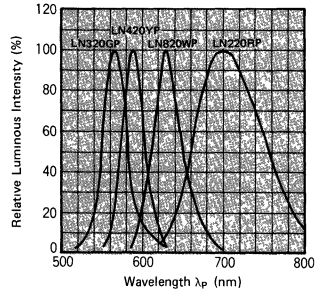
I_F − V_F



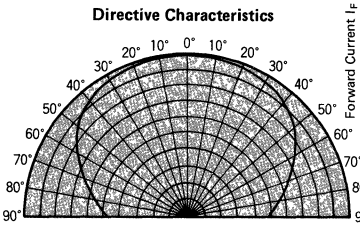
I_O − Ta



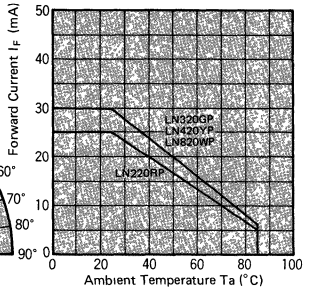
Relative Luminous Intensity Wavelenght Characteristics



Directive Characteristics



I_F − Ta

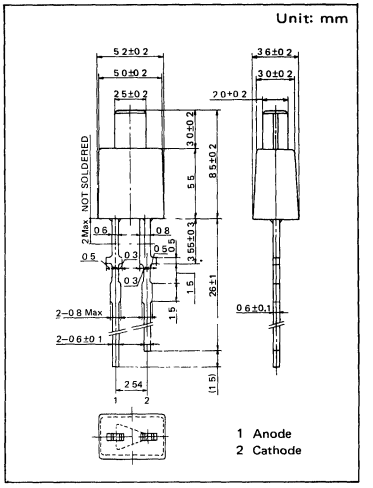


Triangle 2mm X 2.5mm Series

Characteristics: 1. Lighting surface 2mm x 2.5mm triangle

2. Long leadwire and suitable type for location indicator and line finder

3. High reliability, long life



Absolute Maximum Ratings (Ta = 25°C)

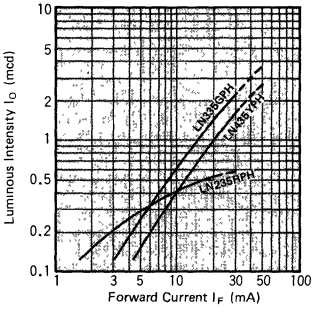
Lighting Color	P_D(mW)	I_F(mA)	I_{FM}(mA)	V_R(V)	Topr(°C)	Tstg(°C)
Red	70	25	30	4	−25~+85	−30~+100
Green	90	30	40	4	−25~+85	−30~+100
Amber	90	30	40	4	−25~+85	−30~+100

Electro-Optical Characteristics (Ta = 25°C)

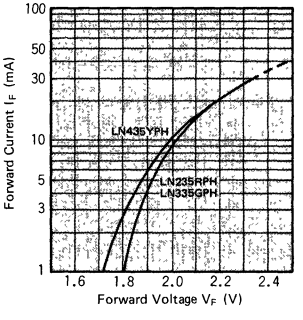
Type No.	Lens Color	I_O			V_F		λ_P	$\Delta\lambda_P$		I_R	
		Typ.	Min.	I_F	Typ.	Max.	Typ.	Typ.	I_F	Max.	V_R
LN235RPH	Red Diffused	0.5	0.25	15	2.2	2.8	700	100	20	5	4
LN335GPH	Green Diffused	1.5	0.60	20	2.2	2.8	565	30	20	10	4
△ LN435YPH	Amber Diffused	1.0	—	20	2.2	2.8	590	30	20	10	4
Unit	——	mcd	mcd	mA	V	V	nm	nm	mA	μA	V

△ Tentative specification

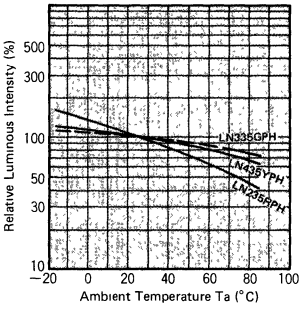
I_O — I_F



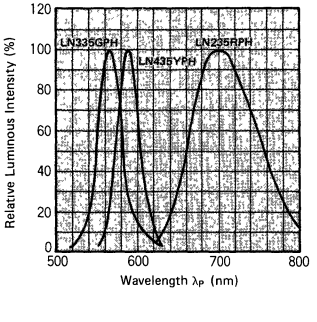
I_F — V_F



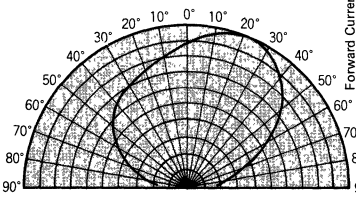
I_O — Ta



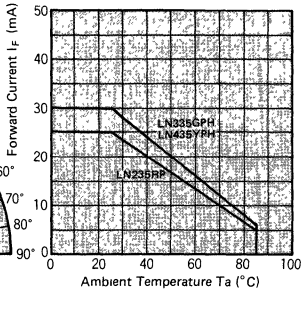
Relative Luminous Intensity Wavelength Characteristics



Directive Characteristics

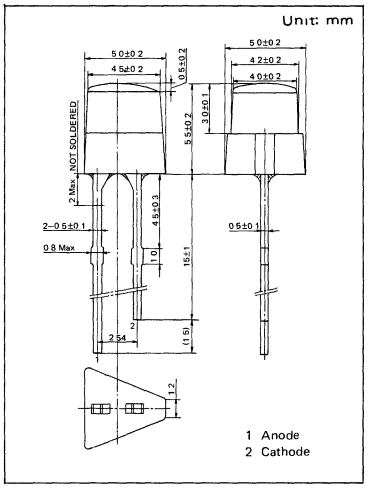


I_F — Ta



Triangle 4mm X 4.5mm Series

Characteristics: 1. Lighting surface 4mm x 4.5mm triangle
2. Suitable type for location indicator and line finder
3. High reliability, long life



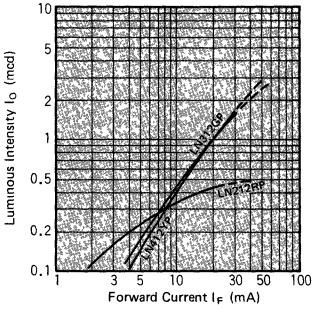
Absolute Maximum Ratings (Ta = 25°C)

Lighting Color	P_D(mW)	I_F(mA)	I_{FM}(mA)	V_R(V)	Topr(°C)	Tstg(°C)
Red	70	25	30	4	−25~+85	−30~+100
Green	90	30	40	4	−25~+85	−30~+100
Amber	90	30	40	4	−25~+85	−30~+100

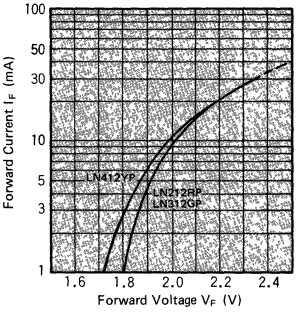
Electro-Optical Characteristics (Ta = 25°C)

Type No.	Lens Color	I_O			V_F		λ_P	$\Delta\lambda_P$		I_R	
		Typ.	Min.	I_F	Typ.	Max.	Typ.	Typ.	I_F	Max.	V_R
LN212RP	Red Diffused	0.4	0.1	15	2.2	2.8	700	100	20	5	4
LN312GP	Green Diffused	1.0	0.3	20	2.2	2.8	565	30	20	10	4
LN412YP	Amber Diffused	1.0	0.4	20	2.2	2.8	590	30	20	10	4
Unit	——	mcd	mcd	mA	V	V	nm	nm	mA	μA	V

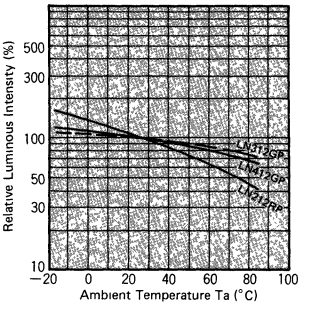
I_O — I_F



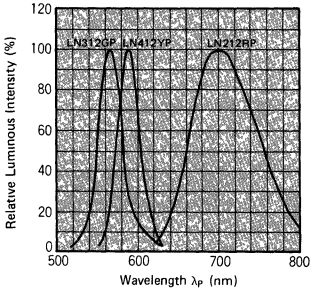
I_F — V_F



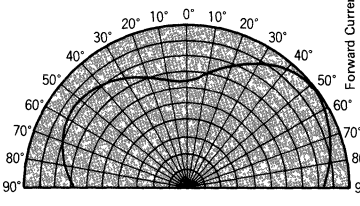
I_O — Ta



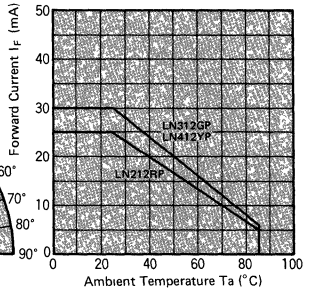
Relative Luminous Intensity Wavelength Characteristics



Directive Characteristics

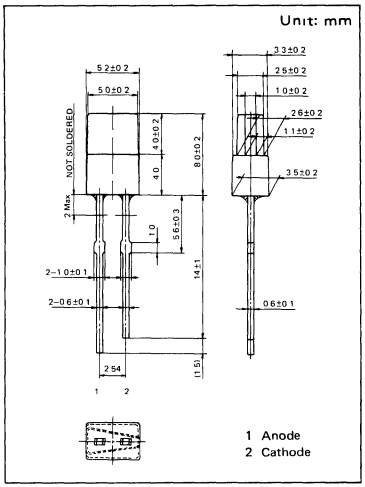


I_F — Ta



Triangle 2.5mm X 5mm Series

Characteristics: 1. Lighting surface 2.5mm x 5mm triangle
2. Suitable type for location indicator and line finder
3. High reliability, long life



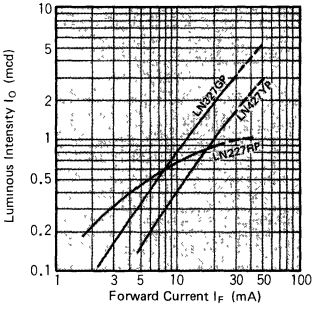
Absolute Maximum Ratings (Ta = 25°C)

Lighting Color	P_D(mW)	I_F(mA)	I_{FM}(mA)	V_R(V)	Topr(°C)	Tstg(°C)
Red	70	25	30	4	−25~+85	−30~+100
Green	90	30	40	4	−25~+85	−30~+100
Amber	90	30	40	4	−25~+85	−30~+100

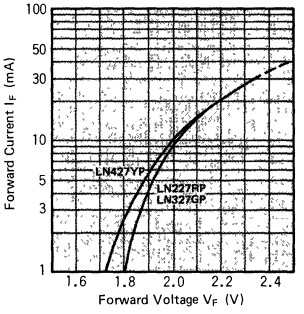
Electro-Optical Characteristics (Ta = 25°C)

Type No.	Lens Color	I_O			V_F		λ_P	$\Delta\lambda_P$		I_R	
		Typ.	Min.	I_F	Typ.	Max.	Typ.	Typ.	I_F	Max.	V_R
LN227RP	Red Diffused	0.8	0.4	15	2.2	2.8	700	100	20	5	4
LN327GP	Green Diffused	2.0	0.7	20	2.2	2.8	565	30	20	10	4
LN427YP	Amber Diffused	1.0	0.3	20	2.2	2.8	590	30	20	10	4
Unit	——	mcd	mcd	mA	V	V	nm	nm	mA	μA	V

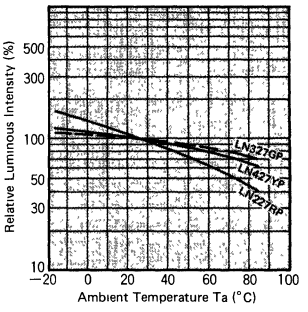
I_O — I_F



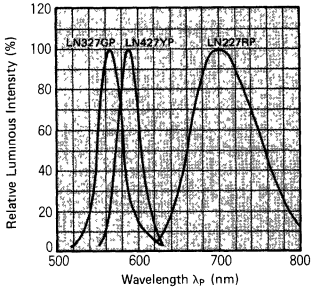
I_F — V_F



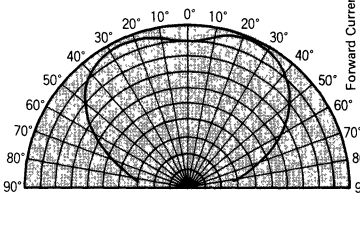
I_O — Ta



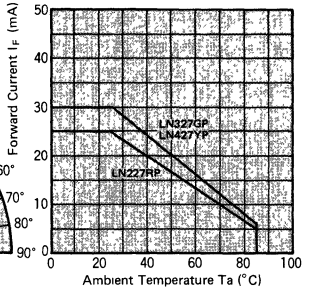
Relative Luminous Intensity Wavelength Characteristics



Directive Characteristics

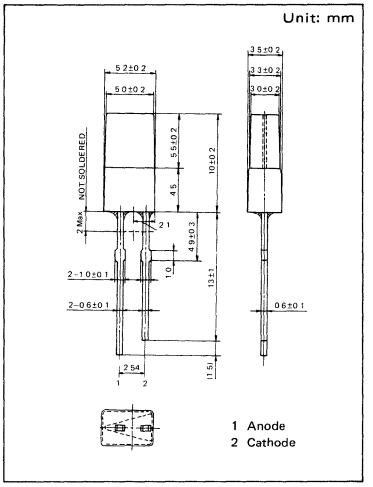


I_F — Ta



Triangle 3mm X 5mm Series

Characteristics: 1. Lighting surface 3mm x 5mm triangle
2. Suitable type for location indicator and line finder
3. High reliability, long life



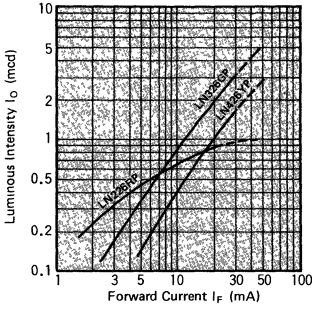
Absolute Maximum Ratings (Ta = 25°C)

Lighting Color	P_D(mW)	I_F(mA)	I_{FM}(mA)	V_R(V)	Topr(°C)	Tstg(°C)
Red	70	25	30	4	−25~+85	−30~+100
Green	90	30	40	4	−25~+85	−30~+100
Amber	90	30	40	4	−25~+85	−30~+100

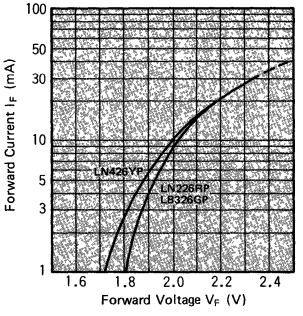
Electro-Optical Characteristics (Ta = 25°C)

Type No.	Lens Color	I_O		I_F	V_F		λ_P	$\Delta\lambda_P$	I_F	I_R	
		Typ.	Min.		Typ.	Max.	Typ.	Typ.		Max.	V_R
LN226RP	Red Diffused	0.8	0.4	15	2.2	2.8	700	100	20	5	4
LN326GP	Green Diffused	2.0	0.7	20	2.2	2.8	565	30	20	10	4
LN426YP	Amber Diffused	1.0	0.3	20	2.2	2.8	590	30	20	10	4
Unit	——	mcd	mcd	mA	V	V	nm	nm	mA	μA	V

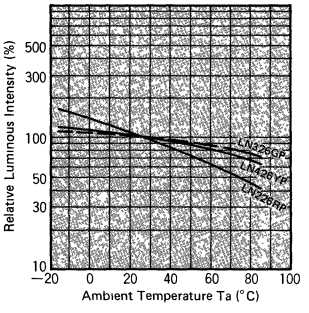
I_O — I_F



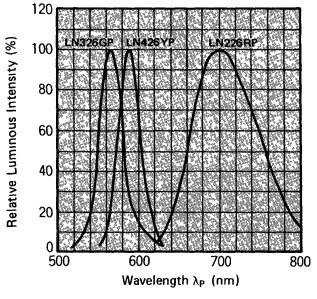
I_F — V_F



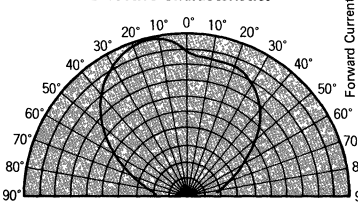
I_O — Ta



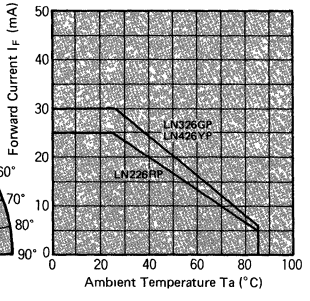
Relative Luminous Intensity Wavelength Characteristics



Directive Characteristics

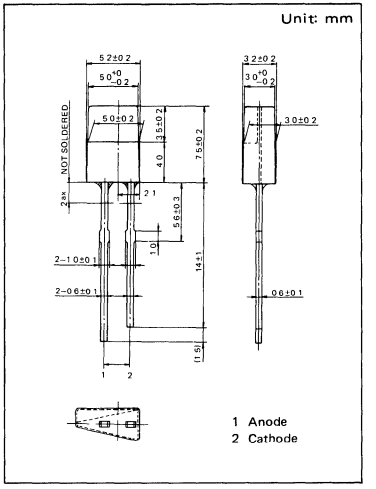


I_F — Ta



Triangle 3mm X 5mm Series

Characteristics: 1. Lighting surface 3mm x 5mm triangle
2. Suitable type for location indicator and line finder
3. High reliability, long life



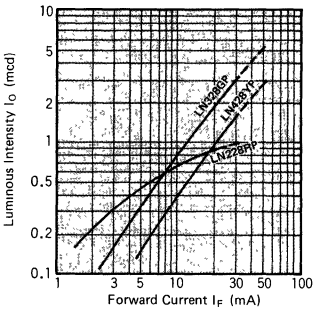
Absolute Maximum Ratings (Ta = 25°C)

Lighting Color	P_D(mW)	I_F(mA)	I_{FM}(mA)	V_R(V)	Topr(°C)	Tstg(°C)
Red	70	25	30	4	−25~+85	−30~+100
Green	90	30	40	4	−25~+85	−30~+100
Amber	90	30	40	4	−25~+85	−30~+100

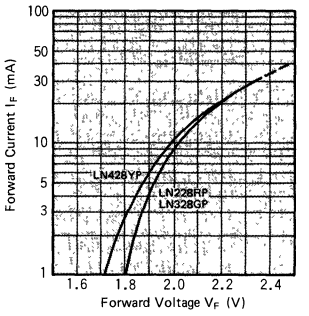
Electro-Optical Characteristics (Ta = 25°C)

Type No.	Lens Color	I_O			V_F		λ_P	$\Delta\lambda_P$		I_R	
		Typ.	Min.	I_F	Typ.	Max.	Typ.	Typ.	I_F	Max.	V_R
LN228RP	Red Diffused	0.8	0.4	15	2.2	2.8	700	100	20	5	4
LN328GP	Green Diffused	2.0	0.7	20	2.2	2.8	565	30	20	10	4
LN428YP	Amber Diffused	1.0	0.3	20	2.2	2.8	590	30	20	10	4
Unit	——	mcd	mcd	mA	V	V	nm	nm	mA	μA	V

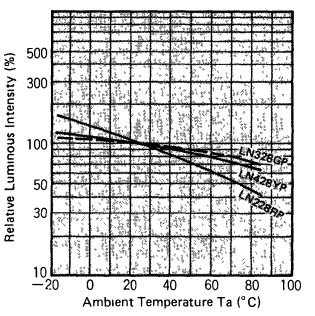
I_O — I_F



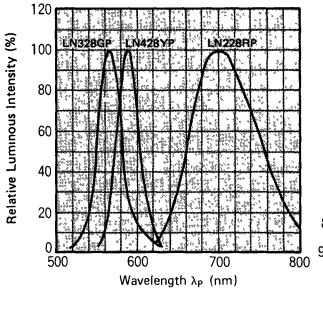
I_F — V_F



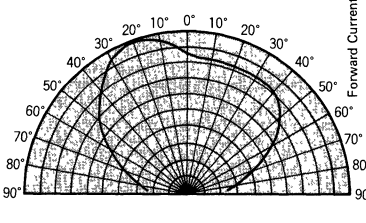
I_O — Ta



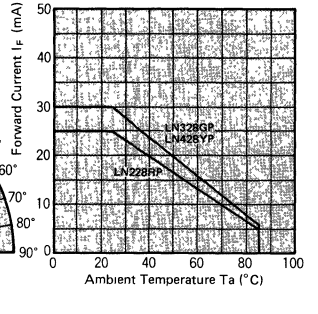
Relative Luminous Intensity Wavelength Characteristics



Directive Characteristics

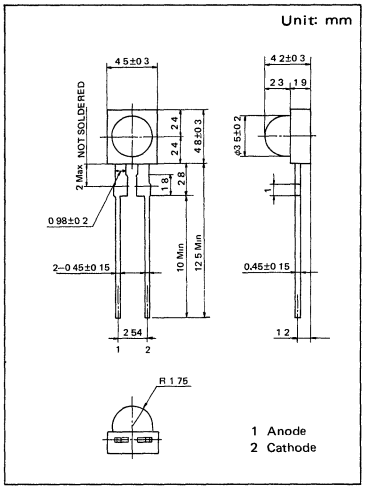


I_F — Ta



Round-Side View 3.5mm Series

Characteristics: 1. Lighting surface side 3.5mm round side view
2. High precise dimension
3. High reliability, long life



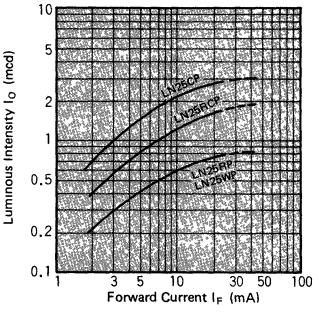
Absolute Maximum Ratings (Ta = 25°C)

Lighting Color	P_D(mW)	I_F(mA)	I_{FM}(mA)	V_R(V)	Topr(°C)	Tstg(°C)
Red	70	25	30	4	−25~+85	−30~+100

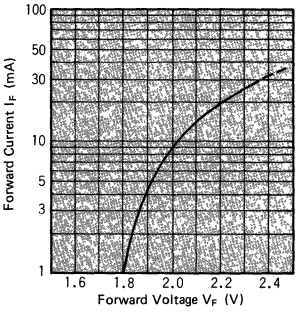
Electro-Optical Characteristics (Ta = 25°C)

Type No.	Lens Color	I_O			V_F		λ_P	$\Delta\lambda_P$		I_R	
		Typ.	Min.	I_F	Typ.	Max.	Typ.	Typ.	I_F	Max.	V_R
LN25RP	Red Diffused	0.7	0.2	15	2.2	2.8	700	100	20	5	4
LN25RCP	Red Clear	1.5	0.5	15	2.2	2.8	700	100	20	5	4
LN25WP	White Diffused	0.7	0.2	15	2.2	2.8	700	100	20	5	4
LN25CP	Clear	2.5	0.7	15	2.2	2.8	700	100	20	5	4
Unit	——	mcd	mcd	mA	V	V	nm	nm	mA	μA	V

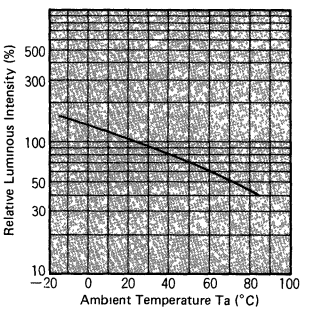
I_O — I_F



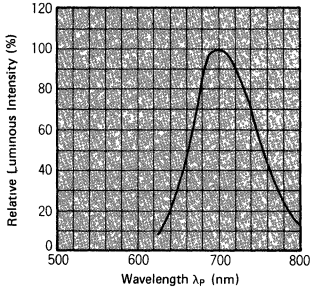
I_F — V_F



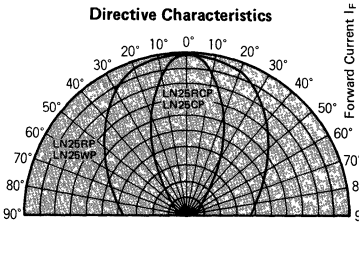
I_O — Ta



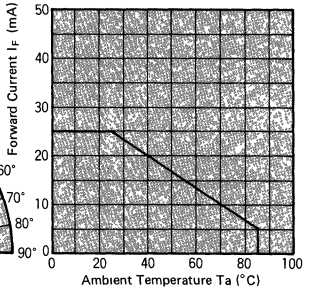
Relative Luminous Intensity Wavelenght Characteristics



Directive Characteristics

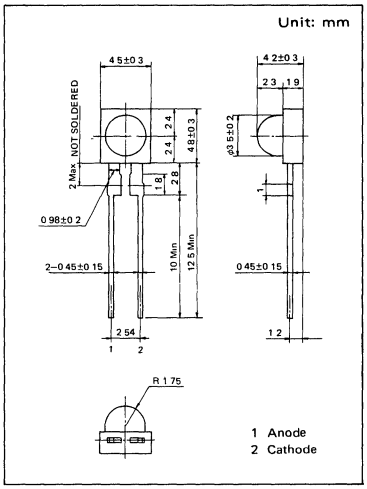


I_F — Ta



Round-Side View 3.5mm Series

Characteristics: 1. Lighting surface side 3.5mm round side view
2. High precision dimension
3. High reliability, long life



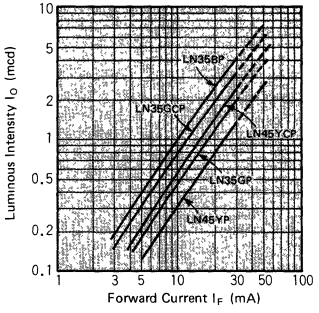
Absolute Maximum Ratings (Ta = 25°C)

Lighting Color	P_D(mW)	I_F(mA)	I_{FM}(mA)	V_R(V)	Topr(°C)	Tstg(°C)
Green	90	30	40	4	−25~+85	−30~+100
Amber	90	30	40	4	−25~+85	−30~+100

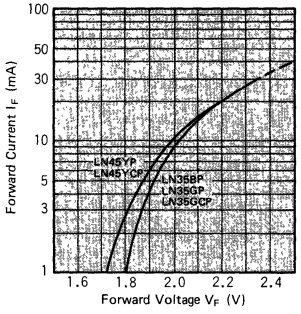
Electro-Optical Characteristics (Ta = 25°C)

Type No.	Lens Color	I_O Typ.	I_O Min.	I_F	V_F Typ.	V_F Max.	λ_P Typ.	$\Delta\lambda_P$ Typ.	I_F	I_R Max.	V_R
LN35BP	Blue Diffused	2.5	0.7	20	2.2	2.8	565	30	20	10	4
LN35GP	Green Diffused	1.2	0.3	20	2.2	2.8	565	30	20	10	4
LN35GCP	Green Clear	2.0	0.5	20	2.2	2.8	565	30	20	10	4
LN45YP	Amber Diffused	0.8	0.3	20	2.2	2.8	590	30	20	10	4
LN45YCP	Amber Clear	1.5	0.5	20	2.2	2.8	590	30	20	10	4
Unit	——	mcd	mcd	mA	V	V	nm	nm	mA	μA	V

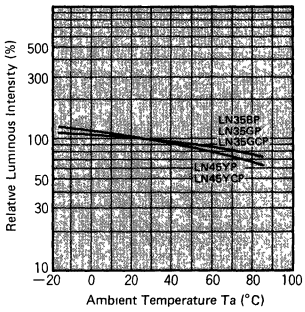
I_O — I_F



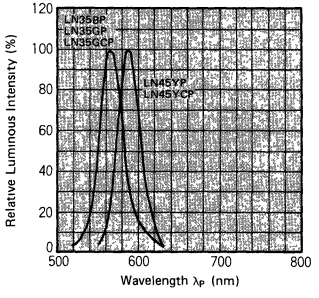
I_F — V_F



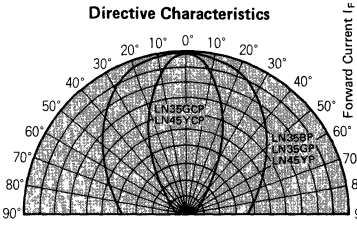
I_O — Ta



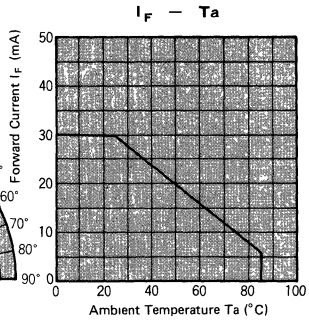
Relative Luminous Intensity Wavelength Characteristics



Directive Characteristics

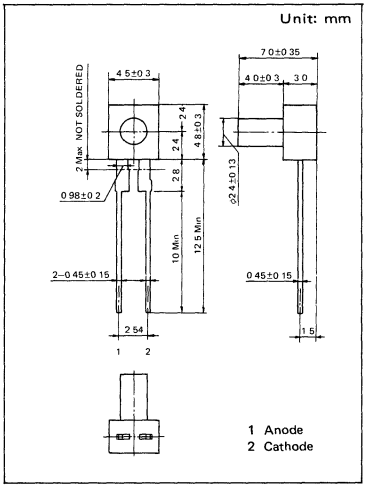


I_F — Ta



Round-Side View 2.4mm Series

Characteristics: 1. Lighting surface side 2.4mm round side view
2. High precise dimension
3. High reliability, long life



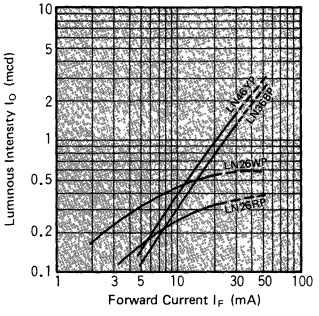
Absolute Maximum Ratings (Ta = 25°C)

Lighting Color	P_D(mW)	I_F(mA)	I_{FM}(mA)	V_R(V)	Topr(°C)	Tstg(°C)
Red	70	25	30	4	−25~+85	−30~+100
Green	90	30	40	4	−25~+85	−30~+100
Amber	90	30	40	4	−25~+85	−30~+100

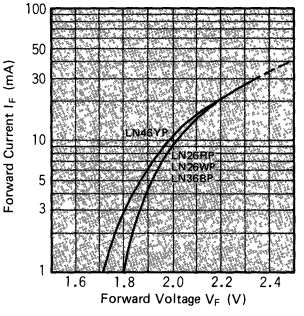
Electro-Optical Characteristics (Ta = 25°C)

Type No.	Lens Color	I_O			V_F		λ_P	$\Delta\lambda_P$		I_R	
		Typ.	Min.	I_F	Typ.	Max.	Typ.	Typ.	I_F	Max.	V_R
LN26RP	Red Diffused	0.3	0.1	15	2.2	2.8	700	100	20	5	4
LN26WP	White Diffused	0.5	0.1	15	2.2	2.8	700	100	20	5	4
LN36BP	Blue Diffused	0.8	0.2	20	2.2	2.8	565	30	20	10	4
LN46YP	Amber Diffused	1.0	0.2	20	2.2	2.8	590	30	20	10	4
Unit	——	mcd	mcd	mA	V	V	nm	nm	mA	μA	V

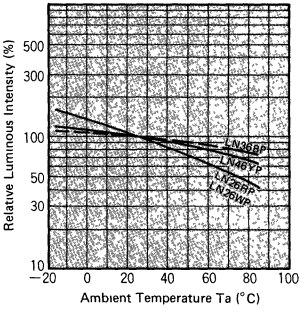
I_O — I_F



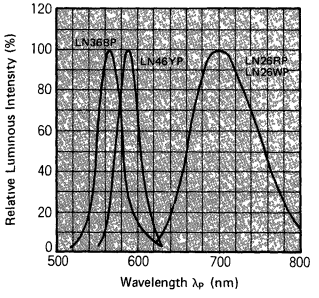
I_F — V_F



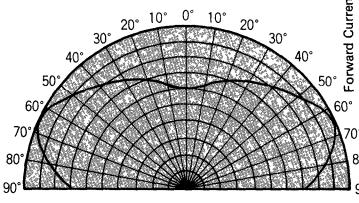
I_O — Ta



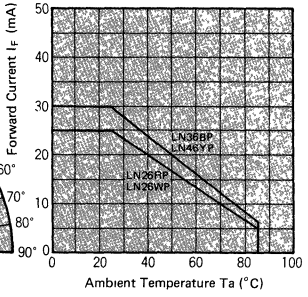
Relative Luminous Intensity Wavelength Characteristics



Directive Characteristics

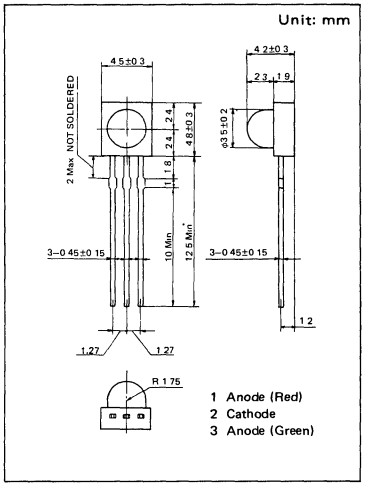


I_F — Ta



Two Colors Combination LED Series

Characteristics: 1. Lighting surface Two color combination of 3.5mm round side view
2. Cathode lead wire is used in common
3. High reliability, long life



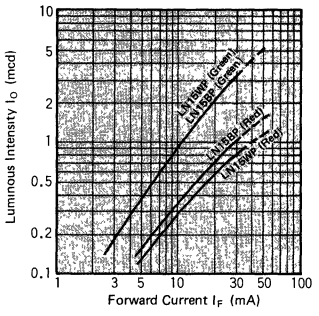
Absolute Maximum Ratings (Ta = 25°C)

Lighting Color	P_D(mW)	I_F(mA)	I_{FM}(mA)	V_R(V)	Topr(°C)	Tstg(°C)
Red	60	30	40	4	−25~+85	−30~+100
Green	90	30	40	4	−25~+85	−30~+100

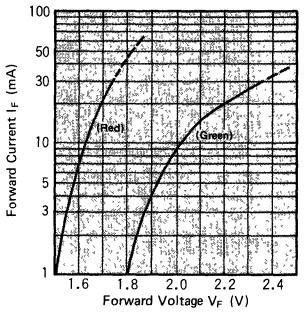
Electro-Optical Characteristics (Ta = 25°C)

Type No.	Lens Color	Lighting Color	I_O Typ.	I_O Min.	I_F	V_F Typ.	V_F Max.	λ_P Typ.	$\Delta\lambda_P$ Typ.	I_F	I_R Max.	V_R
LN15BP	Blue Diffused	Red	0.7	0.2	20	1.75	2.0	660	20	30	10	4
		Green	2.0	0.6	20	2.20	2.8	565	30	20	10	4
LN15WP	White Diffused	Red	0.6	0.2	20	1.75	2.0	660	20	30	10	4
		Green	2.0	0.6	20	2.20	2.8	565	30	20	10	4
Unit	——		mcd	mcd	mA	V	V	nm	nm	mA	μA	V

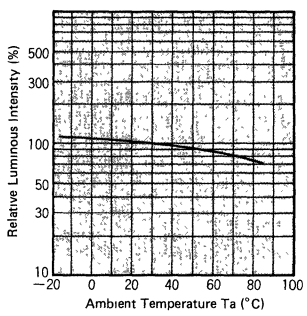
I_O − I_F



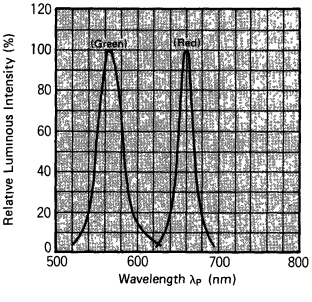
I_F − V_F



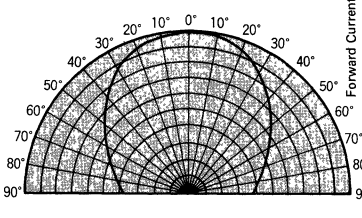
I_O − Ta



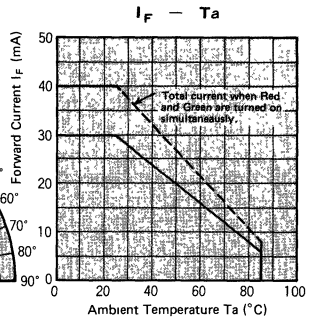
Relative Luminous Intensity Wavelength Characteristics



Directive Characteristics

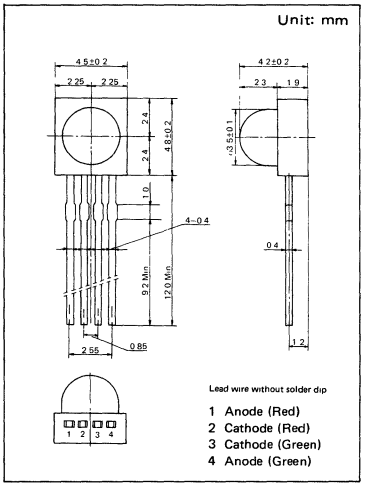


I_F − Ta



Two Colors Combination LED Series

Characteristics: 1. Lighting surface Two color combination of 3.5mm round side view
2. Independent Anode. 4 lead wire Cathode
3. High reliability, long life



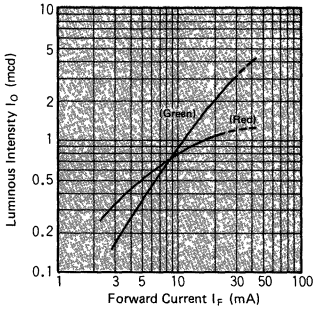
Absolute Maximum Ratings (Ta = 25°C)

Lighting Color	P_D(mW)	I_F(mA)	I_{FM}(mA)	V_R(V)	Topr(°C)	Tstg(°C)
Red	70	25	30	4	−25~+85	−30~+100
Green	90	30	40	4	−25~+85	−30~+100

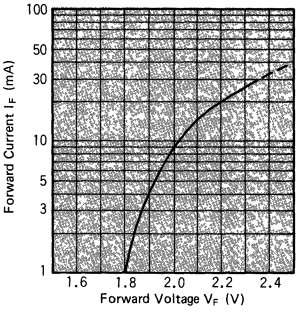
Electro-Optical Characteristics (Ta = 25°C)

Type No.	Lens Color	Lighting Color	I_O Typ.	I_O Min.	I_F	V_F Typ.	V_F Max.	λ_P Typ.	$\Delta\lambda_P$ Typ.	I_F	I_R Max.	V_R
LN15WP-(F)	White Diffused	Red	1.0	0.25	15	2.2	2.8	700	100	20	10	4
		Green	2.0	0.5	20	2.2	2.8	565	30	20	10	4
Unit	——		mcd	mcd	mA	V	V	nm	nm	mA	μA	V

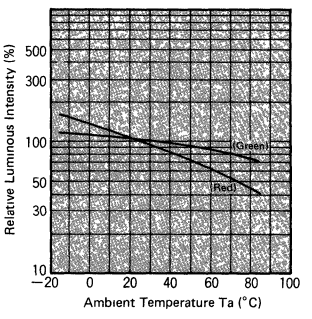
I_O — I_F



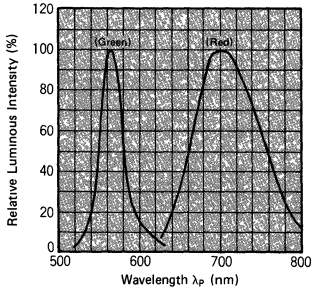
I_F — V_F



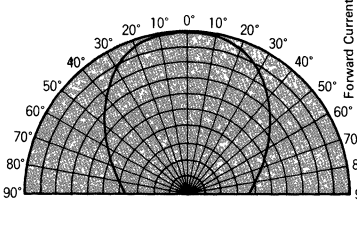
I_O — Ta



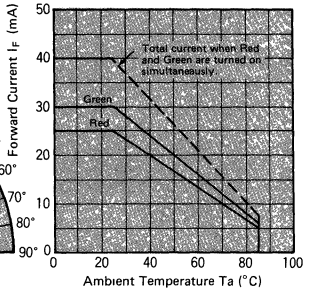
Relative Luminous Intensity Wavelength Characteristics



Directive Characteristics

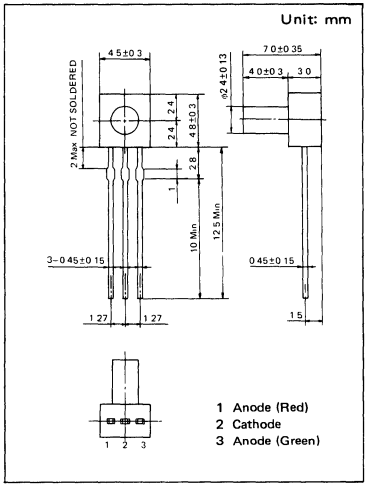


I_F — Ta



Two Colors Combination LED Series

Characteristics: 1. Lighting surface Two color combination of 2.4mm round side view
2. Cathode lead wire is used in common
3. High reliability, long life



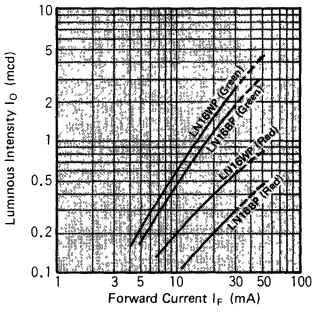
Absolute Maximum Ratings (Ta = 25°C)

Lighting Color	P_D(mW)	I_F(mA)	I_{FM}(mA)	V_R(V)	Topr(°C)	Tstg(°C)
Red	60	30	40	4	−25~+85	−30~+100
Green	90	30	40	4	−25~+85	−30~+100

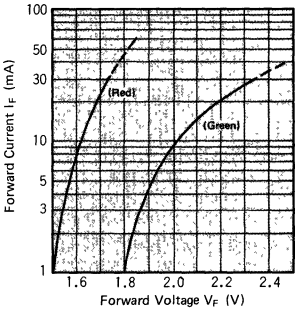
Electro-Optical Characteristics (Ta = 25°C)

Type No.	Lens Color	Lighting Color	I_O Typ.	I_O Min.	I_F	V_F Typ.	V_F Max.	λ_P Typ.	$\Delta\lambda_P$ Typ.	I_F	I_R Max.	V_R
LN16BP	Blue Diffused	Red	0.2	0.06	20	1.75	2.0	660	20	30	10	4
		Green	1.2	0.10	20	2.20	2.8	565	30	20	10	4
LN16WP	White Diffused	Red	0.4	0.10	20	1.75	2.0	660	20	30	10	4
		Green	1.5	0.50	20	2.20	2.8	565	30	20	10	4
Unit			mcd	mcd	mA	V	V	nm	nm	mA	μA	V

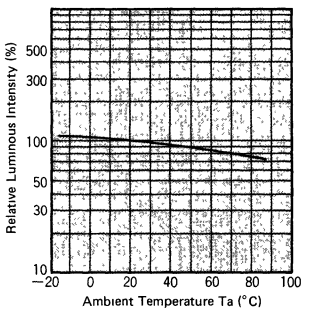
I_O — I_F



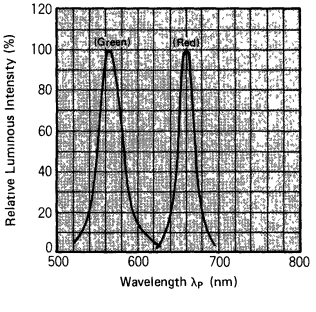
I_F — V_F



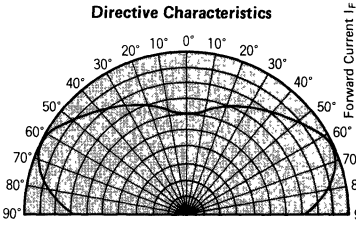
I_O — Ta



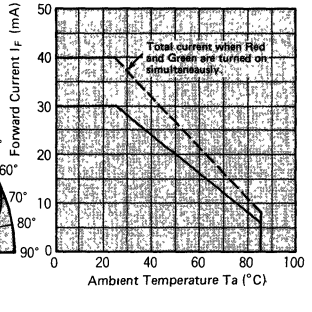
Relative Luminous Intensity Wavelength Characteristics



Directive Characteristics



I_F — Ta

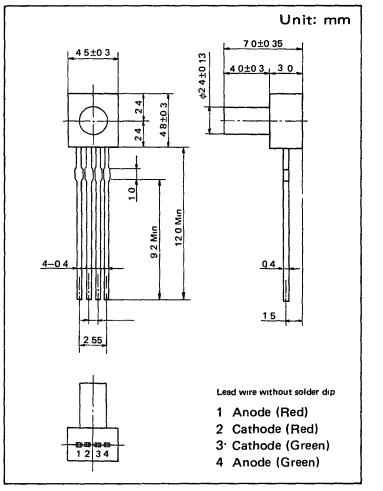


Two Colors Combination LED Series

Characteristics: 1. Lighting surface Two color combination of 2.4mm round side view

2. Independent Anode. 4 lead wire Cathode

3. High reliability, long life



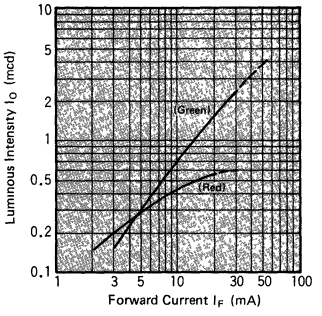
Absolute Maximum Ratings (Ta = 25°C)

Lighting Color	P_D(mW)	I_F(mA)	I_{FM}(mA)	V_R(V)	Topr(°C)	Tstg(°C)
Red	70	25	30	4	−25~+85	−30~+100
Green	90	30	40	4	−25~+85	−30~+100

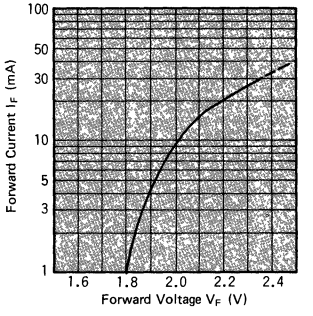
Electro-Optical Characteristics (Ta = 25°C)

Type No.	Lens Color	Lighting Color	I_O Typ	I_O Min	I_F	V_F Typ	V_F Max	λ_P Typ	$\Delta\lambda_P$ Typ	I_F	I_R Max	V_R
LN16WP-(F)	White Diffused	Red	0.5	0.25	15	2.2	2.8	700	100	20	10	4
		Green	1.5	0.75	20	2.2	2.8	565	30	20	10	4
Unit			mcd	mcd	mA	V	V	nm	nm	mA	μA	V

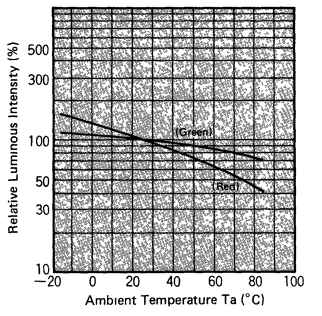
I_O − I_F



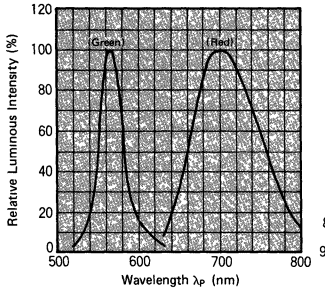
I_F − V_F



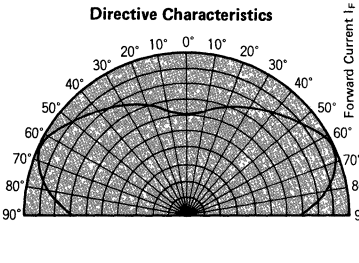
I_O − Ta



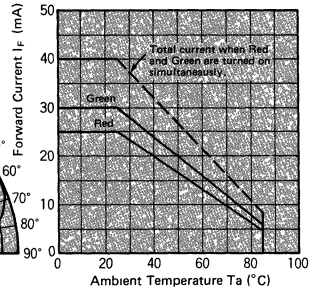
Relative Luminous Intensity Wavelenght Characteristics



Directive Characteristics

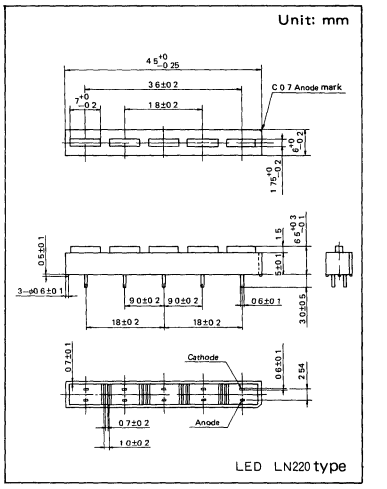


I_F − Ta



Level Meters 5-element Array Series

Characteristics: 1. Lighting surface 1.75mm x 7mm level meter
2. Can combine colors by choice
3. High reliability, long life



Absolute Maximum Ratings (Ta = 25°C)

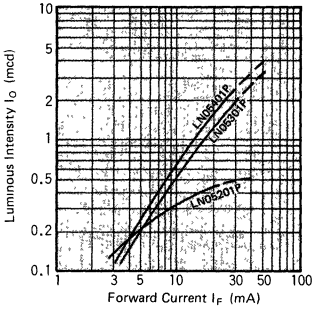
Lighting Color	P_D(mW)	I_F(mA)	I_{FM}(mA)	V_R(V)	Topr(°C)	Tstg(°C)
Red	70	25	30	4	−25~+85	−30~+100
Green	90	30	40	4	−25~+85	−30~+100
Amber	90	30	40	4	−25~+85	−30~+100

Electro-Optical Characteristics (Ta = 25°C)

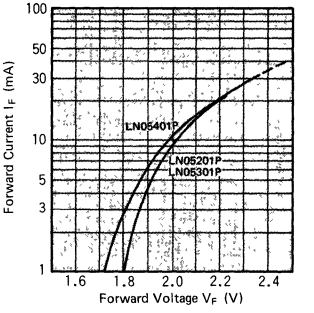
Type No.	Lens Color	I_O			V_F		λ_P	$\Delta\lambda_P$		I_R	
		Typ.	Min.	I_F	Typ.	Max.	Typ.	Typ.	I_F	Max.	V_R
LN05201P	Red Diffused	0.4	0.15	15	2.2	2.8	700	100	20	5	4
LN05301P	Green Diffused	1.2	0.50	20	2.2	2.8	565	30	20	10	4
LN05401P	Amber Diffused	1.5	0.50	20	2.2	2.8	590	30	20	10	4
Unit	—	mcd	mcd	mA	V	V	nm	nm	mA	μA	V

Note I_O value shows the figure of LED

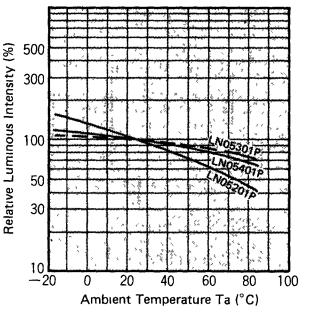
I_O — I_F



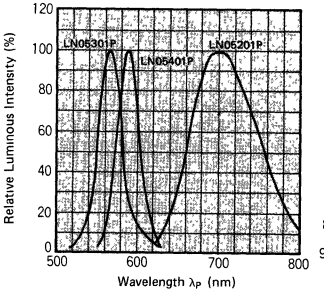
I_F — V_F



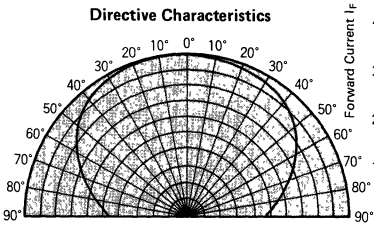
I_O — Ta



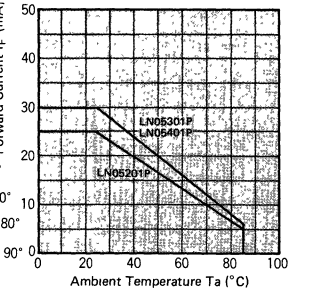
Relative Luminous Intensity Wavelength Characteristics



Directive Characteristics

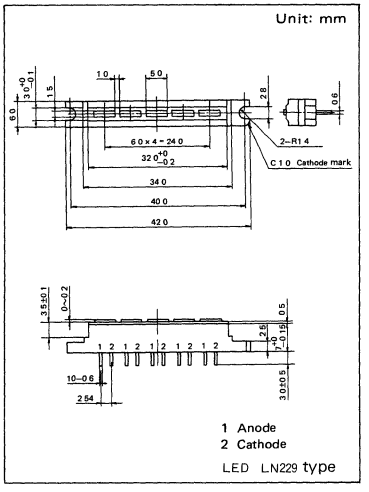


I_F — Ta



Level Meters 5-element Array Series

Characteristics: 1. Lighting surface 1.5mm x 5mm level meter
2. Can combine colors by choice
3. High reliability, long life



Absolute Maximum Ratings (Ta = 25°C)

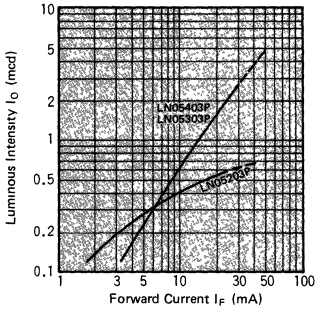
Lighting Color	P_D(mW)	I_F(mA)	I_{FM}(mA)	V_R(V)	Topr(°C)	Tstg(°C)
Red	70	25	30	4	−25~+70	−30~+75
Green	90	30	40	4	−25~+70	−30~+75
Amber	90	30	40	4	−25~+70	−30~+75

Electro-Optical Characteristics (Ta = 25°C)

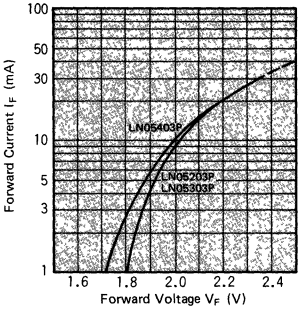
Type No.	Lens Color	I_O			V_F		λ_P	$\Delta\lambda_P$		I_R	
		Typ.	Min.	I_F	Typ.	Max.	Typ.	Typ.	I_F	Max.	V_R
LN05203P	Red Diffused	0.5	0.2	15	2.2	2.8	700	100	20	5	4
LN05303P	Green Diffused	1.5	0.5	20	2.2	2.8	565	30	20	10	4
LN05403P	Amber Diffused	1.5	0.5	20	2.2	2.8	590	30	20	10	4
Unit	——	mcd	mcd	mA	V	V	nm	nm	mA	μA	V

Note I_O value shows the figure of LED

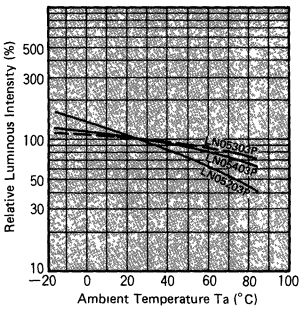
I_O — I_F



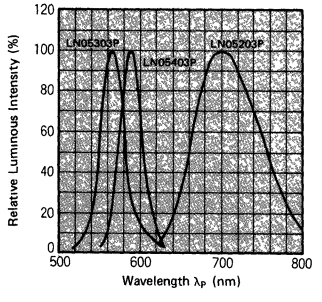
I_F — V_F



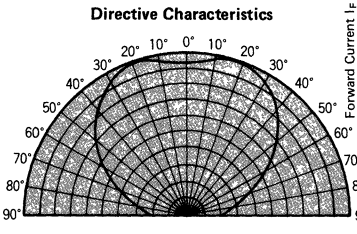
I_O — Ta



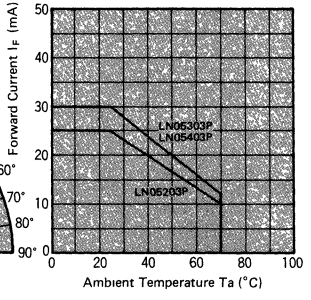
Relative Luminous Intensity Wavelength Characteristics



Directive Characteristics

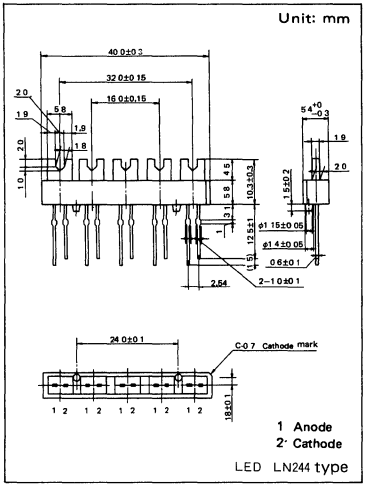


I_F — Ta



Level Meters Two Head 5-element Array Series

Characteristics: 1. Lighting surface 1.9mm x 1.9mm level meter
2. On by 5 chips coner 10 surface
3. High reliability, long life



Absolute Maximum Ratings (Ta = 25°C)

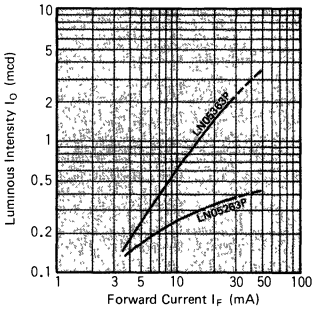
Lighting Color	P_D(mW)	I_F(mA)	I_{FM}(mA)	V_R(V)	Topr(°C)	Tstg(°C)
Red	70	25	30	4	−25~+75	−30~+80
Green	90	30	40	4	−25~+75	−30~+80

Electro-Optical Characteristics (Ta = 25°C)

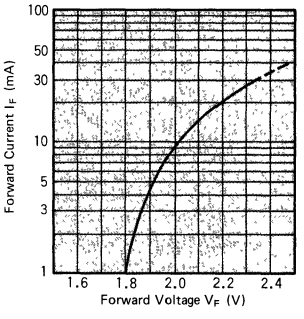
	Type No.	Lens Color	I_O			V_F		λ_P	$\Delta\lambda_P$		I_R	
			Typ.	Min.	I_F	Typ.	Max.	Typ.	Typ.	I_F	Max.	V_R
	LN05263P	Red Diffused	0.3	0.1	15	2.2	2.8	700	100	20	5	4
△	LN05363P	Green Diffused	1.5	—	20	2.2	2.8	565	30	20	10	4
△	LN05463P	Amber Diffused	1.2	—	20	2.2	2.8	590	30	20	10	4
	Unit	——	mcd	mcd	mA	V	V	nm	nm	mA	μA	V

△ Tentative specification Note I_O value shows the figure of LED

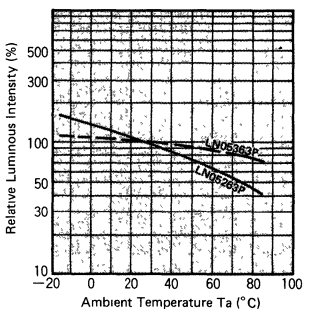
I_O — I_F



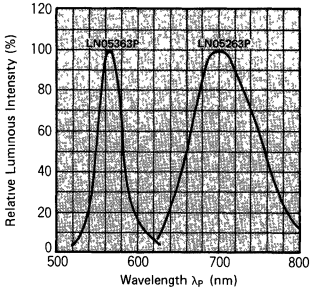
I_F — V_F



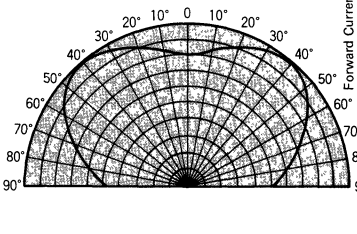
I_O — Ta



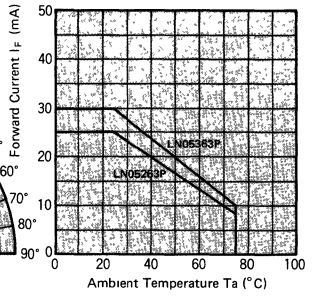
Relative Luminous Intensity Wavelength Characteristics



Directive Characteristics

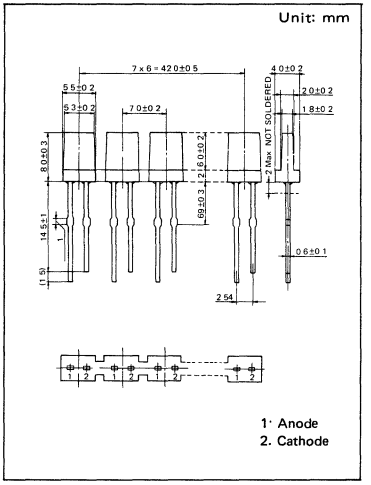


I_F — Ta



Level Meters 7-element Array Series

Characteristics: 1. Lighting surface 1.8mm x 5.3mm level meter
2. Can choose 3 colors
3. High reliability, long life



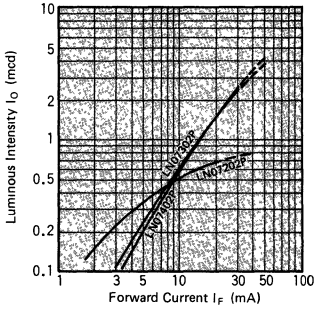
Absolute Maximum Ratings (Ta = 25°C)

Lighting Color	P_D(mW)	I_F(mA)	I_{FM}(mA)	V_R(V)	Topr(°C)	Tstg(°C)
Red	70	25	30	4	−25~+85	−30~+100
Green	90	30	40	4	−25~+85	−30~+100
Amber	90	30	40	4	−25~+85	−30~+100

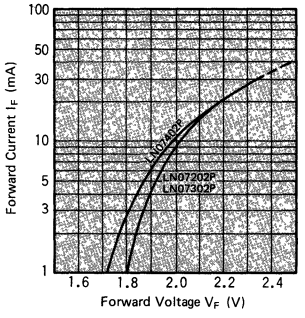
Electro-Optical Characteristics (Ta = 25°C)

Type No.	Lens Color	I_O			V_F		λ_P	$\Delta\lambda_D$		I_R	
		Typ.	Min.	I_F	Typ.	Max.	Typ.	Typ.	I_F	Max.	V_R
LN07202P	Red Diffused	0.6	0.3	15	2.2	2.8	700	100	20	5	4
LN07302P	Green Diffused	1.5	0.4	20	2.2	2.8	565	30	20	10	4
LN07402P	Amber Diffused	1.5	0.6	20	2.2	2.8	590	30	20	10	4
Unit	——	mcd	mcd	mA	V	V	nm	nm	mA	μA	V

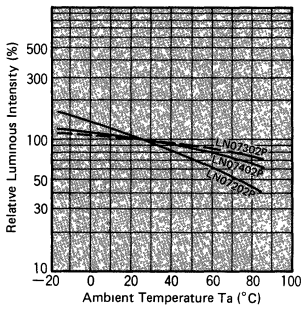
I_O − I_F



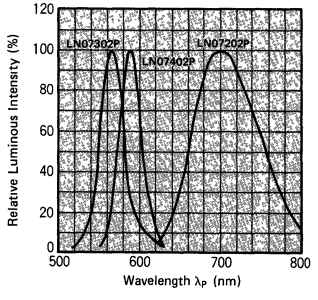
I_F − V_F



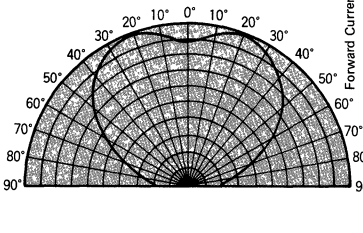
I_O − Ta



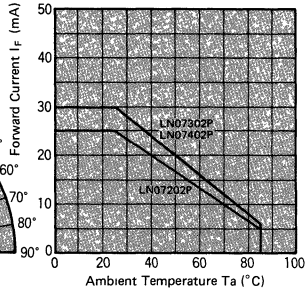
Relative Luminous Intensity Wavelength Characteristics



Directive Characteristics

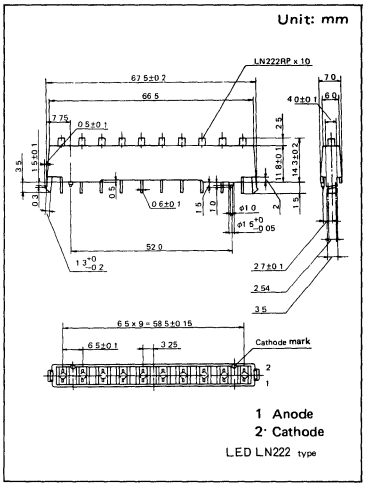


I_F − Ta



Level Meters 10-element Array Series

Characteristics: 1. Lighting surface 2mm cylinder type
2. Lighting color combination
3. High reliability, long life



Absolute Maximum Ratings (Ta = 25°C)

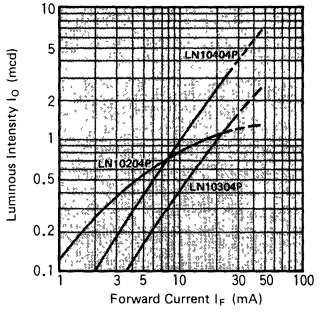
Lighting Color	P_D(mW)	I_F(mA)	I_{FM}(mA)	V_R(V)	Topr(°C)	Tstg(°C)
Red	70	25	30	4	−25~+70	−30~+75
Green	90	30	40	4	−25~+70	−30~+75
Amber	90	30	40	4	−25~+70	−30~+75

Electro-Optical Characteristics (Ta = 25°C)

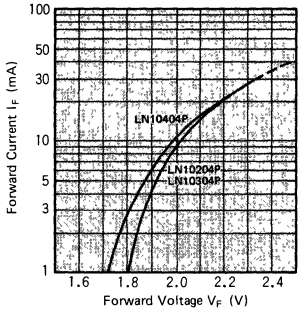
Type No.	Lens Color	I_O		I_F	V_F		λ_P	$\Delta\lambda_P$	I_F	I_R	
		Typ.	Min.		Typ.	Max.	Typ.	Typ.		Max.	V_R
LN10204P	Red Diffused	1.0	0.4	15	2.2	2.8	700	100	20	5	4
LN10304P	Green Diffused	1.0	0.4	20	2.2	2.8	565	30	20	10	4
LN10404P	Amber Diffused	2.5	1.2	20	2.2	2.8	590	30	20	10	4
Unit	——	mcd	mcd	mA	V	V	nm	nm	mA	μA	V

Note I_O value is the figure of LED

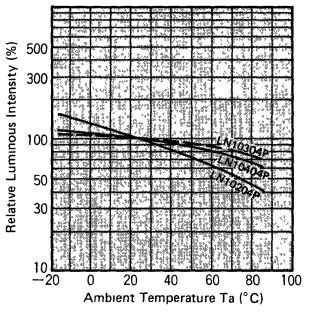
I_O — I_F



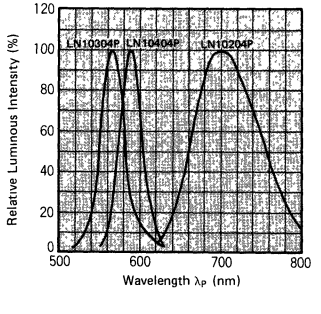
I_F — V_F



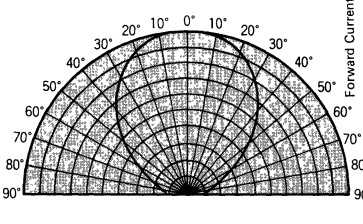
I_O — Ta



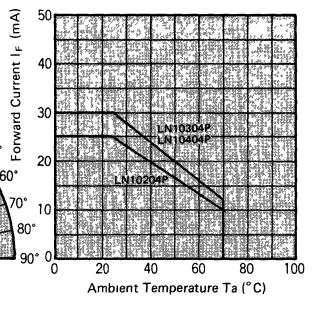
Relative Luminous Intensity Wavelength Characteristics



Directive Characteristics



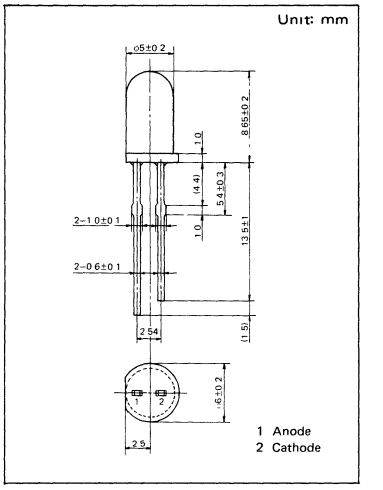
I_F — Ta



New Product

Blue T-1¾ Series

Characteristics: 1. Blue color lighting by GaN
2. High radiation
3. High reliability, long life



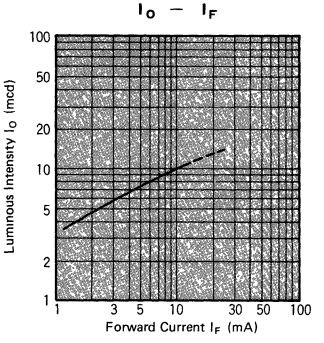
Absolute Maximum Ratings (Ta = 25°C)

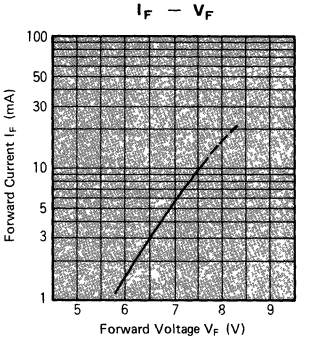
Lighting Color	P_D(mW)	I_F(mA)	I_{FM}(mA)	*V_R(V)	Topr(°C)	Tstg(°C)
Blue	100	12	15	2	−25~+80	−30~+85

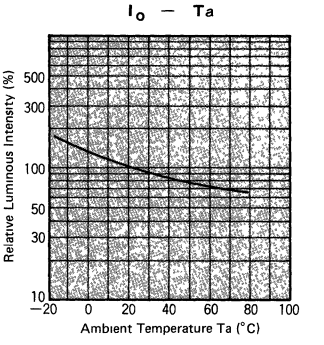
※ Reverse voltage more than 2V should not be applied

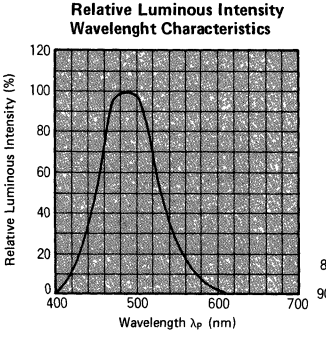
Electro-Optical Characteristics (Ta = 25°C)

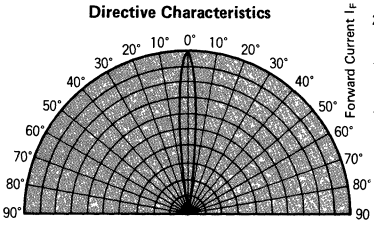
Type No.	Lens Color	I_O		I_F	V_F		λ_P	$\Delta\lambda_P$	I_F	I_R	
		Typ.	Min.		Typ.	Max.	Typ.	Typ.		Max.	V_R
LN91BC	Blue Clear	10	2	10	7.5	10.0	490	80	10	1	2
Unit	——	mcd	mcd	mA	V	V	nm	nm	mA	mA	V

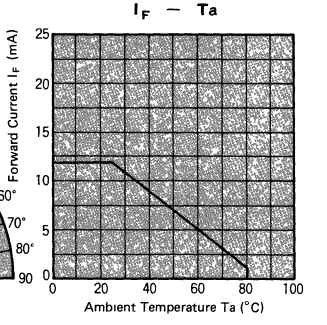








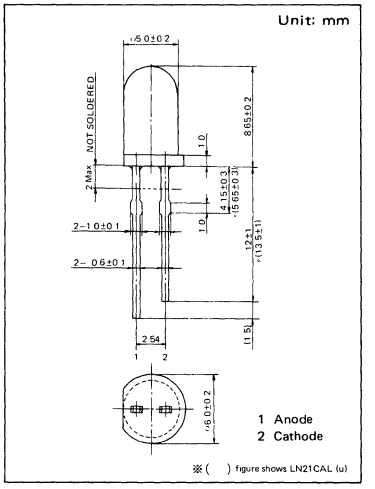




New Product

Hi-Brite T-1¾ Series

Characteristics: 1. Red color lighting by GaAlAs
2. High radiation
3. High reliability, long life



Absolute Maximum Ratings (Ta = 25°C)

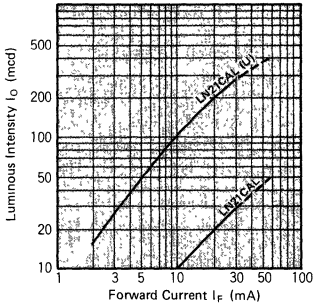
Lighting Color	P_D(mW)	I_F(mA)	I_{FM}(mA)	V_R(V)	Topr(°C)	Tstg(°C)
Red	70	30	40	3	−25~+85	−30~+100

Electro-Optical Characteristics (Ta = 25°C)

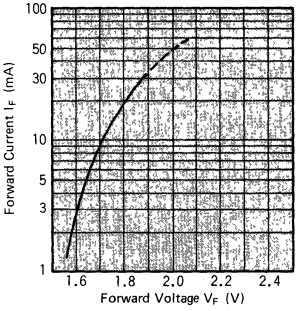
Type No.	Lens Color	I_O			V_F		λ_P	$\Delta\lambda_P$		I_R	
		Typ.	Min.	I_F	Typ.	Max.	Typ.	Typ.	I_F	Max.	V_R
LN21CAL	Clear	20	5	20	1.8	2.4	660	30	20	10	3
△ LN21CAL(U)	Clear	200	20	20	1.8	2.4	660	30	20	10	3
Unit	——	mcd	mcd	mA	V	V	nm	nm	mA	μA	V

△ Tentative specification

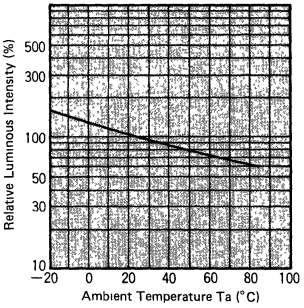
I_O − I_F



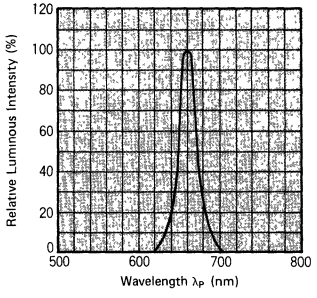
I_F − V_F



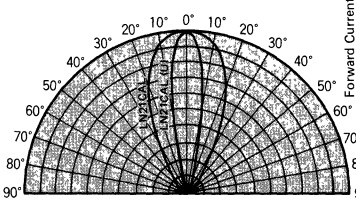
I_O − Ta



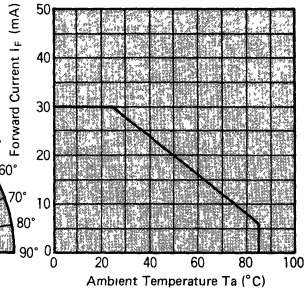
Relative Luminous Intensity Wavelength Characteristics



Directive Characteristics



I_F − Ta

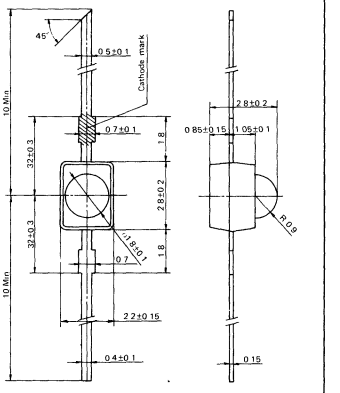


New Product

Subminiature Series

Characteristics: 1 Lighting surface 1.8mm round type
2. High precise dimension
3 High reliability, long life

Unit: mm



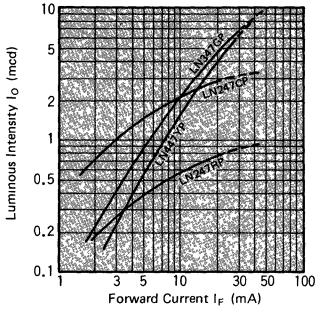
Absolute Maximum Ratings (Ta = 25°C)

Lighting Color	P_D(mW)	I_F(mA)	I_{FM}(mA)	V_R(V)	Topr(°C)	Tstg(°C)
Red	70	25	30	4	−25~+85	−30~+100
Green	90	30	40	4	−25~+85	−30~+100
Amber	90	30	40	4	−25~+85	−30~+100

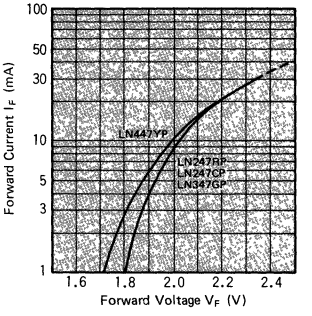
Electro-Optical Characteristics (Ta = 25°C)

Type No.	Lens Color	I_O		I_F	V_F		λ_P	$\Delta\lambda_P$	I_F	I_R	V_R
		Typ.	Min.		Typ.	Max.	Typ.	Typ.		Max.	
LN247RP	Red Diffused	0.7	0.25	15	2.2	2.8	700	100	20	10	4
LN247CP	Clear	2.5	0.9	15	2.2	2.8	700	100	20	10	4
LN347GP	Green Diffused	4.5	1.5	20	2.2	2.8	565	30	20	10	4
LN447YP	Amber Diffused	4.0	0.8)	20	2.2	2.8	590	30	20	10	4
Unit	——	mcd	mcd	mA	V	V	nm	nm	mA	μA	V

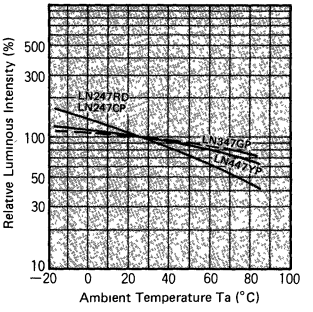
I_O — I_F



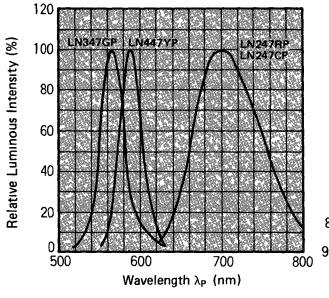
I_F — V_F



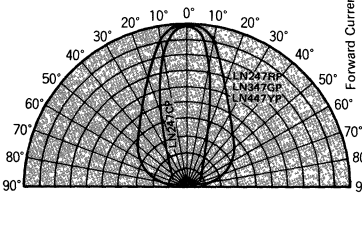
I_O — Ta



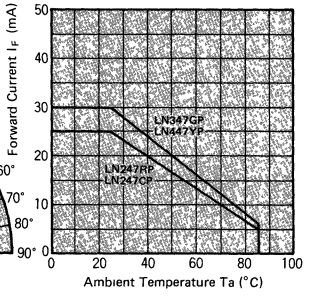
Relative Luminous Intensity Wavelength Characteristics



Directive Characteristics



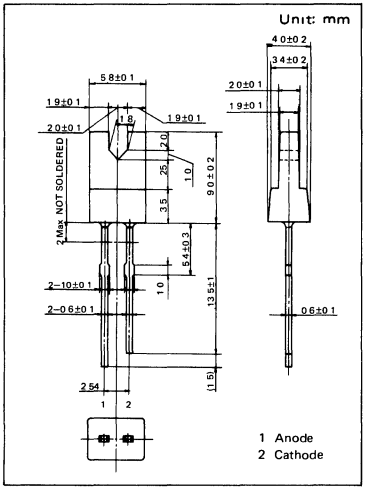
I_F — Ta



New Product

Dual Surface 1.9mm X 1.9mm X 2mm Series

Characteristics: 1. Lighting surface 1.9mm x 1.9mm two head type
2 1 chip 2 surface lighting
3. High reliability, long life



Absolute Maximum Ratings (Ta = 25°C)

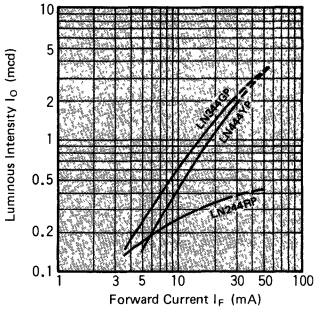
Lighting Color	P_D(mW)	I_F(mA)	I_{FM}(mA)	V_R(V)	Topr(°C)	Tstg(°C)
Red	70	25	30	4	−25~+85	−30~+100
Green	90	30	40	4	−25~+85	−30~+100
Amber	90	30	40	4	−25~+85	−30~+100

Electro-Optical Characteristics (Ta = 25°C)

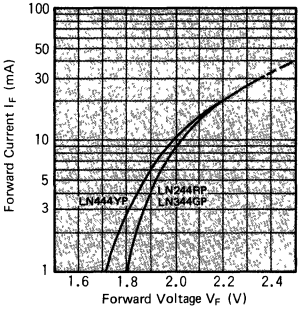
	Type No.	Lens Color	I_O Typ.	I_O Min.	I_F	V_F Typ.	V_F Max.	λ_P Typ.	$\Delta\lambda_P$ Typ.	I_F	I_R Max.	V_R
	LN244RP	Red Diffused	0.3	0.13	15	2.2	2.8	700	100	20	5	4
△	LN344GP	Green Diffused	1.5	—	20	2.2	2.8	565	30	20	10	4
△	LN444YP	Amber Diffused	1.2	—	20	2.2	2.8	590	30	20	10	4
	Unit	——	mcd	mcd	mA	V	V	nm	nm	mA	μA	V

△Tentative specification

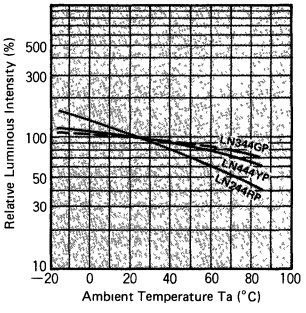
I_O — I_F



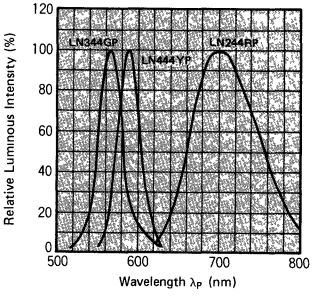
I_F — V_F



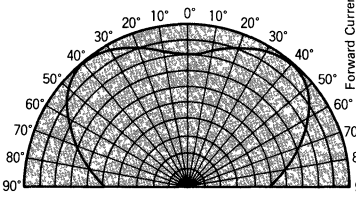
I_O — Ta



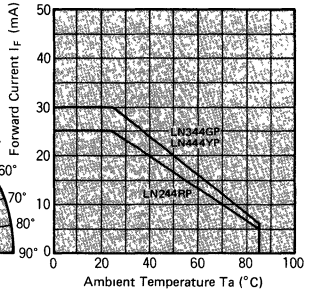
Relative Luminous Intensity Wavelength Characteristics



Directive Characteristics



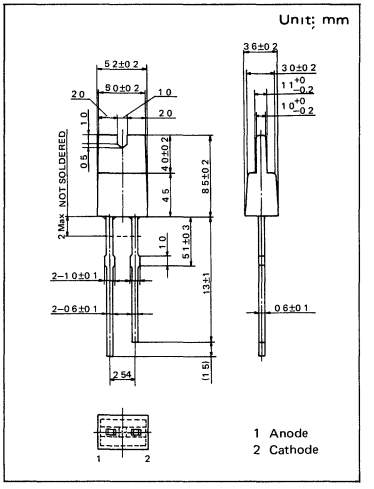
I_F — Ta



New Product

Dual Surface 1mm X 2mm X 2mm Series

Characteristics: 1. Lighting surface 1mm x 2mm two head type
2. 1 chip 2 surface lighting
3. High reliability, long life



Absolute Maximum Ratings (Ta = 25°C)

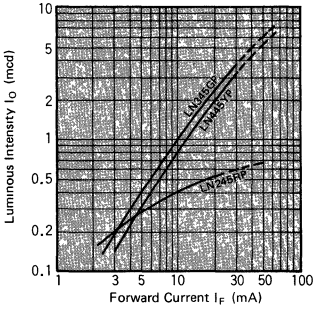
Lighting Color	P_D(mW)	I_F(mA)	I_{FM}(mA)	V_R(V)	Topr(°C)	Tstg(°C)
Red	70	25	30	4	−25~+85	−30~+100
Green	90	30	40	4	−25~+85	−30~+100
Amber	90	30	40	4	−25~+85	−30~+100

Electro-Optical Characteristics (Ta = 25°C)

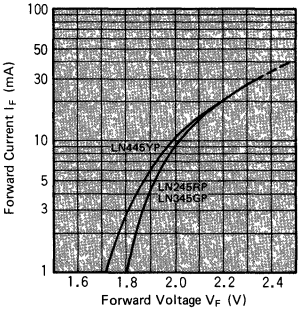
Type No.	Lens Color	I_O			V_F		λ_P	$\Delta\lambda_P$		I_R	
		Typ.	Min.	I_F	Typ.	Max.	Typ.	Typ.	I_F	Max.	V_R
LN245RP	Red Diffused	0.5	0.2	15	2.2	2.8	700	100	20	5	4
LN345GP	Green Diffused	2.5	1.0	20	2.2	2.8	565	30	20	10	4
△ LN445YP	Amber Diffused	2.0	—	20	2.2	2.8	590	30	20	10	4
Unit	——	mcd	mcd	mA	V	V	nm	nm	mA	μA	V

△ Tentative specification

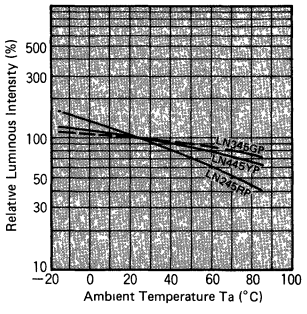
I_O — I_F



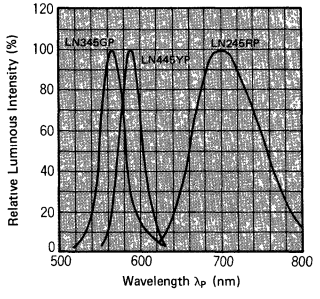
I_F — V_F



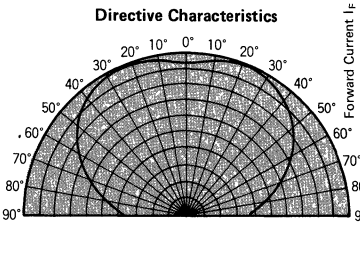
I_O — Ta



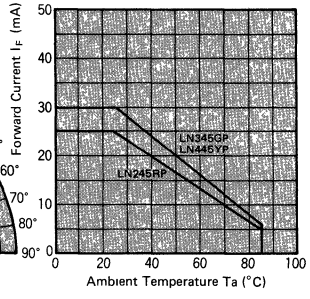
Relative Luminous Intensity Wavelength Characteristics



Directive Characteristics



I_F — Ta

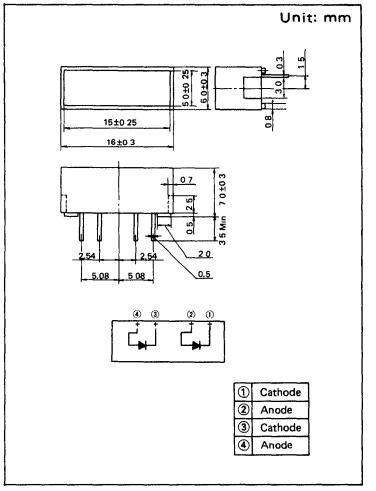


New Product

(Light Bar)

Surface 5mm X 15mm Series

Characteristics: 1. 5mm x 15mm surface
2. High radiation, Uniform lighting surface
3. High reliability, long life



Absolute Maximum Ratings (Ta = 25°C)

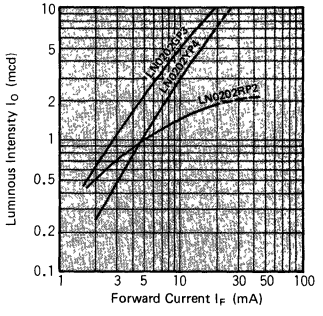
Lighting Color	P_D(mW)	I_F(mA)	Note 1) I_{FP}(mA)	V_R(V)	Topr(°C)	Tstg(°C)
Red	60	20	100	4	−25~+80	−30~+85
Green	60	20	100	4	−25~+80	−30~+85
Amber	60	20	100	4	−25~+80	−30~+85

Note 1) I_{FP} is duty 1/10 pulse with 1 msec

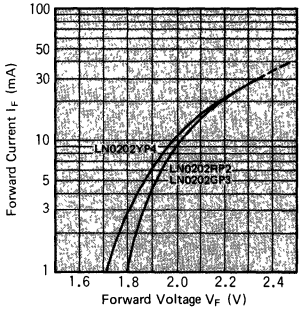
Electro-Optical Characteristics (Ta = 25°C)

Type No.	Lens Color	I_O Typ.	I_O Min.	I_F	V_F Typ.	V_F Max.	λ_P Typ.	$\Delta\lambda_P$ Typ.	I_F	I_R Max.	V_R
LN0202RP2	Red Diffused	1.5	0.5	10	2.2	2.8	700	100	20	10	4
LN0202GP3	Green Diffused	5.0	2.0	10	2.2	2.8	565	30	20	10	4
LN0202YP4	Amber Diffused	3.0	1.0	10	2.2	2.8	590	30	20	10	4
Unit	——	mcd	mcd	mA	V	V	nm	nm	mA	μA	V

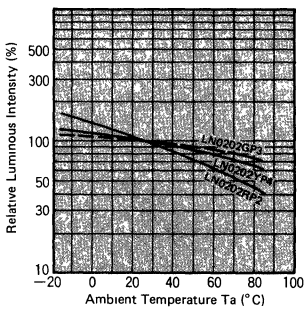
I_O — I_F



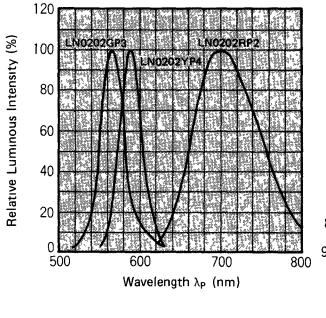
I_F — V_F



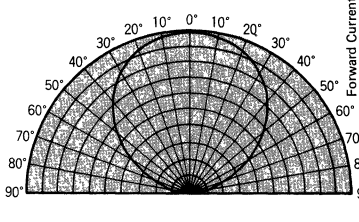
I_O — Ta



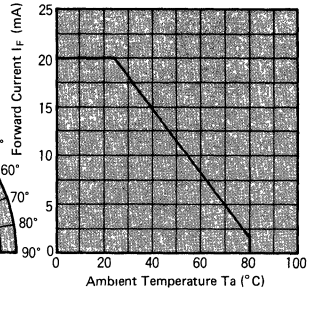
Relative Luminous Intensity Wavelength Characteristics



Directive Characteristics



I_F — Ta

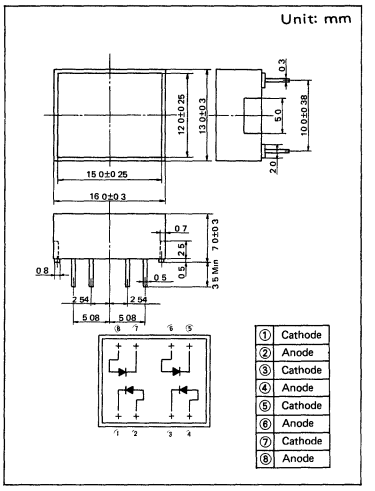


New Product

(Light Bar)

Surface 12mm X 15mm Series

Characteristics: 1. 12mm x 15mm surface
2. High radiation, Uniform lighting surface
3. High reliability, long life



Absolute Maximum Ratings (Ta = 25°C)

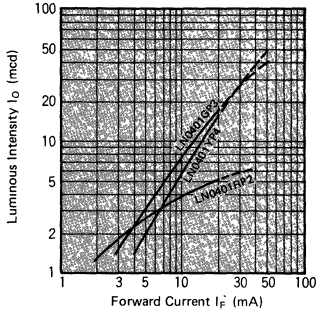
Lighting Color	P_D(mW)	I_F(mA)	Note 1) I_{FP}(mA)	V_R(V)	Topr(°C)	Tstg(°C)
Red	60	20	100	4	−25~+80	−30~+85
Green	60	20	100	4	−25~+80	−30~+85
Amber	60	20	100	4	−25~+80	−30~+85

Note 1) I_{FP} is duty 1/10 pulse with 1 msec

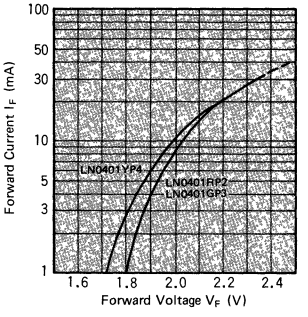
Electro-Optical Characteristics (Ta = 25°C)

Type No.	Lens Color	I_O		I_F	V_F		λ_P	$\Delta\lambda_P$	I_F	I_R	
		Typ.	Min.		Typ.	Max.	Typ.	Typ.		Max.	V_R
LN0401RP2	Red Diffused	4.0	1.2	10	2.2	2.8	700	100	20	10	4
LN0401GP3	Green Diffused	8.0	2.5	10	2.2	2.8	565	30	20	10	4
LN0401YP4	Amber Diffused	6.0	2.0	10	2.2	2.8	590	30	20	10	4
Unit	——	mcd	mcd	mA	V	V	nm	nm	mA	μA	V

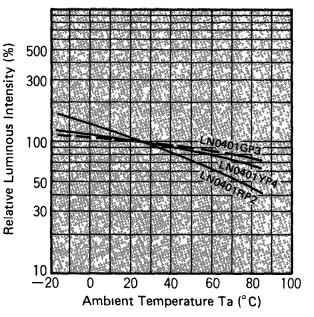
$I_O - I_F$



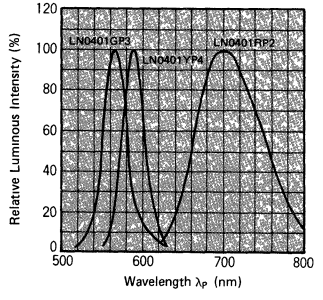
$I_F - V_F$



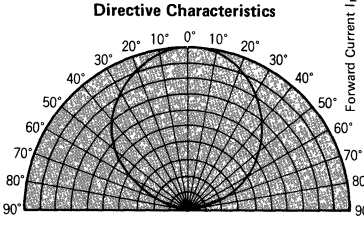
$I_O - Ta$



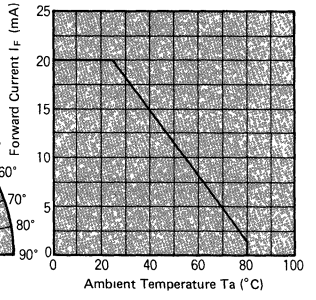
Relative Luminous Intensity Wavelenght Characteristics



Directive Characteristics



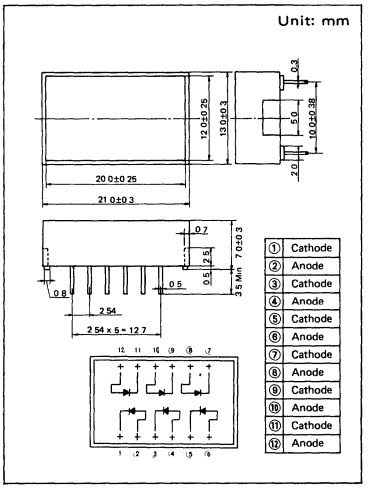
$I_F - Ta$



(Light Bar)

Surface 12mm X 20mm Series

Characteristics: 1. 12mm x 20mm surface
2. High radiation, Uniform lighting surface
3. High reliability, long life



Absolute Maximum Ratings (Ta = 25°C)

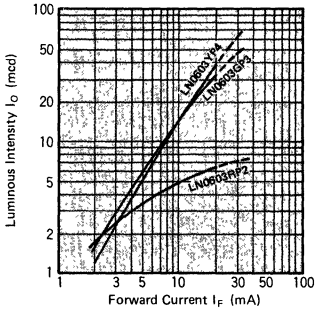
Lighting Color	P_D(mW)	I_F(mA)	Note 1) I_{FP}(mA)	V_R(V)	Topr(°C)	Tstg(°C)
Red	60	20	100	4	−25~+80	−30~+85
Green	60	20	100	4	−25~+80	−30~+85
Amber	60	20	100	4	−25~+80	−30~+85

Note 1) I_{FP} is duty 1/10 pulse with 1 msec

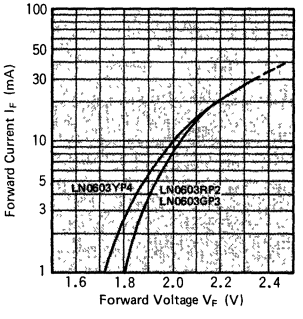
Electro-Optical Characteristics (Ta = 25°C)

Type No.	Lens Color	I_O			V_F		λ_P	$\Delta\lambda_P$		I_R	
		Typ.	Min.	I_F	Typ.	Max.	Typ.	Typ.	I_F	Max.	V_R
LN0603RP2	Red Diffused	5.0	1.5	10	2.2	2.8	700	100	20	10	4
LN0603GP3	Green Diffused	15.0	5.0	10	2.2	2.8	565	30	20	10	4
LN0603YP4	Amber Diffused	15.0	5.0	10	2.2	2.8	590	30	20	10	4
Unit	——	mcd	mcd	mA	V	V	nm	nm	mA	μA	V

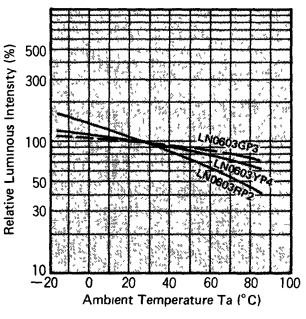
I_O — I_F



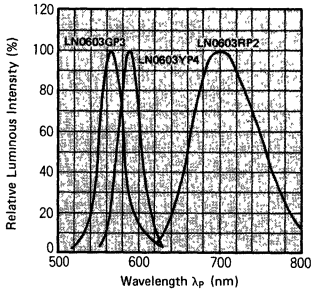
I_F — V_F



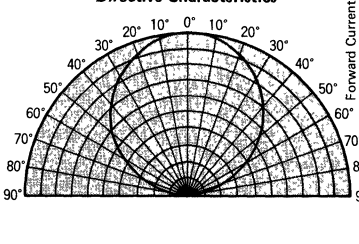
I_O — Ta



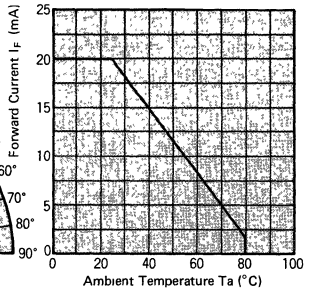
Relative Luminous Intensity Wavelength Characteristics



Directive Characteristics

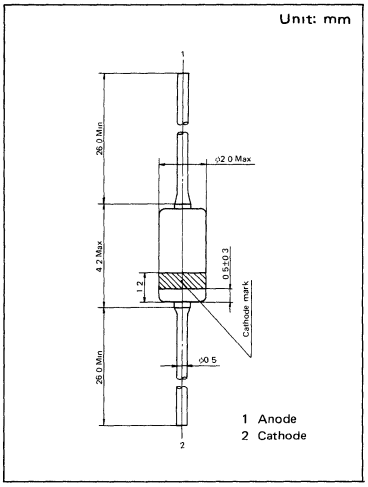


I_F — Ta



Glass Sealed 2mm Series

Characteristics: 1. Glass sealed 2mm cylinder type
2. Wide directive characteristics
3. High reliability, long life



Absolute Maximum Ratings (Ta = 25°C)

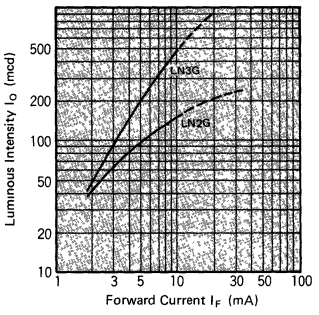
Lighting Color	P_D(mW)	I_F(mA)	I_{FM}(mA)	V_R(V)	Topr(°C)	Tstg(°C)
Red	24	10	15	4	−25~+85	−30~+100
Green	24	10	15	4	−25~+85	−30~+100

Electro-Optical Characteristics (Ta = 25°C)

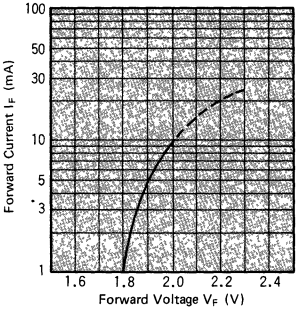
	Type No.	Lens Color	I_O Typ.	I_O Min.	I_F	V_F Typ.	V_F Max.	λ_P Typ.	$\Delta\lambda_P$ Typ.	I_F	I_R Max.	V_R
△	LN2G	Clear	100	30	5	2.0	2.4	700	100	10	10	4
△	LN3G	Clear	200	30	5	2.0	2.4	565	30	10	10	4
	Unit	——	μcd	μcd	mA	V	V	nm	nm	mA	μA	V

△ Tentative specification

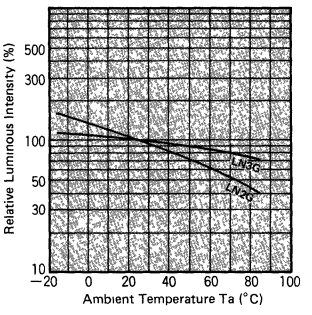
I_O — I_F



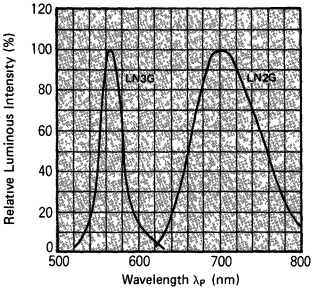
I_F — V_F



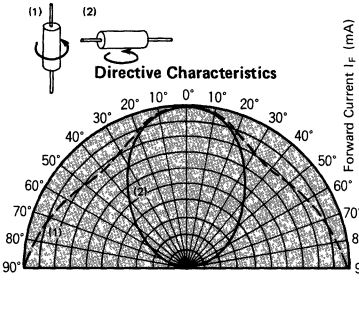
I_O — Ta



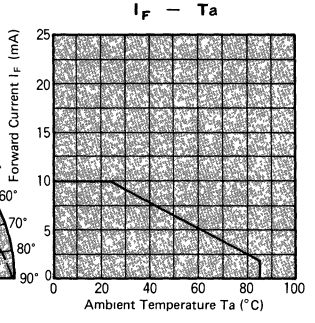
Relative Luminous Intensity Wavelength Characteristics



Directive Characteristics

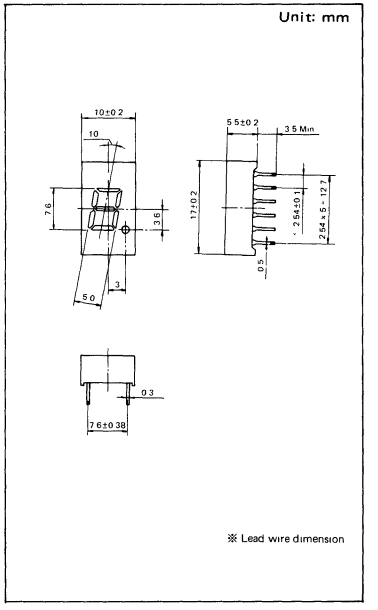


I_F — Ta

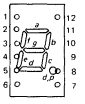


1 Digit 0.3 inch Series

Characteristics: 1. Small and high brightness
2. Black coated surface, colored seg
3. High reliability, long life



Terminal Connection



Pin No	Assignment
1	Anode b
2	Anode a
3	Anode f
4	Anode e
5	Anode d
6	Anode c
7	Anode d.p
8	Common Cathode
9	———
10	———
11	———
12	Anode g

Absolute Maximum Ratings (Ta = 25°C)

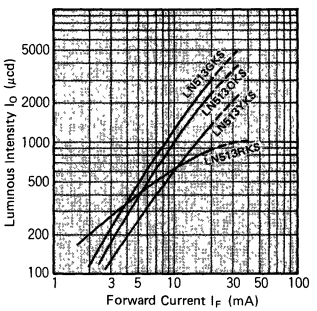
Lighting Color	P_D(mW)	I_F(mA)	I_{FP}(mA) ※	V_R(V)	Topr(℃)	Tstg(℃)
Red	60	20	100	5	−25～+80	−30～+85
Green	60	20	100	5	−25～+80	−30～+85
Amber	60	20	100	5	−25～+80	−30～+85
Orange	60	20	100	5	−25～+80	−30～+85

※ The condition of I_{FP} is duty 10%, Pulse width 1 msec

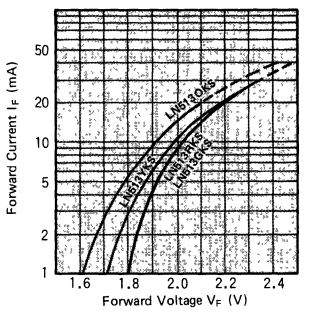
Electro-Optical Characteristics (Ta = 25°C)

Type No.	Lighting Color	I_O/seg		I_O/d.p		V_F		λp	Δλp		I_R	
		Typ.	Min.	Typ.	I_F	Typ.	Max.	Typ.	Typ.	I_F	Max.	V_R
LN513RKS	Red	400	150	150	5	2.2	2.8	700	100	20	10	5
LN513GKS	Green	1200	400	400	10	2.2	2.8	565	30	20	10	5
LN513YKS	Amber	600	200	200	10	2.2	2.8	590	30	20	10	5
LN513OKS	Orange	1000	300	400	10	2.1	2.8	630	40	20	10	5
Unit	——	μcd	μcb	μcd	mA	V	V	nm	nm	mA	μA	V

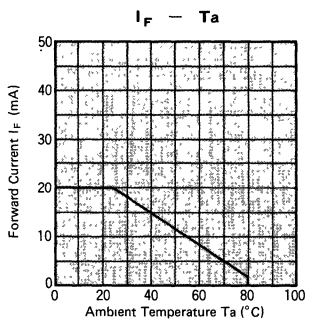
I_O − I_F



I_F − V_F



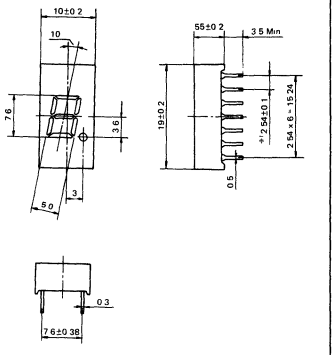
I_F − Ta



1 Digit 0.3 inch Series

Characteristics: 1. Uniform lighting surface and high radiation
2. Black coated surface, colored seg.
3. High reliability, long life

Unit: mm



※ Lead wire dimension

Terminal Connection

Pin No	Assignment	Assignment
1	Cathode a	Anode a
2	Cathode f	Anode f
3	Common Anode	Common Cathode
4	———	———
5	———	———
6	———	———
7	Cathode e	Anode e
8	Cathode d	Anode d
9	Cathode d p	Anode d p
10	Cathode c	Anode c
11	Cathode g	Anode g
12	———	———
13	Cathode b	Anode b
14	Common Anode	Common Cathode

Absolute Maximum Ratings (Ta = 25°C)

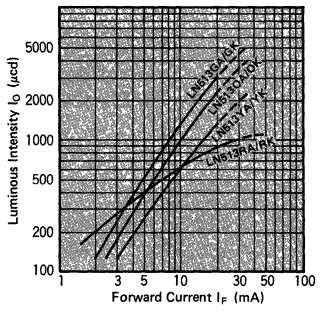
Lighting Color	P_D(mW)	I_F(mA)	I_{FP}(mA) *	V_R(V)	Topr(°C)	Tstg(°C)
Red	60	20	100	5	−25～+80	−30～+85
Green	60	20	100	5	−25～+80	−30～+85
Amber	60	20	100	5	−25～+80	−30～+85
Orange	60	20	100	5	−25～+80	−30～+85

※ The condition of I_{FP} is duty 10%, Pluse width 1 msec

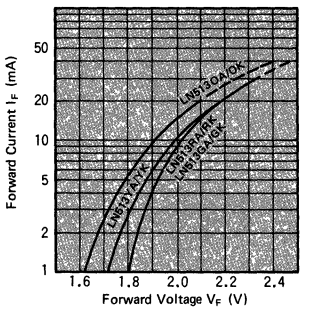
Electro-Optical Characteristics (Ta = 25°C)

Type No.	Lighting Color	I_O/seg		I_O/d.p		V_F		λp	Δλp		I_R	
		Typ.	Min.	Typ.	I_F	Typ.	Max.	Typ.	Typ.	I_F	Max.	V_R
LN513RA/RK	Red	400	150	150	5	2.2	2.8	700	100	20	10	5
LN513GA/GK	Green	1200	400	400	10	2.2	2.8	565	30	20	10	5
LN513YA/YK	Amber	600	200	200	10	2.2	2.8	590	30	20	10	5
LN5130A/OK	Orange	1000	300	400	10	2.1	2.8	630	40	20	10	5
Unit	——	μcd	μcb	μcd	mA	V	V	nm	nm	mA	μA	V

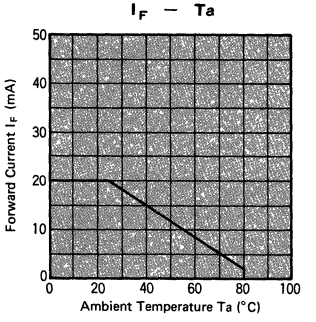
I_O − I_F



I_F − V_F



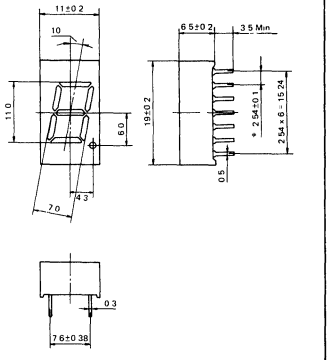
I_F − Ta



1 Digit 0.4 inch Series

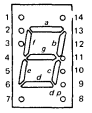
Characteristics: 1. Uniform lighting surface and high radiation
2. Black coated surface, colored seg
3. High reliability, long life

Unit: mm



※ Lead wire dimension

Terminal Connection



Pin No	Assignment	Assignment
1	Cathode a	Anode a
2	Cathode f	Anode f
3	Common Anode	Common Cathode
4	——	——
5	——	——
6	——	——
7	Cathode e	Anode e
8	Cathode d	Anode d
9	Cathode d p	Anode d p
10	Cathode c	Anode c
11	Cathode g	Anode g
12	——	——
13	Cathode b	Anode b
14	Common Anode	Common Cathode

Absolute Maximum Ratings (Ta = 25°C)

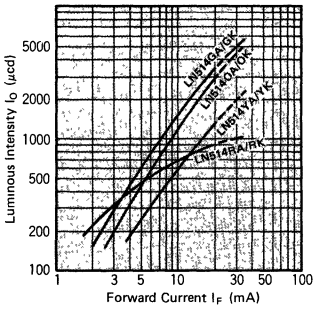
Lighting Color	P_D(mW)	I_F(mA)	I_{FP}(mA) ※	V_R(V)	Topr(℃)	Tstg(℃)
Red	60	20	100	5	−25～+80	−30～+85
Green	60	20	100	5	−25～+80	−30～+85
Amber	60	20	100	5	−25～+80	−30～+85
Orange	60	20	100	5	−25～+80	−30～+85

※ The condition of I_{FP} is duty 10%, Pluse width 1 msec

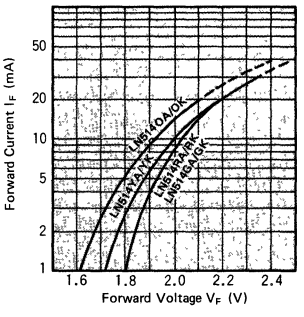
Electro-Optical Characteristics (Ta = 25°C)

Type No.	Lighting Color	I_O/seg		I_O/d.p		V_F		λp	Δλp		I_R	
		Typ.	Min.	Typ.	I_F	Typ.	Max.	Typ.	Typ.	I_F	Max.	V_R
LN514RA/RK	Red	450	150	150	5	2.2	2.8	700	100	20	10	5
LN514GA/GK	Green	1500	500	500	10	2.2	2.8	565	30	20	10	5
LN514YA/YK	Amber	600	200	200	10	2.2	2.8	590	30	20	10	5
LN5140A/OK	Orange	1200	300	500	10	2.1	2.8	630	40	20	10	5
Unit	——	μcd	μcb	μcd	mA	V	V	nm	nm	mA	μA	V

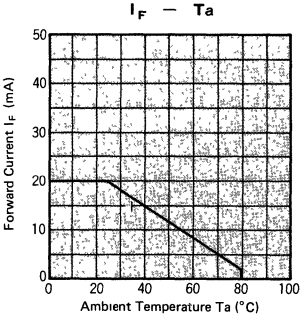
I_O − I_F



I_F − V_F

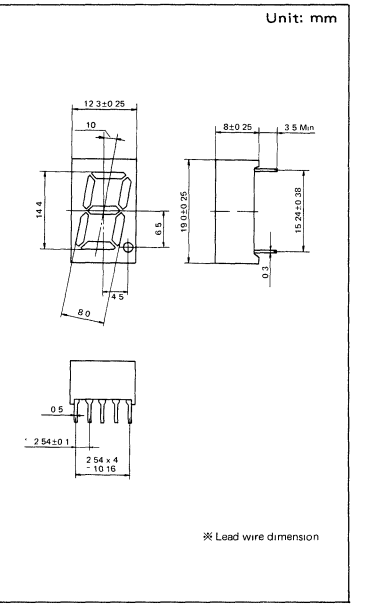


I_F − Ta

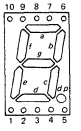


1 Digit 0.6 inch Series

Characteristics: 1. Good visible recognition, high radiation
2. Black coated surface, colored seg.
3. High reliability, long life



Terminal Connection



Pin No	Assignment	Assignment
1	Cathode e	Anode e
2	Cathode d	Anode d
3	Common Anode	Common Cathode
4	Cathode c	Anode c
5	Cathode d p	Anode d p
6	Cathode b	Anode b
7	Cathode a	Anode a
8	Common Anode	Common Cathode
9	Cathode f	Anode f
10	Cathode g	Anode g

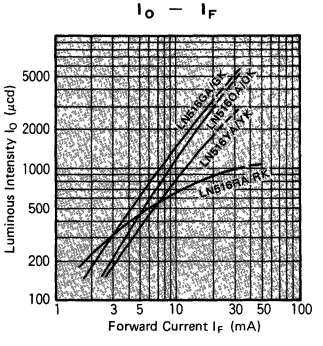
Absolute Maximum Ratings (Ta = 25°C)

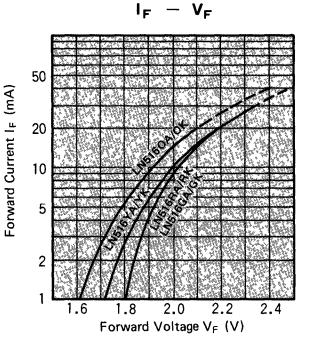
Lighting Color	P_D(mW)	I_F(mA)	I_{FP}(mA) ※	V_R(V)	Topr(°C)	Tstg(°C)
Red	60	20	100	5	−25~+80	−30~+85
Green	60	20	100	5	−25~+80	−30~+85
Amber	60	20	100	5	−25~+80	−30~+85
Orange	60	20	100	5	−25~+80	−30~+85

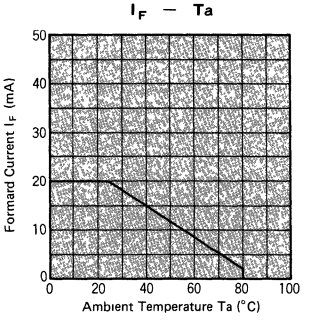
※ The condition of I_{FP} is duty 10%, Pluse width 1 msec

Electro-Optical Characteristics (Ta = 25°C)

Type No.	Lighting Color	I_O/seg		I_O/d.p		V_F		λ_p	$\Delta\lambda_p$		I_R	
		Typ.	Min.	Typ.	I_F	Typ.	Max.	Typ.	Typ.	I_F	Max.	V_R
LN516RA/RK	Red	600	250	600	5	2.2	2.8	700	100	20	10	5
LN516GA/GK	Green	1500	500	500	10	2.2	2.8	565	30	20	10	5
LN516YA/YK	Amber	800	300	300	10	2.2	2.8	590	30	20	10	5
LN5160A/0K	Orange	1200	300	500	10	2.1	2.8	630	40	20	10	5
Unit	——	μcd	μcb	μcd	mA	V	V	nm	nm	mA	μA	V



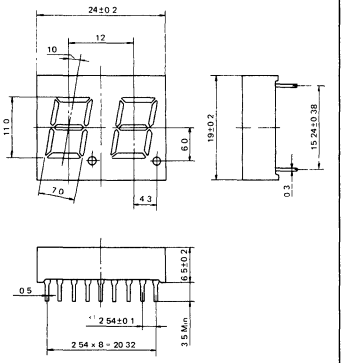




2 Digit 0.4 inch Series

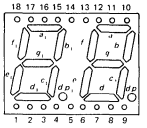
Characteristics: 1. Uniform lighting surface and high radiation
2. Black coated surface, colored seg
3. High reliability, long life

Unit: mm



※ Lead wire dimension

Terminal Connection



Pin No	Assignment	Assignment
1	Cathode e_1	Anode e_1
2	Cathode d_1	Anode d_1
3	Cathode c_1	Anode c_1
4	Cathode d p_1	Anode d p_1
5	Cathode e_2	Anode e_2
6	Cathode d_2	Anode d_2
7	Cathode g_2	Anode g_2
8	Cathode c_2	Anode c_2
9	Cathode d p_2	Anode d p_2
10	Cathode b_2	Anode b_2
11	Cathode a_2	Anode a_2
12	Cathode f_2	Anode f_2
13	Common Anode	Common Cathode
14	Common Anode	Common Cathode
15	Cathode b_1	Anode b_1
16	Cathode a_1	Anode a_1
17	Cathode g_1	Anode g_1
18	Cathode f_1	Anode f_1

Absolute Maximum Ratings (Ta = 25°C)

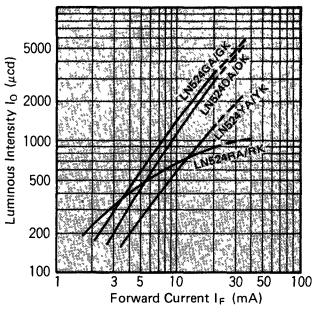
Lighting Color	P_D(mW)	I_F(mA)	I_{FP}(mA) ※	V_R(V)	Topr(°C)	Tstg(°C)
Red	60	20	100	5	−25～+80	−30～+85
Green	60	20	100	5	−25～+80	−30～+85
Amber	60	20	100	5	−25～+80	−30～+85
Orange	60	20	100	5	−25～+80	−30～+85

※ The condition of I_{FP} is duty 10%, Pluse width 1 msec

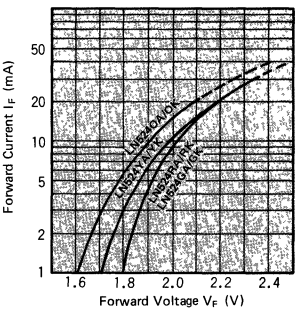
Electro-Optical Characteristics (Ta = 25°C)

Type No.	Lighting Color	I_O/seg		I_O/d.p		V_F		λp	Δλp		I_R	
		Typ.	Min.	Typ.	I_F	Typ.	Max.	Typ.	Typ.	I_F	Max.	V_R
LN524RA/RK	Red	450	150	150	5	2.2	2.8	700	100	20	10	5
LN524GA/GK	Green	1500	500	500	10	2.2	2.8	565	30	20	10	5
LN524YA/YK	Amber	600	200	200	10	2.2	2.8	590	30	20	10	5
LN5240A/0K	Orange	1200	300	500	10	2.1	2.8	630	40	20	10	5
Unit	——	μcd	μcb	μcd	mA	V	V	nm	nm	mA	μA	V

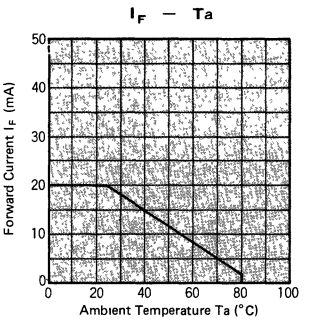
I_O − I_F



I_F − V_F



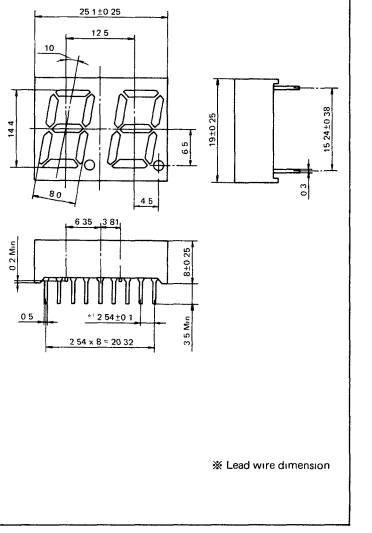
I_F − Ta



2 Digit 0.6 inch Series

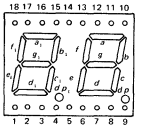
Characteristics: 1. Good visible recogniation, high radiation
2. Black coated surface, colored seg.
3. High reliability, long life

Unit: mm



※ Lead wire dimension

Terminal Connection



Pin No	Assignment	Assignment
1	Cathode e_1	Anode e_1
2	Cathode d_1	Anode d_1
3	Cathode c_1	Anode c_1
4	Cathode d p_1	Anode d p_1
5	Cathode e_2	Anode e_2
6	Cathode d_2	Anode d_2
7	Cathode g_2	Anode g_2
8	Cathode c_2	Anode c_2
9	Cathode d p_2	Anode d p_2
10	Cathode b_2	Anode b_2
11	Cathode a_2	Anode a_2
12	Cathode f_2	Anode f_2
13	Common Anode	Common Cathode
14	Common Anode	Common Cathode
15	Cathode b_1	Anode b_1
16	Cathode a_1	Anode a_1
17	Cathode g_1	Anode g_1
18	Cathode f_1	Anode f_1

Absolute Maximum Ratings (Ta = 25°C)

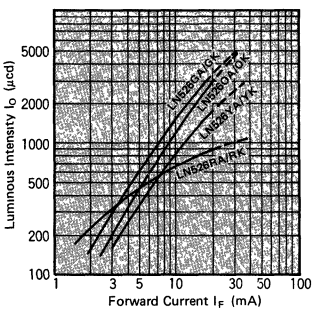
Lighting Color	P_D(mW)	I_F(mA)	I_{FP}(mA)*	V_R(V)	Topr(°C)	Tstg(°C)
Red	60	20	100	5	−25～+80	−30～+85
Green	60	20	100	5	−25～+80	−30～+85
Amber	60	20	100	5	−25～+80	−30～+85
Orange	60	20	100	5	−25～+80	−30～+85

※ The condition of I_{FP} is duty 10%, Pluse width 1 msec

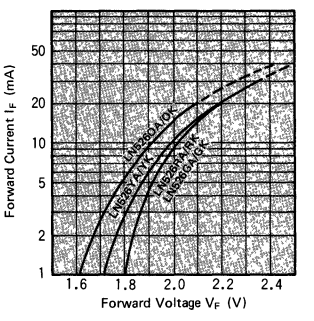
Electro-Optical Characteristics (Ta = 25°C)

Type No.	Lighting Color	I_O/seg		I_O/d.p		V_F		λp	Δλp		I_R	
		Typ.	Min.	Typ.	I_F	Typ.	Max.	Typ.	Typ.	I_F	Max.	V_R
LN526RA/RK	Red	600	250	600	5	2.2	2.8	700	100	20	10	5
LN526GA/GK	Green	1500	500	500	10	2.2	2.8	565	30	20	10	5
LN526YA/YK	Amber	800	300	300	10	2.2	2.8	590	30	20	10	5
LN5260A/OK	Orenge	1200	300	500	10	2.1	2.8	630	40	20	10	5
Unit	——	μcd		μcb	μcd	mA	V	V	nm	nm	mA	μA	V

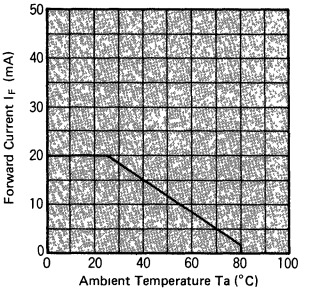
$I_O - I_F$



$I_F - V_F$



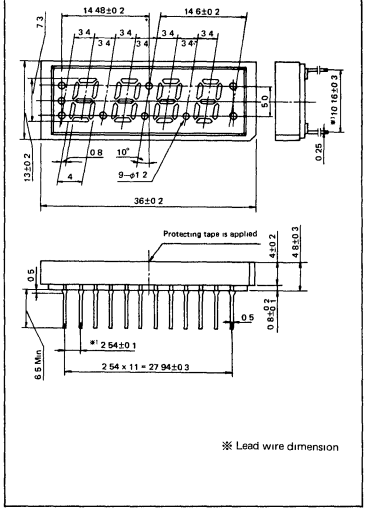
$I_F - Ta$



4 Digit 0.3 inch Series

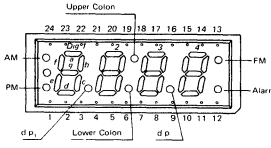
Characteristics: 1. Suitable for frequency and clock display
2. Driver: dynamic lighting
3. High reliability, long life

Unit: mm



※ Lead wire dimension

Terminal Connection



Pin No.	Assignment		Assignment	
1	PM	Anode	PM	Cathode
2	Dig 1	Cathode	Dig 1	Anode
3	Seg d	Anode	Seg d	Cathode
4	d p 1	Anode	d p 1	Cathode
5	Dig 2	Cathode	Dig 2	Anode
6	Lower Colon	Anode	Lower Colon	Cathode
7	Upper Colon	Anode	Upper Colon	Cathode
8	Dig 3	Cathode	Dig 3	Anode
9	d p 2	Anode	d p 2	Cathode
10	Dig 4	Cathode	Dig 4	Anode
11	Seg e	Anode	Seg e	Cathode
12	Alarm	Anode	Alarm	Cathode
13	FM, Alarm	Cathode	FM, Alarm	Anode
14	FM	Anode	FM	Cathode
15	Seg a	Anode	Seg a	Cathode
16	d p 2	Cathode	d p 2	Anode
17	Upper Colon / Lower Colon	Cathode	Upper Colon / Lower Colon	Anode
18	Seg f	Anode	Seg f	Cathode
19	Seg b	Anode	Seg b	Cathode
20	Seg c	Anode	Seg c	Cathode
21	d p 1	Cathode	d p 1	Anode
22	Seg g	Anode	Seg g	Cathode
23	AM	Anode	AM	Cathode
24	AM, PM	Cathode	AM PM	Anode

Absolute Maximum Ratings (Ta = 25°C)

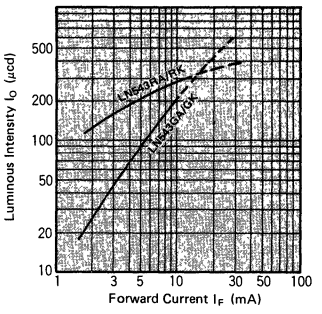
Lighting Color	P_D(mW)	I_F(mA)	I_{FP}(mA) *	V_R(V)	Topr(°C)	Tstg(°C)
Red	30	10	60	5	−25~+80	−30~+85
Green	30	10	60	5	−25~+80	−30~+85

※ The condition of I_{FP} is duty 10%, Pluse width 1 msec

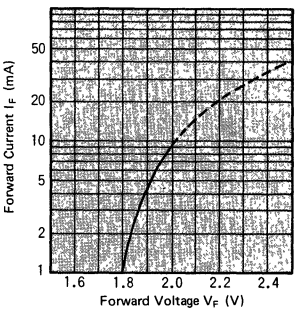
Electro-Optical Characteristics (Ta = 25°C)

Type No.	Lighting Color	I_O/seg		I_O/d.p		V_F		λp	Δλp		I_R	
		Typ.	Min.	Typ.	I_F	Typ.	Max.	Typ.	Typ.	I_F	Max.	V_R
LN543RA/RK	Red	200	100	100	5	2.03	2.8	700	100	10	10	5
LN543GA/GK	Green	200	80	80	10	2.03	2.8	565	30	10	10	5
Unit	——	μcd	μcd	μcd	mA	V	V	nm	nm	mA	μA	V

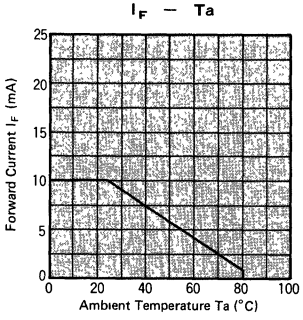
I_O − I_F



I_F − V_F

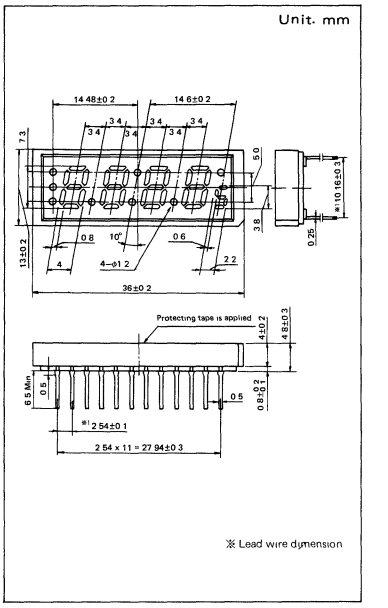


I_F − Ta

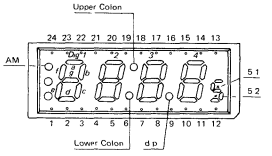


4 Digit 0.3 inch Series

Characteristics: 1. Suitable for frequency and clock display
2. Driver: dynamic lighting
3. High reliability, long life



Terminal Connection



Pin No	Assignment		Assignment	
1	——		——	
2	Dig 1	Cathode	Dig 1	Anode
3	Seg d	Anode	Seg d	Cathode
4	——		——	
5	Dig 2	Cathode	Dig 2	Anode
6	Lower Colon	Anode	Lower Colon	Cathode
7	Upper Colon	Anode	Upper Colon	Cathode
8	Dig 3	Cathode	Dig 3	Anode
9	d p 5-1	Anode	d p 5-1	Cathode
10	Dig 4	Cathode	Dig 4	Anode
11	Seg e	Anode	Seg e	Cathode
12	5-2	Anode	5-2	Cathode
13	5-1 5-2	Cathode	5-1 5-2	Anode
14	——		——	
15	Seg a	Anode	Seg a	Cathode
16	d p	Cathode	d p	Anode
17	Upper Lower Colon	Cathode	Upper Lower Colon	Anode
18	Seg f	Anode	Seg f	Cathode
19	Seg b	Anode	Seg b	Cathode
20	Seg c	Anode	Seg c	Cathode
21	——		——	
22	Seg g	Anode	Seg g	Cathode
23	AM	Anode	AM	Cathode
24	AM	Cathode	AM	Anode

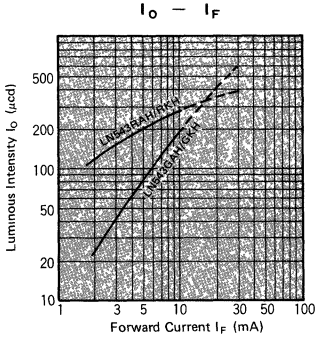
Absolute Maximum Ratings (Ta = 25°C)

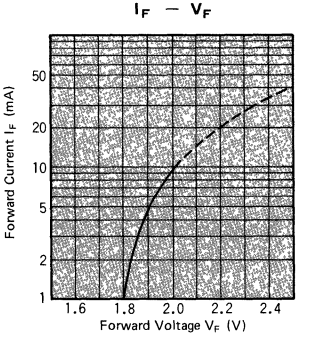
Lighting Color	P_D(mW)	I_F(mA)	I_{FP}(mA) *	V_R(V)	Topr(°C)	Tstg(°C)
Red	30	10	60	5	−25～+80	−30～+85
Green	30	10	60	5	−25～+80	−30～+85

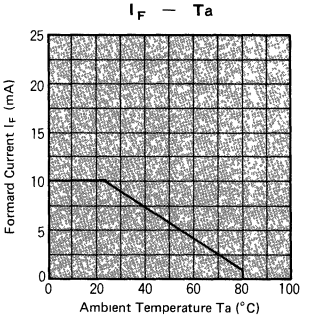
※ The condition of I_{FP} is duty 10%, Pluse width 1 msec

Electro-Optical Characteristics (Ta = 25°C)

Type No.	Lighting Color	I_O/seg		I_O/d.p		V_F		λp	Δλp		I_R	
		Typ.	Min.	Typ.	I_F	Typ.	Max.	Typ.	Typ.	I_F	Max.	V_R
LN543RAH/RKH	Red	200	100	100	5	2.03	2.8	700	100	10	10	5
LN543GAH/GKH	Green	200	80	80	10	2.03	2.8	565	30	10	10	5
Unit	——	μcd	μcb	μcd	mA	V	V	nm	nm	mA	μA	V



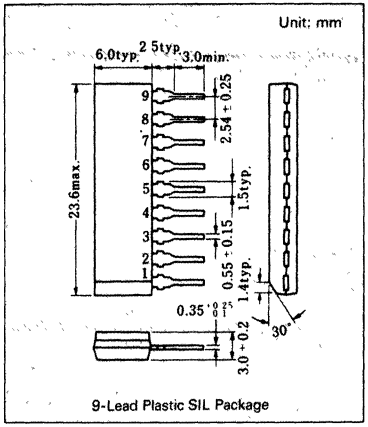




5-Dot LED Driver (Logarithmic Response)

■ Description

The AN6875 is a circuit driving 5 LEDS and designed to turn them on logarithmically (dB). The brightness of the LED can be controlled since an output current adjusting terminal is available.



■ Features

- 5-dot LED display (point and bar model)
- Logarithmic response against input
- Output brightness adjustment for LED
- Large output current, green LED can be turned on
- Turning on/off voltage has hysteresis and no noise fluctuation.

■ Absolute Maximum Ratings (Ta = 25°C)

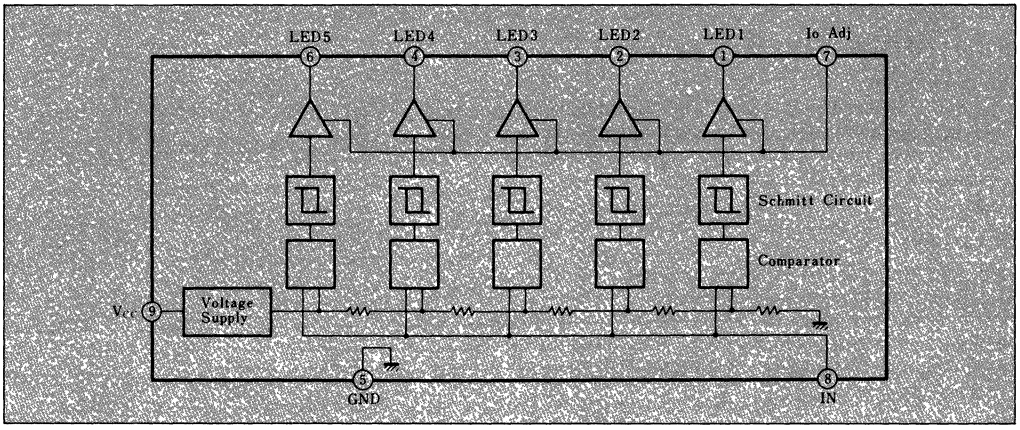
Item		Symbol	Rating		Unit
Voltage	Supply Voltage	V_{CC}	−0.5	+18	V
	Circuit Voltage 8 − 5	$V_{8\text{-}5}$	−0.5	+18	V
	Input Voltage for Setting Load Current	$V_{7\text{-}5}$		+16	V
	Output Voltage	V_O	−0.5	+16	V
Current	Supply Current	I_{CC}	18		mA
	Input Current for Setting Load Current	I_7	4.25		mA
	Output Current	I_O	20		mA
Power Dissipation		P_D	550		mW
Temperature	Operating Ambient Temperature	T_{opr}	−20 ~ +75		°C
	Storage Temperature	T_{stg}	−55 ~ +150		°C

■ Electrical Characteristics (Ta = 25°C)

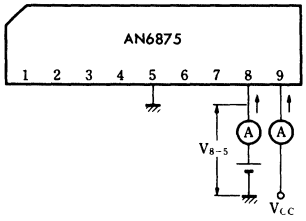
Item		Symbol	Test Circuit	Condition	min.	typ.	max.	Unit
Input Voltage (LED ON)	LED1	$V_{I(ON)1}$	2	V_{CC} = 16V			1 12	V
	LED2	$V_{I(ON)2}$					1 86	V
	LED3	$V_{I(ON)3}$					3 10	V
	LED4	$V_{I(ON)4}$					5 18	V
	LED5	$V_{I(ON)5}$					8 66	V
Input Voltage (LED OFF)	LED1	$V_{I(OFF)1}$	2	V_{CC} = 16V	0 80			V
	LED2	$V_{I(OFF)2}$			1 49			V
	LED3	$V_{I(OFF)3}$			2 54			V
	LED4	$V_{I(OFF)4}$			4 28			V
	LED5	$V_{I(OFF)5}$			7 23			V
Load Current	Pin6	I_6	2	V_{CC} = 16V, V_O = 1 2V, I_7 = 4 25mA	13	16		mA
	Pin1 ~ 4	$I_1 \sim I_4$	2	V_{CC} = 16V, V_O = 2 5V, I_7 = 4 25mA	13	16		mA
	Pin1 ~ 4,6	$I_1 \sim I_4$ I_6	2	V_{CC} = 16V, V_O = 16V, I_7 = 4 25mA		16	19	mA
Input Current		I_{11}	1	V_{CC} = 16V, $V_{8\text{-}5}$ = 8 7V			50	μA
		I_{12}	1	V_{CC} = 16V, $V_{8\text{-}5}$ = 16V			5	mA
Total Circuit Current		I_{tot}	1	V_{CC} = 16V, $V_{8\text{-}5}$ = 16V			18	mA
Output Leak Current		$I_1 \sim I_4$ I_6	2	V_{CC} = 16V, V_O = 16V			15	μA

Operating voltage range $V_{CC\ (opr)}$ = 12 ~ 16V

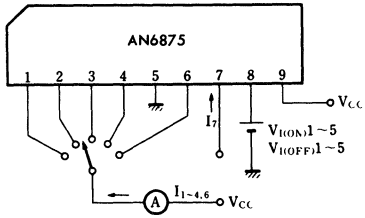
■ Block Diagram



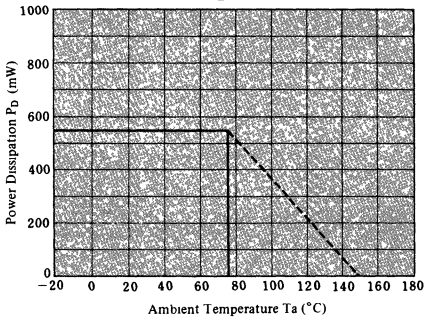
Test Circuit 1 (I_{11}, I_{12}, I_{tot})



Test Circuit 2 ($V_{I(ON)1\sim5}$, $V_{I(OFF)1\sim5}$, $I_1 \sim I_4$, I_6)

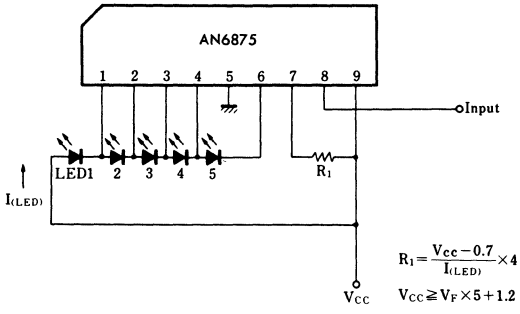


$P_D - Ta$



■ Application Circuit

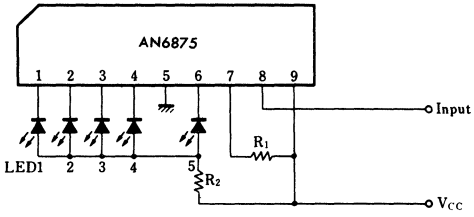
1. Bar graph display



$$R_1 = \frac{V_{CC} - 0.7}{I_{(LED)}} \times 4 - 270$$

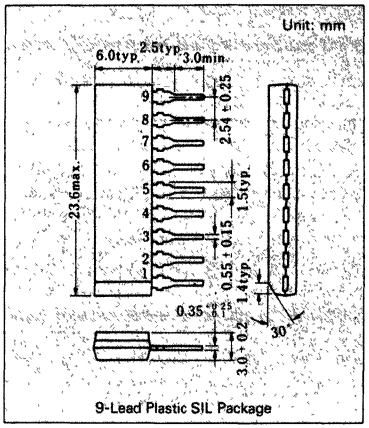
$V_{CC} \geqq V_F \times 5 + 1.2$

2. Dot display



*) When the voltage of terminal 6 is high at 5-dot lighting, P_D should be decreased by inserting resistor into LED1 anode.

5-Dot LED Driver (Linear Response)



■ Description

The AN6876 is a monolithic integrated circuit designed for 5 Dot LED driver applications responding linearly against an input signal. LED brightness can be controlled with a current adjusting terminal.

■ Features

- 5 dot LED display (bar and dot)
- Linear response against the input
- Outer broghtness control for LED
- Large output current and green LED can be turned on.
- Turning on/off voltage has hysteresis and no fluctuation by noise.

■ Absolute Maximum Ratings (Ta = 25°C)

Item		Symbol	Rating		Unit
Voltage	Supply Voltage	V_{CC}	−0.5	+18	V
	Terminal Voltage	$V_{8\text{-}5}$	−0.5	+16	V
	Input Voltage for Setting Load Current	$V_{7\text{-}5}$		+16	V
	Output Voltage*1	V_O	−0.5	+16	V
Current	Supply Current*1	I_{CC}	18		mA
	Input Current for Setting Load Current*2	I_7	5		mA
	Output Current*1	I_O	20		mA
Power Dissipation (Ta = 75°C)		P_D	550		mW
Temperature	Operating Ambient Temperature	T_{opr}	−20 ~ +75		°C
	Storage Temperature	T_{stg}	−55 ~ +150		°C

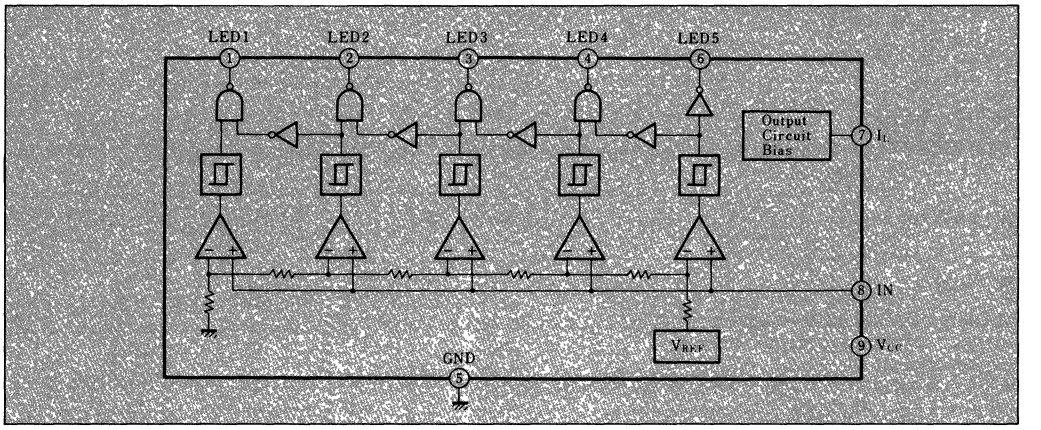
Note: *1 Output terminal 1, 2, 3, 4, 6
*2 I_7 is maximum rating when it can set I_O = 20mA.

■ Electrical Characteristics (Ta = 25°C)

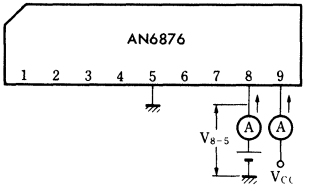
Item		Symbol	Test Circuit	Condition	min.	typ.	max.	Unit
Input Voltage (LED ON)	LED1	$V_{I(ON)1}$	2	V_{CC} = 16V		1.8	2.02	V
	LED2	$V_{I(ON)2}$				2.4	2.69	V
	LED3	$V_{I(ON)3}$				3.0	3.36	V
	LED4	$V_{I(ON)4}$				3.6	4.03	V
	LED5	$V_{I(ON)5}$				4.1	4.59	V
Input Voltage (LED OFF)	LED1	$V_{I(OFF)1}$	2	V_{CC} = 16V	1.58	1.8		V
	LED2	$V_{I(OFF)2}$			2.11	2.4		V
	LED3	$V_{I(OFF)3}$			2.64	3.0		V
	LED4	$V_{I(OFF)4}$			3.17	3.6		V
	LED5	$V_{I(OFF)5}$			3.61	4.1		V
Load Current	Pin6	I_6	2	V_{CC} = 16V, V_O = 1.2V, I_7 = 4.25mA	13	16		mA
	Pin1 ~ 4	$I_1 \sim I_4$	2	V_{CC} = 16V, V_O = 2.5V, I_7 = 4.25mA	13	16		mA
	Pin1 ~ 4,6	$I_1 \sim I_4, I_6$	2	V_{CC} = 16V, V_O = 16V, I_7 = 4.25mA		16	19	mA
Input Current		I_{11}	1	V_{CC} = 16V, $V_{8\text{-}5}$ = 8.5V			50	μA
		I_{12}	1	V_{CC} = 16V, $V_{8\text{-}5}$ = 16V			5	mA
Total Circuit Current		I_{tot}	1	V_{CC} = 16V, $V_{8\text{-}5}$ = 16V			18	mA
Output Leak Current		$I_1 \sim I_4, I_6$	2	V_{CC} = 16V, V_O = 16V			15	μA

Note: Operating supply voltage $V_{CC(opr)}$ = 12 ~ 16V

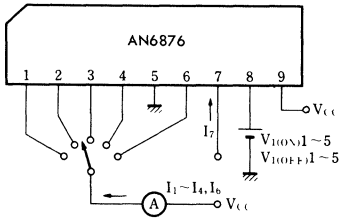
■ Block Diagram



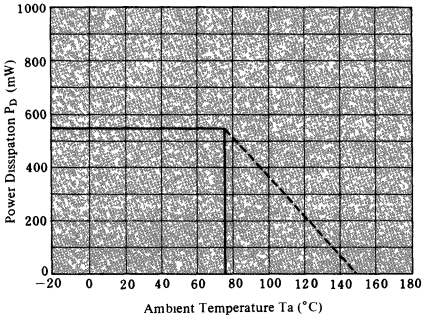
Test Circuit 1 (I_{11}, I_{12}, I_{tot})



Test Circuit 2 ($V_{I(ON)1\sim5}$, $V_{I(OFF)1\sim5}$, I_6, $I_1\sim I_4$)

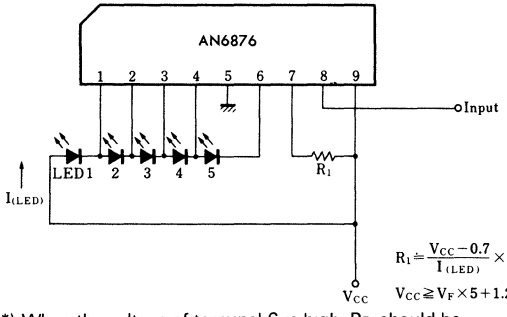


$P_D - Ta$



■ Application Circuit

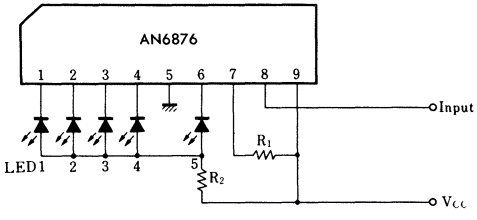
1. Bar graph display



$$R_1 \doteqdot \frac{V_{CC}-0.7}{I_{(LED)}} \times 4 - 270$$

$$V_{CC} \geqq V_F \times 5 + 1.2$$

2. Dot display



*) When the voltage of terminal 6 is high, P_D should be decreased by inserting resistor LED1 anode.

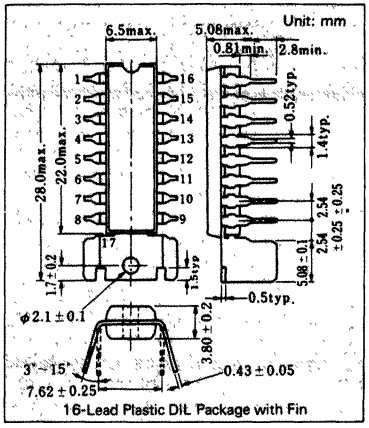
7-Dot LED Driver (Linear Response/Logarithm Response)

■ Description

AN6877 and AN6878 are the monolithic integrated circuit designed for 7 LED driver. AN6877 response linearly against the input signal and AN6878 response logarithmically. LED brightness can be adjusted owing to the output current adjusting terminal.

■ Features

- 7-dot LED display (bar and dot)
- Linear (AN6877) and Logarithmic (AN6878) response against the input signal.
- Outer brightness control of LED.
- Large output current: 25mA max.
- More than 7 point bar display can be enabled in serial connection.
- Built-in reference supply voltage circuit.
- LED current stable against supply voltage.



■ Absolute Maximum Ratings (Ta = 25°C)

Item		Symbol	Rating	Unit
Voltage	Supply Voltage	V_{CC}	18	V
	Terminal Voltage	V_1	7.5	V
	Input Voltage	V_{IN}	16	V
	Output Voltage	V_O	16	V
Current	Supply Current	I_{CC}	25	mA
	Output Current	I_O	25	mA
Power Dissipation (Ta = 25°C)		P_D	1,800	mW
Temperature	Operating Ambient Temperature	T_{opr}	−30 ~ +75	°C
	Storage Temperature	T_{stg}	−55 ~ +150	°C

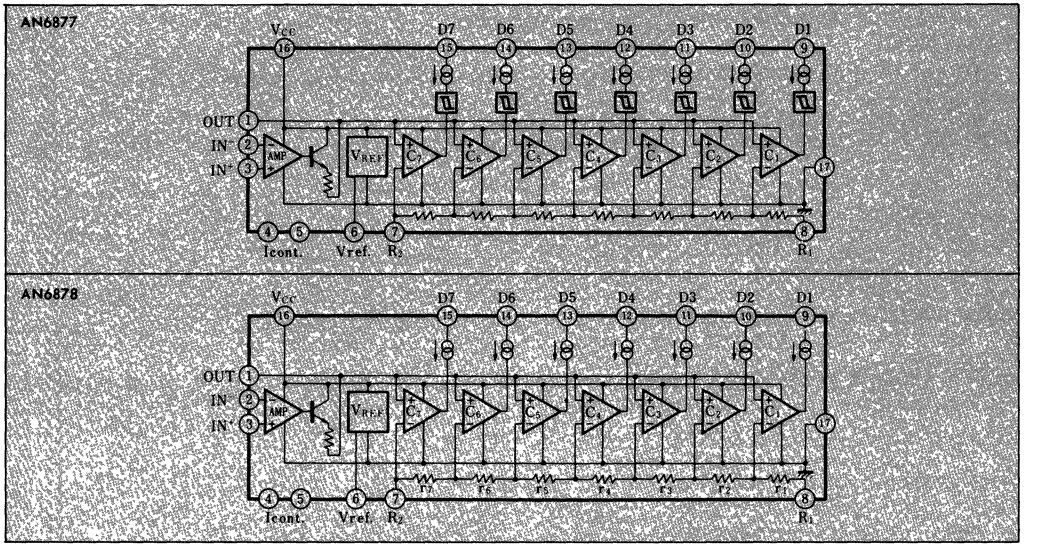
■ Electrical Characteristics (Ta = 25°C)

Item	Symbol	Test Circuit	Condition	min.	typ.	max.	Unit
Total Circuit Current	I_{tot}	1	$V_2 = V_3 = 0V$	4		18	mA
Output Current	$I_{9\text{-}15}$	2	$V_1 = 3.55V$, $V_7 = 3.5V$	13		25	mA
Reference Voltage	V_{REF}	3		3.55	3.75	3.95	V
Output Offset Voltage (Amp)	V_{offset}	4	$V_{CC} = 16V$, $G_V = 20dB$	-150		150	mV
Voltage Gain (Amp)	G_V	4	$V_2 = 50mV$	18	20	22	dB
Output Leak Current	I_{Leak}	5	$V_{CC} = 18V$	0		20	μA
Input Bias Current (Amp)	I_{Bias1}	6	$V_{CC} = 18V$	-2		0	μA
	I_{Bias2}	6	$V_2 = V_3 = 0V$	-2		0	μA
Input Bias Current (Comparator)	I_{Bias3}	7	$V_{CC} = 18V$, $V_2 = 10V$, $V_3 = 0V$ $V_7 = V_8 = 0V$	-10		0	μA
	I_{Bias4}	7	$V_{CC} = 18V$, $V_3 = 10V$, $V_1 = V_2 = 0V$ $V_6 = V_7 = V_8$	-10		0	μA
Comparator Level (AN6877)	GD_1	8	$V_7 = 3.65V$ $V_8 = 0V$	0.44	0.5	0.56	V
	GD_2			0.88	1	1.12	V
	GD_3			1.32	1.5	1.68	V
	GD_4			1.76	2	2.24	V
	GD_5			2.2	2.5	2.8	V
	GD_6			2.64	3	3.36	V
	GD_7			3.1	3.5	3.9	V
Comparator Level (AN6878)	GD_1*	8	$V_7 = 3.5V$ $V_8 = 0V$	-17	-15	-13	dB
	GD_2			-9	-7	-5	dB
	GD_3			-4	-3	-2	dB
	GD_4			-1	0	1	dB
	GD_5			1.5	2	2.5	dB
	GD_6			3.5	4	4.5	dB
	GD_7			4.5	5	5.5	dB

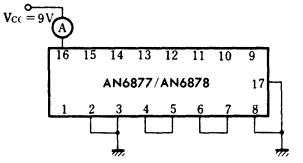
* The reference voltage of comparator should be 3.5V and 2.0V

Note: Operating supply voltage $V_{CC(opr)} = 5 \sim 16V$

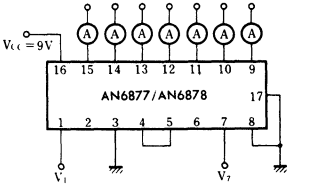
■ Block Diagram



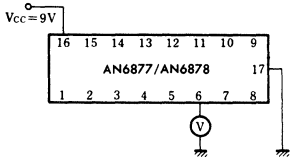
Test Circuit 1 (I_{tot})



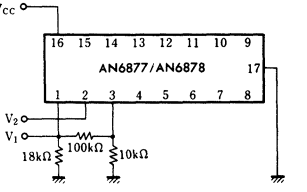
Test Circuit 2 ($I_{9\text{-}15}$)



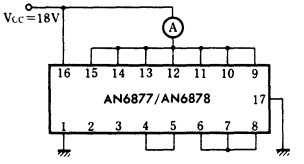
Test Circuit 3 (V_{REF})



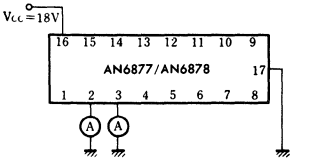
Test Circuit 4 (V_{offset}, Gv)



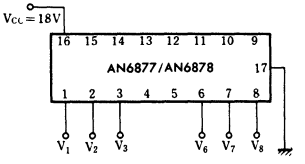
Test Circuit 5 (I_{Leak})



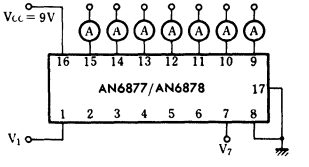
Test Circuit 6 (I_{Bias1}, I_{Bias2})



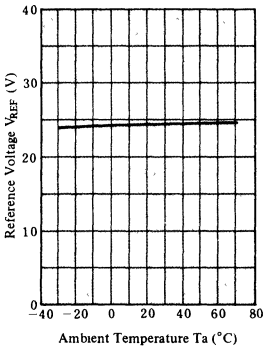
Test Circuit 7 (I_{Bias3}, I_{Bias4})



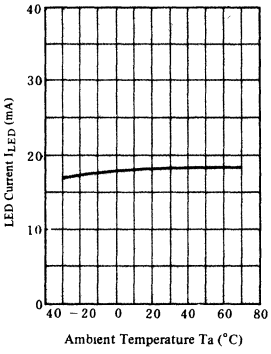
Test Circuit 8 ($GD_{1\text{-}7}$)



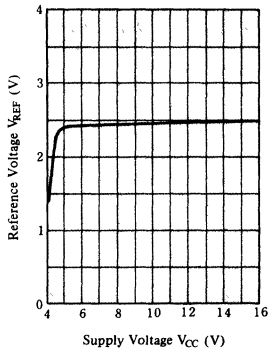
V_{REF} – Ta



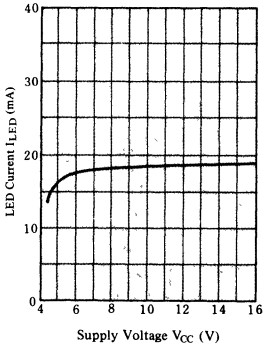
I_{LED} – Ta



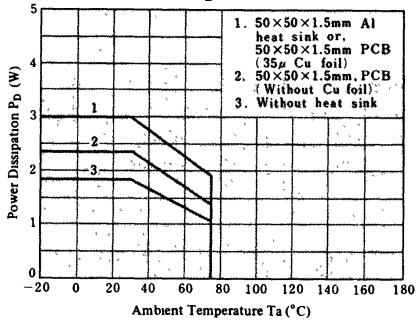
V_{REF} – V_{CC}



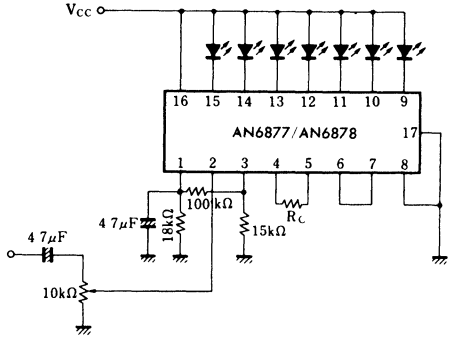
I_{LED} – V_{CC}



P_D – Ta



■ Application Circuit



AMP gain 20 dB

R_C = 10kΩ, I_{LED} = 5.5mA

R_C = 560Ω, I_{LED} = 17.5mA

Low Power Consumption 7 Dot LED Driver (Logarithmic Response)

■ Description

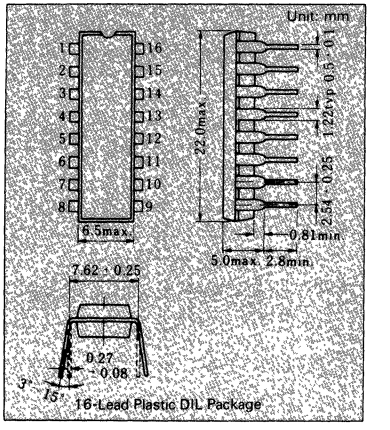
The AN6882 is a monolithic integrated circuit designed for 7-dot LED driver.

■ Features

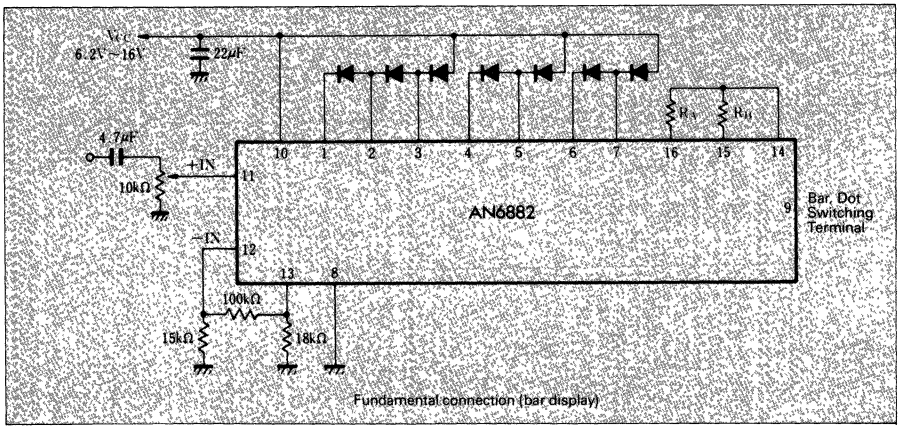
- Capable green LED drive, low power consumption
- Low current: I_{tot} = 9 mA (typ.)
  (V_{CC} = 12V, R_L = 4.7kΩ)
- Wide operating supply voltage: V_{CC} = 6V ~ 16V
- Capable bar response or Dot response

■ Main Characteristics

- Input offset voltage..... <10 mV
- Reference voltage..... 2.7V (typ.)
- Output current: I_{O1} = 4 mA ~ 10 mA
  (V_{CC} = 12V, R_A = 10 kΩ)
  I_{O2} = 6.3 mA ~ 15 mA
  (V_{CC} = 12V, R_A = 10 kΩ, R_B = 22 kΩ)



■ Application Circuit



Reliability

Although reliability testing methods differ depending on individual products and customer requirements, the general test conditions performed by the manufacturer are listed below. These test conditions are based on EIAJ specifications (SD-121), and take into consideration actual field situations of visible light emitting diodes.

Group	Test	Conditions	Description
Operation Endurance	Operating Life Test	I_F = maximum rating current. Ta = 25±3°C 1000$^{+72}_{-24}$Hours	Determines resistance to failure in electrical and thermal stresses.
	High Temperature Storage Test	Ta = Tstg max. 1000$^{+72}_{-24}$Hours	Determines resistance to failure under high temperature conditions over a specified number of hours.
	Low Temperature Storage Test	Ta = Tstg min. 1000$^{+72}_{-24}$Hours	Determines resistance to failure under low temperature conditions over a specified number of hours.
	T.H.B. Test	Ta = 65±3°C RH = 90$^{+5\%}_{-10}$ 1000$^{+72}_{-24}$Hours	Determines resistance to failure under tropical conditions over a specified number of hours.
Environmental Test	Temperature Cycle Test	[Tstg min. ~ 25°C ~ Tstg max. ~ 25°C] [(30 min.) (5 min.) (30 min.) (5 min.)] x 5 cycle	Determines resistance to failure under sudden extreme changes in high and low temperature.
	Thermal Shock Test*1	[Tstg max. ~ 0°C] [(15 sec.) (5 sec.)] x 5 cycle	
	Solder Dip Test	(Ta = 260±5°C T = 10 seconds) x 1 cycle More than 2mm away from resin	Determines thermal characteristic resistance to failure under sudden extreme changes in high and low temperature when soldering lead wires.
	Solderability Test	(Ta = 230±5°C t = 5±1 seconds flux) x 1 cycle	Determines how well soldering can be performed on leads.
	Salt Atmosphere Test	Ta = 35±2°C Salt water concentration = 5% 24 Hours	Tests for metal corrosion on lead wire and determines insulation quality on the electrode surface.
Mechanical Treatment	*2 Mechanical Shock Test	(h = 75 cm) x 3 cycle	Determines resistance to failure when subjected to moderately severe shocks as a result of suddenly applied forces or abrupt changes in motion produced by rough handling, transportation or field operation.
	Lead Tension Test	W = 1 kg t = 30 second	Determines strength of lead wire when subjected to severe shocks as a result of suddenly applied forces, such, as tension and bending produced during handling and soldering.
	Lead Bend Test	(W = 0.5 kg 90°) x 3 cycle	

* 1 4 digit numerical displays don't be tested.
* 2 7-element array level meter is excluded.

Usage Precautions

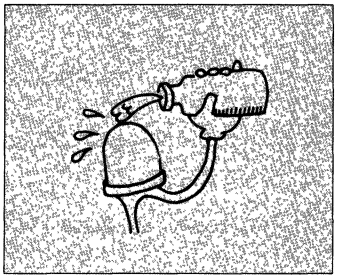
The visible light emitting diode can be handled the same as other general-use semiconductors; however, the following notes concerning optoelectronic characteristics should be carefully considered.

1) Chemical Resistance

Organic solvents such as acetone should not be used as they may cause damage to the device. Cleaning should be performed for 30 seconds under 45°C, using the chemicals listed below:

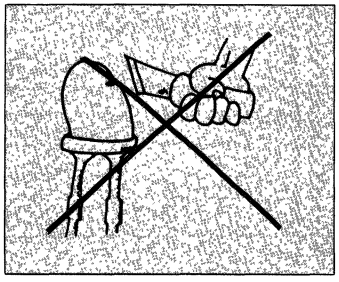
- Point light source: alcohol, chorosen, fleon TF, hexan
- Numerical display/level meter – fleon TF, hexan

(Case should not come in contact with chemicals.)



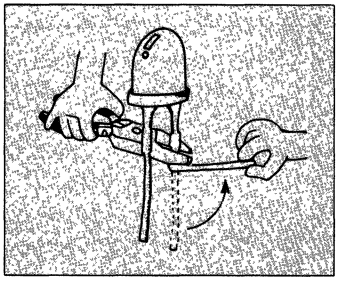
2) Abrasion Resistance

Some of the devices are made of resin with low-hardness characteristics, and therefore could be easily damaged when scratched by metal, fingernails, sand-blast, etc.



3) Lead Wire Stress

- Lead forming should be performed prior to soldering, so as not to add stresses into the resin with cutting pliers.
- When the device is mounted into a PC board, pitch spacing should be carefully aligned to avoid stresses to the lead wires. Any stress will cause trouble in the device under high temperature operation. Three minutes must elapse for the device to return to normal temperature after the soldering operation.

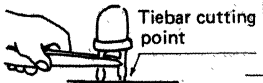
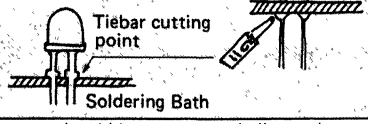


4) Lead Wire Cutting

Lead cutting should be performed at normal room temperature; DO NOT CUT LEADS IMMEDIATELY AFTER SOLDERING. Wait at least three minutes after soldering for device to return to room temperature before cutting.

5) Soldering Resistance

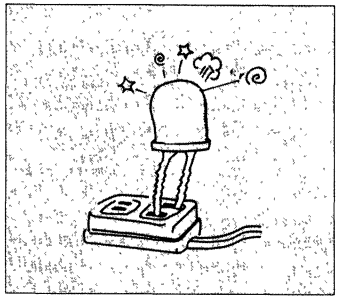
Lead soldering should be performed below the tiebar cutting point, in accordance with the following conditions.

Item	Condition	Temperature	Time
Soldering iron	Soldering iron: Under 25W Top point of the iron: Under ϕ45 x more than 30 		Less than 30 seconds
Soldering Bath		240°C	Less than 5 seconds
		260°C	Less than 3 seconds

When soldering the lead wire, pincette should be recommendedly used.

6) Overcurrent Protection

A protection resistor should be incorporated to guard against excess current. The design should be such that instantaneous excess current is not applied to the device during the ON/OFF cycles.



Panasonic Optoelectronics
Cross Reference Guide LED Lamps

GENERAL INSTRUMENT

COMPETITOR	PANASONIC	CODE
MV5020	LN21CPHL	A
MV5021	LN21RCPHL	A
MV5022	LN21RCPHL	A
MV5023	LN21RPHL	A
MV5024	LN21RCPHL	A
MV5025	LN21RPHL	A
MV5026	LN21RPHL	A
MV5050	LN21CPH	A
MV5052	LN21RPH	A
MV5053	LN21RCPH	A
MV5054-1	LN21RPH	A
MV5054-2	LN21RPH	A
MV5054-3	LN21RPH	A
MV5055	LN21RPH	A
MV5056	LN21RPH	A
MV5074B	LN28RP	A
MV5074C	LN28RP	A
MV5075B	LN28RP	A
MV5075C	LN28RP	A
MV5094	LN21RAHL	A
MV5152	LN81CPH	B
MV5153	LN81RPH	A
MV5154	LN81RCPH	A
MV5152	LN31GCPH	A
MV5253	LN31GPH	A
MV5254	LN31GCPH	A
MV5274B	LN38GP	A
MV5274C	LN38GP	A
MV5352	LN41YCPH	B
MV5353	LN41YPH	A
MV5354	LN41YCPH	A
MV5374B	LN48YP	A
MV5374C	LN48YP	A
MV5752	LN21CAL/LN81CPH	B
MV5753	LN81RPH	A
MV5754	LN81RCPH	A
MV5774B	LN28RP	A
MV5774C	LN28RP	A

LITRONIX

COMPETITOR	PANASONIC	CODE
COX13-1	LN31GPHL	B
COX13-2	LN31GPHL	B
COX23-1	LN21RPHL	B
COX23-2	LN21RPHL	B
COX33-1	LN41YPHL	B
COX33-2	LN41YPHL	B
GL211	LN38GP	A
GL4484	LN38GP	A
GL4850	LN31GPH	A
GL4950	LN31GPH	A
LD30A	LN28RP	A
LD30-1	LN28RP	A
LD30-2	LN28RP	B
LD30-3	LN28RP	B
LD30-C	LN28CP	A
LD32C	LN28RCP	A
LD32-1	LN28RP	B
LD32-2	LN28RP	B
LD36A	LN48YP	A
LD36C	LN48YCP	A
LD36-1	LN48YP	A
LD36-2	LN48YP	A
LD37A	LN38GP	A

LITRONIX

COMPETITOR	PANASONIC	CODE
LD37C	LN38GCP	B
LD37-1	LN38GP	A
LD37-2	LN38GP	B
LD41A	LN21RPHL	A
LD41-1	LN21RPHL	A
LD41-2	LN21RPHL	A
LD50A	LN21RPHL	A
LD50-1	LN21RPHL	A
LD50-2	LN21RPHL	B
LD52C	LN21RCPHL	B
LD52CA	LN21RCPHL	B
LD52-1	LN21RPHL	A
LD52-2	LN21RPHL	B
LD56A	LN41YPHL	A
LD56C	LN41YCPHL	A
LD56CA	LN41YCPHL	A
LD56-1	LN41YPHL	A
LD56-2	LN41YPHL	A
LD57A	LN31GPHL	A
LD57C	LN31GCPHL	A
LD57CA	LN31GCPHL	A
LD57-1	LN31GPHL	B
LN57-2	LN31GPHL	B

HEWLET PACKARD

COMPETITOR	PANASONIC	CODE
HLMP-1300	LN28RA or LN28RP	B
HLMP-1301	LN28RA or LN28RP	B
HLMP-1302	LN28RA or LN28RP	B
HLMP-1400	LN48YP	B
HLMP-1401	LN48YP	B
HLMP-1402	LN48YP	B
HLMP-1500	LN38GP	B
HLMP-1501	LN38GP	B
HLMP-1502	LN38GP	B
5082-4480	LN28RA or LN28RP	B
5082-4483	LN28WP	B
5082-4484	LN28RA or LN28RP	B
5082-4486	LN28RCP	B
5082-4487	LN28RCP	B
5082-4488	LN28RCP	B
5082-4494	LN28RA or LN28RP	A
5082-4550	LN41YPH	A
5082-4555	LN41YPH	A
5082-4557	LN41YCPH	A
5082-4558	LN41YCPH	A
5082-4650	LN81RPH	A
5082-4655	LN81RPH	A
5082-4657	LN81RCPH	A
5082-4658	LN81RCPH	B
5082-4690	LN81RPH	B
5082-4693	LN81RPH	B
5082-4694	LN81RCPH	B
5082-4695	LN81RCPH	A
5082-4850	LN21RPH	A
5082-4855	LN21RPH	B
5082-4880	LN21RPHL	B
5082-4881	LN21RPHL	B
5082-4882	LN21RPHL	B
5082-4883	LN21CPHL	B
5082-4884	LN21CPHL	B
5082-4885	LN21CPHL	A
5082-4950	LN31GPH	A
5082-4955	LN31GPH	A
5082-4957	LN31GCPH	A
5082-4958	LN41YCPH	A

Code Definition:
A = Direct Equivalent
B = Minor Electrical or Mechanical Difference

Panasonic Optoelectronics
Cross Reference Guide LED Lamps

LITRONIX

COMPETITOR	PANASONIC	CODE
LD80A	LN219RP	B
LD80-1	LN219RP	B
LD80-2	LN219RP	B
LD82A	LN219RP	B
LD82-1	LN219RP	B
LD82-2	LN219RP	B
LD86A	LN419YP	B
LD86-1	LN419YP	B
LD86-2	LN419YP	B
LD87A	LN319GP	B
LD87-1	LN319GP	B
LD87-2	LN319GP	B
OL30-3	LN81RPHL	A
OL30-6	LN81RPHL	A
OD30-30-3	LN81RPH	A
OL30-30-6	LN81RPH	A
RL-2	LN29RP	A
RL-209A	LN28RP	B

LITRONIX

COMPETITOR	PANASONIC	CODE
RL209-1	LN28RP	B
RL209-2	LN28RP	B
RL200	LN21RPH	A
RL4403	LN21RPH	A
RL4480	LN28RP	B
RL4480-1	LN28RP	B
RL4480-2	LN28RP	B
RL4480-5	LN28RP	B
RL-4484	LN28RP	B
RL-4850	LN21RPH	A
RL-5054-1	LN21RPH	A
RL-5054-2	LN21RPH	A
RL-5054-5	LN21RPH	A
RLT-1	LN23SRP (H)B	B
YL212	LN48YP	B
YL4484	LN48YP	B
YL4550	LN41YPH	A
YL4850	LN41YPH	A

Panasonic Optoelectronics
Cross Reference Guide LED 7 – Segment Displays

GENERAL INSTRUMENT

COMPETITOR	PANASONIC	CODE
MAN51A	LN513GA	A
MAN43A	LN513GK	B
MAN71A	LN513RA	A
MAN74A	LN513RK	B
MAN81A	LN513YA	A
MAN84A	LN513YK	B
MAN3610A	LN513OA	A
MAN3640A	LN513OK	B
MAN4510	LN514GA	A
MAN4540	LN514GK	B
MAN4610	LN514OA	A
MAN4640	LN514OK	B
MAN4710	LN514RA	A
MAN4740	LN514RK	B
MAN4810	LN514YA	A
MAN4840	LN514YK	B
MAN6610	LN526OA	A
MAN6640	LN526OK	A
MAN6660	LN516OA	A
MAN6680	LN516OK	A
MAN6710	LN526RA	A
MAN6740	LN526RK	A
MAN6760	LN516RA	A
MAN6780	LN516RK	A

HEWLET PACKARD

COMPETITOR	PANASONIC	CODE
HDSP-3531	LN513RA	A
HDSP-3533	LN513RK	B
HDSP-3731	LN514RA	A
HDSP-3733	LN514RK	A
HDSP-4031	LN513YA	A
HDSP-4033	LN513YK	B
HDSP-4131	LN514YA	A
HDSP-4133	LN514YK	A
HDSP-7611	LN513RA	A
HDSP-7613	LN513RK	B
HDSP-7621	LN513YA	A
HDSP-7623	LN513YK	B

Code Definition:
A = Direct Equivalent
B = Minor Electrical or Mechanical Difference

HEWLET PACKARD

COMPETITOR	PANASONIC	CODE
HDSP-7631	LN513GA	A
HDSP-7633	LN513GK	B
HDSP-7651	LN514RA	A
HDSP-7653	LN514RK	A
HDSP-7661	LN514YA	A
HDSP-7663	LN514YK	A
HDSP-7671	LN514GA	A
HDSP-7673	LN514GK	A
HDSP-7731	LN513RA	A
HDSP-7740	LN513RK	B
HDSP-7751	LN514RA	A
HDSP-7760	LN514RK	A

LITRONIX

COMPETITOR	PANASONIC	CODE
DL-500	LN516RK	A
DL-507	LN516RA	A
DL-527	LN526RA	A
DL-528	LN526RK	A
DL-704	LN513RK	B
DL-707R	LN513RA	B
DL-727	LN526RA	A
DL-728	LN526RK	A
DL-4770	LN543RA/RK	B
DL-7731	LN513RA	A
DL-7734	LN513RK	B
DL-7740	LN513RK	B
DL-7751	LN514RA	A
DL-7760	LN514RK	A
DLG-7671	LN514RA	A
DLG-7673	LN514RK	A
DLO-500	LN516RK	A
DLO-507	LN516RA	A
DLO-527	LN526RA	A
DLO-528	LN526RK	A
DLO-4770	LN543RA/RK	B
DLO-7611	LN513RA	A
DLO-7613	LN513RK	B
DLO-7614	LN513RK	B
DLO-7651	LN514RA	A
DLO-7653	LN514RK	A
DLY-7661	LN514RA	A
DLY-7663	LN514RK	A

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