



(5mm) CYLINDRICAL LED LAMPS

LTL-2214RT/ 2214WC BRIGHT RED

LTL-2224RT HIGH EFFICIENCY RED

LTL-2234GT/ 2234WC GREEN

LTL-2294WC ORANGE

LTL-2254YT/ 2254WC YELLOW

FEATURES

- WIDE VIEWING ANGLE
- LOW POWER CONSUMPTION
- LONG LIFE-SOLID STATE RELIABILITY
- LOW COST.

DESCRIPTION

The Bright Red source color devices are made with Gallium Phosphide on Gallium Phosphide Red Light Emitting Diode.

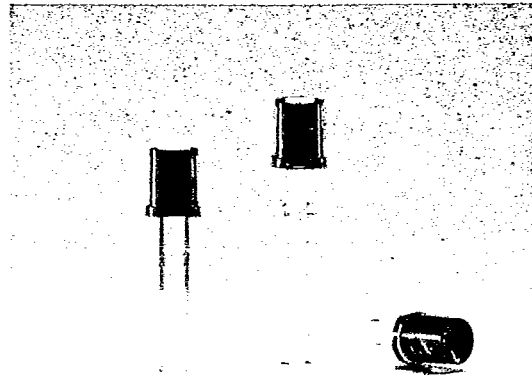
The High Efficiency Red and Orange source color devices are made with Gallium Arsenide Phosphide on Gallium Phosphide Orange Light Emitting Diode.

The Green source color devices are made with Gallium Phosphide on Gallium Phosphide Green Light Emitting Diode.

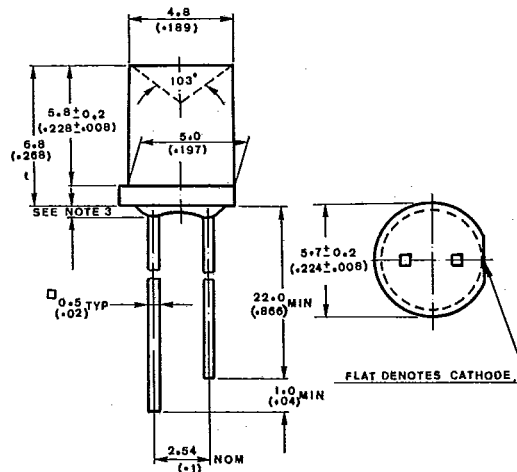
The Yellow source color devices are made with Gallium Arsenide Phosphide on Gallium Phosphide Yellow Light Emitting Diode.

DEVICES

PART NO. LTL—	LENS		SOURCE COLOR
	COLOR	DIFFUSION	
2214RT 2214WC	Red Water Clear	Transparent Non-Diffused	Bright Red
2234GT 2234WC	Green Water Clear	Transparent Non-Diffused	Green
2254YT 2254WC	Yellow Water Clear	Transparent Non-Diffused	Yellow
2224RT	Red	Transparent	Hi. Eff. Red
2294WC	Water Clear	Non-Diffused	Orange



PACKAGE DIMENSIONS



NOTES:

1. All dimensions are in millimeters (inches).
2. Tolerance is ± 0.25 mm (0.010 in) unless otherwise noted.
3. Protruded resin under flange is 1.5 mm (0.059 in) max.
4. Lead spacing is measured where the leads emerge from the package.
5. Specifications are subject to change without notice.

ABSOLUTE MAXIMUM RATINGS AT $T_A = 25^\circ\text{C}$

PARAMETER	BRIGHT RED	GREEN	YELLOW	HI. EFF. RED ORANGE	UNIT
Power Dissipation	40	100	60	100	mW
Peak Forward Current (1/10 Duty Cycle, 0.1ms Pulse Width)	60	120	80	120	mA
Continuous Forward Current	15	30	20	30	mA
Derating Linear From 25°C	0.2	0.4	0.25	0.4	mA/ $^\circ\text{C}$
Reverse Voltage	5	5	5	5	V
Operating Temperature Range	-55°C to $+100^\circ\text{C}$				
Storage Temperature Range	-55°C to $+100^\circ\text{C}$				
Lead Soldering Temperature [1.6mm (0.063in) From Body]	260°C for 5 Seconds				

LED LAMPS

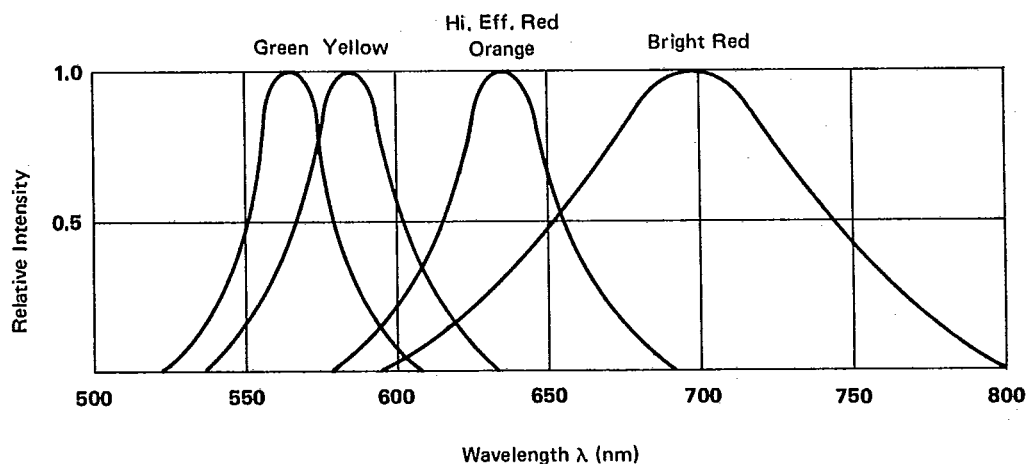


FIG. 1 RELATIVE INTENSITY VS. WAVELENGTH

ELECTRICAL/OPTICAL CHARACTERISTICS AND CURVES AT $T_A = 25^\circ\text{C}$

PARAMETER	SYMBOL	PART NO. LTL—	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Luminous Intensity	I_v	2214RT 2214WC	0.2 0.2	0.4 0.4		mcd	$I_F = 10\text{ mA}$ Note 1
Viewing Angle	$2\theta_{1/2}$	2214RT 2214WC		150		deg.	Note 2 (Fig. 6)
Peak Emission Wavelength	λ_{PEAK}	2214RT 2214WC		697		nm	Measurement @ Peak (Fig. 1)
Spectral Line Half Width	$\Delta\lambda$	2214RT 2214WC		90		nm	
Forward Voltage	V_F	2214RT 2214WC		2.1	2.8	V	$I_F = 20\text{ mA}$
Reverse Current	I_R	2214RT 2214WC			100	μA	$V_R = 5\text{V}$
Capacitance	C	2214RT 2214WC		55		PF	$V_F = 0$ $f = 1\text{MHz}$

NOTES: 1. Luminous intensity is measured with a light sensor and filter combination that approximates the CIE (Commission Internationale De L'Eclairage) eye-response curve.

2. $\theta_{1/2}$ is the off-axis angle at which the luminous intensity is half the axial luminous intensity.

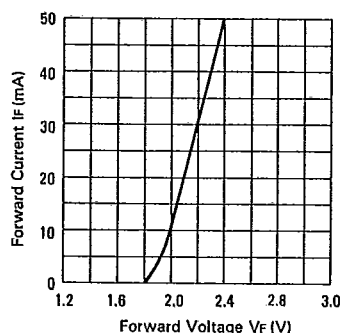


FIG. 2 FORWARD CURRENT VS. FORWARD VOLTAGE.

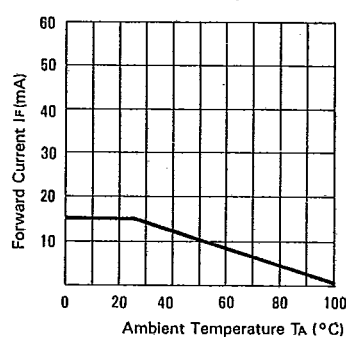


FIG. 3 FORWARD CURRENT DERATING CURVE.

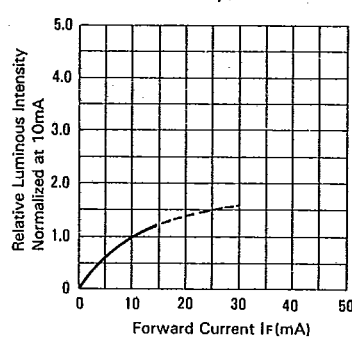


FIG. 4 RELATIVE LUMINOUS INTENSITY VS. FORWARD CURRENT.

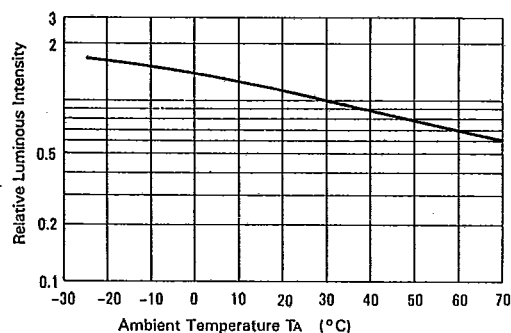


FIG. 5 LUMINOUS INTENSITY VS. AMBIENT TEMPERATURE

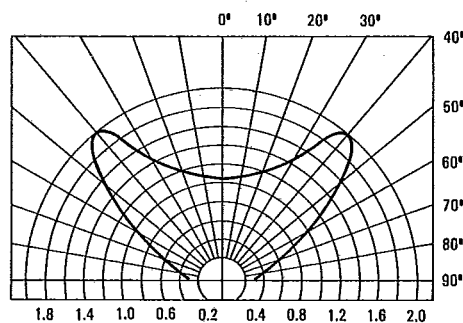


FIG. 6 SPATIAL DISTRIBUTION

ELECTRICAL/OPTICAL CHARACTERISTICS AND CURVES AT $T_A = 25^\circ\text{C}$

PARAMETER	SYMBOL	PART NO. LTL-	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Luminous Intensity	I_V	2234GT 2234WC 2254YT 2254WC	0.5 0.5 0.5 0.5	1.7 1.7 1.7 1.7		mcd	$I_F = 10\text{ mA}$ Note 1
Viewing Angle	$2\theta_{1/2}$	2234GT 2234WC 2254YT 2254WC		150		deg.	Note 2 (Fig. 11)
Peak Emission Wavelength	λ_{PEAK}	2234GT 2234WC 2254YT 2254WC		585 585 585 585		nm	Measurement @ Peak (Fig. 1)
Spectral Line Half Width	$\Delta\lambda$	2234GT 2234WC 2254YT 2254WC		30 30 35 35		nm	
Forward Voltage	V_F	2234GT 2234WC 2254YT 2254WC		2.1	2.8	V	$I_F = 20\text{ mA}$
Reverse Current	I_R	2234GT 2234WC 2254YT 2254WC			100	μA	$V_R = 5\text{V}$
Capacitance	C	2234GT 2234WC 2254YT 2254WC		35 35 15 15		PF	$V_F = 0$ $f = 1\text{ MHz}$

NOTES: 1. Luminous intensity is measured with a light sensor and filter combination that approximates the CIE (Commission Internationale De L'Eclairage) eye-response curve.

2. $\theta_{1/2}$ is the off-axis angle at which the luminous intensity is half the axial luminous intensity.

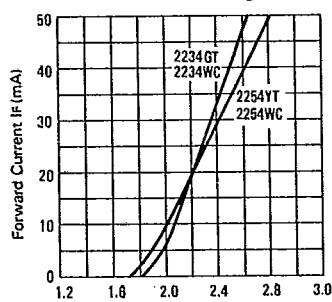


FIG. 7 FORWARD CURRENT VS. FORWARD VOLTAGE

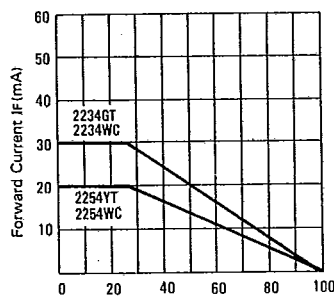


FIG. 8 FORWARD CURRENT DERATING CURVE

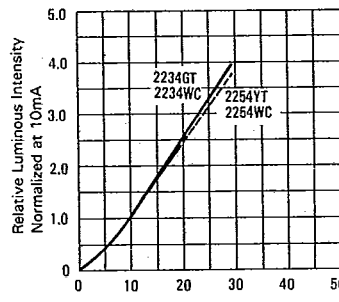


FIG. 9 RELATIVE LUMINOUS INTENSITY VS. FORWARD CURRENT

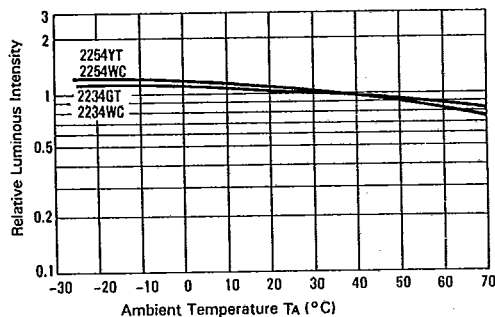


FIG. 10 LUMINOUS INTENSITY VS. AMBIENT TEMPERATURE

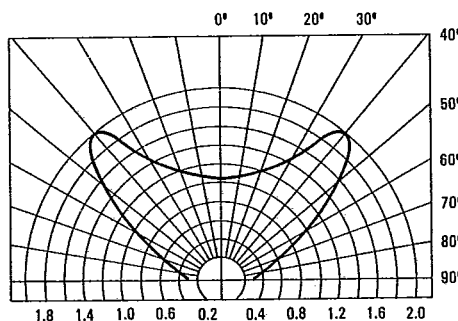


FIG. 11 SPATIAL DISTRIBUTION

ELECTRICAL/OPTICAL CHARACTERISTICS AND CURVES AT $T_A = 25^\circ\text{C}$

PARAMETER	SYMBOL	PART NO. LTL-	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Luminous Intensity	I_V	2224RT 2294WC	0.5 0.5	1.7 1.7		mcd	$I_F = 10\text{ mA}$ Note 1
Viewing Angle	$2\theta_{1/2}$	2224RT 2294WC		150		deg.	Note 2 (Fig. 16)
Peak Emission Wavelength	λ_{PEAK}	2224RT 2294WC		635 630		nm	Measurement @ Peak (Fig. 1)
Spectral Line Half Width	$\Delta\lambda$	2224RT 2294WC		45		nm	
Forward Voltage	V_F	2224RT 2294WC		2.0	2.8	V	$I_F = 20\text{ mA}$
Reverse Current	I_R	2224RT 2294WC			100	μA	$V_R = 5\text{ V}$
Capacitance	C	2224RT 2294WC		20		PF	$V_F = 0$ $f = 1\text{ MHz}$

NOTES: 1. Luminous intensity is measured with a light sensor and filter combination that approximates the CIE (Commission Internationale De L'Eclairage) eye-response curve.

2. $\theta_{1/2}$ is the off-axis angle at which the luminous intensity is half the axial luminous intensity.

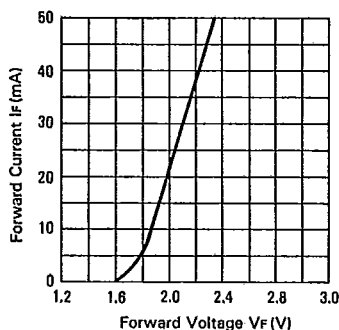


FIG. 12 FORWARD CURRENT VS. FORWARD VOLTAGE

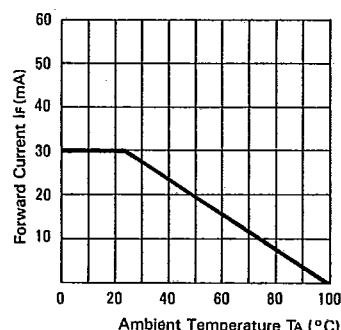


FIG. 13 FORWARD CURRENT DERATING CURVE

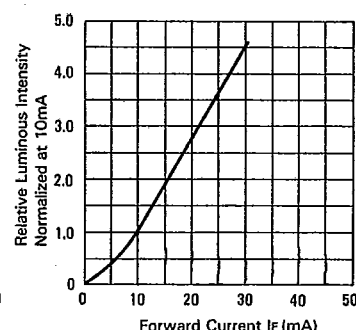


FIG. 14 RELATIVE LUMINOUS INTENSITY VS. FORWARD CURRENT

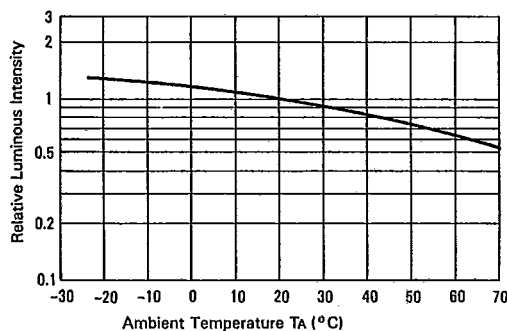


FIG. 15 LUMINOUS INTENSITY VS. AMBIENT TEMPERATURE

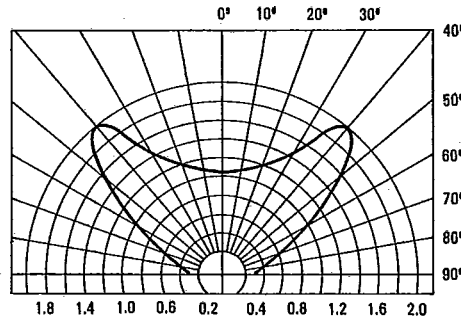


FIG. 16 SPATIAL DISTRIBUTION