T-1(3mm) Solid State LED Lamps

LTL-1CHA/1CHAE Amber
LTL-1CHE/1CHEE High Efficiency Red
LTL-1CHG/1CHGE Green
LTL-1CHP/1CHPE Bright Red
LTL-1CHR/1CHRE Red
LTL-1CHY/1CHYE Yellow

Features

- Low power consumption.
- High efficiency.
- Versatile mounting on P.C. Board or panel.
- I.C. compatible/low current requirements.
- 3.1mm diameter package.

Description

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

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

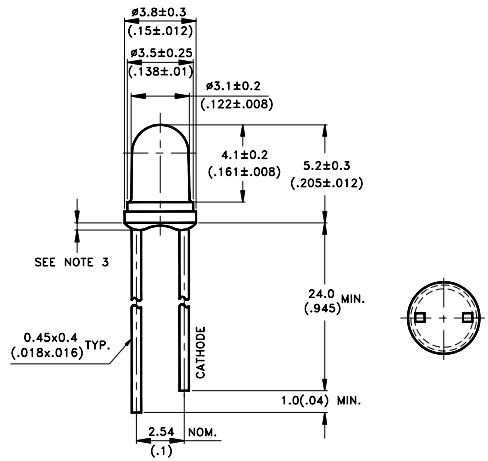
The Green source color devices are made with Gallium Phosphide on Gallium Phosphide Green Light Emitting Diode.

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

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

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

Package Dimensions



Notes:

1. All dimensions are in millimeters (inches).
2. Tolerance is ± 0.25mm (.010") unless otherwise noted.
3. Protruded resin under flange is 1.5mm (.059") max.
4. Lead spacing is measured where the leads emerge from the package.
5. Specifications are subject to change without notice.

Devices

Part No. LTL-	Lens	Source Color
1CHA	Amber Diffused	Amber
1CHAE	Amber Transparent	
1CHE	Red Diffused	Hi. Eff. Red
1CHEE	Red Transparent	
1CHG	Green Diffused	Green
1CHGE	Green Transparent	
1CHP	Red Diffused	Bright Red
1CHPE	Red Transparent	
1CHR	Red Diffused	Red
1CHRE	Red Transparent	
1CHY	Yellow Diffused	Yellow
1CHYE	Yellow Transparent	

Absolute Maximum Ratings at Ta=25℃

Parameter	Amber	Hi. Eff. Red	Green	Bright Red	Red	Yellow	Unit
Power Dissipation	60	100	100	40	80	60	mW
Peak Forward Current (1/10 Duty Cycle, 0.1ms Pulse Width)	80	120	120	60	200	80	mA
Continuous Forward Current	20	30	30	15	40	20	mA
Derating Linear From 50℃	0.25	0.4	0.4	0.2	0.5	0.25	mA/℃
Reverse Voltage	5	5	5	5	5	5	V
Operating Temperature Range	-55℃ to +100℃						
Storage Temperature Range	-55℃ to +100℃						
Lead Soldering Temperature [1.6mm (.063 in.) from body]	260℃ for 5 Seconds						

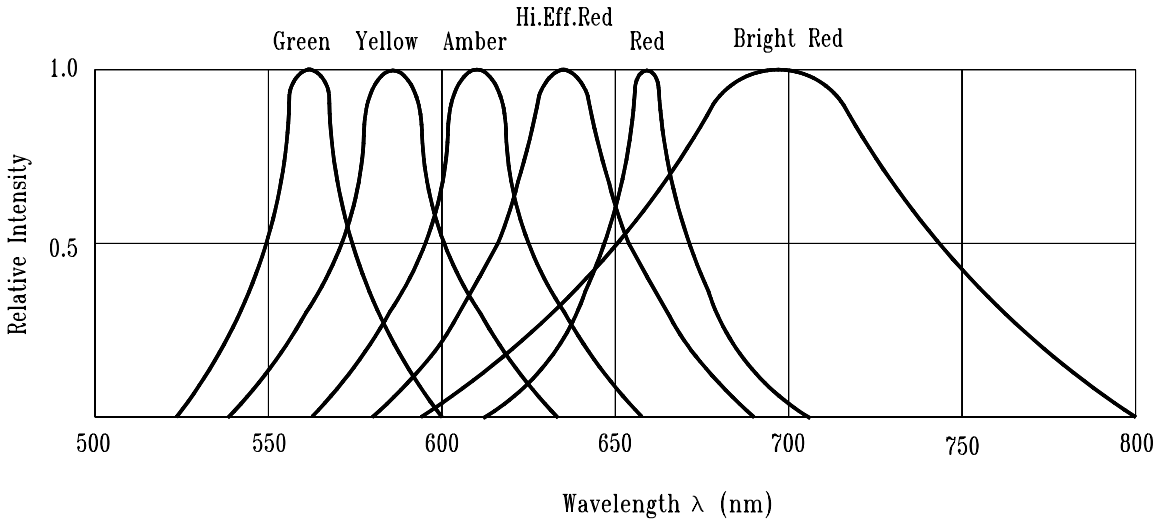


Fig.1 Relative Intensity vs. Wavelength

Electrical/Optical Characteristics at Ta=25℃

Parameter	Symbol	Part No. LTL-	Min.	Typ.	Max.	Unit.	Test Condition.
Luminous Intensity	I_V	1CHA 1CHE 1CHG 1CHP 1CHR 1CHY	3.7 2.5 3.7 1.3 0.4 2.5	12.6 8.7 12.6 4.4 1.1 8.7		mcd	I_F=10 mA Note 1,4
Viewing Angle	$2\theta_{1/2}$	1CHx		60		deg	Note 2 (Fig.7)
Peak Emission Wavelength	λP	1CHA 1CHE 1CHG 1CHP 1CHR 1CHY		610 635 565 697 655 585		nm	Measurement @Peak (Fig.1)
Dominant Wavelength	λd	1CHA 1CHE 1CHG 1CHP 1CHR 1CHY		602 623 569 657 651 588		nm	Note 3
Spectral Line Half Width	$\triangle\lambda$	1CHA 1CHE 1CHG 1CHP 1CHR 1CHY		35 40 30 90 24 35		nm	
Forward Voltage	V_F	1CHA 1CHE 1CHG 1CHP 1CHR 1CHY		2.1 2.0 2.1 2.1 1.7 2.1	2.6 2.6 2.6 2.6 2.0 2.6	V	I_F=20mA
Reverse Current	I_R	1CHx			100	μA	V_R=5V
Capacitance	C	1CHA 1CHE 1CHG 1CHP 1CHR 1CHY		15 20 35 55 30 15		pF	V_F=0 , f=1MHz

Notes:1.Luminous intensity is measured with a light sensor and filter combination that approximates the CIE eye-response curve.
2. $\theta_{1/2}$ is the off-axis angle at which the luminous intensity is half the axial luminous intensity.
3.The dominant wavelength, λ d is derived from the CIE chromaticity diagram and represents the single wavelength which defines the color of the device.
4.I_V needs $\pm$ 15% additionary for guaranteed limits.

Electrical/Optical Characteristics at Ta=25℃

Parameter	Symbol	Part No. LTL-	Min.	Typ.	Max.	Unit.	Test Condition.
Luminous Intensity	I_V	1CHAE 1CHEE 1CHGE 1CHPE 1CHRE 1CHYE	8.7 5.6 12.6 2.5 1.1 12.6	29 19 40 8.7 3.7 40		mcd	I_F=10 mA Note 1,4
Viewing Angle	$2\theta_{1/2}$	1CHxE		45		deg	Note 2 (Fig.7)
Peak Emission Wavelength	λP	1CHAE 1CHEE 1CHGE 1CHPE 1CHRE 1CHYE		610 635 565 697 655 585		nm	Measurement @Peak (Fig.1)
Dominant Wavelength	λd	1CHAE 1CHEE 1CHGE 1CHPE 1CHRE 1CHYE		602 623 569 657 651 588		nm	Note 3
Spectral Line Half Width	$\triangle\lambda$	1CHAE 1CHEE 1CHGE 1CHPE 1CHRE 1CHYE		35 40 30 90 24 35		nm	
Forward Voltage	V_F	1CHAE 1CHEE 1CHGE 1CHPE 1CHRE 1CHYE		2.1 2.0 2.1 2.1 1.7 2.1	2.6 2.6 2.6 2.6 2.0 2.6	V	I_F=20mA
Reverse Current	I_R	1CHxE			100	μA	V_R=5V
Capacitance	C	1CHAE 1CHEE 1CHGE 1CHPE 1CHRE 1CHYE		15 20 35 55 30 15		pF	V_F=0 , f=1MHz

Notes:1.Luminous intensity is measured with a light sensor and filter combination that approximates the CIE eye-response curve.
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3.The dominant wavelength, λ d is derived from the CIE chromaticity diagram and represents the single wavelength which defines the color of the device.
4.I_V needs $\pm$ 15% additionary for guaranteed limits.

Typical Electrical/Optical Characteristic Curves (25℃ Ambient Temperature Unless Otherwise Noted)

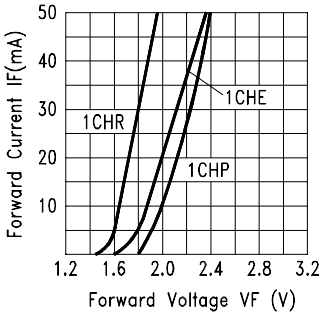


Fig.18 FORWARD CURRENT VS. FORWARD VOLTAGE

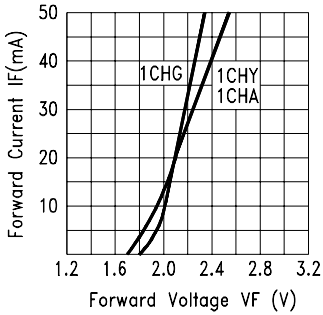


Fig.19 FORWARD CURRENT VS. FORWARD VOLTAGE

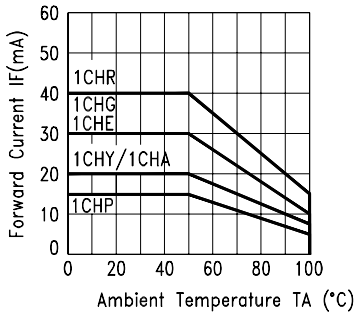


Fig.20 FORWARD CURRENT DERATING CURVE

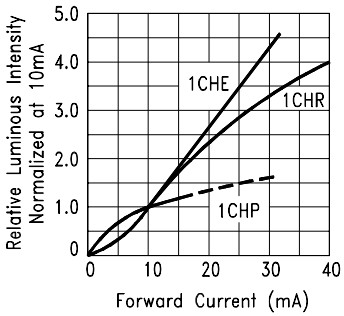


Fig.21 RELATIVE LUMINOUS INTENSITY VS. FORWARD CURRENT

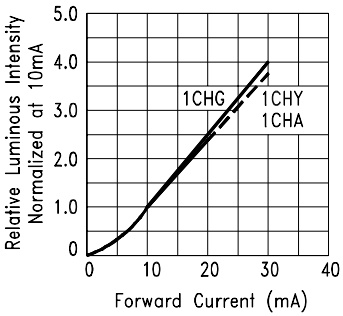


Fig.22 RELATIVE LUMINOUS INTENSITY VS. FORWARD CURRENT

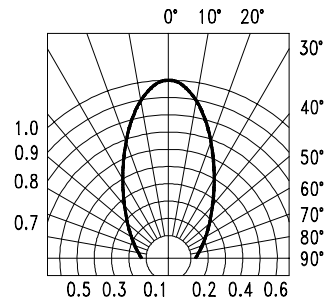


Fig.23 SPATIAL DISTRIBUTION

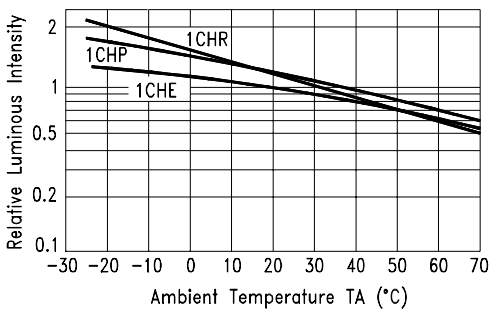


Fig.24 LUMINOUS INTENSITY VS. AMBIENT TEMPERATURE

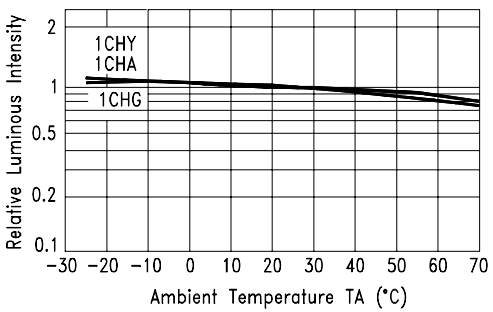


Fig.25 LUMINOUS INTENSITY VS. AMBIENT TEMPERATURE

Typical Electrical/Optical Characteristic Curves (25℃ Ambient Temperature Unless Otherwise Noted)

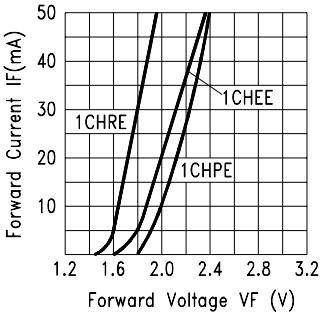


Fig.18 FORWARD CURRENT VS. FORWARD VOLTAGE

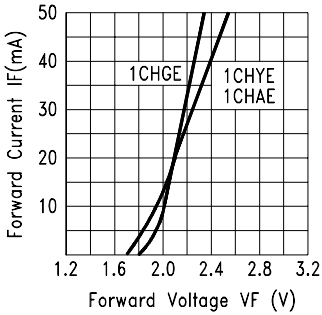


Fig.19 FORWARD CURRENT VS. FORWARD VOLTAGE

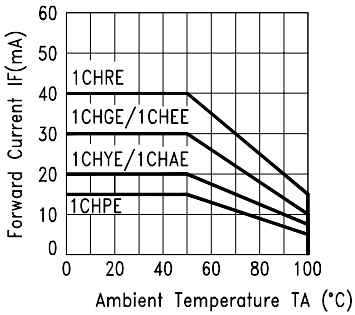


Fig.20 FORWARD CURRENT DERATING CURVE

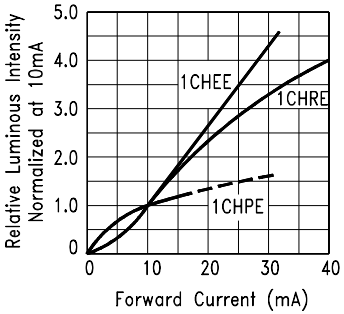
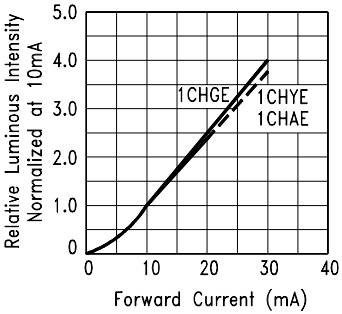


Fig.21 RELATIVE LUMINOUS INTENSITY VS. FORWARD CURRENT



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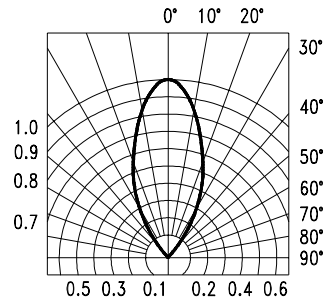


Fig.23 SPATIAL DISTRIBUTION

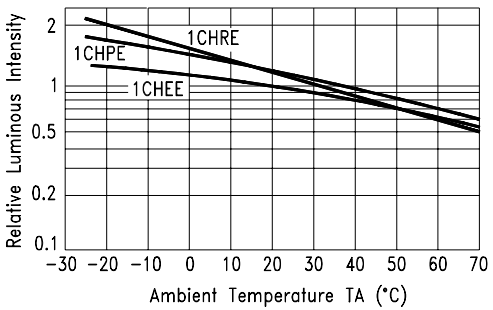
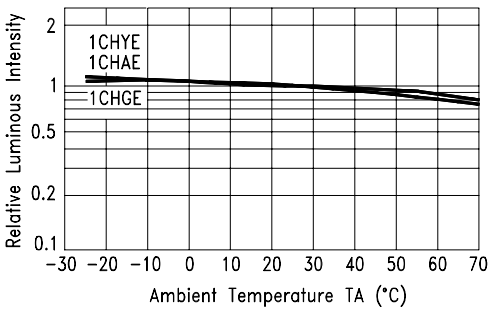


Fig.24 LUMINOUS INTENSITY VS. AMBIENT TEMPERATURE



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