T-1(3mm) Solid State LED Lamps

LTL-4201/4202 Red
LTL-4211/4212 Bright Red
LTL-4221/4222 High Efficiency Red
LTL-4231/4232 Green
LTL-4251/4252 Yellow
LTL-4291/4292 Red Orange

Features

- High intensity.
- Popular T-1 Diameter package.
- Selected minimum intensities.
- Wide viewing angle.
- General purpose leads.
- Reliable and rugged.

Description

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

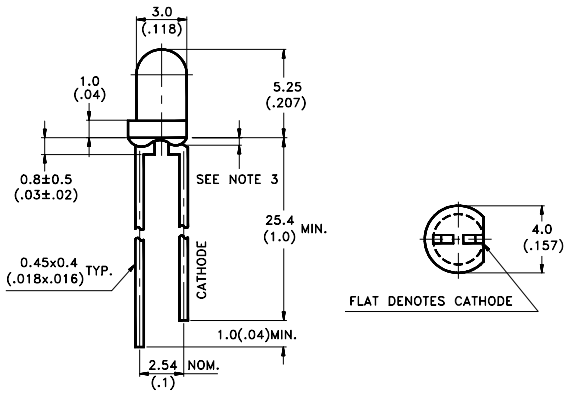
The Bright Red source color devices are made with Gallium Phosphide on Gallium Phosphide Red Light Emitting Diode.

The High Efficiency Red and Red 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.

Package Dimensions

LTL-42x1/42x2 Series



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
4201	Red Diffused	Red
4202	Red Transparent	
4211	Red Diffused	Bright Red
4212	Red Transparent	
4221	Red Diffused	Hi. Eff. Red
4222	Red Transparent	
4231	Green Diffused	Green
4232	Green Transparent	
4251	Yellow Diffused	Yellow
4252	Yellow Transparent	
4291	Orange Diffused	Red Orange
4292	Orange Transparent	

Absolute Maximum Ratings at Ta=25℃

Parameter	Red	Bright Red	Green	Yellow	Hi. Eff. Red Red Orange	Unit
Power Dissipation	80	40	100	60	100	mW
Peak Forward Current (1/10 Duty Cycle, 0.1ms Pulse Width)	200	60	120	80	120	mA
Continuous Forward Current	40	15	30	20	30	mA
Derating Linear From 50℃	0.5	0.2	0.4	0.25	0.4	mA/℃
Reverse Voltage	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					

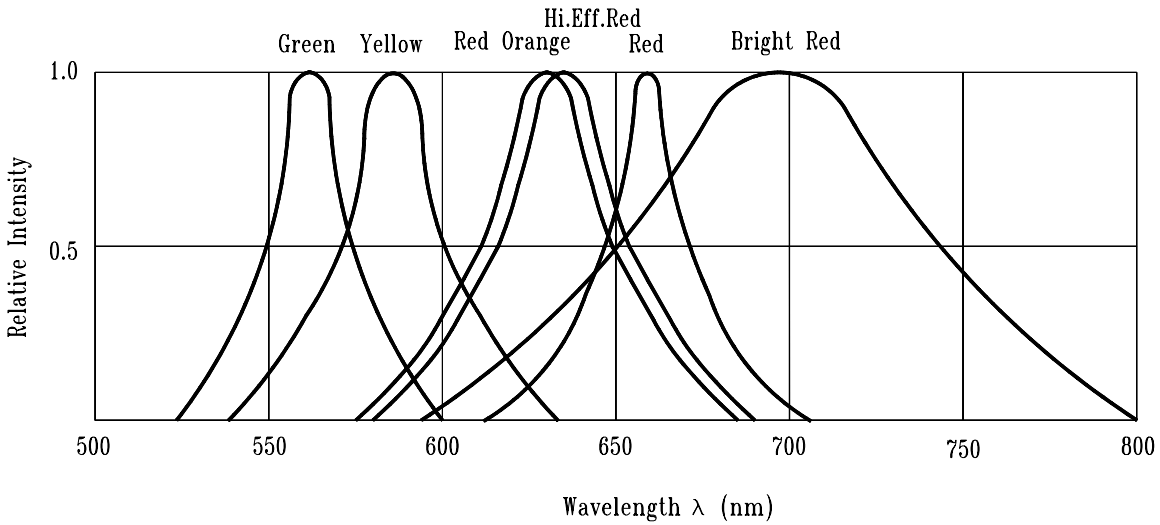


Fig.1 Relative Intensity vs. Wavelength

Electrical/Optical Characteristics at Ta=25℃

Parameter	Symbol	Part No. LTL-	Min.	Typ.	Max.	Unit.	Test Condition.
Luminous Intensity	I_V	4201 4211 4221 4231 4251 4291	0.3 0.7 2.5 3.7 2.5 3.7	0.8 2.5 8.7 12.6 8.7 12.6		mcd	I_F=10 mA Note 1,4
Viewing Angle	2 $\theta_{1/2}$	42x1		40		deg	Note 2 (Fig.7)
Peak Emission Wavelength	λ P	4201 4211 4221 4231 4251 4291		655 697 635 565 585 630		nm	Measurement @Peak (Fig.1)
Dominant Wavelength	λ d	4201 4211 4221 4231 4251 4291		651 657 623 569 588 621		nm	Note 3
Spectral Line Half Width	$\triangle\lambda$	4201 4211 4221 4231 4251 4291		24 90 40 30 35 40		nm	
Forward Voltage	V_F	4201 4211 4221 4231 4251 4291		1.7 2.1 2.0 2.1 2.1 2.0	2.0 2.6 2.6 2.6 2.6 2.6	V	I_F=20mA
Reverse Current	I_R	42x1			100	μ A	V_R=5V
Capacitance	C	4201 4211 4221 4231 4251 4291		30 55 20 35 15 20		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	4202 4212 4222 4232 4252 4292	1.7 2.5 8.7 12.6 5.6 8.7	5.6 8.7 29 40 19 29		mcd	I_F=10 mA Note 1,4
Viewing Angle	$2\theta_{1/2}$	42x2		20		deg	Note 2 (Fig.15)
Peak Emission Wavelength	λP	4202 4212 4222 4232 4252 4292		655 697 635 565 585 630		nm	Measurement @Peak (Fig.1)
Dominant Wavelength	λd	4202 4212 4222 4232 4252 4292		651 657 623 569 588 621		nm	Note 3
Spectral Line Half Width	$\Delta\lambda$	4202 4212 4222 4232 4252 4292		24 90 40 30 35 40		nm	
Forward Voltage	V_F	4202 4212 4222 4232 4252 4292		1.7 2.1 2.0 2.1 2.1 2.0	2.0 2.6 2.6 2.6 2.6 2.6	V	I_F=20mA
Reverse Current	I_R	42x2			100	μ A	V_R=5V
Capacitance	C	4202 4212 4222 4232 4252 4292		30 55 20 35 15 20		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.

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

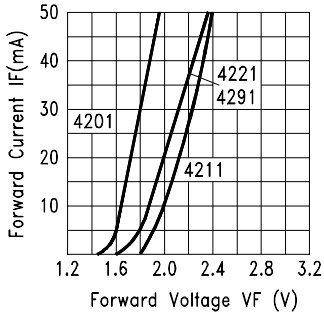


Fig.2 FORWARD CURRENT VS. FORWARD VOLTAGE

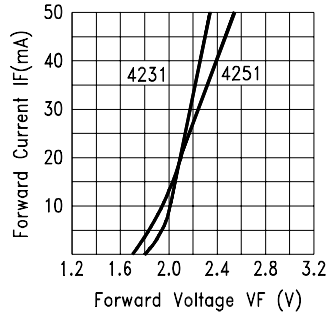


Fig.3 FORWARD CURRENT VS. FORWARD VOLTAGE

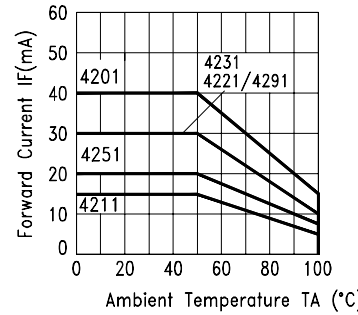


Fig.4 FORWARD CURRENT DERATING CURVE

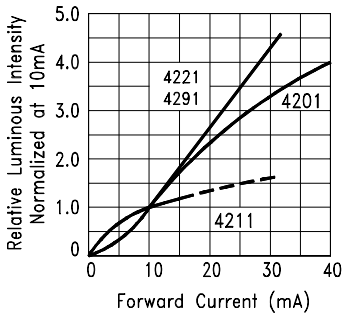


Fig.5 RELATIVE LUMINOUS INTENSITY VS. FORWARD CURRENT

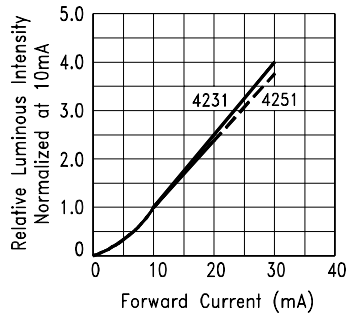


Fig.6 RELATIVE LUMINOUS INTENSITY VS. FORWARD CURRENT

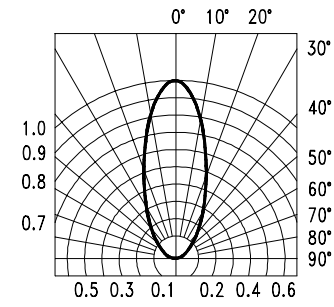


Fig.7 SPATIAL DISTRIBUTION

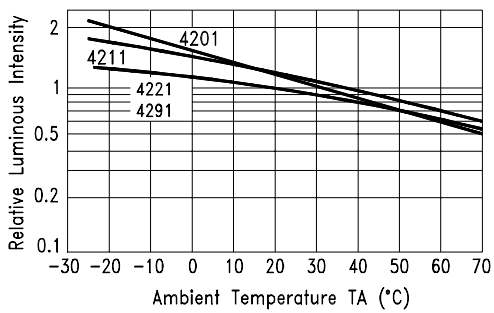


Fig.8 LUMINOUS INTENSITY VS. AMBIENT TEMPERATURE

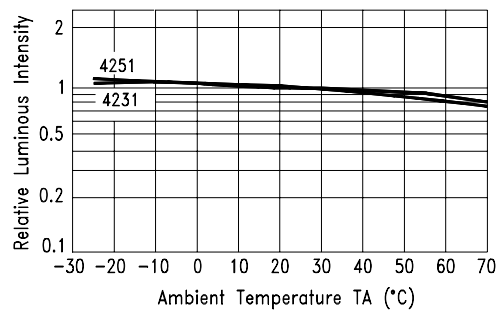


Fig.9 LUMINOUS INTENSITY VS. AMBIENT TEMPERATURE

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

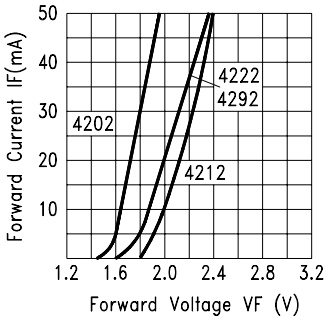


Fig.10 FORWARD CURRENT VS. FORWARD VOLTAGE

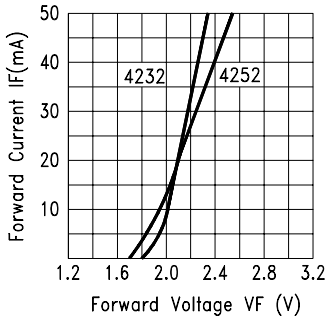


Fig.11 FORWARD CURRENT VS. FORWARD VOLTAGE

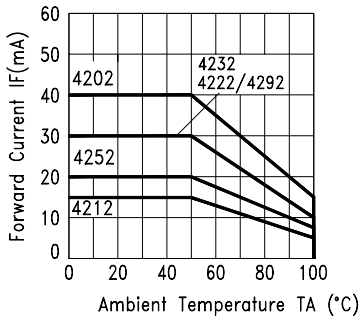


Fig.12 FORWARD CURRENT DERATING CURVE

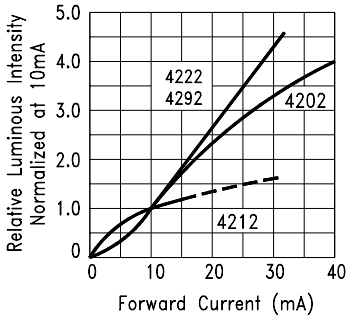


Fig.13 RELATIVE LUMINOUS INTENSITY VS. FORWARD CURRENT

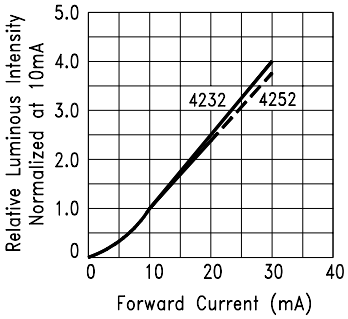


Fig.14 RELATIVE LUMINOUS INTENSITY VS. FORWARD CURRENT

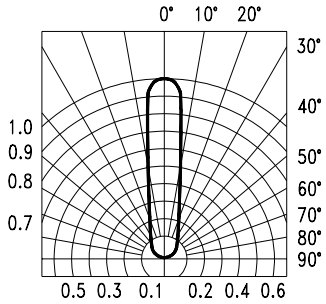


Fig.15 SPATIAL DISTRIBUTION

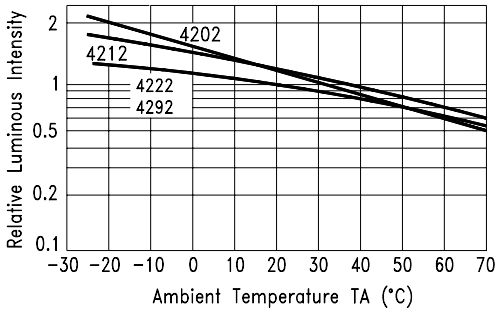


Fig.16 LUMINOUS INTENSITY VS. AMBIENT TEMPERATURE

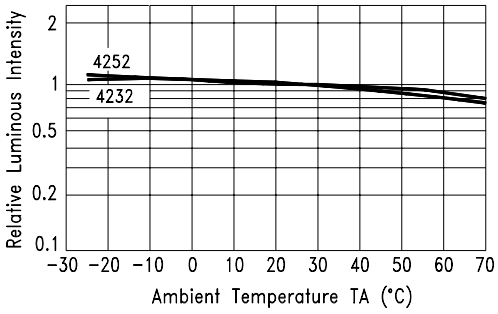


Fig.17 LUMINOUS INTENSITY VS. AMBIENT TEMPERATURE

THROUGH HOLE LAMPS