T-1(3mm) Solid State LED Lamps

LTL-4201N/4206N Red
LTL-4211N/4212N Bright Red
LTL-4221N/4222N High Efficiency Red
LTL-4231N/4232N/4236N Green
LTL-4251N/4252N/4256N Yellow
LTL-4291N/4292N/4296N 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.

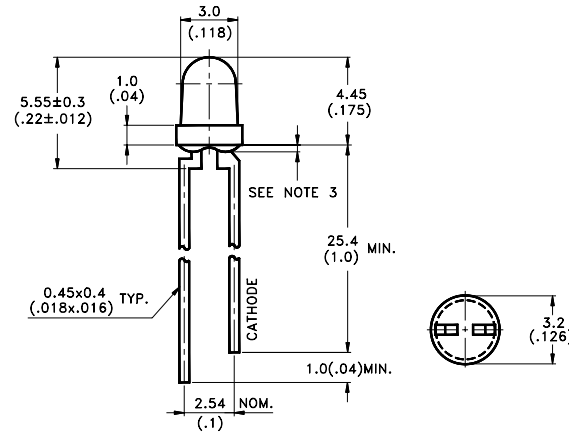
The Green source color devices are made with Gallium Phosphide on Gallium Phosphide Green Light Emitting Diode.

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

Devices

Part No. LTL-	Lens	Source Color
4201N	Red Diffused	Red
4206N	Water Clear	
4211N	Red Diffused	Bright Red
4212N	Red Transparent	
4221N	Red Diffused	Hi. Eff. Red
4222N	Red Transparent	
4231N	Green Diffused	Green
4232N	Green Transparent	
4236N	Water Clear	
4251N	Yellow Diffused	Yellow
4252N	Yellow Transparent	
4256N	Water Clear	
4291N	Orange Diffused	Red Orange
4292N	Orange Transparent	
4296N	Water Clear	

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.

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					

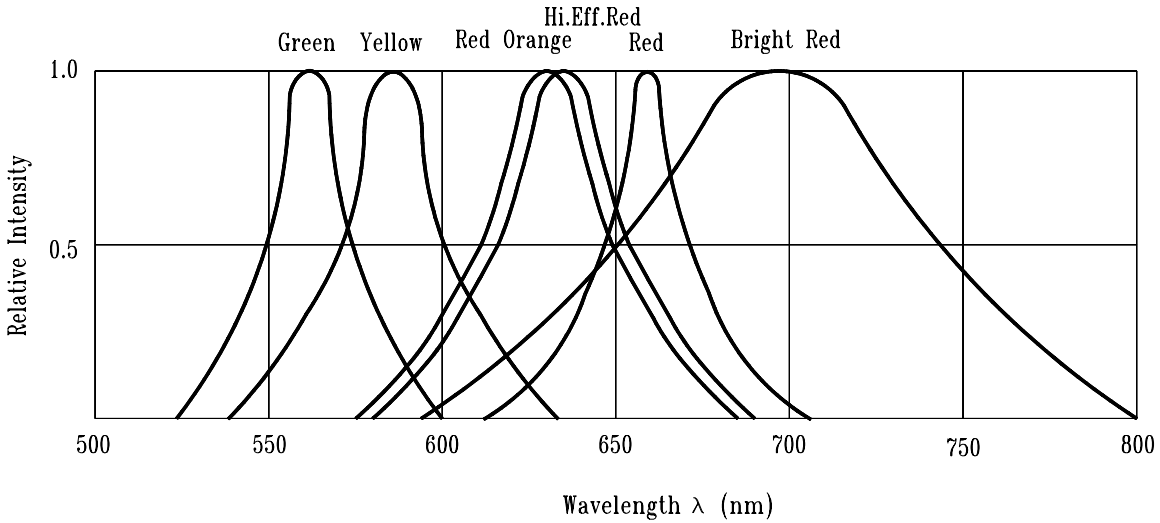


Fig.1 Relative Intensity vs. Wavelength

Electrical/Optical Characteristics at Ta=25℃

Parameter	Symbol	Part No. LTL-	Min.	Typ.	Max.	Unit.	Test Condition.
Luminous Intensity	I_V	4201N 4211N 4221N 4231N 4251N 4291N	0.4 1.3 2.5 3.7 1.7 2.5	1.1 4.4 8.7 12.6 5.6 8.7		mcd	I_F=10 mA Note 1,4
Viewing Angle	$2\theta_{1/2}$	42x1N		60		deg	Note 2 (Fig.7)
Peak Emission Wavelength	λP	4201N 4211N 4221N 4231N 4251N 4291N		655 697 635 565 585 630		nm	Measurement @Peak (Fig.1)
Dominant Wavelength	λd	4201N 4211N 4221N 4231N 4251N 4291N		651 657 623 569 588 621		nm	Note 3
Spectral Line Half Width	$\triangle\lambda$	4201N 4211N 4221N 4231N 4251N 4291N		24 90 40 30 35 40		nm	
Forward Voltage	V_F	4201N 4211N 4221N 4231N 4251N 4291N		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	42x1N			100	μA	V_R=5V
Capacitance	C	4201N 4211N 4221N 4231N 4251N 4291N		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	4206N 4212N 4222N 4232N 4236N 4252N 4256N 4292N 4296N	1.1 1.7 8.7 12.6 19 5.6 12.6 5.6 19	3.7 5.6 29 40 60 19 40 19 60		mcd	I_F=10 mA Note 1,4
Viewing Angle	2 θ 1/2	42x2N		45		deg	Note 2 (Fig.15)
Peak Emission Wavelength	λ P	4206N 4212N 4222N 4232N 4236N 4252N 4256N 4292N 4296N		655 697 635 565 565 585 585 630 630		nm	Measurement @Peak (Fig.1)
Dominant Wavelength	λ d	4206N 4212N 4222N 4232N 4236N 4252N 4256N 4292N 4296N		651 657 623 569 569 588 588 621 621		nm	Note 3
Spectral Line Half Width	$\triangle\lambda$	4206N 4212N 4222N 4232N 4236N 4252N 4256N 4292N 4296N		24 90 40 30 30 35 35 40 40		nm	
Forward Voltage	V_F	4206N 4212N 4222N 4232N 4236N 4252N 4256N 4292N 4296N		1.7 2.1 2.0 2.1 2.1 2.1 2.1 2.0 2.0	2.0 2.6 2.6 2.6 2.6 2.6 2.6 2.6 2.6	V	I_F=20mA
Reverse Current	I_R	42x2N			100	μ A	V_R=5V
Capacitance	C	4206N 4212N 4222N 4232N 4236N 4252N 4256N 4292N 4296N		30 55 20 35 35 15 15 20 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. θ 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)

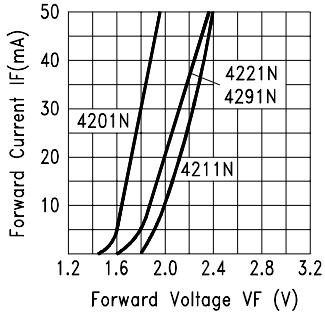


Fig.2 FORWARD CURRENT VS. FORWARD VOLTAGE

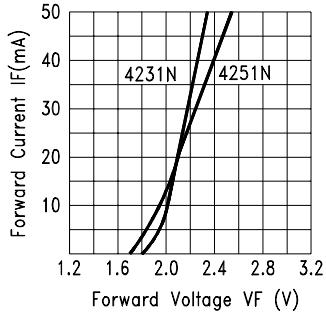


Fig.3 FORWARD CURRENT VS. FORWARD VOLTAGE

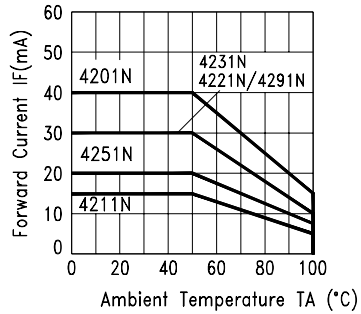


Fig.4 FORWARD CURRENT DERATING CURVE

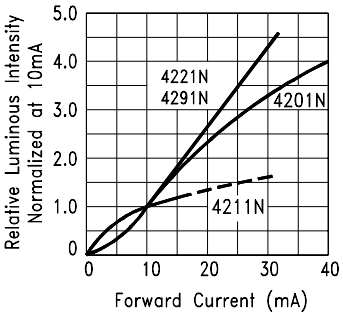


Fig.5 RELATIVE LUMINOUS INTENSITY VS. FORWARD CURRENT

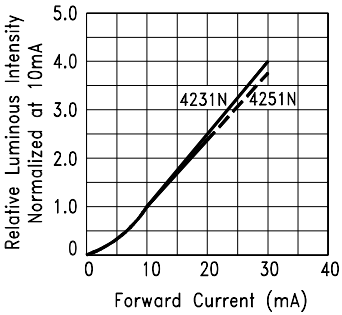


Fig.6 RELATIVE LUMINOUS INTENSITY VS. FORWARD CURRENT

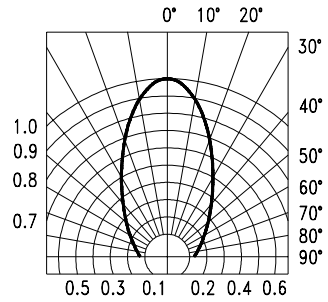


Fig.7 SPATIAL DISTRIBUTION

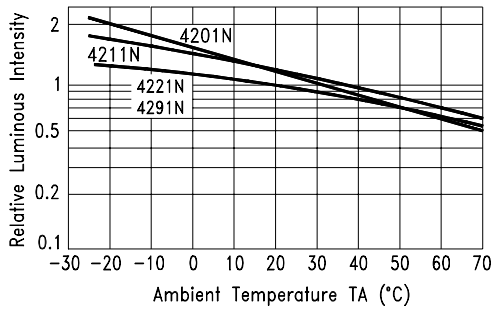


Fig.8 LUMINOUS INTENSITY VS. AMBIENT TEMPERATURE

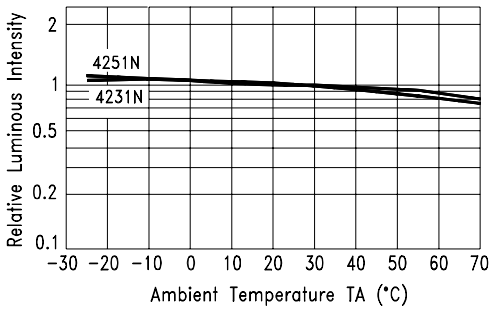


Fig.9 LUMINOUS INTENSITY VS. AMBIENT TEMPERATURE

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

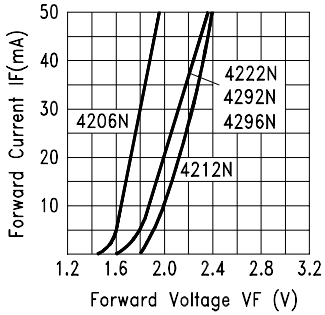


Fig.2 FORWARD CURRENT VS. FORWARD VOLTAGE

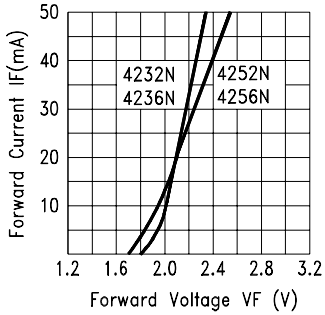


Fig.3 FORWARD CURRENT VS. FORWARD VOLTAGE

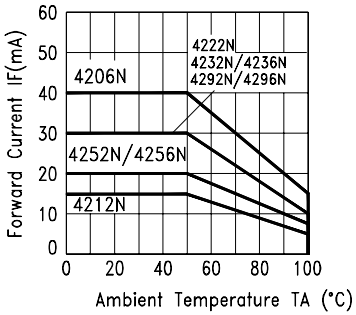


Fig.4 FORWARD CURRENT DERATING CURVE

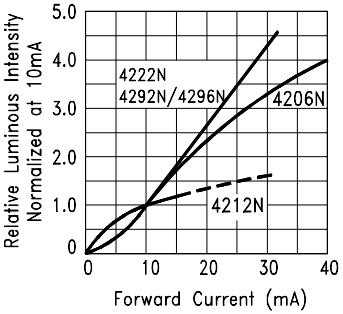
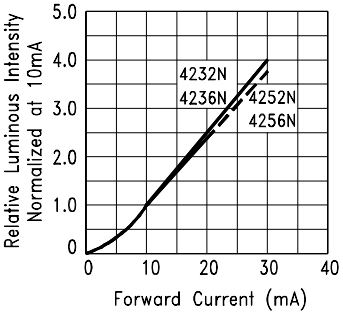


Fig.5 RELATIVE LUMINOUS INTENSITY VS. FORWARD CURRENT



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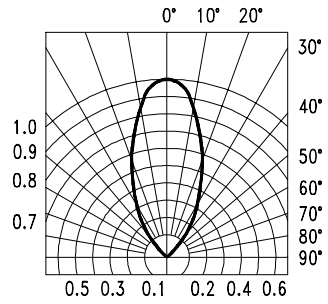

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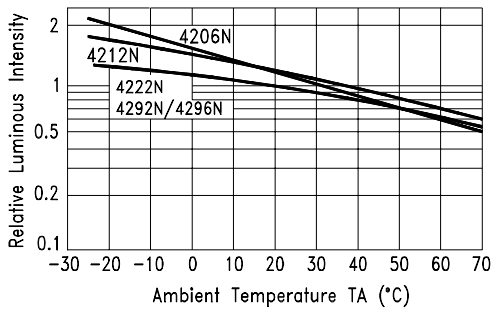
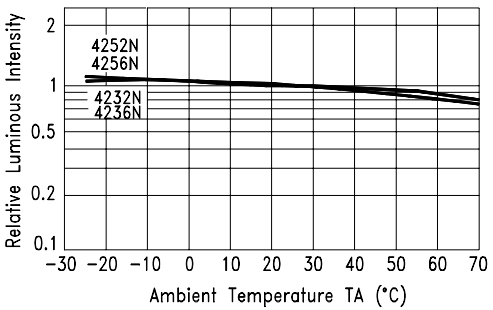


Fig.8 LUMINOUS INTENSITY VS. AMBIENT TEMPERATURE



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