

PLCC Series

3528 0.2W Single Color

Datasheet - AM

Automotive
Lighting

Outdoor Lighting

General
Lighting

Indoor Lighting

Signal
Lighting

Introduction :

Ultra high luminous efficacy, combined with the flexibility in design due to its slim and miniature size, PLCC LED Series are optimized to be used as lighting for automotive signal lighting designs or signboard.

Description :

- Automotive lighting interior and exterior
- Signal and Symbol Luminaire
- Best luminous and color uniformity
- Enables halogen and CDM replacement
- The article itself presents the actual color.

Feature and Benefits :

- High luminous Intensity and high efficiency
- Based on Red : AlGaInP technology
- Wide viewing angle : 120°
- Excellent performance and visibility
- Suitable for all SMT assembly methods
- IR reflow process compatible
- Environmental friendly; RoHS compliance
- Qualification according to AEC-Q101 rev. D

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General Information

Ordering Code Format

$\frac{2}{X1}$ $\frac{T}{X2}$ $\frac{03}{X3-X4}$ $\frac{X2}{X5-X6}$ $\frac{xX}{X7-X8}$ $\frac{X}{X9}$ $\frac{00}{X10-X11}$ $\frac{03}{X12-X13}$ $\frac{XXX}{X14-X16}$

X1		X2		X3-X4		X5-X6		X7-X8	
Type		Component		Series		Wattage		Color/CCT	
2	Emitter	T	PLCC	03	3528	X2	0.2W	RX	Red
								YX	Yellow

X9		X10-X11		X12-X13		X14-X16	
BIN		CRI		Voltage		Serial Number	
X	Single Color	00	-	03	3V	-	-

Absolute Maximum Ratings

Absolute maximum ratings ($T_a=25^{\circ}\text{C}$)

Parameter	Symbol	Value	Units
DC Forward Current	I_F	70	mA
Pulse Forward Current ($t_p \leq 100\mu\text{s}$, Duty cycle=0.25)	I_{pulse}	100	mA
Reverse Voltage	V_R	12	V
LED Junction Temperature	T_J	125	$^{\circ}\text{C}$
Operating Temperature	-	-40 ~ +85	$^{\circ}\text{C}$
Storage Temperature	-	-40 ~ +125	$^{\circ}\text{C}$
ESD Sensitivity (HBM)	V_B	2,000	V
Soldering Temperature	T_s	Reflow Soldering : 255~260 $^{\circ}\text{C}$ /10~30sec Manual Soldering : 350 $^{\circ}\text{C}$ /3sec	

Note:

I_{pulse} condition: pulse width $\leq 0.1\text{msec}$ and duty $\leq 1/10$.

Characteristics

Parameter	Symbol	Value	Units
Viewing Angle (Typ.)	$2\theta_{1/2}$	120	Degree
Thermal resistance	-	22	$^{\circ}\text{C}/\text{W}$
Wavelength (Red) (Yellow)	-	615-630 585-595	nm
JEDEC Moisture Sensitivity	-	Level 2a Floor Life Conditions: $\leq 30^{\circ}\text{C}$ / 60% RH Soak Requirements(Standard) Time (hours): 120+1/-0 Conditions: 60 $^{\circ}\text{C}$ / 60% RH	

Notes:

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

2. Edison Opto maintains a tolerance of $\pm 1\text{nm}$ for dominant wavelength.

Luminous Flux Characteristic

Luminous Flux Characteristics T_j=25°C

Color	Group	Min Luminous Intensity (mcd)	Max Luminous Intensity (mcd)	Forward Current (mA)	Order Code
Red	H0	3200	3650	70	2T03X2RXX00030A1
	I0	3650	4150		
	J0	4150	4700		
Yellow	H0	3200	3650		2T03X2YXX00030A1
	I0	3650	4150		
	J0	4150	4700		

Note:

The luminous flux performance is guaranteed within published operating conditions. Edison Opto maintains a tolerance of $\pm 10\%$ on flux measurements.

Voltage Bin Structure

Group	Min. Voltage (V)	Max. Voltage (V)
U04	1.9	2.2
U05	2.2	2.5
V00	2.5	2.8
V01	2.8	3.1
V02	3.1	3.4

Note:

Forward voltage measurement allowance is $\pm 0.06V$.

Wavelength Bin Structure

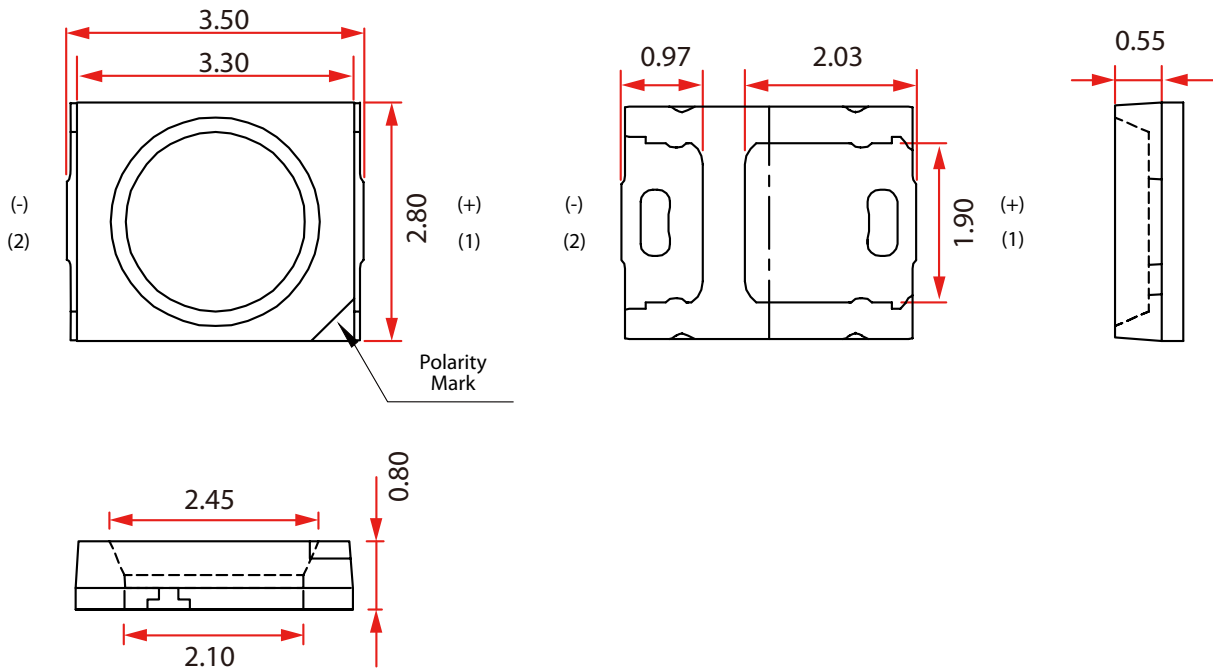
Color	Group	Min Wd (nm)	Max Wd (nm)
Red	OX2	615	620
	RX0	620	630
Yellow	YW0	585	588
	YX0	588	591
	YY0	591	595

Note:

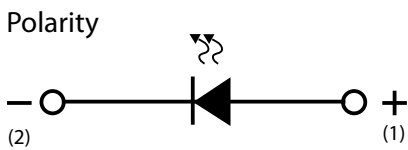
Dominant wavelength measurement allowance is $\pm 1nm$.

Mechanical Dimensions

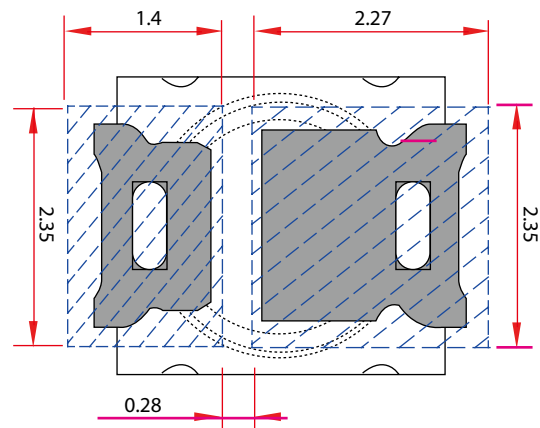
Emitter Type Dimension



Circuit



Solder Pad

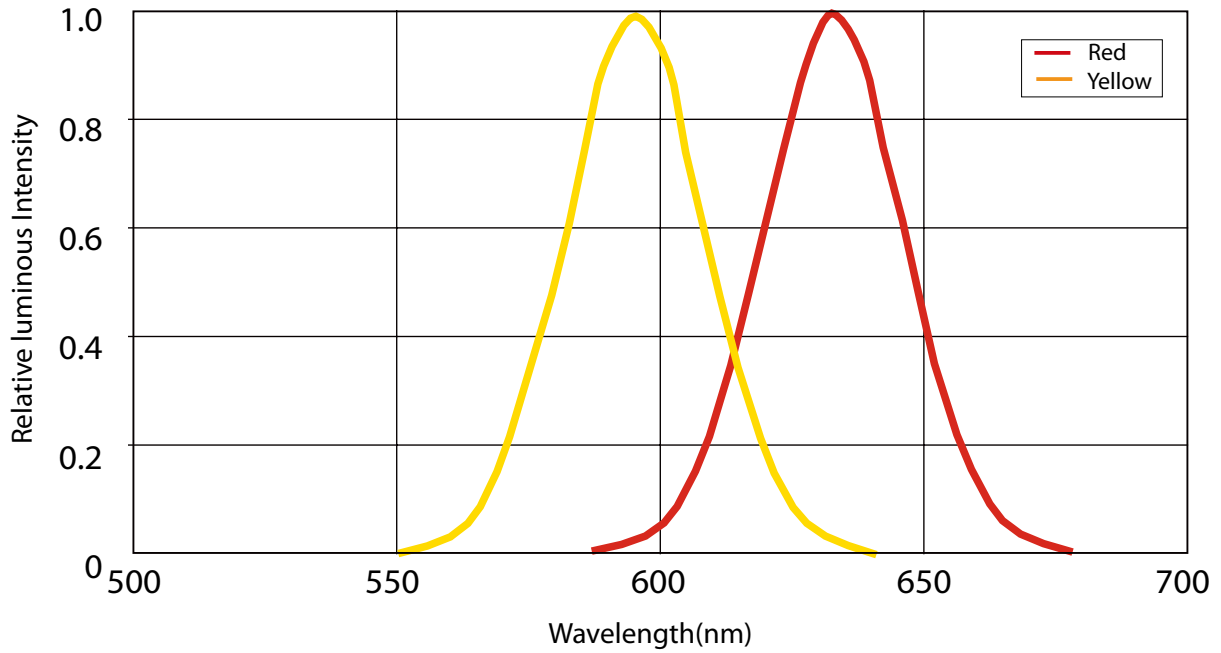


Notes:

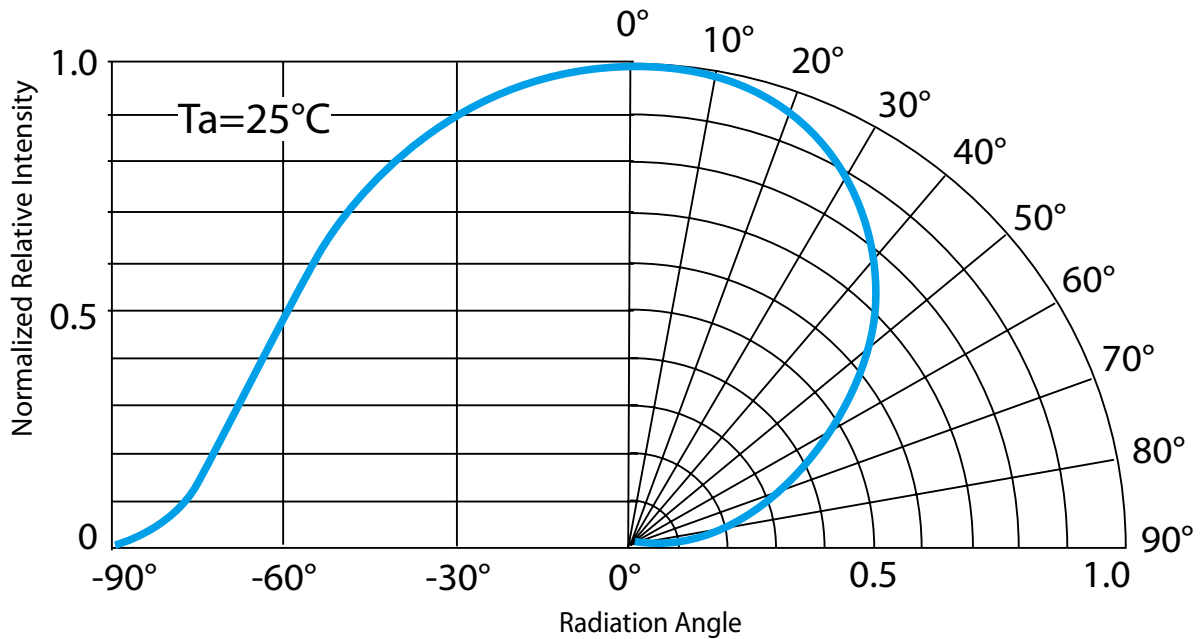
1. All dimensions are measured in mm.
2. Tolerance : ± 0.2 mm

Characteristic curve

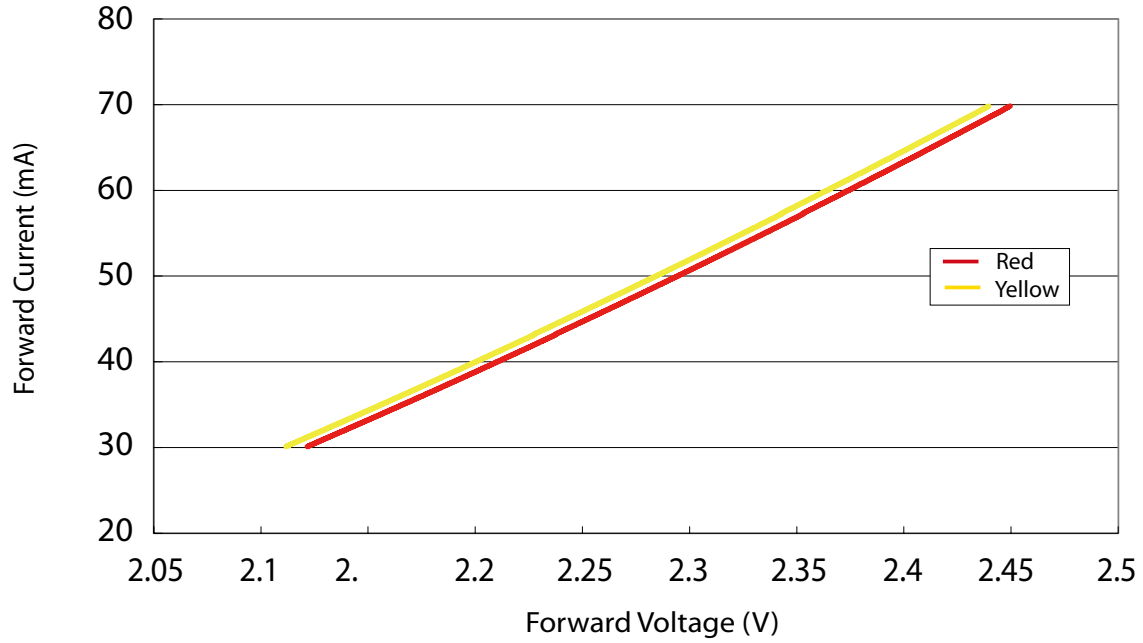
Color Spectrum



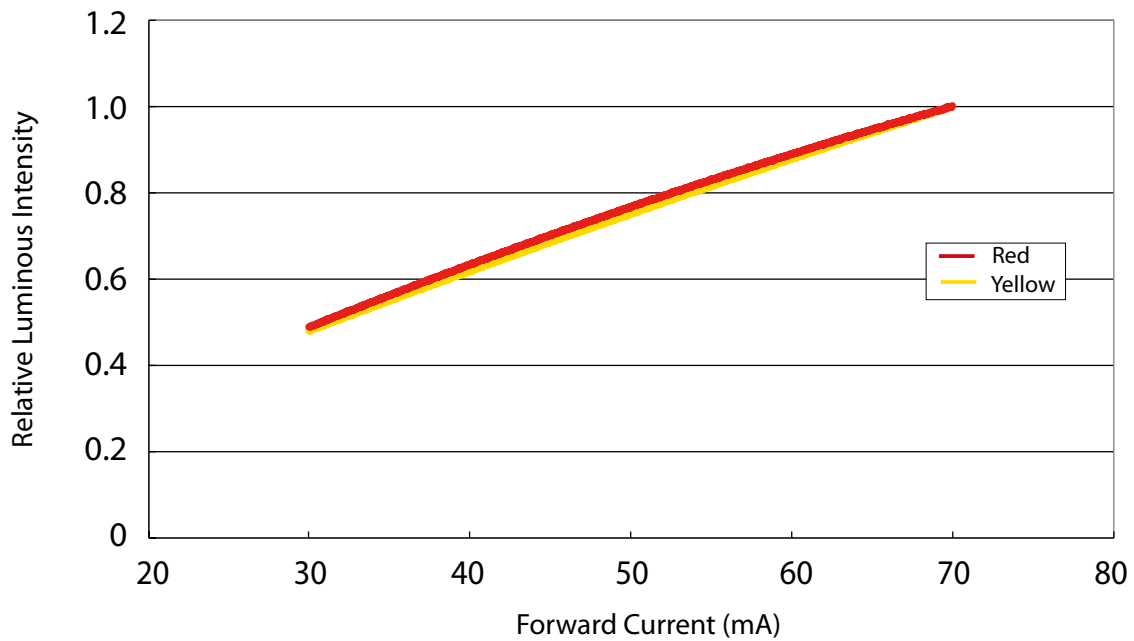
Beam Pattern



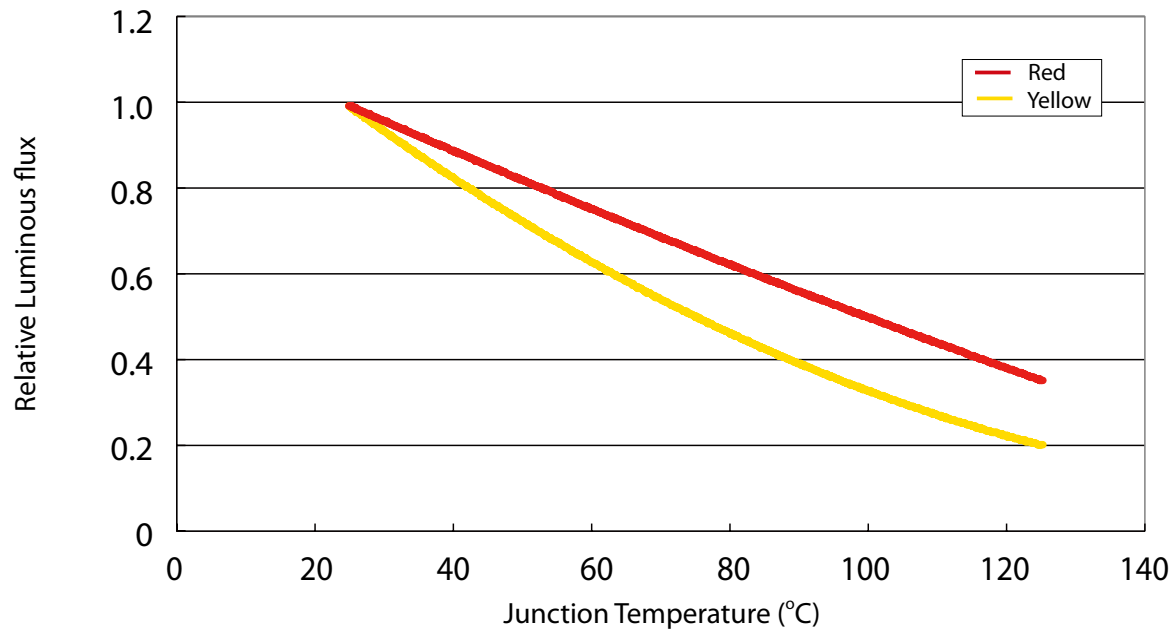
Forward Current vs. Forward Voltage



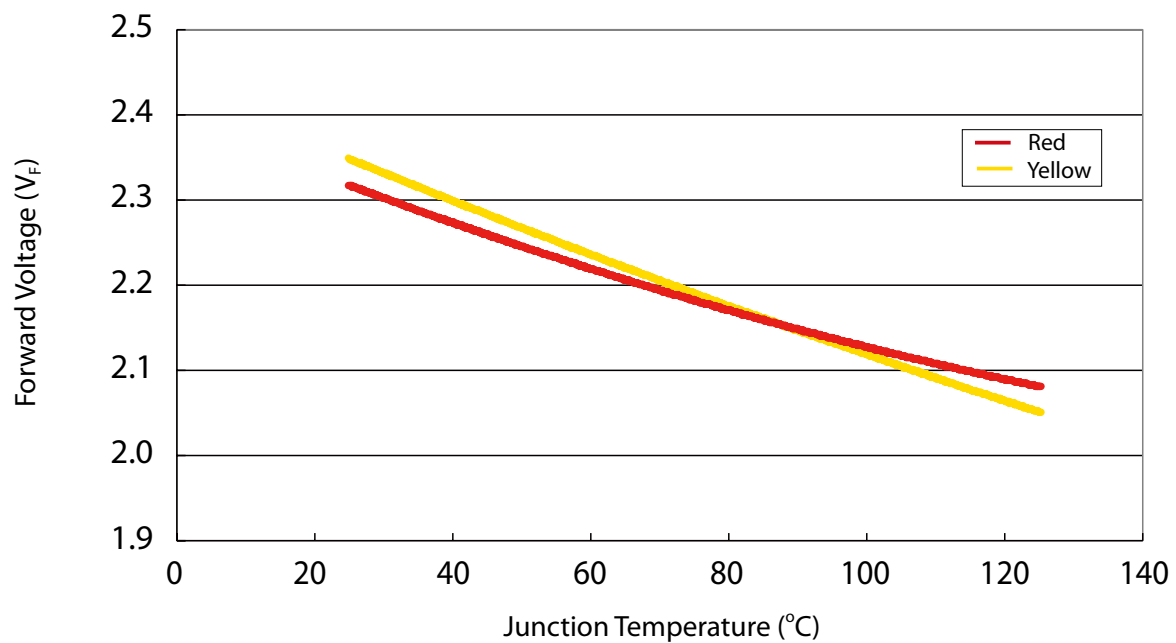
Relative luminous Intensity vs. Forward Current



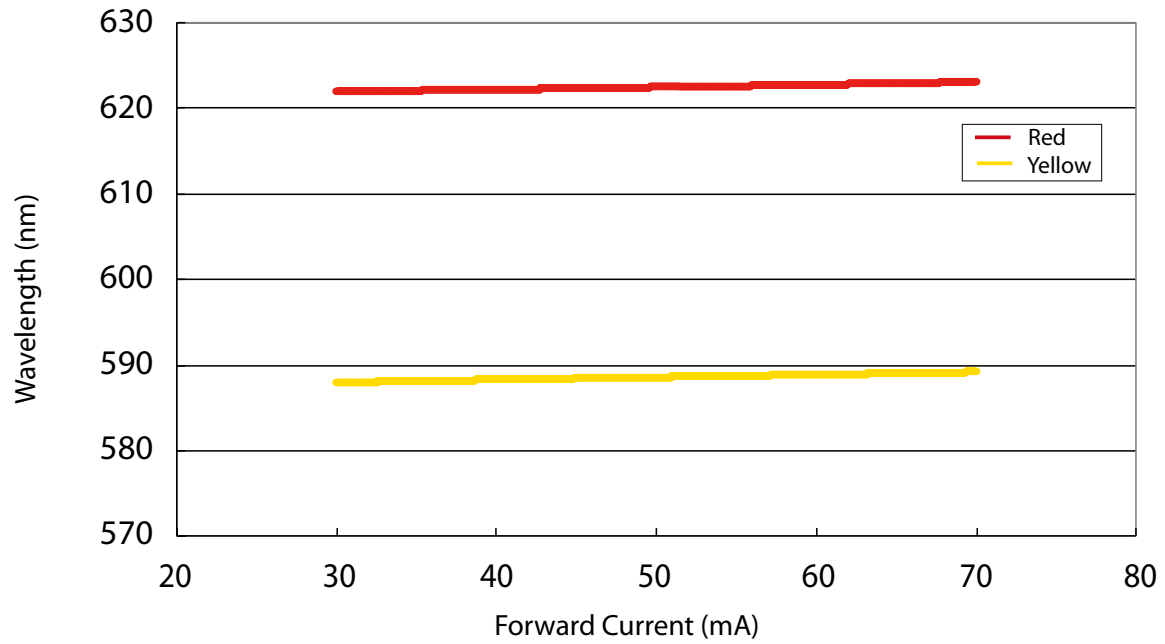
Relative Luminous Flux vs. Junction Temperature



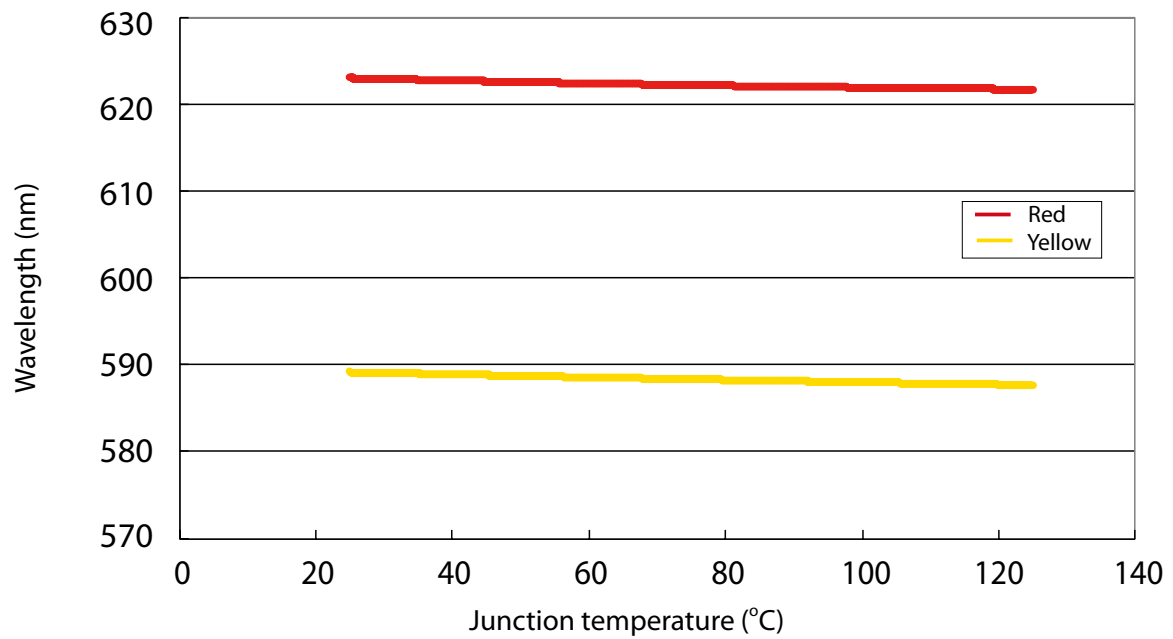
Forward Voltage vs. Junction Temperature



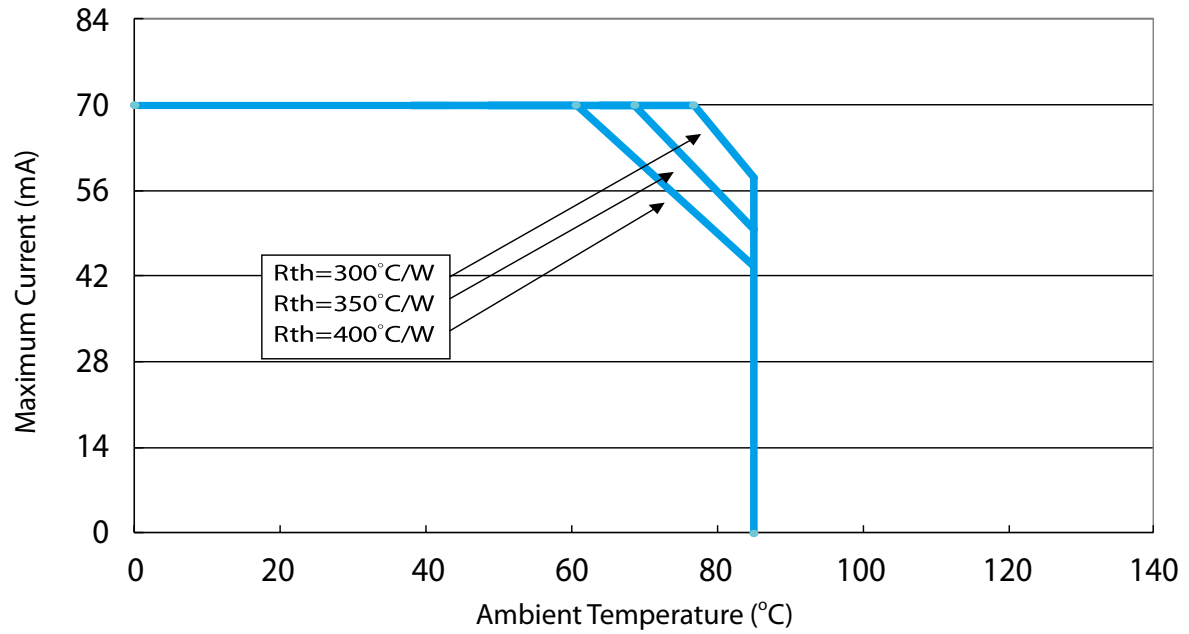
Wavelength vs. Forward Current



Wavelength vs. Junction temperature

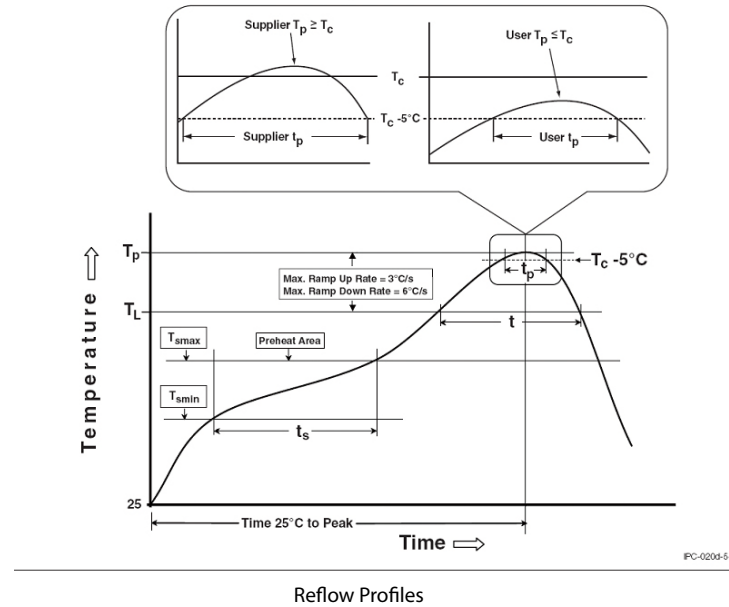


Maximum Current vs. Ambient Temperature



Reflow Profile

The following reflow profile is from IPC/JEDEC J-STD-020D which provided here for reference.



Classification Reflow Profiles

Profile Feature	Pb-Free Assembly
Preheat & Soak	
Temperature min (T _{smin})	150 °C
Temperature max (T _{smax})	200 °C
Time (T _{smin} to T _{smax}) (t _s)	60-120 seconds
Average ramp-up rate (T _{smax} to T _p)	3 °C/second max.
Liquidous temperature (T _l)	217 °C
Time at liquidous (t _l)	60-150 seconds
Peak package body temperature (T _p)*	255 °C ~260 °C *
Classification temperature (T _c)	260 °C
Time (t _p)** within 5 °C of the specified classification temperature (T _c)	30** seconds
Average ramp-down rate (T _p to T _{smax})	6°C/second max.
Time 25°C to peak temperature	8 minutes max.

Notes:

- * Tolerance for peak profile temperature (T_p) is defined as a supplier minimum and a user maximum.
- ** Tolerance for time at peak profile temperature (t_p) is defined as a supplier minimum and a user maximum.

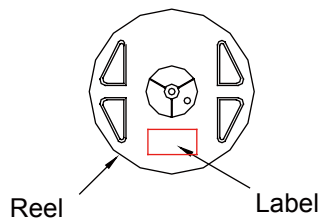
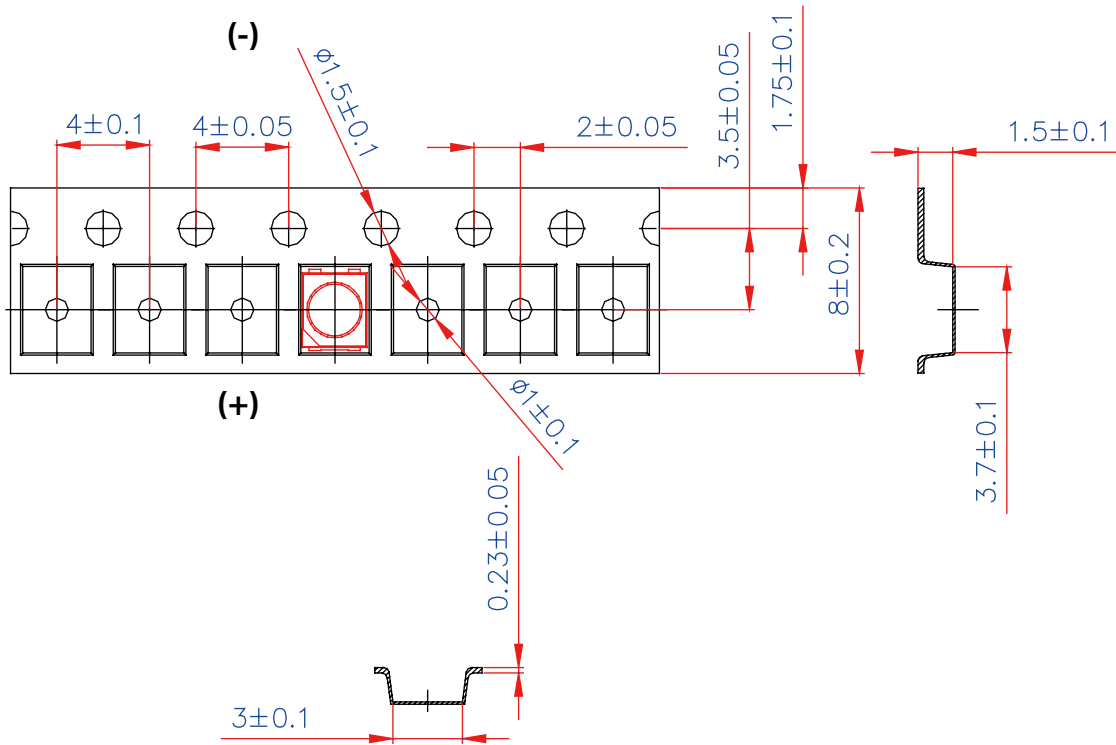
Reliability

NO.	Test Item	Reference	Test Condition	Duration/ Cycle	Failure Criteria	Sample size
1	External Visual	JESD22 B-101	Visual Inspection	---	No visual damage	77
2	Physical Dimension	JESD22 B-100	Verify physical dimensions against device mechanical drawing	1 times	CPK>1.33	30
3	High Temperature Forward Bias	JESD22 A-108	Ta=85°C, IF=100mA	1,000 hrs	1. VF+/- 10% 2. Iv+/- 15% 3. Cx/Cy+/- 0.02	77
4	Temperature Cycle	JESD22 A-104	Tc=-40°C~125°C, 10min dwell, 5 min transfer	1000 Cycle	No dead lamps and visual damage	77
5	Thermal Shock	JESD22 A-104	-40°C/125°C, 20min dwell, <10sec transfer	1000 Cycle	No dead lamps and visual damage	77
6	High Temperature High Humidity Bias	JESD22 A-101	Ta=85°C RH=85%, IF=100mA	1,000 hrs	1. VF+/- 10% 2. Iv+/- 15% 3. Cx/Cy+/- 0.02	77
7	Intermittent Operational Life	MIL-750 1037	Ta=25°C, 3sec on, 3sec off, IF=70mA	10W times	No dead lamps and visual damage	77
8	Power and Temperature Cycle	JESD22 A-105	Tc=-40°C~85°C, 20min dwell, 10min transfer, IF=70mA	1,000 hrs	1. VF+/- 10% 2. Iv+/- 15% 3. Cx/Cy+/- 0.02	77
9	D.P.A.	AEC-Q101-004 Section 4	Random Sample TC	---	No visual damage	2
10	Resistance to Soldering Heat	MIL-202 Method 210	Solder iron temperature : 350 °C ± 10 °C. dwell time : 4~5 seconds	4~5 seconds	Desoldering performance	30
11	Solderability	J-STD-002	Ta=245°C±5°C, 3sec	5 sec	Over 95% area	10
12	High Temperature storage	Jesd22A-103B	Ta=100°C	1,000 hrs	No dead lamps and visual damage	77
13	Low Temperature storage	Jesd22A-119	Ta=-40°C	1,000 hrs	No dead lamps and visual damage	77

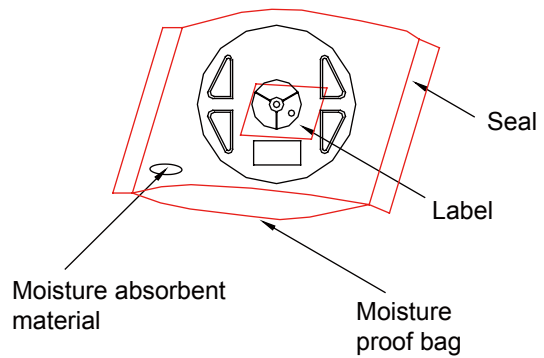
Cautions

LED avoids being stored and lighted in the environment containing sulfur. Some materials, such as seals, printing ink, enclosure and adhesives, may contain sulfur, avoiding the exposure in acid or halogen environment.

Product Packaging Information



Taping reel dimensions



Package & label

Item	Quantity	Total	Dimensions(mm)
Reel	4,000pcs	4,000pcs	R=178
Starting with 150pcs empty, and 150pcs empty at the last			

Revision History

Versions	Description	Release Date
1	Establish a Datasheet	2016/07/25
2	Revise Voltage BIN Structure	2016/08/10
3	1. Update Luminous flux characteristic 2. Revise Characteristic curve	2016/10/12
4	1. Revise Mechanical dimensions 2. Update Packaging information 3. Update the value of thermal resistance	2016/11/11
5	1. Update Reliability 2. Add Wavelength BIN Structure of Color RED	2017/05/12

About Edison Opto

Edison Opto is a leading manufacturer of high power LED and a solution provider experienced in LDMS. LDMS is an integrated program derived from the four essential technologies in LED lighting applications- Thermal Management, Electrical Scheme, Mechanical Refinement, Optical Optimization, to provide customer with various LED components and modules. More Information about the company and our products can be found at www.edison-opto.com

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