

PLCC Series

5050 0.2W Single Color

Datasheet



Outdoor Lighting

Automotive
LightingGeneral
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 signboard or signal lighting designs.

Description :

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

Feature and Benefits :

- High luminous Intensity and high efficiency
- Based on Blue/True Green : InGaN, 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

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General Information

Ordering Code Format

<u>2</u> X1	<u>T</u> X2	<u>04</u> X3-X4	<u>X2</u> X5-X6	<u>x X</u> X7-X8	<u>x x</u> X9-X10	<u>000</u> X11-X13	<u>x x x</u> X14-X16		
X1		X2		X3-X4		X5-X6		X7-X8	
Type		Component		Series		Wattage		Color	
2	Emitter	T	PLCC	04	5050	X2	0.2W	RX	Red
								TX	True Green
								BX	Blue
								AX	Amber
								YX	Yellow

X9-X10		X11-X13		X14-X16	
Internal code		PCB Board		Serial Number	
-	-	000	-	-	-

Absolute Maximum Ratings (Ta=25°C)

Parameter	Symbol	Value	Units
Forward Current	(R/A/Y) (T/B) I_F	35 30	mA
Pulse Forward Current (tp<=100μs, Duty cycle=0.25)	(R/A/Y) (T/B) I_{pulse}	80 100	mA
Reverse Current	I_R	10	uA
Reverse Voltage	V_R	5	V
LED Junction Temperature	T_J	115	°C
Operating Temperature	-	-30 ~ +85	°C
Storage Temperature	-	-40 ~ +100	°C
ESD Sensitivity (HBM)	V_B	2,000	V
Soldering Temperature	T_{sld}	Reflow Soldering : 255~260°C/10~30sec Manual Soldering : 350°C/3sec	

Notes:

1. Proper current derating must be observed to maintain junction temperature below the maximum at all time.
2. LEDs are not designed to be driven in reverse bias.
3. tp: Pulse width time

Characteristics

Parameter	Symbol	Value	Units
Viewing Angle	(Typ.) $2\theta_{1/2}$	120	Degree
Forward voltage (Typ.)	(R/A/Y) (T/B) V_F	2.3 3.4	V
Thermal resistance	-	10	°C/W
Wavelength	(Red) (Amber) (Yellow) (True Green) (Blue)	620-630 610-620 585-595 520-535 465-475	nm
JEDEC Moisture Sensitivity	-	Level 2a Floor Life Conditions: ≤30°C / 60% RH Soak Requirements(Standard) Time (hours): 120+1/-0 Conditions: 60°C / 60% RH	

Note:

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

Luminous Flux Characteristic

Luminous Flux Characteristics, $I_F=60\text{mA}$, $V_F = 5\text{V}$ and $T_a=25^\circ\text{C}$

Color	Group	Min. Luminous Flux (mcd)	Max. Luminous Flux (mcd)	Order Code
Red	C7	1750	1900	2T04X2RX00000001 (Vertical Chip)
	D0	1900	2150	
	E0	2150	2450	2T04X2RX00000002 (Lateral Chip)
	F0	2450	2800	
Amber	F0	2450	2800	2T04X2AX00000001
	G0	2800	3200	
	H0	3200	3650	
	I0	3650	4150	
	J0	4150	4700	
Yellow	D0	1900	2150	2T04X2YX00000001
	E0	2150	2450	
	F0	2450	2800	
	G0	2800	3200	
	H0	3200	3650	
True Green	H0	3200	3650	2T04X2TX00000001
	I0	3650	4150	
	J0	4150	4700	
	K0	4700	5400	
	L0	5400	6300	
Blue	C1	850	1000	2T04X2BX00000001
	C2	1000	1150	
	C3	1150	1300	
	C4	1300	1450	
	C5	1450	1600	

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)
U03	1.6	1.9
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
V03	3.4	3.7
V04	3.7	4.0

Note:

Forward voltage measurement allowance is $\pm 0.1V$.

Wavelength Bin Structure

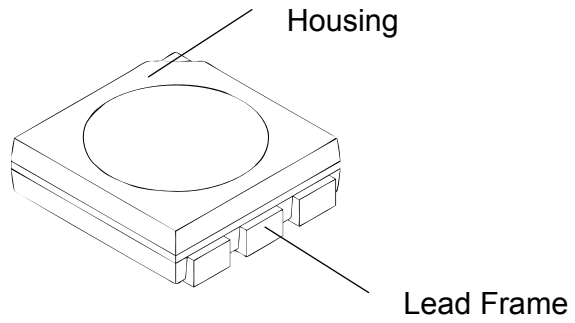
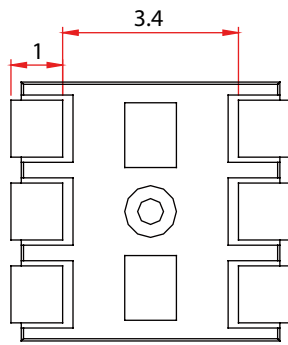
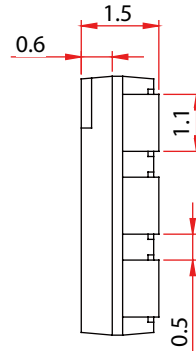
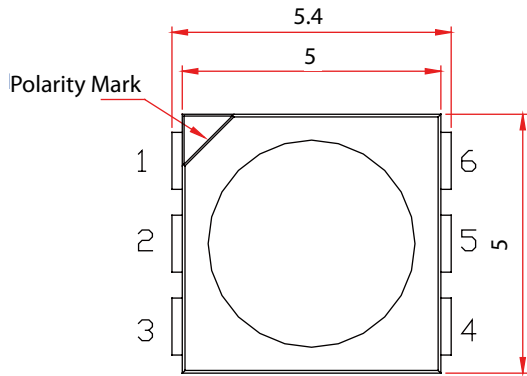
Color	Group	Min. Wd (nm)	Max. Wd (nm)
Red	RX0	620	630
	OX1	610	615
Amber	OX2	615	620
	YW0	585	588
Yellow	YX0	588	591
	YY0	591	595
	TW0	520	525
True Green	TX0	525	530
	TY0	530	535
	BW0	460	465
Blue	BX0	465	470
	BY0	470	475

Note:

Dominant wavelength Measurement Allowance is $\pm 1nm$

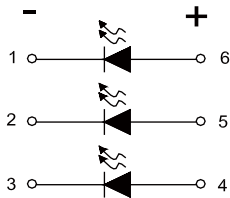
Mechanical Dimensions

Emitter Type Dimension



Circuit

Polarity

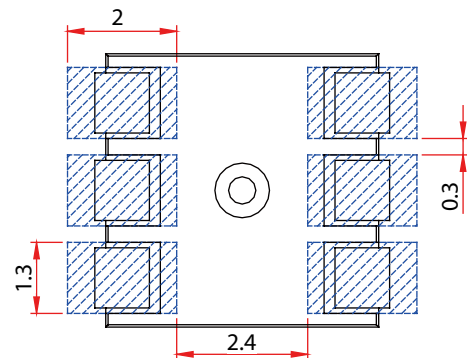


< R/Y/A/T/B >

Notes:

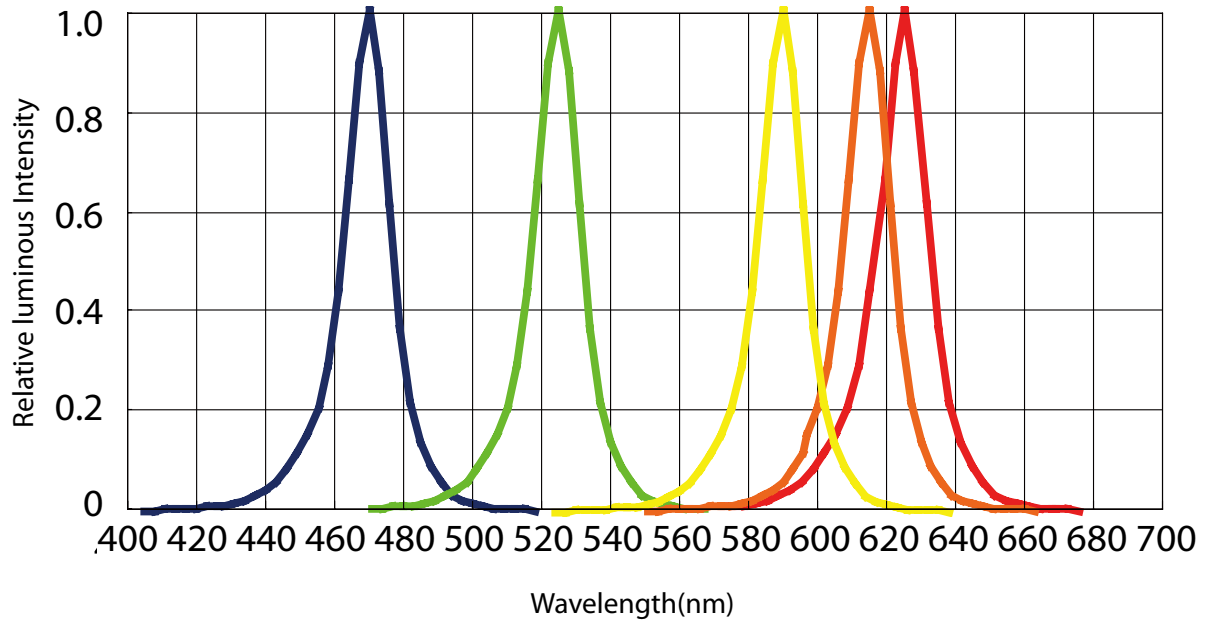
1. All dimensions are measured in mm.
2. Tolerance : ± 0.2 mm

Solder Pad

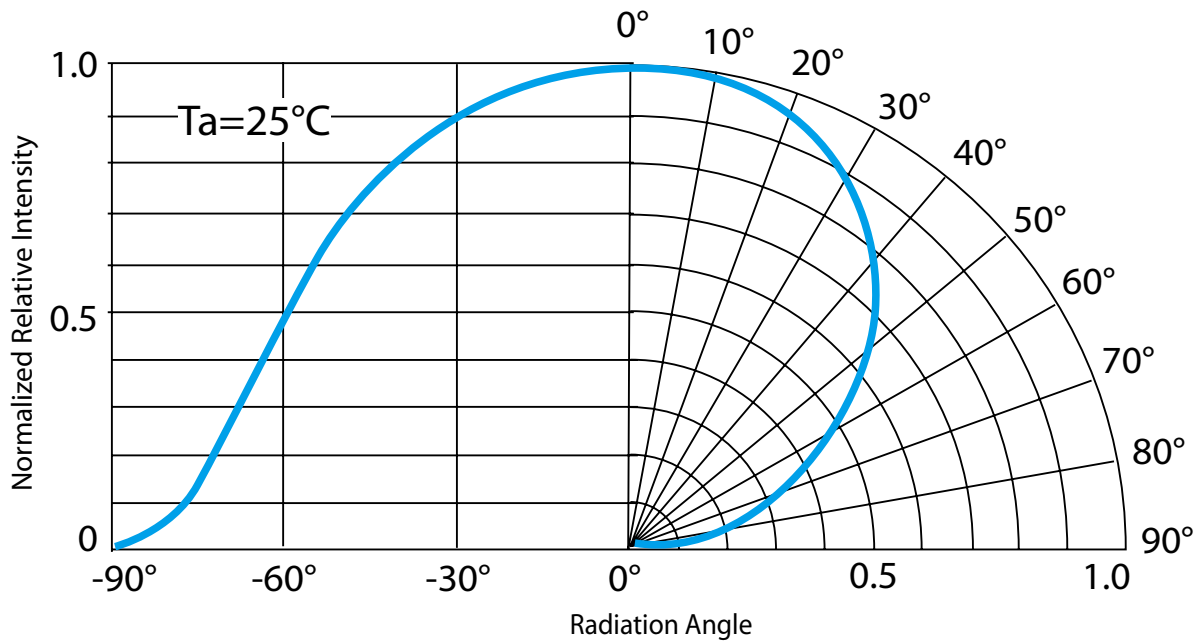


Characteristic curve

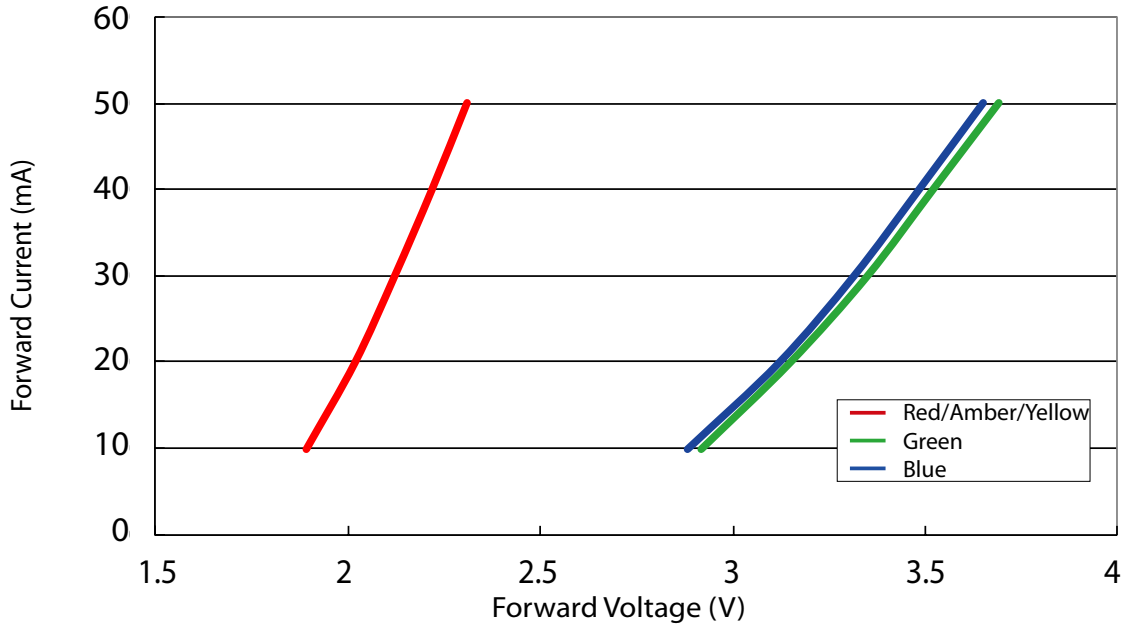
Color Spectrum



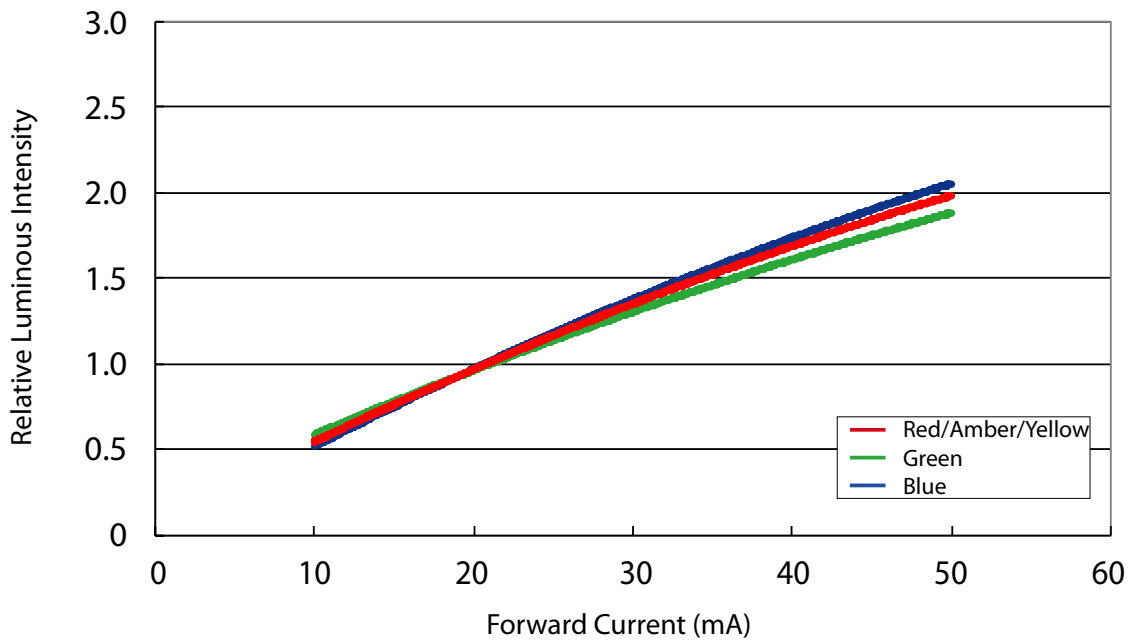
Beam Pattern



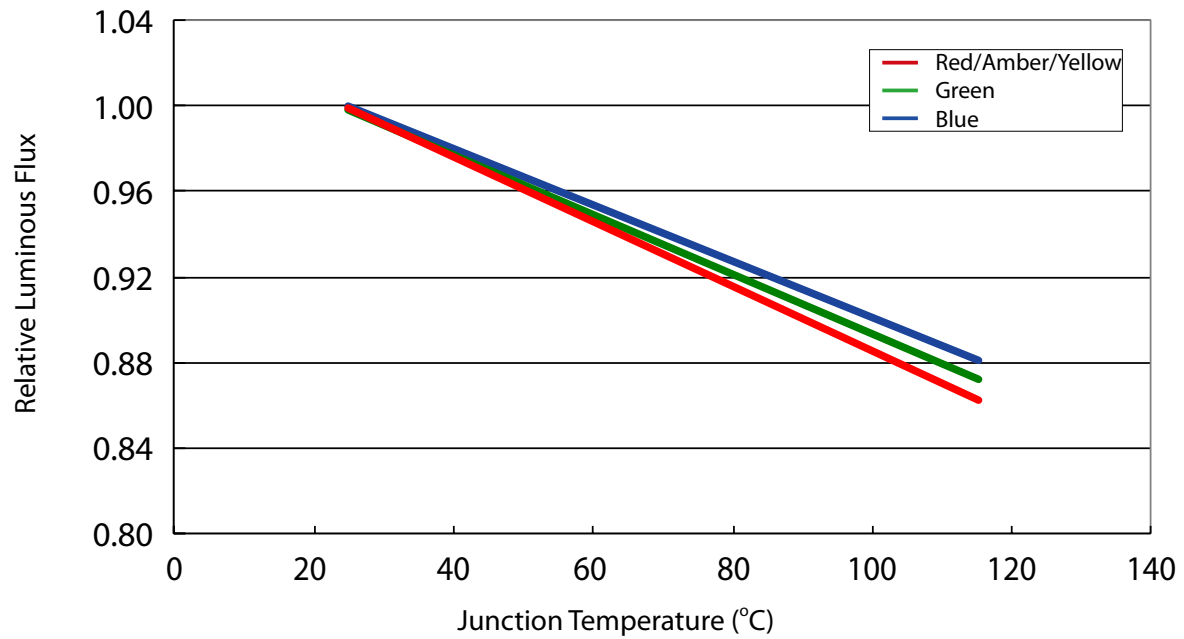
Forward Current vs. Forward Voltage



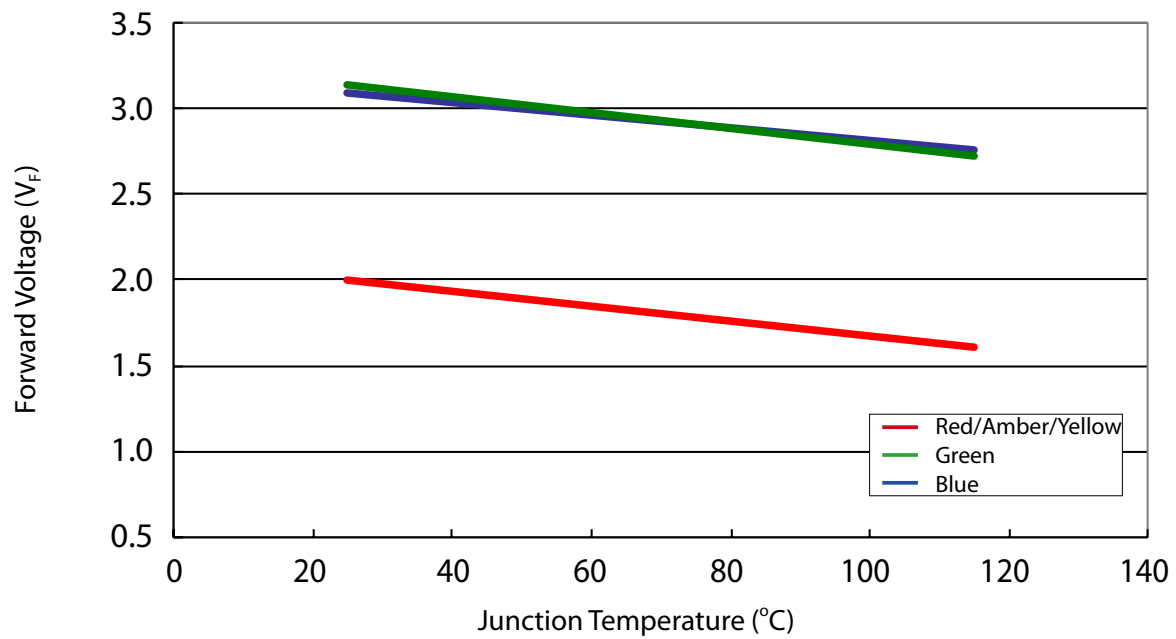
Relative Luminous Intensity vs. Forward Current



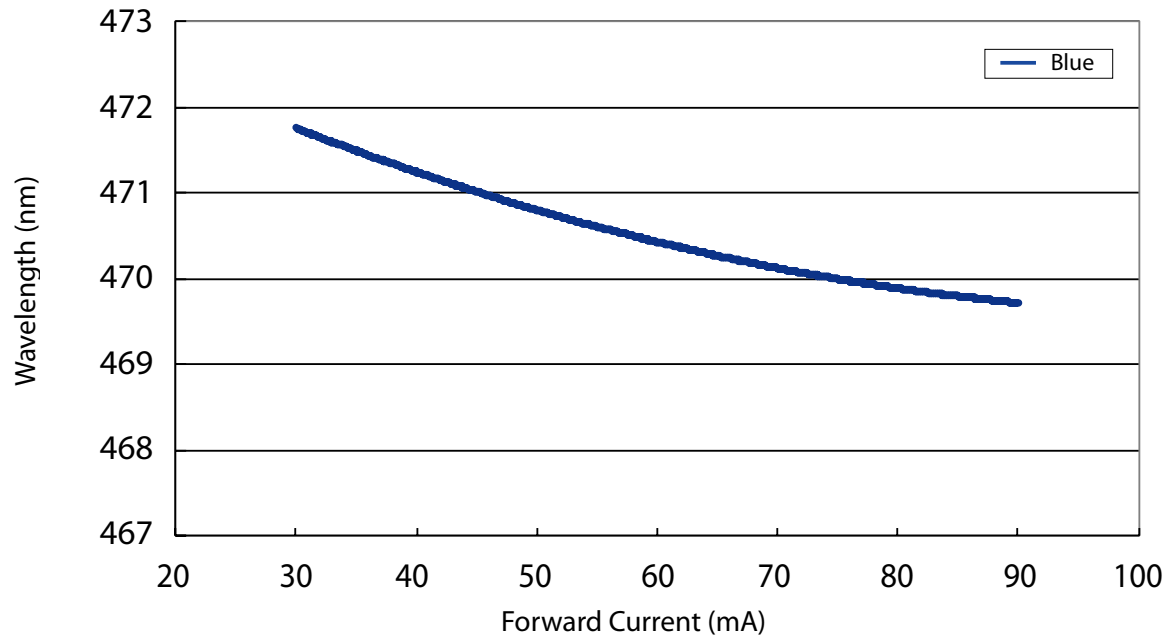
Relative Luminous Flux vs. Junction Temperature



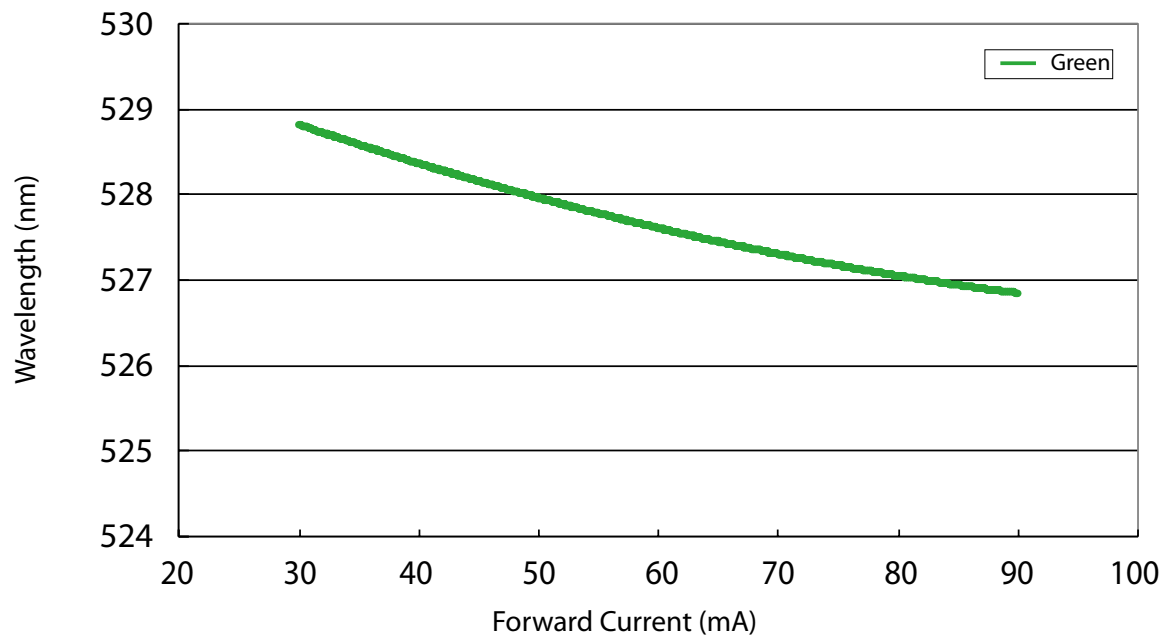
Forward Voltage vs. Junction Temperature



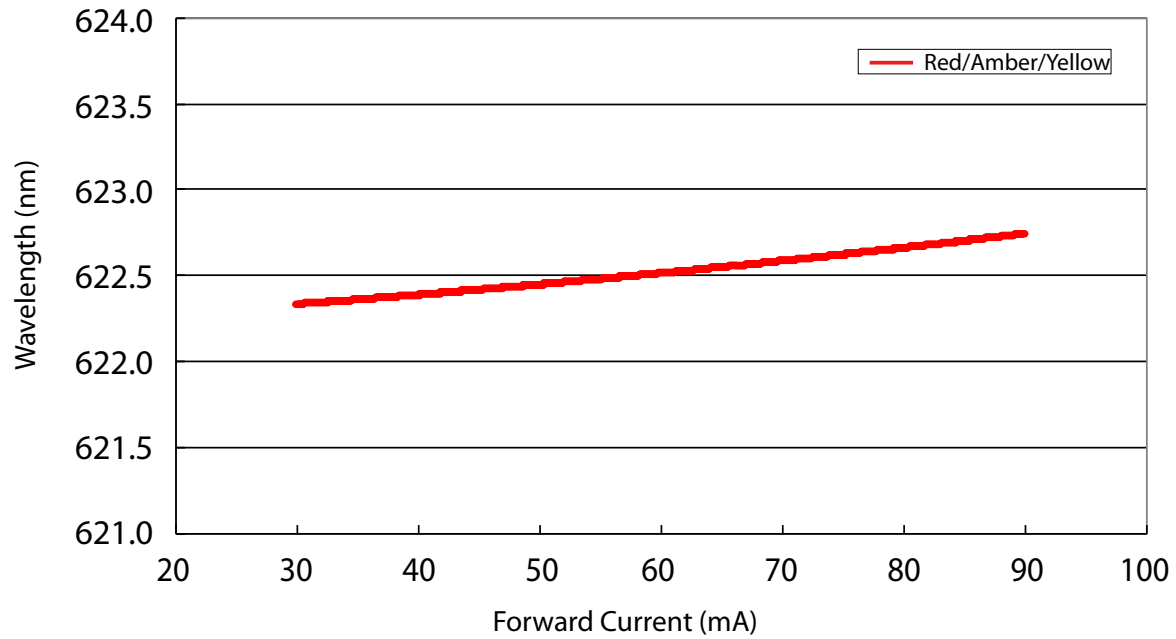
Wavelength vs. Forward Current (Blue)



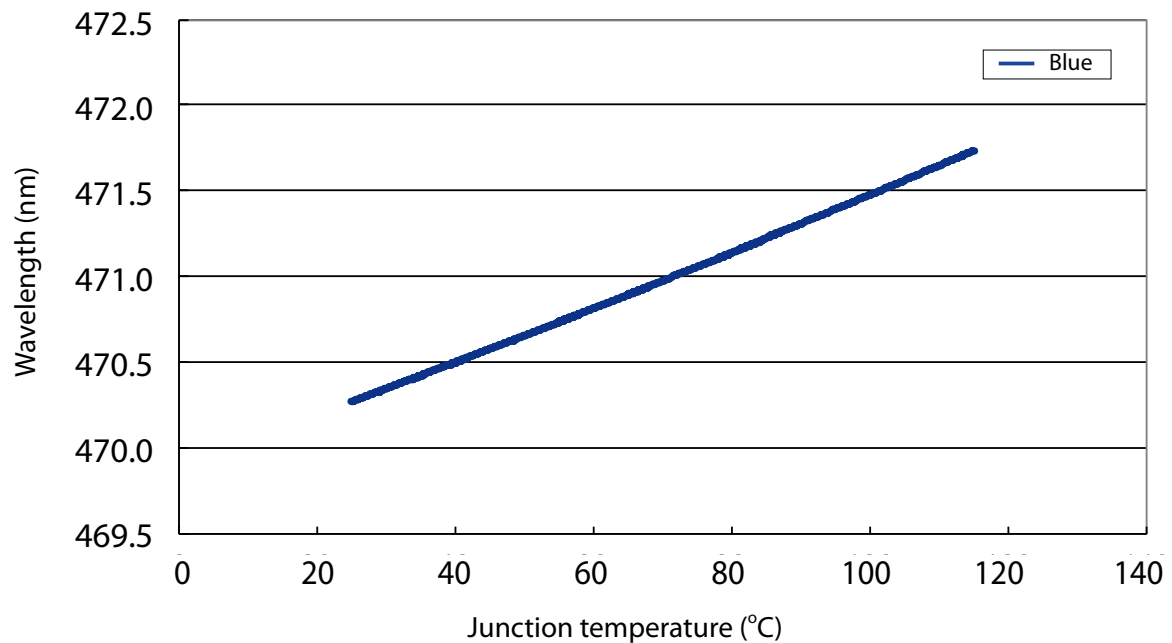
Wavelength vs. Forward Current (Green)



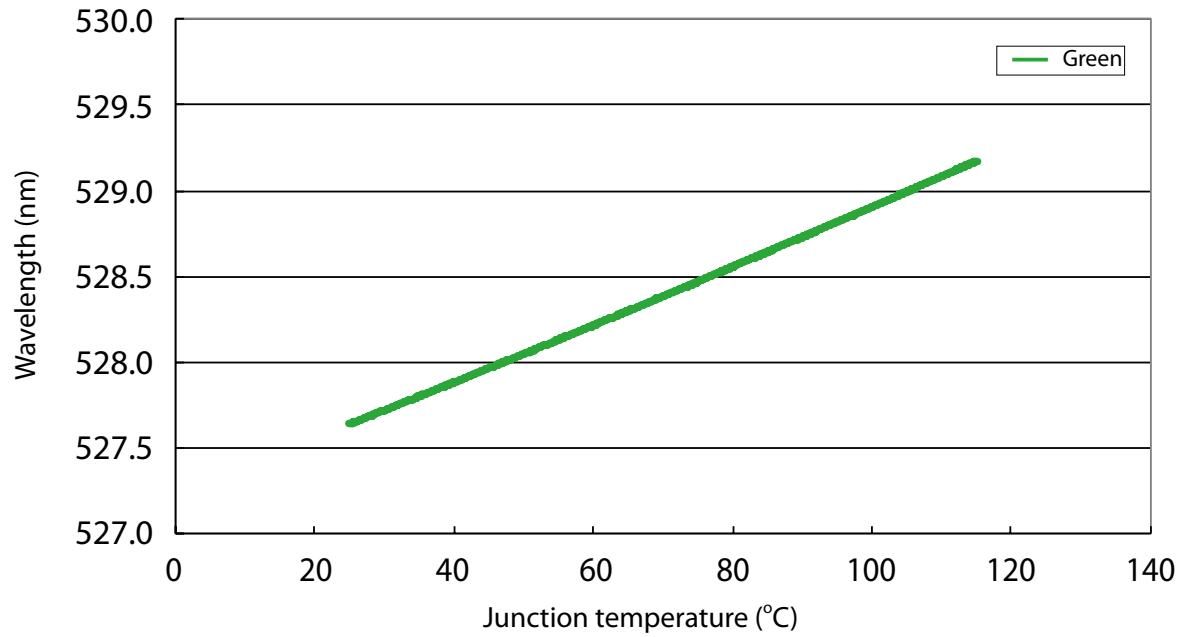
Wavelength vs. Forward Current (Red/Amber/Yellow)



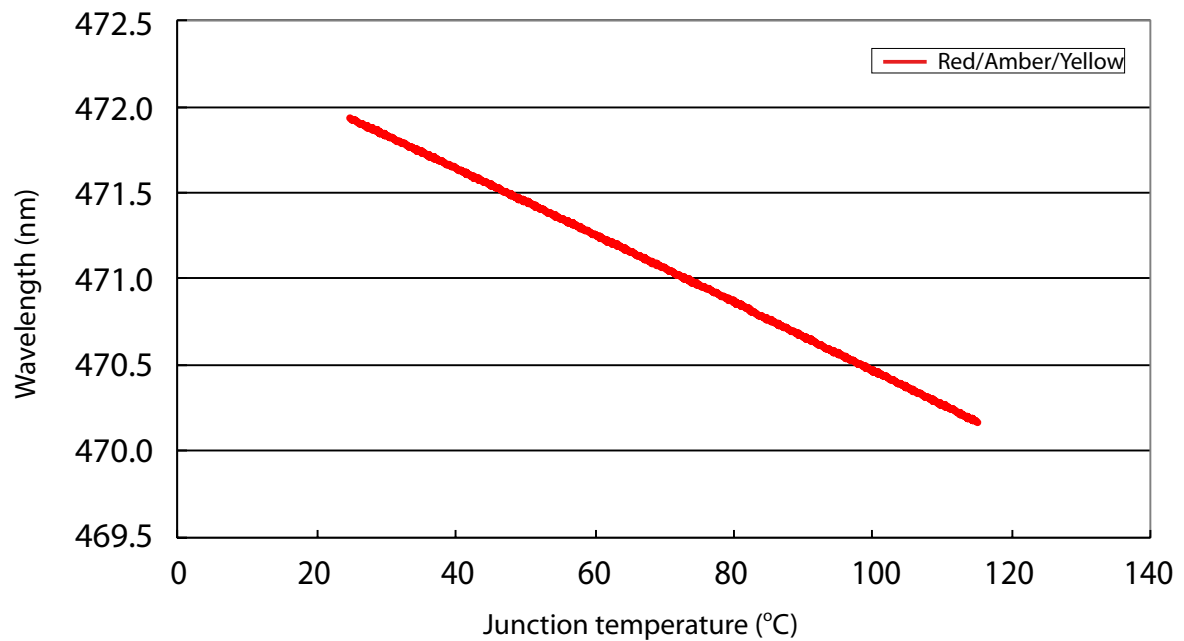
Wavelength vs. Junction temperature (Blue)



Wavelength vs. Junction temperature (Green)

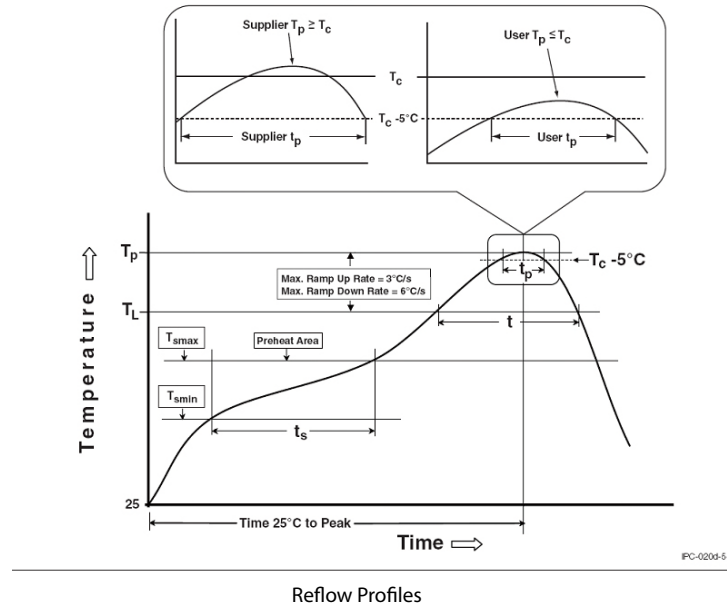


Wavelength vs. Junction temperature (Red/Amber/Yellow)



Reflow Profile

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



Classification Reflow Profiles

Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Preheat & Soak Temperature min (T Amin)	100°C	150 °C
Temperature max (T smax)	150°C	200 °C
Time (T Amin to T smax) (ts)	60-120 seconds	60-120 seconds
Average ramp-up rate (T Amin to Tp)	3°C/second max.	3 °C/second max.
Liquidous temperature (TL) Time at liquidous (tL)	183 °C 60-150 seconds	217 °C 60-150 seconds
Peak package body temperature (Tp)*	230 °C ~235°C *	255 °C ~260 °C *
Classification temperature (Tc)	235°C	260 °C
Time (tp)** within 5 °C of the specified classification temperature (Tc)	20** seconds	30** seconds
Average ramp-down rate (Tp to T smax)	6°C/second max.	6°C/second max.
Time 25°C to peak temperature	6 minutes max.	8 minutes max.

Notes:

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

Reliability

NO .	Test Item	Test Condition	Remark
1	Temperature Cycle	-40°C~100°C 30, 30, mins	100 Cycle
2	Thermal Shock	-40°C~100°C 15, 15 mins \leq 10 sec	100 Cycle
3	Resistance to Soldering Heat	T _{SOL} =260°C, 30 sec	3 times
4	Moisture Resistance	25°C~65°C 90% RH 24 hrs / 1 cycle	10 Cycle
5	High-Temperature Storage	T _A =100°C	1,000 hrs
6	Humidity Heat Storage	T _A =85°C RH=85%	1,000 hrs
7	Low-Temperature Storage	T _A =-40°C	1,000 hrs
8	Operation Life test	25°C	1,000 hrs
9	High Temperature Operation Life test	85°C	1,000 hrs
10	High Humidity Heat Life Test	85°C, 85%RH	1,000 hrs
11	ON/OFF Test	30 sec ON, 30 sec OFF	1.5W times

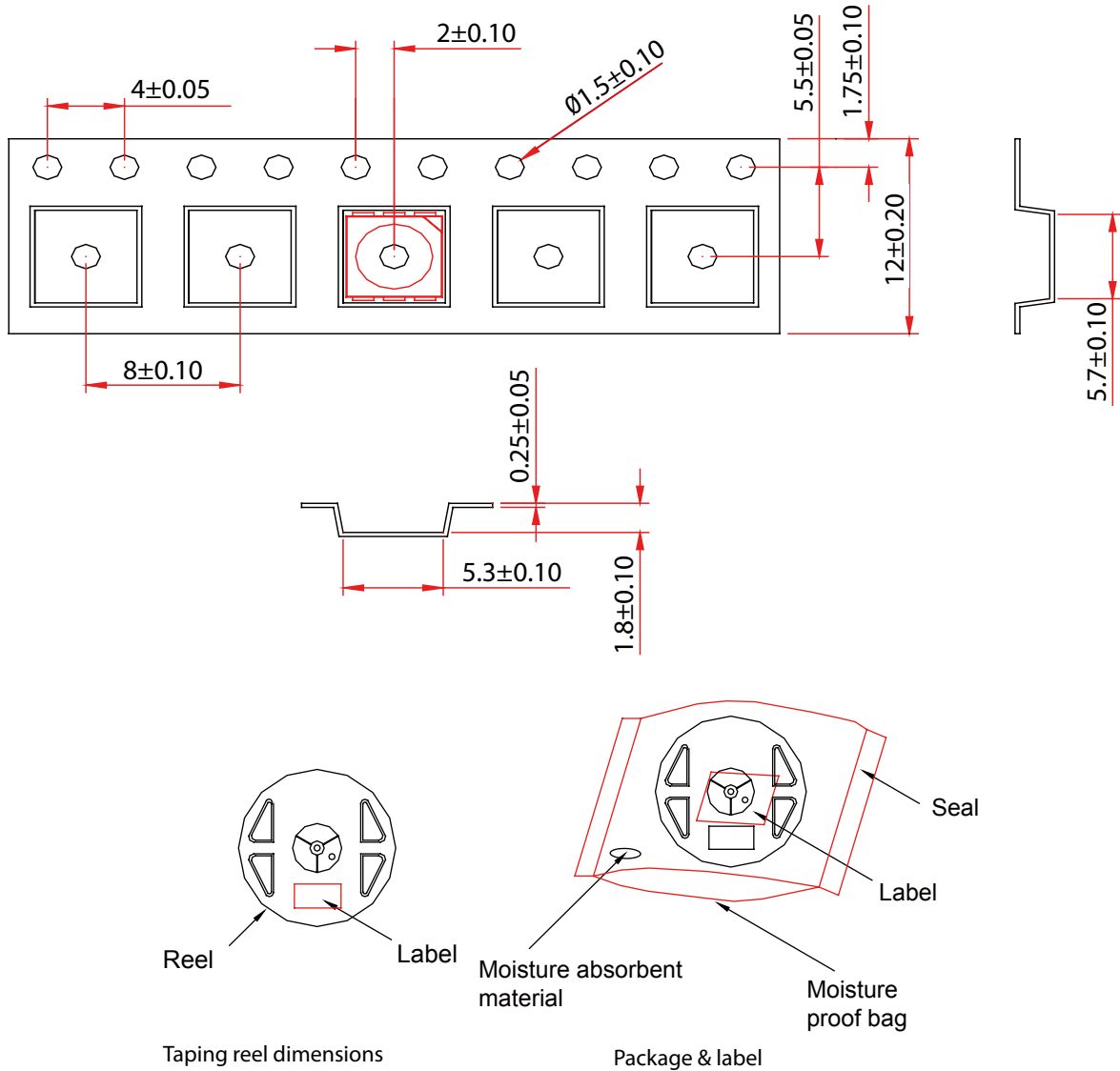
Failure Criteria

Item	Criteria for Judgment	
	Min.	Max.
Lumen Maintenance	85%	-
$\Delta u'v'$	-	0.006
Forward Voltage	-	Initial Data x 1.1
Reverse Current	-	10 μ A
Resistance to Soldering Heat	No dead lamps or visual damage	

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



Revision History

Versions	Description	Release Date
1	Establish order code information	2014/02/07
2	1. Add JEDEC Moisture Sensitivity 2. Revise Reliability	2014/08/22
3	Add Luminous flux characteristic	2014/12/31
4	1. Add order code 2. Update to new pattern	2015/09/01
5	Update luminous flux characteristic	2015/12/30
6	Add the cautions of reliability	2017/06/08

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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