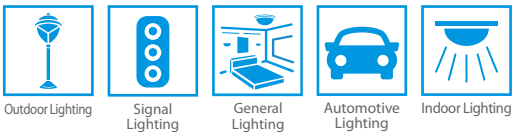
PLCC Series

5050 1W D

Datasheet



Introduction :

High power PLCC is a surface mount, compact, high brightness LED that is built for various illumination needs. A single Cool White high power PLCC can deliver typical luminous flux of 115lm while driving at 350mA suitable for any kind of lighting sources, including general illumination, flashlights, streetlights, spotlights, residential lighting, tube light source, freezer lighting, industrial and commercial lightings. The small physical dimension can free customers from any constrains or limitations in these fields of applications. Furthermore, the reflow-solderable nature of high power PLCC provides an easy path towards the optimum thermal management to achieve a promising reliability.

Description :

- 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 InGaN / GaN technology
- Wide viewing angle : 120°
- Excellent performance and visibility
- Suitable for all SMT assembly methods
- IR reflow process compatible
- Environmental friendly; RoHS compliance

EDISON
Lighting Design Manufacturing Service

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Lighting Design Manufacturing Service

General Information

Ordering Code Format

2	T	0 4	0 1	C W	x x	0 0 0	x x x
X1	X2	X3-X4	X5-X6	X7-X8	X9-X10	X11-X13	X14-X16

X1		X2		X3-X4		X5-X6		X7-X8	
Type		Component		Series		Wattage		Color	
2	Emitter	T	PLCC	04	5050	01	1W	CW	Cool White

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

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Absolute Maximum Ratings

Absolute maximum ratings (T_a=25°C)

Parameter	Symbol	Value	Units
DC Forward Current	I_F	500	mA
Pulse Forward Current (tp≤100μs, Duty cycle=0.25)	I_{pulse}	1000	mA
Reverse Voltage	V_R	5	V
LED Junction Temperature	T_J	125	°C
Operating Temperature	-	-40 ~ +85	°C
Storage Temperature	-	-40 ~ +125	°C
ESD Sensitivity (HBM)	V_B	2,000	V
Soldering Temperature	T_s	Reflow Soldering : 255~260°C/10~30sec Manual Soldering : 350°C/3sec	

Notes:
1. The values are based on 1-die performance.
2.* I_{FP} condition: pulse width ≤0.1msec and duty ≤1/10.

Characteristics

Parameter		Symbol	Value	Units
Forward voltage		V_F	3.3	V
Thermal resistance		-	10	°C/W
CRI	(Typ.)	-	68	-
CCT		-	5000-10000	K
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	-

Notes:
1. $2\theta_{1/2}$ is the off-axis angle where the luminous intensity is half of the axial luminous intensity.
2. Color rendering index CRI Tolerance: ±2.
3. CIE_x/y tolerance: ±0.005

Luminous Flux Characteristic

Luminous Flux Characteristics, I_F=350mA and T_J=25˚C

Color	Group	Min. Luminous Flux(lm)@350mA	Max. Luminous Flux(lm)@350mA	Order Code
Cool White	U1	86.5	90	2T0401CW16000001
	U2	90	100	
	U3	100	110	
	V1	110	120	
	V2	120	130	
	V3	130	140	

Note:
The luminous flux performance is guaranteed within published operating conditions. Edison Opto maintains a tolerance of ±10% on flux measurements.

Voltage Bin Structure

Group	Min. Voltage (V)	Max. Voltage (V)
V01	2.8	3.1
V02	3.1	3.4
V03	3.4	3.7
V04	3.7	4.0
V05	4.0	4.3

Note:
Forward voltage measurement allowance is ± 0.06V.

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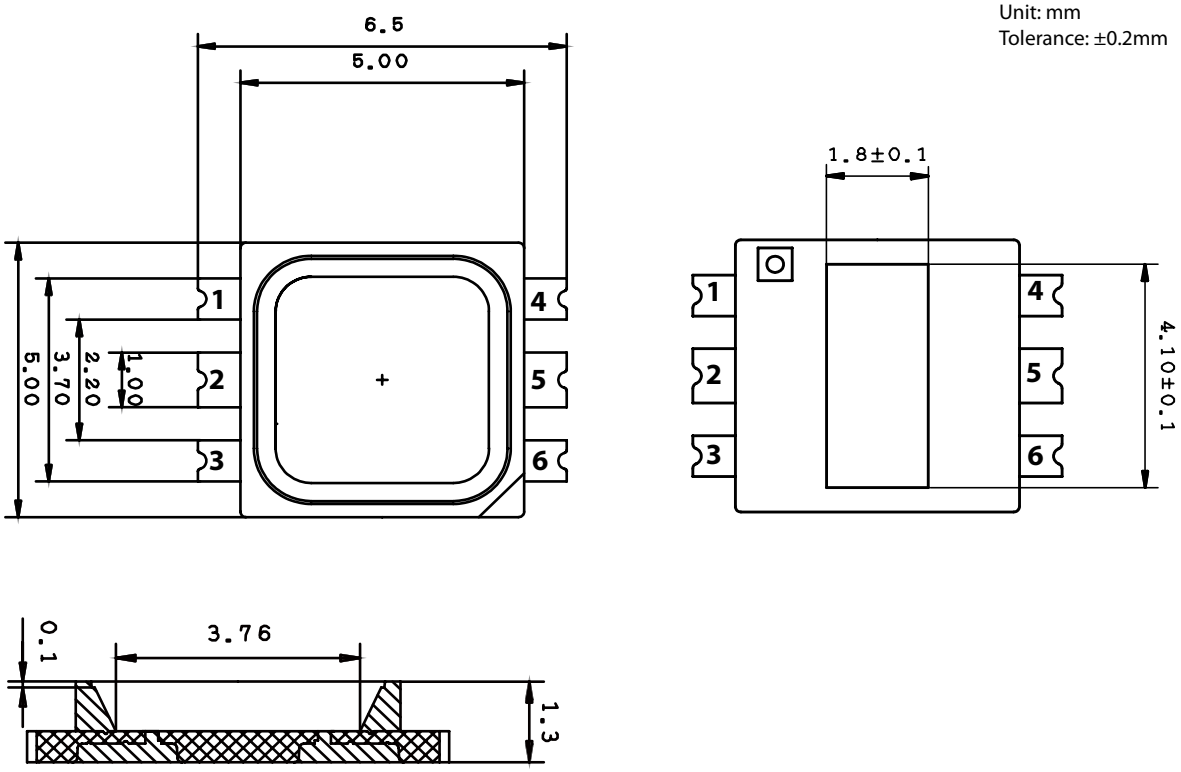
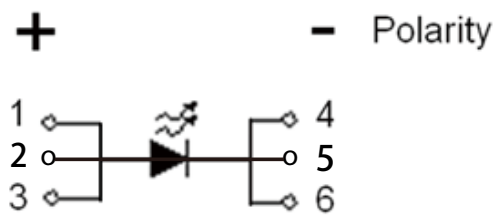
Mechanical Dimensions

Emitter Type Dimension

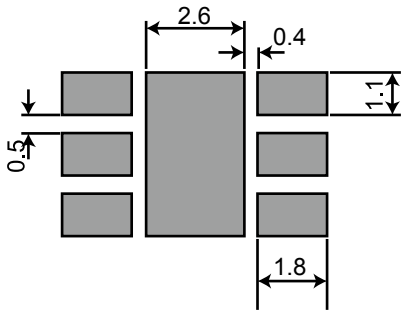
Unit: mm
Tolerance: ±0.2mm



Circuit



Solder Pad



Notes:
1. All dimensions are measured in mm.
2. Tolerance : ± 0.2 mm
3. PLCC Slug without polarity.

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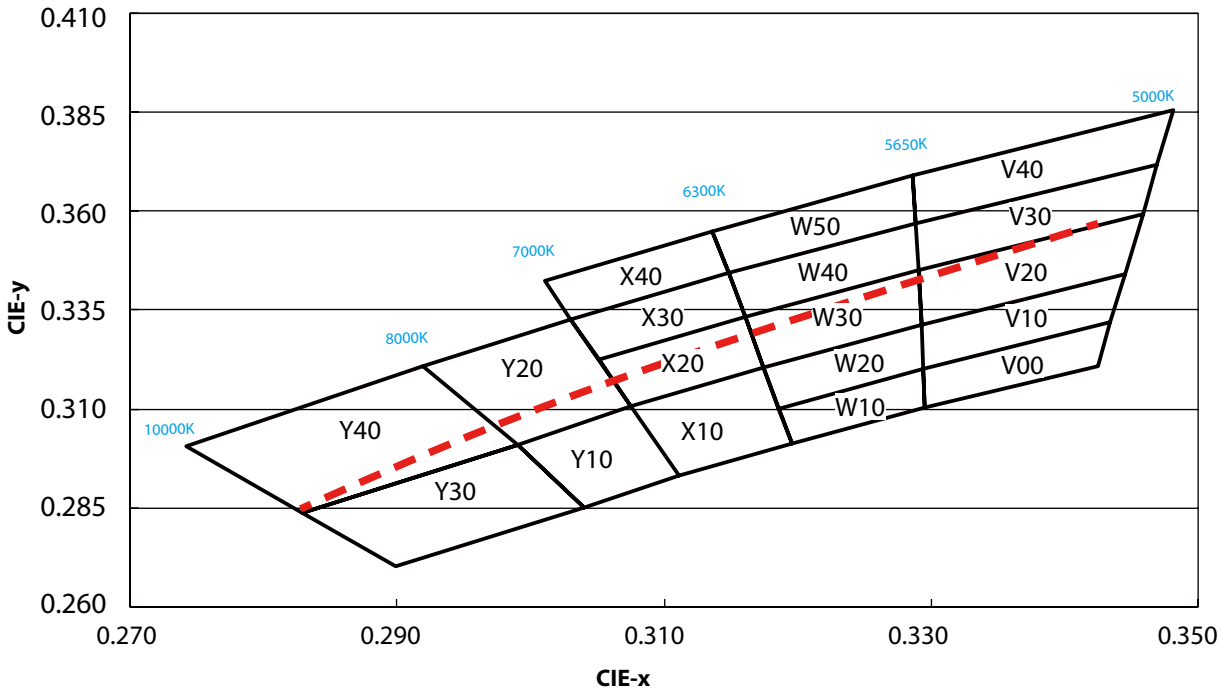
Color BIN code

Cool White



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Cool White

Y10		Y20		Y30		Y40	
X	Y	X	Y	X	Y	X	Y
0.3040	0.2850	0.2990	0.3010	0.3040	0.2850	0.2920	0.3210
0.2990	0.3010	0.2920	0.3210	0.2899	0.2703	0.2742	0.3007
0.3076	0.3108	0.3031	0.3327	0.2830	0.2838	0.2830	0.2838
0.3112	0.2932	0.3076	0.3108	0.2990	0.3010	0.2990	0.3010

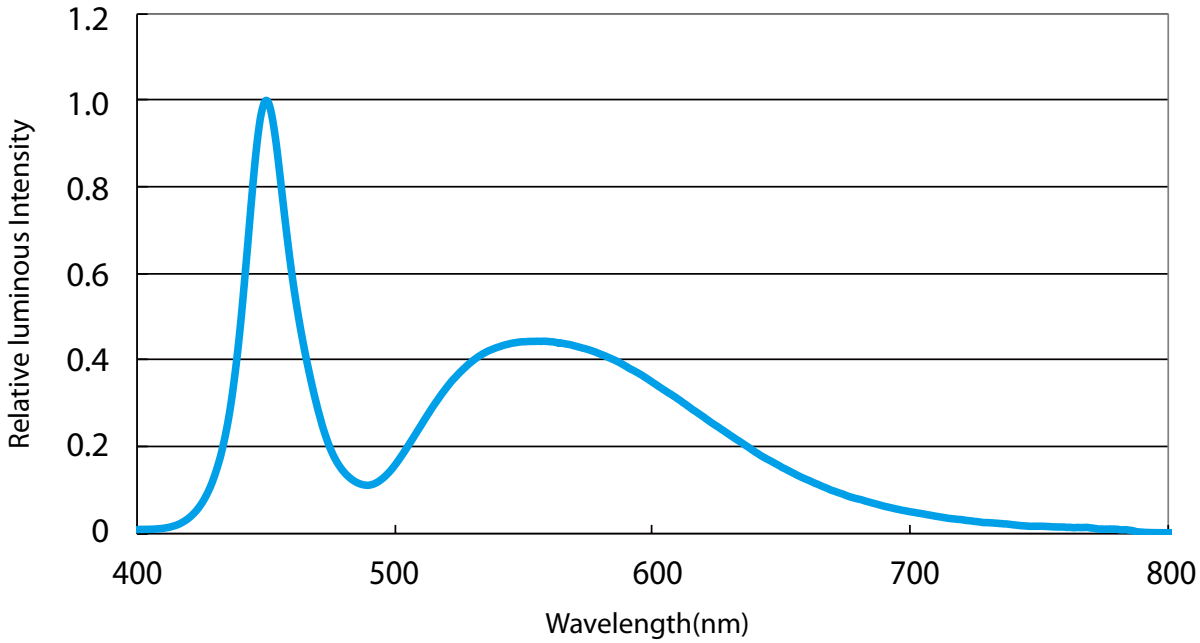
X10		X20		X30		X40	
X	Y	X	Y	X	Y	X	Y
0.3076	0.3108	0.3076	0.3108	0.3052	0.3224	0.3031	0.3327
0.3174	0.3204	0.3052	0.3224	0.3031	0.3327	0.3011	0.3422
0.3196	0.3013	0.3160	0.3332	0.3148	0.3444	0.3136	0.3550
0.3112	0.2932	0.3175	0.3204	0.3160	0.3332	0.3148	0.3444

W10		W20		W30		W40		W50	
X	Y	X	Y	X	Y	X	Y	X	Y
0.3294	0.3202	0.3292	0.3313	0.3290	0.3451	0.3290	0.3451	0.3148	0.3444
0.3295	0.3105	0.3294	0.3202	0.3292	0.3313	0.3160	0.3332	0.3136	0.3550
0.3196	0.3013	0.3186	0.3102	0.3175	0.3204	0.3148	0.3444	0.3286	0.3690
0.3186	0.3102	0.3175	0.3204	0.3160	0.3332	0.3288	0.3569	0.3288	0.3569

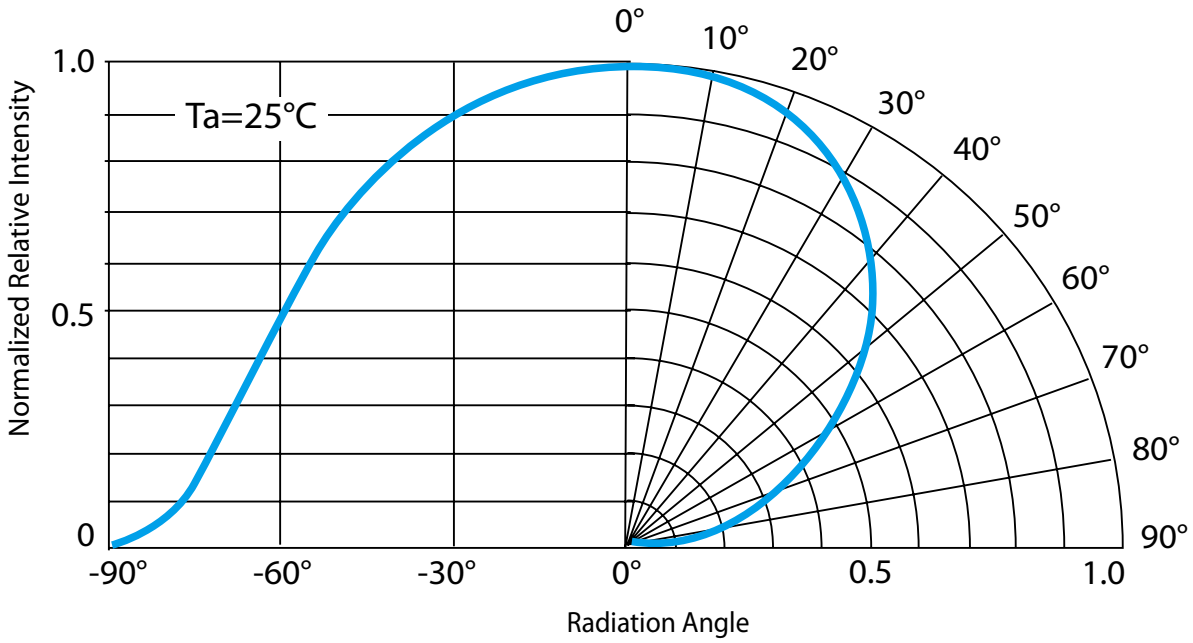
V00		V10		V20		V30		V40	
X	Y	X	Y	X	Y	X	Y	X	Y
0.3434	0.3320	0.3292	0.3313	0.3292	0.3313	0.3290	0.3451	0.3288	0.3569
0.3425	0.3208	0.3444	0.3442	0.3290	0.3451	0.3288	0.3569	0.3286	0.3690
0.3295	0.3105	0.3434	0.3320	0.3458	0.3592	0.3469	0.3717	0.3481	0.3856
0.3294	0.3200	0.3294	0.3200	0.3444	0.3442	0.3458	0.3592	0.3469	0.3717

Characteristic curve

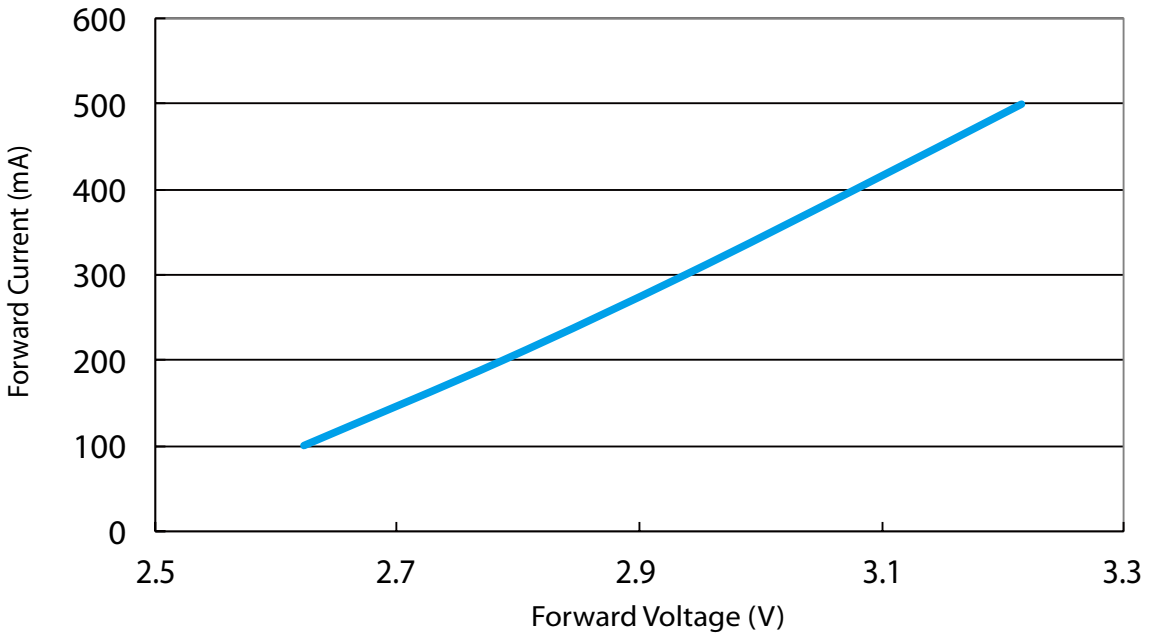
Color Spectrum



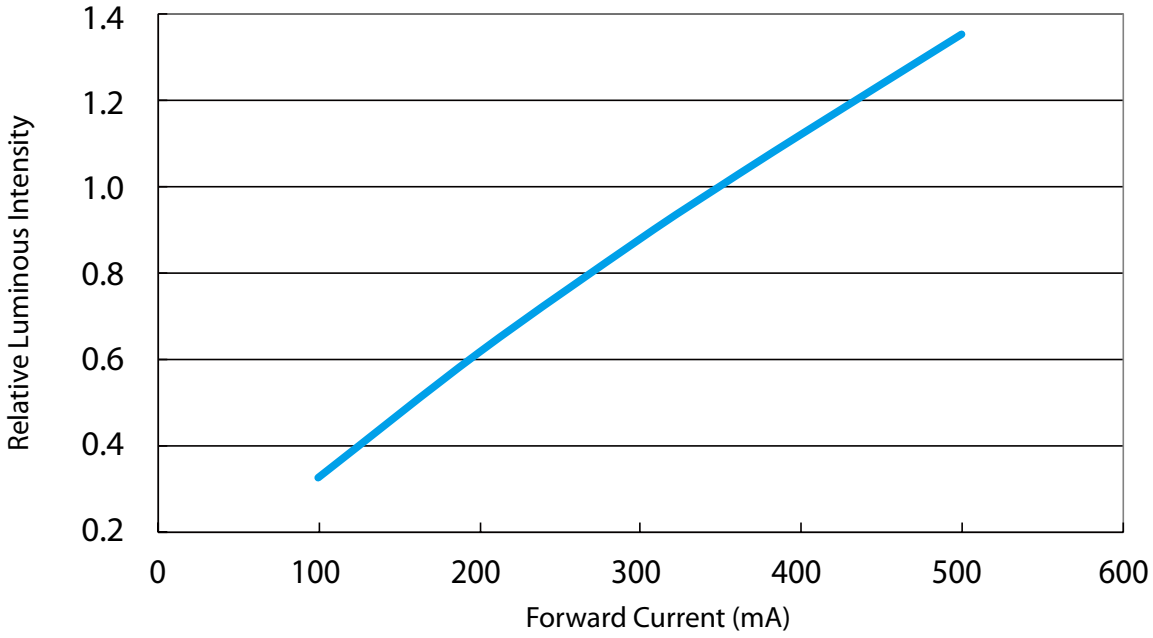
Beam Pattern



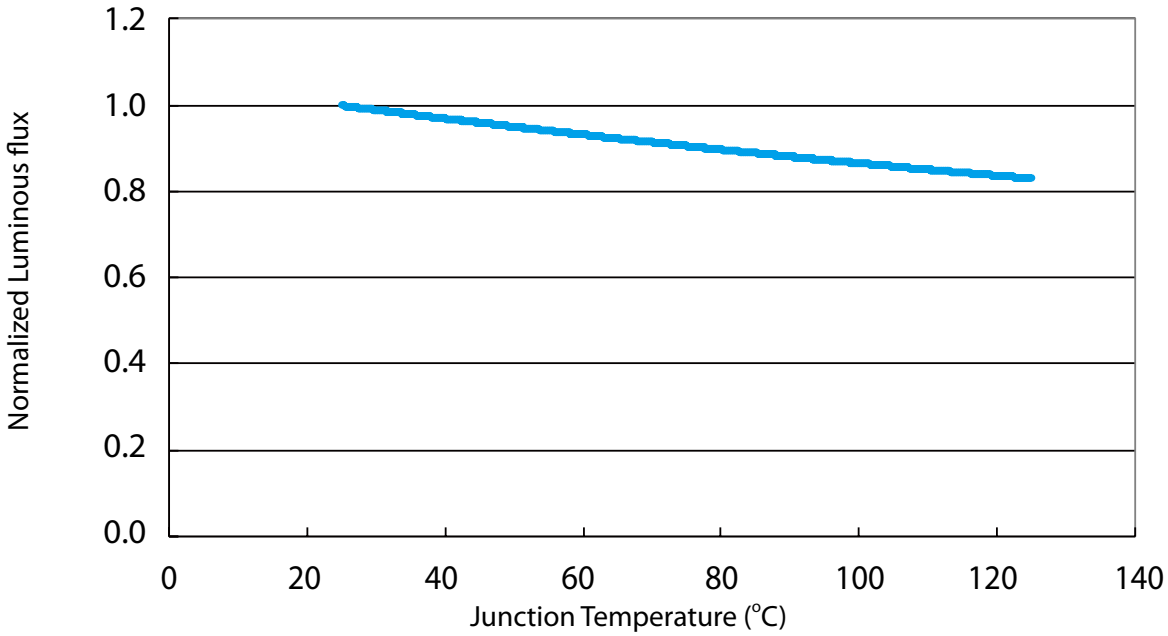
Forward Current vs. Forward Voltage



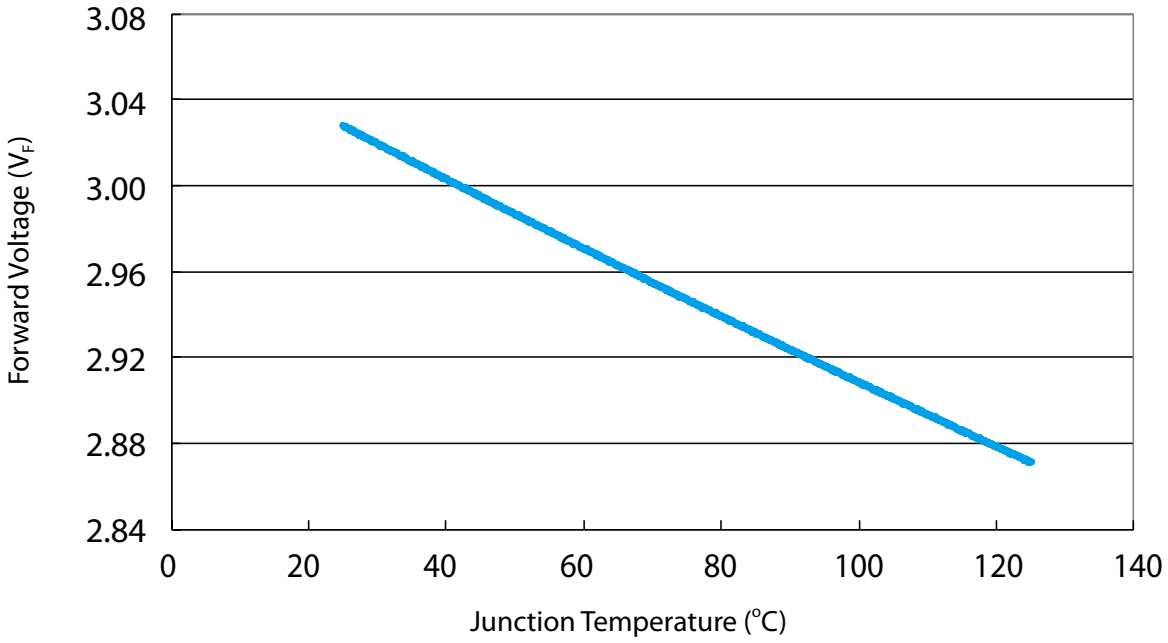
Relative luminous Intensity vs. Forward Current



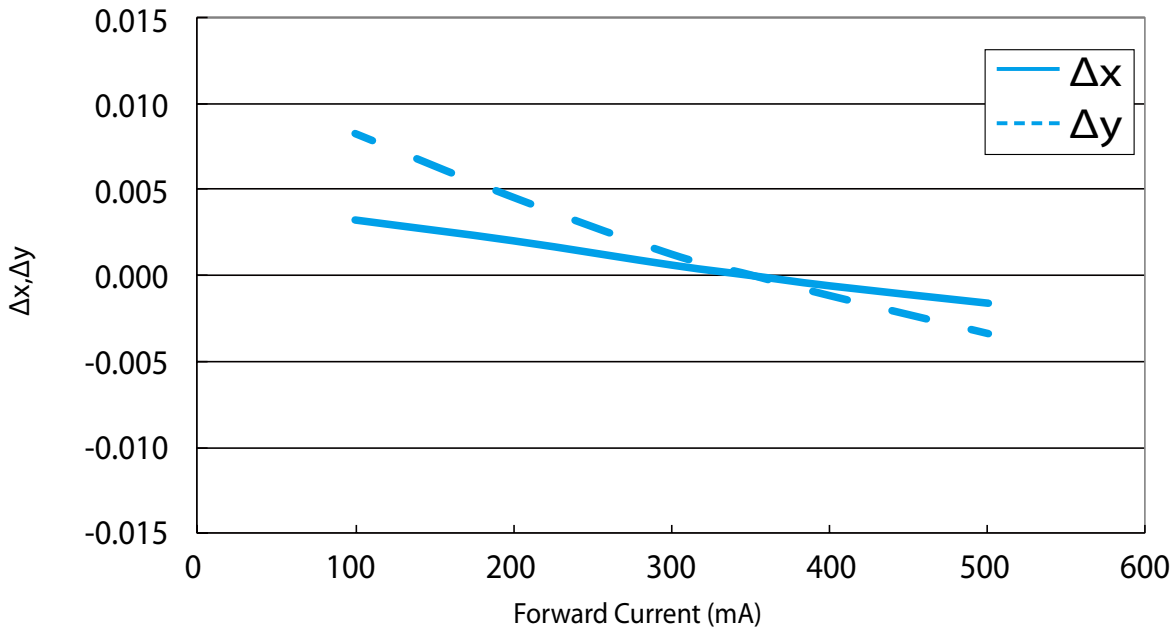
Relative Luminous Flux vs. Junction Temperature



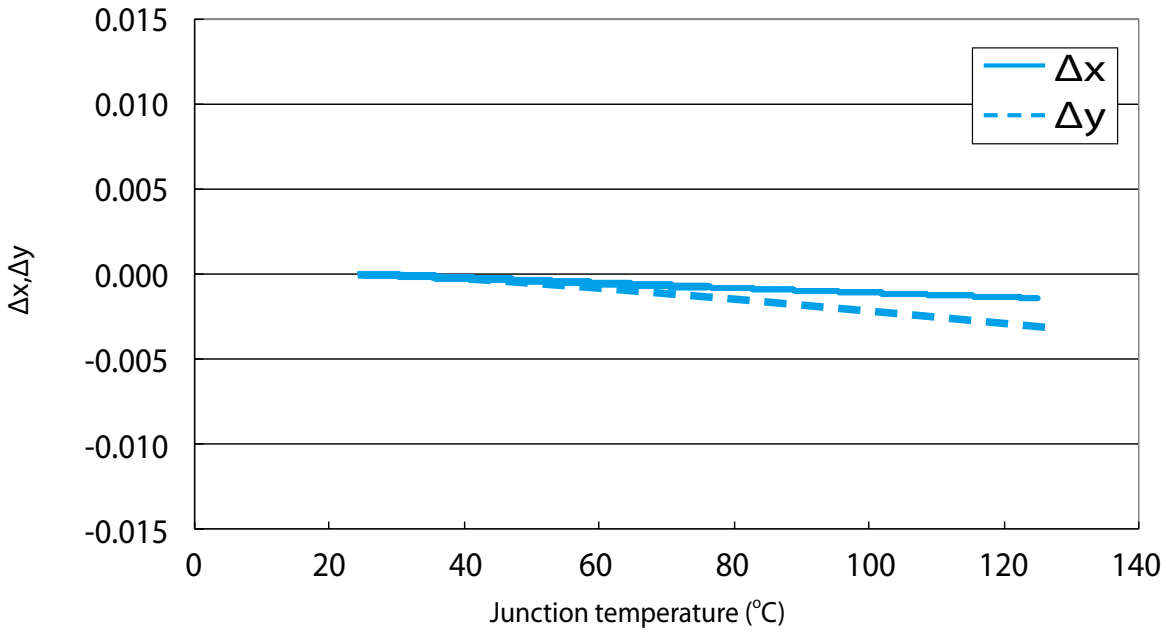
Forward Voltage vs. Junction Temperature



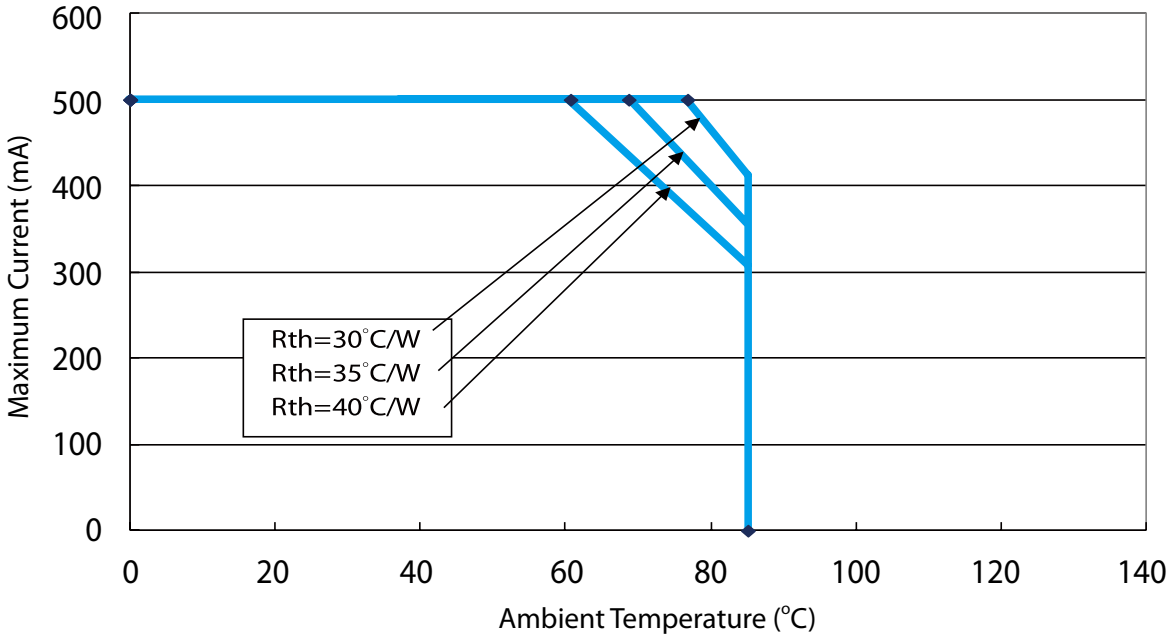
Δx,Δy vs. Forward Current



Δx,Δy vs. Junction Temperature

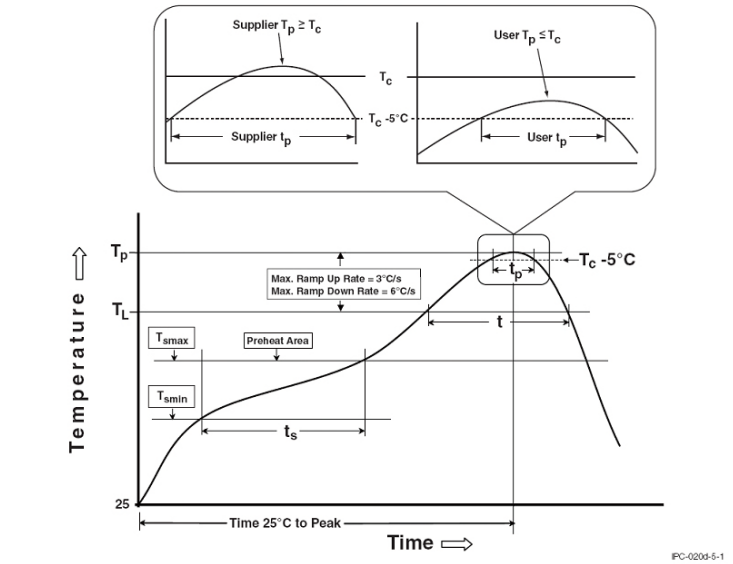


Maximum Current vs. Ambient Temperature



Reflow Profile

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



Reflow Profiles

Classification Reflow Profiles

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

Notes:
1. * Tolerance for peak profile temperature (Tp) is defined as a supplier minimum and a user maximum.
2. ** 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 ≦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%	-
Δu'v'	-	0.006
Forward Voltage	-	Initial Data x 1.1
Reverse Current	-	10 μA
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.

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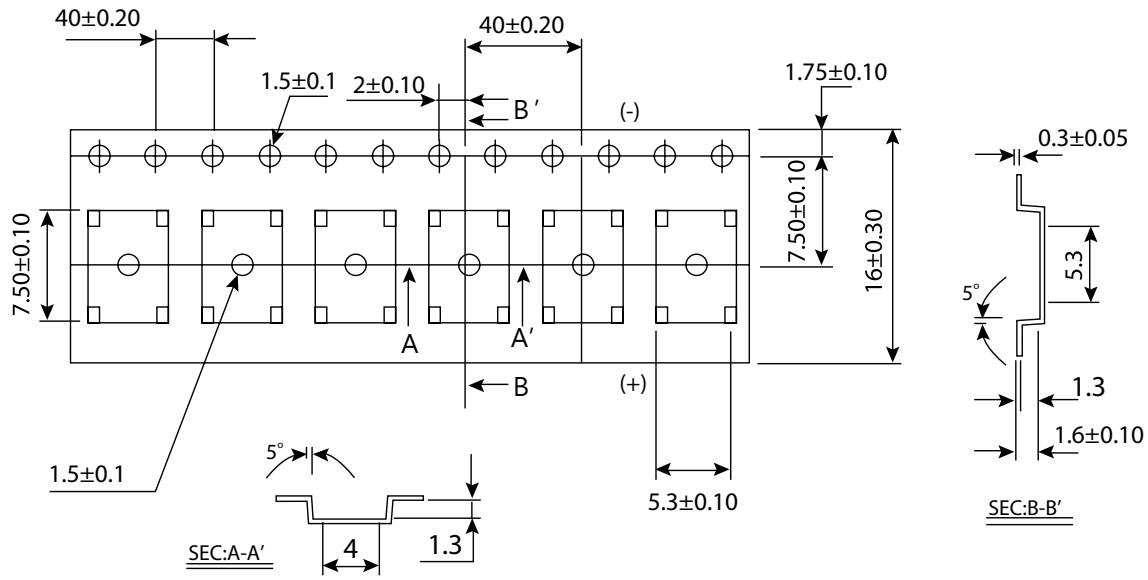
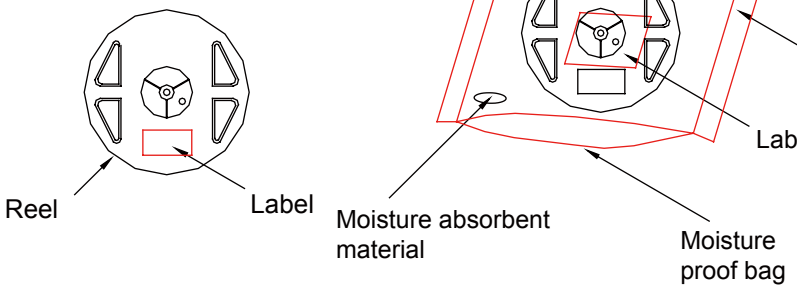
Product Packaging Information





Taping reel dimensions

Package & label

Item	Quantity	Total	Dimensions (mm)
Reel	1,000pcs	1,000pcs	R=178
Box	3 Reels	3,000pcs	240*235*67
Carton	5 boxes	15,000pcs	353*254*256
Starting with 50pcs empty, and 50pcs empty at the last			

Lighting Design Manufacturing Service

Revision History

Versions	Description	Release Date
1	Establish order code information	2012/11/26
2	Add the Characteristic Curve	2013/04/01
3	1. Update the circuit of mechanical dimensions 2. Add the characteristic curve 3. Revise I_F of luminous flux characteristic	2013/10/24
4	1. Revise Luminous flux characteristic 2. Revise the name of the Datasheet 3. Update all the characteristic curve	2014/05/22
5	Revise Reliability	2014/08/22
6	1. Update luminous flux characteristic 2. Add Color BIN Code	2014/12/31
7	Update quantity of product package	2015/03/13
8	1. Add the cautions of reliability 2. Update front page to new pattern	2017/06/14

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

www.edison-opto.com

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