

PLCC 3014 0.1W IEC Series CRI80 Datasheet



Features :

- High luminous Intensity and high efficiency
- Based on Blue : InGaN technology
- Wide viewing angle : 120°
- Excellent performance and visibility
- Suitable for all SMT assembly methods
- IR reflow process compatible
- Environmental friendly; RoHS compliance

Typical Applications :

- Signal and Symbol Luminaire
- Indoor Displays
- Backlighting (illuminated advertising, general lighting)

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General Information

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.

Ordering Code Format

<u>2</u> X1	<u>T</u> X2	<u>01</u> X3-X4	<u>X1</u> X5-X6	<u>xW</u> X7-X8	<u>xx</u> X9-X10	<u>000</u> X11-X13	<u>xxx</u> X14-X16		
X1	X2	X3-X4	X5-X6	X7-X8	X9-X10	X11-X13	X14-X16		
Type	Component		Series		Wattage		Color		
2	Emitter	T	PLCC	01	3014	X1	0.1W	CW	Cool White
								NW	Neutral White
								WW	Warm White
X9-X10		X11-X13		X14-X16					
Internal code		PCB Board		Serial Number					
-	-	000	-	-	-	-	-		

Absolute Maximum Ratings

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

Parameter	Symbol	Value	Units
Forward Current	I_F	40	mA
Pulse Forward Current ($t_p \leq 100\mu\text{s}$, Duty cycle=0.25)	I_{pulse}	100	mA
Reverse Current	I_R	10	μA
Reverse Voltage	V_R	5	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	

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.

Characteristics

Parameter	Symbol	Value	Units
Viewing Angle	(Typ.) $2\theta_{1/2}$	120	Degree
Forward voltage	(Typ.) V_F	3.2	V
Thermal resistance	-	40	$^{\circ}\text{C}/\text{W}$
CRI	-	>80	-
CCT/Wavelength	(Cool White) (Neutral White) (Warm White)	2,700 3,000 3,500 4,000 5,000 6,500	K
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:

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

Luminous Flux Characteristic

Luminous Flux Characteristics, $I_f=30\text{mA}$ and $T_j=25^\circ\text{C}$

Color	Group	Min. Luminous Flux(lm)	Max. Luminous Flux(lm)	Forward Current(mA)	Order Code		
Cool White	9	9	10	30	2T01X1CW11000003		
	10	10	11				
	11	11	12				
	12	12	13				
Neutral White	9	9	10		30	2T01X1NW11000007	
	10	10	11				
	11	11	12				
	12	12	13				
Warm White	09	9	10			30	2T01X1WW11000009
	10	10	11				
	11	11	12				
	12	12	13				

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

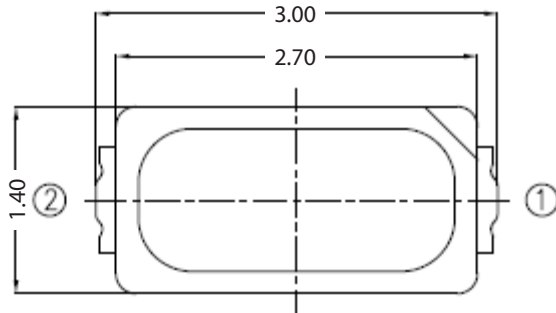
Group	Min. Voltage (V)	Max. Voltage (V)
VA1	2.8	2.9
VB1	2.9	3.0
VC1	3.0	3.1
VA2	3.1	3.2
VB2	3.2	3.3
VC2	3.3	3.4
VA3	3.4	3.5
VB3	3.5	3.6

Note:

Forward voltage measurement allowance is $\pm 0.06\text{V}$.

Mechanical Dimensions

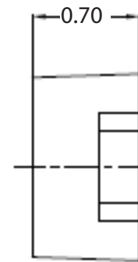
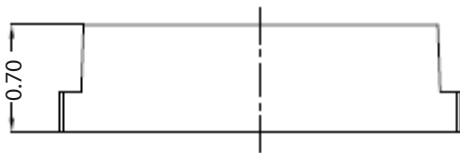
Emitter Type Dimension



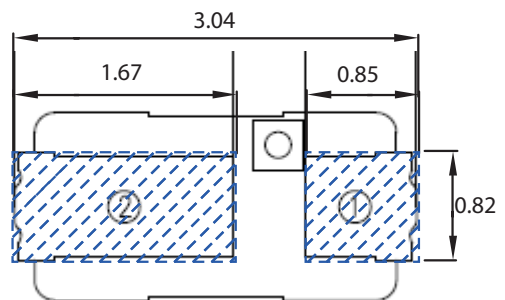
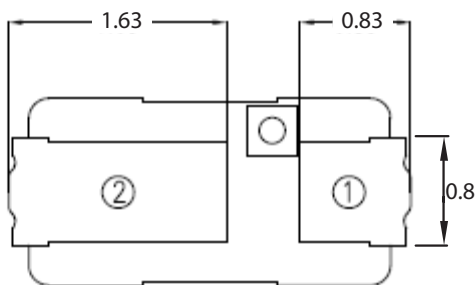
Circuit



Polarity



Solder Pad



Notes:

1. All dimensions are measured in mm.
2. Tolerance : ± 0.20 mm

Color BIN code

Color region stay within IEC "3-Step/6-step" ellipse from the chromaticity center.

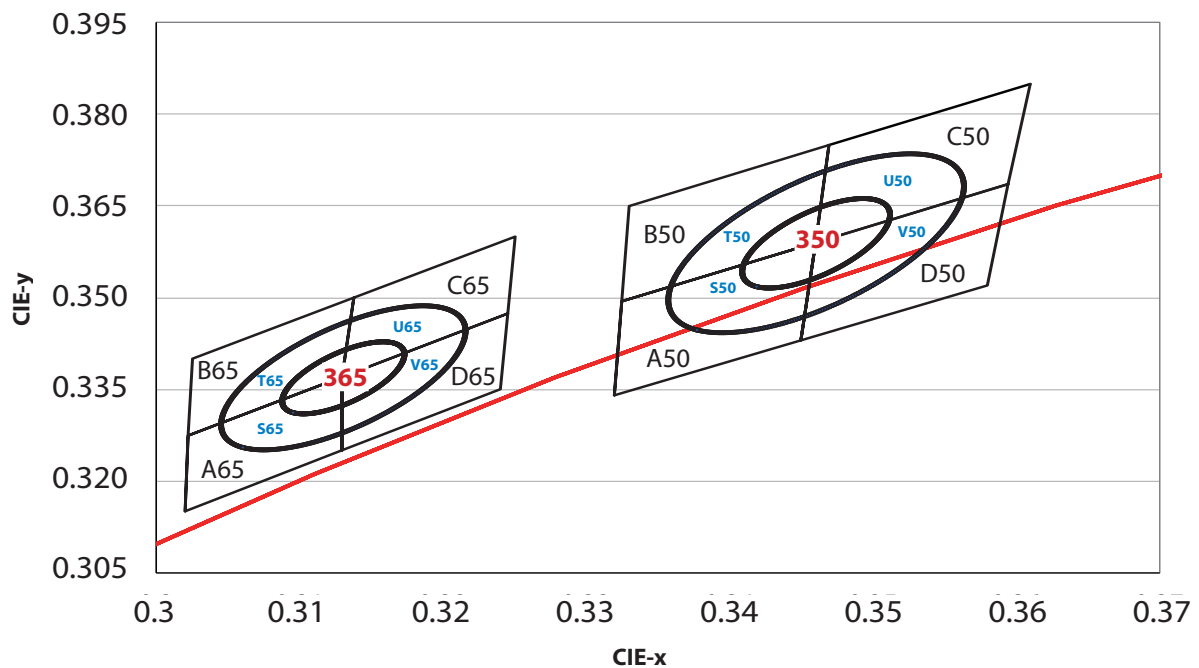
The chromaticity center refers to IEC Regulation.

Please refer to IEC Regulation for the chromaticity center.

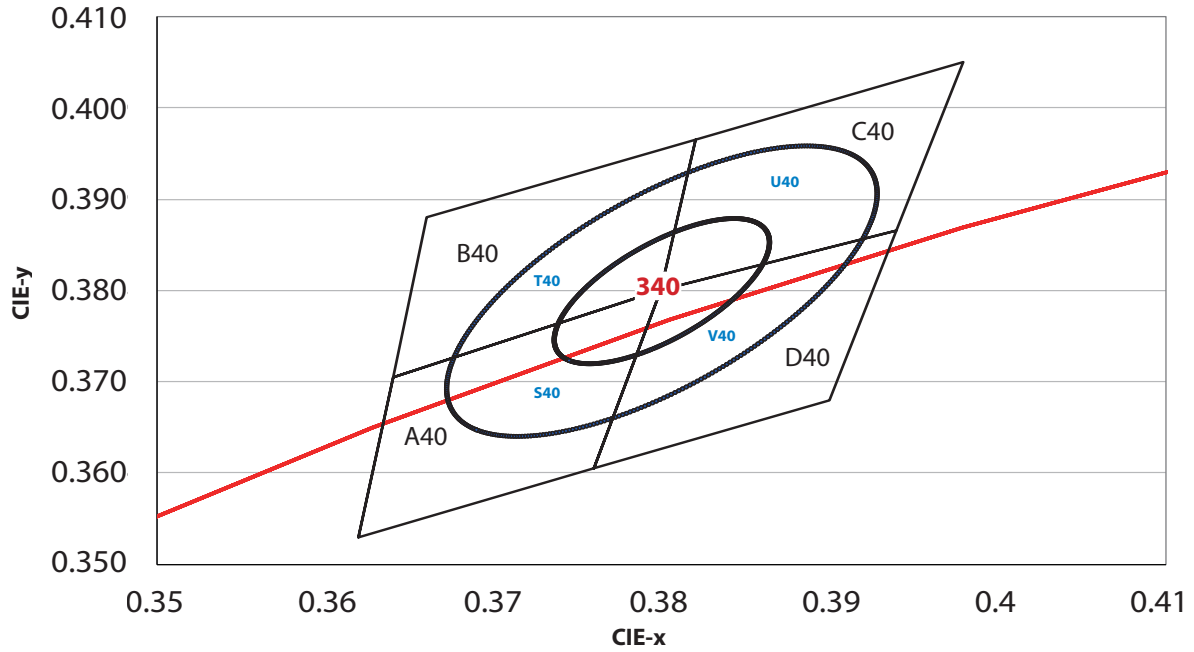
CCT	Steps	Cx	Cy	a	b	theta
2700K	3	0.4630	0.4200	0.00774	0.00411	53.28
3000K	3	0.4400	0.4030	0.00834	0.00408	53.17
3500K	3	0.4090	0.3940	0.00951	0.00417	52.97
4000K	3	0.3800	0.3800	0.00939	0.00402	54.00
5000K	3	0.3460	0.3590	0.00822	0.00354	59.62
6500K	3	0.3130	0.3370	0.00669	0.00285	58.38

CCT	Steps	Cx	Cy	a	b	theta
2700K	6	0.4630	0.4200	0.01548	0.00822	53.28
3000K	6	0.4400	0.4030	0.01668	0.00816	53.17
3500K	6	0.4090	0.3940	0.01902	0.00834	52.97
4000K	6	0.3800	0.3800	0.01878	0.00804	54.00
5000K	6	0.3460	0.3590	0.01644	0.00708	59.62
6500K	6	0.3130	0.3370	0.01338	0.00570	58.38

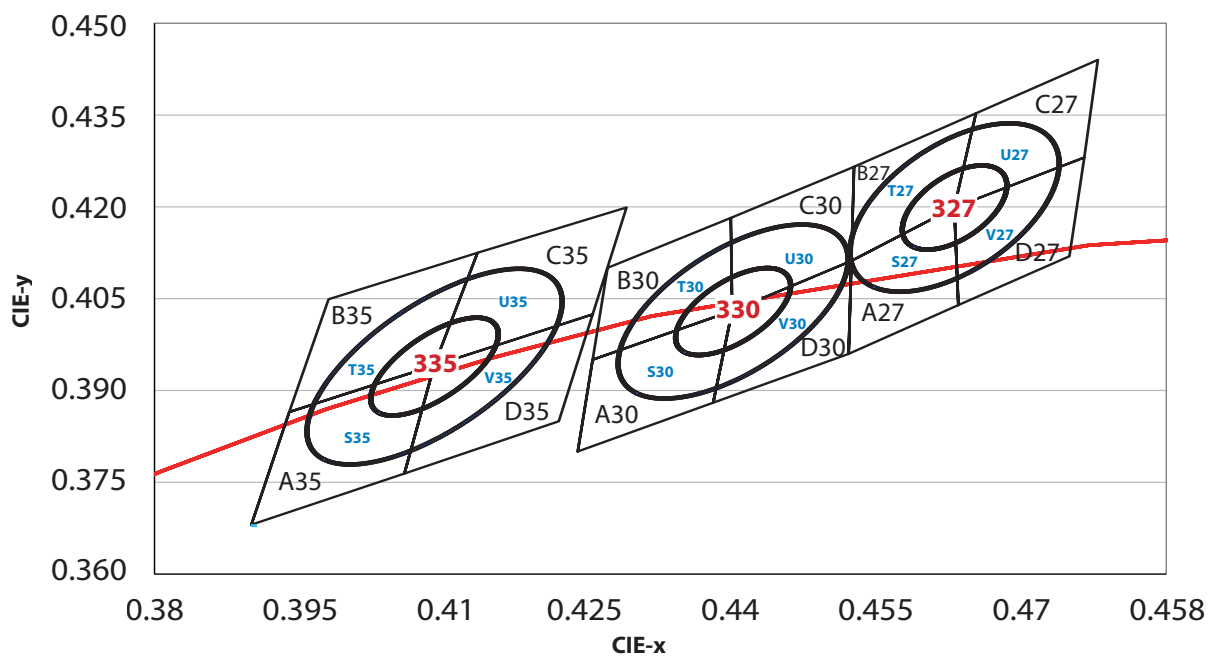
Cool White



Neutral White



Warm White



6500K

A65		B65		C65		D65	
X	Y	X	Y	X	Y	X	Y
0.3020	0.3150	0.3023	0.3275	0.3130	0.3370	0.3130	0.3250
0.3023	0.3275	0.3025	0.3400	0.3138	0.3500	0.3130	0.3370
0.3130	0.3370	0.3138	0.3500	0.3250	0.3600	0.3245	0.3475
0.3130	0.3250	0.3130	0.3370	0.3245	0.3475	0.3240	0.3350

5000K

A50		B50		C50		D50	
X	Y	X	Y	X	Y	X	Y
0.3320	0.3340	0.3325	0.3495	0.3460	0.3590	0.3450	0.3430
0.3325	0.3495	0.3330	0.3650	0.3470	0.3750	0.3460	0.3590
0.3460	0.3590	0.3470	0.3750	0.3610	0.3850	0.3595	0.3685
0.3450	0.3430	0.3460	0.3590	0.3595	0.3685	0.3580	0.3520

4000K

A40		B40		C40		D40	
X	Y	X	Y	X	Y	X	Y
0.3620	0.3530	0.3640	0.3705	0.3800	0.3800	0.3760	0.3605
0.3640	0.3705	0.3660	0.3880	0.3820	0.3965	0.3800	0.3800
0.3800	0.3800	0.3820	0.3965	0.3980	0.4050	0.3940	0.3865
0.3760	0.3605	0.3800	0.3800	0.3940	0.3865	0.3900	0.3680

3500K

A35		B35		C35		D35	
X	Y	X	Y	X	Y	X	Y
0.3900	0.3680	0.3940	0.3865	0.4090	0.3940	0.4060	0.3765
0.3940	0.3865	0.3980	0.4050	0.4135	0.4125	0.4090	0.3940
0.4090	0.3940	0.4135	0.4125	0.4290	0.4200	0.4255	0.4025
0.4060	0.3765	0.4090	0.3940	0.4255	0.4025	0.4220	0.3850

3000K

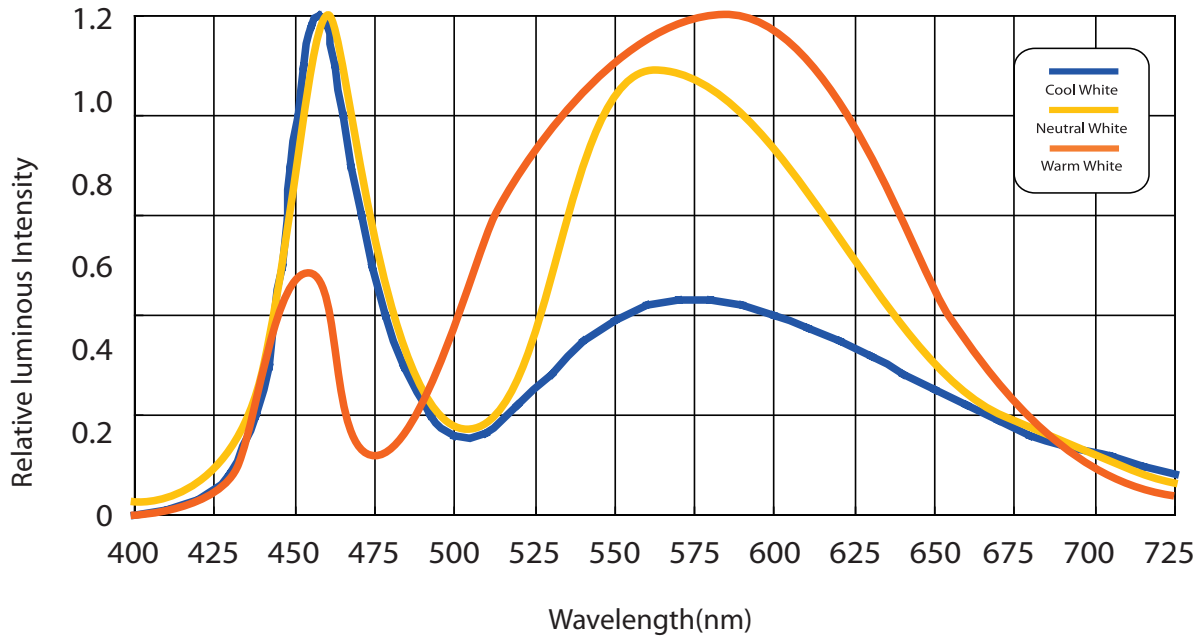
A30		B30		C30		D30	
X	Y	X	Y	X	Y	X	Y
0.4240	0.3800	0.4255	0.3950	0.4400	0.4030	0.4380	0.3880
0.4255	0.3950	0.4270	0.4100	0.4398	0.4183	0.4400	0.4030
0.4400	0.4030	0.4398	0.4183	0.4526	0.4265	0.4523	0.4113
0.4380	0.3880	0.4400	0.4030	0.4523	0.4113	0.4520	0.3960

2700K

A27		B27		C27		D27	
X	Y	X	Y	X	Y	X	Y
0.4520	0.3960	0.4523	0.4113	0.4630	0.4200	0.4635	0.4040
0.4523	0.4113	0.4526	0.4265	0.4653	0.4353	0.4630	0.4200
0.4630	0.4200	0.4653	0.4353	0.4780	0.4440	0.4765	0.4280
0.4635	0.4040	0.4630	0.4200	0.4765	0.4280	0.4750	0.4120

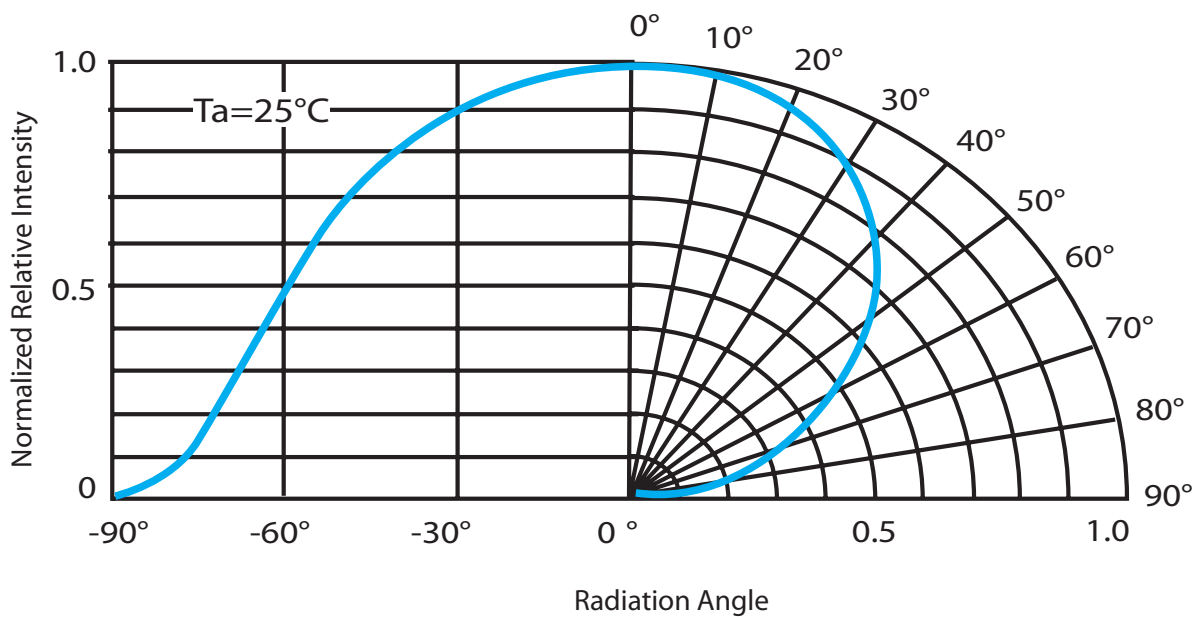
Characteristic Curve

Color Spectrum



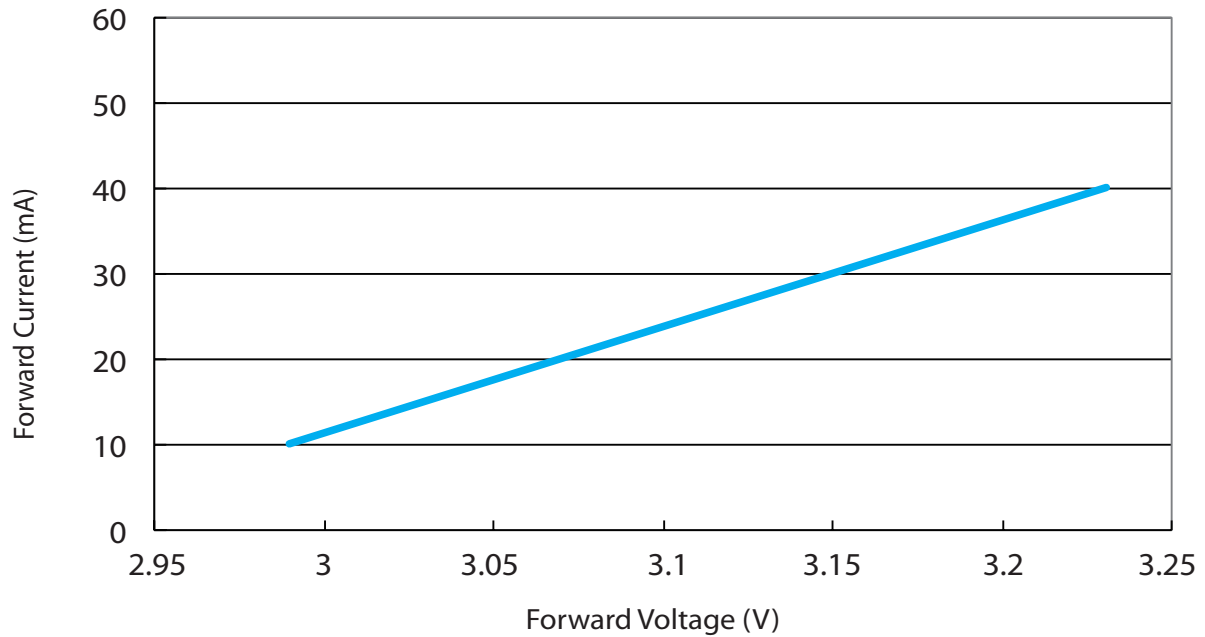
Color Spectrum at a typical CCT for PLCC 3014 0.1W IEC Series CRI80

Beam Pattern



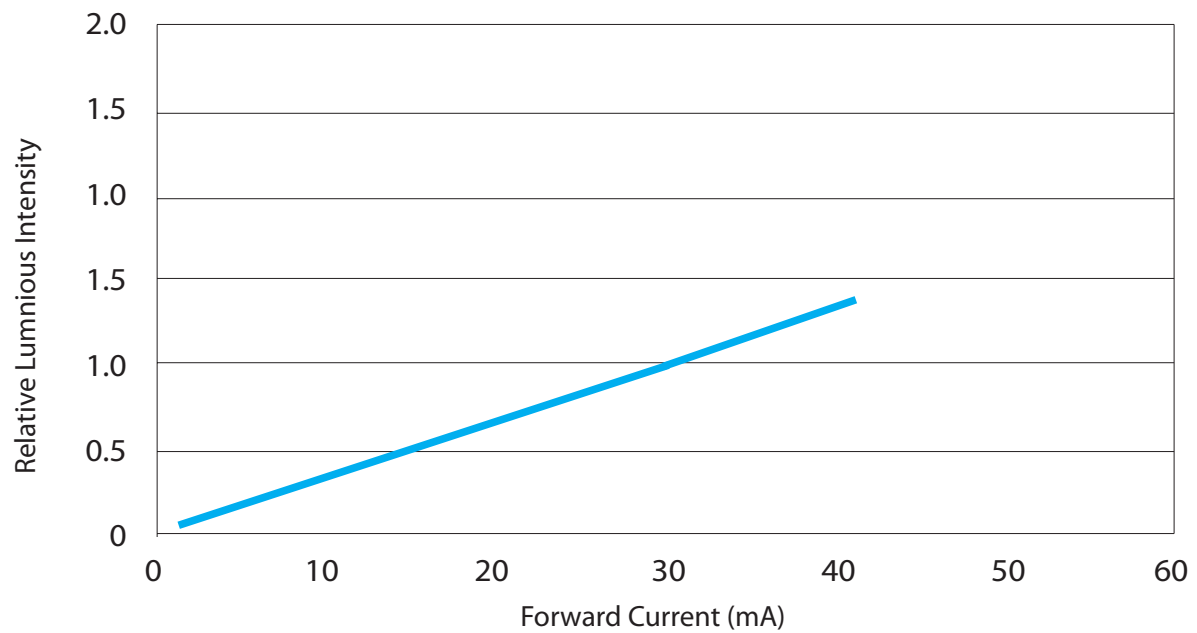
Beam pattern diagram for PLCC 3014 0.1W IEC Series CRI80

Forward Current vs. Forward Voltage



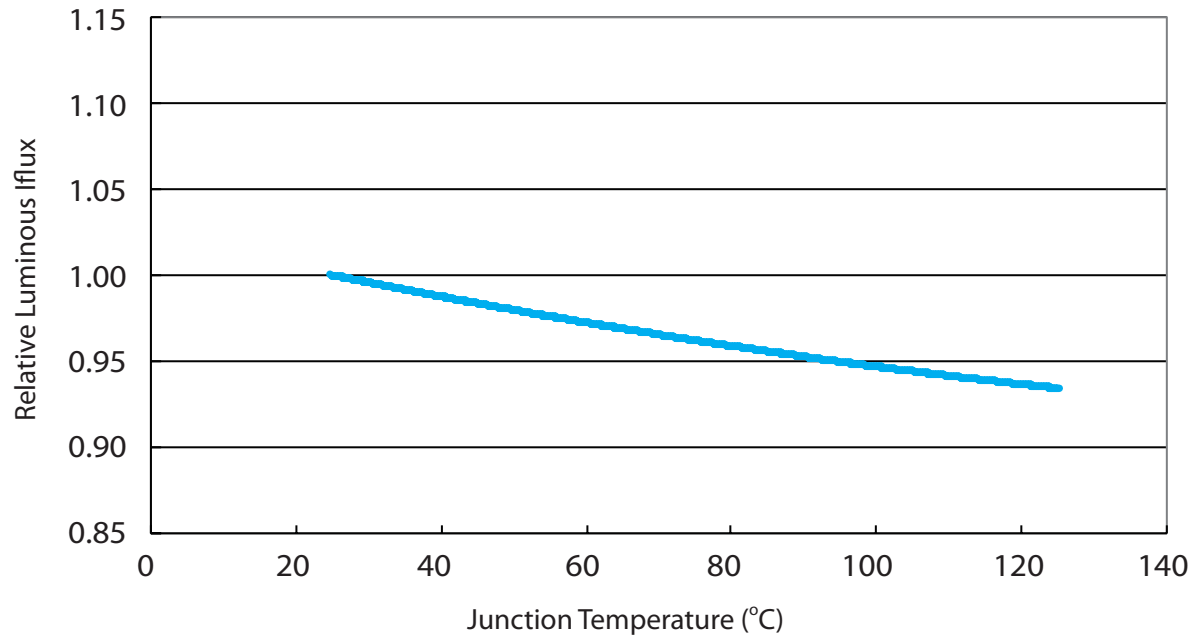
Forward Current vs. Forward Voltage for PLCC 3014 0.1W IEC Series CRI80

Relative Luminous Intensity vs. Forward Current



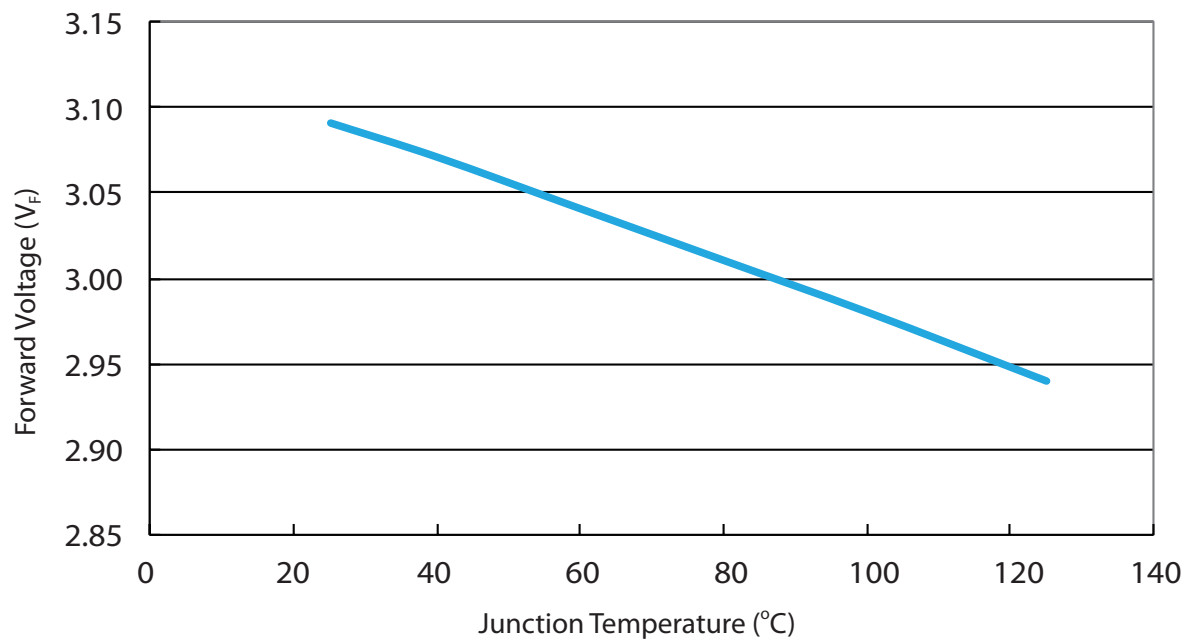
Relative Luminous Intensity vs. Forward Current for PLCC 3014 0.1W IEC Series CRI80

Relative Luminous Flux vs. Junction Temperature



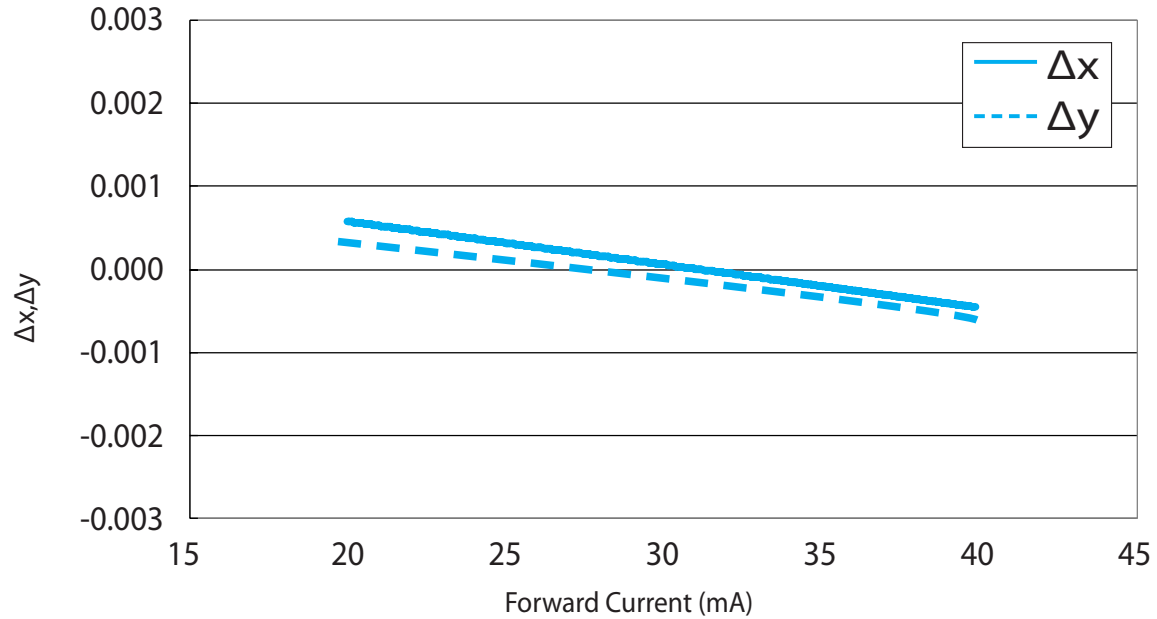
Relative Luminous flux vs. junction temperature for PLCC 3014 0.1W IEC Series CRI80

Forward Voltage vs. Junction Temperature



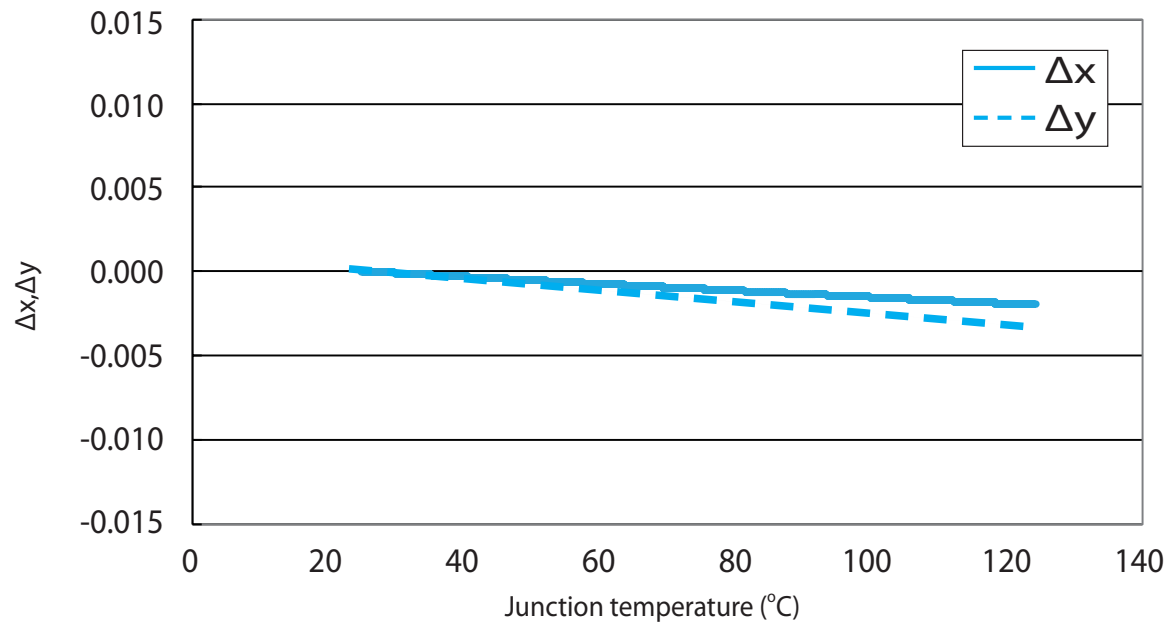
Forward voltage vs. junction temperature for PLCC 3014 0.1W IEC Series CRI80

$\Delta x, \Delta y$ vs. Forward Current



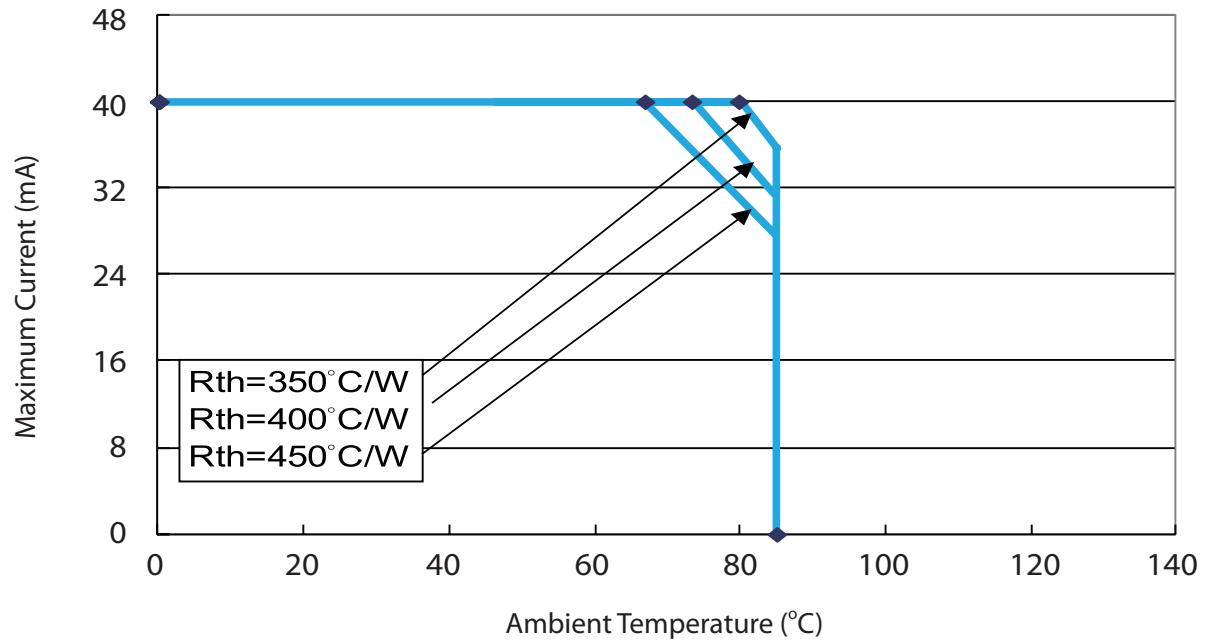
$\Delta x, \Delta y$ vs. Forward Current for PLCC 3014 0.1W IEC Series CRI80

$\Delta x, \Delta y$ vs. Junction Temperature



$\Delta x, \Delta y$ vs. Junction temperature for PLCC 3014 0.1W IEC Series CRI80

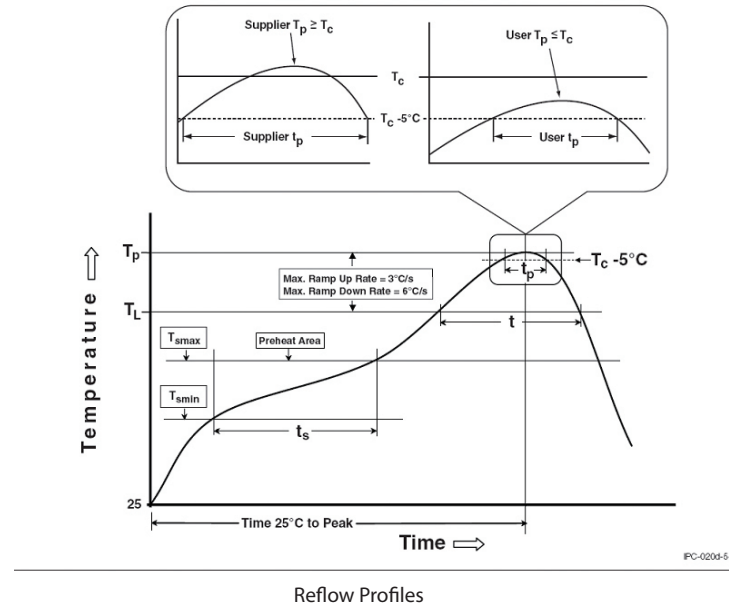
Maximum Current vs. Ambient Temperature



Maximum Current vs. Ambient Temperature for PLCC 3014 0.1W IEC Series CRI80

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_{sm})	200 °C
Time (T_{smin} to T_{sm}) (t_s)	60-120 seconds
Average ramp-up rate (T_{sm} 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_{sm})	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.

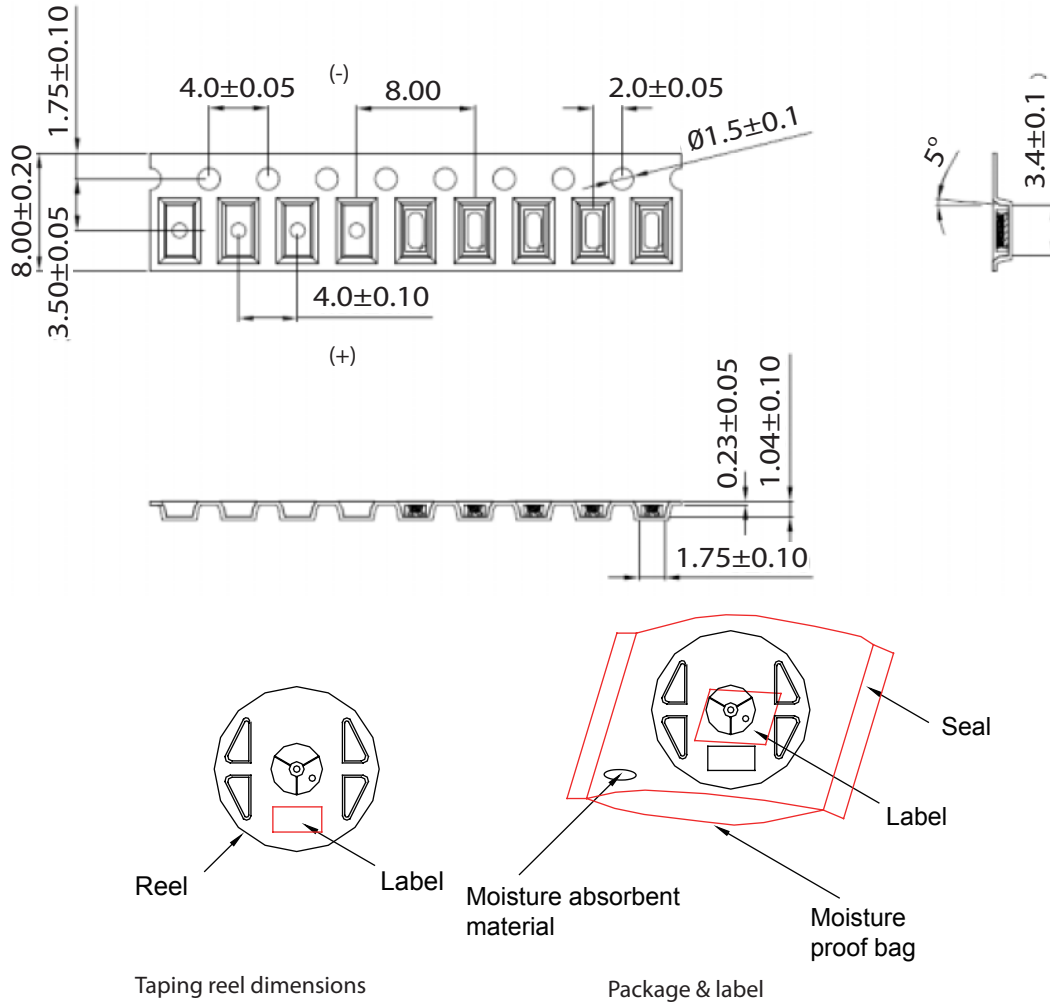
Reliability

NO .	Test Item	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%	-
$\Delta u'v'$	-	0.006
Forward Voltage	-	Initial Data x 1.1
Reverse Current	-	10 μ A
Resistance to Soldering Heat	No dead lamps or visual damage	

Product Packaging Information



Item	Quantity	Total	Dimensions(mm)
Reel	4,000pcs	4,000pcs	R=178
Carton	25 reels	100,000pcs	353*254*256
Starting with 50pcs empty, and 50pcs empty at the last			

Revision History

Versions	Description	Release Date
1	Establish order code information	2014/05/23
2	Revise Reliability	2014/08/22

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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