

CSP 1616

Datasheet



Features :

- High lumen performance
- Promising lumen maintenance characteristics
- High efficiency package
- Level 1 on JEDEC moisture sensitivity analysis
- RoHS compliant

Typical Applications :

- LED light bulbs
- Down Light
- Backlight
- Ceiling fan light

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General Information

Introduction

CSP Series is the smallest SMD package LED with wide beam angle. It is flexible for lamp design whether for high luminous intensity design or wide light angle design. CSP Series is the best choice of thin and miniature lamps such as ceiling light.

Ordering Code Format

$\frac{2}{X1}$ $\frac{F}{X2}$ $\frac{L0}{X3}$ $\frac{0x}{X4}$ $\frac{xW}{X5}$ $\frac{xx}{X6}$ $\frac{F08}{X7}$ $\frac{xxx}{X8}$

X1		X2		X3		X4		X5	
Type		Component		Series		Wattage		Color	
2	Emitter	F	Federal	L0	1616	01	1W	CW	Cool White
						03	3W	WW	Warm White

X6		X7		X8	
Internal code		PCB Board		Serial Number	
-	-	F08	1616	-	-

Absolute Maximum Ratings

Parameter	Symbol	Value	Units
DC Forward Current ^[1] (each chip)	I_F	1W: 350 3W: 700	mA
Peak Pulsed Current; (tp≤100μs, Duty cycle=0.25)	I_{pulse}	1W: 500 3W: 1000	mA
Transient Surge Voltage	-	8	V
Reverse Voltage ^[2]	V_R	Note 2	V
LED Junction Temperature ^[3]	T_J	125	°C
Operating Temperature	-	-40 ~ +80	°C
Storage Temperature	-	-40 ~ +125	°C
Allowable Reflow Cycles	-	3	cycles
Soldering Temperature	-	260	°C

Notes:

1. LEDs are not designed to drive in reverse bias.
2. Proper current derating must be observed to maintain junction temperature below the maximum.

Characteristics

Parameter	Symbol	Value	Units
Viewing Angle (Typ.)	$2\theta_{1/2}$	150	Degree
Thermal resistance	-	30	°C/W
CRI	-	80	-
CCT	-	5,000-10,000 2,670-3,800	K
Level 1			
Floor Life			
Conditions: ≤30°C / 85% RH			
JEDEC Moisture Sensitivity	-		-
Soak Requirements(Standard)			
Time (hours): 168+5/-0			
Conditions: 85°C / 85% RH			

Notes:

1. CIE_{x/y} tolerance: ±0.005
2. Color rendering index CRI Tolerance: ±2

Luminous Flux Characteristic (1W)

Luminous Flux Characteristics ($T_j=25^{\circ}\text{C}$)

Color	Group	Min. Luminous Flux @150mA (lm)	Max. Luminous flux @150mA (lm)	Calculated Min. Luminous flux @350mA (lm)	Order Code
Cool White	R2	45.3	51.2	85	2FL001CW27F08101
	S1	51.2	58.8	95	
	S2	58.8	66.5	105	
Warm White	R1	39.4	45.3	75	2FL001WW23F08101
	R2	45.3	51.2	85	
	S1	51.2	58.8	95	

Luminous Flux Characteristic (3W)

Luminous Flux Characteristics ($T_j=25^{\circ}\text{C}$)

Color	Group	Min. Luminous Flux @700mA (lm)	Max. Luminous flux @700mA (lm)	Calculated Min. Luminous flux @1000mA (lm)	Order Code
Cool White	W2	180	200	260	2FL003CW27F08101
	W3	200	220	280	
	X1	220	240	300	
Warm White	W1	160	180	240	2FL003WW23F08101
	W2	180	200	260	
	W3	200	220	280	

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)
VE0	2.8	3.0
VE1	3.0	3.2
VE2	3.2	3.4

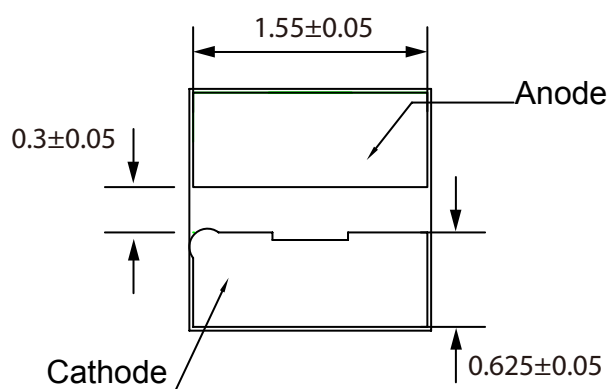
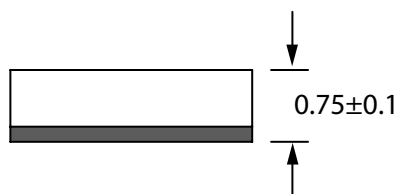
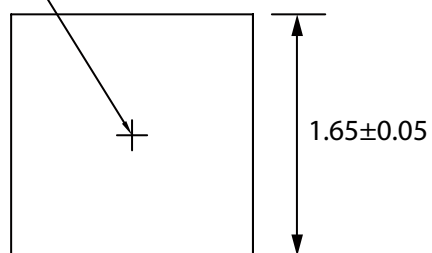
Note:

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

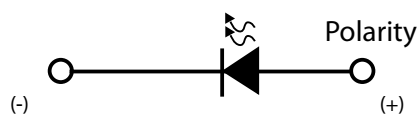
Mechanical Dimensions

Emitter Type Dimension

Optical center

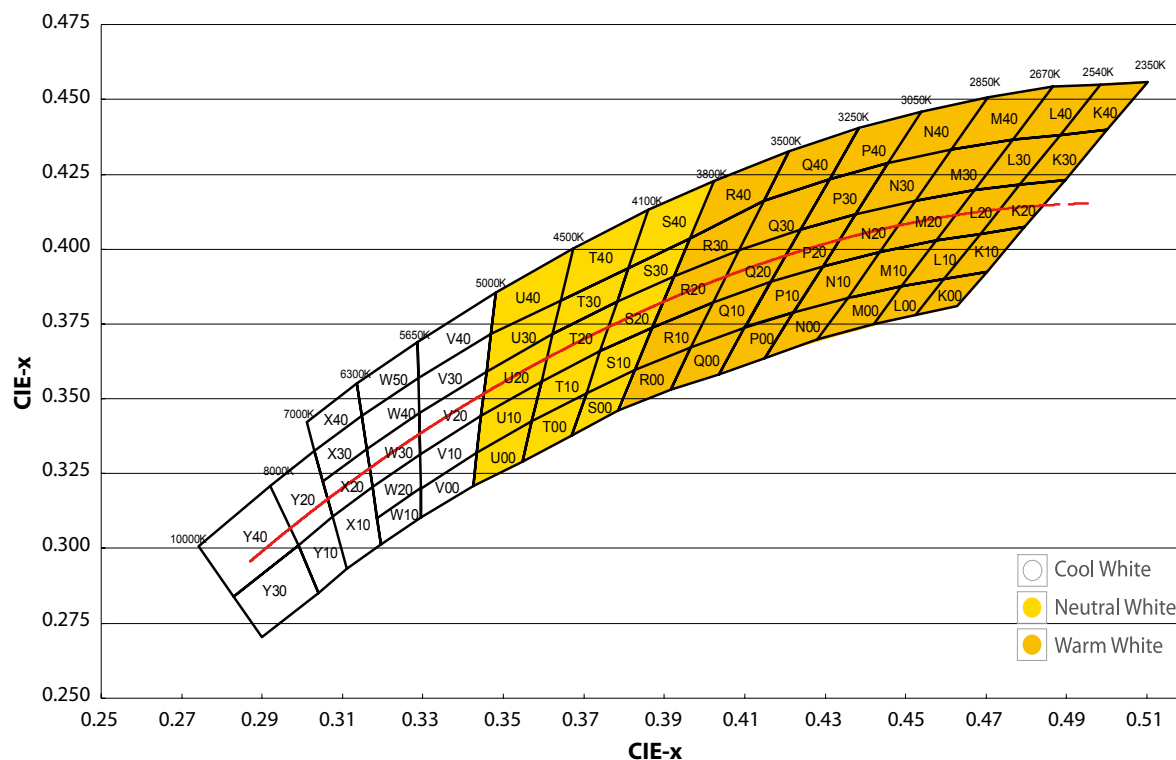


Circuit



Note:
All dimensions are measured in mm.

Color BIN code



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

Neutral White

U00		U10		U20		U30		U40	
X	Y	X	Y	X	Y	X	Y	X	Y
0.3571	0.3426	0.3444	0.3442	0.3622	0.3716	0.3642	0.3829	0.3642	0.3829
0.3548	0.3290	0.3434	0.3320	0.3594	0.3557	0.3622	0.3716	0.3673	0.4003
0.3425	0.3208	0.3571	0.3426	0.3444	0.3442	0.3458	0.3592	0.3481	0.3856
0.3434	0.3320	0.3594	0.3557	0.3458	0.3592	0.3469	0.3717	0.3469	0.3717

T00		T10		T20		T30		T40	
X	Y	X	Y	X	Y	X	Y	X	Y
0.3706	0.3520	0.3594	0.3557	0.3622	0.3716	0.3642	0.3829	0.3673	0.4003
0.3670	0.3377	0.3571	0.3426	0.3783	0.3825	0.3811	0.3937	0.3860	0.4130
0.3548	0.3290	0.3706	0.3520	0.3741	0.3658	0.3783	0.3825	0.3811	0.3937
0.3571	0.3426	0.3741	0.3658	0.3594	0.3557	0.3622	0.3716	0.3642	0.3829

S00		S10		S20		S30		S40	
X	Y	X	Y	X	Y	X	Y	X	Y
0.3826	0.3595	0.3741	0.3658	0.3783	0.3825	0.3783	0.3825	0.3860	0.4130
0.3785	0.3460	0.3871	0.3739	0.3924	0.3909	0.3811	0.3937	0.4023	0.4228
0.3670	0.3377	0.3826	0.3595	0.3871	0.3739	0.3963	0.4035	0.3963	0.4035
0.3706	0.3520	0.3706	0.3520	0.3741	0.3658	0.3924	0.3909	0.3811	0.3937

R00		R10		R20		R30		R40	
X	Y	X	Y	X	Y	X	Y	X	Y
0.3966	0.3673	0.3871	0.3739	0.3924	0.3909	0.4086	0.3995	0.4023	0.4228
0.3917	0.3530	0.4021	0.3822	0.3871	0.3739	0.3924	0.3909	0.4209	0.4326
0.3785	0.3460	0.3966	0.3673	0.4021	0.3822	0.3963	0.4035	0.4148	0.4161
0.3826	0.3595	0.3826	0.3595	0.4086	0.3995	0.4148	0.4161	0.3963	0.4035

Warm White

Q00		Q10		Q20		Q30		Q40	
X	Y	X	Y	X	Y	X	Y	X	Y
0.4100	0.3740	0.4165	0.3890	0.4086	0.3995	0.4086	0.3995	0.4385	0.4404
0.4035	0.3580	0.4100	0.3738	0.4240	0.4065	0.4148	0.4161	0.4312	0.4234
0.3917	0.3530	0.4021	0.3822	0.4165	0.3890	0.4312	0.4234	0.4148	0.4161
0.3966	0.3673	0.3966	0.3673	0.4021	0.3822	0.4240	0.4065	0.4209	0.4326

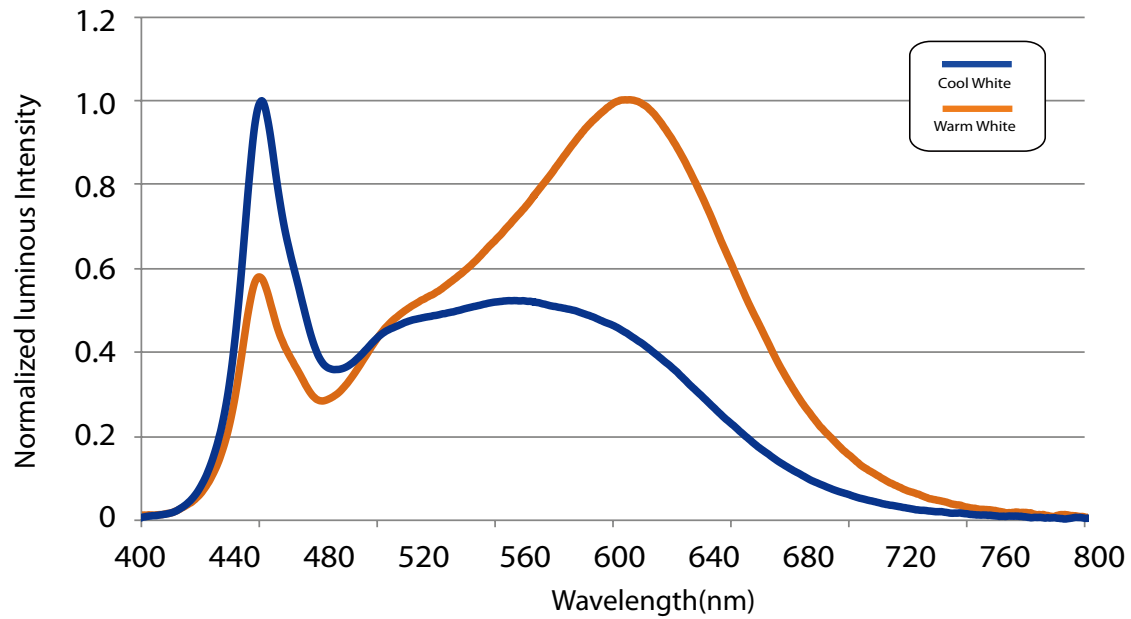
P00		P10		P20		P30		P40	
X	Y	X	Y	X	Y	X	Y	X	Y
0.4220	0.3790	0.4294	0.3943	0.4240	0.4065	0.4312	0.4234	0.4385	0.4404
0.4150	0.3635	0.4221	0.3790	0.4376	0.4116	0.4456	0.4287	0.4538	0.4460
0.4035	0.3580	0.4100	0.3738	0.4294	0.3943	0.4376	0.4116	0.4456	0.4287
0.4100	0.3740	0.4165	0.3890	0.4165	0.3890	0.4240	0.4065	0.4312	0.4234

N00		N10		N20		N30		N40	
X	Y	X	Y	X	Y	X	Y	X	Y
0.4356	0.3837	0.4294	0.3943	0.4376	0.4116	0.4614	0.4333	0.4538	0.4460
0.4280	0.3700	0.4436	0.3991	0.4294	0.3943	0.4525	0.4162	0.4705	0.4508
0.4150	0.3635	0.4356	0.3837	0.4436	0.3991	0.4376	0.4116	0.4614	0.4333
0.4220	0.3790	0.4221	0.3790	0.4525	0.4162	0.4456	0.4287	0.4456	0.4287

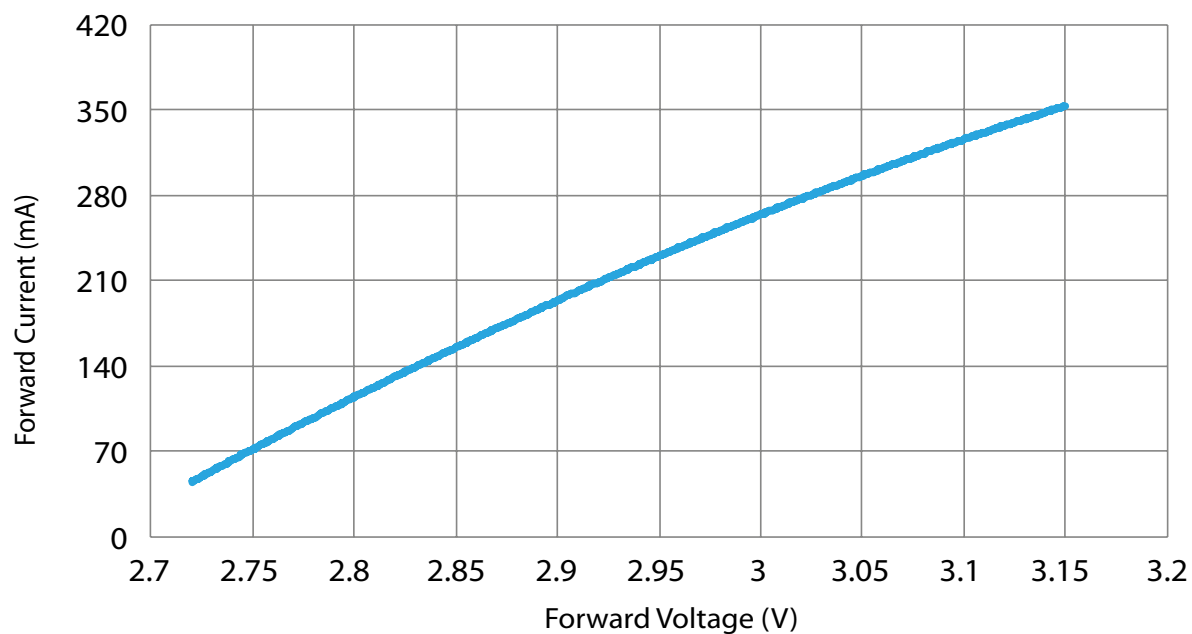
M00		M10		M20		M30		M40	
X	Y	X	Y	X	Y	X	Y	X	Y
0.4490	0.3875	0.4436	0.3991	0.4525	0.4162	0.4614	0.4333	0.4705	0.4508
0.4420	0.3750	0.4577	0.4029	0.4671	0.4196	0.4767	0.4366	0.4866	0.4542
0.4280	0.3700	0.4490	0.3875	0.4577	0.4029	0.4671	0.4196	0.4767	0.4366
0.4356	0.3837	0.4356	0.3837	0.4436	0.3991	0.4525	0.4162	0.4614	0.4333

Characteristic curve

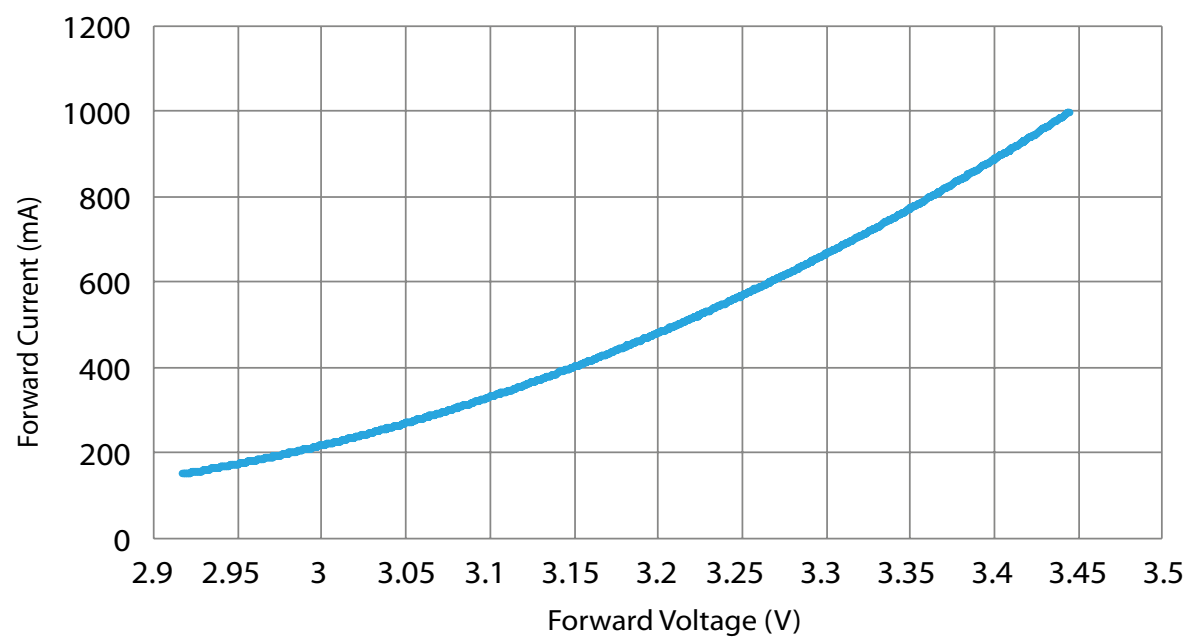
Color Spectrum



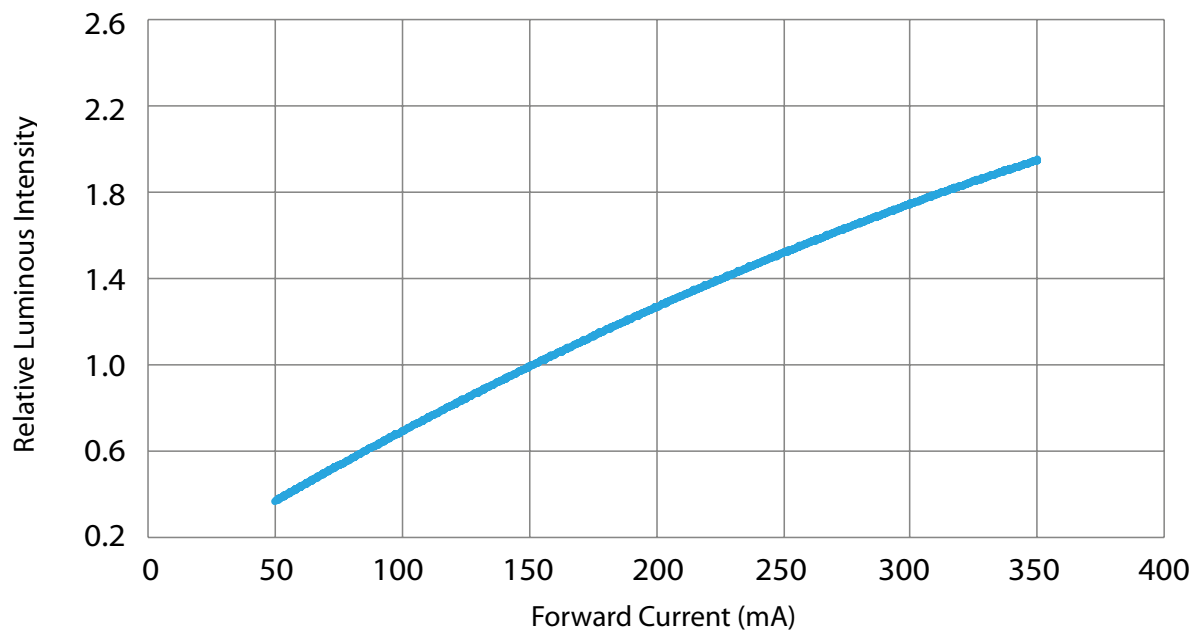
Forward Current vs. Forward Voltage (1W)



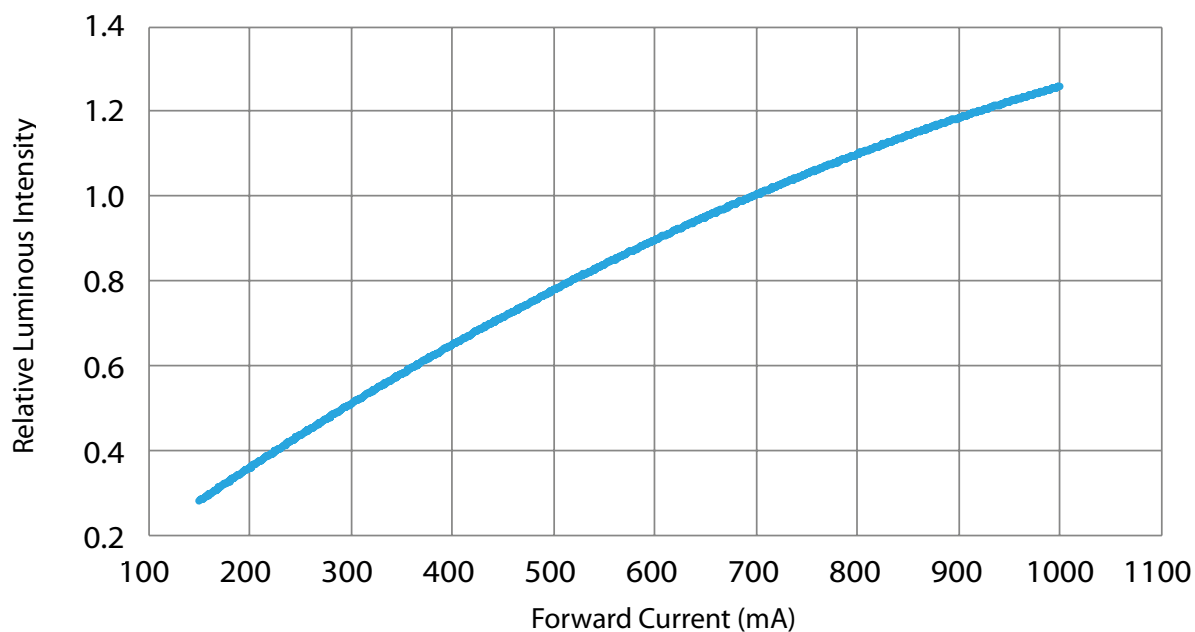
Forward Current vs. Forward Voltage (3W)



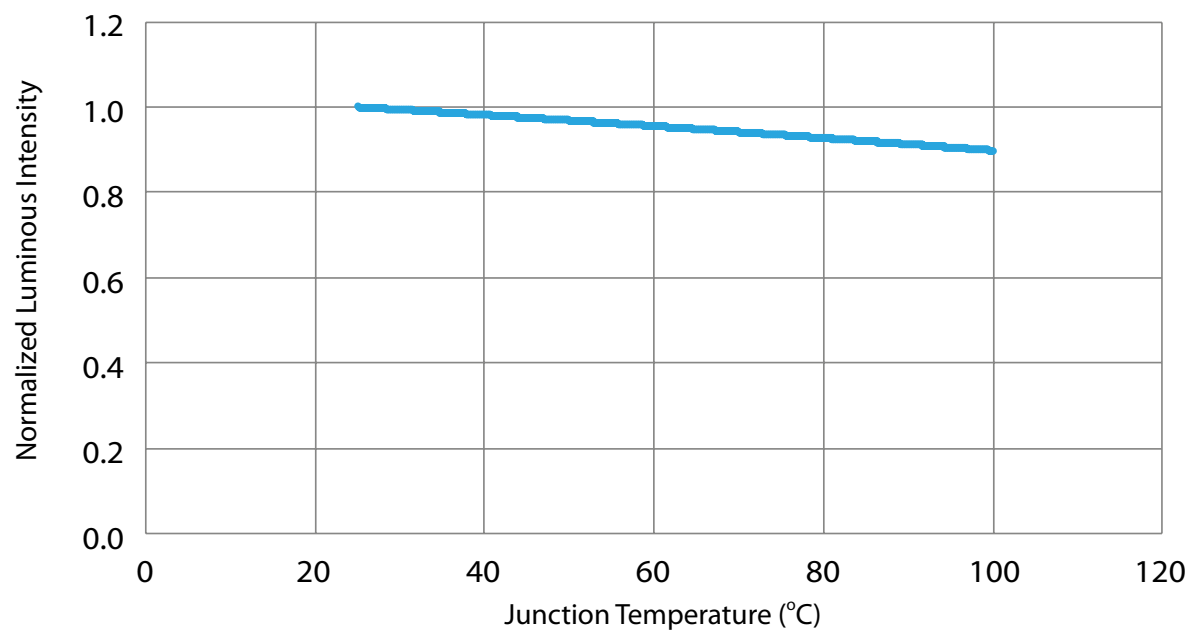
Relative Luminous Intensity vs. Forward Current (1W)



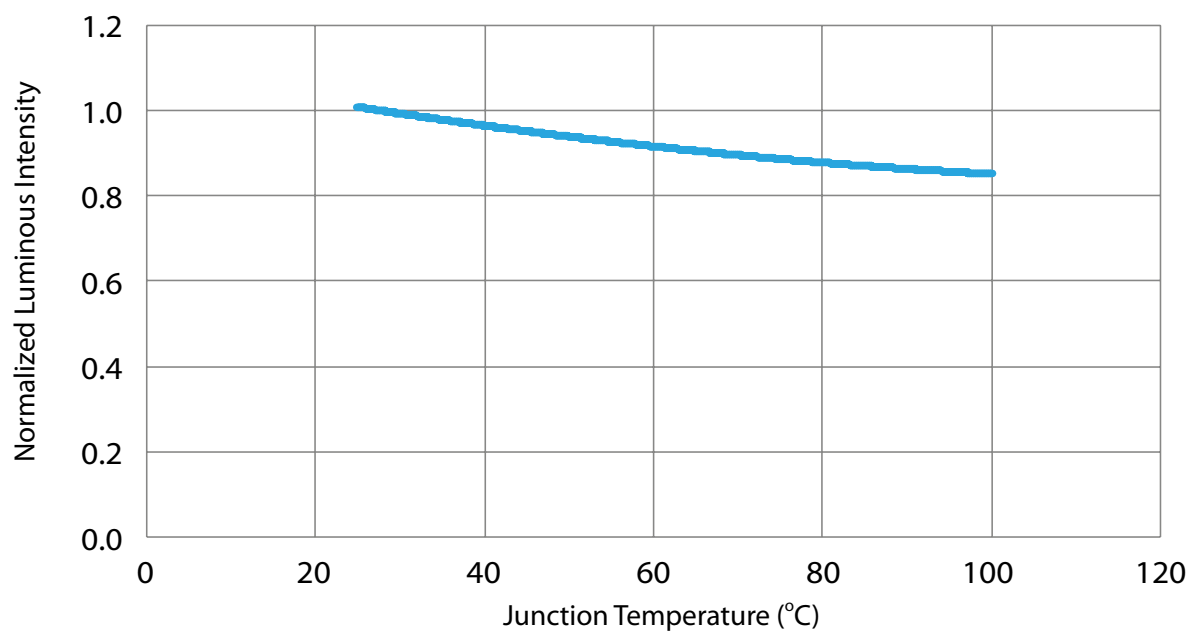
Relative Luminous Intensity vs. Forward Current (3W)



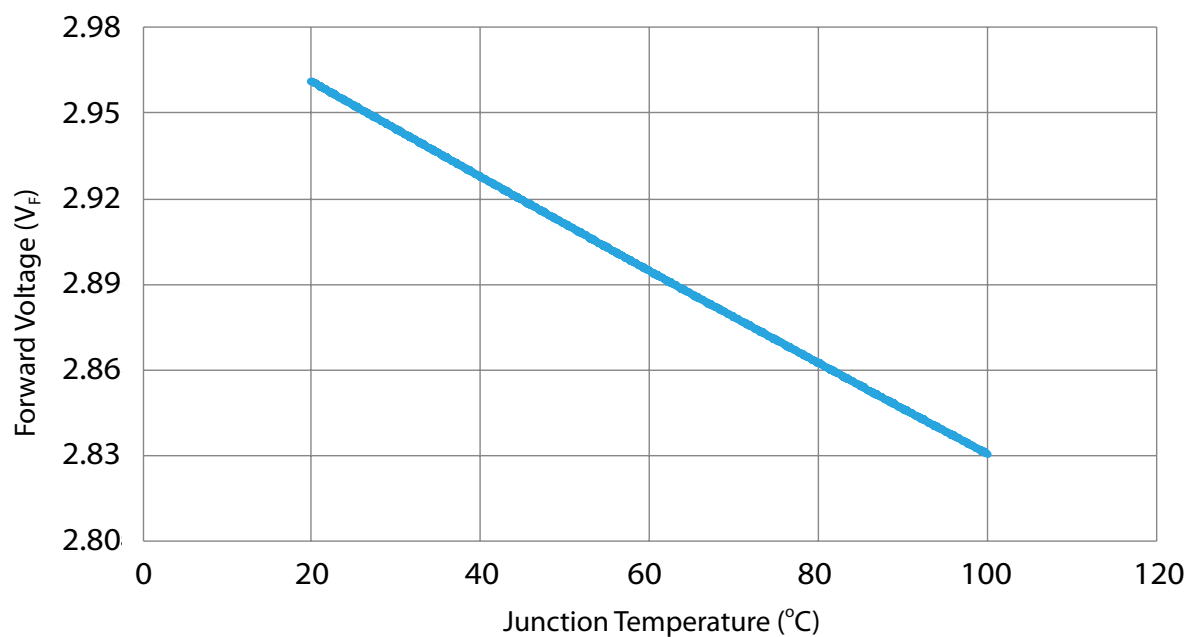
Relative Luminous Intensity vs. Junction Temperature (1W)



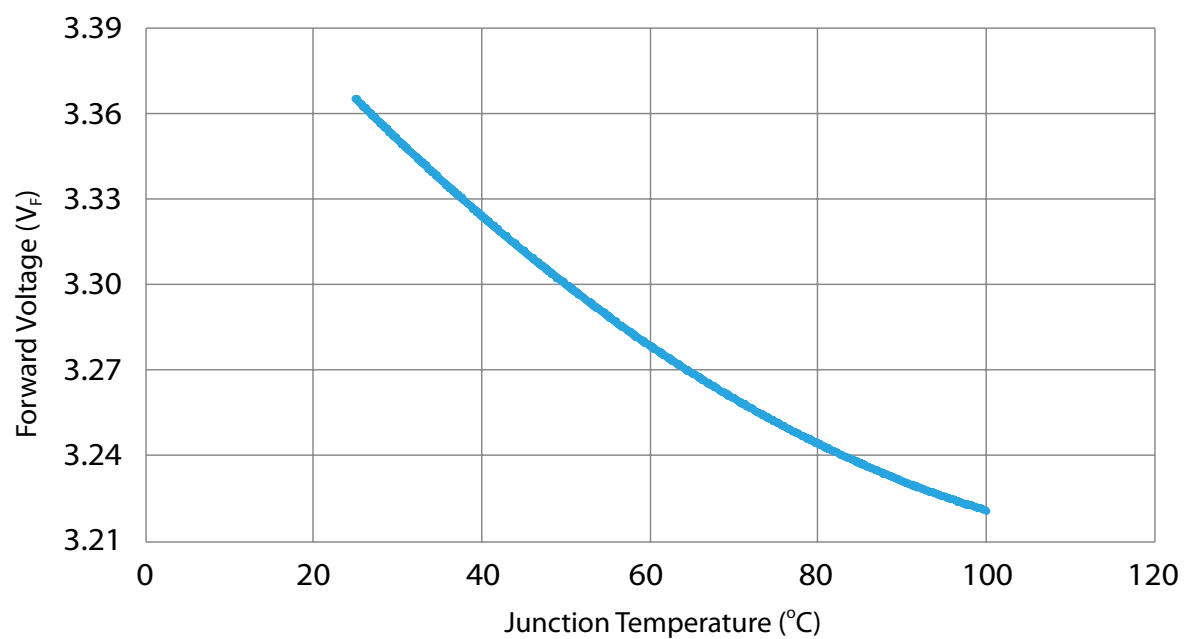
Relative Luminous Intensity vs. Junction Temperature (3W)



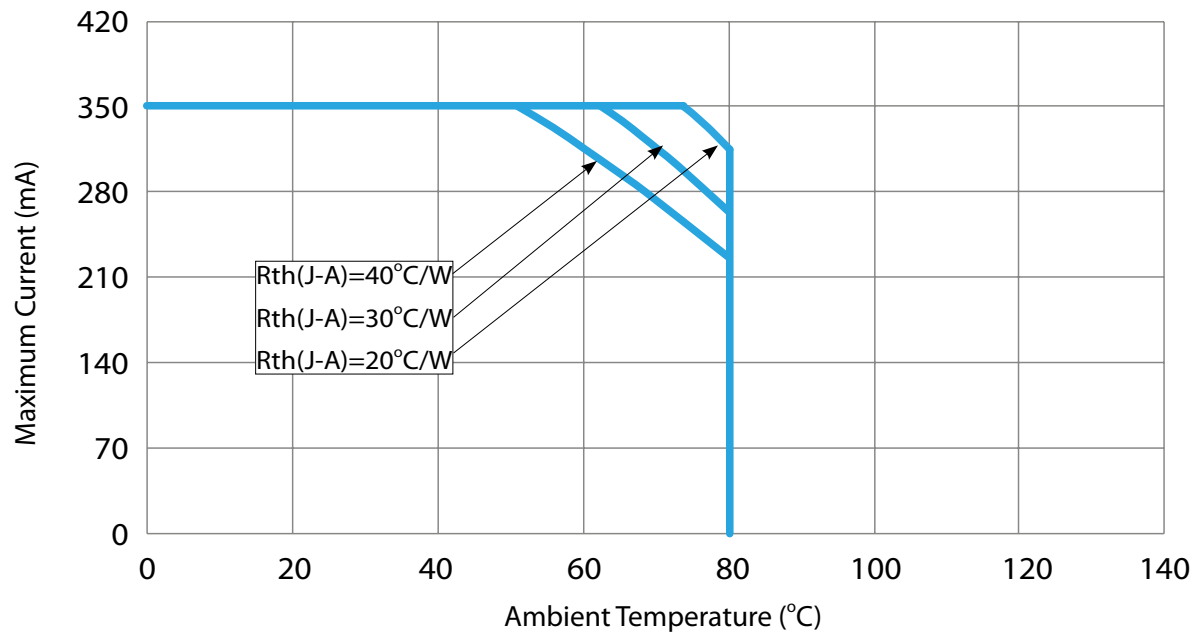
Forward Voltage vs. Junction Temperature (1W)



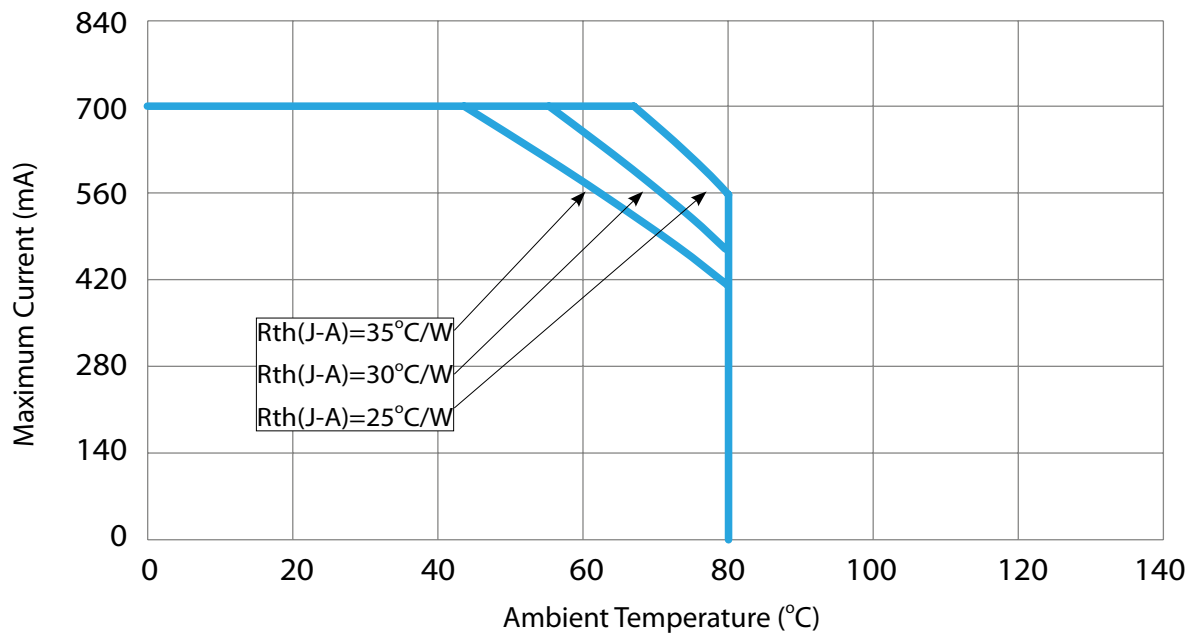
Forward Voltage vs. Junction Temperature (3W)



Maximum Current vs. Ambient Temperature (1W)



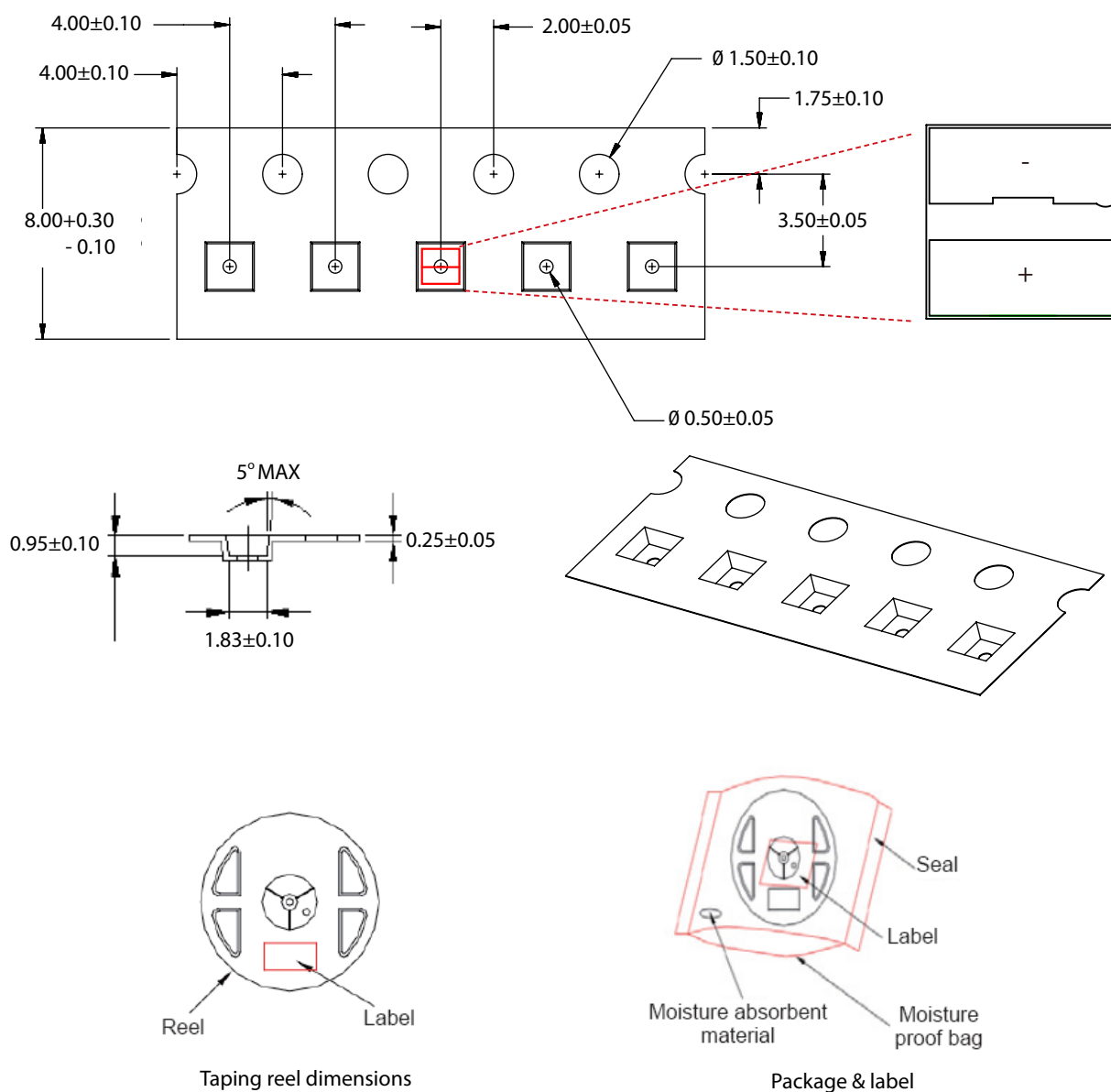
Maximum Current vs. Ambient Temperature (3W)



Reliability

NO .	Test Item	Test Condition	Remark
1	Thermal Shock	-40°C~100°C 15, 15 mins $\leq$ 10 sec	100 Cycle
2	Resistance to Soldering Heat	T _{SOL} =260°C, 30 sec	3 times
3	Operation Life test	25°C	1,000 hrs
4	High Temperature Operation Life test	85°C	1,000 hrs
5	ON/OFF Test	30 sec ON, 30 sec OFF	1.5W times

Product Packaging Information



Item	Quantity	Total	Dimensions(mm)
Reel	4,000pcs	4,000pcs	R-178
Box	5 Reels	20,000pcs	250*240*70
Carton	10 boxes	200,000pcs	488*260*364
Starting with 50pcs empty, and 50pcs empty at the last			

Revision History

Versions	Description	Release Date
1	Establish a Datasheet	2015/10/23

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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