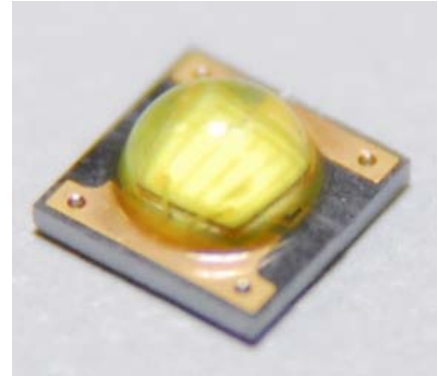


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1 Features

- 1.1 General purpose white
- 1.2 Typical viewing angle:120°
- 1.3 Thermal resistance: 7 K/W
- 1.4 Footprint: 3.37mm x 3.37mm
- 1.5 ESD protection
- 1.6 Soldering methods: SMT
- 1.7 RoHS compliant
- 1.8 Reflow solderable JEDEC J-STD-020D



2 Application

- 2.1 General lighting
- 2.2 Contour lighting
- 2.3 Decoration lighting
- 2.4 Automotive lighting
- 2.5 Material

Item	Description
Housing body	Silicon
Encapsulating resin	Silicone
Electrodes	Cu /Au
Die attach	Silver Epoxy
Chip	InGaN

3 Environmental Compliance

ALTIS is compliant to the restriction of hazardous substances directive or RoHS. The restricted materials is including lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls (PBB) or polybrominated diphenyl ethers (PBDE).

4 Absolute Maximum Ratings

Parameters		Symbol	Rating	Unit
DC Forward Current		IF	500	mA
Reverse Voltage		VR	5	V
Operating temperature at 350mA		Topr	(-40 ~ 110)	°C
LED Storage temperature		T stg ₁	(-40 ~ 110)	°C
LED in tape storage temperature		Tstg ₂	(0 ~ 60)	°C
LED Junction temperature		Tj	125	°C
Soldering temperature at tp (JEDEC-020-D)		Tsol	20-40	second
ESD classification	JESD22-A114-E	HBM	8000 (Class3B)	V
	JESD22-A115-B	MM	400 (Class C)	V

Note:

4.1 Proper current derating must be observed to maintain junction temperature below the maximum.

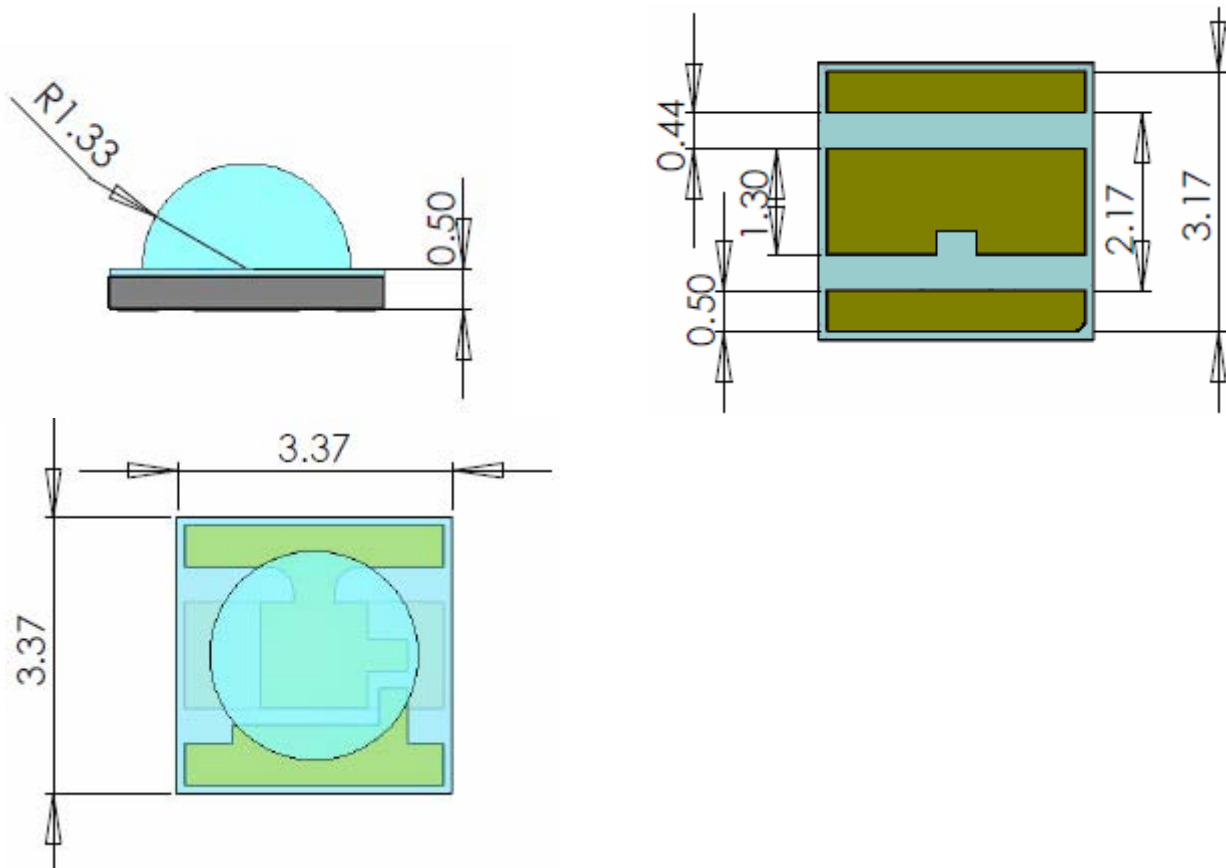
5 Flux Characteristics (Tj=25 °C, IF=350mA)

Color	CCT Range			Minimal Luminous Flux (lm)	Forward Voltage (V)	Order Code
	Min.	Typ	Max.			
Cool White	5650K	6300K	7000K	80	2.79~3.75	VA-P1CC0L080
				87		VA-P1CC0L087
				94		VA-P1CC0L094
				101		VA-P1CC0L101
				108		VA-P1CC0L108
				115		VA-P1CC0L115
	5000K	5650K	6300K	122	2.79~3.75	VA-P1CC0L122
				80		VA-P1CD0L080
				87		VA-P1CD0L087
				94		VA-P1CD0L094
				101		VA-P1CD0L101
				108		VA-P1CD0L108
	4500K	5000K	5650K	115	2.79~3.75	VA-R1CD0L115
				122		VA-R1CD0L122
				80		VA-P1CE1L080
				87		VA-P1CE1L087
				94		VA-P1CE1L094
				101		VA-P1CE1L101
Neutral White	4100K	4500K	5000K	108	2.79~3.75	VA-P1NF1L080
				115		VA-P1NF1L087
				122		VA-P1NF1L094
				74		VA-P1NF1L101
				80		VA-P1NG1L074
	3800K	4100K	4500K	87	2.79~3.75	VA-P1NG1L080
				94		VA-P1NG1L087
				101		VA-P1NG1L094
				60		VA-P1SH1L060
				67		VA-P1SH1L067
Warm White	3500K	3800K	4100K	74	2.79~3.75	VA-P1SH1L074
				80		VA-P1SH1L080
				87		VA-P1SH1L087
				94		VA-P1SH1L094
				60	2.79~3.75	VA-P1SJ1L060
				67		VA-P1SJ1L067
	3250K	3500K	3800K	74		VA-P1SJ1L074
				80		VA-P1SJ1L080
				87		VA-P1SJ1L087
				94		VA-P1SJ1L094
	3050K	3250K	3500K	60	2.79~3.75	VA-P1SK1L060
				67		VA-P1SK1L067
				74		VA-P1SK1L074
				80		VA-P1SK1L080
				87		VA-P1SK1L087
				94		VA-P1SK1L094
	2850K	3050K	3250K	60	2.79~3.75	VA-P1SL1L060
				67		VA-P1SL1L067
				74		VA-P1SL1L074
				80		VA-P1SL1L080
				87		VA-P1SL1L087
				94		VA-P1SL1L094
	2650K	2850K	3050K	60	2.79~3.75	VA-P1SM1L060
				67		VA-P1SM1L067
				74		VA-P1SM1L074
				80		VA-P1SM1L080
				87		VA-P1SM1L087
				94		VA-P1SM1L094

Notes:

- Forward voltage is measured with an accuracy of $\pm 0.1V$
- Flux is measured with an accuracy of $\pm 10\%$
- Typical CRI (Color Rendering Index) for Neutral White and Cool White is 70.
- Typical CRI (Color Rendering Index) for Warm White is 80.

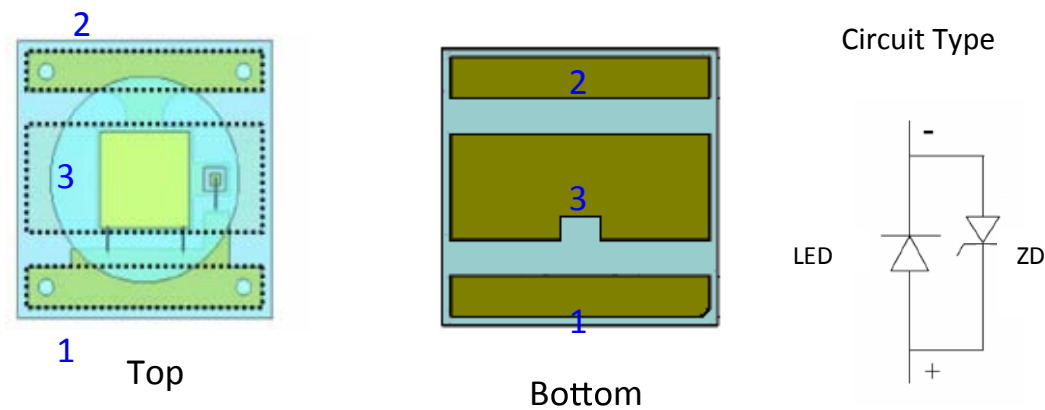
6 Mechanical Dimension



Notes:

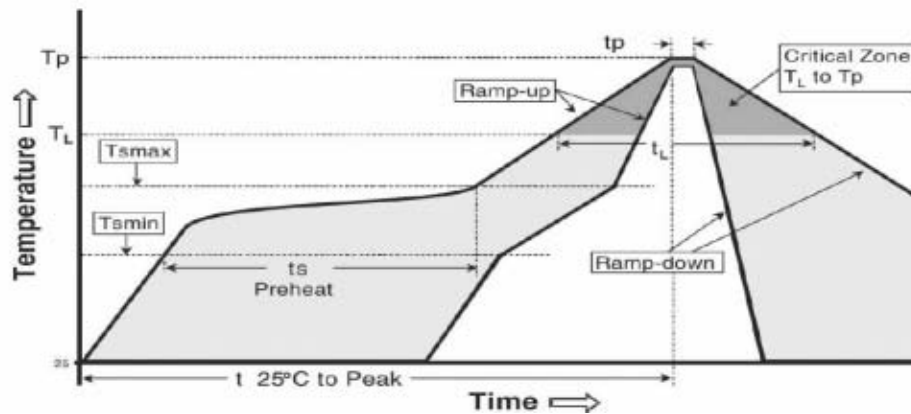
- 6.1 All dimensions are in millimeters.
- 6.2 Drawings not to scale.
- 6.3 General tolerance are ± 0.13 mm unless otherwise indicated

7 Pad configuration



Pad	Function
1	Cathode
2	Anode
3	Thermal

8 Reflow soldering conditions

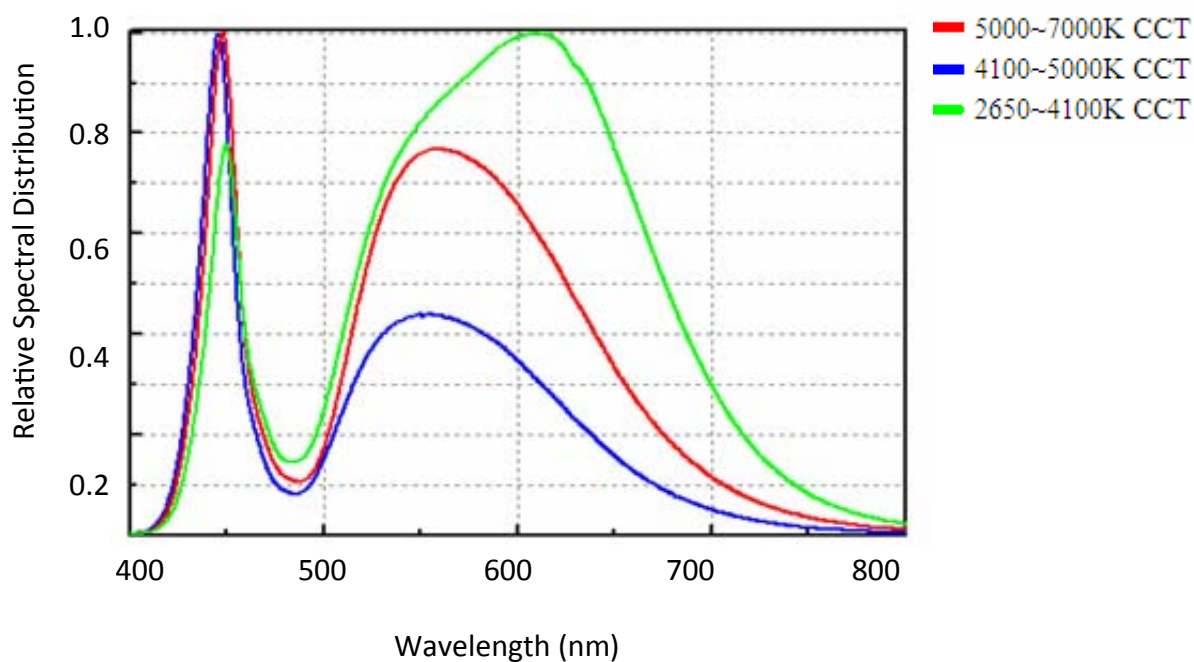


Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Average ramp-up rate (Tsmax to Tp)	3° C/second max.	3° C/second max.
Preheat		
- Temperature Min (T _{smin})	100 °C	150 °C
- Temperature Max (T _{smax})	150 °C	200 °C
- Time (T _{smin} to T _{smax}) (ts)	60-120 seconds	60-180 seconds
Time maintained above:		
- Temperature (T _L)	183 °C	217 °C
- Time (t _L)	60-150 seconds	60-150 seconds
Peak Temperature (Tp)	215 °C	260 °C
Time within 5°C of actual Peak Temperature (tp) ²	10-30 seconds	20-40 seconds
Ramp-down Rate	6 °C/second max.	6 °C/second max.
Time 25°C to Peak Temperature	6 minutes max.	8 minutes max.

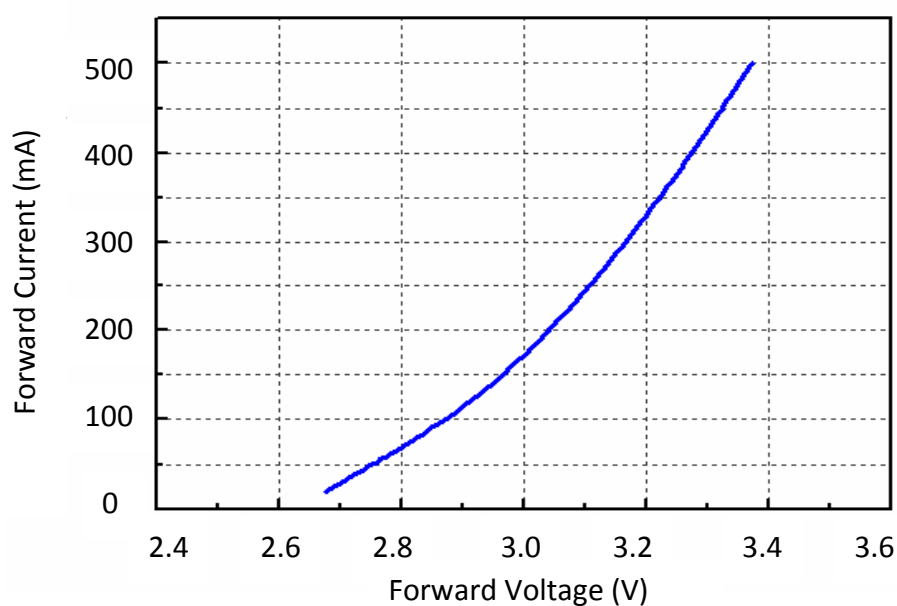
Note: The housing side wall is composed by silicon which is a kind of semiconductor.

Please avoid solder ball or excessive solder aroundside wall during SMT process.

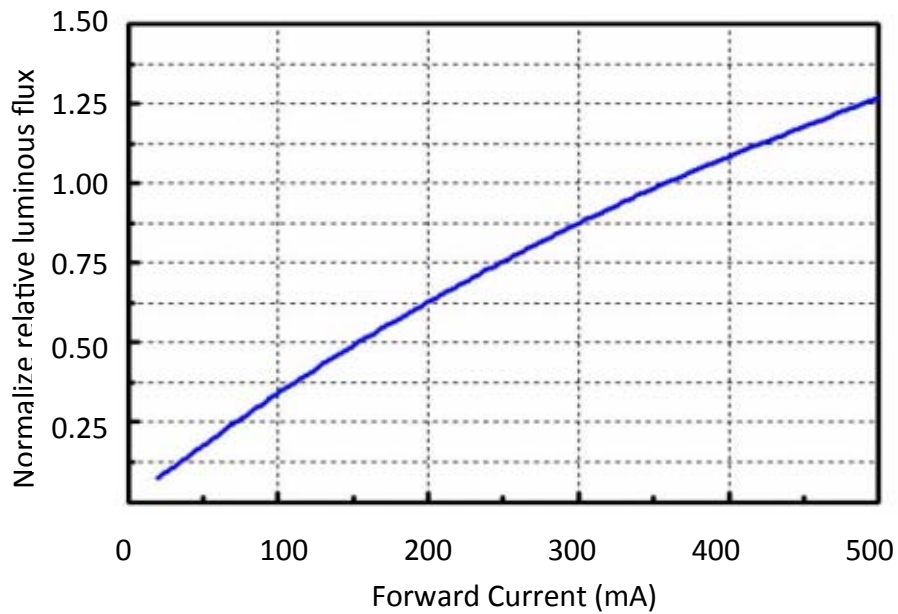
8.1 Relative Spectral Characteristics, $T_j=25\text{ }^{\circ}\text{C}$, $I_F=350\text{mA}$



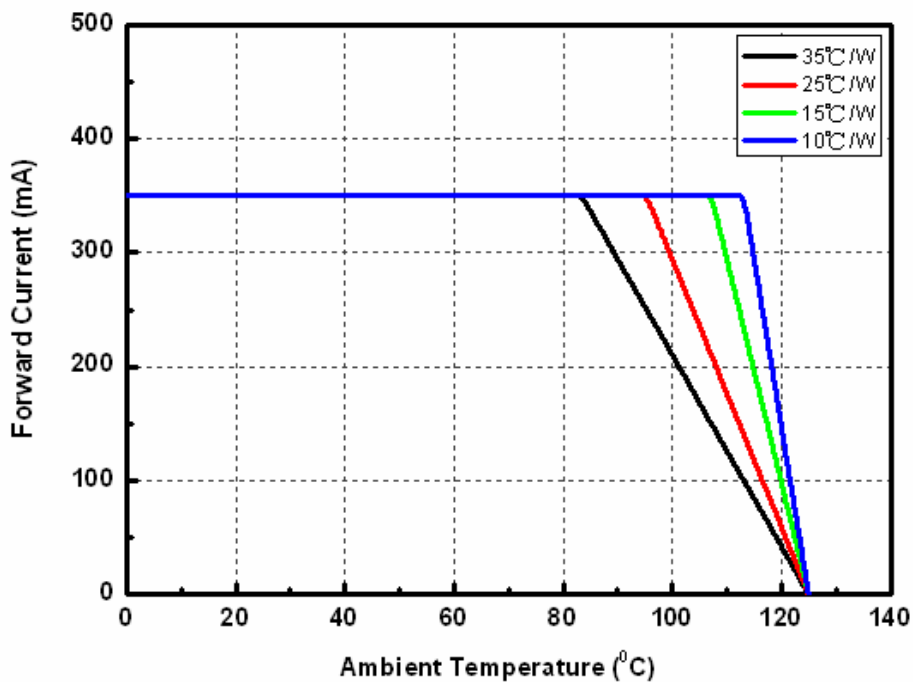
8.2 Typical Electrical Characteristics, $T_j=25\text{ }^{\circ}\text{C}$



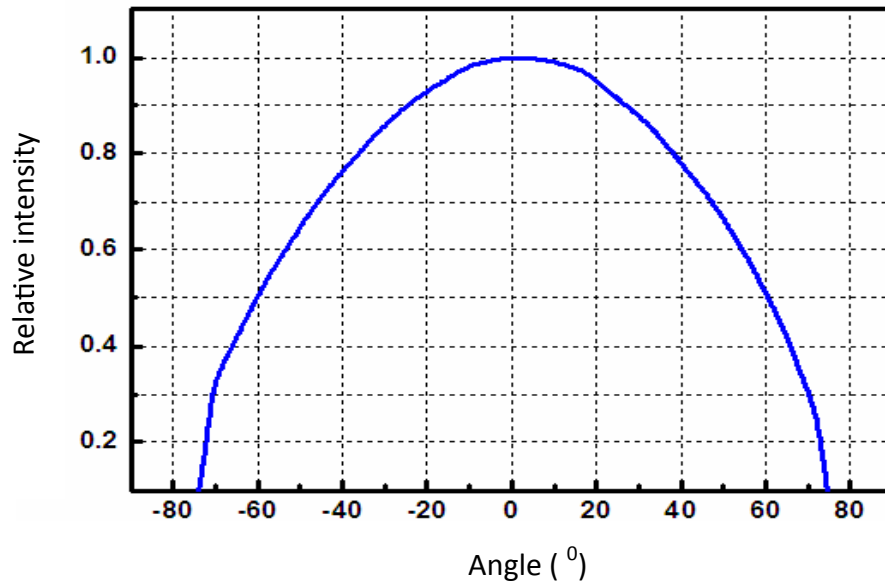
8.3 Typical Relative Luminous Flux vs. Forward Current, $T_j=25^\circ\text{C}$



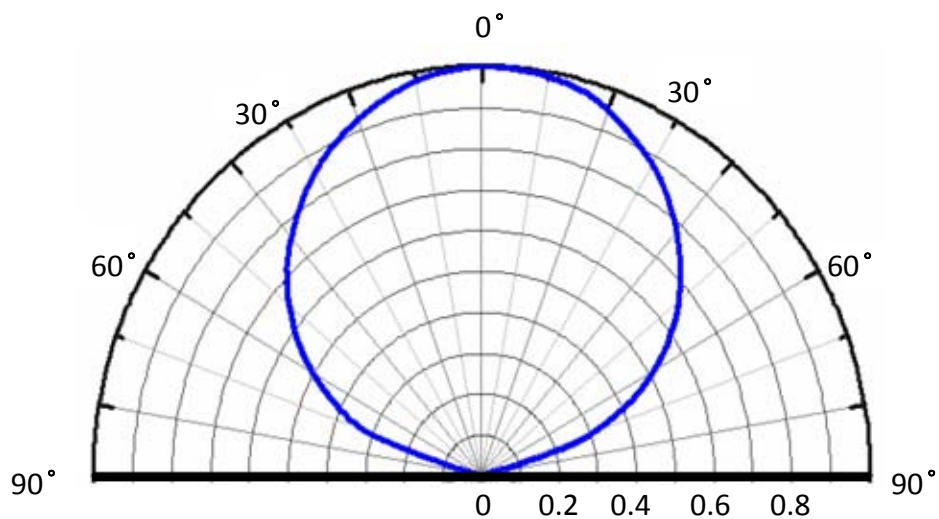
8.4 Current Derating Curve, $I_F=350\text{mA}$



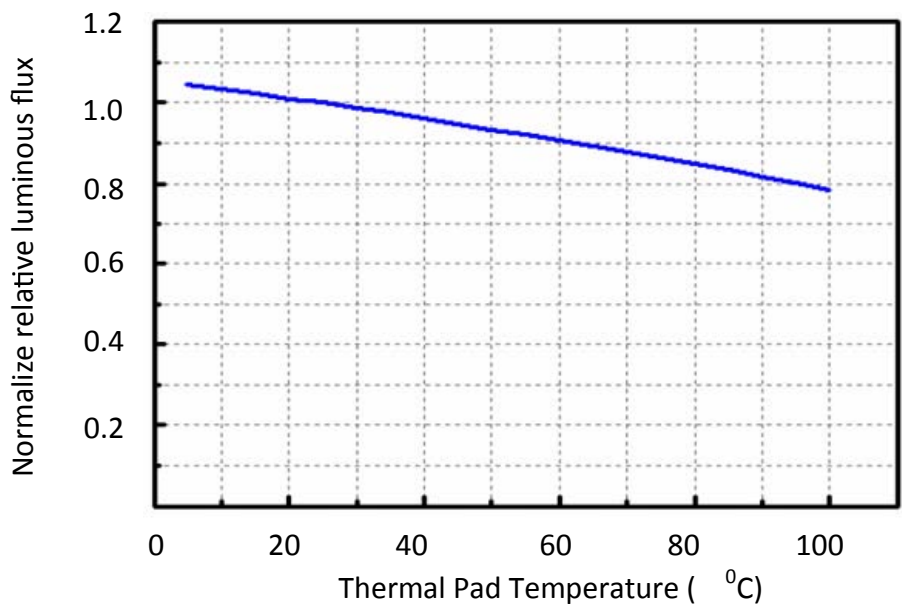
8.5 Typical Spatial Radiation Pattern for Lambertian, $T_j=25^\circ\text{C}$, $I_F=350\text{mA}$



8.6 Typical Polar Radiation Pattern for Lambertian, $T_j= 25^\circ\text{C}$, $I_F=350\text{mA}$

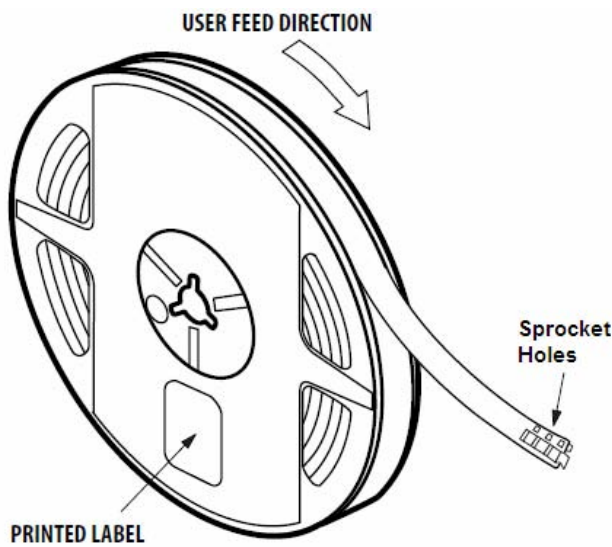
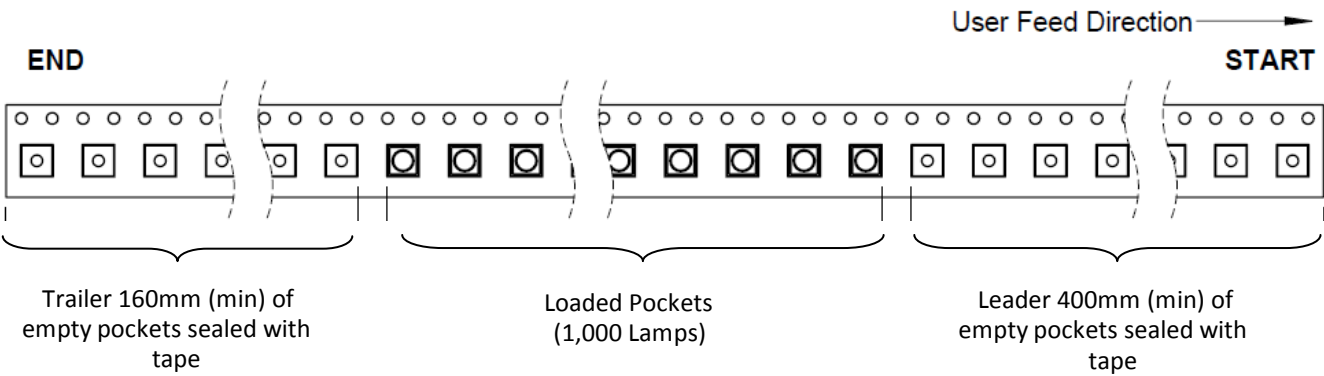
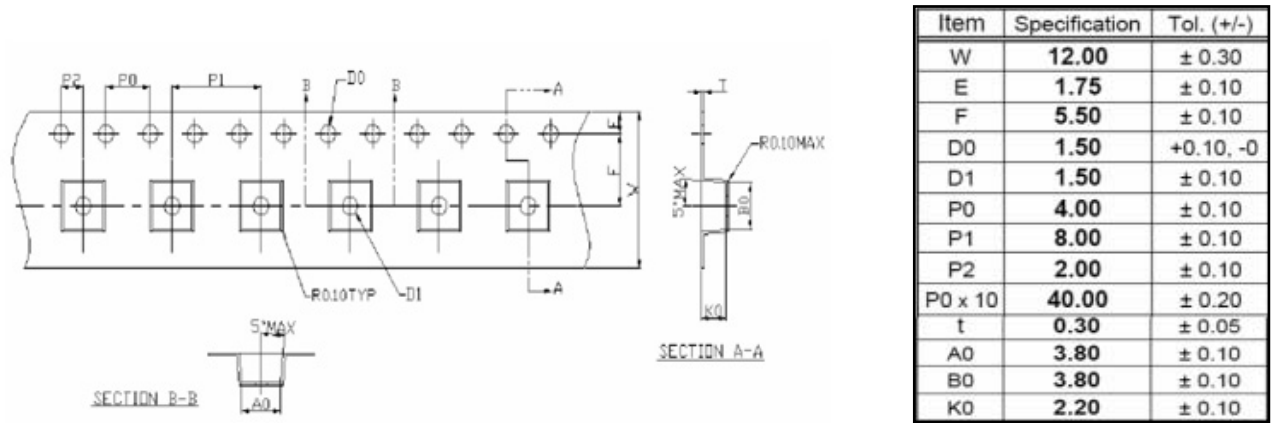


8.7 Typical Relative Luminous Flux vs. Thermal Pad Temperature, IF=350mA

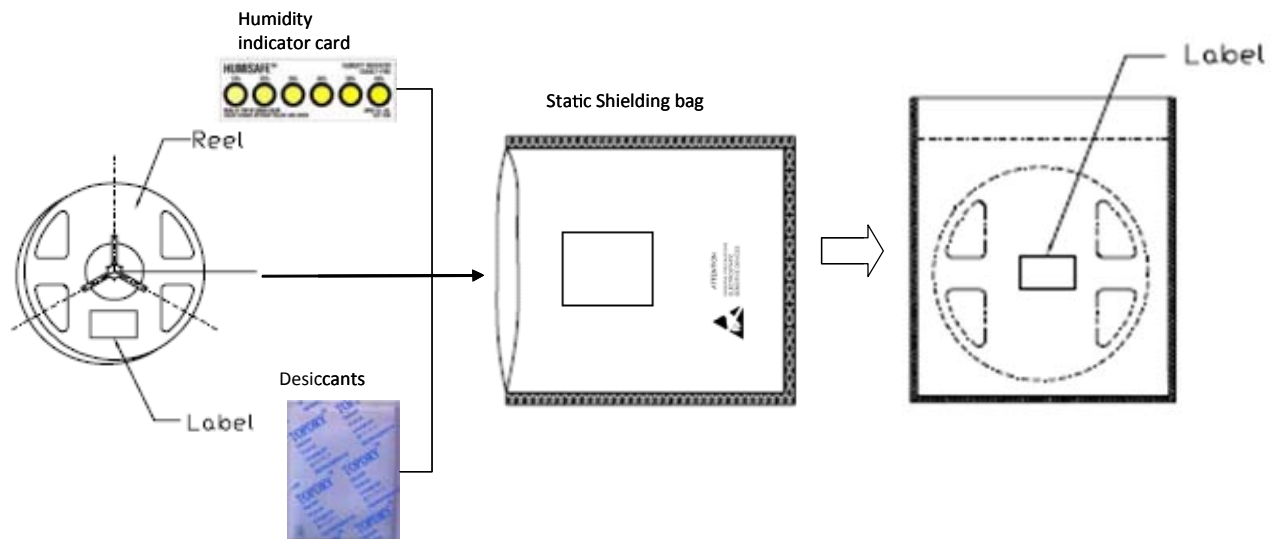


Note: The LED is soldered on slug. The slug backside temperature is defined as thermal pad temperature

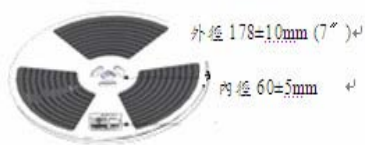
9 Tape and Reel



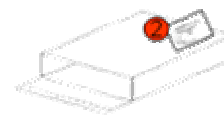
10 Packaging



MFG Packing



Ship out packing Step

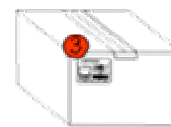


1 bags in an inner box = 1000 EA

FG in after OQC Packing



1 reel in a bag = 1000pcs



Small size: 5 inner box in an outer box = 5000 EA
Large size: 10 inner box in an outer box = 10000 EA

11 Cool White Binning

Bin code	X	Y	Reference CCT (K)
XO	0.3052	0.3224	6300-7000
	0.3160	0.3332	
	0.3175	0.3204	
	0.3076	0.3108	
XP	0.3076	0.3108	
	0.3175	0.3204	
	0.3196	0.3013	
	0.3112	0.2932	
WN	0.3148	0.3444	5650-6300
	0.3288	0.3569	
	0.3290	0.3451	
	0.3160	0.3332	
WO	0.3160	0.3332	
	0.3290	0.3451	
	0.3292	0.3313	
	0.3175	0.3204	
WP	0.3175	0.3204	
	0.3292	0.3313	
	0.3294	0.3202	
	0.3186	0.3102	

Bin code	X	Y	Reference CCT (K)
VM	0.3286	0.3690	5000-5650
	0.3481	0.3856	
	0.3490	0.3717	
	0.3288	0.3569	
VN	0.3288	0.3569	
	0.3469	0.3717	
	0.3458	0.3592	
	0.3290	0.3451	
VO	0.3290	0.3451	
	0.3458	0.3592	
	0.3444	0.3442	
	0.3292	0.3313	
VP	0.3292	0.3313	
	0.3444	0.3442	
	0.3434	0.3320	
	0.3294	0.3202	

12 Neutral White Binning

Bin code	X	Y	Reference CCT (K)
UM	0.3481	0.3856	4500-5000
	0.3673	0.4003	
	0.3642	0.3829	
	0.3469	0.3717	
UN	0.3469	0.3717	
	0.3642	0.3829	
	0.3622	0.3716	
	0.3458	0.3592	
UO	0.3458	0.3592	
	0.3622	0.3716	
	0.3594	0.3557	
	0.3444	0.3442	
UP	0.3444	0.3442	
	0.3594	0.3557	
	0.3574	0.3426	
	0.3434	0.3320	

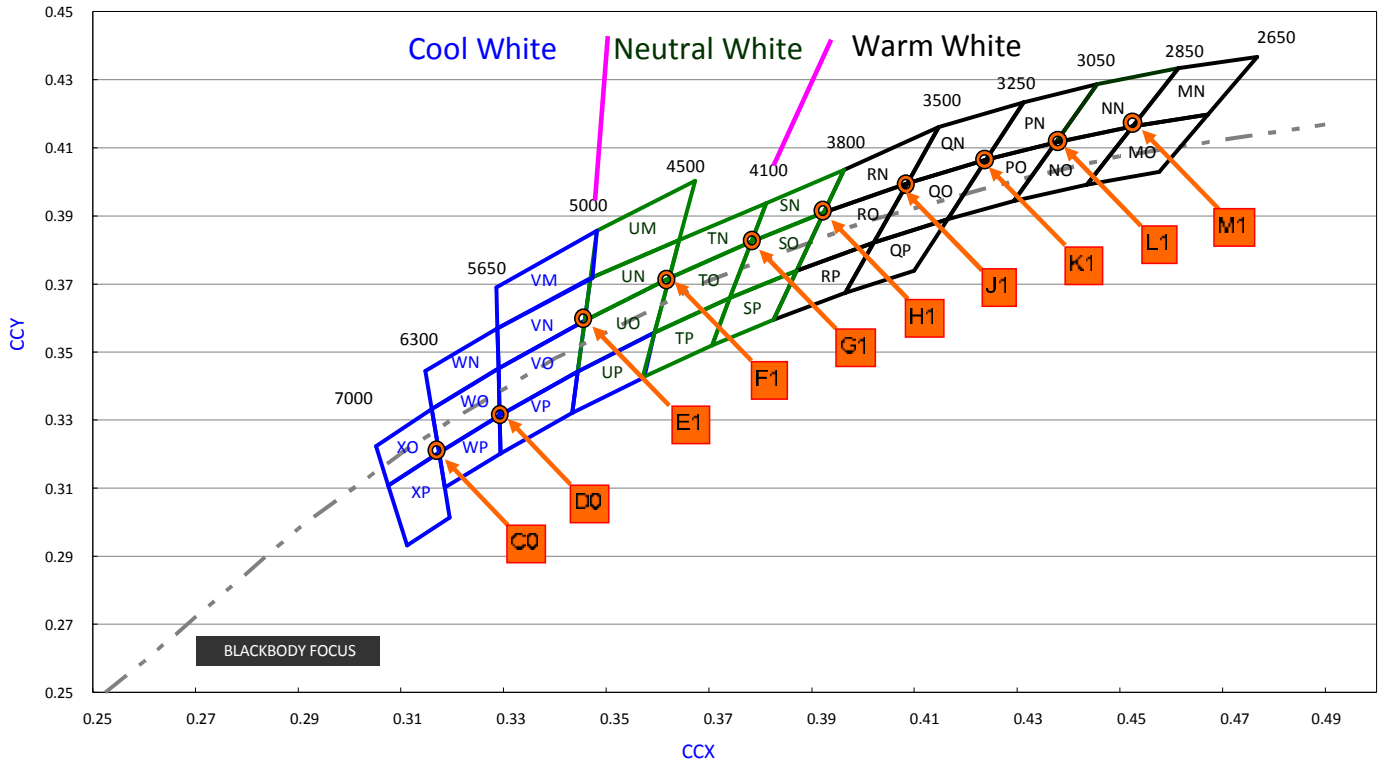
Bin code	X	Y	Reference CCT (K)
TN	0.3642	0.3829	4100-4500
	0.3811	0.3937	
	0.3783	0.3825	
	0.3622	0.3716	
TO	0.3622	0.3716	
	0.3783	0.3825	
	0.3741	0.3658	
	0.3594	0.3557	
TP	0.3594	0.3557	
	0.3741	0.3658	
	0.3706	0.3520	
	0.3571	0.3426	

13 Warm White Binning

Bin code	X	Y	Reference CCT (K)
SN	0.3811	0.3937	3800-4100
	0.3963	0.4035	
	0.3924	0.3909	
	0.3783	0.3825	
SO	0.3783	0.3825	
	0.3924	0.3909	
	0.3871	0.3739	
	0.3741	0.3658	
SP	0.3741	0.3658	
	0.3871	0.3739	
	0.3826	0.3595	
	0.3706	0.3520	
RN	0.3963	0.4035	3500-3800
	0.4148	0.4161	
	0.4086	0.3995	
	0.3924	0.3909	
RO	0.3924	0.3909	
	0.4086	0.3995	
	0.4021	0.3822	
	0.3871	0.3739	
RP	0.3871	0.3739	
	0.4021	0.3822	
	0.3966	0.3673	
	0.3826	0.3595	
QN	0.4148	0.4161	3250-3500
	0.4312	0.4234	
	0.4240	0.4065	
	0.4086	0.3995	

Bin code	X	Y	Reference CCT (K)
QO	0.4086	0.3995	3250-3500
	0.4240	0.4065	
	0.4165	0.3890	
	0.4021	0.3822	
QP	0.4021	0.3822	
	0.4165	0.3890	
	0.4100	0.3738	
	0.3966	0.3673	
PN	0.4312	0.4234	3050-3250
	0.4456	0.4287	
	0.4376	0.4116	
	0.4240	0.4065	
PO	0.4240	0.4065	
	0.4376	0.4116	
	0.4294	0.3943	
	0.4165	0.3890	
NN	0.4456	0.4287	2850-3050
	0.4614	0.4333	
	0.4525	0.4162	
	0.4376	0.4116	
NO	0.4376	0.4116	
	0.4525	0.4162	
	0.4436	0.3991	
	0.4294	0.3943	
MN	0.4614	0.4333	2650-2850
	0.4767	0.4366	
	0.4671	0.4196	
	0.4525	0.4162	
MO	0.4525	0.4162	
	0.4671	0.4196	
	0.4577	0.4029	
	0.4436	0.3991	

14 Color Binning Structure Graphic Representation



15 Reliability

Items	Reference	Stress Condition	Period	Sample Size	Result
Wet High Temperature Operation Life Test (WHTOL)	JESD22-A108C	If= 350mA, Ta=85 °C, 85%RH	1000 hrs	22	1000hrs PASS
High Temperature Operation Life Test (HTOL)	JESD22-A108C	If= 350mA, Ta=85 °C	1000 hrs	22	1000hrs PASS
Room Temperature Operation Life Test (RTOL)	JESD22-A108C	If= 350mA, Ta=45 °C	1000 hrs	22	1000hrs PASS
Low Temperature Operation Life Test (LTOL)	JESD22-A108C	If= 350mA, Ta=-40 °C	1000 hrs	22	1000hrs PASS
Temperature Cycle (TC)	JESD22-A104D	-40~+125 °C, 15min dwell , <5min transfer	500 cycles	22	500cycles PASS
Thermal Shock (TMSK)	JESD22-A106B	-40 ~+125 °C, 20min dwell , <20sec transfer	500 cycles	22	500cycles PASS
High Temperature Storage Life (HTS)	JESD22-A103C	Ta=110 °C	1000 hrs	22	1000hrs PASS
Low Temperature Storage Life (LTS)	JESD22-A119	Ta=-40 °C	1000 hrs	22	1000hrs PASS
Pre-Condition	J-STD-020D	MSL 2		66	PASS

Failure Criteria :

1. For precondition, failure criteria is “LED no longer lights up after test”.
2. A failure is a LED that is open or short.
3. A failure is a LED loses more than 30% of its initial light output or forward voltage after 1000hrs/500cycles.
4. A failure is a LED that color coordinate shift $du'v' > 0.7\%$ after 1000hrs/cycles.

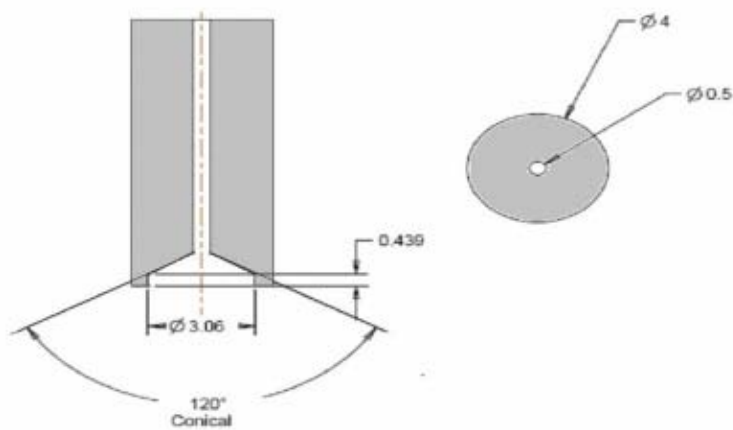
16 LED Handling Information

The following items are recommended when handling LEDs

- 16.1 The lens of LEDs should not be exposed to dust and debris. Excessive dust and debris may cause a drastic decrease in light output.
- 16.2 Avoid mechanical stress on LED lens
- 16.3 Do not touch the LED lens surface. It would affect the optical performance of the LED due to the LED lens' damage
- 16.4 Pick & place tool was recommended to use for the remove of LEDs from the factory tape & reel

17 Pick & Place Nozzle

The pickup tool was recommended and shown as below

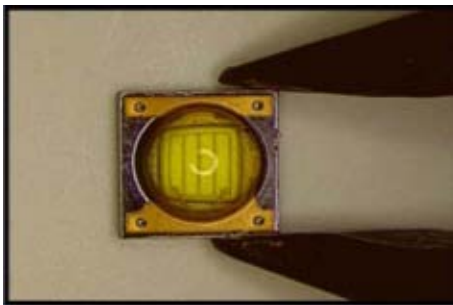
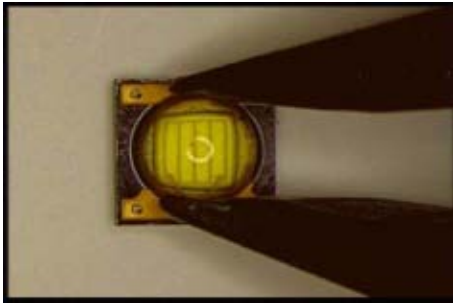


Unit : mm
Tolerance : ±0.1

18 Lens handling

Please follow the guideline to grab LEDs

- 18.1 Use tweezers to grab LEDs
- 18.2 Do not touch lens with the tweezers
- 18.3 Do not touch lens with fingers
- 18.4 Do not apply more than 4N of lens (400g) directly onto the lens

Correct (√)	Wrong (X)
	

19 Lens cleaning

In the case where a minimal level of dirt and dustparticles can not be guaranteed, a suitable cleaning solution can be applied to the lens surface

- 19.1 Try a gentle swabbing using a lint-free swab
- 19.2 If needed, the use of lint-free swab and isopropyl alcohol used gently removes dirt from the lens surface
- 19.3 Do not use other solvents as they may directly react with the LED assembly
- 19.4 Do not use ultrasonic cleaning that the LED will be damaged

20 Carrier Tape Handling

The following items are recommended when handling the Carrier tape of LEDs

- 20.1 Do not twist the carrier tape
- 20.2 The inward bending diameter should not smaller than 6cm for carrier tape.
- 20.3 Do not bend the tape outward.
- 20.4 Storage temperature should not exceed 60°C

