

1.90mm Height PLCC-4 Top View
Full Color Chip LED
Technical Data Sheet

Part No.: R3528RGBM-008-B-L

Features:

- ◇ PLCC-4 package.
- ◇ White Frame with black surface
- ◇ semi-glossy surface
- ◇ Ideal for backlight and light pipe application.
- ◇ Inter reflector.
- ◇ Wide viewing angle.
- ◇ Suitable for automatic placement equipment.
- ◇ Suitable for vapor-phase reflow, Infrared reflow and wave solder processes.
- ◇ Available on tape and reel (8mm Tape).
- ◇ The product itself will remain within RoHS compliant Version.

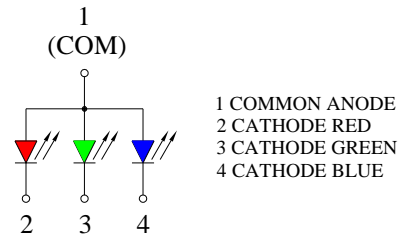
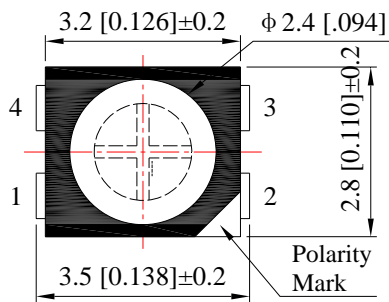
Descriptions:

- ◇ The R3528XXX is available in soft red, orange, yellow, green, blue and white. Due to the package design, the LED has wide viewing angle and optimized light coupling by inter reflector, this feature makes the SMT TOP LED ideal for light pipe Application. The low current requirement makes this device ideal for portable equipment or any other application where power is at a premium.

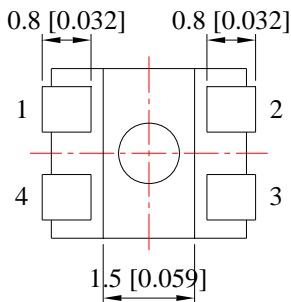
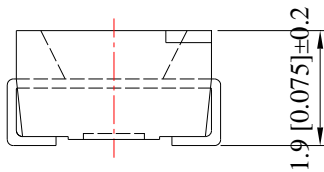
Applications:

- ◇ Indoor full-color video Screen
- ◇ Decorative Lighting
- ◇ Amusement
- ◇ General use.

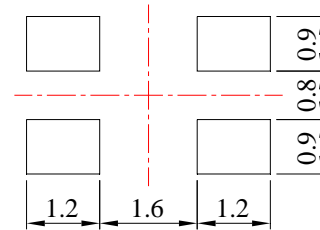
Package Dimension:



Polarity



Recommended Soldering Pad Dimensions



Part No.	Chip Material		Lens Color	Source Color
R3528RGBM-008-B-L	R	AlGaInP	White Diffused	Hyper Red
	G	InGaN		Pure Green
	B	InGaN		Blue

Notes:

1. All dimensions are in millimeters.
2. Tolerance is $\pm 0.10\text{mm}$ (.004") unless otherwise specified.
3. Specifications are subject to change without notice.

Absolute Maximum Ratings at Ta=25°C

Parameters	Symbol	Max.	Unit	
Power Dissipation	PD	Hyper Red	48	mW
		Pure Green	72	
		Blue	72	
Peak Forward Current (1/10 Duty Cycle, 0.1ms Pulse Width)	IFP	Hyper Red	50	mA
		Pure Green	40	
		Blue	40	
Continuous Forward Current	IF	Hyper Red	20	mA
		Pure Green	20	
		Blue	20	
Reverse Voltage	VR	5	V	
Electrostatic Discharge (HBM)	ESD	Hyper Red	2000	V
		Pure Green	400	V
		Blue	400	V
Operating Temperature Range	Topr	-40°C to +80°C		
Storage Temperature Range	Tstg	-40°C to +85°C		
Soldering Temperature	Tsld	260°C for 5 Seconds		

Electrical Optical Characteristics at Ta=25°C

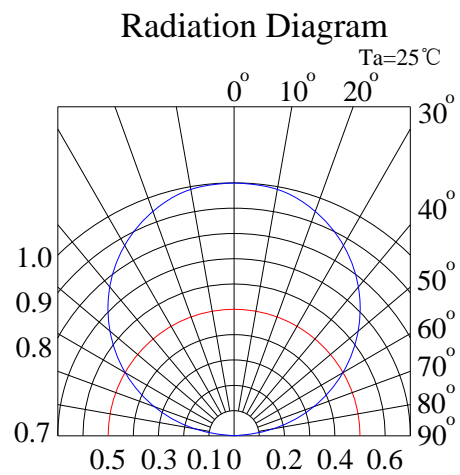
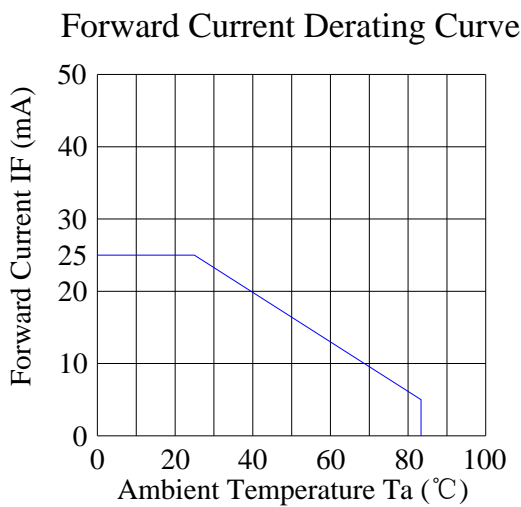
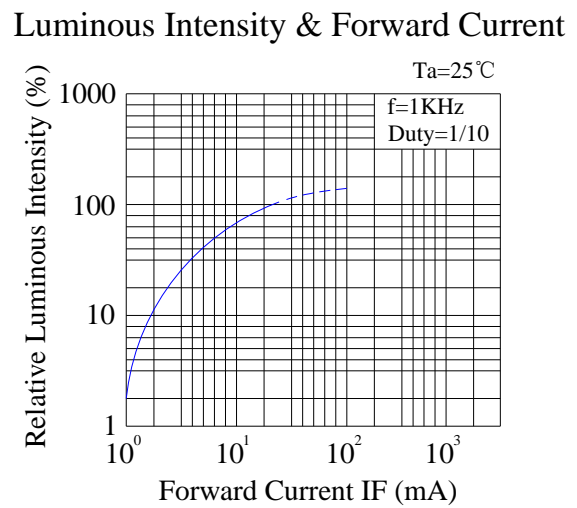
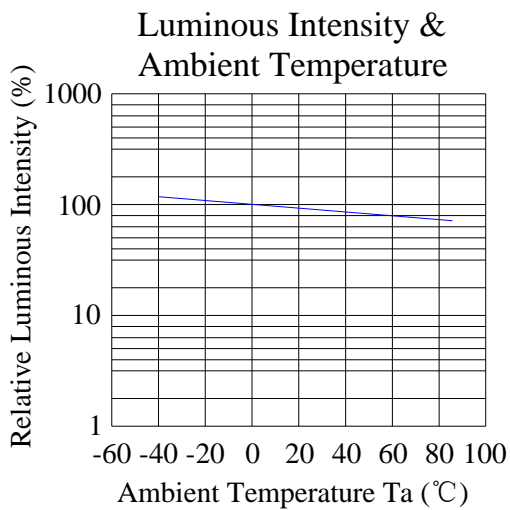
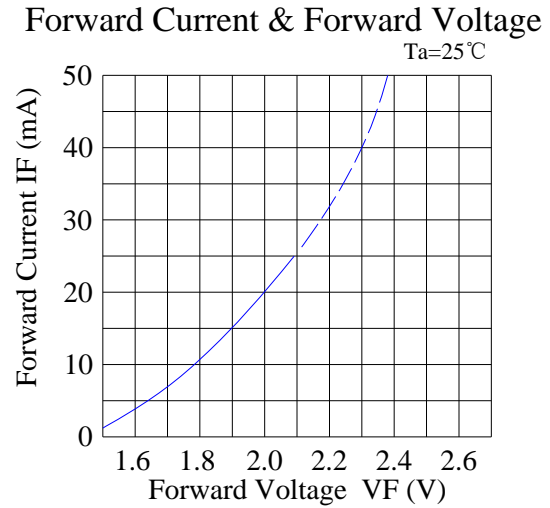
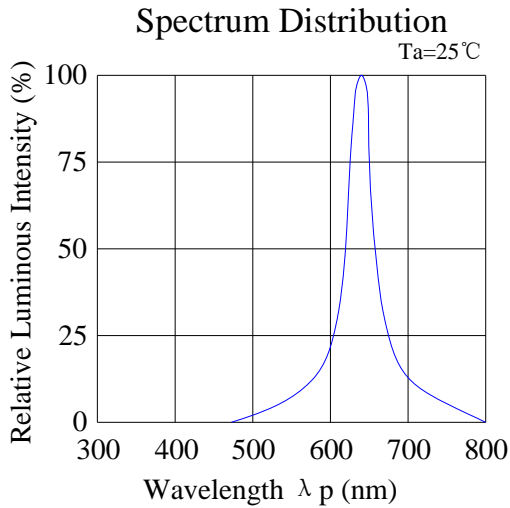
Parameters	Symbol	Emitting Color	Min.	Typ.	Max.	Unit	Test Condition
Luminous Intensity (Note 1)	IV	Hyper Red	180	300	---	mcd	IF=20mA
		Pure Green	440	650	---		IF=12mA
		Blue	100	140	---		IF=12mA
Viewing Angle (Note 2)	2θ _{1/2}	Hyper Red	---	120	---	Deg	IF=20mA
		Pure Green	---	120	---		IF=12mA
		Blue	---	120	---		IF=12mA
Peak Emission Wavelength	λ _p	Hyper Red	---	632	---	nm	IF=20mA
		Pure Green	---	520	---		IF=12mA
		Blue	---	468	---		IF=12mA
Dominant Wavelength	λ _d	Hyper Red	---	624	---	nm	IF=20mA
		Pure Green	---	525	---		IF=12mA
		Blue	---	470	---		IF=12mA
Spectral Line Half-Width	Δλ	Hyper Red	---	20	---	nm	IF=20mA
		Pure Green	---	35	---		IF=12mA
		Blue	---	25	---		IF=12mA
Forward Voltage	VF	Hyper Red	1.60	2.00	2.40	V	IF=20mA
		Pure Green	2.60	2.95	3.60		IF=12mA
		Blue	2.60	2.95	3.60		IF=12mA
Reverse Current	IR	Hyper Red	---	---	10	μA	V _R =5V
		Pure Green			50		
		Blue			50		

Notes:

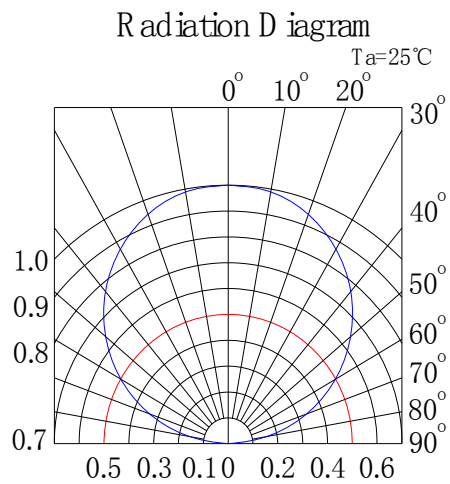
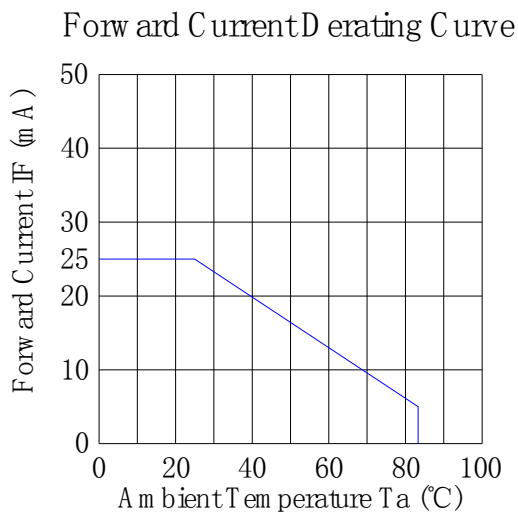
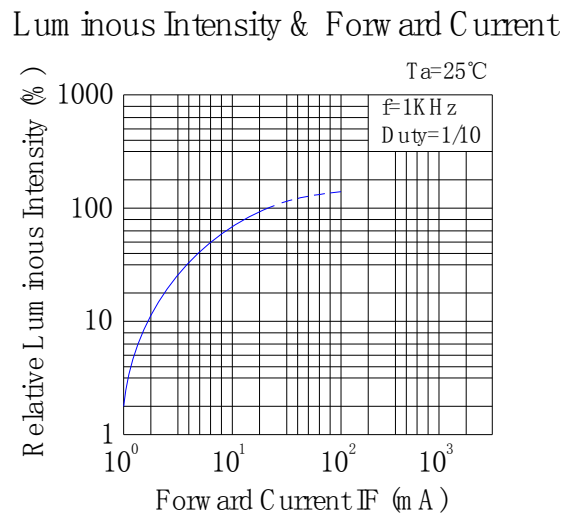
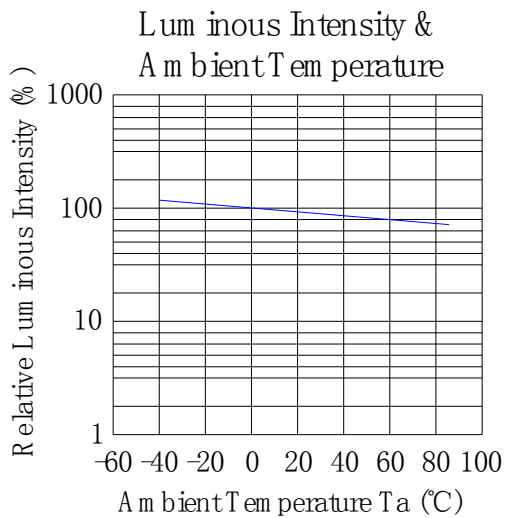
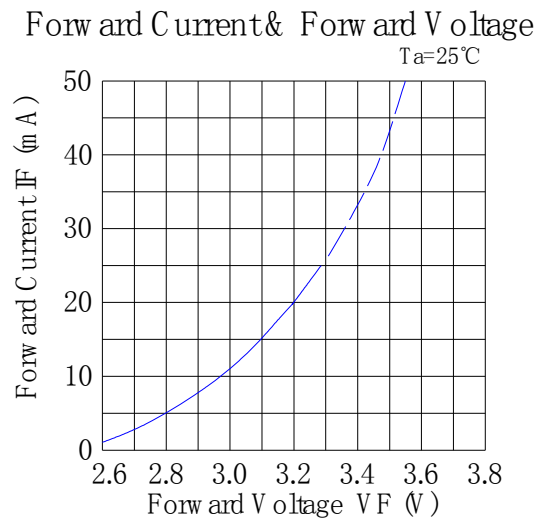
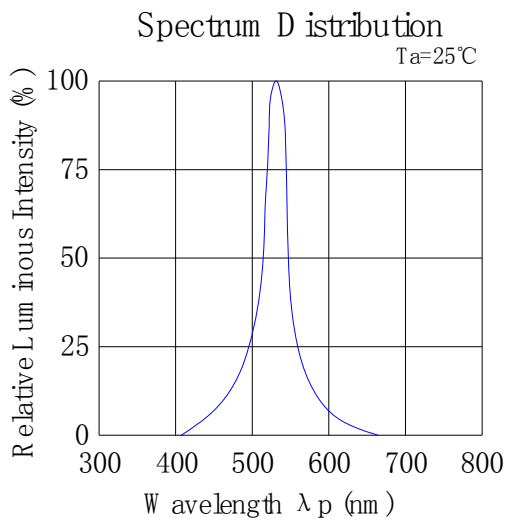
1. Luminous Intensity Measurement allowance is ± 10%.
2. θ_{1/2} is the off-axis angle at which the luminous intensity is half the axial luminous intensity.
3. The dominant wavelength (λ_d) is derived from the CIE chromaticity diagram and represents the single wavelength which defines the color of the device.

Typical Electrical / Optical Characteristics Curves (25°C Ambient Temperature Unless Otherwise Noted)

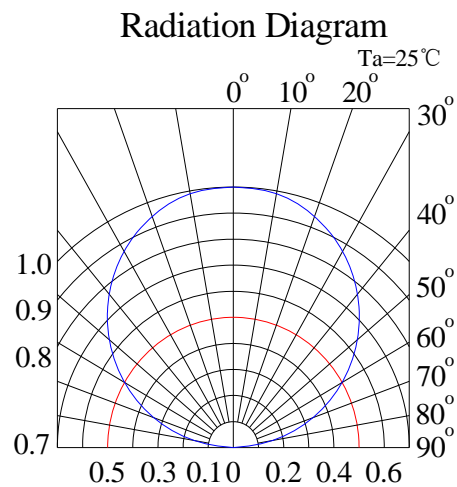
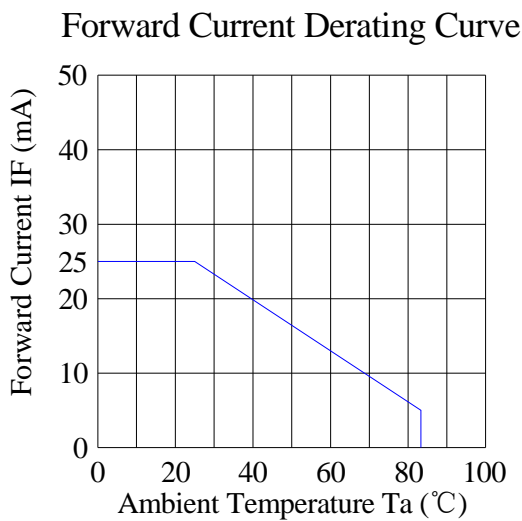
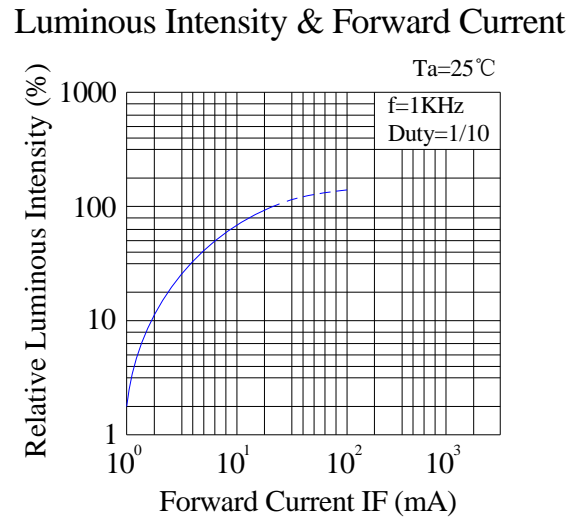
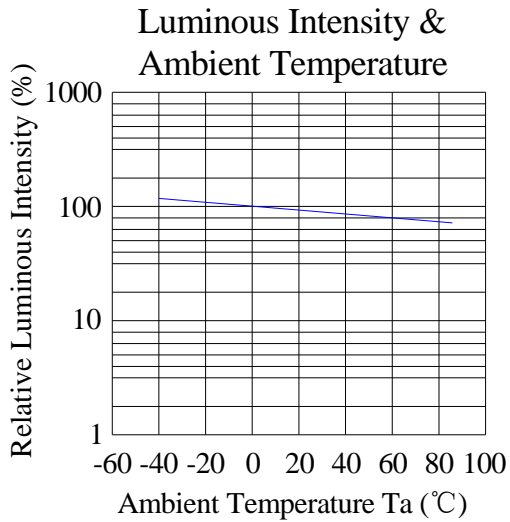
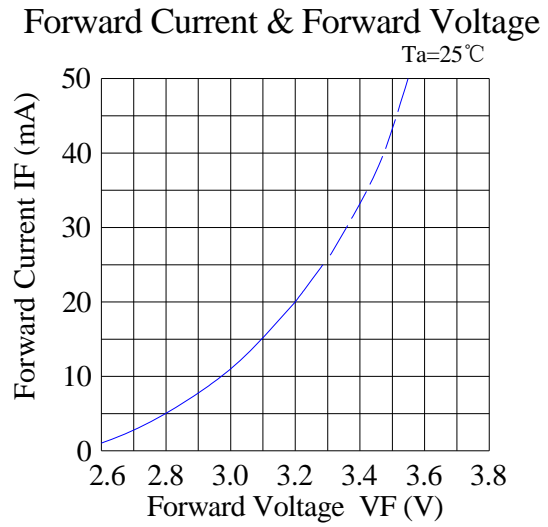
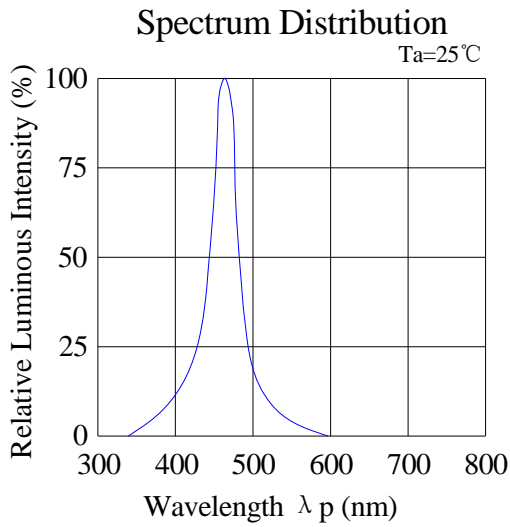
Hyper Red:



Pure Green:



Blue:



Reliability Test Items And Conditions:

The reliability of products shall be satisfied with items listed below:

Confidence level: 90%.

LTPD: 10%.

1) Test Items and Results:

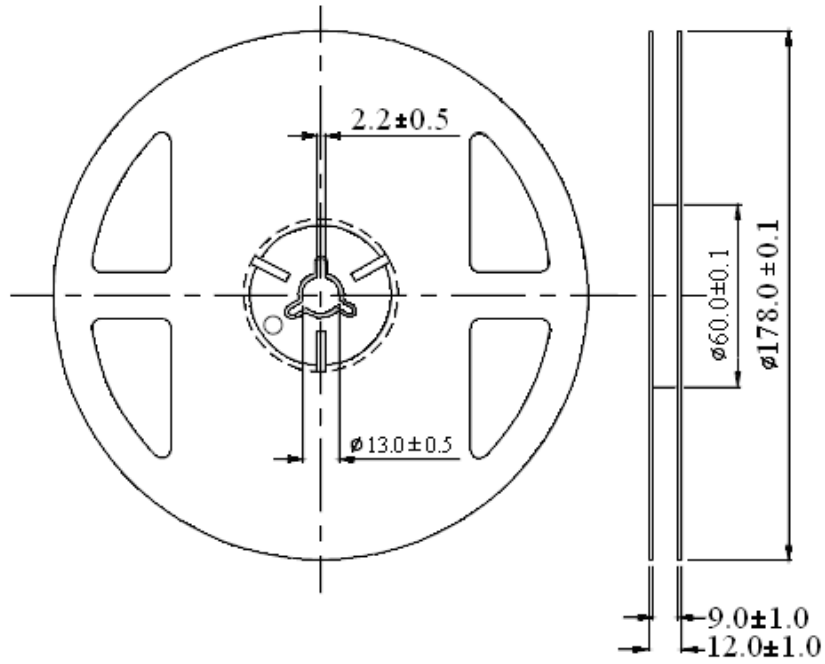
No.	Test Item	Test Hours/Cycles	Test Conditions	Sample Size	Ac/Re
1	Resistance to Soldering Heat	6 Min	Tsld=260±5°C, Min. 5sec	25pcs	0/1
2	Thermal Shock	300 Cycles	H: +100°C 5min ∫ 10 sec L: -10°C 5min	25pcs	0/1
3	Temperature Cycle	300 Cycles	H: +100°C 15min ∫ 5min L: -40°C 15min	25pcs	0/1
4	High Temperature Storage	1000Hrs.	Temp: 100°C	25pcs	0/1
5	DC Operating Life	1000Hrs.	IF _R =20mA IF _G =12mA IF _B =12mA	25pcs	0/1
6	Low Temperature Storage	1000Hrs.	Temp: -40°C	25pcs	0/1
7	High Temperature/ High Humidity	1000Hrs.	85°C/85%RH	25pcs	0/1

2) Criteria for Judging the Damage:

Item	Symbol	Test Conditions	Criteria for Judgment	
			Min	Max
Forward Voltage	VF	IF _R =20mA IF _G =12mA IF _B =12mA	---	F.V.*)×1.1
Reverse Current	IR	VR=5V	---	F.V.*)×2.0
Luminous Intensity	IV	IF _R =20mA IF _G =12mA IF _B =12mA	F.V.*)×0.7	---

*) F.V.: First Value.

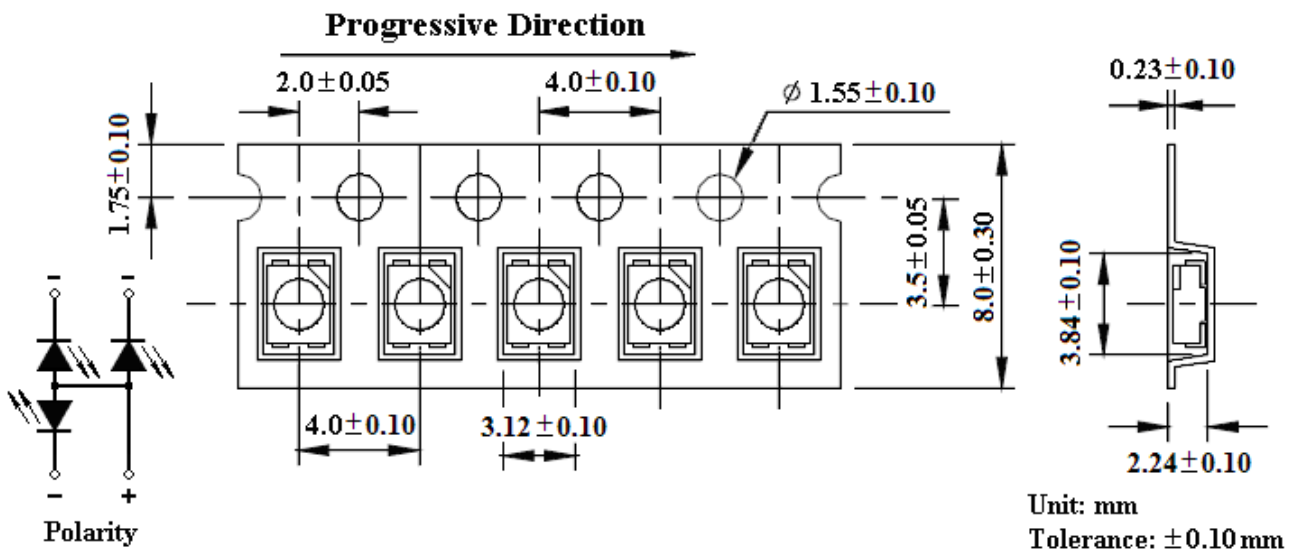
Reel Dimensions:



Unit: mm
Tolerance: ± 0.25 mm

Carrier Tape Dimensions:

Loaded quantity 8000PCS per reel.



Unit: mm
Tolerance: ± 0.10 mm

Please read the following notes before using the product:

1. Over-current-proof

Customer must apply resistors for protection, otherwise slight voltage shift will cause big current change (Burn out will happen).

2. Storage

2.1 Do not open moisture proof bag before the products are ready to use.

2.2 Before opening the package, the LEDs should be kept at 30°C or less and 80%RH or less.

2.3 The LEDs should be used within a year.

2.4 After opening the package, the LEDs should be kept at 30°C or less and 60%RH or less.

2.5 The LEDs should be used within 168 hours (7 days) after opening the package.

2.6 If the moisture adsorbent material has fabled away or the LEDs have exceeded the storage time, baking treatment should be performed using the following conditions. Baking treatment: 60±5°C for 24 hours.

3. Soldering Condition

When soldering, for Lamp without stopper type and must be leave a minimum of 3mm clearance from the base of the lens to the soldering point.

To avoided the Epoxy climb up on lead frame and was impact to non-soldering problem, dipping the lens into the solder must be avoided.

Do not apply any external stress to the lead frame during soldering while the LED is at high temperature.

Recommended soldering conditions:

Soldering Iron		Wave Soldering	
Temperature	300°C Max.	Pre-heat	100°C Max.
Soldering Time	3 sec. Max. (one time only)	Pre-heat Time	60 sec. Max.
		Solder Wave	260°C Max.
		Soldering Time	5 sec. Max.

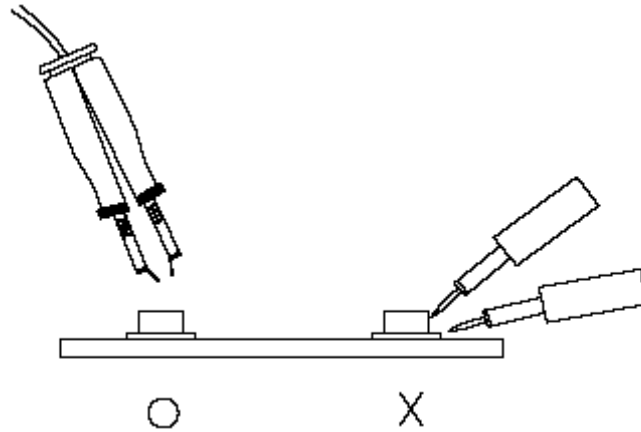
Note: Excessive soldering temperature and / or time might result in deformation of the LED lens or catastrophic failure of the LED.

4. Soldering Iron

Each terminal is to go to the tip of soldering iron temperature less than 260°C for 5 seconds within once in less than the soldering iron capacity 25W. Leave two seconds and more intervals, and do soldering of each terminal. Be careful because the damage of the product is often started at the time of the hand solder.

5. Repairing

Repair should not be done after the LEDs have been soldered. When repairing is unavoidable, a double-head soldering iron should be used (as below figure). It should be confirmed beforehand whether the characteristics of the LEDs will or will not be damaged by repairing.



6. Caution in ESD

Static Electricity and surge damages the LED. It is recommended to use a wrist band or anti-electrostatic glove when handling the LED. All devices, equipment and machinery must be properly grounded.