R3528W-W6-1F

3.5x2.8mm,Warm White LED
Surface Mount PLCC-2 LED Indicator

Technical Data Sheet

Features:

- Industry standard PLCC-2 package.
- High reliability LED Package
- Inter reflector.
- Available in full selection of colors.
- 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:

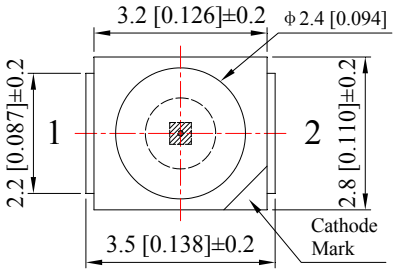
- The R3528 series is available in soft red, orange, yellow, green, blue and white. Due to the package design, the LED has wide viewing angle and optimized light coupling by inter reflector. This feature makes the SMT TOP LED ideal for light pipe application. The low current requirement makes this device ideal for portable equipment or any other application where power is at a premium.

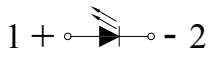
Applications:

- Interior automotive
- Instrument panel backlighting
- Central console backlighting
- Switch push button backlighting
- Electronic signs and signals
- Interior full color sign
- Variable message sign
- Office automation,home appliances,industrial equipment
- Front panel backlighting
- Push button backlighting
- Display backlighting
- Light pipe application

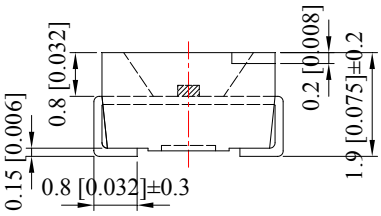
Part No.	Emitting Color	Lens Color
R3528W-W6-1F	Warm White	Yellow Diffused

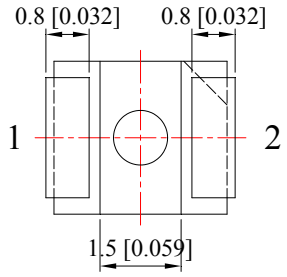
Package Dimension:



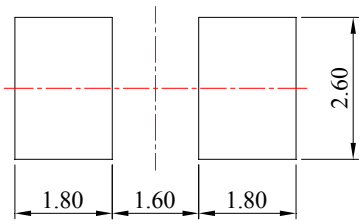


Polarity





Recommended Soldering Pad Dimensions



Notes:

1. All dimensions are in millimeters (inches).
2. Tolerance is ± 0.25 mm (.010″) unless otherwise noted.

Absolute Maximum Ratings at Ta=25℃

Parameters	Symbol	Max	Unit
Power Dissipation	Pd	90	mW
Peak Forward Current[a]	IFP	100	mA
DC Forward Current[b]	IF	25	mA
Reverse Voltage	VR	5	V
Electrostatic Discharge (HBM)	ESD	1000	V
Operating Temperature Range	Topr	-40℃ to +80℃	
Storage Temperature Range	Tstg	-40℃ to +85℃	
Soldering Temperature	Tsld	260℃ for 5 Seconds	

Notes:
a. Derate linearly as shown in derating curve.
b. Duty Factor = 10%, Frequency = 1 kHz

Electrical Optical Characteristics at Ta=25℃

Parameters	Symbol	Min.	Typ.	Max.	Unit	Test Condition
Luminous Intensity[a]	IV	2000	2300	---	mcd	IF=20mA
Luminous Flux [a]	Φv	7	7.5	---	lm	IF=20mA
Viewing Angle [b]	2θ1/2	---	120	---	Deg	IF=20mA
Chromaticity Coordinates[C]	x	---	0.43	---		IF=20mA
	y	---	0.40	---		
Color Temperature	CCT	2600	3000	3500	K	IF=20mA
Color Rendering Index	CRI	---	70	---	Ra	IF=20mA
Forward Voltage	VF	2.80	3.20	3.60	V	IF=20mA
Reverse Current	IR	---	---	10	μA	V_R=5V

Notes:

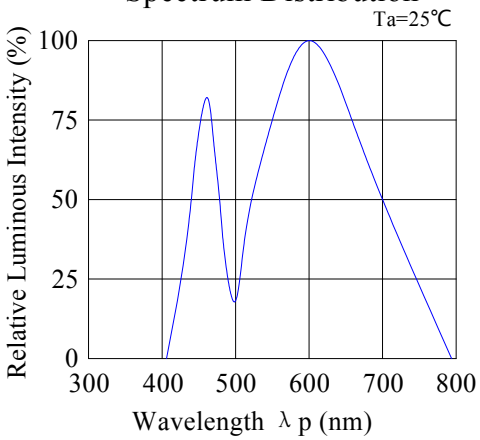
a. ALuminous intensity is measured with a light sensor and filter combination that approximates the CIE eye-response curve.

b. 2θ1/2 is the o -axis angle where the luminous intensity is 1⁄2 the peak intensity

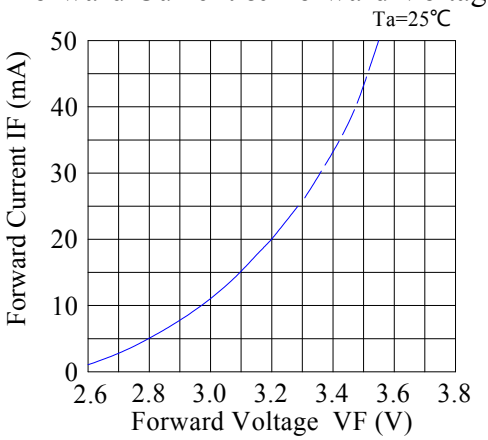
c. The dominant wavelength (λd) is derived from the CIE chromaticity diagram and represents the single wavelength which defines the color of the device.

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

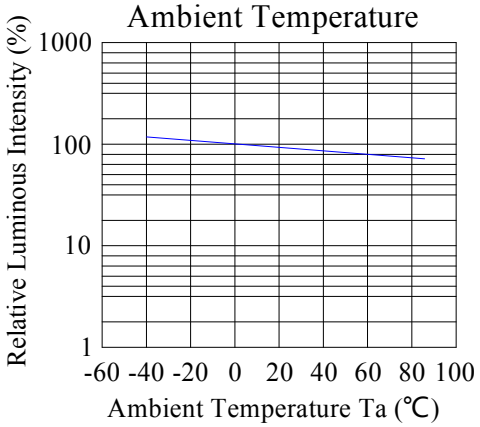
Spectrum Distribution



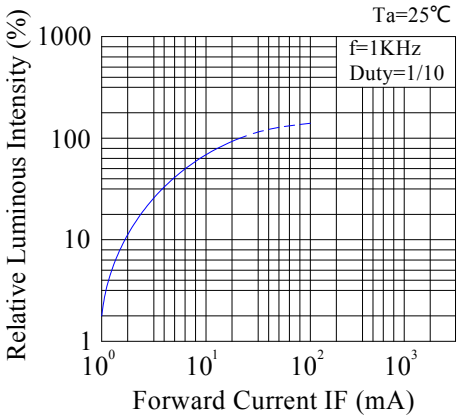
Forward Current & Forward Voltage



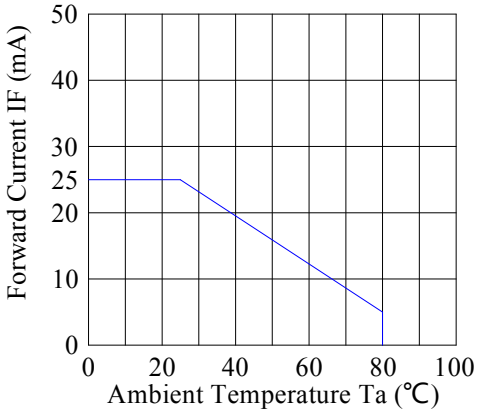
Luminous Intensity & Ambient Temperature



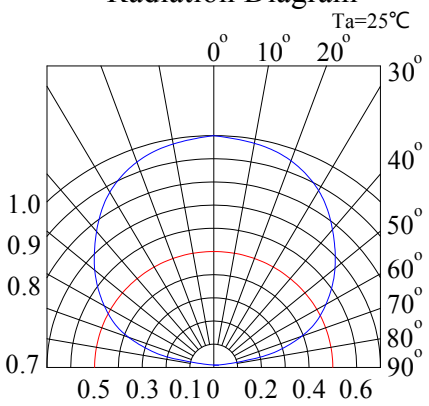
Luminous Intensity & Forward Current



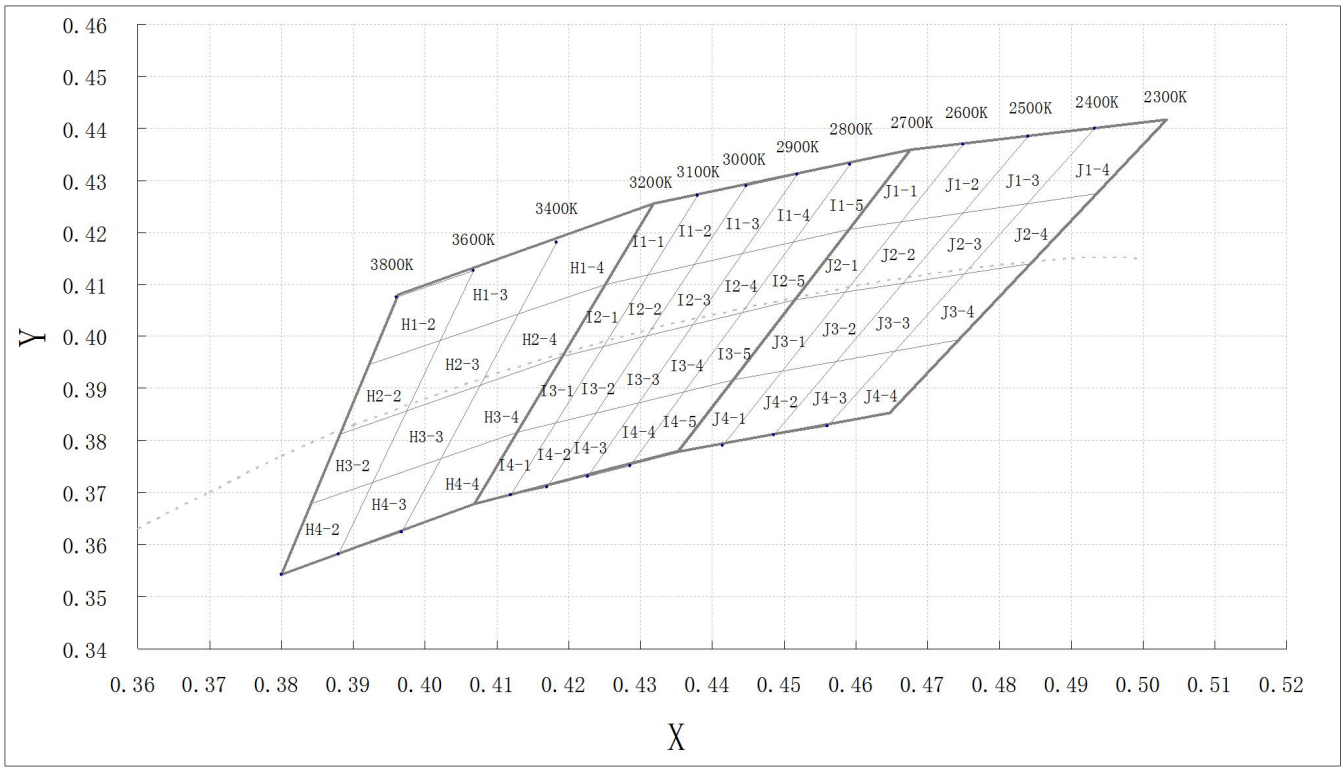
Forward Current Derating Curve



Radiation Diagram



CIE 1931 Chromaticity Diagram:



Chromaticity Coordinates Specifications for Bin Rank:

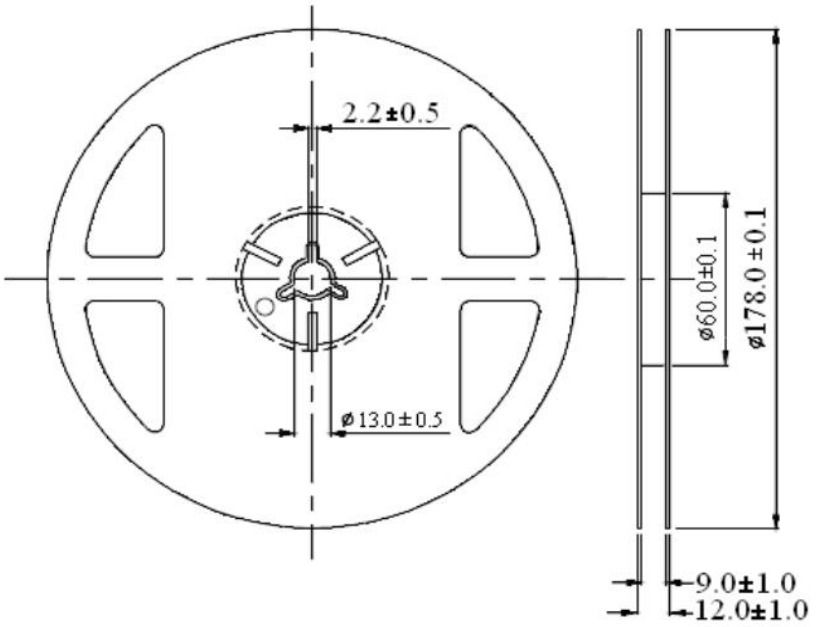
Bin Code	Left x	Left y	Top x	Top y	Right x	Right y	Bottom x	Bottom y
H1-2	0.392	0.394	0.402	0.399	0.407	0.413	0.396	0.408
H2-2	0.388	0.381	0.397	0.386	0.402	0.399	0.392	0.394
H3-2	0.384	0.367	0.393	0.372	0.397	0.386	0.388	0.381
H4-2	0.380	0.354	0.388	0.358	0.393	0.372	0.384	0.367
H1-3	0.402	0.399	0.412	0.403	0.418	0.419	0.407	0.413
H2-3	0.397	0.386	0.407	0.390	0.412	0.403	0.402	0.399
H3-3	0.393	0.372	0.402	0.376	0.407	0.390	0.397	0.386
H4-3	0.388	0.358	0.397	0.362	0.402	0.376	0.393	0.372
H1-4	0.412	0.403	0.425	0.410	0.432	0.426	0.418	0.419
H2-4	0.407	0.390	0.419	0.396	0.425	0.410	0.412	0.403
H3-4	0.402	0.376	0.413	0.382	0.419	0.396	0.407	0.390
H4-4	0.397	0.362	0.407	0.368	0.413	0.382	0.402	0.376
I1-1	0.425	0.410	0.431	0.412	0.438	0.428	0.432	0.426
I2-1	0.419	0.396	0.424	0.398	0.431	0.412	0.425	0.410
I3-1	0.413	0.382	0.418	0.384	0.424	0.398	0.419	0.396
I4-1	0.407	0.368	0.412	0.370	0.418	0.384	0.413	0.382

I1-2	0.431	0.412	0.437	0.414	0.445	0.430	0.438	0.428
I2-2	0.424	0.398	0.430	0.400	0.437	0.414	0.431	0.412
I3-2	0.418	0.384	0.423	0.385	0.430	0.400	0.424	0.398
I4-2	0.412	0.370	0.417	0.372	0.423	0.385	0.418	0.384
I1-3	0.437	0.414	0.444	0.416	0.452	0.432	0.445	0.430
I2-3	0.430	0.400	0.437	0.402	0.444	0.416	0.437	0.414
I3-3	0.423	0.385	0.430	0.387	0.437	0.402	0.430	0.400
I4-3	0.417	0.372	0.423	0.374	0.430	0.387	0.423	0.385
I1-4	0.444	0.416	0.451	0.418	0.459	0.434	0.452	0.432
I2-4	0.437	0.402	0.444	0.404	0.451	0.418	0.444	0.416
I3-4	0.430	0.387	0.436	0.389	0.444	0.404	0.437	0.402
I4-4	0.423	0.374	0.429	0.376	0.436	0.389	0.430	0.387
I1-5	0.451	0.418	0.460	0.421	0.468	0.436	0.459	0.434
I2-5	0.444	0.404	0.452	0.407	0.460	0.421	0.451	0.418
I3-5	0.436	0.389	0.444	0.392	0.452	0.407	0.444	0.404
I4-5	0.429	0.376	0.436	0.378	0.444	0.392	0.436	0.389
J1-1	0.460	0.421	0.466	0.422	0.475	0.437	0.468	0.436
J2-1	0.452	0.407	0.458	0.408	0.466	0.422	0.460	0.421
J3-1	0.444	0.392	0.449	0.393	0.458	0.408	0.452	0.407
J4-1	0.436	0.378	0.441	0.379	0.449	0.393	0.444	0.392
J1-2	0.466	0.422	0.475	0.424	0.484	0.439	0.475	0.437
J2-2	0.458	0.408	0.467	0.410	0.475	0.424	0.466	0.422
J3-2	0.449	0.393	0.458	0.395	0.467	0.410	0.458	0.408
J4-2	0.441	0.379	0.449	0.381	0.458	0.395	0.449	0.393
J1-3	0.475	0.424	0.483	0.425	0.493	0.440	0.484	0.439
J2-3	0.467	0.410	0.475	0.412	0.483	0.425	0.475	0.424
J3-3	0.458	0.395	0.465	0.397	0.475	0.412	0.467	0.410
J4-3	0.449	0.381	0.456	0.383	0.465	0.397	0.458	0.395
J1-4	0.483	0.425	0.493	0.427	0.503	0.442	0.493	0.440
J2-4	0.475	0.412	0.484	0.414	0.493	0.427	0.483	0.425
J3-4	0.465	0.397	0.474	0.399	0.484	0.414	0.475	0.412
J4-4	0.456	0.383	0.465	0.385	0.474	0.399	0.465	0.397

Notes:

1. Color coordinates measurement allowance is ± 0.15.
2. One delivery will include up to two consecutive color ranks and three luminous intensity ranks of the products the quantity-ratio of the ranks is decided by ***Luckylight***.

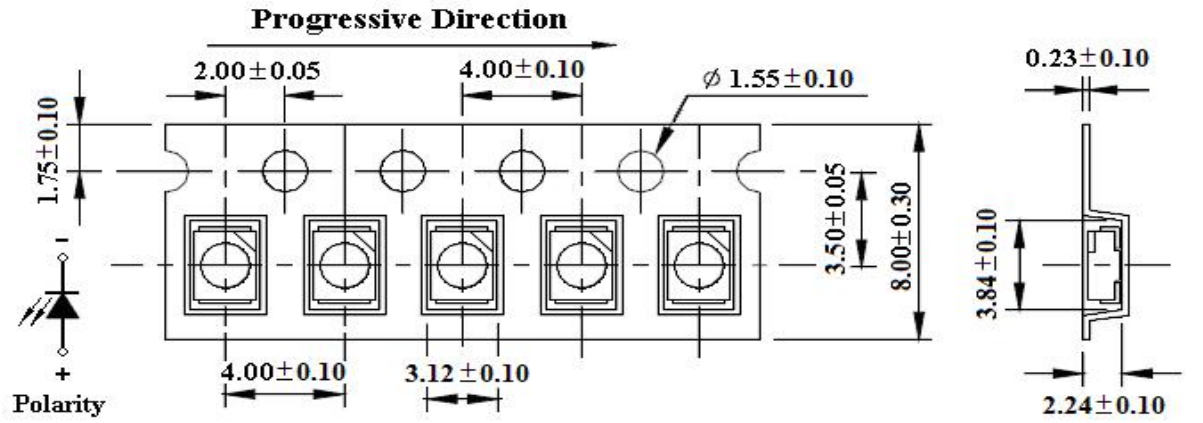
Reel Dimensions:



Unit: mm
Tolerance: ±0.25mm

Carrier Tape Dimensions:

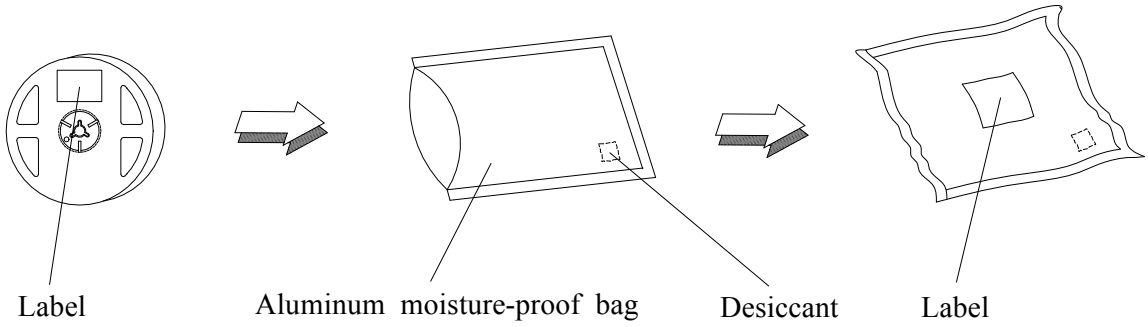
Loaded quantity 2000 pcs per reel.

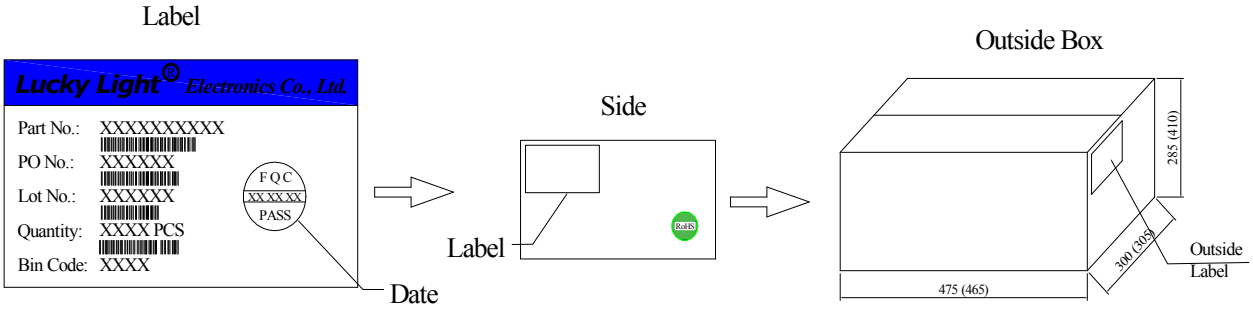


Unit: mm
Tolerance: ±0.10 mm

Packing & Label Specifications:

Moisture Resistant Packaging:





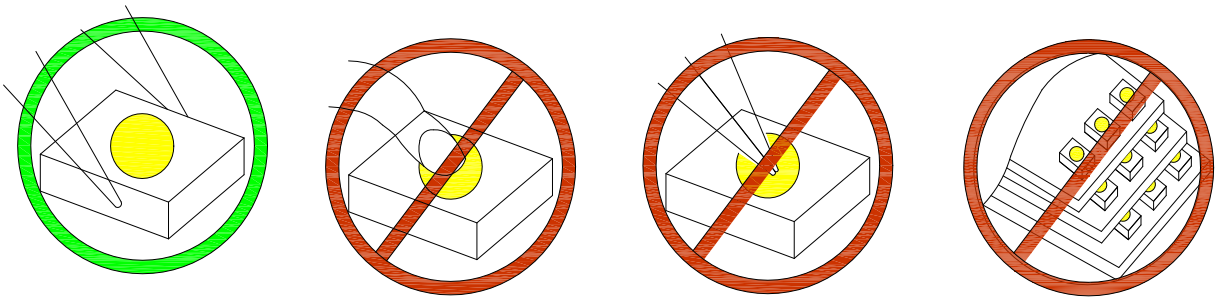
CAUTIONS

1. Handling Precautions:

1.1 Handle the component along the side surfaces by using forceps or appropriate tools.

1.2 Do not directly touch or handle the silicone lens surface. It may damage the internal circuitry.

1.3 Do not stack together assembled PCBs containing exposed LEDs. Impact may scratch the silicone lens or damage the internal circuitry.



1.4 Compare to epoxy encapsulant that is hard and brittle, silicone is softer and flexible. Although its characteristic significantly reduces thermal stress, it is more susceptible to damage by external mechanical force. As a result, special handling precautions need to be observed during assembly using silicone encapsulated LED products. Failure to comply might lead to damage and premature failure of the LED.

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 60%RH or less.

2.3 The LEDs should be used within a year.

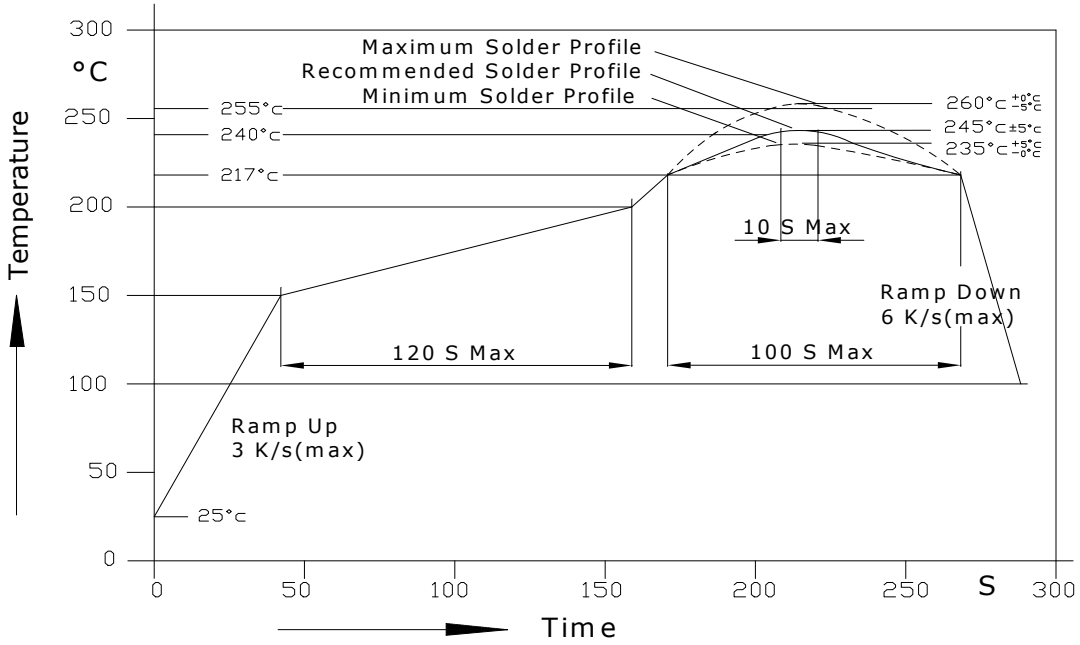
2.4 After opening the package, the LEDs should be kept at 30°C or less and 60%RH or less.

2.5 The LEDs should be used within 24 hours 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: 65±5°C for 24 hours.

3. Soldering Condition:

3.1 Pb-free solder temperature profile.



3.2 Reflow soldering should not be done more than two times.

3.3 When soldering, do not put stress on the LEDs during heating.

3.4 After soldering, do not warp the circuit board.

3.5 Recommended soldering conditions:

Reflow soldering		Soldering iron	
Pre-heat	150~200°C	Temperature	300°C Max.
Pre-heat time	120 sec. Max.	Soldering time	3 sec. Max.
Peak temperature	260°C Max.		(one time only)
Soldering time	10 sec. Max. (Max. two times)		

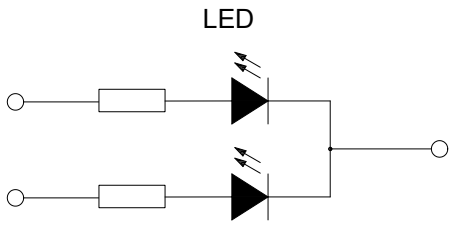
3.6 Because different board designs use different number and types of devices, solder pastes, reflow ovens, and circuit boards, no single temperature profile works for all possible combinations.

However, you can successfully mount your packages to the PCB by following the proper guidelines and PCB-specific characterization.

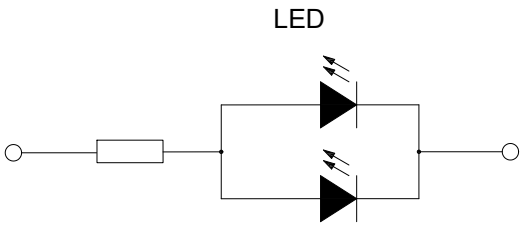
4. Drive Method:

4.1 An LED is a current-operated device. In order to ensure intensity uniformity on multiple LEDs connected in parallel in an application, it is recommended that a current limiting resistor be incorporated in the drive circuit, in series with each LED as shown in Circuit A below.

Circuit model A



Circuit model B



(A) Recommended circuit.

(B) The brightness of each LED might appear different due to the differences in the I-V characteristics of those LEDs.

5. ESD (Electrostatic Discharge):

Static Electricity or power surge will damage the LED. Suggestions to prevent ESD damage:

- Use of a conductive wrist band or anti-electrostatic glove when handling these LEDs.
- All devices, equipment, and machinery must be properly grounded.
- Work tables, storage racks, etc. should be properly grounded.
- Use ion blower to neutralize the static charge which might have built up on surface of the LED's plastic lens as a result of friction between LEDs during storage and handling.

ESD-damaged LEDs will exhibit abnormal characteristics such as high reverse leakage current, low forward voltage, or "no lightup" at low currents. To verify for ESD damage, check for "lightup" and Vf of the suspect LEDs at low currents. The Vf of "good" LEDs should be >2.0V@0.1mA for InGaN product and >1.4V@0.1mA for AlInGaP product.

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