

Customer Approved
Date:

Part No.:
LL9213R6GHB1W-C01CF

DATA SHEET

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REVISION: V3

Designer	Checker	Approver
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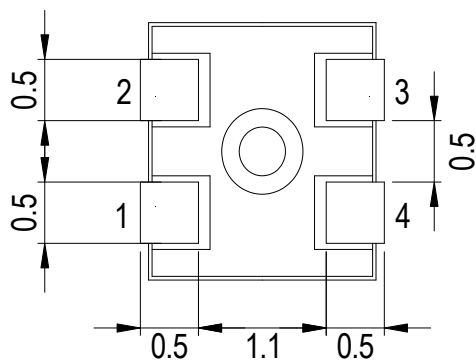
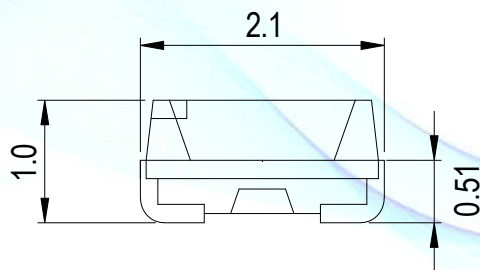
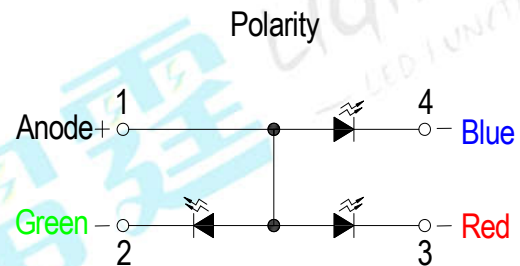
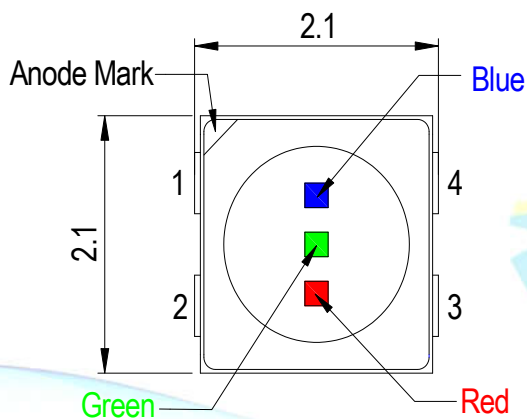
Multi-Color Type ■ Top View 2121 Package LL9213R6GHb1W-C01CF

Features

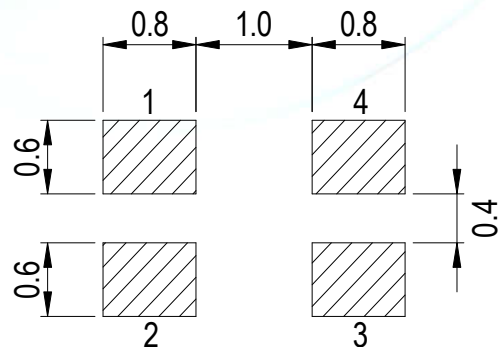
- Top view 2121 package
- Wide viewing angle
- Compatible with infrared and vapor phase reflow solder process
- Pb-free
- RoHS compliant



Package Dimensions



Recommended Solder Pad



Note:

Tolerance unless mentioned is ± 0.1 mm, Unit = mm.

Applications

- Indoor signage display applications
- Indoor decorating and design
- Signal and Symbol Luminary
- Automotive Telecommunication
- Switch lights

Device Selection Guide

Emitted Color	Resin Color
Red \ Green \ Blue	White Diffused

Absolute Maximum Ratings (T_{Soldering}=25°C)

Parameter	Symbol	Rating	Unit
Forward Current	I _F	Red:20	mA
		Green:15	
		Blue:15	
Peak Forward Current (Duty 1/10 @1ms)	I _{FP}	30	mA
Power Dissipation	P _d	Red:55	mW
		Green:50	mW
		Blue:50	mW
Operating Temperature	T _{opr}	-40 ~ +85	°C
Storage Temperature	T _{stg}	-40 ~ +100	°C
Soldering Temperature	T _{sol}	Reflow Soldering : 260°C for 10 sec. Hand Soldering : 350°C for 3 sec.	
Reverse Voltage	V _R	5	V

Note:

The products are sensitive to static electricity and must be carefully taken when handling products.

Electro-Optical Characteristics (T_{Soldering}=25°C)

Parameter	Symbol	Color	Min.	Typ.	Max.	Unit	Condition
Luminous Intensity	I _v	Red	55	--	93	mcd	I _F =8mA
		Green	160	--	270	mcd	I _F =5mA
		Blue	19	--	32	mcd	I _F =3mA
Dominant Wavelength	λ _D	Red	618	--	628	nm	I _F =8mA
		Green	522	--	530	nm	I _F =5mA
		Blue	463	--	471	nm	I _F =3mA
Forward Voltage	V _F	Red	1.7	--	2.5	V	I _F =8mA
		Green	2.5	--	3.1	V	I _F =5mA
		Blue	2.5	--	3.1	V	I _F =3mA
Viewing Angle	2θ _{1/2}		-	120	-	deg	I _F =10mA
Reverse Current	I _R	Red	-	-	1	μA	V _R =5V
		Green	-	-	1	μA	
		Blue	-	-	1	μA	

Notes:

1. Tolerance of Luminous Intensity ±10%.
2. Tolerance of Dominant Wavelength: ±1nm.
3. Tolerance of Forward Voltage: ±0.1V.

Bin Code Description

Red: Bin Range of Luminous Intensity

Bin Code	Min.	Max.	Unit	Condition
M0	55.0	71.5	mcd	I _F =8mA
N0	71.5	93.0		

Green: Bin Range of Luminous Intensity

Bin Code	Min.	Max.	Unit	Condition
R0	160	208	mcd	I _F =5mA
S0	208	270		

Blue: Bin Range of Luminous Intensity

Bin Code	Min.	Max.	Unit	Condition
J0	19.0	24.5	mcd	I _F =3mA
K0	24.5	32.0		

Note:

Tolerance of Luminous Intensity: ±10%.

Red: Bin Range of Dominant Wavelength

Bin Code	Min.	Max.	Unit	Condition
R1	618	623	nm	I _F =8mA
R2	623	628		

Green: Bin Range of Dominant Wavelength

Bin Code	Min.	Max.	Unit	Condition
G1	522	526	nm	I _F =5mA
G2	526	530		

Blue: Bin Range of Dominant Wavelength

Bin Code	Min.	Max.	Unit	Condition
B1	463	467	nm	I _F =3mA
B2	467	471		

Note:

Tolerance of Dominant Wavelength: ±1nm.

Typical Electro-Optical Characteristics Curves

Fig.1-Forward Current(V) vs.

Forward Voltage

Ts=25°C

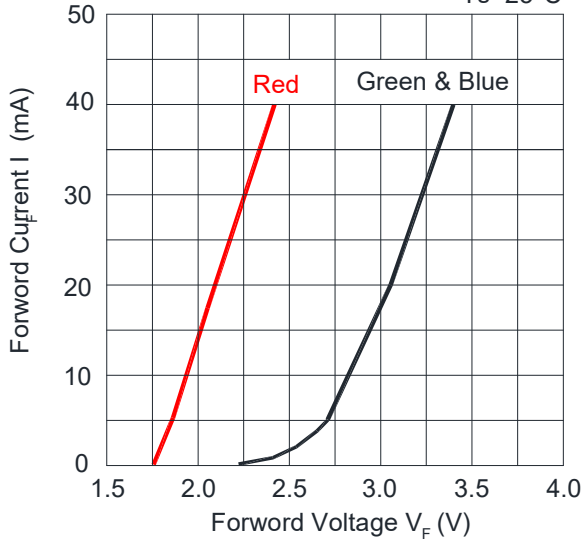


Fig.2-Relative Luminous Intensity

vs. Forward Current

Ts=25°C

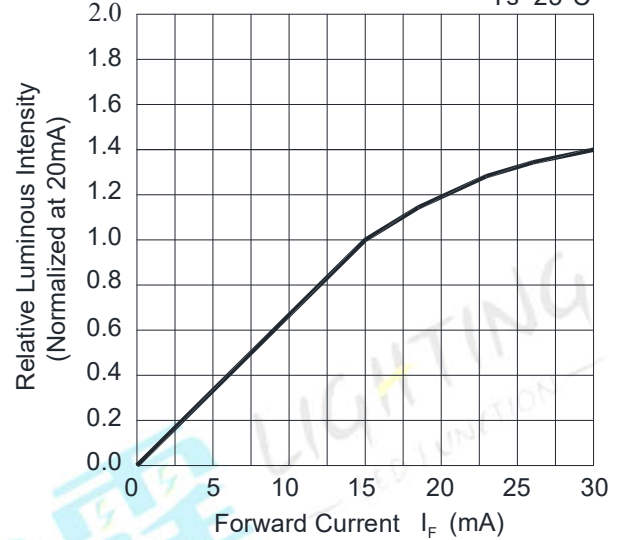


Fig.3-Max. Driving Forward Current vs. Soldering Temperature

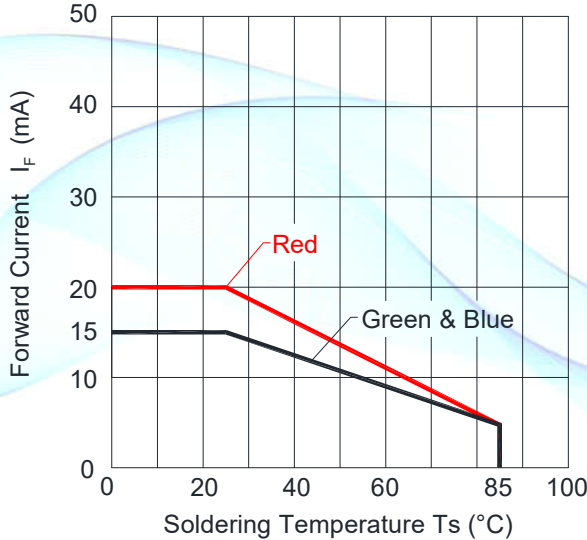
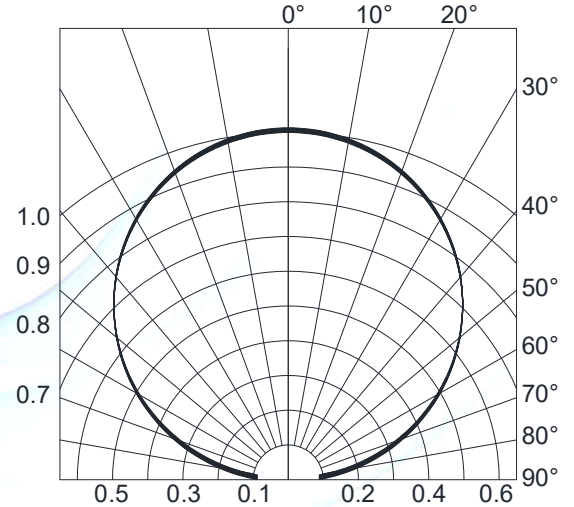


Fig.4-Radiation Diagram

Ta=25°C



Typical Electro-Optical Characteristics Curves

Fig.5-Forward Voltage Shift vs. Junction Temperature

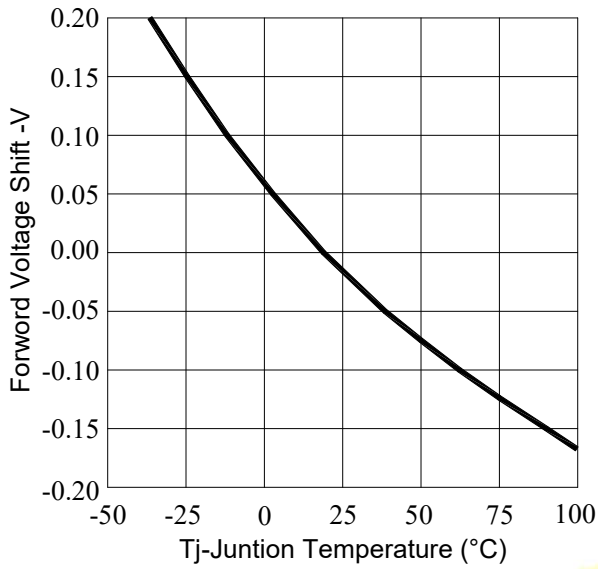
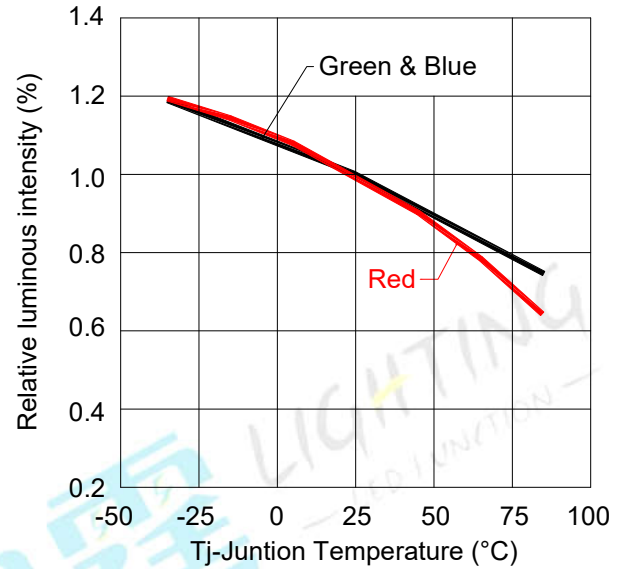
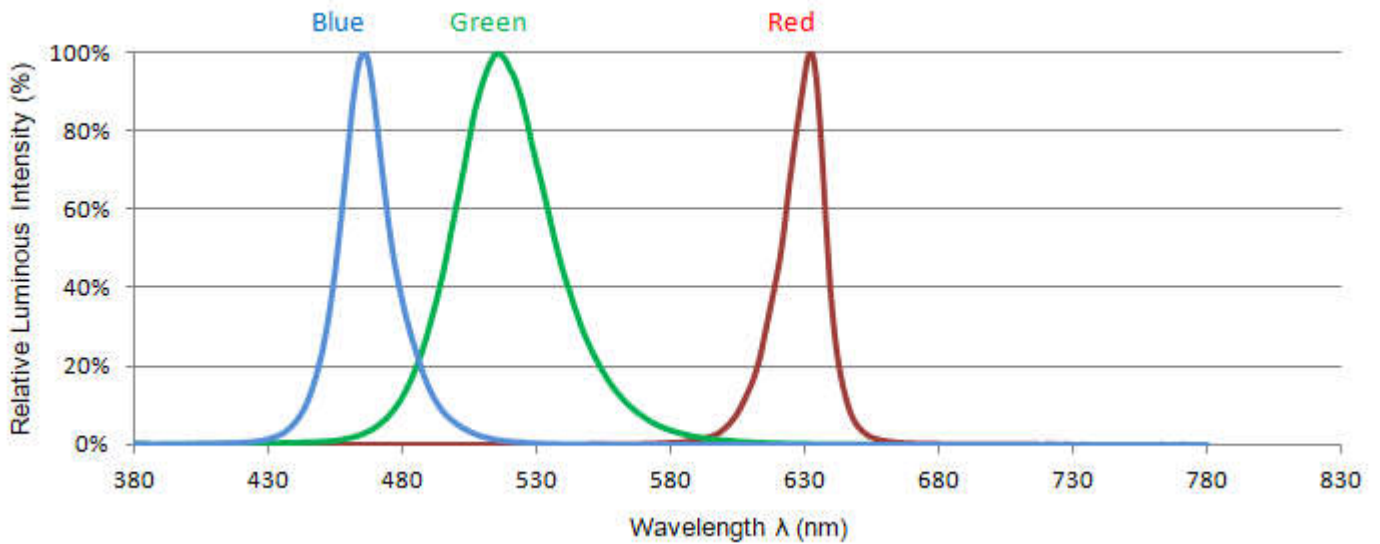


Fig.6-Relative Luminous Intensity vs. Junction Temperature



Spectrum Distribution

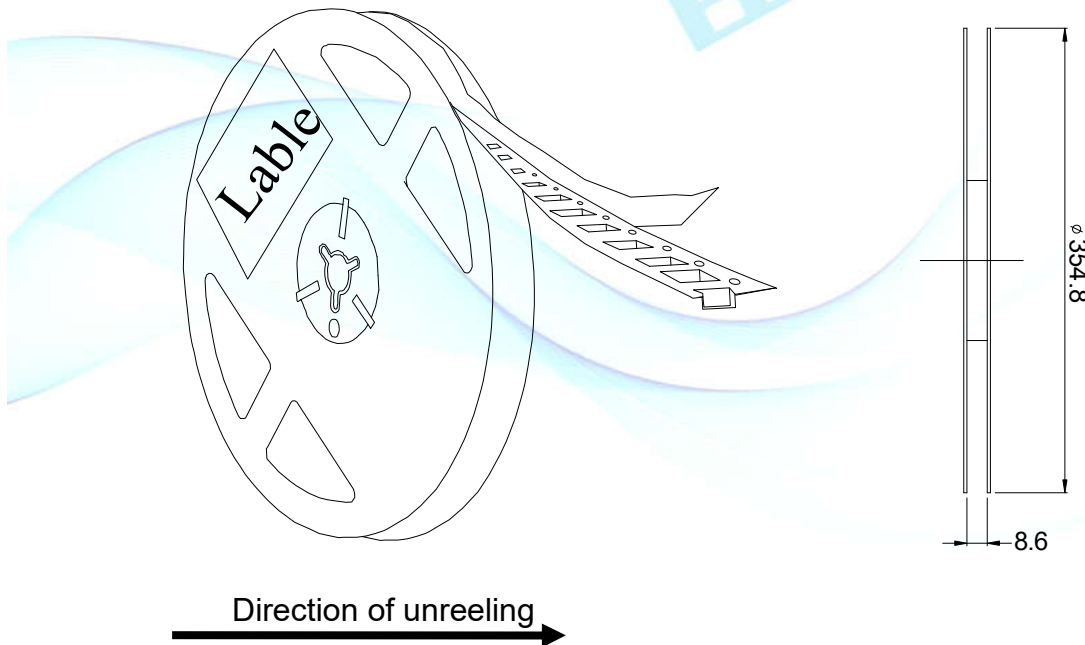


**Moisture Resistant Packing Materials
Label Explanation**



- QR code:
Contains all of the following information
- P/N: Product Number
- TYPE :Part NO.
- IV: Luminous Intensity Rank
- WD: Dom. Wavelength Rank
- VF: Forward Voltage Rank
- QTY: Packing Quantity
- LOT NO.: Lot Number

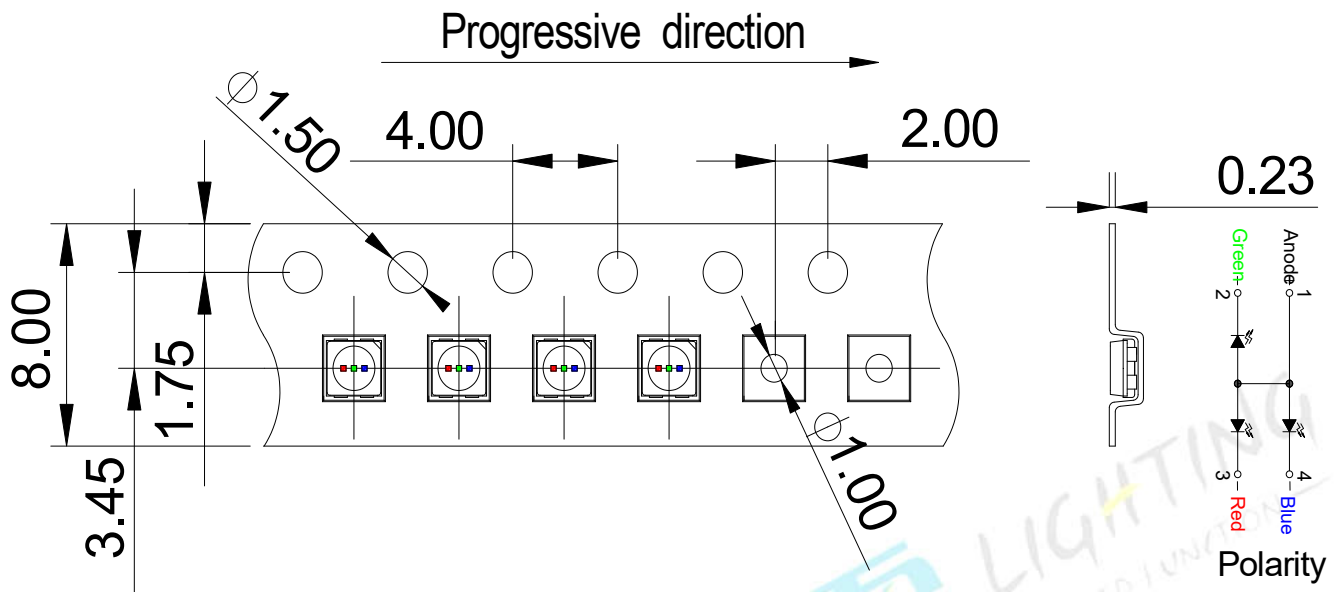
Taping method: Loaded Quantity 17,000 pcs Per Reel



Notes:

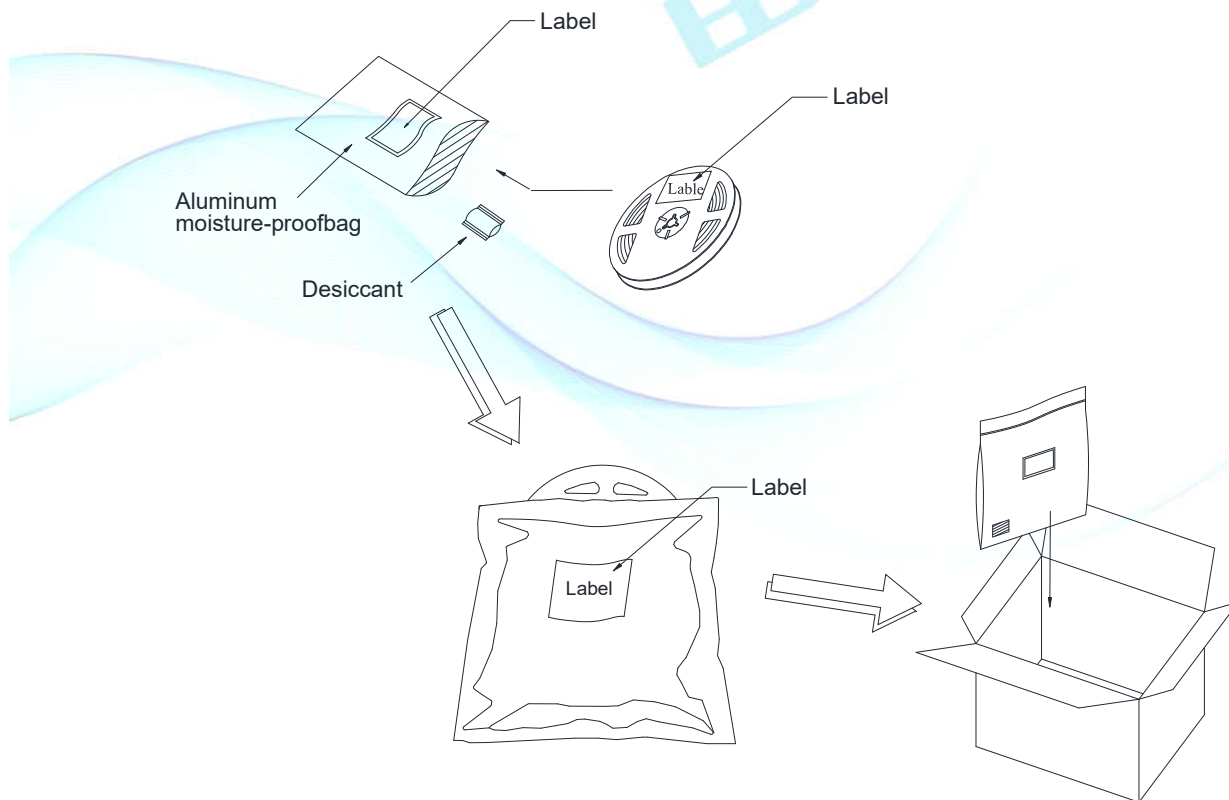
- 1.Tolerance unless mentioned is ± 0.1 mm,Unit = mm.
- 2.Minimum packing amount is 1000 pcs per reel.

Carrier Tape Dimensions:



Note:
Tolerance unless mentioned is ± 0.1 mm, Unit = mm.

Moisture Resistant Packing Process



Moisture/Reflow sensitivity classification

IPC / JEDEC J-STD-020C: Level 3

Reliability Test Items and Conditions

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

Confidence level : 90%

LTPD : 10%

No.	Items	Test Condition	Test Hours/Cycles	Sample Size	Ac/Re
1	Reflow Soldering	Temp.: 260°C/10sec.	6 Min.	22 PCS.	0/1
2	Thermal Shock	H : +100°C/5min ∫ 10 sec L : -10°C/5min	300 Cycles	22 PCS.	0/1
3	Temperature Cycle	H : +100°C/15min ∫ 5 min L : -40°C/15min	300 Cycles	22 PCS.	0/1
4	High Temperature/Humidity Storage	Ta=85°C,85%RH	1000 Hrs.	22 PCS.	0/1
5	Low Temperature Storage	Ta=-40°C	1000 Hrs.	22 PCS.	0/1
6	High Temperature Storage	Ta=100°C	1000 Hrs.	22 PCS.	0/1
7	DC Operation Life	Ta=25°C, I _F = 5 mA	1000 Hrs.	22 PCS.	0/1

Precautions for Use

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 90%RH or less.

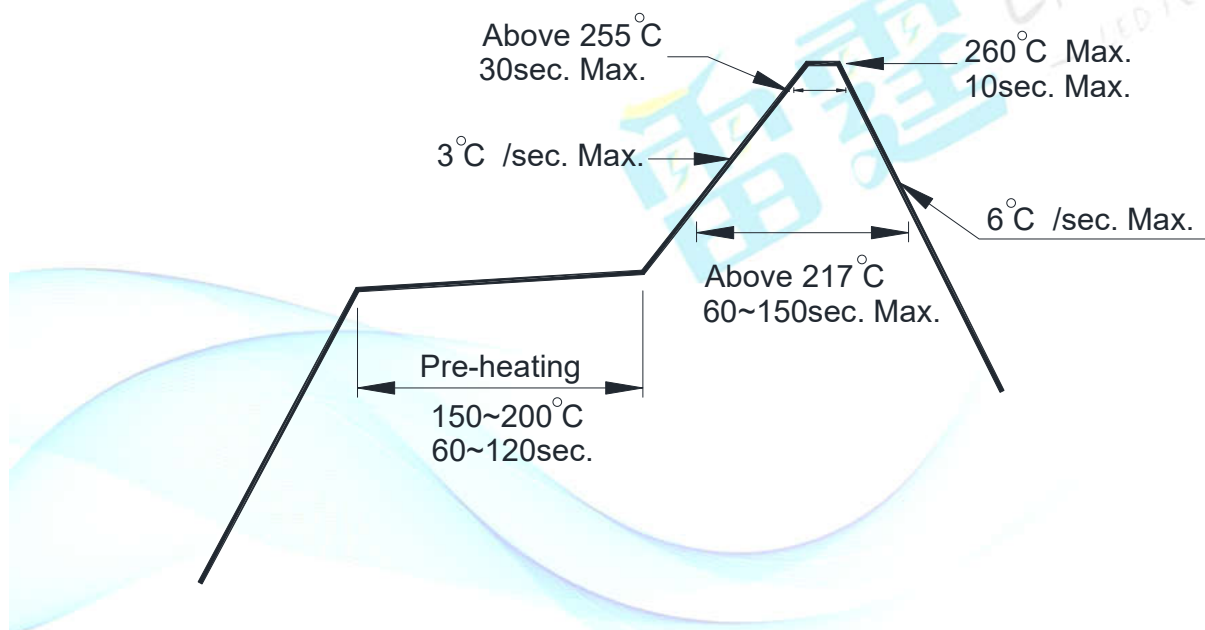
2.3 After opening the package: The LED's floor life is 168 hours under 30°C or less and 60%RH or less. If unused LEDs remain, it should be stored in moisture proof packages.

2.4 If the moisture absorbent material (silica gel) has faded 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

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.

4. Soldering Iron

Each terminal is to go to the tip of soldering iron temperature less than 350°C for 3 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.