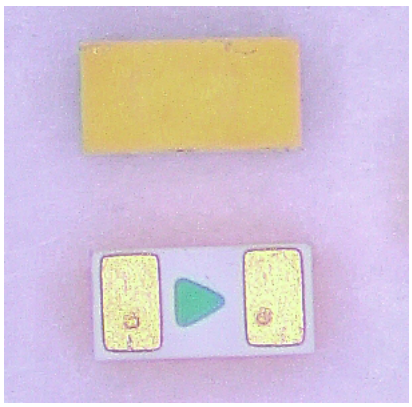
方晶科技 FANGJING

White LED Series
Chip Scale Package



FL1005PWA2

Fangjing CSP Technology Applies
High performance and easy to use

Features & Benefits

- Utilizes Fangjing technology
- Suitable for use in indoor and outdoor lighting
- Operates at a maximum current of up to 20mA
- Dimensions (L/W/H): 1.0 × 0.5 × 0.6mm

Applications

- Indoor Lighting: Spotlight, Downlight, MR, PAR
- Outdoor Lighting: Street Light, Tunnel Light, Security Light, Parking Lot Light
- Industrial Lighting: High Bay Light, Low Bay Light
- Consumer Lighting: Torch Light

Table of Contents：

一、 Product Code Information

Main Code

FL	1005	PW	A2

- A2 → Version
- PW → Color Code
- 1005 → Size Code
- FL → Fangjing

Sub-Code

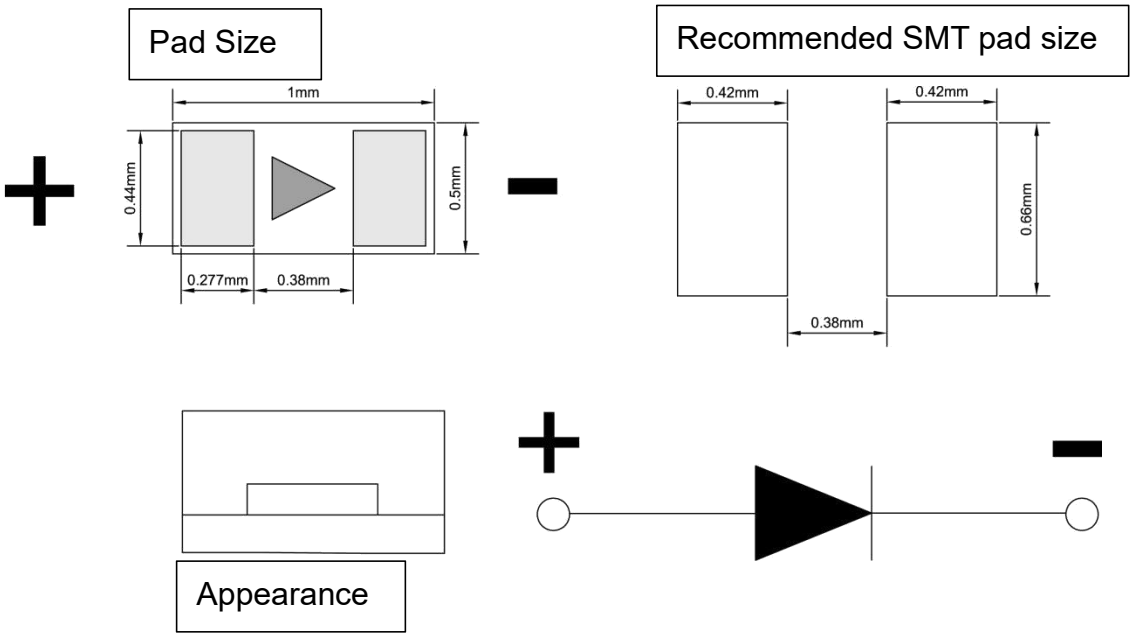
PW1	A2	V3	90	I7	001

- 001 → Serial Number
- I7 → Brightness Code
- 90 → CRI Code
- V3 → Voltage Code
- A2 → Current Code
- PW1 → Color Code

二、 Features & Benefits

- ●Dimensions (L/W/H): 1.0 × 0.5 × 0.6mm
- ●Color: Pure White
- ●EIA Standard Packaging
- ●With ROHS Requirement
- ●Suitable for SMT
- ●Suitable for Infrared Reflow Soldering

三、 Product Dimension



Note：1.Unit:mm.
2.Tolerance: ±0.10.

四、 Absolute Maximum Rating(T_A=25℃, unless otherwise specified)

Item	Symbol	Value(Max.)	Unit
Power Dissipation	P_D	60	mW
Peak Pulse Forward Current (Duty 1/10 pulse width 0.1ms)	I_{FP}	40	mA
Forward Current	I_F	20	mA
Reverse Voltage	V_R	5	V
Operating Temperature	T_{OPR}	-30~85	℃
Storage Temperature	T_{stg}	-40~90	℃
Soldering Temperature	T_{sol}	Reflow : No more than 10 seconds @ max. 255 ºC	

五、 Electro-optical Characteristics (T_A=25℃, unless otherwise specified)

Item	Symbol	Min.	Type	Max.	Unit	Test Conditions
Luminous Intensity	I_V	1200	--	1800	mcd	I_F=20mA
Color Temperature	CCT	5500	--	6500	K	
CRI	Ra		90			
Forward Voltage	V_F	2.6	--	3.0	V	
Beam Angle	θ	--	165	--	deg	
Reverse Current	I_R	--	--	1	μA	V_R=5V

Current Classification:

Code	Min.	Type	Max.	Unit
A2		20		mA

Note: Tolerance ± 0.1mA

Brightness Classification:

Code	Min.	Type	Max.	Unit	Test Conditions
I7	4		6	LM	I_F=20mA

Note: : Tolerance ±15%.

Voltage Classification:

Code	Min.	Type	Max.	Unit	Test Conditions
V2	2.6		2.7	V	I_F=20mA
V3	2.7		2.8		
V4	2.8		2.9		
V5	2.9		3.0		

Note: : Tolerance ± 0.05V

Color Classification:

Code	Min.	Max.	Unit	Test Conditions
PW1	5500	6000	K	I_F=20mA
PW2	6000	6500		

Note: Tolerance ± 50K

六、Typical Characteristics

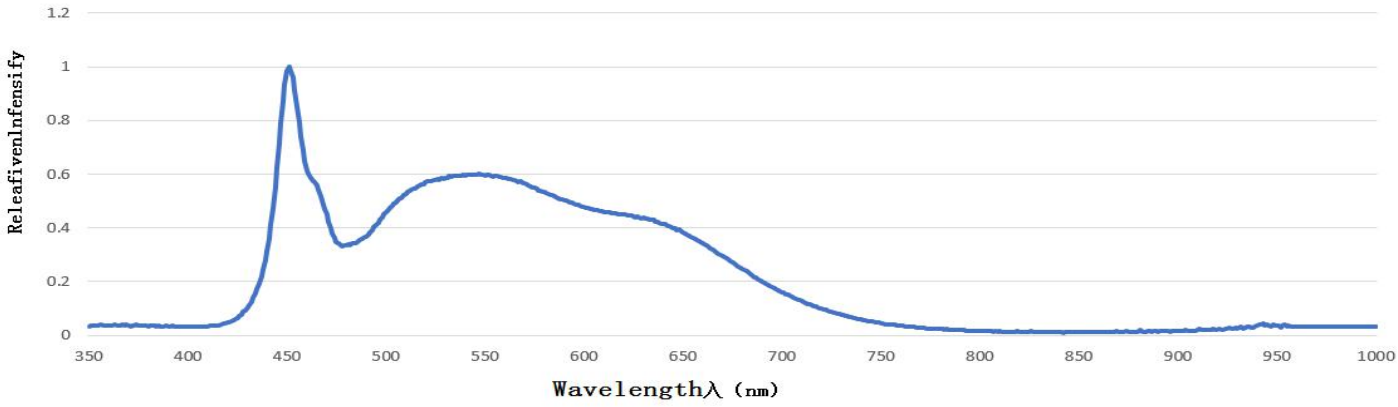


Fig.1 Relative Intensity vs. Wavelength

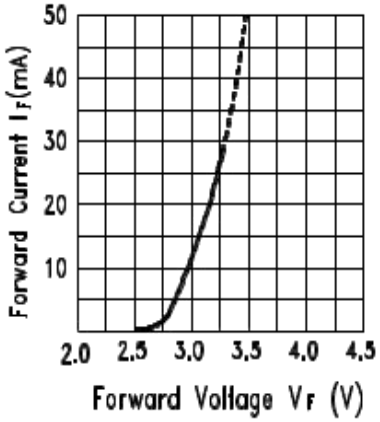


Fig.2 Forward Current vs. Forward Voltage

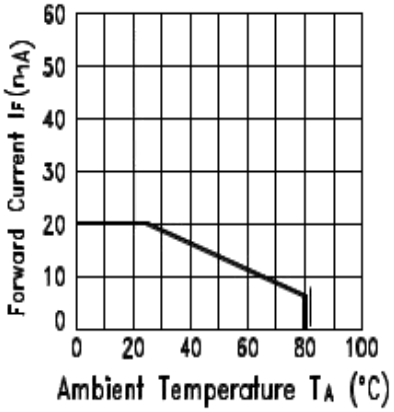


Fig.3 Forward Current Derating Curve

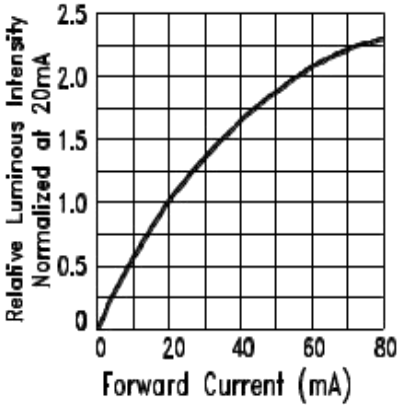


Fig.4 Relative Luminous Intensity vs. Forward Current

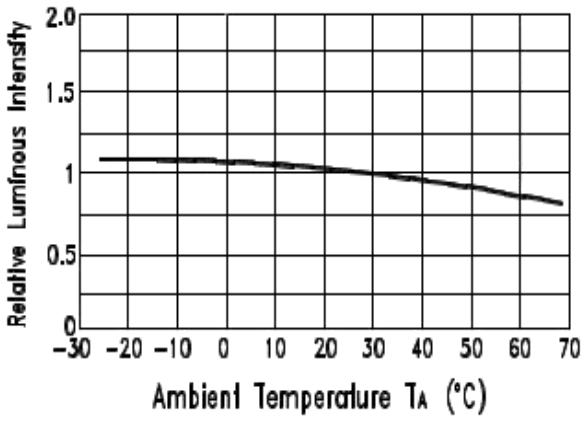


Fig.5 Luminous Intensity vs.Ambient Temperature

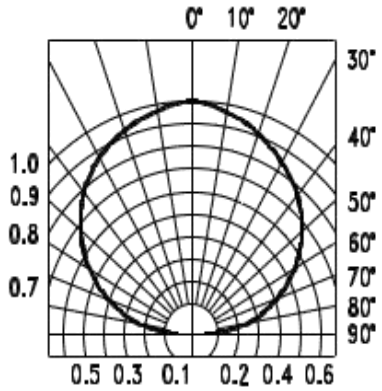


Fig.6 Spatial Distribution

七、Label Structure

I_V：Luminous Intensity (lm).

CCT：Color Temperature (K).

V_F：Forward Voltage (V)

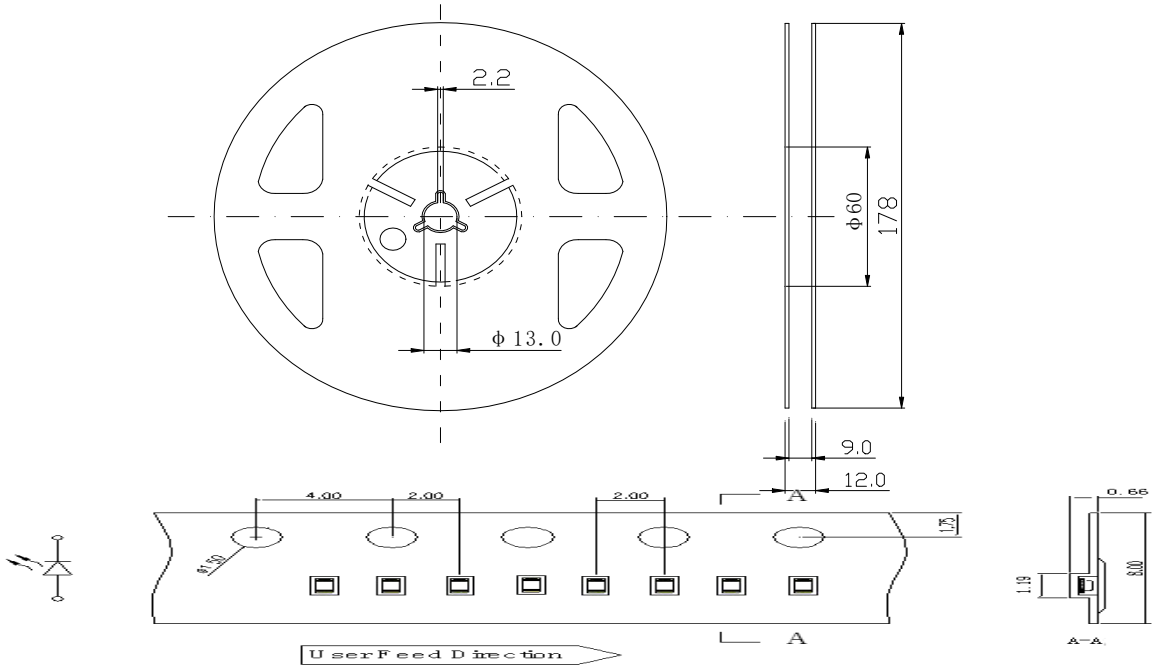
Error Range

a. Luminous Intensity: ± 15%

b. Color Temperature: ±50K

c. Forward Voltage: ± 0.05V

八、Tape & Reel

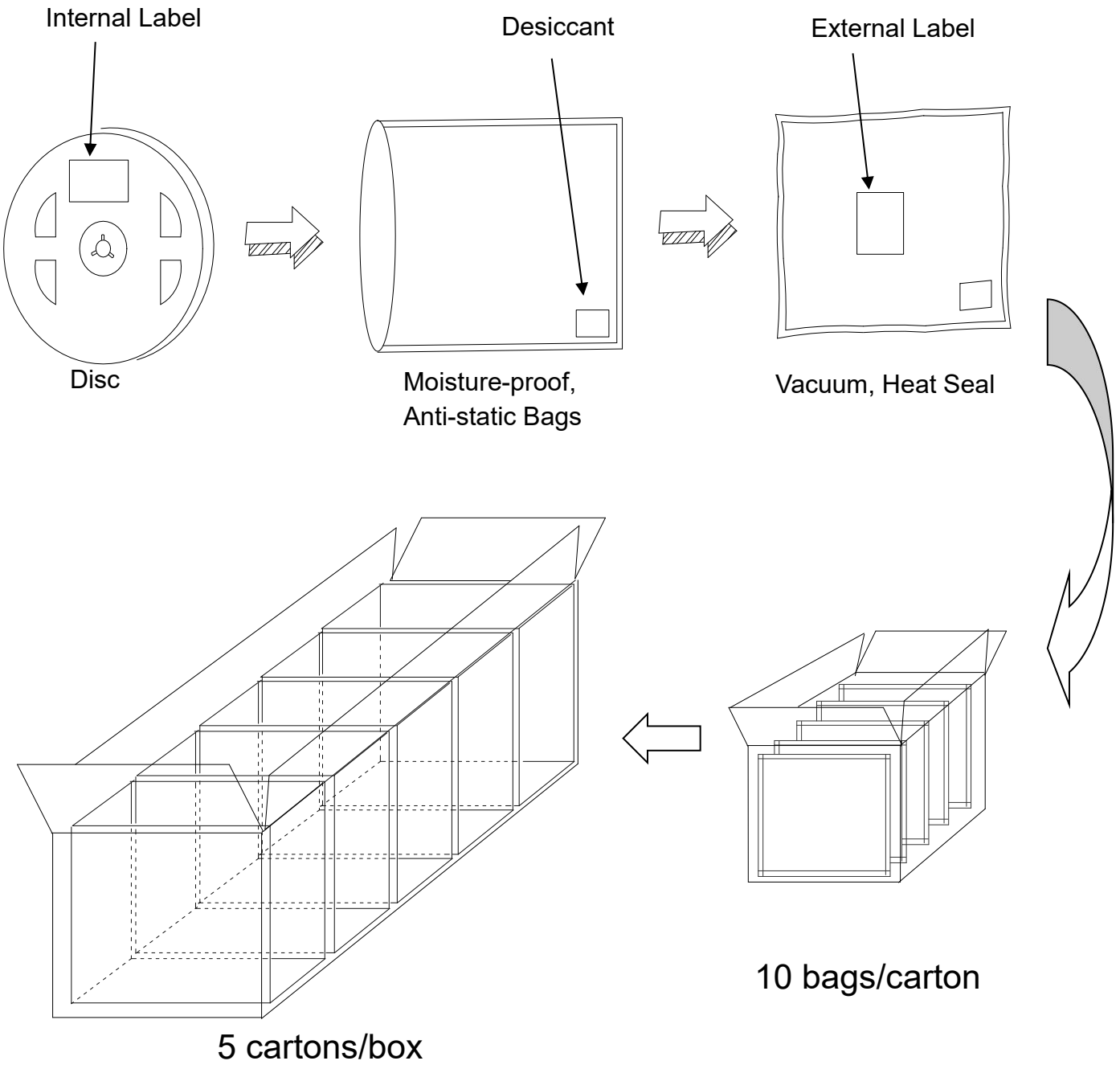


Note：1.Dimensions in millimeters (mm)

2.Tolerance: ±0.15mm

3.Quantity: 6,000 Pcs/reel

九、**Packing Structure**



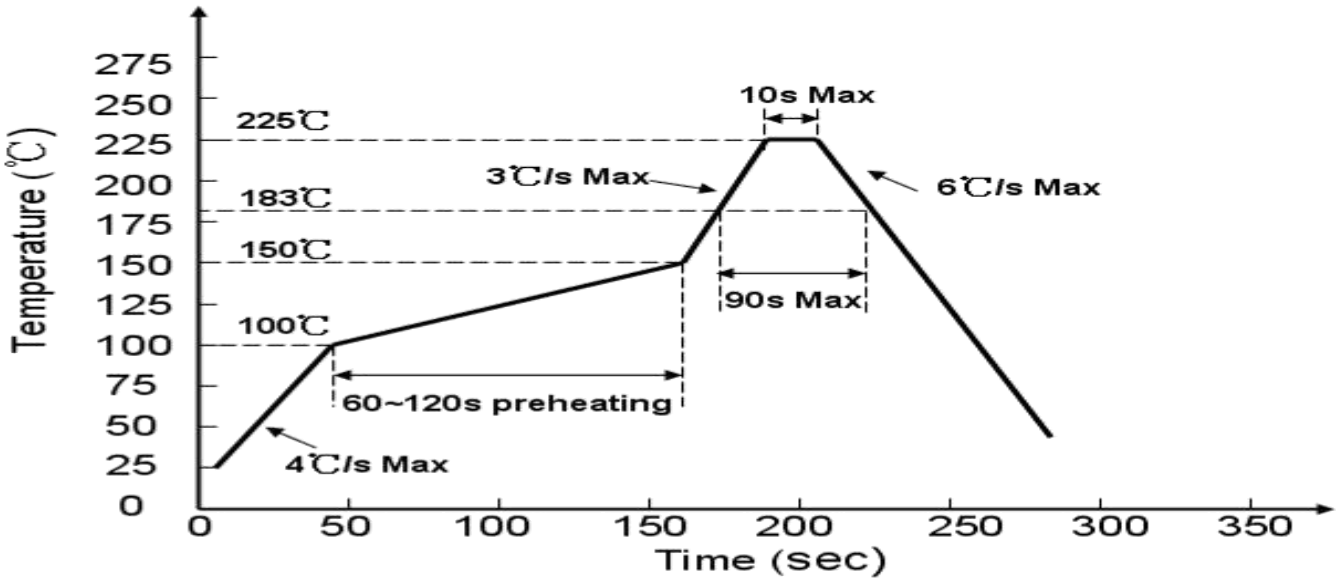
Note : For the purpose of continuous improvement, the appearance and parameter specifications of the product may be improved without prior notice. The right of final interpretation belongs to us.

十、 Reliability Test Items & Conditions

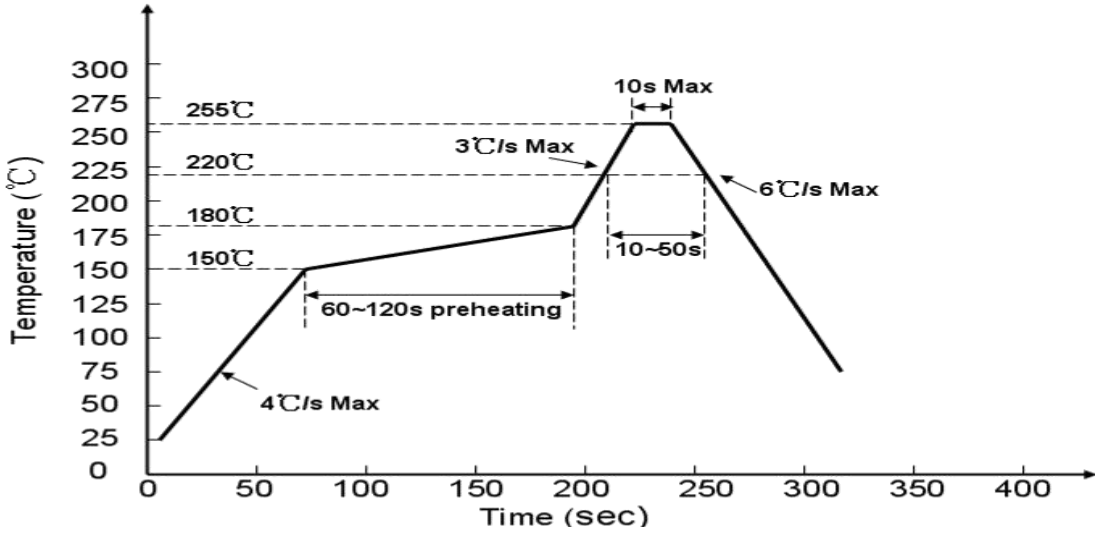
Test Item	Test conditions	Test Hour/Cycle
Resistance to Soldering heat	1. Maximum Reflow Temperature：260℃, 10 seconds,2 times； 2. Storage Conditions Before Reflow :30℃,70%RH,168h；	
Solderability	Maximum Reflow Temperature: 245±5℃,5 seconds (Lead-free Reflow)	
Temperature Cycle Test	-40℃,30 min~25℃,5 min~ 100℃,30 min~25 ℃,5 min.	300 cycles
Thermal Shock	-35℃,each 15 min Transfer time within 3 min 85℃ ,each 15 min	300 cycles
High Temperature Storage	T_A=100℃	1000 h
Low Temperature Storage	T_A=-40℃	1000 h
Room Temperature Aging	T_A=25℃ I_F=20mA	1000 h

十一、 Soldering Conditions

1.Soldering Temperature Curve(Lead)



2.Soldering Temperature Curve(Lead-free)



十二、 Precautions in Handling & Use

1.Use:

1）Too high temperature can affect the brightness and other performances, therefore, in order to make LED have better performance, we should keep LED away from heat source.

2）Optical Parameters Tolerance：

Reverse Voltage (V_F): ± 0.05V

Brightness (I_V):± 15%

Color Temperature(CCT): ±50K

2.Storage

1）Without opening the original package, the recommended storage environment temperature is 5 ℃ ~ 30 ℃, humidity below 65% RH.When the inventory is more than two months, dehumidification should be done before use, and the condition is 70 ℃ / 8 hours.

2）After opening the original package, the recommended storage environment temperature is 5~30℃, humidity below 50%RH.

3）LED is humidity-sensitive component, in order to avoid moisture absorption,It is recommended to store it in a sealed container with desiccant or in a nitrogen moisture-proof cabinet after opening the package.

4）LED should be used within 24 hours (1 day) after unpacking, and soldering should be completed as soon as possible after SMT.

5）Dehumidification should be done,if the desiccant fails or the LED is exposed to the air for more than 24 hours (1 day). Baking conditions:70℃/8 hours.

3.Electrostatic Discharge (ESD)

● This LED is sensitive to transient excessive voltages (e.g. ESD, lightning surge). If this excessive voltage occurs in the circuit, it may cause the LED to be damaged causing issues (e.g. the LED to become dimmer or not to illuminate [i.e. catastrophic failure]).

Ensure that when handling the LEDs, necessary measures are taken to protect them from an ESD discharge. The following examples are recommended measures to eliminate the charge:

- Grounded wrist strap, ESD footwear, clothes, and floors
- Grounded workstation equipment and tools
- ESD table/shelf mat made of conductive materials

● Ensure that all necessary measures are taken to prevent the LEDs from being exposed to transient excessive voltages (e.g. ESD, lightning surge):

- tools, jigs, and machines that are used are properly grounded
- appropriate ESD materials/equipment are used in the work area
- the system/assembly is designed to provide ESD protection for the LEDs

● If the tool/equipment used is an insulator (e.g. glass cover, plastic, etc.), ensure that necessary

measures have been taken to protect the LED from transient excessive voltages (e.g. ESD). The following examples are recommended measures to eliminate the charge:

- Dissipating static charge with conductive materials
- Preventing charge generation with moisture
- Neutralizing the charge with ionizers

● To detect if an LED was damaged by transient excess voltages (i.e. an ESD event during the system's assembly process), perform a characteristics inspection (e.g. forward voltage measurement, light-up test) at low current (≤1mA).

●Failure Criteria: V_F<2.0V at I_F=0.5mA

If any one or more dice, except for the red die, are damaged by transient excess voltages (e.g. ESD), it will cause:

- the leakage current to increase
- the Forward Voltage (V_F) to decrease
- the LED not to illuminate at a low current

4.Cleaning

●Do not clean the LEDs with water, benzine and/or thinner.

●To clean the LEDs, use isopropyl alcohol (IPA). If another solvent is used, it may cause the LED package/resin to be damaged causing issues; ensure that sufficient verification is performed prior to use. Additionally, ensure that the solvent being used does not cause any other issues (e.g. CFC-based solvents are heavily regulated).

●If an LED is contaminated (e.g. dust/dirt), use a cloth soaked with isopropyl alcohol (IPA). Ensure that the cloth is firmly squeezed before wiping the LED.

●Do not clean the LEDs with an ultrasonic cleaner. If cleaning must be done, ensure that sufficient verification is performed by using a finished assembly with LEDs to determine cleaning conditions (e.g. ultrasonic power, LED position on the PCB assembly) that donot cause an issue.