

APPROVAL SHEET

AOT MODEL NAME	SMD LED – SMD dome
AOT PART NUMBER	AOT-6060HPW-0303BD-H
CUSTOMER NAME	
DATE	2004/Feb.
Version	1

MAKER			CUSTOMER			
Prepared	Checked	Approved				



AOT HEAD QUARTER

No. 13, Gongye 5th. Road, Hsinchu Industrial Park, Hukou Shiang,
Hsinchu Hsien 303, Taiwan, R.O.C.
TEL: 886-3-597-6988 / FAX: 886-3-598-7392

AOT KOREA INC.

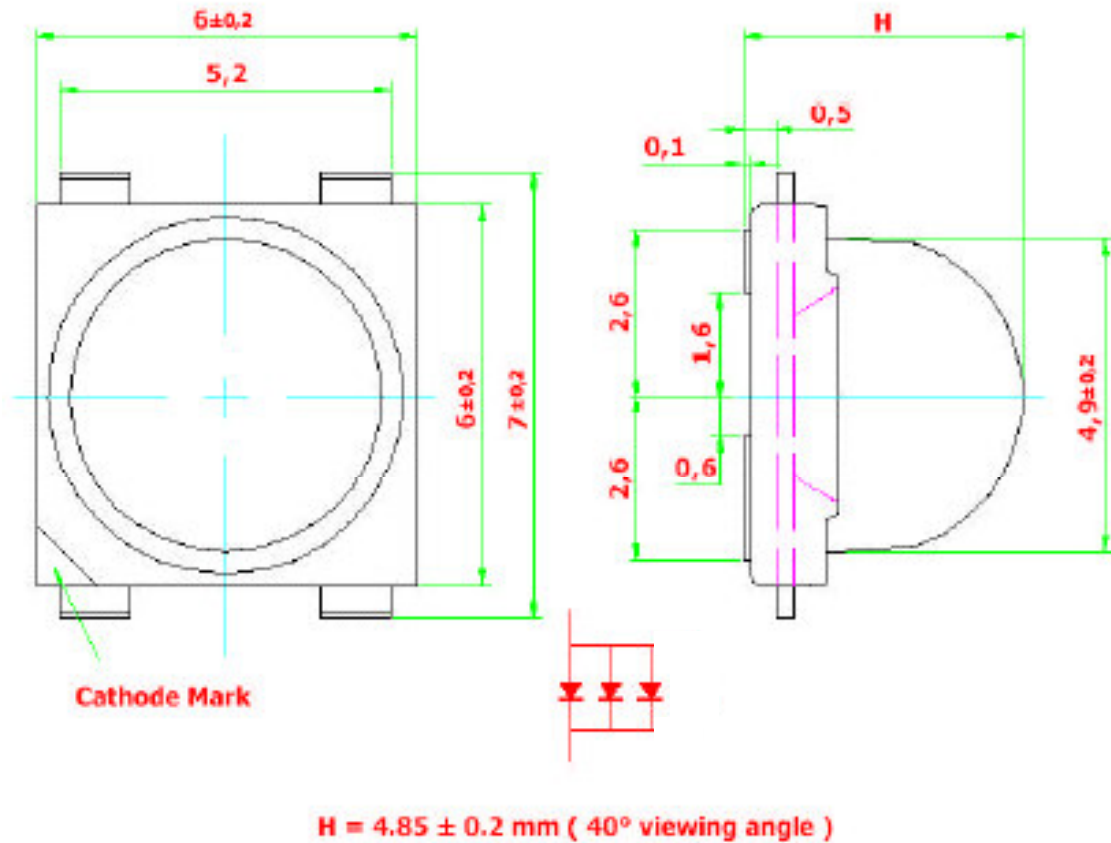
Room 1410, Windstone building, #275-2, Yangjaedong, Seocho, Seoul, KOREA
TEL : +82-2-3462-8453~5 / FAX : +82-2-3462-8456



Revision note

[illegible]

AOT-6060HPW-0303BD-H



- 3 chips.
- Super high brightness surface mount LED.
- High flux output and high thermal effect and dissipation
- 60° viewing angle with dome lens.
- Compact package outline (LxW) of 6.0 x 6.0 mm.
- Designed for high current drive; Maximum 90 mA.
- Low thermal resistance; $R_{th(j-s)} = 20$ K/W.
- Compatible to IR reflow soldering.

Absolute Maximum Ratings

	Maximum Value	Unit
DC forward current.	90	mA
Reverse voltage.	5	V
LED junction temperature.	125	°C
Operating temperature.	-40~ +100	°C
Storage temperature.	-40~ +100	°C
Power dissipation	360	mW

Optical Characteristics at Ta=25°C.

		Intensity @ If=90mA (mcd)			Viewing Angle
Rated Current	Color	Min	Typ.	Max	
90 mA	White	7,150	9,000	11,250	60

	Intensity @ If=90mA (mcd)	
IV Group	Min	Max
AA	7,150	9,000
AB	9,000	11,250

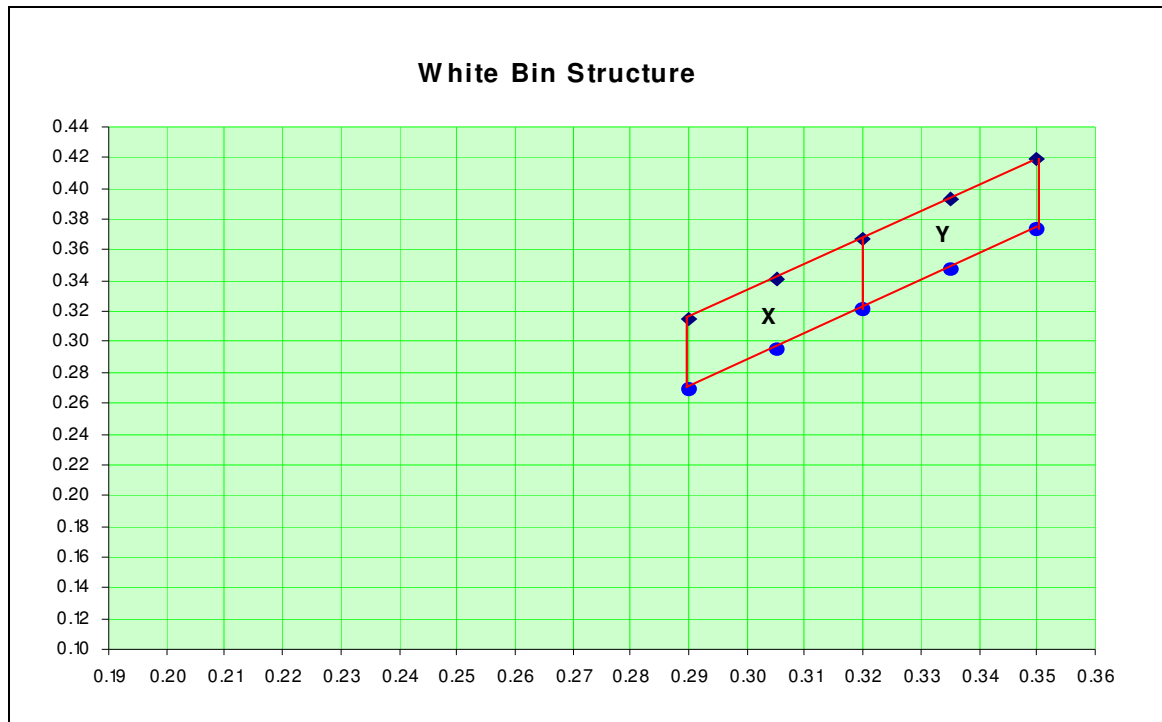
1. Luminous intensity is measured with an accuracy of $\pm 11\%$.
2. Wavelength binning is carried for all units as per the wavelength-binning table. Only one wavelength group is allowed for each reel.

Electrical Characteristics at Ta = 25°C.

		Vf @ If=90mA		Vr @ Ir=10uA
Rated Current	Color	Typ. (V)	Max. (V)	Min.(V)
90 mA	White	3.6 V	4.0 V	5

Color Grouping.

If color binning is required, only one color group is allowed for each chip within a reel.



Chromaticity coordinate groups are measured with an accuracy of ± 0.01 .

Bin		1	2	3	4
X	Cx	0.290	0.310	0.310	0.290
	Cy	0.270	0.304	0.349	0.315
Y	Cx	0.310	0.330	0.330	0.310
	Cy	0.304	0.339	0.384	0.349

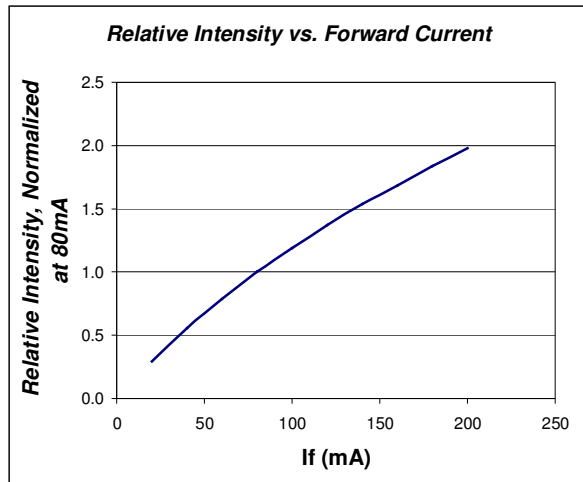
Material

	<u>Material</u>
1. Lead-frame	Cu Alloy With Ag Plating
2. Package	High Temperature Resistant Plastic, PPA
3. Encapsulation	Expoxy Resin
4. Soldering Leads	Sn-Sn Plating
5. Die	InGaN based
6. Bonding Wire	Au

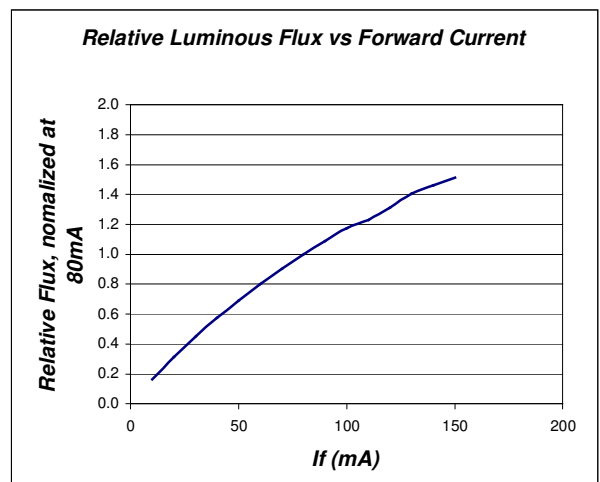
Note: Product is lead-free

Optical and electrical characteristics

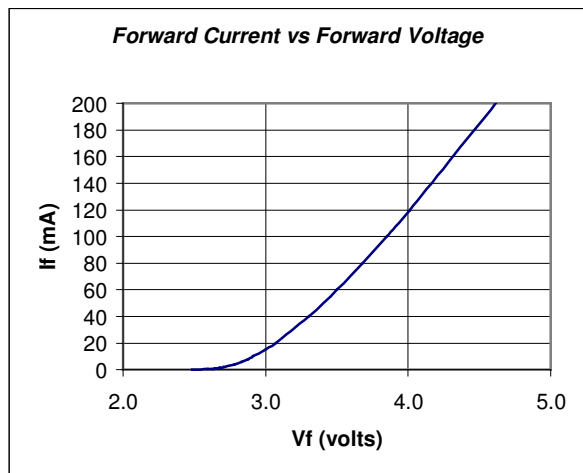
Relative luminous intensity vs. forward current.



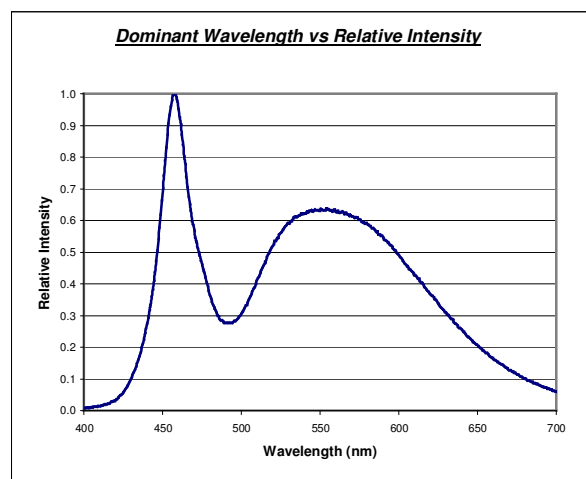
Flux vs. forward current.



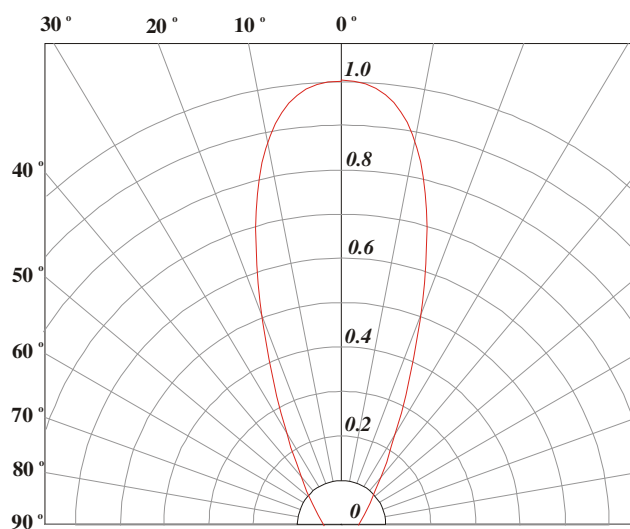
Forward current vs. forward voltage.



Relative Spectra Emission

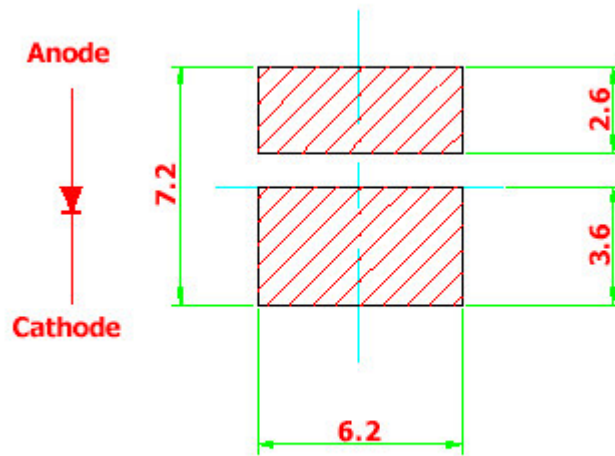


Radiation pattern.



Recommended Solder Pad Design.

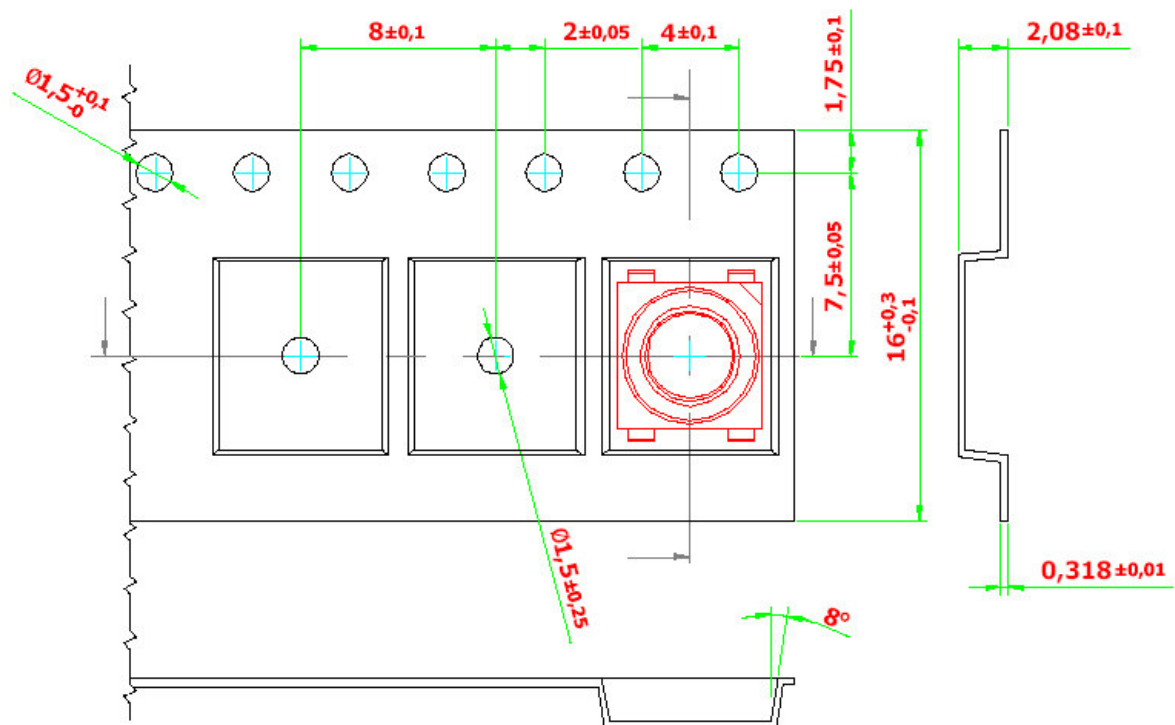
Unit: mm



Taping And Orientation.

Quantity: 1000 units/reel

Reel Diameter: 330 mm.



Unit: mm

Recommended Soldering Temperature – Time Profile (Reflow Soldering)

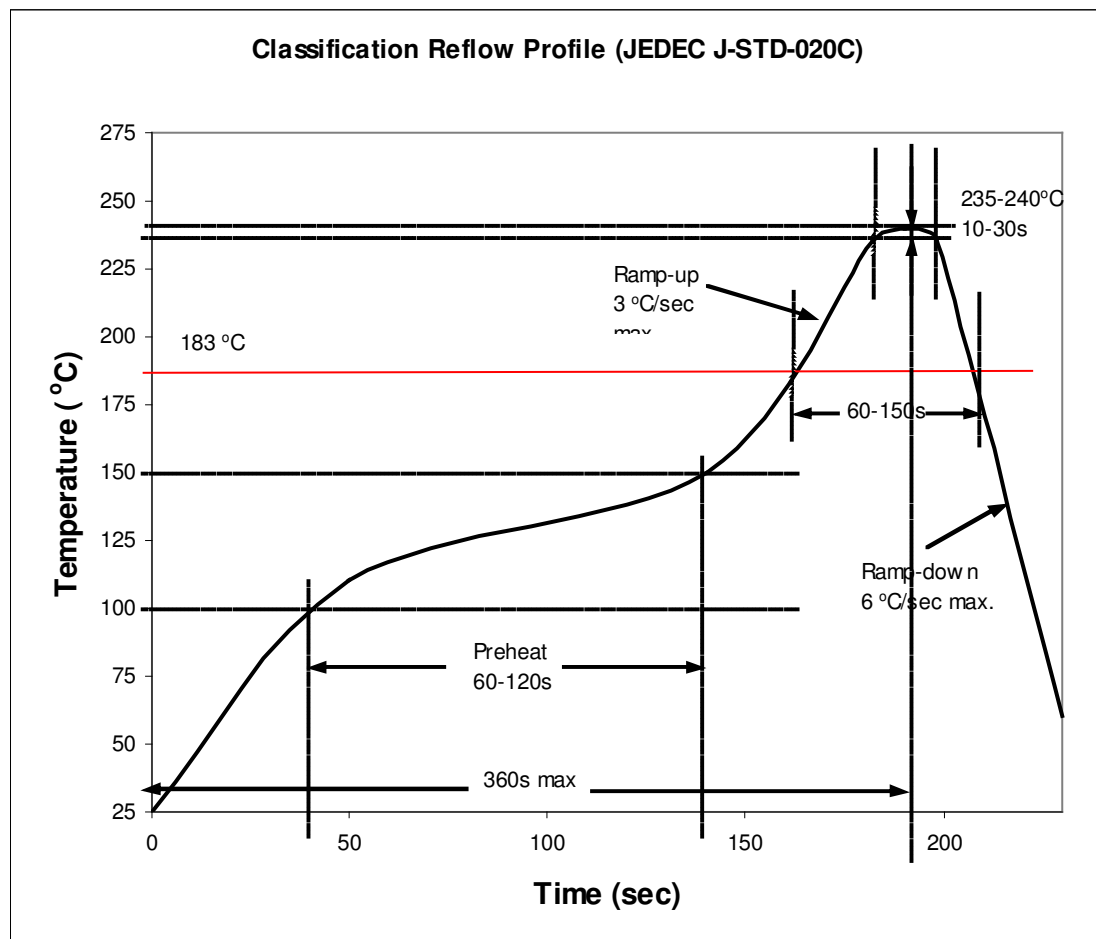
Surface Mounting Condition

In automatic mounting of the SMD LEDs on printed circuit boards, any bending, expanding and pulling forces or shock against the SMD LEDs should be kept min. to prevent them from electrical failures and mechanical damages of the devices.

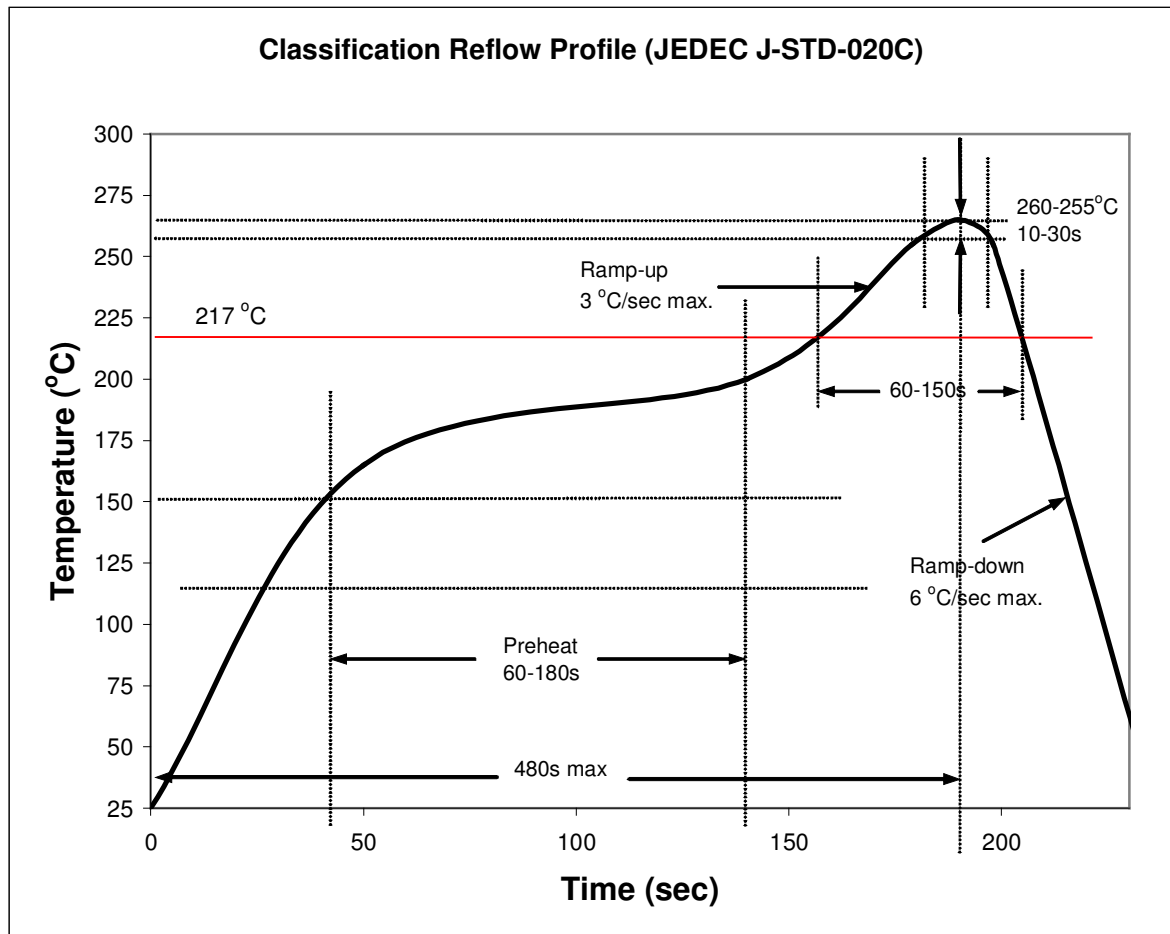
Soldering Reflow

- Soldering of the SMD LEDs should conform to the soldering condition in the individual specifications.
- SMD LEDs are designed for Reflow Soldering.
- In the reflow soldering, too high temperature and too large temperature gradient such as rapid heating/cooling may cause electrical & optical failures and damages of the devices.
- AOT cannot guarantee the LEDs after they have been assembled using the solder dipping method.

1) Lead Solder



2) Lead-Free Solder (JEDEC J-STD-020B).



3) Manual Soldering conditions.

- Lead Solder
Max. 300°C for Max. 3sec, and only one time.
- Lead-free Solder
Max. 350°C for Max. 3sec, and only one time.

- There is possibility that the brightness of LEDs is decreased, which is influenced by heat or ambient atmosphere during reflow. It is recommended to use the nitrogen reflow method.
- After LEDs have been soldered, repair should not be done. As repair is unavoidable, a double-head soldering iron should be used. It should be confirmed beforehand whether the characteristics of the LEDs will be damaged by repairing or not.
- Reflow soldering should not be done more than two times.

Reliability Test

No.	Test Item	Standard Test Method	Test Conditions	Note	Sample Size	Pass
1	Steady State Operating Life	Internal Ref.	$I_f = 60 \text{ mA}$ (20 mA / chip)	168 Hr	20	OK
2	Soldering Test	JESD22-B102-C	230C max	2 Times	60	OK
3	Reflow Test	JESD22-B102-C	230C max	2 Times	20	OK
4	Thermal Shock	JESD22-A106-A	-40C ~ 85C	84 Cycles	20	OK
5	Temperature Cycle	JESD22-A104-A	-35C ~ 75C	168 Cycles	20	OK
6	High Temperature Storage	JESD22-A103-A	100C	168 Hr	20	OK
7	Low Temperature Storage	Internal Ref.	-40C	168 Hr	20	OK
8	High Temperature High Humidity	JESD22-A101-B	85C,85%RH	168 Hr	20	OK
9	Pressure Cook	JESD22-A102B	121C,P=2atm 100%RH	168 Hr	20	OK
10	On-Off Test	Internal Ref.	2 sec ON - 2sec OFF	100,000 cycle	20	OK
11	ESD Test	ESD-STM5.2, 1999			20	OK

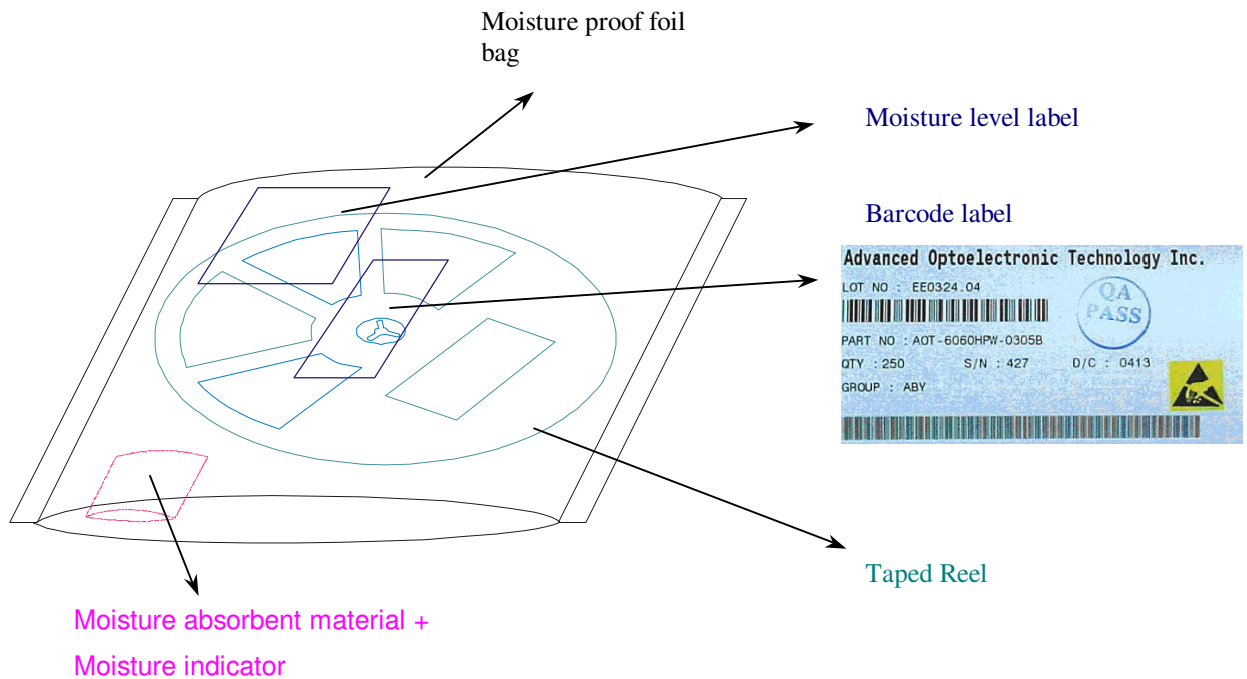
Conclusion :

The reliability tests were designed to evaluate both package integrity as well as workability of product performance over time.

All samples have done well by completed test requirement and passed all the qualification criteria with **zero** failure. From design standpoint, the package is robust enough to meet its datasheet conditions.

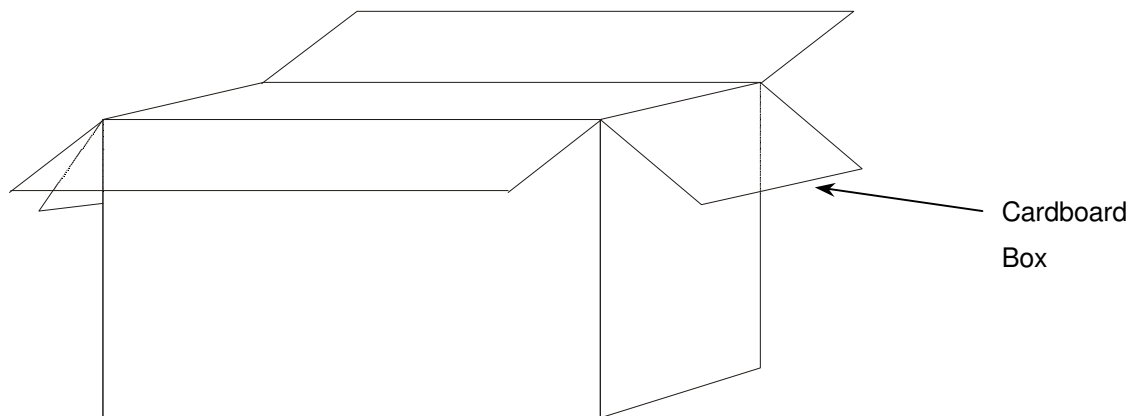
Based on the good result shows on the above test, this product is qualified and released for market.

Packaging Specification



The reel, moisture absorbent material and moisture indicator are sealed inside the moisture proof foil bag.

	Average 1pc AOT 6060 HPW series	1 completed bag (2000pcs)
Weight (gram)	0.22	1360 ± 10



For AOT 6060 HPW series

Cardboard Box Size	Dimensions (mm)	Empty Box Weight (kg)	Reel /box	Quantity /box (pcs)
Large	416 x 516 x 476	1.4	22 reels MAX.	44,000 MAX

Cautions:

1. After open the package, the LED should be kept at 30°C, 60%RH or less. The LED should be soldered within 168 hours (7 days) after opening the package.
2. Heat generation must be taken into design consideration when using the LED.
3. Power must be applied resistors for protection, over current would be caused the optic damage to the devices and wavelength shift.
4. Manual tip solder may cause the damage to Chip devices, so advised that heat of iron should be lower than 15W with temperature control under 5 seconds at 230-260 deg. C. (The device would be got damage in re working process, recommended under 5 seconds at 230-260 deg. C)
5. All equipments and machinery must be properly grounded. It is recommended to use a wristband or anti-electrostatic glove when handling the LED.
6. Use IPA as a solvent for cleaning the LED. The other solvent may dissolve the LED package and the epoxy, Ultrasonic cleaning should not be done.
7. Damaged LED will show unusual characteristics such as leak current remarkably increases, turn-on voltage becomes lower and the LED gets unlight at low current.

NOTE.

All the information published is considered to be reliable. However, AOT does not assume any liability arising out of the application or use of any product described herein.

AOT reserves the right to make changes at any time without notice to any products in order to improve reliability, function or design.

AOT products are not authorized for use as critical components in life support devices or systems without the express written approval from the managing director of AOT.