Acrich
semiconductor eco lighting

SEOUL SEMICONDUCTOR

RoHS

Specification

SSC-SZB05A0A

Rev9. Agust, 2020
www.seoulsemicon.com
서식번호 : SSC-QP-7-07-12 (Rev.00)

SZB05A0A

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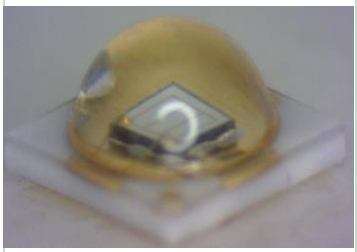
Description



The Z-Power series is designed for high current operation and high flux output applications.

It incorporates state of the art SMD design and low thermal resistant material.

The Z Power LED is ideal light sources for general illumination applications, custom designed solutions, large backlights and high performance torches.

Features

- Super high Flux output and high Luminance
- Designed for high current operation
- SMT solderable
- Lead Free product
- RoHS compliant

Applications

- General Torch
- Architectural lighting
- Projector light source
- Traffic signals
- Task lighting
- Decorative / Pathway lighting
- Remote / Solar powered lighting
- Automotive interior / exterior lighting
- Automotive signal / forward lighting

* The appearance and specifications of the product can be changed for improvement without notice.

[Contents]

1. Full code of Z5 series

Full code form : X_1 X_2 X_3X_4 X_5X_6 X_7X_8

1. Part Number

X_1	Company

X_2	Z-Power LED series number

X_3X_4	Color Specification
B0	Blue

X_5	PKG Series
5	Z5 series

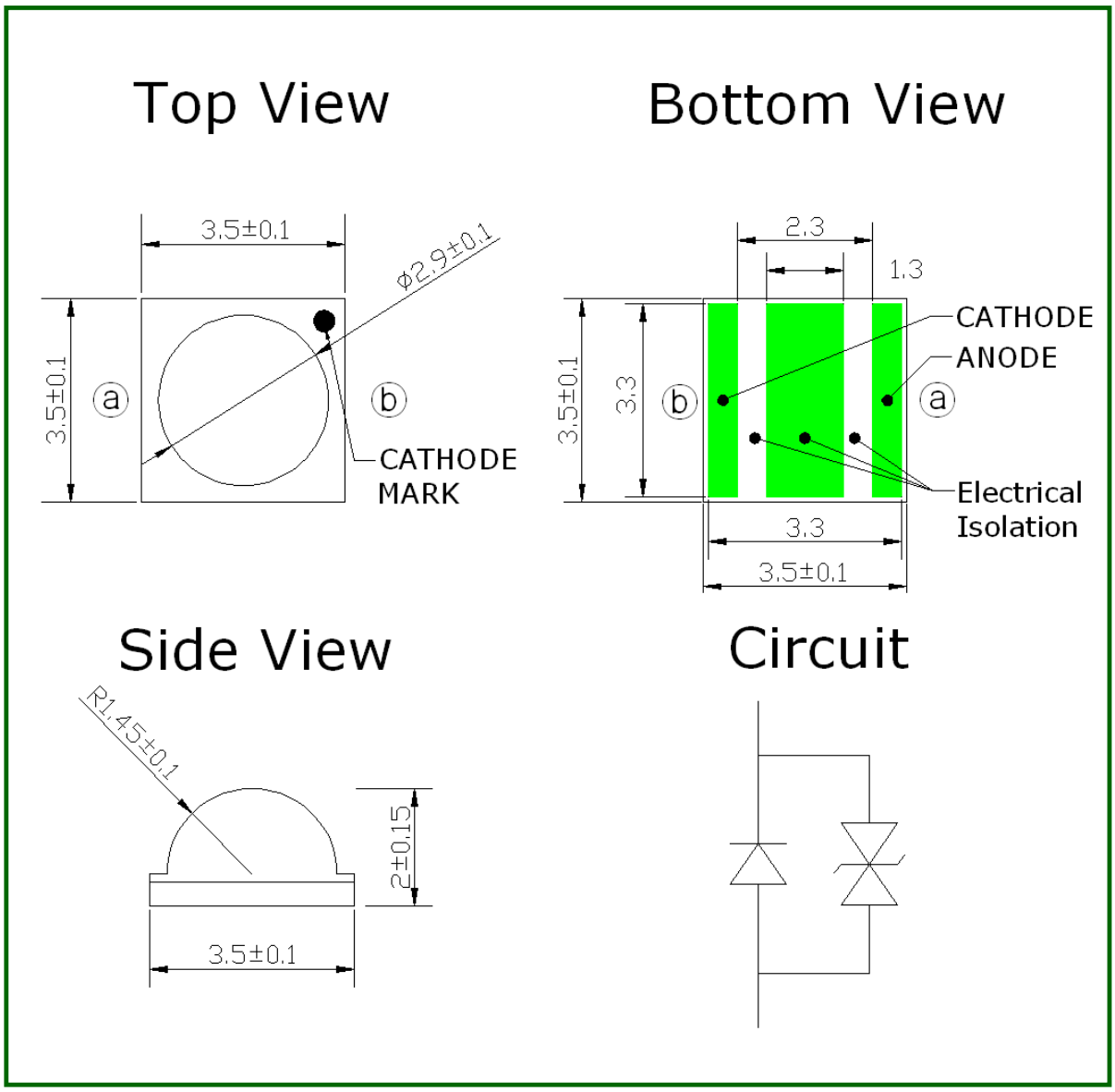
X_6	Lens type

X_7	PCB Type

2. Internal Number

X_8	Revision No.

2. Outline dimensions



Notes :

[1] All dimensions are in millimeters.

[2] Scale : none

[3] Undefined tolerance is ±0.1mm

3. Characteristics of SZB05A0A (Blue)

Blue

1-1 Electro-Optical characteristics at 350mA

(Ta=25℃, RH30%)

Parameter	Symbol	Value			Unit
		Min	Typ	Max	
Luminous Flux [1]	Φ_V [2]	14.5	22	26	lm
	Φ_V (Tj=100℃)	-	20	-	
Dominant Wavelength[3]	λ_D	453	460	465	nm
Forward Voltage [4]	V_F	2.75	3.10	4.00	V
Thermal resistance (J to S)	$R\theta_{J-S}$		7.0		K /W
View Angle	2Θ ½		128		deg.

1-2 Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Forward Current	I_F	700	mA
Reverse Voltage	V_r	5	V
Power Dissipation	P_d	3	W
Junction Temperature	T_j	145(@ $I_F \leq$ 700mA)	ºC
Operating Temperature	T_{opr}	-40 ~ +100	ºC
Storage Temperature	T_{stg}	-40 ~ +100	ºC
ESD Sensitivity(HBM) [6]	-	2	kV

*Notes :

[1] SSC maintains a tolerance of ±7% on flux and power measurements.

[2] Φ_V is the total luminous flux output as measured with an integrating sphere.

[3] Correlated Color Temperature is derived from the CIE 1931 Chromaticity diagram.
Color coordinate : ±0.005, CCT ±5% tolerance.

[4] Tolerance is ±0.06V on forward voltage measurements

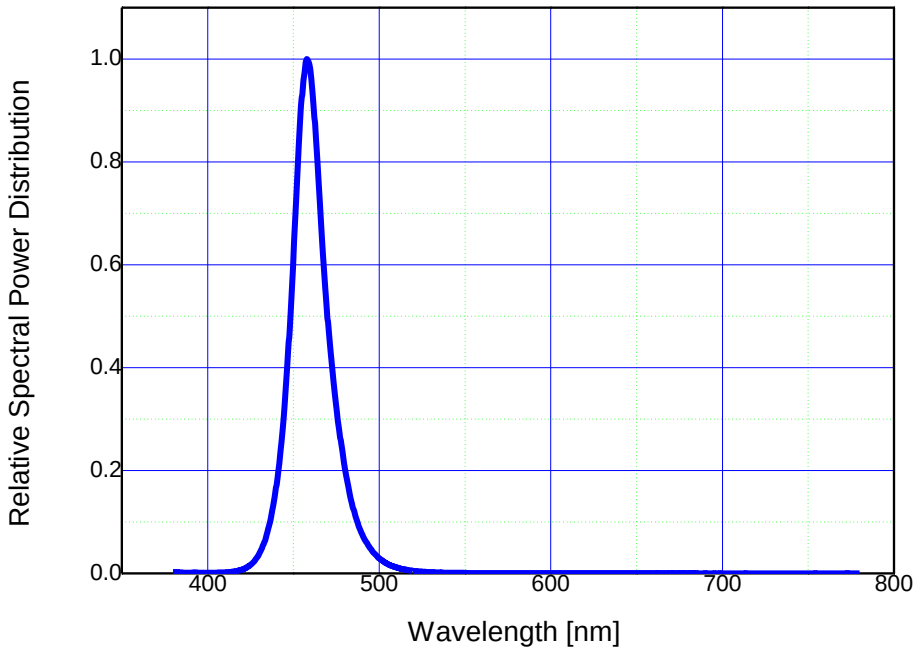
[5] A zener diode is included to protect the product from ESD.

[6] Tolerance is ±2.0 on CRI measurements

4. Characteristic diagrams

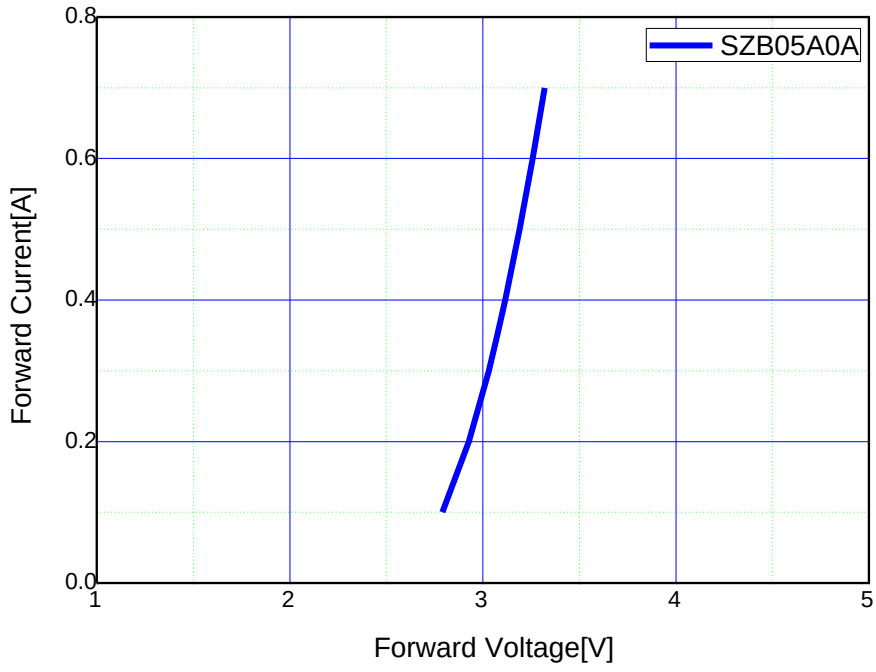
Color Spectrum

(IF=350mA, Ta=25℃, RH30%)

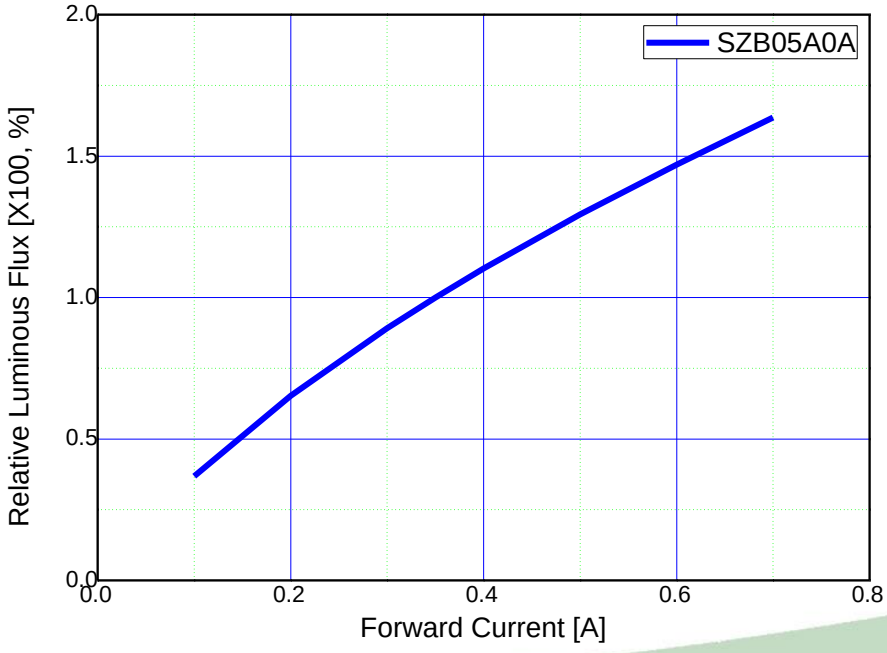


Forward Current Characteristics

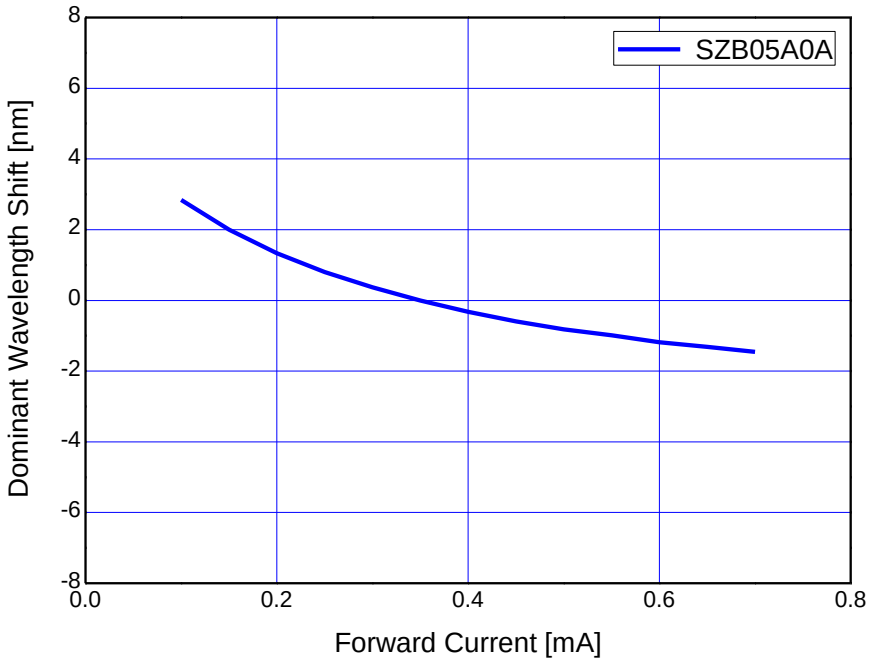
Forward Voltage vs. Forward Current, Ta=25℃



Forward Current vs. Normalized Relative Luminous Flux, Ta=25℃

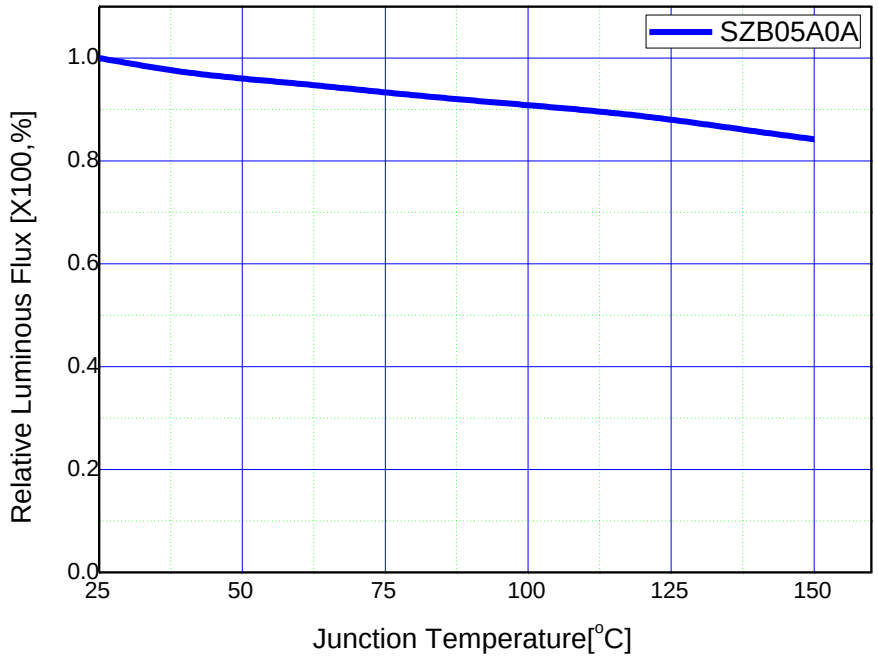


Forward Current vs Wavelength Shift, Ta=25℃

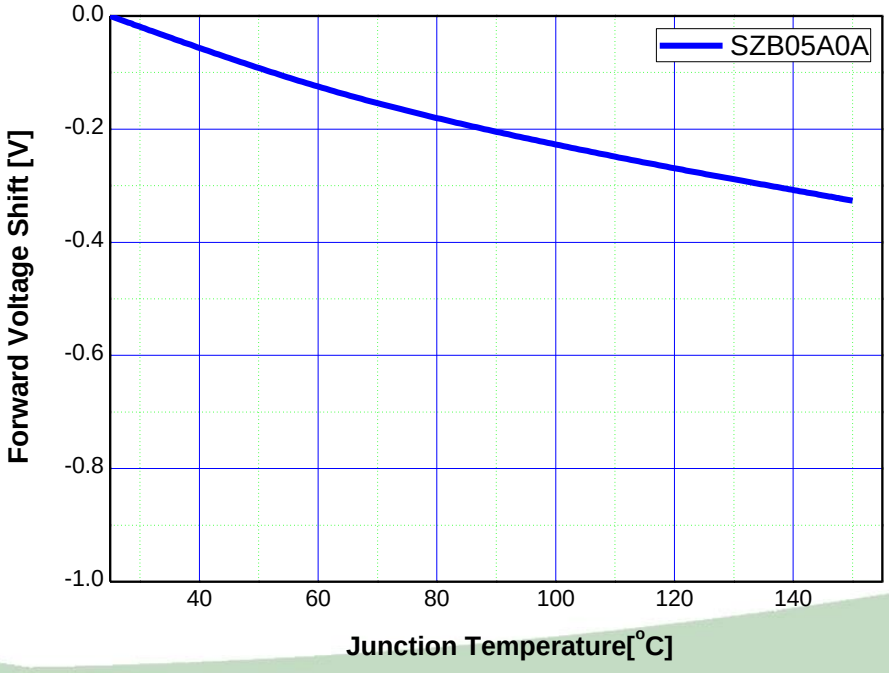


Junction Temperature Characteristics

Junction Temperature vs. Relative Light Output at IF=350mA

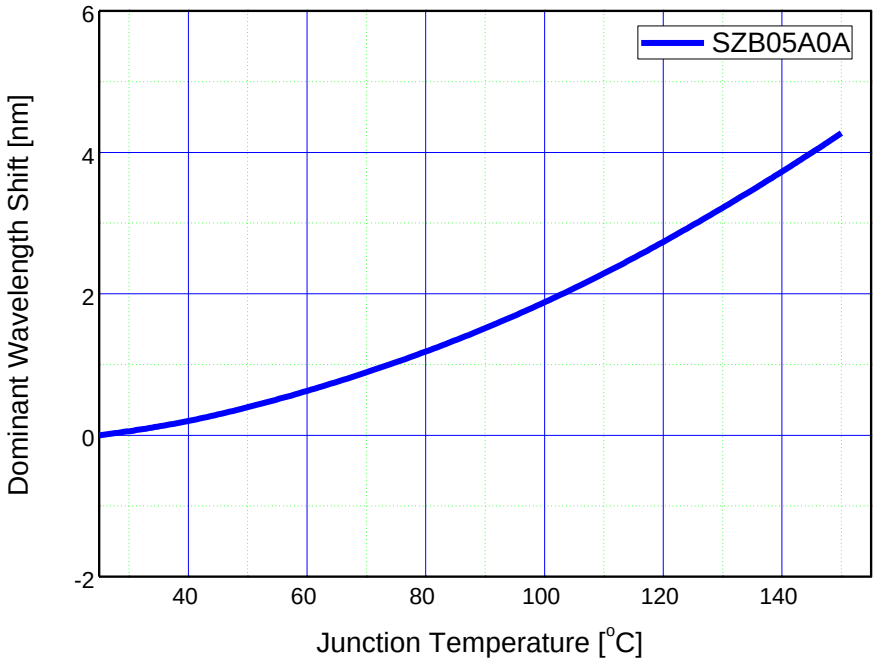


Junction Temperature vs. Forward Voltage at IF=350mA



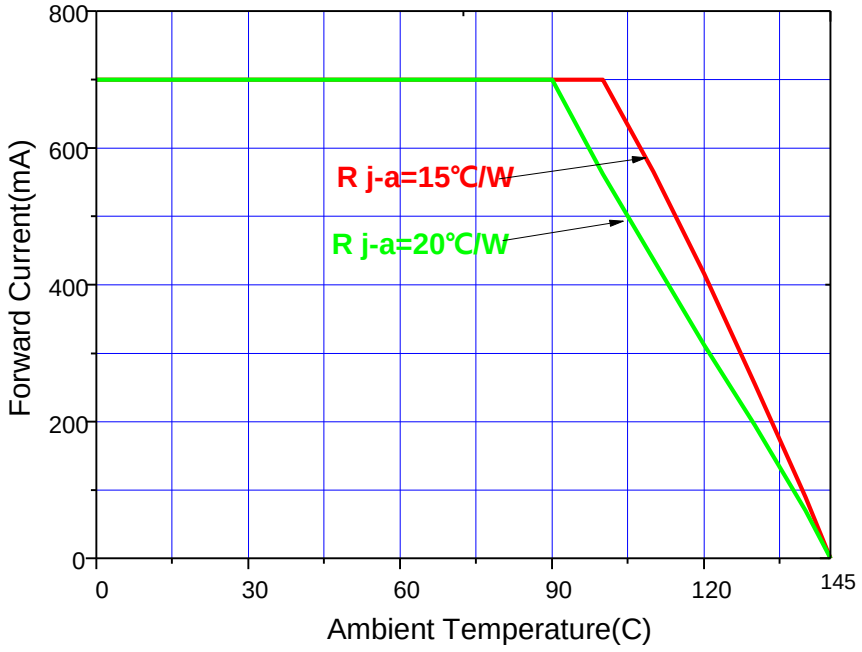
Junction Temperature Characteristics

Junction Temperature vs. Dominant Wavelength at IF=350mA

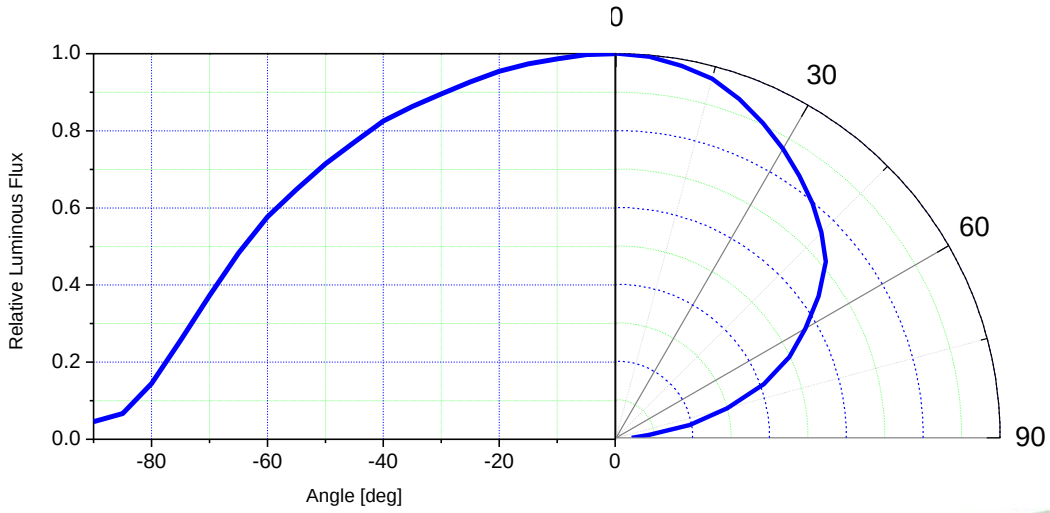


Characteristic diagrams

Ambient Temperature vs. Allowable Forward Current (Tjmax = 145℃, @0.7A)



Radiation pattern at 350mA



5. Bin Code Description

Bin Code		
Luminous Flux (lm) @ I_F = 350mA	Dominant Wavelength (nm) @ I_F = 350mA	Forward Voltage (V) @ I_F = 350mA
O	BB1	H

Luminous Flux (lm) @ I_F = 350mA

Bin Code	Min.	Max.
M	14.5	19.0
O	19.0	24.5
P	24.5	32.0

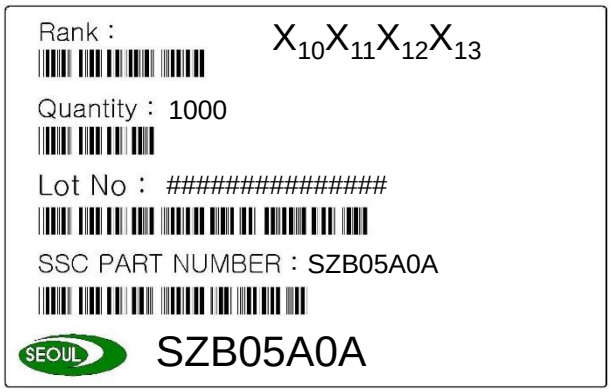
Dominant Wavelength (nm) @ I_F = 350mA

Bin Code	Min.	Max.
BB1	453	460
BB2	460	465

Forward Voltage (V) @ I_F = 350mA

Bin Code	Min.	Max.
G	2.75	3.00
H	3.00	3.25
I	3.25	3.50
J	3.50	3.75

6. Labeling



Full code form

$X_1X_2X_3X_4X_5X_6X_7X_8$

- X_1 : Company
- X_2 : Z-Power LED series number
- X_3X_4 : Color Specification
- X_5 : PKG Series
- X_6 : Lens Type
- X_7 : PCB Type
- X_8 : Revision No.

Rank

$X_{10}X_{11}X_{12}X_{13}$

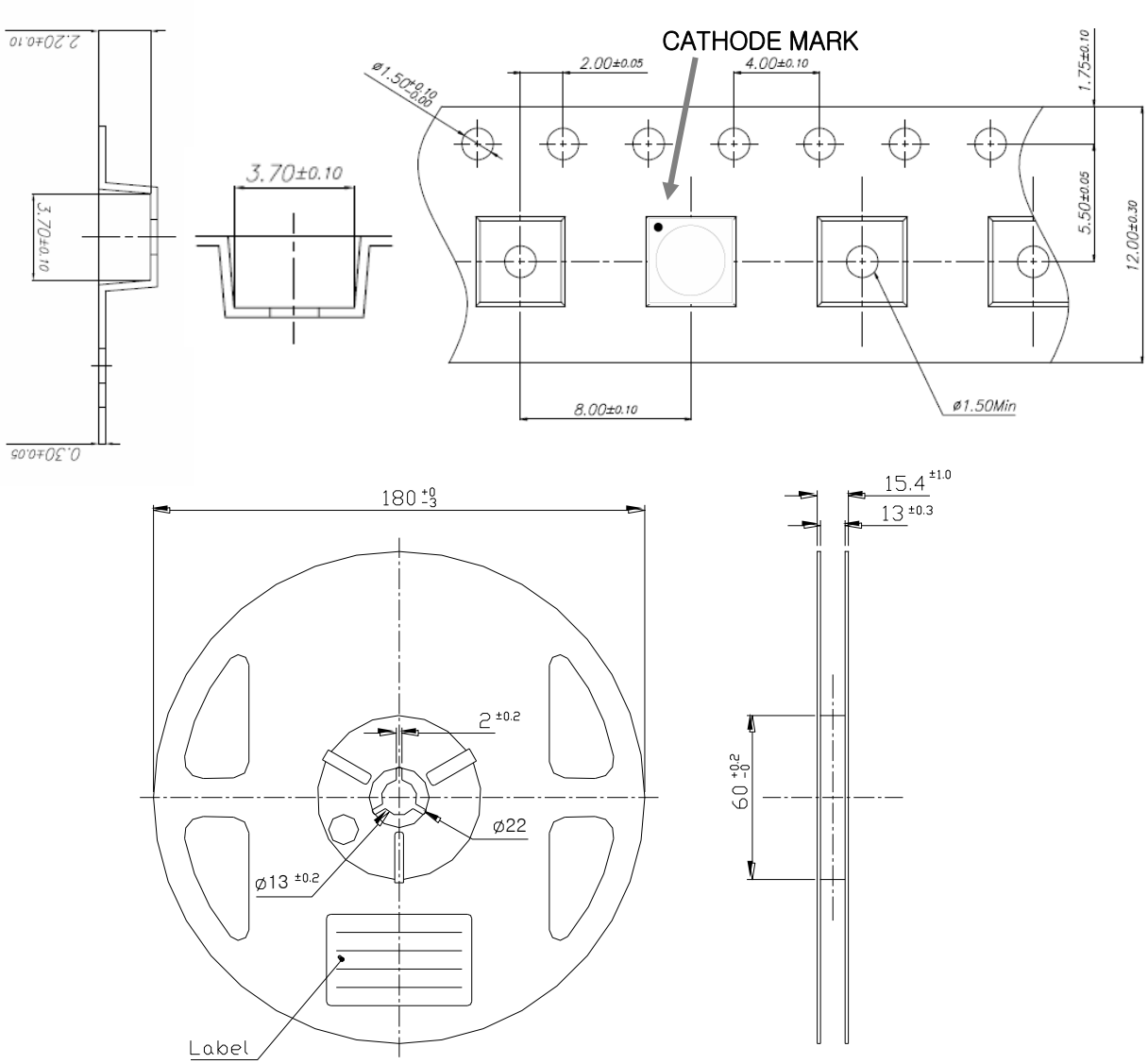
- X_{10} : Luminous Flux : LF [lm]
- $X_{11}X_{12}$: Dominant Wavelength [nm]
- X_{13} : Forward Voltage : V_F [V]

Lot No

#1#2#3#4#5#6 - #7#8#9#10 - #11#12#13

- #1 #2 : Year
- #3 #4 : Month
- #5 #6 : Day
- #7 #8 #9 #10 : Mass order
- #11 #12 #13 : Tray No.

7. Packing

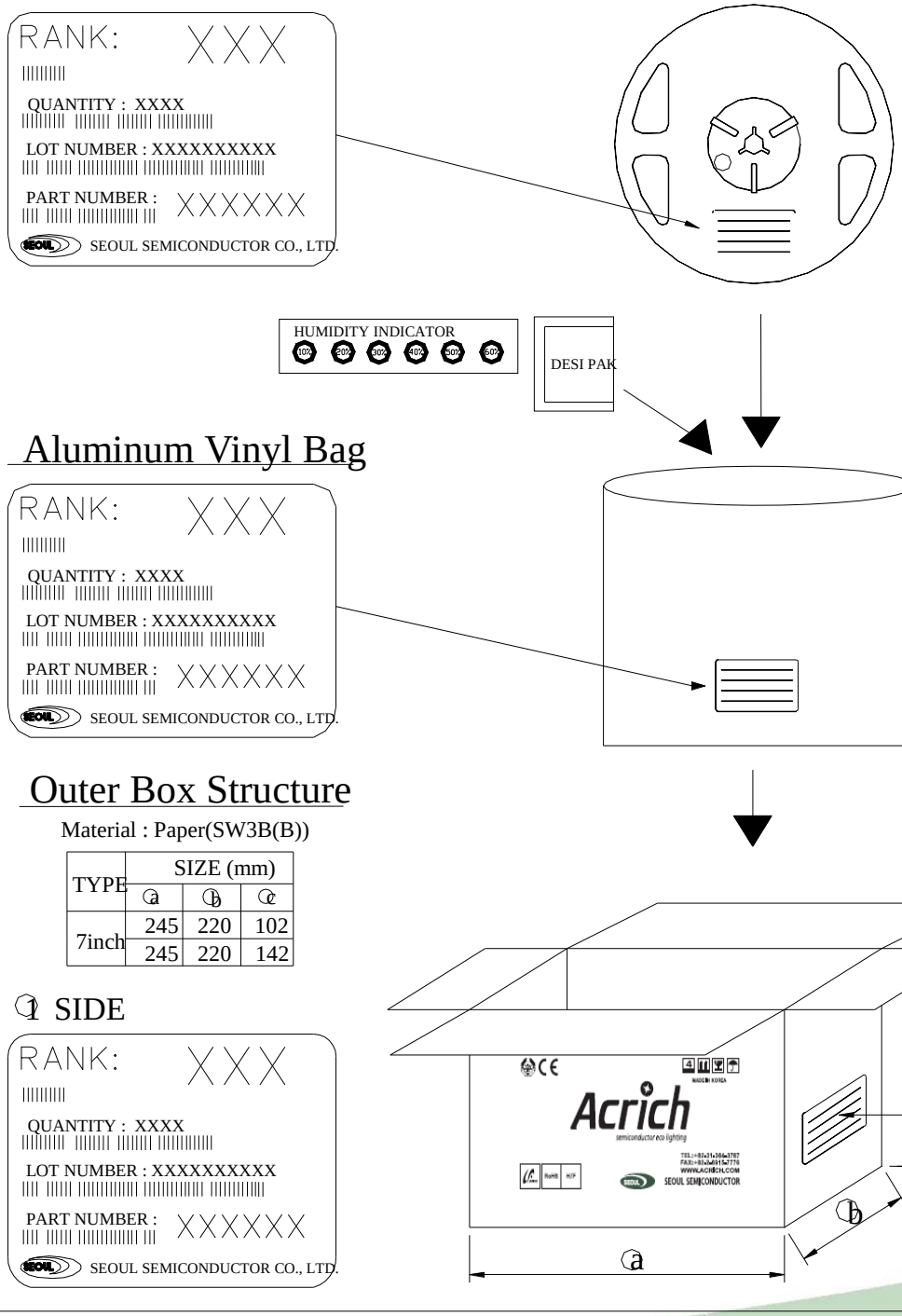


NOTES:

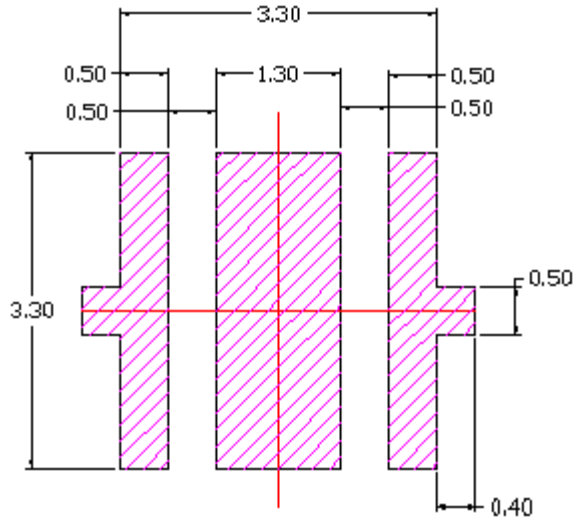
1. 10 sprocket hole pitch cumulative tolerance ±0.20
2. Camber not to exceed 1mm in 250mm
3. Material: Black conductive Polystyrene
4. Ao and Bo measured on a plane 0.3mm above the bottom of the pocket
5. Ko measured from a plane on the inside bottom of the pocket to the top surface of the carrier.
6. Pocket position relative to sprocket hole measured as true position of pocket, not pocket hole.
7. Pocket center and pocket hole center must be same position.

7. Packing

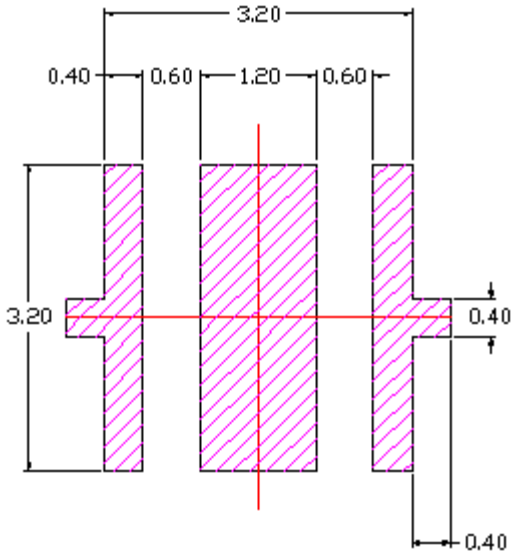
Reel



8. Recommended solder pad



Recommended PCB Solder Pad



Recommended Stencil Pattern

Notes :

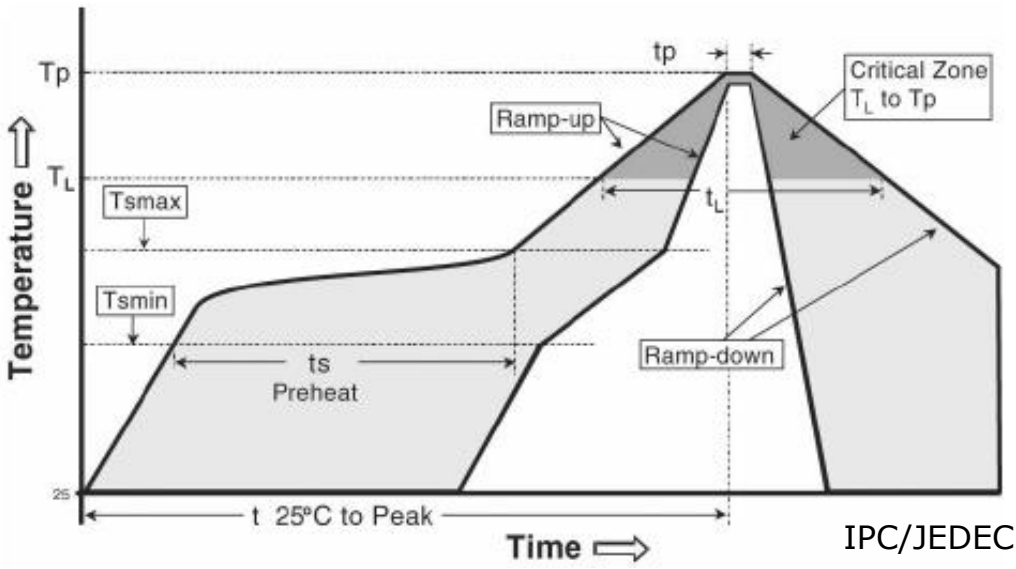
[1] All dimensions are in millimeters.

[2] Scale : none

[3] This drawing without tolerances are for reference only

[4] Undefined tolerance is ±0.1mm

9. Soldering



IPC/JEDEC J-STD-020

Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Average ramp-up rate (Tsmax to Tp)	3° C/second max.	3° C/second max.
Preheat - Temperature Min (Tsmin) - Temperature Max (Tsmax) - Time (Tsmin to Tsmax) (ts)	 100 °C 150 °C 60-120 seconds	 150 °C 200 °C 60-180 seconds
Time maintained above: - Temperature (TL) - Time (tL)	 183 °C 60-150 seconds	 217 °C 60-150 seconds
Peak Temperature (Tp)	215℃	260℃
Time within 5°C of actual Peak Temperature (tp)2	10-30 seconds	20-40 seconds
Ramp-down Rate	6 °C/second max.	6 °C/second max.
Time 25°C to Peak Temperature	6 minutes max.	8 minutes max.

* Caution

1. Reflow soldering is recommended not to be done more than two times. In the case of more than 24 hours passed soldering after first, LEDs will be damaged.
2. Repairs should not be done after the LEDs have been soldered. When repair is unavoidable, suitable tools must be used.
3. Die slug is to be soldered.
4. When soldering, do not put stress on the LEDs during heating.
5. After soldering, do not warp the circuit board.

10. Precaution for use

(1) Storage

To avoid the moisture penetration, we recommend storing LED in a dry box with a desiccant . The recommended storage temperature range is 5℃ to 30℃ and a maximum humidity of RH50%.

(2) Use Precaution after Opening the Packaging

Use SMD techniques properly when solder the LED as separation of the lens may affect the light output efficiency.

Pay attention to the following:

a. Recommend conditions after opening the package

- Sealing / Temperature : 5 ~ 30℃ Humidity : less than RH60%

b. If the package has been opened more than 4 weeks **(MSL 2a)** or the color of the desiccant changes, components should be dried for 10-24hr at 65±5℃

(3) Do not apply mechanical force or excess vibration during the cooling process to normal temperature after soldering.

(4) Do not rapidly cool device after soldering.

(5) Components should not be mounted on warped (non coplanar) portion of PCB.

(6) Radioactive exposure is not considered for the products listed here in.

(7) Gallium arsenide is used in some of the products listed in this publication. These products are dangerous if they are burned or shredded in the process of disposal. It is also dangerous to drink the liquid or inhale the gas generated by such products when chemically disposed of.

(8) This device should not be used in any type of fluid such as water, oil, organic solvent and etc. When washing is required, IPA (Isopropyl Alcohol) should be used.

(9) When the LED are in operation the maximum current should be decided after measuring the package temperature.

(10) The appearance and specifications of the product may be modified for improvement without notice.

(11) Long time exposure of sunlight or occasional UV exposure will cause lens discoloration.

10. Precaution for use

(12) VOCs (Volatile organic compounds) emitted from materials used in the construction of fixtures can penetrate silicone encapsulants of LED and discolor when exposed to heat and photonic energy. The result can be a significant loss of light output from the fixture. Knowledge of the properties of the materials selected to be used in the construction of fixtures can help prevent these issues.

(13) Attaching LEDs, do not use adhesives that outgas organic vapor.

(14) The driving circuit must be designed to allow forward voltage only when it is ON or OFF. If the reverse voltage is applied to LED, migration can be generated resulting in LED damage.

(15) LED is sensitive to Electro-Static Discharge (ESD) and Electrical Over Stress (EOS). Below is a list of suggestions that Seoul Semiconductor purposes to minimize these effects.

a. ESD (Electro Static Discharge)

Electrostatic discharge (ESD) is the defined as the release of static electricity when two objects come into contact. While most ESD events are considered harmless, it can be an expensive problem in many industrial environments during production and storage. The damage from ESD to an LED may cause the product to demonstrate unusual characteristics such as:

- Increase in reverse leakage current lowered turn-on voltage
- Abnormal emissions from the LED at low current

The following recommendations are suggested to help minimize the potential for an ESD event.
One or more recommended work area suggestions:

- Ionizing fan setup
- ESD table/shelf mat made of conductive materials
- ESD safe storage containers

One or more personnel suggestion options:
- Antistatic wrist-strap
- Antistatic material shoes
- Antistatic clothes

Environmental controls:
- Humidity control (ESD gets worse in a dry environment)

b. EOS (Electrical Over Stress)

Electrical Over-Stress (EOS) is defined as damage that may occur when an electronic device is subjected to a current or voltage that is beyond the maximum specification limits of the device. The effects from an EOS event can be noticed through product performance like:

- Changes to the performance of the LED package
  (If the damage is around the bond pad area and since the package is completely encapsulated the package may turn on but flicker show severe performance degradation.)
- Changes to the light output of the luminaire from component failure
- Components on the board not operating at determined drive power

Failure of performance from entire fixture due to changes in circuit voltage and current across total circuit causing trickle down failures. It is impossible to predict the failure mode of every LED exposed to electrical overstress as the failure modes have been investigated to vary, but there are some common signs that will indicate an EOS event has occurred:

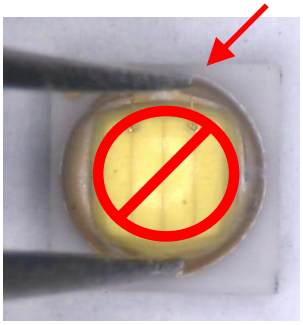
- Damaged may be noticed to the bond wires (appearing similar to a blown fuse)
- Damage to the bond pads located on the emission surface of the LED package
  (shadowing can be noticed around the bond pads while viewing through a microscope)
- Anomalies noticed in the encapsulation and phosphor around the bond wires.
- This damage usually appears due to the thermal stress produced during the EOS event.

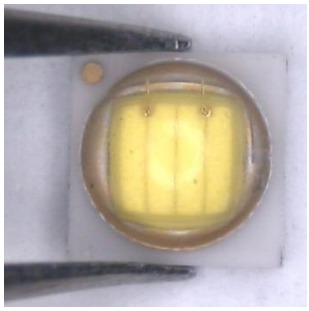
c. To help minimize the damage from an EOS event Seoul Semiconductor recommends utilizing:

- A surge protection circuit
- An appropriately rated over voltage protection device
- A current limiting device

11. Handling of Silicone Resin LEDs

(1) During processing, mechanical stress on the surface should be minimized as much as possible. Sharp objects of all types should not be used to pierce the sealing compound.





(2) In general, LEDs should only be handled from the side. By the way, this also applies to LEDs without a silicone sealant, since the surface can also become scratched.

(3) When populating boards in SMT production, there are basically no restrictions regarding the form of the pick and place nozzle, except that mechanical pressure on the surface of the resin must be prevented.
This is assured by choosing a pick and place nozzle which is larger than the LED's reflector area.

(4) Silicone differs from materials conventionally used for the manufacturing of LEDs. These conditions must be considered during the handling of such devices. Compared to standard encapsulants, silicone is generally softer, and the surface is more likely to attract dust. As mentioned previously, the increased sensitivity to dust requires special care during processing. In cases where a minimal level of dirt and dust particles cannot be guaranteed, a suitable cleaning solution must be applied to the surface after the soldering of components.

(5) SSC suggests using isopropyl alcohol for cleaning. In case other solvents are used, it must be assured that these solvents do not dissolve the package or resin. Ultrasonic cleaning is not recommended. Ultrasonic cleaning may cause damage to the LED.

(6) Please do not mold this product into another resin (epoxy, urethane, etc) and do not handle this product with acid or sulfur material in sealed space.

(7) Avoid leaving fingerprints on silicone resin parts.