

AB3528-XXW-00

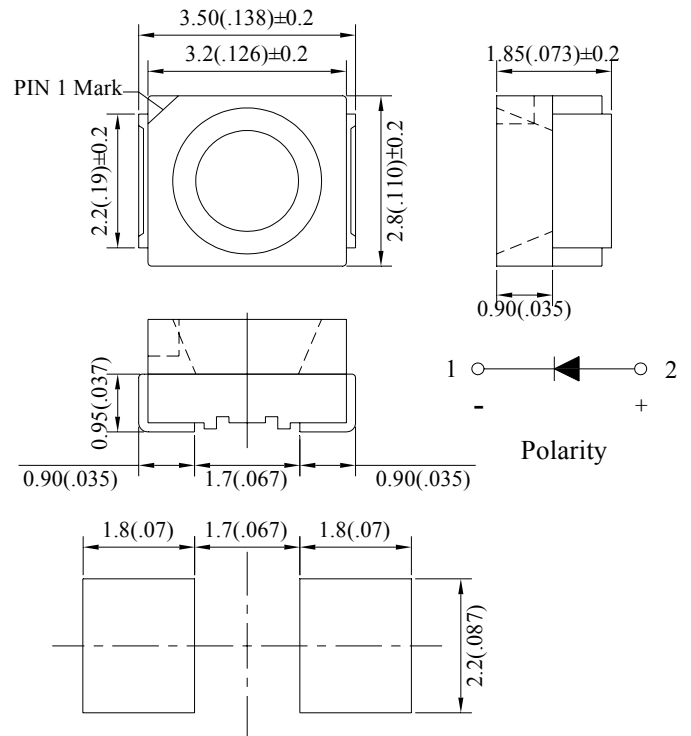
<Features>

1. Emitted Color : White, CCT:3700-5400K
2. Lens Appearance : Yello Diffuse
3. 3.5x2.8x1.9mm standard package
4. Suitable for all SMT assembly methods
5. Compatible with infrared and vapor phase reflow solder process
6. Compatible with automatic placement equipment
7. This product doesn't contain restriction Substance, comply ROHS standard

<Applications>

1. Automotive: Dashboards, Stop Lamps, Turn Signals
2. Backlighting : LCDs, Key pads advertising
3. Status indicators : Consumer & industrial electronics
4. General use

<Package Dimensions>



NOTES:

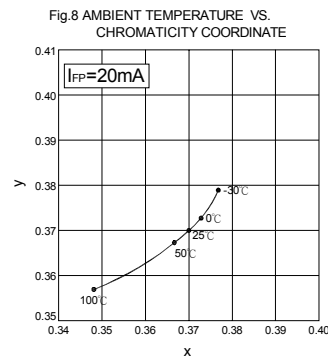
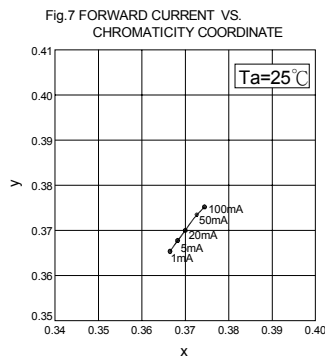
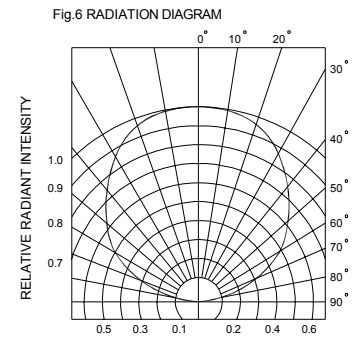
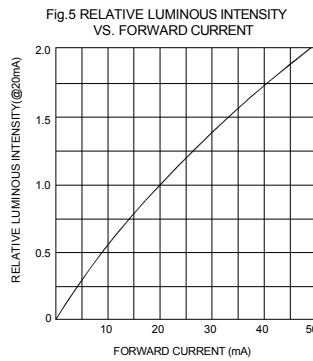
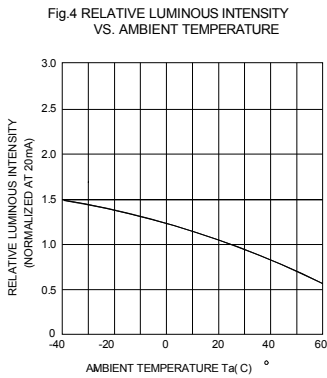
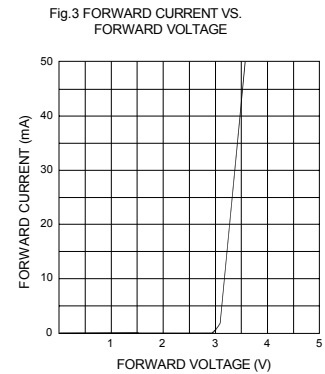
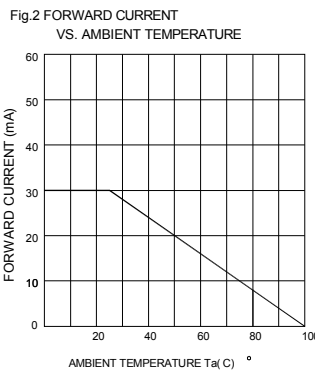
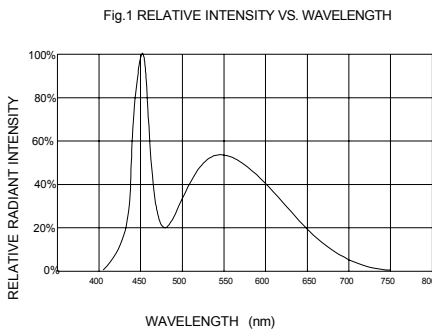
1. All dimensions are in millimeters (inches).
2. Tolerance is $\pm 0.10\text{mm}$ ($0.004''$) unless otherwise specified.
3. Specifications are subject to change without notice.

Absolute Maximum Ratings [Ta=25°C]			
Item	Symbol	Rating	Unit
Power Dissipation	PD	120	mW
Forward Current	IF	30	mA
Peak Forward Current*	IFP	100	mA
Reverse Voltage	VR	5	V
Operating Temperature	TOPR	-40 ~ +100	°C
Storage Temperature	TSTG	-40 ~ +100	°C
Soldering Temperature	TSOL	See Page 8	°C

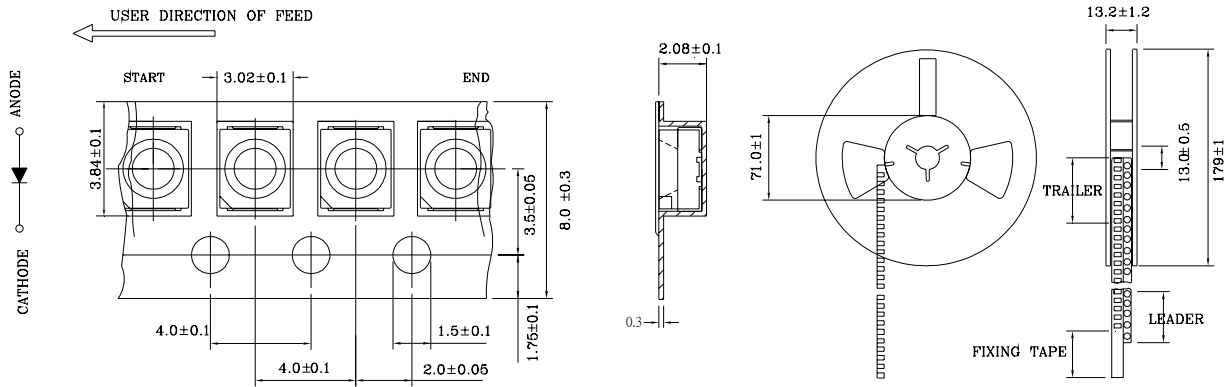
* Condition for IFP is pulse of 1/10 duty and 3 msec.width

Electro-Optical Characteristics[Ta=25°C]						
Item	Symbol	Condition	Minimum	Typical	Maximum	Unit
Forward Voltage	VF	IF=20mA		3.2	3.5	V
Luminous Intensity	IV	IF=20mA	2300	2700		mcd
Chromaticity Coordinates	x	IF=20mA		0.37		
	y	IF=20mA		0.37		
Reverse Current	IR	VR=5V			10	uA
Viewing Angle	θ1/2	IF=20mA		120		deg
Color Rendering Index(CRI)	CRI	IF=20mA		70		

Typical Electro-Optical Characteristics Curves

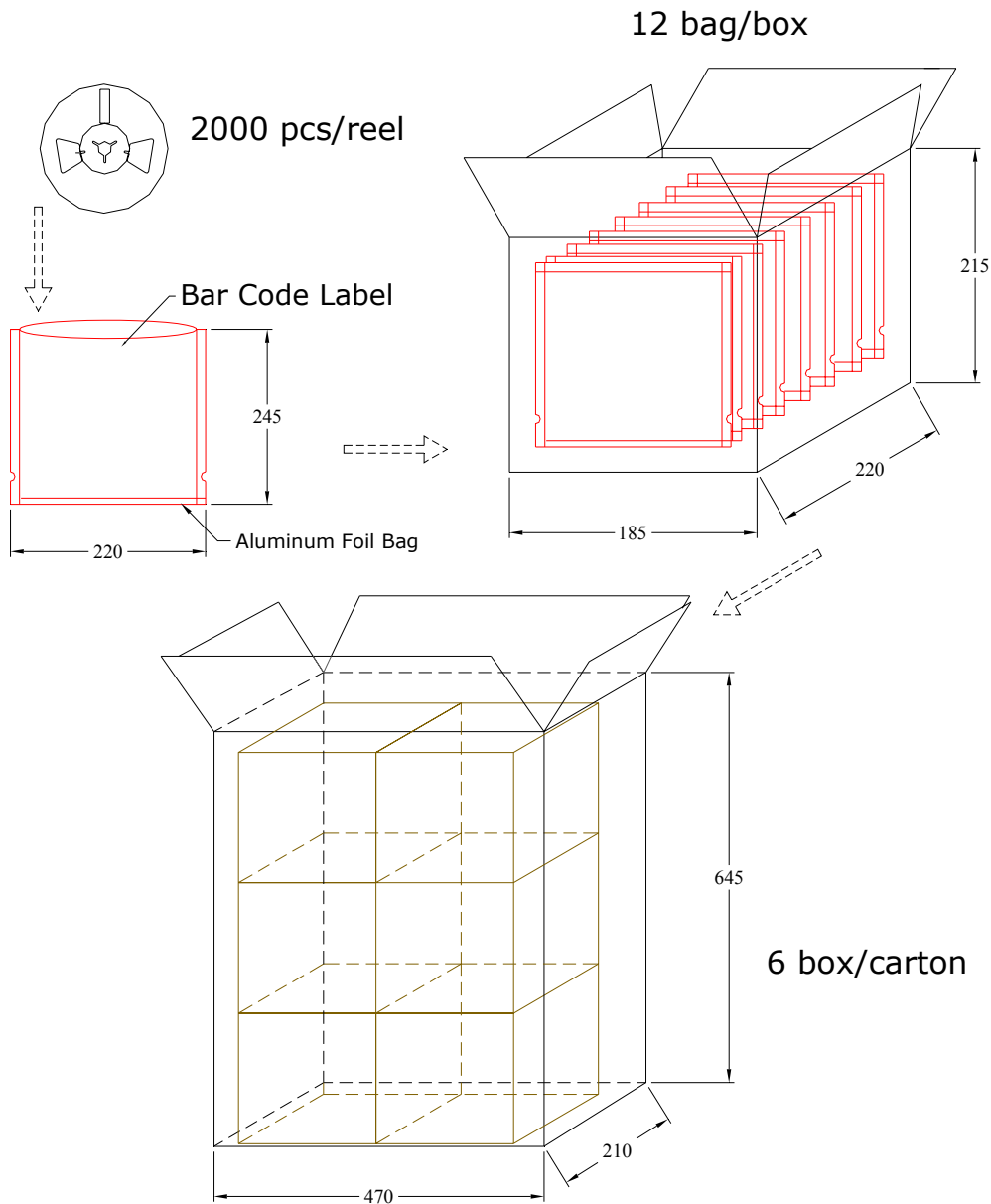


Tapping and packaging specifications (Unit:mm)



NOTE:2000 PCS PER REEL

Package Method:(unit:mm)



Bin Limits

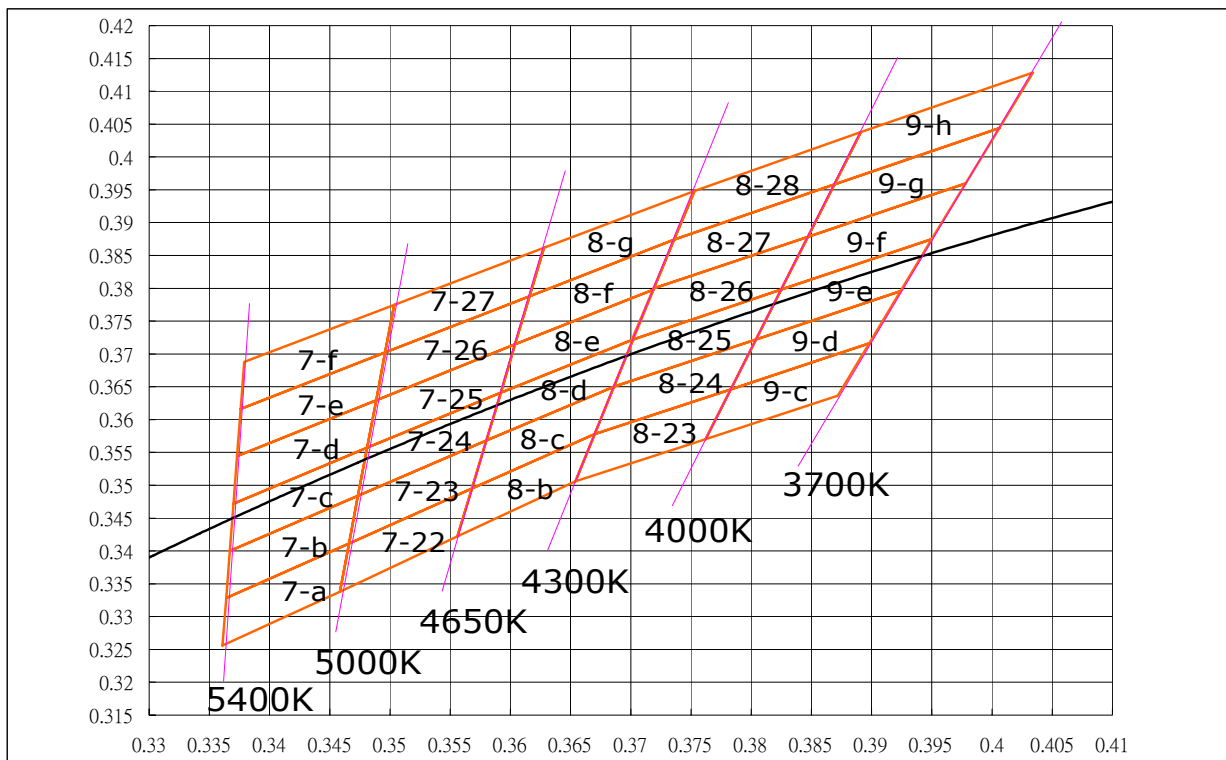
Intensity Bin Limits (At 20mA)

BIN CODE	Min. (mcd)	Max. (mcd)	Im
X7	2300	2450	5.5~5.8
Y1	2450	2600	5.8~6.2
Y2	2600	2750	6.2~6.5
Y3	2750	2900	6.5~6.9
Y4	2900	3050	6.9~7.3
Y5	3050	3250	7.3~7.8
Y6	3250	3450	7.8~8.2

VF Bin Limits (At 20mA)

BIN CODE	Min.(v)	Max.(v)
H1	3.0	3.1
H2	3.1	3.2
J1	3.2	3.3
J2	3.3	3.4
K1	3.4	3.5

Color Bin Limits (At 20mA)

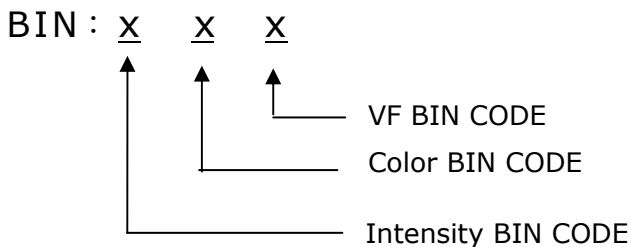


Color Bin Limits (At 20mA)

CCT	BIN	Chromaticity Coordinates					
5000-5400K	7-a	x	0.3361	0.34585	0.3466	0.3364	
		y	0.3256	0.3338	0.3411	0.3328	
	7-b	x	0.3364	0.3466	0.34735	0.3367	
		y	0.3328	0.3411	0.3484	0.34	
	7-c	x	0.3367	0.34735	0.3481	0.337	
		y	0.34	0.3484	0.3557	0.3472	
	7-d	x	0.337	0.3481	0.34885	0.3373	
		y	0.3472	0.3557	0.36295	0.3544	
	7-e	x	0.3373	0.34885	0.3496	0.3376	
		y	0.3544	0.36295	0.3702	0.3616	
	7-c	x	0.3376	0.3496	0.35035	0.3379	
		y	0.3616	0.3702	0.37745	0.3688	
	4650-5000K	7-22	x	0.34585	0.3556	0.3568	0.3466
			y	0.3338	0.3422	0.3495	0.3411
7-23		x	0.3466	0.3568	0.358	0.34735	
		y	0.3411	0.3495	0.3568	0.3484	
7-24		x	0.34735	0.358	0.3592	0.3481	
		y	0.3484	0.3568	0.3641	0.3557	
7-25		x	0.3481	0.3592	0.3604	0.34885	
		y	0.3557	0.3641	0.37145	0.36295	
7-26		x	0.34885	0.3604	0.3616	0.3496	
		y	0.36295	0.37145	0.3788	0.3702	
7-27		x	0.35035	0.3628	0.3616	0.3496	
		y	0.37745	0.38615	0.3788	0.3702	
4300-4650K		8-b	x	0.3556	0.3654	0.367	0.3568
			y	0.3422	0.3506	0.3578	0.3495
	8-c	x	0.3568	0.367	0.3686	0.358	
		y	0.3495	0.3578	0.365	0.3568	
	8d	x	0.358	0.3686	0.3702	0.3592	
		y	0.3568	0.365	0.3722	0.3641	
	8-e	x	0.3592	0.3702	0.3719	0.3604	
		y	0.3641	0.3722	0.3798	0.37145	
	8-f	x	0.3604	0.3719	0.3736	0.3616	
		y	0.37145	0.3798	0.3874	0.3788	
	8-g	x	0.3628	0.3753	0.3736	0.3616	
		y	0.38615	0.3948	0.3874	0.3788	

4000-4300K	8-23	x	0.3654	0.3762	0.3783	0.367	
		y	0.3506	0.357	0.3646	0.3578	
	8-24	x	0.367	0.3783	0.3804	0.3686	
		y	0.3578	0.3646	0.3722	0.365	
	8-25	x	0.3686	0.3804	0.3825	0.3702	
		y	0.365	0.3722	0.3798	0.3722	
	8-26	x	0.3702	0.3825	0.3847	0.3719	
		y	0.3722	0.3798	0.3878	0.38	
	8-27	x	0.3719	0.3847	0.3869	0.3736	
		y	0.38	0.3878	0.3958	0.3874	
	8-28	x	0.3753	0.3891	0.3869	0.3736	
		y	0.3948	0.4038	0.3958	0.3874	
	3700-4000K	9-c	x	0.3762	0.3872	0.3898	0.3783
			y	0.357	0.36365	0.3716	0.3646
9-d		x	0.3783	0.3898	0.3924	0.3804	
		y	0.3646	0.3716	0.37955	0.3722	
9-e		x	0.3804	0.3924	0.395	0.3825	
		y	0.3722	0.37955	0.3875	0.3798	
9-f		x	0.3825	0.395	0.3978	0.3847	
		y	0.3798	0.3875	0.39595	0.3878	
9-g		x	0.3847	0.3978	0.4006	0.3869	
		y	0.3878	0.39595	0.4044	0.3958	
9-h		x	0.3891	0.4034	0.4006	0.3869	
		y	0.4038	0.41285	0.4044	0.3958	

CCT : Tolerance for each Bin Limit is $\pm 100K$



Notes:

1. IV: Tolerance for each Bin Limit is $\pm 10\%$
2. Color: Tolerance for each Bin Limit is ± 0.005
3. Bin Categories are established for classification of products.
Products may not be available in all bin categories.

Reliability Test

Classification	Test Item	Reference Standard	Test Conditions	Result
Endurance Test	Operation Life	MIL-STD-750:1026 MIL-STD-883:1005 JIS-C-7021 :B-1	I _F =20mA Ta=Under room temperature Test time=1,000hrs	0/20
	High Temperature High Humidity Storage	MIL-STD-202:103B JIS-C-7021 :B-11	Ta=+65°C±5°C RH=90%-95% Test time=240hrs	0/20
	High Temperature Storage	MIL-STD-883:1008 JIS-C-7021 :B-10	High Ta=+85°C±5°C Test time=1,000hrs	0/20
	Low Temperature Storage	JIS-C-7021 :B-12	Low Ta=-35°C±5°C Test time=1,000hrs	0/20
Environmental Test	Temperature Cycling	MIL-STD-202:107D MIL-STD-750:1051 MIL-STD-883:1010 JIS-C-7021 :A-4	-35°C ~ +25°C ~ +85°C ~ +25°C 60min 20min 60min 20min Test Time=5cycle	0/20
	Thermal Shock	MIL-STD-202:107D MIL-STD-750:1051 MIL-STD-883:1011	-35°C±5°C ~+85°C±5°C 20min 20min Test Time=10cycle	0/20
	Solder Resistance	MIL-STD-202:201A MIL-STD-750:2031 JIS-C-7021 :A-1	Preheating : 140°C-160°C ,within 2 minutes. Operation heating : 260°C (Max.), within 10seconds. (Max.)	0/20

Judgment criteria of failure for the reliability

Measuring items	Symbol	Measuring conditions	Judgment criteria for failure
Forward voltage	V _F (V)	I _F =20mA	Over U ¹ x1.2
Reverse current	I _R (uA)	V _R =5V	Over U ¹ x2
Luminous intensity	I _v (mcd)	I _F =20mA	Below S ¹ X0.5

Notes:

1. U means the upper limit of specified characteristics. S means initial value.
2. After each test, remove test pieces; wait for 2 hours and test pieces have returned to ambient temperature, then take next measurement.

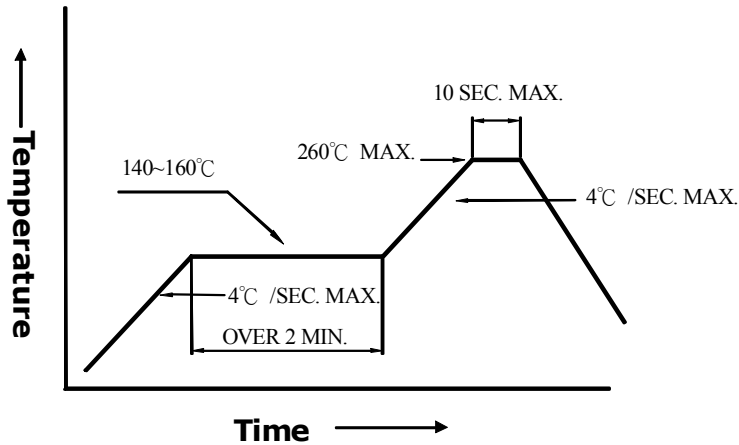
Soldering

1. Manual of Soldering

The temperature of the iron tip should not be higher than 350°C and soldering time to be within 3 seconds per solder-pad.

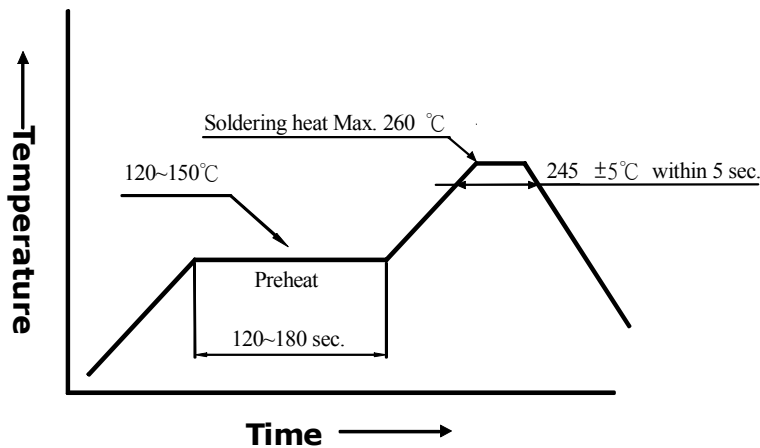
2. Reflow Soldering

Preheating: 140°C ~ 160°C ±5°C, within 2 minutes.
 Operation Heating: 250°C(Max) within 10 seconds(Max).
 Gradual Cooling (Avoid quenching).



3. DIP Soldering (Wave Soldering)

Preheating: 120°C ~ 150°C, within 120~180 seconds.
 Operation Heating: 245°C±5°C within 5 seconds 260°C(Max).
 Gradual Cooling (Avoid quenching).



Handling

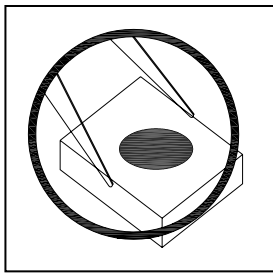
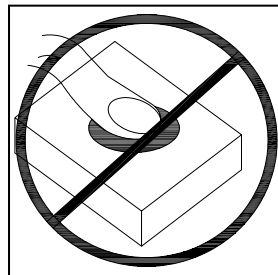
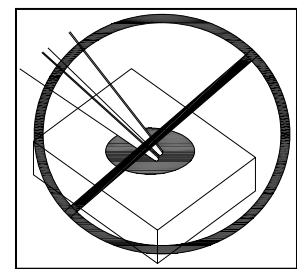
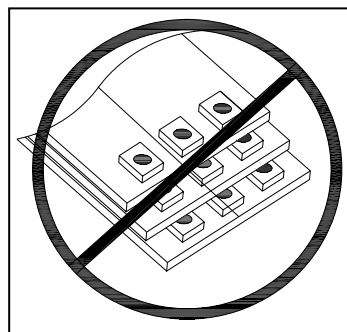
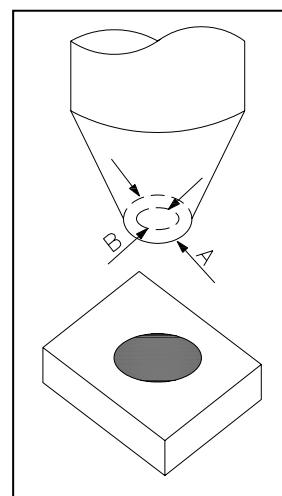
Care must be taken not to damage LED's epoxy resin while exposing to high temperature or contact LED's epoxy resin with hard or sharp objects, such as metal hook, tweezer or sand blasting.

Handling Precautions

Compare to epoxy encapsulate 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.

1. Handle the component along the side surfaces by using forceps or appropriate tools. (pic.1)
2. Do not directly touch or handle the silicone lens surface. It may damage the internal circuitry. (pic.2 & pic.3)
3. Do not stack together assembled PCBs containing exposed LEDs. Impact may scratch the silicone lens or damage the internal circuitry. (pic.4)
4. The outer diameter of the SMD pickup nozzle should not exceed the size of the LED to prevent air leaks. The inner diameter of the nozzle should be as large as possible. (pic.5)
5. A pliable material is suggested for the nozzle tip to avoid scratching or damaging the LED surface during pick up. (pic.5)
6. The dimensions of the component must be accurately programmed in the pick-and-place machine to insure precise pickup and avoid damage during production.

**Pic.1****Pic.2****Pic.3****Pic.4****Pic.5**

Notes for designing:

Current limiting resistor must be used in the circuit to drive LEDs within the rated figures and not to overload LEDs with instantaneous voltage at the turning ON and OFF cycles.

When using pulse driving, the average current must be within the rated figures. And the circuit should be designed to avoid reverse voltage when turning off the LEDs.

Storage:

In order to avoid the absorption of moisture, it is recommended to solder LEDs as soon as possible after unpacking the sealed envelope.

If the envelope is still packed, to store it in the environment as following:

- (1) Temperature : 5°C-30°C (41°F) Humidity : RH 60% Max.
- (2) After this bag is opened, devices that will be applied to infrared reflow, vapor-phase reflow, or equivalent soldering process must be:
 - a. Completed within 168 hours.
 - b. Stored at less than 30% RH.
- (3) Devices require baking before mounting, if:
 - (2) a or (2) b is not met.
- (4) If baking is required, devices must be baked under below conditions:
48 hours at 60°C±3°C.

Package and Label of Products:

- (1) Package: Products are packed in one bag of 2000 pcs (one taping reel) and a label is attached to each bag.
- (2) Label