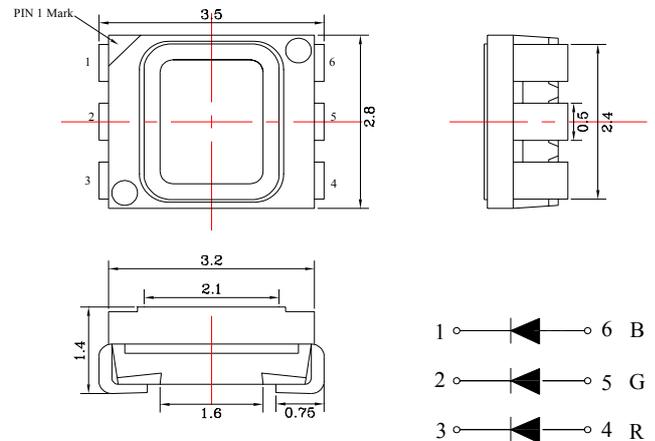


**AB3528-RGB-00**

<Features>

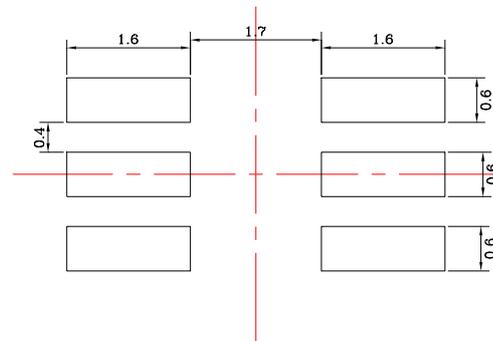
1. Emitted Color : Red, Blue and Green
2. Lens Appearance : Water Clear
3. 3.5x2.8x1.4mm standard package
4. Suitable for all SMT assembly methods
5. Compatible with infrared and vapor phase reflow solder process
6. Compatible with automatic placement equipment
7. This product doesn't contain restriction Substance, comply ROHS standard

<Package Dimensions>



<Applications>

1. Automotive Lighting
2. Backlighting : LCDs, Key pads advertising
3. Status indicators : Consumer & industrial electronics
4. General use



NOTES:

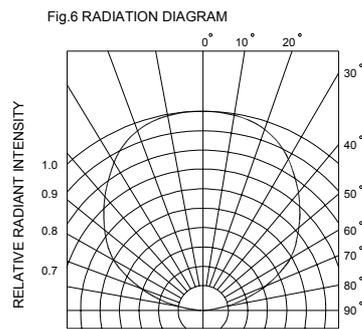
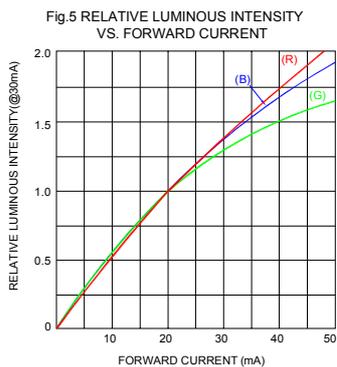
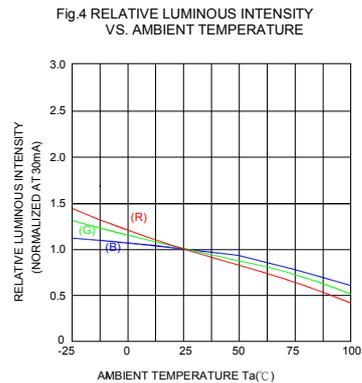
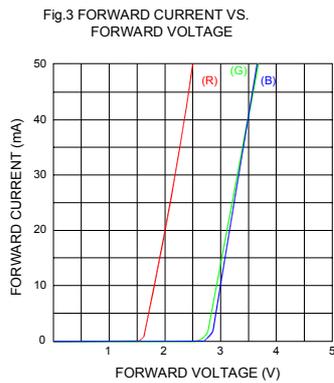
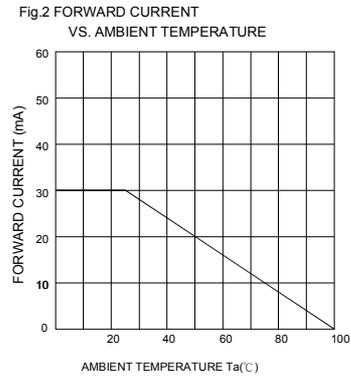
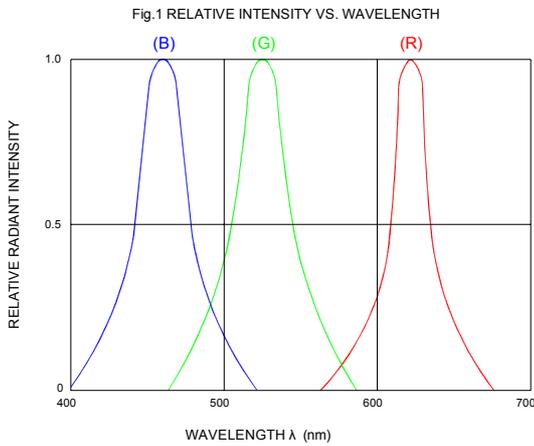
- 1.All dimensions are in millimeters (inches).
- 2.Tolerance is  $\pm 0.10\text{mm}$  (0.004") unless otherwise specified.
- 3.Specifications are subject to change without notice.

Absolute Maximum Ratings[Ta=25°C]				
Item	Symbol		Rating	Unit
Power Dissipation	PD	Red	75	mW
		Green	120	
		Blue	120	
Forward Current	IF		30	mA
Peak Forward Current*	IFP		100	mA
Reverse Voltage	VR		5	V
Operating Temperature	TOPR		-40 ~ +85	°C
Storage Temperature	TSTG		-40 ~ +100	°C
Soldering Temperature	TSOL		See Page 7	°C

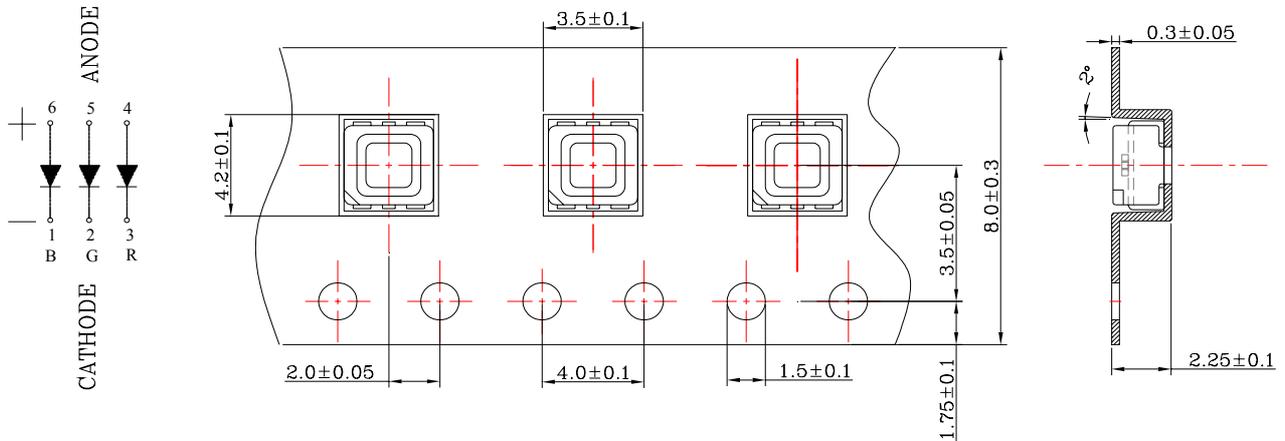
\* Condition for IFP is pulse of 1/10 duty and 3 msec.width

Electro-Optical Characteristics [Ta=25°C]												
Item	Symbol	Condition	Minimum			Typical			Maximum			Unit
			Red	Green	Blue	Red	Green	Blue	Red	Green	Blue	
Forward Voltage	VF	IF=20mA				2.0	3.2	3.3	2.5	3.6	3.6	V
Luminous Intensity	IV	IF=20mA				750	1250	360				mcd
Peak wavelength	$\lambda P$	IF=20mA				617	525	470				nm
Dominant Wavelength	$\lambda D$	IF=20mA	618	520	460				628	535	475	nm
Spectral line Half Width	$\Delta\lambda$	IF=20mA				20	30	30				nm
Reverse Current	IR	VR=5V							10			$\mu A$
Viewing Angle	$\theta 1/2$	IF=20mA				120						deg

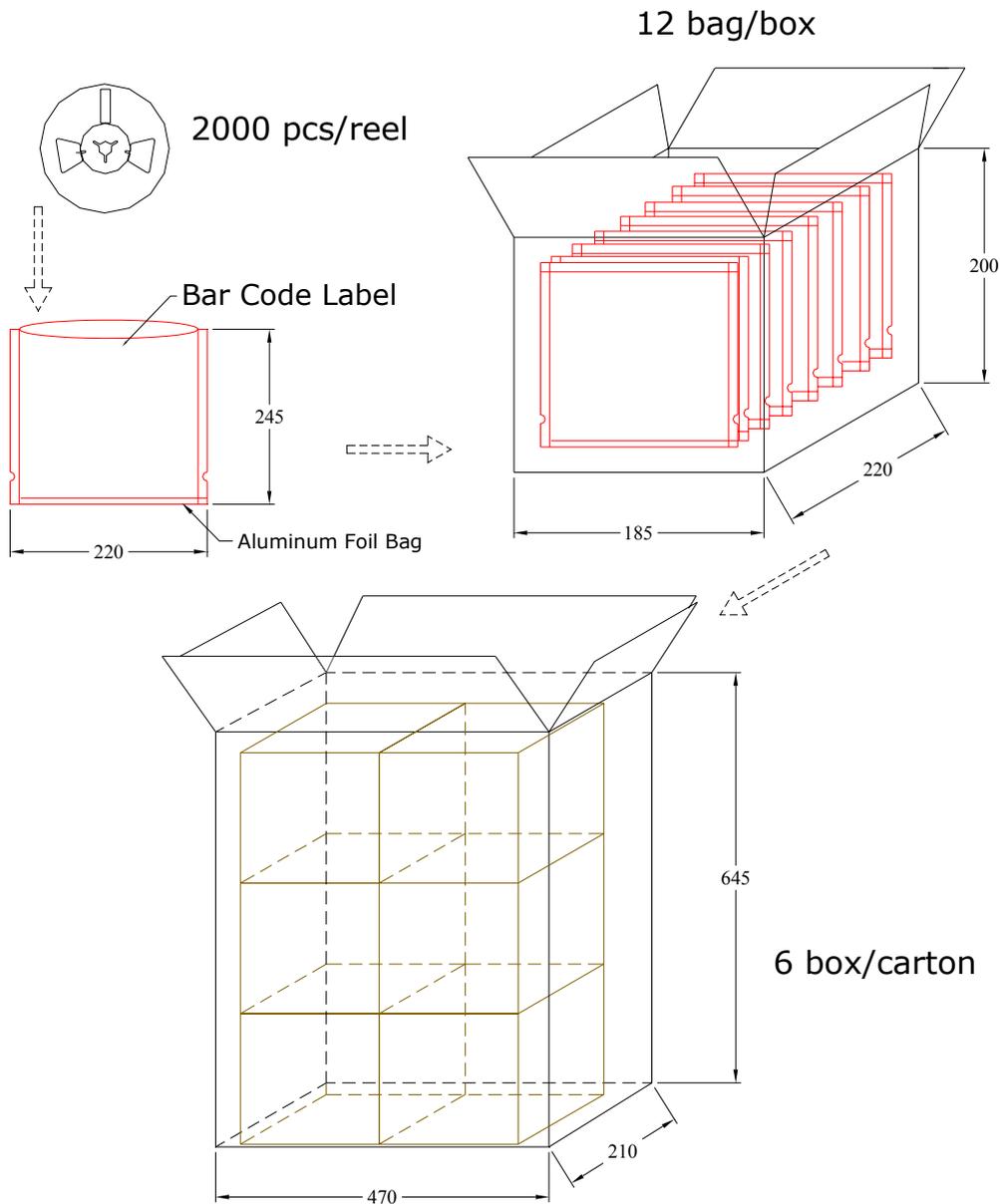
**Typical Electro-Optical Characteristics Curves**



**Tapping and packaging specifications (Unit:mm)**



**Package Method:(unit:mm)**



**Bin Limits (At 30mA)**

Intensity Bin Limits (At 20 mA) (JL)

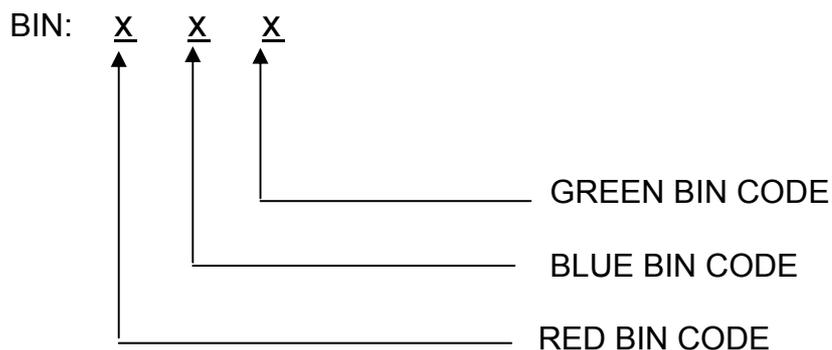
COLOR	RED			
ITEM	Iv (mcd)		λ d (nm)	
Spec	475-1600		618~628	
BIN	MIN	MAX	MIN	MAX
U5	475	715	618	628
V5	715	1070		
W5	1070	1600		

Intensity Bin Limits (At 20 mA) (GA)

COLOR	GREEN			
ITEM	Iv (mcd)		λ d (nm)	
Spec	1070-3600		520-535	
BIN	MIN	MAX	MIN	MAX
W6	1070	1600	520	525
W7			525	530
W8			530	535
X6	1600	2400	520	525
X7			525	530
X8			530	535
Y6	2400	3600	520	525
Y7			525	530
Y8			530	535

Intensity Bin Limits (At 20 mA) (BG)

COLOR	BLUE			
ITEM	Iv (mcd)		λ d (nm)	
Spec	317~1070		460~475	
BIN	MIN	MAX	MIN	MAX
T3	317	475	460	465
T4			465	470
T5			470	475
U3	475	715	460	465
U4			465	470
U5			470	475
V3	715	1070	460	465
V4			465	470
V5			470	475



**Notes:**

1. I<sub>v</sub>: Tolerance for each Bin limit is ±15%
2. λ<sub>d</sub>: Tolerance for each Bin Limit is ±1nm
3. Bin categories are established for classification of products.  
Products may not be available in all bin categories.

**Reliability Test**

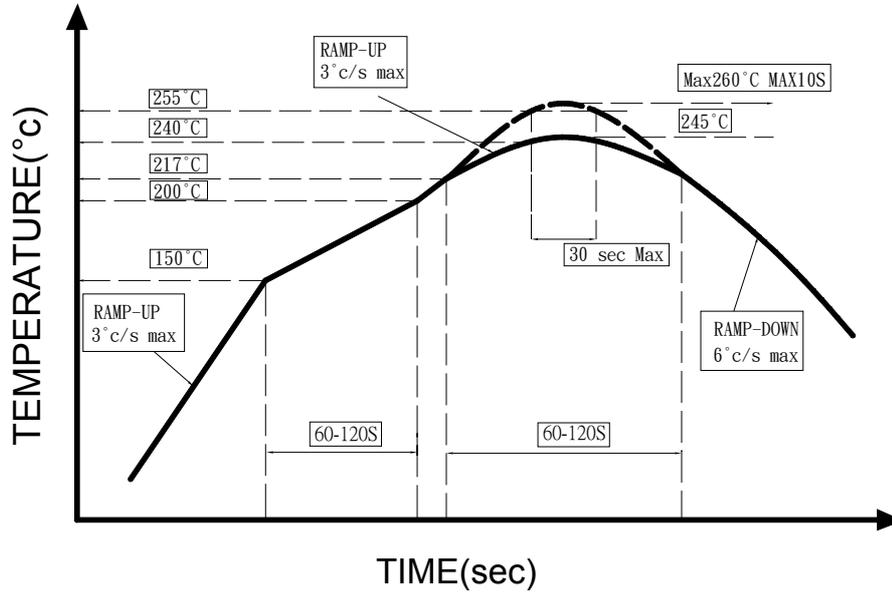
Classification	Test Item	Reference Standard	Test Conditions	Result
Endurance Test	Operation Life	MIL-STD-750:1026 MIL-STD-883:1005 JIS-C-7021 :B-1	I <sub>F</sub> =20mA Ta=Under room temperature Test time=1,000hrs	0/20
	High Temperature High Humidity Storage	MIL-STD-202:103B JIS-C-7021 :B-11	Ta=+65°C ±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**

<b>Measuring items</b>	<b>Symbol</b>	<b>Measuring conditions</b>	<b>Judgment criteria for failure</b>
Forward voltage	$V_F$ (V)	$I_F=20\text{mA}$	Over $U^1 \times 1.2$
Reverse current	$I_R$ ( $\mu\text{A}$ )	$V_R=5\text{V}$	Over $U^1 \times 2$
Luminous intensity	$I_v$ ( mcd )	$I_F=20\text{mA}$	Below $S^1 \times 0.5$

- Note: 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.

**IR-Reflow Soldering**



1. Avoid any external stress applied to the resin while the LEDs are at high temperature, especially during soldering .
2. Avoid rapid cooling or any excess vibration during temperature ramp-down process
3. Although the soldering condition is recommended above, soldering at the lowest possible temperature is feasible for the LEDs

**IRON Soldering**

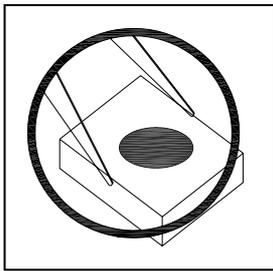
300°C Within 3 sec. one time only

## Handling Precautions

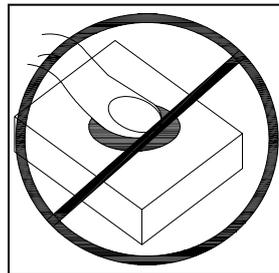
Compare to epoxy encapsulate that is hard and brittle, silicone is softer and flexible. Although its characteristic significantly reduces thermal stress, it is more susceptible to damage by external mechanical force.

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.

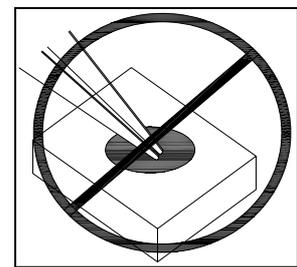
1. Handle the component along the side surfaces by using forceps or appropriate tools. (pic.1)
2. Do not directly touch or handle the silicone lens surface. It may damage the internal circuitry. (pic.2 & pic.3)
3. Do not stack together assembled PCBs containing exposed LEDs. Impact may scratch the silicone 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.



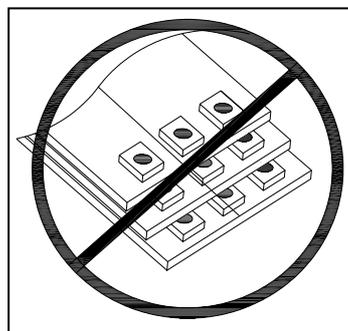
**Pic.1**



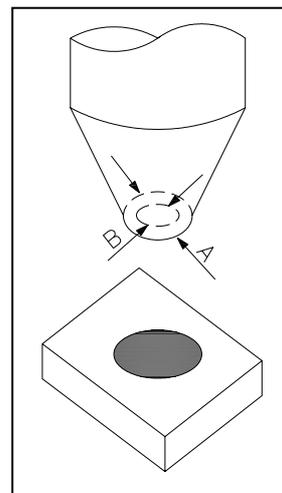
**Pic.2**



**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