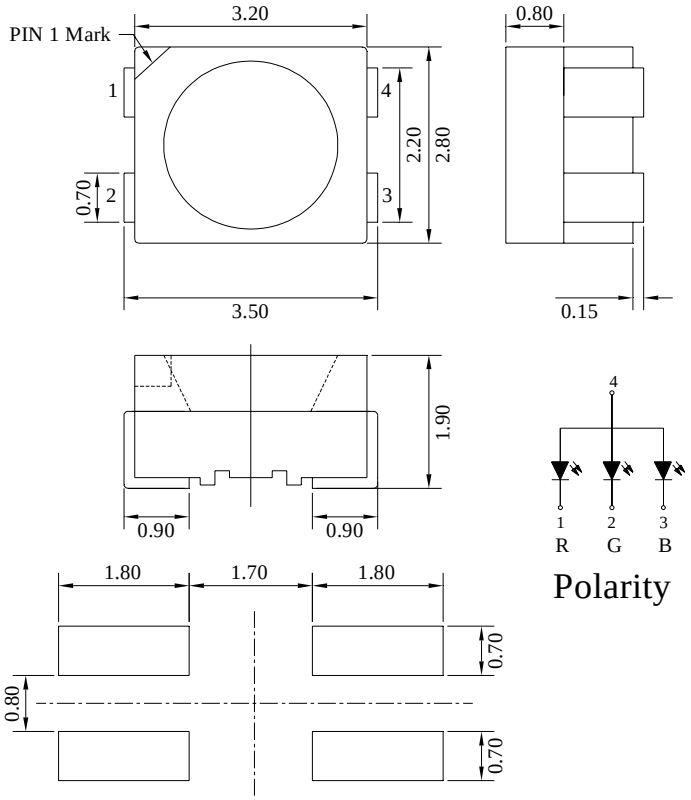
● Features:

1. Emitted Color: Red, Green and Blue.
2. Lens Appearance: Water Clear.
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 lighting.
2. Backlighting: LCDs, Key padadvertising.
3. Status indicators: Consumer & industrial electronics.
4. General use.

●Package Dimensions:



NOTES:
1.All dimensions are in millimeters (inches).
2.Tolerance is ±0.10mm (0.004") unless otherwise specified.
3. Specifications are subject to change without notice.

● Absolute Maximum Ratings(Ta=25℃)

Parameter	Symbol	Color	Rating	Unit
Power Dissipation	P_D	Red	75	mW
		Green	120	
		Blue	120	
Forward Current	I_F		30	mA
Peak Forward Current*[1]	I_{FP}		100	mA
Reverse Voltage	V_R		5	V
Operating Temperature	Topr		-40℃~100℃	-
Storage Temperature	Tstg		-40℃~100℃	-
Soldering Temperature	Tsol		See Page 7	-

*[1]Condition for I_{FP} is pulse of 1/10 duty and 3 msec width.

● Electrical and optical characteristics(Ta=25℃)

Parameter	Symbol	Condition	Color	Min.	Typ.	Max.	Unit
Forward Voltage	V_F	I_F=20mA	Red	-	2.0	2.5	V
			Green	-	3.2	3.6	
			Blue	-	3.3	3.6	
Luminous Intensity	Iv	I_F=20mA	Red	-	600	-	mcd
			Green	-	1200	-	
			Blue	-	280		
Peak Wavelength	λ p	I_F=20mA	Red	-	635	-	nm
			Green	-	525	-	
			Blue	-	465	-	
Dominant Wavelength	λ d	I_F=20mA	Red	620	-	630	nm
			Green	520	-	530	
			Blue	465	-	470	
Spectral Line Half-width	Δ λ	I_F=20mA	Red	-	20	-	nm
			Green	-	30	-	
			Blue	-	30	-	
Reverse Current	I_R	V_R=5V	-	-	-	10	μA
Viewing Angle	$2\theta_{1/2}$	I_F=20mA	-	-	120	-	degree

● Typical Electro-Optical Characteristics Curves

Fig.1 RELATIVE INTENSITY VS. WAVELENGTH

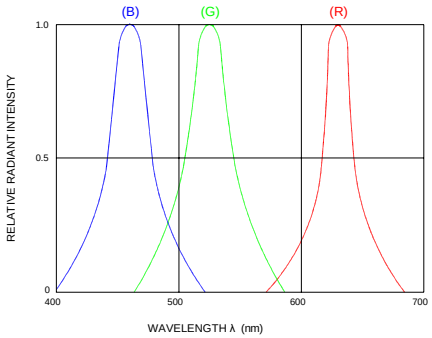


Fig.2 FORWARD CURRENT VS. AMBIENT TEMPERATURE

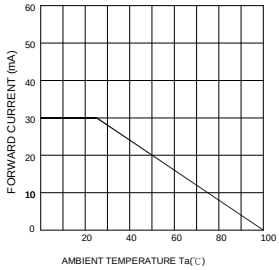


Fig.3 FORWARD CURRENT VS. FORWARD VOLTAGE

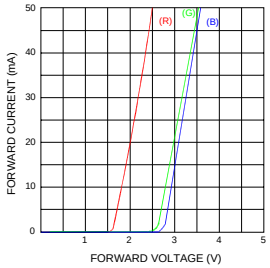


Fig.4 RELATIVE LUMINOUS INTENSITY VS. AMBIENT TEMPERATURE

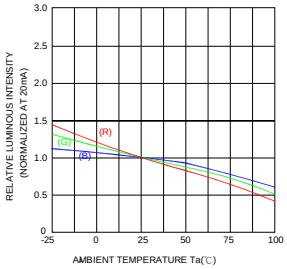


Fig.5 RELATIVE LUMINOUS INTENSITY VS. FORWARD CURRENT

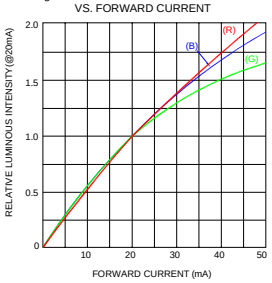
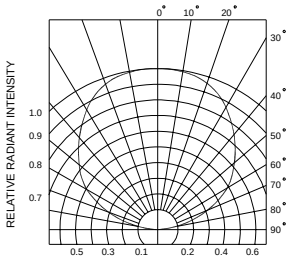
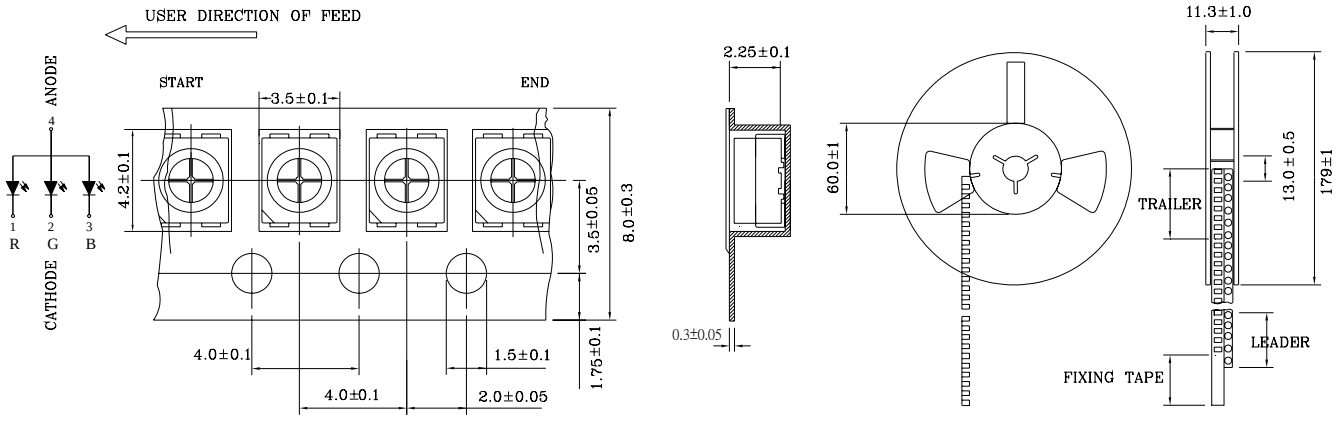


Fig.6 RADIATION DIAGRAM

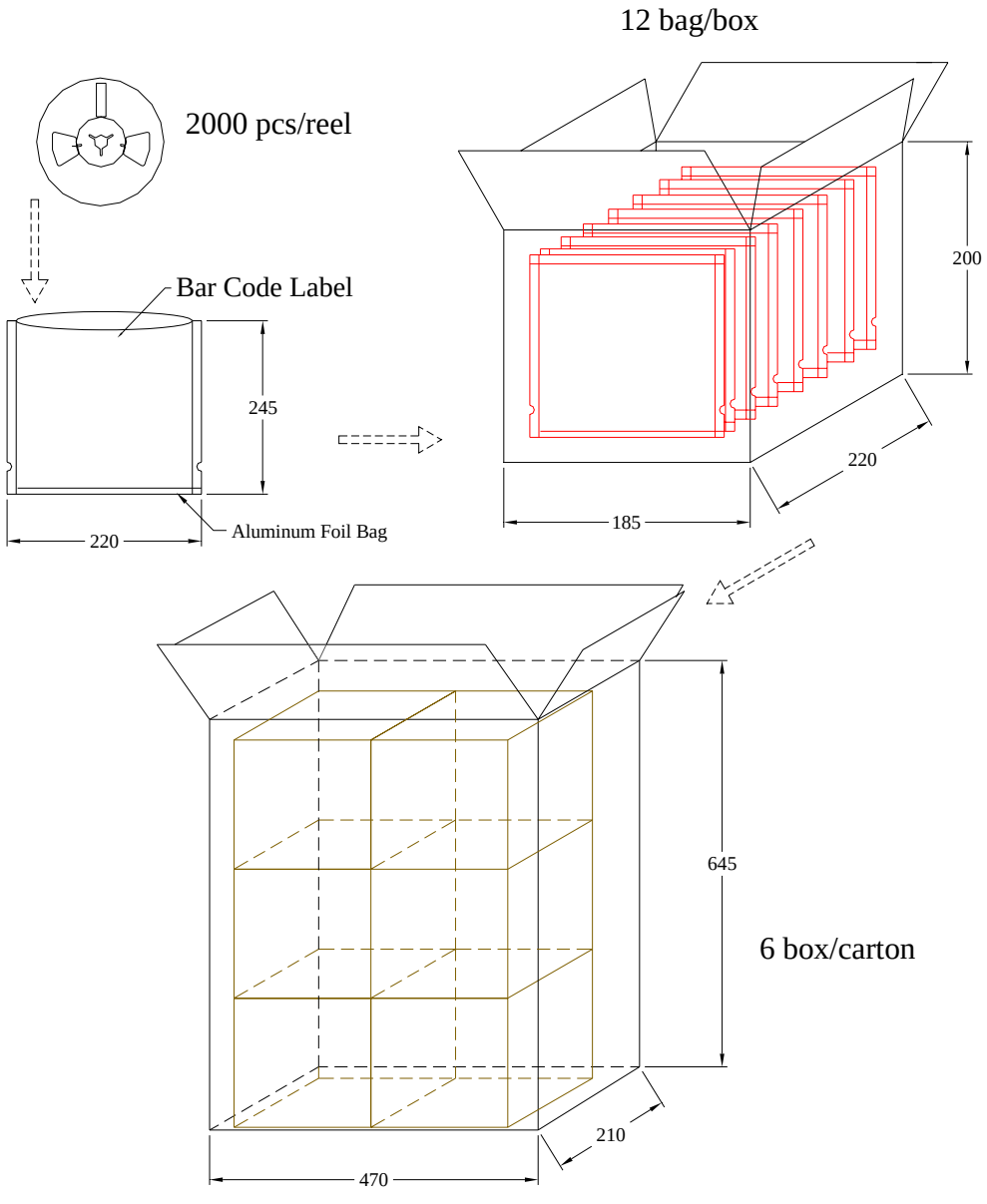


● Tapping and packaging specifications(Units: mm)



NOTE:2000 PCS PER REEL

●Package Method:(unit:mm)



● Bin Limits (At 20mA)

Intensity Bin Limits (At 20 mA) (JL)

COLOR	RED			
ITEM	Iv (mcd)		λ d (nm)	
Spec	317-1070		620-630	
BIN	MIN	MAX	MIN	MAX
T	317	475	620	630
U	475	715		
V	715	1070		

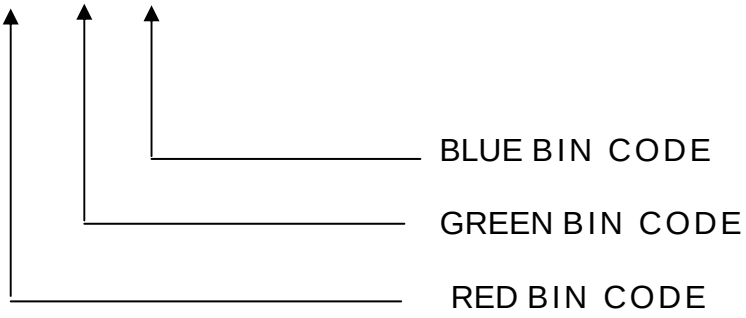
Intensity Bin Limits (At 20 mA) (G6)

COLOR	GREEN			
ITEM	Iv (mcd)		λ d (nm)	
Spec	475-1600		520-530	
BIN	MIN	MAX	MIN	MAX
U6	475	715	520	525
U7			525	530
V6	715	1070	520	525
V7			525	530
W6	1070	1600	520	525
W7			525	530

Intensity Bin Limits (At 20 mA) (BX)

COLOR	BLUE			
ITEM	Iv (mcd)		λd (nm)	
Spec	140-475		460-470	
BIN	MIN	MAX	MIN	MAX
R3	140	210	460	465
R4			465	470
S3	210	317	460	465
S4			465	470
T3	317	475	460	465
T4			465	470

● BIN : X X X



Notes:

1. Iv : Tolerance for each Bin limit is ± 15 %
2. λd : 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_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℃±5℃ RH=90%-95% Test time=240hrs	0/20
	High Temperature Storage	MIL-STD-883:1008 JIS-C-7021 :B-10	High Ta=+85℃±5℃ Test time=1,000hrs	0/20
	Low Temperature Storage	JIS-C-7021 :B-12	Low Ta=-35℃±5℃ 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℃ ~ +25℃ ~ +85℃ ~ +25℃ 60min 20min 60min 20min Test Time=5cycle	0/20
	Thermal Shock	MIL-STD-202:107D MIL-STD-750:1051 MIL-STD-883:1011	-35℃±5℃ ~+85℃±5℃ 20min 20min Test Time=10cycle	0/20
	Solder Resistance	MIL-STD-202:201A MIL-STD-750:2031 JIS-C-7021 :A-1	Preheating： 140℃-160℃,within 2 minutes. Operation heating： 260℃(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^1x1.2
Reverse current	I_R (uA)	V_R=5V	Over U^1x2
Luminous intensity	Iv (mcd)	I_F=20mA	Below S^1X0.5

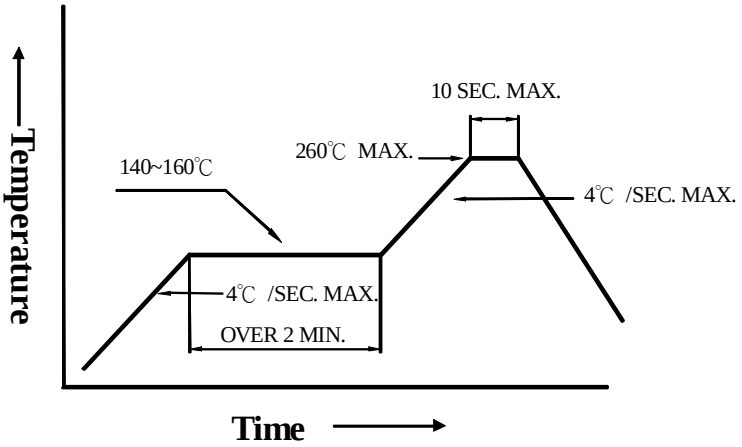
Note: 1. U means the upper limit of specified characteristics. S means initial value.

2. After each test, remove test pieces, wait for 2 hours and test pieces have returned to ambient temperature, then take next measurement.

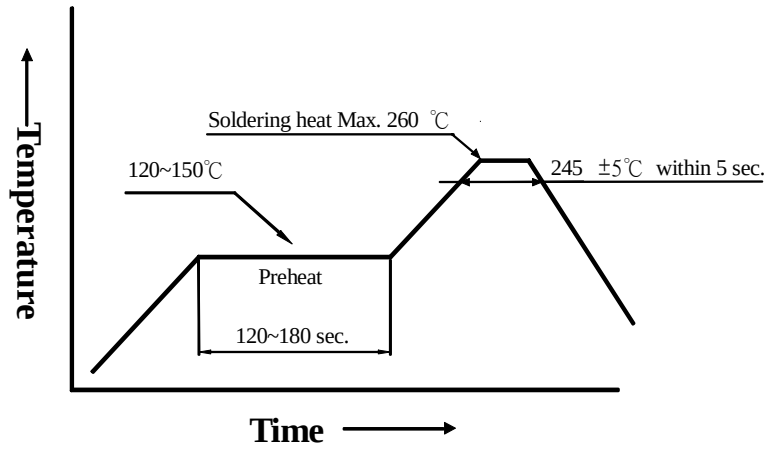
● Soldering :

1. Manual Soldering
   The temperature of the iron tip should not be higher than 350℃and Soldering time to be within 3 seconds per solder-pad.

2. Reflow Soldering
   Preheating : 140℃~160℃±5℃,within 2 minutes.
   Operation heating : 260℃(Max.) within 10 seconds.(Max)
   Gradual Cooling (Avoid quenching).



3. DIP soldering (Wave Soldering) :
   Preheating : 120℃~150℃,within 120~180 sec.
   Operation heating : 245℃±5℃ within 5 sec.260℃ (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.

● Notes for designing:

Current limiting resistor must be used in the circuit to drive BRIGHT LEDs within the rated figures and not to overload BRIGHT 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 BRIGHT LEDs.

● Storage:

In order to avoid the absorption of moisture, it is recommended to solder BRIGHT 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℃-30℃(41℉)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℃±3℃.

● 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: