

Technical Data Sheet

Full Color Side View LEDs (Height 0.8mm)

99-235/RSGBB7C-A22/2D

Features

- White package.
- Optical indicator.
- Colorless clear window.
- Ideal for backlight and light pipe application.
- Inter reflector.
- Wide viewing angle.
- Suitable for vapor-phase reflow, Infrared reflow and wave solder processes.
- Computable with automatic placement equipment.
- Available on tape and reel (12mm Tape)
- Pb-free
- The product itself will remain within RoHS compliant version.



Descriptions

- The 99-235 series is available in soft red, green and blue.
Due to the package design, the LED has wide viewing angle and optimized light coupling by inter reflector. This feature makes the ideal for light pipe application. The low current requirement makes this device ideal for portable equipment or any other application where power is at a premium.

Applications

- Telecommunication: indicator and backlighting in telephone and fax.
- Flat backlight for LCD's, switches and symbols.
- Light pipe application.
- General use.

Device Selection Guide

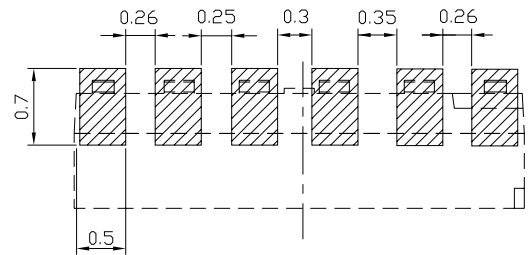
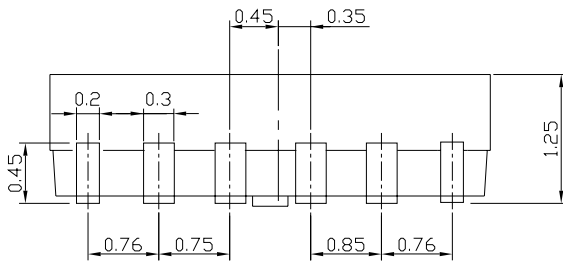
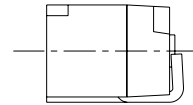
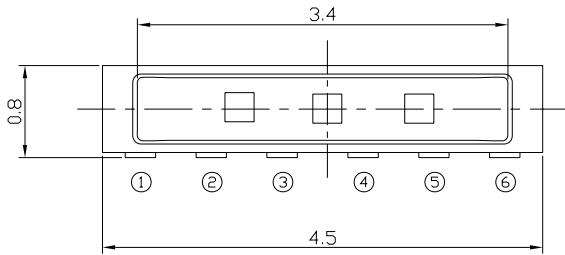
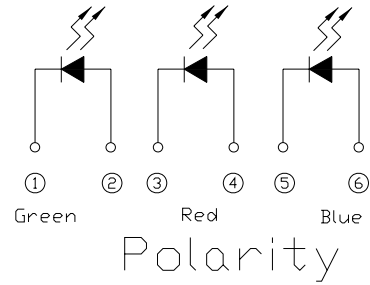
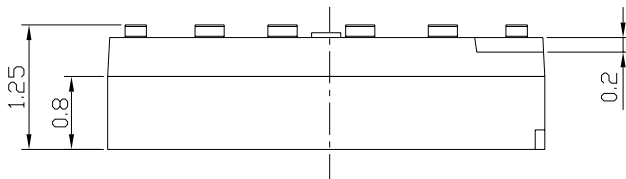
Chip			Resin Color
Type	Material	Emitted Color	
RS	AlGaInP	Brilliant Red	Water Clear
GB	InGaN	Brilliant Green	
B7	InGaN	Blue	

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Package Outline Dimensions



Recommended soldering pad design

Note: The tolerances unless mentioned is $\pm 0.1\text{mm}$;Unit = mm

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Absolute Maximum Ratings (Ta=25°C)

Parameter	Symbol	Rating	Unit
Reverse Voltage	V_R	5	V
Forward Current	I_F	RS	50
		GB	30
		B7	30
Peak Forward Current(Duty 1/10@ 1KHZ)	I_{FP}	RS	100
		GB	100
		B7	100
Power Dissipation	P_d	RS	130
		GB	110
		B7	110
Electrostatic Discharge(HBM)	ESD	RS	2000
		GB	2000
		B7	2000
Operating Temperature	T_{opr}	-40 ~ +85	°C
Storage Temperature	T_{stg}	-40~ +90	°C
Soldering Temperature	T_{sol}	Reflow Soldering : 260 °C for 10 sec. Hand Soldering : 350 °C for 3 sec.	

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Electro-Optical Characteristics (Ta=25°C)

Parameter	Symbol		Min.	Typ.	Max.	Unit	Condition
Luminous Intensity	I _v	RS	225	-----	450	mcd	I _F =17mA (R) I _F =18mA (G) I _F =9mA (B)
		GB	565	-----	1120		
		B7	57	-----	140		
Viewing Angle	2θ 1/2		-----	120	-----	deg	
Dominant Wavelength	λ _d	RS	618	-----	627	nm	
		GB	525	-----	535		
		B7	457	-----	465		
Forward Voltage	V _F	RS	1.80	-----	2.30	V	
		GB	2.75	-----	3.45		
		B7	2.75	-----	3.45		
White point coordinate	x	-----	-----	0.294	-----	-----	
	y	-----	-----	0.286	-----	-----	
Reverse Current	I _R	RS	-----	-----	10	μA	V _R =5V

Notes:

1. Tolerance of Luminous Intensity ±11%
2. Tolerance of Dominant Wavelength ±1nm
3. Tolerance of Forward Voltage : ±0.1V

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Bin Range of Luminous Intensity

Symbol		Bin Code	Min.	Max.	Unit	Condition
I _v	RS	S2	225	285	mcd	I _F =17mA (R) I _F =18mA (G) I _F =9mA (B)
		T1	285	360		
		T2	360	450		
	GB	U2	565	715		
		V1	715	900		
		V2	900	1120		
	B7	P2	57	72		
		Q1	72	90		
		Q2	90	112		
		R1	112	140		

Bin Range of Forward Voltage

Symbol		Bin Code	Min.	Max.	Unit	Condition
V _F	RS	RV1	1.80	2.05	V	I _F =17mA (R) I _F =18mA (G) I _F =9mA (B)
		RV2	2.05	2.30		
	GB	GV1	2.75	3.10		
		GV2	3.10	3.45		
	B7	BV1	2.75	3.10		
		BV2	3.10	3.45		

Note:

1. Tolerance of Luminous Intensity: $\pm 11\%$
2. Tolerance of Forward Voltage: $\pm 0.1V$

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Bin Code of Chromaticity Coordinates

R/G/B=17/18/9mA

Bin Code	CIE_x	CIE_y	Bin Code	CIE_x	CIE_y
S1	0.284	0.276	S2	0.304	0.276
	0.284	0.296		0.304	0.296
	0.304	0.296		0.324	0.296
	0.304	0.276		0.324	0.276
S3	0.304	0.296	S4	0.284	0.296
	0.304	0.316		0.284	0.316
	0.324	0.316		0.304	0.316
	0.324	0.296		0.304	0.296
S5	0.264	0.296	S6	0.264	0.276
	0.264	0.316		0.264	0.296
	0.284	0.316		0.284	0.296
	0.284	0.296		0.284	0.276
S7	0.264	0.256	S8	0.284	0.256
	0.264	0.276		0.284	0.276
	0.284	0.276		0.304	0.276
	0.284	0.256		0.304	0.256
S9	0.304	0.256			
	0.304	0.276			
	0.324	0.276			
	0.324	0.256			

Note:

Tolerance of Chromaticity Coordinates: ± 0.01

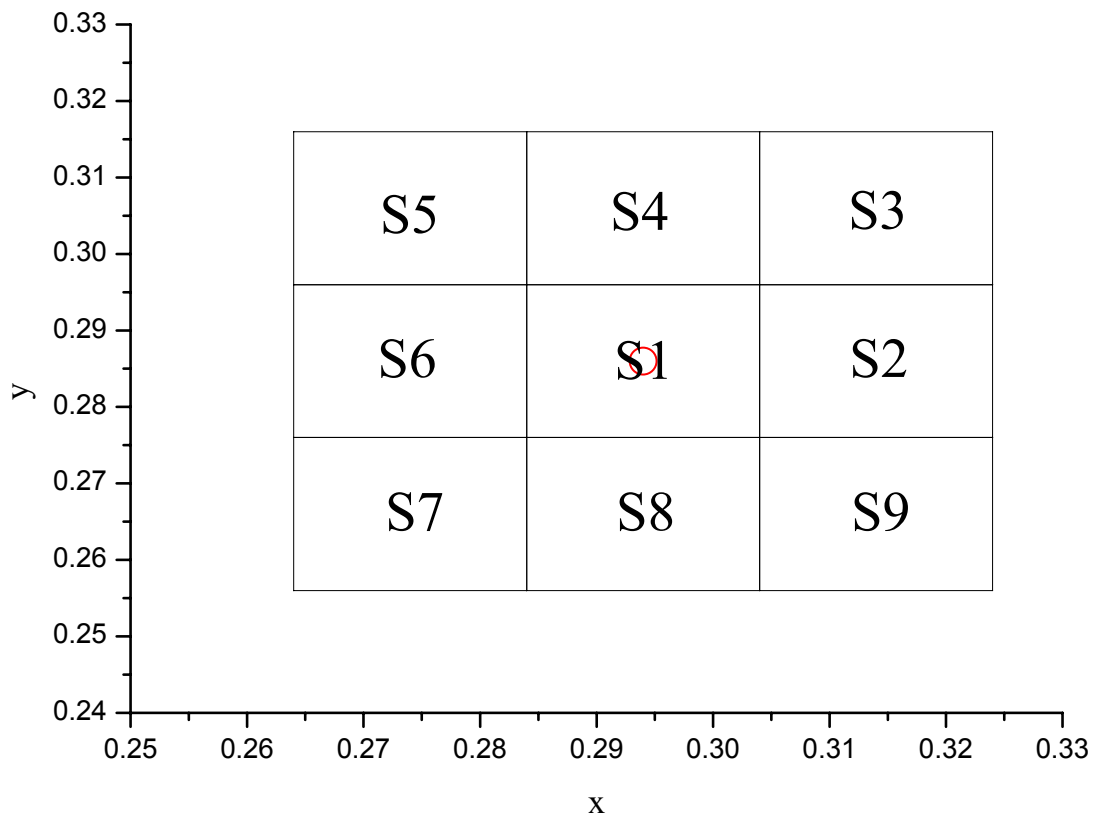
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The C.I.E. 1931 Chromaticity Diagram

R/G/B=17/18/9mA

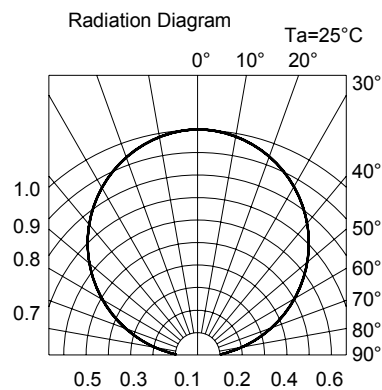
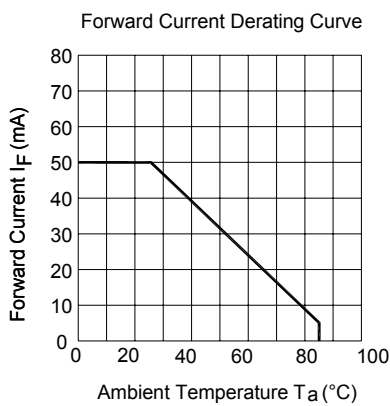
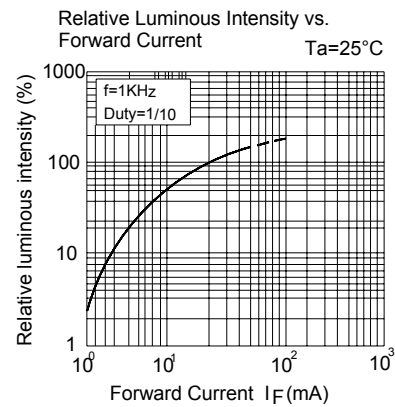
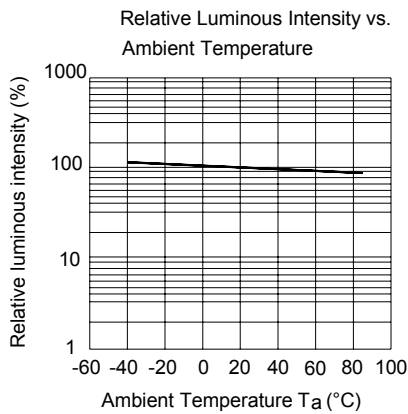
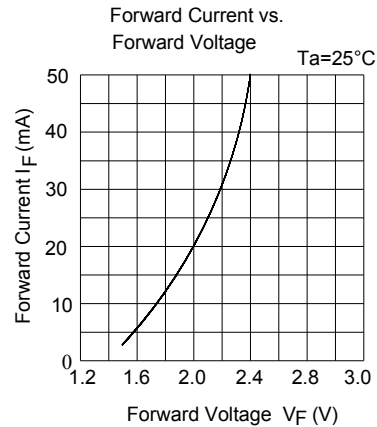
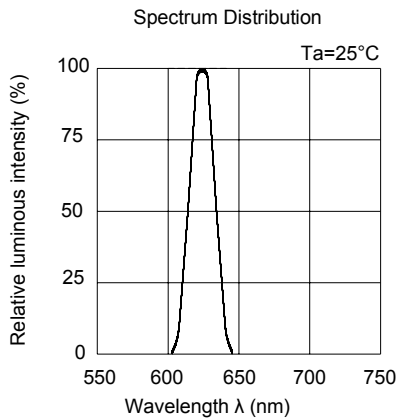


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Typical Electro-Optical Characteristics Curves(RS)

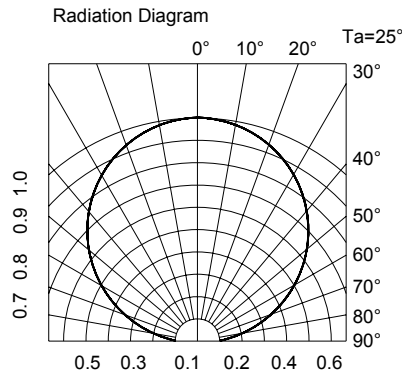
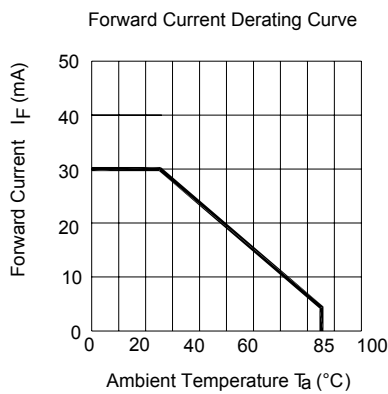
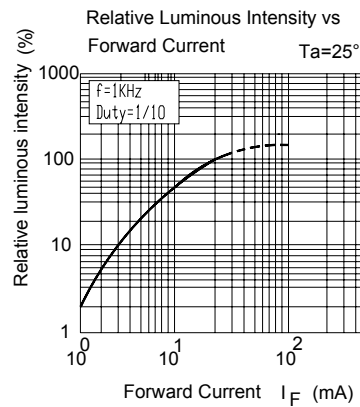
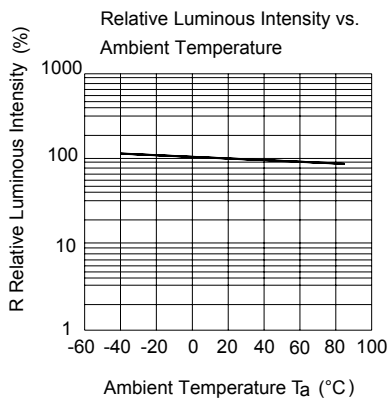
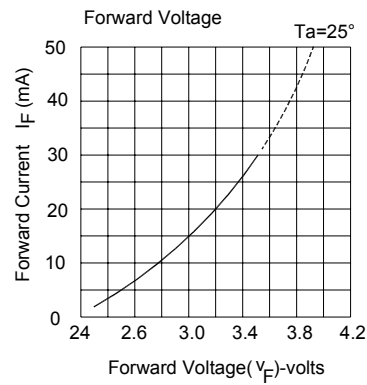
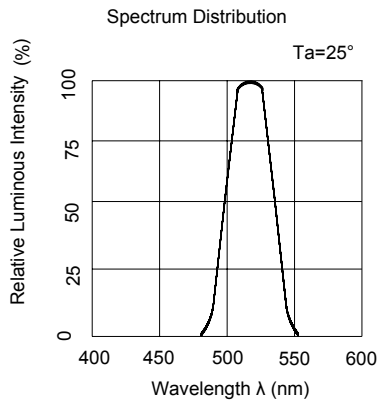


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Typical Electro-Optical Characteristics Curves(GB)

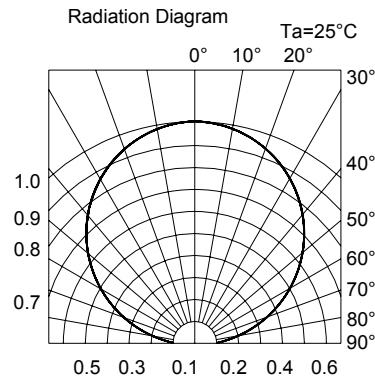
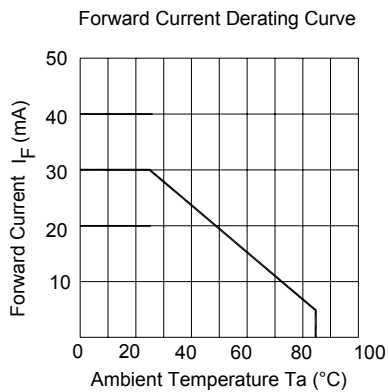
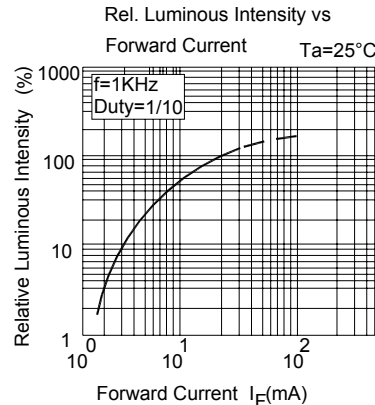
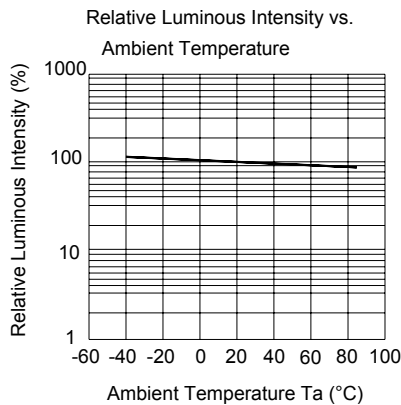
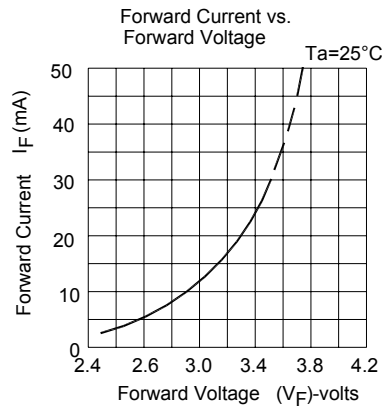
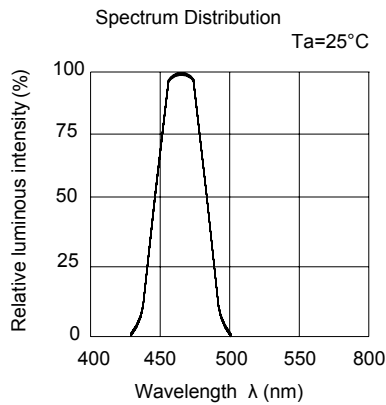


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Typical Electro-Optical Characteristics Curves(B7)



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Label Explanation

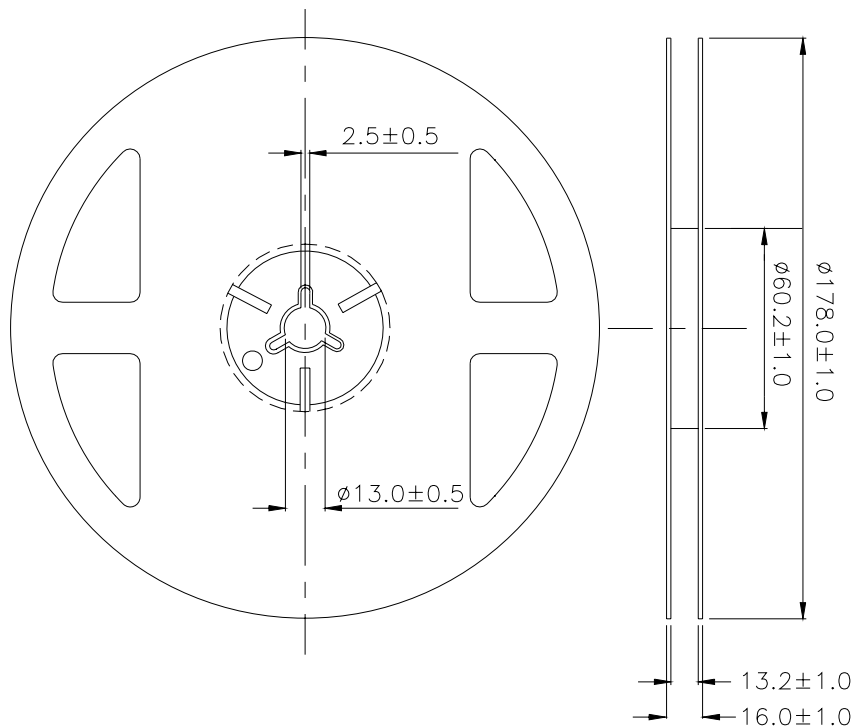
CAT: Luminous Intensity Rank

HUE: Chromaticity Coordinates

REF: Forward Voltage Rank



Reel Dimensions



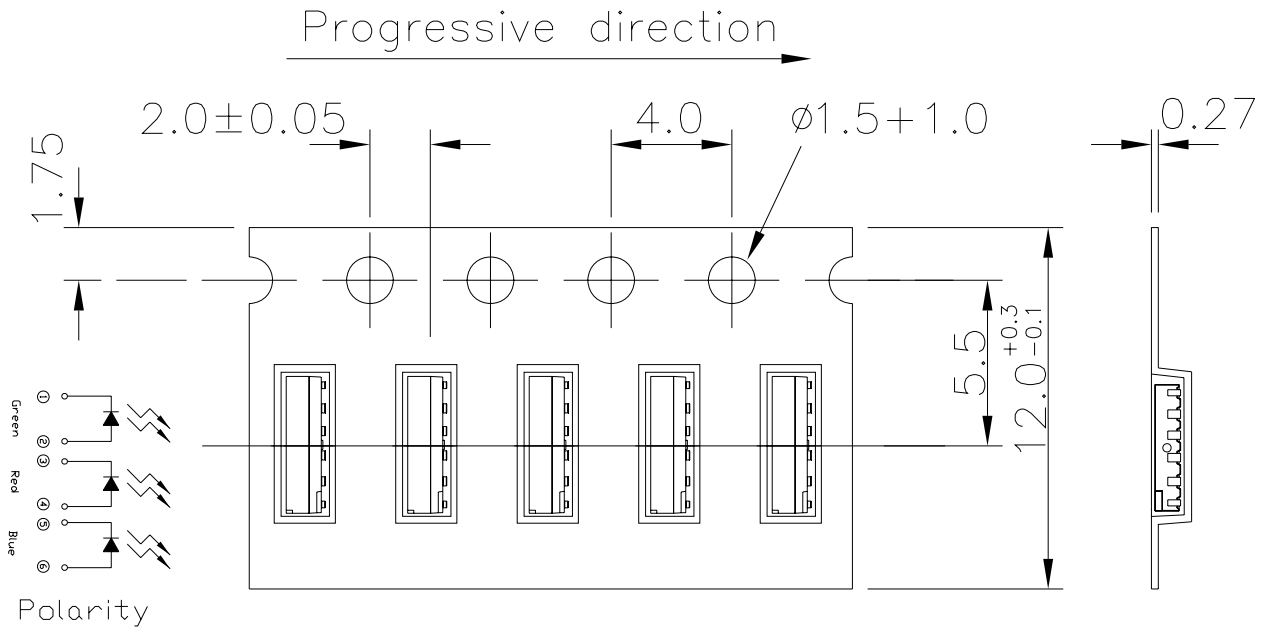
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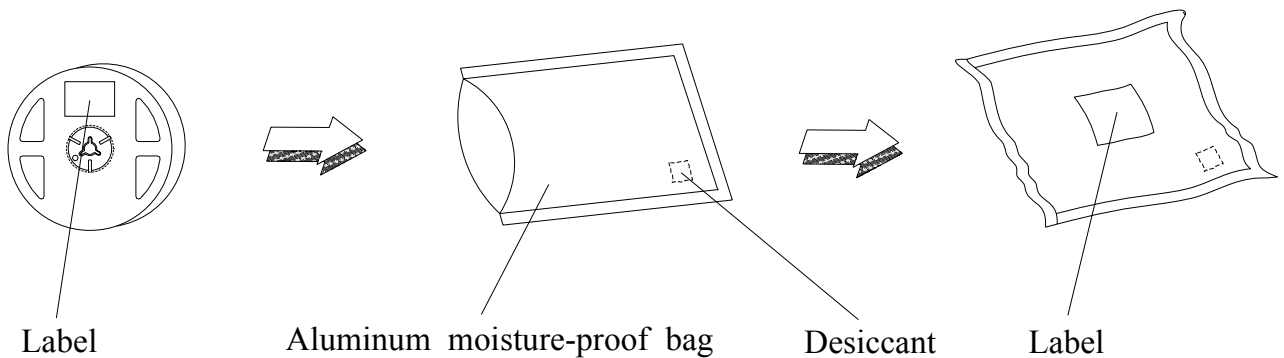
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Carrier Tape Dimensions: Loaded quantity 2000 PCS per reel.



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Moisture Resistant Packaging



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Reliability Test Items And Conditions

The reliability of products shall be satisfied with items listed below.

Confidence level : 90%

LTPD : 10%

No.	Items	Test Condition	Test Hours/Cycles	Sample Size	Ac/Re
1	Reflow Soldering	Temp. : 260°C±5°C Max. 10sec.	6 min	22 PCS.	0/1
2	Temperature Cycle	H : +100°C 15min ∫ 5 min L : -40°C 15min	300 Cycles	22 PCS.	0/1
3	Thermal Shock	H : +100°C 5min ∫ 10 sec L : -10°C 5min	300 Cycles	22 PCS.	0/1
4	High Temperature Storage	Temp. : 100°C	1000 Hrs.	22 PCS.	0/1
5	Low Temperature Storage	Temp. : -40°C	1000 Hrs.	22 PCS.	0/1
6	DC Operating Life	I _F = 20 mA	1000 Hrs.	22 PCS.	0/1
7	High Temperature / High Humidity	85°C/RH85%	1000 Hrs.	22 PCS.	0/1

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Precautions For Use

1. Over-current-proof

Customer must apply resistors for protection, otherwise slight voltage shift will cause big current change (Burn out will happen).

2. Storage

2.1 Do not open moisture proof bag before the products are ready to use.

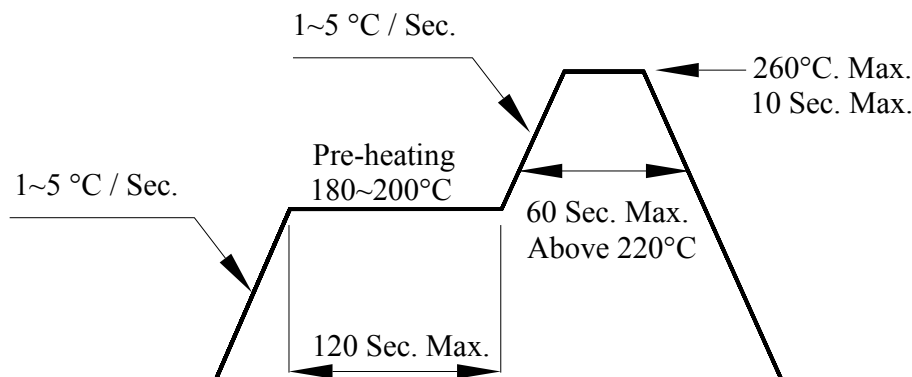
2.2 Before opening the package: The LEDs should be kept at 30°C or less and 90%RH or less.

2.3 After opening the package: The LED's floor life are 168 hours under 30°C or less and 60% RH or less. If unused LEDs remain, it should be stored in moisture proof packages.

2.4 If the moisture absorbent material (silica gel) has faded away or the LEDs have exceeded the storage time, baking treatment should be performed using the following conditions.
Baking treatment : 60±5°C for 24 hours.

3. Soldering Condition

3.1 Pb-free solder temperature profile



3.2 Reflow soldering should not be done more than two times.

3.3 When soldering, do not put stress on the LEDs during heating.

3.4 After soldering, do not warp the circuit board.

4. Soldering Iron

Each terminal is to go to the tip of soldering iron temperature less than 350°C for 3 seconds within once in less than the soldering iron capacity 25W. Leave two seconds and more intervals, and do soldering of each terminal. Be careful because the damage of the product is often started at the time of the hand solder.

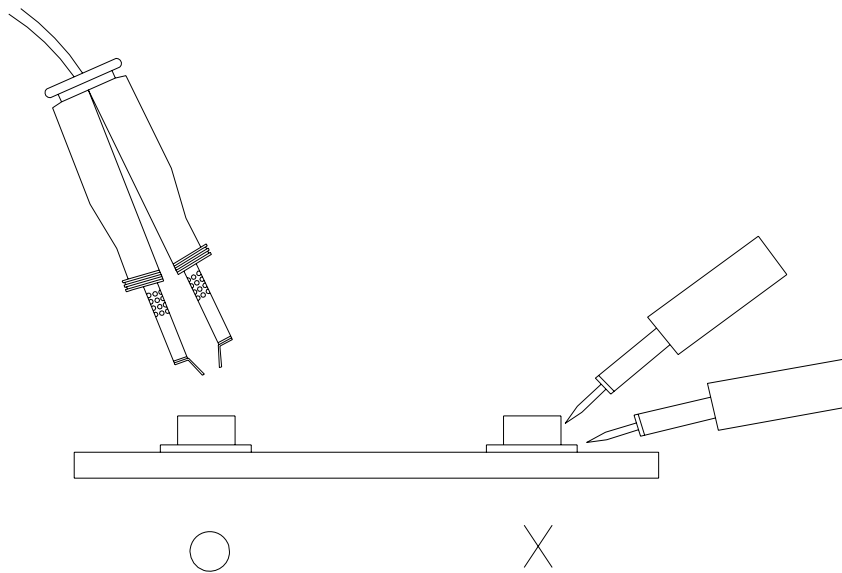
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5. Repairing

Repair should not be done after the LEDs have been soldered. When repairing is unavoidable, a double-head soldering iron should be used (as below figure). It should be confirmed beforehand whether the characteristics of the LEDs will or will not be damaged by repairing.



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