

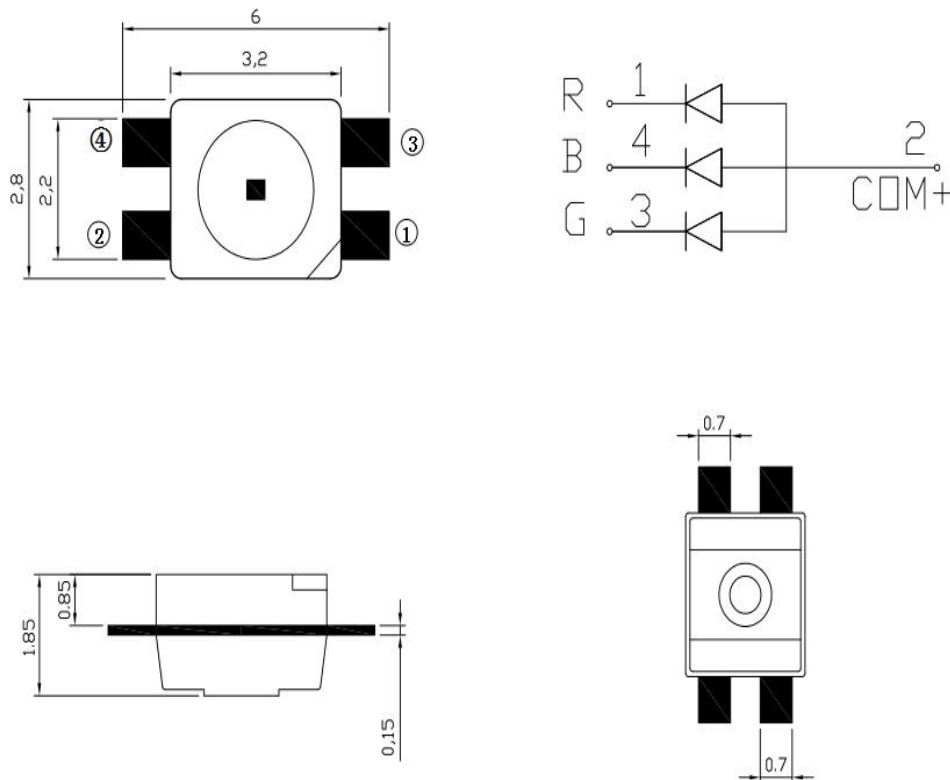
■ Features

- PB Free.
- Multi-color type.
- 3528 Package in 8 mm tape on 7" diameter reels.
- Suitable for all SMT assembly methods.
- Compatible with automatic placement equipment.
- Compatible with infrared and vapor phase reflow solder process.

■ Typical Applications

- Automotive: Dashboards, stop lamps, turn signals.
- Backlighting: LCDs, Key pads advertising.
- Status indicators: Consumer & industrial electronics.
- General use.

■ Package Dimensions



Notes:

1. All dimensions are in millimeters (inches).
2. Tolerance is ± 0.25 mm unless otherwise specified.

■ Device Selection Guide

Chip Material	Emitted Color	Lens Color
AlInGaP	Red	Water Clear
InGaN	True Green	
InGaN	Blue	

■ Absolute Maximum Ratings at Ta=25°C (Red)

Parameter	Symbol	Maximum	Unit
Power Dissipation	Pd	78	mW
Peak Forward Current (Duty 1/10 @1KHz)	IFP	100	mA
Forward Current	IF	30	mA
Reverse Voltage	VR	5	V
Operating Temperature Range	Topr	-40°C to + 80°C	
Storage Temperature Range	Tstg	-40°C to + 85°C	
Lead Soldering Temperature [2.0mm from body]	Tsol	Preheating: 140°C~160°C±5°C, within 2 minutes. Operation heating:260°C(Max) within 10 seconds.(Max) Gradual Cooling (Avoid quenching).	

■ Electrical/Optical Characteristics at Ta=25°C (Red)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Luminous Intensity	IV	IF=20mA	350	700	—	mcd
Peak Wavelength	λp	IF=20mA	—	632	—	nm
Dominant Wavelength	λd	IF=20mA	615	—	630	nm
Spectral Line Half-width	Δλ	IF=20mA	—	20	—	nm
Forward Voltage	VF	IF=20mA	1.8	—	2.6	V
Viewing Angle	2θ1/2	IF=20mA	—	120	—	deg
Reverse Current	IR	VR=5V	—	—	50	uA

Notes:

1. Tolerance of Luminous Intensity ±15%.
2. Tolerance of Forward Voltage ±0.1V.
3. Tolerance of Dominant Wavelength ±1nm.

■ Absolute Maximum Ratings at Ta=25°C (True Green)

Parameter	Symbol	Maximum	Unit
Power Dissipation	Pd	108	mW
Peak Forward Current (Duty 1/10 @1KHz)	I _{FP}	120	mA
Forward Current	I _F	30	mA
Electrostatic Discharge(HBM)	ESD	2000	V
Reverse Voltage	V _R	5	V
Operating Temperature Range	Topr	-40°C to + 80°C	
Storage Temperature Range	Tstg	-40°C to + 85°C	
Lead Soldering Temperature [2.0mm from body]	Tsol	Preheating: 140°C~160°C±5°C, within 2 minutes. Operation heating:260°C(Max) within 10 seconds.(Max) Gradual Cooling (Avoid quenching).	

■ Electrical/Optical Characteristics at Ta=25°C (True Green)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Luminous Intensity	I _v	I _F =20mA	800	1600	—	mcd
Dominant Wavelength	λ _d	I _F =20mA	515	—	530	nm
Spectral Line Half-width	Δλ	I _F =20mA	—	35	—	nm
Forward Voltage	V _F	I _F =20mA	2.6	—	3.4	V
Viewing Angle	2θ _{1/2}	I _F =20mA	—	120	—	deg
Reverse Current	I _R	V _R =5V	—	—	10	uA

Notes:

1. Tolerance of Luminous Intensity ±15%.
2. Tolerance of Forward Voltage ±0.1V.
3. Tolerance of Dominant Wavelength ±1nm.

■ Absolute Maximum Ratings at Ta=25°C(Blue)

Parameter	Symbol	Maximum	Unit
Power Dissipation	Pd	108	mW
Peak Forward Current (Duty 1/10 @1KHz)	I _{FP}	120	mA
Forward Current	I _F	30	mA
Electrostatic Discharge(HBM)	ESD	2000	V
Reverse Voltage	V _R	5	V
Operating Temperature Range	Topr	-40°C to + 80°C	
Storage Temperature Range	Tstg	-40°C to + 85°C	
Lead Soldering Temperature [2.0mm from body]	Tsol	Preheating: 140°C~160°C±5°C, within 2 minutes. Operation heating:260°C(Max) within 10 seconds.(Max) Gradual Cooling (Avoid quenching).	

■ Electrical/Optical Characteristics at Ta=25°C(Blue)

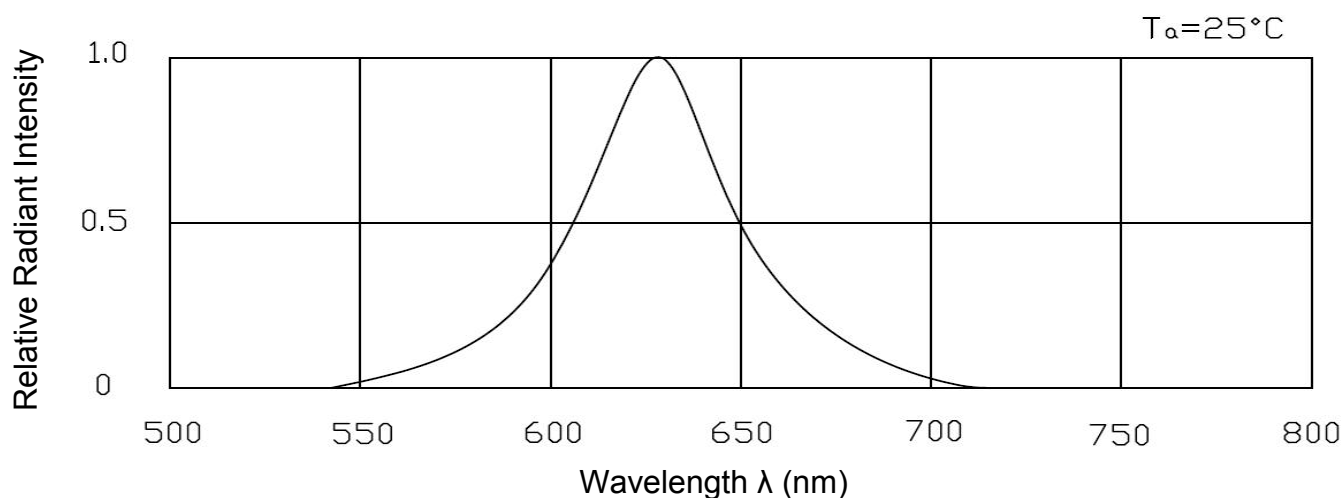
Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Luminous Intensity	I _v	I _F =20mA	350	700	—	mcd
Dominant Wavelength	λ _d	I _F =20mA	460	—	475	nm
Spectral Line Half-width	Δλ	I _F =20mA	—	26	—	nm
Forward Voltage	V _F	I _F =20mA	2.6	—	3.4	V
Viewing Angle	2θ1/2	I _F =20mA	—	120	—	deg
Reverse Current	I _R	V _R =5V	—	—	10	uA

Notes:

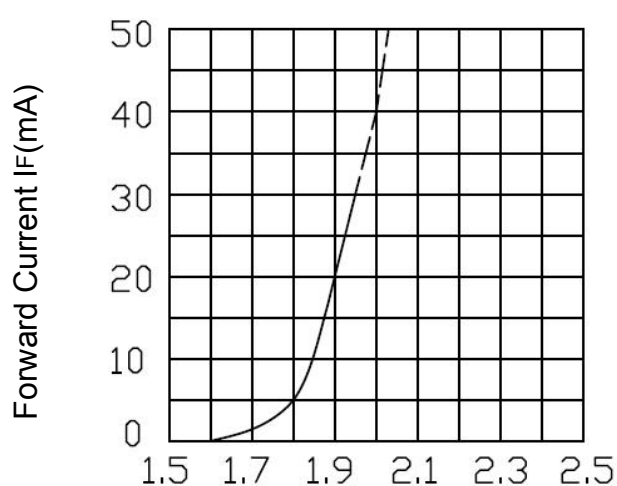
1. Tolerance of Luminous Intensity ±15%.
2. Tolerance of Forward Voltage ±0.1V.
3. Tolerance of Dominant Wavelength ±1nm.

■ Typical Electrical/Optical Characteristic Curves (Red)

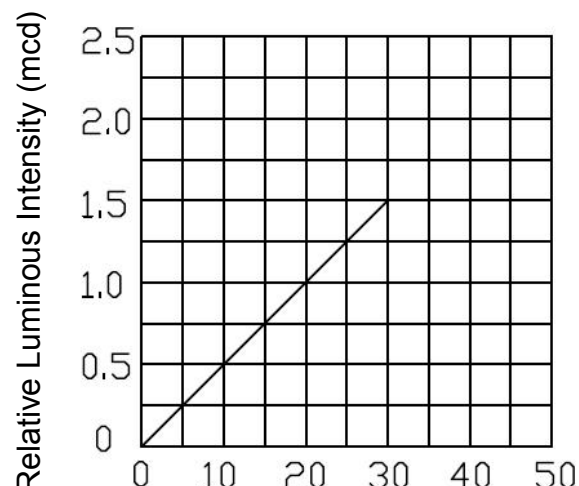
(25°C Ambient Temperature Unless Otherwise Noted)



Relative Intensity Vs. Wavelength



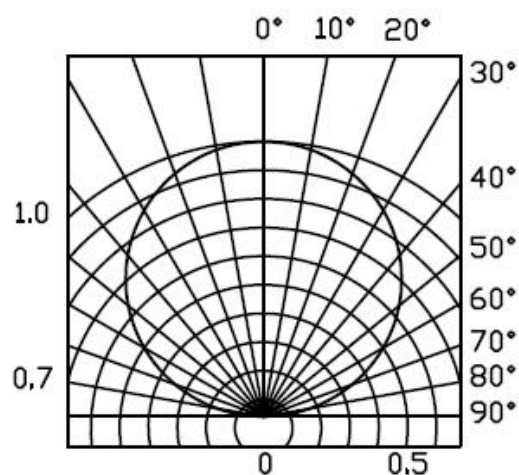
Forward Current vs. Forward Voltage



Relative Luminous Intensity vs. Forward Current



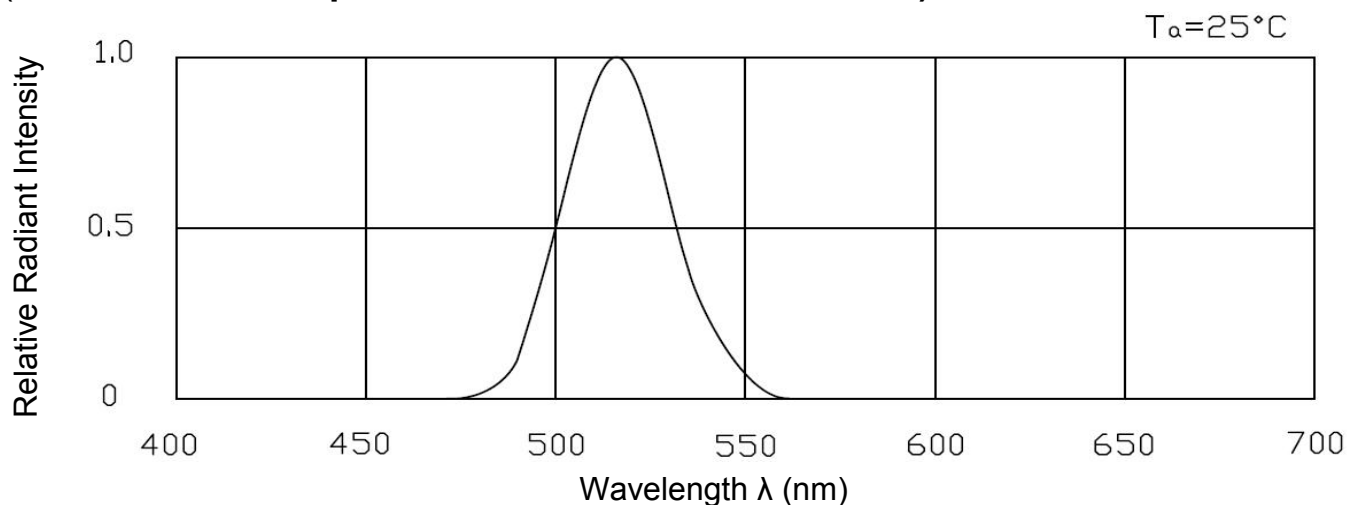
Forward Current Derating Curve



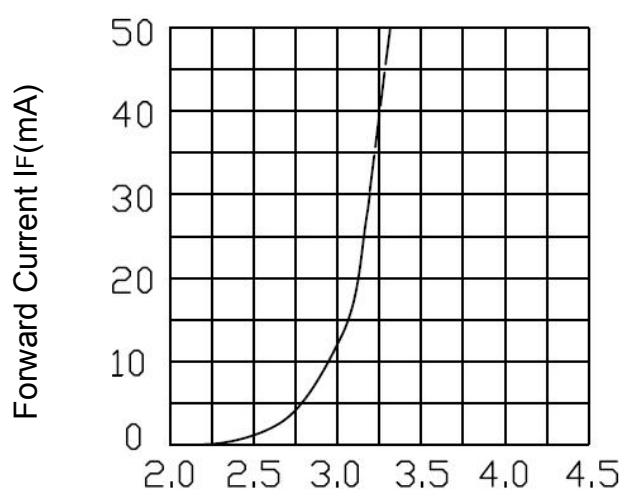
Spatial Distribution

■ Typical Electrical/Optical Characteristic Curves (True Green)

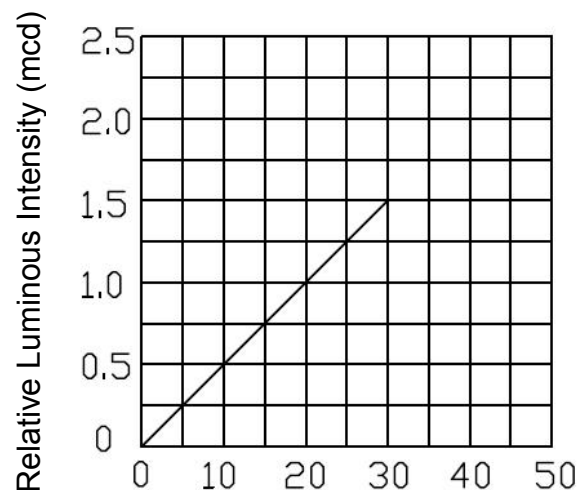
(25°C Ambient Temperature Unless Otherwise Noted)



Relative Intensity Vs. Wavelength



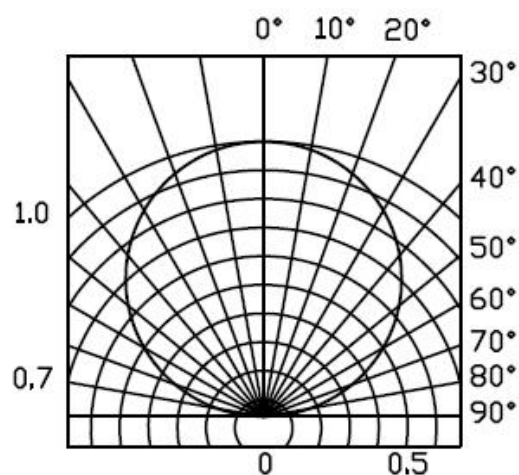
Forward Current vs. Forward Voltage



Relative Luminous Intensity vs. Forward Current



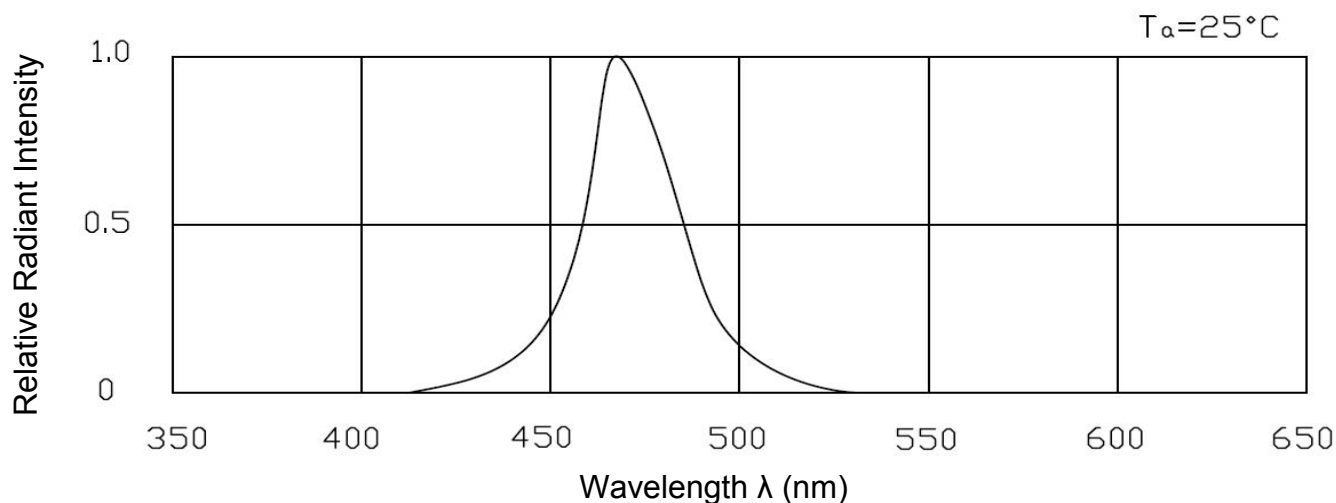
Forward Current Derating Curve



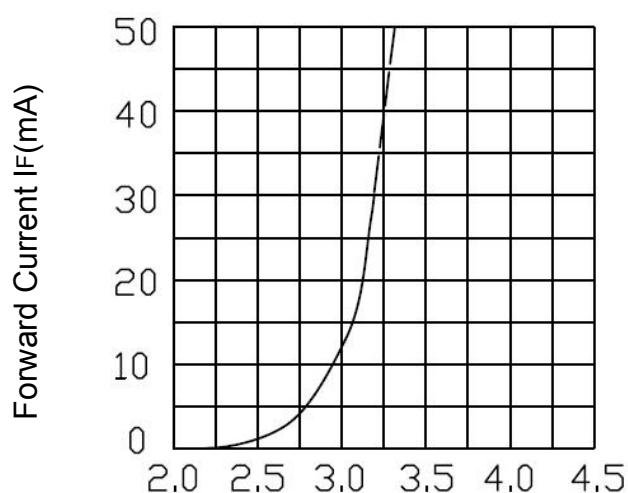
Spatial Distribution

■ Typical Electrical/Optical Characteristic Curves (Blue)

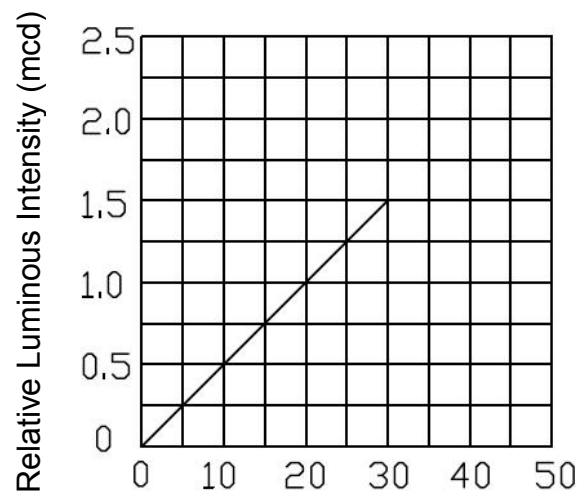
(25°C Ambient Temperature Unless Otherwise Noted)



Relative Intensity Vs. Wavelength



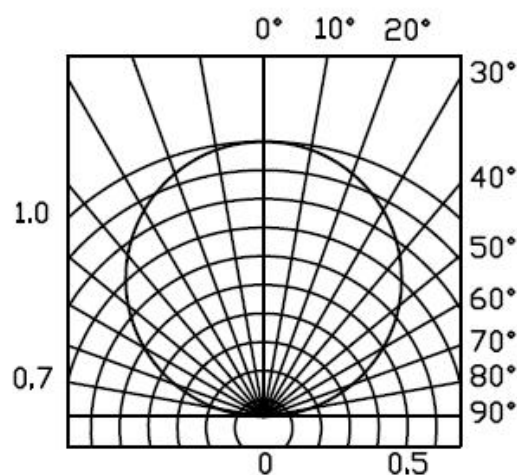
Forward Current vs. Forward Voltage



Relative Luminous Intensity vs. Forward Current



Forward Current Derating Curve



Spatial Distribution

■ Precautions

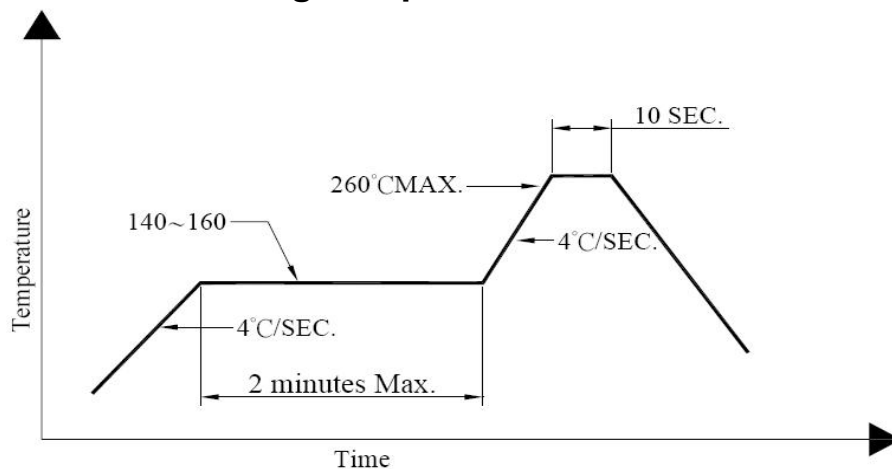
1. Storage

- Recommend storage environment
Temperature: $5^{\circ}\text{C} \sim 30^{\circ}\text{C}$ ($41^{\circ}\text{F} \sim 86^{\circ}\text{F}$) Relative Humidity: 60% RH Max.
- Product in the original sealed package is recommended to be assembled within 168 hours of opening.
- 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.
 - a. Baking treatment: $60 \pm 5^{\circ}\text{C}$ for 24 hours.
 - b. Fold the opened bag firmly and keep in dry environment.

2. Cleaning

- Surface condition of this device may change when organic solvents such as trichloroethylene or acetone were applied.
- Avoid using organic solvent.
- Recommend ultrasonic method 300W Max.

■ SMT Reflow Soldering Temp/Time



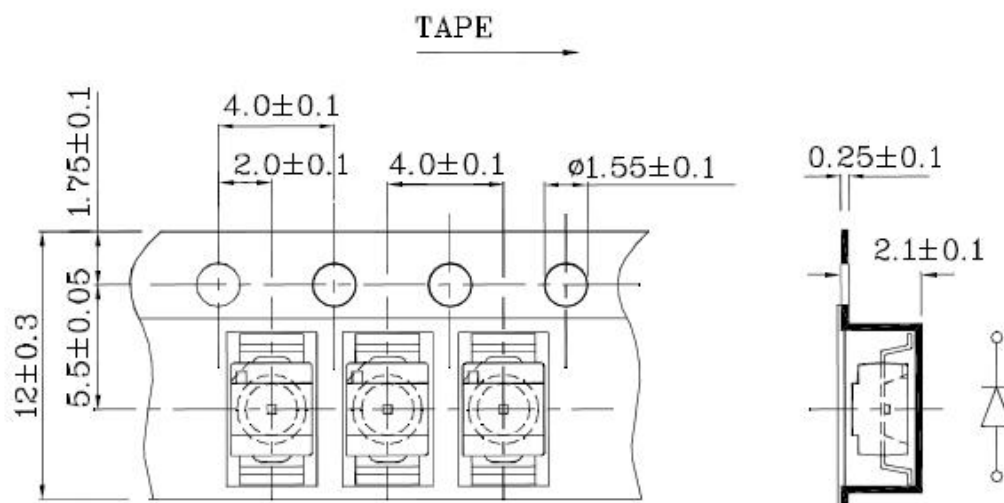
■ Reflow soldering

- Recommend use of upper and lower heater type reflow furnace.
- 260°C Max for up to 10 seconds, one time only.
- Pre-heat is 150°C Max for up to 2 minutes Max.
- In case of screen-printing, keep metal mask thickness between 0.2mm and 0.3mm.
- When soldering, do not put stress on the LEDs during heating.

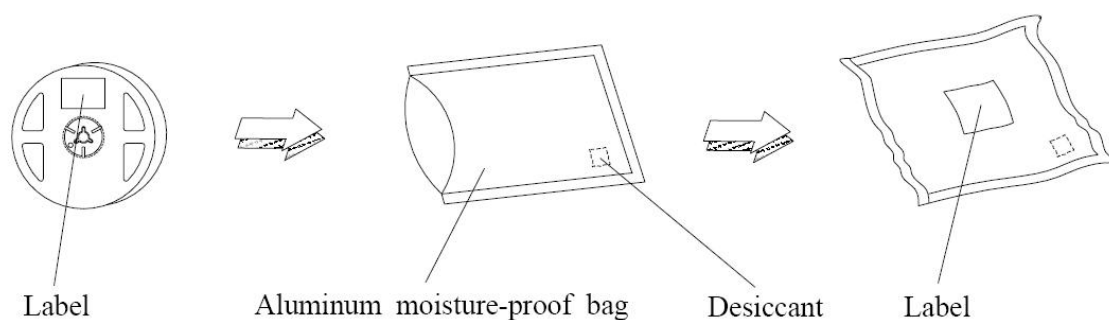
■ Soldering iron

- When hand soldering, keep the temperature of iron below less 300°C less than 3 seconds
- The hand solder should be done only one times

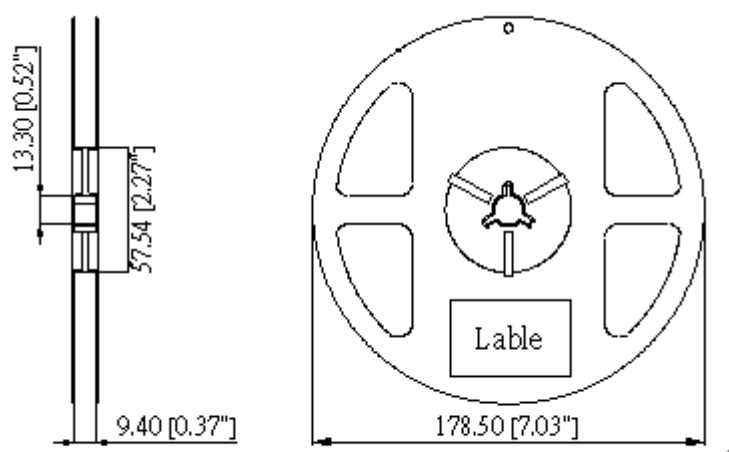
- Carrier Tape Dimensions: Loaded quantity 2000 PCS per reel.



- Moisture Resistant Packaging



- Reel Dimensions



Notes:

1. All dimensions are in mm, tolerance is ± 2.0 mm unless otherwise noted.
2. Specifications are subject to change without notice.