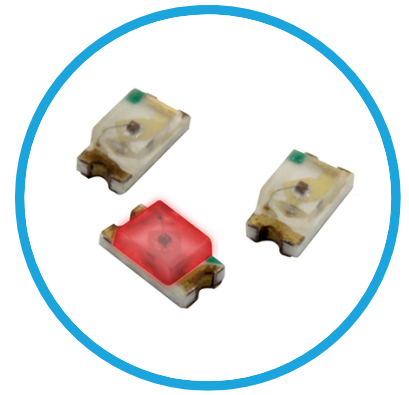




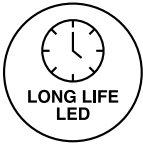
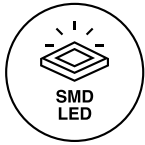
# LSM0603 Series

## 0603 SMD LED packages

### 1.6 x 0.8 x 0.55 mm LED Lamp



LSM0603412V Red SMD LED. High intensity light output, low power consumption, low profile and wide viewing angle.



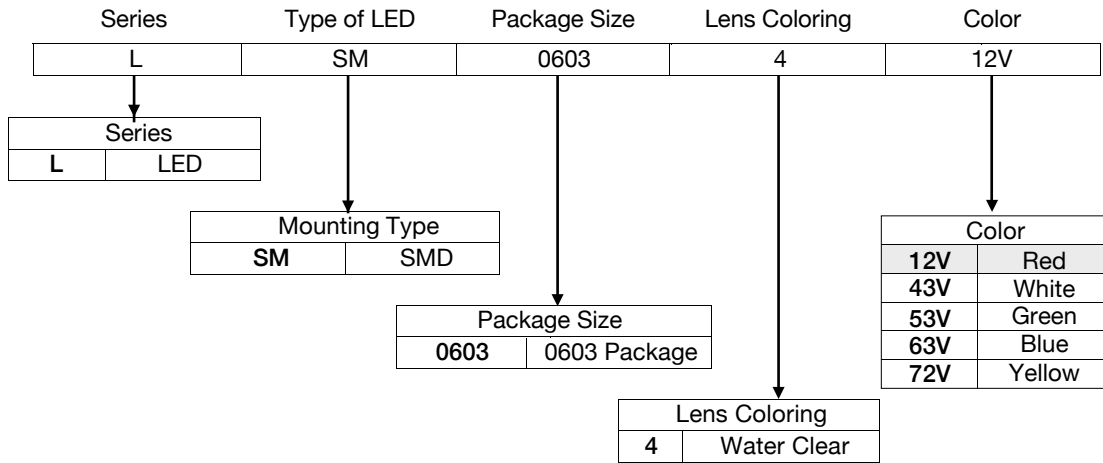
#### Application

- Wearable Device
- Automotive Features
- Navigations Systems
- Home and Smart Appliances
- Backlit Keypads
- Medical
- Health Care Application
- IoT
- Industrial Control Systems

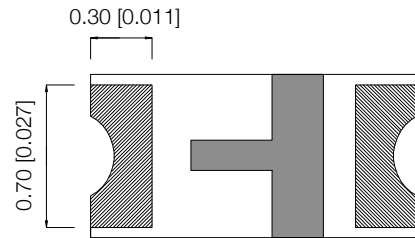
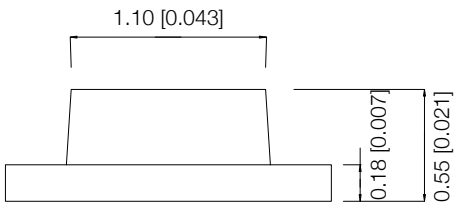
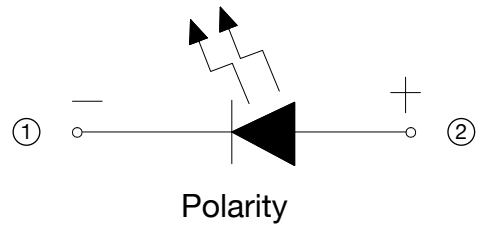
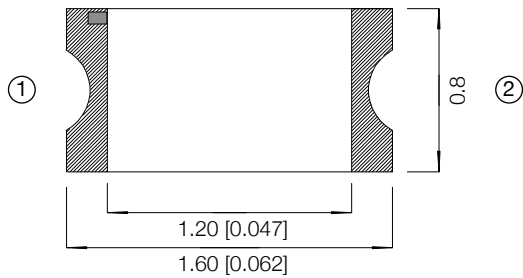
#### Key features

- 1.6 mm x 0.8 mm (0603 package/1608 metric) Chip SMD LED
- 0.55 mm in thickness
- Low power consumption
- Rectangle flat top LED
- Wide viewing angle (120°)
- Optimized light coupling by inter reflector
- GaInP technology
- Available in a range of colors: red, white, green, blue and yellow making it ideal for status indication
- Cost-efficient solution for low-power and compact electronic equipment designs
- Compatible with automatic placement equipment and available in automation-friendly tape and reel
- Ideal for special configurations for automated PC board assembly and space-sensitive applications
- Pb-free
- Moisture sensitivity level: 3
- Package 4,000 pieces per reel
- Compliant with RoHS and REACH

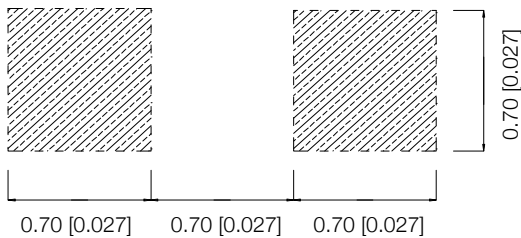
# Ordering Data



# Package Dimensions



# Recommended Soldering Pattern



**Note:** The tolerance unless mentioned is  $\pm 0.1\text{mm}$  [0.005 in] ; Unit=mm [in]

## Product Specifications

### Absolute Maximum Ratings (ta=25°C)

Items	Symbol	Ratings	Unit
Reverse Voltage	VR	5	V
Forward Current	If	20	mA
Operation Temperature	Topt	-40~+85	°C
Storage Temperature	Tstg	-40~+100	°C
Electrostatic Discharge (HBM)	ESD	2000	V
Power Dissipation	Pt	75	MW
Peak Forward Current (Duty 1/10 @1KHZ)	IFP	50	MA
Soldering Temperature	Tsol	Reflow Soldering: 240°C for 10 sec	

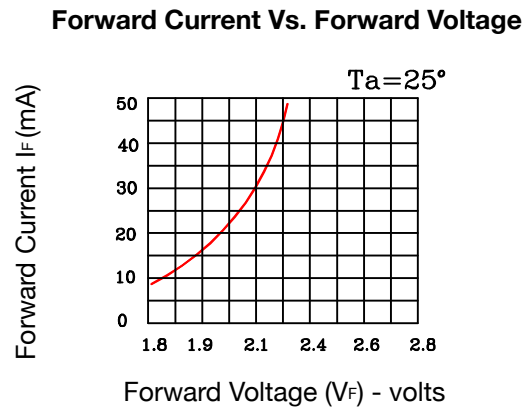
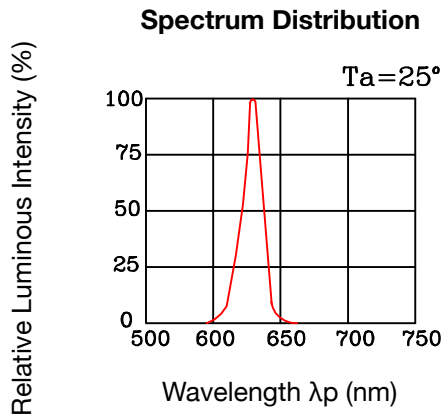
Parameter	Symbol	Min	Typ.	Max.	Unit	Condition
Luminous Intensity	Iv	50	—	80	mcd	IF=20mA
Peak Wavelength	$\lambda_P$	--	635	--	nm	IF=20mA
Dominant Wavelength	$\lambda_d$	631	--	639	nm	IF=20mA
Spectrum Radiation Bandwidth	$\Delta\lambda$	--	20	--	nm	IF=20mA
Forward Voltage	V <sub>F</sub>	1.7	--	2.3	v	IF=20mA
Viewing Angle	$\theta$	-	120	-	deg	IF=20mA
Reverse Current	I <sub>R</sub>	-	-	5	uA	V <sub>R</sub> =5V

#### Note:

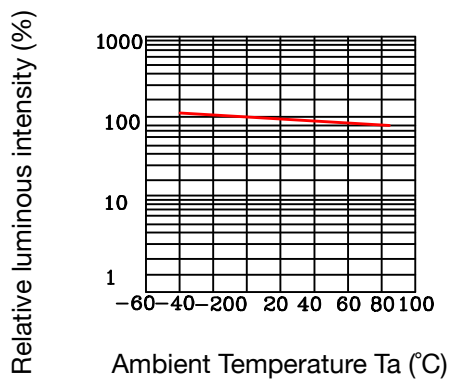
1. Tolerance of Luminous Intensity  $\pm 3\%$
2. Tolerance of Dominant Wavelength  $\pm 1\text{nm}$
3. Tolerance of Forward Voltage  $\pm 0.03\text{V}$

# Product Specifications

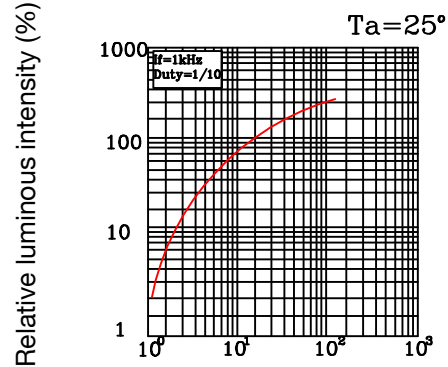
## Typical Electrical-Optical Characteristics Curves



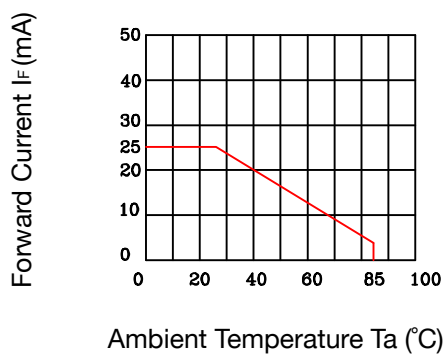
**Luminous Intensity Vs. Ambient Temperature**



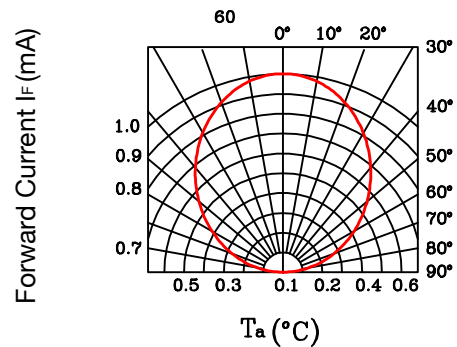
**Luminous Intensity Vs. Forward Current**



**Forward Current Derating Curve**



**Forward Current  $I_F$  (mA) Radiation Diagram**



## Reliability Data

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±5°C	6 min	22 PCS	0/1
2	Temperature Cycle	H: +100°C 15 min ∫ 5 min L: -40°C 15 min	300 Cycles	22 PCS	0/1
3	Thermal Shock	H: +100°C 5 min ∫ 10 sec L: -10°C 5 min	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	IF=20mA	1000 Hrs	22 PCS	0/1
7	High Temperature High Humidity	85°C/85%RH	1000 Hrs	22 PCS	0/1

## Recommended Reflow Soldering Profile

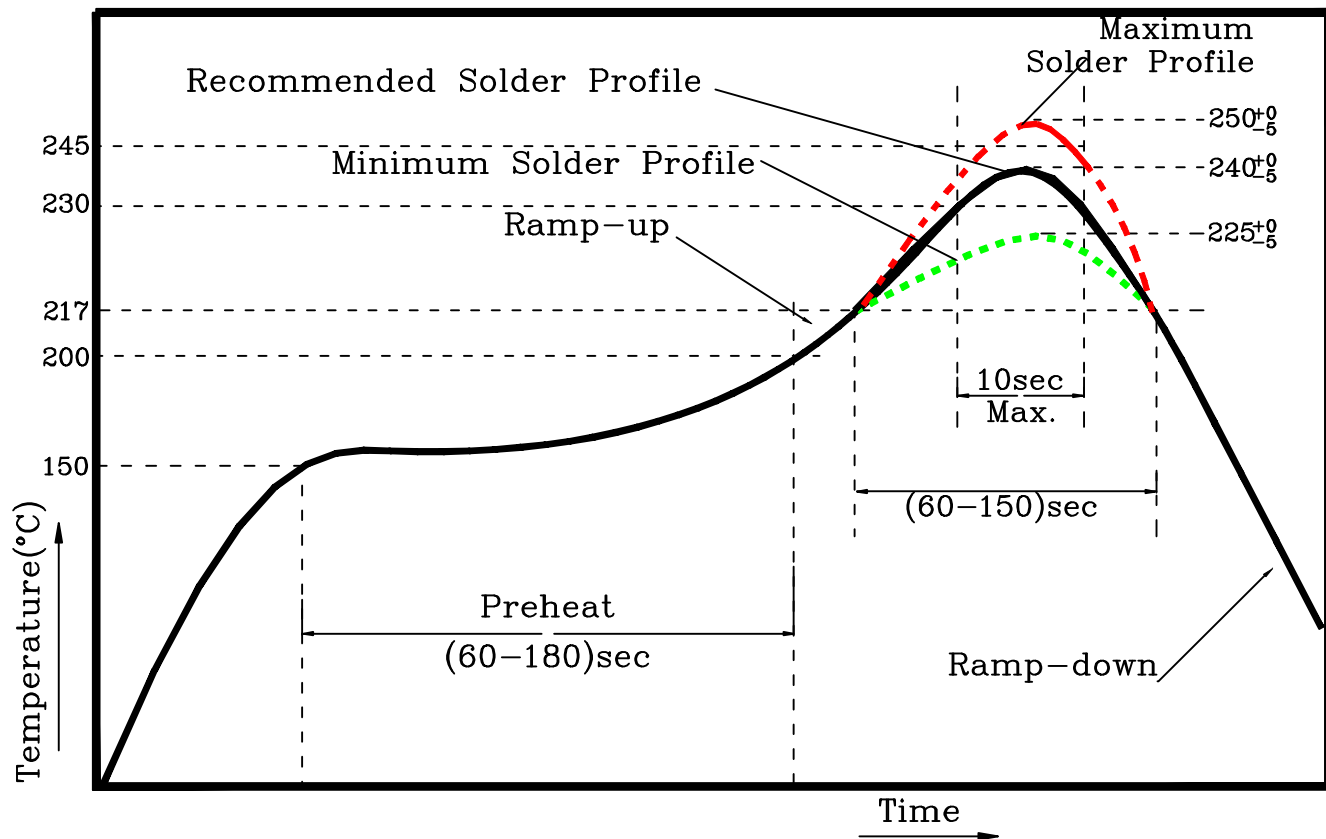
### • Hand Soldering

A soldering iron of less than 20W is recommended to be used in Hand Soldering. Please keep the temperature of the soldering iron under 300° C while soldering. Each terminal of the LED is to go for less than 3 seconds and for one time only.

Be careful because the damage to the product is often started at the time of the hand soldering.

### • Reflow Soldering

Use the conditions shown in the figure below for PB-Free Reflow Soldering.



- Reflow soldering should not be done more than two times.
- Stress on the LEDs should be avoided during heating in soldering process.
- After soldering, do not handle the product before its temperature drops down to room temperature.

## Precautions

### • Storage

Moisture proof and anti-electrostatic package with moisture absorbent material are used, to keep moisture to a minimum.

Before opening the package, the product should be kept at 30°C or less and humidity less than 60%Rh, and be used within a year.

Afer opening the package, the product should be stored at 30°C or less and humidity less than 10%RH, and be soldered within 24 hours. It is recommended that the product be operated at the workshop condition of 30°C or less and humidity less than 60%RH.

If the moisture absorbent material has faded away or the LEDs have exceeded the storage time. Baking should be performed based on the following condition: (60+5C) for 12 hours.

### • Static Electricity

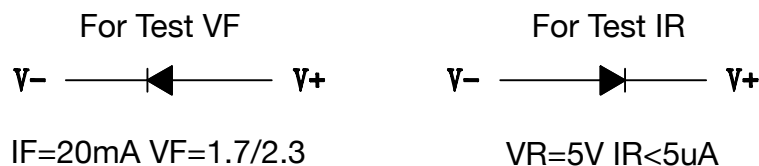
Static electricity or surge voltage damages the LEDs. Damaged LEDs will show some unusual characteristics such as the forward voltage becomes lower, or the LEDs do not light at the low current, even not light.

All devices, equipment, and machinery must be properly grounded. At the same time, it is recommended that wristbands or anti-electrostatic gloves, anti-electrostatic containers be used when dealing with the LEDs.

## Circuit Design Notes

### • Design Consideration

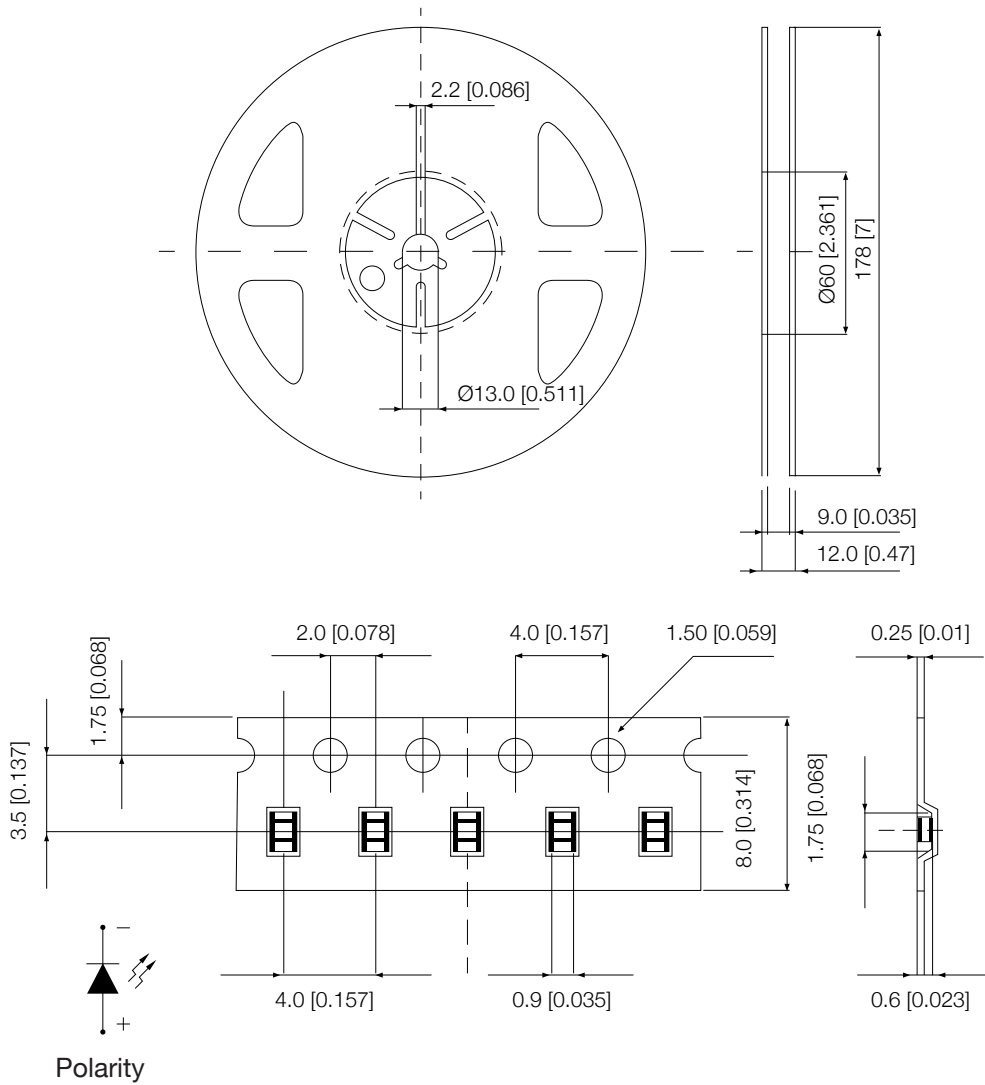
In designing a circuit, the current through each LED must not exceed the absolute maximum rating specified for each LED. In the meanwhile, resistors for protection should be applied, otherwise slight voltage shift will cause big current change, burn out may happen.



### • Thermal Design

Is paramount importance because heat generation may result in the Characteristics decline, such as brightness decreased, Color changed and so on. Please consider the heat generation of the LEDs when making the system design.

# Tape and Reel Specifications



**Note:** The tolerance unless mentioned is  $\pm 0.1\text{mm}$  [0.005 in] ; Unit=mm [in]

## Compliances and Approvals

