

# Sample Approval Sheet

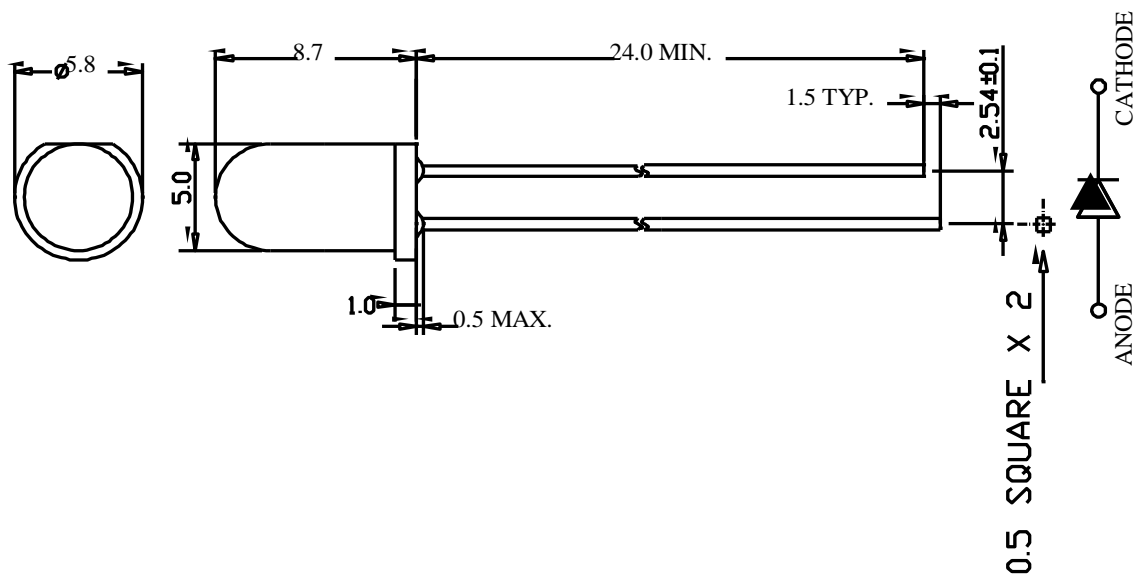
|                                  |                  |                |
|----------------------------------|------------------|----------------|
| (Product type):LED               |                  |                |
| (Product name):5mm Round Red LED |                  |                |
| (Part No.):                      |                  |                |
| (Sample No.):                    |                  |                |
| (Acknowledgement Numbers):       |                  |                |
| <b>Signatures</b>                |                  |                |
| <b>(Approved)</b>                | <b>(Checked)</b> | <b>(Drawn)</b> |
|                                  |                  |                |

|                            |  |  |
|----------------------------|--|--|
| <b>Customer</b>            |  |  |
| (Corporation):             |  |  |
| (Material No.):            |  |  |
| (Part No.):                |  |  |
| <b>Customer Signatures</b> |  |  |
|                            |  |  |
|                            |  |  |

## Feature

- \*Low power consumption
- \*Long life-solid state reliability
- \*Available on tape and reel
- \*RoHS compliant

## Package outline dimensions



## Note:

1. All dimensions are in millimeters;
2. Tolerance is  $\pm 0.25$  unless otherwise noted;
3. Lead spacing is measured where the leads emerge from the package;
4. Specifications are subject to change without notice.

## Electrical characteristics data sheet

### Selection Guide

| Part No. | Emitted Color | Resin color | Viewing Angle<br>20 <sub>1/2</sub> |
|----------|---------------|-------------|------------------------------------|
|          | Red           | Water Clear | 15°                                |

### Absolute Maximum Ratings at Ta=25°C

| Parameter                              | Symbol | Value        | Unit |
|--|--------|--------------|------|
| Power dissipation                      | Pd     | 72           | mW   |
| DC Forward Current                     | If     | 30           | mA   |
| Peak Forward Current <sup>(1)</sup>    | Ifp    | 100          | mA   |
| Reverse Voltage                        | Vr     | 5            | V    |
| Electro-Static-Discharge (HBM)         | ESD    | 2000         | V    |
| Operating Temperature                  | Topr   | -40to+85     | °C   |
| Storage Temperature                    | Tstg   | -40to+100    | °C   |
| Lead Solder Temperature <sup>(2)</sup> | Tsol   | 260 for 5sec | °C   |

### Notes:

- 1.1/10 duty cycle, 0.1 ms pulse width;
- 2.2mm below package base.

### Electrical/Optical Characteristics Ta=25°C

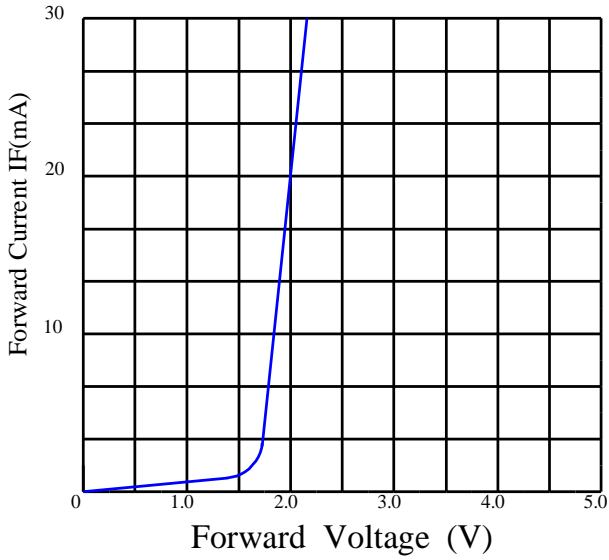
| Parameter           | Symbol | Condition | Value |      |      | Unit |
|---------------------|--------|-----------|-------|------|------|------|
|                     |        |           | Min.  | Typ. | Max. |      |
| Forward voltage     | Vf     | If=20mA   | ---   | 2.2  | 2.6  | V    |
| Luminous intensity  | Iv     | If=20mA   | 2900  | 5000 | ---  | mcd  |
| Dominant wavelength | λd     | If=20mA   | 620   | 622  | 630  | nm   |
| Peak wavelength     | λp     | If=20mA   | ---   | 628  | ---  | nm   |
| Reverse current     | Ir     | Vr=5V     | ---   | ---  | 10   | μA   |

### Notes:

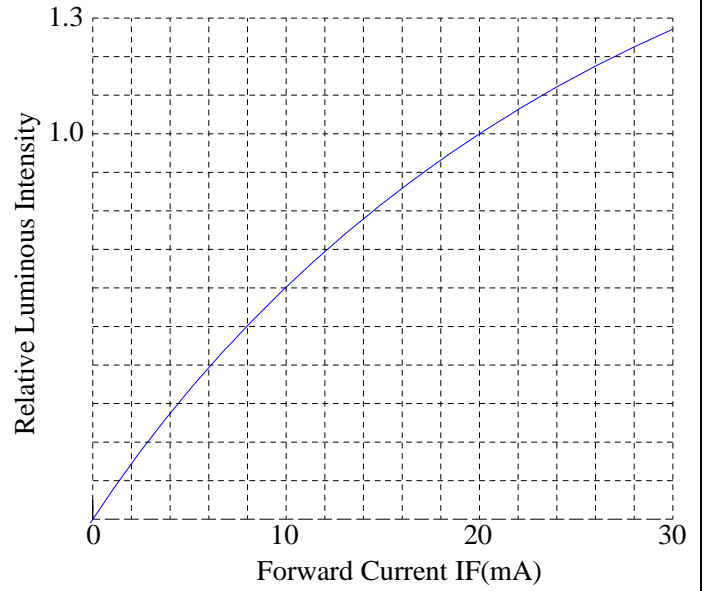
1. Forward Voltage: ±0.1V
2. Wavelength: ±1.5nm
3. Luminous Intensity: ±10%

## Typical Electro-Optical Characteristics Curves

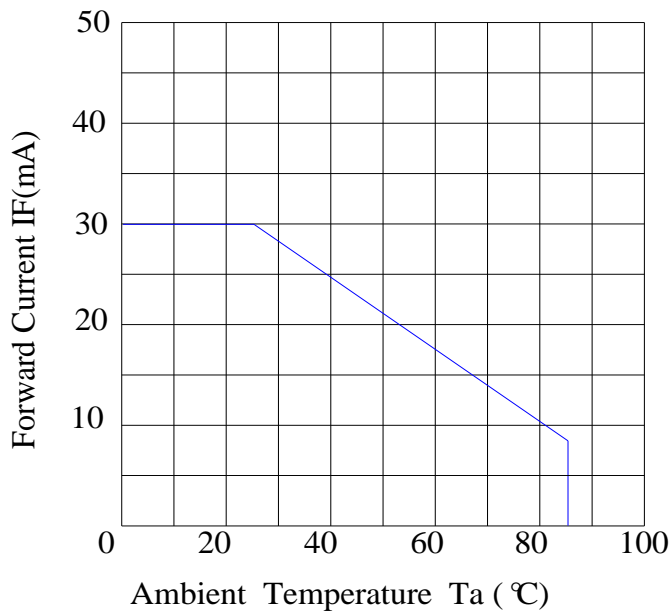
**FORWARD CURRENT VS. FORWARD VOLTAGE**



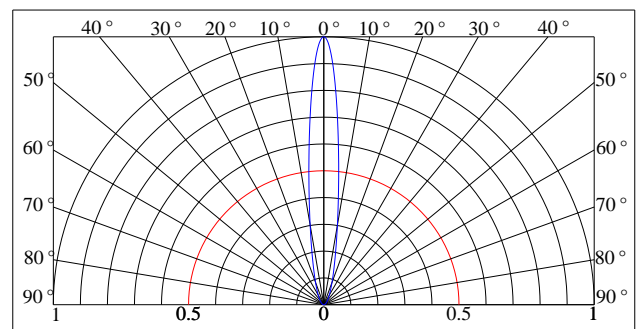
**FORWARD CURRENT VS. LUMINOUS INTENSITY**



**AMBIENT TEMPERATURE VS. FORWARD CURRENT**



**RADIATION DIAGRAM**



## Reliability Test Items and Conditions

### 1、 Test items and result

| Test Item  | Ref. Standard            | Test Condition                       | Note              | Number of Damaged |
|--|--------------------------|--------------------------------------|-------------------|-------------------|
| Resistance to Soldering Heat                         | JEITA ED-4701<br>300 301 | Tsld=260℃, 10sec                     | 2 times           | 0/50              |
| Solder ability                                       | JEITA ED-4701<br>300 303 | Tsld=215±5℃, 3sec                    | 1time<br>over 95% | 0/50              |
| Thermal Shock  | JEITA ED-4701<br>300 307 | -40℃ 15min<br>↑↓<br>100℃ 15min       | 100cycles         | 0/50              |
| Temperature Cycle                                    | JEITA ED-4701<br>100 105 | -40℃ 30min<br>↓↑ 5min<br>100℃ 30min  | 100cycles         | 0/50              |
| Moisture Resistance Cycle                            | JEITA ED-4701<br>200 203 | 65℃~25℃~ -10℃<br>90%RH 24hrs./1cycle | 100cycles         | 0/50              |
| High Temperature Storage                             | JEITA ED-4701<br>200 201 | Ta=100℃                              | 1000 hrs          | 0/50              |
| High Temperature<br>High Humidity Storage            | JEITA ED-4701<br>100 103 | Ta=60℃, 90%RH                        | 1000 hrs          | 0/50              |
| Low Temperature Storage                              | JEITA ED-4701<br>200 202 | Ta= -40℃                             | 1000 hrs          | 0/50              |
| Steady State Operating Life                          |                          | Ta=25℃, IF=20mA                      | 1000 hrs          | 0/50              |
| Steady State Operating Life<br>of High Temperature   |                          | Ta=85℃, IF=20mA                      | 1000 hrs          | 0/50              |
| Steady State Operating Life<br>of High Humidity Heat |                          | 60℃, 90%RH, IF=20mA                  | 1000 hrs          | 0/50              |
| Steady State Operating Life<br>of Low Temperature    |                          | Ta= -30℃, IF=20mA                    | 1000 hrs          | 0/50              |
| Drop   |                          | H=75cm                               | 3 cycles          | 0/50              |

### 2、 Criteria for judging damage

| Item               | Symbol | Test Conditions | Criteria for Judgment |                  |
|--------------------|--------|-----------------|-----------------------|------------------|
|                    |        |                 | Min                   | Max              |
| Forward voltage    | VF     | IF=20mA         | --                    | U. S. L*) × 1. 1 |
| Reverse current    | IR     | VR=5V           | --                    | U. S. L*) × 2. 0 |
| Luminous intensity | IV     | IF=20mA         | L. S. L**) × 0. 7     | --               |

#### Notes:

\*)U.S.L.: Upper Standard Level

\*\*)L.S.L.: Lower Standard Level

## Precautions

### 1.Storage

Under the storage conditions of 30°C or less and humidity less than 60%RH, the LEDs can be storage for 3months. Storage in a sealed container with moisture absorbent material can prolong the storage time to a certain extent bad storage conditions may cause the lead frames to corrode or degradation of LED characteristics. It is recommended that the LEDs be used as soon as possible.

### 2. Static electricity

Static electricity of surge voltage damages the LED .Damaged LED will show some unusual chrematistics such as the forward voltage becomes lower or the LED 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 wrist Bands or anti-electrostatic gloves anti-electrostatic containers be used when dealing with the LED.

### 3. Design Consideration

When 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, bum out may happen.

Thermal Design is paramount important in 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 LED when making the system design.

### 4. Lead Forming

Any lead forming must be done before soldering, not during or after soldering. When forming leads ,the leads should bent at a point at least 3mm from the base of the expose bulb. Bending at the same point twice or even more should be avoided.

Please use proper tools to hold and bent the leads, do not use the base of the lead frame as a fulcrum during lead forming .Bending stress to the base of the lead frame may cause characteristics change on LED or even break it.

Just for the same reason, when mounting the LED on to printed circuit board, the holes on the circuit board should be exactly aligned with the leads of the LED.

### 5. Soldering

Be careful because damages always caused during soldering. Please note that stress to the leads and expose bulb should be avoided during soldering particularly when heated. When soldering, leave certain distance from soldering joint to base, the distance is determined by different soldering techniques. It is recommended that soldering be performed base on the following conditions.

Recommended Soldering Conditions:

| DIP Soldering    |  | Hand Soldering     |  |
|------------------|--|--------------------|--|
| Pre-Heat         | 100°C Max.60 sec. Max                    | Temperature        | 350°C Max                                |
| Dipping Time     | 260°C Max.5 sec Max                      | Soldering Time     | 3 Sec. Max                               |
| Dipping Position | 2mm ,Min<br>From soldering joint to base | Soldering Position | 2mm ,Min<br>From soldering joint to base |