

Technical Data Sheet**1.9mm Round Subminiature “Yoke” Lead LED****91-21SUBC/S400-A6/TR9****Features**

- Package in 12mm tape on 7" diameter reels.
- Compatible with automatic placement equipment.
- EIA Std. package.
- Mono-color type.
- Pb-free
- The product itself will remain within RoHS compliant version

**Descriptions**

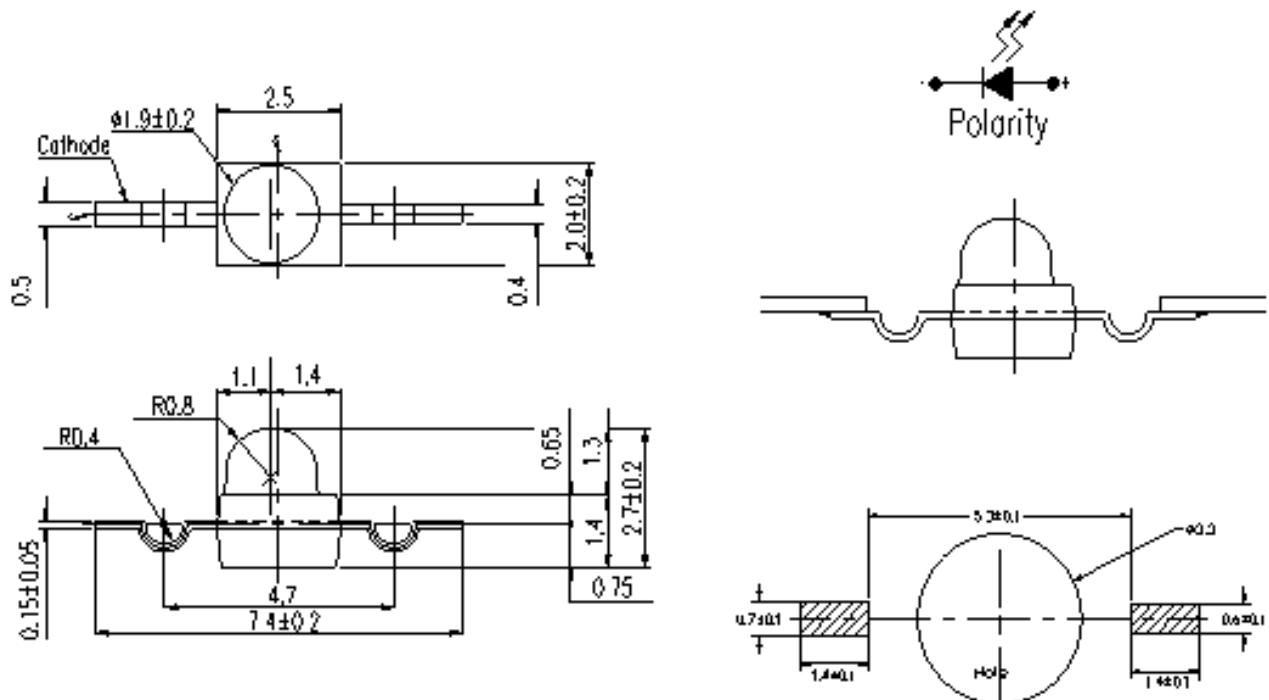
- The 91-21 SMD LED is much smaller than leaded components. Thus enable smaller board size. Higher packing density. Reduced storage space and finally smaller equipment to be obtained.
- Besides, light weight makes them ideal for miniature applications.
- Furthermore by automation assembly machines the accuracy is anticipated.

Applications

- Small indicator for indoor applications.
- Flat backlight for LCD, switches and symbols.
- Indicator and backlight in office equipment.
- Indicator and backlight for battery driven equipment.
- Indicator and backlight for audio and video equipment.
- Backlighting in dashboards and switches.
- Telecommunication : indicator and backlighting in telephone and fax.

Device Selection Guide

| Part No. | Chip | Emitted Color | Resin Color |
|------------------------------|----------|---------------|-------------|
| | Material | | |
| 91-21SUBC/S400-A6/TR9 | InGaN | Blue | Water Clear |

Package Outline Dimensions

Note: The tolerances unless mentioned is ± 0.1 mm ,Unit = mm

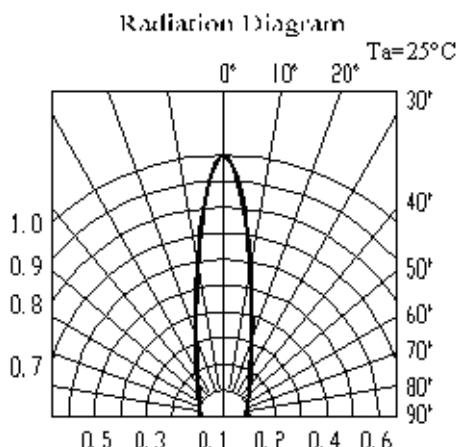
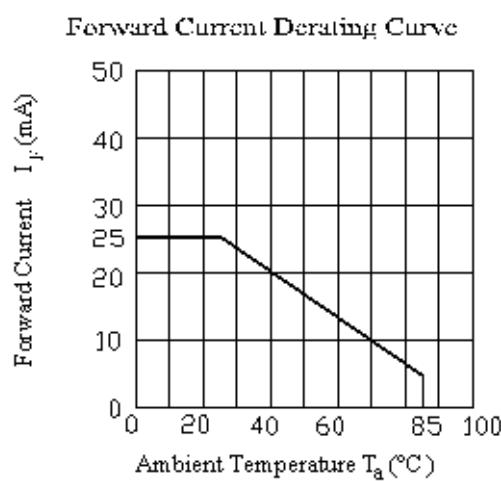
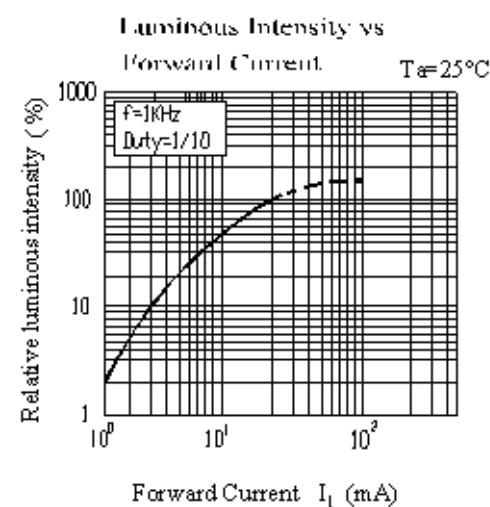
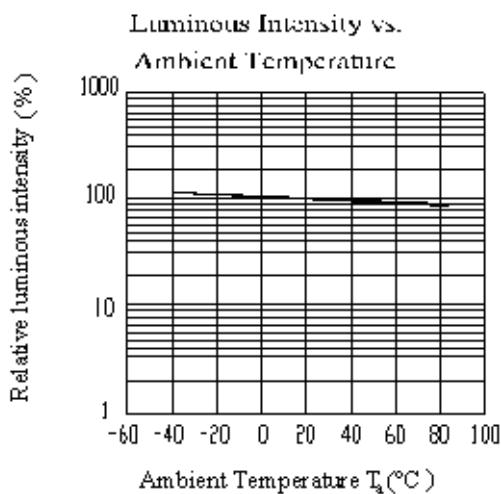
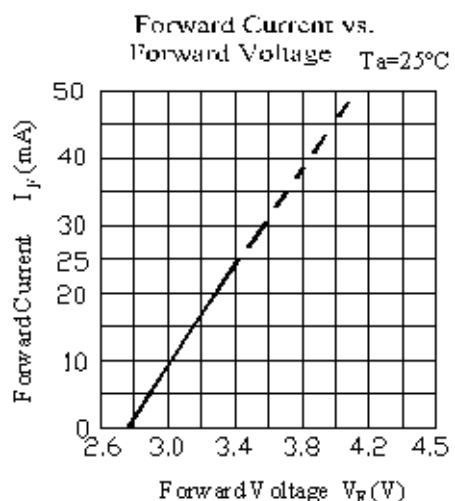
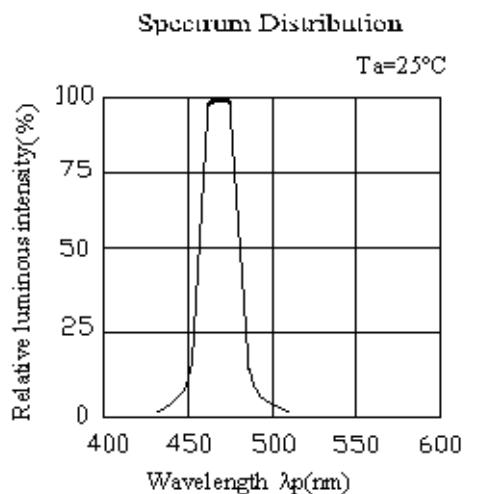
91-21SUBC/S400-A6/TR9**Absolute Maximum Ratings (Ta=25°C)**

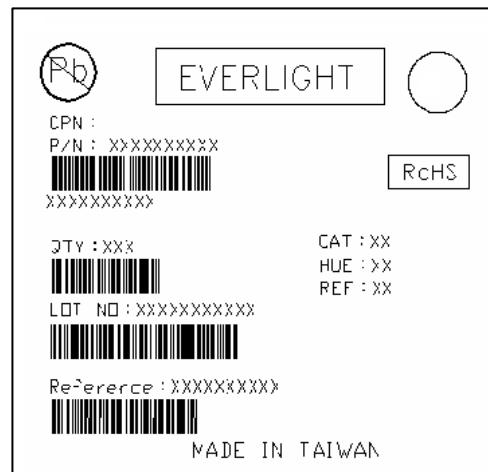
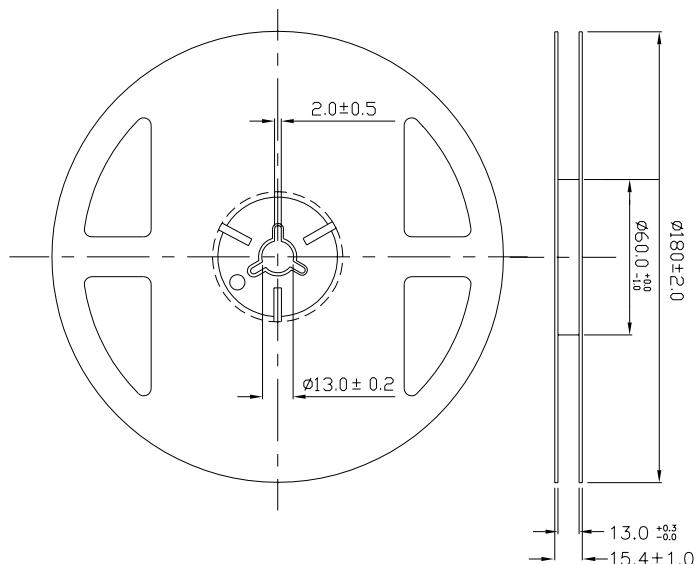
| Parameter | Symbol | Rating | Unit |
|---|------------------|---|------|
| Reverse Voltage | V _R | 5 | V |
| Forward Current | I _F | 25 | mA |
| Peak Forward Current (Duty 1/10 @1KHz) | I _{FP} | 100 | mA |
| Power Dissipation | P _d | 95 | mW |
| Electrostatic Discharge(HBM) | ESD | 150 | V |
| Operating Temperature | Topr | -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. | |

Electro-Optical Characteristics (Ta=25°C)

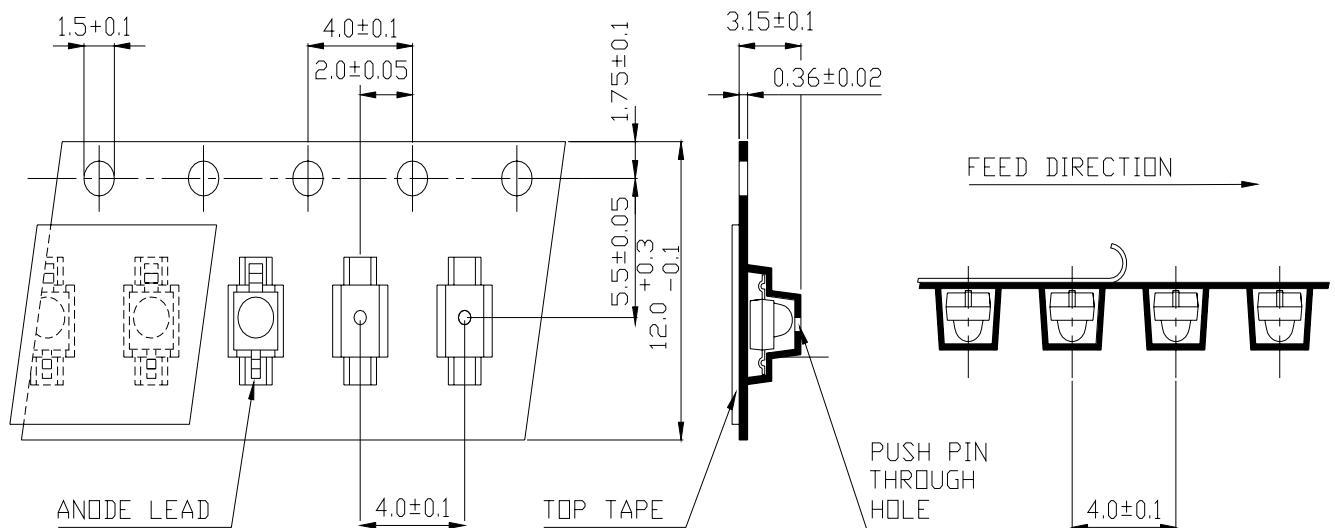
| Parameter | Symbol | MIN. | TYP. | MAX. | Unit | Condition |
|---------------------------------|----------------|------|------|------|------|----------------------|
| Luminous Intensity | I _v | 650 | 800 | ---- | mcd | I _F =20mA |
| Viewing Angle | 2θ 1/2 | ---- | 25 | ---- | deg | |
| Peak Wavelength | λ _p | ---- | 468 | ---- | nm | |
| Dominant Wavelength | λ _d | ---- | 470 | ---- | nm | |
| Spectrum Radiation Bandwidth | △λ | ---- | 25 | ---- | nm | |
| Forward Voltage | V _F | ---- | 3.3 | 3.7 | V | |
| Reverse Current | I _R | ---- | ---- | 50 | μA | |

Typical Electro-Optical Characteristics Curves



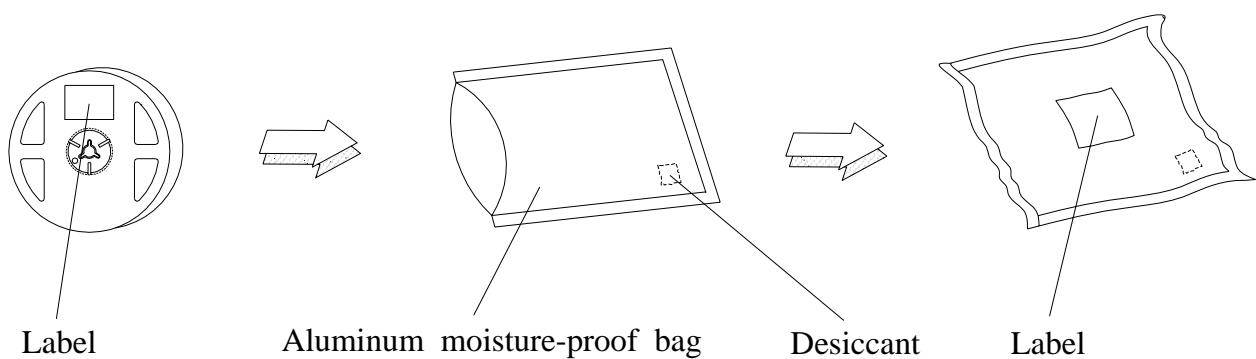
91-21SUBC/S400-A6/TR9**Label explanation****CAT: Luminous Intensity Rank****HUE: Dom. Wavelength Rank****REF: Forward Voltage Rank****Reel & Carrier Tape Dimensions**

Note: The tolerances unless mentioned are ± 0.1 , unit=mm.

91-21SUBC/S400-A6/TR9**Loaded quantity per reel 1000 PCS/reel****TR9**

Note: The tolerances unless mentioned is ± 0.1 mm ,Unit = mm

Moisture Resistant Packaging



91-21SUBC/S400-A6/TR9**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. : $260^{\circ}\text{C} \pm 5^{\circ}\text{C}$ Min. 5 sec. | 6 Min. | 22 Pcs. | 0/1 |
| 2 | Temperature Cycle | H : $+100^{\circ}\text{C}$ 15 min. ↓ 5 min. L : -40°C 15 min. | 300 Cycles | 22 Pcs. | 0/1 |
| 3 | Thermal Shock | H : $+100^{\circ}\text{C}$ 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 | $I_F = 20 \text{ mA}$ | 1000 Hrs. | 22 Pcs. | 0/1 |
| 7 | High Temperature / High Humidity | $85^{\circ}\text{C} / 85\% \text{ RH}$ | 1000 Hrs. | 22 Pcs. | 0/1 |

91-21SUBC/S400-A6/TR9**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

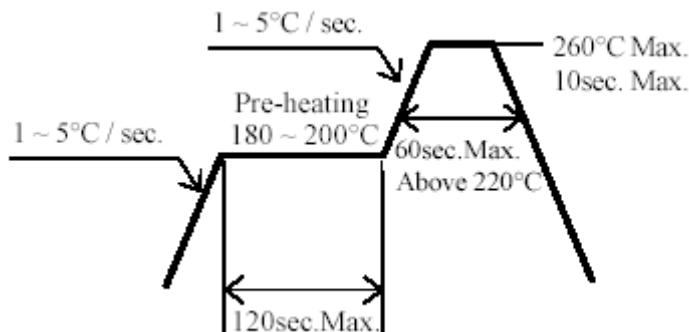
2.1 Do not open moisture proof bag before the products are ready to use.

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 is 1 year 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.

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.

91-21SUBC/S400-A6/TR9**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.

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.

