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INFRARED EMITTING DIODES



Lead-Free Parts

LIR13733-PF

DATA SHEET

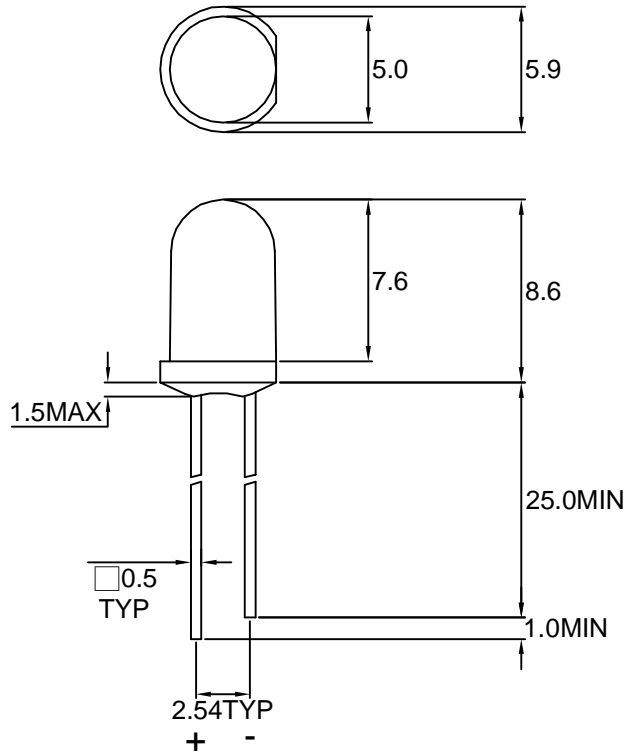
DOC. NO : QW0905-LIR13733-PF

REV. A

DATE : 10 - May - 2007



Package Dimensions



NOTE:1.All dimension are in millimeters tolerance is ± 0.25 unless otherwise noted
 2.Specifications are subject to change without notice

Features:

1. High radiant intensity.
2. Suitable for pulsed applications.
3. Low average degradation.

Descriptions:

The LIR13733-PF series are high power solution grown efficiency Gallium Arsenide infrared emitting diodes encapsulated in water clear plastic T-1 3/4 package individually

Device Selection Guide:

| PART NO | MATERIAL | LENS COLOR |
|-------------|-------------|-------------|
| LIR13733-PF | AlGaAs/GaAs | Water Clear |



Absolute Maximum Ratings at Ta=25 °C

| Parameter | Symbol | Ratings | UNIT |
|--|--------|-----------|------|
| | | IR | |
| Forward Current | IF | 50 | mA |
| Peak Forward Current (300PPS,10 μs Pulse) | IFP | 1 | A |
| Power Dissipation | PD | 100 | mW |
| Reverse Voltage | Vr | 5 | V |
| Electrostatic Discharge | ESD | 2000 | V |
| Operating Temperature | Topr | -40 ~ +85 | °C |
| Storage Temperature | Tstg | -40 ~ +85 | °C |

Electrical Optical Characteristics (Aa=25°C)

| PARAMETER | SYMBOL | Min. | Typ. | Max. | UNIT | TEST CONDITION |
|------------------------------|--------|------|------|------|--------------------|----------------|
| Radiant Intensity | Le | 3.0 | 6.0 | | mW/sr | IF=20mA |
| Aperture Radiant Incidence | Ee | 0.43 | 0.86 | | mW/cm ² | IF=20mA |
| Peak Emission Wavelength | λ peak | | 940 | | nm | IF=20mA |
| Spectral Line Half Width | Δλ | | 50 | | nm | IF=20mA |
| Forward Voltage (@ 40 ms) | VF | | 1.2 | 1.6 | V | IF=20mA |
| Reverse Current | IR | | | 100 | μA | VR=5V |
| Viewing Angle | 2θ 1/2 | | 46 | | deg | |

Note : 1.The forward voltage data did not including ±0.1V testing tolerance.
2. The radiant intensity data did not including ±15% testing tolerance.



Typical Electro-Optical Characteristics Curve

IR CHIP

Fig.1 Forward Current vs. Forward Voltage

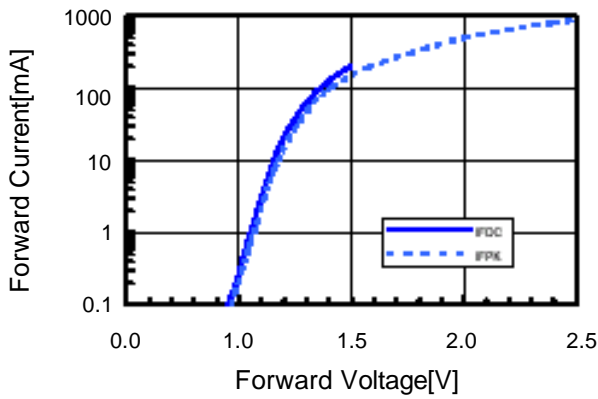


Fig.2 Relative Radiant Power vs. Wavelength

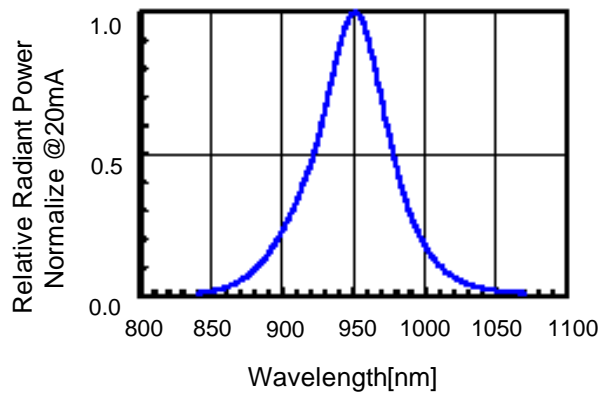


Fig.3 Relative Radiant Power vs. Forward DC Current

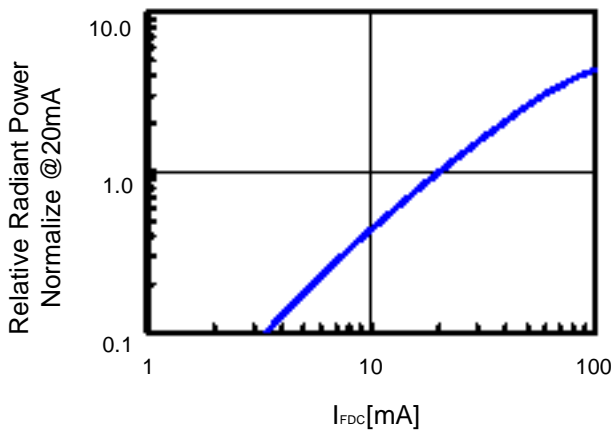


Fig.4 Relative Radiant Power vs. Forward Peak Current

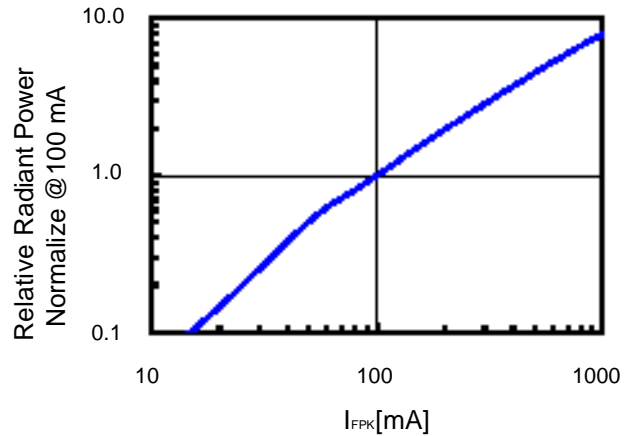


Fig.5 Forward DC Voltage vs. Temperature

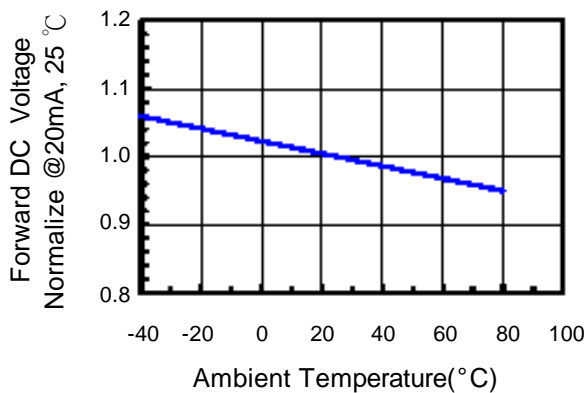
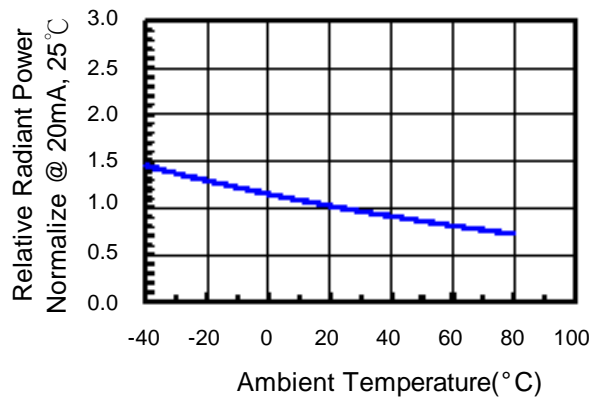


Fig.6 Relative Radiant Power vs. Temperature





Storage time:

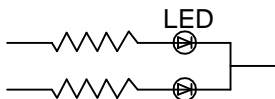
- 1.The operation of Temperatures and RH are : $5^{\circ}\text{C} \sim 35^{\circ}\text{C}$,RH<60%.
- 2.Once the package is opened, the products should be used within a week.
Otherwise, they should be kept in a damp proof box with descanting agent.
Considering the tape life, we suggest our customers to use our products within a year(from production date).
- 3.If opened more than one week in an atmosphere $5^{\circ}\text{C} \sim 35^{\circ}\text{C}$,RH<60%, they should be treated at $60^{\circ}\text{C} \pm 5^{\circ}\text{C}$ fo r 15hrs.

Drive Method:

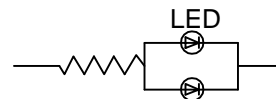
LED is a current operated device, and therefore, require some kind of current limiting incorporated into the driver circuit. This current limiting typically takes the form of a current limiting resistor placed in series with the LED.

Consider worst case voltage variations than could occur across the current limiting resistor. The forwr d current should not be allowed to change by more than 40% of its desired value.

Circuit model A



Circuit model B



- (A) Recommended circuit.
(B) The difference of brightness between LED could be found due to the VF-IF characteristics of LED.

Cleaning:

Use alcohol-based cleaning solvents such as isopropyl alcohol to clean the LED.

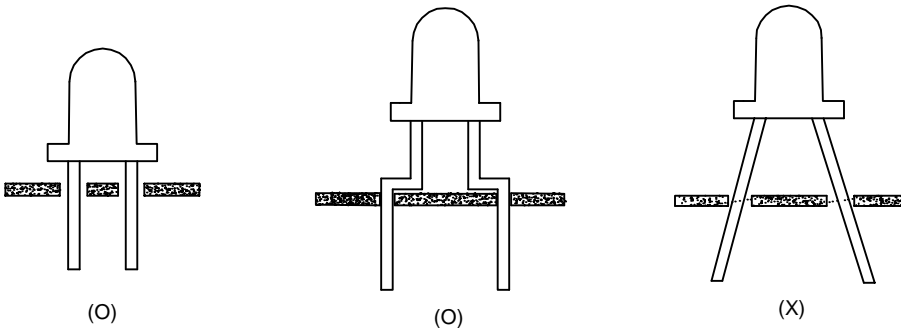
ESD(Electrostatic Discharge):

Static Electricity or power surge will damage the LED. Use of a conductive wrist band or anti-electrosatic glove is recommended when handing these LED. All devices, equipment and machinery must be properly grounded.

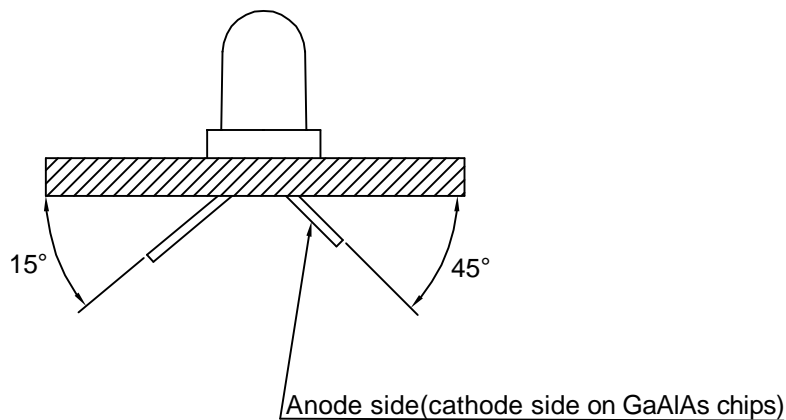


Mounting:

1. If the leads are subjected to stress during soldering a printed circuit board, illumination failure may result immediately or later during use. For this reason, make sure that the intervals between the installation holes in the board are equal to the intervals between the leads (after forming if done) so that no stress is applied to the lead.



2. The LED lamps are designed for high-density mounting and have a structure which can alleviate mechanical stress due to clinching . Nevertheless , take care to avoid the occurrence of residual mechanical stress due to clinching .





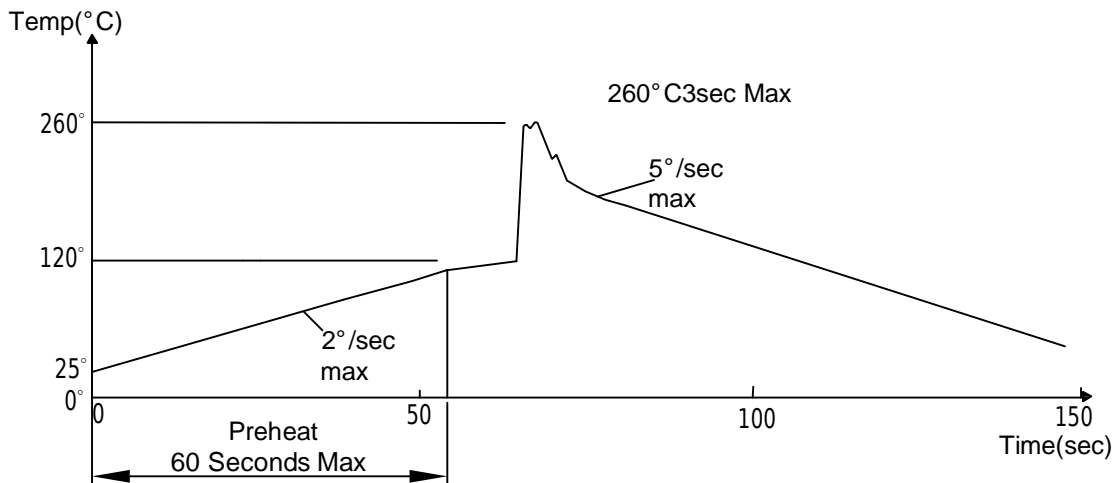
Soldering Condition(Pb-Free)

1.Iron:

- Soldering Iron:30W Max
- Temperature 350° C Max
- Soldering Time:3 Seconds Max(One time only)
- Distance:2mm Min(From solder joint to body)

2.Wave Soldering Profile

- Dip Soldering
- Preheat: 120° C Max
- Preheat time: 60seconds Max
- Ramp-up
- 2° C/sec(max)
- Ramp-Down:-5° C/sec(max)
- Solder Bath:260° C Max
- Dipping Time:3 seconds Max
- Distance:2mm Min(From solder joint to body)



Note: 1.Wave solder should not be made more than one time.
2.You can just only select one of the soldering conditions as above.

**Reliability Test:**

| Test Item | Test Condition | Description | Reference Standard |
|-------------------------------------|--|---|--|
| Operating Life Test | 1.Under Room Temperature 2.If=20mA 3.t=1000 hrs (-24hrs, +72hrs) | This test is conducted for the purpose of determining the resistance of a part in electrical and thermal stressed. | MIL-STD-750: 1026 MIL-STD-883: 1005 JIS C 7021: B-1 |
| High Temperature Storage Test | 1.Ta=85 °C±5°C 2.t=1000 hrs (-24hrs, +72hrs) | The purpose of this is the resistance of the device which is laid under condition of high temperature for hours. | MIL-STD-883:1008 JIS C 7021: B-10 |
| Low Temperature Storage Test | 1.Ta=-40 °C±5°C 2.t=1000 hrs (-24hrs, +72hrs) | The purpose of this is the resistance of the device which is laid under condition of low temperature for hours. | JIS C 7021: B-12 |
| High Temperature High Humidity Test | 1.Ta=65 °C±5°C 2.RH=90%~95% 3.t=240hrs ±2hrs | The purpose of this test is the resistance of the device under tropical for hours. | MIL-STD-202:103B JIS C 7021: B-11 |
| Thermal Shock Test | 1.Ta=105 °C±5°C & -40°C±5°C (10min) (10min) 2.total 10 cycles | The purpose of this is the resistance of the device to sudden extreme changes in high and low temperature. | MIL-STD-202: 107D MIL-STD-750: 1051 MIL-STD-883: 1011 |
| Solder Resistance Test | 1.T.Sol=260 °C±5°C 2.Dwell time= 10 ±1sec. | This test intended to determine the thermal characteristic resistance of the device to sudden exposures at extreme changes in temperature when soldering the lead wire. | MIL-STD-202: 210A MIL-STD-750: 2031 JIS C 7021: A-1 |
| Solderability Test | 1.T.Sol=230 °C±5°C 2.Dwell time=5 ±1sec | This test intended to see soldering well performed or not. | MIL-STD-202: 208D MIL-STD-750: 2026 MIL-STD-883: 2003 JIS C 7021: A-2 |