

Surface Mount Chip LEDs

MSL-1947HB3

Description

The MSL-1947HB3, a BLUE source Chip LED device, is designed in an industry standard package suitable for SMT assembly method. It utilizes GaN on Sapphire LED chip technology and water clear epoxy package.

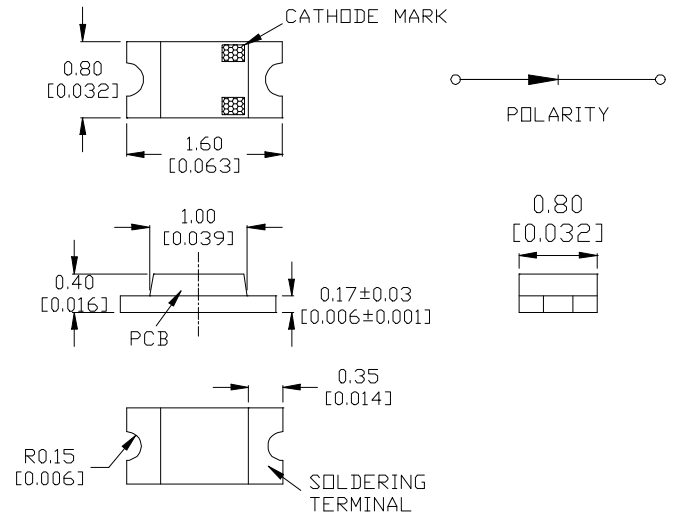
Applications

- Small Size (Extra Thin)
- Industry Standard Footprint(0603)
- Compatible with IR Solder process
- Available in 8 mm Tape on 7"(178mm) Diameter Reels

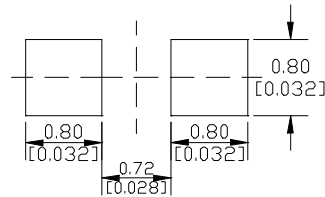
Features

- Push-Button Backlighting
- LCD Backlighting
- Symbol Backlighting
- Front Panel Indicator

Package Dimensions



Recommended Solder Patterns



- NOTE:
1. All dimensions are in millimeter (inches)
 2. Tolerance is $\pm 0.15\text{mm}$ (.006") unless otherwise specified.

Absolute Maximum Ratings

@ $T_A = 25^\circ\text{C}$

| Parameter | Symbol | Maximum Rating | Unit |
|---|-----------|-----------------|------|
| Peak Forward Current(1/10 Duty Cycle@1KHz) | I_{FP} | 100 | mA |
| DC Forward Current | I_F | 30 | mA |
| Power Dissipation | P_D | 125 | mW |
| Reverse Voltage | V_R | 5 | V |
| Electrostatic Discharge Threshold (HBM) ^{Note A} | E_{OT} | 300 | V |
| Operating Temperature Range | T_{OPR} | -25°C to +80°C | |
| Storage Temperature Range | T_{STG} | -30°C to +100°C | |

Note A : HBM(Human Body Model)

Optical-Electrical Characteristics

@ T_A=25°C

| Item | Conditions | Symbol | Min . | Typ . | Max . | Unit . |
|---------------------|----------------------|-----------------|-------|-------|-------|--------|
| Luminous Intensity | I _F =10mA | I _V | 23 | - | - | mcd |
| Forward Voltage | I _F =20mA | V _F | 3.0 | - | 3.5 | V |
| Dominant Wavelength | I _F =20mA | λ _d | 465 | 468 | 470 | nm |
| Threshold Voltage | I _F =10uA | V _{th} | 2.0 | - | 2.6 | V |
| Reverse Voltage | I _R =10uA | V _R | 10.0 | - | - | V |
| Reverse Current | V _R =5V | I _R | - | - | 50.0 | μA |
| Dominant Wavelength | I _F =20mA | λ _d | 465 | - | 475 | nm |

Typical Optical-Electrical Characteristic Curves

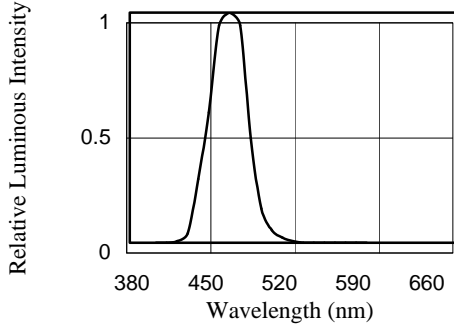


FIG.1 RELATIVE INTENSITY LUMINOUS VS. WAVELENGTH

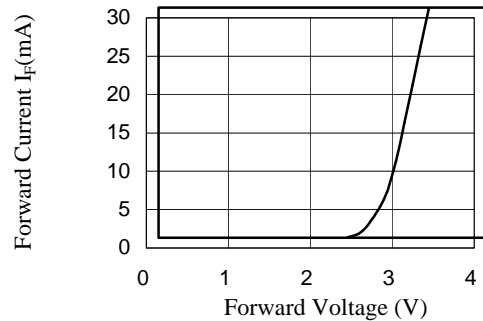


FIG.2 FORWARD CURRENT VS. FORWARD VOLTAGE

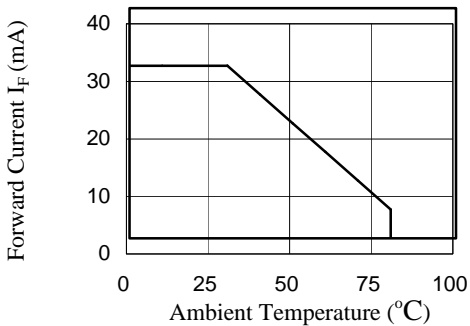


FIG.3 FORWARD CURRENT VS. AMBIENT TEMPERATURE

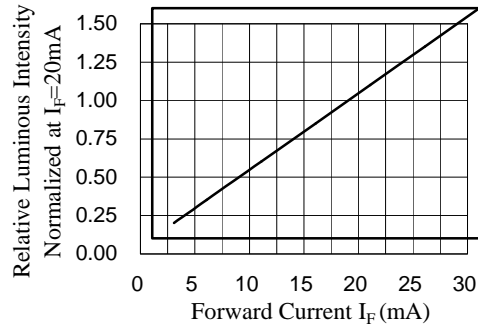


FIG.4 RELATIVE LUMINOUS INTENSITY VS. FORWARD CURRENT

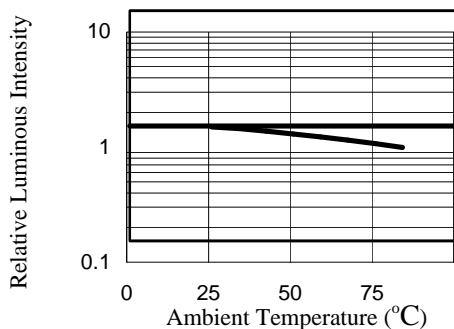


FIG.5 LUMINOUS INTENSITY VS. AMBIENT TEMPERATURE

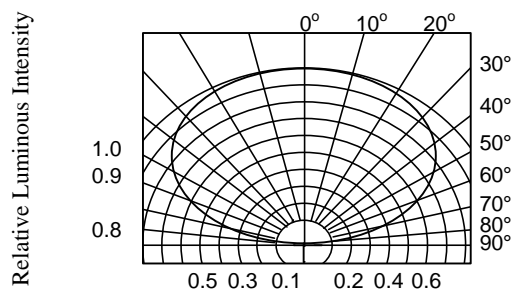


FIG.6 RADIATION DIAGRAM

Sorting For Luminous Intensity And Dominant Wavelength

| Rank Markings | Forward Voltage V_F (Volts) @ $I_F = 5mA$ | | Luminous Intensity I_v (mcd) $I_F=10mA$ | | Dominant Wavelength λ_d (nm) $I_F=20mA$ | | Remark |
|---------------|---|------|---|-------|---|-------|--------|
| | Min | Max | Min | Max | Min | Max | |
| A | 2.70 | 2.80 | 23.00 | 35.00 | 465.0 | 470.0 | |
| B | 2.80 | 2.90 | 25.00 | 35.00 | 465.0 | 470.0 | |

GaN LED HANDLING PRECAUTION

The blue LED is a device that is very sensitive to surge voltage produced when static electricity is discharged. Handling with sufficient care is needed to prevent damage to a chip or a drop in its reliability. Also, the same handling care is needed when applying voltage over the absolute maximum rating.

(Be aware of surge voltage produced when you turn the on-off switch)

How to prevent electrical charge and discharge during operation

If the person who is electrically charged touches the part, there is a possibility of electric discharge toward the semiconductor device which may destroy the part, if the part is electrically charged inductively by the surroundings, or the part is electrically charged by friction and touches metal, the part may discharge static and cause damage.

During your operations, please take these countermeasures written below.

1. Do not let material which is electrically charged get close to the part.
(Avoid contact with metal when the part is electrically charged)
2. Avoid any friction process with the part
3. Be sure to ground all manufacturing machines and measuring instruments if possible
4. Make an anti-static environment, such as placing electrically conductive mat (below $10^6\Omega$) or using anti-static equipment such as static blow
Let the worker wear the anti-static wrist strap, (Electrical resistance of 250K-1M Ω must be placed in series to avoid an electric shock.)

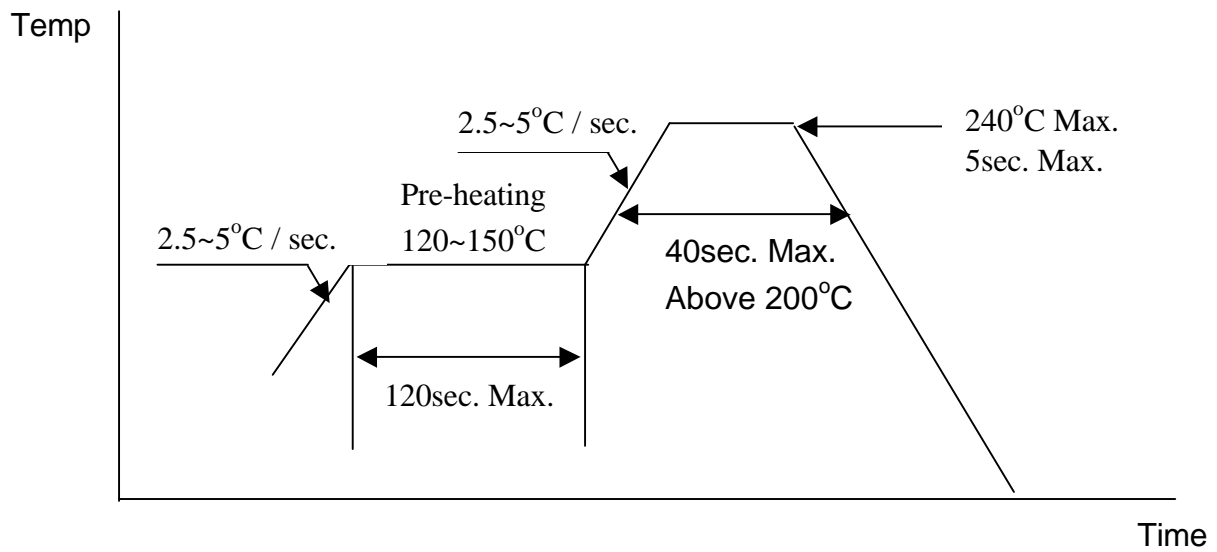
Working Environment

In case of semiconductor device, static occurs easily in dry condition. Especially the surface mount led should be kept in a dry environment to avoid moisture absorbency. But a relative humidity of 50% or more is recommended for the process after the soldering. Static level should be kept under 300V at your working area.

RECOMMENDED SOLDERING CONDITION

Reflow Soldering.

Temperature-Profile



Recommended Soldering Conditions

1.Reflow Soldering

- (1).The Fig. 1 temperature profile shall be at the surface of LED resin.
- (2).Number of reflow process shall be less than 2 times.
If second reflow process would be performed,intervals between first and second process shall be as short as possible to prevent absorption of moisture to resin of LED
Cooling process to normal temp,shall be required between first and second reflow process
- (3).Temp.fluctuation to LED at pre-heat process shall be minimized.(Less than 6°C)

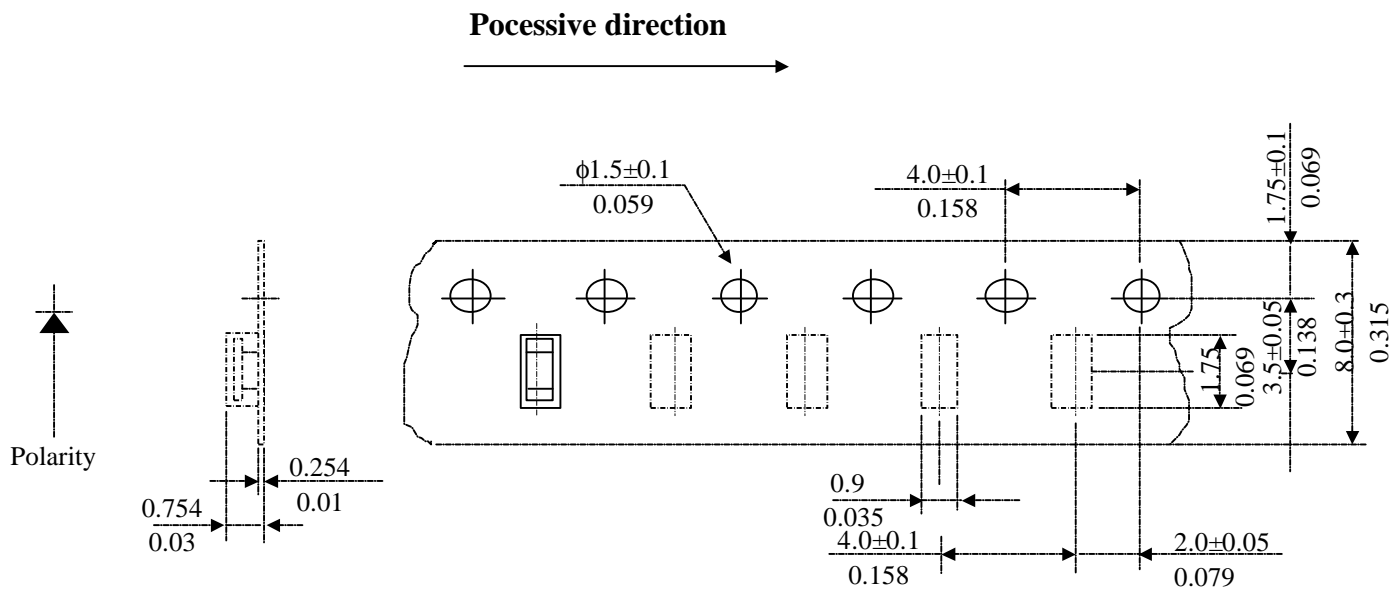
2.Dip Soldering

- (1).Preheat temp,for soldering:120-150°C ,60-120sec
- (2).Soldering temp:Temp of soldering pot 260 MAX.less than 5sec
- (3).Number of dip soldering process shall be less than 2 times and these process shall be performed in a row.
Cooling process to normal temp, shall be required between first and second soldering process.

3.Other Caution

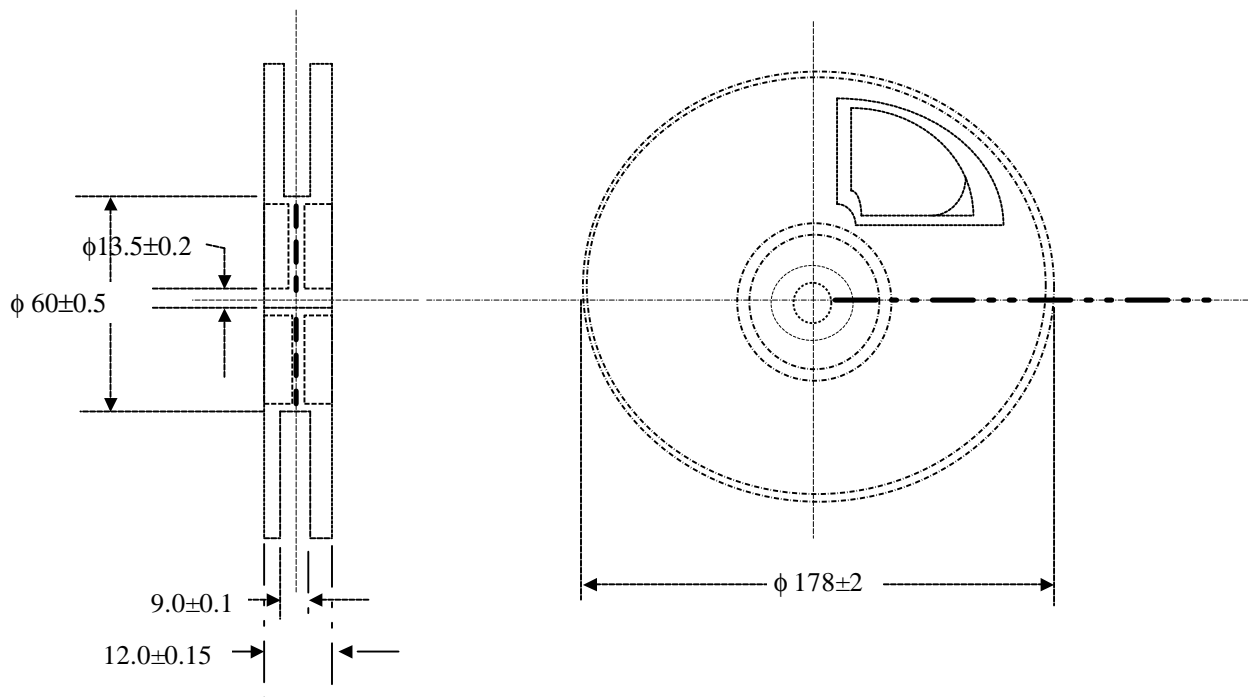
- (1).Manual soldering should be less than 280°C within 3 sec.
- (2).Heat or UV(or both)curing resin shall used for preliminary fixing.
Curing condition or temp,:150°C MAX.less than 120sec
- (3).Any mechanical force or any excess vibration shall not be accepted to apply during cooling process to normal temp,after soldering
- (4).If manual soldering would be performed to repair LED by tweezers, mechanical force to resin should not be given

Tape Dimensions



Units: mm / inch

REEL Dimensions

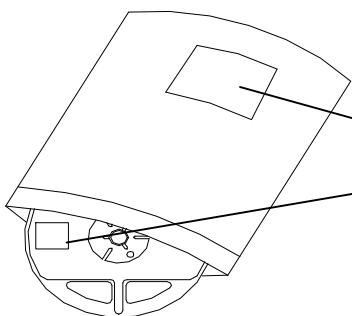


Units: mm / inch

Packaging

Product lable:

Loaded quantity per reel : 4000 pcs / reel



| |
|---------------|
| CUSTOMER: |
| CUSTOMER P/N: |
| DEVICE TYPE: |
| BIN: |
| LOT NO: |
| Q'TY: |
| DATE: |

STORAGE PERIOD: Damp-proofbag un-opened: 6 month max.

Temperature: 5 to 30°C; humidity:70%RH, max; 6 month max.

STORAGE PRECAUTIONS: After open the laminate bag the lamps should be storage in the follow condition:

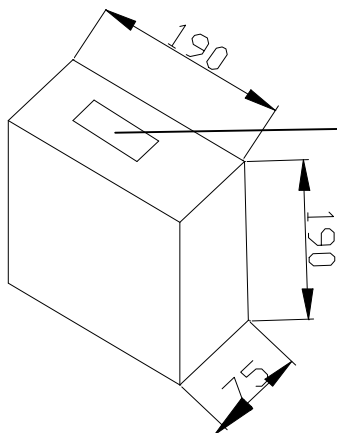
Temperature: 5 to 30°C; humidity:70%RH, max; storage time: 72hrs max

Baking condition: If backing is necessary, we recommended the backing condition is 60+/- 5°C 10hours

Packing Box

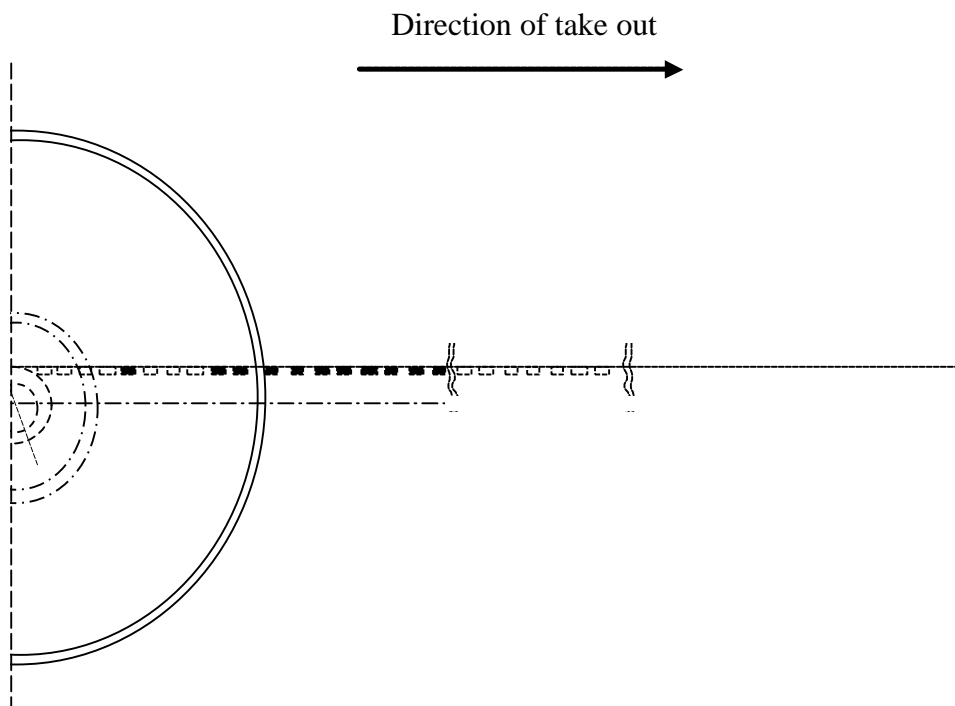
Product lable:

Loaded quantity per box : 20,000 pcs / box



| |
|---------------|
| CUSTOMER: |
| CUSTOMER P/N: |
| DEVICE TYPE: |
| BIN: |
| LOT NO: |
| Q'TY: |
| DATE: |

Reel Packing



| Items | | Specifications | Remarks |
|--------|---------------|---|--|
| Leader | Cover Tape | Cover tape shall be longer than 200 mm without carrier tape | The end of the tape shall be adhered to tape |
| | Carrier Tape | There will be more than 10 empties | The orientation of tape is as shown |
| Traier | | There will be more than 15 empties | The end of the tape is inserted into a slit of the hub |
| | Empty Pockets | There will be a maximum of 3 empty component pockets | The maximum connecting pockets in the middle of carrier-tape |