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SURFACE MOUNT TYPE AND REEL



Lead-Free Parts

**LHY9033/TR2**

# **DATA SHEET**

DOC. NO : QW0905-LHY9033/TR2

REV. : A

DATE : 23 - May. - 2007



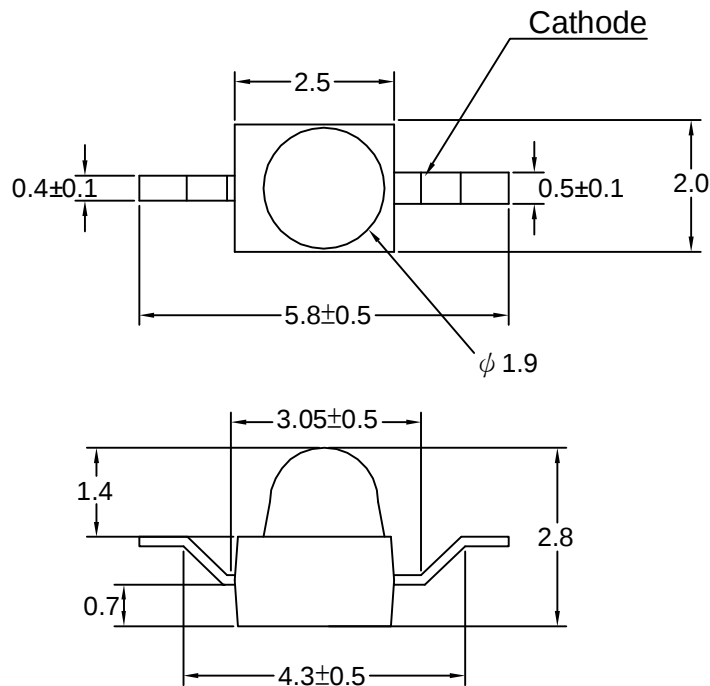
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PART NO. LHY9033/TR2

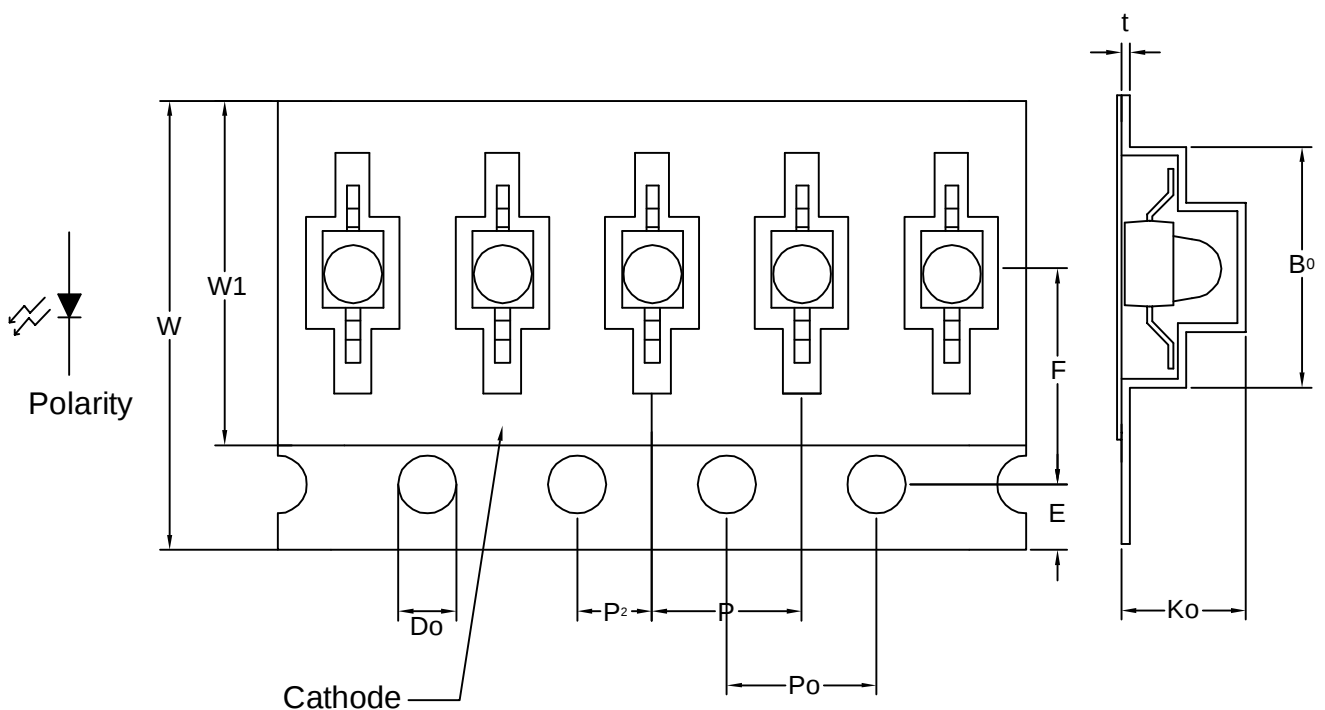
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## Package Dimensions



Note : 1.All dimension are in millimeter tolerance is  $\pm 0.2\text{mm}$  unless otherwise noted.  
2.Specifications are subject to change without notice.

## Carrier Type Dimensions



Note : The tolerances unless mentioned is  $\pm 0.2\text{mm}$ , Angle  $\pm 0.5$ . Unit=mm.



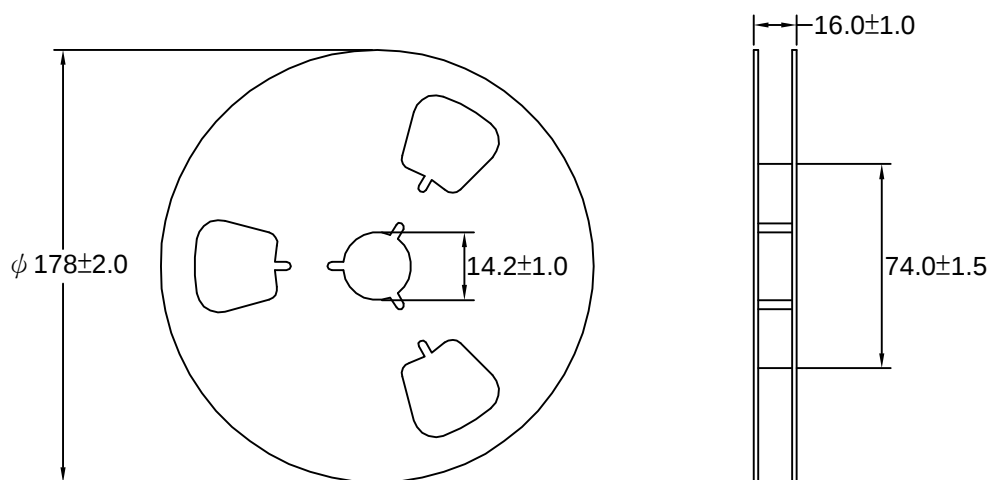
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## Reel Dimensions



| Part No.    | Description          | Quantity/Reel |
|-------------|----------------------|---------------|
| LHY9033/TR2 | 12.0mm tape, 7" reel | 1500 devices  |



## Absolute Maximum Ratings at Ta=25 °C

| Parameter                               | Symbol | Ratings    | UNIT    |
|-----------------------------------------|--------|------------|---------|
|                                         |        | HY         |         |
| Forward Current                         | IF     | 30         | mA      |
| Peak Forward Current<br>Duty 1/10@10KHz | IFP    | 60         | mA      |
| Power Dissipation                       | PD     | 75         | mW      |
| Reverse Current @5V                     | Ir     | 10         | $\mu A$ |
| Electrostatic Discharge                 | ESD    | 2000       | V       |
| Operating Temperature                   | Topr   | -40 ~ +85  | °C      |
| Storage Temperature                     | Tstg   | -40 ~ +100 | °C      |

## Typical Electrical &amp; Optical Characteristics (Ta=25 °C)

| PART NO     | MATERIAL | COLOR   |             | Dominant wave length<br>$\lambda_{Dnm}$ | Spectral halfwidth<br>$\Delta \lambda$ nm | Forward voltage<br>@20 mA(V) |      | Luminous intensity<br>@20mA(mcd) |      | Viewing angle<br>2 $\theta$ 1/2<br>(deg) |
|-------------|----------|---------|-------------|-----------------------------------------|-------------------------------------------|------------------------------|------|----------------------------------|------|------------------------------------------|
|             |          | Emitted | Lens        |                                         |                                           | Min.                         | Max. | Min.                             | Typ. |                                          |
| LHY9033/TR2 | AlGaInP  | Yellow  | Water Clear | 595                                     | 15                                        | 1.7                          | 2.6  | 160                              | 260  | 20                                       |

Note : 1.The forward voltage data did not including  $\pm 0.1V$  testing tolerance.

2. The luminous intensity data did not including  $\pm 15\%$  testing tolerance.



## Typical Electro-Optical Characteristics Curve HY CHIP

Fig.1 Forward current vs. Forward Voltage

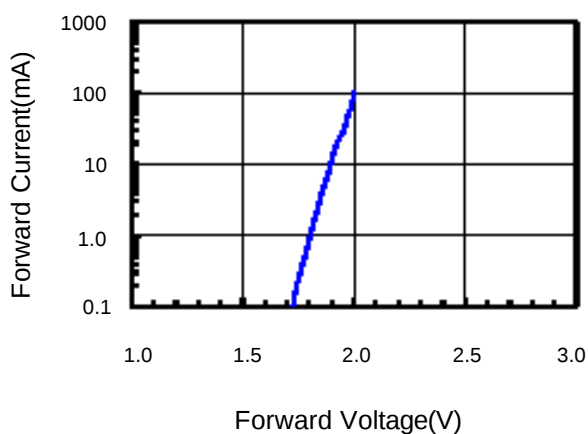


Fig.2 Relative Intensity vs. Forward Current

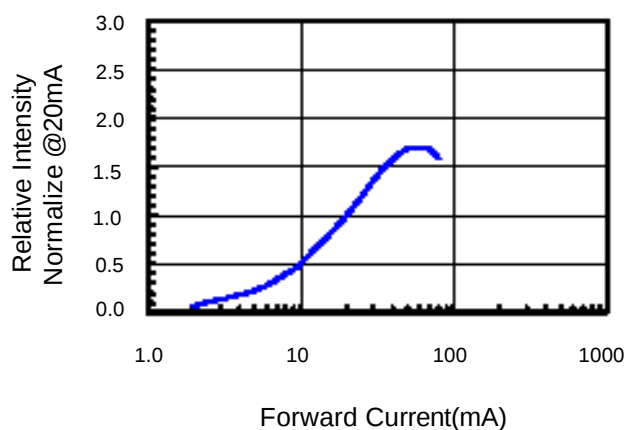


Fig.3 Forward Voltage vs. Temperature

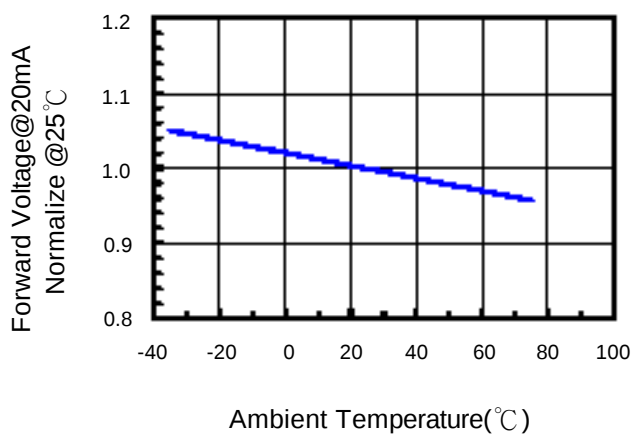


Fig.4 Relative Intensity vs. Temperature

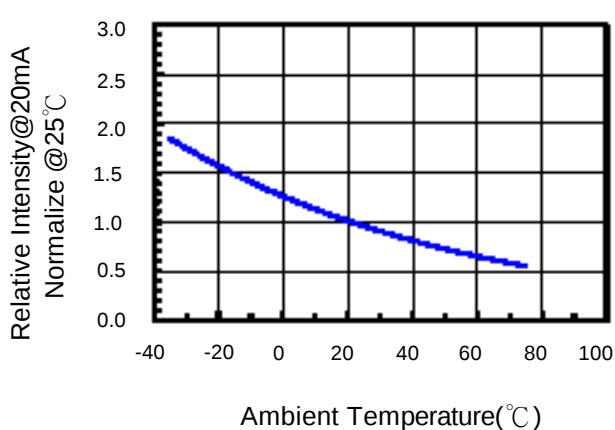
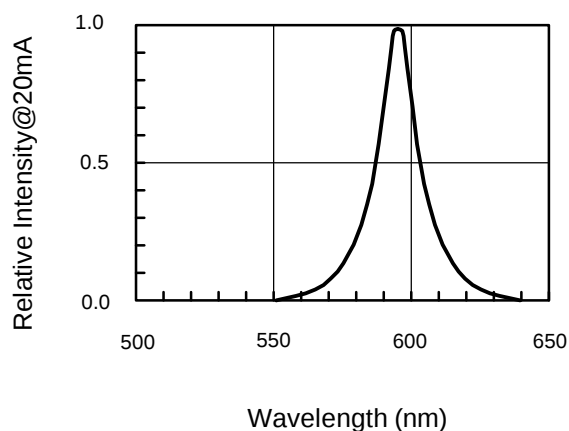
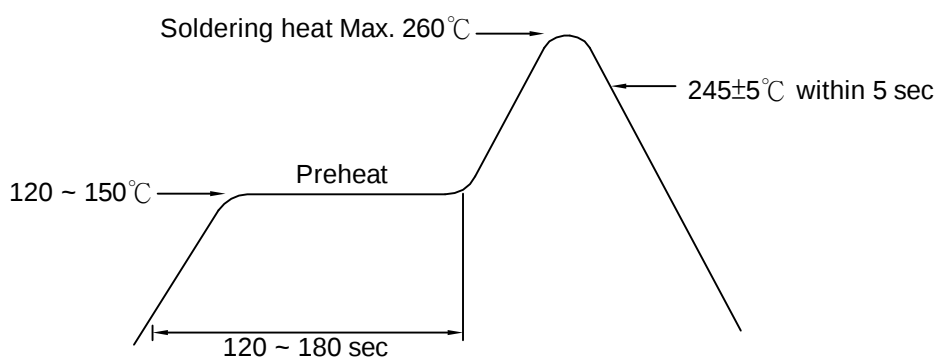
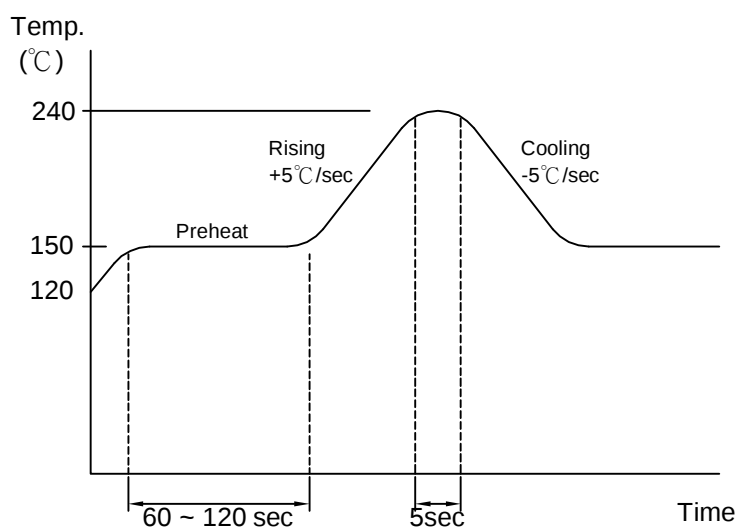
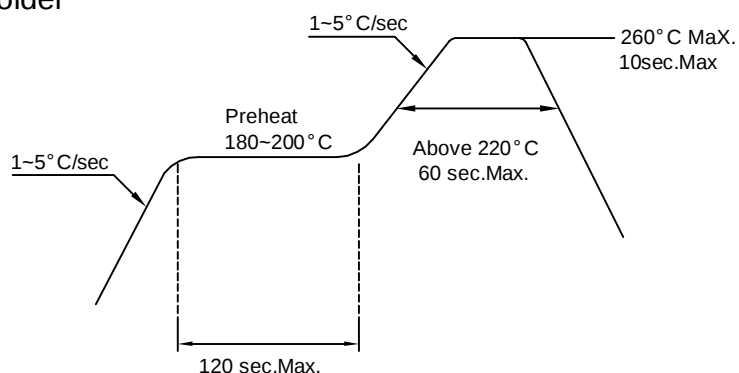


Fig.5 Relative Intensity vs. Wavelength



**Recommended Soldering Conditions****1. Hand Solder**

Basic spec is  $\leq 280^{\circ}\text{C}$  3 sec one time only.

**2. Wave Solder****3-1. LEAD Reflow Solder****3-2 PB-Free Reflow Solder**

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

**Precautions For Use:****Storage time:**

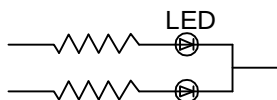
- 1.The operation of Temperatures and RH are :  $5^{\circ}\text{C} \sim 35^{\circ}\text{C}$  ,RH<60%.
- 2.Once the package is opened, the products should be used within a week.  
Otherwise, they should be kept in a damp proof box with descanting agent.  
Considering the tape life, we suggest our customers 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  $60^{\circ}\text{C} \pm 5^{\circ}\text{C}$  for 15hrs.

**Drive Method:**

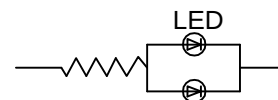
LED is a current operated device, and therefore, requires some kind of current limiting incorporated into the driver circuit. This current limiting typically takes the form of a current limiting resistor placed in series with the LED.

Consider worst case voltage variations that could occur across the current limiting resistor. The forward 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-electrostatic glove is recommended when handling these LED. All devices, equipment and machinery must be properly grounded.



Reliability Test:

| Classification     | Test Item                                   | Test Condition                                                                                                                                                                                                                                                                                | Reference Standard                                                                                    |
|--------------------|---------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|
| Endurance Test     | Operating Life Test                         | 1.Ta=Under Room Temperature As Per Data Sheet Maximum Rating.<br>2.If=20mA<br>3.t=1000 hrs (-24hrs, +72hrs)                                                                                                                                                                                   | MIL-STD-750D: 1026<br>MIL-STD-883D: 1005<br>JIS C 7021: B-1                                           |
|                    | High Temperature Storage Test               | 1.Ta=105 °C ±5 °C<br>2.t=1000 hrs (-24hrs, +72hrs)                                                                                                                                                                                                                                            | MIL-STD-883D:1008<br>JIS C 7021: B-10                                                                 |
|                    | Low Temperature Storage Test                | 1.Ta=-40 °C ±5 °C<br>2.t=1000 hrs (-24hrs, +72hrs)                                                                                                                                                                                                                                            | JIS C 7021: B-12                                                                                      |
|                    | High Temperature High Humidity Storage Test | 1.IR-Reflow In-Board, 2 Times<br>2.Ta=65 °C ±5 °C<br>3.RH=90 %~95 %<br>4.t=1000hrs ±2hrs                                                                                                                                                                                                      | MIL-STD-202F:103B<br>JIS C 7021: B-11                                                                 |
| Environmental Test | Thermal Shock Test                          | 1.IR-Reflow In-Board,2 times<br>2.Ta=105 °C ±5 °C & -40 °C ±5 °C (10min) (10min)<br>3.total 10 cycles                                                                                                                                                                                         | MIL-STD-202F: 107D<br>MIL-STD-750D: 1051<br>MIL-STD-883D: 1011                                        |
|                    | Solderability Test                          | 1.T.Sol=235 °C ±5 °C<br>2.Immersion time 2 ±0.5sec<br>3.Immersion rate 25 ±2.5mm/sec<br>4.Immersion rate 25 ±2.5mm/sec<br>5.Coverage ≥ 95% of the dipped surface                                                                                                                              | MIL-STD-202F: 208D<br>MIL-STD-750D: 2026<br>MIL-STD-883D: 2003<br>IEC 68 Part 2-20<br>JIS C 7021: A-2 |
|                    | Temperature Cycling                         | 1.105 °C ~ 25 °C ~ 55 °C ~ 25 °C<br>30mins 5mins 30mins 5mins<br>2.10 Cycles                                                                                                                                                                                                                  | MIL-STD-202F: 107D<br>MIL-STD-750D: 1051<br>MIL-STD-883D: 1010<br>JIS C 7021: A-4                     |
|                    | Solderability Test                          | Ramp-up rate(183 °C to Peak) +3 °C second max<br>Temp. maintain at 125( ±25) °C 120 seconds max<br>Temp. maintain above 183 °C 60-150 seconds<br>Peak temperature range 235 °C +5-0 °C<br>Time within 5 °C of actual Peak Temperature(tp)<br>10-30 seconds<br>Ramp-down rate +6 °C/second max | MIL-STD-750D:2031.2<br>J-STD-020                                                                      |