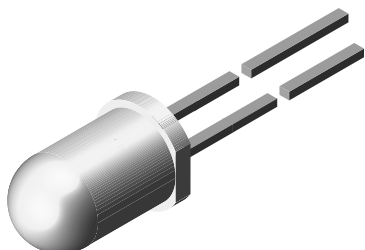


## High Speed Infrared Emitting Diode, 850 nm, GaAlAs Double Hetero



94 8389

### DESCRIPTION

TSHG6400 is an infrared, 850 nm emitting diode in GaAlAs double hetero (DH) technology with high radiant power and high speed, molded in a clear, untinted plastic package.

### FEATURES

- Package type: leaded
- Package form: T-1 $\frac{3}{4}$
- Dimensions (in mm):  $\varnothing$  5
- Peak wavelength:  $\lambda_p = 850$  nm
- High reliability
- High radiant power
- High radiant intensity
- Angle of half intensity:  $\phi = \pm 22^\circ$
- Low forward voltage
- Suitable for high pulse current operation
- High modulation bandwidth:  $f_c = 18$  MHz
- Good spectral matching with CMOS cameras
- Compliant to RoHS Directive 2002/95/EC and in accordance to WEEE 2002/96/EC



**RoHS**  
COMPLIANT  
**GREEN**  
(5-2008)\*\*

### Note

\*\* Please see document "Vishay Material Category Policy":  
[www.vishay.com/doc?99902](http://www.vishay.com/doc?99902)

### APPLICATIONS

- Infrared radiation source for operation with CMOS cameras (illumination).
- High speed IR data transmission.

### PRODUCT SUMMARY

| COMPONENT | $I_e$ (mW/sr) | $\phi$ (deg) | $\lambda_p$ (nm) | $t_r$ (ns) |
|-----------|---------------|--------------|------------------|------------|
| TSHG6400  | 70            | $\pm 22$     | 850              | 20         |

### Note

- Test conditions see table "Basic Characteristics"

### ORDERING INFORMATION

| ORDERING CODE | PACKAGING | REMARKS                      | PACKAGE FORM      |
|---------------|-----------|------------------------------|-------------------|
| TSHG6400      | Bulk      | MOQ: 4000 pcs, 4000 pcs/bulk | T-1 $\frac{3}{4}$ |

### Note

- MOQ: minimum order quantity

### ABSOLUTE MAXIMUM RATINGS ( $T_{amb} = 25^\circ\text{C}$ , unless otherwise specified)

| PARAMETER                           | TEST CONDITION                          | SYMBOL     | VALUE         | UNIT             |
|-------------------------------------|-----------------------------------------|------------|---------------|------------------|
| Reverse voltage                     |                                         | $V_R$      | 5             | V                |
| Forward current                     |                                         | $I_F$      | 100           | mA               |
| Peak forward current                | $t_p/T = 0.5$ , $t_p = 100 \mu\text{s}$ | $I_{FM}$   | 200           | mA               |
| Surge forward current               | $t_p = 100 \mu\text{s}$                 | $I_{FSM}$  | 1             | A                |
| Power dissipation                   |                                         | $P_V$      | 180           | mW               |
| Junction temperature                |                                         | $T_j$      | 100           | $^\circ\text{C}$ |
| Operating temperature range         |                                         | $T_{amb}$  | - 40 to + 85  | $^\circ\text{C}$ |
| Storage temperature range           |                                         | $T_{stg}$  | - 40 to + 100 | $^\circ\text{C}$ |
| Soldering temperature               | $t \leq 5$ s, 2 mm from case            | $T_{sd}$   | 260           | $^\circ\text{C}$ |
| Thermal resistance junction/ambient | J-STD-051, leads 7 mm soldered on PCB   | $R_{thJA}$ | 230           | K/W              |

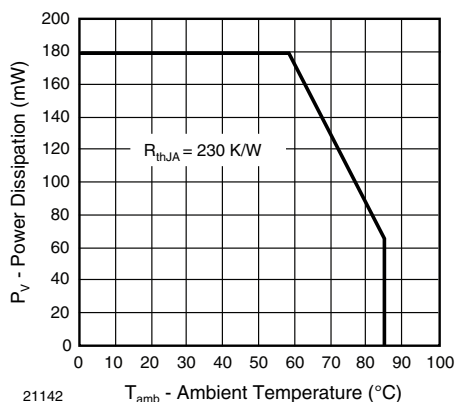


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

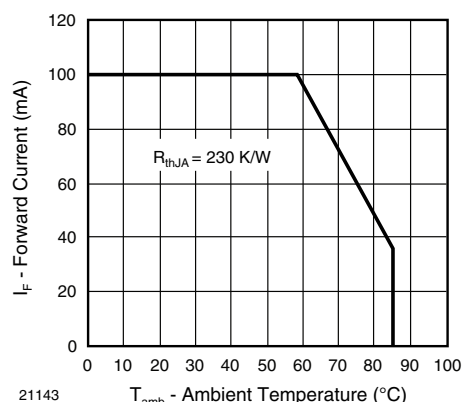


Fig. 2 - Forward Current Limit vs. Ambient Temperature

| <b>BASIC CHARACTERISTICS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified) |                                                      |                  |      |          |      |               |
|-----------------------------------------------------------------------------------------------------|------------------------------------------------------|------------------|------|----------|------|---------------|
| PARAMETER                                                                                           | TEST CONDITION                                       | SYMBOL           | MIN. | TYP.     | MAX. | UNIT          |
| Forward voltage                                                                                     | $I_F = 100\text{ mA}$ , $t_p = 20\text{ ms}$         | $V_F$            |      | 1.5      | 1.8  | V             |
|                                                                                                     | $I_F = 1\text{ A}$ , $t_p = 100\text{ }\mu\text{s}$  | $V_F$            |      | 2.3      |      | V             |
| Temperature coefficient of $V_F$                                                                    | $I_F = 1\text{ mA}$                                  | $TK_{VF}$        |      | - 1.8    |      | mV/K          |
| Reverse current                                                                                     | $V_R = 5\text{ V}$                                   | $I_R$            |      |          | 10   | $\mu\text{A}$ |
| Junction capacitance                                                                                | $V_R = 0\text{ V}$ , $f = 1\text{ MHz}$ , $E = 0$    | $C_j$            |      | 125      |      | pF            |
| Radiant intensity                                                                                   | $I_F = 100\text{ mA}$ , $t_p = 20\text{ ms}$         | $I_e$            | 45   | 70       | 135  | mW/sr         |
|                                                                                                     | $I_F = 1\text{ A}$ , $t_p = 100\text{ }\mu\text{s}$  | $I_e$            |      | 700      |      | mW/sr         |
| Radiant power                                                                                       | $I_F = 100\text{ mA}$ , $t_p = 20\text{ ms}$         | $\phi_e$         |      | 50       |      | mW            |
| Temperature coefficient of $\phi_e$                                                                 | $I_F = 100\text{ mA}$                                | $TK_{\phi_e}$    |      | - 0.35   |      | %/K           |
| Angle of half intensity                                                                             |                                                      | $\phi$           |      | $\pm 22$ |      | deg           |
| Peak wavelength                                                                                     | $I_F = 100\text{ mA}$                                | $\lambda_p$      |      | 850      |      | nm            |
| Spectral bandwidth                                                                                  | $I_F = 100\text{ mA}$                                | $\Delta\lambda$  |      | 40       |      | nm            |
| Temperature coefficient of $\lambda_p$                                                              | $I_F = 100\text{ mA}$                                | $TK_{\lambda_p}$ |      | 0.25     |      | nm/K          |
| Rise time                                                                                           | $I_F = 100\text{ mA}$                                | $t_r$            |      | 20       |      | ns            |
| Fall time                                                                                           | $I_F = 100\text{ mA}$                                | $t_f$            |      | 13       |      | ns            |
| Cut-off frequency                                                                                   | $I_{DC} = 70\text{ mA}$ , $I_{AC} = 30\text{ mA pp}$ | $f_c$            |      | 18       |      | MHz           |
| Virtual source diameter                                                                             |                                                      | $d$              |      | 3.7      |      | mm            |

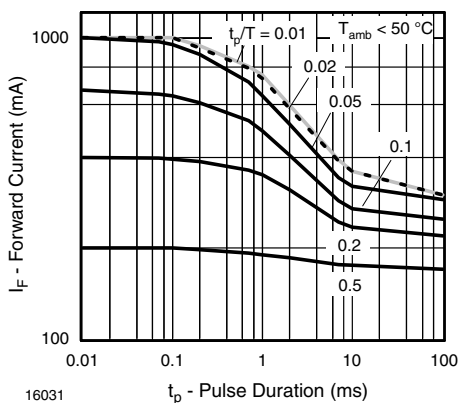
**BASIC CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)


Fig. 3 - Pulse Forward Current vs. Pulse Duration

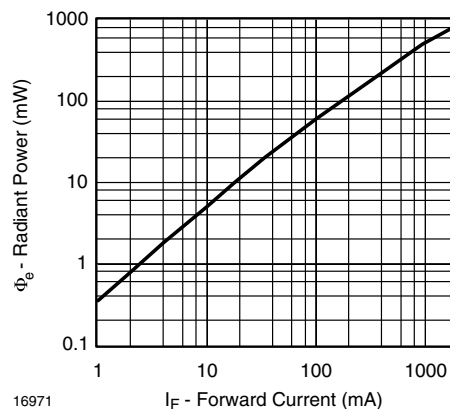


Fig. 6 - Radiant Power vs. Forward Current

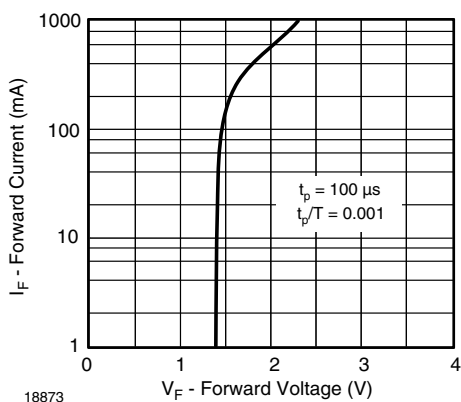


Fig. 4 - Forward Current vs. Forward Voltage

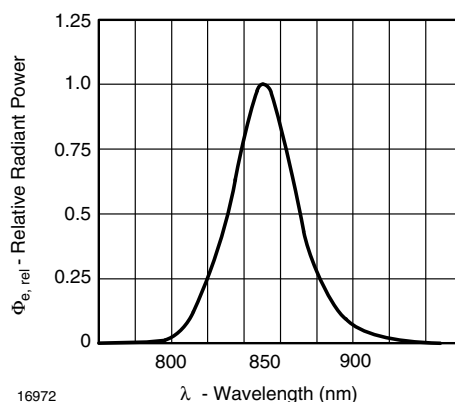


Fig. 7 - Relative Radiant Power vs. Wavelength

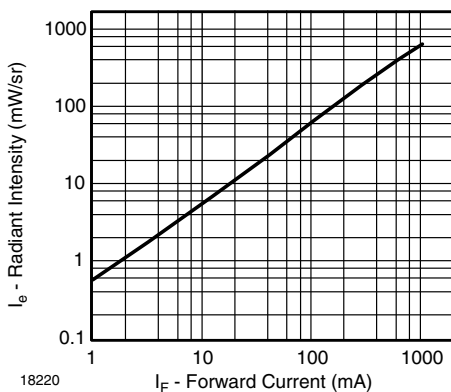


Fig. 5 - Radiant Intensity vs. Forward Current

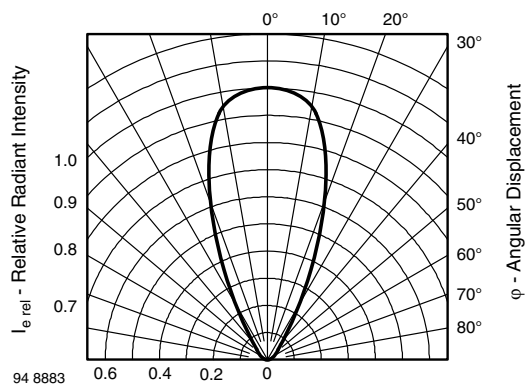
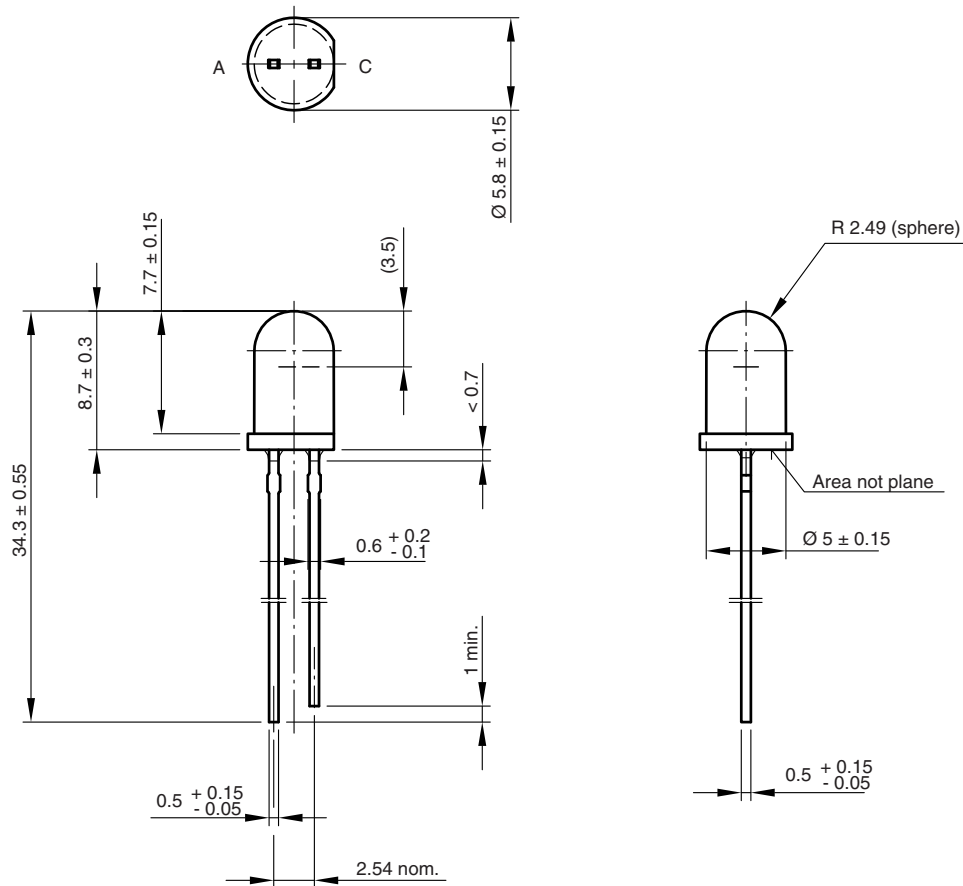


Fig. 8 - Relative Radiant Intensity vs. Angular Displacement

**PACKAGE DIMENSIONS** in millimeters


Drawing-No.: 6.544-5259.06-4

Issue: 6; 19.05.09

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