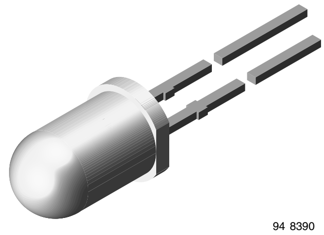
# High Speed IR Emitting Diode in T-1¾ Package

## Description

TSHG6400 is a high speed infrared emitting diode in GaAlAs double hetero (DH) technology, molded in a clear, untinted plastic package.

TSHG6000 series combines high speed with high radiant power at wavelength of 850 nm.



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## Features

- High modulation bandwidth
- Extra high radiant power and radiant intensity
- Low forward voltage
- Suitable for high pulse current operation
- Standard package T-1¾ (∅ 5 mm)
- Angle of half intensity $\varphi = \pm 22°$
- Peak wavelength $\lambda_p = 850$ nm
- High reliability
- Good spectral matching to Si photodetectors
- Lead (Pb)-free component
- Component in accordance to ELV 2000/53/EC, RoHS 2002/95/EC and WEEE 2002/96/EC

Pb Pb-free

e2

## Applications

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

## Parts Table

| Part | Remarks |
|---|---|
| TSHG6400 | MOQ: 4000 pc |

## Absolute Maximum Ratings

$T_{amb}$ = 25 °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 | $t_p/T = 0.5$, $t_p = 100$ µs | $I_{FM}$ | 200 | mA |
| Surge forward current | $t_p = 100$ µs | $I_{FSM}$ | 1 | A |
| Power dissipation | | $P_V$ | 250 | mW |
| Junction temperature | | $T_j$ | 100 | °C |
| Operating temperature range | | $T_{amb}$ | - 40 to + 85 | °C |
| Storage temperature range | | $T_{stg}$ | - 40 to + 100 | °C |
| Soldering temperature | $t \le 5$ sec, 2 mm from case | $T_{sd}$ | 260 | °C |
| Thermal resistance junction/ ambient | | $R_{thJA}$ | 300 | K/W |

## Basic Characteristics

$T_{amb}$ = 25 °C, unless otherwise specified

| Parameter | Test condition | Symbol | Min | Typ. | Max | Unit |
|---|---|---|---|---|---|---|
| Forward voltage | $I_F$ = 100 mA, $t_p$ = 20 ms | $V_F$ | | 1.5 | 1.8 | V |
| | $I_F$ = 1 A, $t_p$ = 100 µs | $V_F$ | | 2.3 | | V |
| Temp. coefficient of $V_F$ | $I_F$ = 100 mA | $TK_{VF}$ | | - 2.1 | | mV/K |
| Reverse current | $V_R$ = 5 V | $I_R$ | | | 10 | µA |
| Junction capacitance | $V_R$ = 0 V, f = 1 MHz, E = 0 | $C_j$ | | 125 | | pF |
| Radiant intensity | $I_F$ = 100 mA, $t_p$ = 20 ms | $I_e$ | 40 | 70 | 200 | mW/sr |
| | $I_F$ = 1 A, $t_p$ = 100 µs | $I_e$ | | 700 | | mW/sr |
| Radiant power | $I_F$ = 100 mA, $t_p$ = 20 ms | $\phi_e$ | | 50 | | mW |
| Temp. coefficient of $\phi_e$ | $I_F$ = 100 mA | $TK\phi_e$ | | - 0.35 | | %/K |
| Angle of half intensity | | $\varphi$ | | ± 22 | | deg |
| Peak wavelength | $I_F$ = 100 mA | $\lambda_p$ | | 850 | | nm |
| Spectral bandwidth | $I_F$ = 100 mA | $\Delta\lambda$ | | 40 | | nm |
| Temp. coefficient of $\lambda_p$ | $I_F$ = 100 mA | $TK\lambda_p$ | | 0.25 | | nm/K |
| Rise time | $I_F$ = 100 mA | $t_r$ | | 20 | | ns |
| Fall time | $I_F$ = 100 mA | $t_f$ | | 13 | | ns |
| Cut-off frequency | $I_{DC}$ = 70 mA, $I_{AC}$ = 30 mA pp | $f_c$ | | 20 | | MHz |
| Virtual source diameter | | ∅ | | 3.7 | | mm |

## Typical Characteristics

Tamb = 25 °C, unless otherwise specified

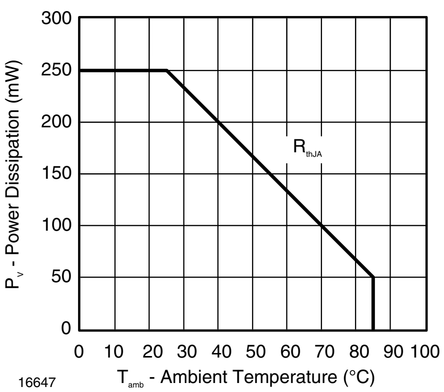



Figure 1. Power Dissipation vs. Ambient Temperature

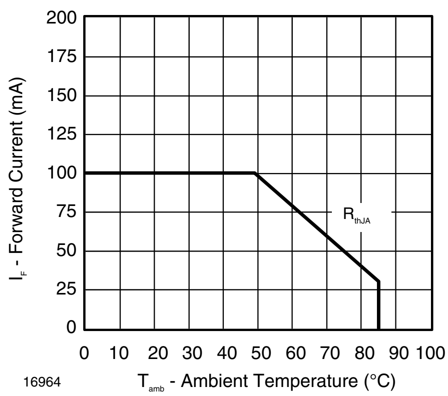



Figure 2. Forward Current vs. Ambient Temperature

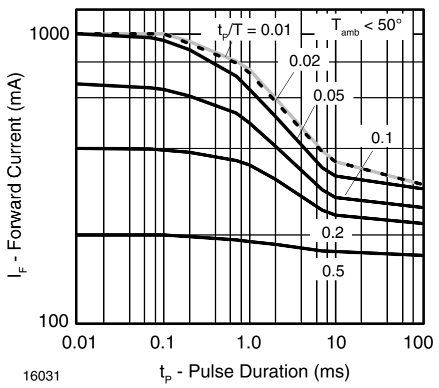



Figure 3. Pulse Forward Current vs. Pulse Duration

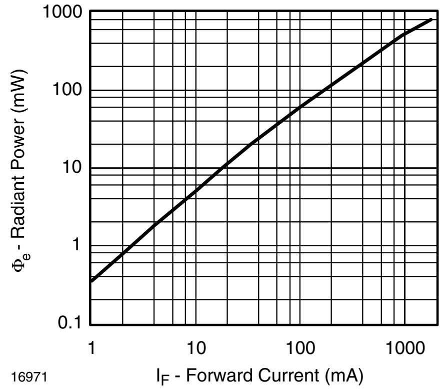



Figure 6. Radiant Power vs. Forward Current

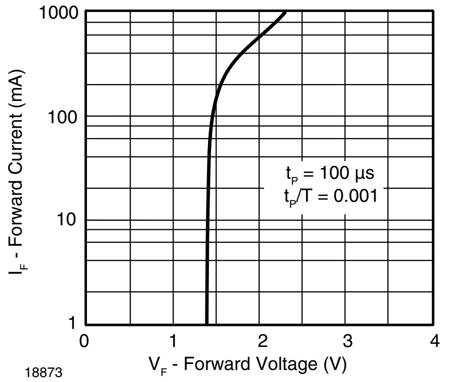



Figure 4. Forward Current vs. Forward Voltage

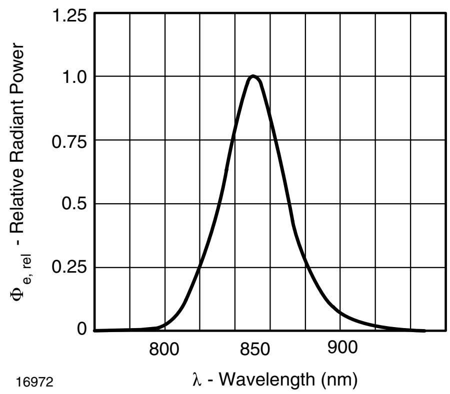



Figure 7. Relative Radiant Power vs. Wavelength

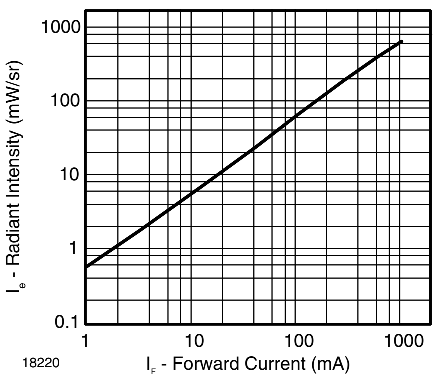



Figure 5. Radiant Intensity vs. Forward Current

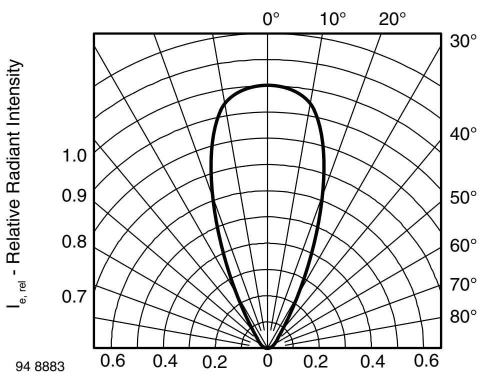
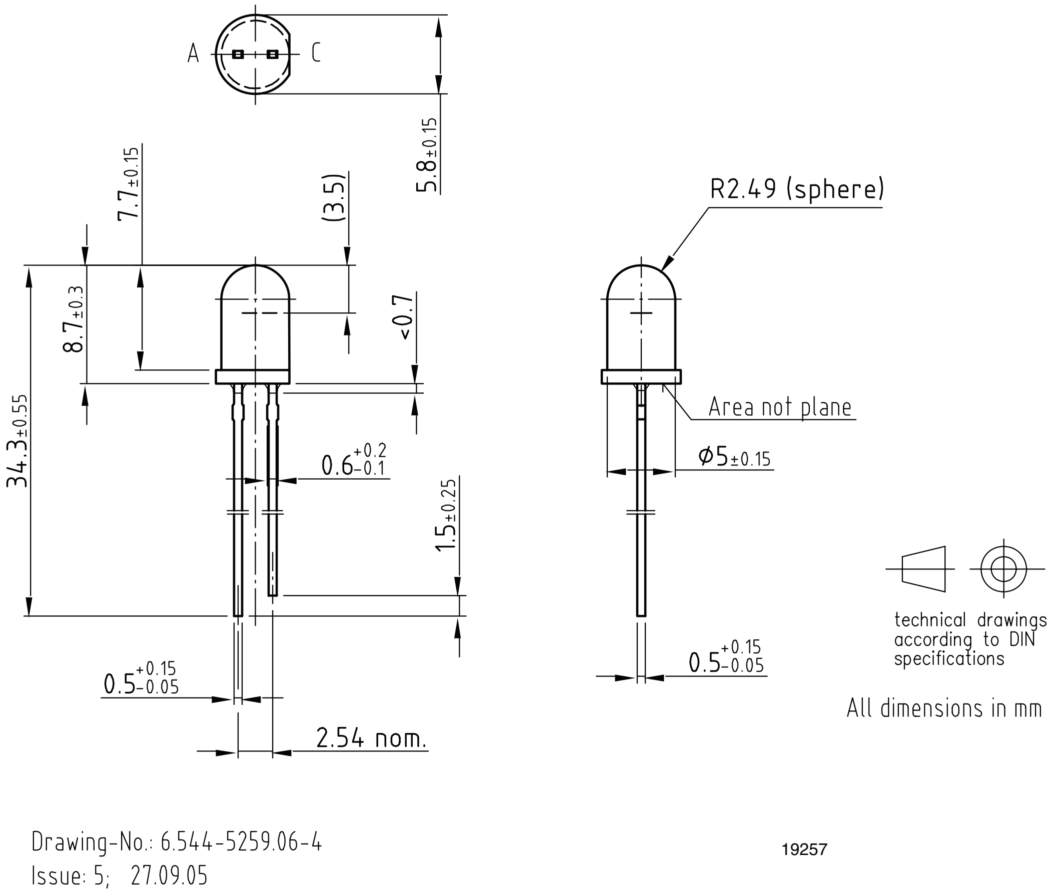



Figure 8. Relative Radiant Intensity vs. Angular Displacement

## Package Dimensions in mm



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1. Meet all present and future national and international statutory requirements.
2. Regularly and continuously improve the performance of our products, processes, distribution and operating systems with respect to their impact on the health and safety of our employees and the public, as well as their impact on the environment.

It is particular concern to control or eliminate releases of those substances into the atmosphere which are known as ozone depleting substances (ODSs).

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Vishay Semiconductor GmbH has been able to use its policy of continuous improvements to eliminate the use of ODSs listed in the following documents.

1. Annex A, B and list of transitional substances of the Montreal Protocol and the London Amendments respectively
2. Class I and II ozone depleting substances in the Clean Air Act Amendments of 1990 by the Environmental Protection Agency (EPA) in the USA
3. Council Decision 88/540/EEC and 91/690/EEC Annex A, B and C (transitional substances) respectively.

Vishay Semiconductor GmbH can certify that our semiconductors are not manufactured with ozone depleting substances and do not contain such substances.



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