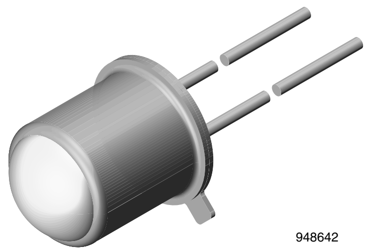
# Infrared Emitting Diode, 870 nm, GaAlAs

## Description

TSTA7300 is a high efficiency infrared emitting diode in GaAlAs on GaAlAs technology in a hermetically sealed TO-18 package. Its glass lens provides a high radiant intensity without external optics.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## Features

- High radiant power and radiant intensity
- Suitable for pulse operation
- Angle of half intensity $\varphi = \pm 12°$
- Peak wavelength $\lambda_p$ = 875 nm
- High reliability
- Good spectral matching to Si photodetectors
- Lead (Pb)-free component
- Component in accordance to RoHS 2002/95/EC and WEEE 2002/96/EC

Pb
Pb-free

e4

## Applications

- Radiation source in near infrared range

## 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 | $t_p/T = 0.5$, $t_p \le 100$ µs | $I_{FM}$ | 200 | mA |
| Surge forward current | $t_p \le 100$ µs | $I_{FSM}$ | 2.5 | A |
| Power dissipation | | $P_V$ | 180 | mW |
| | $T_{case} \le 25$ °C | $P_V$ | 500 | mW |
| Junction temperature | | $T_j$ | 100 | °C |
| Storage temperature range | | $T_{stg}$ | - 55 to + 100 | °C |
| Thermal resistance junction/ ambient | | $R_{thJA}$ | 450 | K/W |
| Thermal resistance junction/ case | | $R_{thJC}$ | 150 | K/W |

## Electrical Characteristics

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

| Parameter | Test condition | Symbol | Min | Typ. | Max | Unit |
|---|---|---|---|---|---|---|
| Forward voltage | $I_F$ = 100 mA, $t_p \le 20$ ms | $V_F$ | | 1.4 | 1.8 | V |
| Breakdown voltage | $I_R$ = 100 µA | $V_{(BR)}$ | 5 | | | V |
| Junction capacitance | $V_R$ = 0 V, f = 1 MHz, E = 0 | $C_j$ | | 20 | | pF |

## Optical Characteristics

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

| Parameter | Test condition | Symbol | Min | Typ. | Max | Unit |
|---|---|---|---|---|---|---|
| Radiant intensity | $I_F$ = 100 mA, $t_p \leq$ 20 ms | $I_e$ | 10 | 20 | 50 | mW/sr |
| Radiant power | $I_F$ = 100 mA, $t_p \leq$ 20 ms | $\phi_e$ | | 10 | | mW |
| Temp. coefficient of $\phi_e$ | $I_F$ = 100 mA | $TK\phi_e$ | | - 0.7 | | %/K |
| Angle of half intensity | | $\varphi$ | | ± 12 | | deg |
| Peak wavelength | $I_F$ = 100 mA | $\lambda_p$ | | 875 | | nm |
| Spectral bandwidth | $I_F$ = 100 mA | $\Delta\lambda$ | | 80 | | nm |
| Rise time | $I_F$ = 1.5 A, $t_p/T$ = 0.01, $t_p \leq$ 10 µs | $t_r$ | | 300 | | ns |
| Fall time | $I_F$ = 1.5 A, $t_p/T$ = 0.01, $t_p \leq$ 10 µs | $t_f$ | | 300 | | ns |
| Virtual source diameter | | ∅ | | 1 | | mm |

## Typical Characteristics

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

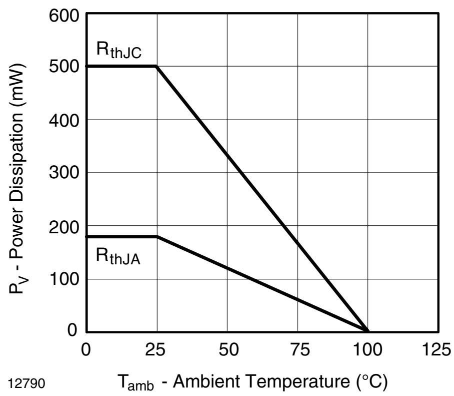



Figure 1. Power Dissipation vs. Ambient Temperature

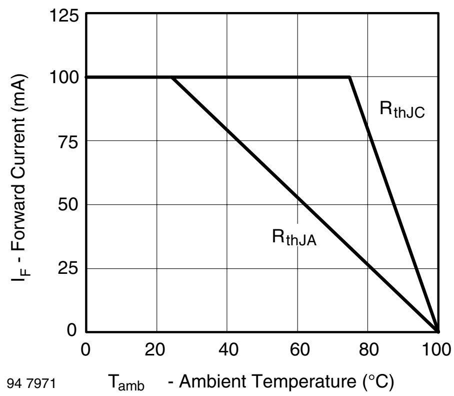



Figure 2. Forward Current vs. Ambient Temperature

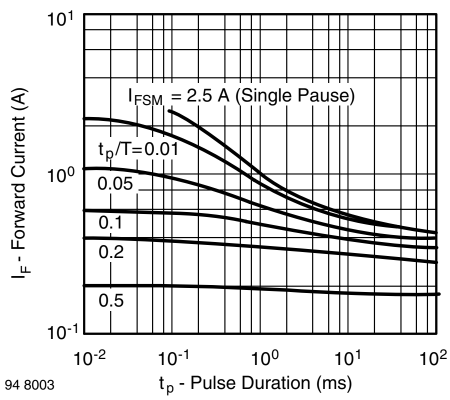



Figure 3. Pulse Forward Current vs. Pulse Duration

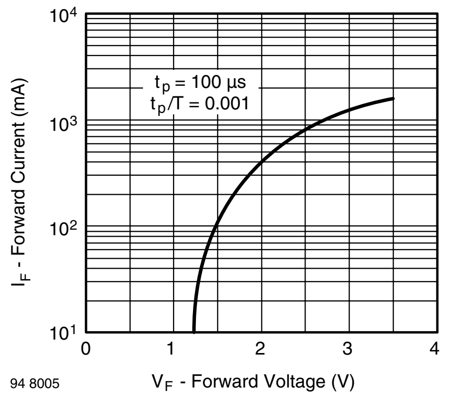



Figure 4. Forward Current vs. Forward Voltage

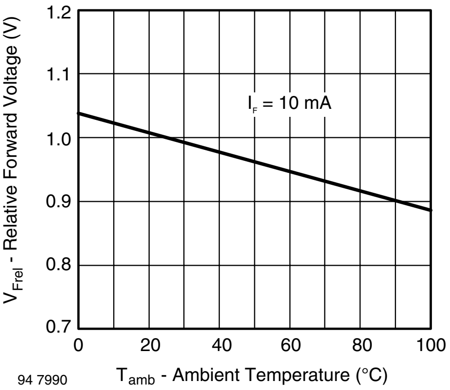



Figure 5. Relative Forward Voltage vs. Ambient Temperature

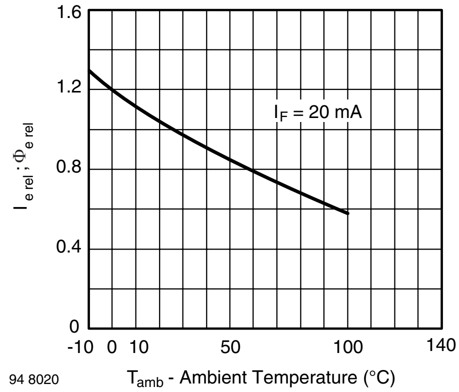



Figure 8. Rel. Radiant Intensity/Power vs. Ambient Temperature

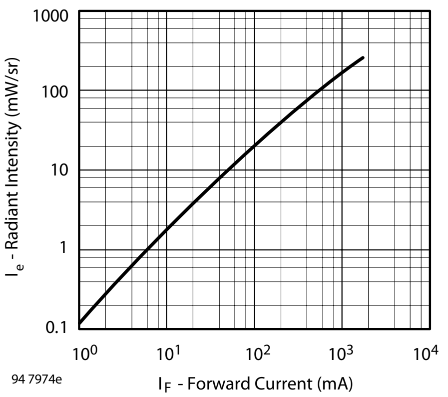



Figure 6. Radiant Intensity vs. Forward Current

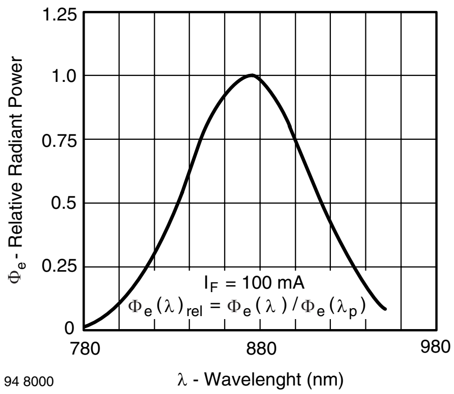



Figure 9. Relative Radiant Power vs. Wavelength

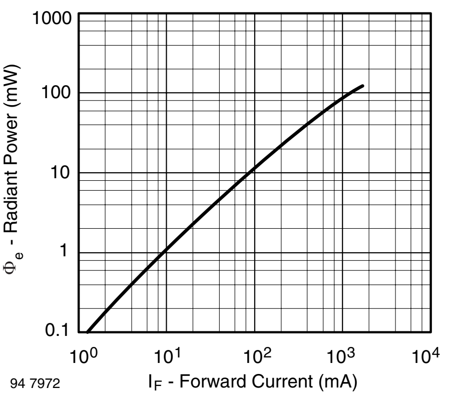



Figure 7. Radiant Power vs. Forward Current

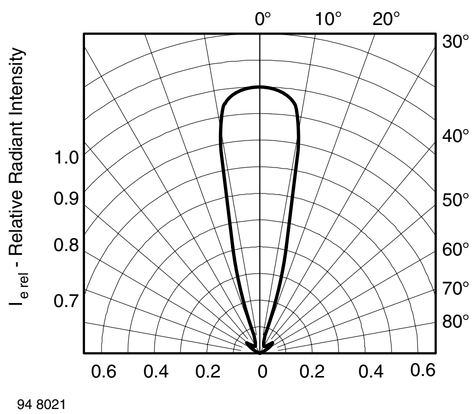
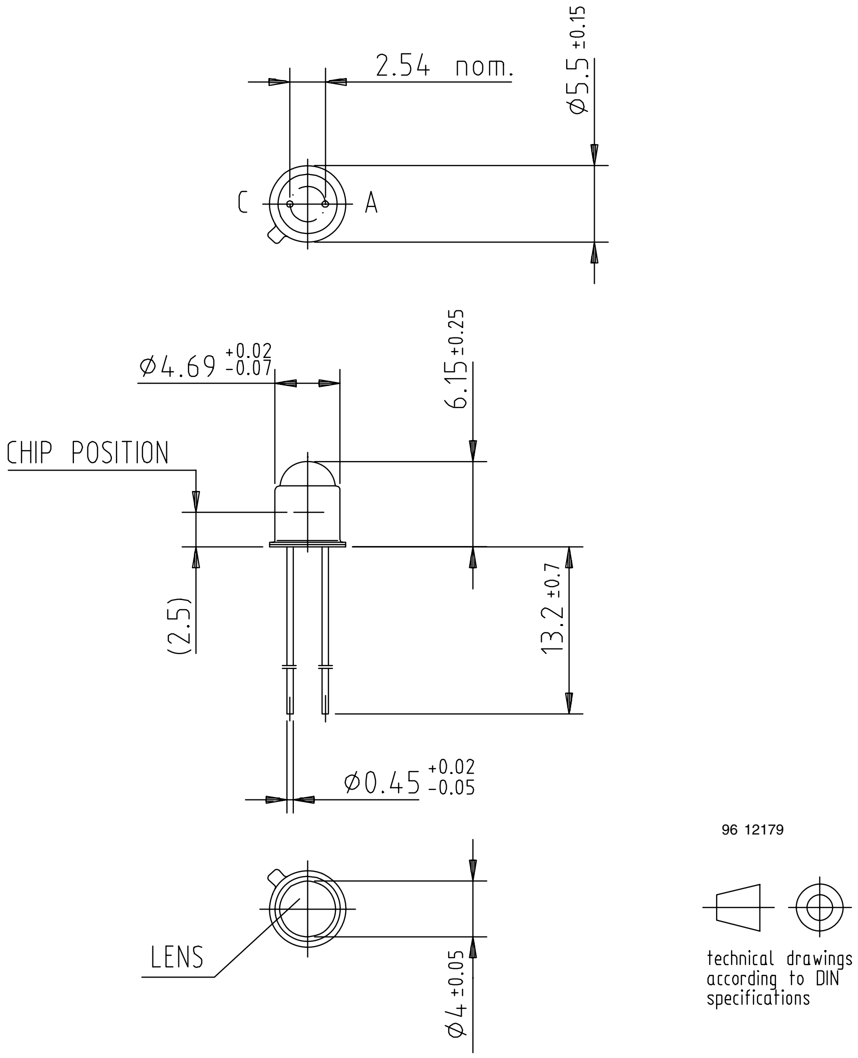



Figure 10. Relative Radiant Intensity vs. Angular Displacement

## Package Dimensions in mm

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## Ozone Depleting Substances Policy Statement

It is the policy of Vishay Semiconductor GmbH to

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).

The Montreal Protocol (1987) and its London Amendments (1990) intend to severely restrict the use of ODSs and forbid their use within the next ten years. Various national and international initiatives are pressing for an earlier ban on these substances.

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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