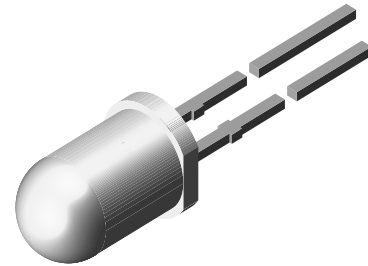


High Speed Infrared Emitting Diode, 870 nm, GaAIAs Double Hetero

Description

The TSHA520. series are high efficiency infrared emitting diodes in GaAIAs on GaAIAs technology, molded in a clear, untinted plastic package.

In comparison with the standard GaAs on GaAs technology these high intensity emitters feature about 70 % radiant power improvement.



94 8390

Features

- Extra high radiant power and radiant intensity
- Suitable for high pulse current operation
- Standard T-1 $\frac{3}{4}$ (\varnothing 5 mm) package
- Angle of half intensity $\varphi = \pm 12^\circ$
- Peak wavelength $\lambda_p = 875$ nm
- High reliability
- Good spectral matching to Si photodetectors
- Lead-free component
- Component in accordance to RoHS 2002/95/EC and WEEE 2002/96/EC

Applications

Infrared remote control and free air transmission systems with high power and long transmission distance requirements in combination with PIN photodiodes or phototransistors.

Because of the reduced radiance absorption in glass at the wavelength of 875 nm, this emitter series is also suitable for systems with panes in the transmission range between emitter and detector.

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} | 2.5 | A |
| Power Dissipation | | P_V | 210 | mW |
| Junction Temperature | | T_j | 100 | $^\circ\text{C}$ |
| Operating Temperature Range | | T_{amb} | - 55 to + 100 | $^\circ\text{C}$ |
| Storage Temperature Range | | T_{stg} | - 55 to + 100 | $^\circ\text{C}$ |
| Soldering Temperature | $t \leq 5$ sec, 2 mm from case | T_{sd} | 260 | $^\circ\text{C}$ |
| Thermal Resistance Junction/Ambient | | R_{thJA} | 350 | K/W |

Electrical Characteristics

$T_{amb} = 25\text{ }^{\circ}\text{C}$, 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 |
| Temp. Coefficient of V_F | $I_F = 100\text{ mA}$ | TK_{V_F} | | -1.6 | | mV/K |
| Reverse Current | $V_R = 5\text{ V}$ | I_R | | | 100 | μA |
| Junction capacitance | $V_R = 0\text{ V}$, $f = 1\text{ MHz}$, $E = 0$ | C_j | | 20 | | pF |

Optical Characteristics

$T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified

| Parameter | Test condition | Symbol | Min | Typ. | Max | Unit |
|----------------------------------|-----------------------|-----------------|-----|----------|-----|------|
| Temp. Coefficient of ϕ_e | $I_F = 20\text{ mA}$ | $TK\phi_e$ | | -0.7 | | %/K |
| Angle of Half Intensity | | ϕ | | ± 12 | | deg |
| Peak Wavelength | $I_F = 100\text{ mA}$ | λ_p | | 875 | | nm |
| Spectral Bandwidth | $I_F = 100\text{ mA}$ | $\Delta\lambda$ | | 80 | | nm |
| Temp. Coefficient of λ_p | $I_F = 100\text{ mA}$ | $TK\lambda_p$ | | 0.2 | | nm/K |
| Rise Time | $I_F = 100\text{ mA}$ | t_r | | 600 | | ns |
| | $I_F = 1.5\text{ A}$ | t_r | | 300 | | ns |
| Fall Time | $I_F = 100\text{ mA}$ | t_f | | 600 | | ns |
| | $I_F = 1.5\text{ A}$ | t_f | | 300 | | ns |
| Virtual Source Diameter | | \emptyset | | 3.7 | | mm |

Type Dedicated Characteristics

$T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified

| Parameter | Test condition | Part | Symbol | Min | Typ. | Max | Unit |
|-------------------|---|----------|----------|-----|------|-----|-------|
| Forward Voltage | $I_F = 1.5\text{ A}$, $t_p = 100\text{ }\mu\text{s}$ | TSHA5200 | V_F | | 3.2 | 4.9 | V |
| | | TSHA5201 | V_F | | 3.2 | 4.9 | V |
| | | TSHA5202 | V_F | | 3.2 | 4.5 | V |
| | | TSHA5203 | V_F | | 3.2 | 4.5 | V |
| Radiant Intensity | $I_F = 100\text{ mA}$, $t_p = 20\text{ ms}$ | TSHA5200 | I_e | 25 | 40 | 125 | mW/sr |
| | | TSHA5201 | I_e | 30 | 50 | 125 | mW/sr |
| | | TSHA5202 | I_e | 36 | 60 | 125 | mW/sr |
| | | TSHA5203 | I_e | 50 | 65 | 125 | mW/sr |
| | $I_F = 1.5\text{ A}$, $t_p = 100\text{ }\mu\text{s}$ | TSHA5200 | I_e | 300 | 500 | | mW/sr |
| | | TSHA5201 | I_e | 400 | 600 | | mW/sr |
| | | TSHA5202 | I_e | 500 | 700 | | mW/sr |
| | | TSHA5203 | I_e | 600 | 800 | | mW/sr |
| Radiant Power | $I_F = 100\text{ mA}$, $t_p = 20\text{ ms}$ | TSHA5200 | ϕ_e | | 22 | | mW |
| | | TSHA5201 | ϕ_e | | 23 | | mW |
| | | TSHA5202 | ϕ_e | | 24 | | mW |
| | | TSHA5203 | ϕ_e | | 25 | | mW |

Typical Characteristics ($T_{amb} = 25\text{ }^{\circ}\text{C}$ unless otherwise specified)

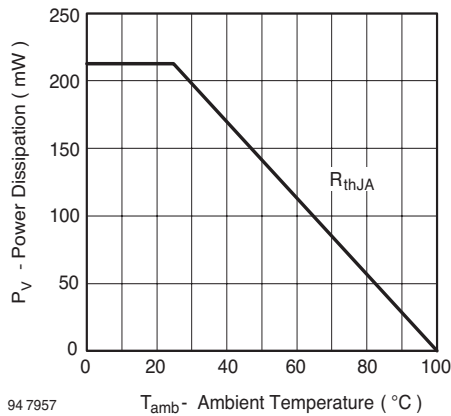


Figure 1. Power Dissipation vs. Ambient Temperature

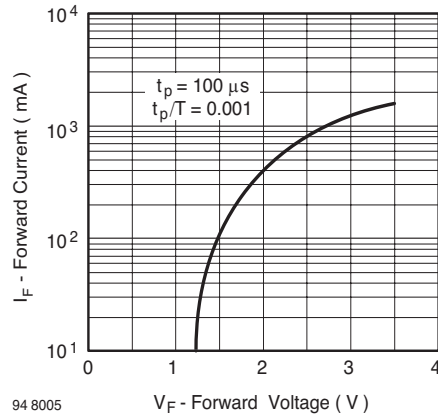


Figure 4. Forward Current vs. Forward Voltage

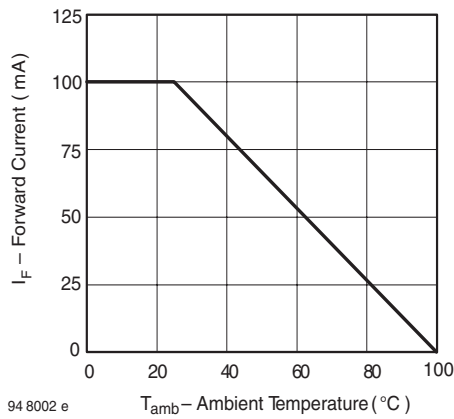


Figure 2. Forward Current vs. Ambient Temperature

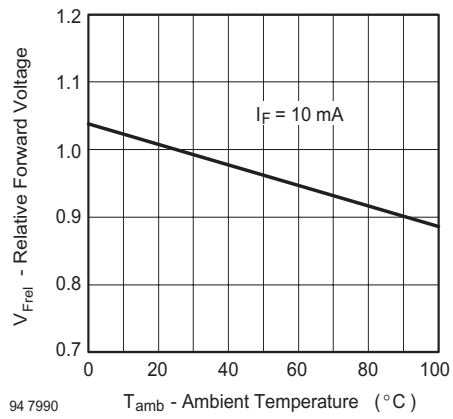


Figure 5. Relative Forward Voltage vs. Ambient Temperature

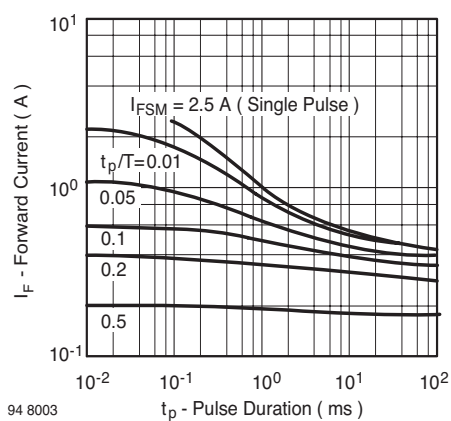


Figure 3. Pulse Forward Current vs. Pulse Duration

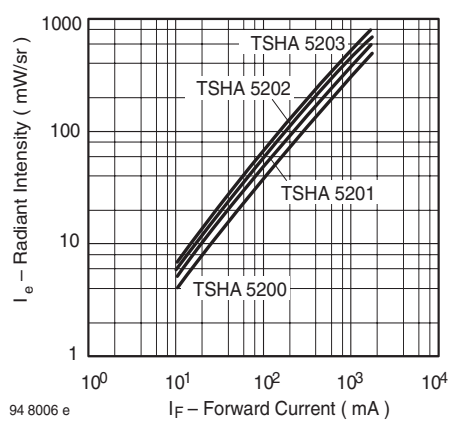


Figure 6. Radiant Intensity vs. Forward Current

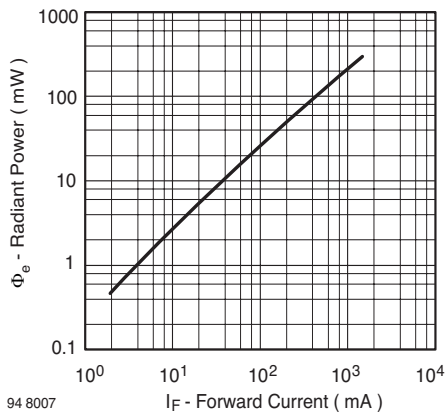


Figure 7. Radiant Power vs. Forward Current

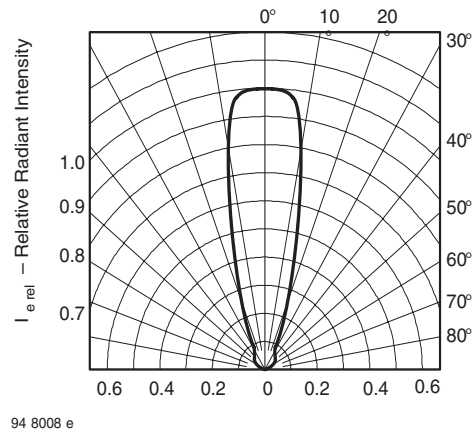


Figure 10. Relative Radiant Intensity vs. Angular Displacement

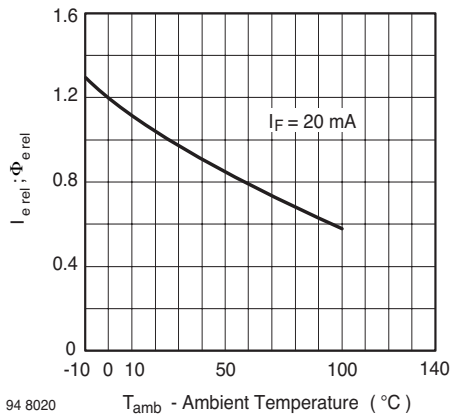


Figure 8. Rel. Radiant Intensity/Power vs. Ambient Temperature

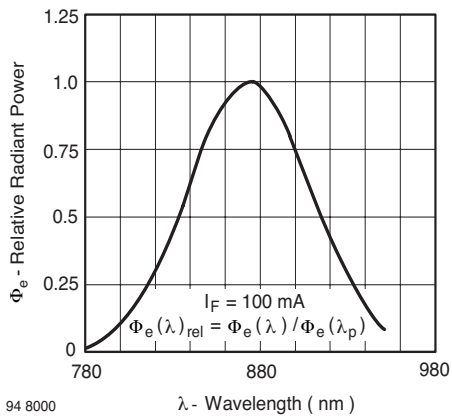
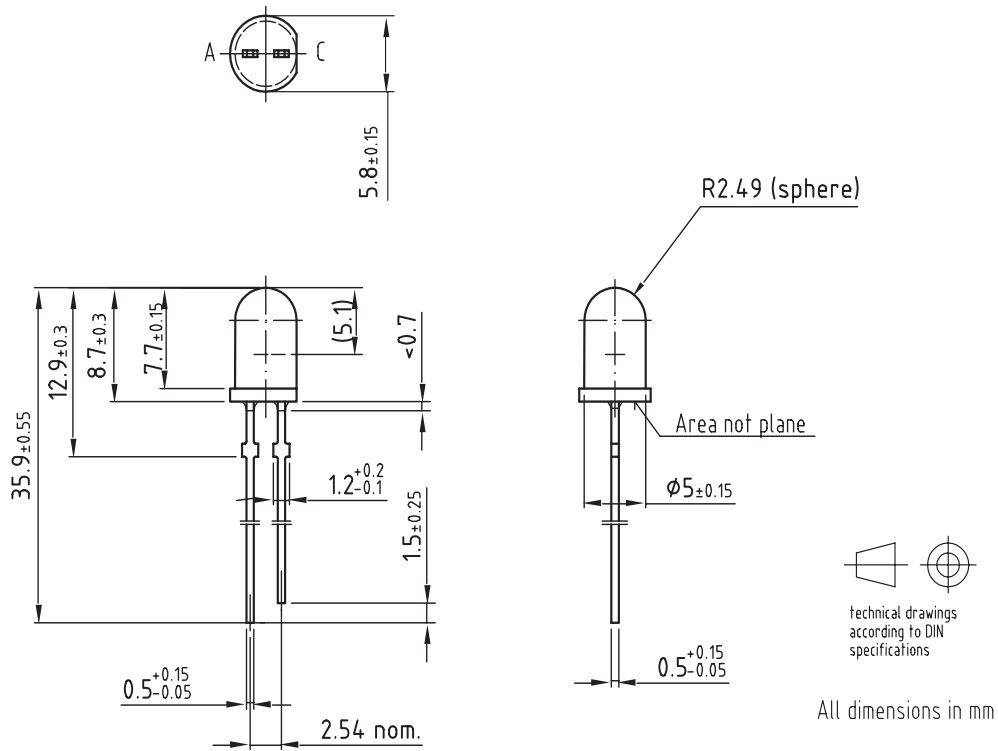


Figure 9. Relative Radiant Power vs. Wavelength

Package Dimensions in mm



Drawing-No.: 6.544-5258.04-4
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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.

We reserve the right to make changes to improve technical design
and may do so without further notice.

Parameters can vary in different applications. All operating parameters must be validated for each customer application by the customer. Should the buyer use Vishay Semiconductors products for any unintended or unauthorized application, the buyer shall indemnify Vishay Semiconductors against all claims, costs, damages, and expenses, arising out of, directly or indirectly, any claim of personal damage, injury or death associated with such unintended or unauthorized use.

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