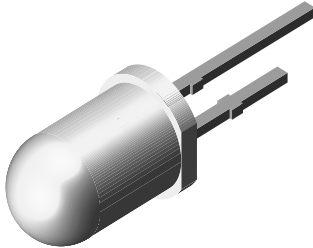


## High Speed Infrared Emitting Diode, 890 nm, GaAlAs Double Hetero



94 8390

### DESCRIPTION

TSHF5210 is an infrared, 890 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
- Leads with stand-off
- Peak wavelength:  $\lambda_p = 890$  nm
- High reliability
- High radiant power
- High radiant intensity
- Angle of half intensity:  $\varphi = \pm 10^\circ$
- Low forward voltage
- Suitable for high pulse current operation
- High modulation bandwidth:  $f_c = 12$  MHz
- Good spectral matching with Si photodetectors
- 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 high speed remote control and free air data transmission systems with high modulation frequencies or high data transmission rate requirements
- Transmission systems according to IrDA requirements and for carrier frequency based systems (e.g. ASK/FSK - coded, 450 kHz or 1.3 MHz)
- Smoke-automatic fire detectors

### PRODUCT SUMMARY

| COMPONENT | $I_e$ (mW/sr) | $\varphi$ (deg) | $\lambda_p$ (nm) | $t_r$ (ns) |
|-----------|---------------|-----------------|------------------|------------|
| TSHF5210  | 180           | $\pm 10$        | 890              | 30         |

### Note

- Test conditions see table "Basic Characteristics"

### ORDERING INFORMATION

| ORDERING CODE | PACKAGING | REMARKS                      | PACKAGE FORM      |
|---------------|-----------|------------------------------|-------------------|
| TSHF5210      | 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               | $t_p = 100 \mu\text{s}$                | $I_{FSM}$  | 1.5           | A                |
| Power dissipation                   |  | $P_V$      | 160           | 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              |

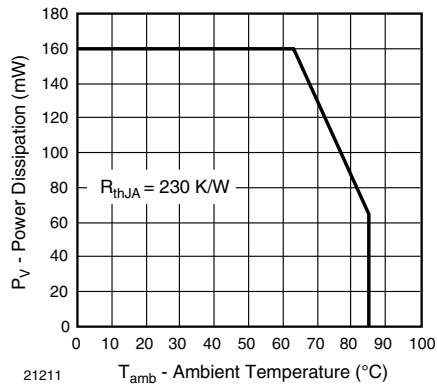


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

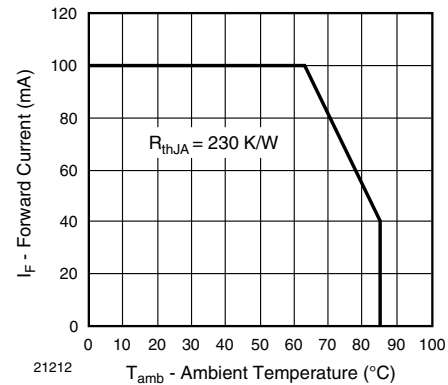


Fig. 2 - Forward Current Limit vs. Ambient Temperature

| <b>BASIC CHARACTERISTICS</b> (T <sub>amb</sub> = 25 °C, unless otherwise specified) |   |                             |      |        |      |       |
|---|---|-----------------------------|------|--------|------|-------|
| PARAMETER   | TEST CONDITION                                      | SYMBOL                      | MIN. | TYP.   | MAX. | UNIT  |
| Forward voltage   | I <sub>F</sub> = 100 mA, t <sub>p</sub> = 20 ms     | V <sub>F</sub>              |      | 1.4    | 1.6  | V     |
|   | I <sub>F</sub> = 1 A, t <sub>p</sub> = 100 μs       | V <sub>F</sub>              |      | 2.3    |      | V     |
| Temperature coefficient of V <sub>F</sub>   | I <sub>F</sub> = 1 mA                               | TK <sub>V<sub>F</sub></sub> |      | - 1.8  |      | mV/K  |
| Reverse current   | V <sub>R</sub> = 5 V                                | I <sub>R</sub>              |      |        | 10   | μA    |
| Junction capacitance  | V <sub>R</sub> = 0 V, f = 1 MHz, E = 0              | C <sub>j</sub>              |      | 125    |      | pF    |
| Radiant intensity   | I <sub>F</sub> = 100 mA, t <sub>p</sub> = 20 ms     | I <sub>e</sub>              | 120  | 180    | 360  | mW/sr |
|   | I <sub>F</sub> = 1 A, t <sub>p</sub> = 100 μs       | I <sub>e</sub>              |      | 1800   |      | mW/sr |
| Radiant power   | I <sub>F</sub> = 100 mA, t <sub>p</sub> = 20 ms     | φ <sub>e</sub>              |      | 50     |      | mW    |
| Temperature coefficient of φ <sub>e</sub>   | I <sub>F</sub> = 100 mA                             | TK <sub>φ<sub>e</sub></sub> |      | - 0.35 |      | %/K   |
| Angle of half intensity   |   | φ                           |      | ± 10   |      | deg   |
| Peak wavelength   | I <sub>F</sub> = 100 mA                             | λ <sub>p</sub>              |      | 890    |      | nm    |
| Spectral bandwidth  | I <sub>F</sub> = 100 mA                             | Δλ                          |      | 40     |      | nm    |
| Temperature coefficient of λ <sub>p</sub>   | I <sub>F</sub> = 100 mA                             | TK <sub>λ<sub>p</sub></sub> |      | 0.25   |      | nm/K  |
| Rise time   | I <sub>F</sub> = 100 mA                             | t <sub>r</sub>              |      | 30     |      | ns    |
| Fall time   | I <sub>F</sub> = 100 mA                             | t <sub>f</sub>              |      | 30     |      | ns    |
| Cut-off frequency   | I <sub>DC</sub> = 70 mA, I <sub>AC</sub> = 30 mA pp | f <sub>c</sub>              |      | 12     |      | MHz   |
| Virtual source diameter   |   | d                           |      | 3.7    |      | mm    |

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

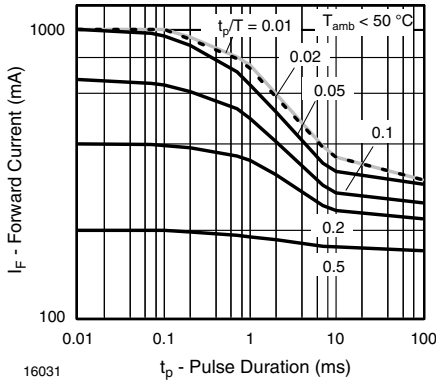


Fig. 3 - Pulse Forward Current vs. Pulse Duration

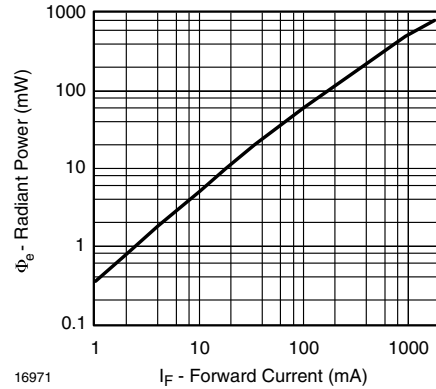


Fig. 6 - Radiant Power vs. Forward Current

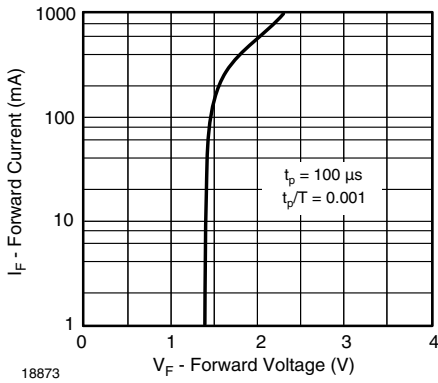


Fig. 4 - Forward Current vs. Forward Voltage

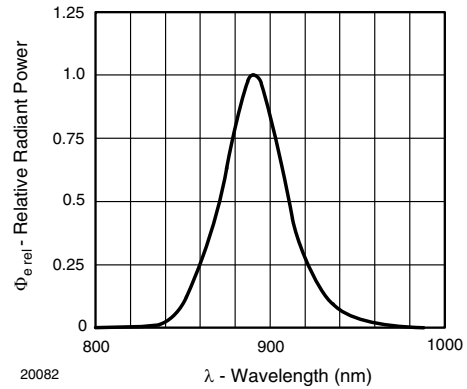


Fig. 7 - Relative Radiant Power vs. Wavelength

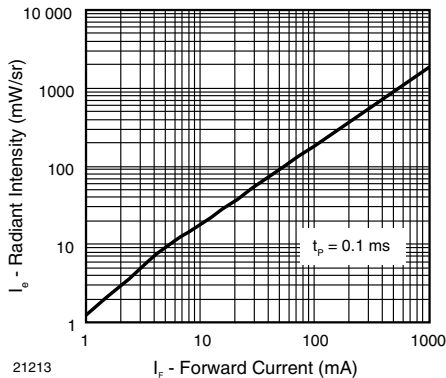


Fig. 5 - Radiant Intensity vs. Forward Current

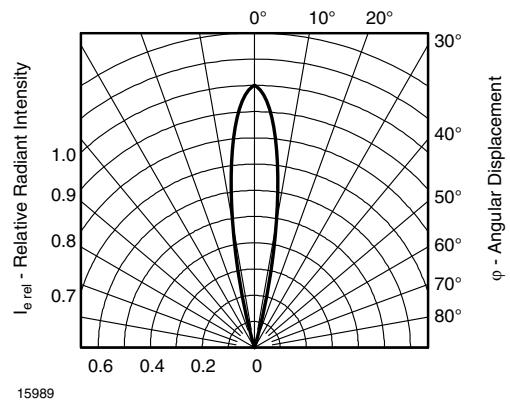
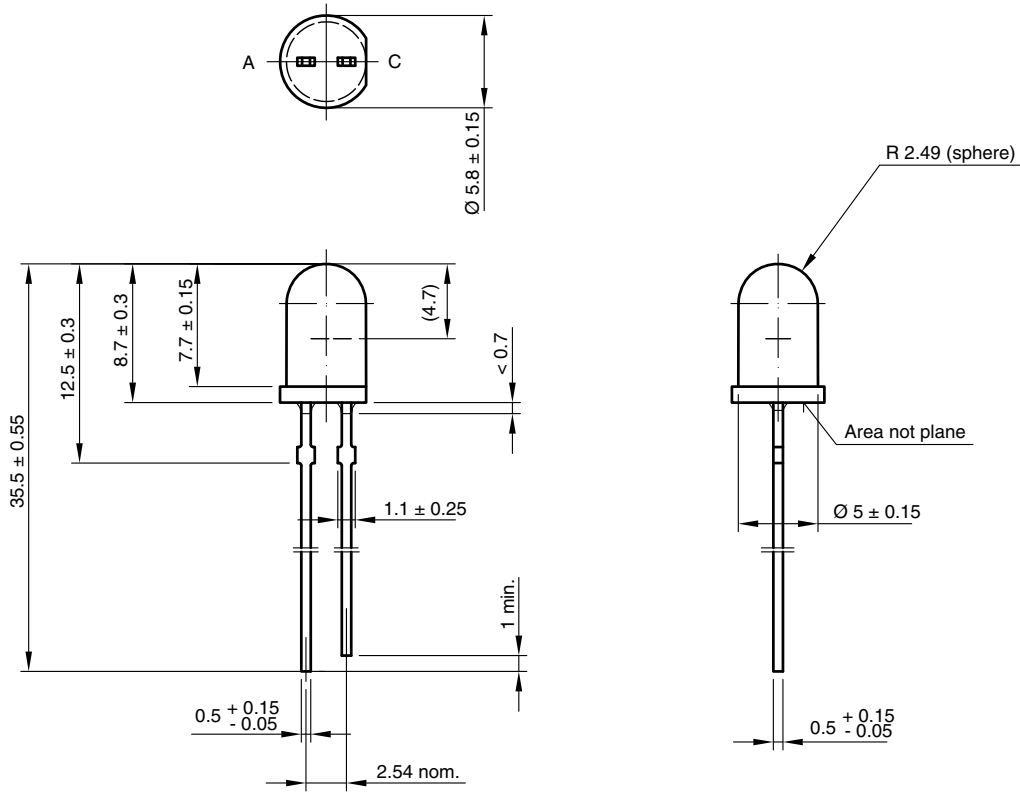


Fig. 8 - Relative Radiant Intensity vs. Angular Displacement



PACKAGE DIMENSIONS in millimeters



technical drawings  
according to DIN  
specifications

6.544-5258.02-4  
Issue: 7; 23.07.10  
95 10916



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