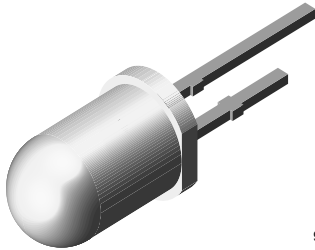


## High Speed Infrared Emitting Diode, 870 nm, GaAlAs Double Hetero



94 8390

### DESCRIPTION

TSFF5210 is an infrared, 870 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 3/4
- Dimensions (in mm):  $\varnothing$  5
- Leads with stand-off
- Peak wavelength:  $\lambda_p = 870$  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:  $f_c = 24$  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 video data transmission between camcorder and TV set
- Free air data transmission systems with high modulation frequencies or high data transmission rate requirements
- Smoke-automatic fire detectors

### PRODUCT SUMMARY

| COMPONENT | $I_e$ (mW/sr) | $\varphi$ (deg) | $\lambda_p$ (nm) | $t_r$ (ns) |
|-----------|---------------|-----------------|------------------|------------|
| TSFF5210  | 180           | $\pm 10$        | 870              | 15         |

### Note

- Test conditions see table "Basic Characteristics"

### ORDERING INFORMATION

| ORDERING CODE | PACKAGING | REMARKS                      | PACKAGE FORM      |
|---------------|-----------|------------------------------|-------------------|
| TSFF5210      | 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   |

| <b>ABSOLUTE MAXIMUM RATINGS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified) |  |            |               |                    |
|--|--|------------|---------------|--------------------|
| PARAMETER  | TEST CONDITION                         | SYMBOL     | VALUE         | UNIT               |
| 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  | $t \leq 5\text{ s}$ , 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                |

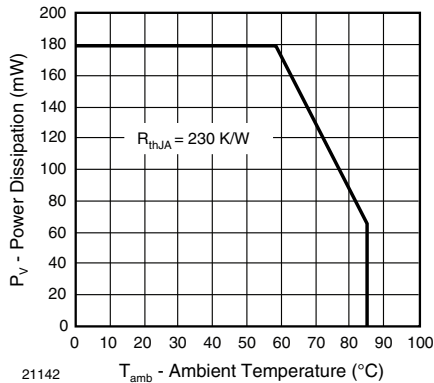


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

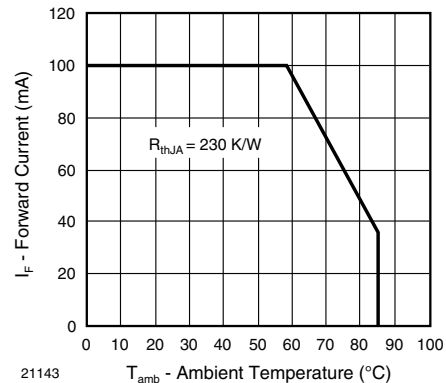


Fig. 2 - Forward Current Limit vs. Ambient Temperature

| <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      | 3.0  | V             |
| Temperature coefficient of $V_F$  | $I_F = 1\text{ mA}$                                  | $TK_{V_F}$       |      | - 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   | $I_F = 100\text{ mA}$ , $t_p = 20\text{ ms}$         | $I_e$            | 120  | 180      | 360  | mW/sr         |
|   | $I_F = 1\text{ A}$ , $t_p = 100\text{ }\mu\text{s}$  | $I_e$            |      | 1800     |      | 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   |  | $\varphi$        |      | $\pm 10$ |      | deg           |
| Peak wavelength   | $I_F = 100\text{ mA}$                                | $\lambda_p$      |      | 870      |      | 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   | $I_F = 100\text{ mA}$                                | $t_r$            |      | 15       |      | ns            |
| Fall time   | $I_F = 100\text{ mA}$                                | $t_f$            |      | 15       |      | ns            |
| Cut-off frequency   | $I_{DC} = 70\text{ mA}$ , $I_{AC} = 30\text{ mA pp}$ | $f_c$            |      | 24       |      | MHz           |
| Virtual source diameter   |  | $d$              |      | 3.7      |      | mm            |

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

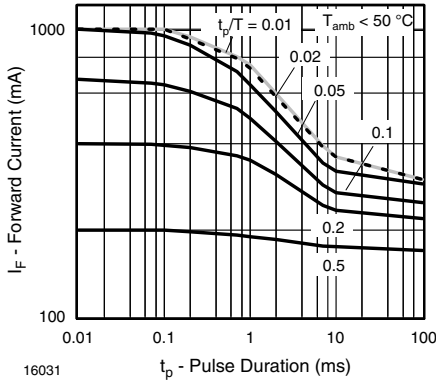


Fig. 3 - Pulse Forward Current vs. Pulse Duration



Fig. 6 - Relative Radiant Power vs. Wavelength



Fig. 4 - Forward Current vs. Forward Voltage



Fig. 7 - Relative Radiant Intensity vs. Angular Displacement

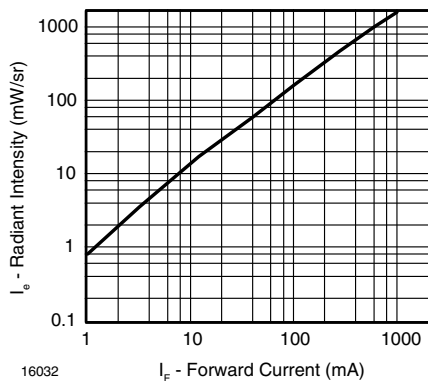


Fig. 5 - Radiant Intensity vs. Forward Current

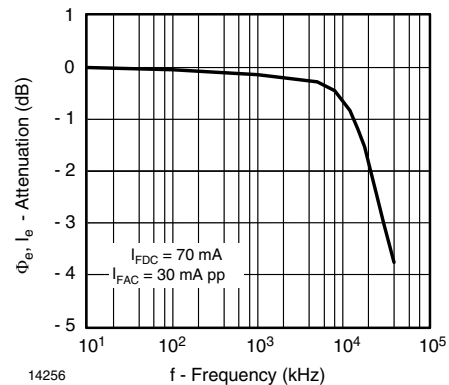
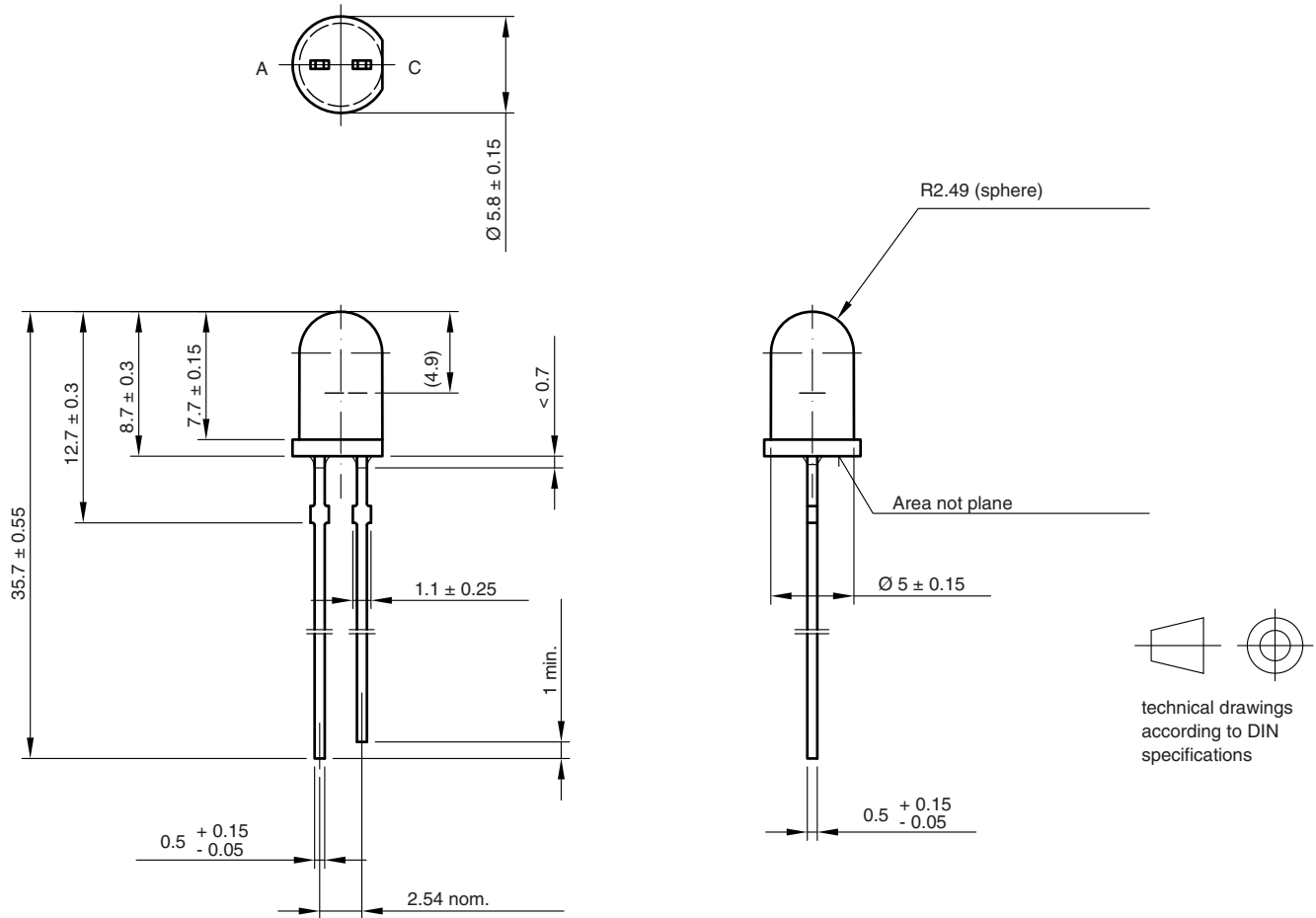


Fig. 8 - Attenuation vs. Frequency



PACKAGE DIMENSIONS in millimeters



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