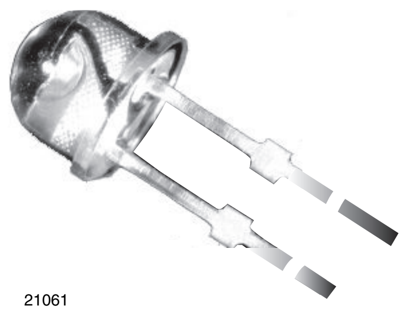
# High Speed Infrared Emitting Diode, 870 nm, GaAlAs Double Hetero



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## DESCRIPTION

TSFF5510 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-1¾
- Dimensions (in mm): Ø 5
- Leads with stand-off
- Peak wavelength: $\lambda_p$ = 870 nm
- High reliability
- High radiant power
- High radiant intensity
- Angle of half intensity: $\varphi$ = ± 38°
- Low forward voltage
- Suitable for high pulse current operation
- High modulation bandwidth: $f_c$ = 24 MHz
- Good spectral matching with Si photodetectors
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

RoHS COMPLIANT
HALOGEN FREE
GREEN (5-2008)

## APPLICATIONS

- Infrared video data transmission between camcorder and TV set
- Free air data transmission systems with high data transmission rates

**PRODUCT SUMMARY**

| COMPONENT | $I_e$ (mW/sr) | $\varphi$ (deg) | $\lambda_p$ (nm) | $t_r$ (ns) |
|---|---|---|---|---|
| TSFF5510 | 32 | ± 38 | 870 | 15 |

**Note**

- Test conditions see table "Basic Characteristics"

**ORDERING INFORMATION**

| ORDERING CODE | PACKAGING | REMARKS | PACKAGE FORM |
|---|---|---|---|
| TSFF5510 | Bulk | MOQ: 4000 pcs, 4000 pcs/bulk | T-1¾ |

**Note**

- MOQ: minimum order quantity

**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 | | $P_V$ | 180 | 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 ≤ 5 s, 2 mm from case | $T_{sd}$ | 260 | °C |
| Thermal resistance junction/ambient | J-STD-051, leads 7 mm soldered on PCB | $R_{thJA}$ | 230 | K/W |

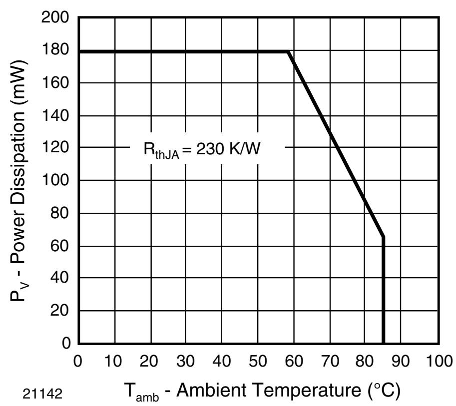



Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

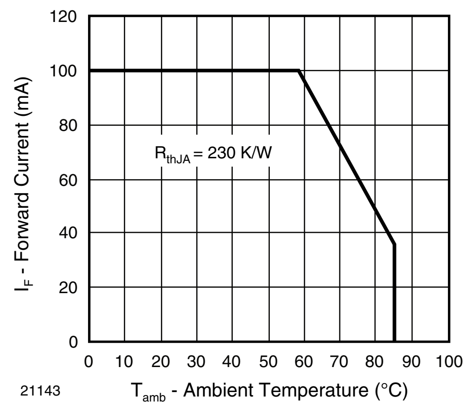



Fig. 1 - Forward Current Limit vs. Ambient Temperature

| **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 | $V_F$ | 1.3 | 1.45 | 1.7 | V |
| | $I_F$ = 450 mA, $t_p$ = 100 µs | $V_F$ | 1.5 | 1.75 | 2.1 | V |
| | $I_F$ = 1 A, $t_p$ = 100 µs | $V_F$ | | 2.1 | | V |
| Temperature coefficient of $V_F$ | $I_F$ = 1 mA | $TK_{VF}$ | | - 1.8 | | mV/K |
| Reverse current | $V_R$ = 5 V | $I_R$ | | | 10 | µA |
| Junction capacitance | $V_R$ = 0 V, f = 1 MHz, E = 0 | $C_j$ | | 110 | | pF |
| Radiant intensity | $I_F$ = 100 mA, $t_p$ = 20 ms | $I_e$ | 16 | 32 | 48 | mW/sr |
| Radiant power | $I_F$ = 100 mA, $t_p$ = 20 ms | $\phi_e$ | | 55 | | mW |
| Temperature coefficient of $\phi_e$ | $I_F$ = 100 mA | $TK\phi_e$ | | - 0.35 | | %/K |
| Angle of half intensity | | $\varphi$ | | ± 38 | | deg |
| Peak wavelength | $I_F$ = 100 mA | $\lambda_p$ | | 870 | | nm |
| Spectral bandwidth | $I_F$ = 100 mA | $\Delta\lambda$ | | 55 | | nm |
| Temperature coefficient of $\lambda_p$ | $I_F$ = 100 mA | $TK\lambda_p$ | | 0.25 | | nm/K |
| Rise time | $I_F$ = 100 mA | $t_r$ | | 15 | | ns |
| Fall time | $I_F$ = 100 mA | $t_f$ | | 15 | | ns |
| Cut-off frequency | $I_{DC}$ = 70 mA, $I_{AC}$ = 30 mA pp | $f_c$ | | 24 | | MHz |

**BASIC CHARACTERISTICS** ($T_{amb}$ = 25 °C, unless otherwise specified)

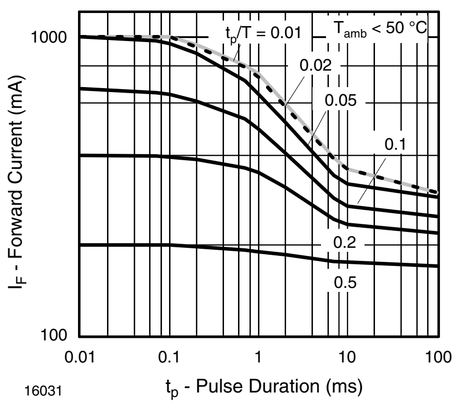



Fig. 2 - Pulse Forward Current vs. Pulse Duration

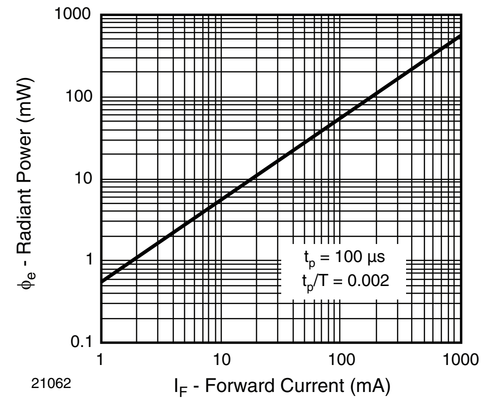



Fig. 5 - Radiant Power vs. Forward Current

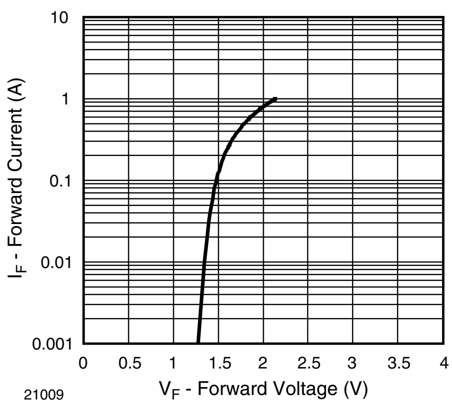



Fig. 3 - Forward Current vs. Forward Voltage

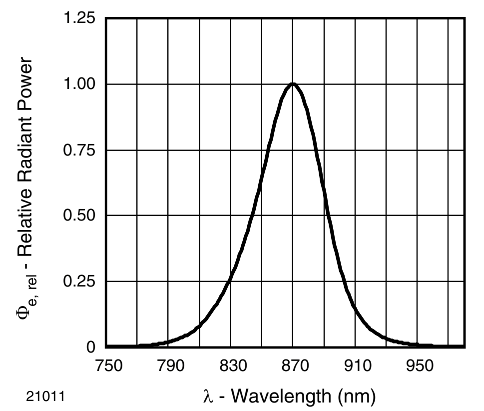



Fig. 6 - Relative Radiant Power vs. Wavelength

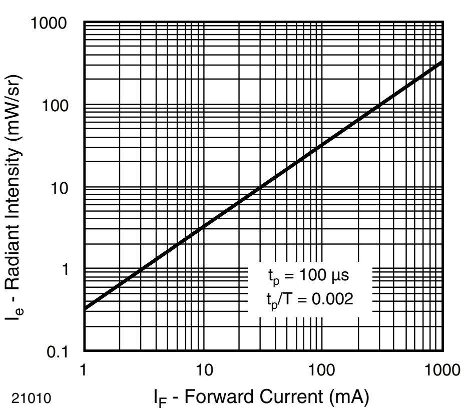



Fig. 4 - Radiant Intensity vs. Forward Current

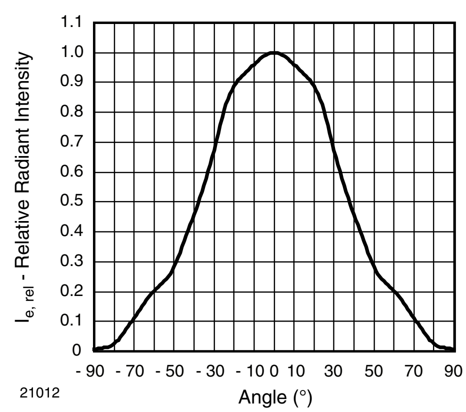
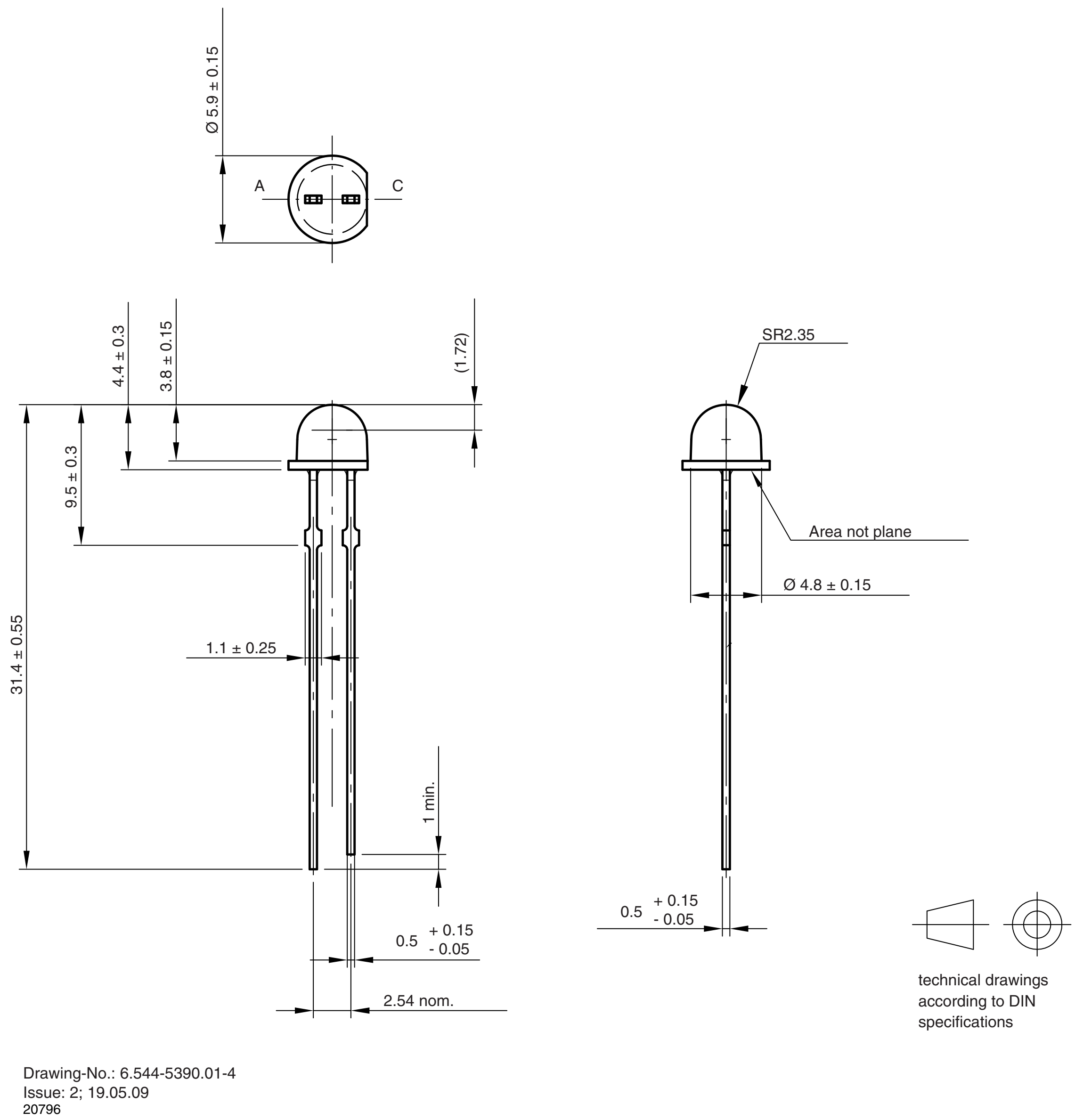



Fig. 7 - Relative Radiant Intensity vs. Angular Displacement

**PACKAGE DIMENSIONS** in millimeters



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