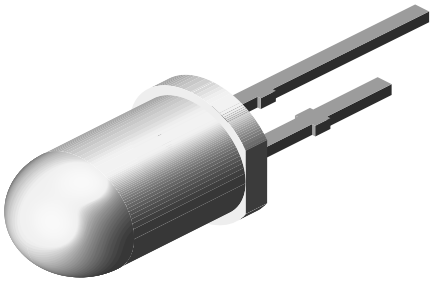
# High Speed Infrared Emitting Diode, 890 nm, Surface Emitter Technology



## FEATURES

- Package type: leaded
- Package form: T-1¾
- Dimensions (in mm): Ø 5
- Leads with stand-off
- Peak wavelength: $\lambda_p$ = 890 nm
- High reliability
- High radiant power
- High radiant intensity
- Angle of half intensity: φ = ± 10°
- Low forward voltage
- Good spectral matching to Si photodetectors
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

RoHS COMPLIANT
HALOGEN FREE
GREEN (5-2008)

## DESCRIPTION

TSHF5211 is an infrared, 890 nm emitting diode in surface emitter chip technology with high radiant power and high speed, molded in a clear, untinted plastic package.

## APPLICATIONS

- Industrial sensors

| PRODUCT SUMMARY | | | | |
|---|---|---|---|---|
| COMPONENT | $I_e$ (mW/sr) | φ (°) | $\lambda_p$ (nm) | $t_r$ (ns) |
| TSHF5211 | 235 | ± 10 | 890 | 15 |

**Note**

- Test conditions see table “Basic Characteristics“

| ORDERING INFORMATION | | | |
|---|---|---|---|
| ORDERING CODE | PACKAGING | REMARKS | PACKAGE FORM |
| TSHF5211 | Bulk | MOQ: 4000 pcs, 1000 pcs/reel | T-1¾ |
| TSHF5211-MS21 | Tape and reel | MOQ: 5000 pcs, 1000 pcs/reel | T-1¾ |
| TSHF5211-MSZ | Ammopack | MOQ: 5000 pcs, 1000 pcs/reel | T-1¾ |

**Note**

- MOQ: minimum order quantity

| ABSOLUTE MAXIMUM RATINGS ($T_{amb}$ = 25 °C, unless otherwise specified) | | | | |
|---|---|---|---|---|
| PARAMETER | TEST CONDITION | SYMBOL | VALUE | UNIT |
| 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 | $I_{FSM}$ | 1.0 | A |
| Power dissipation | | $P_V$ | 170 | mW |
| Junction temperature | | $T_j$ | 100 | °C |
| Ambient 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 to ambient (1) | EIA / JESD51 | $R_{thJA}$ | 230 | K/W |

**Note**

(1) The emitted optical signal was not considered

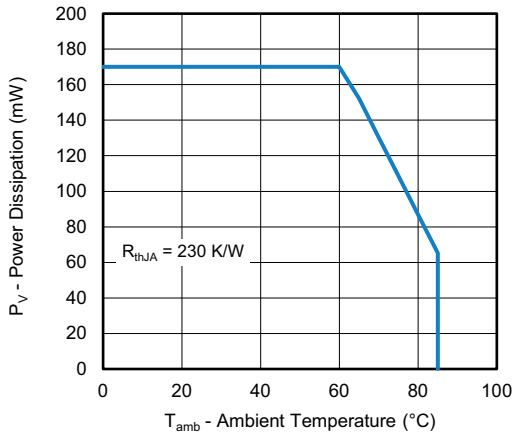



Fig. 1 - Power Dissipation vs. Ambient Temperature

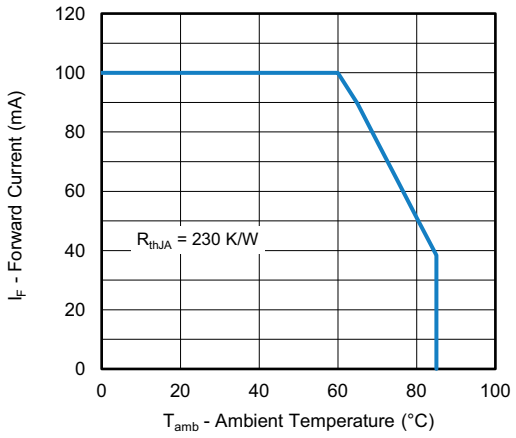



Fig. 2 - Forward Current vs. Ambient Temperature

| **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 | $V_F$ | - | 1.5 | 1.7 | V |
| | $I_F$ = 1 A, $t_p$ = 100 µs | $V_F$ | - | 2.5 | - | V |
| Temperature coefficient of $V_F$ | $I_F$ = 1 mA | $TK_{VF}$ | - | -1.0 | - | mV/K |
| Reverse current | | $I_R$ | Not designed for reverse operation | | | |
| Junction capacitance | $V_R$ = 0 V, f = 1 MHz, E = 0 | $C_j$ | - | 45 | - | pF |
| Radiant intensity | $I_F$ = 100 mA, $t_p$ = 20 ms | $I_e$ | 150 | 235 | 340 | mW/sr |
| | $I_F$ = 1 A, $t_p$ = 100 µs | $I_e$ | - | 1800 | - | mW/sr |
| Radiant power | $I_F$ = 100 mA, $t_p$ = 20 ms | $\phi_e$ | - | 50 | - | mW |
| Temperature coefficient of $\phi_e$ | $I_F$ = 100 mA | $TK\phi_e$ | - | -0.2 | - | %/K |
| Angle of half intensity | | $\varphi$ | - | ± 10 | - | ° |
| Peak wavelength | $I_F$ = 100 mA | $\lambda_p$ | - | 890 | - | nm |
| Spectral bandwidth | $I_F$ = 100 mA | $\Delta\lambda$ | - | 40 | - | nm |
| Temperature coefficient of $\lambda_p$ | $I_F$ = 100 mA | $TK\lambda_p$ | - | 0.3 | - | nm/K |
| Rise time | $I_F$ = 100 mA | $t_r$ | - | 15 | - | ns |
| Fall time | $I_F$ = 100 mA | $t_f$ | - | 15 | - | ns |

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

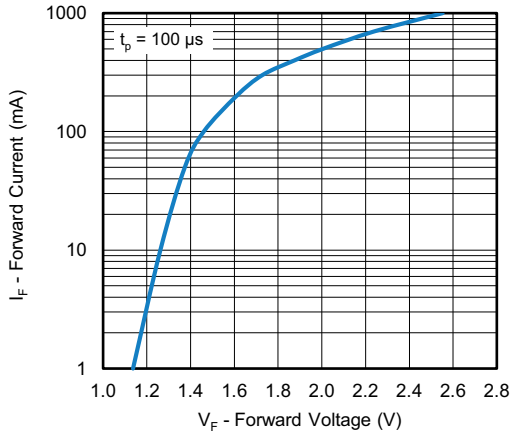



Fig. 3 - Forward Current vs. Forward Voltage

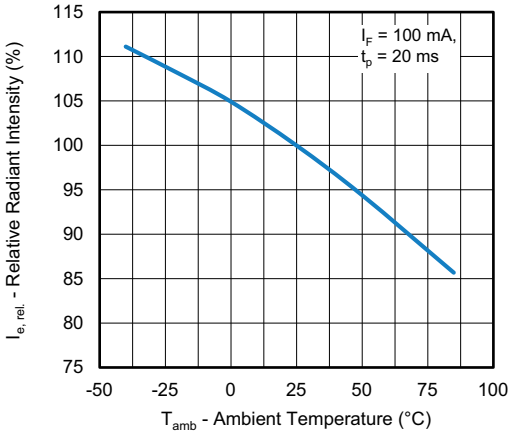



Fig. 6 - Relative Radiant Intensity vs. Ambient Temperature

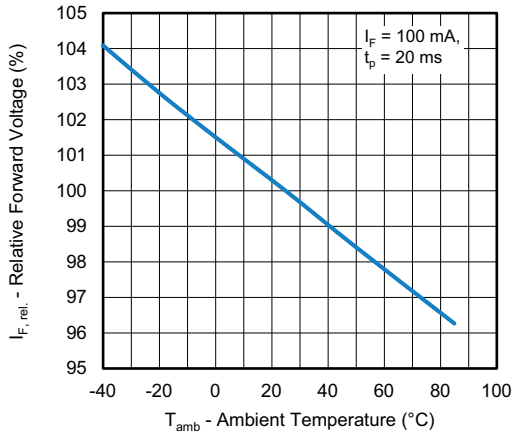



Fig. 4 - Forward Voltage vs. Ambient Temperature

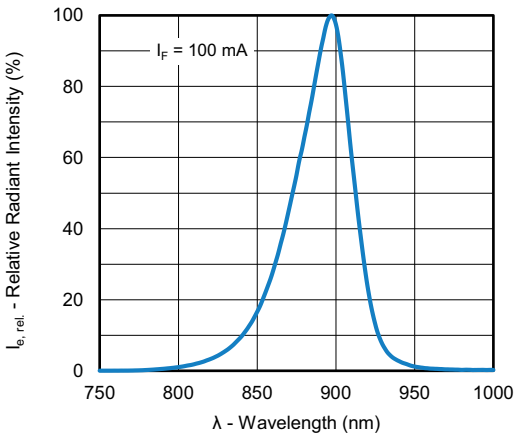



Fig. 7 - Relative Radiant Intensity vs. Wavelength

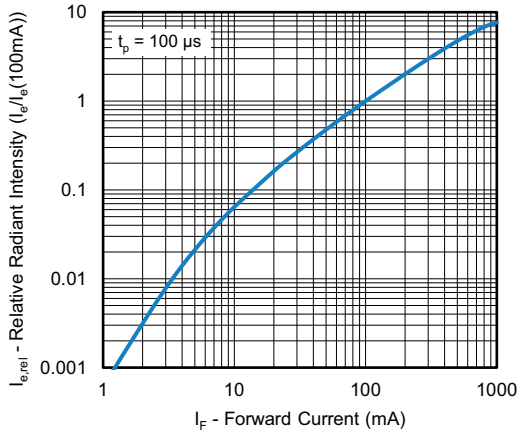



Fig. 5 - Relative Radiant Intensity vs. Forward Current

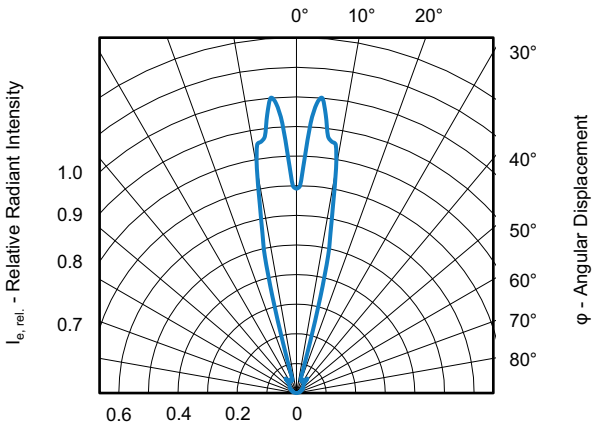



Fig. 8 - Relative Radiant Intensity vs. Angular Displacement

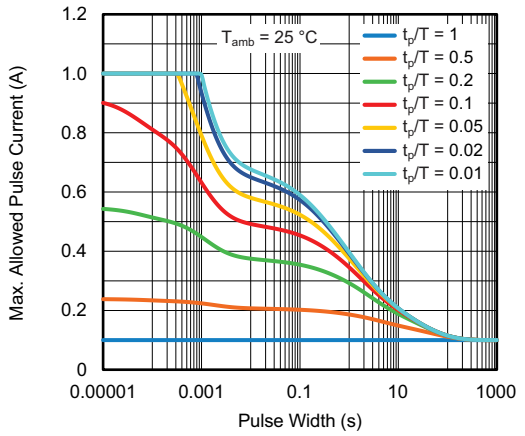



Fig. 9 - Pulse Forward Current vs. Pulse Duration at 25 °C

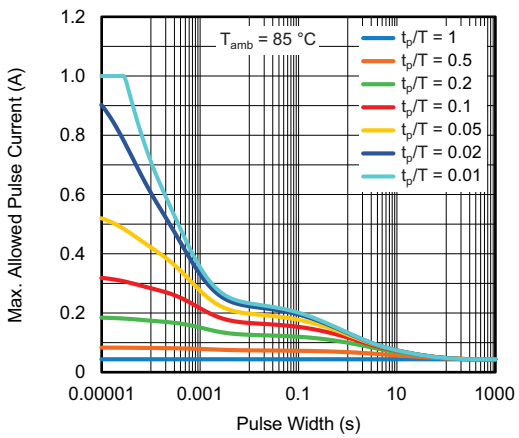
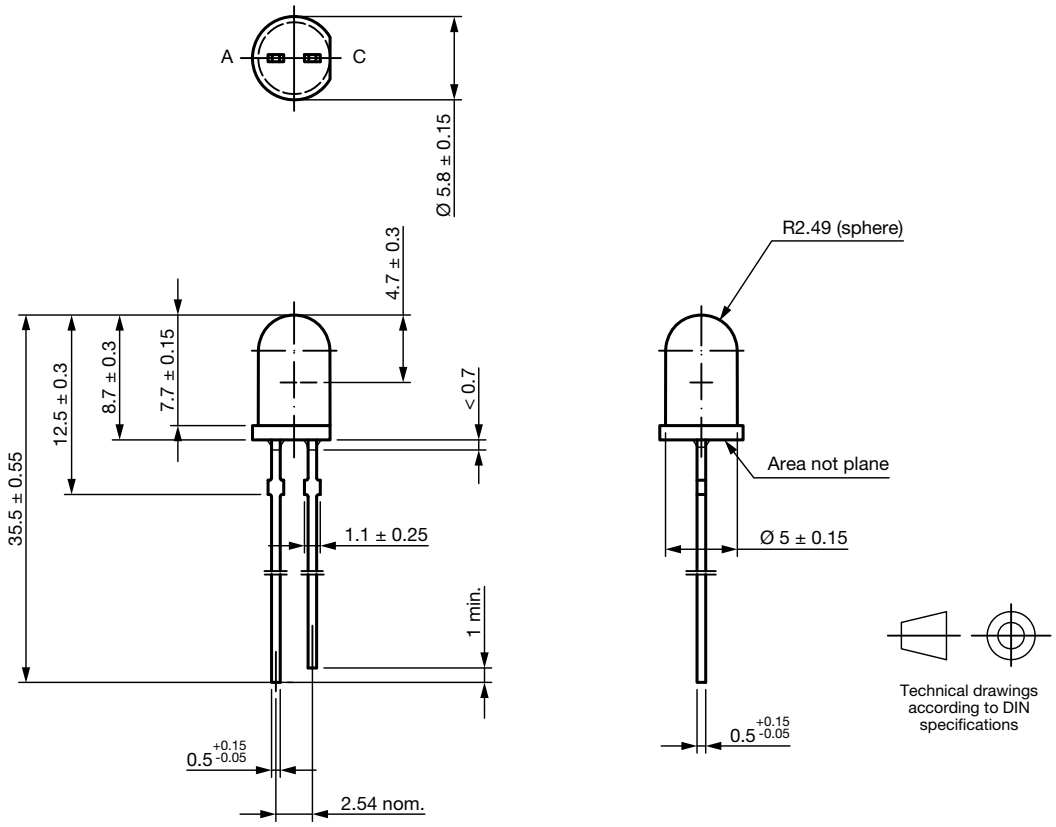



Fig. 10 - Pulse Forward Current vs. Pulse Duration at 85 °C

## **PACKAGE DIMENSIONS** in millimeters

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