TEMIC

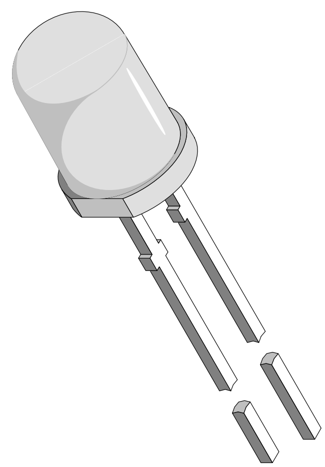
TELEFUNKEN Semiconductors

TSHF 5400

High Speed IR Emitting Diode in ø 5 mm (T–1¾) Package

Description

TSHF 5400 is a high speed infrared emitting diode in GaAlAs on GaAlAs double hetero (DH) technology, molded in a clear, untinted plastic package.
The new technology combines the high speed of DH–GaAlAs with the efficiency of standard GaAlAs and the low forward voltage of the standard GaAs technology.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Features

- High modulation bandwidth (10 MHz)
- Extra high radiant power and radiant intensity
- Low forward voltage
- Suitable for high pulse current operation
- Standard T–1¾ (ø 5 mm) package
- Angle of half intensity $\varphi = \pm 24^\circ$
- Peak wavelength λ_p = 870 nm
- High reliability
- Good spectral matching to Si photodetectors

Applications

Infrared high speed remote control and free air data transmission systems with high modulation frequencies or high data transmission rate requirements.
TSHF 5400 is ideal for the design of transmission systems according to IrDA requirements and for carrier frequency based systems (e.g. ASK / FSK – coded, 450 kHz or 1.3 MHz).

Absolute Maximum Ratings

T_{amb} = 25°C

Parameter	Test Conditions	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	150	mW
Junction Temperature		T_j	100	°C
Operating Temperature Range		T_{amb}	–40...+100	°C
Storage Temperature Range		T_{stg}	–40...+100	°C
Soldering Temperature	t ≦ 5sec, 2 mm from case	T_{sd}	260	°C
Thermal Resistance Junction/Ambient		R_{thJA}	350	K/W

Basic Characteristics

T_{amb} = 25°C

Parameter	Test Conditions	Symbol	Min	Typ	Max	Unit
Forward Voltage	I_F = 100 mA, t_p = 20 ms	V_F		1.35	1.6	V
	I_F = 1 A, t_p = 100 µs	V_F		2.4	3.0	V
Temp. Coefficient of V_F	I_F = 100mA	TK_{VF}		–1.3		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		160		pF
Radiant Intensity	I_F = 100 mA, t_p = 20 ms	I_e	20	30		mW/sr
	I_F = 1 A, t_p = 100 µs	I_e		300		mW/sr
Radiant Power	I_F = 100 mA, t_p = 20 ms	ϕ_e		25		mW
Temp. Coefficient of ϕ_e	I_F = 100 mA	$TK_{\phi e}$		–0.7		%/K
Angle of Half Intensity		φ		±24		deg
Peak Wavelength	I_F = 100 mA	λ_p		870		nm
Spectral Bandwidth	I_F = 100 mA	$\Delta\lambda$		40		nm
Temp. Coefficient of λ_p	I_F = 100 mA	$TK_{\lambda p}$		0.2		nm/K
Rise Time	I_F = 100 mA	t_r		30		ns
	I_F = 1 A	t_r		30		ns
Fall Time	I_F = 100 mA	t_f		30		ns
	I_F = 1 A	t_f		30		ns

Typical Characteristics (T$_{amb}$ = 25°C unless otherwise specified)

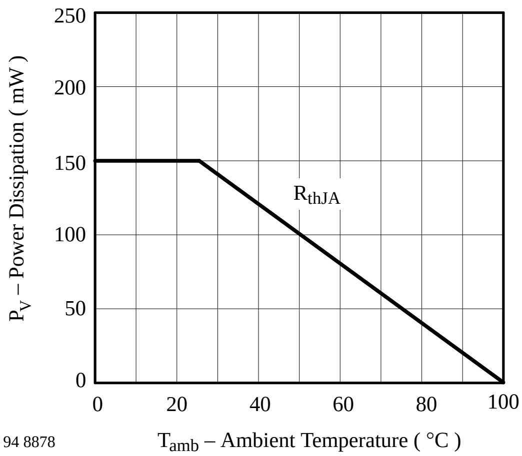

Figure 1 : Power Dissipation vs. Ambient Temperature

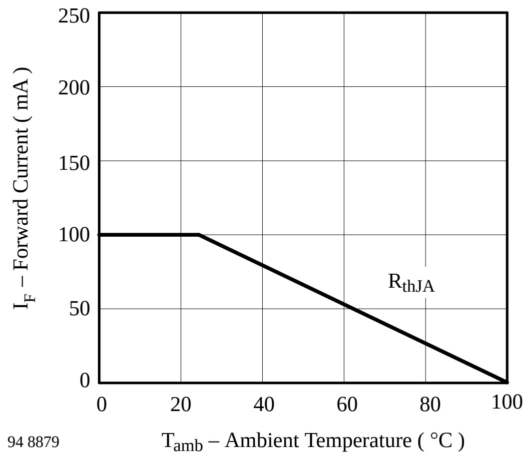

Figure 2 : Forward Current vs. Ambient Temperature

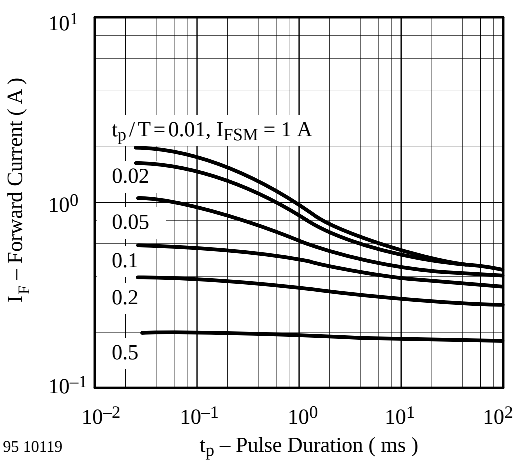

Figure 3 : Pulse Forward Current vs. Pulse Duration

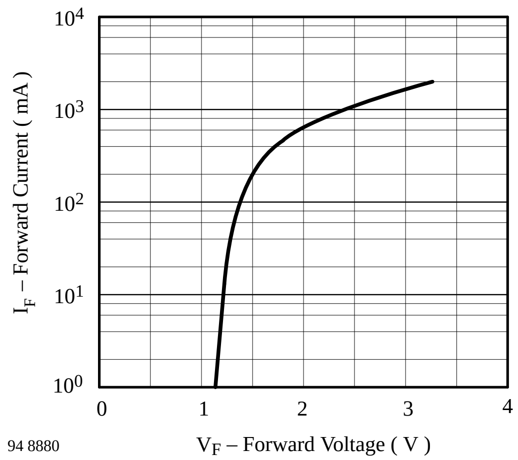

Figure 4 : Forward Current vs. Forward Voltage

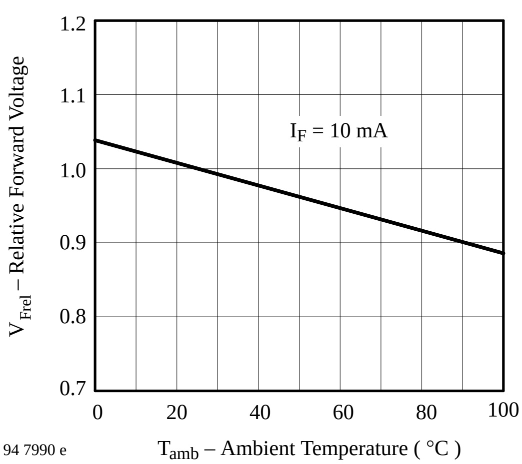

Figure 5 : Relative Forward Voltage vs. Ambient Temperature

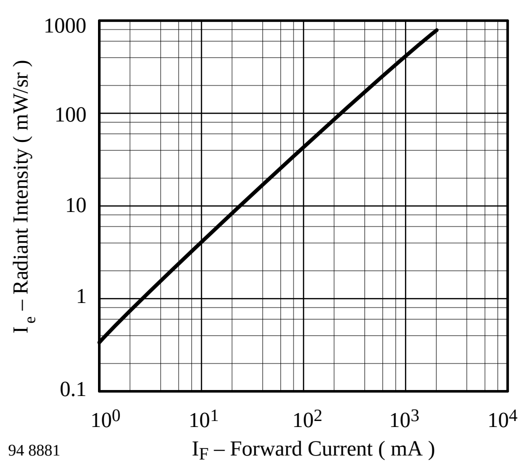

Figure 6 : Radiant Intensity vs. Forward Current

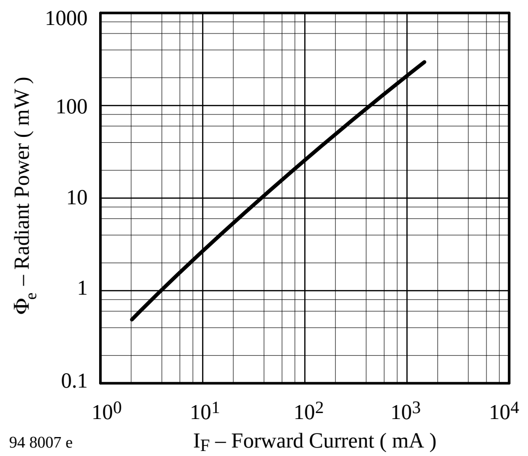

Figure 7 : Radiant Power vs. Forward Current

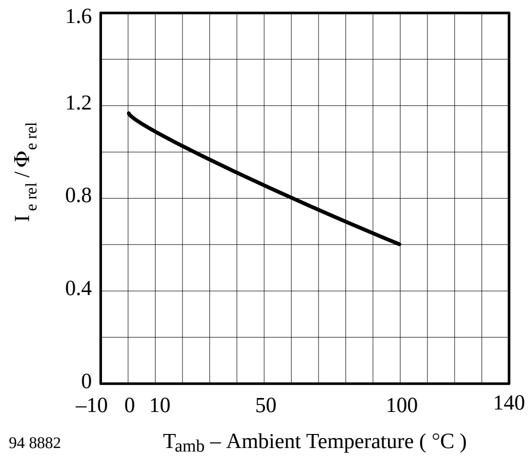

Figure 8 : Rel. Radiant Intensity\Power vs. Ambient Temperature

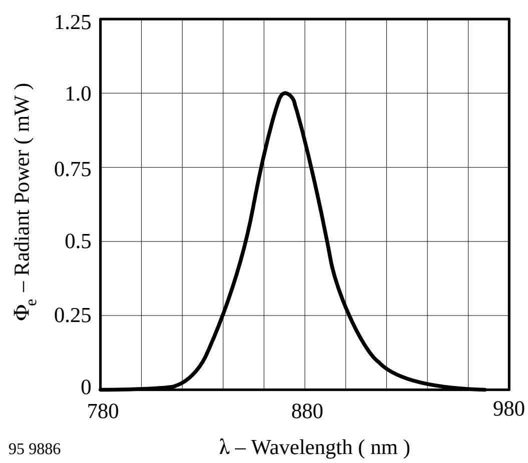

Figure 9 : Relative Radiant Power vs. Wavelength

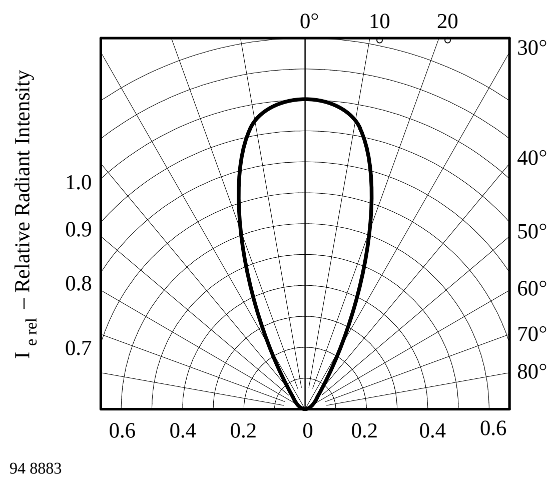

Figure 10 : Relative Radiant Intensity vs. Angular Displacement

Dimensions in mm