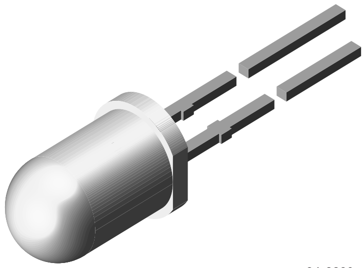
High Speed IR Emitting Diode in ∅ 5 mm (T-1¾) Package

Description

TSFF5410 is a high speed infrared emitting diode in GaAlAs on GaAlAs double hetero (DH) technology, molded in a clear, untinted plastic package.

DH technology combines high speed with high radiant power at wavelength of 870 nm.



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Features

- High modulation bandwidth (23 MHz)
- Extra high radiant power and radiant intensity
- Low forward voltage
- Suitable for high pulse current operation
- Standard T-1¾ (∅ 5 mm) package
- Angle of half intensity $\varphi = \pm 22°$
- Peak wavelength $\lambda_p = 870$ nm
- High reliability
- Good spectral matching to Si photodetectors
- Lead-free device

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.

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	250	mW
Junction Temperature		T_j	100	°C
Operating Temperature Range		T_{amb}	- 25 to + 85	°C
Storage Temperature Range		T_{stg}	- 25 to + 85	°C
Soldering Temperature	t ≤ 5 sec, 2 mm from case	T_{sd}	260	°C
Thermal Resistance Junction/ Ambient		R_{thJA}	300	K/W

Electrical 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	1.8	V
	I_F = 1 A, t_p = 100 µs	V_F		2.3	3.0	V
Temp. Coefficient of V_F	I_F = 100 mA	TK_{VF}		-2.1		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		125		pF

Optical Characteristics

T_{amb} = 25 °C, unless otherwise specified

Parameter	Test condition	Symbol	Min	Typ.	Max	Unit
Radiant Intensity	I_F = 100 mA, t_p = 20 ms	I_e	40	70	200	mW/sr
	I_F = 1 A, t_p = 100 µs	I_e		700		mW/sr
Radiant Power	I_F = 100 mA, t_p = 20 ms	ϕ_e		50		mW
Temp. Coefficient of ϕ_e	I_F = 100 mA	$TK_{\phi e}$		-0.35		%/K
Angle of Half Intensity		φ		±22		deg
Peak Wavelength	I_F = 100 mA	λ_p		870		nm
Spectral Bandwidth	I_F = 100 mA	Δλ		40		nm
Temp. Coefficient of λ_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		23		MHz
Virtual Source Diameter		∅		2.1		mm

Typical Characteristics (T_{amb} = 25 °C unless otherwise specified)

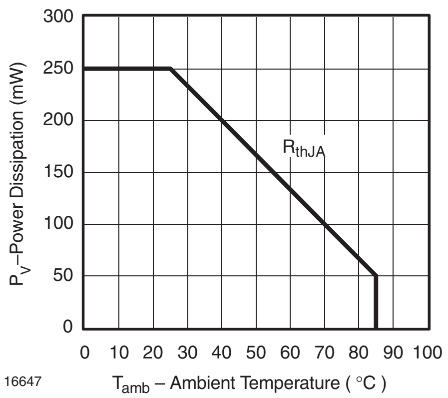

Figure 1. Power Dissipation vs. Ambient Temperature

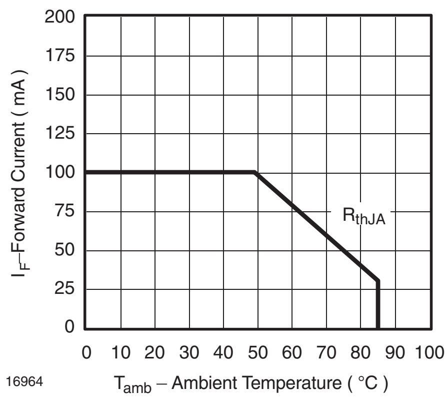

Figure 2. Forward Current vs. Ambient Temperature

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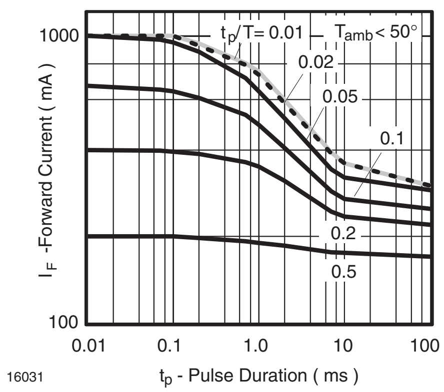


Figure 3. Pulse Forward Current vs. Pulse Duration

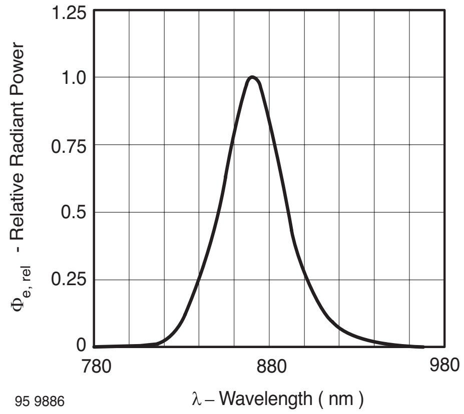


Figure 6. Relative Radiant Power vs. Wavelength

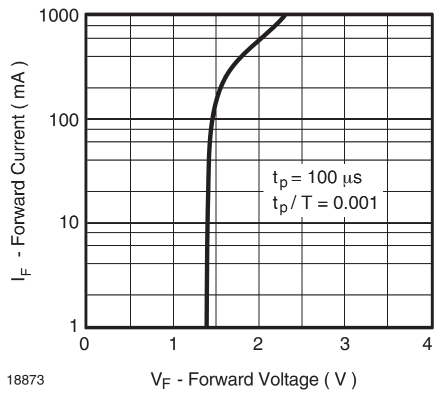


Figure 4. Forward Current vs. Forward Voltage

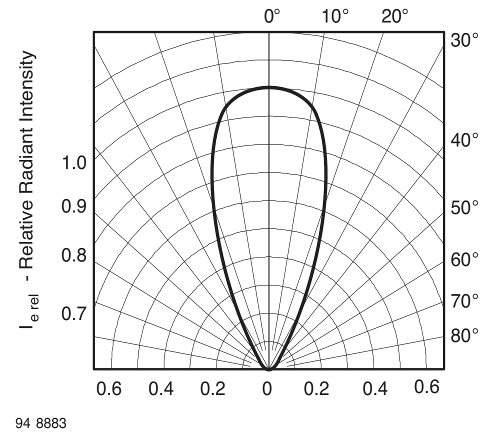


Figure 7. Relative Radiant Intensity vs. Angular Displacement

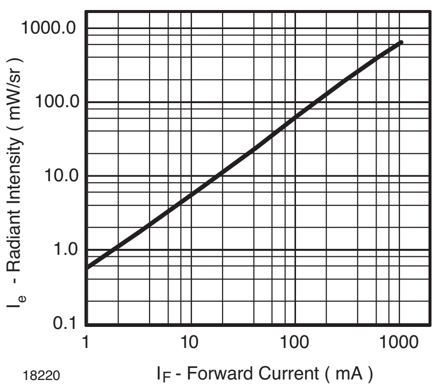


Figure 5. Radiant Intensity vs. Forward Current

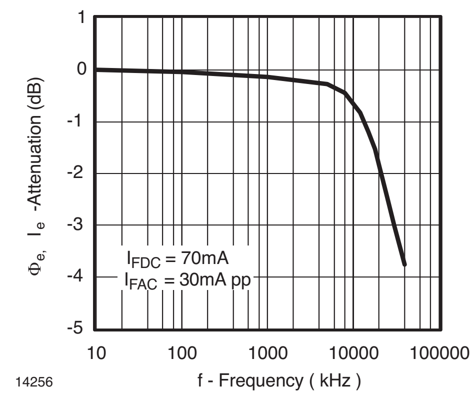
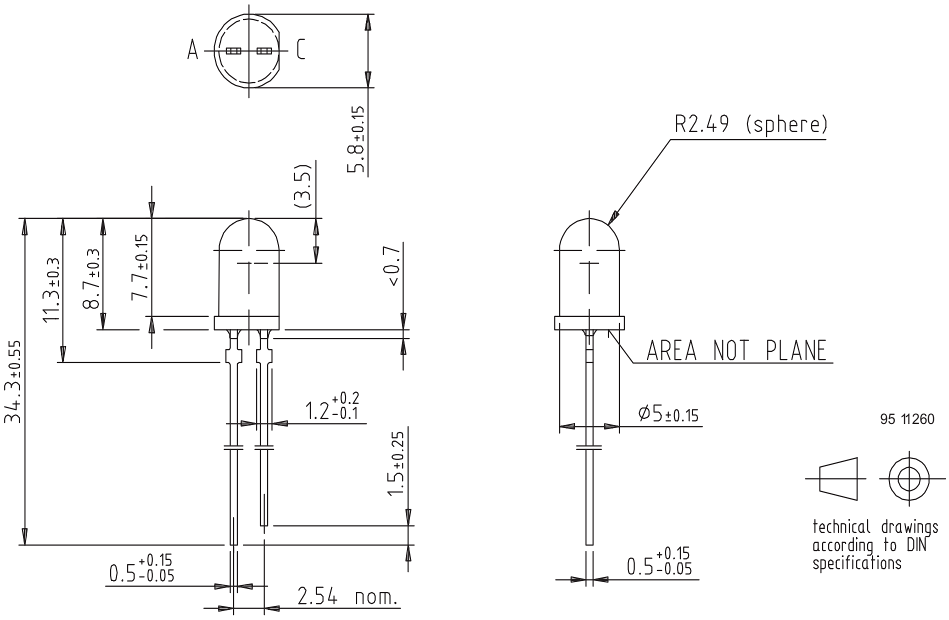


Figure 8. Attenuation vs. Frequency

Package Dimensions in mm



Ozone Depleting Substances Policy Statement

It is the policy of **Vishay Semiconductor GmbH** to

1. Meet all present and future national and international statutory requirements.
2. Regularly and continuously improve the performance of our products, processes, distribution and operatingsystems with respect to their impact on the health and safety of our employees and the public, as well as their impact on the environment.

It is particular concern to control or eliminate releases of those substances into the atmosphere which are known as ozone depleting substances (ODSs).

The Montreal Protocol (1987) and its London Amendments (1990) intend to severely restrict the use of ODSs and forbid their use within the next ten years. Various national and international initiatives are pressing for an earlier ban on these substances.

Vishay Semiconductor GmbH has been able to use its policy of continuous improvements to eliminate the use of ODSs listed in the following documents.

1. Annex A, B and list of transitional substances of the Montreal Protocol and the London Amendments respectively
2. Class I and II ozone depleting substances in the Clean Air Act Amendments of 1990 by the Environmental Protection Agency (EPA) in the USA
3. Council Decision 88/540/EEC and 91/690/EEC Annex A, B and C (transitional substances) respectively.

Vishay Semiconductor GmbH can certify that our semiconductors are not manufactured with ozone depleting substances and do not contain such substances.

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