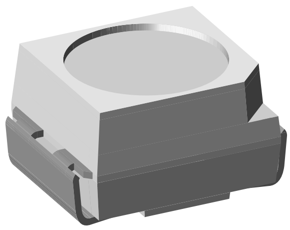
High Speed Infrared Emitting Diode, 870 nm, GaAlAs Double Hetero

Description

TSMF3700 is a high speed infrared emitting diode in GaAlAs on GaAlAs double hetero (DH) technology in a miniature PL-CC-2 SMD package.

It has been designed to meet the increasing demand on optoelectronic devices for surface mounting.

The package consists of a lead frame which is surrounded with a white thermoplast. The reflector inside the package is filled up with clear epoxy.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Features

- SMT IRED with extra high radiant power
- Low forward voltage
- Compatible with automatic placement equipment
- EIA and ICE standard package
- Suitable for infrared, vapor phase and wavesolder process
- Available in 8 mm tape
- Suitable for pulse current operation
- Extra wide angle of half intensity $\varphi = \pm 60°$
- Peak wavelength λ_p = 870 nm
- High reliability
- Lead-free component
- Component in accordance to RoHS 2002/95/EC and WEEE 2002/96/EC

Applications

Infrared source in tactile keyboards

IR diode in low space applications

High performance PCB mounted infrared sensors

High power infrared emitter for miniature light barriers

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	$t_p/T = 0.5$, $t_p = 100\ \mu s$	I_{FM}	200	mA
Surge Forward Current	$t_p = 100\ \mu s$	I_{FSM}	1	A
Power Dissipation		P_V	160	mW
Junction Temperature		T_j	100	°C
Operating Temperature Range		T_{amb}	- 55 to + 100	°C
Storage Temperature Range		T_{stg}	- 55 to + 100	°C
Soldering Temperature	$t \leq 10$ sec	T_{sd}	260	°C
Thermal Resistance Junction/ Ambient		R_{thJA}	450	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		1.4	1.7	V
	I_F = 1 A, t_p = 100 µs	V_F		2.4		V
Temp. Coefficient of V_F	I_F = 100 mA	TK_{VF}		- 1.7		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

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	5	7	25	mW/sr
	I_F = 1 A, t_p = 100 µs	I_e		60		mW/sr
Radiant Power	I_F = 100 mA, t_p = 20 ms	ϕ_e		32		mW
Temp. Coefficient of ϕ_e	I_F = 100 mA	$TK\phi_e$		- 0.8		%/K
Angle of Half Intensity		φ		± 60		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
Fall Time	I_F = 100 mA	t_f		30		ns
Virtual Source Diameter		∅		0.5		mm

Typical Characteristics (Tamb = 25 °C unless otherwise specified)

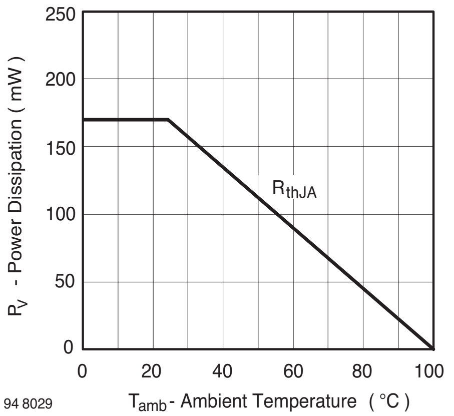


Figure 1. Power Dissipation vs. Ambient Temperature

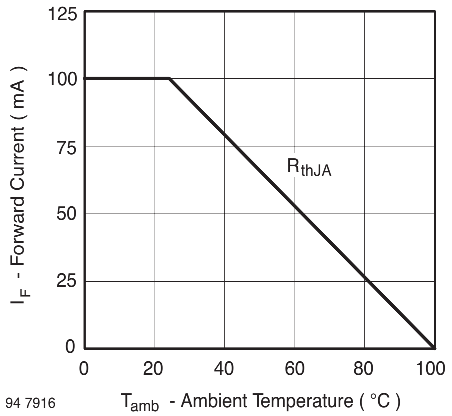


Figure 2. Forward Current vs. Ambient Temperature

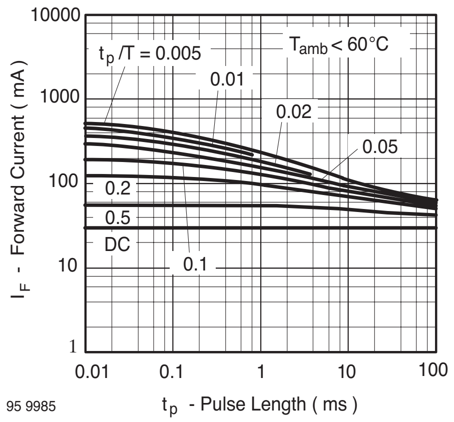


Figure 3. Pulse Forward Current vs. Pulse Duration

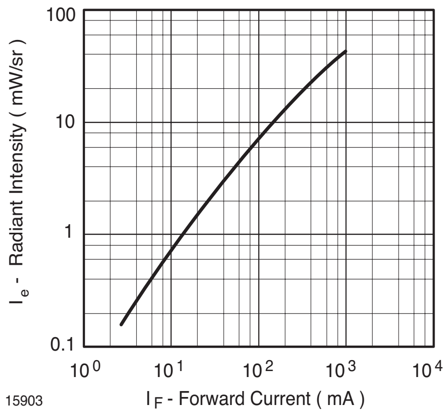


Figure 6. Radiant Intensity vs. Forward Current

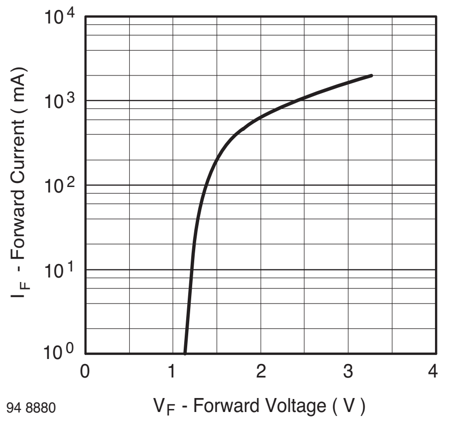


Figure 4. Forward Current vs. Forward Voltage

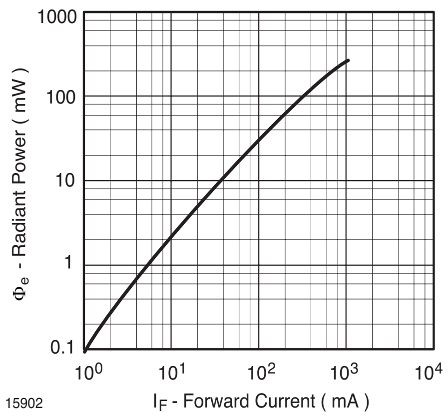


Figure 7. Radiant Power vs. Forward Current

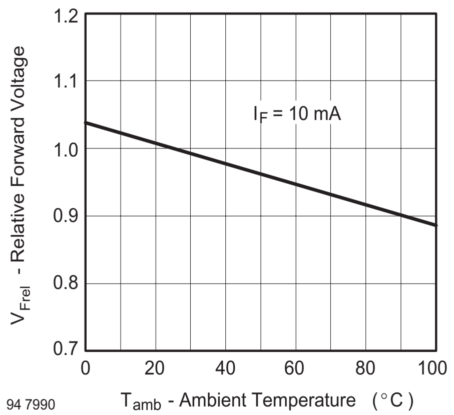


Figure 5. Relative Forward Voltage vs. Ambient Temperature

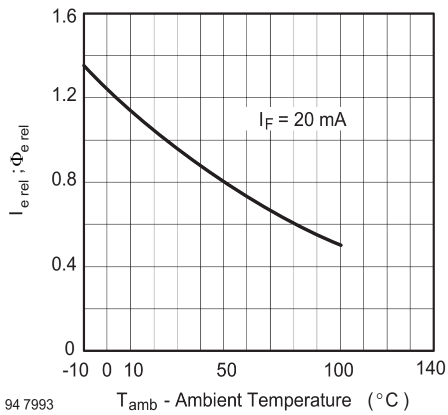


Figure 8. Rel. Radiant Intensity/Power vs. Ambient Temperature

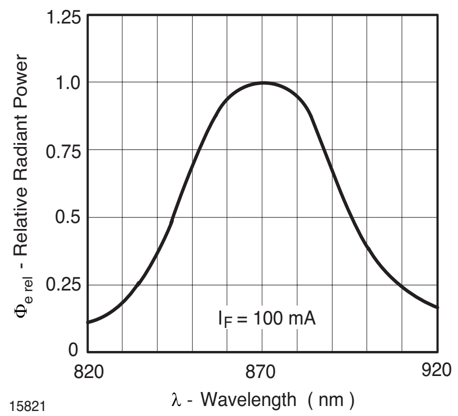


Figure 9. Relative Radiant Power vs. Wavelength

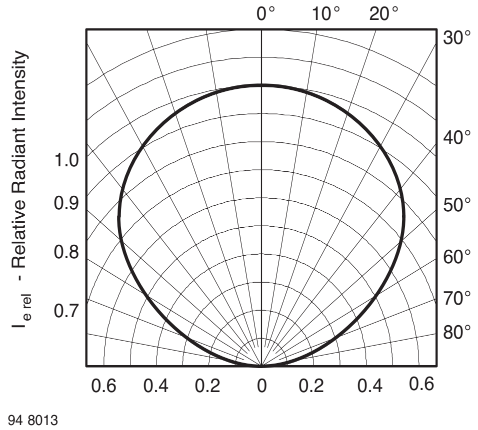
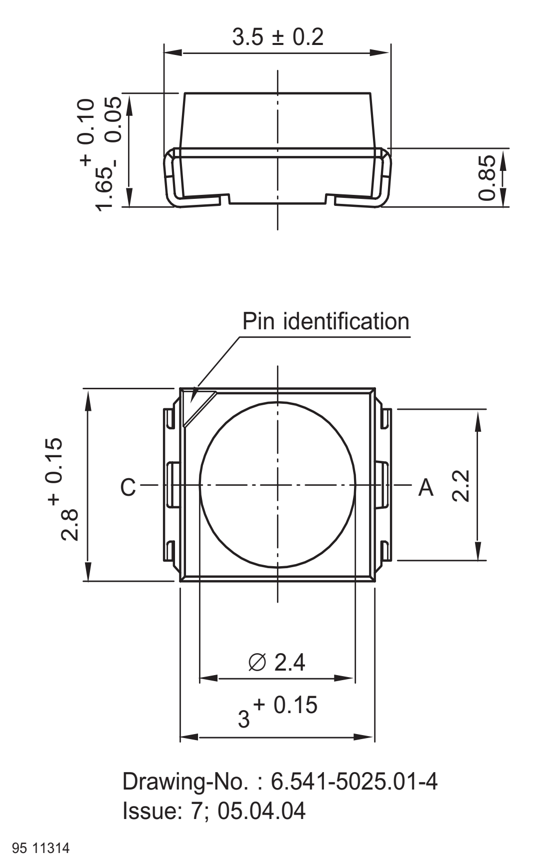
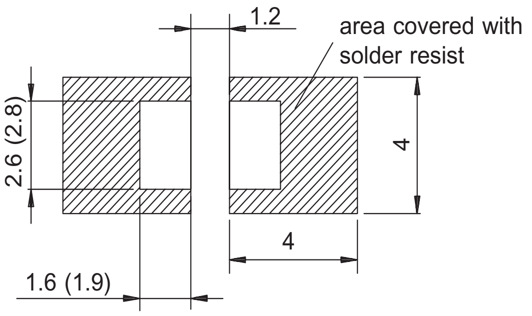


Figure 10. Relative Radiant Intensity vs. Angular Displacement

Package Dimensions in mm



Mounting Pad Layout



Dimensions: IR and Vaporphase
(Wave Soldering)

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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