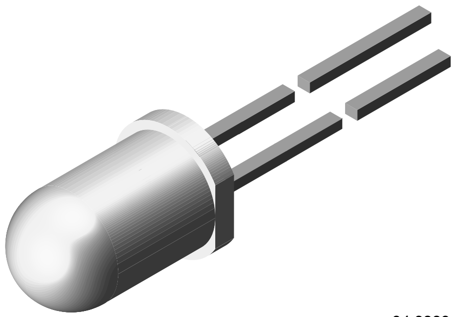
Infrared Emitting Diode, 950 nm, GaAs

Description

TSUS540. series are infrared emitting diodes in standard GaAs on GaAs technology, molded in a clear, blue-grey tinted plastic package. The devices are spectrally matched to silicon photodiodes and phototransistors.



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Features

- Low cost emitter
- Low forward voltage
- High radiant power and radiant intensity
- Suitable for DC and high pulse current operation
- Standard T-1¾ (∅ 5 mm) package
- Comfortable angle of half intensity $\varphi = \pm 22°$
- Peak wavelength $\lambda_p = 950$ nm
- High reliability
- Good spectral matching to Si photodetectors
- Lead (Pb)-free component
- Component in accordance to RoHS 2002/95/EC and WEEE 2002/96/EC

Pb Pb-free

e2

Applications

- Infrared remote control and free air transmission systems with low forward voltage and comfortable radiation angle requirements in combination with PIN photodiodes or phototransistors.

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	150	mA
Peak forward current	$t_p/T = 0.5$, $t_p = 100$ µs	I_{FM}	300	mA
Surge forward current	$t_p = 100$ µs	I_{FSM}	2.5	A
Power dissipation		P_V	210	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 ≤ 5 sec, 2 mm from case	T_{sd}	260	°C
Thermal Resistance junction/ ambient		R_{thJA}	375	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		1.3	1.7	V
Temp. coefficient of V_F	I_F = 100 mA	TK_{VF}		- 1.3		mV/K
Reverse current	V_R = 5 V	I_R			100	µA
Junction capacitance	V_R = 0 V, f = 1 MHz, E = 0	C_j		30		pF

Optical Characteristics

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

Parameter	Test condition	Symbol	Min	Typ.	Max	Unit
Temp. coefficient of ϕ_e	I_F = 20 mA	$TK\phi_e$		- 0.8		%/K
Angle of half intensity		φ		± 22		deg
Peak wavelength	I_F = 100 mA	λ_p		950		nm
Spectral bandwidth	I_F = 100 mA	$\Delta\lambda$		50		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		800		ns
	I_F = 1.5 A	t_r		400		ns
Fall time	I_F = 100 mA	t_f		800		ns
	I_F = 1.5 A	t_f		400		ns
Virtual source diameter		∅		2.9		mm

Type Dedicated Characteristics

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

Parameter	Test condition	Part	Symbol	Min	Typ.	Max	Unit
Forward voltage	I_F = 1.5 A, t_p = 100 µs	TSUS5400	V_F		2.2	3.4	V
		TSUS5401	V_F		2.2	3.4	V
		TSUS5402	V_F		2.2	2.7	V
Radiant intensity	I_F = 100 mA, t_p = 20 ms	TSUS5400	I_e	7	14	35	mW/sr
		TSUS5401	I_e	10	17	35	mW/sr
		TSUS5402	I_e	15	20	35	mW/sr
	I_F = 1.5 A, t_p = 100 µs	TSUS5400	I_e	60	140		mW/sr
		TSUS5401	I_e	85	160		mW/sr
		TSUS5402	I_e	120	190		mW/sr
Radiant power	I_F = 100 mA, t_p = 20 ms	TSUS5400	ϕ_e		13		mW
		TSUS5401	ϕ_e		14		mW
		TSUS5402	ϕ_e		15		mW

Typical Characteristics

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

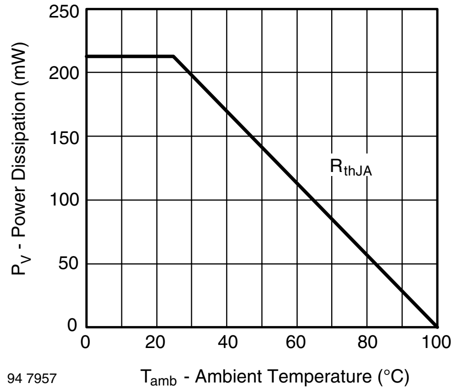


Figure 1. Power Dissipation vs. Ambient Temperature

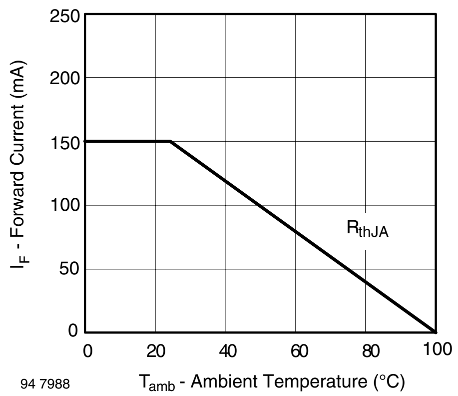


Figure 2. Forward Current vs. Ambient Temperature

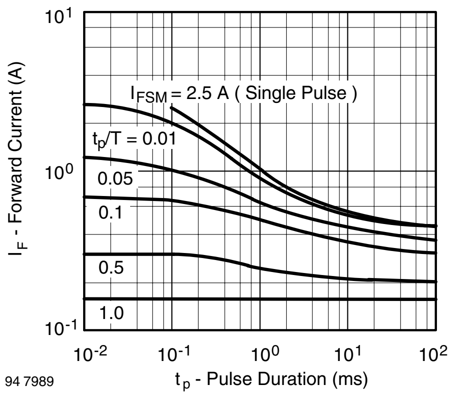


Figure 3. Pulse Forward Current vs. Pulse Duration

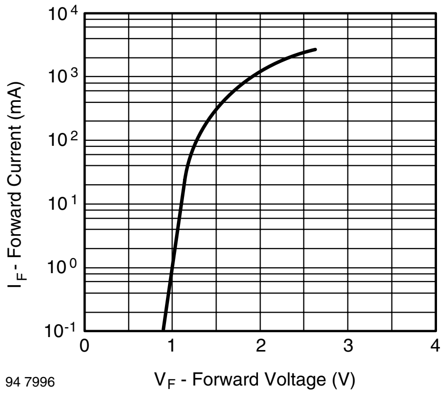


Figure 4. Forward Current vs. Forward Voltage

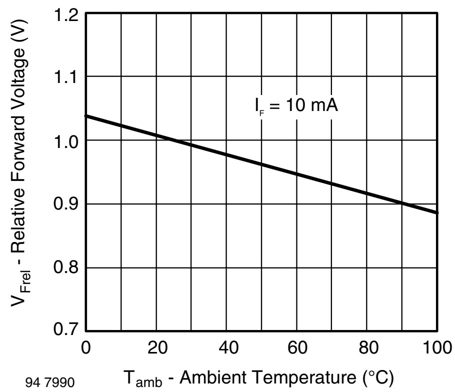


Figure 5. Relative Forward Voltage vs. Ambient Temperature

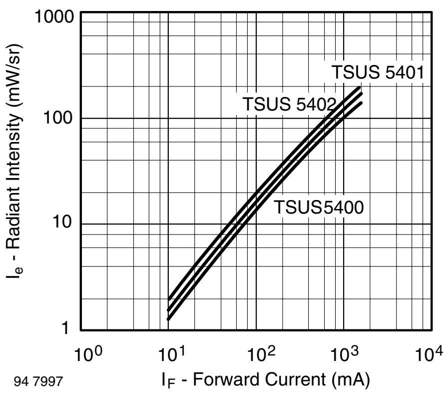


Figure 6. Radiant Intensity vs. Forward Current

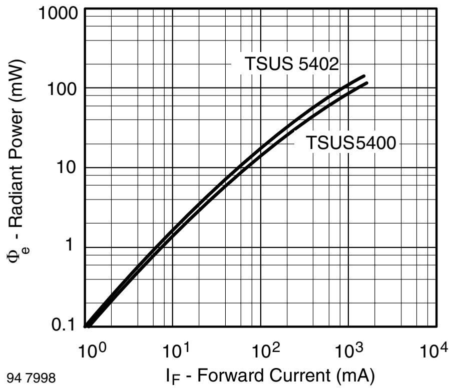


Figure 7. Radiant Power vs. Forward Current

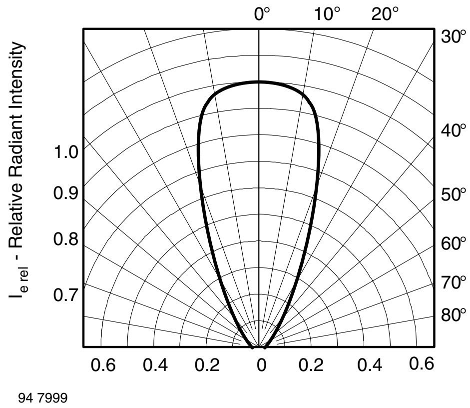


Figure 10. Relative Radiant Intensity vs. Angular Displacement

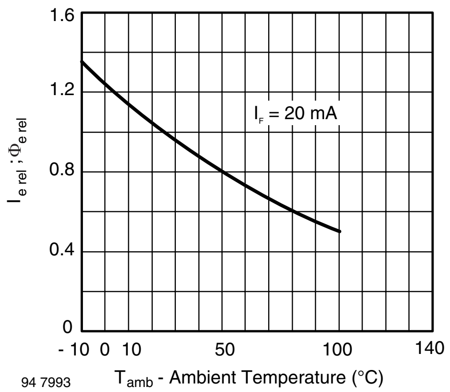


Figure 8. Rel. Radiant Intensity/Power vs. Ambient Temperature

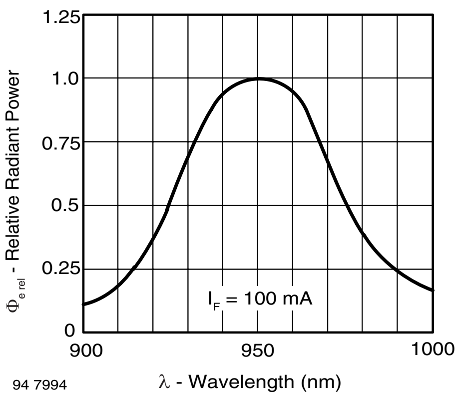
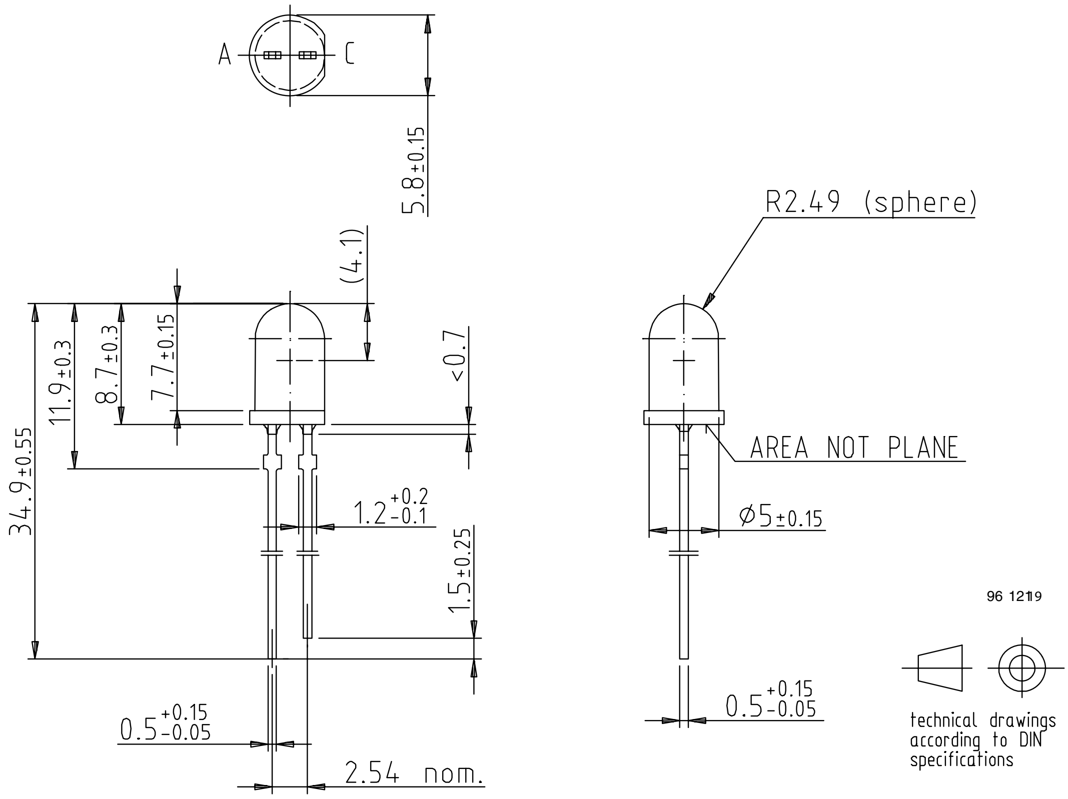


Figure 9. Relative Radiant Power vs. Wavelength

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 operating systems 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.

Vishay Semiconductor GmbH, P.O.B. 3535, D-74025 Heilbronn, Germany

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