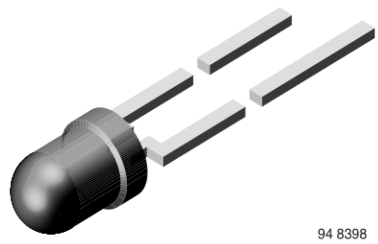
High Speed Infrared Emitting Diode, 870 nm, GaAIAs Double Hetero



Description

The TSHA44..series are high efficiency infrared emitting diodes in GaAIAs on GaAIAs technology, molded in a clear, untinted plastic package.

In comparison with the standard GaAs on GaAs technology these high intensity emitters feature about 50 % radiant power improvement.

Features

- Extra high radiant power
- High radiant intensity for long transmission distance
- Suitable for high pulse current operation
- Standard T-1(∅ 3 mm) package for low space application
- Angle of half intensity $\varphi = \pm 20°$
- Peak wavelength λ_p = 875 nm
- High reliability
- Good spectral matching to Si photodetectors
- Lead-free component
- Component in accordance to RoHS 2002/95/EC and WEEE 2002/96/EC

Applications

Infrared remote control and free air transmission systems with high power requirements in combination with PIN photodiodes or phototransistors.

Because of the very low radiance absorption in glass at the wavelength of 875 nm, this emitter series is also suitable for systems with panes in the transmission range between emitter and detector.

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}	2	A
Power Dissipation		P_V	180	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	$t \leq 5$ sec, 2 mm from case	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		1.5	1.8	V
	I_F = 1.5 A, t_p = 100 µs	V_F		3.2	4.9	V
Temp. Coefficient of V_F	I_F = 100 mA	TK_{VF}		- 1.6		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		20		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 = 100 mA	$TK\phi_e$		- 0.7		%/K
Angle of Half Intensity		φ		± 20		deg
Peak Wavelength	I_F = 100 mA	λ_p		875		nm
Spectral Bandwidth	I_F = 100 mA	$\Delta\lambda$		80		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		600		ns
	I_F = 1.5 A	t_r		300		ns
Fall Time	I_F = 100 mA	t_f		600		ns
	I_F = 1.5 A	t_f		300		ns
Virtual Source Diameter		∅		1.8		mm

Type Dedicated Characteristics

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

Parameter	Test condition	Part	Symbol	Min	Typ.	Max	Unit
Radiant Intensity	I_F = 100 mA, t_p = 20 ms	TSHA4400	I_e	12	20	60	mW/sr
		TSHA4401	I_e	16	30	60	mW/sr
	I_F = 1.5 mA, t_p = 100 µs	TSHA4400	I_e	140	240		mW/sr
		TSHA4401	I_e	190	360		mW/sr
Radiant Power	I_F = 100 mA, t_p = 20 ms	TSHA4400	ϕ_e		20		mW
		TSHA4401	ϕ_e		24		mW

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

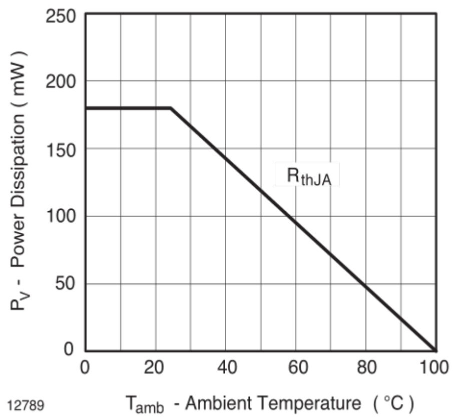


Figure 1. Power Dissipation vs. Ambient Temperature

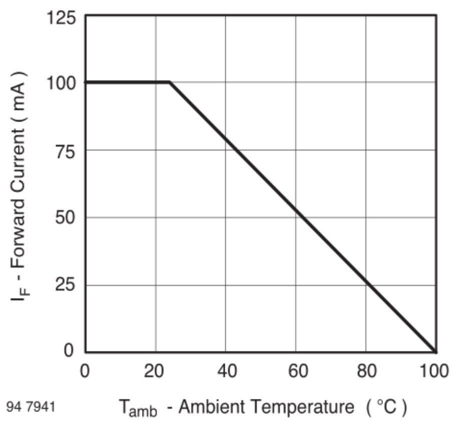


Figure 2. Forward Current vs. Ambient Temperature

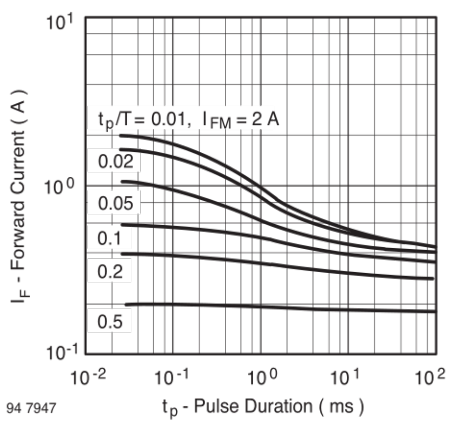


Figure 3. Pulse Forward Current vs. Pulse Duration

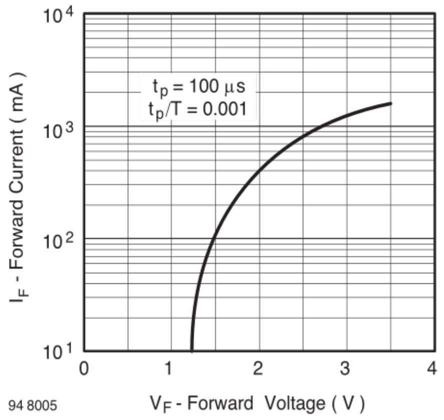


Figure 4. Forward Current vs. Forward Voltage

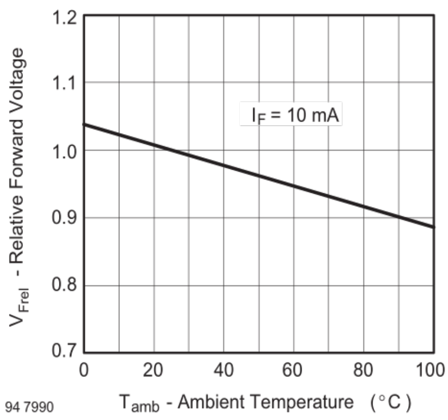


Figure 5. Relative Forward Voltage vs. Ambient Temperature

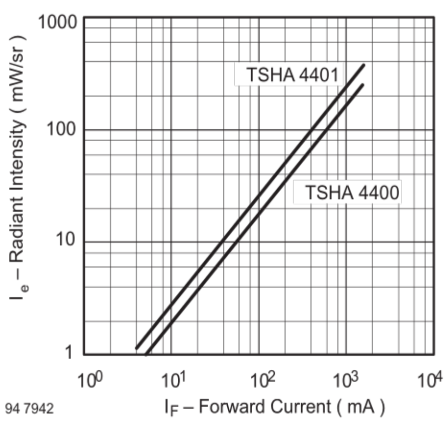


Figure 6. Radiant Intensity vs. Forward Current

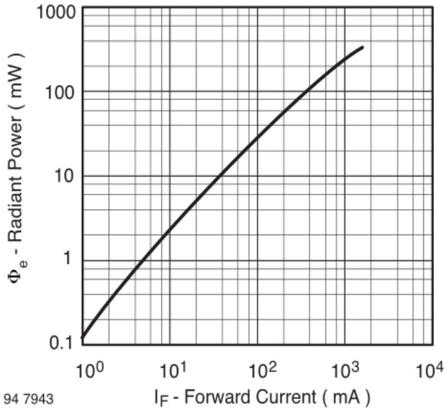


Figure 7. Radiant Power vs. Forward Current

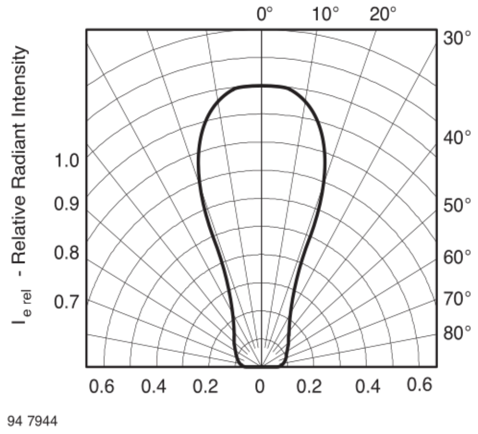


Figure 10. Relative Radiant Intensity vs. Angular Displacement

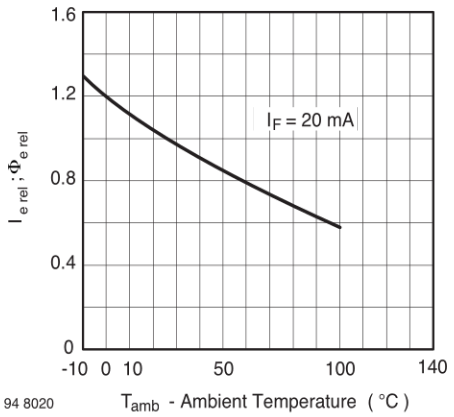


Figure 8. Rel. Radiant Intensity/Power vs. Ambient Temperature

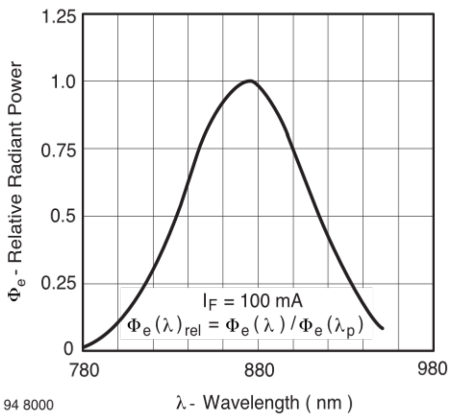
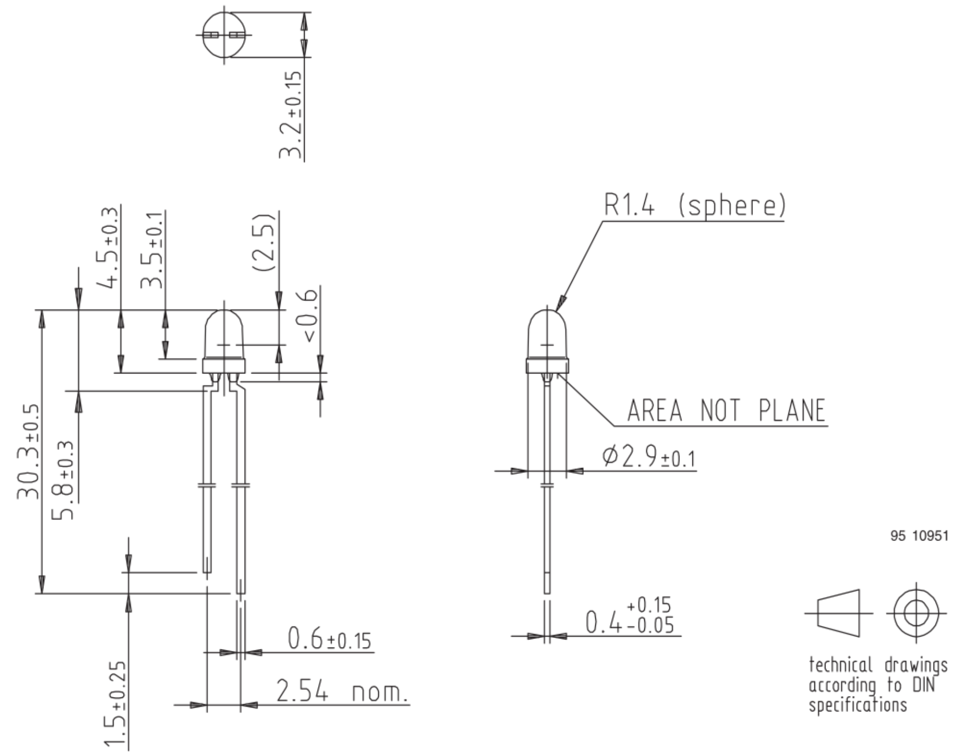


Figure 9. Relative Radiant Power vs. Wavelength

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 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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