

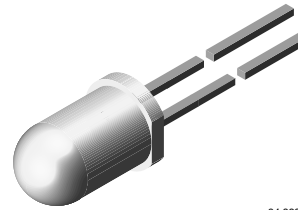
## High Speed Infrared Emitting Diode, 870 nm, GaAlAs Double Hetero

### Description

The TSHA620. series are high efficiency infrared emitting diodes in GaAlAs on GaAlAs technology, molded in a clear, untinted plastic package.

In comparison with the standard GaAs on GaAs technology these high intensity emitters feature about 70 % radiant power improvement.

In contrast to the TSHA520. series lead stand-offs are omitted.



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### Features

- Extra high radiant power and radiant intensity
- Suitable for high pulse current operation
- Standard T-1 $\frac{3}{4}$  ( $\varnothing$  5 mm) package
- Leads formed without stand-off
- Angle of half intensity  $\varphi = \pm 12^\circ$
- Peak wavelength  $\lambda_p = 875$  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



### Applications

- Infrared remote control and free air transmission systems with high power and long transmission distance requirements in combination with PIN photodiodes or phototransistors.
- Because of the reduced 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

$T_{amb} = 25^\circ\text{C}$ , unless otherwise specified

Parameter	Test condition	Symbol	Value	Unit
Reverse voltage		$V_R$	5	V
Forward current		$I_F$	100	mA
Peak forward current	$t_p/T = 0.5$ , $t_p = 100 \mu\text{s}$	$I_{FM}$	200	mA
Surge forward current	$t_p = 100 \mu\text{s}$	$I_{FSM}$	2.5	A
Power dissipation		$P_V$	210	mW
Junction temperature		$T_j$	100	$^\circ\text{C}$
Operating temperature range		$T_{amb}$	- 55 to + 100	$^\circ\text{C}$
Storage temperature range		$T_{stg}$	- 55 to + 100	$^\circ\text{C}$
Soldering temperature	$t \leq 5$ sec, 2 mm from case	$T_{sd}$	260	$^\circ\text{C}$
Thermal resistance junction/ambient		$R_{thJA}$	350	K/W

### Electrical Characteristics

$T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified

Parameter	Test condition	Symbol	Min	Typ.	Max	Unit
Forward voltage	$I_F = 100\text{ mA}$ , $t_p = 20\text{ ms}$	$V_F$		1.5	1.8	V
Temp. coefficient of $V_F$	$I_F = 100\text{ mA}$	$TK_{V_F}$		- 1.6		mV/K
Reverse current	$V_R = 5\text{ V}$	$I_R$			100	$\mu\text{A}$
Junction capacitance	$V_R = 0\text{ V}$ , $f = 1\text{ MHz}$ , $E = 0$	$C_j$		20		pF

### Optical Characteristics

$T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified

Parameter	Test condition	Symbol	Min	Typ.	Max	Unit
Temp. coefficient of $\phi_e$	$I_F = 20\text{ mA}$	$TK_{\phi_e}$		- 0.7		%/K
Angle of half intensity		$\phi$		$\pm 12$		deg
Peak wavelength	$I_F = 100\text{ mA}$	$\lambda_p$		875		nm
Spectral bandwidth	$I_F = 100\text{ mA}$	$\Delta\lambda$		80		nm
Temp. coefficient of $\lambda_p$	$I_F = 100\text{ mA}$	$TK_{\lambda_p}$		0.2		nm/K
Rise time	$I_F = 100\text{ mA}$	$t_r$		600		ns
	$I_F = 1.5\text{ A}$	$t_r$		300		ns
Fall time	$I_F = 100\text{ mA}$	$t_f$		600		ns
	$I_F = 1.5\text{ A}$	$t_f$		300		ns
Virtual source diameter		$\emptyset$		3.7		mm

### Type Dedicated Characteristics

$T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified

Parameter	Test condition	Part	Symbol	Min	Typ.	Max	Unit
Forward voltage	$I_F = 1.5\text{ A}$ , $t_p = 100\text{ }\mu\text{s}$	TSHA6200	$V_F$		3.2	4.9	V
		TSHA6201	$V_F$		3.2	4.9	V
		TSHA6202	$V_F$		3.2	4.5	V
		TSHA6203	$V_F$		3.2	4.5	V
Radiant intensity	$I_F = 100\text{ mA}$ , $t_p = 20\text{ ms}$	TSHA6200	$I_e$	25	40	125	mW/sr
		TSHA6201	$I_e$	30	50	125	mW/sr
		TSHA6202	$I_e$	36	60	125	mW/sr
		TSHA6203	$I_e$	50	65	125	mW/sr
	$I_F = 1.5\text{ A}$ , $t_p = 100\text{ }\mu\text{s}$	TSHA6200	$I_e$	300	500		mW/sr
		TSHA6201	$I_e$	400	600		mW/sr
		TSHA6202	$I_e$	500	700		mW/sr
		TSHA6203	$I_e$	600	800		mW/sr
Radiant power	$I_F = 100\text{ mA}$ , $t_p = 20\text{ ms}$	TSHA6200	$\phi_e$		22		mW
		TSHA6201	$\phi_e$		23		mW
		TSHA6202	$\phi_e$		24		mW
		TSHA6203	$\phi_e$		25		mW

## Typical Characteristics

$T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified

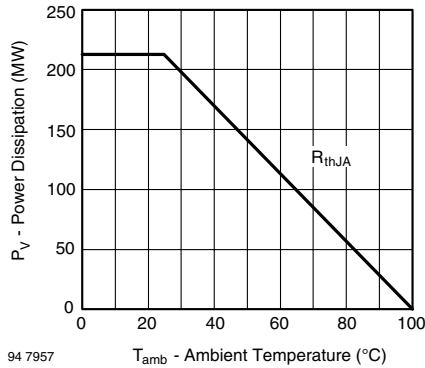


Figure 1. Power Dissipation vs. Ambient Temperature

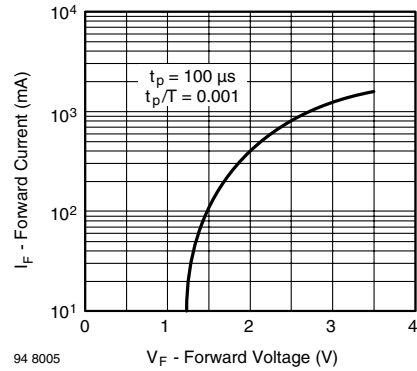


Figure 4. Forward Current vs. Forward Voltage

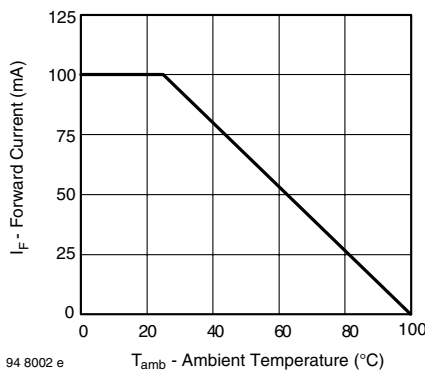


Figure 2. Forward Current vs. Ambient Temperature

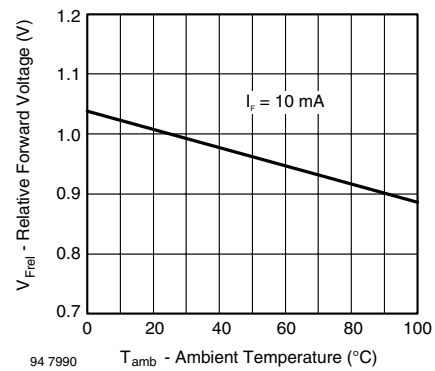


Figure 5. Relative Forward Voltage vs. Ambient Temperature

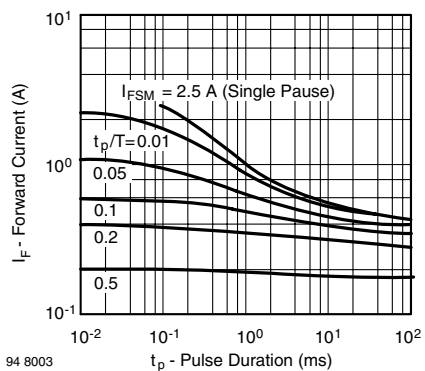


Figure 3. Pulse Forward Current vs. Pulse Duration

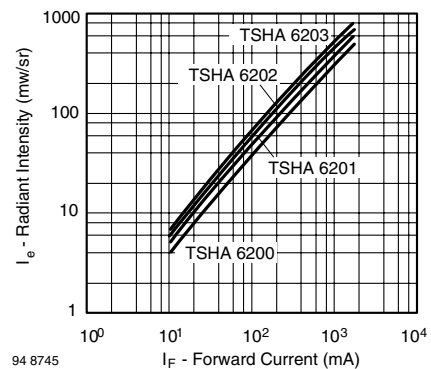


Figure 6. Radiant Intensity vs. Forward Current

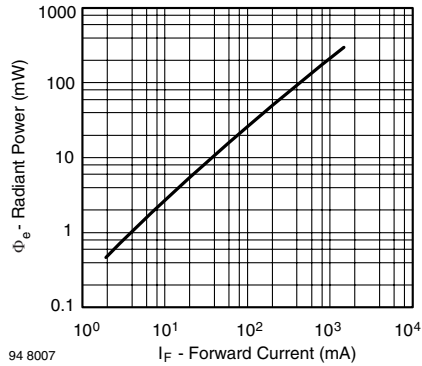


Figure 7. Radiant Power vs. Forward Current

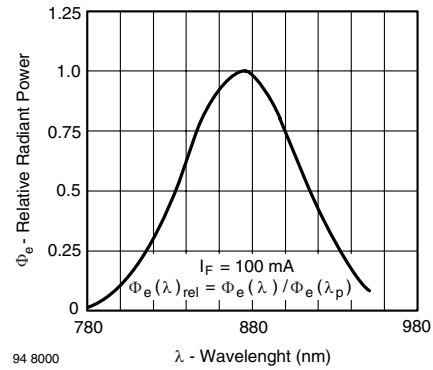


Figure 9. Relative Radiant Power vs. Wavelength

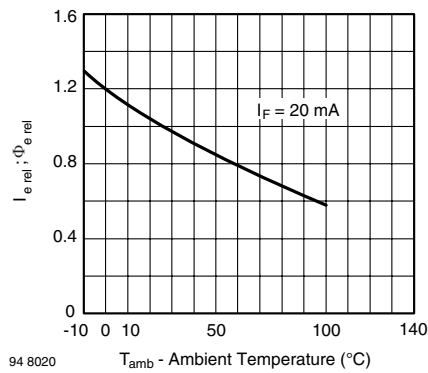


Figure 8. Rel. Radiant Intensity/Power vs. Ambient Temperature

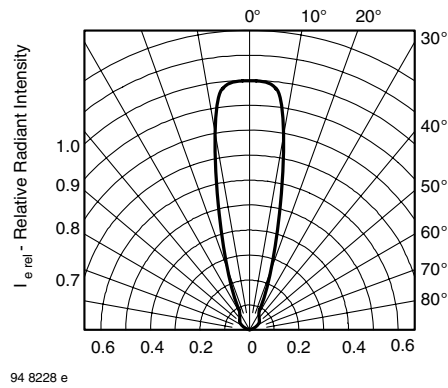
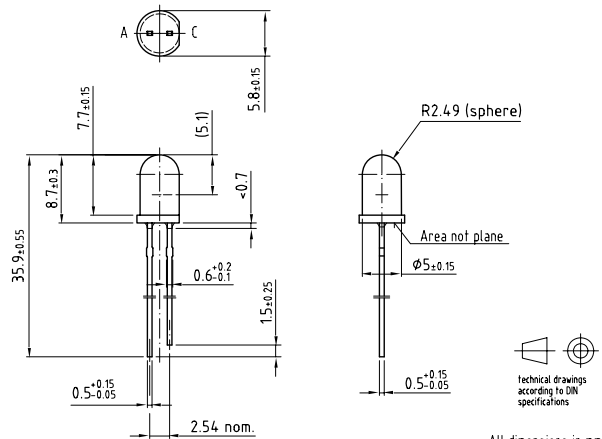


Figure 10. Relative Radiant Intensity vs. Angular Displacement

## Package Dimensions in mm



Drawing-No.: 6.544-5259.04-4  
Issue: 6; 04.07.03

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## Ozone Depleting Substances Policy Statement

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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.

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and may do so without further notice.

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