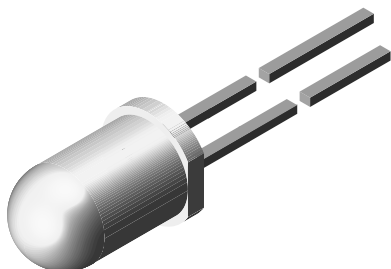


## Infrared Emitting Diode, RoHS Compliant, 875 nm, GaAlAs



94 8389

### DESCRIPTION

The TSHA650. series are infrared, 875 nm emitting diodes in GaAlAs technology, molded in a clear, untinted plastic package.

### FEATURES

- Package type: leaded
- Package form: T-1 $\frac{3}{4}$
- Dimensions (in mm):  $\varnothing$  5
- Peak wavelength:  $\lambda_p = 875$  nm
- High reliability
- Angle of half intensity:  $\varphi = \pm 24^\circ$
- Low forward voltage
- Suitable for high pulse current operation
- Good spectral matching with Si photodetectors
- Lead (Pb)-free component in accordance with RoHS 2002/95/EC and WEEE 2002/96/EC



**RoHS**  
COMPLIANT

### APPLICATIONS

- Infrared remote control and free air data transmission systems with comfortable radiation angle
- This emitter series is dedicated to systems with panes in transmission space between emitter and detector, because of the low absorption of 875 nm radiation in glass

### PRODUCT SUMMARY

COMPONENT	$I_e$ (mW/sr)	$\varphi$ (deg)	$\lambda_p$ (nm)	$t_r$ (ns)
TSHA6500	20	$\pm 24$	875	600
TSHA6501	25	$\pm 24$	875	600
TSHA6502	30	$\pm 24$	875	600
TSHA6503	35	$\pm 24$	875	600

#### Note

Test conditions see table "Basic Characteristics"

### ORDERING INFORMATION

ORDERING CODE	PACKAGING	REMARKS	PACKAGE FORM
TSHA6500	Bulk	MOQ: 4000 pcs, 4000 pcs/bulk	T-1 $\frac{3}{4}$
TSHA6501	Bulk	MOQ: 4000 pcs, 4000 pcs/bulk	T-1 $\frac{3}{4}$
TSHA6502	Bulk	MOQ: 4000 pcs, 4000 pcs/bulk	T-1 $\frac{3}{4}$
TSHA6503	Bulk	MOQ: 4000 pcs, 4000 pcs/bulk	T-1 $\frac{3}{4}$

#### Note

MOQ: minimum order quantity

### ABSOLUTE MAXIMUM RATINGS

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	$t_p = 100 \mu s$	$I_{FSM}$	2.5	A
Power dissipation		$P_V$	180	mW



# TSHA6500, TSHA6501, TSHA6502, TSHA6503

Infrared Emitting Diode, RoHS Compliant, Vishay Semiconductors  
875 nm, GaAlAs

ABSOLUTE MAXIMUM RATINGS				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Junction temperature		$T_j$	100	$^{\circ}\text{C}$
Operating temperature range		$T_{\text{amb}}$	- 40 to + 85	$^{\circ}\text{C}$
Storage temperature range		$T_{\text{stg}}$	- 40 to + 100	$^{\circ}\text{C}$
Soldering temperature	$t \leq 5$ s, 2 mm from case	$T_{\text{sd}}$	260	$^{\circ}\text{C}$
Thermal resistance junction/ambient	J-STD-051, leads 7 mm, soldered on PCB	$R_{\text{thJA}}$	230	K/W

**Note**

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

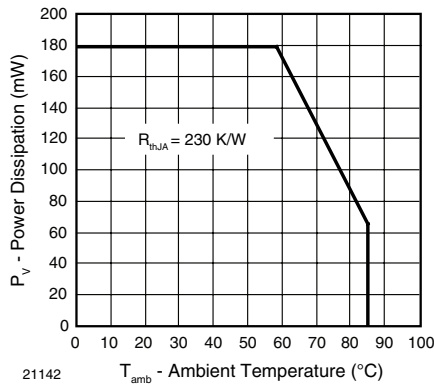


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

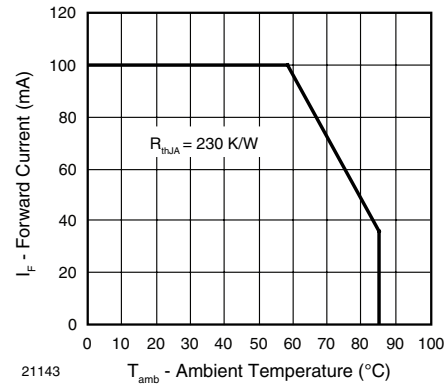


Fig. 2 - Forward Current Limit vs. Ambient Temperature

BASIC CHARACTERISTICS						
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
Temperature coefficient of $V_F$	$I_F = 100$ mA	$\text{TK}_{V_F}$		- 1.6		mV/K
Reverse current	$V_R = 5$ V	$I_R$			100	$\mu\text{A}$
Junction capacitance	$V_R = 0$ V, $f = 1$ MHz, $E = 0$	$C_j$		20		pF
Temperature coefficient of $\phi_e$	$I_F = 20$ mA	$\text{TK}_{\phi_e}$		- 0.7		%/K
Angle of half intensity		$\varphi$		$\pm 24$		deg
Peak wavelength	$I_F = 100$ mA	$\lambda_p$		875		nm
Spectral bandwidth	$I_F = 100$ mA	$\Delta\lambda$		80		nm
Temperature coefficient of $\lambda_p$	$I_F = 100$ mA	$\text{TK}_{\lambda_p}$		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		$d$		2.2		mm

**Note**

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

# TSHA6500, TSHA6501, TSHA6502, TSHA6503



Vishay Semiconductors Infrared Emitting Diode, RoHS Compliant,  
875 nm, GaAlAs

TYPE DEDICATED CHARACTERISTICS							
PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
Forward voltage	$I_F = 1.5 \text{ A}$ , $t_p = 100 \mu\text{s}$	TSHA6500	$V_F$		3.2	4.9	V
		TSHA6501	$V_F$		3.2	4.9	V
		TSHA6502	$V_F$		3.2	4.5	V
		TSHA6503	$V_F$		3.2	4.5	V
Radiant intensity	$I_F = 100 \text{ mA}$ , $t_p = 20 \text{ ms}$	TSHA6500	$I_e$	12	20	60	mW/sr
		TSHA6501	$I_e$	16	25	60	mW/sr
		TSHA6502	$I_e$	20	30	60	mW/sr
		TSHA6503	$I_e$	24	35	60	mW/sr
	$I_F = 1.5 \text{ A}$ , $t_p = 100 \mu\text{s}$	TSHA6500	$I_e$	150	240		mW/sr
		TSHA6501	$I_e$	200	300		mW/sr
		TSHA6502	$I_e$	250	360		mW/sr
		TSHA6503	$I_e$	300	420		mW/sr
Radiant power	$I_F = 100 \text{ mA}$ , $t_p = 20 \text{ ms}$	TSHA6500	$\phi_e$		22		mW
		TSHA6501	$\phi_e$		23		mW
		TSHA6502	$\phi_e$		24		mW
		TSHA6503	$\phi_e$		25		mW

**Note**

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

**BASIC CHARACTERISTICS**

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

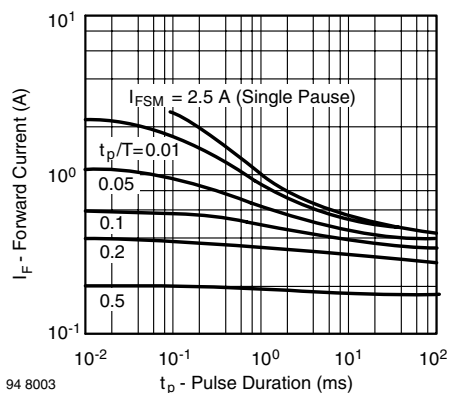


Fig. 3 - Pulse Forward Current vs. Pulse Duration

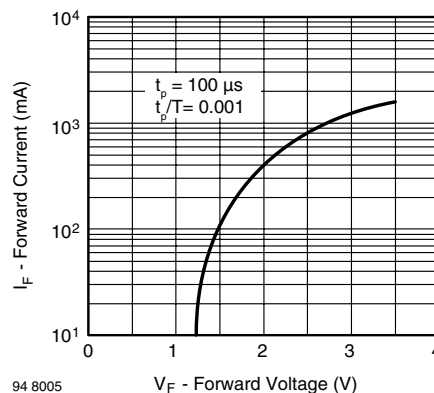


Fig. 4 - Forward Current vs. Forward Voltage



# TSHA6500, TSHA6501, TSHA6502, TSHA6503

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875 nm, GaAlAs

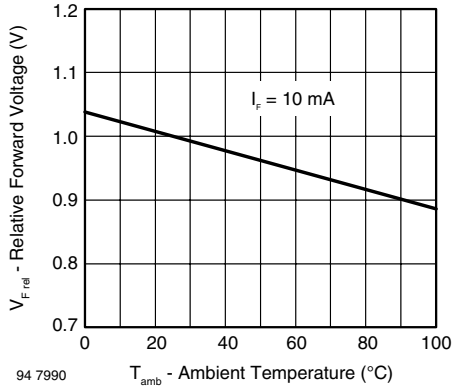


Fig. 5 - Relative Forward Voltage vs. Ambient Temperature

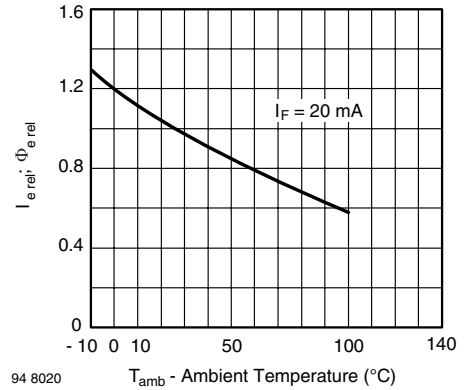


Fig. 8 - Relative Radiant Intensity/Power vs. Ambient Temperature

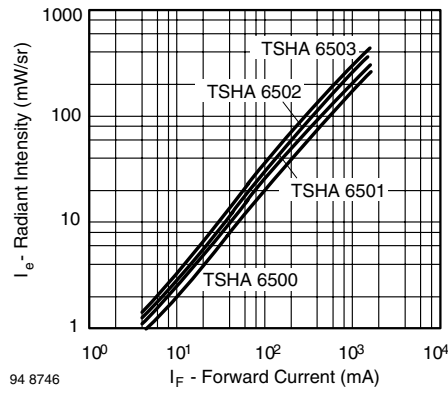


Fig. 6 - Radiant Intensity vs. Forward Current

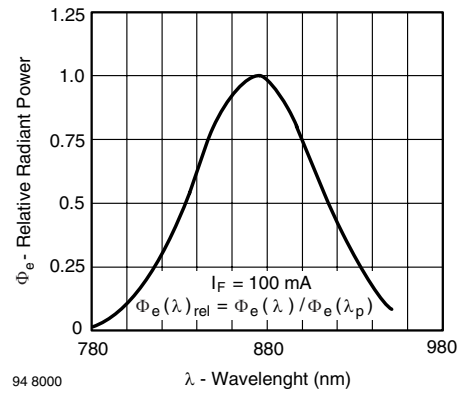


Fig. 9 - Relative Radiant Power vs. Wavelength

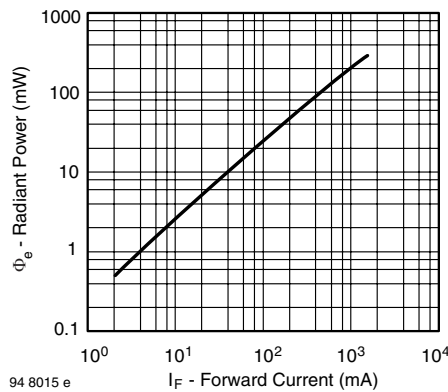


Fig. 7 - Radiant Power vs. Forward Current

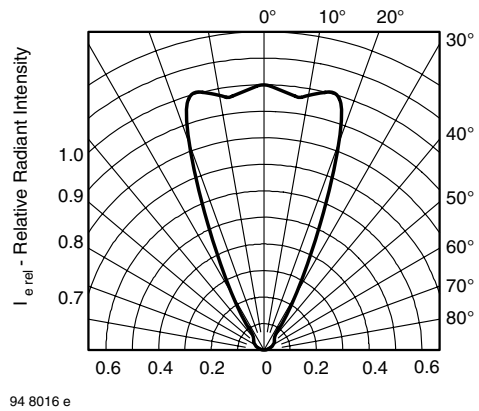


Fig. 10 - Relative Radiant Intensity vs. Angular Displacement

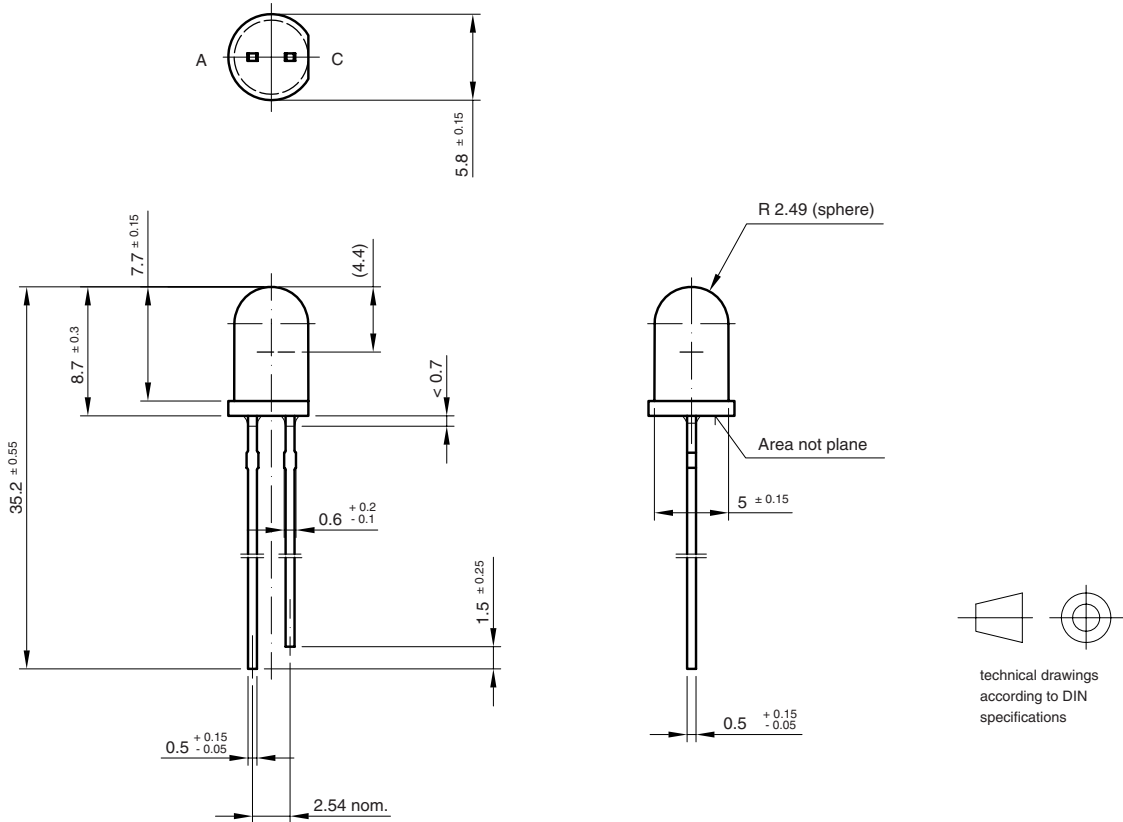
# TSHA6500, TSHA6501, TSHA6502, TSHA6503

Vishay Semiconductors

Infrared Emitting Diode, RoHS Compliant,  
875 nm, GaAlAs



## PACKAGE DIMENSIONS in millimeters



6.544-5259.08-4  
Issue: 2; 25.08.98  
14436



## Disclaimer

All product specifications and data are subject to change without notice.

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