

## **Excellent Integrated System Limited**

Stocking Distributor

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[Vishay Semiconductor/Opto Division](#)  
[TSHA4400](#)

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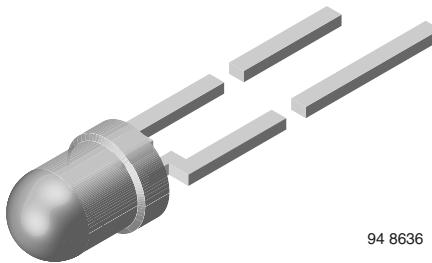
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## TSHA4400, TSHA4401

Vishay Semiconductors

### Infrared Emitting Diode, 875 nm, GaAlAs

#### FEATURES



94 8636



**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**  
**GREEN**  
(S-2008)

- Package type: leaded
- Package form: T-1
- Dimensions (in mm): Ø 3
- Peak wavelength:  $\lambda_p = 875$  nm
- High reliability
- Angle of half intensity:  $\phi = \pm 20^\circ$
- Low forward voltage
- Suitable for high pulse current operation
- Good spectral matching with Si photodetectors
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)

#### DESCRIPTION

The TSHA440 series are infrared, 875 nm emitting diodes in GaAlAs technology, molded in a clear, untinted plastic package.

#### 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 <sub>e</sub> (mW/sr)	φ (deg)	λ <sub>p</sub> (nm)	t <sub>r</sub> (ns)
TSHA4400	20	± 20	875	600
TSHA4401	30	± 20	875	600

#### Note

- Test conditions see table "Basic Characteristics"

ORDERING INFORMATION			
ORDERING CODE	PACKAGING	REMARKS	PACKAGE FORM
TSHA4400	Bulk	MOQ: 5000 pcs, 5000 pcs/bulk	T-1
TSHA4401	Bulk	MOQ: 5000 pcs, 5000 pcs/bulk	T-1

#### Note

- MOQ: minimum order quantity

ABSOLUTE MAXIMUM RATINGS (T <sub>amb</sub> = 25 °C, unless otherwise specified)				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Reverse voltage		V <sub>R</sub>	5	V
Forward current		I <sub>F</sub>	100	mA
Peak forward current	t <sub>p</sub> /T = 0.5, t <sub>p</sub> = 100 µs	I <sub>FM</sub>	200	mA
Surge forward current	t <sub>p</sub> = 100 µs	I <sub>FSM</sub>	2	A
Power dissipation		P <sub>V</sub>	180	mW
Junction temperature		T <sub>j</sub>	100	°C
Operating temperature range		T <sub>amb</sub>	-40 to +85	°C
Storage temperature range		T <sub>stg</sub>	-40 to +100	°C
Soldering temperature	t ≤ 5 s, 2 mm from case	T <sub>sd</sub>	260	°C
Thermal resistance junction/ambient	J-STD-051, leads 7 mm, soldered on PCB	R <sub>thJA</sub>	300	K/W



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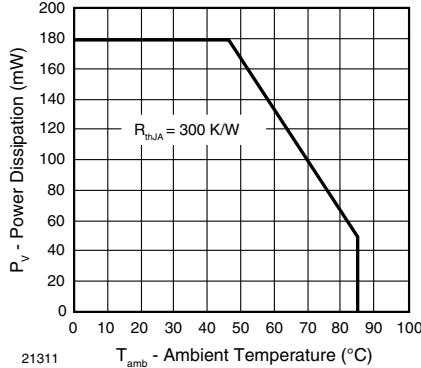


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

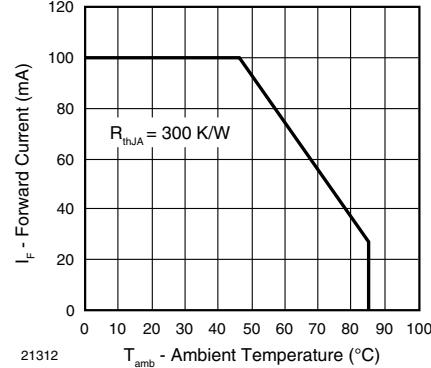


Fig. 2 - Forward Current Limit vs. Ambient Temperature

### BASIC CHARACTERISTICS ( $T_{amb} = 25^\circ\text{C}$ , 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
	$I_F = 1.5 \text{ A}, t_p = 100 \mu\text{s}$	$V_F$		3.2	4.9	V
Temperature coefficient of $V_F$	$I_F = 100 \text{ mA}$	$TK_{VF}$		-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
Temperature coefficient of $\phi_e$	$I_F = 100 \text{ mA}$	$TK\phi_e$		-0.7		%/K
Angle of half intensity		$\phi$		$\pm 20$		deg
Peak wavelength	$I_F = 100 \text{ mA}$	$\lambda_p$		875		nm
Spectral bandwidth	$I_F = 100 \text{ mA}$	$\Delta\lambda$		80		nm
Temperature 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		$d$		1.8		mm

### TYPE DEDICATED CHARACTERISTICS ( $T_{amb} = 25^\circ\text{C}$ , unless otherwise specified)

PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
Radiant intensity	$I_F = 100 \text{ mA}, t_p = 20 \text{ ms}$	TSHA4400	$I_e$	12	20	60	$\text{mW/sr}$
		TSHA4401	$I_e$	16	30	60	$\text{mW/sr}$
	$I_F = 1.5 \text{ mA}, t_p = 100 \mu\text{s}$	TSHA4400	$I_e$	140	240		$\text{mW/sr}$
		TSHA4401	$I_e$	190	360		$\text{mW/sr}$
Radiant power	$I_F = 100 \text{ mA}, t_p = 20 \text{ ms}$	TSHA4400	$\phi_e$		20		$\text{mW}$
		TSHA4401	$\phi_e$		24		$\text{mW}$

**BASIC CHARACTERISTICS** ( $T_{amb} = 25^{\circ}C$ , unless otherwise specified)

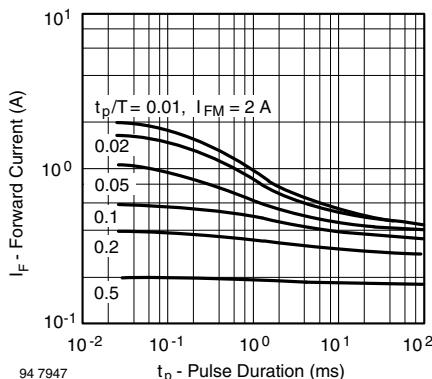


Fig. 3 - Pulse Forward Current vs. Pulse Duration

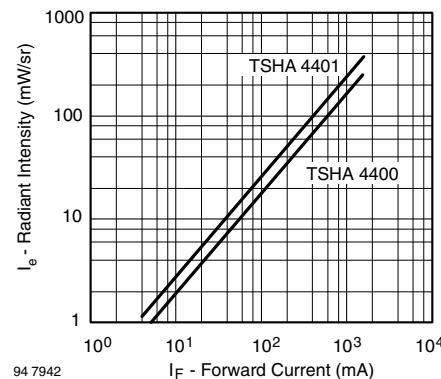


Fig. 6 - Radiant Intensity vs. Forward Current

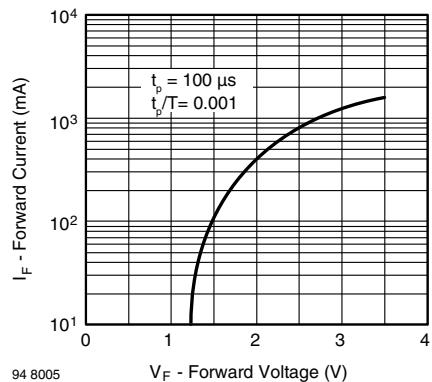


Fig. 4 - Forward Current vs. Forward Voltage

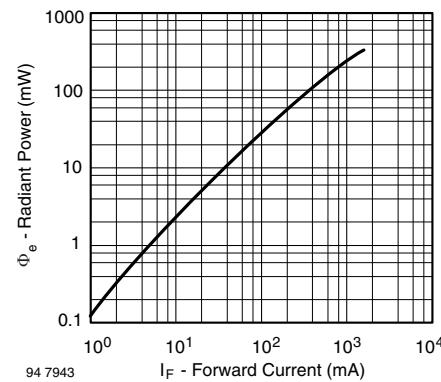


Fig. 7 - Radiant Power vs. Forward Current

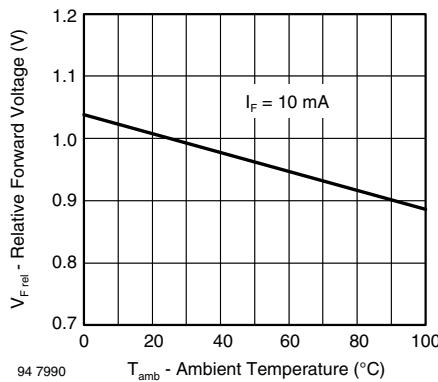


Fig. 5 - Relative Forward Voltage vs. Ambient Temperature

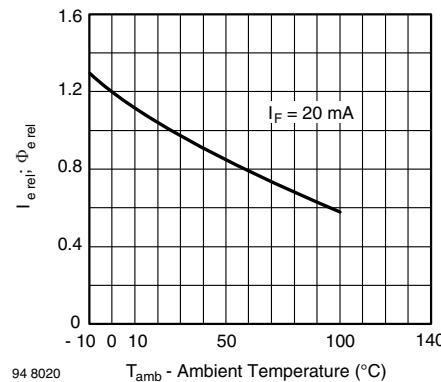


Fig. 8 - Relative Radiant Intensity/Power vs. Ambient Temperature

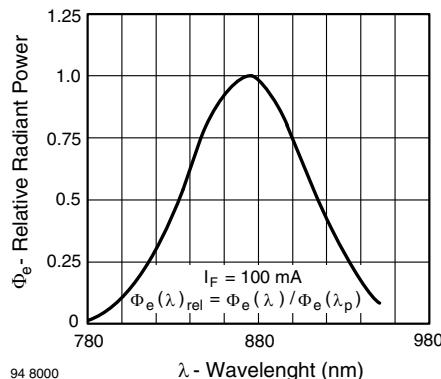


Fig. 9 - Relative Radiant Power vs. Wavelength

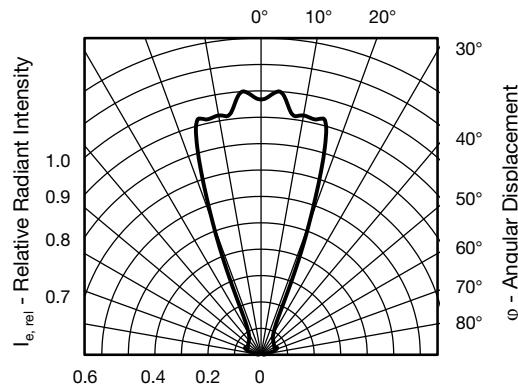
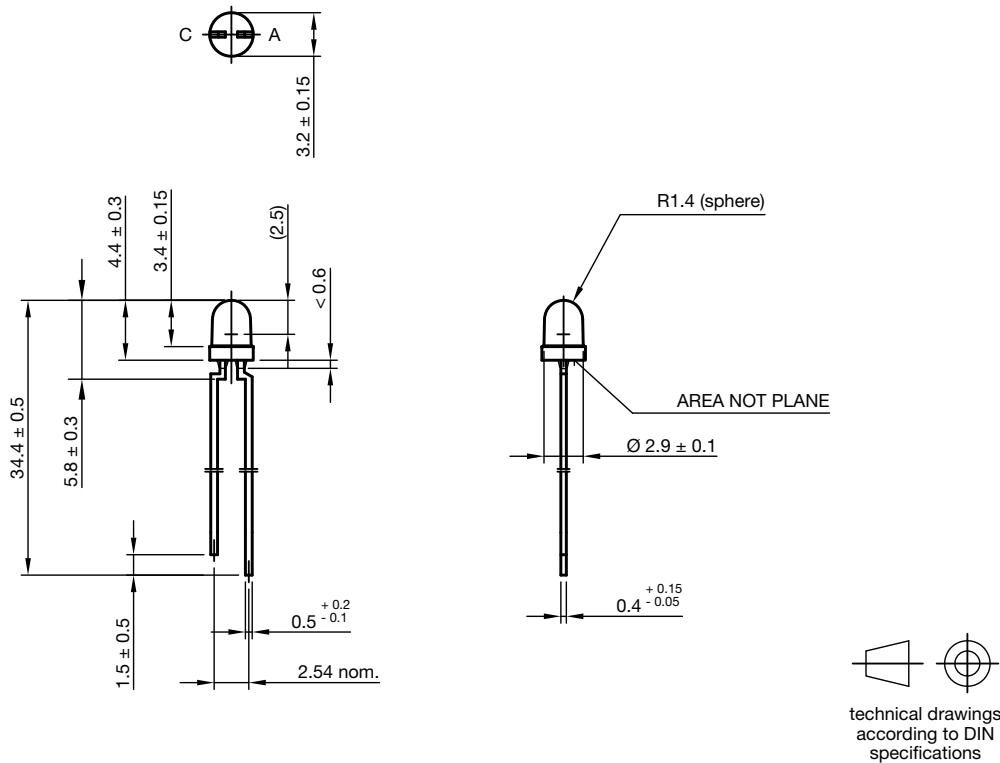


Fig. 10 - Relative Radiant Intensity vs. Angular Displacement

**PACKAGE DIMENSIONS** in millimeters



Drawing-No.: 6.544-5264.01-4  
Issue: 4; 28.07.14

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