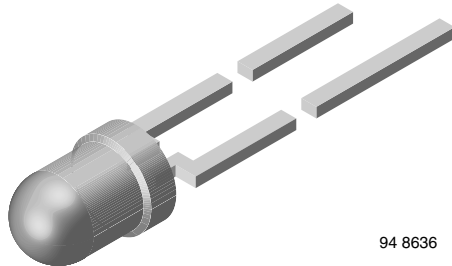


## Infrared Emitting Diode, RoHS Compliant, 875 nm, GaAlAs



94 8636

### DESCRIPTION

The TSHA4400 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
- Dimensions (in mm):  $\varnothing 3$
- Peak wavelength:  $\lambda_p = 875$  nm
- High reliability
- Angle of half intensity:  $\varphi = \pm 20^\circ$
- 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)
TSHA4400	20	$\pm 20$	875	600
TSHA4401	30	$\pm 20$	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

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	$^\circ C$
Operating temperature range		$T_{amb}$	- 40 to + 85	$^\circ C$
Storage temperature range		$T_{stg}$	- 40 to + 100	$^\circ C$
Soldering temperature	$t \leq 5$ s, 2 mm from case	$T_{sd}$	260	$^\circ C$
Thermal resistance junction/ambient	J-STD-051, leads 7 mm, soldered on PCB	$R_{thJA}$	300	K/W

#### Note

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

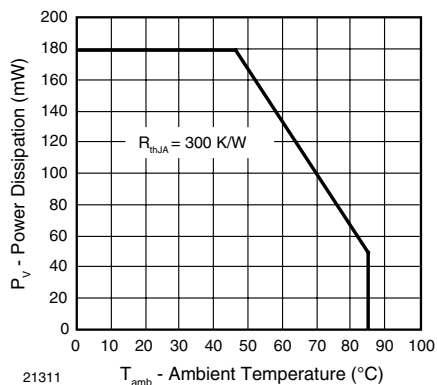


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

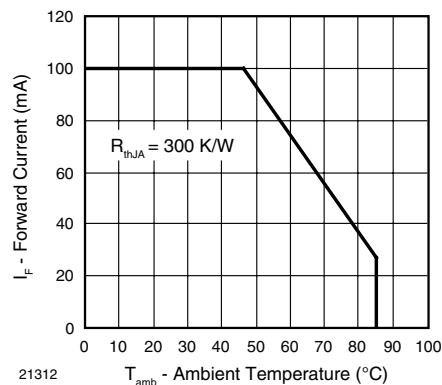


Fig. 2 - Forward Current Limit vs. Ambient Temperature

BASIC CHARACTERISTICS						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Forward voltage	$I_F = 100 \text{ mA}$ , $t_p = 20 \text{ ms}$	$V_F$		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 $V_F$	$I_F = 100 \text{ mA}$	$TK_{V_F}$		-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
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

**Note**

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

TYPE DEDICATED CHARACTERISTICS							
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	mW/sr
		TSHA4401	$I_e$	16	30	60	mW/sr
	$I_F = 1.5 \text{ mA}$ , $t_p = 100 \mu\text{s}$	TSHA4400	$I_e$	140	240		mW/sr
		TSHA4401	$I_e$	190	360		mW/sr
Radiant power	$I_F = 100 \text{ mA}$ , $t_p = 20 \text{ ms}$	TSHA4400	$\phi_e$		20		mW
		TSHA4401	$\phi_e$		24		mW

**Note**

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



## BASIC CHARACTERISTICS

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

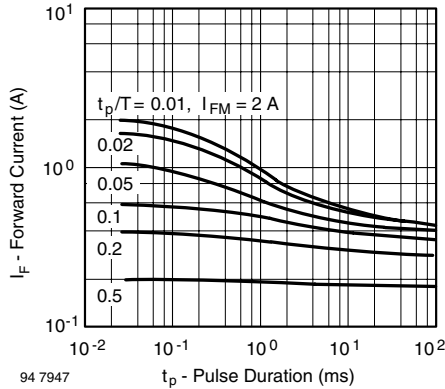


Fig. 3 - Pulse Forward Current vs. Pulse Duration

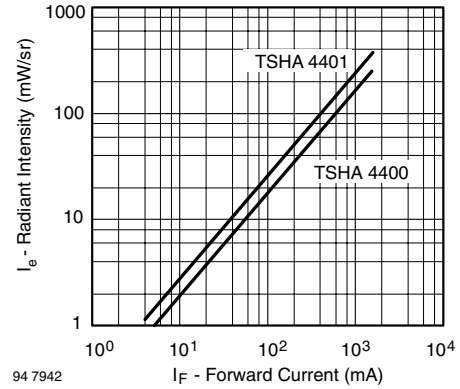


Fig. 6 - Radiant Intensity vs. Forward Current

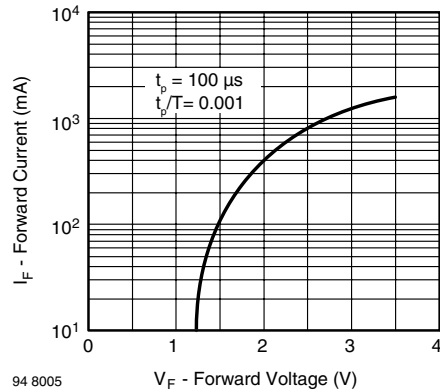


Fig. 4 - Forward Current vs. Forward Voltage

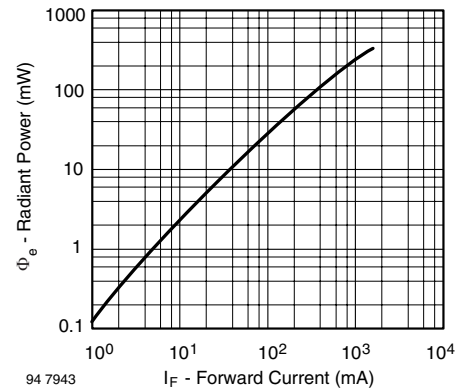


Fig. 7 - Radiant Power vs. Forward Current

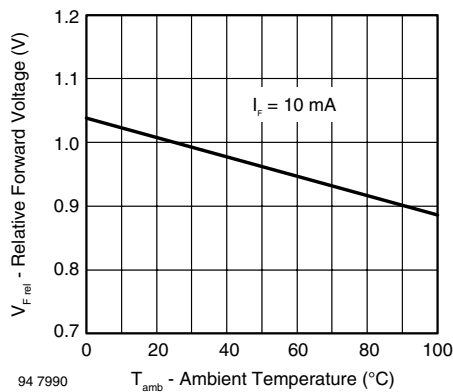


Fig. 5 - Relative Forward Voltage vs. Ambient Temperature

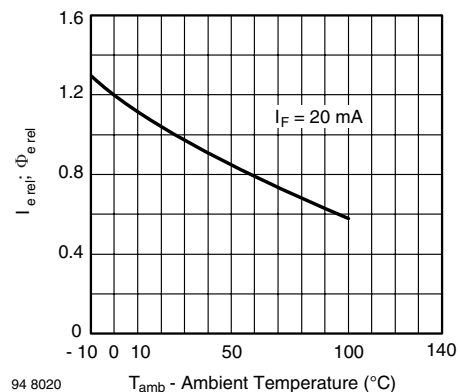
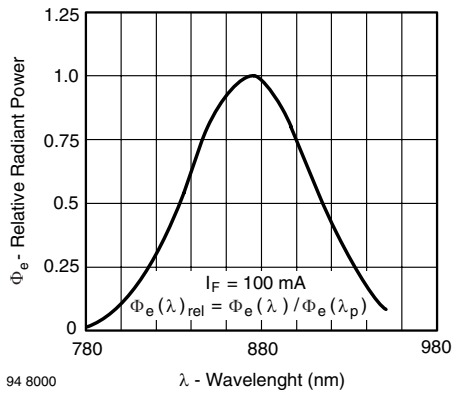
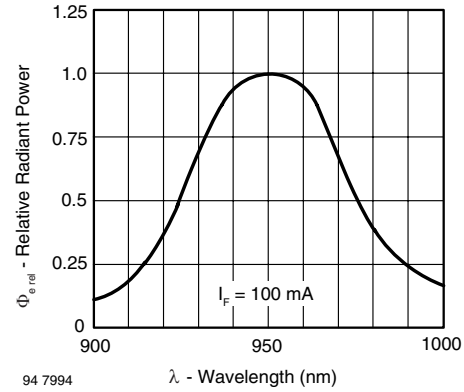


Fig. 8 - Relative Radiant Intensity/Power vs. Ambient Temperature



94 8000

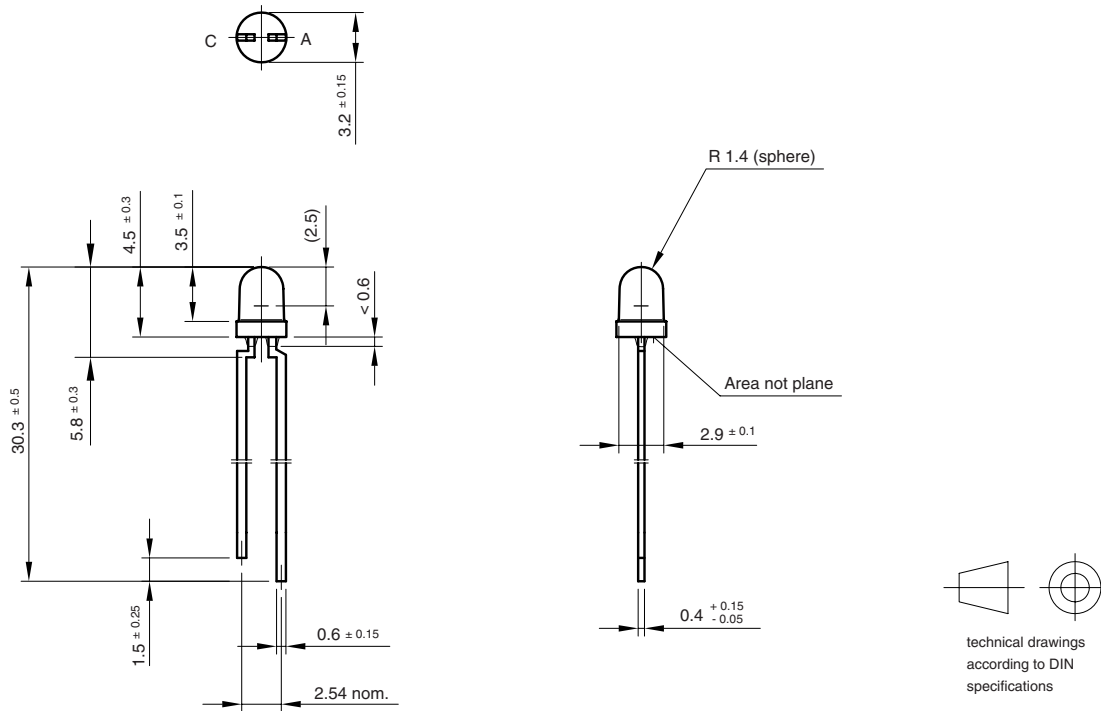


94 7994

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: 2; 23.04.98  
95 10951



## Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and/or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk and agree to fully indemnify and hold Vishay and its distributors harmless from and against any and all claims, liabilities, expenses and damages arising or resulting in connection with such use or sale, including attorneys fees, even if such claim alleges that Vishay or its distributor was negligent regarding the design or manufacture of the part. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.