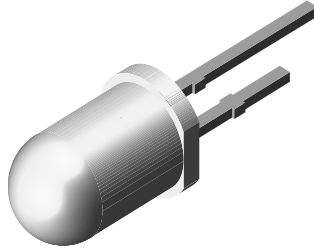




## Infrared Emitting Diode, 875 nm, GaAlAs



94 8390

### FEATURES

- Package type: leaded
- Package form: T-1 $\frac{3}{4}$
- Dimensions (in mm):  $\varnothing$  5
- Leads with stand-off
- Peak wavelength:  $\lambda_p = 875$  nm
- High reliability
- Angle of half intensity:  $\varphi = \pm 12^\circ$
- Low forward voltage
- Suitable for high pulse current operation
- Compliant to RoHS directive 2002/95/EC and in accordance to WEEE 2002/96/EC
- Halogen-free according to IEC 61249-2-21 definition



**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**

### DESCRIPTION

The TSHA520. 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
- 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)
TSHA5200	40	$\pm 12$	875	600
TSHA5201	50	$\pm 12$	875	600
TSHA5202	60	$\pm 12$	875	600
TSHA5203	65	$\pm 12$	875	600

#### Note

Test conditions see table "Basic Characteristics"

ORDERING INFORMATION			
ORDERING CODE	PACKAGING	REMARKS	PACKAGE FORM
TSHA5200	Bulk	MOQ: 4000 pcs, 4000 pcs/bulk	T-1 $\frac{3}{4}$
TSHA5201	Bulk	MOQ: 4000 pcs, 4000 pcs/bulk	T-1 $\frac{3}{4}$
TSHA5202	Bulk	MOQ: 4000 pcs, 4000 pcs/bulk	T-1 $\frac{3}{4}$
TSHA5203	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
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	$R_{thJA}$	230	K/W

#### Note

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

# TSHA5200, TSHA5201, TSHA5202, TSHA5203

Vishay Semiconductors Infrared Emitting Diode, 875 nm,  
GaAlAs

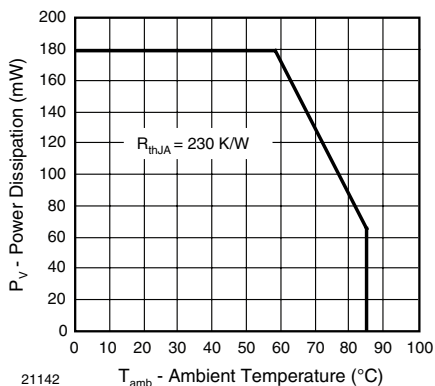


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

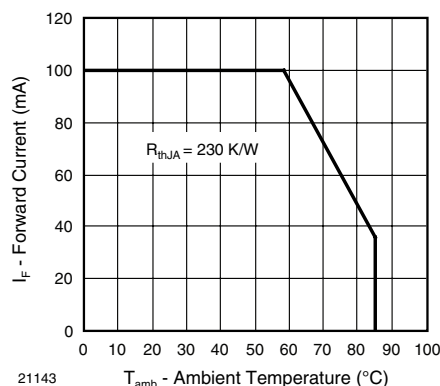


Fig. 2 - Forward Current Limit vs. Ambient Temperature

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
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 $\phi_e$	$I_F = 20 \text{ mA}$	$TK_{\phi_e}$		- 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
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
	$I_F = 1 \text{ A}$	$t_r$		300		ns
Fall time	$I_F = 100 \text{ mA}$	$t_f$		600		ns
	$I_F = 1 \text{ A}$	$t_f$		300		ns
Virtual source diameter		$d$		3.7		mm

**Note**

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



# TSHA5200, TSHA5201, TSHA5202, TSHA5203

Infrared Emitting Diode, 875 nm, GaAlAs Vishay Semiconductors

TYPE DEDICATED CHARACTERISTICS							
PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
Forward voltage	$I_F = 1 \text{ A}, t_p = 100 \mu\text{s}$	TSHA5200	$V_F$		2.8	3.5	V
		TSHA5201	$V_F$		2.8	3.5	V
		TSHA5202	$V_F$		2.8	3.5	V
		TSHA5203	$V_F$		2.8	3.5	V
Radiant intensity	$I_F = 100 \text{ mA}, t_p = 20 \mu\text{s}$	TSHA5200	$I_e$	25	40	125	mW/sr
		TSHA5201	$I_e$	30	50	125	mW/sr
		TSHA5202	$I_e$	36	60	125	mW/sr
		TSHA5203	$I_e$	50	65	125	mW/sr
	$I_F = 1 \text{ A}, t_p = 100 \mu\text{s}$	TSHA5200	$I_e$	200	330		mW/sr
		TSHA5201	$I_e$	260	400		mW/sr
		TSHA5202	$I_e$	330	460		mW/sr
		TSHA5203	$I_e$	400	530		mW/sr
Radiant power	$I_F = 100 \text{ mA}, t_p = 20 \mu\text{s}$	TSHA5200	$\phi_e$		22		mW
		TSHA5201	$\phi_e$		23		mW
		TSHA5202	$\phi_e$		24		mW
		TSHA5203	$\phi_e$		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

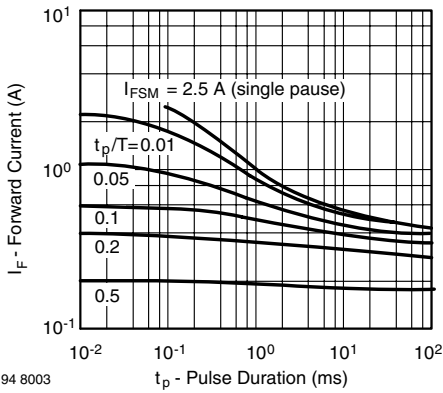


Fig. 3 - Pulse Forward Current vs. Pulse Duration

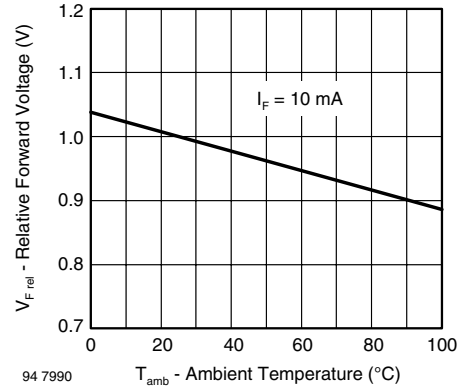


Fig. 5 - Relative Forward Voltage vs. Ambient Temperature

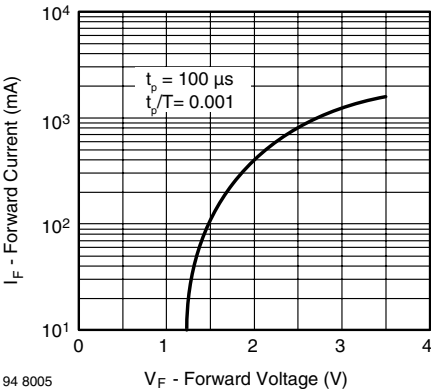


Fig. 4 - Forward Current vs. Forward Voltage

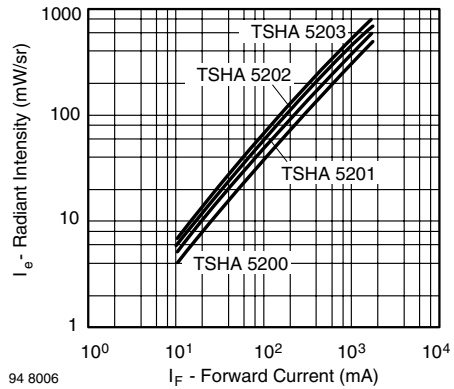
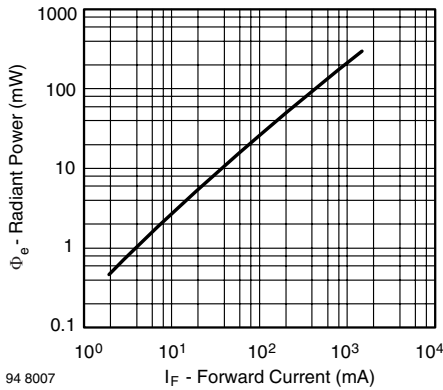


Fig. 6 - Radiant Intensity vs. Forward Current

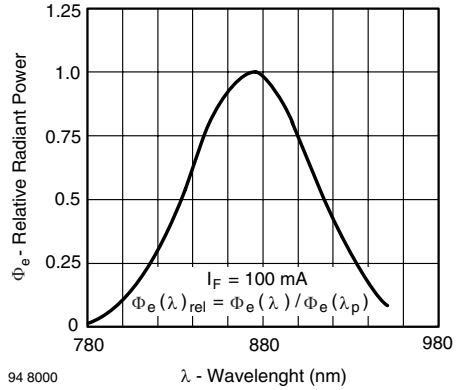
# TSHA5200, TSHA5201, TSHA5202, TSHA5203



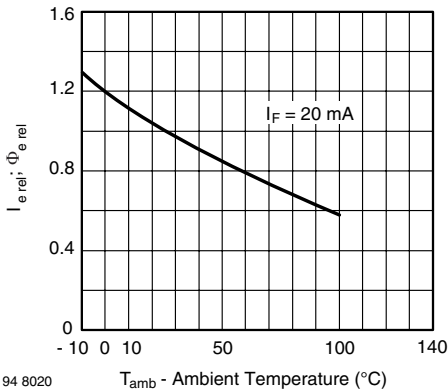
Vishay Semiconductors Infrared Emitting Diode, 875 nm, GaAlAs



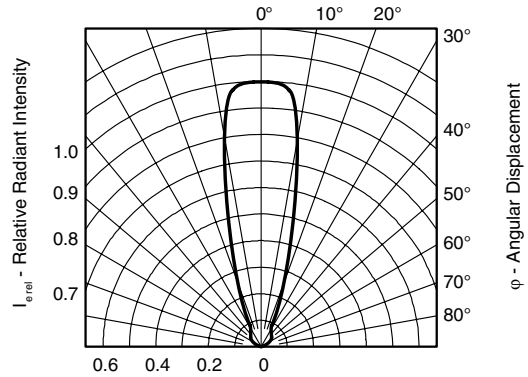
94 8007  $I_F$  - Forward Current (mA)  
Fig. 7 - Radiant Power vs. Forward Current



94 8000  $\lambda$  - Wavelength (nm)  
Fig. 9 - Relative Radiant Power vs. Wavelength

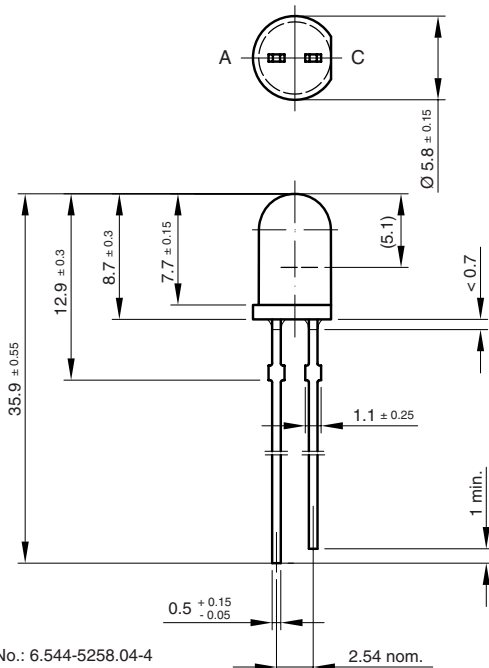


94 8020  $T_{amb}$  - Ambient Temperature (°C)  
Fig. 8 - Relative Radiant Intensity/Power vs. Ambient Temperature

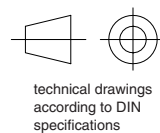
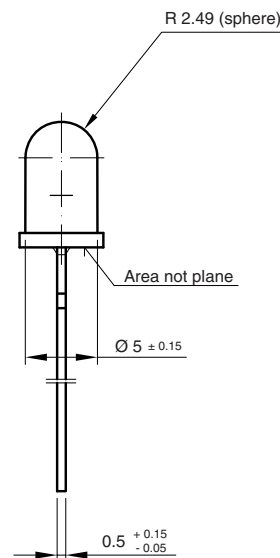


94 8008  $\phi$  - Angular Displacement  
Fig. 10 - Relative Radiant Intensity vs. Angular Displacement

## PACKAGE DIMENSIONS in millimeters



Drawing-No.: 6.544-5258.04-4  
Issue: 8; 19.05.09  
96 12121





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