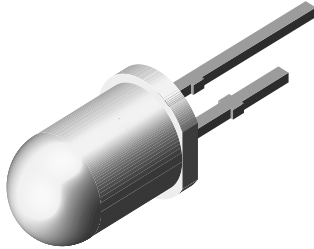




## Infrared Emitting Diode, 950 nm, GaAs



94 8390



**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**  
**GREEN**  
(5-2008)

### FEATURES

- Package type: leaded
- Package form: T-1 $\frac{3}{4}$
- Dimensions (in mm):  $\varnothing$  5
- Leads with stand-off
- Peak wavelength:  $\lambda_p = 950$  nm
- High reliability
- Angle of half intensity:  $\varphi = \pm 22^\circ$
- 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

TSUS5400 is an infrared, 950 nm emitting diode in GaAs technology molded in a blue-gray tinted plastic package.

### APPLICATIONS

- Infrared remote control and free air transmission systems with low forward voltage and small package requirements
- Emitter in transmissive sensors
- Emitter in reflective sensors

### PRODUCT SUMMARY

COMPONENT	$I_e$ (mW/sr)	$\varphi$ (°)	$\lambda_p$ (nm)	$t_r$ (ns)
TSUS5400	14	$\pm 22$	950	800
TSUS5401	17	$\pm 22$	950	800
TSUS5402	20	$\pm 22$	950	800

#### Note

- Test conditions see table "Basic Characteristics"

### ORDERING INFORMATION

ORDERING CODE	PACKAGING	REMARKS	PACKAGE FORM
TSUS5400	Bulk	MOQ: 4000 pcs, 4000 pcs/bulk	T-1 $\frac{3}{4}$
TSUS5401	Bulk	MOQ: 4000 pcs, 4000 pcs/bulk	T-1 $\frac{3}{4}$
TSUS5402	Bulk	MOQ: 4000 pcs, 4000 pcs/bulk	T-1 $\frac{3}{4}$

#### Note

- MOQ: minimum order quantity

### 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		$I_F$	150	mA
Peak forward current	$t_p/T = 0.5$ , $t_p = 100 \mu\text{s}$	$I_{FM}$	300	mA
Surge forward current	$t_p = 100 \mu\text{s}$	$I_{FSM}$	2.5	A
Power dissipation		$P_V$	170	mW
Junction temperature		$T_j$	100	$^\circ\text{C}$
Operating temperature range		$T_{amb}$	- 40 to + 85	$^\circ\text{C}$
Storage temperature range		$T_{stg}$	- 40 to + 100	$^\circ\text{C}$
Soldering temperature	$t \leq 5$ s, 2 mm from case	$T_{sd}$	260	$^\circ\text{C}$
Thermal resistance junction/ambient	J-STD-051, leads 7 mm, soldered on PCB	$R_{thJA}$	230	K/W

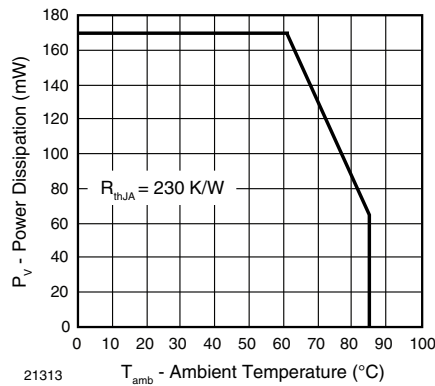


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

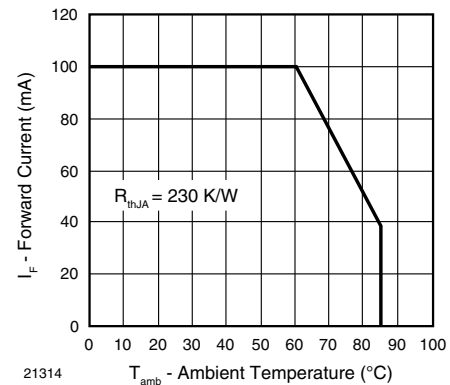


Fig. 2 - Forward Current Limit vs. Ambient Temperature

BASIC CHARACTERISTICS ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Forward voltage	$I_F = 100\text{ mA}$ , $t_p = 20\text{ ms}$	$V_F$		1.3	1.7	V
Temperature coefficient of $V_F$	$I_F = 100\text{ mA}$	$TK_{V_F}$		-1.3		mV/K
Reverse current	$V_R = 5\text{ V}$	$I_R$			100	$\mu\text{A}$
Junction capacitance	$V_R = 0\text{ V}$ , $f = 1\text{ MHz}$ , $E = 0$	$C_j$		30		pF
Temperature coefficient of $\phi_e$	$I_F = 20\text{ mA}$	$TK_{\phi_e}$		-0.8		%/K
Angle of half intensity		$\phi$		$\pm 22$		$^{\circ}$
Peak wavelength	$I_F = 100\text{ mA}$	$\lambda_p$		950		nm
Spectral bandwidth	$I_F = 100\text{ mA}$	$\Delta\lambda$		50		nm
Temperature coefficient of $\lambda_p$	$I_F = 100\text{ mA}$	$TK_{\lambda_p}$		0.2		nm/K
Rise time	$I_F = 100\text{ mA}$	$t_r$		800		ns
	$I_F = 1.5\text{ A}$	$t_r$		400		ns
Fall time	$I_F = 100\text{ mA}$	$t_f$		800		ns
	$I_F = 1.5\text{ A}$	$t_f$		400		ns
Virtual source diameter		$d$		2.9		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	$I_F = 1.5\text{ A}$ , $t_p = 100\text{ }\mu\text{s}$	TSUS5400	$V_F$		2.2	3.4	V
		TSUS5401	$V_F$		2.2	3.4	V
		TSUS5402	$V_F$		2.2	2.7	V
Radiant intensity	$I_F = 100\text{ mA}$ , $t_p = 20\text{ ms}$	TSUS5400	$I_e$	7	14	35	mW/sr
		TSUS5401	$I_e$	10	17	35	mW/sr
		TSUS5402	$I_e$	15	20	35	mW/sr
	$I_F = 1.5\text{ A}$ , $t_p = 100\text{ }\mu\text{s}$	TSUS5400	$I_e$	60	140		mW/sr
		TSUS5401	$I_e$	85	160		mW/sr
		TSUS5402	$I_e$	120	190		mW/sr
Radiant power	$I_F = 100\text{ mA}$ , $t_p = 20\text{ ms}$	TSUS5400	$\phi_e$		13		mW
		TSUS5401	$\phi_e$		14		mW
		TSUS5402	$\phi_e$		15		mW



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

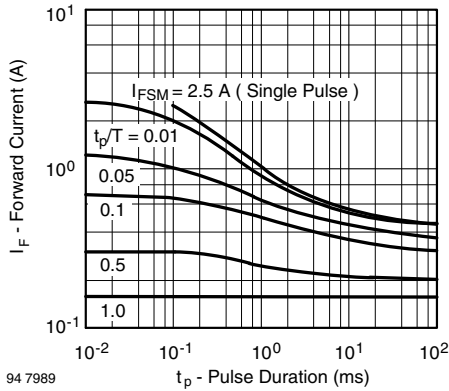


Fig. 3 - Pulse Forward Current vs. Pulse Duration

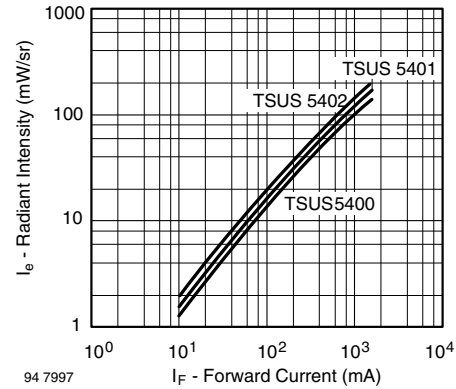


Fig. 6 - Radiant Intensity vs. Forward Current

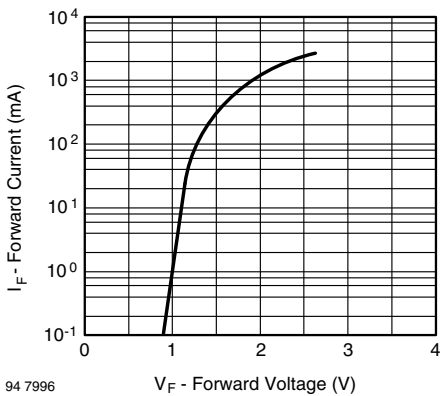


Fig. 4 - Forward Current vs. Forward Voltage

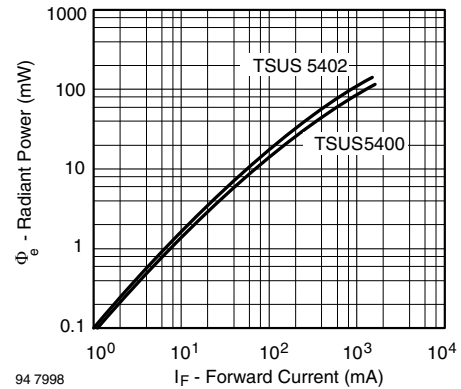


Fig. 7 - Radiant Power vs. Forward Current

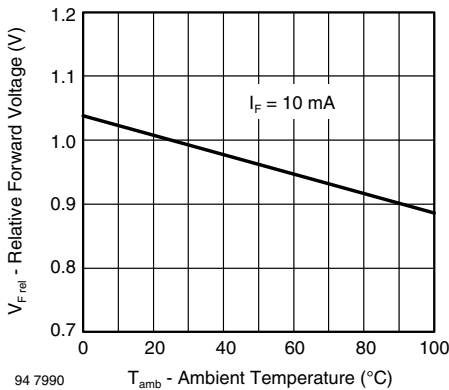


Fig. 5 - Relative Forward Voltage vs. Ambient Temperature

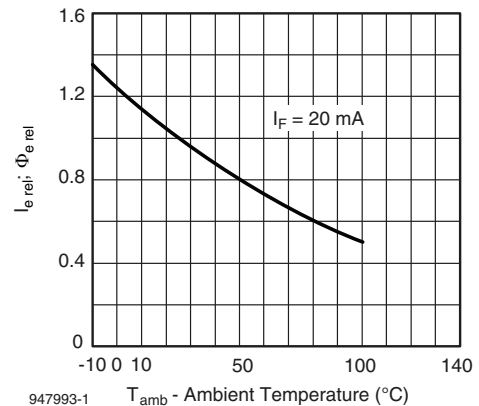


Fig. 8 - Relative Radiant Intensity/Power vs. Ambient Temperature

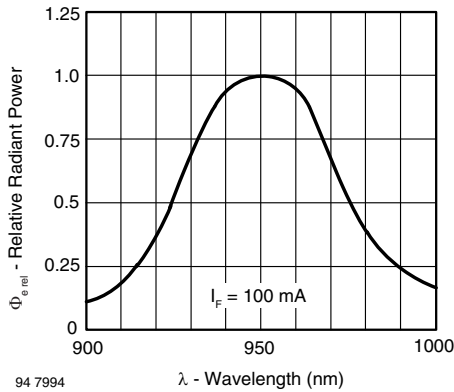


Fig. 9 - Relative Radiant Power vs. Wavelength

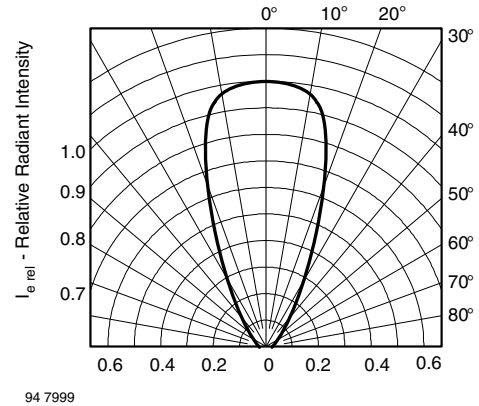
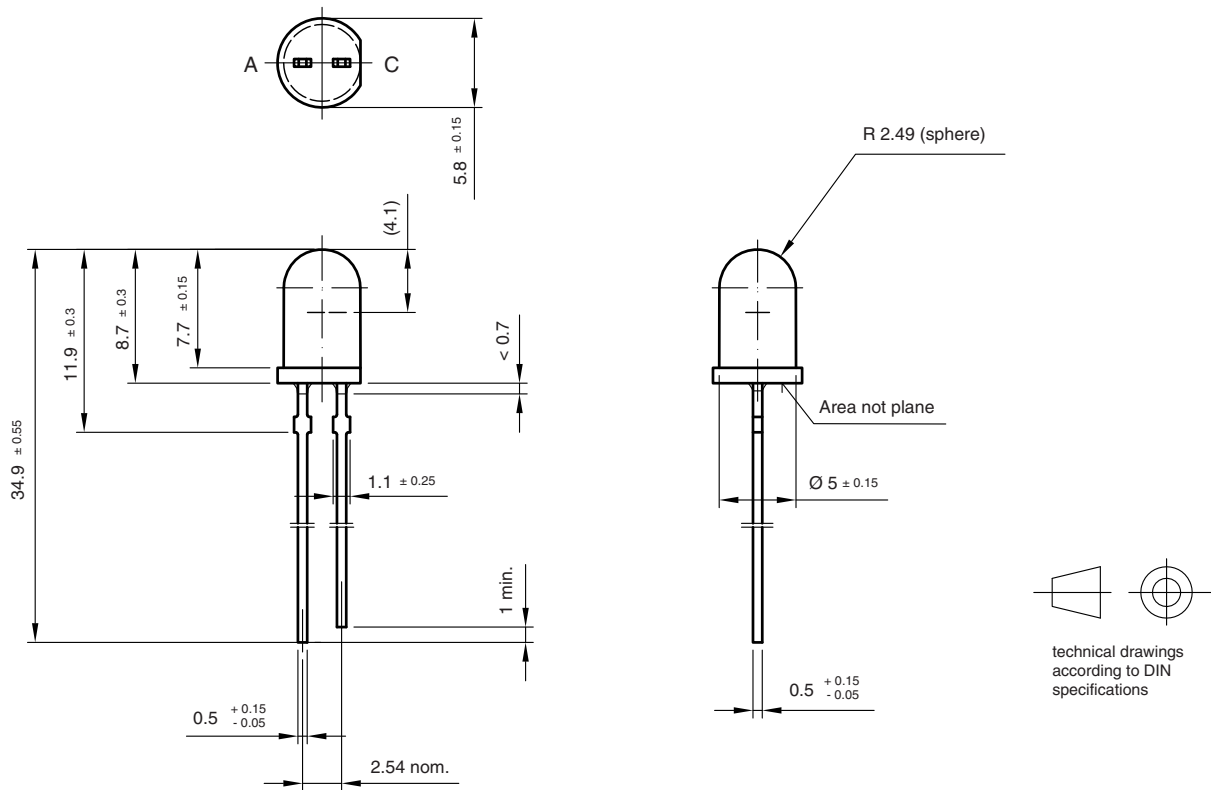


Fig. 10 - Relative Radiant Intensity vs. Angular Displacement

**PACKAGE DIMENSIONS** in millimeters



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