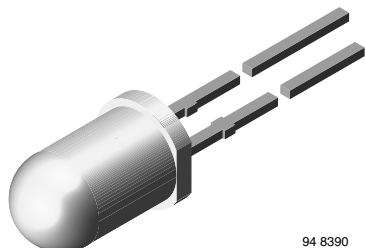


## Infrared Emitting Diode, RoHS Compliant, 950 nm, GaAs



94 8390

### DESCRIPTION

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

### 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
- 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 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)	$\varphi$ (deg)	$\lambda_p$ (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

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Reverse voltage		$V_R$	5	V
Forward current		$I_F$	150	mA
Peak forward current	$t_p/T = 0.5, t_p = 100 \mu s$	$I_{FM}$	300	mA
Surge forward current	$t_p = 100 \mu s$	$I_{FSM}$	2.5	A
Power dissipation		$P_V$	170	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

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



# TSUS5400, TSUS5401, TSUS5402

Infrared Emitting Diode, RoHS Compliant, Vishay Semiconductors  
950 nm, GaAs

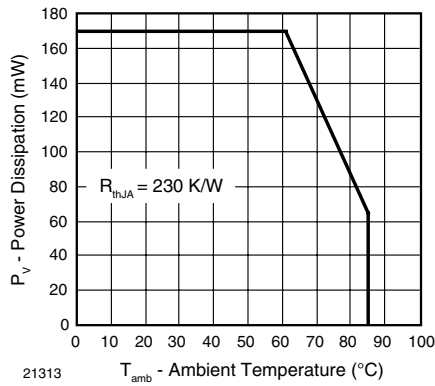


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

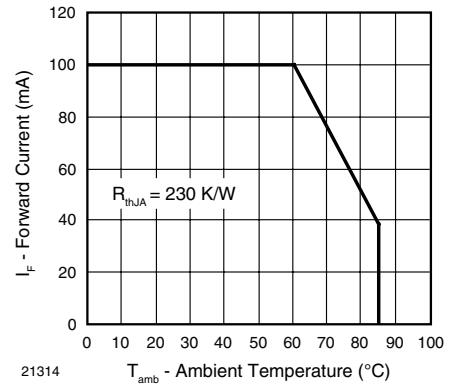


Fig. 2 - Forward Current Limit vs. Ambient Temperature

BASIC CHARACTERISTICS						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Forward voltage	I <sub>F</sub> = 100 mA, t <sub>p</sub> = 20 ms	V <sub>F</sub>		1.3	1.7	V
Temperature coefficient of V <sub>F</sub>	I <sub>F</sub> = 100 mA	TK <sub>V<sub>F</sub></sub>		- 1.3		mV/K
Reverse current	V <sub>R</sub> = 5 V	I <sub>R</sub>			100	μA
Junction capacitance	V <sub>R</sub> = 0 V, f = 1 MHz, E = 0	C <sub>j</sub>		30		pF
Temperature coefficient of φ <sub>e</sub>	I <sub>F</sub> = 20 mA	TKφ <sub>e</sub>		- 0.8		%/K
Angle of half intensity		φ		± 22		deg
Peak wavelength	I <sub>F</sub> = 100 mA	λ <sub>p</sub>		950		nm
Spectral bandwidth	I <sub>F</sub> = 100 mA	Δλ		50		nm
Temperature coefficient of λ <sub>p</sub>	I <sub>F</sub> = 100 mA	TKλ <sub>p</sub>		0.2		nm/K
Rise time	I <sub>F</sub> = 100 mA	t <sub>r</sub>		800		ns
	I <sub>F</sub> = 1.5 A	t <sub>r</sub>		400		ns
Fall time	I <sub>F</sub> = 100 mA	t <sub>f</sub>		800		ns
	I <sub>F</sub> = 1.5 A	t <sub>f</sub>		400		ns
Virtual source diameter		d		2.9		mm

**Note**

T<sub>amb</sub> = 25 °C, unless otherwise specified

TYPE DEDICATED CHARACTERISTICS							
PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
Forward voltage	I <sub>F</sub> = 1.5 A, t <sub>p</sub> = 100 μs	TSUS5400	V <sub>F</sub>		2.2	3.4	V
		TSUS5401	V <sub>F</sub>		2.2	3.4	V
		TSUS5402	V <sub>F</sub>		2.2	2.7	V
Radiant intensity	I <sub>F</sub> = 100 mA, t <sub>p</sub> = 20 ms	TSUS5400	I <sub>e</sub>	7	14	35	mW/sr
		TSUS5401	I <sub>e</sub>	10	17	35	mW/sr
		TSUS5402	I <sub>e</sub>	15	20	35	mW/sr
	I <sub>F</sub> = 1.5 A, t <sub>p</sub> = 100 μs	TSUS5400	I <sub>e</sub>	60	140		mW/sr
		TSUS5401	I <sub>e</sub>	85	160		mW/sr
		TSUS5402	I <sub>e</sub>	120	190		mW/sr
Radiant power	I <sub>F</sub> = 100 mA, t <sub>p</sub> = 20 ms	TSUS5400	φ <sub>e</sub>		13		mW
		TSUS5401	φ <sub>e</sub>		14		mW
		TSUS5402	φ <sub>e</sub>		15		mW

**Note**

T<sub>amb</sub> = 25 °C, unless otherwise specified

## BASIC CHARACTERISTICS

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

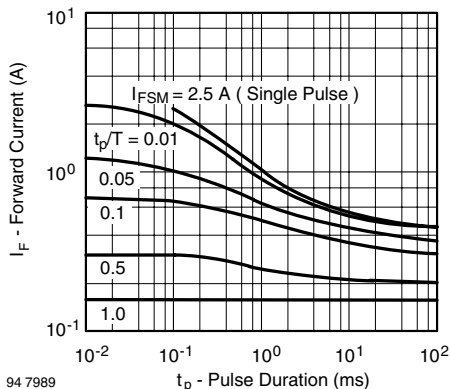


Fig. 3 - Pulse Forward Current vs. Pulse Duration

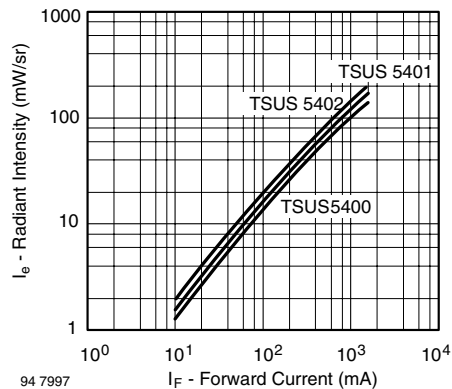


Fig. 6 - Radiant Intensity vs. Forward Current

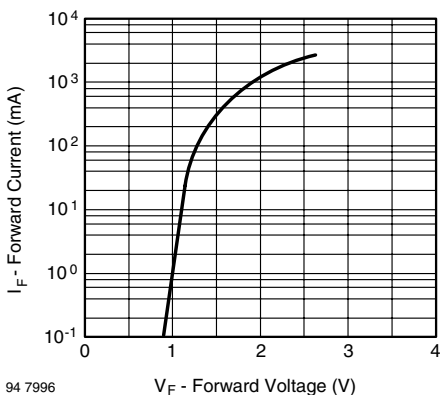


Fig. 4 - Forward Current vs. Forward Voltage

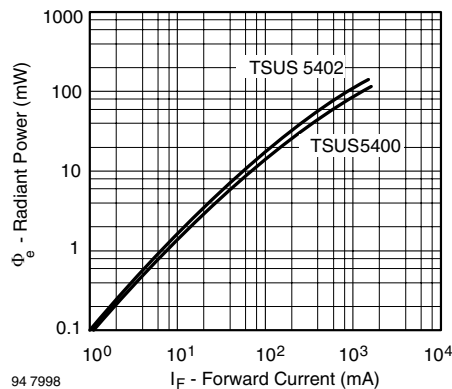


Fig. 7 - Radiant Power vs. Forward Current

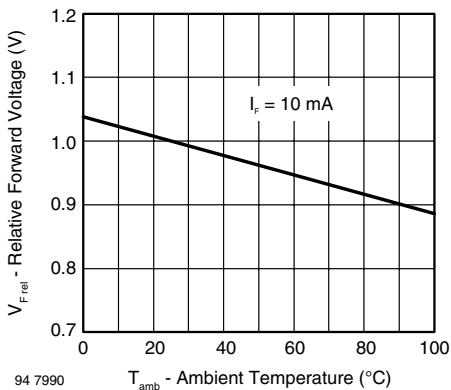


Fig. 5 - Relative Forward Voltage vs. Ambient Temperature

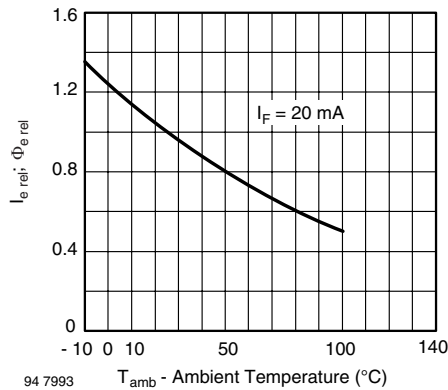


Fig. 8 - Relative Radiant Intensity/Power vs. Ambient Temperature



# TSUS5400, TSUS5401, TSUS5402

Infrared Emitting Diode, RoHS Compliant, Vishay Semiconductors  
950 nm, GaAs

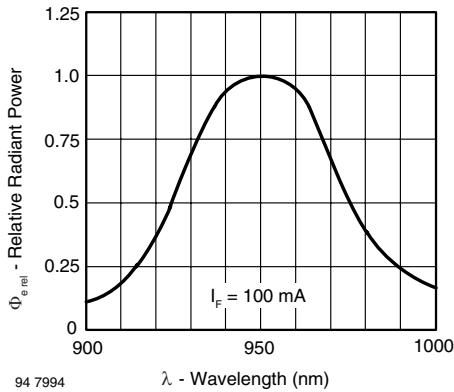


Fig. 9 - Relative Radiant Power vs. Wavelength

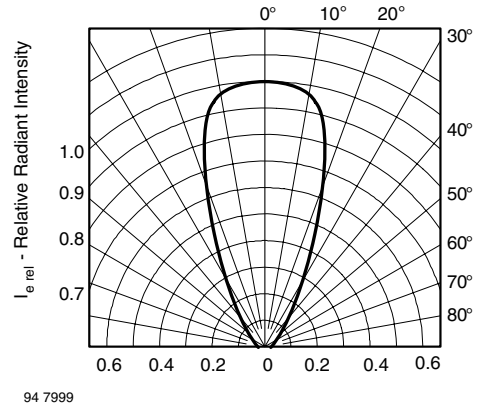
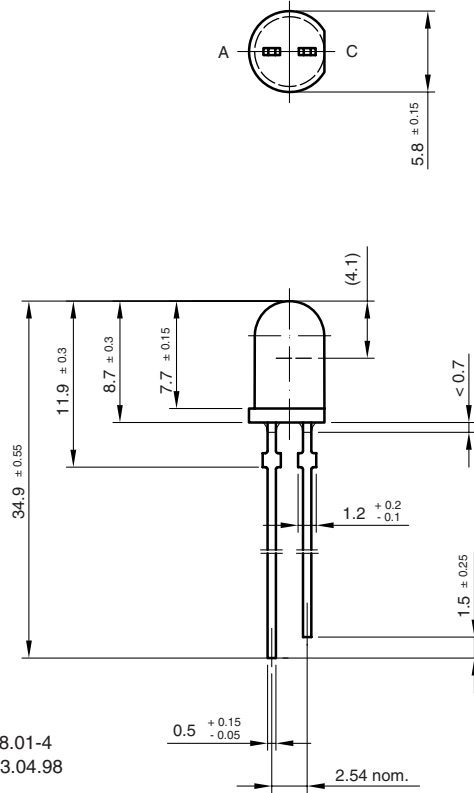
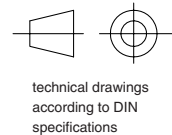
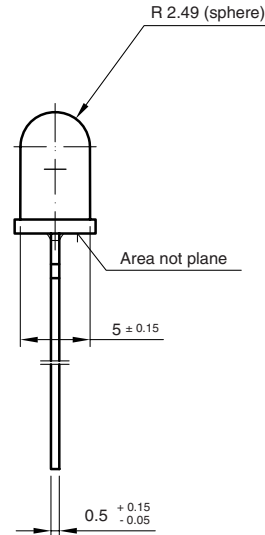


Fig. 10 - Relative Radiant Intensity vs. Angular Displacement

## PACKAGE DIMENSIONS in millimeters



6.544-5258.01-4  
Issue: 4; 23.04.98  
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