RoHS

**GREEN** 

(5-2008)\*\*



# Vishay Semiconductors

# High Speed Infrared Emitting Diode, 870 nm, GaAlAs Double Hetero



#### **DESCRIPTION**

TSFF5510 is an infrared, 870 nm emitting diode in GaAlAs double hetero (DH) technology with high radiant power and high speed, molded in a clear, untinted plastic package.

#### **FEATURES**

Package type: leadedPackage form: T-1¾

• Dimensions (in mm): Ø 5

• Leads with stand-off

• Peak wavelength:  $\lambda_p = 870 \text{ nm}$ 

· High reliability

High radiant power

· High radiant intensity

• Low forward voltage

· Suitable for high pulse current operation

• High modulation bandwidth: f<sub>c</sub> = 24 MHz

· Good spectral matching with Si photodetectors

 Compliant to RoHS Directive 2002/95/EC and in accordance to WEEE 2002/96/EC

#### Note

\*\* Please see document "Vishay Material Category Policy": www.vishay.com/doc?99902

#### **APPLICATIONS**

- Infrared video data transmission between camcorder and TV set
- Free air data transmission systems with high data transmission rates

PRODUCT SUMMARY					
COMPONENT	I <sub>e</sub> (mW/sr)	φ (deg)	λ <sub>p</sub> (nm)	t <sub>r</sub> (ns)	
TSFF5510	32	± 38	870	15	

#### Note

· Test conditions see table "Basic Characteristics"

ORDERING INFORMATI	ON		
ORDERING CODE	PACKAGING	REMARKS	PACKAGE FORM
TSFF5510	Bulk	MOQ: 4000 pcs, 4000 pcs/bulk	T-1¾

### Note

MOQ: minimum order quantity

<b>ABSOLUTE MAXIMUM RATINGS</b> (T <sub>amb</sub> = 25 °C, unless otherwise specified)					
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT	
Reverse voltage		$V_{R}$	5	V	
Forward current		I <sub>F</sub>	100	mA	
Peak forward current	$t_p/T = 0.5, t_p = 100 \mu s$	I <sub>FM</sub>	200	mA	
Surge forward current	t <sub>p</sub> = 100 μs	I <sub>FSM</sub>	1	Α	
Power dissipation		P <sub>V</sub>	180	mW	
Junction temperature		Tj	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	$t \le 5$ 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>	230	K/W	





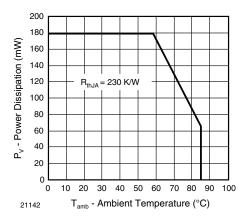


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

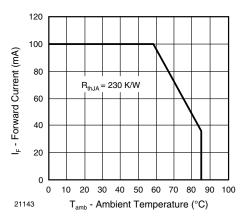


Fig. 1 - Forward Current Limit vs. Ambient Temperature

PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
	$I_F = 100 \text{ mA}, t_p = 20 \text{ ms}$	V <sub>F</sub>	1.3	1.45	1.7	V
Forward voltage	$I_F = 450 \text{ mA}, t_p = 100 \mu \text{s}$	V <sub>F</sub>	1.5	1.75	2.1	V
	$I_F = 1 \text{ A}, t_p = 100 \mu \text{s}$	V <sub>F</sub>		2.1		V
Temperature coefficient of V <sub>F</sub>	I <sub>F</sub> = 1 mA	TK <sub>VF</sub>		- 1.8		mV/K
Reverse current	V <sub>R</sub> = 5 V	I <sub>R</sub>			10	μA
Junction capacitance	$V_R = 0 \text{ V, } f = 1 \text{ MHz, } E = 0$	C <sub>i</sub>		110		pF
Radiant intensity	$I_F = 100 \text{ mA}, t_p = 20 \text{ ms}$	I <sub>e</sub>	16	32	48	mW/sr
Radiant power	$I_F = 100 \text{ mA}, t_p = 20 \text{ ms}$	фe		55		mW
Temperature coefficient of φ <sub>e</sub>	I <sub>F</sub> = 100 mA	TKφ <sub>e</sub>		- 0.35		%/K
Angle of half intensity		φ		± 38		deg
Peak wavelength	I <sub>F</sub> = 100 mA	$\lambda_{p}$		870		nm
Spectral bandwidth	I <sub>F</sub> = 100 mA	Δλ		55		nm
Temperature coefficient of λ <sub>p</sub>	I <sub>F</sub> = 100 mA	TKλ <sub>p</sub>		0.25		nm/K
Rise time	I <sub>F</sub> = 100 mA	t <sub>r</sub>		15		ns
Fall time	I <sub>F</sub> = 100 mA	t <sub>f</sub>		15		ns
Cut-off frequency	$I_{DC} = 70 \text{ mA}, I_{AC} = 30 \text{ mA pp}$	f <sub>c</sub>		24		MHz



## BASIC CHARACTERISTICS (T<sub>amb</sub> = 25 °C, unless otherwise specified)

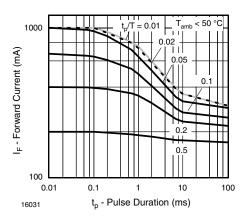


Fig. 2 - Pulse Forward Current vs. Pulse Duration

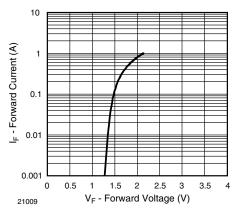


Fig. 3 - Forward Current vs. Forward Voltage

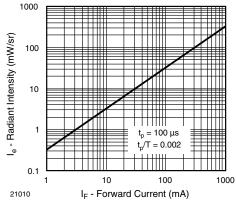


Fig. 4 - Radiant Intensity vs. Forward Current

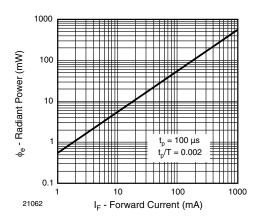


Fig. 5 - Radiant Power vs. Forward Current

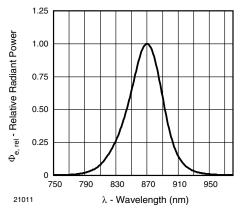


Fig. 6 - Relative Radiant Power vs. Wavelength

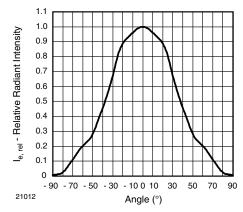
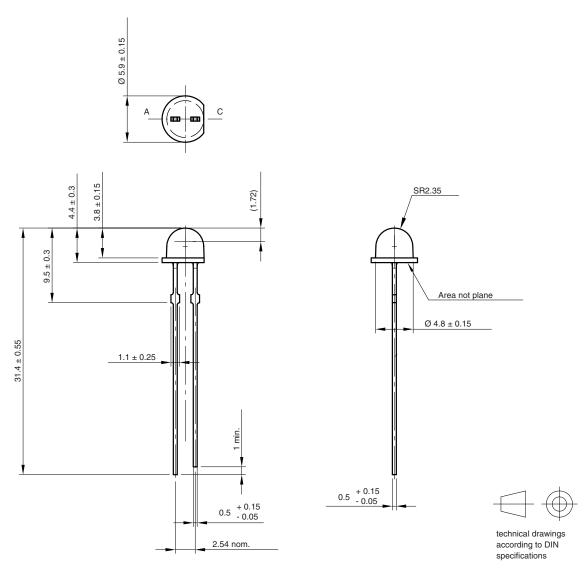


Fig. 7 - Relative Radiant Intensity vs. Angular Displacement



## **PACKAGE DIMENSIONS** in millimeters



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