GREEN (5-2008)\*



# Vishay Semiconductors

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



#### **DESCRIPTION**

TSFF5210 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: leaded
Package form: T-1 3/4
Dimensions (in mm): Ø 5

Leads with stand-off

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

High reliability

· High radiant power

· High radiant intensity

• Angle of half intensity:  $\varphi = \pm 10^{\circ}$ 

· 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 modulation frequencies or high data transmission rate requirements
- · Smoke-automatic fire detectors

PRODUCT SUMMARY				
COMPONENT	I <sub>e</sub> (mW/sr)	φ (deg)	λ <sub>p</sub> (nm)	t <sub>r</sub> (ns)
TSFF5210	180	± 10	870	15

#### Note

Test conditions see table "Basic Characteristics"

ORDERING INFORMATION				
ORDERING CODE	PACKAGING	REMARKS	PACKAGE FORM	
TSFF5210	Bulk	MOQ: 4000 pcs, 4000 pcs/bulk	T-1¾	

#### Note

MOQ: minimum order quantity

ABSOLUTE MAXIMUM RATINGS (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	А
Power dissipation		P <sub>V</sub>	180	mW



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<b>ABSOLUTE MAXIMUM RATINGS</b> (T <sub>amb</sub> = 25 °C, unless otherwise specified)				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Junction temperature		T <sub>j</sub>	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

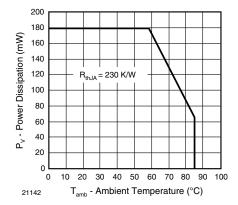


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

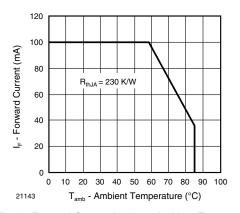


Fig. 2 - Forward Current Limit vs. Ambient Temperature

PARAMETER	CS (T <sub>amb</sub> = 25 °C, unless other TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
TANAMETER	$I_{\rm F} = 100 \text{ mA}, t_{\rm D} = 20 \text{ ms}$	V <sub>F</sub>		1.5	1.8	V
Forward voltage	$I_F = 1.00 \text{ mA}, t_p = 20 \text{ ms}$ $I_F = 1.00 \text{ µs}$	V <sub>F</sub>		2.3	3.0	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	$V_R = 0 \text{ V, } f = 1 \text{ MHz, } E = 0$	Cj		125		pF
Radiant intensity	I <sub>F</sub> = 100 mA, t <sub>p</sub> = 20 ms	I <sub>e</sub>	120	180	360	mW/sr
	$I_F = 1 \text{ A}, t_p = 100 \ \mu\text{s}$	I <sub>e</sub>		1800		mW/sr
Radiant power	$I_F = 100 \text{ mA}, t_p = 20 \text{ ms}$	φ <sub>e</sub>		50		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		± 10		deg
Peak wavelength	I <sub>F</sub> = 100 mA	$\lambda_{p}$		870		nm
Spectral bandwidth	I <sub>F</sub> = 100 mA	Δλ		40		nm
Temperature coefficient of $\lambda_p$	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 <sub>DC</sub> = 70 mA, I <sub>AC</sub> = 30 mA pp	f <sub>c</sub>		24		MHz
Virtual source diameter		d		3.7		mm



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

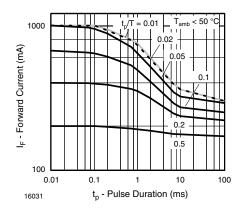


Fig. 3 - Pulse Forward Current vs. Pulse Duration

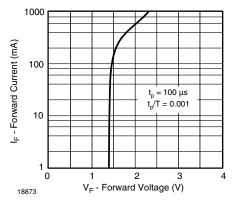


Fig. 4 - Forward Current vs. Forward Voltage

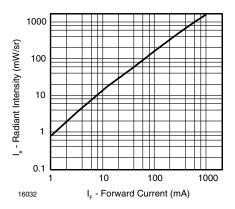


Fig. 5 - Radiant Intensity vs. Forward Current

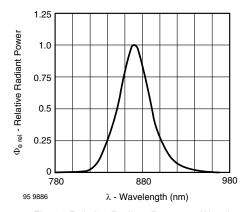


Fig. 6 - Relative Radiant Power vs. Wavelength

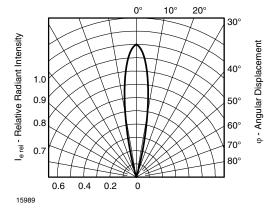


Fig. 7 - Relative Radiant Intensity vs. Angular Displacement

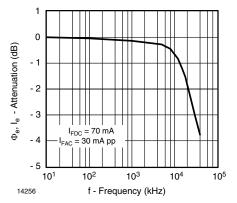
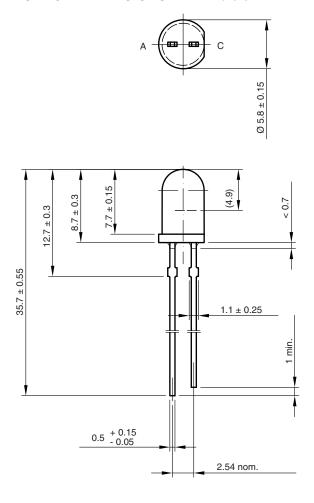
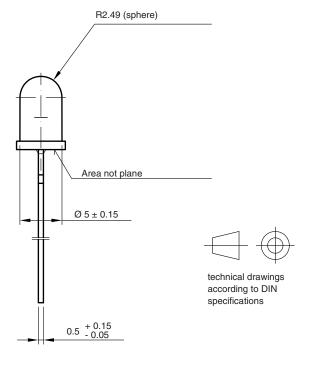


Fig. 8 - Attenuation vs. Frequency

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### **PACKAGE DIMENSIONS** in millimeters





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