# **TSHG5210**



**Vishay Semiconductors** 

## High Speed Infrared Emitting Diode, 850 nm, **GaAlAs Double Hetero**



### **FEATURES**

- · Package type: leaded
- Package form: T-1¾
- Dimensions (in mm): Ø 5
- · Leads with stand-off
- Peak wavelength: λ<sub>p</sub> = 850 nm
- High reliability
- High radiant power
- · High radiant intensity
- Angle of half intensity:  $\phi = \pm 10^{\circ}$
- · Low forward voltage
- Suitable for high pulse current operation
- High modulation bandwidth: f<sub>c</sub> = 18 MHz
- · Good spectral matching with CMOS cameras
- · 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 radiation source for operation with CMOS cameras
- High speed IR data transmission
- Smoke-automatic fire detectors

### DESCRIPTION

TSHG5210 is an infrared, 850 nm emitting diode in GaAlAs double hetero (DH) technology with high radiant power and high speed, molded in a clear, untinted plastic package.

PRODUCT SUMMARY					
COMPONENT	l <sub>e</sub> (mW/sr)	φ (deg)	λ <sub>p</sub> (nm)	t <sub>r</sub> (ns)	
TSHG5210	230	± 10	850	20	

#### Note

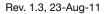
Test conditions see table "Basic Characteristics"

ORDERING INFORMATION					
ORDERING CODE	PACKAGING	REMARKS	PACKAGE FORM		
TSHG5210	Bulk	MOQ: 4000 pcs, 4000 pcs/bulk	T-1¾		

Note

MOQ: minimum order quantity

<b>ABSOLUTE MAXIMUM RATINGS</b> ( $T_{amb} = 25 \text{ °C}$ , unless otherwise specified)					
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT	
Reverse voltage		V <sub>R</sub>	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	A	
Power dissipation		Pv	180	mW	
Junction temperature		Тj	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	



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(5-2008)\*\*



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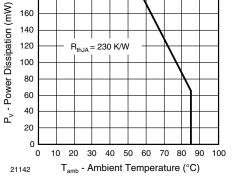


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

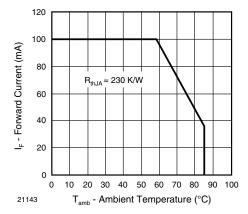


Fig. 1 - Forward Current Limit vs. Ambient Temperature

<b>BASIC CHARACTERISTICS</b> (T <sub>amb</sub> = 25 °C, unless otherwise specified)						
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>		1.5	1.8	V
	I <sub>F</sub> = 1 A, t <sub>p</sub> = 100 μs	V <sub>F</sub>		2.3		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	$V_{R} = 0 V, f = 1 MHz, E = 0$	Cj		125		pF
<b>D H H H</b>	$I_F = 100 \text{ mA}, t_p = 20 \text{ ms}$	l <sub>e</sub>	140	230	420	mW/sr
Radiant intensity	I <sub>F</sub> = 1 A, t <sub>p</sub> = 100 μs	l <sub>e</sub>		2300		mW/sr
Radiant power	$I_F = 100 \text{ mA}, t_p = 20 \text{ ms}$	φ <sub>e</sub>		55		mW
Temperature coefficient of $\phi_{\text{e}}$	l <sub>F</sub> = 100 mA	TKφ <sub>e</sub>		- 0.35		%/K
Angle of half intensity		φ		± 10		deg
Peak wavelength	l <sub>F</sub> = 100 mA	λ <sub>p</sub>	820	850	880	nm
Spectral bandwidth	l <sub>F</sub> = 100 mA	Δλ		40		nm
Temperature coefficient of $\lambda_p$	l <sub>F</sub> = 100 mA	TKλp		0.25		nm/K
Rise time	l <sub>F</sub> = 100 mA	t <sub>r</sub>		20		ns
Fall time	l <sub>F</sub> = 100 mA	t <sub>f</sub>		13		ns
Cut-off frequency	$I_{DC} = 70$ mA, $I_{AC} = 30$ mA pp	f <sub>c</sub>		18		MHz
Virtual source diameter		d		3.7		mm

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

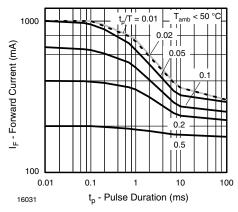


Fig. 2 - Pulse Forward Current vs. Pulse Duration

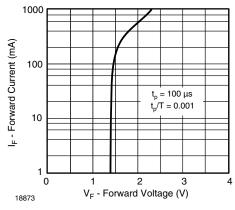


Fig. 3 - Forward Current vs. Forward Voltage

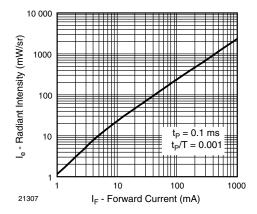


Fig. 4 - Radiant Intensity vs. Forward Current

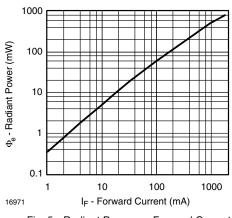


Fig. 5 - Radiant Power vs. Forward Current

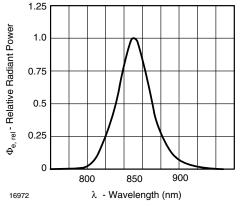


Fig. 6 - Relative Radiant Power vs. Wavelength

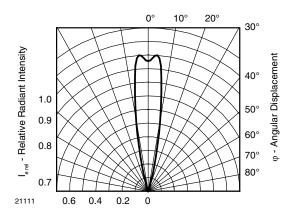


Fig. 7 - Relative Radiant Intensity vs. Angular Displacement

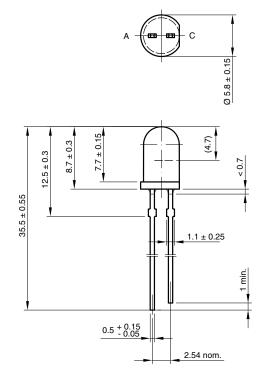
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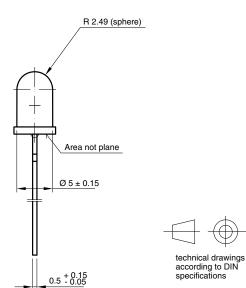


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### **PACKAGE DIMENSIONS** in millimeters







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