**GREEN** (5-2008)



### Vishay Semiconductors

# High Speed Infrared Emitting Diodes, 940 nm, GaAlAs, MQW



### **DESCRIPTION**

VSMB2948SL is an infrared, 940 nm, side looking emitting diode in GaAlAs multi quantum well (MQW) technology with high radiant power and high speed, molded in clear, untinted plastic package (with lens) for surface mounting (SMD).

### **APPLICATIONS**

- · Remote control
- IR touch panels

#### **FEATURES**

· Package type: surface mount

• Package form: side view

Dimensions (L x W x H in mm): 2.3 x 2.55 x 2.3

Peak wavelength: λ<sub>p</sub> = 940 nm

High reliability

• High radiant power

· High radiant intensity

• Angle of half intensity:  $\varphi = \pm 25^{\circ}$ 

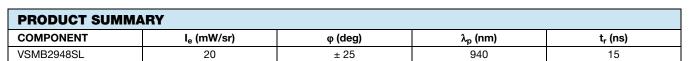
· Low forward voltage

• Suitable for high pulse current operation

 Package matches with detector VEMD2023SLX01 and VEMT2023SLX01

• Floor life: 4 weeks, MSL 2a, acc. J-STD-020

 Material categorization: For definitions of compliance please see <a href="https://www.vishay.com/doc?99912">www.vishay.com/doc?99912</a>



### Note

· Test conditions see table "Basic Characteristics"

ORDERING INFORMATION				
ORDERING CODE	PACKAGING	REMARKS	PACKAGE FORM	
VSMB2948SL	Tape and reel	MOQ: 3000 pcs, 3000 pcs/reel	Side view	

#### 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 <sub>R</sub>	5	V
Forward current		I <sub>F</sub>	100	mA
Surge forward current	t <sub>p</sub> = 100 μs	I <sub>FSM</sub>	500	mA
Power dissipation		P <sub>V</sub>	160	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	according figure 9, J-STD-020	T <sub>sd</sub>	260	°C
Thermal resistance junction/ambient	J-STD-051, leads 7 mm, soldered on PCB	R <sub>thJA</sub>	250	K/W



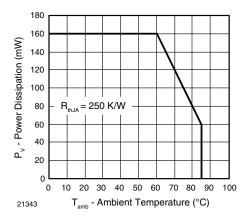


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

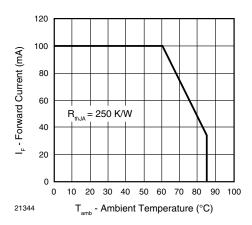


Fig. 2 - Forward Current Limit vs. Ambient Temperature

<b>BASIC CHARACTERISTICS</b> (T <sub>amb</sub> = 25 °C, unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Forward voltage	$I_F = 100 \text{ mA}, t_p = 20 \text{ ms}$	$V_{F}$	1.15	1.35	1.6	V
	$I_F = 500 \text{ mA}, t_p = 100 \mu \text{s}$	$V_{F}$		1.8		V
Temperature coefficient of V <sub>F</sub>	I <sub>F</sub> = 1 mA	TK <sub>VF</sub>		- 1.5		mV/K
Reverse current	V <sub>R</sub> = 5 V	I <sub>R</sub>			10	μA
Junction capacitance	$V_R = 0 \text{ V, f} = 1 \text{ MHz, E} = 0 \text{ mW/cm}^2$	CJ		21		pF
	$I_F = 100 \text{ mA}, t_p = 20 \text{ ms}$	l <sub>e</sub>	10	20	30	mW/sr
Radiant intensity	$I_F = 500 \text{ mA}, t_p = 100 \mu \text{s}$	l <sub>e</sub>		90		mW/sr
Radiant power	$I_F = 100 \text{ mA}, t_p = 20 \text{ ms}$	фe		40		mW
Temperature coefficient of radiant power	I <sub>F</sub> = 1 mA	TKφ <sub>e</sub>		- 1.1		%/K
Angle of half intensity		φ		± 25		deg
Peak wavelength	I <sub>F</sub> = 30 mA	λρ	920	940	960	nm
Spectral bandwidth	I <sub>F</sub> = 30 mA	Δλ		25		nm
Temperature coefficient of $\lambda_p$	I <sub>F</sub> = 30 mA	TKλ <sub>p</sub>		0.25		nm/K
Rise time	I <sub>F</sub> = 100 mA, 20 % to 80 %	t <sub>r</sub>		15		ns
Fall time	I <sub>F</sub> = 100 mA, 20 % to 80 %	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>		23		MHz

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

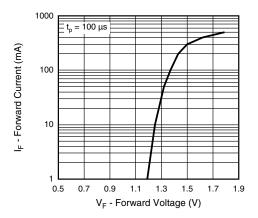


Fig. 3 - Forward Current vs. Forward Voltage

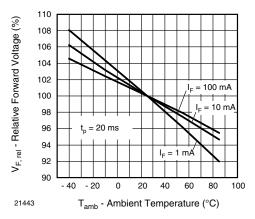


Fig. 4 - Relative Forward Voltage vs. Ambient Temperature

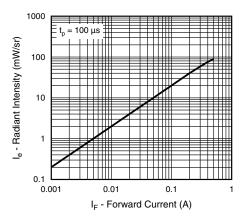


Fig. 5 - Radiant Intensity vs. Forward Current

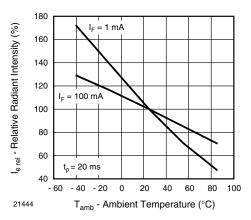


Fig. 6 - Relative Radiant Intensity vs. Ambient Temperature

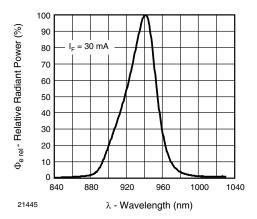


Fig. 7 - Relative Radiant Power vs. Wavelength

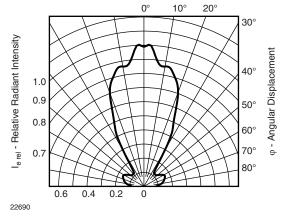


Fig. 8 - Relative Radiant Intensity vs. Angular Displacement



### **SOLDER PROFILE**

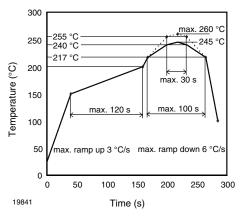


Fig. 9 - Lead (Pb)-free Reflow Solder Profile acc. J-STD-020

### **DRYPACK**

Devices are packed in moisture barrier bags (MBB) to prevent the products from moisture absorption during transportation and storage. Each bag contains a desiccant.

### **FLOOR LIFE**

Floor life (time between soldering and removing from MBB) must not exceed the time indicated on MBB label:

Floor life: 4 weeks

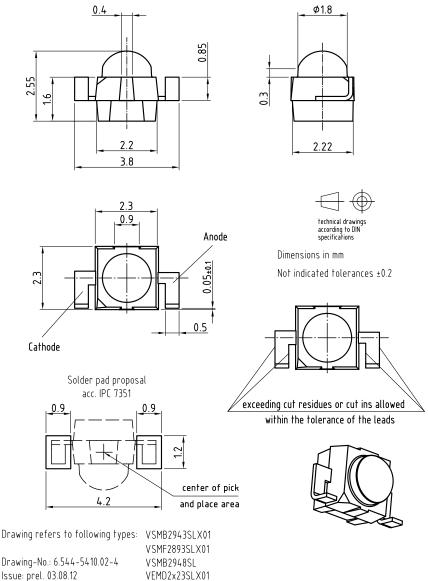
Conditions: T<sub>amb</sub> < 30 °C, RH < 60 %

Moisture sensitivity level 2a, acc. to J-STD-020.

#### **DRYING**

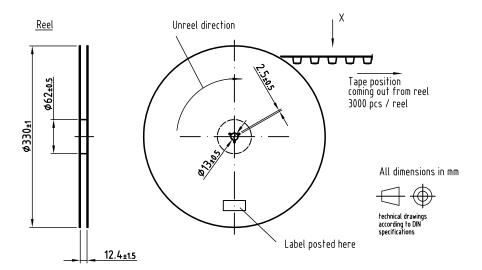
In case of moisture absorption devices should be baked before soldering. Conditions see J-STD-020 or label. Devices taped on reel dry using recommended conditions 192 h at 40  $^{\circ}$ C (+ 5  $^{\circ}$ C), RH < 5  $^{\circ}$ K.

### PACKAGE DIMENSIONS in millimeters: VSMB2948SL

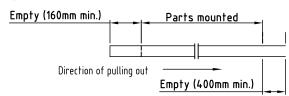




### TAPING AND REEL DIMENSIONS in millimeters: VSMB2948SL

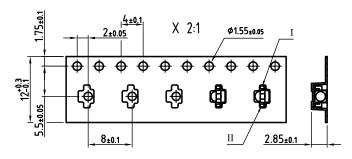


Leader and trailer tape:



Termina	l position	in tape

Lead I	Lead II	
Larnode	Anode	
1		
6.11	F-'11	
Collector	Emitter	
Anode	Cathode	
	- Cathode - Collector	



Drawing refers to following types: see table Reel dimensions and tape

Drawing-No.: 9.800-5123.01-4 Issue: prel; 01.02.13



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