

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



#### **DESCRIPTION**

VSMB2943SLX01 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**

- IrDA compatible data transmission
- · Miniature light barrier
- Photointerrupters
- · Optical switch
- · 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
- AEC-Q101 qualified
- 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 www.vishav.com/doc?99912









**PRODUCT SUMMARY** COMPONENT I<sub>e</sub> (mW/sr) φ (deg)  $\lambda_p$  (nm) t<sub>r</sub> (ns) VSMB2943SLX01 20  $\pm 25$ 940 15

#### Note

· Test conditions see table "Basic Characteristics"

ORDERING INFORMATION				
ORDERING CODE	PACKAGING	REMARKS	PACKAGE FORM	
VSMB2943SLX01	Tape and reel	MOQ: 3000 pcs, 3000 pcs/reel	Side view	

#### Note

· MOQ: minimum order quantity

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Reverse voltage	TEST CONDITION	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	Α
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



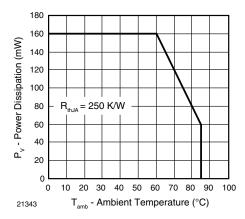


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

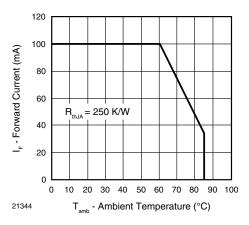


Fig. 2 - Forward Current Limit vs. Ambient Temperature

<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 <sub>F</sub>	1.15	1.35	1.6	V
	$I_F = 1 \text{ A}, t_p = 100 \mu \text{s}$	V <sub>F</sub>		2.2		V
Temperature coefficient of V <sub>F</sub>	I <sub>F</sub> = 1 mA	TK <sub>VF</sub>		- 1.8		mV/K
	I <sub>F</sub> = 100 mA	TK <sub>VF</sub>		- 1.1		mV/K
Reverse current	V <sub>R</sub> = 5 V	I <sub>R</sub>			10	μΑ
Junction capacitance	$V_R = 0 \text{ V, f} = 1 \text{ MHz, E} = 0 \text{ mW/cm}^2$	CJ		70		pF
Radiant intensity	$I_F = 100 \text{ mA}, t_p = 20 \text{ ms}$	l <sub>e</sub>	10	20	30	mW/sr
	$I_F = 1 \text{ A}, t_p = 100 \mu \text{s}$	l <sub>e</sub>		170		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
	I <sub>F</sub> = 100 mA	TKφ <sub>e</sub>		- 0.51		%/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)

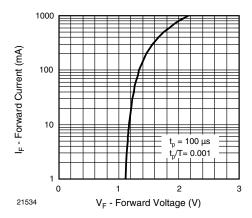


Fig. 3 - Forward Current vs. Forward Voltage

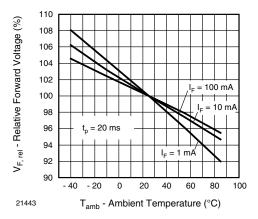


Fig. 4 - Relative Forward Voltage vs. Ambient Temperature

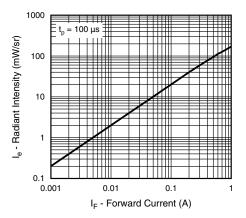


Fig. 5 - Radiant Intensity vs. Forward Current

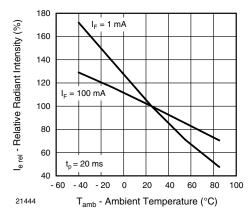


Fig. 6 - Relative Radiant Intensity vs. Ambient Temperature

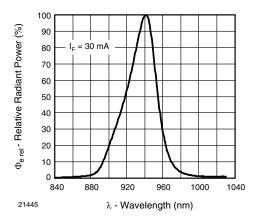


Fig. 7 - Relative Radiant Power vs. Wavelength

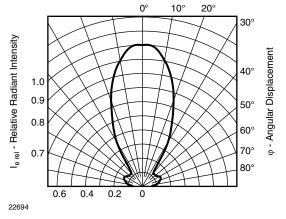


Fig. 8 - Relative Radiant Intensity vs. Angular Displacement

### **SOLDER PROFILE**

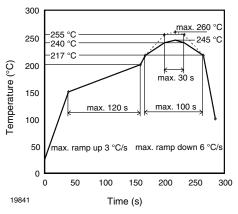


Fig. 9 - Lead (Pb)-free Reflow Solder Profile acc. J-STD-020

Issue: prel. 03.08.12

### **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

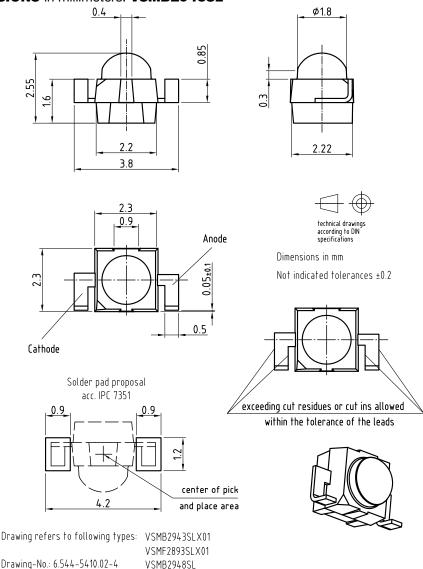
Conditions: T<sub>amb</sub> < 30 °C, RH < 60 %

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

### **DRYING**

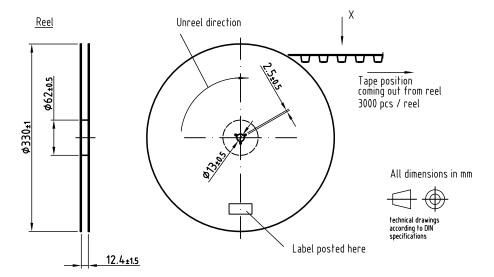
In case of moisture absorption devices should be baked before soldering. Conditions see J-STD-020 or label. Devices taped on reel dry using recommended conditions 192 h at 40  $^{\circ}$ C (+ 5  $^{\circ}$ C), RH < 5  $^{\circ}$ M.

### PACKAGE DIMENSIONS in millimeters: VSMB2943SL

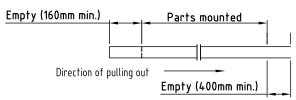


VEMD2x23SLX01

### TAPING AND REEL DIMENSIONS in millimeters: VSMB2943SL

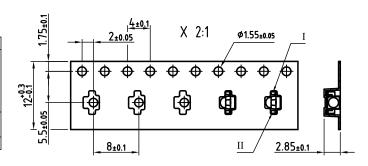


Leader and trailer tape:



### Terminal position in tape

Device	Lead I	Lead II	
VSMB2943SLX01			
VSMF2893SLX01		Anode	
VSMB2948SL	Cathode		
VEMD2023SLX01			
VEMD2523SLX01			
VEMT2023SLX01	C.11	Emitter	
VEMT2523SLX01	Collector		
VSMY2853SL	Anode	Cathode	



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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