

# 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:  $\lambda_p = 940$  nm
- High reliability
- High radiant power
- High radiant intensity
- Angle of half intensity:  $\phi = \pm 25^\circ$
- 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.vishay.com/doc?99912](http://www.vishay.com/doc?99912)

AUTOMOTIVE  
GRADE

**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**  
**GREEN**  
(5-2008)

## PRODUCT SUMMARY

COMPONENT	$I_e$ (mW/sr)	$\phi$ (°)	$\lambda_p$ (nm)	$t_r$ (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

## ABSOLUTE MAXIMUM RATINGS ( $T_{amb} = 25^\circ\text{C}$ , unless otherwise specified)

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Reverse voltage		$V_R$	5	V
Forward current		$I_F$	100	mA
Peak forward current	$t_p/T = 0.5$ , $t_p = 100 \mu\text{s}$	$I_{FM}$	200	mA
Surge forward current	$t_p = 100 \mu\text{s}$	$I_{FSM}$	1	A
Power dissipation		$P_V$	160	mW
Junction temperature		$T_j$	100	$^\circ\text{C}$
Operating temperature range		$T_{amb}$	-40 to +85	$^\circ\text{C}$
Storage temperature range		$T_{stg}$	-40 to +100	$^\circ\text{C}$
Soldering temperature	according figure 9, J-STD-020	$T_{sd}$	260	$^\circ\text{C}$
Thermal resistance junction to ambient	J-STD-051, leads 7 mm, soldered on PCB	$R_{thJA}$	250	K/W

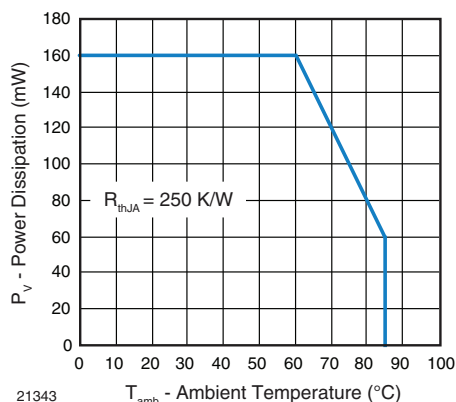


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

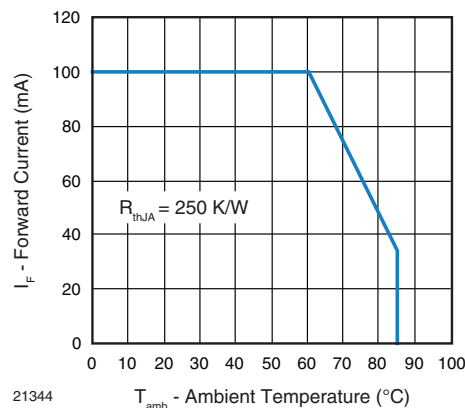


Fig. 2 - Forward Current Limit vs. Ambient Temperature

<b>BASIC CHARACTERISTICS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , 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
	$I_F = 1\text{ A}$ , $t_p = 100\text{ }\mu\text{s}$	$V_F$		2.2		V
Temperature coefficient of $V_F$	$I_F = 1\text{ mA}$	$TK_{VF}$		-1.8		mV/K
	$I_F = 100\text{ mA}$	$TK_{VF}$		-1.1		mV/K
Reverse current		$I_R$	Not designed for reverse operation			$\mu\text{A}$
Junction capacitance	$V_R = 0\text{ V}$ , $f = 1\text{ MHz}$ , $E = 0\text{ mW/cm}^2$	$C_J$		70		pF
Radiant intensity	$I_F = 100\text{ mA}$ , $t_p = 20\text{ ms}$	$I_e$	10	20	30	mW/sr
	$I_F = 1\text{ A}$ , $t_p = 100\text{ }\mu\text{s}$	$I_e$		170		mW/sr
Radiant power	$I_F = 100\text{ mA}$ , $t_p = 20\text{ ms}$	$\phi_e$		40		mW
Temperature coefficient of radiant power	$I_F = 1\text{ mA}$	$TK_{\phi_e}$		-1.1		%/K
	$I_F = 100\text{ mA}$	$TK_{\phi_e}$		-0.51		%/K
Angle of half intensity		$\phi$		$\pm 25$		$^{\circ}$
Peak wavelength	$I_F = 30\text{ mA}$	$\lambda_p$	920	940	960	nm
Spectral bandwidth	$I_F = 30\text{ mA}$	$\Delta\lambda$		25		nm
Temperature coefficient of $\lambda_p$	$I_F = 30\text{ mA}$	$TK_{\lambda_p}$		0.25		nm/K
Rise time	$I_F = 100\text{ mA}$ , 20 % to 80 %	$t_r$		15		ns
Fall time	$I_F = 100\text{ mA}$ , 20 % to 80 %	$t_f$		15		ns
Cut-off frequency	$I_{DC} = 70\text{ mA}$ , $I_{AC} = 30\text{ mA pp}$	$f_c$		23		MHz

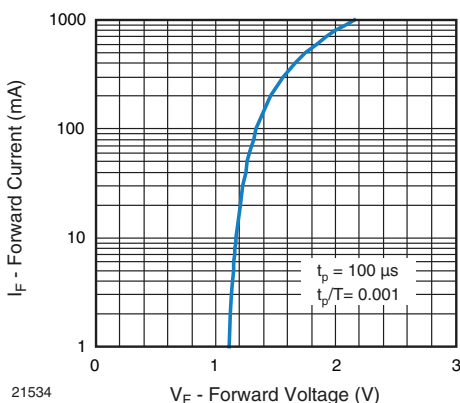
**BASIC CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)


Fig. 3 - Forward Current vs. Forward Voltage

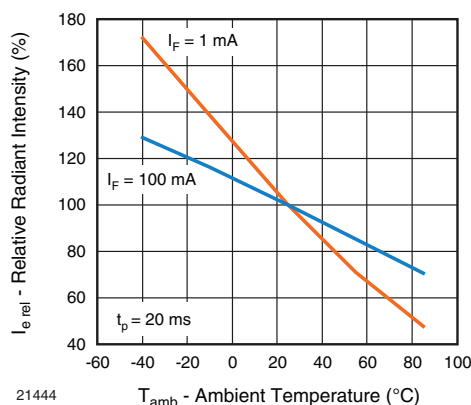


Fig. 6 - Relative Radiant Intensity vs. Ambient Temperature

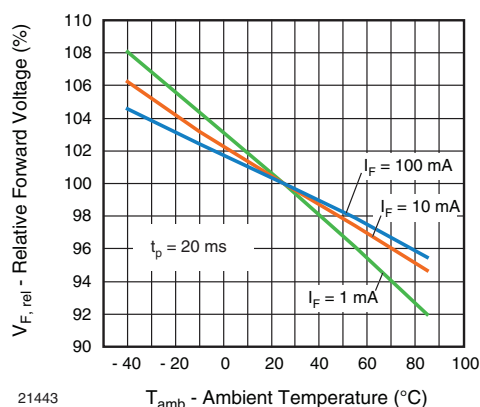


Fig. 4 - Relative Forward Voltage vs. Ambient Temperature

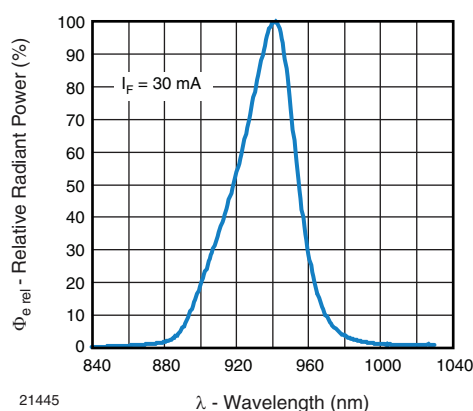


Fig. 7 - Relative Radiant Power vs. Wavelength

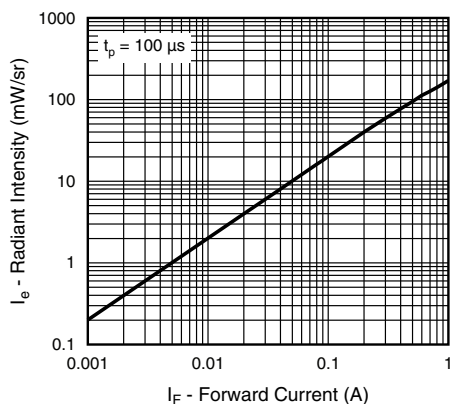


Fig. 5 - Radiant Intensity vs. Forward Current

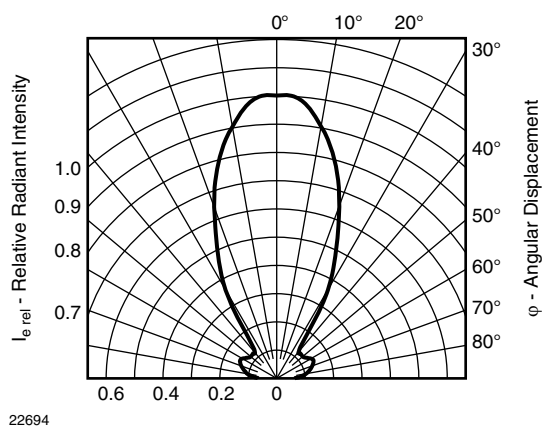


Fig. 8 - Relative Radiant Intensity vs. Angular Displacement



## SOLDER PROFILE

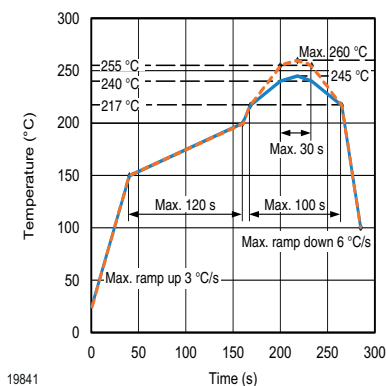


Fig. 9 - Lead (Pb)-free Reflow Solder Profile acc. J-STD-020

## DRYPACK

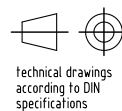
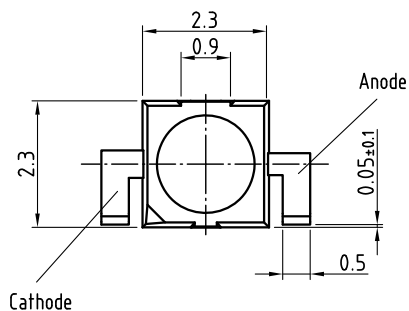
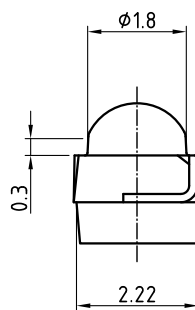
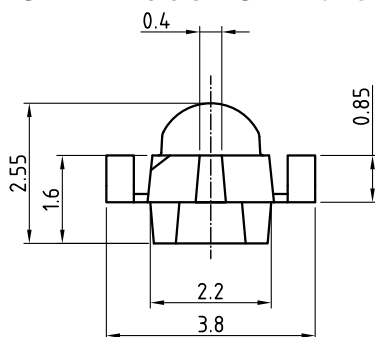
Devices are packed in moisture barrier bags (MBB) to prevent the products from moisture absorption during transportation and storage. Each bag contains a desiccant.

## FLOOR LIFE

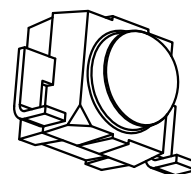
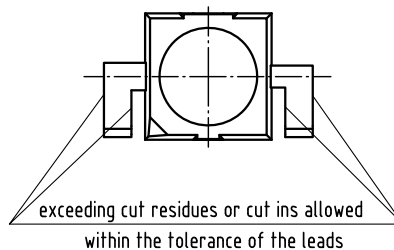
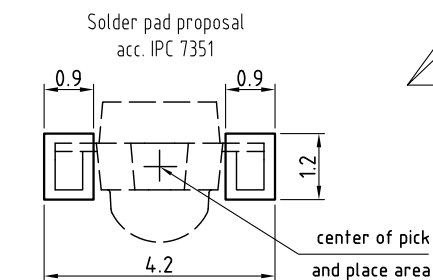
Floor life (time between soldering and removing from MBB) must not exceed the time indicated on MBB label:  
Floor life: 4 weeks  
Conditions:  $T_{amb} < 30\text{ °C}$ ,  $RH < 60\%$   
Moisture sensitivity level 2a, acc. to J-STD-020.

## DRYING

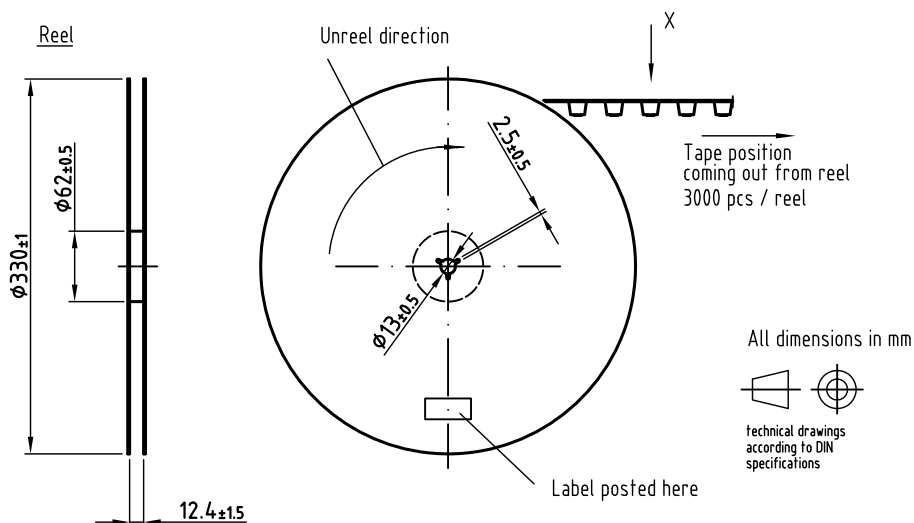
In case of moisture absorption devices should be baked before soldering. Conditions see J-STD-020 or label. Devices taped on reel dry using recommended conditions 192 h at  $40\text{ °C}$  (+  $5\text{ °C}$ ),  $RH < 5\%$ .

**PACKAGE DIMENSIONS** in millimeters: **VSMB2943SL**


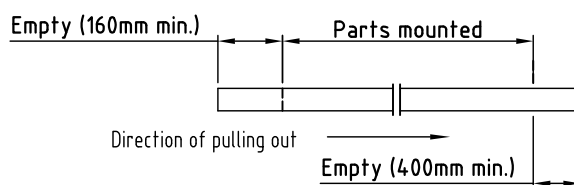
Dimensions in mm  
Not indicated tolerances  $\pm 0.2$



Drawing refers to following types: VSMB2943SLX01  
VSMF2893SLX01  
Drawing-No.: 6.544-5410.02-4 VSMB2948SL  
Issue: prel. 03.08.12 VEMD2x23SLX01

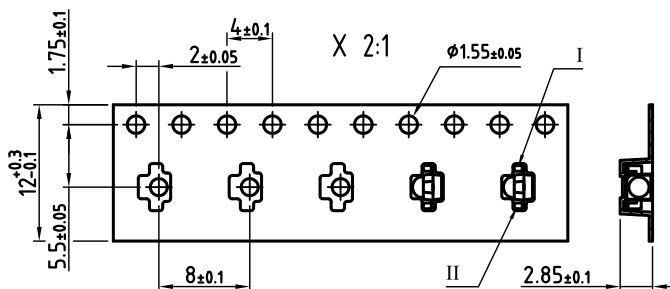
**TAPING AND REEL DIMENSIONS in millimeters: VSMB2943SL**


Leader and trailer tape:



Terminal position in tape

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



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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