AUTOMOTIVE

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(5-2008)



# Vishay Semiconductors

### Silicon PIN Photodiode



#### **DESCRIPTION**

VEMD2523SLX01 is a high speed and high sensitive PIN photodiode in a miniature side looking, surface mount package (SMD) with dome lens. The clear epoxy allows light detection of a wide wavelength range from 350 nm to 1120 nm. The photo sensitive area of the chip is 0.23 mm<sup>2</sup>.

#### **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
- · High radiant sensitivity
- Suitable for visible and near infrared radiation
- Fast response times
- Angle of half sensitivity:  $\varphi = \pm 35^{\circ}$
- Package matched with IR emitter series VSMB2943SLX01
- Floor life: 4 weeks, MSL 2a, acc. J-STD-020
- Lead (Pb)-free reflow soldering
- Material categorization: For definitions of compliance please see <a href="https://www.vishav.com/doc?99912"><u>www.vishav.com/doc?99912</u></a>



- · High speed photo detector
- · Light curtain
- · Detector for optical switch

PRODUCT SUMMARY				
COMPONENT	I <sub>ra</sub> (μΑ)	φ (deg)	λ <sub>0.1</sub> (nm)	
VEMD2523SLX01	10	± 35	350 to 1120	

#### Note

· Test conditions see table "Basic Characteristics"

ORDERING INFORMATION					
ORDERING CODE	PACKAGING	REMARKS	PACKAGE FORM		
VEMD2523SLX01	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>	60	V
Power dissipation	T <sub>amb</sub> ≤ 25 °C	P <sub>V</sub>	215	mW
Junction temperature		Tj	100	°C
Operating temperature range		T <sub>amb</sub>	- 40 to + 100	°C
Storage temperature range		T <sub>stg</sub>	- 40 to + 100	°C
Soldering temperature	Acc. reflow solder profile fig. 7	T <sub>sd</sub>	260	°C
Thermal resistance junction/ambient	Acc. J-STD-051	R <sub>thJA</sub>	250	K/W

<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> = 50 mA	$V_{F}$		1		V
Breakdown voltage	$I_R = 100 \mu A, E = 0$	V <sub>(BR)</sub>	32			V
Reverse dark current	V <sub>R</sub> = 10 V, E = 0	I <sub>ro</sub>		1	10	nA
Diode capacitance	$V_R = 0 V, f = 1 MHz, E = 0$	$C_D$		4		pF
	$V_R = 5 V, f = 1 MHz, E = 0$	$C_D$		1.3		pF
Open circuit voltage	$E_{e} = 1 \text{ mW/cm}^{2}, \lambda = 950 \text{ nm}$	Vo		350		mV
Temperature coefficient of Vo	$E_e = 1 \text{ mW/cm}^2$ , $\lambda = 950 \text{ nm}$	$TK_Vo$		- 2.6		mV/K
Short circuit current	$E_{e} = 1 \text{ mW/cm}^{2}, \lambda = 950 \text{ nm}$	I <sub>k</sub>		10		μA
Temperature coefficient of I <sub>k</sub>	$E_e = 1 \text{ mW/cm}^2, \lambda = 950 \text{ nm}$	TK <sub>lk</sub>		0.1		%/K
Reverse light current	$E_e = 1 \text{ mW/cm}^2$ , $\lambda = 950 \text{ nm}$ , $V_R = 5 \text{ V}$	I <sub>ra</sub>	7	10	14	μA
Angle of half sensitivity		φ		± 35		deg
Wavelength of peak sensitivity		$\lambda_{p}$		900		nm
Range of spectral bandwidth		λ <sub>0.1</sub>		350 to 1120		nm
Rise time	$V_R = 10 \text{ V}, R_L = 1 \text{ k}\Omega, \lambda = 820 \text{ nm}$	t <sub>r</sub>		100		ns
Fall time	$V_R = 10 \text{ V}, R_L = 1 \text{ k}\Omega, \lambda = 820 \text{ nm}$	t <sub>f</sub>		100		ns

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

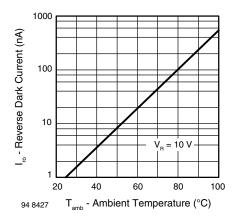


Fig. 1 - Reverse Dark Current vs. Ambient Temperature

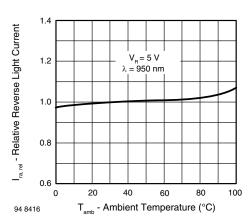


Fig. 2 - Relative Reverse Light Current vs. Ambient Temperature

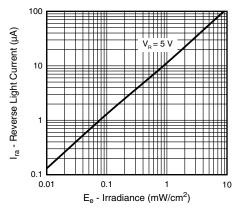


Fig. 3 - Reverse Light Current vs. Irradiance

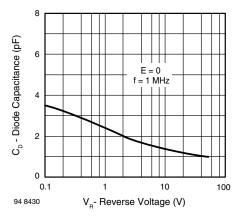


Fig. 4 - Diode Capacitance vs. Reverse Voltage



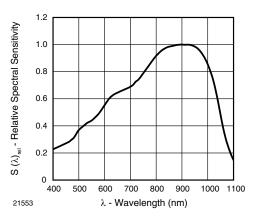


Fig. 5 - Relative Spectral Sensitivity vs. Wavelength

#### **REFLOW SOLDER PROFILE**

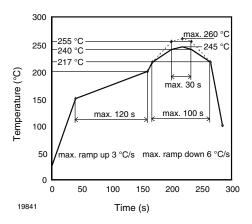


Fig. 7 - Lead (Pb)-free Reflow Solder Profile acc. J-STD-020D

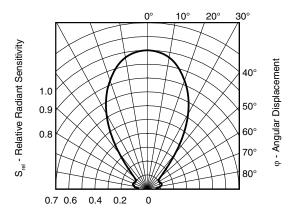


Fig. 6 - Relative Radiant Intensity vs. Angular Displacement

#### **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 %

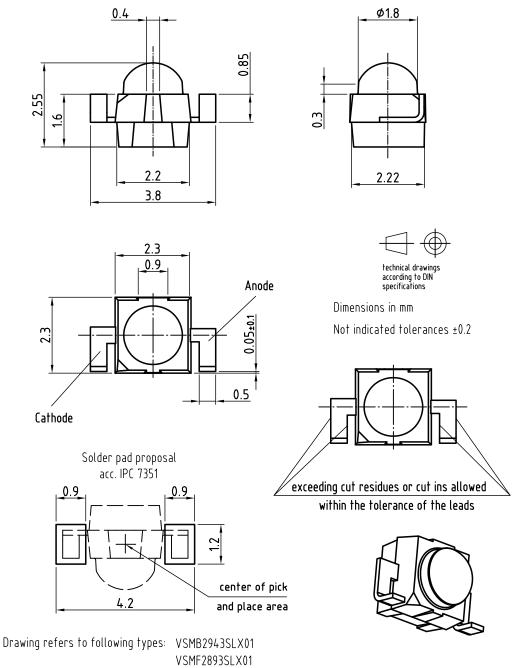
Moisture sensitivity level 2a, acc. to J-STD-020.

### **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.



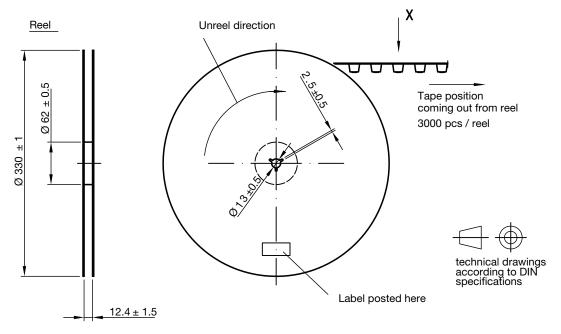
#### **PACKAGE DIMENSIONS** in millimeters: **VEMD2523SL**



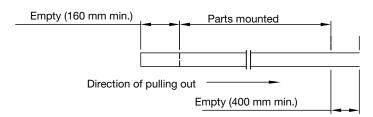
Drawing-No.: 6.544-5410.02-4 VSMB2948SL Issue: prel. 03.08.12 VEMD2x23SLX01



### TAPING AND REEL DIMENSIONS in millimeters: VEMD2523SL

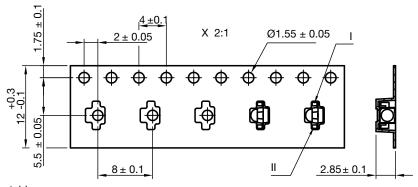


Leader and tailer tape:



#### Terminal position in tape

Device	Lead I	Lead II	
VSMB2943SLX01			
VSMF2893SLX01	0-4	Anada	
VSMB2948SL	Cathode	Anode	
VEMD2023SLX01			
VEMD2523SLX01			
VEMT2023SLX01	Collector	F:44	
VEMT2523SLX01	Collector	Emitter	
VSMY2853SL	Anode	Cathode	



Drawing refers to following types: see table

Reel dimensions and tape

Drawing-No.: 9.800-5123.01-4

Issue: 2; 19.02.13



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