

## Silicon PIN Photodiode



### DESCRIPTION

VEMD11940FX01 is a high speed and high sensitive PIN photodiode in a miniature side looking, surface mount package (SMD) with daylight blocking filter. Filter is matched with IR emitters operating at wavelength of 830 nm to 950 nm. The photo sensitive area of the chip is 0.053 mm<sup>2</sup>.

### FEATURES

- Package type: surface mount
- Package form: Side view
- Dimensions (L x W x H in mm): 3 x 2 x 0.6
- AEC-Q101 qualified
- High radiant sensitivity
- Daylight blocking filter matched with 830 nm to 950 nm IR emitters
- Angle of half sensitivity:  $\varphi = \pm 75^\circ$
- Package matched with IR emitter VSMB11940X01
- Floor life: 168 h, MSL 3, according to J-STD-020
- Lead (Pb)-free reflow soldering
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)




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

### APPLICATIONS

- High speed photo detector
- Infrared remote control
- Infrared data transmission
- Photo interrupters
- IR touch panels

### PRODUCT SUMMARY

COMPONENT	I <sub>ra</sub> (μA)	φ (deg)	λ <sub>0.5</sub> (nm)
VEMD11940FX01	1.13	± 75	780 to 1050

#### Note

- Test conditions see table "Basic Characteristics"

### ORDERING INFORMATION

ORDERING CODE	PACKAGING	REMARKS	PACKAGE FORM
VEMD11940FX01	Tape and reel	MOQ: 4000 pcs, 4000 pcs/reel	Side view

#### Note

- MOQ: minimum order quantity

### ABSOLUTE MAXIMUM RATINGS (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>	104	mW
Junction temperature		T <sub>j</sub>	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	According to reflow solder profile fig. 8	T <sub>sd</sub>	260	°C
Thermal resistance junction / ambient	According to J-STD-051	R <sub>thJA</sub>	580	K/W

<b>BASIC CHARACTERISTICS</b> ( $T_{amb} = 25^\circ C$ , unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Forward voltage	$I_F = 50 \text{ mA}$	$V_F$	-	1.7	-	V
Breakdown voltage	$I_R = 100 \mu\text{A}$ , $E = 0$	$V_{(BR)}$	32	-	-	V
Reverse dark current	$V_R = 10 \text{ V}$ , $E = 0$	$I_{ro}$	-	< 1	10	nA
Diode capacitance	$V_R = 0 \text{ V}$ , $f = 1 \text{ MHz}$ , $E = 0$	$C_D$	-	1.1	-	pF
	$V_R = 3 \text{ V}$ , $f = 1 \text{ MHz}$ , $E = 0$	$C_D$	-	0.5	-	pF
Open circuit voltage	$E_e = 1 \text{ mW/cm}^2$ , $\lambda = 950 \text{ nm}$	$V_o$	-	350	-	mV
Temperature coefficient of $V_o$	$E_e = 1 \text{ mW/cm}^2$ , $\lambda = 950 \text{ nm}$	$TK_{Vo}$	-	-2.7	-	mV/K
Short circuit current	$E_e = 1 \text{ mW/cm}^2$ , $\lambda = 950 \text{ nm}$	$I_k$	-	1.13	-	µA
Temperature coefficient of $I_k$	$E_e = 1 \text{ mW/cm}^2$ , $\lambda = 950 \text{ nm}$	$TK_{Ik}$	-	0.1	-	%/K
Reverse light current	$E_e = 1 \text{ mW/cm}^2$ , $\lambda = 950 \text{ nm}$ , $V_R = 5 \text{ V}$	$I_{ra}$	0.8	1.13	1.8	µA
Angle of half sensitivity		$\varphi$	-	$\pm 75$	-	deg
Wavelength of peak sensitivity		$\lambda_p$	-	950	-	nm
Range of spectral bandwidth		$\lambda_{0.5}$	-	780 to 1050	-	nm
Rise time	$V_R = 10 \text{ V}$ , $R_L = 1 \text{ k}\Omega$ , $\lambda = 820 \text{ nm}$	$t_r$	-	100	-	ns
Fall time	$V_R = 10 \text{ V}$ , $R_L = 1 \text{ k}\Omega$ , $\lambda = 820 \text{ nm}$	$t_f$	-	100	-	ns

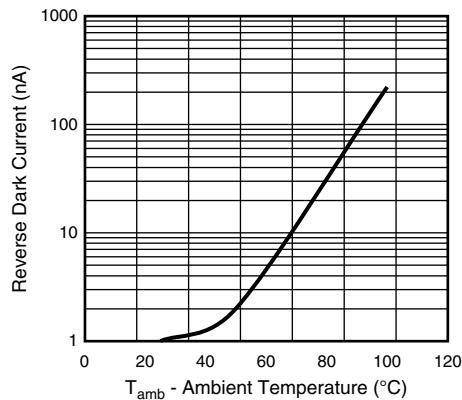
**BASIC CHARACTERISTICS** ( $T_{amb} = 25^\circ C$ , unless otherwise specified)


Fig. 1 - Reverse Dark Current vs. Ambient Temperature

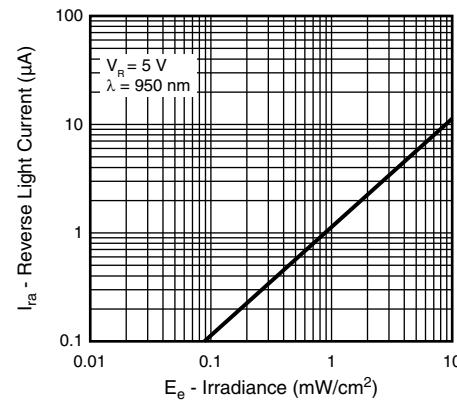


Fig. 3 - Reverse Light Current vs. Irradiance

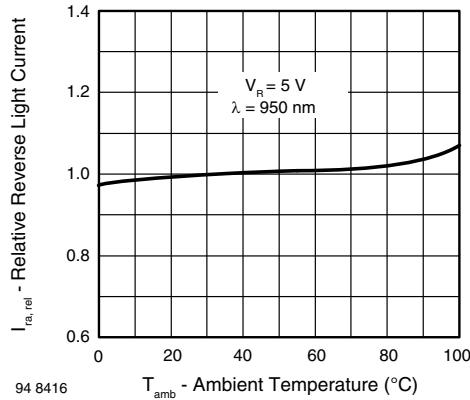


Fig. 2 - Relative Reverse Light Current vs. Ambient Temperature

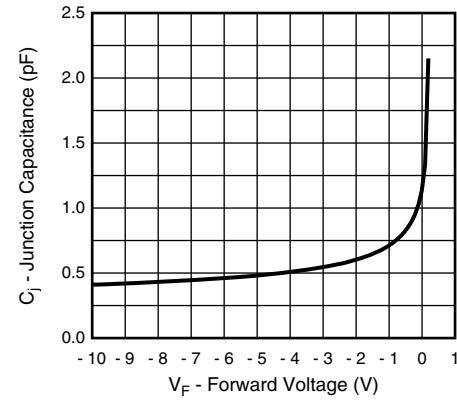


Fig. 4 - Diode Capacitance vs. Reverse Voltage

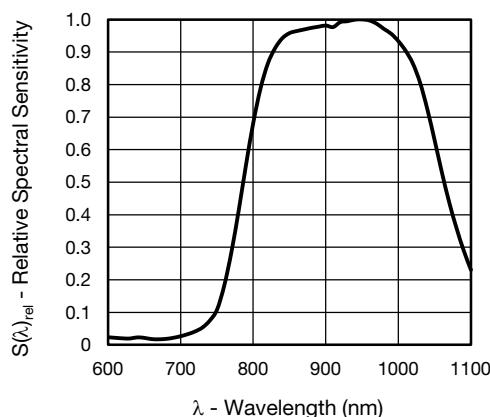


Fig. 5 - Relative Spectral Sensitivity vs. Wavelength

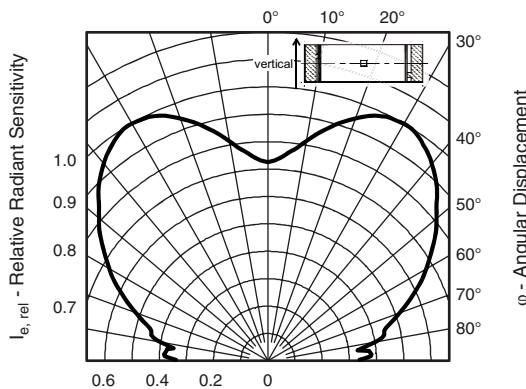


Fig. 7 - Relative Radiant Sensitivity vs. Angular Displacement - Vertical

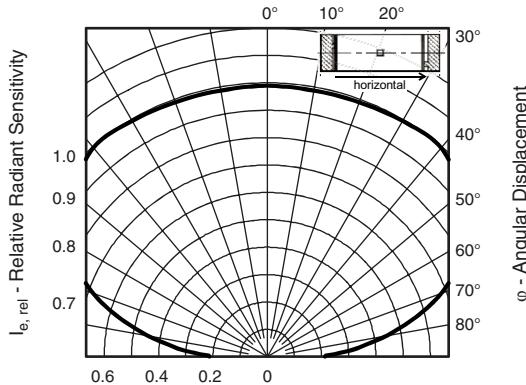


Fig. 6 - Relative Radiant Sensitivity vs. Angular Displacement - Horizontal

## REFLOW SOLDER PROFILE

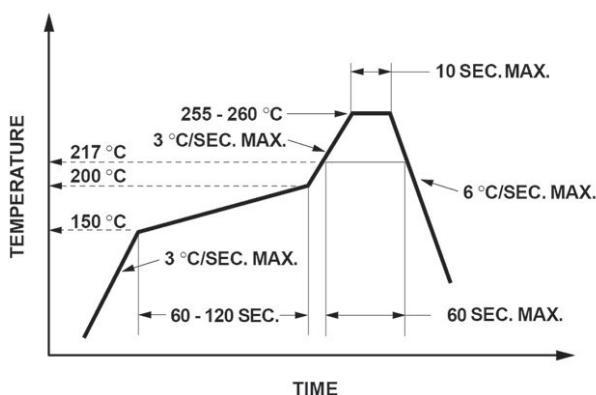


Fig. 8 - Lead (Pb)-free Reflow Solder Profile  
According to J-STD-020D

## 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:

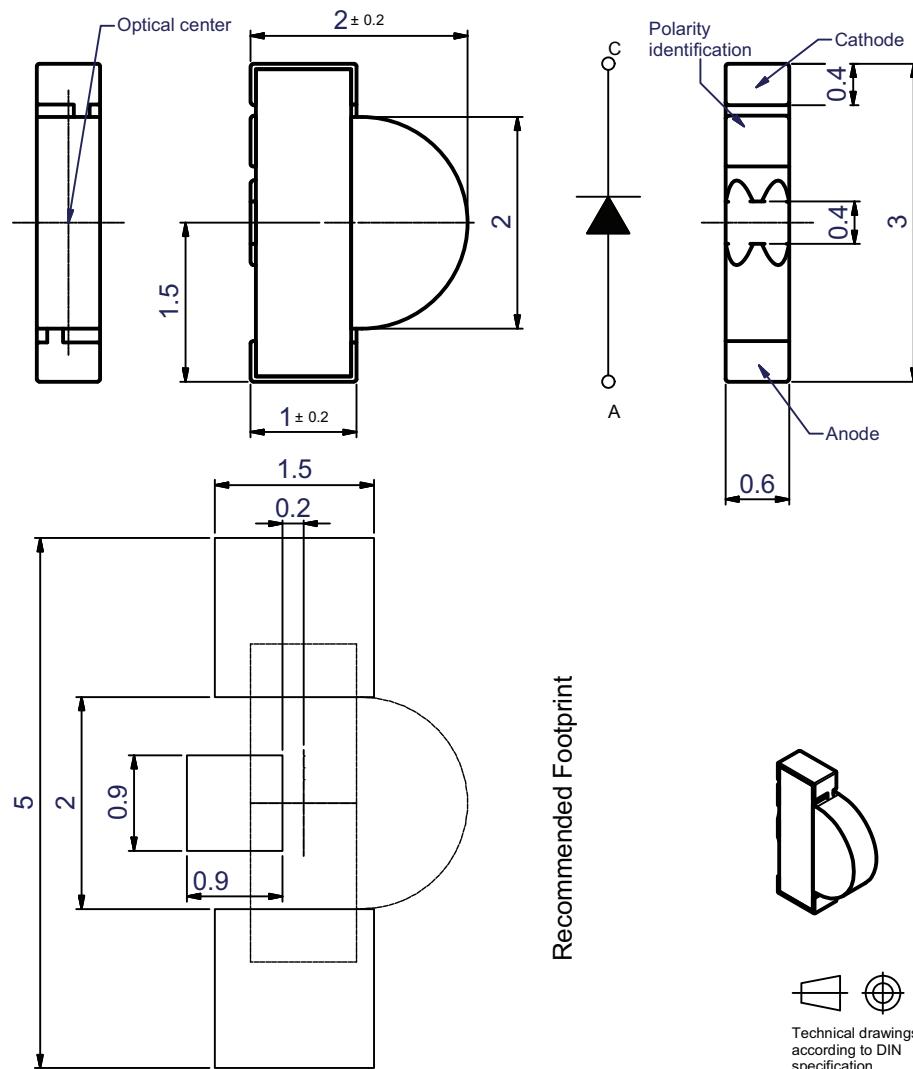
Floor life: 168 h

Conditions:  $T_{amb} < 30^{\circ}\text{C}$ , RH < 60 %

Moisture sensitivity level 3, according to J-STD-020.

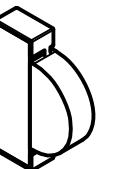
## DRYING

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  $40^{\circ}\text{C}$  ( $\pm 5^{\circ}\text{C}$ ), RH < 5 %.

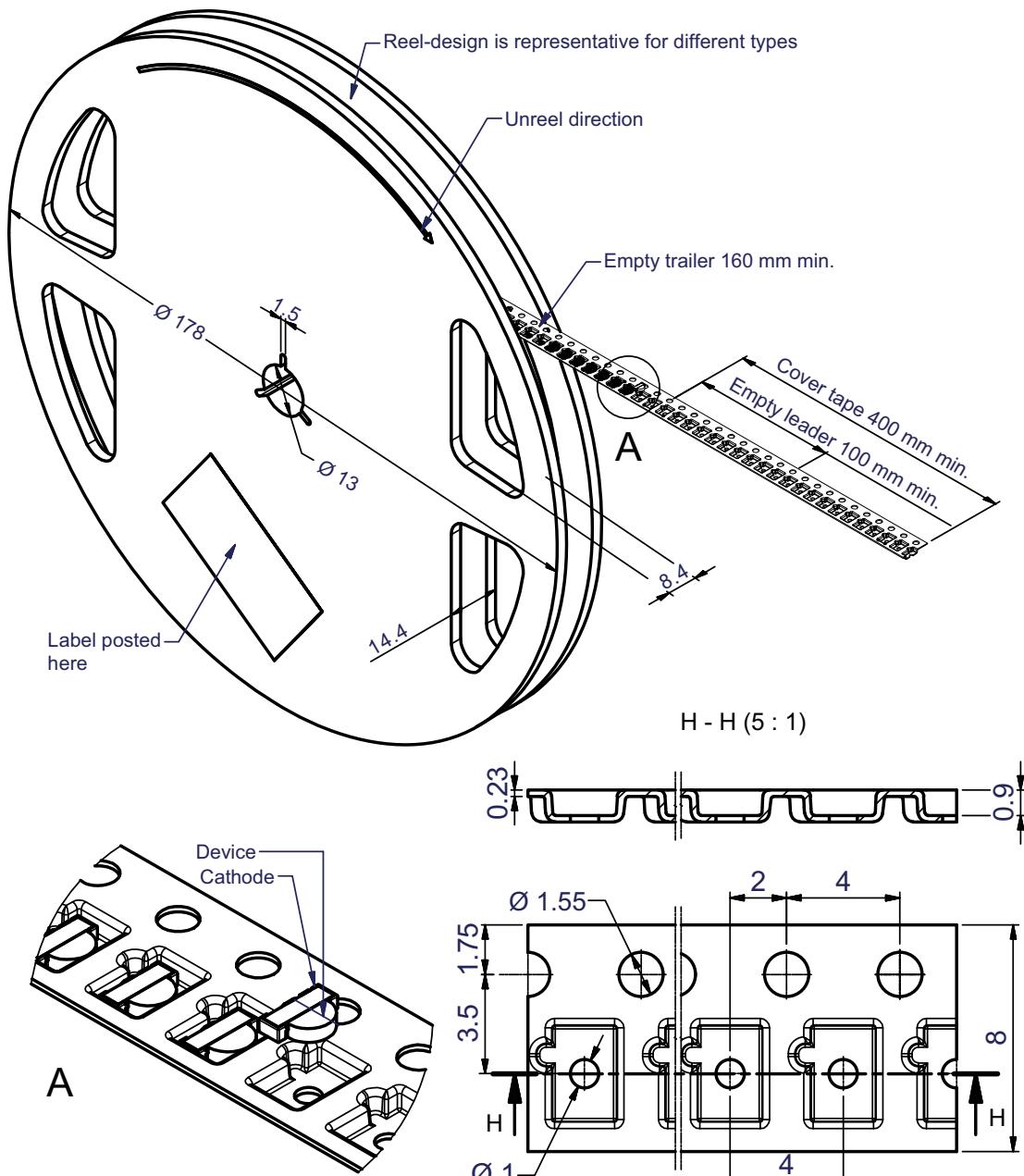
**PACKAGE DIMENSIONS** in millimeters


Drawing- No: 6.550-5327.01-4  
 Issue: Prel. 26.11.2013

Not indicated tolerances  $\pm 0.1$  mm



Technical drawings  
 according to DIN  
 specification.

**TAPING AND REEL DIMENSIONS** in millimeters


Drawing refers to following types: VSMB11940  
VEMD11940F

Drawing No. 9.800-5126.01-4; Issue: Prel. 23.05.2013

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