

# Silicon PIN Photodiode



## LINKS TO ADDITIONAL RESOURCES



## DESCRIPTION

VEMD4110X01 is a high speed and high sensitive PIN photodiode. It is a miniature surface mount device (SMD) with a 0.42 mm<sup>2</sup> sensitive area and a daylight blocking filter matched with IR emitters operating at wavelength of 830 nm to 950 nm.

## FEATURES

- Package type: surface-mount
- Package form: 0805
- Dimensions (L x W x H in mm): 2 x 1.25 x 0.7
- Radiant sensitive area (in mm<sup>2</sup>): 0.42
- Operating temperature range: T<sub>OP</sub> = -40 °C to +110 °C
- Daylight blocking filter matched with 830 nm to 950 nm emitters
- Angle of half sensitivity:  $\phi = \pm 55^\circ$
- Floor life: 168 h, MSL 3, according to J-STD-020
- Lead (Pb)-free reflow soldering
- AEC-Q101 qualified
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



## APPLICATIONS

- High speed photo detector
- Photo interrupters
- Automotive sensors
- [Hygienic applications](#)

PRODUCT SUMMARY			
COMPONENT	$I_{ra}$ (μA) at $E_e = 1 \text{ mW/cm}^2$ , $\lambda = 950 \text{ nm}$ , $V_R = 5 \text{ V}$	$\phi$ (°)	$\lambda_{0.5}$ (nm)
VEMD4110X01	2.4	± 55	740 to 1040

### Note

- Test conditions see table “Basic Characteristics”

ORDERING INFORMATION			
ORDERING CODE	PACKAGING	REMARKS	PACKAGE FORM
VEMD4110X01	Tape and reel	MOQ: 3000 pcs, 3000 pcs/reel	0805

### 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>	20	V
Operating temperature range		T <sub>amb</sub>	-40 to +110	°C
Storage temperature range		T <sub>stg</sub>	-40 to +110	°C
Soldering temperature	According to reflow solder profile Fig. 8	T <sub>sd</sub>	260	°C

<b>BASIC CHARACTERISTICS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Forward voltage	$I_F = 50\text{ mA}$	$V_F$	-	1.1	1.3	V
Reverse dark current	$V_R = 5\text{ V}, E = 0$	$I_{r0}$	-	1	3	nA
Diode capacitance	$V_R = 0\text{ V}, f = 1\text{ MHz}, E = 0$	$C_D$	-	7	-	pF
	$V_R = 5\text{ V}, f = 1\text{ MHz}, E = 0$	$C_D$	-	2.5	-	pF
Short circuit current	$E_e = 1\text{ mW/cm}^2, \lambda = 950\text{ nm}$	$I_k$	-	2.2	-	$\mu\text{A}$
Open circuit voltage	$E_e = 1\text{ mW/cm}^2, \lambda = 950\text{ nm}$	$V_O$	-	318	-	mV
Temperature coefficient of $I_k$	$E_e = 1\text{ mW/cm}^2, \lambda = 950\text{ nm}$	$TK_{I_k}$	-	0.1	-	%/K
Reverse light current	$E_e = 1\text{ mW/cm}^2, \lambda = 950\text{ nm}, V_R = 5\text{ V}$	$I_{ra}$	1.9	2.4	3.1	$\mu\text{A}$
Angle of half sensitivity		$\phi$	-	$\pm 55$	-	$^{\circ}$
Wavelength of peak sensitivity		$\lambda_p$	-	910	-	nm
Range of spectral bandwidth		$\lambda_{0.5}$	-	740 to 1040	-	nm
Rise time	$V_R = 5\text{ V}, R_L = 1\text{ k}\Omega, \lambda = 820\text{ nm}$	$t_r$	-	100	-	ns
Fall time	$V_R = 5\text{ V}, R_L = 1\text{ k}\Omega, \lambda = 820\text{ nm}$	$t_f$	-	100	-	ns

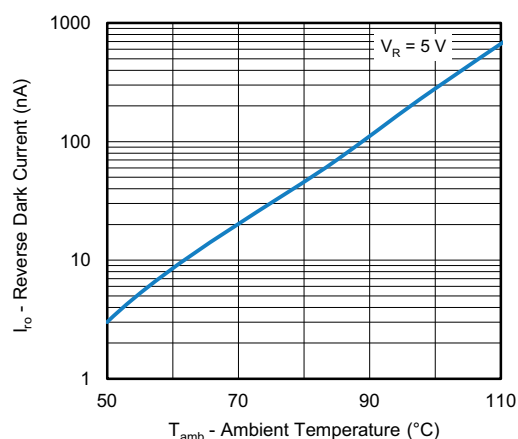
**BASIC CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)


Fig. 1 - Reverse Dark Current vs. Ambient Temperature

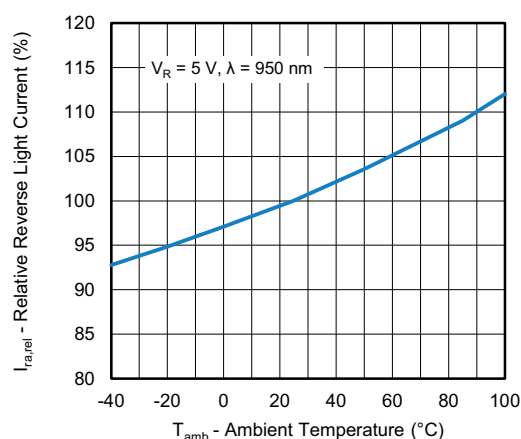


Fig. 2 - Relative Reverse Light Current vs. Ambient Temperature

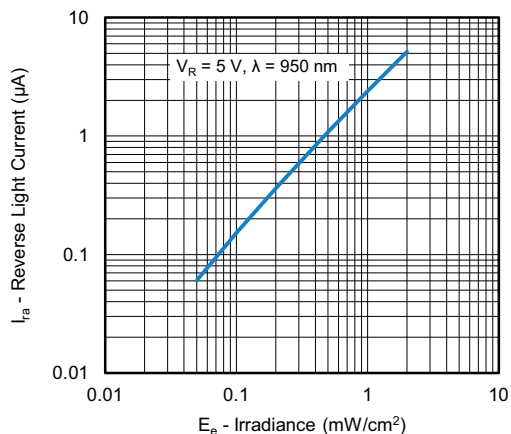


Fig. 3 - Reverse Light Current vs. Irradiance

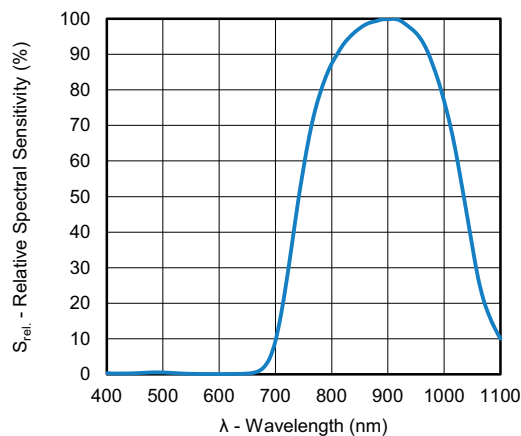


Fig. 5 - Relative Spectral Sensitivity vs. Wavelength

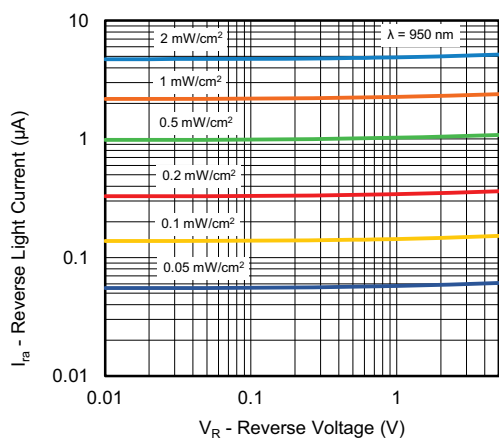


Fig. 4 - Reverse Light Current vs. Reverse Voltage

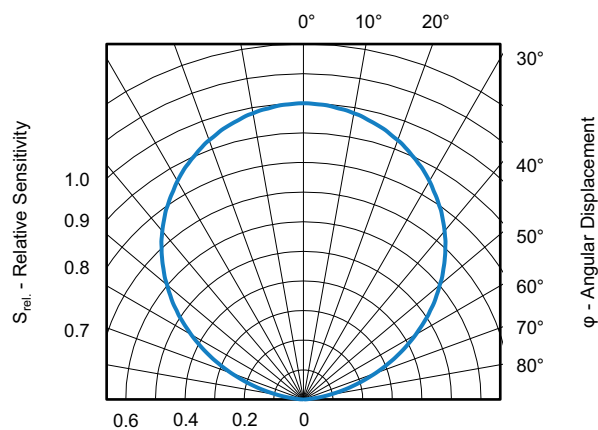


Fig. 6 - Relative Sensitivity vs. Angular Displacement

## REFLOW SOLDER PROFILE

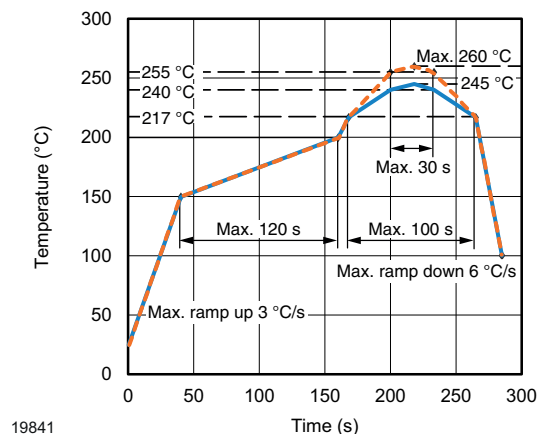


Fig. 7 - Lead (Pb)-free Reflow Solder Profile  
According to J-STD-020

## 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: 168 h

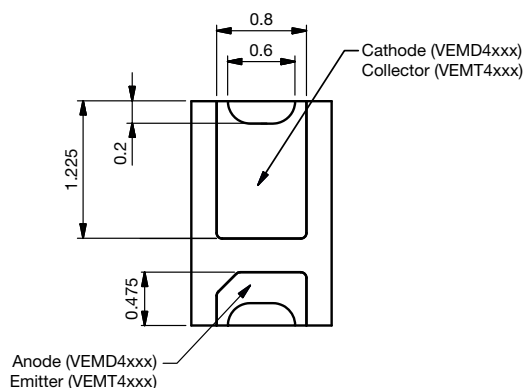
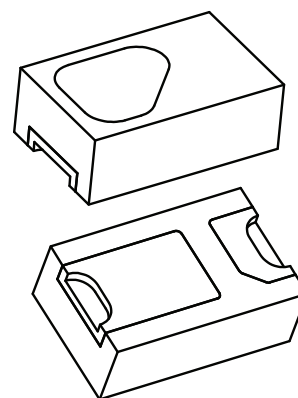
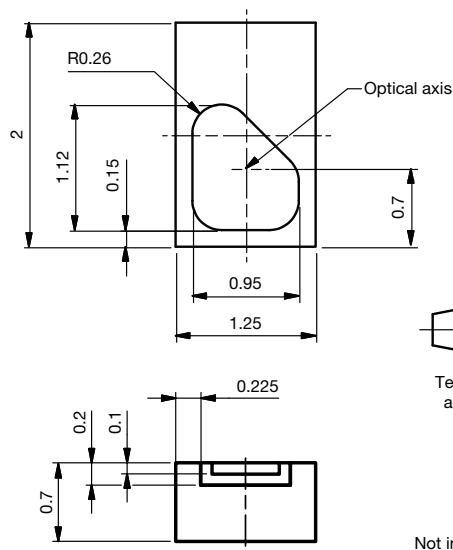
Conditions:  $T_{amb} < 30\text{ °C}$ ,  $RH < 60\%$

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

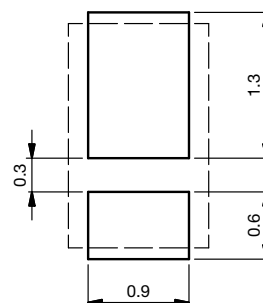
## DRYING

In case of moisture absorption devices should be baked before soldering. Conditions see J-STD-033D or label. Devices taped on reel dry using recommended conditions 192 h at  $40\text{ °C}$  ( $+5\text{ °C}$ ),  $RH < 5\%$ .

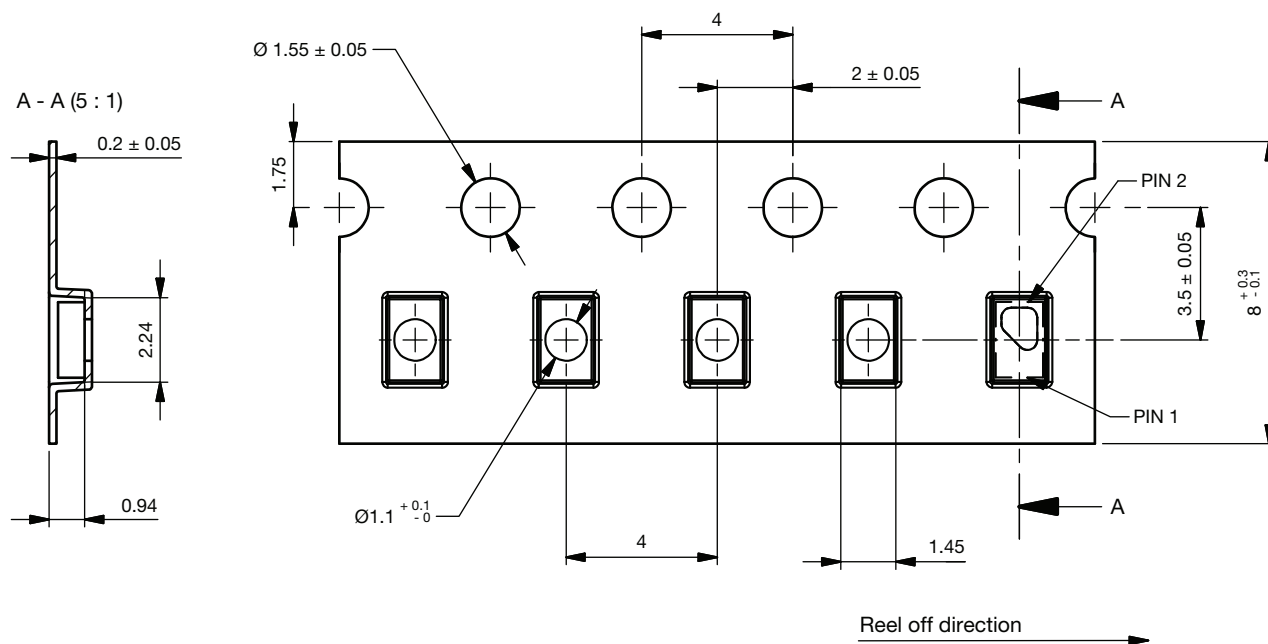
## PACKAGE DIMENSIONS in millimeters



## Recommended footprint



Drawing-No.: 6.550-5363.01-4  
Issue: 2; 01.07.2020

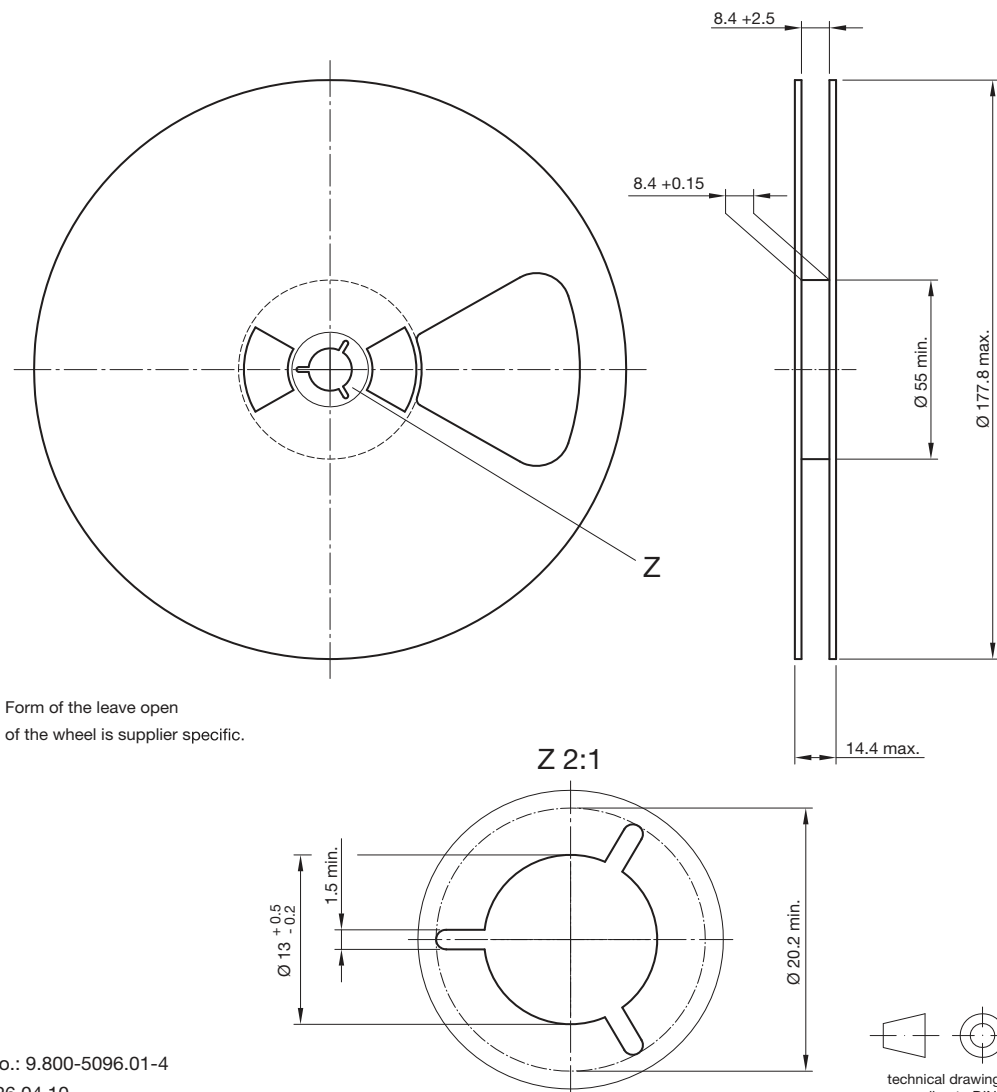
**BLISTER TAPE DIMENSIONS** in millimeters

TYPE	PIN 1	PIN 2
VEMD4xxx	Anode	Cathode

Drawing-No.: 9.700-5411.0-4  
Issue: 1\_A; 11.10.2022



**REEL DIMENSIONS** in millimeters



Drawing-No.: 9.800-5096.01-4  
Issue: 2; 26.04.10  
20875



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