

## Silicon PIN Photodiode



### DESCRIPTION

VEMD8080 is a high speed and high sensitive PIN photodiode with enhanced sensitivity for visible light. It is a low profile surface-mount device (SMD) including the chip with a 4.5 mm<sup>2</sup> sensitive area detecting visible and near infrared radiation.

### FEATURES

- Package type: surface-mount
- Package form: top view
- Dimensions (L x W x H in mm): 4.8 x 2.5 x 0.48
- Radiant sensitive area (in mm<sup>2</sup>): 4.5
- 0.48 mm low profile package
- Enhanced sensitivity for visible light
- Suitable for visible and near infrared radiation
- Fast response times
- Angle of half sensitivity:  $\phi = \pm 65^\circ$
- Floor life: 168 h, MSL 3, according to J-STD-020
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



### APPLICATIONS

- High speed photo detector
- Wearables

### PRODUCT SUMMARY

COMPONENT	$I_{ra}$ ( $\mu A$ )	$\phi$ (deg)	$\lambda_{0.1}$ (nm)
VEMD8080	28	$\pm 65$	350 to 1100

#### Note

- Test conditions see table “Basic Characteristics”

### ORDERING INFORMATION

ORDERING CODE	PACKAGING	REMARKS	PACKAGE FORM
VEMD8080	Tape and reel	MOQ: 5000 pcs, 5000 pcs/reel	Top view

#### Note

- MOQ: minimum order quantity

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

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Reverse voltage		$V_R$	20	V
Junction temperature		$T_j$	85	$^\circ C$
Operating temperature range		$T_{amb}$	-40 to +85	$^\circ C$
Storage temperature range		$T_{stg}$	-40 to +85	$^\circ C$
Soldering temperature	According to reflow solder profile Fig. 8	$T_{sd}$	260	$^\circ C$
Thermal resistance junction-to-ambient		$R_{thJA}$	350	K/W
ESD safety HBM	$\pm 2000$ V, 1.5 k $\Omega$ , 100 pF, 3 pulses	$ESD_{HBM}$	$\geq 2$	kV

<b>BASIC CHARACTERISTICS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Forward voltage	$I_F = 50\text{ mA}$	$V_F$	-	1.2	1.6	V
Breakdown voltage	$I_R = 100\text{ }\mu\text{A}$ , $E = 0$	$V_{(BR)}$	20	-	-	V
Reverse dark current	$V_R = 10\text{ V}$ , $E = 0$	$I_{ro}$	-	0.2	10	nA
Diode capacitance	$V_R = 0\text{ V}$ , $f = 1\text{ MHz}$ , $E = 0$	$C_D$	-	47	-	pF
	$V_R = 3\text{ V}$ , $f = 1\text{ MHz}$ , $E = 0$	$C_D$	-	17	40	pF
Open circuit voltage	$E_e = 1\text{ mW/cm}^2$ , $\lambda = 950\text{ nm}$	$V_o$	-	320	-	mV
Temperature coefficient of $V_o$	$E_e = 1\text{ mW/cm}^2$ , $\lambda = 950\text{ nm}$	$TK_{V_o}$	-	-3.0	-	mV/K
Short circuit current	$E_e = 1\text{ mW/cm}^2$ , $\lambda = 950\text{ nm}$	$I_k$	-	32	-	$\mu\text{A}$
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	$E_e = 1\text{ mW/cm}^2$ , $\lambda = 850\text{ nm}$ , $V_R = 5\text{ V}$	$I_{ra}$	23	28	33	$\mu\text{A}$
	$E_e = 0.25\text{ mW/cm}^2$ , $\lambda = 525\text{ nm}$ , $V_R = 5\text{ V}$	$I_{ra}$	3.4	4.4	5.3	$\mu\text{A}$
Angle of half sensitivity		$\phi$	-	$\pm 65$	-	deg
Wavelength of peak sensitivity		$\lambda_p$	-	850	-	nm
Range of spectral bandwidth		$\lambda_{0.1}$	-	350 to 1100	-	nm
Rise time	$V_R = 10\text{ V}$ , $R_L = 1\text{ k}\Omega$ , $\lambda = 830\text{ nm}$	$t_r$	-	70	-	ns
Fall time	$V_R = 10\text{ V}$ , $R_L = 1\text{ k}\Omega$ , $\lambda = 830\text{ nm}$	$t_f$	-	70	-	ns

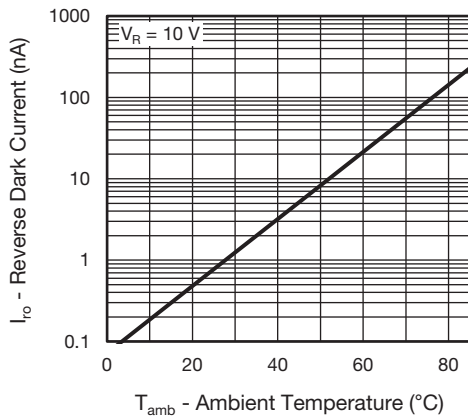
**BASIC CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)


Fig. 1 - Reverse Dark Current vs. Ambient Temperature

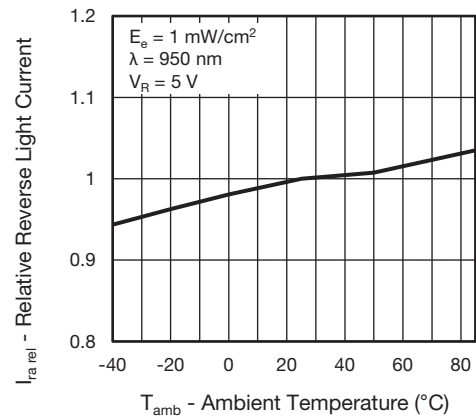


Fig. 2 - Relative Reverse Light Current vs. Ambient Temperature

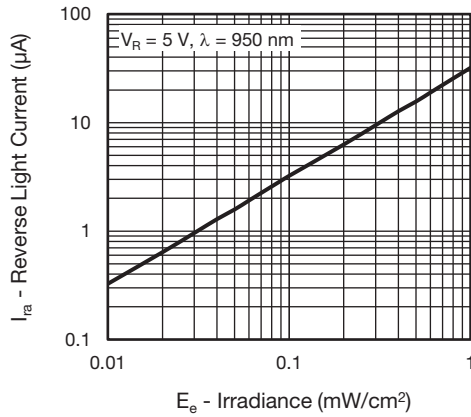


Fig. 3 - Reverse Light Current vs. Irradiance

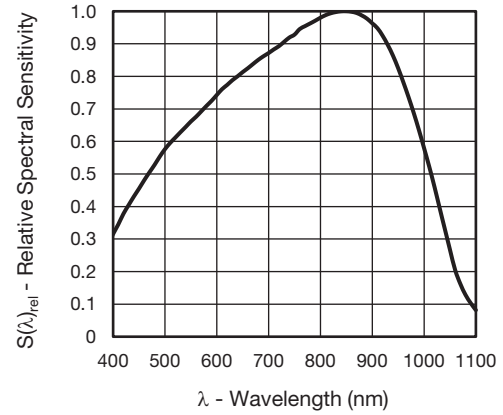


Fig. 5 - Relative Spectral Sensitivity vs. Wavelength

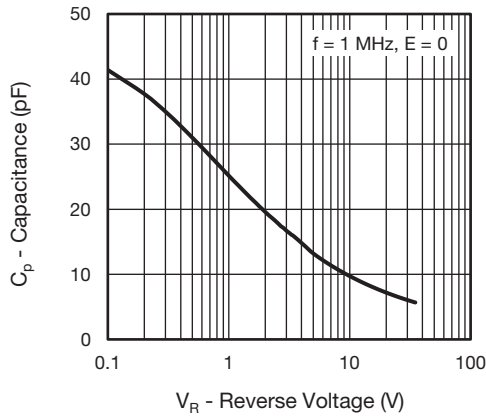


Fig. 4 - Diode Capacitance vs. Reverse Voltage

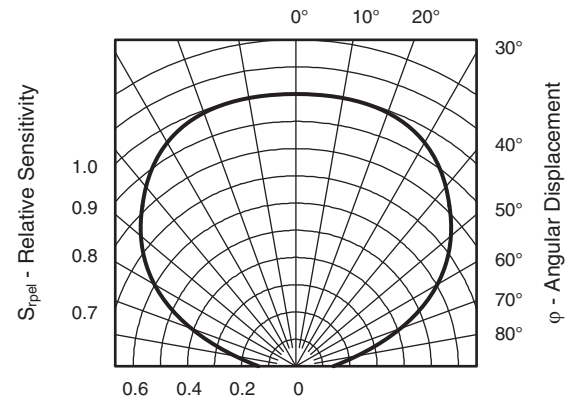
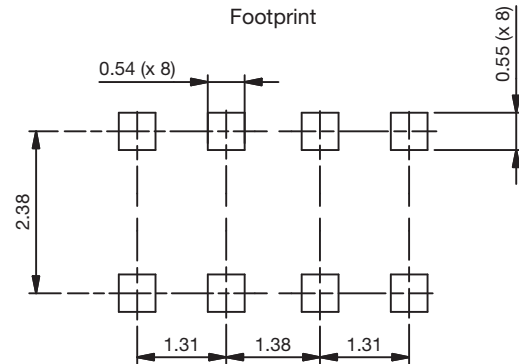
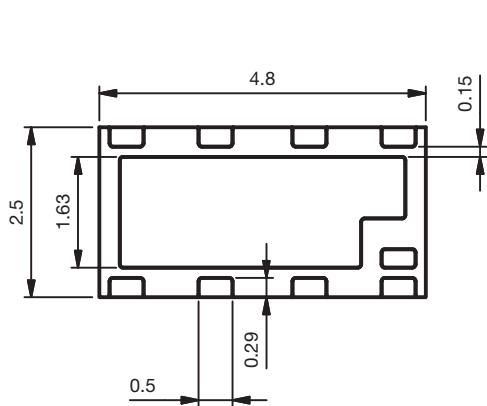
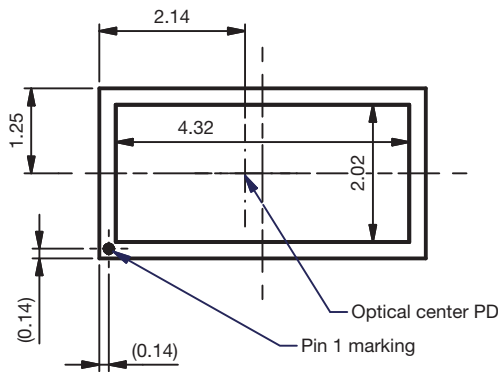
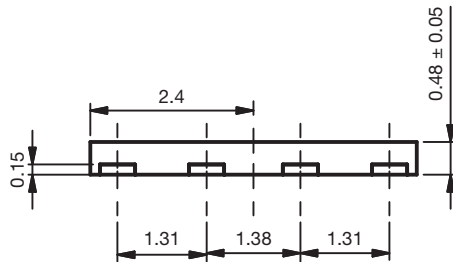


Fig. 6 - Relative Sensitivity vs. Angular Displacement

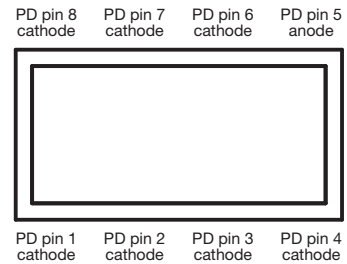
**PACKAGE DIMENSIONS** in millimeters



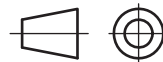
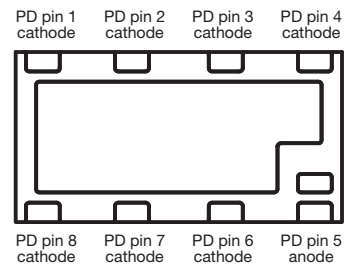
Not indicated tolerances  $\pm 0.1$  mm



Pinning top view



Pinning bottom view



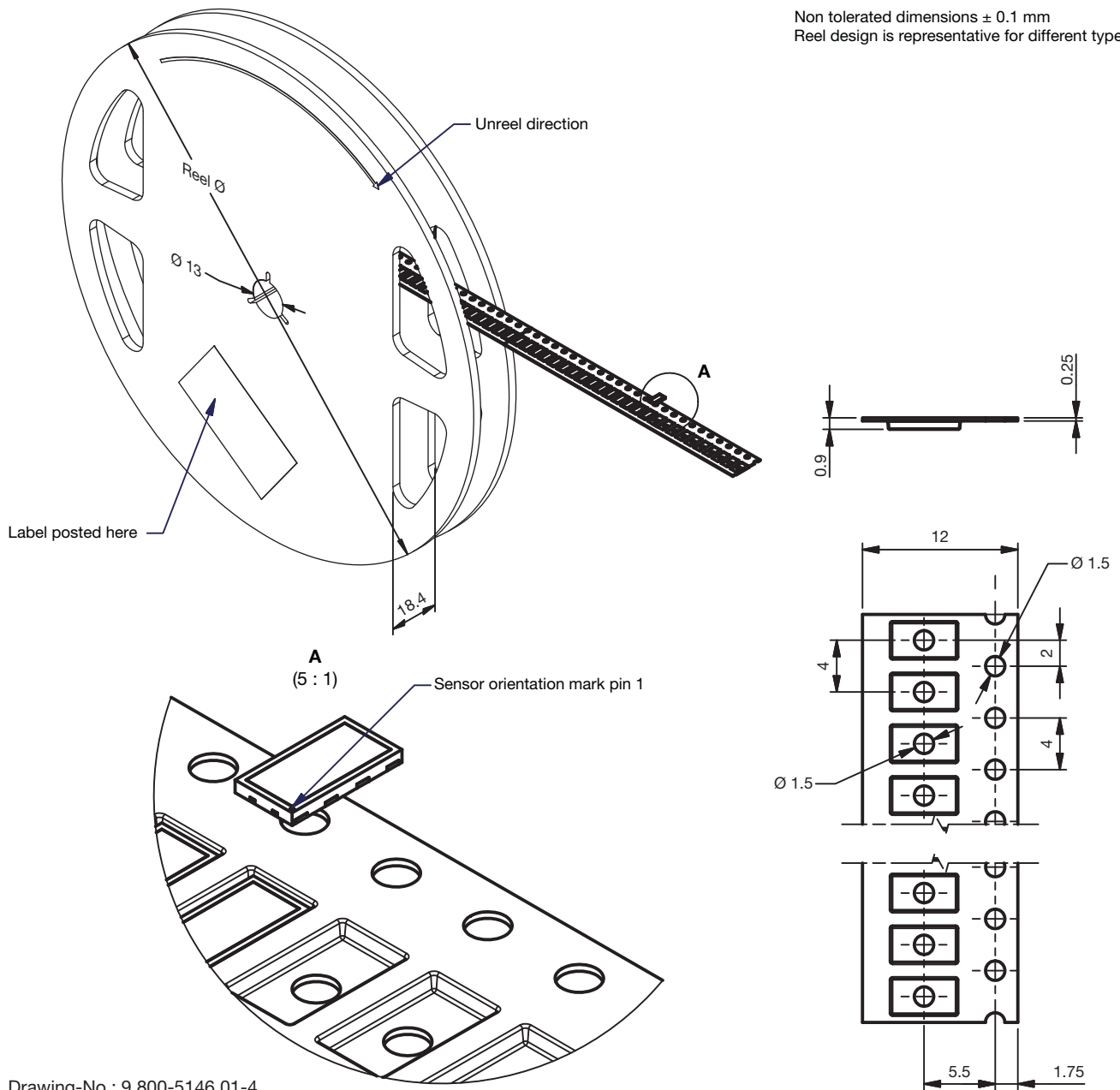
Technical drawings according to DIN specification.

Drawing number: 6.550-5354.01-4  
Issue: 1; 20.04.2018



TAPE AND REEL DIMENSIONS in millimeters

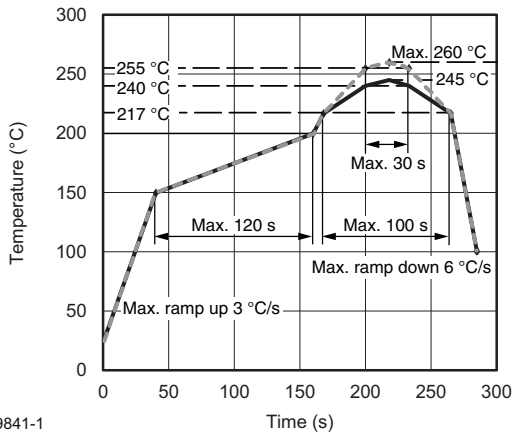
Non tolerated dimensions ± 0.1 mm  
Reel design is representative for different types



Drawing-No.: 9.800-5146.01-4  
Issue: 1; 20.04.2018



**SOLDER PROFILE**



19841-1

Fig. 7 - 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**

Time between soldering and removing from MBB must not exceed the time indicated in J-STD-020:

Moisture sensitivity: level 3

Floor life: 168 h

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

**DRYING**

In case of moisture absorption devices should be baked before soldering. Conditions see J-STD-020 or recommended conditions:

192 h at  $40\text{ °C} (+ 5\text{ °C})$ ,  $RH < 5\%$

or

96 h at  $60\text{ °C} (+ 5\text{ °C})$ ,  $RH < 5\%$



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