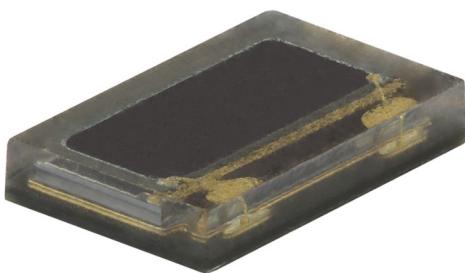


## Silicon PIN Photodiode



### DESCRIPTION

VEMD8083 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  $2.8 \text{ mm}^2$  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):  $3.2 \times 2.0 \times 0.6$
- Radiant sensitive area (in  $\text{mm}^2$ ):  $2.8$
- Enhanced sensitivity
- Suitable for visible and near infrared radiation
- Compatible with infrared reflow solder process
- Angle of half sensitivity:  $\varphi = \pm 60^\circ$
- 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)



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**GREEN**  
(5-2008)

### APPLICATIONS

- Wearables
- Health monitoring
- High speed photo detector

PRODUCT SUMMARY			
COMPONENT	$I_{ra}$ ( $\mu\text{A}$ ) at $E_e = 1.0 \text{ mW/cm}^2$ , $\lambda = 940 \text{ nm}$ , $V_R = 0 \text{ V}$	$\varphi$ ( $^\circ$ )	$\lambda_{0.1}$ (nm)
VEMD8083	16	$\pm 60$	350 to 1100

#### Note

- Test conditions see table "Basic Characteristics"

ORDERING INFORMATION			
ORDERING CODE	PACKAGING	REMARKS	PACKAGE FORM
VEMD8083	Tape and reel	MOQ: 3000 pcs, 3000 pcs/reel	Top 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		$V_R$	20	V
Operating temperature range		$T_{amb}$	-40 to +85	°C
Storage temperature range		$T_{stg}$	-55 to +100	°C
Soldering temperature	According to reflow solder profile Fig. 7	$T_{sd}$	260	°C

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

PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Forward voltage	$I_F = 1 \text{ mA}$	$V_F$	-	0.9	1.3	V
Reverse break down voltage	$I_R = 100 \mu\text{A}$ , $E_e = 0 \text{ mW/cm}^2$	$V_{(BR)R}$	20	-	-	V
Reverse dark current	$V_R = 10 \text{ V}$ , $E_e = 0 \text{ mW/cm}^2$	$I_{ro}$	-	-	10	nA
Diode capacitance	$V_R = 0 \text{ V}$ , $f = 1 \text{ kHz}$ , $E = 0$	$C_D$	-	50	-	pF
	$V_R = 3 \text{ V}$ , $f = 1 \text{ kHz}$ , $E = 0$	$C_D$	-	35	-	pF
Reverse light current	$E_e = 1 \text{ mW/cm}^2$ , $\lambda = 525 \text{ nm}$ , $V_R = 0 \text{ V}$	$I_{ra}$	-	11	-	$\mu\text{A}$
	$E_e = 1 \text{ mW/cm}^2$ , $\lambda = 660 \text{ nm}$ , $V_R = 0 \text{ V}$	$I_{ra}$	-	14	-	$\mu\text{A}$
	$E_e = 1 \text{ mW/cm}^2$ , $\lambda = 940 \text{ nm}$ , $V_R = 0 \text{ V}$	$I_{ra}$	-	16	-	$\mu\text{A}$
Angle of half sensitivity		$\varphi$	-	$\pm 60$	-	$^{\circ}$
Wavelength of peak sensitivity		$\lambda_p$	-	940	-	nm
Range of spectral bandwidth		$\lambda_{0.1}$	-	350 to 1100	-	nm
Rise time	$V_R = 10 \text{ V}$ , $R_L = 1 \text{ k}\Omega$ , $\lambda = 940 \text{ nm}$	$t_r$	-	30	-	ns
Fall time	$V_R = 10 \text{ V}$ , $R_L = 1 \text{ k}\Omega$ , $\lambda = 940 \text{ nm}$	$t_f$	-	30	-	ns

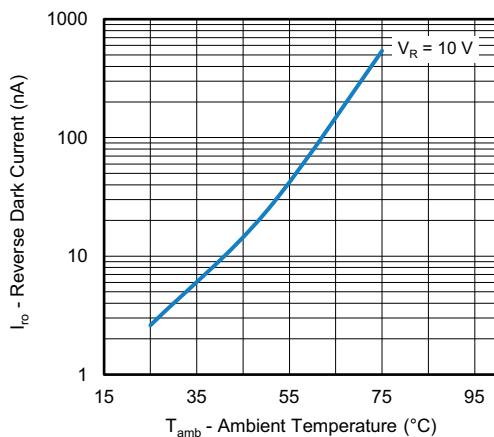
**BASIC CHARACTERISTICS** ( $T_{amb} = 25^{\circ}C$ , unless otherwise specified)


Fig. 1 - Reverse Dark Current vs. Ambient Temperature

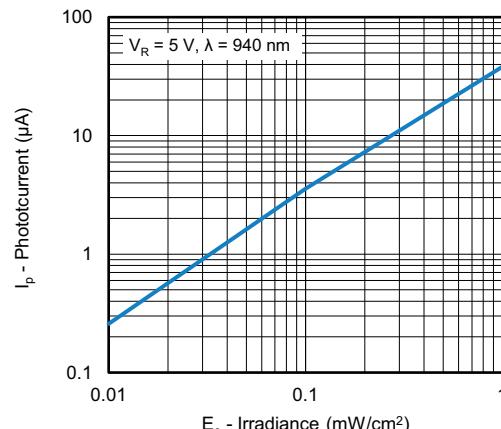


Fig. 3 - Reverse Light Current vs. Irradiance

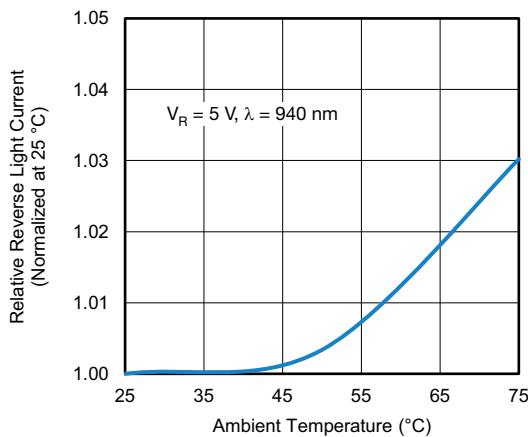


Fig. 2 - Relative Reverse Light Current vs. Ambient Temperature

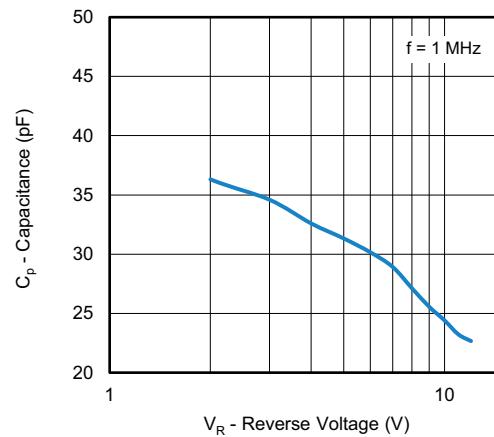


Fig. 4 - Diode Capacitance vs. Reverse Voltage

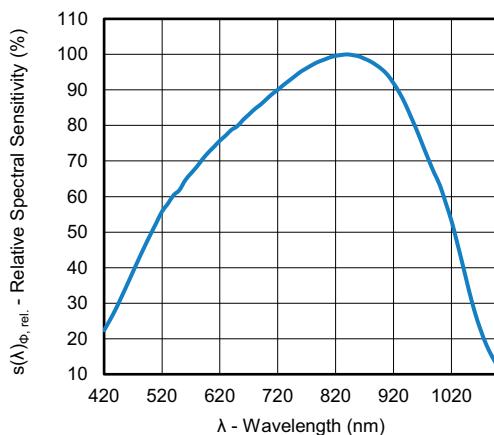


Fig. 5 - Relative Spectral Sensitivity vs. Wavelength

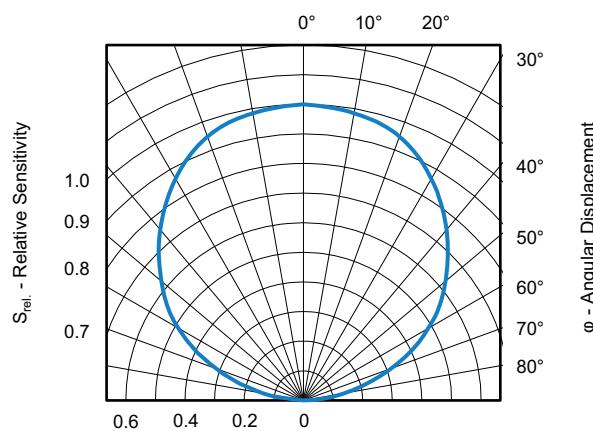
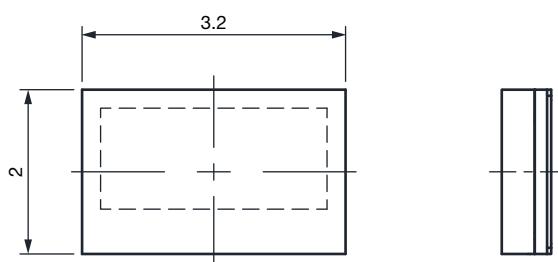


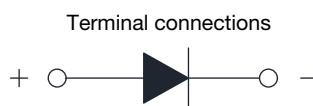
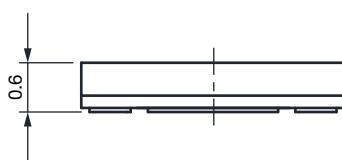
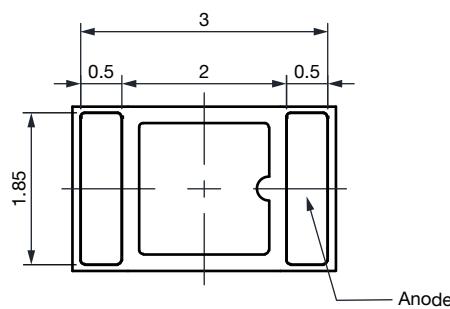
Fig. 6 - Relative Sensitivity vs. Angular Displacement

## PACKAGE DIMENSIONS in millimeters

Top view



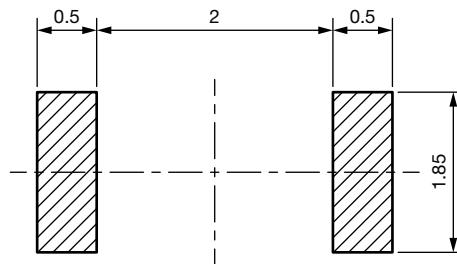
Bottom view

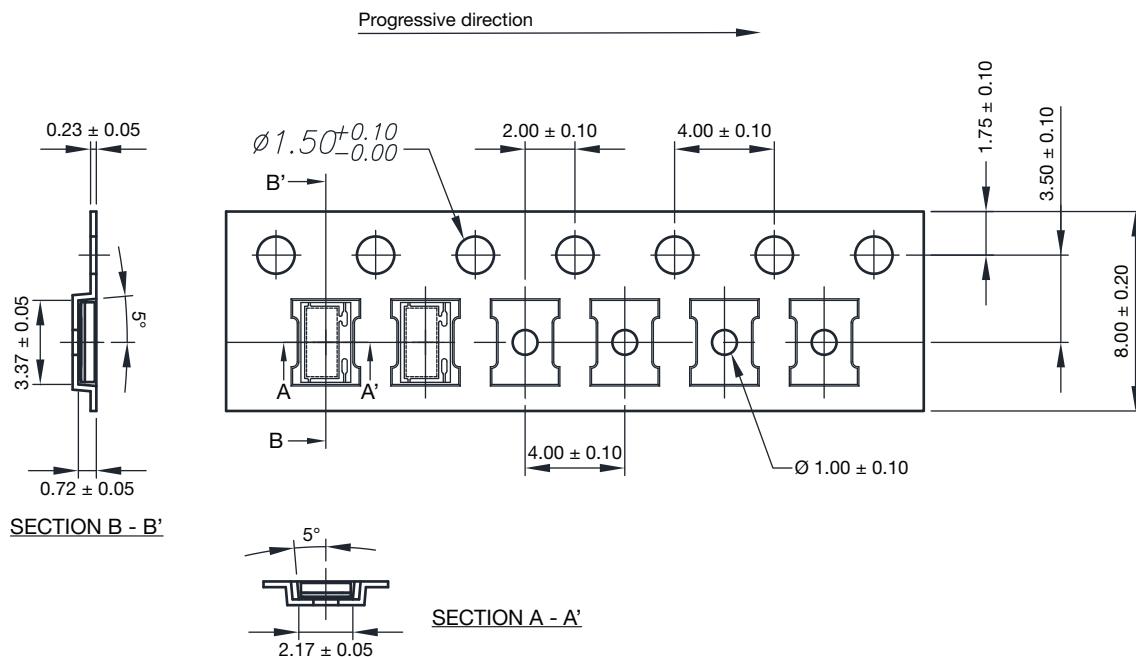
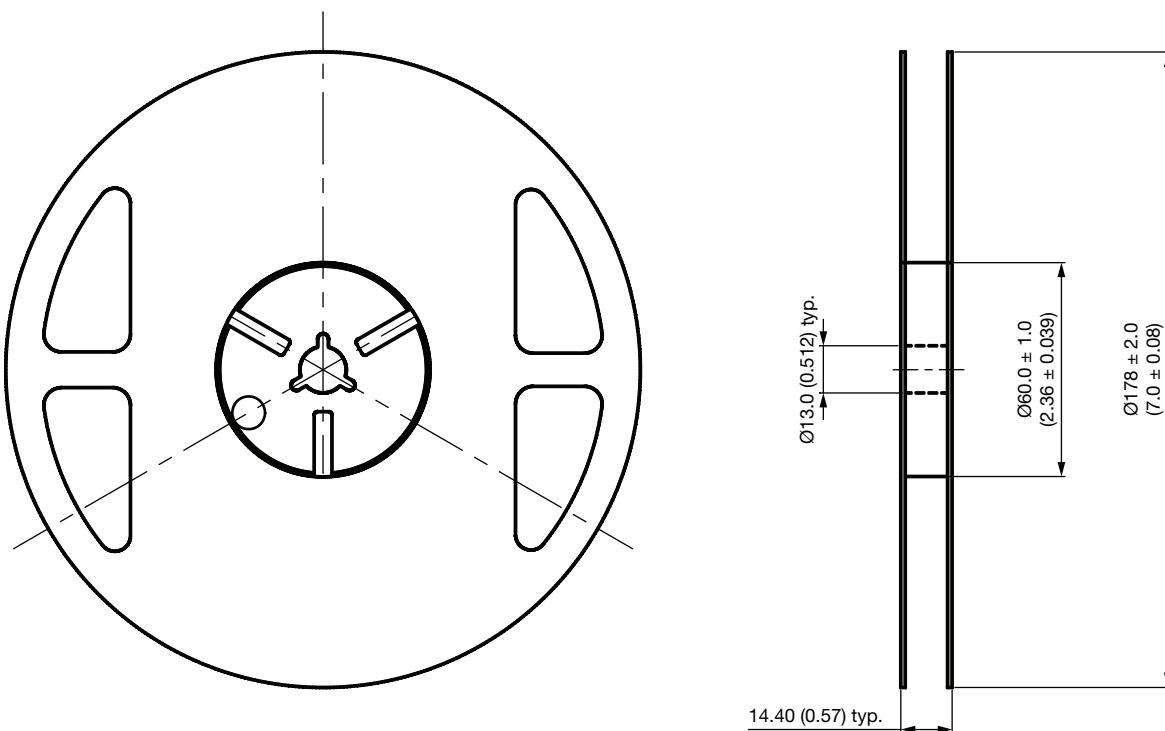


### Note

- Tolerance is  $\pm 0.1$  mm (0.004") unless otherwise noted

## RECOMMENDED SOLDERING PAD DIMENSIONS



**TAPE DIMENSIONS** in millimeters (inches)

**REEL DIMENSIONS** in millimeters (inches)

**Notes**

- Empty component pockets sealed with top cover tape
- 7 inch reel - 3000 pieces per reel
- The maximum number of consecutive missing parts is two
- In accordance with ANSI/EIA 481-1-A-1994 specifications

## SOLDER PROFILE

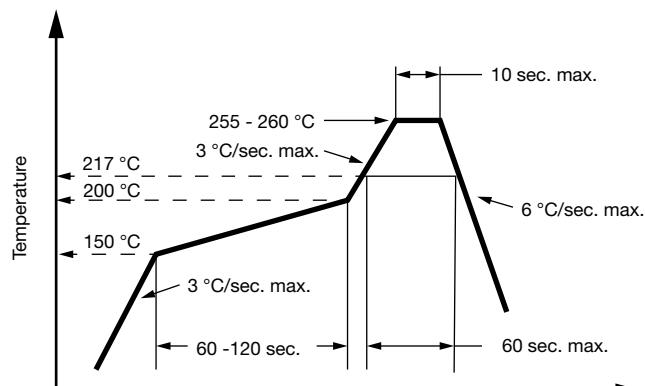


Fig. 7 - Lead (Pb)-free Reflow Solder Profile

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

## DRYING

In case of moisture absorption devices should be baked before soldering. Conditions see J-STD-033D or recommended conditions:

192 h at 40 °C (+ 5 °C), RH < 5 %

or

96 h at 60 °C (+ 5 °C), RH < 5 %

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