

Silicon PIN Photodiode



DESCRIPTION

VEMD8082 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 6.0 mm² 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 0.5
- Radiant sensitive area (in mm²): 6.0
- Enhanced sensitivity
- Suitable for visible and near infrared radiation
- Compatible with infrared reflow solder process
- 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



APPLICATIONS

- Wearables
- Health monitoring
- High speed photo detector

PRODUCT SUMMARY

COMPONENT	I_{ra} (μA) at $E_e = 1.0 \text{ mW/cm}^2$, $\lambda = 850 \text{ nm}$, $V_R = 5.0 \text{ V}$	ϕ ($^\circ$)	$\lambda_{0.1}$ (nm)
VEMD8082	40	± 65	350 to 1100

Note

- Test conditions see table “Basic Characteristics”

ORDERING INFORMATION

ORDERING CODE	PACKAGING	REMARKS	PACKAGE FORM
VEMD8082	Tape and reel	MOQ: 3000 pcs, 1500 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
Operating temperature range		T_{amb}	-40 to +85	$^\circ C$
Storage temperature range		T_{stg}	-55 to +100	$^\circ C$
Soldering temperature	According to reflow solder profile Fig. 7	T_{sd}	260	$^\circ C$
ESD safety HBM	$\pm 2000 \text{ V}$, 1.5 k Ω , 100 pF, 3 pulses	ESD_{HBM}	≥ 2	kV

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

PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Forward voltage	$I_F = 20\text{ mA}$	V_F	-	0.9	-	V
Reverse break down voltage	$I_R = 100\text{ }\mu\text{A}$, $E_e = 0\text{ mW/cm}^2$	$V_{(BR)R}$	20	-	-	V
Reverse dark current	$V_R = 10\text{ V}$, $E_e = 0\text{ mW/cm}^2$	I_{ro}	-	0.2	10	nA
Diode capacitance	$V_R = 0\text{ V}$, $f = 1\text{ MHz}$, $E = 0$	C_D	-	46	-	pF
	$V_R = 3\text{ V}$, $f = 1\text{ MHz}$, $E = 0$	C_D	-	18	-	pF
Reverse light current	$E_e = 1\text{ mW/cm}^2$, $\lambda = 525\text{ nm}$, $V_R = 5\text{ V}$	I_{ra}	17	25	-	μA
	$E_e = 1\text{ mW/cm}^2$, $\lambda = 850\text{ nm}$, $V_R = 5\text{ V}$	I_{ra}	-	40	-	μA
	$E_e = 1\text{ mW/cm}^2$, $\lambda = 940\text{ nm}$, $V_R = 5\text{ V}$	I_{ra}	24	38	-	μA
Angle of half sensitivity		ϕ	-	± 65	-	$^{\circ}$
Wavelength of peak sensitivity		λ_p	-	890	-	nm
Range of spectral bandwidth		$\lambda_{0.1}$	-	350 to 1100	-	nm
Rise time	$V_R = 10\text{ V}$, $R_L = 50\text{ }\Omega$, $\lambda = 830\text{ nm}$	t_r	-	40	-	ns
Fall time	$V_R = 10\text{ V}$, $R_L = 50\text{ }\Omega$, $\lambda = 830\text{ nm}$	t_f	-	40	-	ns

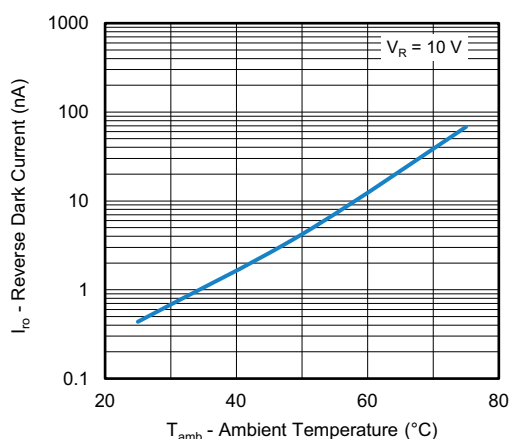
BASIC CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)

Fig. 1 - Reverse Dark Current vs. Ambient Temperature

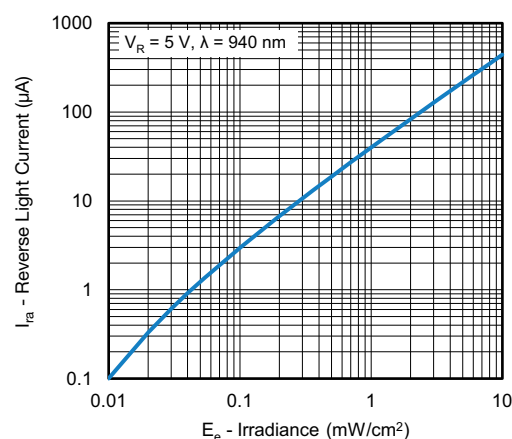


Fig. 3 - Reverse Light Current vs. Irradiance

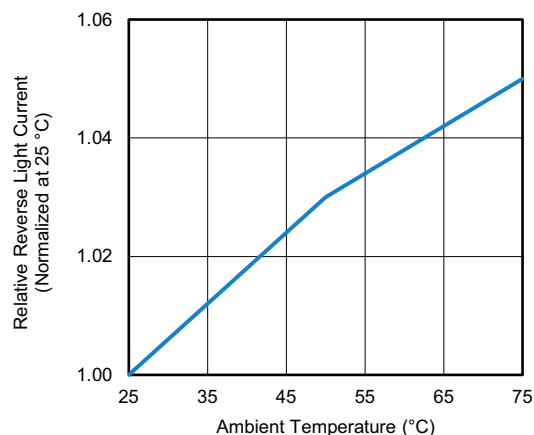


Fig. 2 - Relative Reverse Light Current vs. Ambient Temperature

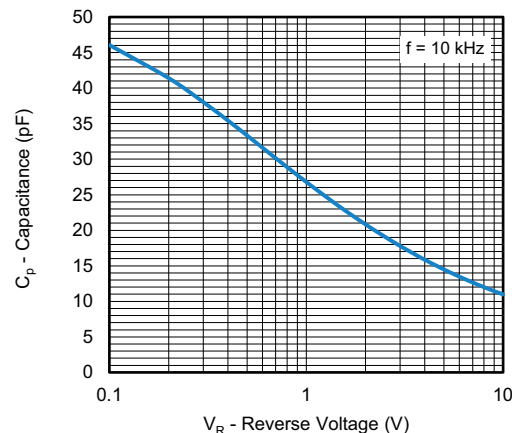


Fig. 4 - Diode Capacitance vs. Reverse Voltage

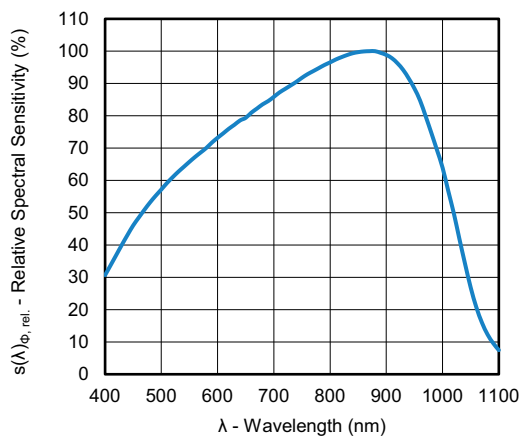


Fig. 5 - Relative Spectral Sensitivity vs. Wavelength

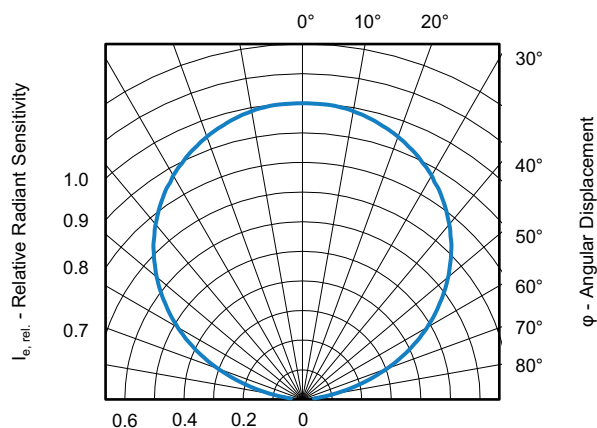
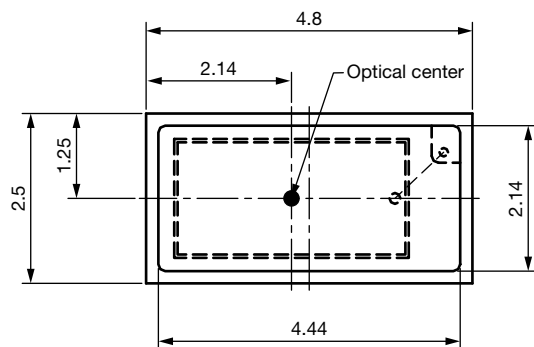
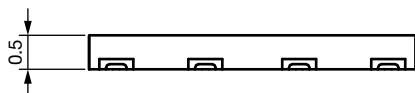


Fig. 6 - Relative Sensitivity vs. Angular Displacement

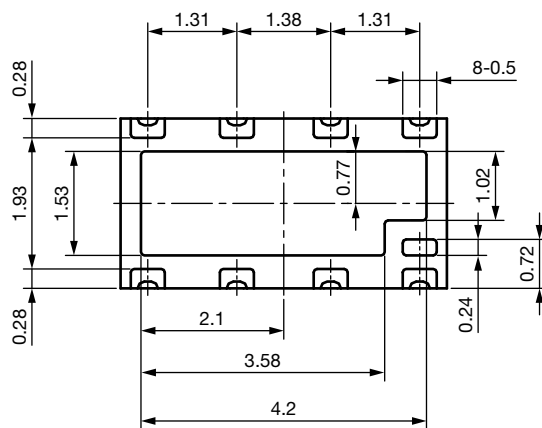
PACKAGE DIMENSIONS in millimeters



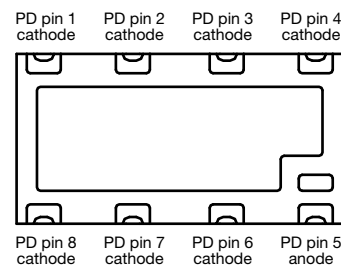
Top view

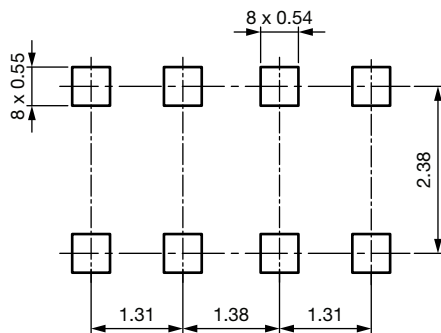
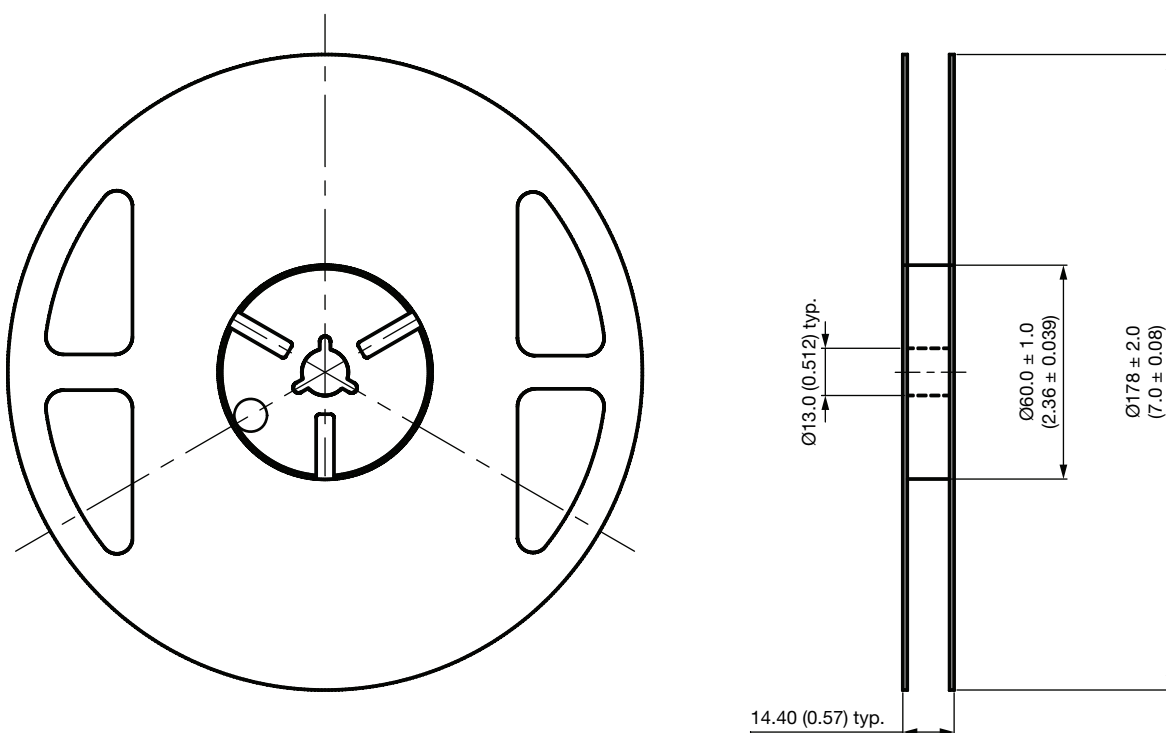


Tolerance is ± 0.1 mm (0.004") unless otherwise noted.



Bottom view



RECOMMENDED SOLDERING PAD DIMENSIONS

REEL DIMENSIONS in millimeters (inches)

Notes

- Empty component pockets sealed with top cover tape
- 7 inch reel - 1500 pieces per reel
- The maximum number of consecutive missing lamps is two
- In accordance with ANSI/EIA 481-1-A-1994 specifications



SOLDER PROFILE

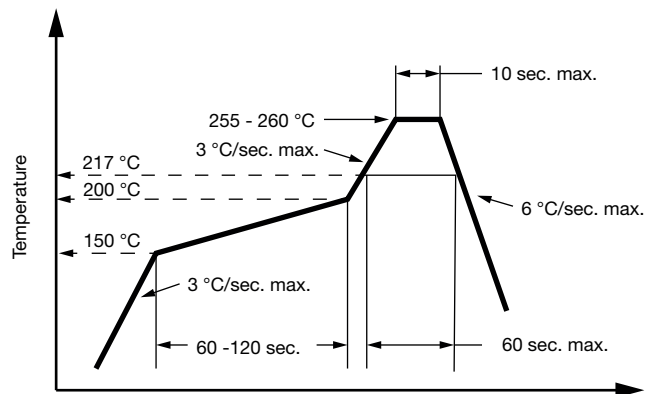


Fig. 7 - Lead (Pb)-free Reflow Solder Profile

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: $T_{amb} < 30\text{ °C}$, 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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