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# Silicon PIN Photodiode



## 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 $mm^2$): 6.0
- Enhanced sensitivity
- Suitable for visible and near infrared radiation
- Compatible with infrared reflow solder process
- Angle of half sensitivity: $\varphi = \pm 65°$
- Floor life: 168 h, MSL 3, according to J-STD-020
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Pb-free

e4

RoHS COMPLIANT

HALOGEN FREE

GREEN (5-2008)

## 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 $mm^2$ sensitive area detecting visible and near infrared radiation.

## APPLICATIONS

- Wearables
- Health monitoring
- High speed photo detector

## PRODUCT SUMMARY

| COMPONENT | $I_{ra}$ (µA) at $E_e$ = 1.0 mW/cm², λ = 850 nm, $V_R$ = 5.0 V | φ (°) | $\lambda_{0.1}$ (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: 1500 pcs, 1500 pcs/reel | Top view |

**Note**

- MOQ: minimum order quantity

## ABSOLUTE MAXIMUM RATINGS ($T_{amb}$ = 25 °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 |
| ESD safety HBM | ± 2000 V, 1.5 kΩ, 100 pF, 3 pulses | $ESD_{HBM}$ | ≥ 2 | kV |



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| BASIC CHARACTERISTICS ($T_{amb}$ = 25 °C, unless otherwise specified) | | | | | | |
|---|---|---|---|---|---|---|
| **PARAMETER** | **TEST CONDITION** | **SYMBOL** | **MIN.** | **TYP.** | **MAX.** | **UNIT** |
| Forward voltage | $I_F$ = 20 mA | $V_F$ | - | 0.9 | - | V |
| Reverse break down voltage | $I_R$ = 100 µA, $E_e$ = 0 mW/cm² | $V_{(BR)R}$ | 20 | - | - | V |
| Reverse dark current | $V_R$ = 10 V, $E_e$ = 0 mW/cm² | $I_{ro}$ | - | 0.2 | 10 | nA |
| Diode capacitance | $V_R$ = 0 V, f = 1 MHz, E = 0 | $C_D$ | - | 46 | - | pF |
| | $V_R$ = 3 V, f = 1 MHz, E = 0 | $C_D$ | - | 18 | - | pF |
| Reverse light current | $E_e$ = 1 mW/cm², λ = 525 nm, $V_R$ = 5 V | $I_{ra}$ | 17 | 25 | - | µA |
| | $E_e$ = 1 mW/cm², λ = 850 nm, $V_R$ = 5 V | $I_{ra}$ | - | 40 | - | µA |
| | $E_e$ = 1 mW/cm², λ = 940 nm, $V_R$ = 5 V | $I_{ra}$ | 24 | 38 | - | µA |
| Angle of half sensitivity | | φ | - | ± 65 | - | ° |
| Wavelength of peak sensitivity | | $\lambda_p$ | - | 890 | - | nm |
| Range of spectral bandwidth | | $\lambda_{0.1}$ | - | 350 to 1100 | - | nm |
| Rise time | $V_R$ = 10 V, $R_L$ = 50 Ω, λ = 830 nm | $t_r$ | - | 40 | - | ns |
| Fall time | $V_R$ = 10 V, $R_L$ = 50 Ω, λ = 830 nm | $t_f$ | - | 40 | - | ns |

## BASIC CHARACTERISTICS ($T_{amb}$ = 25 °C, unless otherwise specified)

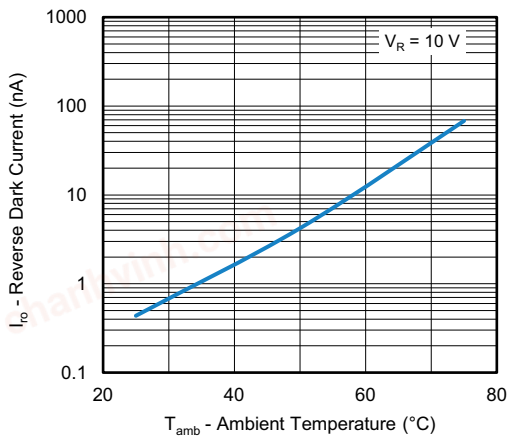



Fig. 1 - Reverse Dark Current vs. Ambient Temperature

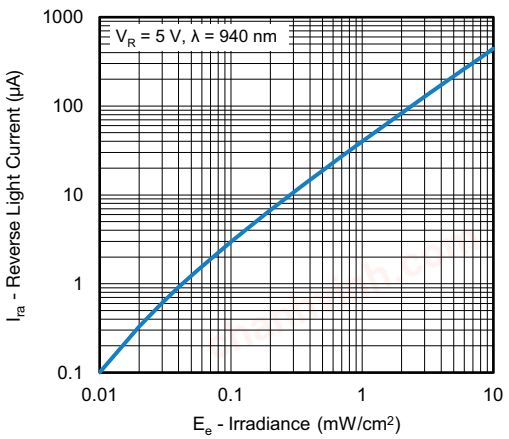



Fig. 3 - Reverse Light Current vs. Irradiance

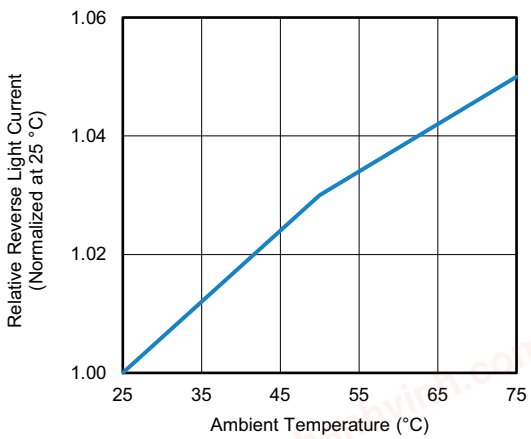



Fig. 2 - Relative Reverse Light Current vs. Ambient Temperature

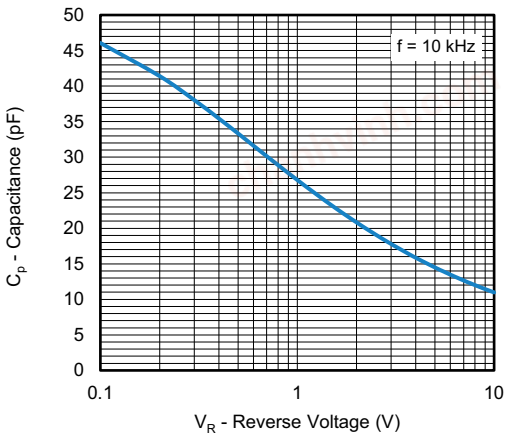



Fig. 4 - Diode Capacitance vs. Reverse Voltage


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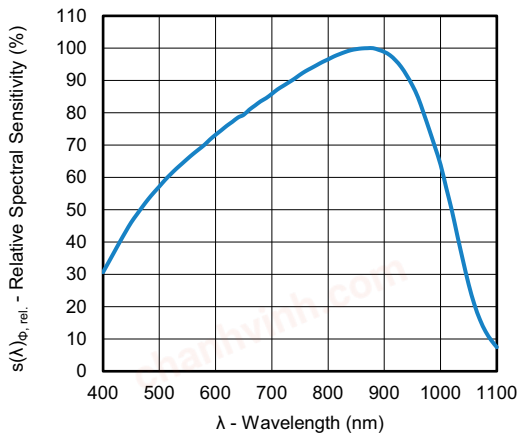



Fig. 5 - Relative Spectral Sensitivity vs. Wavelength

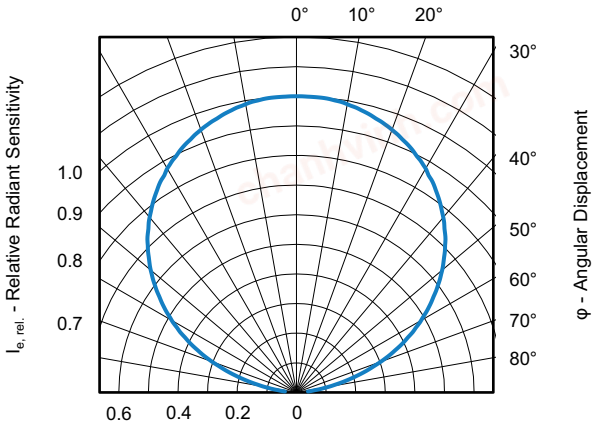
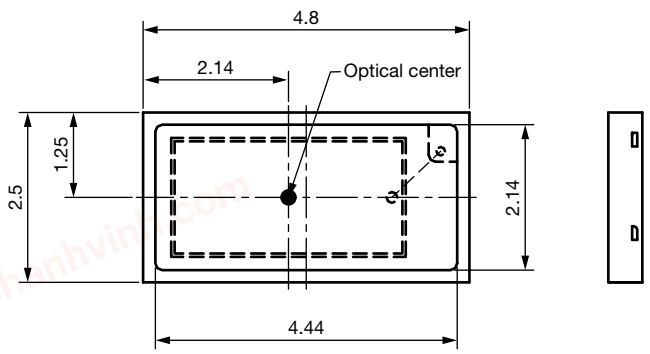
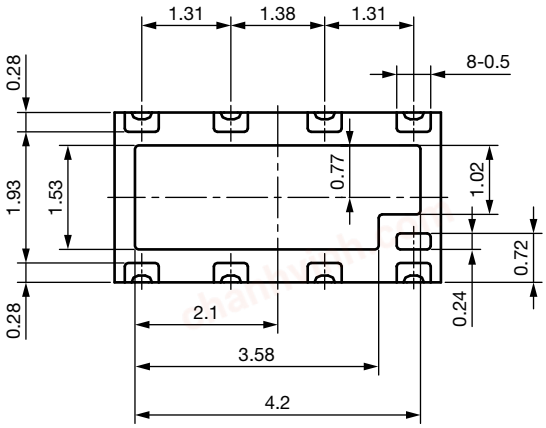



Fig. 6 - Relative Sensitivity vs. Angular Displacement

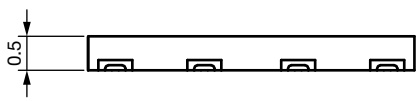
## **PACKAGE DIMENSIONS** in millimeters

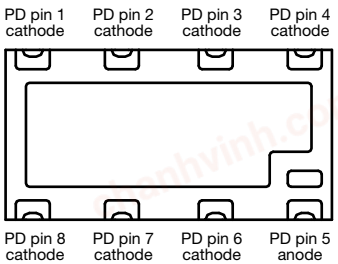



Top view




Bottom view



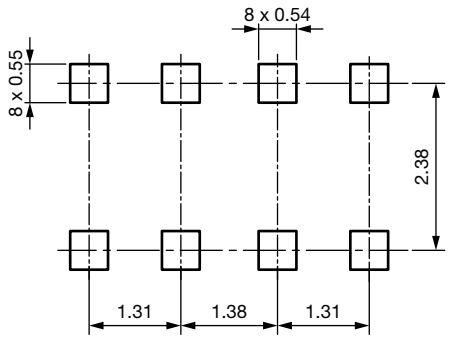


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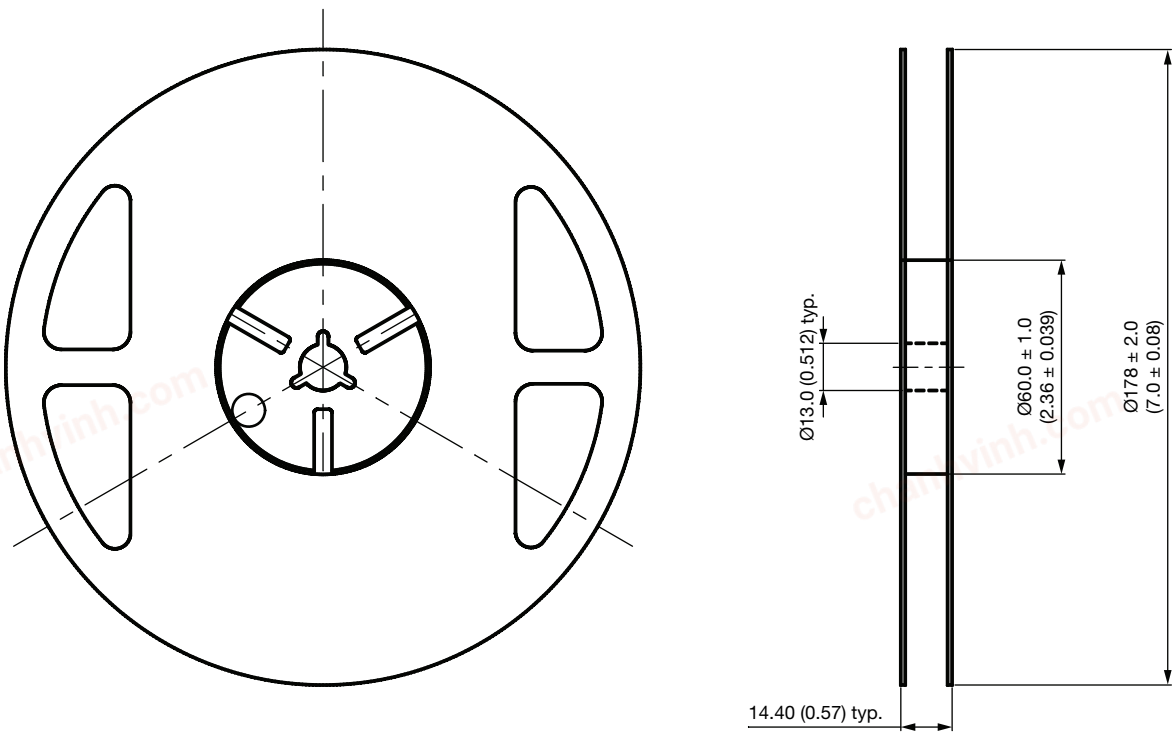
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## RECOMMENDED SOLDERING PAD DIMENSIONS




## 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


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## SOLDER PROFILE

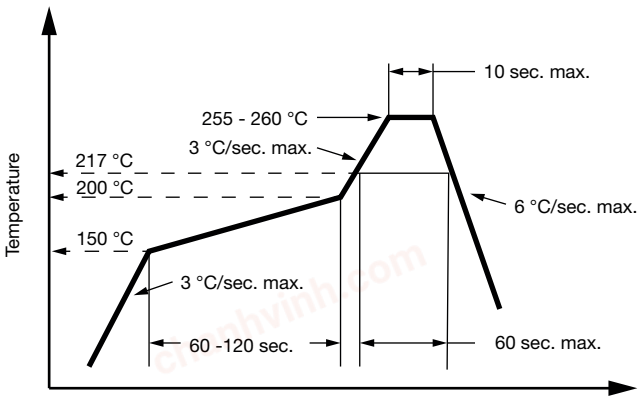



Fig. 7 - Lead (Pb)-free Reflow Solder Profile

## 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 °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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