

## Silicon PIN Photodiode



### LINKS TO ADDITIONAL RESOURCES



### DESCRIPTION

VEMD8081 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 5.4 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>): 5.4
- 0.48 mm low profile package
- Enhanced sensitivity for visible light
- Suitable for visible and near infrared radiation
- 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 | $I_{ra}$ ( $\mu A$ )<br>at $E_e = 1.0 \text{ mW/cm}^2$ ,<br>$\lambda = 850 \text{ nm}$ , $V_R = 5.0 \text{ V}$ | $\phi$<br>( $^\circ$ ) | $\lambda_{0.1}$<br>(nm) |
|-----------|----------------------------------------------------------------------------------------------------------------|------------------------|-------------------------|
| VEMD8081  | 33                                                                                                             | $\pm 65$               | 350 to 1100             |

#### Note

- Test conditions see table "Basic Characteristics"

### ORDERING INFORMATION

| ORDERING CODE | PACKAGING     | REMARKS                      | PACKAGE FORM |
|---------------|---------------|------------------------------|--------------|
| VEMD8081      | 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          |
| 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        | $^\circ C$ |
| ESD safety HBM              | $\pm 2000 \text{ V}$ , 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                                                                                     | $I_F = 50\text{ mA}$                                                 | $V_F$           | -    | 2.3         | 3.3  | V             |
| Reverse dark current                                                                                | $V_R = 10\text{ V}, E = 0$                                           | $I_{ro}$        | -    | 0.5         | 10   | nA            |
| Diode capacitance                                                                                   | $V_R = 0\text{ V}, f = 1\text{ MHz}, E = 0$                          | $C_D$           | -    | 50          | -    | pF            |
|                                                                                                     | $V_R = 3\text{ V}, f = 1\text{ MHz}, E = 0$                          | $C_D$           | -    | 20          | 40   | pF            |
| Reverse light current                                                                               | $E_e = 1\text{ mW/cm}^2, \lambda = 525\text{ nm}, V_R = 5\text{ V}$  | $I_{ra}$        | 15   | 20          | 24   | $\mu\text{A}$ |
|                                                                                                     | $E_e = 1\text{ mW/cm}^2, \lambda = 850\text{ nm}, V_R = 5\text{ V}$  | $I_{ra}$        | 29   | 33          | 38   | $\mu\text{A}$ |
| Angle of half sensitivity                                                                           |                                                                      | $\phi$          | -    | $\pm 65$    | -    | $^{\circ}$    |
| Wavelength of peak sensitivity                                                                      |                                                                      | $\lambda_p$     | -    | 840         | -    | nm            |
| Range of spectral bandwidth                                                                         |                                                                      | $\lambda_{0.1}$ | -    | 350 to 1100 | -    | nm            |
| Rise time                                                                                           | $V_R = 10\text{ V}, R_L = 50\text{ }\Omega, \lambda = 830\text{ nm}$ | $t_r$           | -    | 110         | -    | ns            |
| Fall time                                                                                           | $V_R = 10\text{ V}, R_L = 50\text{ }\Omega, \lambda = 830\text{ nm}$ | $t_f$           | -    | 110         | -    | ns            |

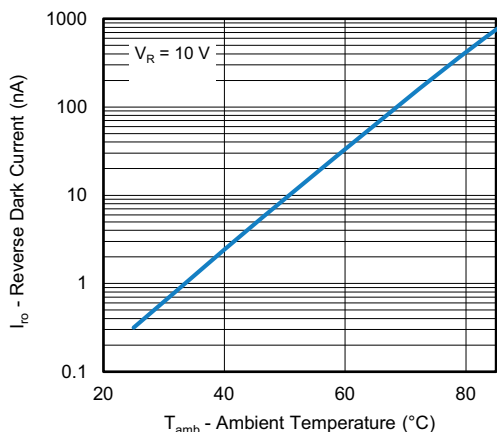
**BASIC CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)


Fig. 1 - Reverse Dark Current vs. Ambient Temperature

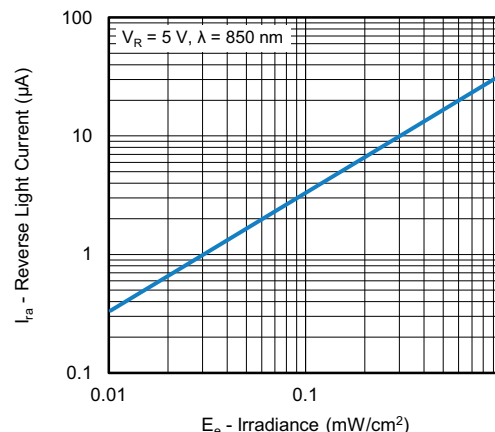


Fig. 3 - Reverse Light Current vs. Irradiance

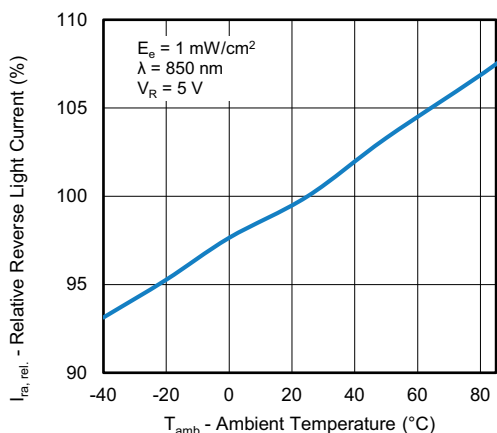


Fig. 2 - Relative Reverse Light Current vs. Ambient Temperature

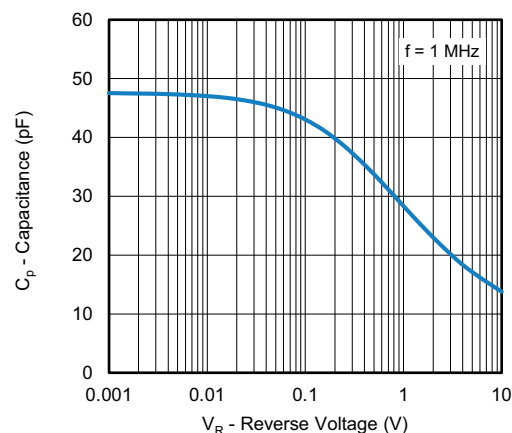


Fig. 4 - Diode Capacitance vs. Reverse Voltage

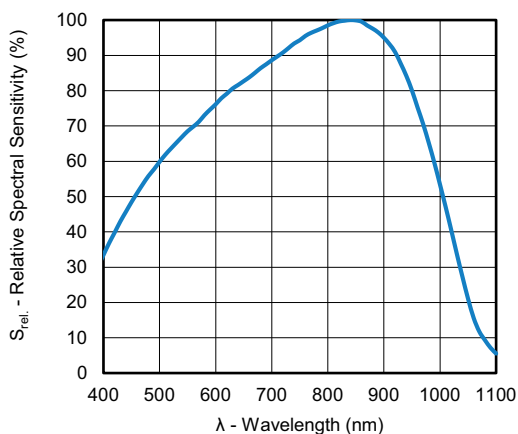


Fig. 5 - Relative Spectral Sensitivity vs. Wavelength

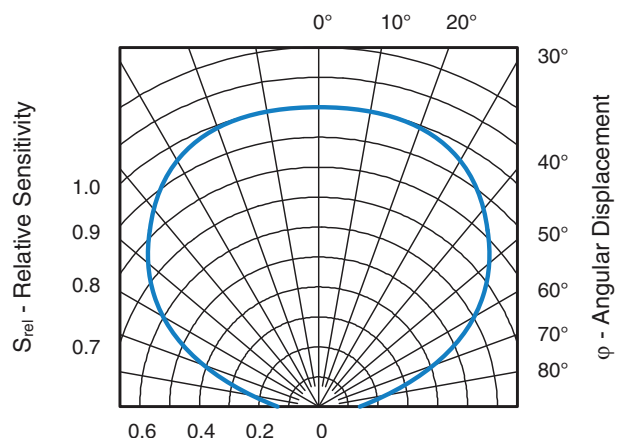
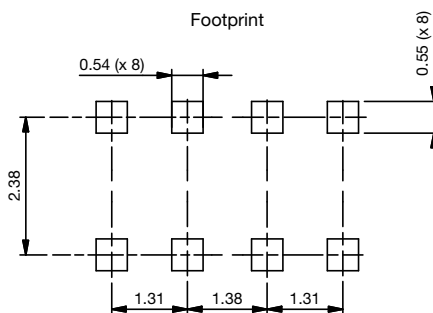
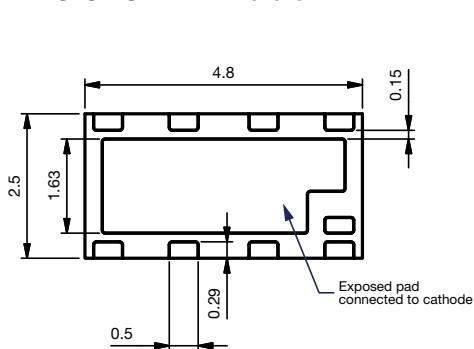
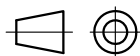
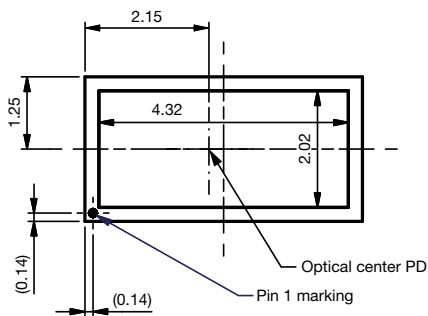
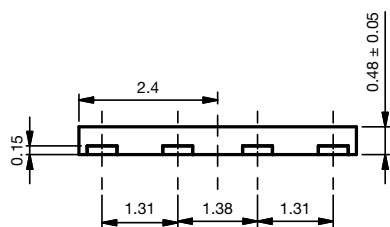


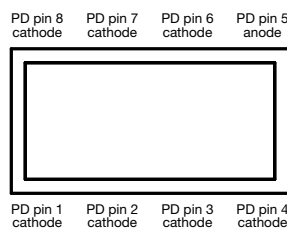
Fig. 6 - Relative Sensitivity vs. Angular Displacement

### PACKAGE DIMENSIONS in millimeters

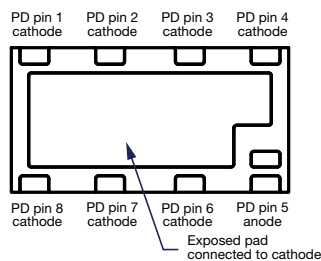

Not indicated tolerances  $\pm 0.1$  mm


Technical drawings according to DIN specification.

#### Pinning top view

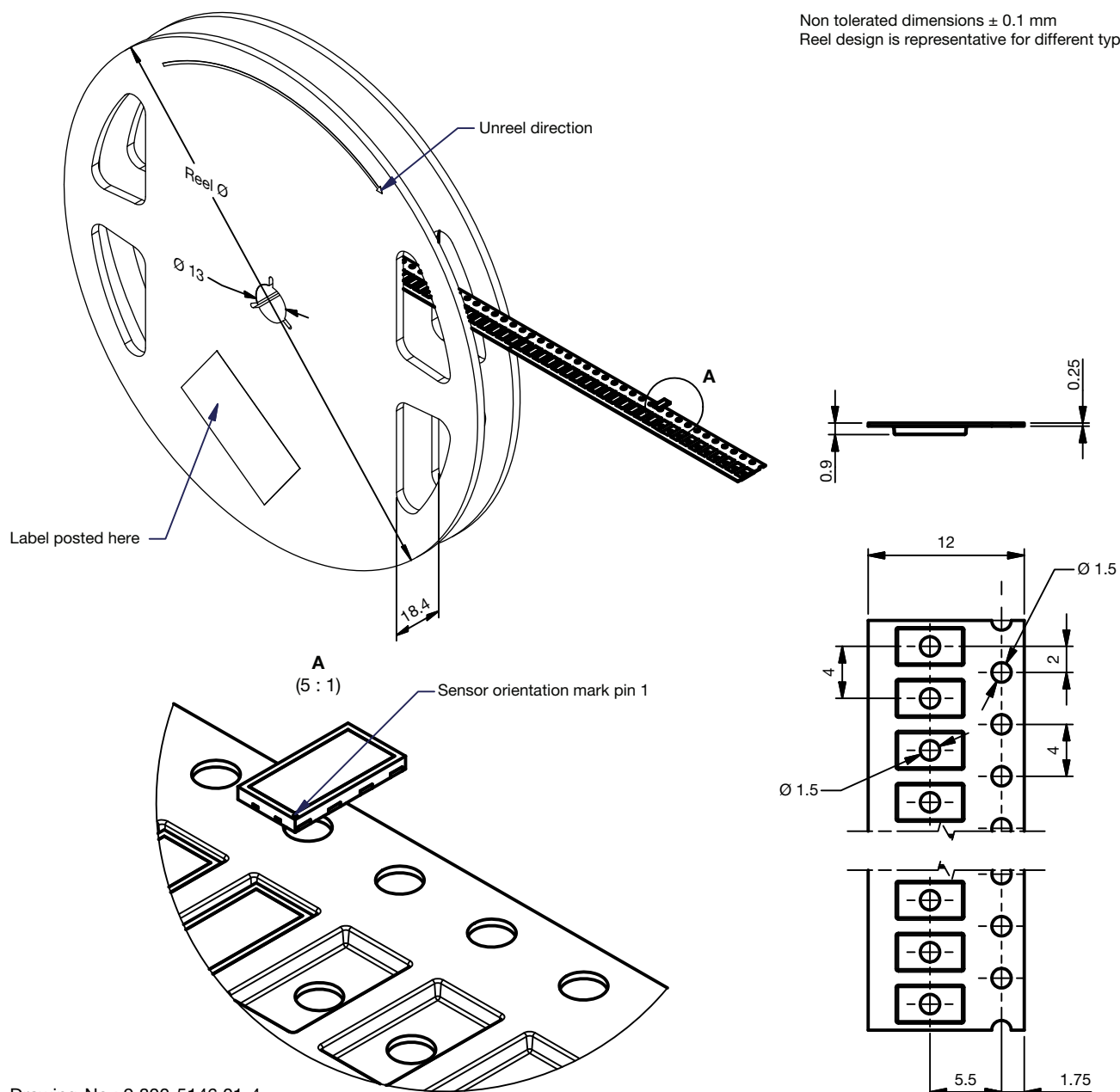


#### Pinning bottom view



### TAPE AND REEL DIMENSIONS in millimeters

Non tolerated dimensions  $\pm 0.1$  mm  
Reel design is representative for different types



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

## SOLDER PROFILE

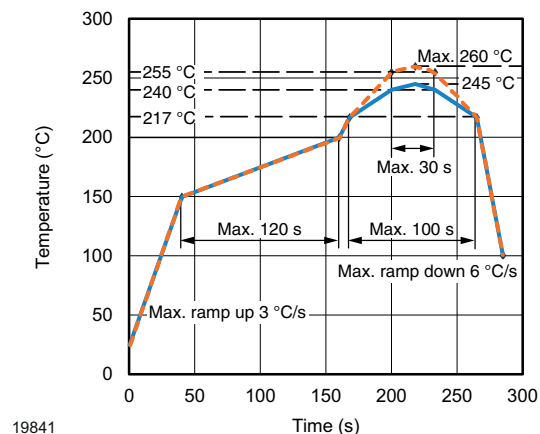


Fig. 7 - Lead (Pb)-free Reflow Solder Profile  
According to J-STD-020D

## 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-033D 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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