

## 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 | $I_{ra}$ (μA) | $\phi$ (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 ( $T_{amb} = 25^\circ\text{C}$ , unless otherwise specified)

| PARAMETER                              | TEST CONDITION                                  | SYMBOL      | VALUE      | UNIT             |
|----------------------------------------|-------------------------------------------------|-------------|------------|------------------|
| Reverse voltage                        |                                                 | $V_R$       | 20         | V                |
| Junction temperature                   |                                                 | $T_j$       | 85         | $^\circ\text{C}$ |
| Operating temperature range            |                                                 | $T_{amb}$   | -40 to +85 | $^\circ\text{C}$ |
| Storage temperature range              |                                                 | $T_{stg}$   | -40 to +85 | $^\circ\text{C}$ |
| Soldering temperature                  | According to reflow solder profile Fig. 8       | $T_{sd}$    | 260        | $^\circ\text{C}$ |
| 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            |

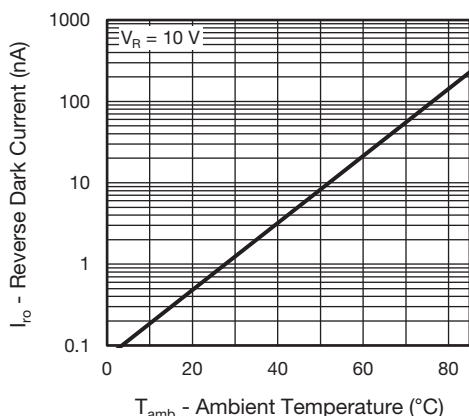
**BASIC CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)


Fig. 1 - Reverse Dark Current vs. Ambient Temperature

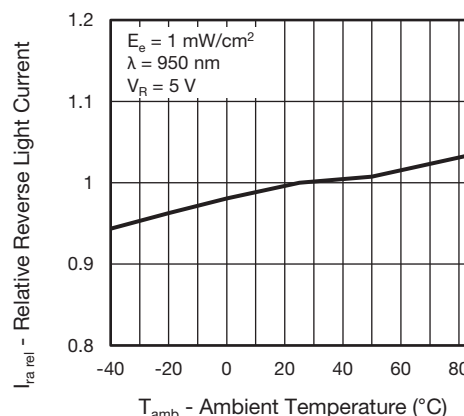


Fig. 2 - Relative Reverse Light Current vs. Ambient Temperature

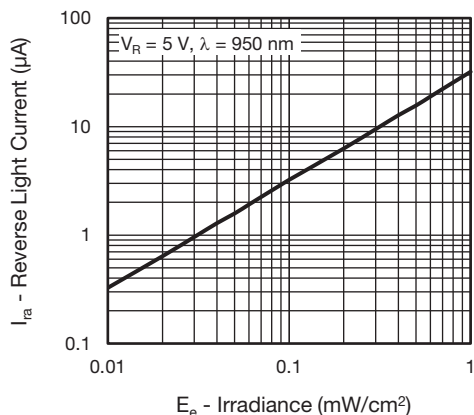


Fig. 3 - Reverse Light Current vs. Irradiance

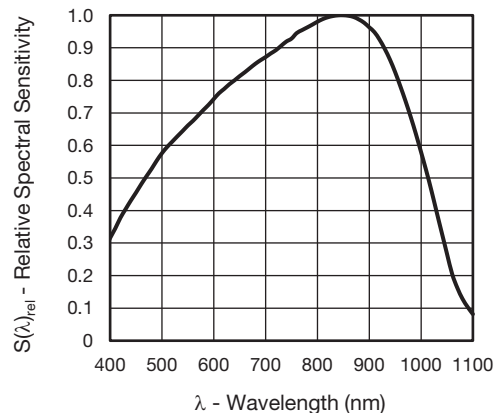


Fig. 5 - Relative Spectral Sensitivity vs. Wavelength

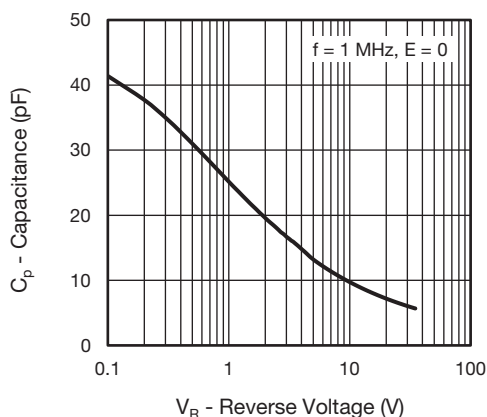


Fig. 4 - Diode Capacitance vs. Reverse Voltage

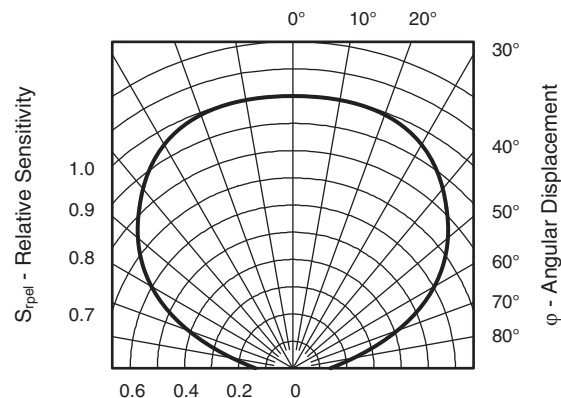
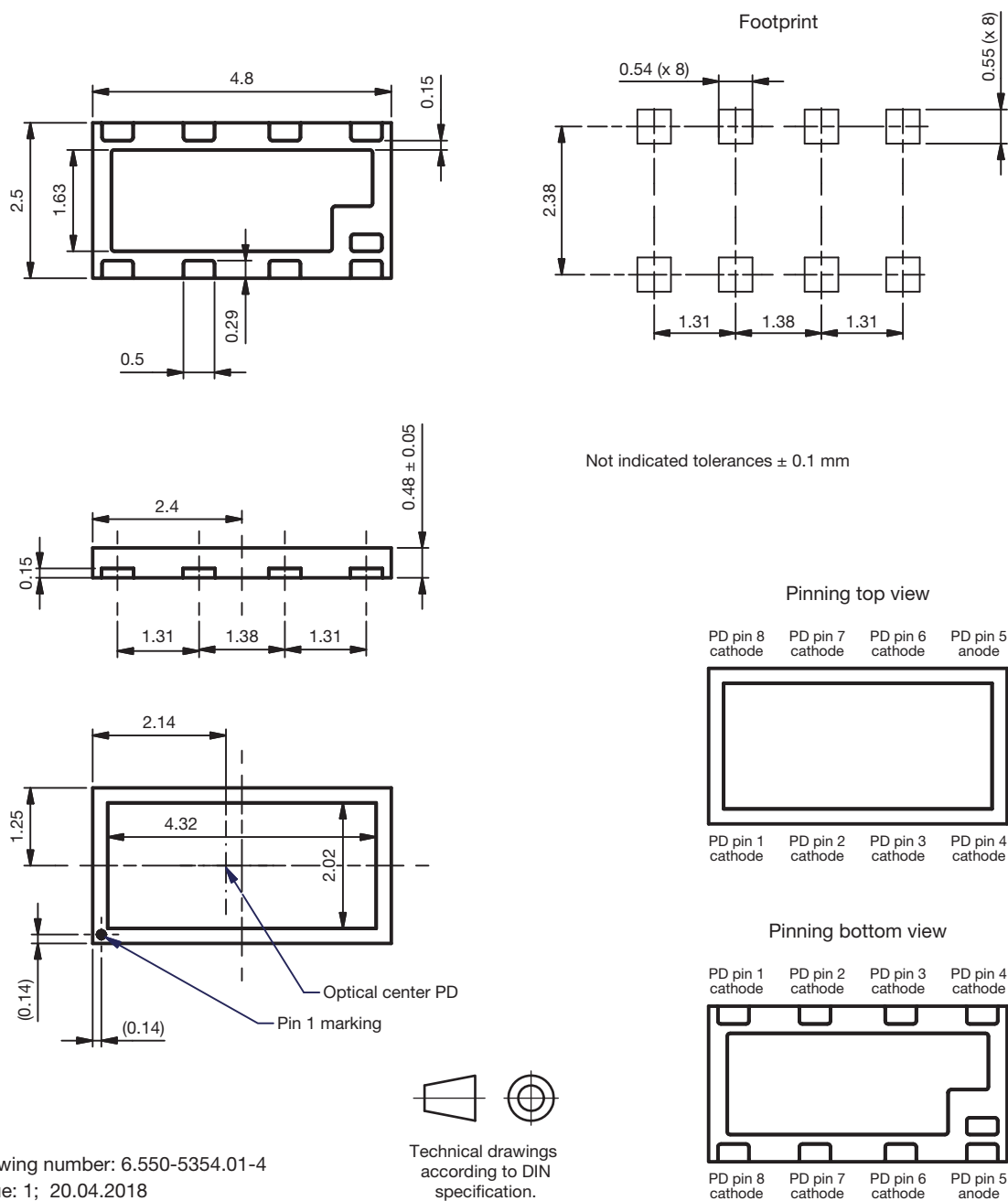


Fig. 6 - Relative Sensitivity vs. Angular Displacement

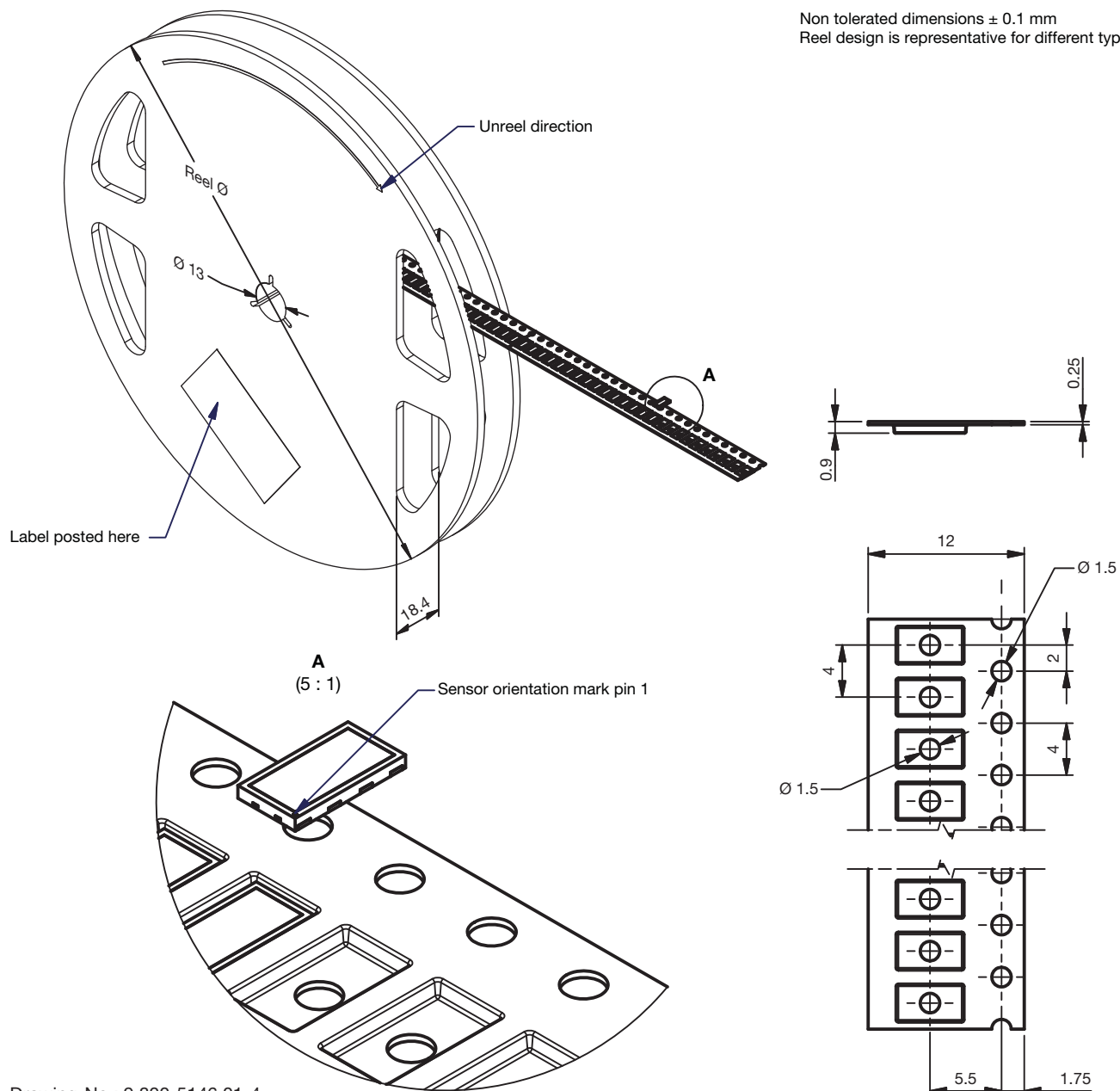
**PACKAGE DIMENSIONS** in millimeters


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Issue: 1; 20.04.2018



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

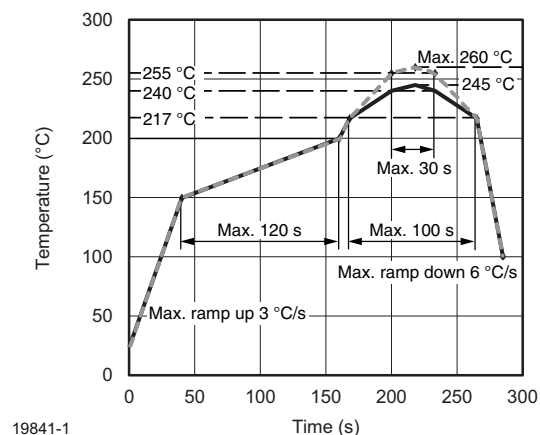


Fig. 7 - Lead (Pb)-free Reflow Solder Profile  
According to J-STD-020D

## 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-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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