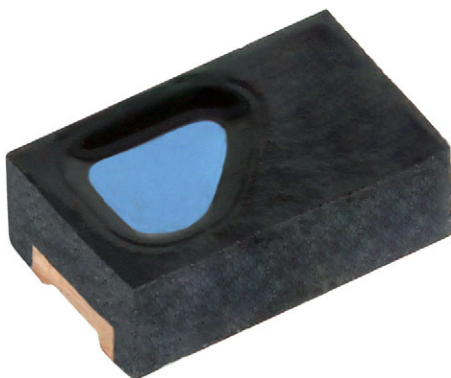


## Silicon PIN Photodiode



### FEATURES

- Package type: surface-mount
- Package form: 0805
- Dimensions (L x W x H in mm): 2 x 1.25 x 0.7
- Radiant sensitive area (in mm<sup>2</sup>): 0.42
- Operating temperature range: T<sub>OP</sub> = -40 °C to +125 °C
- Angle of half sensitivity:  $\phi = \pm 55^\circ$
- Floor life: 4 weeks, MSL2a, according to J-STD-020
- Lead (Pb)-free reflow soldering
- AEC-Q102 qualified
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



### LINKS TO ADDITIONAL RESOURCES



### DESCRIPTION

VEMD4010X02 is a high speed and high sensitive PIN photodiode. It is a miniature surface mount device (SMD) with a 0.42 mm<sup>2</sup> sensitive area.

### APPLICATIONS

- High speed photo detector
- Photo interrupters
- Automotive sensors
- [Hygienic applications](#)

### PRODUCT SUMMARY

| COMPONENT   | $I_{ra}$ (μA)<br>at $E_e = 1 \text{ mW/cm}^2$ , $\lambda = 950 \text{ nm}$ , $V_R = 5 \text{ V}$ | $\phi$ (°) | $\lambda_{0.5}$ (nm) |
|-------------|--------------------------------------------------------------------------------------------------|------------|----------------------|
| VEMD4010X02 | 2.4                                                                                              | ± 55       | 550 to 1040          |

#### Note

- Test conditions see table “Basic Characteristics”

### ORDERING INFORMATION

| ORDERING CODE | PACKAGING     | REMARKS                      | PACKAGE FORM |
|---------------|---------------|------------------------------|--------------|
| VEMD4010X02   | Tape and reel | MOQ: 3000 pcs, 3000 pcs/reel | 0805         |

#### Note

- MOQ: minimum order quantity

### ABSOLUTE MAXIMUM RATINGS (T<sub>amb</sub> = 25 °C, unless otherwise specified)

| PARAMETER                 | TEST CONDITION                            | SYMBOL           | VALUE       | UNIT |
|---------------------------|-------------------------------------------|------------------|-------------|------|
| Reverse voltage           |                                           | V <sub>R</sub>   | 20          | V    |
| Ambient temperature range |                                           | T <sub>amb</sub> | -40 to +125 | °C   |
| Storage temperature range |                                           | T <sub>stg</sub> | -40 to +125 | °C   |
| Soldering temperature     | According to reflow solder profile Fig. 8 | T <sub>sd</sub>  | 260         | °C   |

| <b>BASIC CHARACTERISTICS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified) |                                                                     |                 |      |             |      |               |
|-----------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|-----------------|------|-------------|------|---------------|
| PARAMETER                                                                                           | TEST CONDITION                                                      | SYMBOL          | MIN. | TYP.        | MAX. | UNIT          |
| Forward voltage                                                                                     | $I_F = 50\text{ mA}$                                                | $V_F$           | -    | 1.1         | 1.3  | V             |
| Reverse dark current                                                                                | $V_R = 5\text{ V}, E = 0$                                           | $I_{r0}$        | -    | 1           | 3    | nA            |
| Diode capacitance                                                                                   | $V_R = 0\text{ V}, f = 1\text{ MHz}, E = 0$                         | $C_D$           | -    | 7           | -    | pF            |
|                                                                                                     | $V_R = 5\text{ V}, f = 1\text{ MHz}, E = 0$                         | $C_D$           | -    | 2.5         | -    | pF            |
| Short circuit current                                                                               | $E_e = 1\text{ mW/cm}^2, \lambda = 950\text{ nm}$                   | $I_k$           | -    | 2.2         | -    | $\mu\text{A}$ |
| Open circuit voltage                                                                                | $E_e = 1\text{ mW/cm}^2, \lambda = 950\text{ nm}$                   | $V_O$           | -    | 318         | -    | mV            |
| 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                                                                               | $E_e = 1\text{ mW/cm}^2, \lambda = 950\text{ nm}, V_R = 5\text{ V}$ | $I_{ra}$        | 1.9  | 2.4         | 3.1  | $\mu\text{A}$ |
| Angle of half sensitivity                                                                           |                                                                     | $\phi$          | -    | $\pm 55$    | -    | $^{\circ}$    |
| Wavelength of peak sensitivity                                                                      |                                                                     | $\lambda_p$     | -    | 910         | -    | nm            |
| Range of spectral bandwidth                                                                         |                                                                     | $\lambda_{0.5}$ | -    | 550 to 1040 | -    | nm            |
| Rise time                                                                                           | $V_R = 5\text{ V}, R_L = 1\text{ k}\Omega, \lambda = 820\text{ nm}$ | $t_r$           | -    | 100         | -    | ns            |
| Fall time                                                                                           | $V_R = 5\text{ V}, R_L = 1\text{ k}\Omega, \lambda = 820\text{ nm}$ | $t_f$           | -    | 100         | -    | ns            |

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

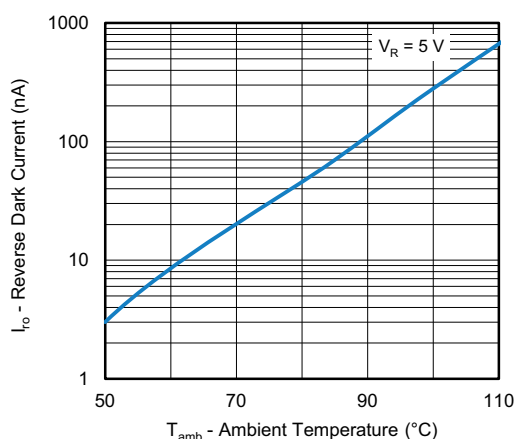


Fig. 1 - Reverse Dark Current vs. Ambient Temperature

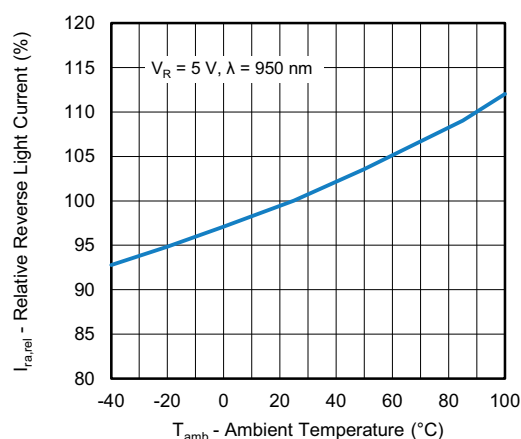


Fig. 2 - Relative Reverse Light Current vs. Ambient Temperature

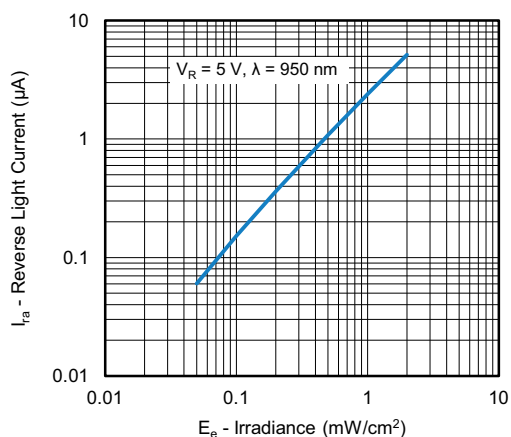


Fig. 3 - Reverse Light Current vs. Irradiance

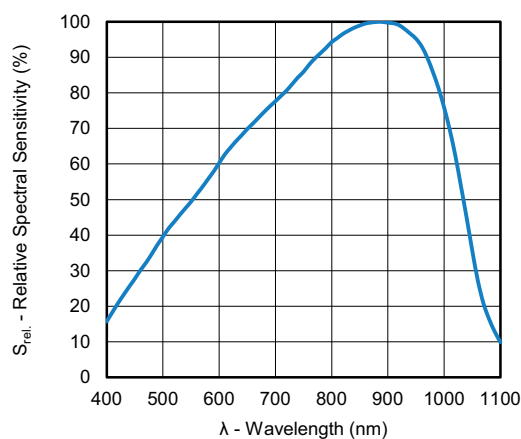


Fig. 5 - Relative Spectral Sensitivity vs. Wavelength

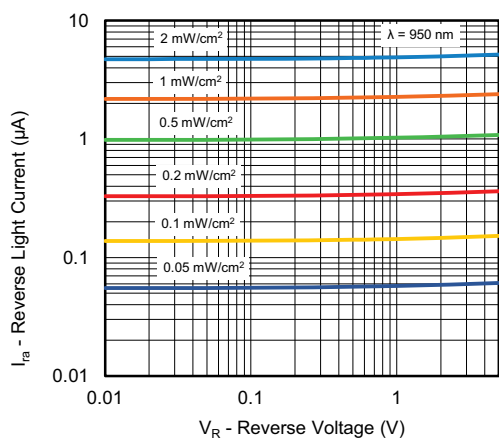


Fig. 4 - Reverse Light Current vs. Reverse Voltage

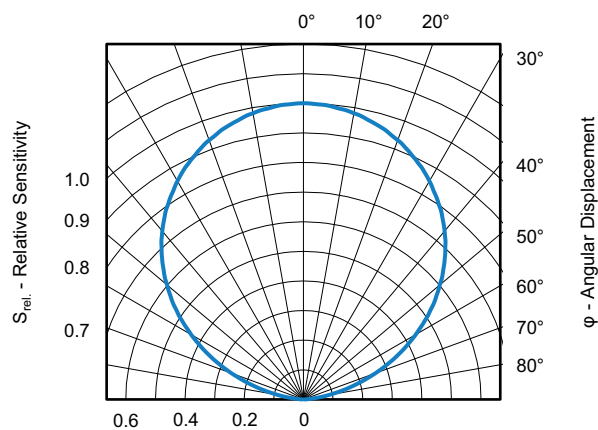


Fig. 6 - Relative Sensitivity vs. Angular Displacement

## REFLOW SOLDER PROFILE

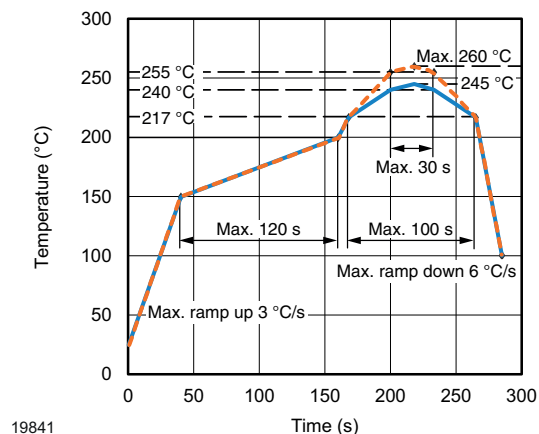


Fig. 7 - Lead (Pb)-free Reflow Solder Profile  
According to J-STD-020

## 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

Floor life (time between soldering and removing from MBB) must not exceed the time indicated on MBB label:

Floor life: 4 weeks

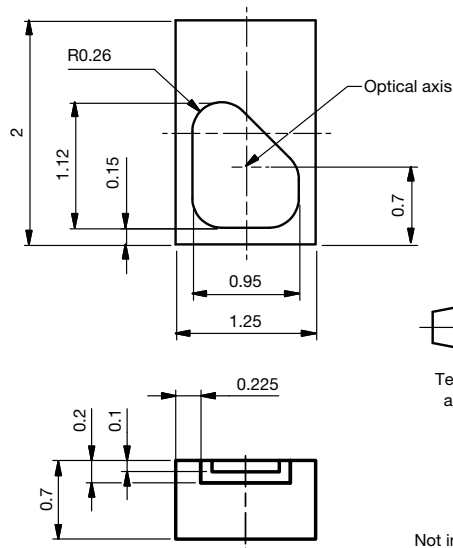
Conditions:  $T_{amb} < 30\text{ °C}$ ,  $RH < 60\%$

Moisture sensitivity level MSL2a, according to J-STD-020.

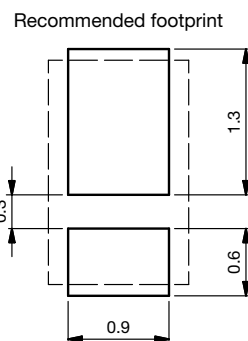
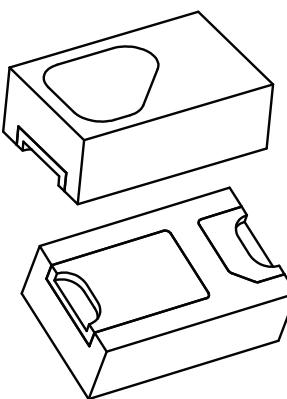
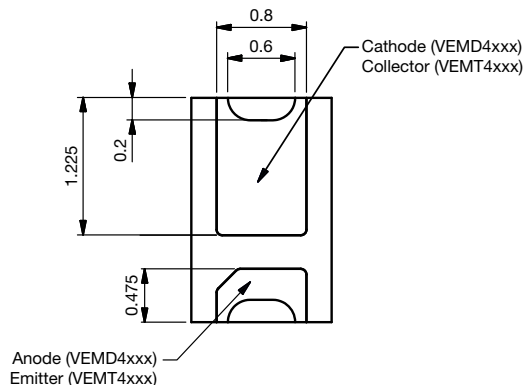
## DRYING

In case of moisture absorption devices should be baked before soldering. Conditions see J-STD-033D or label. Devices taped on reel dry using recommended conditions 192 h at 40 °C (+ 5 °C),  $RH < 5\%$ .

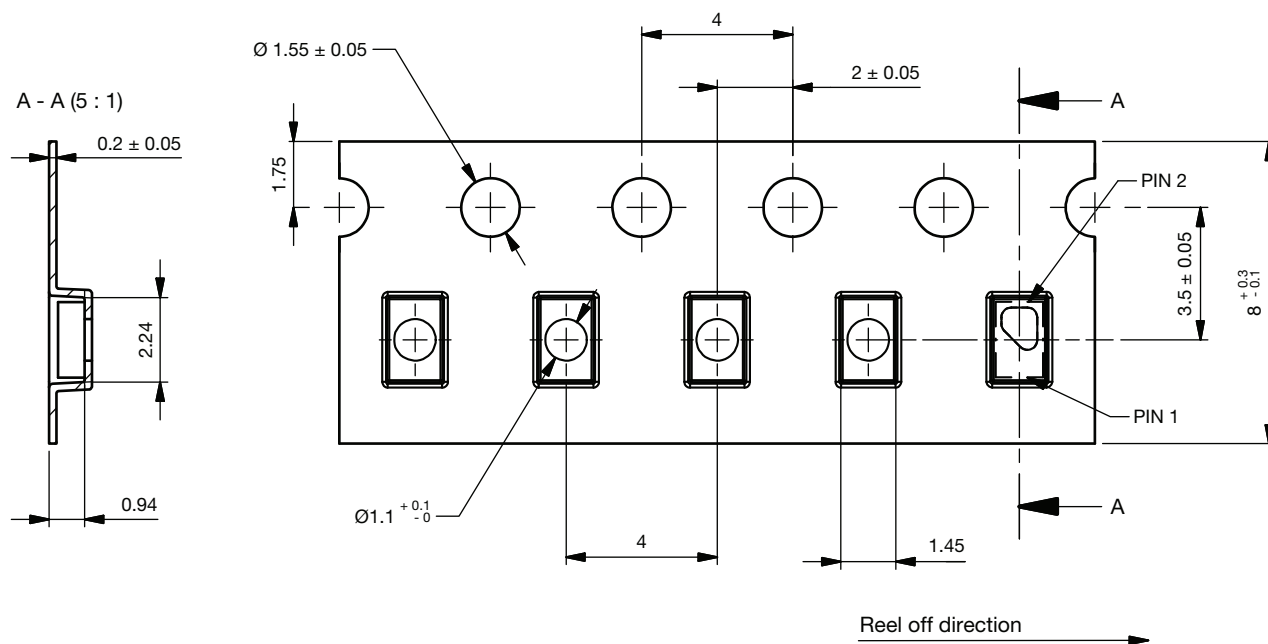
## PACKAGE DIMENSIONS in millimeters



Not indicated tolerances  $\pm 0.1$



Drawing-No.: 6.550-5363.01-4  
Issue: 2; 01.07.2020

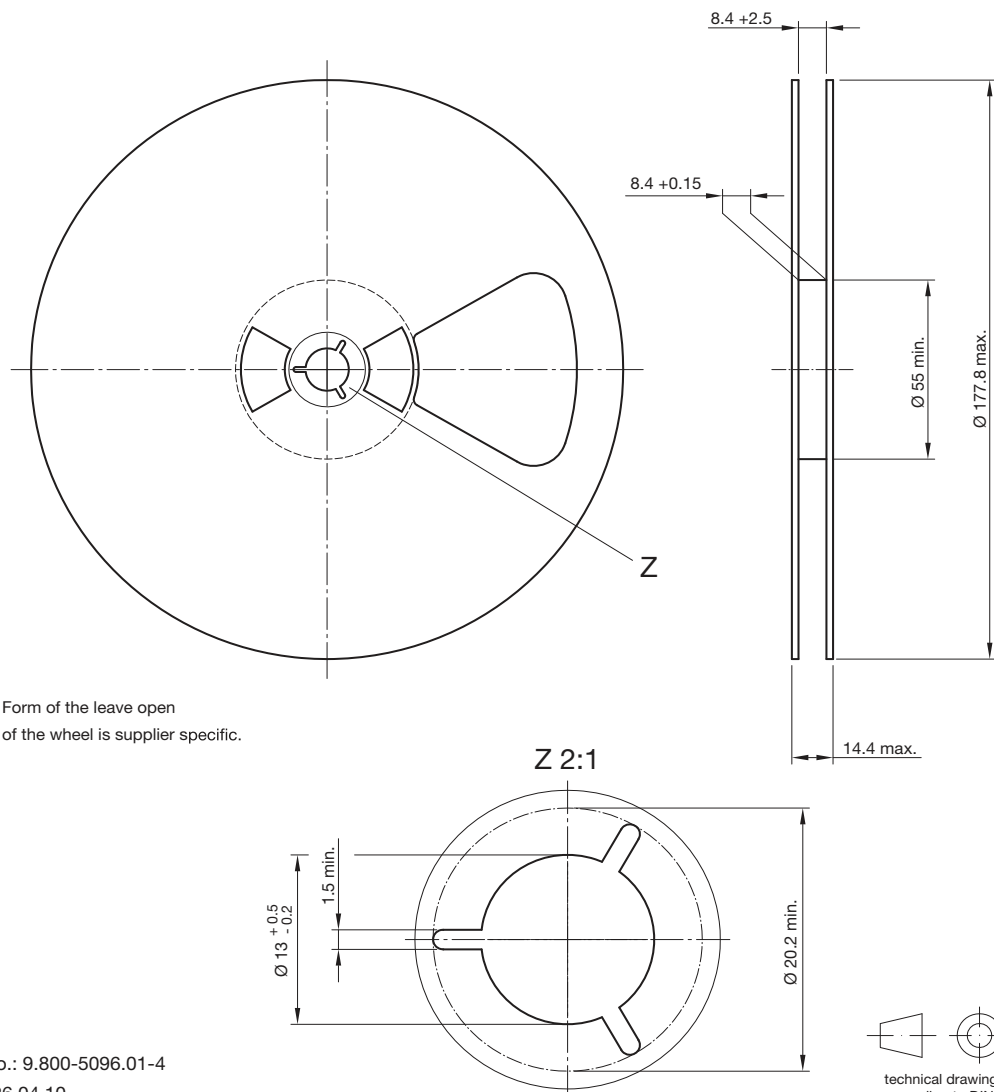
**BLISTER TAPE DIMENSIONS** in millimeters

| TYPE     | PIN 1 | PIN 2   |
|----------|-------|---------|
| VEMD4xxx | Anode | Cathode |

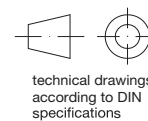
Drawing-No.: 9.700-5411.0-4  
Issue: 1\_A; 11.10.2022



REEL DIMENSIONS in millimeters



Drawing-No.: 9.800-5096.01-4  
Issue: 2; 26.04.10  
20875





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