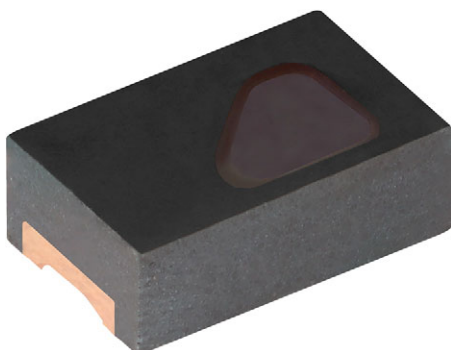


## Silicon PIN Photodiode



### 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>): 0.375
- Ambient temperature range: T<sub>OP</sub> = -40 °C to +125 °C
- Angle of half sensitivity:  $\phi = \pm 58^\circ$
- 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)

AUTOMOTIVE  
GRADE

**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**  
**GREEN**  
(5-2008)

### LINKS TO ADDITIONAL RESOURCES



### DESCRIPTION

The VEMD4060X02 is a high speed and high sensitive PIN photodiode with a highly linear photoresponse. It is a low profile surface-mount device (SMD) with a 0.375 mm<sup>2</sup> sensitive area detecting visible and near infrared radiation.

### APPLICATIONS

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

### PRODUCT SUMMARY

| COMPONENT   | I <sub>ra</sub> (μA) | φ (°) | λ <sub>0.5</sub> (nm) |
|-------------|----------------------|-------|-----------------------|
| VEMD4060X02 | 1.5                  | ± 58  | 540 to 960            |

#### Note

- Test conditions see table “Basic Characteristics”

### ORDERING INFORMATION

| ORDERING CODE | PACKAGING     | REMARKS                      | PACKAGE FORM |
|---------------|---------------|------------------------------|--------------|
| VEMD4060X02   | 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                                                                                     | $I_F = 50\text{ mA}$                                                       | $V_F$           | -    | 1.0        | 1.3  | V             |
| Breakdown voltage                                                                                   | $I_R = 100\text{ }\mu\text{A}$ , $E = 0\text{ mW/cm}^2$                    | $V_{(BR)}$      | 20   | -          | -    | V             |
| Reverse dark current                                                                                | $V_R = 10\text{ V}$ , $E = 0$                                              | $I_{ro}$        | -    | -          | 3    | nA            |
| Diode capacitance                                                                                   | $V_R = 0\text{ V}$ , $f = 1\text{ MHz}$ , $E = 0\text{ mW/cm}^2$           | $C_D$           | -    | 7.6        | -    | pF            |
| Short circuit current                                                                               | $E_e = 1\text{ mW/cm}^2$ , $\lambda = 940\text{ nm}$                       | $I_k$           | -    | 1.5        | -    | $\mu\text{A}$ |
| Open circuit voltage                                                                                | $E_e = 1\text{ mW/cm}^2$ , $\lambda = 940\text{ nm}$                       | $V_O$           | -    | 355        | -    | mV            |
| Temperature coefficient of $I_k$                                                                    | $E_e = 1\text{ mW/cm}^2$ , $\lambda = 940\text{ nm}$                       | $TK_{I_k}$      | -    | 0.37       | -    | %/K           |
| Reverse light current                                                                               | $E_e = 1\text{ mW/cm}^2$ , $\lambda = 850\text{ nm}$ , $V_R = 5\text{ V}$  | $I_{ra}$        | 1.7  | 2.3        | 2.9  | $\mu\text{A}$ |
|                                                                                                     | $E_e = 1\text{ mW/cm}^2$ , $\lambda = 940\text{ nm}$ , $V_R = 5\text{ V}$  | $I_{ra}$        | 1.0  | 1.5        | 1.9  | $\mu\text{A}$ |
| Angle of half sensitivity                                                                           |                                                                            | $\phi$          | -    | $\pm 58$   | -    | $^{\circ}$    |
| Wavelength of peak sensitivity                                                                      |                                                                            | $\lambda_p$     | -    | 820        | -    | nm            |
| Range of spectral bandwidth                                                                         | $S_{rel} > 0.5$                                                            | $\lambda_{0.5}$ | -    | 540 to 960 | -    | nm            |
| Rise time                                                                                           | $V_R = 10\text{ V}$ , $R_L = 50\text{ }\Omega$ , $\lambda = 890\text{ nm}$ | $t_r$           | -    | 160        | -    | ns            |
| Fall time                                                                                           | $V_R = 10\text{ V}$ , $R_L = 50\text{ }\Omega$ , $\lambda = 890\text{ nm}$ | $t_f$           | -    | 125        | -    | ns            |

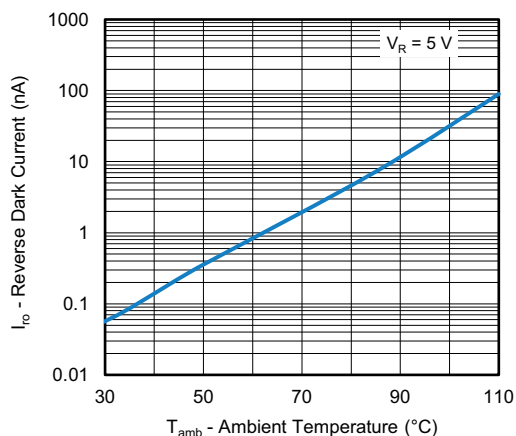
**BASIC CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)


Fig. 1 - Reverse Dark Current vs. Ambient Temperature

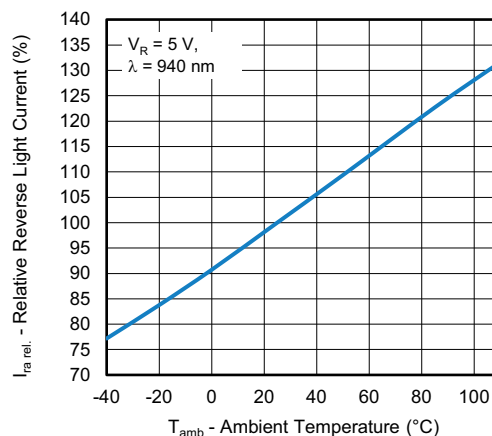


Fig. 2 - Relative Reverse Light Current vs. Ambient Temperature

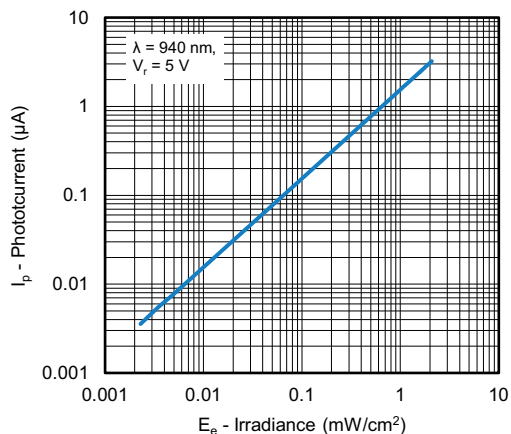


Fig. 3 - Reverse Light Current vs. Irradiance

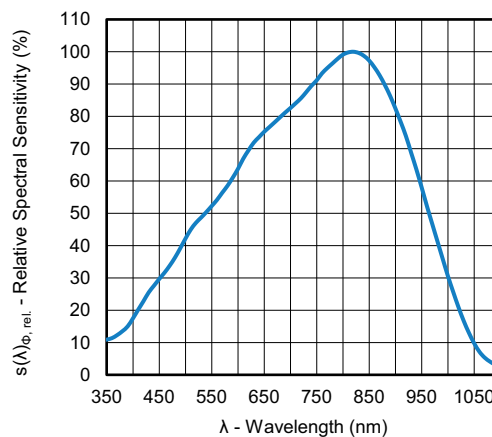


Fig. 6 - Relative Spectral Sensitivity vs. Wavelength

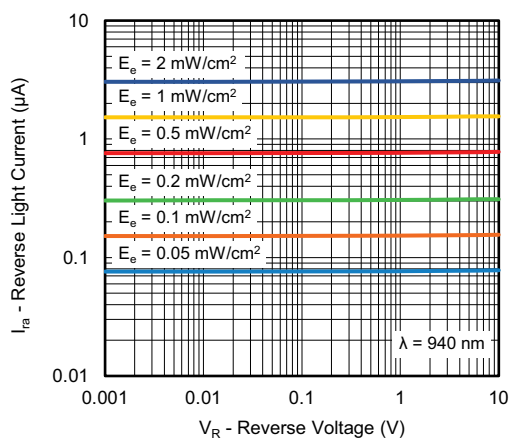


Fig. 4 - Reverse Light Current vs. Reverse Voltage

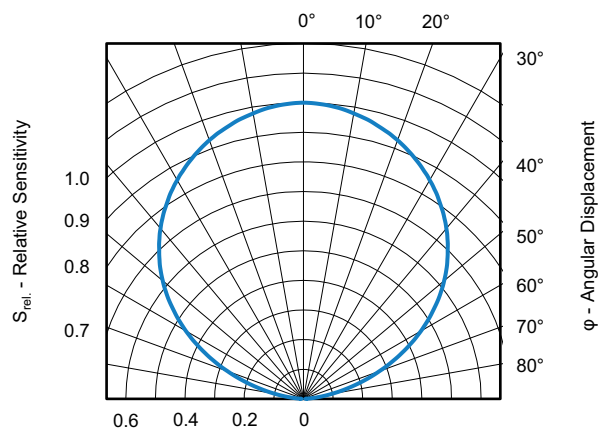


Fig. 7 - Relative Sensitivity vs. Angular Displacement

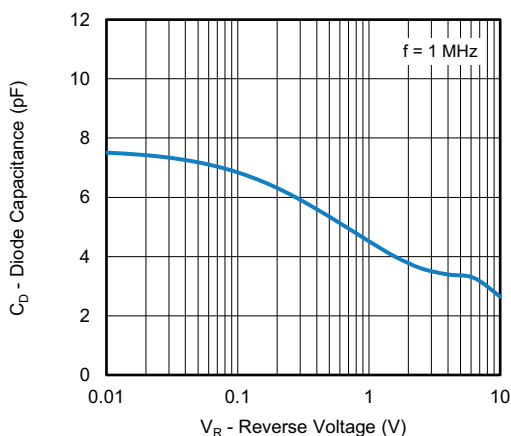


Fig. 5 - Diode Capacitance vs. Reverse Voltage

## REFLOW SOLDER PROFILE

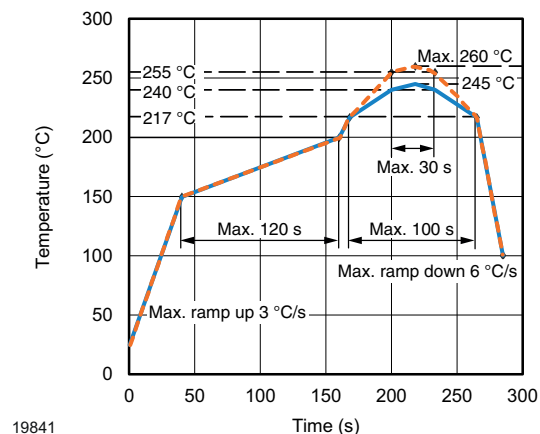


Fig. 8 - Lead (Pb)-free Reflow Solder Profile According to J-STD-020

## 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

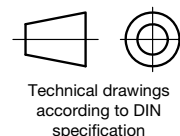
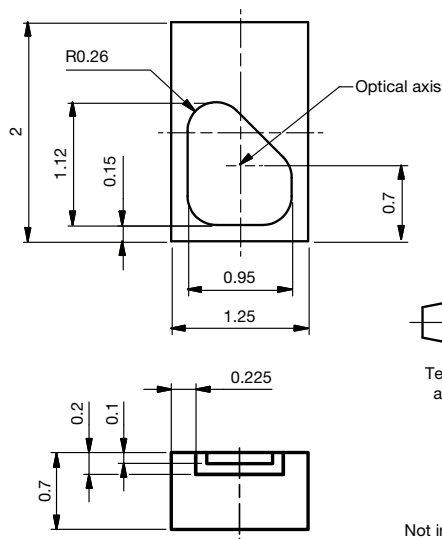
Conditions:  $T_{amb} < 30\text{ °C}$ ,  $RH < 60\%$

Moisture sensitivity level 2a, according to J-STD-020.

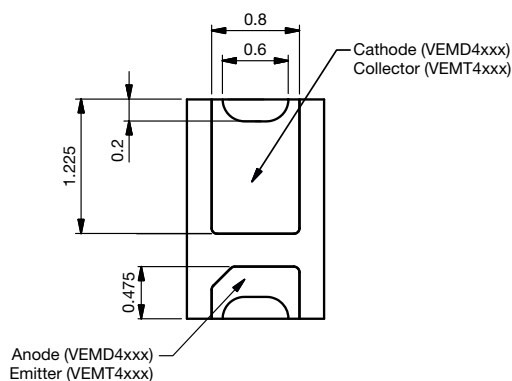
## DRYING

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),  $RH < 5\%$ .

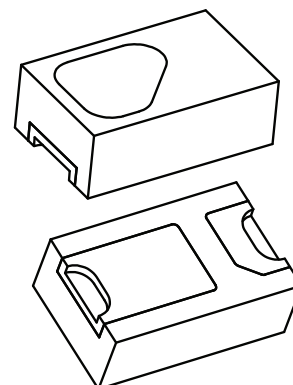
## PACKAGE DIMENSIONS in millimeters



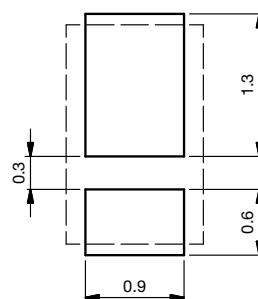
Not indicated tolerances  $\pm 0.1$

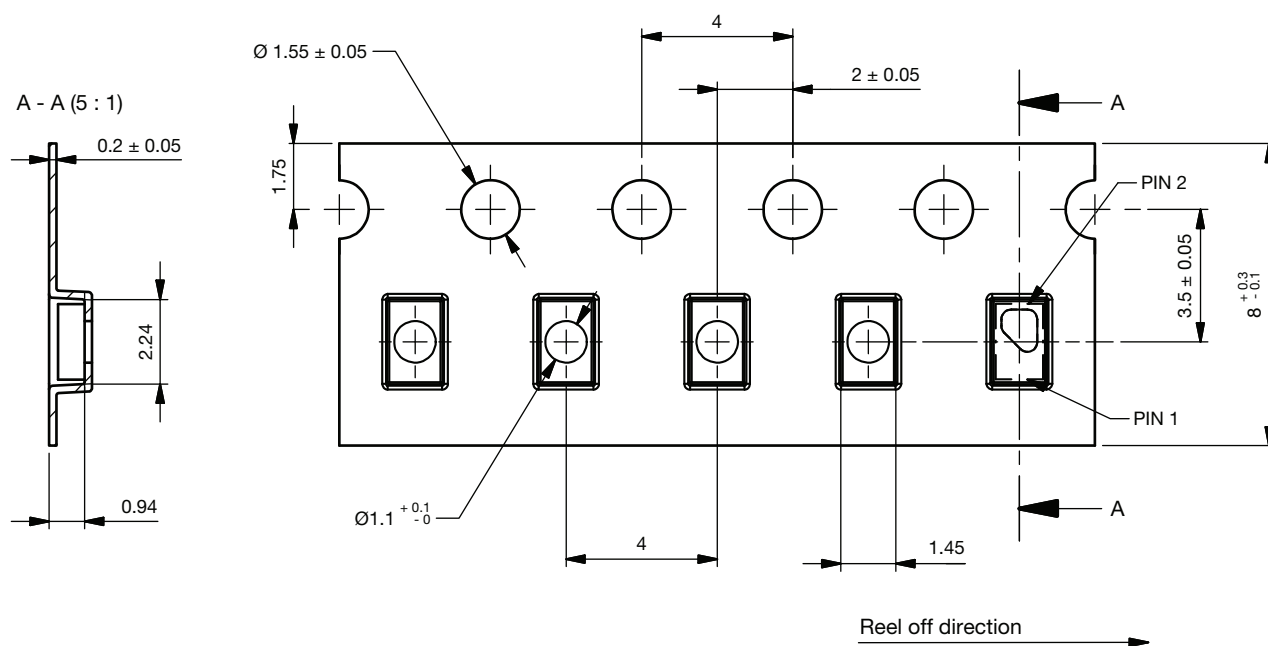


Drawing-No.: 6.550-5363.01-4  
Issue: 2; 01.07.2020



## Recommended footprint



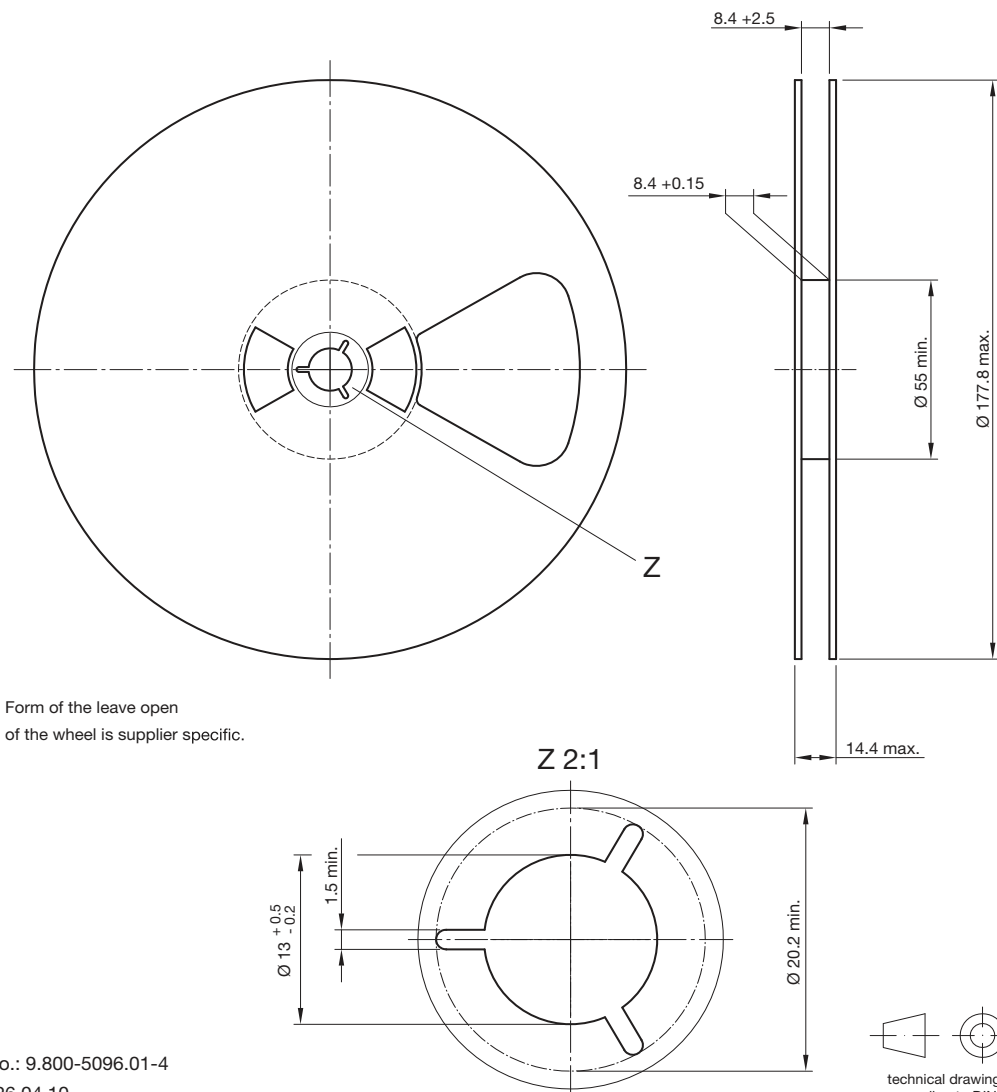
**BLISTER TAPE DIMENSIONS** in millimeters

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

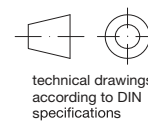
Drawing-No.: 9.700-5411.0-4  
Issue: 1\_A; 11.10.2022



**REEL DIMENSIONS** in millimeters



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





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