



## Silicon PIN Photodiode

VEMD2520X01



16758-11

VEMD2500X01



### DESCRIPTION

VEMD2500X01 and VEMD2520X01 are high speed and high sensitive PIN photodiodes in a clear epoxy, miniature surface mount package (SMD) with dome lens. The photo sensitive area of the chip is 0.23 mm<sup>2</sup>.

### FEATURES

- Package type: surface mount
- Package form: GW, RGW
- Dimensions (L x W x H in mm): 2.3 x 2.3 x 2.8
- AEC-Q101 qualified
- High radiant sensitivity
- Suitable for visible and near infrared radiation
- Fast response times
- Angle of half sensitivity:  $\phi = \pm 15^\circ$
- Package matched with IR emitter series VSMB2000X01
- Floor life: 4 weeks, MSL 2a, acc. J-STD-020
- Lead (Pb)-free reflow soldering
- Compliant to RoHS Directive 2002/95/EC and in accordance to WEEE 2002/96/EC



### Note

\*\* Please see document "Vishay Material Category Policy": [www.vishay.com/doc?99902](http://www.vishay.com/doc?99902)

### APPLICATIONS

- High speed photo detector

| PRODUCT SUMMARY |                      |              |                      |
|-----------------|----------------------|--------------|----------------------|
| COMPONENT       | $I_{ra}$ ( $\mu A$ ) | $\phi$ (deg) | $\lambda_{0.1}$ (nm) |
| VEMD2500X01     | 12                   | $\pm 15$     | 350 to 1120          |
| VEMD2520X01     | 12                   | $\pm 15$     | 350 to 1120          |

### Note

- Test conditions see table "Basic Characteristics"

| ORDERING INFORMATION |               |                              |                  |
|----------------------|---------------|------------------------------|------------------|
| ORDERING CODE        | PACKAGING     | REMARKS                      | PACKAGE FORM     |
| VEMD2500X01          | Tape and reel | MOQ: 6000 pcs, 6000 pcs/reel | Reverse gullwing |
| VEMD2520X01          | Tape and reel | MOQ: 6000 pcs, 6000 pcs/reel | Gullwing         |

### Note

- MOQ: minimum order quantity

| ABSOLUTE MAXIMUM RATINGS ( $T_{amb} = 25^\circ C$ , unless otherwise specified) |                                   |            |               |            |
|---|-----------------------------------|------------|---------------|------------|
| PARAMETER   | TEST CONDITION                    | SYMBOL     | VALUE         | UNIT       |
| Reverse voltage   |                                   | $V_R$      | 60            | V          |
| Power dissipation   | $T_{amb} \leq 25^\circ C$         | $P_V$      | 215           | mW         |
| Junction temperature  |                                   | $T_j$      | 100           | $^\circ C$ |
| Operating temperature range   |                                   | $T_{amb}$  | - 40 to + 100 | $^\circ C$ |
| Storage temperature range   |                                   | $T_{stg}$  | - 40 to + 100 | $^\circ C$ |
| Soldering temperature   | Acc. reflow solder profile fig. 7 | $T_{sd}$   | 260           | $^\circ C$ |
| Thermal resistance junction/ambient   | Acc. J-STD-051                    | $R_{thJA}$ | 250           | K/W        |



| <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           |      | V             |
| Breakdown voltage   | $I_R = 100\text{ }\mu\text{A}$ , $E = 0$                                      | $V_{(BR)}$      | 32   |             |      | V             |
| Reverse dark current  | $V_R = 10\text{ V}$ , $E = 0$   | $I_{ro}$        |      | 1           | 10   | nA            |
| Diode capacitance   | $V_R = 0\text{ V}$ , $f = 1\text{ MHz}$ , $E = 0$                             | $C_D$           |      | 4           |      | pF            |
|   | $V_R = 5\text{ V}$ , $f = 1\text{ MHz}$ , $E = 0$                             | $C_D$           |      | 1.3         |      | pF            |
| Open circuit voltage  | $E_e = 1\text{ mW/cm}^2$ , $\lambda = 950\text{ nm}$                          | $V_o$           |      | 350         |      | mV            |
| Temperature coefficient of $V_o$  | $E_e = 1\text{ mW/cm}^2$ , $\lambda = 950\text{ nm}$                          | $TK_{V_o}$      |      | -2.6        |      | mV/K          |
| Short circuit current   | $E_e = 1\text{ mW/cm}^2$ , $\lambda = 950\text{ nm}$                          | $I_k$           |      | 11          |      | $\mu\text{A}$ |
| 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   | $E_e = 1\text{ mW/cm}^2$ , $\lambda = 950\text{ nm}$ ,<br>$V_R = 5\text{ V}$  | $I_{ra}$        | 8.5  | 12          | 17   | $\mu\text{A}$ |
| Angle of half sensitivity   |   | $\phi$          |      | $\pm 15$    |      | deg           |
| Wavelength of peak sensitivity  |   | $\lambda_p$     |      | 900         |      | nm            |
| Range of spectral bandwidth   |   | $\lambda_{0.1}$ |      | 350 to 1120 |      | nm            |
| Rise time   | $V_R = 10\text{ V}$ , $R_L = 1\text{ k}\Omega$ ,<br>$\lambda = 820\text{ nm}$ | $t_r$           |      | 100         |      | ns            |
| Fall time   | $V_R = 10\text{ V}$ , $R_L = 1\text{ k}\Omega$ ,<br>$\lambda = 820\text{ nm}$ | $t_f$           |      | 100         |      | ns            |

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



Fig. 1 - Reverse Dark Current vs. Ambient Temperature

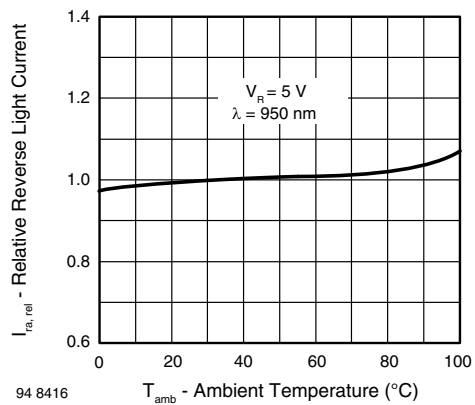


Fig. 2 - Relative Reverse Light Current vs. Ambient Temperature

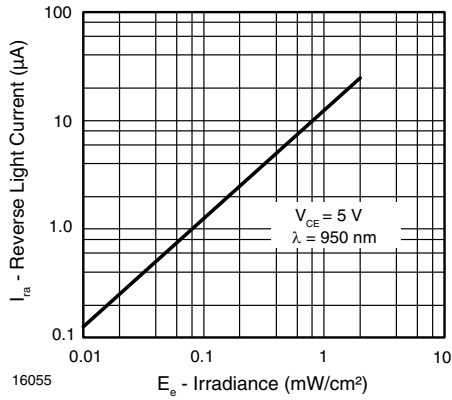


Fig. 3 - Reverse Light Current vs. Irradiance

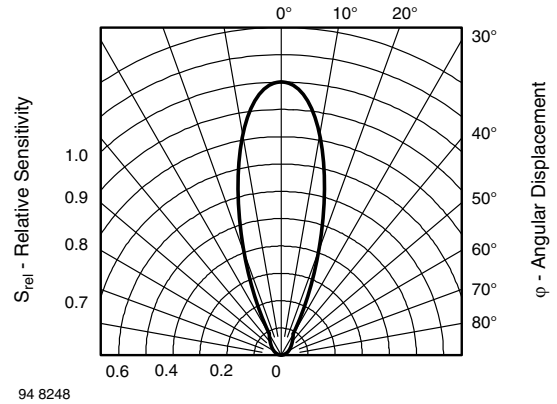


Fig. 6 - Relative Radiant Sensitivity vs. Angular Displacement

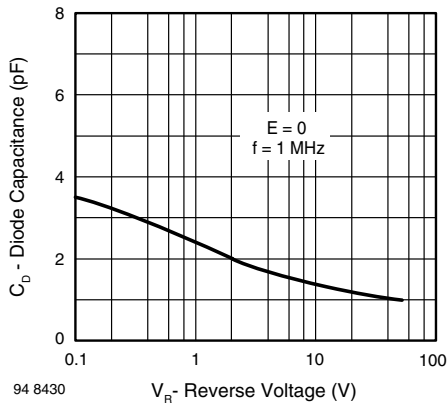


Fig. 4 - Diode Capacitance vs. Reverse Voltage

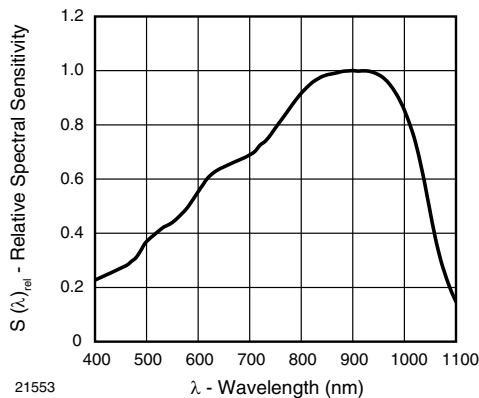


Fig. 5 - Relative Spectral Sensitivity vs. Wavelength



### REFLOW SOLDER PROFILE



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

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

Floor life: 4 weeks

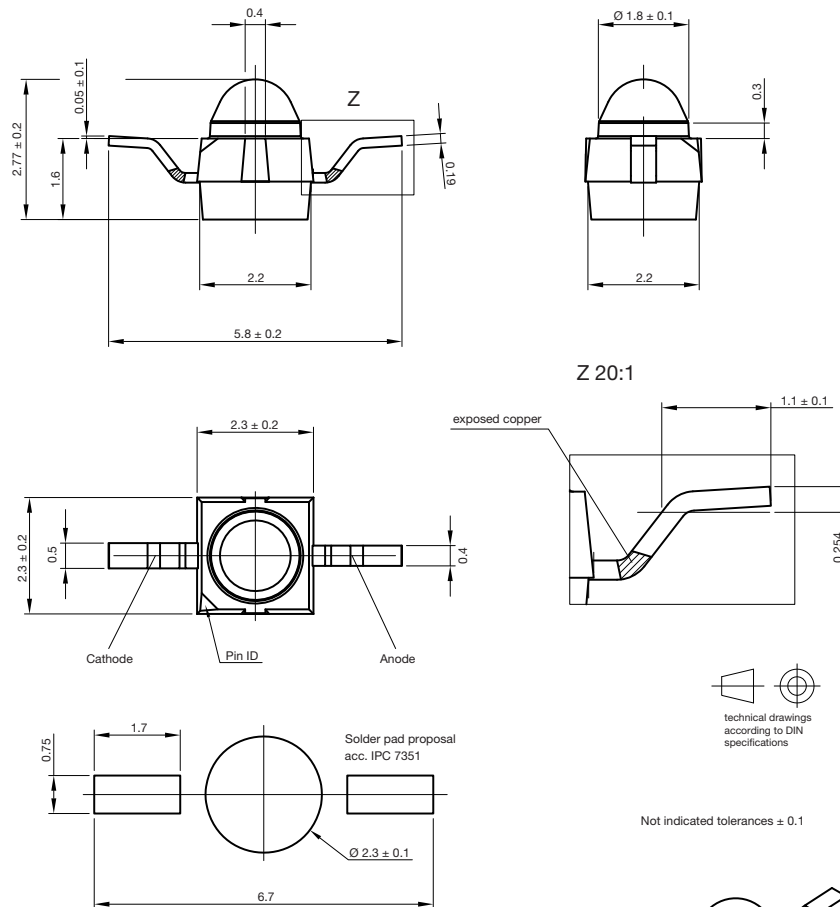
Conditions:  $T_{amb} < 30\text{ °C}$ , RH < 60 %

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

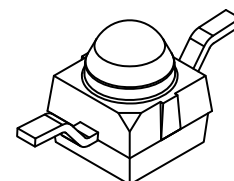
### DRYING

In case of moisture absorption devices should be baked before soldering. Conditions see J-STD-020 or label. Devices taped on reel dry using recommended conditions 192 h at 40 °C (+ 5 °C), RH < 5 %.

### PACKAGE DIMENSIONS in millimeters: VEMD2500X01

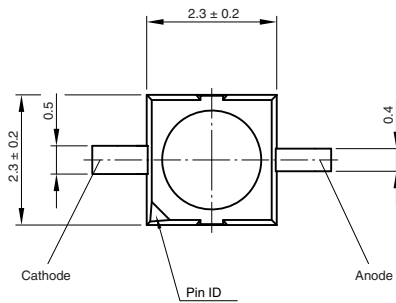
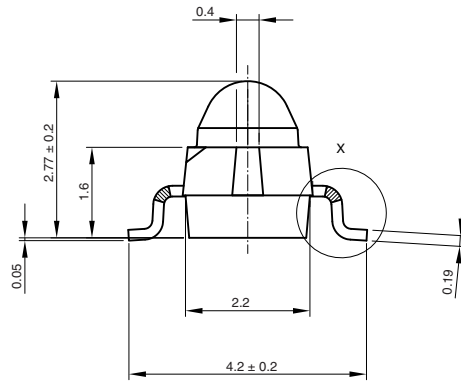


Drawing-No.: 6.544-5391.02-4  
Issue: 2; 18.03.10  
21517

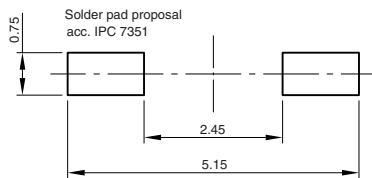
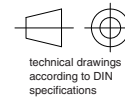
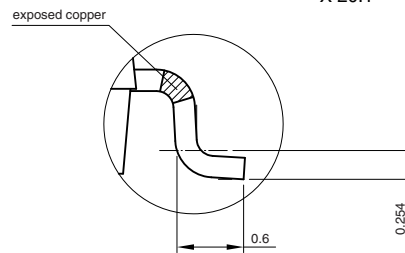




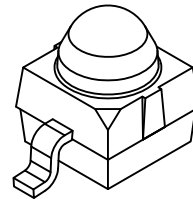
## PACKAGE DIMENSIONS in millimeters: VEMD2520X01



X 20:1



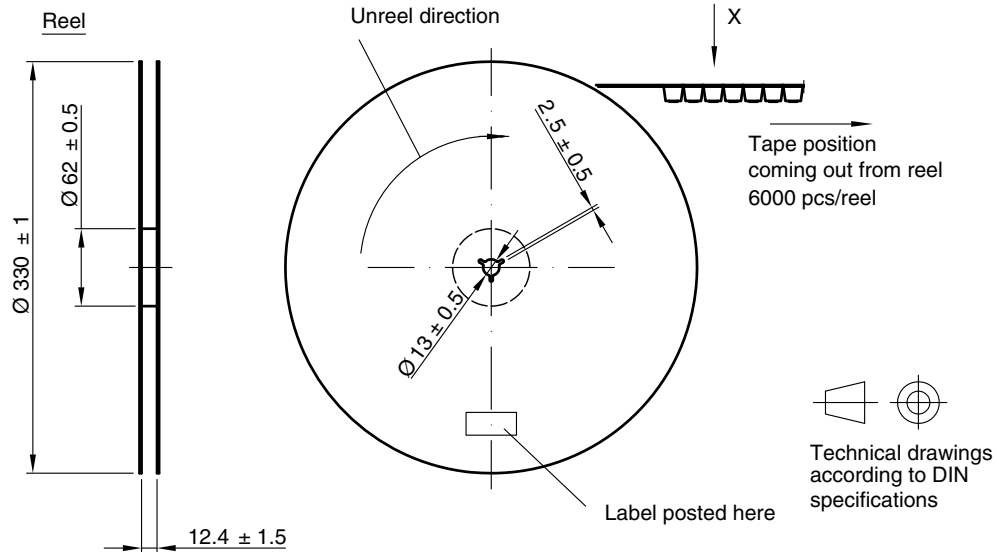
Not indicated tolerances ± 0.1



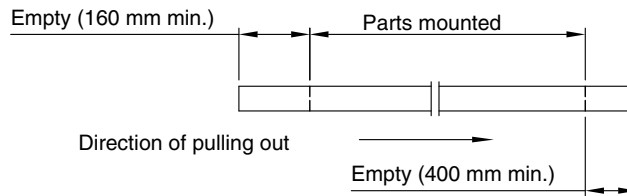
Drawing-No.: 6.544-5383.02-4  
 Issue: 4; 18.03.10  
 21488



**TAPING AND REEL DIMENSIONS** in millimeters: **VEMD2500X01**

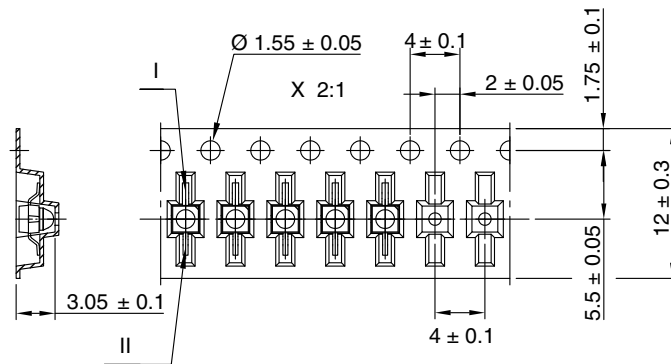


Leader and trailer tape:



Terminal position in tape

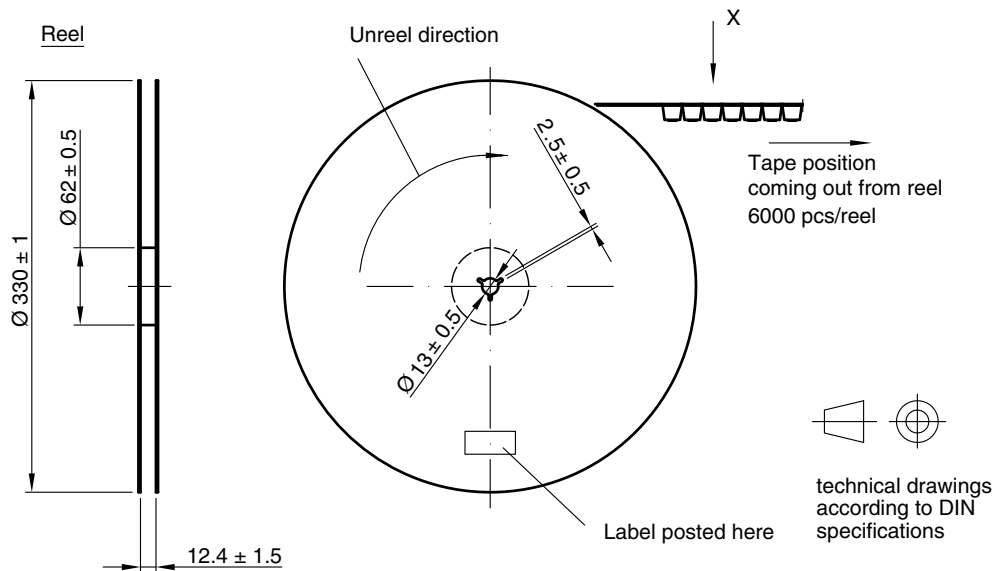
| Device     | Lead I    | Lead II |
|------------|-----------|---------|
| VEMT2000   | Collector | Emitter |
| VEMT2500   |           |         |
| VEMD2000   | Cathode   | Anode   |
| VEMD2500   |           |         |
| VSMB2000   |           |         |
| VSMG2000   |           |         |
| VSMY2850RG | Anode     | Cathode |



Drawing-No.: 9.800-5100.01-4  
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**TAPING AND REEL DIMENSIONS** in millimeters: **VEMD2520X01**



Leader and trailer tape:



Terminal position in tape

| Device    | Lead I    | Lead II |
|-----------|-----------|---------|
| VEMT2020  | Collector | Emitter |
| VEMT2520  |           |         |
| VSMB2020  | Cathode   | Anode   |
| VSMG2020  |           |         |
| VEMD2020  |           |         |
| VEMD2520  | Anode     | Cathode |
| VSMY2850G |           |         |



Drawing-No.: 9.800-5091.01-4

Issue: 3; 18.03.10

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