

## Silicon PIN Photodiode



### DESCRIPTION

VEMD2523SLX01 is a high speed and high sensitive PIN photodiode in a miniature side looking, surface mount package (SMD) with dome lens. The clear epoxy allows light detection of a wide wavelength range from 350 nm to 1120 nm. The photo sensitive area of the chip is 0.23 mm<sup>2</sup>.

### FEATURES

- Package type: surface mount
- Package form: side view
- Dimensions (L x W x H in mm): 2.3 x 2.55 x 2.3
- AEC-Q101 qualified
- High radiant sensitivity
- Suitable for visible and near infrared radiation
- Fast response times
- Angle of half sensitivity:  $\phi = \pm 35^\circ$
- Package matched with IR emitter series VSMB2943SLX01
- Floor life: 4 weeks, MSL 2a, acc. J-STD-020
- Lead (Pb)-free reflow soldering
- Material categorization: For definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



### APPLICATIONS

- High speed photo detector
- Light curtain
- Detector for optical switch

### PRODUCT SUMMARY

| COMPONENT     | $I_{ra}$ (μA) | $\phi$ (deg) | $\lambda_{0.1}$ (nm) |
|---------------|---------------|--------------|----------------------|
| VEMD2523SLX01 | 10            | $\pm 35$     | 350 to 1120          |

#### Note

- Test conditions see table "Basic Characteristics"

### ORDERING INFORMATION

| ORDERING CODE | PACKAGING     | REMARKS                      | PACKAGE FORM |
|---------------|---------------|------------------------------|--------------|
| VEMD2523SLX01 | Tape and reel | MOQ: 3000 pcs, 3000 pcs/reel | Side 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                     |                                   | $V_R$      | 60            | V                |
| Power dissipation                   | $T_{amb} \leq 25^\circ\text{C}$   | $P_V$      | 215           | mW               |
| Junction temperature                |                                   | $T_j$      | 100           | $^\circ\text{C}$ |
| Operating temperature range         |                                   | $T_{amb}$  | - 40 to + 100 | $^\circ\text{C}$ |
| Storage temperature range           |                                   | $T_{stg}$  | - 40 to + 100 | $^\circ\text{C}$ |
| Soldering temperature               | Acc. reflow solder profile fig. 7 | $T_{sd}$   | 260           | $^\circ\text{C}$ |
| 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                                                                               | $E_e = 1\text{ mW/cm}^2$ , $\lambda = 950\text{ nm}$                       | $I_k$           |      | 10          |      | $\mu\text{A}$ |
| 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                                                                               | $E_e = 1\text{ mW/cm}^2$ , $\lambda = 950\text{ nm}$ , $V_R = 5\text{ V}$  | $I_{ra}$        | 7    | 10          | 14   | $\mu\text{A}$ |
| Angle of half sensitivity                                                                           |                                                                            | $\phi$          |      | $\pm 35$    |      | deg           |
| Wavelength of peak sensitivity                                                                      |                                                                            | $\lambda_p$     |      | 900         |      | nm            |
| Range of spectral bandwidth                                                                         |                                                                            | $\lambda_{0.1}$ |      | 350 to 1120 |      | nm            |
| Rise time                                                                                           | $V_R = 10\text{ V}$ , $R_L = 1\text{ k}\Omega$ , $\lambda = 820\text{ nm}$ | $t_r$           |      | 100         |      | ns            |
| Fall time                                                                                           | $V_R = 10\text{ V}$ , $R_L = 1\text{ k}\Omega$ , $\lambda = 820\text{ nm}$ | $t_f$           |      | 100         |      | ns            |

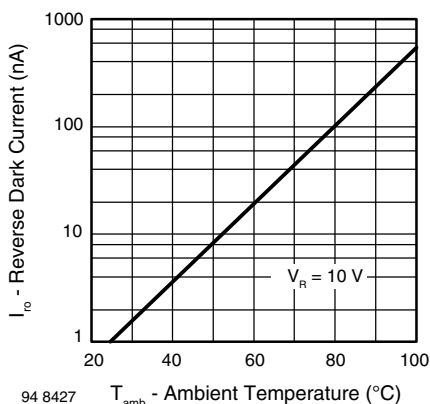
**BASIC CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)


Fig. 1 - Reverse Dark Current vs. Ambient Temperature

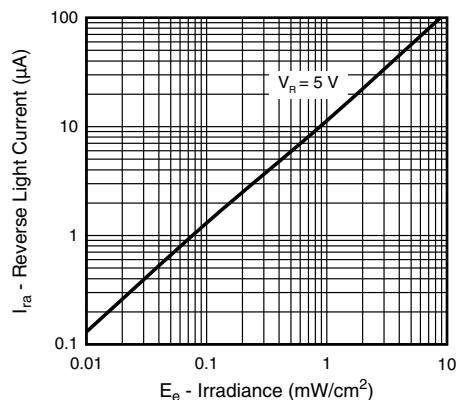


Fig. 3 - Reverse Light Current vs. Irradiance

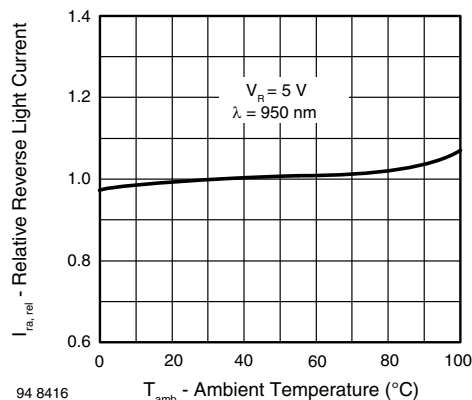


Fig. 2 - Relative Reverse Light Current vs. Ambient Temperature

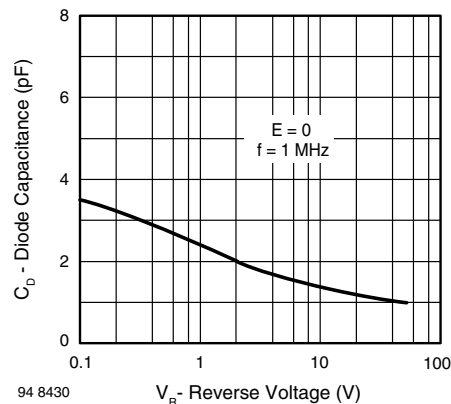


Fig. 4 - Diode Capacitance vs. Reverse Voltage

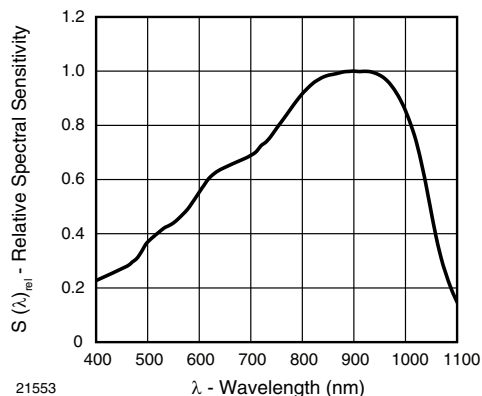


Fig. 5 - Relative Spectral Sensitivity vs. Wavelength

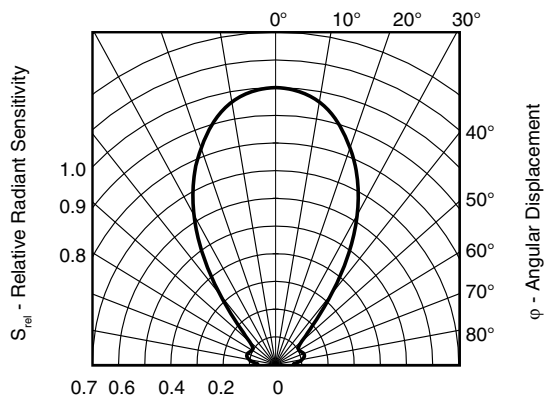


Fig. 6 - Relative Radiant Intensity vs. Angular Displacement

## REFLOW SOLDER PROFILE

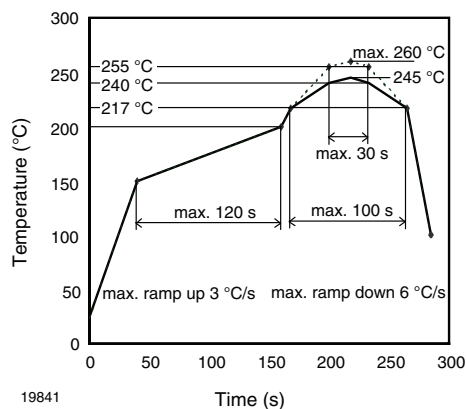


Fig. 7 - Lead (Pb)-free Reflow Solder Profile acc. J-STD-020D

## 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:

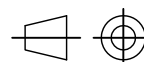
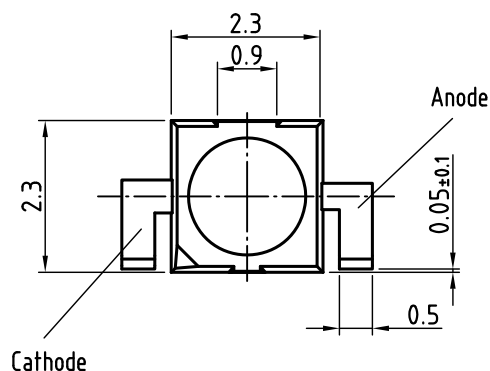
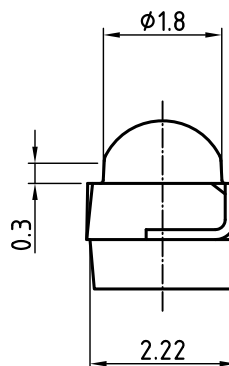
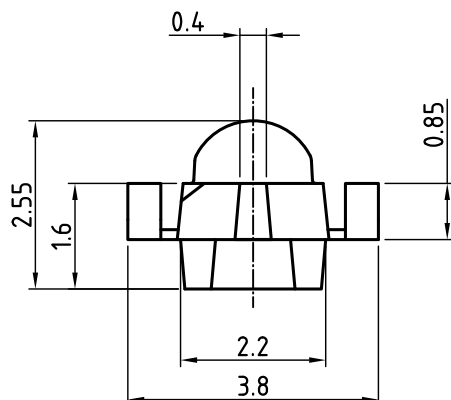
Floor life: 4 weeks

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  $40\text{ °C} (+ 5\text{ °C})$ ,  $RH < 5\%$ .

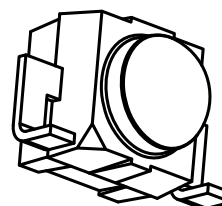
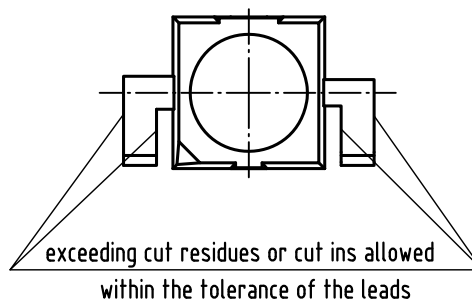
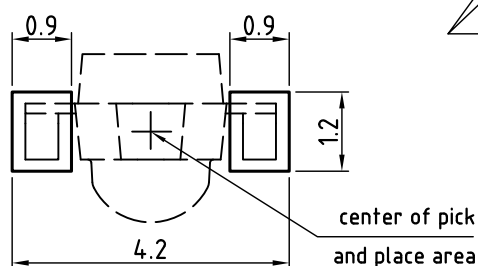
**PACKAGE DIMENSIONS** in millimeters: **VEMD2523SL**


technical drawings  
according to DIN  
specifications

Dimensions in mm

Not indicated tolerances  $\pm 0.2$

Solder pad proposal  
acc. IPC 7351



Drawing refers to following types: VSMB2943SLX01

VSMF2893SLX01

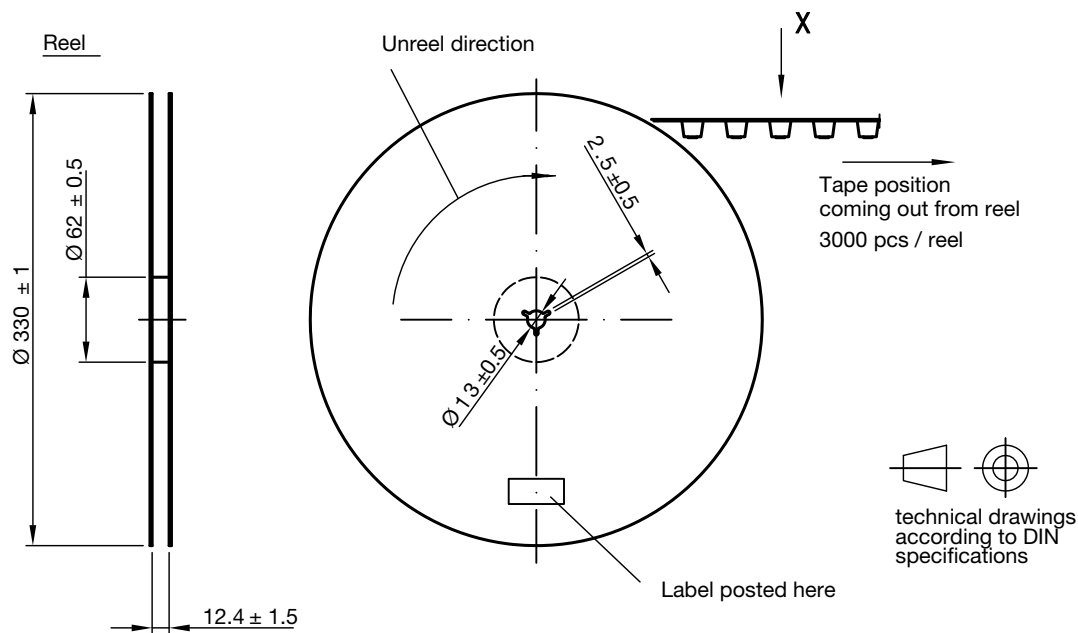
Drawing-No.: 6.544-5410.02-4

VSMB2948SL

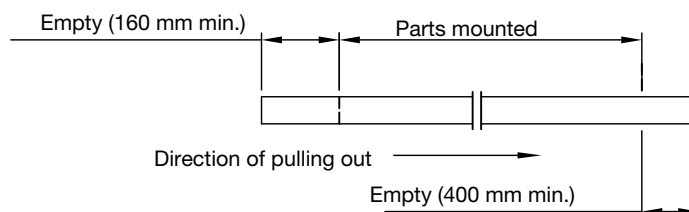
Issue: prel. 03.08.12

VEMD2x23SLX01

### TAPING AND REEL DIMENSIONS in millimeters: **VEMD2523SL**

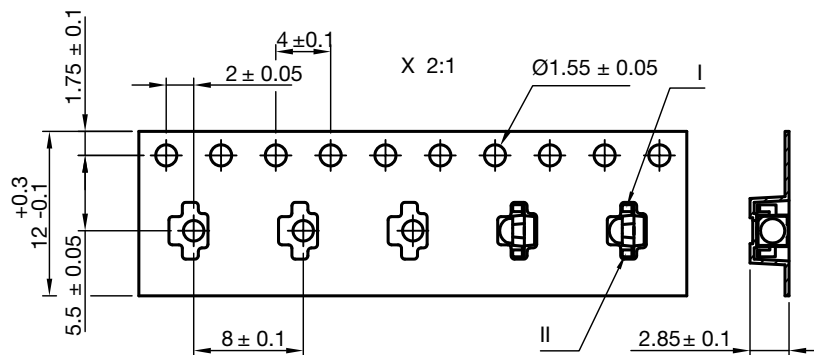


Leader and tailer tape:



Terminal position in tape

| Device        | Lead I    | Lead II |
|---------------|-----------|---------|
| VSMB2943SLX01 | Cathode   | Anode   |
| VSMF2893SLX01 |           |         |
| VSMB2948SL    |           |         |
| VEMD2023SLX01 |           |         |
| VEMD2523SLX01 |           |         |
| VENT2023SLX01 | Collector | Emitter |
| VENT2523SLX01 |           |         |
| SMY2853SL     | Anode     | Cathode |



Drawing refers to following types: see table  
Reel dimensions and tape

Drawing-No.: 9.800-5123.01-4  
Issue: 2; 19.02.13



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