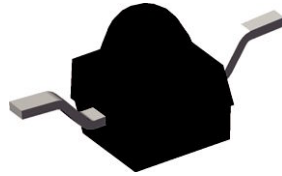




## Silicon PIN Photodiode



21568-1 VEMD2020X01



VEMD2000X01

### DESCRIPTION

VEMD2000X01 and VEMD2020X01 are high speed and high sensitive PIN photodiodes in a miniature surface mount package (SMD) with dome lens and daylight blocking filter. Filter is matched with IR emitters operating at wavelength of 830 nm to 950 nm. 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
- Daylight blocking filter matched with 830 nm to 950 nm IR emitters
- 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
- Infrared remote control
- Infrared data transmission
- Photo interrupters
- Shaft encoders

PRODUCT SUMMARY			
COMPONENT	I <sub>ra</sub> (μA)	φ (deg)	λ <sub>0.5</sub> (nm)
VEMD2000X01	12	± 15	750 to 1050
VEMD2020X01	12	± 15	750 to 1050

### Note

- Test conditions see table "Basic Characteristics"

ORDERING INFORMATION			
ORDERING CODE	PACKAGING	REMARKS	PACKAGE FORM
VEMD2000X01	Tape and reel	MOQ: 6000 pcs, 6000 pcs/reel	Reverse gullwing
VEMD2020X01	Tape and reel	MOQ: 6000 pcs, 6000 pcs/reel	Gullwing

### 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>	60	V
Power dissipation	T <sub>amb</sub> ≤ 25 °C	P <sub>V</sub>	215	mW
Junction temperature		T <sub>j</sub>	100	°C
Operating temperature range		T <sub>amb</sub>	- 40 to + 100	°C
Storage temperature range		T <sub>stg</sub>	- 40 to + 100	°C
Soldering temperature	Acc. reflow solder profile fig. 7	T <sub>sd</sub>	260	°C
Thermal resistance junction/ambient	Acc. J-STD-051	R <sub>thJA</sub>	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	$E_e = 1\text{ mW/cm}^2$ , $\lambda = 950\text{ nm}$ , $V_R = 5\text{ V}$	$I_{ra}$	8.5	12	17	$\mu\text{A}$
Angle of half sensitivity		$\phi$		$\pm 15$		deg
Wavelength of peak sensitivity		$\lambda_p$		940		nm
Range of spectral bandwidth		$\lambda_{0.5}$		750 to 1050		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

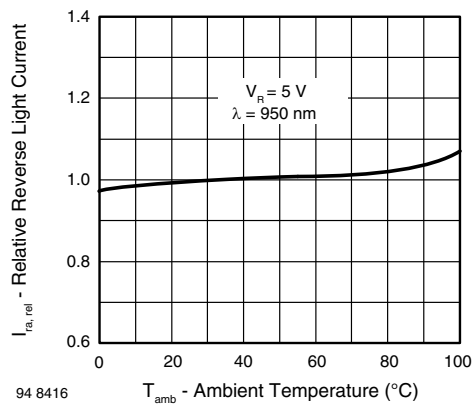


Fig. 2 - Relative Reverse Light Current vs. Ambient Temperature

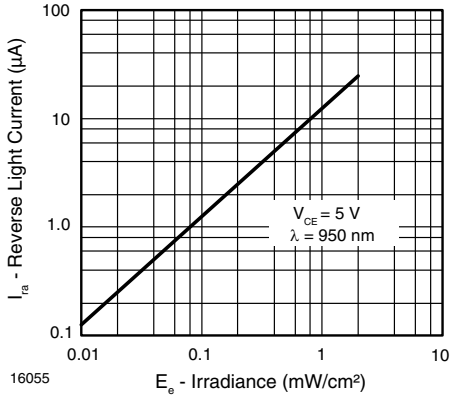


Fig. 3 - Reverse Light Current vs. Irradiance

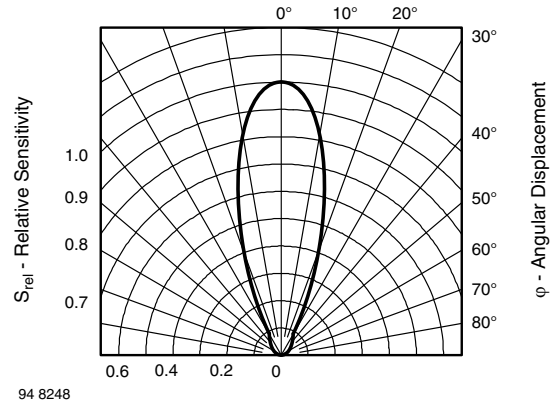


Fig. 6 - Relative Radiant Intensity vs. Angular Displacement

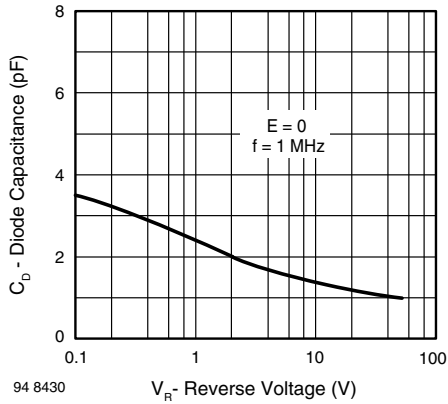


Fig. 4 - Diode Capacitance vs. Reverse Voltage

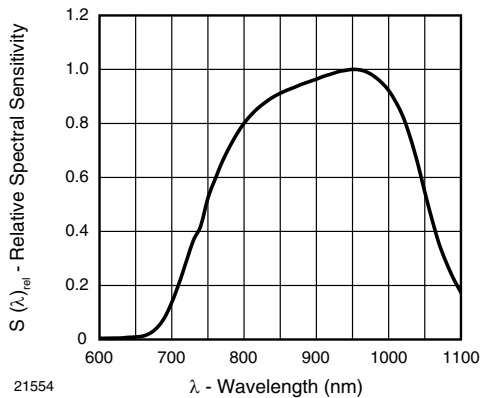


Fig. 5 - Relative Spectral Sensitivity vs. Wavelength



### 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

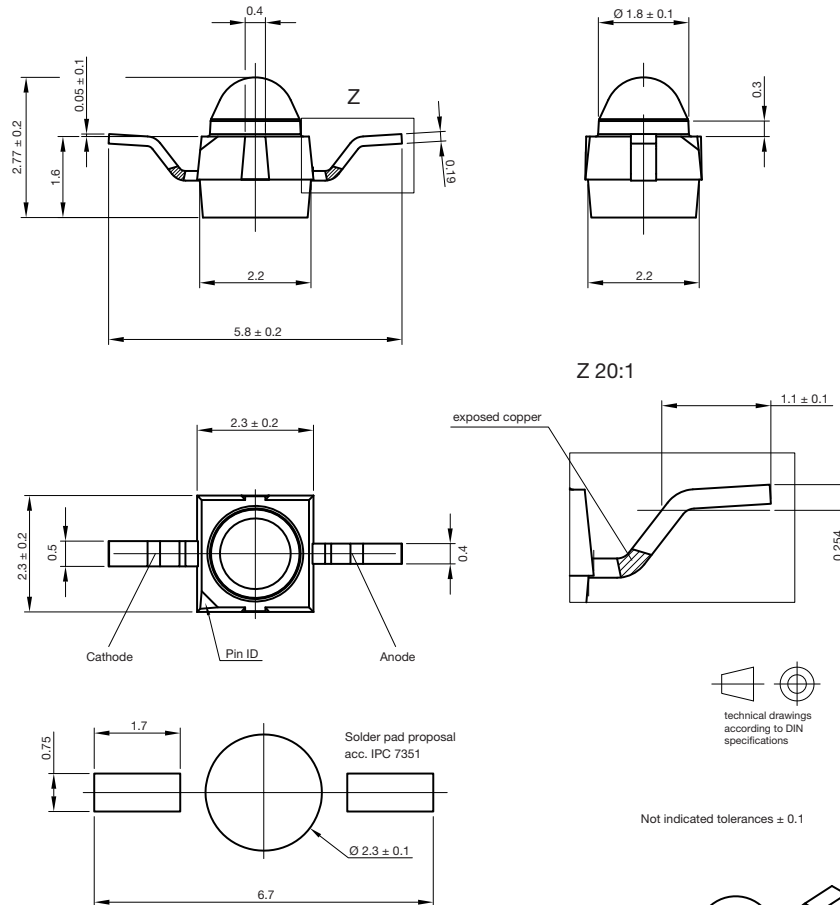
Conditions:  $T_{amb} < 30\text{ °C}$ , RH < 60 %

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

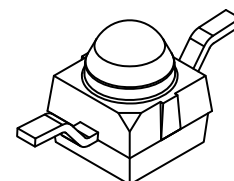
### DRYING

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: VEMD2000



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

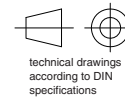




## PACKAGE DIMENSIONS in millimeters: VEMD2020

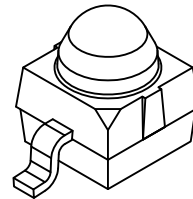


X 20:1



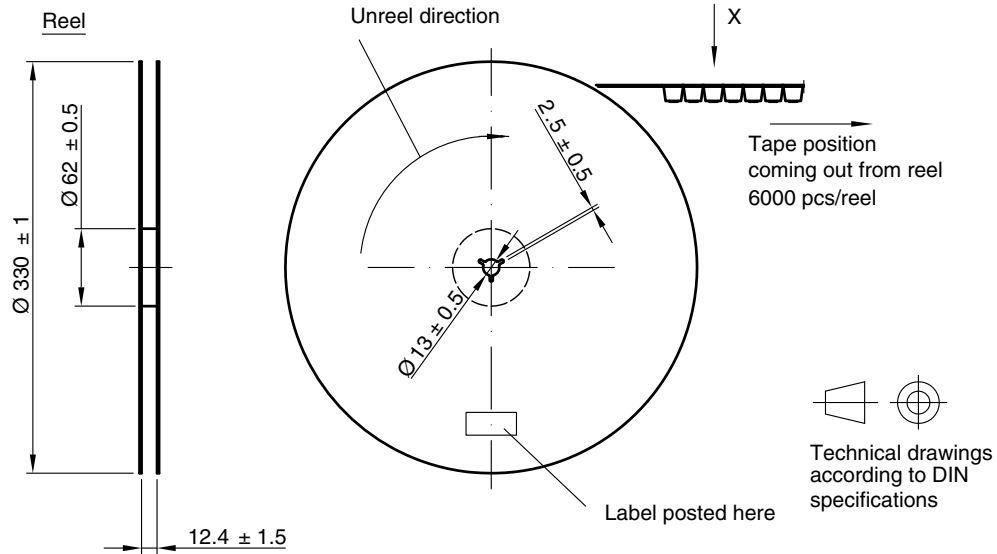
Not indicated tolerances ± 0.1

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

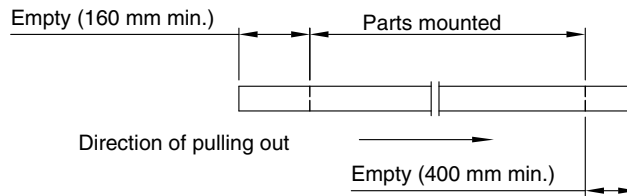




**TAPING AND REEL DIMENSIONS** in millimeters: **VEMD2000**

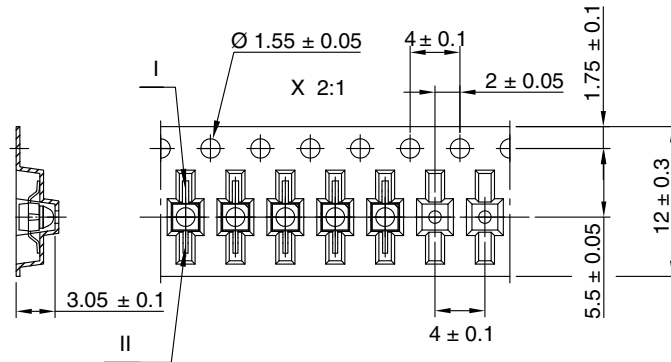


Leader and trailer tape:



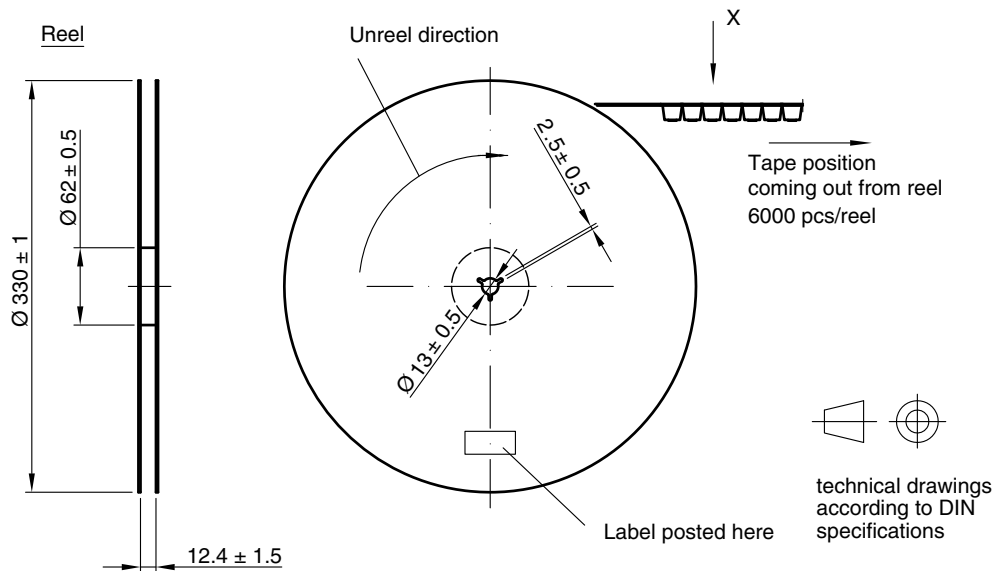
Terminal position in tape

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  
 Issue: 2; 18.03.10  
 21572

## TAPING AND REEL DIMENSIONS in millimeters: VEMD2020

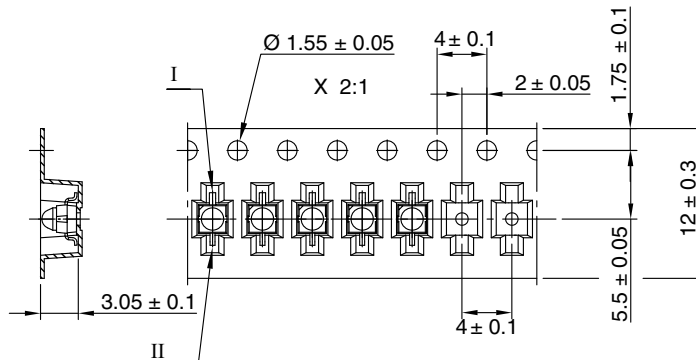


### Leader and trailer tape:



### 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

21571



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