

## Silicon PIN Photodiode



### DESCRIPTION

VEMD1160X01 is a high speed and high sensitive PIN photodiode with a highly linear photoresponse. It is a low profile surface mount device (SMD) including the chip with a 0.23 mm<sup>2</sup> sensitive area and a daylight blocking filter.

### FEATURES

- Package type: surface mount
- Package form: 0805 top view
- Dimensions (L x W x H in mm): 2 x 1.25 x 0.85
- Radiant sensitive area (in mm<sup>2</sup>): 0.23
- Daylight blocking filter
- AEC-Q101 qualified
- High photo sensitivity
- High radiant sensitivity
- Excellent I<sub>ra</sub> linearity
- Fast response times
- Angle of half sensitivity:  $\phi = \pm 70^\circ$
- Floor life: 72 h, MSL 4, according to J-STD-020
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)




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

### APPLICATIONS

- High speed photo detector
- Small signal detection
- Proximity sensors

<b>PRODUCT SUMMARY</b>			
COMPONENT	I <sub>ra</sub> (μA)	φ (deg)	λ <sub>0.1</sub> (nm)
VEMD1160X01	1.8	± 70	700 to 1070

#### Note

- Test conditions see table "Basic Characteristics"

<b>ORDERING INFORMATION</b>			
ORDERING CODE	PACKAGING	REMARKS	PACKAGE FORM
VEMD1160X01	Tape and reel	MOQ: 3000 pcs, 3000 pcs/reel	0805 top view

#### Note

- MOQ: minimum order quantity

<b>ABSOLUTE MAXIMUM RATINGS</b> (T <sub>amb</sub> = 25 °C, unless otherwise specified)				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Reverse voltage		V <sub>R</sub>	20	V
Power dissipation	T <sub>amb</sub> ≤ 25 °C	P <sub>V</sub>	215	mW
Junction temperature		T <sub>j</sub>	110	°C
Operating temperature range		T <sub>amb</sub>	-40 to +110	°C
Storage temperature range		T <sub>stg</sub>	-40 to +110	°C
Soldering temperature	According to reflow solder profile Fig. 6	T <sub>sd</sub>	260	°C
Thermal resistance junction / ambient	According to EIA / JESD 51	R <sub>thJA</sub>	270	K/W

<b>BASIC CHARACTERISTICS</b> ( $T_{amb} = 25^\circ\text{C}$ , unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Forward voltage	$I_F = 50 \text{ mA}$	$V_F$	-	0.9	1.1	V
Breakdown voltage	$I_R = 100 \mu\text{A}$ , $E = 0$	$V_{(BR)}$	20	-	-	V
Reverse dark current	$V_R = 10 \text{ V}$ , $E = 0$	$I_{ro}$	-	0.01	5	nA
Diode capacitance	$V_R = 0 \text{ V}$ , $f = 1 \text{ MHz}$ , $E = 0$	$C_D$	-	3.8	-	pF
	$V_R = 3 \text{ V}$ , $f = 1 \text{ MHz}$ , $E = 0$	$C_D$	-	1.8	-	pF
Open circuit voltage	$E_e = 1 \text{ mW/cm}^2$ , $\lambda = 950 \text{ nm}$	$V_o$	-	350	-	mV
Temperature coefficient of $V_o$	$E_e = 1 \text{ mW/cm}^2$ , $\lambda = 950 \text{ nm}$	$TK_{Vo}$	-	-2.6	-	mV/K
Short circuit current	$E_e = 1 \text{ mW/cm}^2$ , $\lambda = 950 \text{ nm}$	$I_k$	-	1.8	-	μA
Temperature coefficient of $I_k$	$E_e = 1 \text{ mW/cm}^2$ , $\lambda = 835 \text{ nm}$	$TK_{Ik}$	-	0.1	-	%/K
Reverse light current	$E_e = 1 \text{ mW/cm}^2$ , $\lambda = 950 \text{ nm}$ , $V_R = 5 \text{ V}$	$I_{ra}$	1.4	1.8	3	μA
	$E_e = 1 \text{ mW/cm}^2$ , $\lambda = 890 \text{ nm}$ , $V_R = 5 \text{ V}$	$I_{ra}$	-	2.6	-	μA
Angle of half sensitivity		$\phi$	-	± 70	-	deg
Wavelength of peak sensitivity		$\lambda_p$	-	840	-	nm
Range of spectral bandwidth		$\lambda_{0.1}$	-	700 to 1070	-	nm
Rise time	$V_R = 5 \text{ V}$ , $R_L = 50 \Omega$ , $\lambda = 820 \text{ nm}$	$t_r$	-	60	-	ns
Fall time	$V_R = 5 \text{ V}$ , $R_L = 50 \Omega$ , $\lambda = 820 \text{ nm}$	$t_f$	-	80	-	ns

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

Basic characteristics graphs to be extended to  $110^\circ\text{C}$  ambient temperatures where applicable.

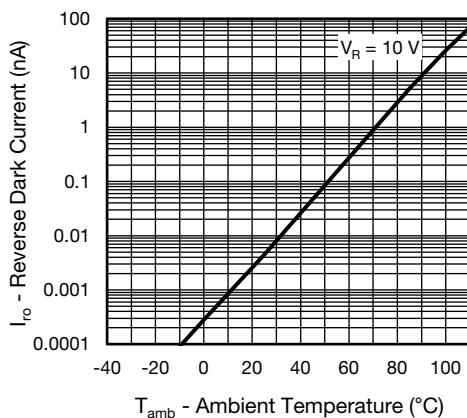


Fig. 1 - Reverse Dark Current vs. Ambient Temperature

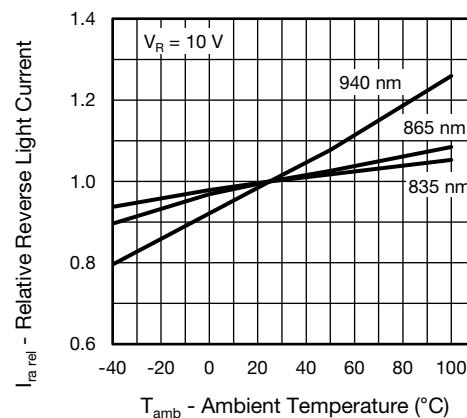


Fig. 2 - Relative Reverse Light Current vs. Ambient Temperature

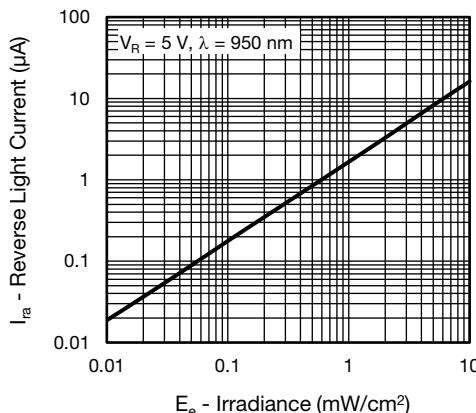


Fig. 3 - Reverse Light Current vs. Irradiance

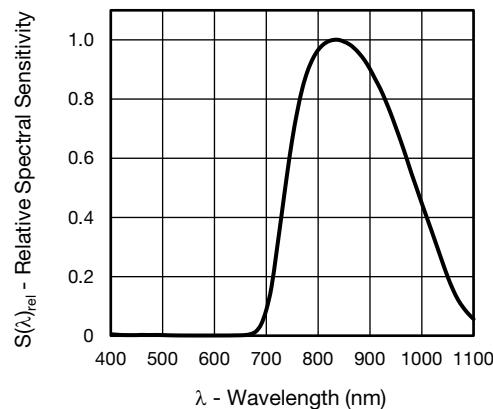


Fig. 6 - Relative Spectral Sensitivity vs. Wavelength

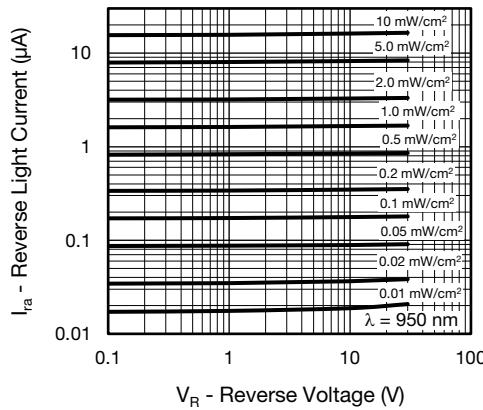


Fig. 4 - Reverse Light Current vs. Reverse Voltage

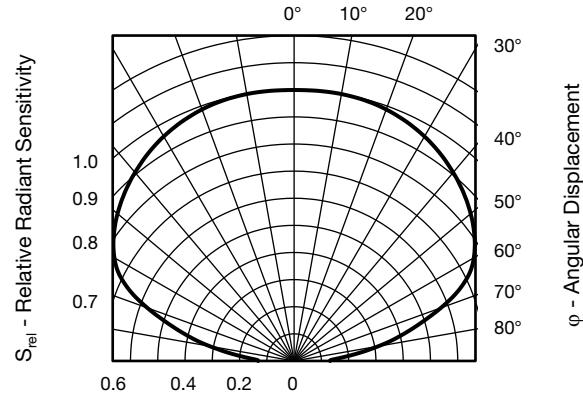


Fig. 7 - Relative Radiant Sensitivity vs. Angular Displacement

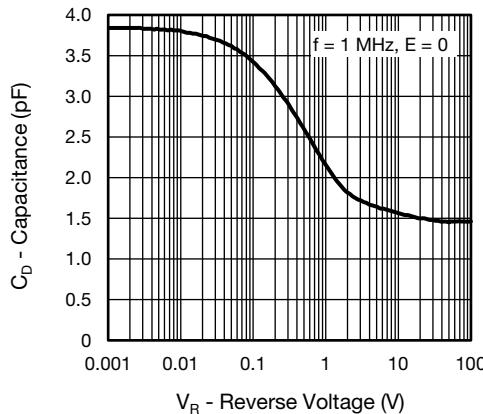


Fig. 5 - Diode Capacitance vs. Reverse Voltage

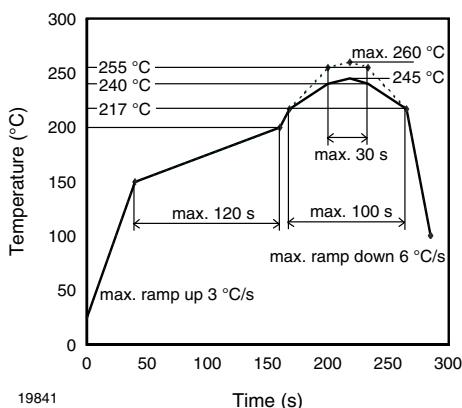
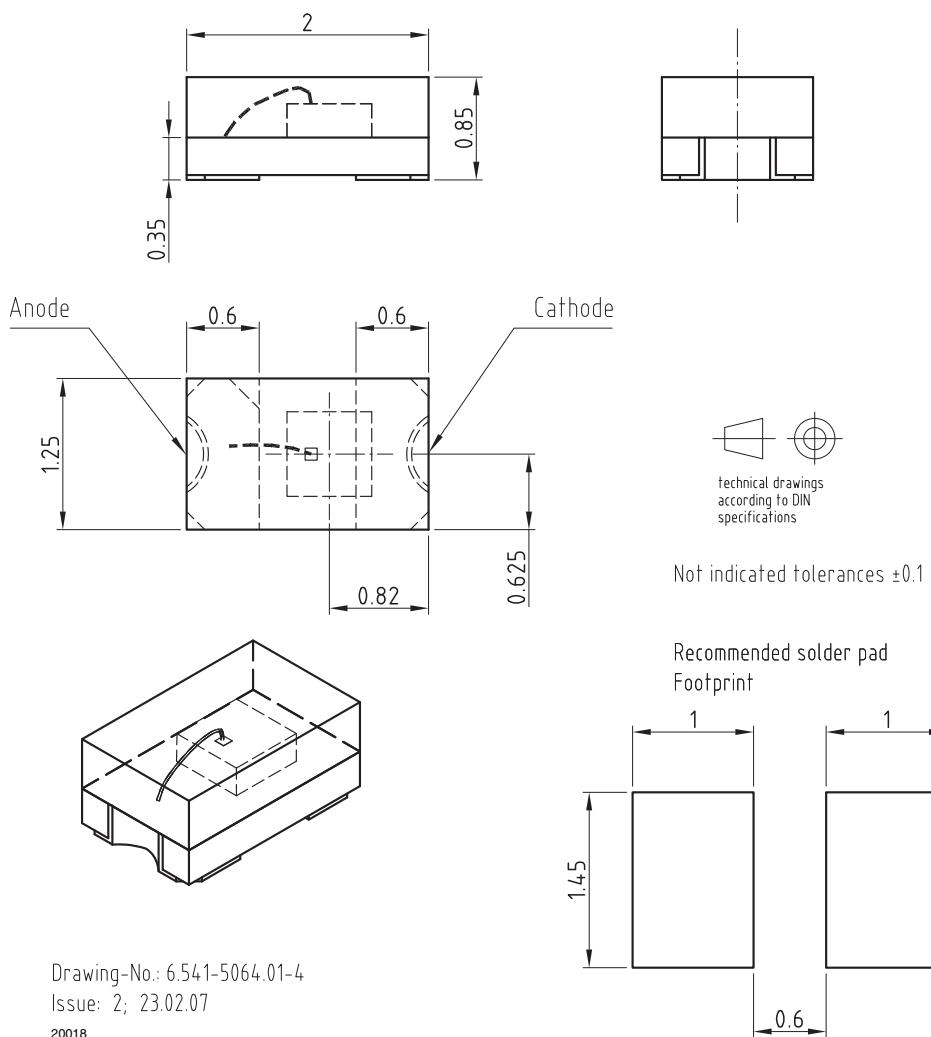
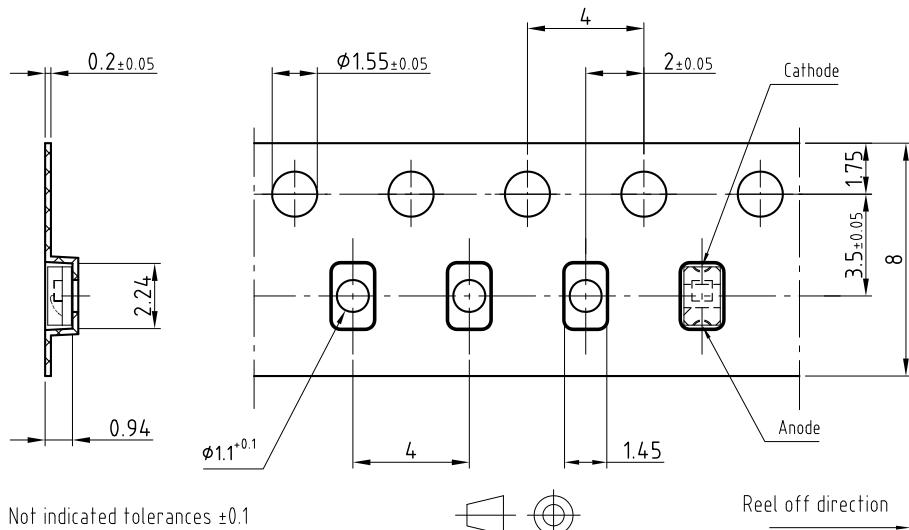
**REFLOW SOLDER PROFILE**


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

**PACKAGE DIMENSIONS** in millimeters


## **BLISTER TAPE DIMENSIONS** in millimeters



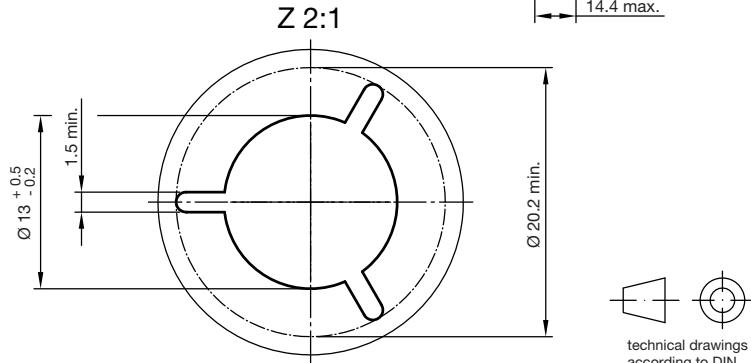
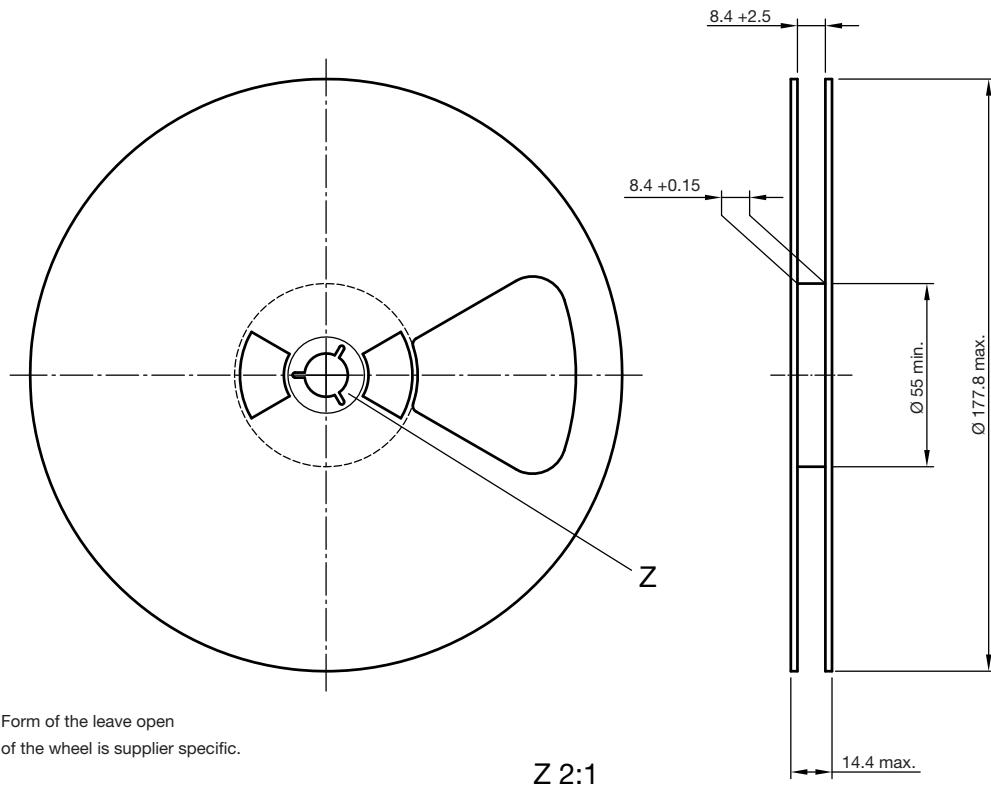
Not indicated tolerances  $\pm 0.1$

Drawing-No.: 9.700-5311.01-4

Issue: 1: 23.02.07

technical drawings  
according to DIN  
specifications

Reel off direction

**REEL DIMENSIONS** in millimeters


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