AUTOMOTIVE

ROHS

HALOGEN

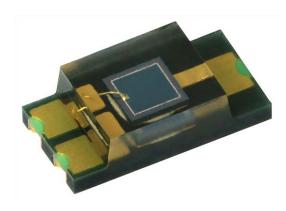
FREE GREEN

(5-2008)



### Vishay Semiconductors

### Silicon PIN Photodiode



# DESCRIPTION

VEMD6010X01 is a high speed and high sensitive PIN photodiode. It is a small surface mount device (SMD) including the chip with a 0.85 mm<sup>2</sup> sensitive area detecting visible and near infrared radiation.

#### **FEATURES**

• Package type: surface mount

• Package form: 1206

- Dimensions (L x W x H in mm): 4 x 2 x 1.05
- Radiant sensitive area (in mm<sup>2</sup>): 0.85
- · High photo sensitivity
- · High radiant sensitivity
- Suitable for visible and near infrared radiation
- Fast response times
- Angle of half sensitivity:  $\phi = \pm 60^{\circ}$
- Floor life: 72 h, MSL 4, acc. J-STD-020
- · Lead (Pb)-free reflow soldering
- AEC-Q101 qualified
- Material categorization: for definitions of compliance please see <u>www.vishay.com/doc?99912</u>



High speed photo detector

PRODUCT SUMMARY				
COMPONENT	I <sub>ra</sub> (μΑ)	φ (deg)	λ <sub>0.1</sub> (nm)	
VEMD6010X01	9.5	± 60	430 to 1100	

#### Note

· Test conditions see table "Basic Characteristics"

ORDERING INFORMATION					
ORDERING CODE	PACKAGING	REMARKS	PACKAGE FORM		
VEMD6010X01	Tape and reel	MOQ: 3000 pcs, 3000 pcs/reel	1206		

#### 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>	32	V	
Power dissipation	T <sub>amb</sub> ≤ 25 °C	P <sub>V</sub>	215	mW	
Junction temperature		Tj	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	Acc. reflow solder profile fig. 8	T <sub>sd</sub>	260	°C	
Thermal resistance junction/ambient	Acc. J-STD-051	R <sub>thJA</sub>	270	K/W	

<b>BASIC CHARACTERISTICS</b> (T <sub>amb</sub> = 25 °C, unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Forward voltage	I <sub>F</sub> = 50 mA	V <sub>F</sub>		1		V
Breakdown voltage	$I_R = 100 \ \mu A, \ E = 0$	V <sub>(BR)</sub>	32			V
Reverse dark current	V <sub>R</sub> = 10 V, E = 0	I <sub>ro</sub>		1	3	nA
Diode capacitance	$V_R = 0 V, f = 1 MHz, E = 0$	$C_D$		12		pF
	$V_R = 5 \text{ V}, f = 1 \text{ MHz}, E = 0$	$C_D$		3.6		pF
Open circuit voltage	$E_{e} = 1 \text{ mW/cm}^{2}, \lambda = 950 \text{ nm}$	Vo		356		mV
Temperature coefficient of Vo	$E_e = 1 \text{ mW/cm}^2, \lambda = 950 \text{ nm}$	TK <sub>Vo</sub>		-3.1		mV/K
Short circuit current	$E_e = 1 \text{ mW/cm}^2, \lambda = 950 \text{ nm}$	I <sub>k</sub>		9		μΑ
Temperature coefficient of I <sub>k</sub>	$E_e = 1 \text{ mW/cm}^2, \lambda = 950 \text{ nm}$	TK <sub>lk</sub>		0.1		%/K
Reverse light current	$E_e = 1 \text{ mW/cm}^2$ , $\lambda = 950 \text{ nm}$ , $V_R = 5 \text{ V}$	I <sub>ra</sub>	6.7	9.5	12.4	μΑ
Angle of half sensitivity		φ		± 60		deg
Wavelength of peak sensitivity		$\lambda_{p}$		900		nm
Range of spectral bandwidth		λ <sub>0.1</sub>		430 to 1100		nm
Rise time	$V_R = 10 \text{ V}, R_L = 1 \text{ k}\Omega, \lambda = 820 \text{ nm}$	t <sub>r</sub>	•	100	•	ns
Fall time	$V_R = 10 \text{ V}, R_L = 1 \text{ k}\Omega, \lambda = 820 \text{ nm}$	t <sub>f</sub>		100		ns

### **BASIC CHARACTERISTICS** (T<sub>amb</sub> = 25 °C, unless otherwise specified)

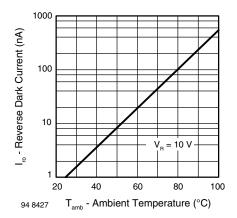


Fig. 1 - Reverse Dark Current vs. Ambient Temperature

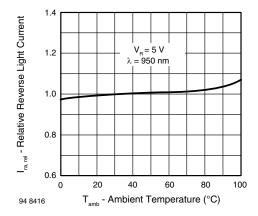


Fig. 2 - Relative Reverse Light Current vs. Ambient Temperature

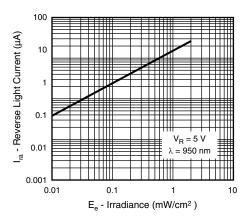


Fig. 3 - Reverse Light Current vs. Irradiance

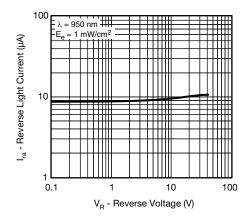


Fig. 4 - Reverse Light Current vs. Reverse Voltage

### **REFLOW SOLDER PROFILE**

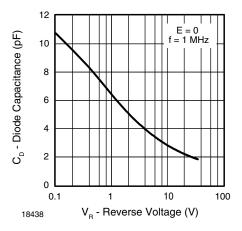


Fig. 5 - Diode Capacitance vs. Reverse Voltage

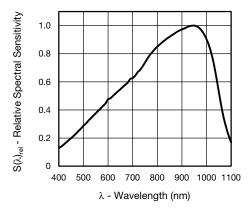


Fig. 6 - Relative Spectral Sensitivity vs. Wavelength

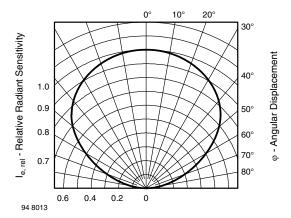


Fig. 7 - Relative Radiant Sensitivity vs. Angular Displacement

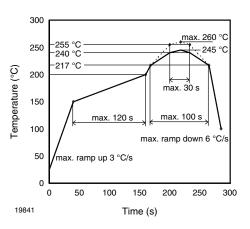


Fig. 8 - Lead (Pb)-free Reflow Solder Profile acc. J-STD-020

#### **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: 72 h

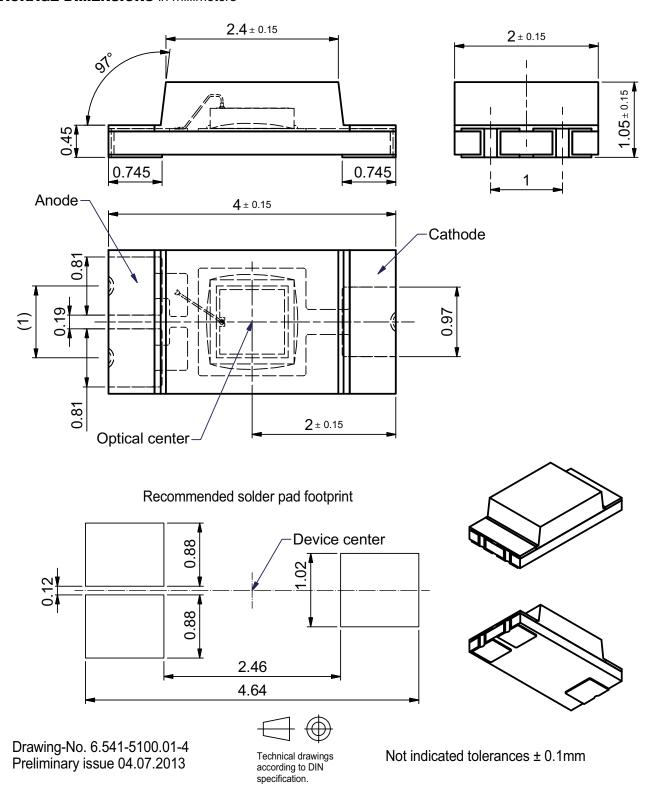
Conditions: T<sub>amb</sub> < 30 °C, RH < 60 %

Moisture sensitivity level 4, acc. to J-STD-020.

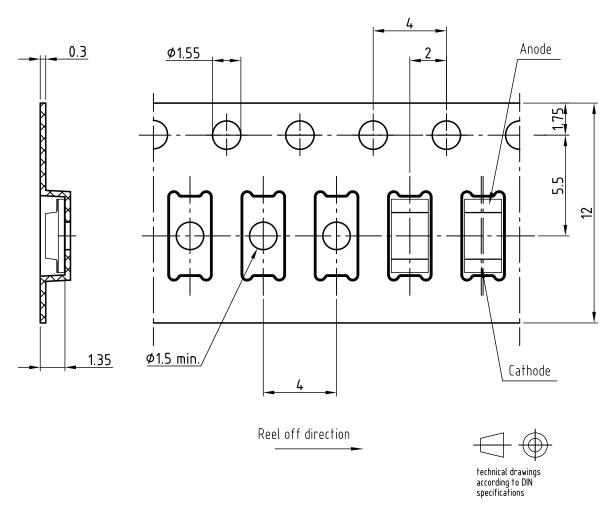
#### **DRYING**

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  $^{\circ}$ C (+ 5  $^{\circ}$ C), RH < 5  $^{\circ}$ M.

#### **PACKAGE DIMENSIONS** in millimeters



#### **BLISTER TAPE DIMENSIONS** in millimeters



Not indicated tolerances ±0.1

Drawing refers to following Types: TEMD6010FX01

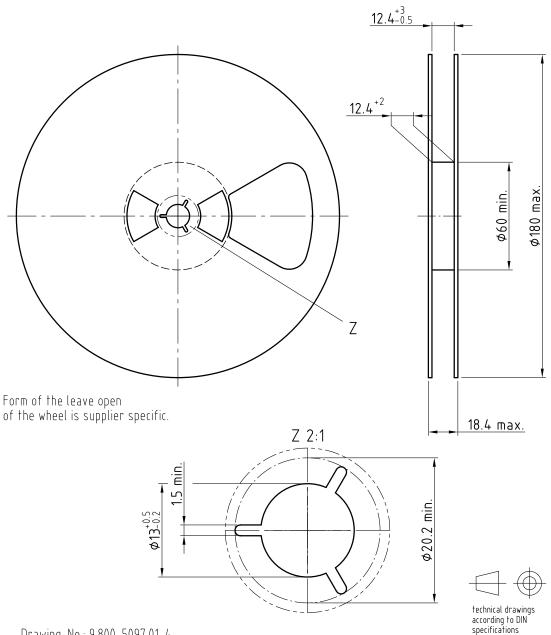
VEMD6x10X01 VEMD6x15X01

Drawing-No.: 9.700-5329.02-4

Prel Issue: 16.07.2013

All dimensions in mm

#### **REEL DIMENSIONS** in millimeters



Drawing-No.: 9.800-5097.01-4

Issue: 1; 05.05.08

20874



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