AUTOMOTIVE

ROHS

HALOGEN

FREE GREEN

(5-2008)



Vishay Semiconductors

Silicon PIN Photodiode



DESCRIPTION

VEMD1060X01 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 mm² sensitive area detecting visible and near infrared radiation.

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 mm²): 0.23
- AEC-Q101 qualified
- · High photo sensitivity
- · High radiant sensitivity
- Excellent I_{ra} linearity
- Suitable for visible and near infrared radiation
- Fast response times
- Angle of half sensitivity: $\varphi = \pm 70^{\circ}$
- Floor life: 72 h, MSL 4, according to J-STD-020
- Material categorization: for definitions of compliance please see <u>www.vishay.com/doc?99912</u>



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

PRODUCT SUMMARY				
COMPONENT	I _{ra} (μΑ)	φ (deg)	λ _{0.1} (nm)	
VEMD1060X01	1.8	± 70	350 to 1070	

Note

· Test conditions see table "Basic Characteristics"

ORDERING INFORMATION					
ORDERING CODE	PACKAGING	REMARKS	PACKAGE FORM		
VEMD1060X01	Tape and reel	MOQ: 3000 pcs, 3000 pcs/reel	0805 top view		

Note

MOQ: minimum order quantity

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



BASIC CHARACTERISTICS (T _{amb} = 25 °C, unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Forward voltage	I _F = 50 mA	V _F	-	0.9	1.1	V
Breakdown voltage	$I_R = 100 \ \mu A, \ E = 0$	V _(BR)	20	-	-	V
Reverse dark current	V _R = 10 V, E = 0	I _{ro}	-	0.01	5	nA
Diode capacitance	$V_R = 0 V, f = 1 MHz, E = 0$	C _D	-	3.8	-	pF
	V _R = 3 V, f = 1 MHz, E = 0	C _D	-	1.7	-	pF
Open circuit voltage	$E_e = 1 \text{ mW/cm}^2$, $\lambda = 950 \text{ nm}$	Vo	-	350	=	mV
Temperature coefficient of Vo	$E_e = 1 \text{ mW/cm}^2$, $\lambda = 950 \text{ nm}$	TK _{Vo}	-	-2.6	-	mV/K
Short circuit current	$E_e = 1 \text{ mW/cm}^2$, $\lambda = 950 \text{ nm}$	I _k	-	1.8	-	μΑ
Temperature coefficient of I _k	$E_e = 1 \text{ mW/cm}^2$, $\lambda = 835 \text{ nm}$	TK _{lk}	-	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	μΑ
	$E_e = 1 \text{ mW/cm}^2$, $\lambda = 890 \text{ nm}$, $V_R = 5 \text{ V}$	I _{ra}	-	2.6	-	μΑ
Angle of half sensitivity		φ	-	± 70	=	deg
Wavelength of peak sensitivity		λ_{p}	-	820	-	nm
Range of spectral bandwidth		λ _{0.1}	-	350 to 1070	-	nm
Rise time	$V_R = 5 \text{ V}, R_L = 50 \Omega, \lambda = 830 \text{ nm}$	t _r	-	60	-	ns
Fall time	$V_R = 5$ V, $R_L = 50$ Ω , $\lambda = 830$ nm	t _f	-	80	=	ns

BASIC CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)

Basic characteristics graphs to be extended to 110 °C ambient temperatures where applicable.

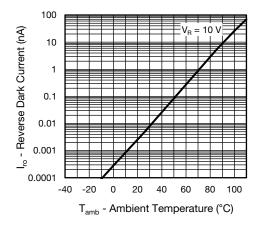


Fig. 1 - Reverse Dark Current vs. Ambient Temperature

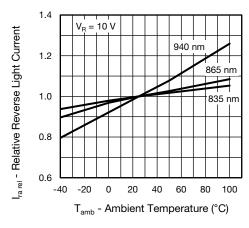


Fig. 2 - Relative Reverse Light Current vs. Ambient Temperature

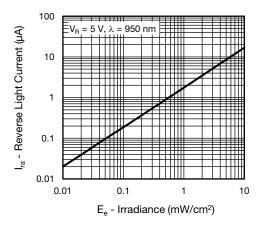


Fig. 3 - Reverse Light Current vs. Irradiance

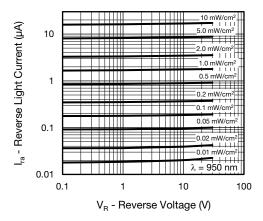


Fig. 4 - Reverse Light Current vs. Reverse Voltage

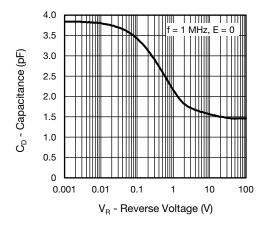


Fig. 5 - Diode Capacitance vs. Reverse Voltage

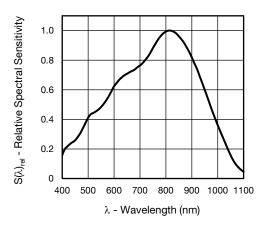


Fig. 6 - Relative Spectral Sensitivity vs. Wavelength

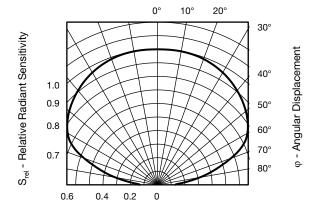


Fig. 7 - Relative Radiant Sensitivity vs. Angular Displacement



REFLOW SOLDER PROFILE

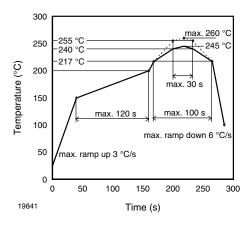


Fig. 8 - Lead (Pb)-free Reflow Solder Profile According to J-STD-020

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

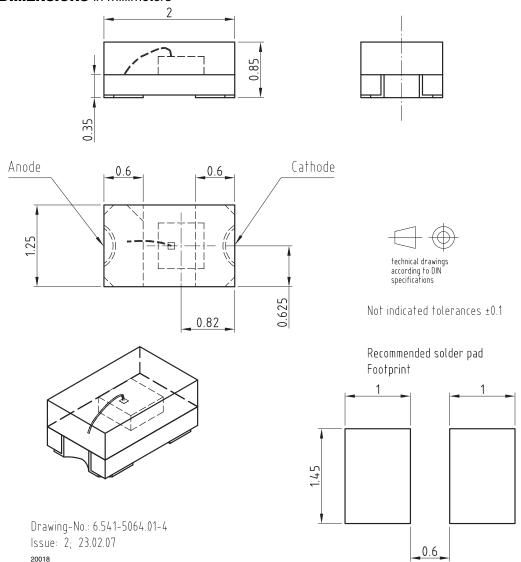
Conditions: T_{amb} < 30 °C, RH < 60 %

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

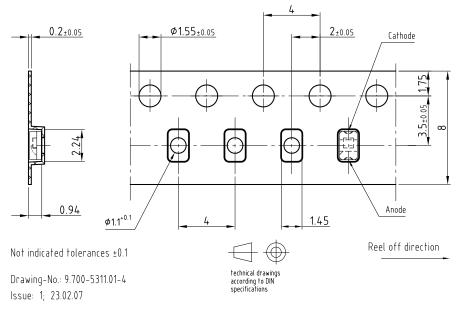
DRYING

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.

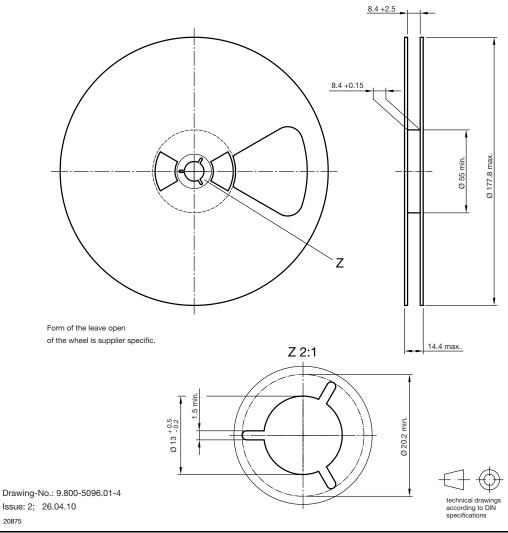
PACKAGE DIMENSIONS in millimeters



BLISTER TAPE DIMENSIONS in millimeters



REEL DIMENSIONS in millimeters





Legal Disclaimer Notice

Vishay

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