

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 mm² 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 mm²): 0.23
- Daylight blocking filter
- AEC-Q101 qualified
- High photo sensitivity
- High radiant sensitivity
- Excellent I_{ra} 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



APPLICATIONS

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

PRODUCT SUMMARY

COMPONENT	I_{ra} (μA)	ϕ (deg)	$\lambda_{0.1}$ (nm)
VEMD1160X01	1.8	± 70	700 to 1070

Note

- Test conditions see table “Basic Characteristics”

ORDERING INFORMATION

ORDERING CODE	PACKAGING	REMARKS	PACKAGE FORM
VEMD1160X01	Tape and reel	MOQ: 3000 pcs, 3000 pcs/reel	0805 top 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	20	V
Power dissipation	$T_{amb} \leq 25^\circ\text{C}$	P_V	215	mW
Junction temperature		T_j	110	$^\circ\text{C}$
Operating temperature range		T_{amb}	-40 to +110	$^\circ\text{C}$
Storage temperature range		T_{stg}	-40 to +110	$^\circ\text{C}$
Soldering temperature	According to reflow solder profile Fig. 6	T_{sd}	260	$^\circ\text{C}$
Thermal resistance junction / ambient	According to EIA / JESD 51	R_{thJA}	270	K/W

BASIC CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Forward voltage	$I_F = 50\text{ mA}$	V_F	-	0.9	1.1	V
Breakdown voltage	$I_R = 100\text{ }\mu\text{A}$, $E = 0$	$V_{(BR)}$	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_{V_o}	-	-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_{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}	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		ϕ	-	± 70	-	deg
Wavelength of peak sensitivity		λ_p	-	840	-	nm
Range of spectral bandwidth		$\lambda_{0.1}$	-	700 to 1070	-	nm
Rise time	$V_R = 5\text{ V}$, $R_L = 50\text{ }\Omega$, $\lambda = 820\text{ nm}$	t_r	-	60	-	ns
Fall time	$V_R = 5\text{ V}$, $R_L = 50\text{ }\Omega$, $\lambda = 820\text{ nm}$	t_f	-	80	-	ns

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

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

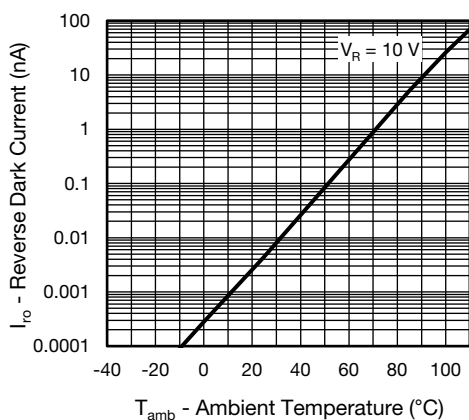


Fig. 1 - Reverse Dark Current vs. Ambient Temperature

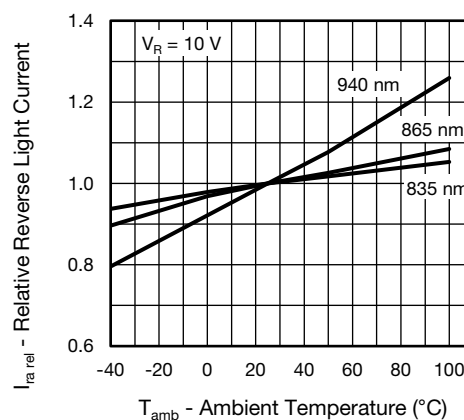


Fig. 2 - Relative Reverse Light Current vs. Ambient Temperature

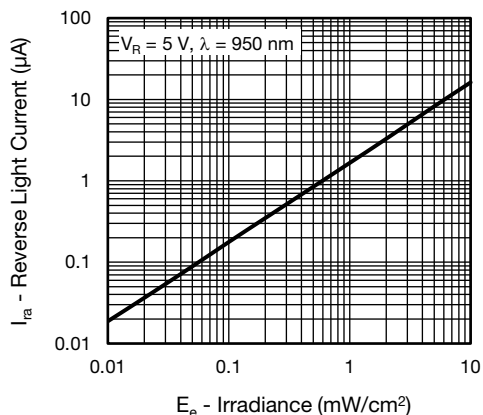


Fig. 3 - Reverse Light Current vs. Irradiance

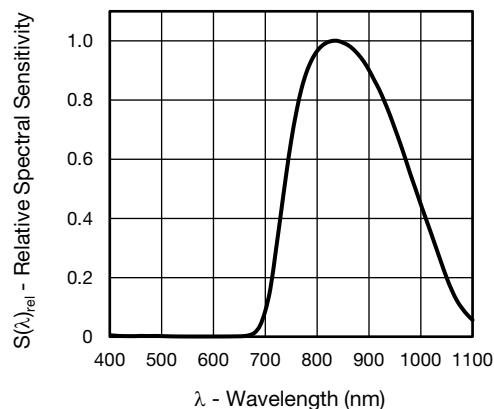


Fig. 6 - Relative Spectral Sensitivity vs. Wavelength

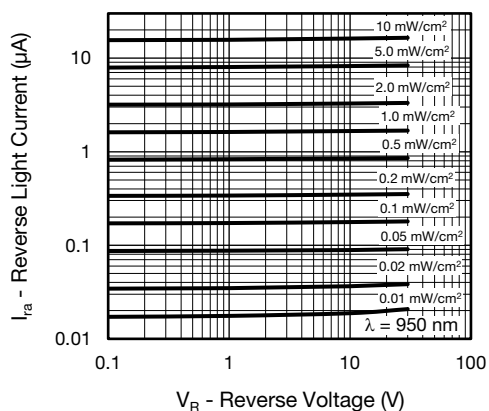


Fig. 4 - Reverse Light Current vs. Reverse Voltage

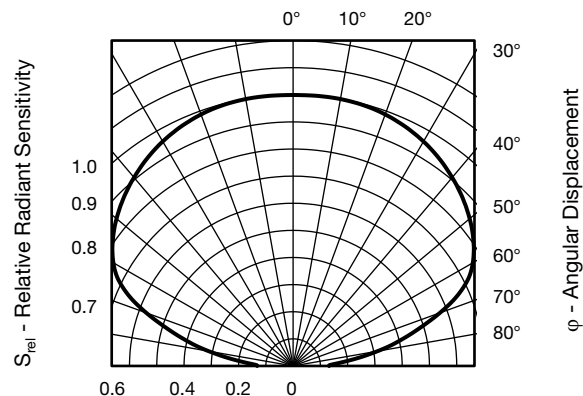


Fig. 7 - Relative Radiant Sensitivity vs. Angular Displacement

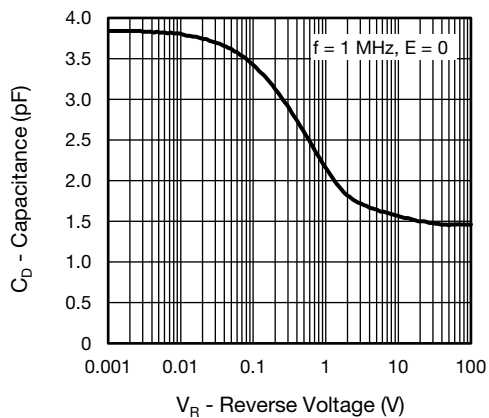


Fig. 5 - Diode Capacitance vs. Reverse Voltage

REFLOW SOLDER PROFILE

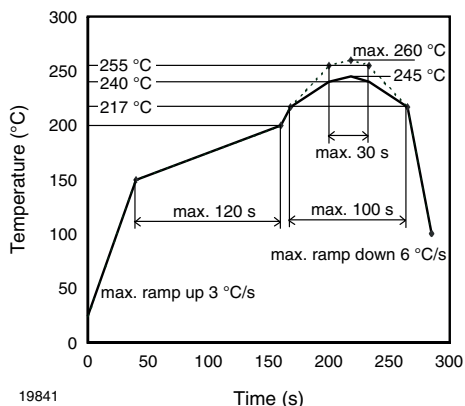


Fig. 8 - Lead (Pb)-free Reflow Solder Profile
According to J-STD-020

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

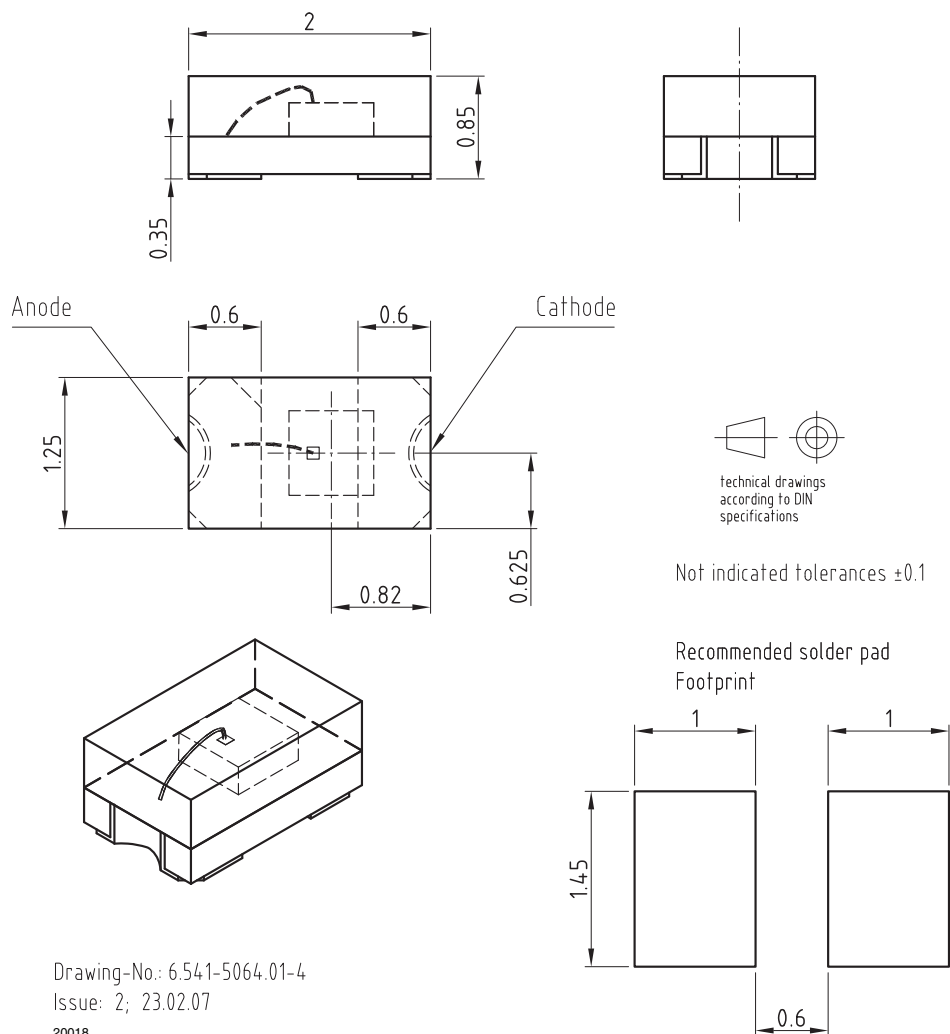
Conditions: $T_{amb} < 30\text{ °C}$, RH < 60 %

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 °C (+ 5 °C), RH < 5 %.

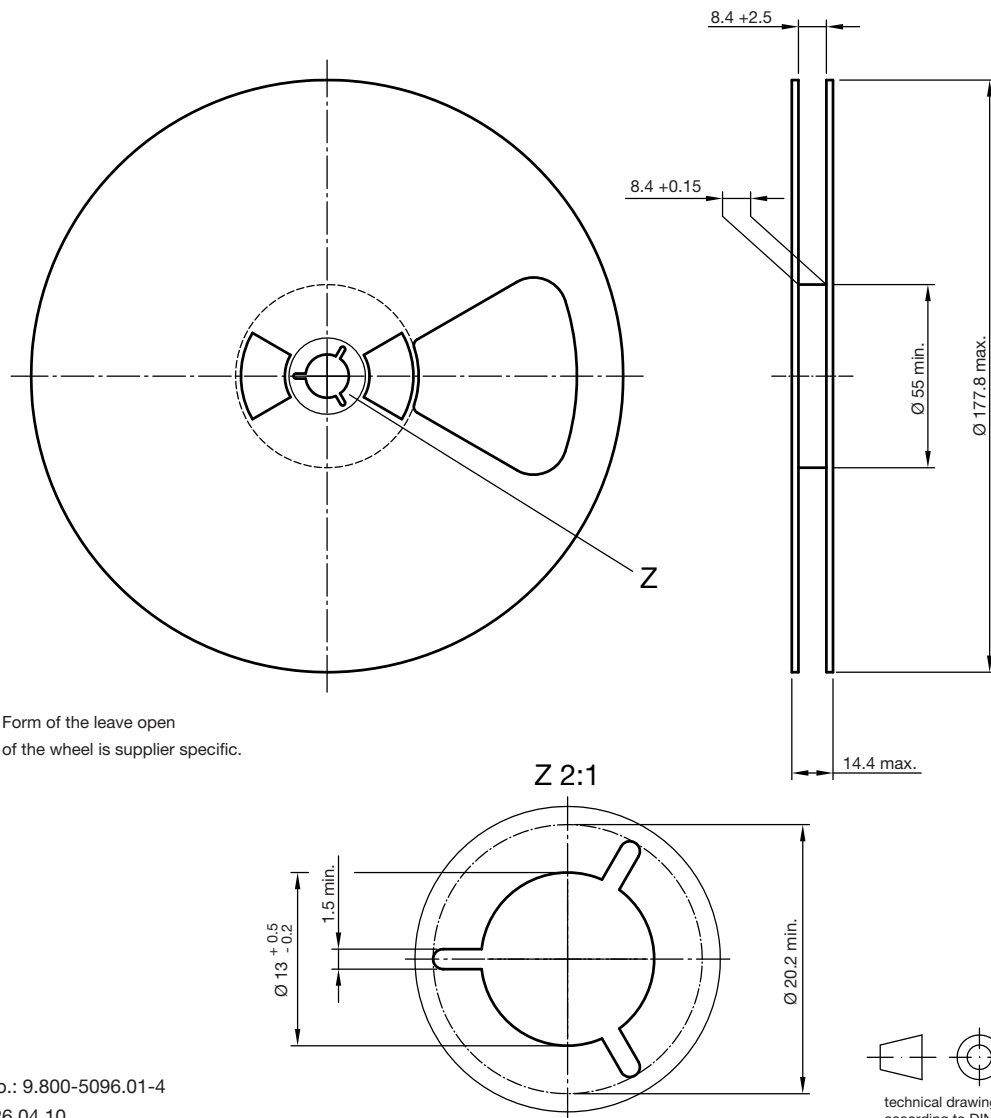
PACKAGE DIMENSIONS in millimeters



Drawing-No.: 6.541-5064.01-4
Issue: 2; 23.02.07
20018



REEL DIMENSIONS in millimeters



Drawing-No.: 9.800-5096.01-4
Issue: 2; 26.04.10
20875



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