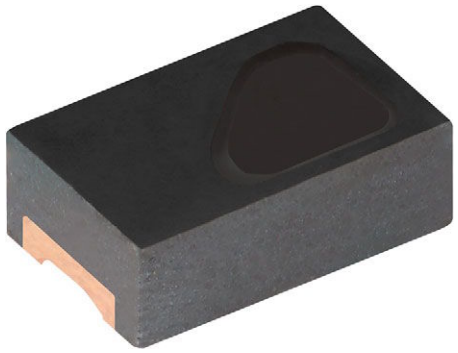
Silicon PIN Photodiode



FEATURES

- Package type: surface-mount
- Package form: 0805
- Dimensions (L x W x H in mm): 2 x 1.25 x 0.7
- Radiant sensitive area (in mm^2): 0.375
- Ambient temperature range: T_{OP} = -40 °C to +125 °C
- Angle of half sensitivity: φ = ± 56°
- Floor life: 4 weeks, MSL2a, according to J-STD-020
- Lead (Pb)-free reflow soldering
- AEC-Q102 qualified
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

AUTOMOTIVE GRADE

Pb-free

e4

RoHS COMPLIANT

HALOGEN FREE

GREEN (5-2008)

LINKS TO ADDITIONAL RESOURCES

3D Models Footprints

DESCRIPTION

The VEMD4160X02 is a high speed and high sensitive PIN photodiode with a highly linear photoresponse. It is a low profile surface-mount device (SMD) with a 0.375 mm^2 sensitive area and a daylight blocking filter matched with IR emitters operating at wavelengths of 850 nm or 950 nm.

APPLICATIONS

- High speed photo detector
- Photo interrupters
- Automotive sensors

PRODUCT SUMMARY			
COMPONENT	**I_{ra} (µA)**	**φ (°)**	**$\lambda_{0.5}$ (nm)**
VEMD4160X02	1.4	± 56	730 to 960

Note

- Test conditions see table “Basic Characteristics”

ORDERING INFORMATION			
ORDERING CODE	**PACKAGING**	**REMARKS**	**PACKAGE FORM**
VEMD4160X02	Tape and reel	MOQ: 3000 pcs, 3000 pcs/reel	0805

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
Ambient temperature range		T_{amb}	-40 to +125	°C
Storage temperature range		T_{stg}	-40 to +125	°C
Soldering temperature	According to reflow solder profile Fig. 8	T_{sd}	260	°C

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	-	1.0	1.3	V
Breakdown voltage	I_R = 100 µA, E = 0 mW/cm²	$V_{(BR)}$	20	-	-	V
Reverse dark current	V_R = 10 V, E = 0	I_{ro}	-	-	2	nA
Diode capacitance	V_R = 0 V, f = 1 MHz, E = 0 mW/cm²	C_D	-	7.8	-	pF
Short circuit current	E_e = 1 mW/cm², λ = 940 nm	I_k	-	1.5	-	µA
Open circuit voltage	E_e = 1 mW/cm², λ = 940 nm	V_O	-	354	-	mV
Temperature coefficient of I_k	E_e = 1 mW/cm², λ = 940 nm	TK_{Ik}	-	0.37	-	%/K
Reverse light current	E_e = 1 mW/cm², λ = 850 nm, V_R = 5 V	I_{ra}	1.6	2.2	2.8	µA
	E_e = 1 mW/cm², λ = 940 nm, V_R = 5 V	I_{ra}	1.0	1.4	1.9	µA
Angle of half sensitivity		φ	-	± 56	-	°
Wavelength of peak sensitivity		λ_p	-	830	-	nm
Range of spectral bandwidth	S_{rel} > 0.5	$\lambda_{0.5}$	-	730 to 960	-	nm
Rise time	V_R = 10 V, R_L = 50 Ω, λ = 890 nm	t_r	-	160	-	ns
Fall time	V_R = 10 V, R_L = 50 Ω, λ = 890 nm	t_f	-	125	-	ns

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

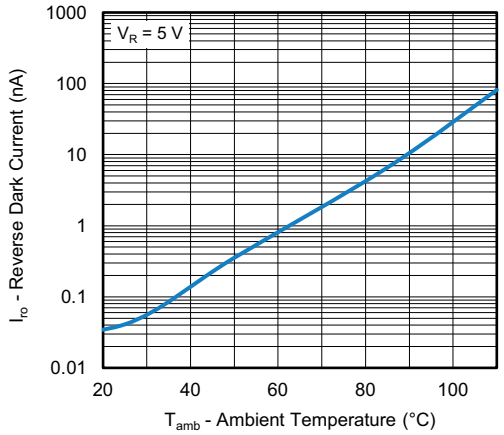


Fig. 1 - Reverse Dark Current vs. Ambient Temperature

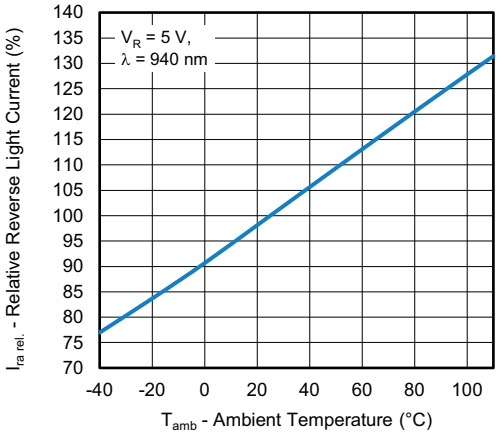


Fig. 2 - Relative Reverse Light Current vs. Ambient Temperature

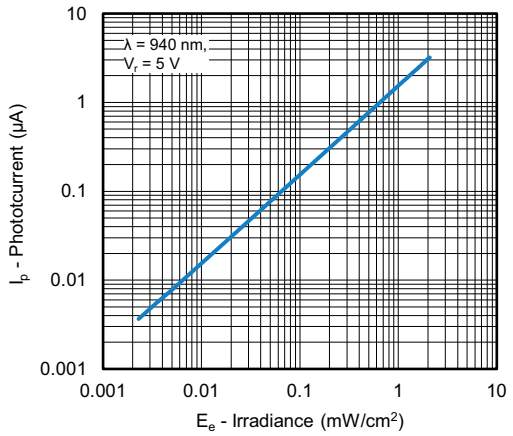


Fig. 3 - Reverse Light Current vs. Irradiance

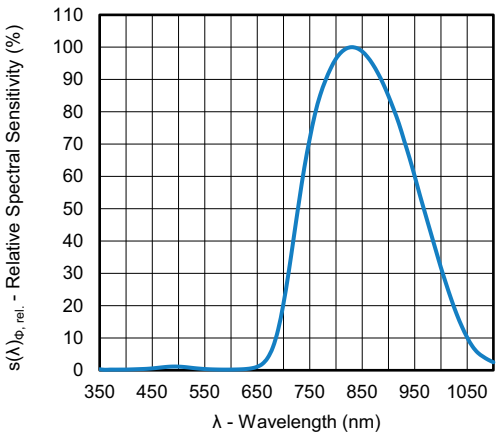


Fig. 6 - Relative Spectral Sensitivity vs. Wavelength

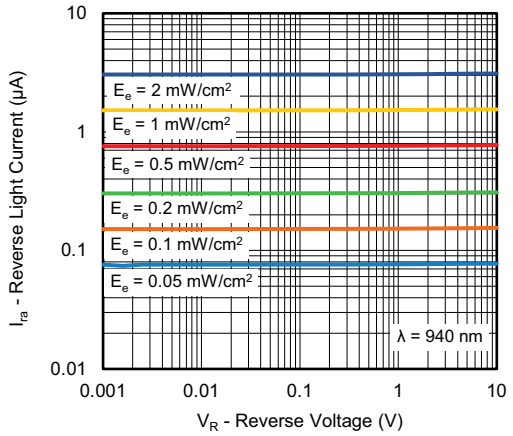


Fig. 4 - Reverse Light Current vs. Reverse Voltage

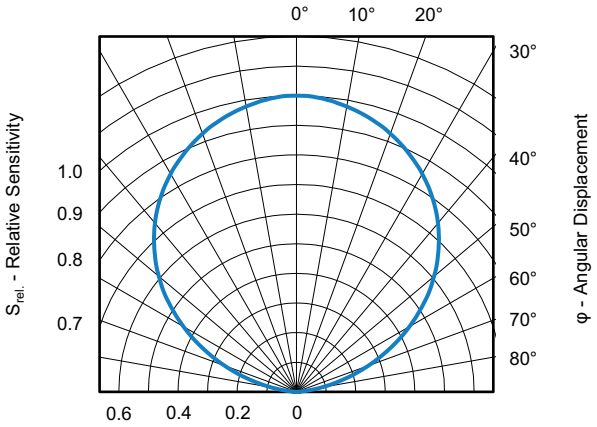


Fig. 7 - Relative Sensitivity vs. Angular Displacement

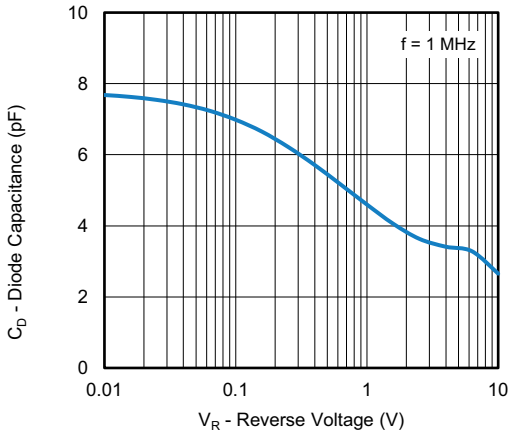


Fig. 5 - Diode Capacitance vs. Reverse Voltage

REFLOW SOLDER PROFILE

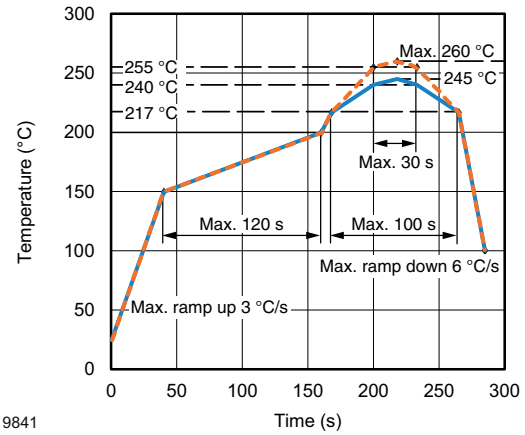


Fig. 8 - Lead (Pb)-free Reflow Solder Profile According to J-STD-020

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: 4 weeks

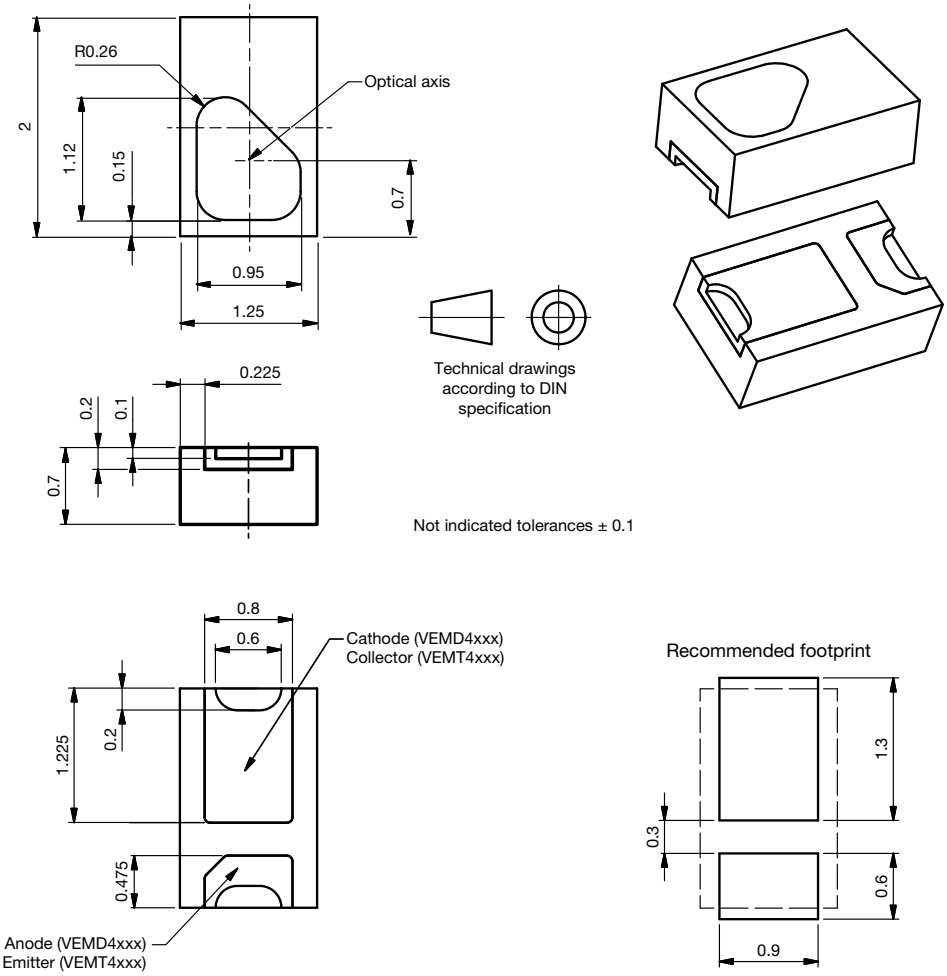
Conditions: T_{amb} < 30 °C, RH < 60 %

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

DRYING

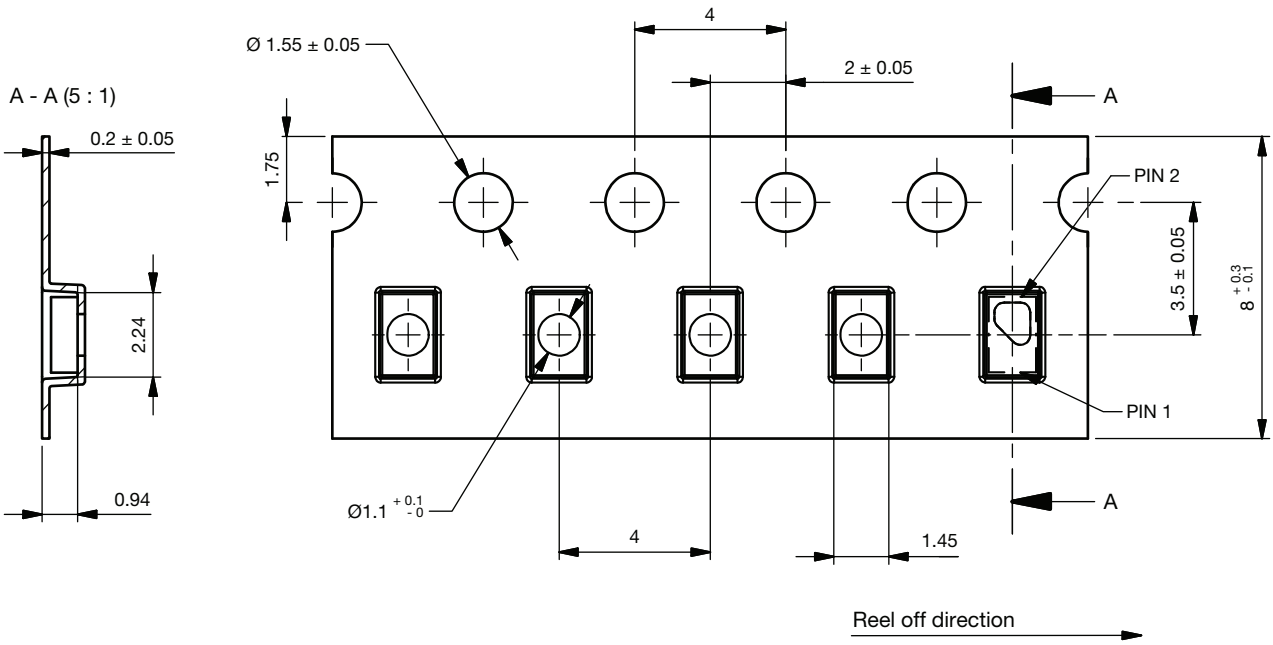
In case of moisture absorption devices should be baked before soldering. Conditions see J-STD-033D or label. Devices taped on reel dry using recommended conditions 192 h at 40 °C (+ 5 °C), RH < 5 %.

PACKAGE DIMENSIONS in millimeters



Drawing-No.: 6.550-5363.01-4
Issue: 2; 01.07.2020

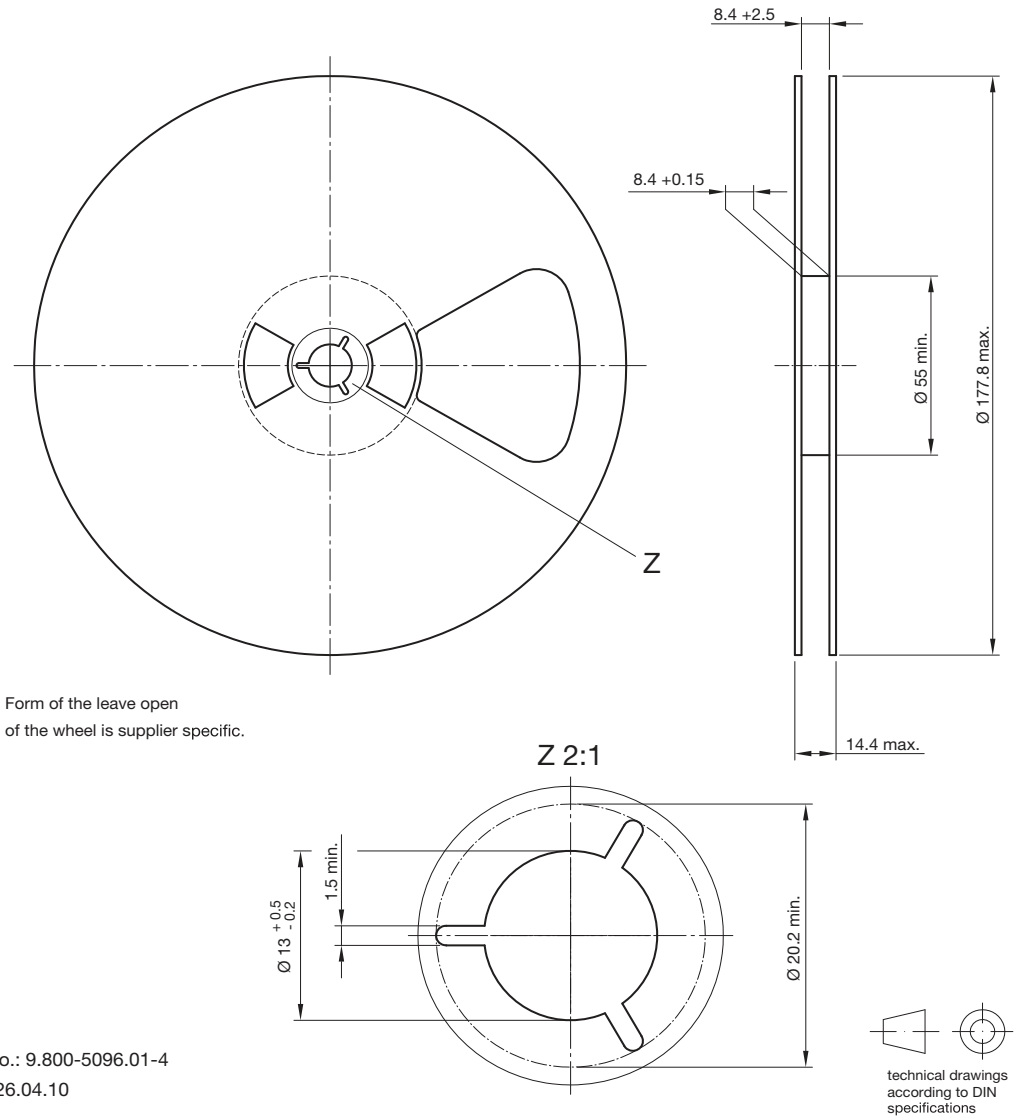
BLISTER TAPE DIMENSIONS in millimeters



TYPE	PIN 1	PIN 2
VEMD4xxx	Anode	Cathode

Drawing-No.: 9.700-5411.0-4
Issue: 1_A; 11.10.2022

REEL DIMENSIONS in millimeters



Form of the leave open
of the wheel is supplier specific.

technical drawings
according to DIN
specifications

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

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