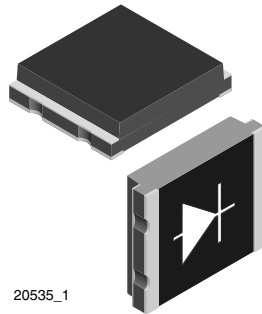




## Silicon PIN Photodiode, RoHS Compliant, Released for Lead (Pb)-free Reflow Soldering, AEC-Q101 Released



20535\_1

### DESCRIPTION

TEMD5120X01 is a high speed and high sensitive PIN photodiode. It is a miniature surface mount device (SMD) including the chip with a 4.4 mm<sup>2</sup> sensitive area and a daylight blocking filter matched with IR emitters operating at wavelength 870 nm or 950 nm.

### FEATURES

- Package type: surface mount
- Package form: top view
- Dimensions (L x W x H in mm): 5 x 4.24 x 1.12
- Radiant sensitive area (in mm<sup>2</sup>): 4.4
- AEC-Q101 qualified
- High radiant sensitivity
- Daylight blocking filter matched with 870 nm to 950 nm emitters
- Fast response times
- Angle of half sensitivity:  $\phi = \pm 65^\circ$
- Floor life: 72 h, MSL 4, acc. J-STD-020
- Compliant to RoHS Directive 2002/95/EC and in accordance to WEEE 2002/96/EC



### Note

\*\* Please see document "Vishay Material Category Policy": [www.vishay.com/doc?99902](http://www.vishay.com/doc?99902)

### APPLICATIONS

- High speed detector for infrared radiation
- Infrared remote control and free air data transmissionsystems, e.g. in combination with TSFFxxxx series IR emitters

PRODUCT SUMMARY			
COMPONENT	I <sub>ra</sub> (μA)	φ (deg)	λ <sub>0.5</sub> (nm)
TEMD5120X01	35	± 65	790 to 1050

### Note

- Test conditions see table "Basic Characteristics"

ORDERING INFORMATION			
ORDERING CODE	PACKAGING	REMARKS	PACKAGE FORM
TEMD5120X01	Tape and reel	MOQ: 1500 pcs, 1500 pcs/reel	Top view

### Note

- MOQ: minimum order quantity

ABSOLUTE MAXIMUM RATINGS (T <sub>amb</sub> = 25 °C, unless otherwise specified)				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Reverse voltage		V <sub>R</sub>	60	V
Power dissipation	T <sub>amb</sub> ≤ 25 °C	P <sub>V</sub>	215	mW
Junction temperature		T <sub>j</sub>	100	°C
Operating temperature range		T <sub>amb</sub>	- 40 to + 100	°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		R <sub>thJA</sub>	350	K/W



BASIC CHARACTERISTICS (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	1.3	V
Breakdown voltage	I <sub>R</sub> = 100 μA, E = 0	V <sub>(BR)</sub>	60			V
Reverse dark current	V <sub>R</sub> = 10 V, E = 0	I <sub>ro</sub>		2	30	nA
Diode capacitance	V <sub>R</sub> = 0 V, f = 1 MHz, E = 0	C <sub>D</sub>		48		pF
	V <sub>R</sub> = 3 V, f = 1 MHz, E = 0	C <sub>D</sub>		17	40	pF
Open circuit voltage	E <sub>0</sub> = 1 mW/cm <sup>2</sup> , λ = 950 nm	V <sub>o</sub>		350		mV
Temperature coefficient of V <sub>o</sub>	E <sub>0</sub> = 1 mW/cm <sup>2</sup> , λ = 950 nm	TK <sub>V<sub>o</sub></sub>		-2.6		mV/K
Short circuit current	E <sub>0</sub> = 1 mW/cm <sup>2</sup> , λ = 950 nm	I <sub>k</sub>		32		μA
Temperature coefficient of I <sub>k</sub>	E <sub>0</sub> = 1 mW/cm <sup>2</sup> , λ = 950 nm	TK <sub>I<sub>k</sub></sub>		0.1		%/K
Reverse light current	E <sub>0</sub> = 1 mW/cm <sup>2</sup> , λ = 950 nm, V <sub>R</sub> = 5 V	I <sub>ra</sub>	25	35		μA
Angle of half sensitivity		φ		± 65		deg
Wavelength of peak sensitivity		λ <sub>p</sub>		940		nm
Range of spectral bandwidth		λ <sub>0.5</sub>		790 to 1050		nm
Noise equivalent power	V <sub>R</sub> = 10 V, λ = 950 nm	NEP		4 x 10 <sup>-14</sup>		W/√Hz
Rise time	V <sub>R</sub> = 10 V, R <sub>L</sub> = 1 kΩ, λ = 820 nm	t <sub>r</sub>		100		ns
Fall time	V <sub>R</sub> = 10 V, R <sub>L</sub> = 1 kΩ, λ = 820 nm	t <sub>f</sub>		100		ns

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

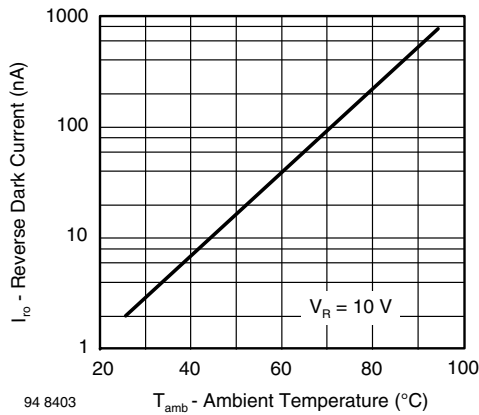


Fig. 1 - Reverse Dark Current vs. Ambient Temperature

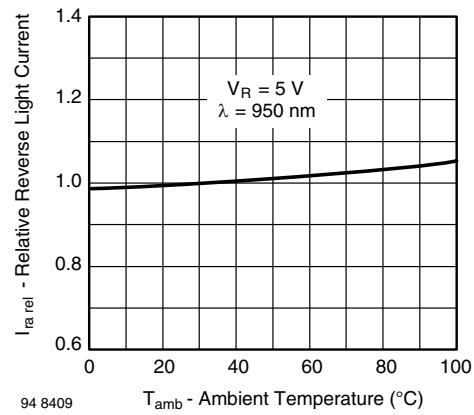


Fig. 2 - Relative Reverse Light Current vs. Ambient Temperature

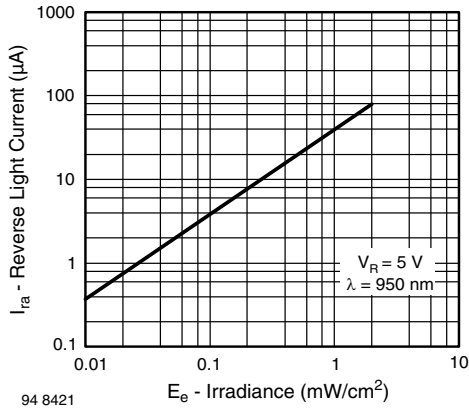


Fig. 3 - Reverse Light Current vs. Irradiance

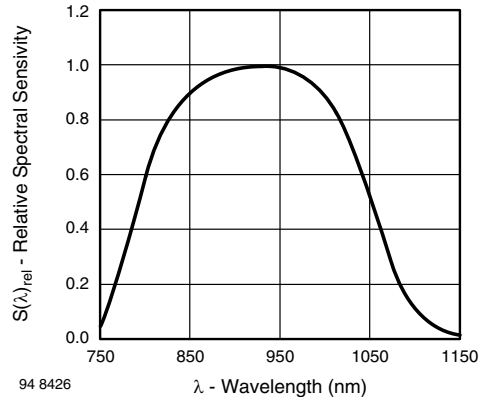


Fig. 6 - Relative Spectral Sensitivity vs. Wavelength

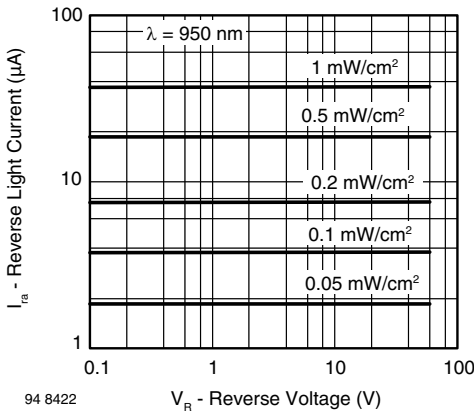


Fig. 4 - Reverse Light Current vs. Reverse Voltage

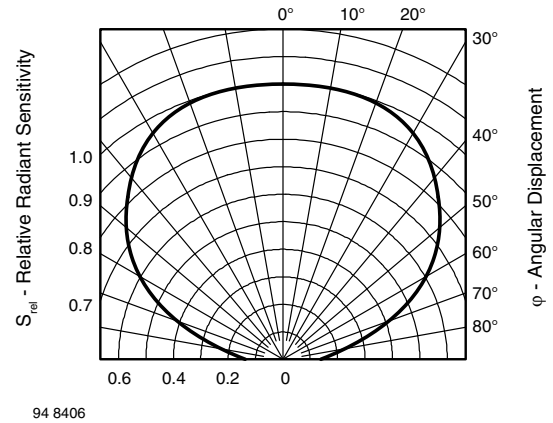


Fig. 7 - Relative Radiant Sensitivity vs. Angular Displacement

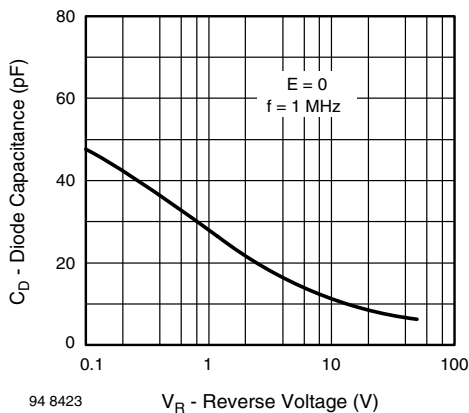
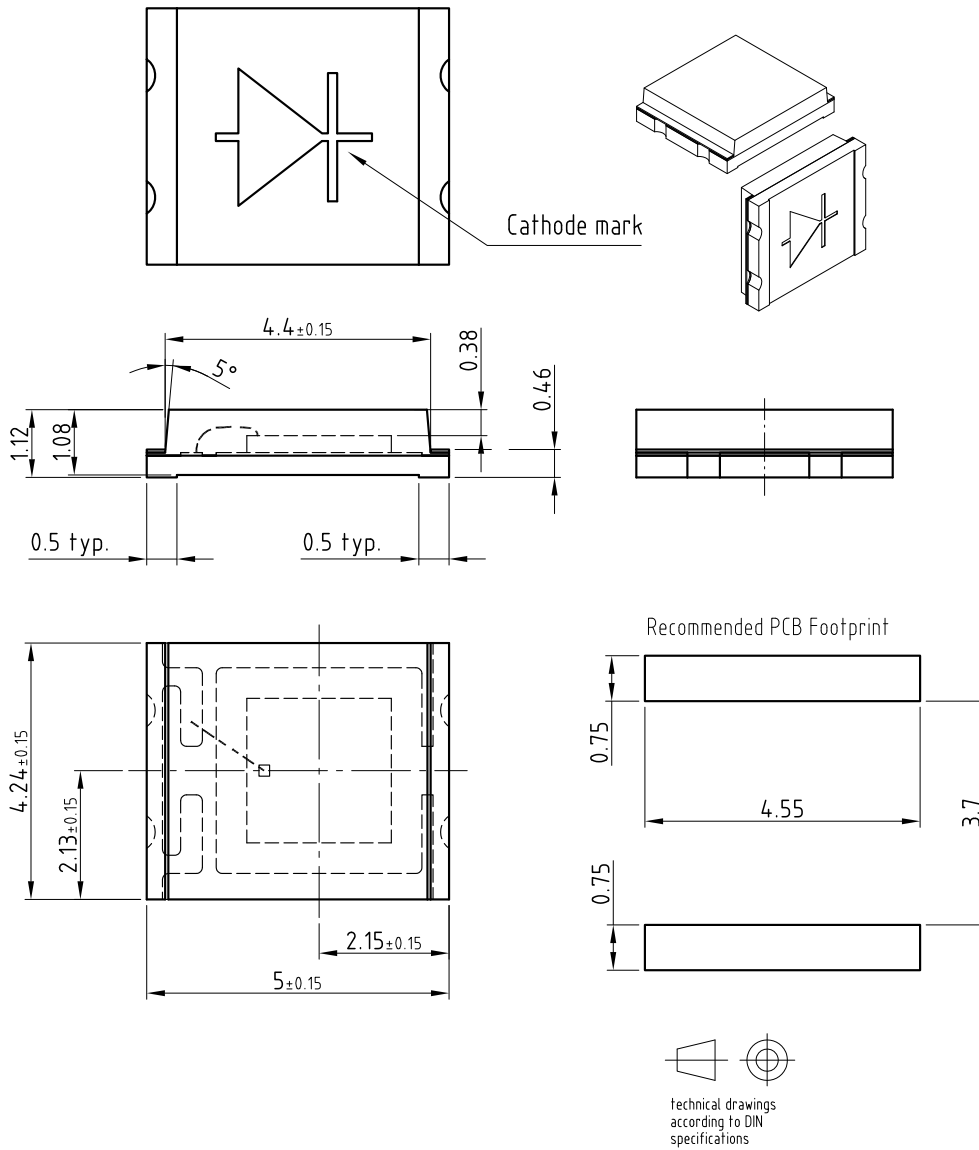


Fig. 5 - Diode Capacitance vs. Reverse Voltage



### PACKAGE DIMENSIONS in millimeters



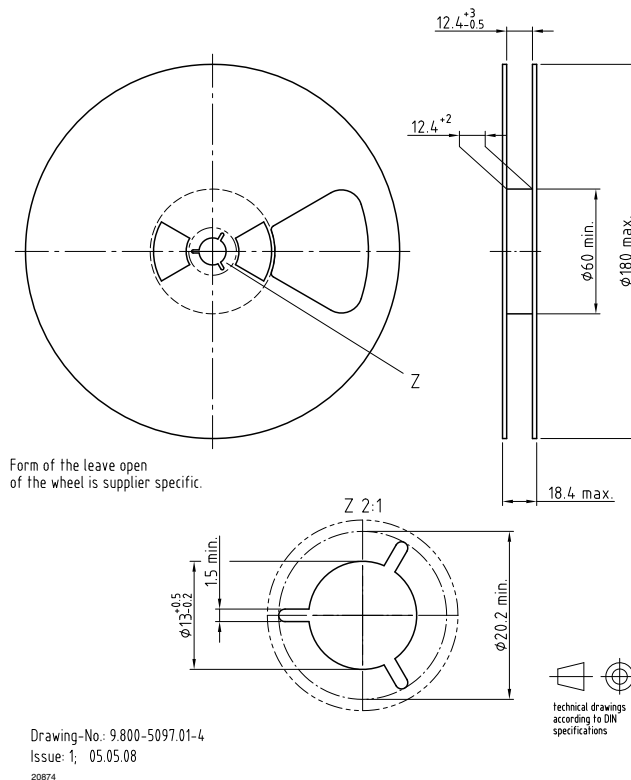
Drawing-No.: 6.541-5059.01-4  
Issue: 4; 26.04.07  
19280

Not indicated tolerances  $\pm 0.1$

**TAPING DIMENSIONS** in millimeters



**REEL DIMENSIONS** in millimeters





**SOLDER PROFILE**

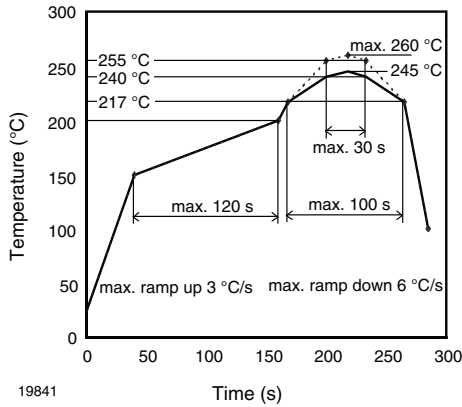


Fig. 8 - Lead (Pb)-free Reflow Solder Profile acc. J-STD-020D

**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**

Time between soldering and removing from MBB must not exceed the time indicated in J-STD-020:

Moisture sensitivity: level 4

Floor life: 72 h

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

**DRYING**

In case of moisture absorption devices should be baked before soldering. Conditions see J-STD-020 or recommended conditions:

192 h at  $40\text{ }^{\circ}\text{C}$  (+ 5  $^{\circ}\text{C}$ ), RH < 5 %

or

96 h at  $60\text{ }^{\circ}\text{C}$  (+ 5  $^{\circ}\text{C}$ ), RH < 5 %.



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