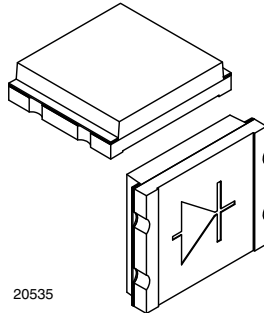


## Silicon PIN Photodiode



20535

### DESCRIPTION

TEMD5080X01 is a PIN photodiode with enhanced blue sensitivity. The miniature surface mount package (SMD) include a chip with 7.7 mm<sup>2</sup> sensitive area, covered by clear epoxy.

### 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>): 7.7
- AEC-Q101 qualified
- Enhanced blue photo sensitivity: S (400 nm) rel > 30 %
- Peak sensitivity at 940 nm
- Suitable for visible and near infrared radiation
- Low junction capacitance
- Fast response times
- Angle of half sensitivity:  $\phi = \pm 65^\circ$
- Floor life: 72 h, MSL 4, acc. J-STD-020
- Lead (Pb)-free reflow soldering
- Compliant to RoHS Directive 2002/95/EC and in accordance to WEEE 2002/96/EC

AUTOMOTIVE GRADE


**RoHS**  
COMPLIANT

**GREEN**  
(5-2008)\*\*

### Note

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

### APPLICATIONS

- High speed photo detector

PRODUCT SUMMARY			
COMPONENT	$I_{ra}$ ( $\mu$ A)	$\phi$ (deg)	$\lambda_{0.1}$ (nm)
TEMD5080X01	60	$\pm 65$	350 to 1100

### Note

- Test conditions see table "Basic Characteristics"

ORDERING INFORMATION			
ORDERING CODE	PACKAGING	REMARKS	PACKAGE FORM
TEMD5080X01	Tape and reel	MOQ: 1500 pcs, 1500 pcs/reel	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		$V_R$	25	V
Power dissipation	$T_{amb} \leq 25^\circ\text{C}$	$P_V$	215	mW
Junction temperature		$T_j$	100	$^\circ\text{C}$
Operating temperature range		$T_{amb}$	- 40 to + 100	$^\circ\text{C}$
Storage temperature range		$T_{stg}$	- 40 to + 110	$^\circ\text{C}$
Soldering temperature	Acc. reflow solder profile fig. 8	$T_{sd}$	260	$^\circ\text{C}$
Thermal resistance junction/ambient		$R_{thJA}$	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>	25			V
Reverse dark current	V <sub>R</sub> = 10 V, E = 0	I <sub>ro</sub>		2	10	nA
Diode capacitance	V <sub>R</sub> = 0 V, f = 1 MHz, E = 0	C <sub>D</sub>		90		pF
	V <sub>R</sub> = 3 V, f = 1 MHz, E = 0	C <sub>D</sub>		30	40	pF
Open circuit voltage	E <sub>e</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>e</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>e</sub> = 1 mW/cm <sup>2</sup> , λ = 950 nm	I <sub>k</sub>		50		μA
Temperature coefficient of I <sub>k</sub>	E <sub>e</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>e</sub> = 1 mW/cm <sup>2</sup> , λ = 400 nm, V <sub>R</sub> = 5 V	I <sub>ra</sub>		18		μA
	E <sub>v</sub> = 100 lx, CIE illuminant A, V <sub>R</sub> = 5 V	I <sub>ra</sub>		8.5		μA
	E <sub>e</sub> = 1 mW/cm <sup>2</sup> , λ = 950 nm, V <sub>R</sub> = 5 V	I <sub>ra</sub>		60		μA
Temperature coefficient of I <sub>ra</sub>	CIE illuminant A	TK <sub>I<sub>ra</sub></sub>		0.15		%/K
	λ = 950 nm	TK <sub>I<sub>ra</sub></sub>		0.1		%/K
Angle of half sensitivity		φ		± 65		deg
Wavelength of peak sensitivity		λ <sub>p</sub>		940		nm
Range of spectral bandwidth		λ <sub>0.1</sub>		350 to 1100		nm
Noise equivalent power	V <sub>R</sub> = 10 V, λ = 400 nm	NEP		1.1 x 10 <sup>-13</sup>		W/√Hz
Rise time	V <sub>R</sub> = 5 V, R <sub>L</sub> = 50 Ω, λ = 850 nm	t <sub>r</sub>		40		ns
Fall time	V <sub>R</sub> = 5 V, R <sub>L</sub> = 50 Ω, λ = 850 nm	t <sub>f</sub>		40		ns

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

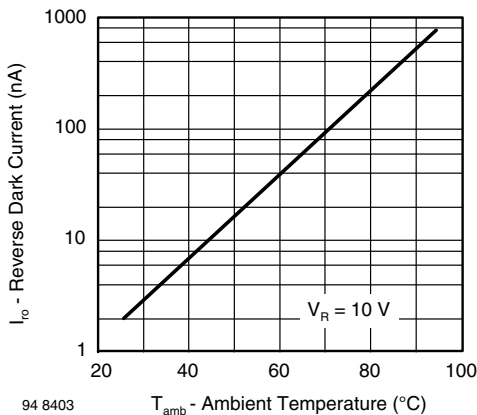


Fig. 1 - Reverse Dark Current vs. Ambient Temperature

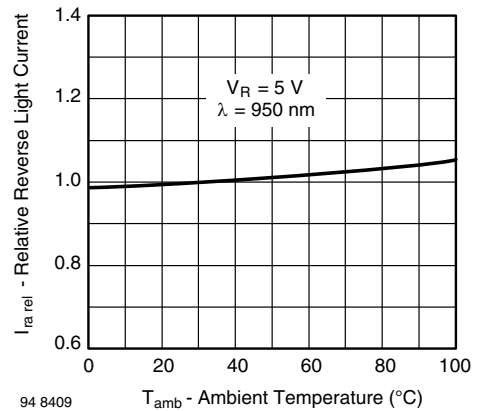


Fig. 2 - Relative Reverse Light Current vs. Ambient Temperature

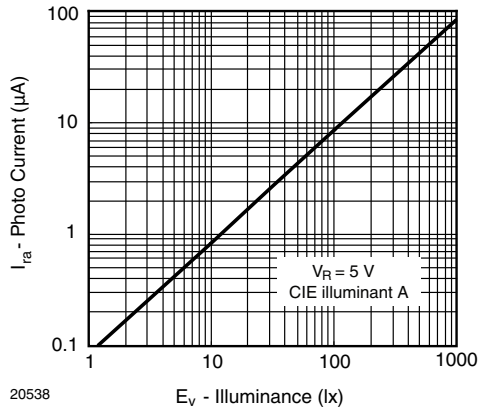


Fig. 3 - Reverse Light Current vs. Irradiance

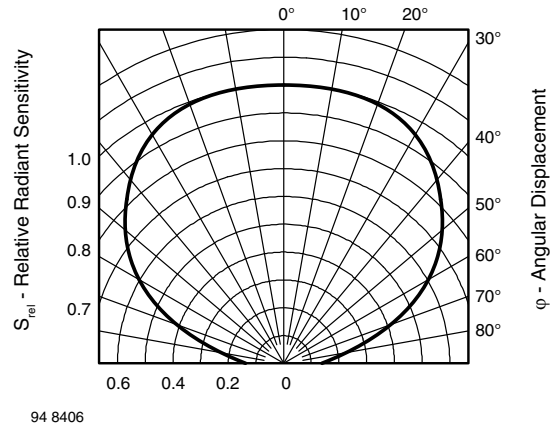


Fig. 6 - Relative Radiant Sensitivity vs. Angular Displacement

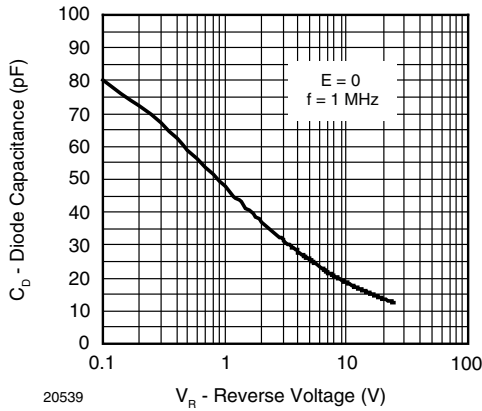


Fig. 4 - Diode Capacitance vs. Reverse Voltage

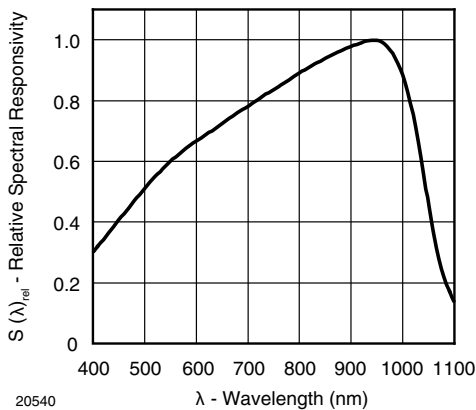
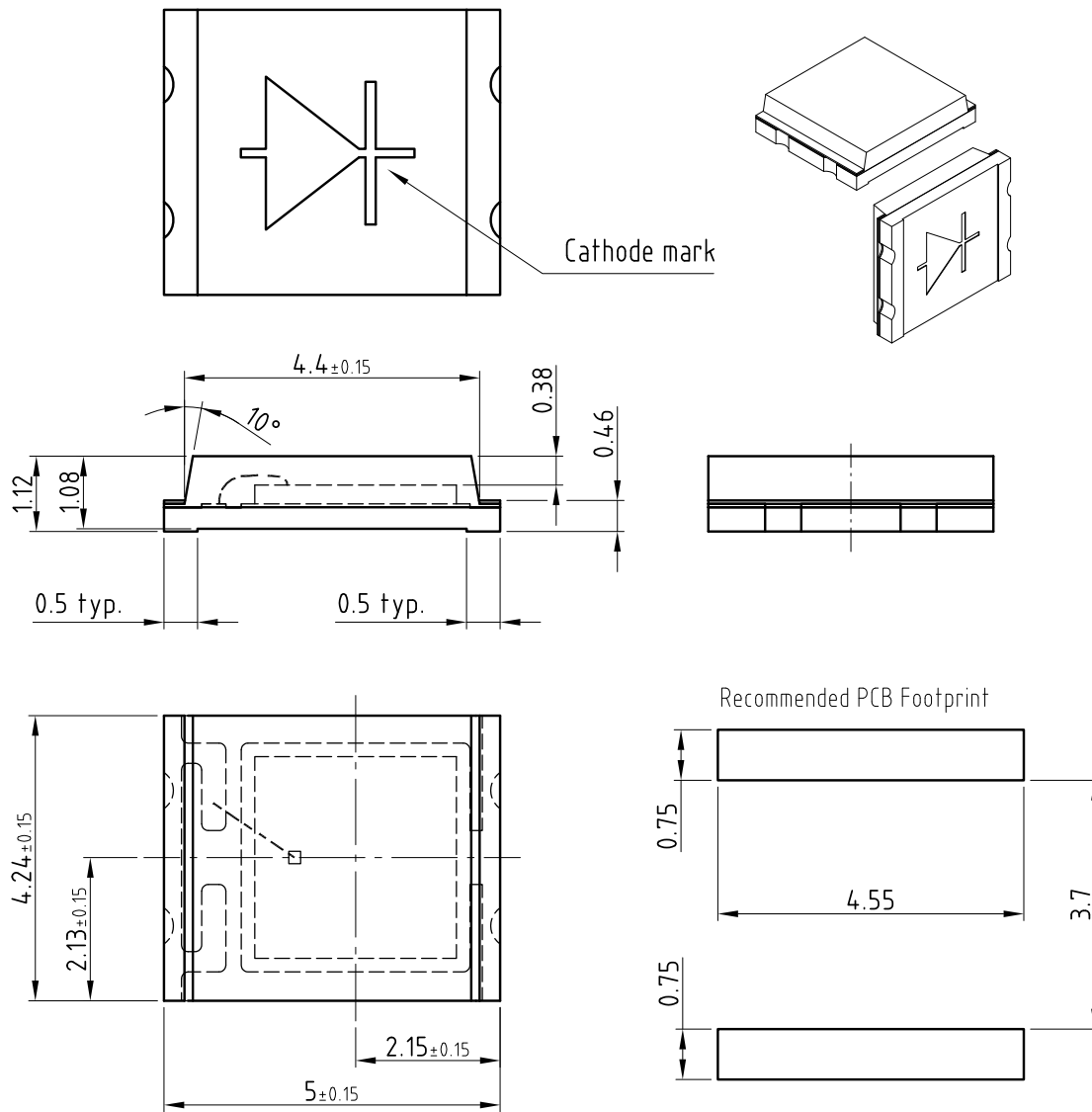


Fig. 5 - Relative Spectral Sensitivity vs. Wavelength

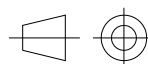


### PACKAGE DIMENSIONS in millimeters



Cathode mark

Recommended PCB Footprint

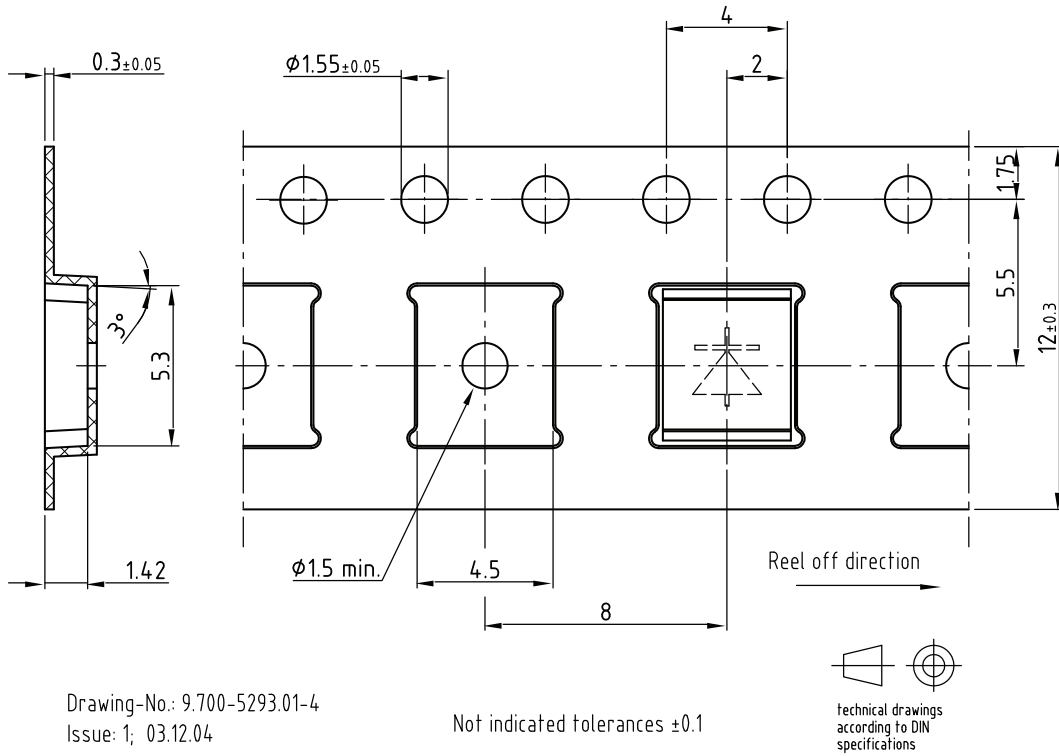


Technical drawings according to DIN specifications

Drawing-No.: 6.541-5060.01-4  
Issue: 3; 05.02.08  
20536

Not indicated tolerances  $\pm 0.1$

**TAPING DIMENSIONS** in millimeters

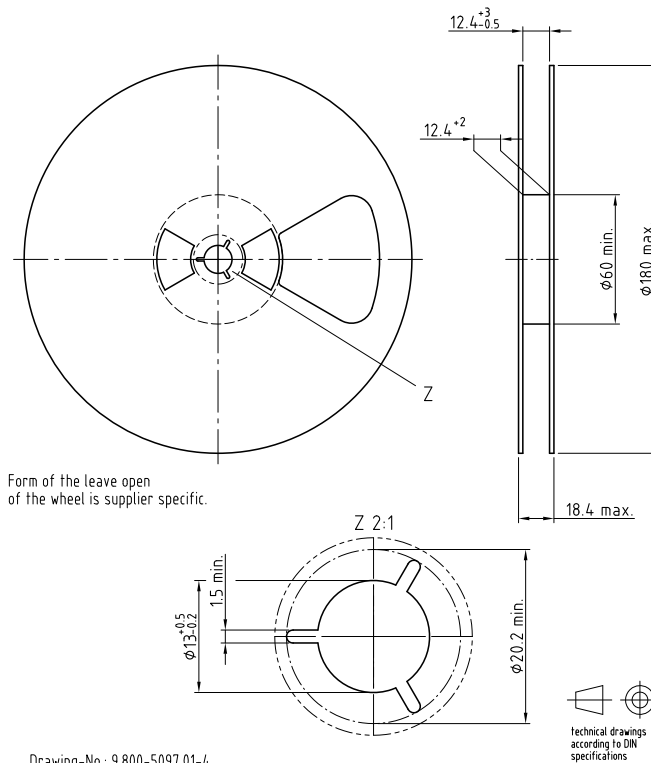


Drawing-No.: 9.700-5293.01-4  
 Issue: 1; 03.12.04  
 20537

Not indicated tolerances ±0.1

technical drawings  
 according to DIN  
 specifications

**REEL DIMENSIONS** in millimeters

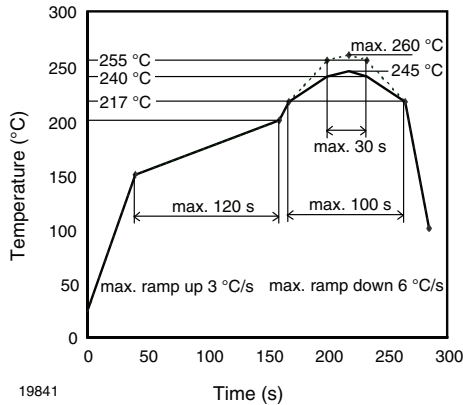


Form of the leave open  
 of the wheel is supplier specific.

Drawing-No.: 9.800-5097.01-4  
 Issue: 1; 05.05.08  
 20874

technical drawings  
 according to DIN  
 specifications

**SOLDER PROFILE**



19841

Fig. 7 - 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:  $T_{amb} < 30\text{ °C}$ , 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 °C (+ 5 °C), RH < 5 %

or

96 h at 60 °C (+ 5 °C), RH < 5 %.



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