

## Silicon PIN Photodiode



### DESCRIPTION

T1172P6 is a high speed and high sensitive PIN photodiode chip with 1.06 mm<sup>2</sup> sensitive area detecting visible and near infrared radiation. Anode and cathode are the bond pads on top.

### GENERAL INFORMATION

The datasheet is based on Vishay optoelectronics sample testing under certain predetermined and assumed conditions, and is provided for illustration purpose only. Customers are encouraged to perform testing in actual proposed packaged and used conditions. Vishay optoelectronics die products are tested using Vishay optoelectronics based quality assurance procedures and are manufactured using Vishay optoelectronics established processes. Estimates such as those described and set forth in this datasheet for semiconductor die will vary depending on a number of packaging, handling, use, and other factors. Therefore sold die may not perform on an equivalent basis to standard package products.

### FEATURES

- Package type: chip
- Package form: single chip
- Dimensions (L x W x H in mm): 1.47 x 1.07 x 0.28
- Radiant sensitive area (in mm<sup>2</sup>): 1.06
- Peak sensitivity wavelength: 960 nm
- High photo sensitivity
- Suitable for visible light and near infrared radiation
- Fast response times
- Angle of half sensitivity:  $\phi = \pm 60^\circ$
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



### APPLICATIONS

- High speed photo detector

### PRODUCT SUMMARY

COMPONENT	$I_{ra}$ ( $\mu A$ )	$\phi$ (deg)	$\lambda_{0.5}$ (nm)
T1172P6	8.7	$\pm 60$	640 to 1060

#### Note

- Test conditions see table "Basic Characteristics"

### ORDERING INFORMATION

ORDERING CODE	PACKAGING	REMARKS	PACKAGE FORM
T1172P6-SD-F	Wafer sawn on foil with disco frame	MOQ: 48 000 pcs	Chip

#### Note

- MOQ: minimum order quantity

### ABSOLUTE MAXIMUM RATINGS ( $T_{amb} = 25^\circ C$ , unless otherwise specified)

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Reverse voltage		$V_R$	60	V
Junction temperature		$T_j$	100	$^\circ C$
Operating temperature range		$T_{amb}$	-40 to +100	$^\circ C$
Storage temperature range		$T_{stg1}$	-40 to +100	$^\circ C$
Storage temperature range on foil		$T_{stg2}$	-40 to +50	$^\circ C$

<b>BASIC CHARACTERISTICS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Breakdown voltage	$I_R = 100\text{ }\mu\text{A}$ , $E = 0$	$V_{(BR)}$	60	-	-	V
Reverse dark current	$V_R = 10\text{ V}$ , $E = 0$	$I_{ro}$	-	< 1	3	nA
Diode capacitance	$V_R = 0\text{ V}$ , $f = 1\text{ MHz}$ , $E = 0$	$C_D$	-	12	-	pF
	$V_R = 3\text{ V}$ , $f = 1\text{ MHz}$ , $E = 0$	$C_D$	-	5	-	pF
Reverse light current	$E_e = 1\text{ mW/cm}^2$ , $\lambda = 890\text{ nm}$ , $V_R = 5\text{ V}$	$I_{ra}$	-	8.4	-	$\mu\text{A}$
	$E_e = 1\text{ mW/cm}^2$ , $\lambda = 950\text{ nm}$ , $V_R = 5\text{ V}$	$I_{ra}$	-	8.7	-	$\mu\text{A}$
Angle of half sensitivity		$\phi$	-	$\pm 60$	-	deg
Wavelength of peak sensitivity		$\lambda_p$	-	960	-	nm
Range of spectral bandwidth		$\lambda_{0.5}$	-	640 to 1060	-	nm
Rise time	$V_R = 10\text{ V}$ , $R_L = 1\text{ k}\Omega$ , $\lambda = 870\text{ nm}$	$t_r$	-	625	-	ns
Fall time		$t_f$	-	670	-	ns

**Note**

- The measurements are based on samples of die which are mounted on a TO18-header without epoxy coating

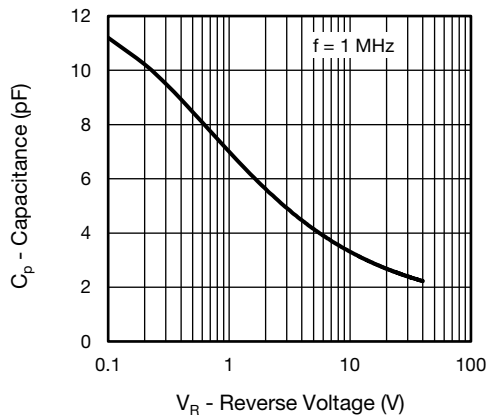
**BASIC CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)


Fig. 1 - Diode Capacitance vs. Reverse Voltage

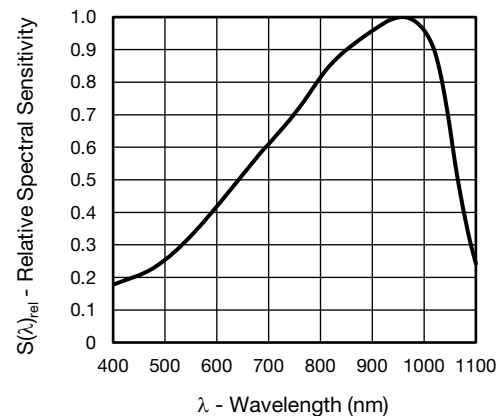
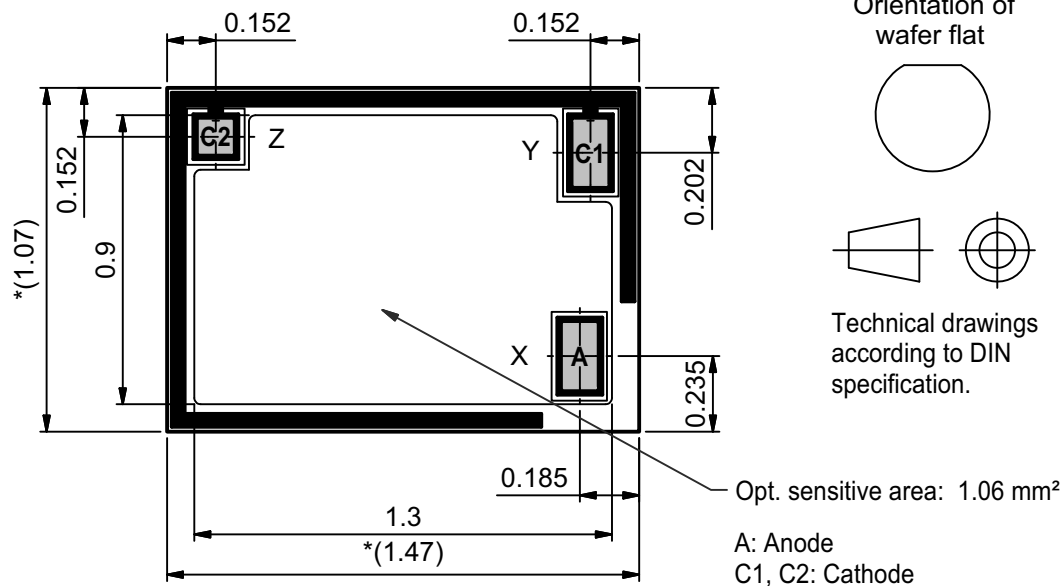
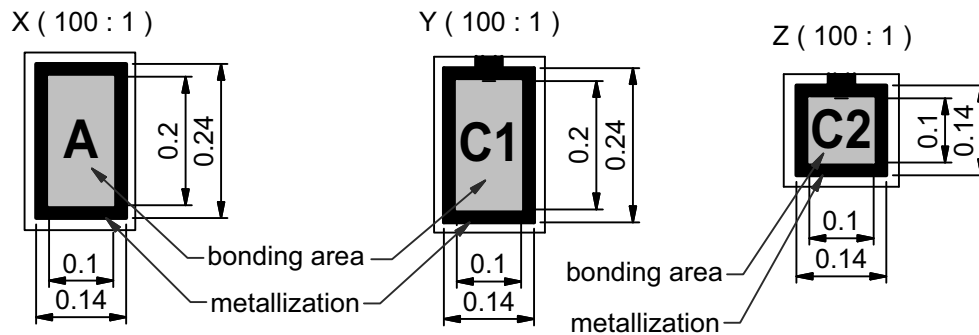


Fig. 2 - Relative Spectral Sensitivity vs. Wavelength without Epoxy Coating

**DIMENSIONS** in millimeters


\*only for information:  
dimension of sawn die under consideration of 30 μm saw kerf



Bonding area: A: 100 μm x 200 μm  
C1: 100 μm x 200 μm  
C2: 100 μm x 100 μm

Thickness: 280 μm ± 15 μm

Drawing-No.: 9.000-5127.01-4  
Issue: 1; 29.10.2013

Bonding restricted to this area  
in order to avoid damage  
of adjacent structures

<b>MECHANICAL DIMENSIONS</b>					
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Length of chip edge (x-direction)	L <sub>x</sub>	-	1.47	-	mm
Length of chip edge (y-direction)	L <sub>y</sub>	-	1.07	-	mm
Sensitive area	A <sub>S</sub>	-	1.06	-	mm <sup>2</sup>
Wafer diameter	D	-	150	-	mm
Die height	H	0.265	0.28	0.295	mm
Bond pad anode		-	0.1 x 0.2	-	mm <sup>2</sup>
Bond pad cathode type 1		-	0.1 x 0.2	-	mm <sup>2</sup>
Bond pad cathode type 2		-	0.1 x 0.1	-	mm <sup>2</sup>



ADDITIONAL INFORMATION	
Frontside metallization, anode, cathode	AlSi
Backside	Electrically isolated
Dicing	Sawing
Die bonding technology	Epoxy bonding

**Note**

- All chips are checked in accordance with the Vishay Semiconductor, specification of visual inspection FVOV6870. The visual inspection shall be made in accordance with the "specification of visual inspection as referenced". The visual inspection of chip backside is performed with stereo microscope with incident light and 40x to 80x magnification. The quality inspection (final visual inspection) is performed by production. An additional visual inspection step as special release procedure by QM is not installed.

**HANDLING AND STORAGE CONDITIONS**

- The hermetically sealed shipment lots shall be opened in temperature and moisture controlled cleanroom environment only. It is mandatory to follow the rules for disposition of material that can be hazardous for humans and environment.
- Product must be handled only at ESD safe workstations. Standard ESD precautions and safe work environments are as defined in MIL-HDBK-263.
- Singulated die are not to be handled with tweezers. A vacuum wand with non metallic ESD protected tip should be used.

**PACKING**

Chips are fixed on adhesive foil. Upon request the foils can be mounted on plastic frame or disco frame. For shipment, the wafers are arranged to stacks and hermetically sealed in plastic bags to ensure protection against environmental influence (humidity and contamination).

Use for recycling reliable operators only. We can help getting in touch with your nearest sales office. By agreement we will take back packing material, if it is sorted. You will have to bear the costs of transport. We will invoice you for any costs incurred for packing material that is returned unsorted or which we are not obliged to accept.



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