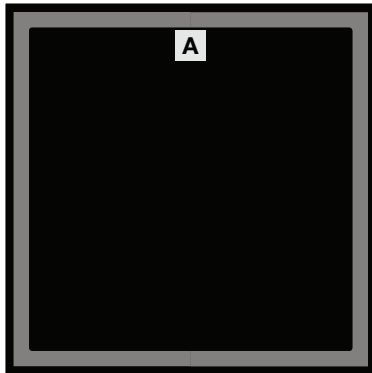


## Silicon PIN Photodiode



21678

### FEATURES

- Package type: chip
- Package form: single chip
- Dimensions (L x W x H in mm): 2.37 x 2.37 x 0.28
- Radiant sensitive area (in mm<sup>2</sup>): 4.4
- High photo sensitivity
- High radiant sensitivity
- Suitable for visible 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)



### DESCRIPTION

T1120P is a high speed and high sensitive PIN photodiode chip with 4.4 mm<sup>2</sup> sensitive area detecting visible and near infrared radiation. Anode is the bond pad 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.

### APPLICATIONS

- High speed photo detector

### PRODUCT SUMMARY

COMPONENT	$I_{ra}$ ( $\mu A$ )	$\phi$ (deg)	$\lambda_{0.1}$ (nm)
T1120P	35	$\pm 60$	430 to 1100

#### Note

- Test conditions see table "Basic Characteristics"

### ORDERING INFORMATION

ORDERING CODE	PACKAGING	REMARKS	PACKAGE FORM
T1120P-SD-F	Wafer sawn on foil with discoframe	MOQ: 5000 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
Forward voltage	$I_F = 50\text{ mA}$	$V_F$	-	1	1.3	V
Reverse dark current	$V_R = 10\text{ V}$ , $E = 0$	$I_{ro}$	-	2	5	nA
Diode capacitance	$V_R = 0\text{ V}$ , $f = 1\text{ MHz}$ , $E = 0$	$C_D$	-	48	-	pF
	$V_R = 3\text{ V}$ , $f = 1\text{ MHz}$ , $E = 0$	$C_D$	-	17	-	pF
Open circuit voltage	$E_e = 1\text{ mW/cm}^2$ , $\lambda = 950\text{ nm}$	$V_{OC}$	-	350	-	mV
Temperature coefficient of $V_{OC}$	$E_e = 1\text{ mW/cm}^2$ , $\lambda = 950\text{ nm}$	$TK_{V_{OC}}$	-	- 2.6	-	mV/K
Short circuit current	$E_e = 1\text{ mW/cm}^2$ , $\lambda = 950\text{ nm}$	$I_k$	-	32	-	$\mu\text{A}$
Temperature coefficient of $I_k$	$E_e = 1\text{ mW/cm}^2$ , $\lambda = 950\text{ nm}$	$TK_{I_k}$	-	0.1	-	%/K
Reverse light current	$E_e = 1\text{ mW/cm}^2$ , $\lambda = 950\text{ nm}$ , $V_R = 5\text{ V}$	$I_{ra}$	25	35	-	$\mu\text{A}$
Angle of half sensitivity		$\varphi$	-	$\pm 60$	-	deg
Wavelength of peak sensitivity		$\lambda_p$	-	940	-	nm
Range of spectral bandwidth		$\lambda_{0.1}$	-	430 to 1100	-	nm
Noise equivalent power	$V_R = 10\text{ V}$ , $\lambda = 950\text{ nm}$	NEP	-	$4 \times 10^{-14}$	-	W/ $\sqrt{\text{Hz}}$
Rise time	$V_R = 10\text{ V}$ , $R_L = 1\text{ k}\Omega$ , $\lambda = 820\text{ nm}$	$t_r$	-	100	-	ns
Fall time	$V_R = 10\text{ V}$ , $R_L = 1\text{ k}\Omega$ , $\lambda = 820\text{ nm}$	$t_f$	-	100	-	ns

**Note**

- The measurements are based on samples of die which are mounted on a TO-header without resin coating

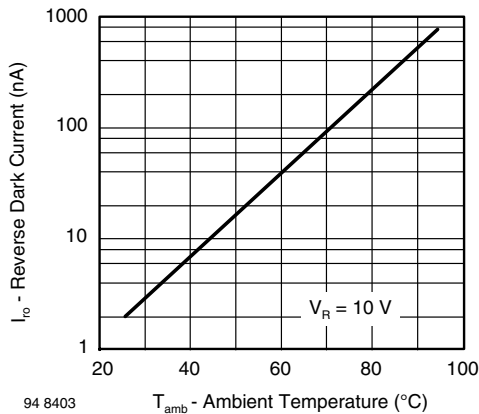
**BASIC CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)


Fig. 1 - Reverse Dark Current vs. Ambient Temperature

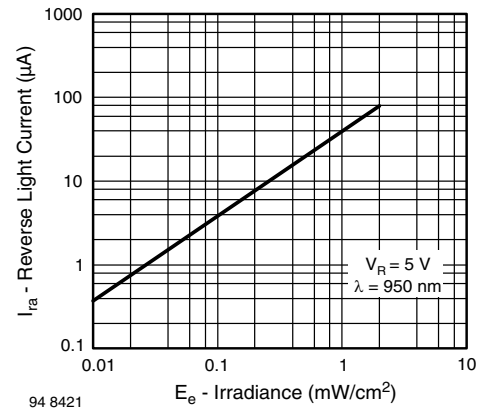


Fig. 3 - Reverse Light Current vs. Irradiance

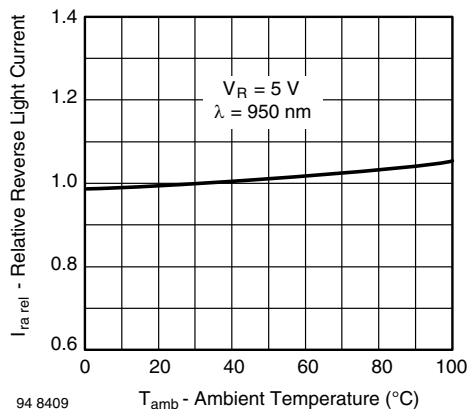


Fig. 2 - Relative Reverse Light Current vs. Ambient Temperature

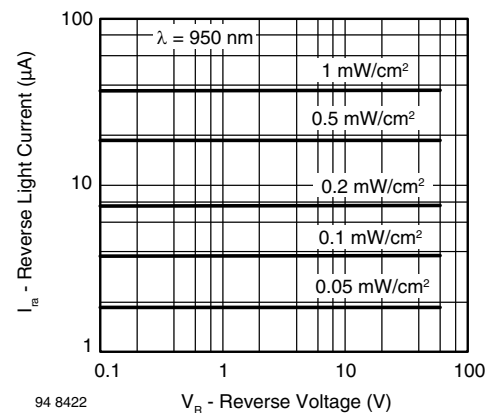


Fig. 4 - Reverse Light Current vs. Reverse Voltage

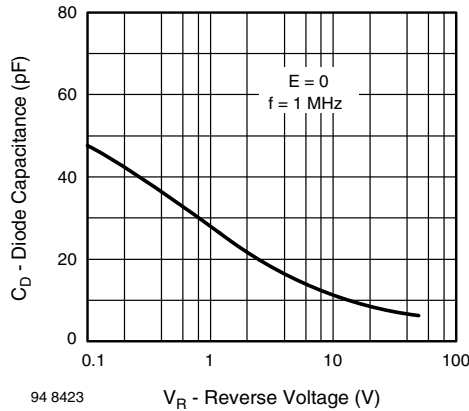


Fig. 5 - Diode Capacitance vs. Reverse Voltage

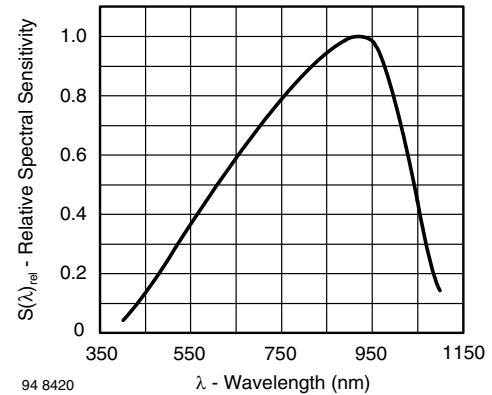


Fig. 6 - Relative Spectral Sensitivity vs. Wavelength

MECHANICAL DIMENSIONS					
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Length of chip edge (x-direction)	$L_x$	-	2.37	-	mm
Length of chip edge (y-direction)	$L_y$	-	2.37	-	mm
Sensitive area	$A_S$	-	4.4	-	mm <sup>2</sup>
Die height	H	-	0.28	-	mm
Bond pad anode	a x b	-	0.2 x 0.2	-	mm <sup>2</sup>

ADDITIONAL INFORMATION	
Frontside metallization, anode	Aluminum
Backside metallization, cathode	NiV-Ag
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).

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