

# Dual Photodiode PR5001

2 compact Silicon pn Junctions for spacial Resolved Light Detection.

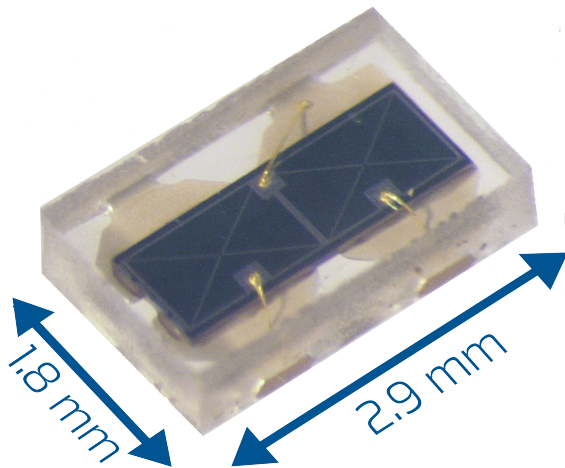
The PR5001 is a dual-element Si photodiode moulded into a small plastic leadless optical package. The photodiodes offer a very good symmetry, low dark current and high sensitivity.

## FEATURES

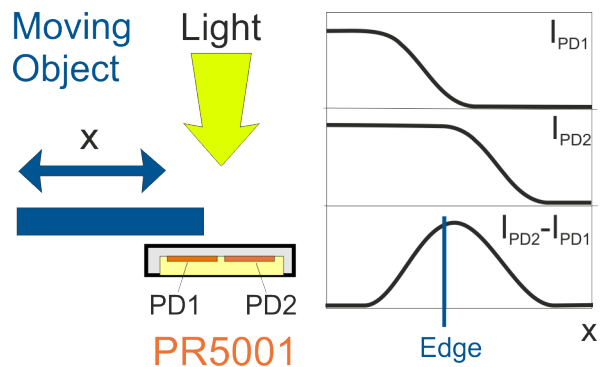
- Low dark current
- Low capacity
- High sensitivity

## TYPICAL APPLICATIONS

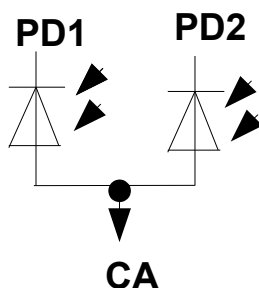
- Laser beam alignment
- Opto encoders
- Position detection



## EDGE DETECTOR



## CIRCUIT



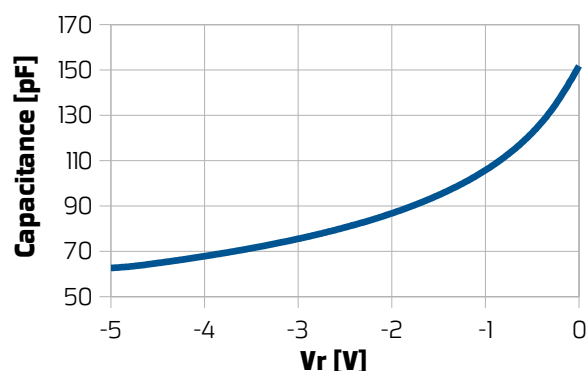
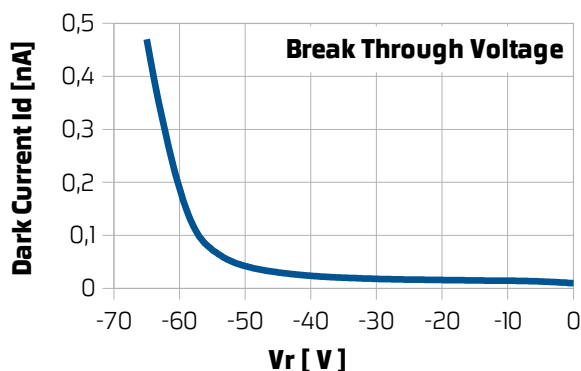
## CHARACTERISTICS

Parameter	Conditions	Typ	Units
Operating Temperature Range		-20 - 85	[°C]
Spectral response range		500 - 1000	[nm]
Dark current $I_d$	$T = 25^\circ\text{C}$	10	[pA]
Temperature coefficient of $I_d$	$V_r = 10\text{ V}$	10	[% / K]
Terminal capacitance $C_t$	$V_r = 10\text{ V}$ $f = 1\text{ MHz}$	60	[pF]

# Dual Photodiode PR5001

## Properties and Schematic Assembly

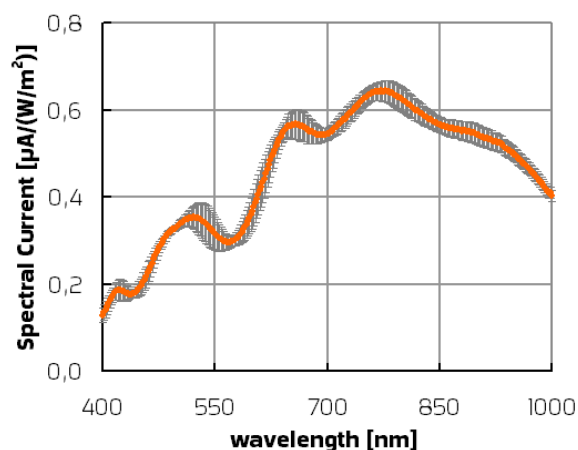
### PERFORMANCE DEPENDENCY OF THE REVERSE VOLTAGE



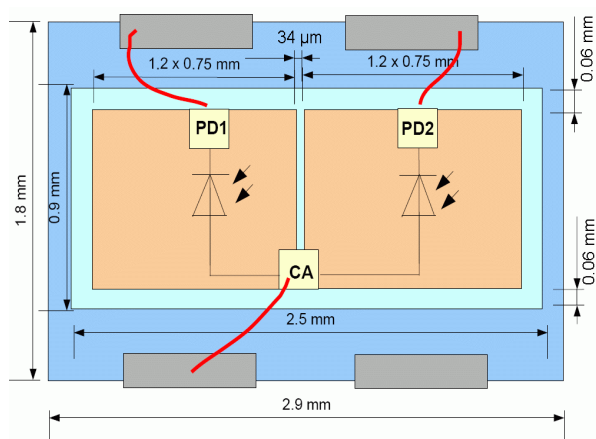
### SPECTRAL SENSITIVITY

The sensitivity of a single photodiode (size:  $0.75 \times 1.2 \text{ mm}^2$ ) is given as a function of irradiated photon wavelength obtained with 0 V forward bias (insignificant changes with voltages up to 10 V). The measurement was conducted with a halogen lamp. A well-known diode was used to calibrate the obtained current to a spectral irradiation density of  $1 \text{ Wm}^{-2}$ .

The periodically arranged peaks can be explained by interference effects that are caused by the thickness variations of protection layers on top of the photodiode. The orange curve illustrates the the average current measured from 10 photodiodes. In gray, the corresponding standard deviation is given.



### DIMENSIONAL OUTLINES AND LAYOUT



### PIN DESCRIPTION

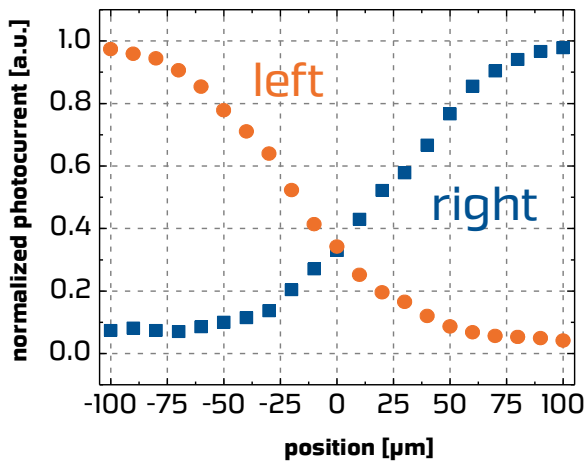
Pin No.	Pin Name	PIN Function Description
1	CA	Common Anode
2		Not connected
3	PD2	Cathode photo diode 2
4	PD1	Cathode photo diode 1

- = bond wires
- = pad area ( $178 \times 192 \mu\text{m}^2$ )
- = active area ( $0.75 \times 1.2 \text{ mm}^2$ )
- = die ( $0.9 \times 2.5 \text{ mm}^2$ )
- = clear package (leadless)

# Dual Photodiode PR5001

## Channel separation

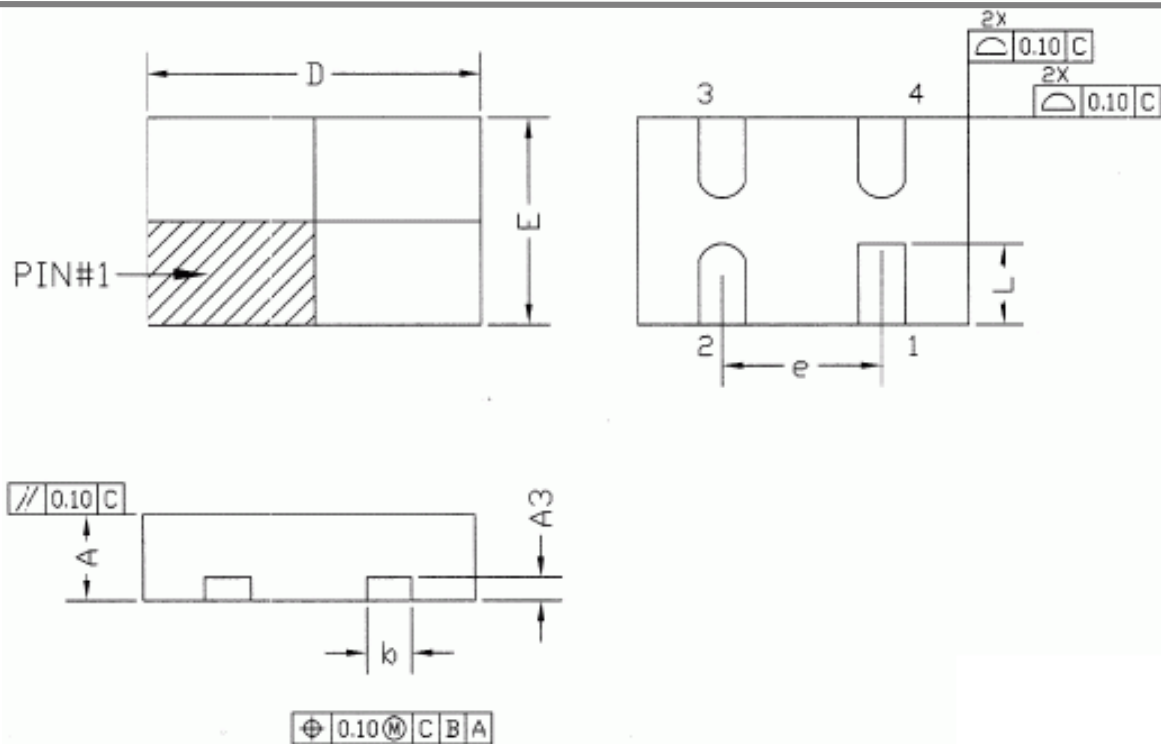
### WHILE MOVING A BEAM FROM ONE TO THE OTHER PHOTODIODE



The sensitivity of the crossover between both single photodiodes was measured in detail. To resolve the crossover from one photodiode to the other, increments of 10  $\mu\text{m}$  were performed using monochromatic light with a wavelength of about 660 nm (red) and a focus point with a diameter of about 100  $\mu\text{m}$ . 0  $\mu\text{m}$  correspond to the center of the die. The photocurrent was measured with an applied reverse voltage of about 4 V.

Considering a beam diameter of 100  $\mu\text{m}$  and a gap between both photodiodes of > 30  $\mu\text{m}$  (50  $\mu\text{m}$  between inner of metal rings along the edge of each photodiode), the observed behaviour is consistent with a sharp channel separation.

### AVAILABLE PACKAGE



# Dual Photodiode PR5001

## Available Package

### DIMENSIONS

SYMBOL	COMMON					
	DIMENSIONS MILLIMETER			DIMENSIONS INCH		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A	SEE VARIATIONS					
A3	0.195	0.203	0.211	0.0077	0.0080	0.0083
b	0.35	0.40	0.45	0.014	0.016	0.018
D	2.80	2.90	3.00	0.110	0.114	0.118
E	1.70	1.80	1.90	0.066	0.070	0.074
e	1.40 BSC.			0.055 BSC.		
L	0.60	0.70	0.80	0.023	0.027	0.031

PAD SIZE	VARIATIONS "A"					
	DIMENSIONS MILLIMETER			DIMENSIONS INCH		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
DFN	0.90	1.00	1.10	0.035	0.039	0.043

### NOTES

1. DIMENSION AND TOLERANCING CONFORM TO ASME Y14.5M-1994.
2. CONTROLLING DIMENSIONS : MILLIMETER. CONVERTED INCH DIMENSION ARE NOT NECESSARILY EXACT.
3. DIMENSION b APPLIES TO METALLIZED TERMINAL AND IS MEASURED BETWEEN 0.18 AND 0.30 MM. FROM TERMINAL TIP.
4. INSULATION THICKNESS OF OVERLAP ARE USER DEFINED.
5. INSULATION NOT COMPLETELY SHOWN FOR REASONS OF CLARITY.

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