Dual Photodiode PR5001-IR

2 Photodiodes for Spatially Resolved IR Light Detection

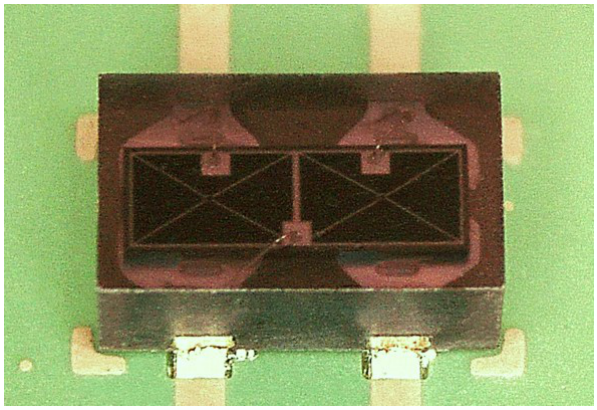
The PR5001-IR is a dual-element Si photodiode moulded into a small plastic leadless optical package. Produced as one chip, the photodiodes offer a very good symmetry, low dark current and high sensitivity for near infrared light. The PR5001-IR is assembled in an infrared-transparent package, blocking most wavelengths below 750 nm.

FEATURES

- Suppresses visible light
- Low dark current
- Low capacitance
- Small Footprint: 1,8 mm x 2,9 mm

TYPICAL APPLICATIONS

- Laser beam alignment
- Opto encoders
- Position detection
- Differential light measurement

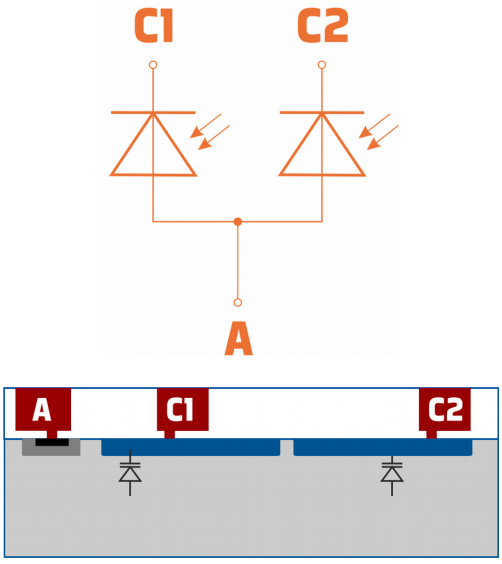


Note: Dice are only visible with CMOS camera without IR filter

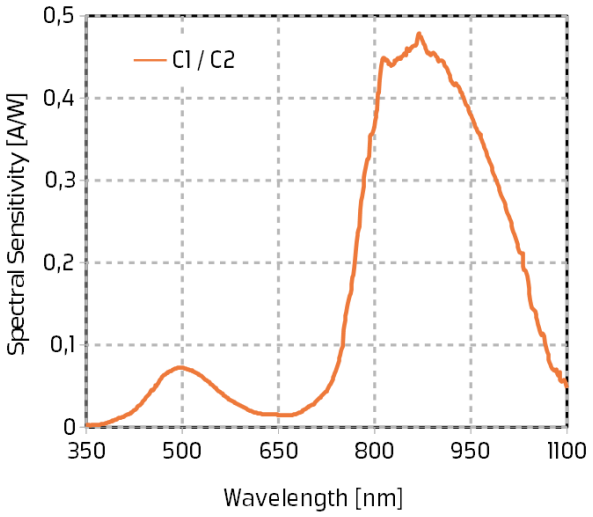
KEY CHARACTERISTICS

Parameter	Typ	Unit
package size	2,9 x 1,8 x 0,9	mm^3
photodiode size	2 x 0,78	mm^2
peak wavelength	860	nm
dark current @ 40°C / Vr = 1 V	14	pA
capacitance @ Vr = 10 V	38	pF

CIRCUIT



SPECTRAL SENSITIVITY



Note: Peak at 500 nm can be suppressed. Please contact PREMA for further details

Dual Photodiode PR5001-IR

Electrical and optical Characteristics

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Min	Max	Units
V_{C-A}	V(A) – V(C1, C2)	-0,3	35	V
T_S	storage temperature	-40	85	°C
T_{peak}	soldering peak temperature		260	°C
P_{tot}	total power dissipation		100	mW

ELECTRICAL CHARACTERISTICS

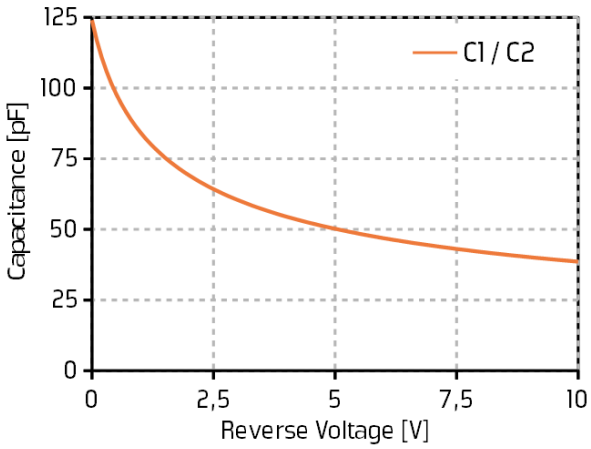
Ta = 27°C, unless otherwise noted.

Symbol	Parameter		Conditions	Min	Typ	Max	Units
T_A	operating ambient temperature			-40		85	°C
$V_{r\ (A-C)}$	reverse voltage V(A) – V(C)					28	V
A_{PD}	active area (geometrical)	C1, C2	width height inactive area (pads) effective active area		1145 738 0,064 0,781		µm µm mm² mm²
I_d	dark current	C1, C2	V_r = 10V		10		pA
$\Delta I_d/\Delta T$	temperature coefficient of dark current	C1, C2	V_r = 10V		10		%/K
λ_{peak}	peak sensitivity wavelength	C1, C2			860		nm
S_{peak}	peak sensitivity	C1, C2			0,46		A/W
C_{j0}	zero-bias junction capacitance	C1, C2	V_r = 0V, f = 1 MHz		125		pF
Cj	biased junction capacitance	C1, C2	V_r = 10V, f = 1 MHz		38		pF

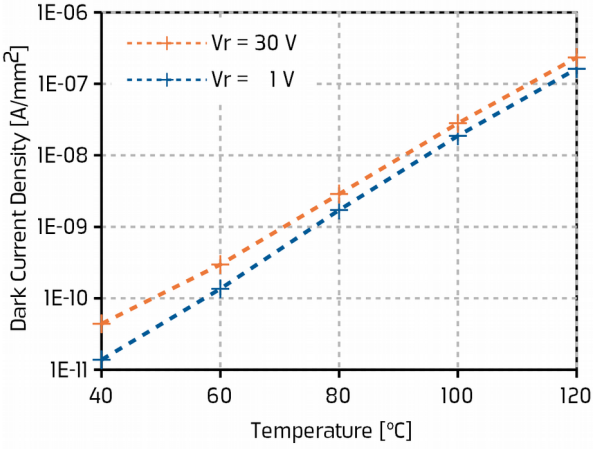
Dual Photodiode PR5001-IR

Electrical and Optical Characteristics

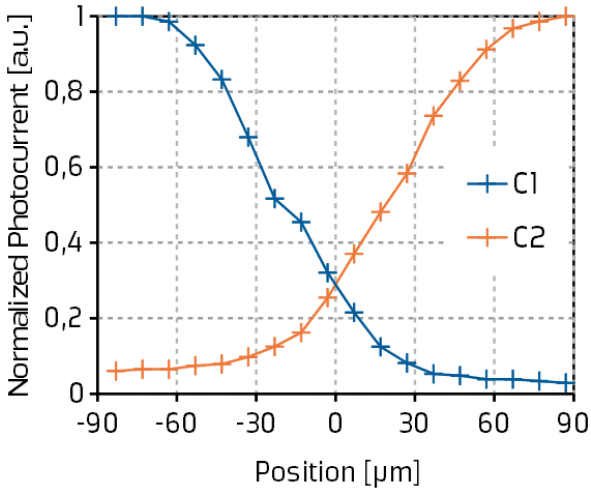
CAPACITANCE VS. REVERSE VOLTAGE



DARK CURRENT VS. TEMPERATURE



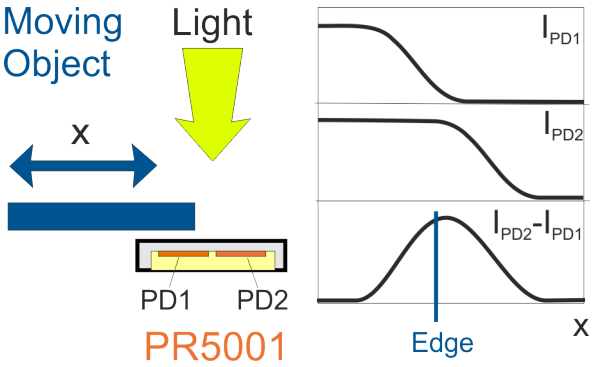
CHANNEL SEPARATION



The crosstalk between both photodiodes C1/C2 was measured. The crossover of a light spot with a diameter of 100 µm from one photodiode to the other has been resolved with increments of 10 µm. The photocurrent was measured with an applied reverse voltage of 4 V.

Considering a beam diameter of 100 µm and a gap between both photodiodes of 50 µm, the observed behaviour is consistent with almost sharp channel separation.

EDGE DETECTOR

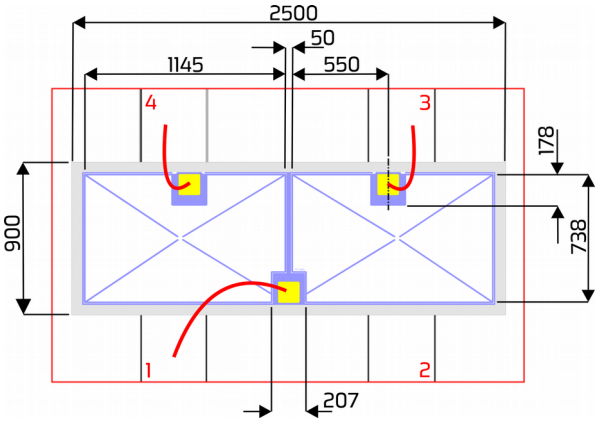


Dual Photodiode PR5001-IR

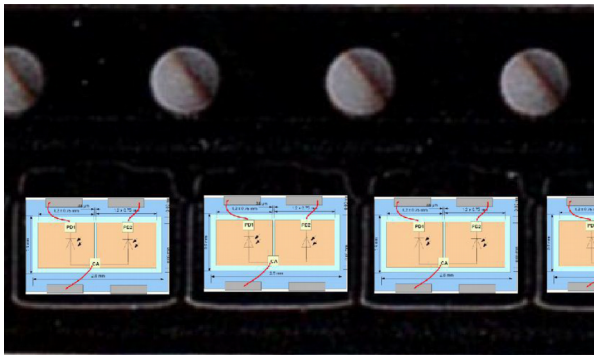
Package Information

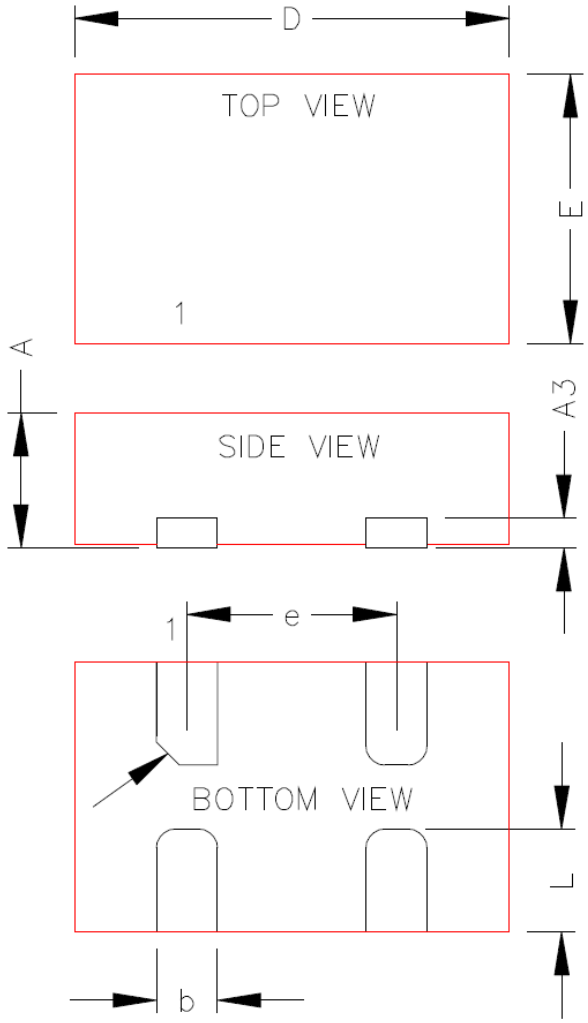
LAYOUT AND PIN CONFIGURATION

Pin No.	Pin Name	PIN Function Description
1	A	Common Anode
2		Not connected
3	C2	Cathode photodiode 2
4	C1	Cathode photodiode 1



ORIENTATION IN TAPE & REEL





PACKAGE DIMENSIONS (ODFN)

	MIN	TYP	MAX	Unit
A	0,85	0,9	0,95	mm
A3		0,20 REF.		mm
b	0,35	0,4	0,45	mm
D	2,8	2,9	3	mm
E	1,7	1,8	1,9	mm
e		1,4 BSC*		mm
L	0,6	0,7	0,8	mm

* Basic Spacing Between Centrers

Package Information

SOLDERING INFORMATION

A lead-free solder profile with a peak temperature of 260°C or less, according to J-STD-020 should be followed.
Parts should be handled in accordance with the moisture sensitivity level as indicated on the moisture barrier bag, but at least to MSL 3.
Any parts without or with unsealed moisture barrier bag must be dry-baked according to JEDEC guidelines before soldering. Manual soldering must be done with utmost care.
Direct infrared heating should be avoided; pure convection heating is recommended.

TAPE & REEL

Reel diameter: 7" (178 mm)
Tape width: 8 mm
Quantity per reel: 3,000
Packaging: moisture barrier bag
Orientation of ICs in tape: Pins 3 and 4 towards sprocket holes

BARE DIES

PR5010 is available as bare dies on request on tested and sawn wafers or in wafflepack.
Please contact us for minimum order quantities and delivery times.

Disclaimer

Information provided by PREMA is believed to be accurate and correct. However, no responsibility is assumed by PREMA for its use, nor for any infringements of patents or other rights of third parties which may result from its use. PREMA reserves the right at any time without notice to change circuitry and specifications.

Life Support Policy

PREMA Semiconductors products are not authorized for use as critical components in life support devices or systems without the express written approval of PREMA Semiconductor. As used herein:
1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, and whose failure to perform when properly used in accordance with instructions for use provided in the labelling, can be reasonably expected to result in a significant injury to the user.
2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

PREMA Semiconductor GmbH
Robert-Bosch-Str. 6
55129 Mainz Germany
Phone: +49-6131-5062-0
Fax: +49-6131-5062-220
Email: prema@prema.com Web site: www.prema.com