

# Photodiode PR5040



## Single Photodiode with identical Outer Dimensions

PR5040 is a single silicon photodiode with rectangular shape having the similar outer dimensions as the segmented types PR5001 to PR5030. The photodiode has a low dark current combined with a high sensitivity. The dies are moulded into a small plastic leadless optical DFN package.

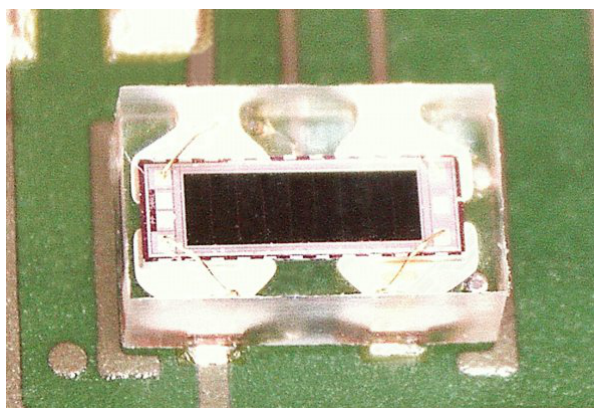
### FEATURES

- single photodiode
- low dark current
- anti-reflective coating (ARC)

### TYPICAL APPLICATIONS

- ambient light detection
- measuring infra-red light

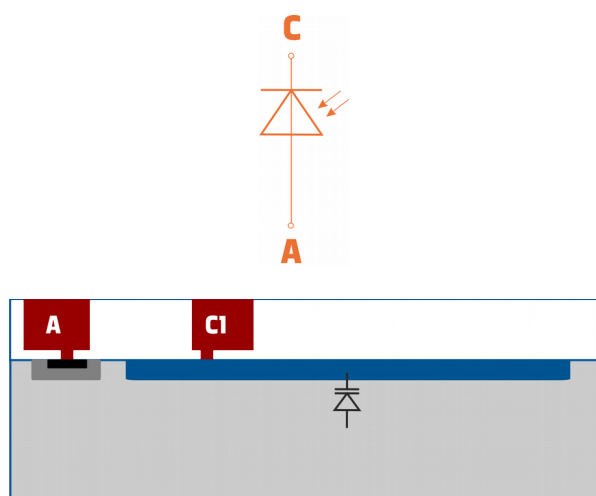
### PR5040



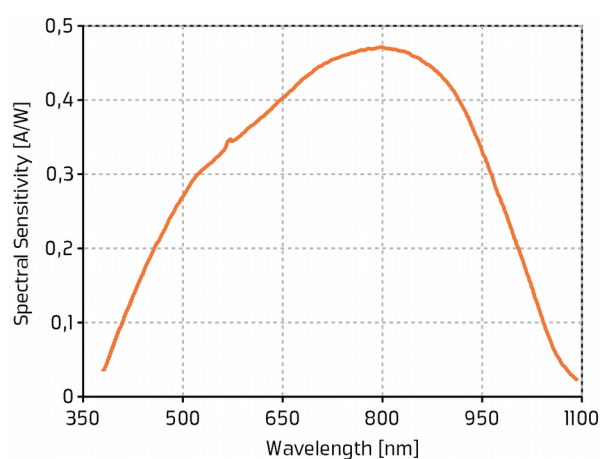
### KEY CHARACTERISTICS

Parameter	Typ	Unit
Package size	2.9 x 1.8 x 0.9	mm
photodiode size	1760 x 608	mm
peak wavelength	830	nm
dark current @ 40°C / Vr = 1 V	13	pA
Capacitance @ Vr = 2 V	96	pF

### CIRCUIT



### SPECTRAL SENSITIVITY



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## Electrical and optical Characteristics

### ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Min	Max	Units
$V_{C-A}$	$V(C) - V(A)$	-0.3	35	V
$T_A$	operating ambient temperature	-40	85	°C
$T_S$	storage temperature	-40	85	°C
$T_{peak}$	soldering peak temperature		260	°C
$P_{tot}$	total power dissipation		100	mW

### ELECTRICAL CHARACTERISTICS

$T_a = 27^\circ\text{C}$

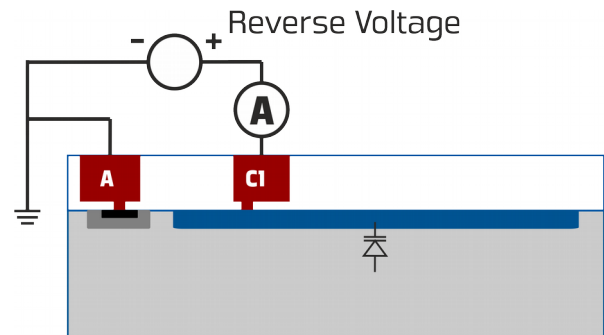
Symbol	Parameter	Conditions	Min	Typ	Max	Units
$T_{amb}$	operating temperature range		-40		85	°C
$V_r (C-A)$	reverse voltage $V(C) - V(A)$				30	V
$A_{PD}$	active area (geometrical)			1.088		mm <sup>2</sup>
$I_d/A$	dark current @ $V_r = 1\text{ V}$	$T_{amb} = 40^\circ\text{C}$ $T_{amb} = 80^\circ\text{C}$		13 0,8		pA nA
$\Delta I_d/\Delta T$	temperature coefficient of $I_d$ @ $T_{amb} > 40^\circ\text{C}$	$V_r (C-A) = 1\text{ V}$ $V_r (C-A) = 30\text{ V}$		12.5 11.0		%/K %/K
$\lambda_{peak}$	peak sensitivity wavelength			800		nm
$S_{peak}$	peak sensitivity			0.48		A/W
$C_j$	junction capacitance @ $F = 1\text{ MHz}$	$V_r = 0\text{ V}$ $V_r = 10\text{ V}$		172 54		pF pF

# Photodiode PR5040

## Dark Current

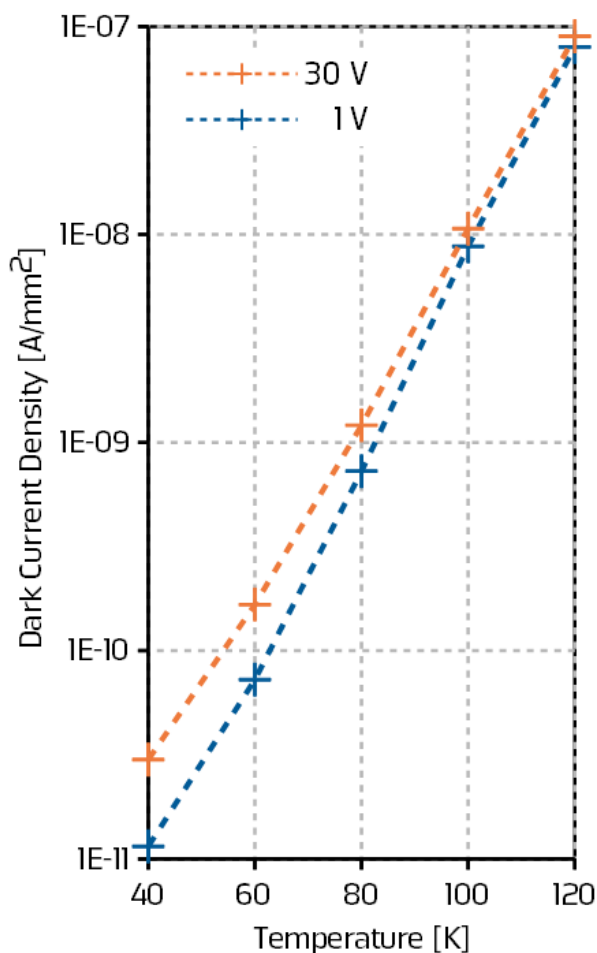
### MEASUREMENT SETUP

Dark currents of the C1 photodiode are measured as a function of reverse voltage and temperature. The substrate (A) is connected to ground, while a positive voltage is applied to C1.



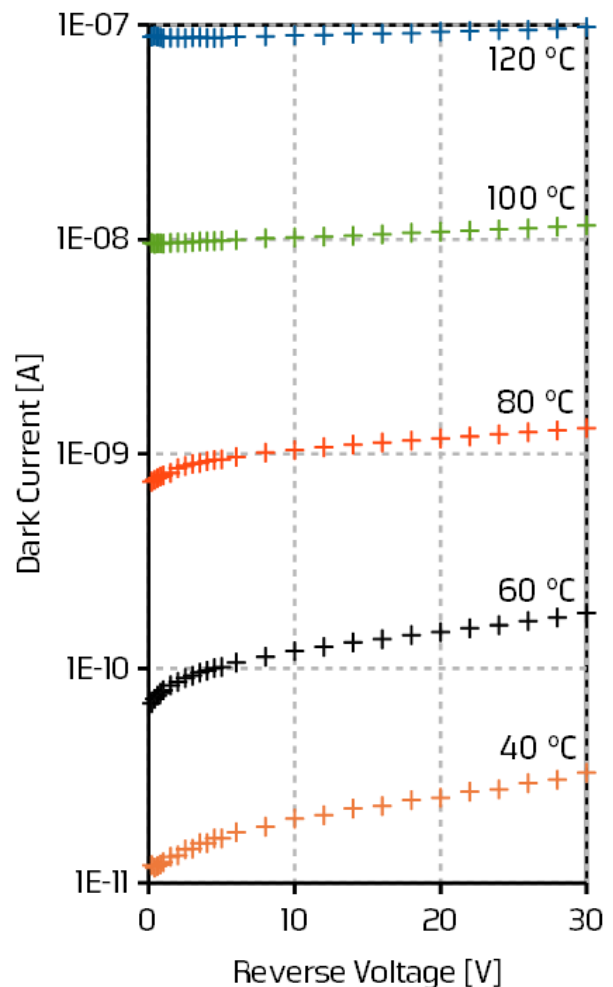
### OVER TEMPERATURE

Dark currents are shown at reverse voltages of 1 V (blue) and 30 V (orange). In general, dark currents rise by approximately a factor 10 every 20 °C.



### AS A FUNCTION OF REVERSE VOLTAGE

The diagram shows the dependency of dark currents on reverse voltage at different temperatures.



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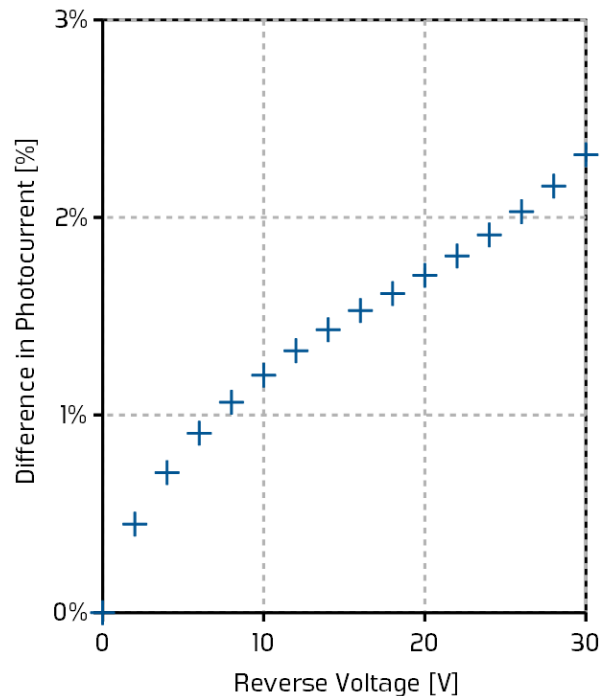
## Electrical and optical Characteristics

### SENSITIVITY AFFECTED BY REVERSE VOLTAGE

The spectral sensitivity increases by a few per cent when reverse voltages are applied to the photodiodes.

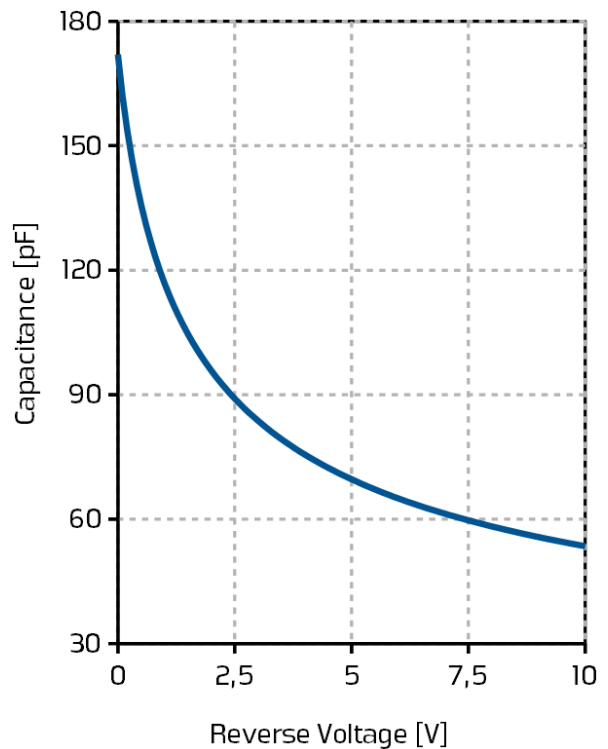
The diagram shows the relative deviation of the photocurrent to the zero-bias value. The deviation changes insignificantly when illumination is changed.

Red light with a wave length of 630 nm and a light intensity of about 16.5  $\mu\text{W}$  were applied.



### CAPACITANCE

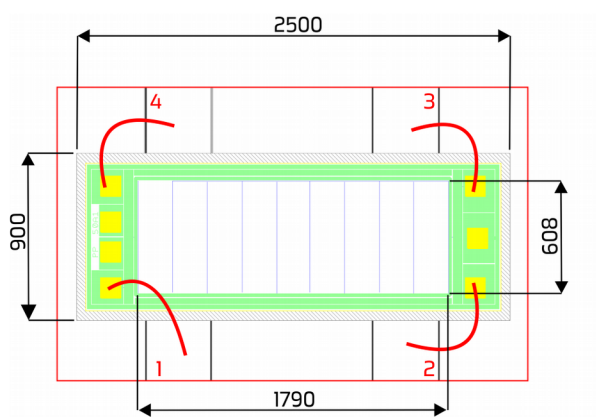
The diagram illustrates the dependency of the capacitances on the applied reverse voltage of the PR5040.



# Photodiode PR5040

## Dimensions

### PR5020



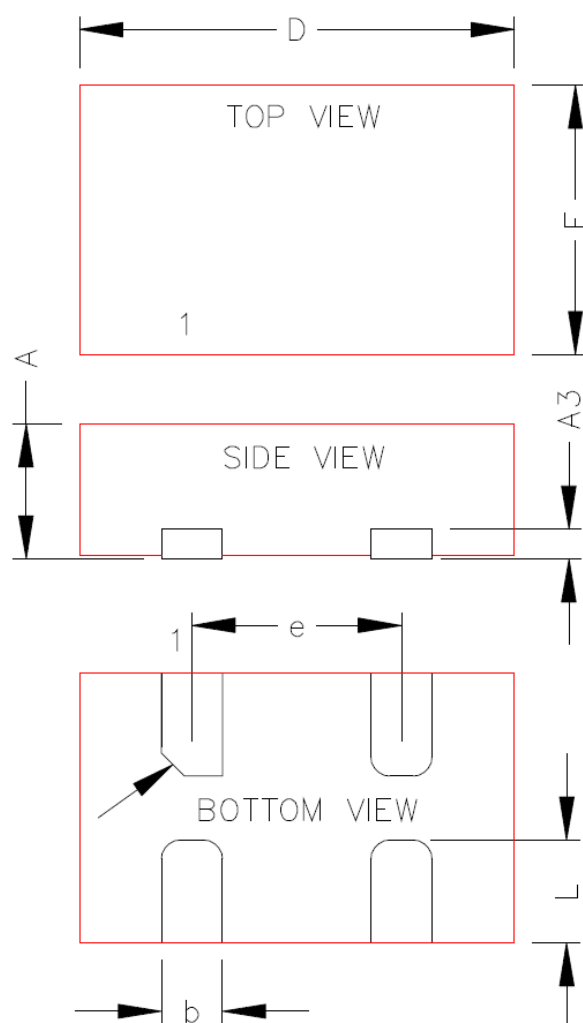
### PIN CONFIGURATION

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

### ODFN-4L – PACKAGE

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

\* Basic Spacing Between Centers



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## Package Information

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### SOLDERING INFORMATION

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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

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PR5040 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.

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