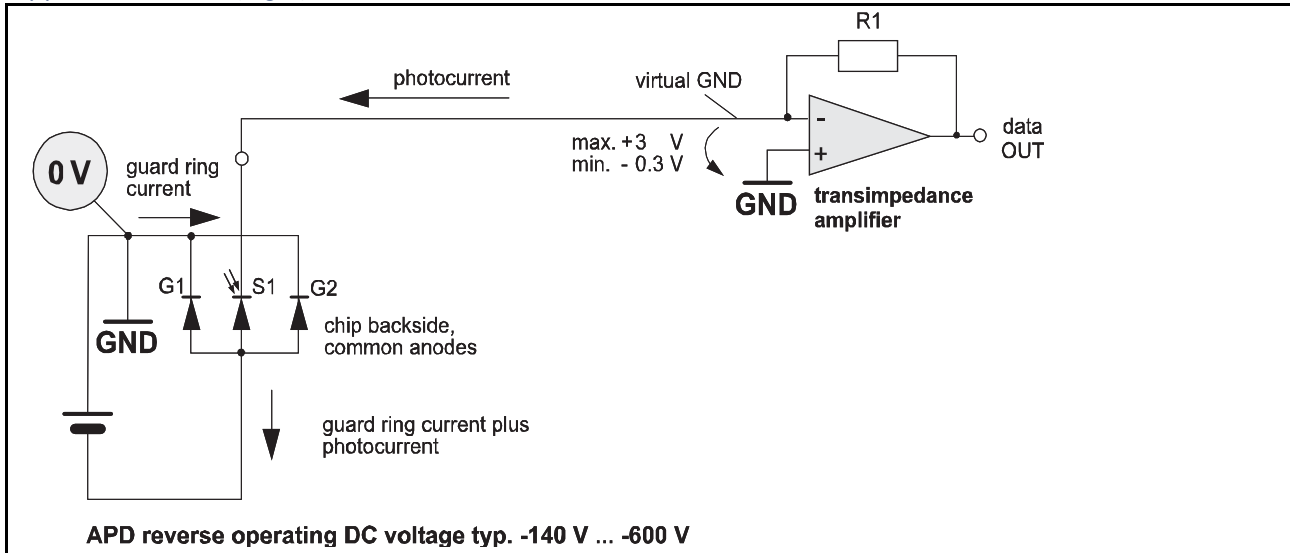


Application circuit (Fig.1)



Application notes

- Keep all cathodes including guard rings on virtual or real ground potential [GND = 0 V].
- A single diode cathode (including guard ring) must never float or get disconnected from GND potential.
- The maximum voltage difference between any diode cathode and GND is +3 V / -0.3 V
- The photocurrent must be allowed to flow from or to any virtual or real ground at any time. So the DC input resistance of the amplifier must not be giga-ohmic (as MOS inputs usually are).
- If there is more than one photodiode enclosed with a guard diode a single channel input per pixel is the best way to process the output data. Alternately, an analog switch may be used. The switch matrix must make sure that all pixels including the guard diode except for the actual measured one are connected to GND.
- The use of a secure current limiter in the reverse operating DC voltage line is recommended. Any overload may produce heat in the device and / or irreversible breakdown in the input structures of the transimpedance amplifiers or analog switches.
- Fig. 1 shows a sample circuit including the signal delivering diode S1 and the guard ring diodes G1 and G2. The guard ring diodes G1 and G2 are connected together on chip. Quadrant devices have 4 signal delivery diodes S1 to S4 and one surrounding guard ring diode instead of the two guard ring diodes G1 and G2 drawn in Fig. 1. The operation mode however is exactly the same as in arrays.
- Breakdown voltage and hence the chosen operating point vary with temperature (see data sheet temperature coefficient).
- The operating reverse voltage should be controlled to compensate for any temperature shift of the device.
- Please note: the gap regions in all avalanche array type devices including quadrants are insensitive to light.
- The guard ring diode must be connected to the circuit at least once per device.
Multiple connections to the same potential are possible.
- The outer light shield metal is at backside potential and may be bonded to backside potential.
If this connection is used instead of a true low resistive backside contact, there may be enhanced parasitic resistances in the signal path, depending on the chip size.
- Current should be limited by a protecting resistor or current limiting - IC inside the power supply.
- For low light level applications blocking of ambient light should be used.
- For high gain applications bias voltage should be temperature compensated.
- Please consider basic ESD protection while handling.
- Use low noise read-out - IC.
- Optimized APD power supplies and evaluation kits are available. Visit our website.
- For further questions please refer to document "Instructions for handling and processing".

European, International Sales:



First Sensor AG
Peter-Behrens-Strasse 15
12459 Berlin
Germany
Phone: +49-30-6399-2399
Fax: +49-30-6399-23752
E-Mail: sales.opto@first-sensor.com

USA:



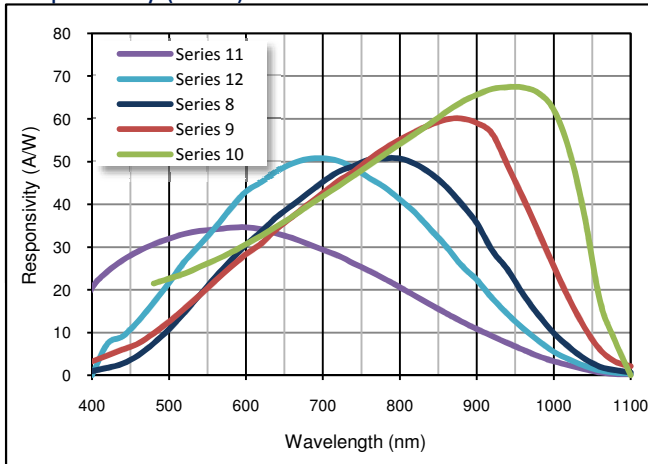
Pacific Silicon Sensor, Inc.
5700 Corsa Avenue #105
Westlake Village
CA 91362 USA
Phone: +1-818-706-3400
Fax: +1-818-889-7053
E-Mail: sales@pacific-sensor.com

APD Series overview

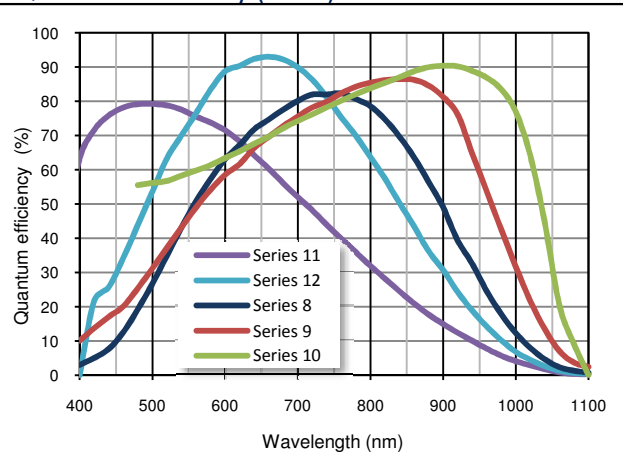
APD Series	Optimized for	Application	Special features
Series -11*	360...560 nm	Analytical instruments, readout for scintillators	Blue enhanced, high speed
Series -12	550...750 nm	Precise distance measurement, communication	Ultra low temp. coefficient, flat frequency response up to 3 GHz
Series -8	750...820 nm	General purpose, distance measurement, laser scanner, high speed applications, optical fiber and communication	High speed, low temperature coefficient, high gain, high bandwidth
Series -9	750...930 nm	Laser rangefinder, LIDAR, basic technology for arrays	Low rise time at higher NIR sensitivity, low temperature coefficient, high gain
Series -10	860...1100 nm	Range finder, laser tracker, LIDAR	Sensitivity at 1064 nm is close to physical limits

* Please note that Series 11 has opposite polarity w.r.t. the the other series'.

Responsivity (23 °C)



Quantum efficiency (23 °C)



APD part description

From the part description it is possible to conclude the basic geometry of the detector:

Number	Two letter designator : device type	Number	-	Number	Package designator
-	AD - Avalanche photodiode	Diameter [μm]	-	Series	TO/THD/SMD/CLP/CH*
-	QA - Quadrant avalanche photodiode	Total diameter [μm]	-	Series	TO/THD/SMD/CLP/CH*
Pixel count	AA - Avalanche photodiode array	Single pixel area [mm^2]	-	Series	TO/THD/SMD/CLP/CH*

*Package designator:

TO	Metal can type package
THD	Through hole device package
SMD	Surface mount device package
CLP	Chip level package
CH	Chip: bare die

Disclaimer: Due to our strive for continuous improvement, specifications are subject to change within our PCN policy according to JESD46C.

European, International Sales:



First Sensor AG
Peter-Behrens-Strasse 15
12459 Berlin
Germany
Phone: +49-30-6399-2399
Fax: +49-30-6399-23752
E-Mail: sales.opto@first-sensor.com

USA:



Pacific Silicon Sensor, Inc.
5700 Corsa Avenue #105
Westlake Village
CA 91362 USA
Phone: +1-818-706-3400
Fax: +1-818-889-7053
E-Mail: sales@pacific-sensor.com