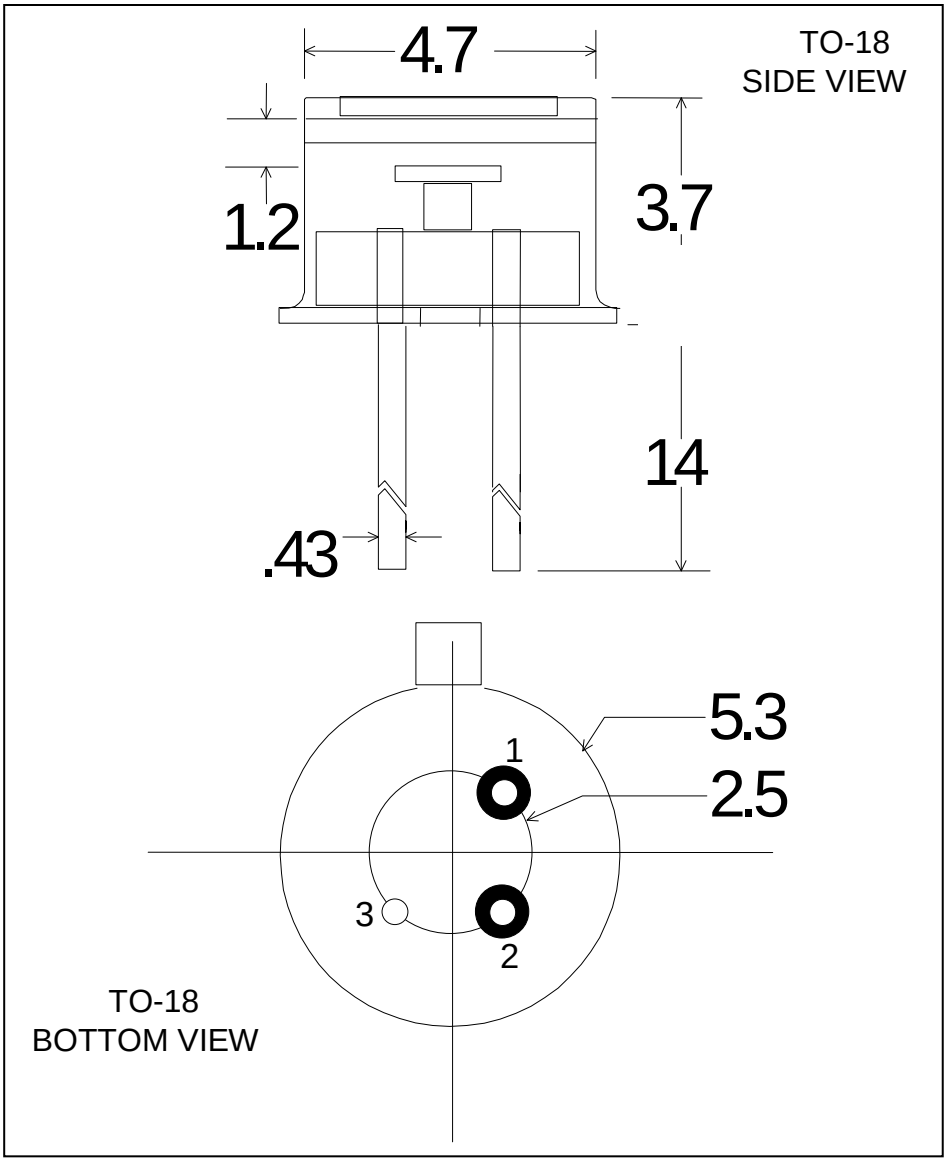
IA - SERIES PHOTODIODE



Part No: **IA-010**

PIN OUT

1 = ANODE
2 = CATHODE
3 = CASE

Note:
Dimensions in millimeters

Application Note

ELECTRO OPTICAL SYSTEMS offers room temperature InAs photodiode detectors for operation in the 1.0 – 3.5 μm spectral range.

The units have state-of-the-art sensitivity and may be supported by accessories such as optical filters (longpass and bandpass), integral preamplifiers, and infrared source assemblies. These units find applications in industrial control systems, gas analyzers, thermal sensors, and general infrared instrumentation.

SPECIFICATIONS	
Active Diameter (mm)	**1.0**
Operating Temperature (°C)	**22**
Operating Wavelength	**1.0 – 3.4**
Shunt Resistance (Ω) typ	**≥ 15**
Shunt Capacitance (pF)	**400 typ**
Responsivity @ 3.2 μm (A/W)	**1.0**
NEP @ 3.2 μm (W/Hz$^{1/2}$)	**33 x 10^{-12}**

RoHS Compliant

Electro - Optical Systems Inc, 1288 Valley Forge Rd, Ste 49, Phoenixville, PA 19460
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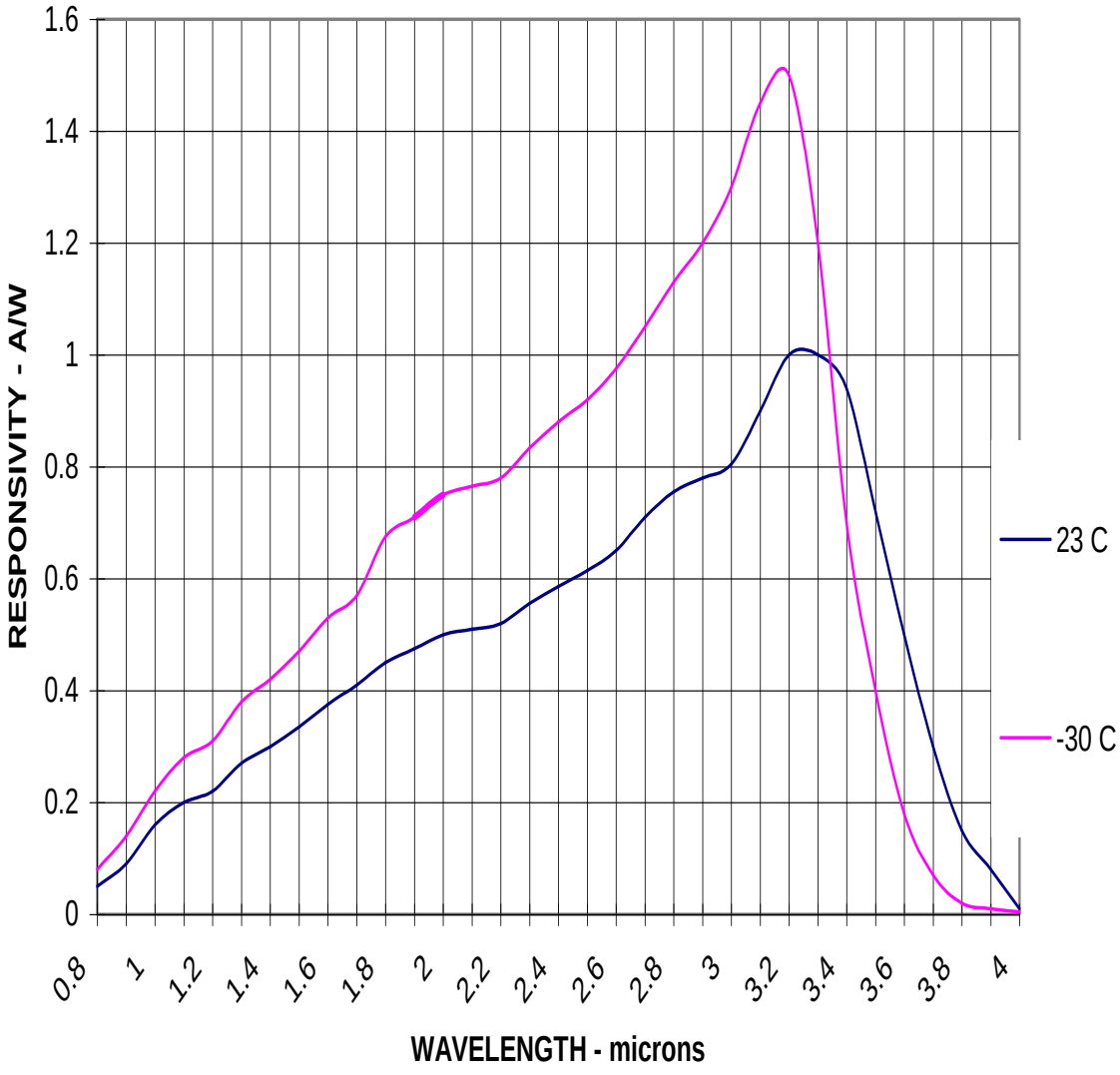
IA - SERIES PHOTODIODE

SPECTRAL RESPONSE - IA-series



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USING THE LOW IMPEDANCE InAs PHOTODIODES

The IA-series photodiodes operate in a similar fashion as more common silicon or InGaAs devices in that they generate a current proportional to incident radiation within their sensitive wavelength region -- 1 to 3.4 microns. A number of differences in their electrical characteristics however make it essential that the user designs an optimized amplifier circuit for these specific devices.

Parameters to consider:

1) Shunt resistance -- the low value of the shunt resistance is the primary problem in interfacing the detector. With typical values of 10 ohms (IA-020) to 25 ohms (IA-010) these photodiodes look quite different. Some circuit considerations:

a) DC offset voltages -- the output offset voltage is determined by the amplifier's input offset multiplied by the voltage gain of the circuit. High impedance photodiodes typically have very low voltage gains in a transimpedance amplifier, but a 10 ohm IA-series device with a 10k feedback amplifier has a voltage gain of 1000. Choose an amplifier with good offset properties. Also consider a low gain 1st stage with an AC-coupled 2nd stage if DC information is not critical.

b) Noise voltages -- the input noise voltage, not the input noise current of the amplifier is critical. Choose an amplifier with as low as possible input noise voltage.

2) Series resistance -- the series resistance of these devices is only a few ohms, but this can cause problems because the level is significant compared to the shunt resistance. The series resistance lowers the overall responsivity and causes a non-uniformity in response across the active area (a fall-off as the light moves away from the electrical contact area).