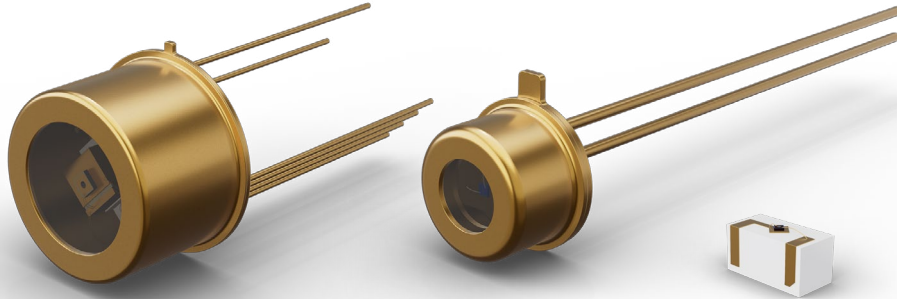


## IAG-SERIES

InGaAs Avalanche Photodiode



The IAG-series avalanche photodiode is the largest commercially available InGaAs APD with high responsivity and extremely fast rise and fall times throughout the 1000 to 1630 nm wavelength range. The peak responsivity at 1550 nm is ideally suited to eye-safe rangefinding applications, free space optical communications, OTDR and high resolution Optical Coherence Tomography. The chip is hermetically sealed in a modified TO-46 package. SMD and pigtailed options are also available.

### FEATURES

- / 80, 200 or 350  $\mu\text{m}$  active area
- / Bandwidth up to 2.5 GHz
- / Over 70% QE from 1000 to 1600 nm
- / Low dark current and noise
- / Modified TO-46 or ceramic submount
- / Fiber-coupled versions available

### APPLICATIONS

- / Rangefinding
- / Optical communication systems
- / Optical coherence Tomography
- / Low-light-level detection

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## SPECIFICATIONS

### Generic Characteristics at T = 21 °C

	IAG-Series		
	Min	Typ	Max
Wavelength range [nm]	1000		1630
Peak sensitivity [nm]		1550	

### Absolute Maximum Ratings

	IAG 080X / IAG 200X / IAG 350X		
	Min	Typ	Max
Storage temperature [°C]	-60		125
Operating temperature <sup>1</sup> [°C]	-40		85
Max. reverse current [mA]			1
Max. forward current [mA]	0		10
Optical input (10 ns pulse) [kW/cm <sup>2</sup> ]			200
Optical input (average) [dBm]			0/0/2
Soldering (for 15 sec.) [°C]			260

<sup>1</sup> Extended operating temperature range possible for special design considerations

### Electrical Characteristics at T<sub>c</sub> = 25 °C, λ = 1550 nm

Parameter	IAG 080X			IAG 200X			IAG 350X		
	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max
Active diameter [μm]	78	80	82	200	205	210	350	352	355
Responsivity @ M=1 [A/W]	0.85	0.94	1.05	0.90	0.94	1.05	0.90	0.94	1.05
Dark current @ M=10 [nA]	-	3	15	-	25	50	-	50	250
Operating voltage V <sub>r</sub> @ M=10 [V]	-	60	70	-	55	65	30	45	60
Breakdown voltage V <sub>br</sub> (I <sub>d</sub> =10 μA) [V]	45	66	75	45	60	75	35	55	70
Capacitance [pF]	0.32	0.35	0.40	-	1.7	2.1	-	4.1	4.6
Temperature coeff. of V <sub>br</sub> [V/°C]	-	0.075	-	-	0.075	-	-	0.075	-
Bandwidth @ M=5 [GHz]	2.0	2.5	3.0	0.5	1.0	1.5	-	0.6	-
Bandwidth @ M=10 [GHz]	2.0	2.5	3.0	0.5	1.0	1.5	-	0.6	-
Bandwidth @ M=20 [GHz]	1.5	2.2	2.5	0.5	0.8	1.2	-	0.6	-
Excess noise factor F @ M=10	-	3.2	3.7	-	3.2	3.7	-	3.2	3.7
Excess noise factor F @ M=20	-	5.5	6.0	-	5.5	6.0	-	5.5	6.0
Noise equivalent power NEP @ M=10 [pW/Hz <sup>1/2</sup> ]	-	0.04	0.07	-	0.07	0.2	-	0.12	-

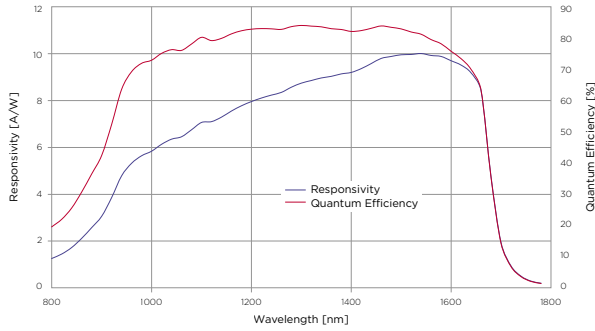


Figure 1: Spectral Response and Quantum Efficiency @ M=10, 1550 nm

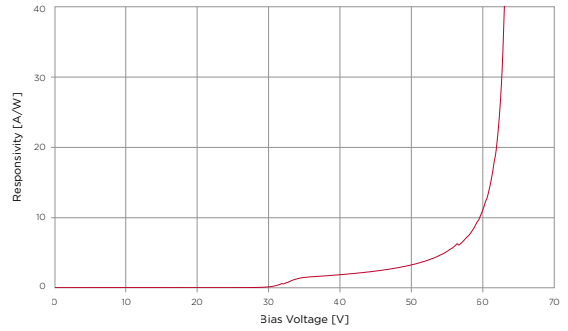


Figure 2: Responsivity Voltage Characteristics @ 25 °C

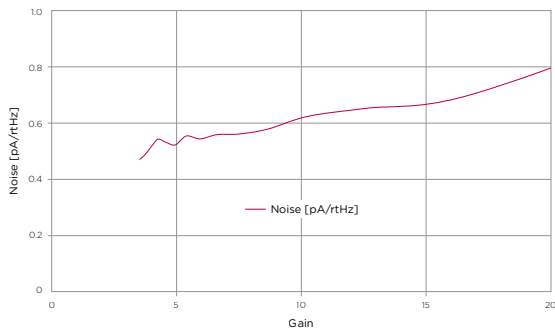


Figure 3: Typical APD Noise Density as a Function of Gain  
(only valid for IAG 200-Series)

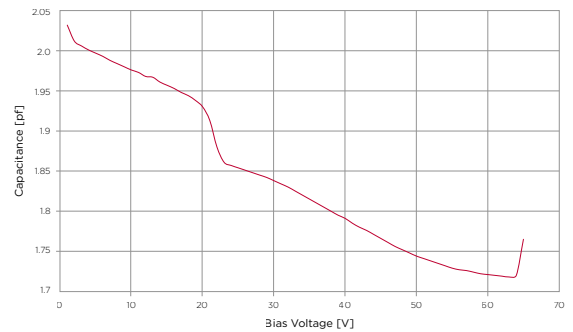


Figure 4: Capacitance vs. Reverse Voltage

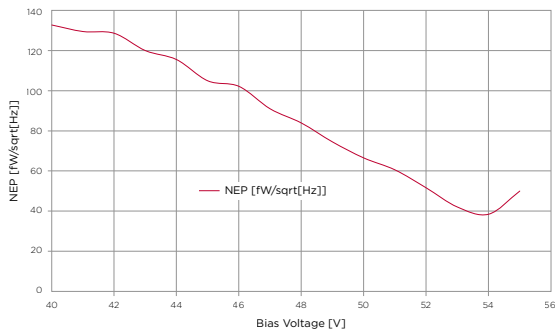


Figure 5: NEP vs. Bias Voltage (only valid for IAG 200-Series)

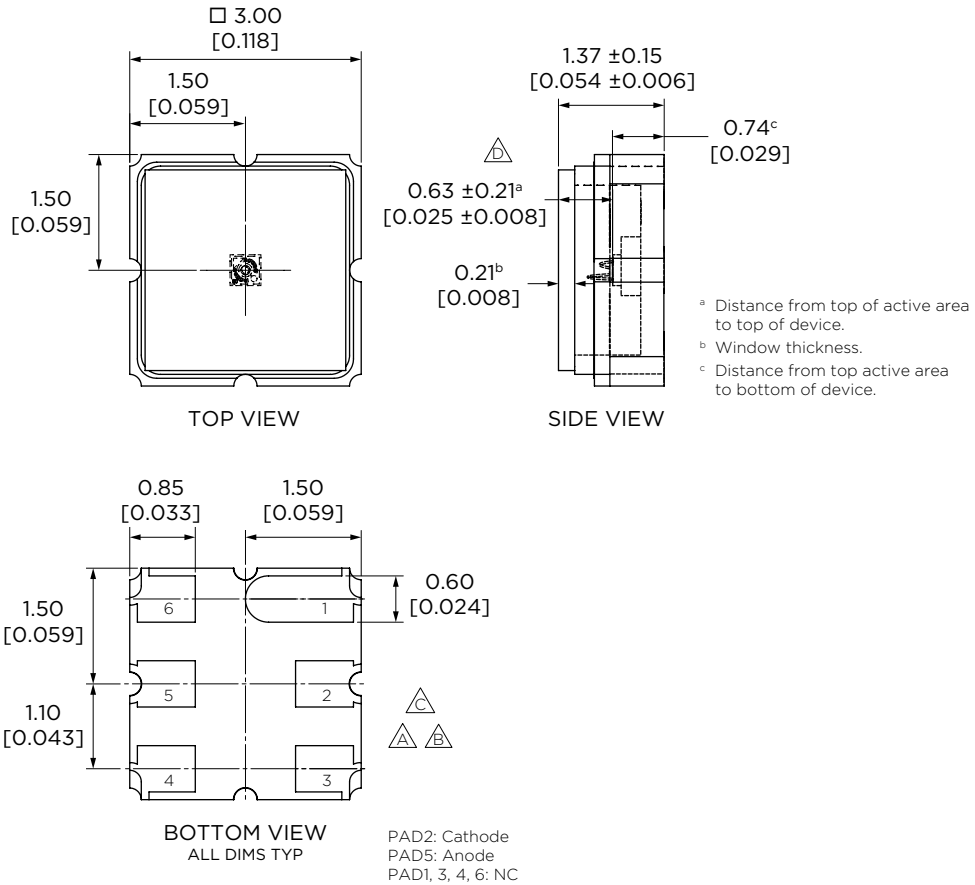
# INGAAS AVALANCHE PHOTODIODE

IAG-Series



## TECHNICAL DRAWING

Package M6



M6

Units: mm [inch]  
Dimensions are in millimeters - [inches] and are for reference only.

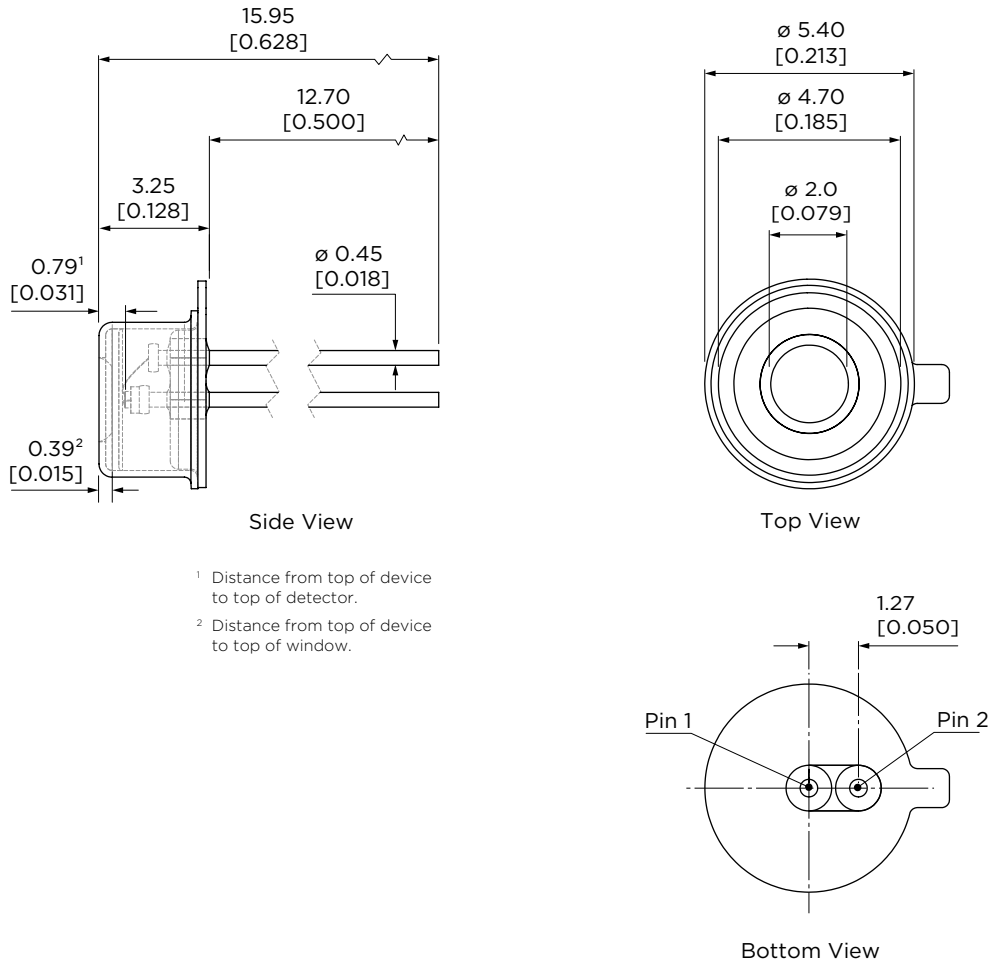
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# INGAAS AVALANCHE PHOTODIODE

IAG-Series

## TECHNICAL DRAWING

Package S5 TO-46 (2 pin)



### Package S5 TO-46 2 Pin

Pin out:

1. Cathode (-)
2. Anode (+)

Units: mm [inch]

Dimensions are in millimeters - [inches] and are for reference only.

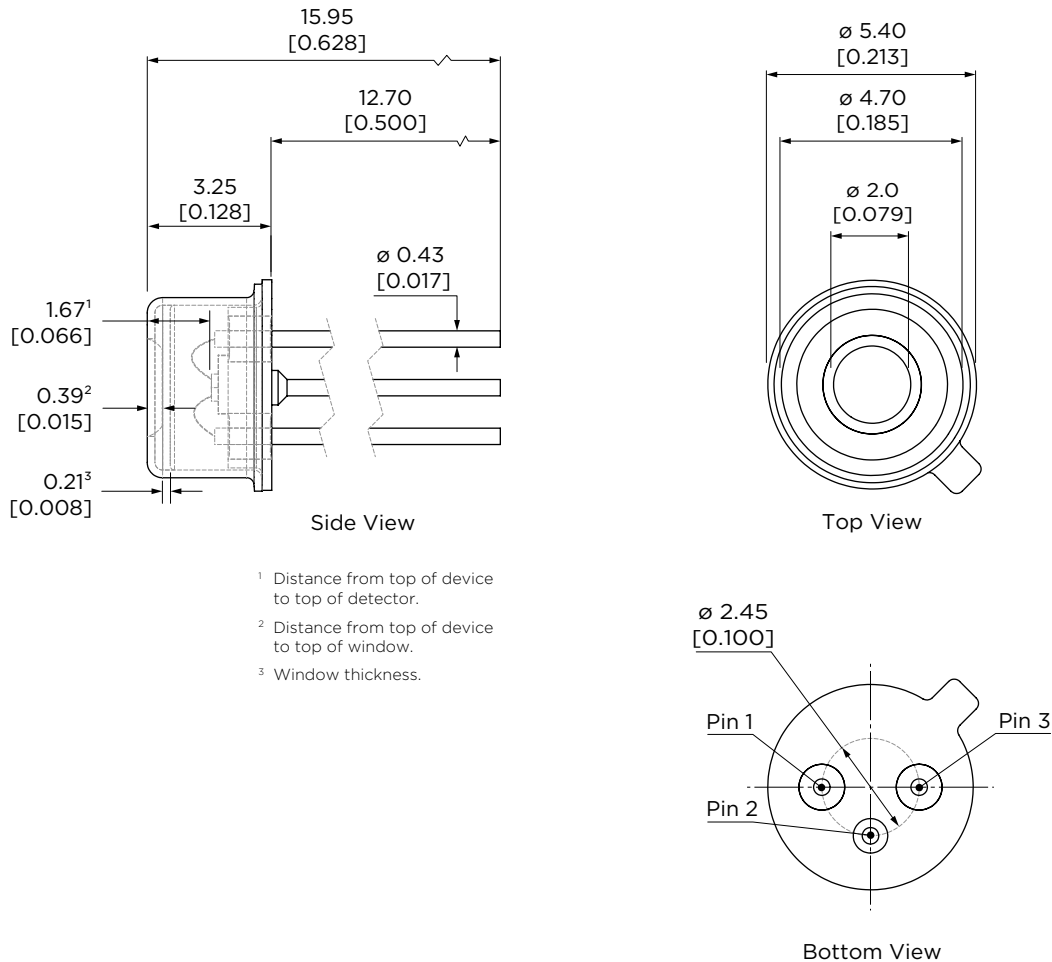
# INGAAS AVALANCHE PHOTODIODE

IAG-Series



## TECHNICAL DRAWING

Package S6 TO-46 (3 pin)



### Package S6 TO-46 3 Pin

Pin out:

1. Cathode (-)
2. Case/Ground
3. Anode (+)

Units: mm [inch]

Dimensions are in millimeters - [inches] and are for reference only.

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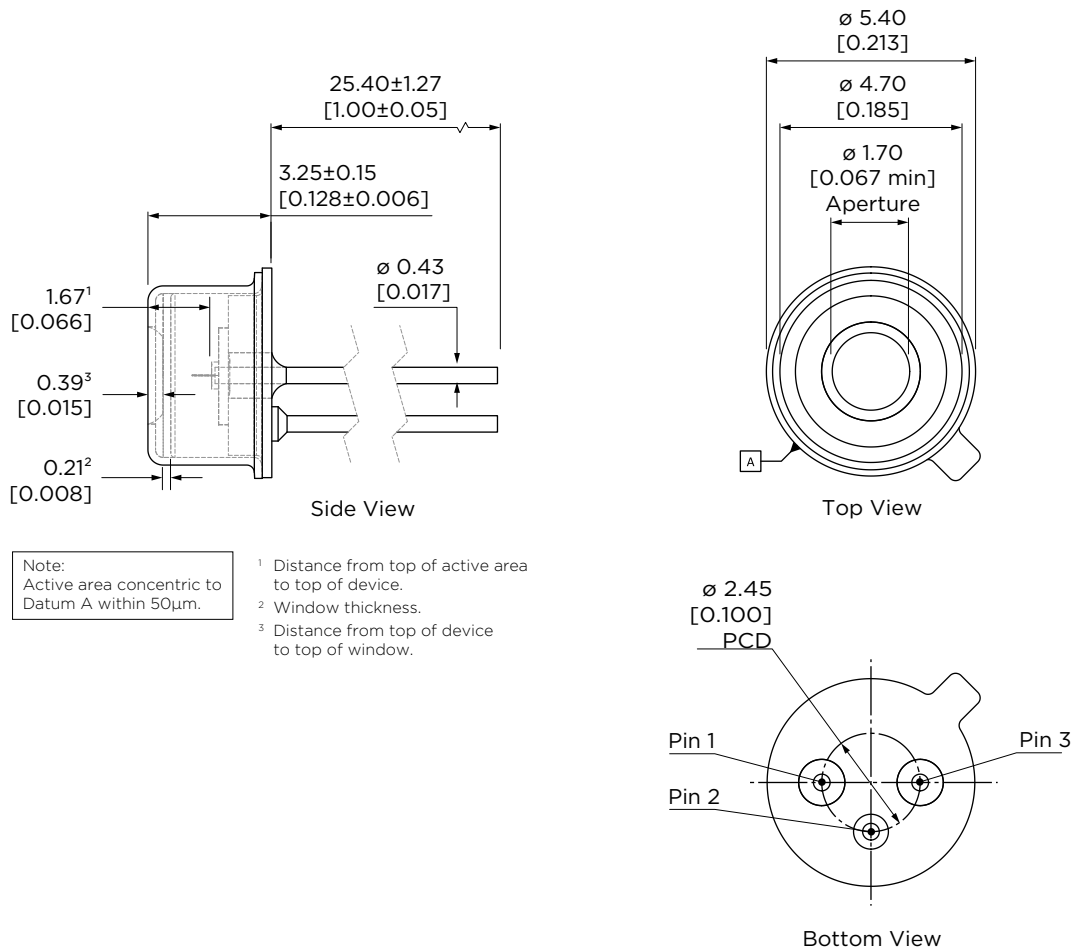
# INGAAS AVALANCHE PHOTODIODE

IAG-Series



## TECHNICAL DRAWING

Package S6L TO-46 (3 pin 1" lead)



### Package S6L TO-46 3 Pin

Pin out:

1. Cathode (-)
2. Ground/Case
3. Anode (+)

Units: mm [inch]

Dimensions are in millimeters - [inches] and are for reference only.

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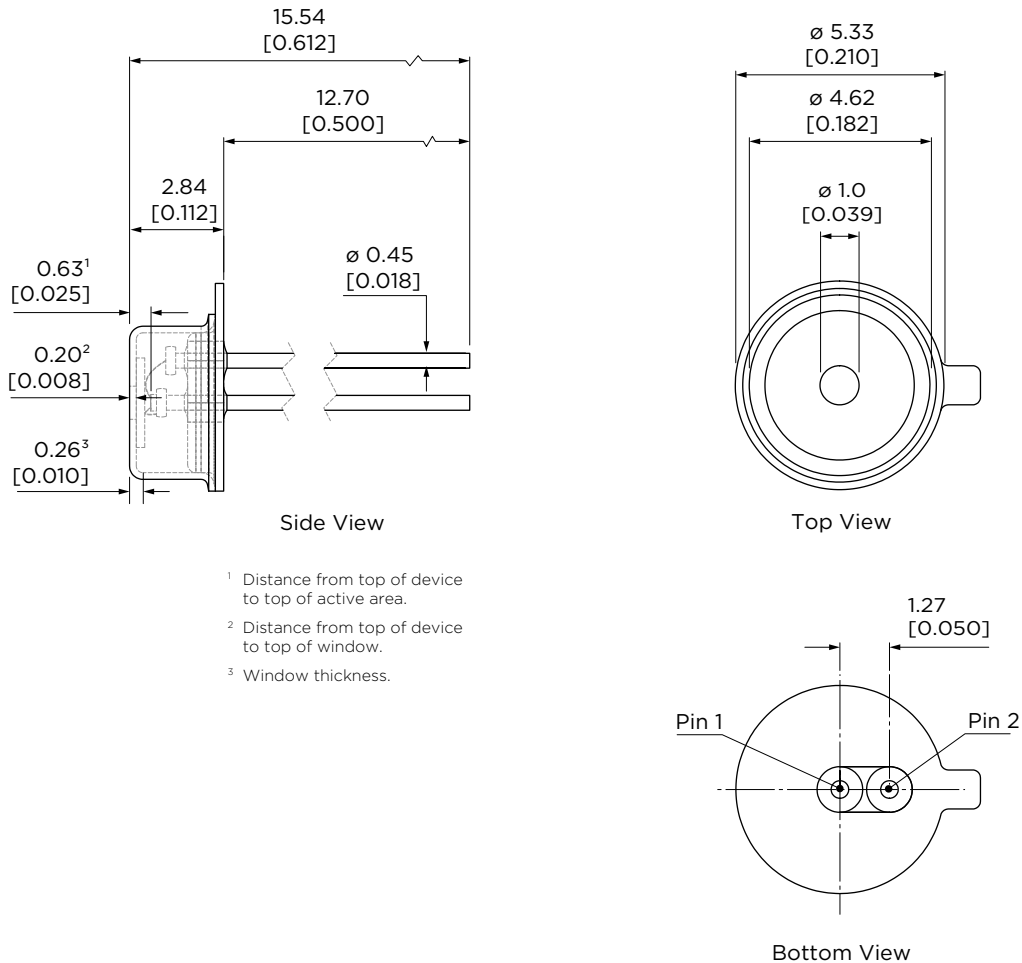
# INGAAS AVALANCHE PHOTODIODE

IAG-Series



## TECHNICAL DRAWING

Package S7 TO-46 (low profile)



### Package S7 TO-46

Pin out:

1. Cathode (-)
2. Anode (+)

Units: mm [inch]

Dimensions are in millimeters - [inches] and are for reference only.

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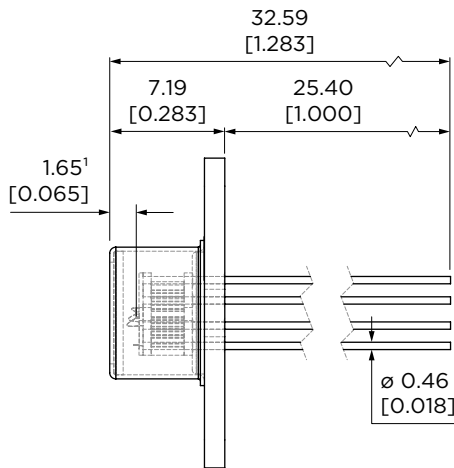
# INGAAS AVALANCHE PHOTODIODE

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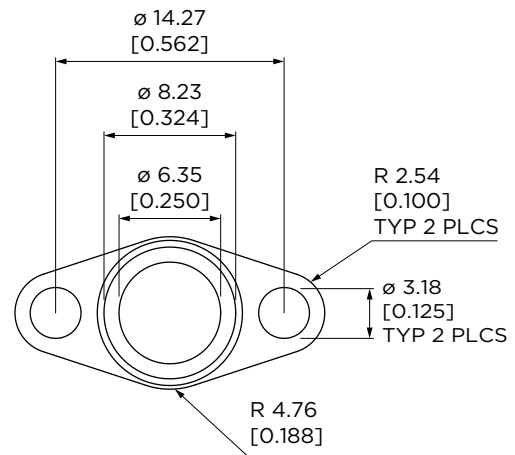


## TECHNICAL DRAWING

Package T6 TO-37 (with TEC)

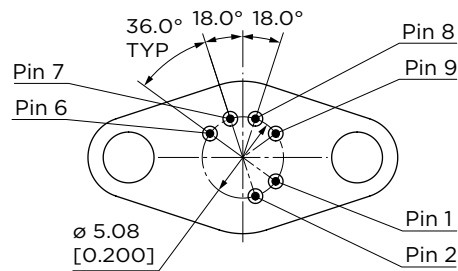


Side View



Top View

<sup>1</sup> Distance from top of device to top of detector.



Bottom View

### Package T6 TO-37

Pin out:

1. Thermistor
2. Thermistor
6. Anode (+)
7. Cathode (-)
8. TEC-
9. TEC+

Units: mm [inch]

Dimensions are in millimeters - [inches] and are for reference only.

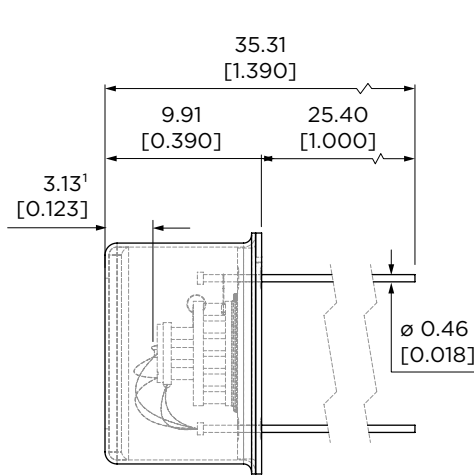
# INGAAS AVALANCHE PHOTODIODE

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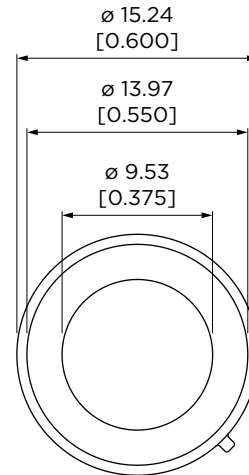


## TECHNICAL DRAWING

Package T8 TO-8 (with TEC)

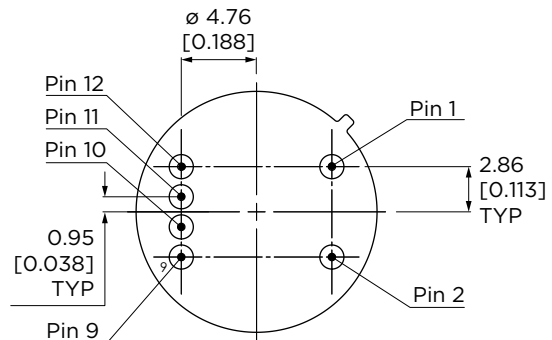


Side View



Top View

<sup>1</sup> Distance from top of device to top of detector.



Bottom View

### Package T8 TO-8

Pin out:

1. TEC -
2. TEC +
9. Anode (+)
10. Thermistor
11. Thermistor
12. Cathode (-)

Units: mm [inch]

Dimensions are in millimeters - [inches] and are for reference only.

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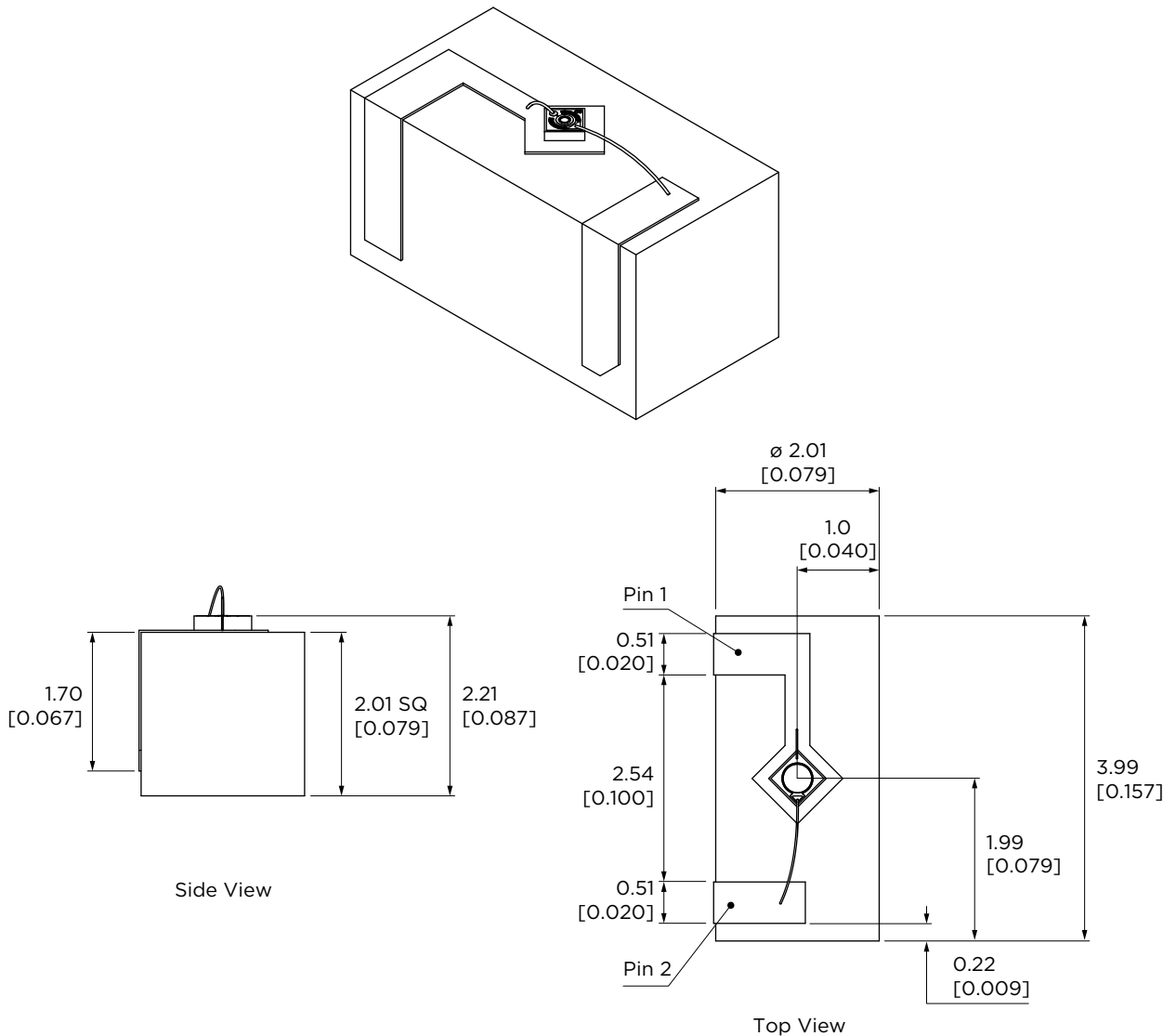
# INGAAS AVALANCHE PHOTODIODE

IAG-Series



## TECHNICAL DRAWING

Package Y1 Ceramic Submount



### Package Y1 Ceramic Submount

Pin out:

1. Cathode (-)
2. Anode (+)

Units: mm [inch]

Dimensions are in millimeters - [inches] and are for reference only.

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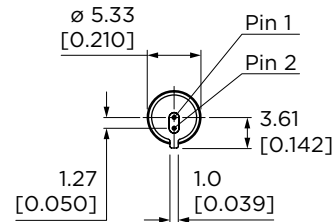
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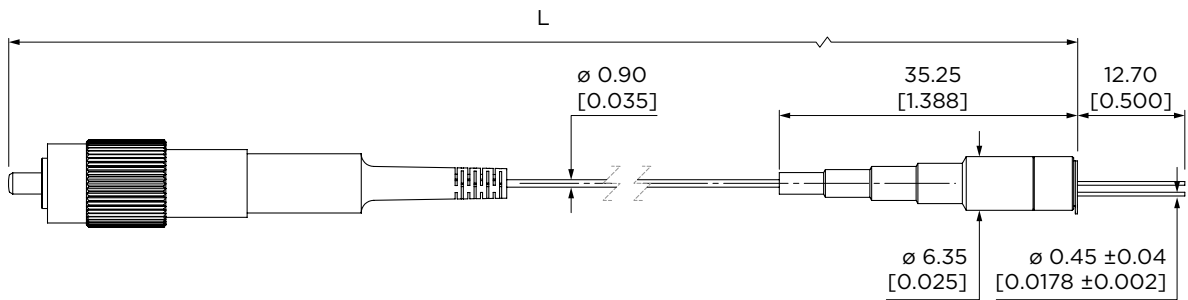


## TECHNICAL DRAWING

Package FP Fiber Pigtail



Bottom View



Side View

### Package FP Fiber Pigtail

Pin out:

1. Cathode (-)
2. Anode (+)

Units: mm [inch]

Dimensions are in millimeters - [inches] and are for reference only.

# INGAAS AVALANCHE PHOTODIODE

IAG-Series



## ORDERING CODE

	Diameter [μm]	Package Style	Fiber (FP only)	Connector (FP only)	Fiber length [m] (FP only)
<b>IAG</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>
	<b>080</b> <b>200</b> <b>350</b>	<b>M6</b> = 3x3 mm SMD <b>S5</b> = TO-46 (2 pin) <b>S6</b> = TO-46 (3 pin) <b>S6L</b> = TO-46 (3 pin 1" lead) <b>S7</b> = TO-46 (low profile) <b>T6</b> = TO-37 (with TEC) <b>T8</b> = TO-8 (with TEC) <b>Y1</b> = ceramic submount <b>FP</b> = fiber pigtail	<b>1/15</b> = 9 μm core, NA 0.15 <b>5/20</b> = 50 μm core, NA 0.20 <b>6/27</b> = 62.5 μm core, NA 0.27 <b>10/22</b> = 105 μm core, NA 0.22	<b>O</b> = none <b>SM</b> = SMA <b>FC</b> = FC/PC <b>FA</b> = FC/APC	

Note: other fibers and connectors are available on request.

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