

# AVALANCHE PHOTODIODES FOR INDUSTRIAL & ANALYTICAL APPLICATIONS

Avalanche Photodiodes  
Silicon and InGaAs APDs



## Avalanche Photodiodes – Silicon and InGaAs APDs

### Applications

- Laser range finder
- Scanning video imager
- Confocal microscope
- Free space communication
- Spectrophotometers
- Fluorescence Detection
- Luminometer
- DNA sequencer
- Particle sizing

### Features and Benefits

- Low noise
- High gain
- High quantum efficiency
- Built-in TE-cooler option
- Various optical input options

### Product Description

These rear entry “reach-through” silicon APDs offer the best compromise in terms of cost and performance for applications requiring high speed and low noise photon detection from 400 nm up to 1100 nm. They feature low noise, high quantum efficiency and high gain while maintaining reasonably low operating voltage. The active area varies from 0.5 mm to 3 mm to accommodate a large variety of applications.

The “S” series of the C30902 family of APDs can be used in either their normal linear mode ( $V_R < V_{BR}$ ) or as photon counter in the Geiger mode ( $V_R > V_{BR}$ ). This series is particularly well-suited for ultra-sensitive photon measurements in biomedical and analytical instruments.

Precise temperature control can be achieved with a thermo electric cooler which can be used to improve noise and responsivity or to maintain constant responsivity over a wide range of ambient temperature.

High quantum efficiency can be achieved from 1100 nm to 1700 nm with our InGaAs Avalanche Photodiodes. They were designed to maintain high gain, high quantum efficiency and high bandwidth even with their large area of up to 200  $\mu\text{m}$ . The short distance between to window and the active area allows easy interface with optical system.

### Technical Specification

## Avalanche Photodiodes – Silicon and InGaAs APDs

Unit	Active Diameter mm	Capacitance pF	Rise/Fall Time ns	Dark Current nA	Breakdown Voltage min V	Breakdown Voltage max V	Temperature Coefficient V/°C	Typical Gain	Responsivity 830 nm A/W	Responsivity 900 nm A/W	Responsivity 1060 nm A/W	NEP fW/ $\sqrt{\text{Hz}}$	Package
C30817EH	0.8	2	2	50	300	475	2.2	120		75		1	TO-5
C30872EH	3	10	2	100	325	500	2.2	60		37	9	30	TO-8
C30884E CDxx	0.8	4	1	100	190	290	1.1	100		63	8	13	TO-5
C30902BH	0.5	1.6	0.5	15	185	265	0.7	150	77	60		3	Ball lens TO-18
C30902BFCH	0.5	1.6	0.5	15	185	265	0.7	150	77	60		3	FC receptacle
C30902BSTH	0.5	1.6	0.5	15	185	265	0.7	150	77	60		3	ST receptacle
C30902EH	0.5	1.6	0.5	15	185	265	0.7	150	77	60		3	TO-18, flat window
C30902SH	0.5	1.6	0.5	15	185	265	0.7	250	128	108		0.9	TO-18, flat window
C30916EH	1.5	3	3	100	315	490	2.2	80		50	12	20	TO-5
C30921EH	0.25	1.6	0.5	15	185	265	0.7	150	77	60		3	TO-18, flat window
C30921SH	0.25	1.6	0.5	15	185	265	0.7	250	128	108		0.9	TO-18, light pipe
C30954EH	0.8	2	2	50	300	475	2.4	120		75	36	13	TO-5
C30955EH	1.5	3	2	100	315	490	2.4	100		70	34	14	TO-5
C30956EH	3	10	2	100	325	500	2.4	75		45	25	25	TO-8

Product Table

**Silicon APD – TE-Cooled**

Unit	Active Diameter mm	Active Area mm <sup>2</sup>	Total Capacitance pF	Rise/Fall Time ns	Dark Current nA	Breakdown Voltage min V	Breakdown Voltage max V	Temperature Coefficient	Typical Gain	Responsivity 830 nm A/W	Responsivity 900 nm A/W	Responsivity 1060 nm A/W	Noise Current pA/sqrt(Hz)	Package
C30902SH-TC	0.5	0.2	1.6	0.5	2	225	-	0.7	250	128	108	-	0.04	TO-8 flange
C30902SH-DTC	0.5	0.2	1.6	0.5	1	225	-	0.7	250	128	108	-	0.02	TO-8 flange
C30954E-TC	0.8	0.5	2	2	50	300	475	2.4	120	-	75	-	0.2	TO-8 flange
C30954E-DTC	0.8	0.5	2	2	50	300	475	2.4	120	-	75	-	0.04	TO-8 flange
C30955E-TC	1.5	1.8	3	2	100	315	490	2.4	100	-	70	-	0.2	TO-8 flange
C30955E-DTC	1.5	1.8	3	2	100	315	490	2.4	100	-	70	-	0.05	TO-8 flange
C30956E-TC	3	7	10	2	100	325	500	2.4	75	-	45	-	0.2	TO-8 flange

TC stands for single stage cooler, operating temperature 0°C  
DTC stands for double stage cooler, operating temperature -20°C

Product Table

**InGaAs APD**

Unit	Active Diameter µm	Capacitance pF	Bw MHz	Dark Current nA	Breakdown Voltage min V	Breakdown Voltage max V	Temperature Coefficient V/°C	Typical Gain	Responsivity 1550 nm A/W	NEP fW/sqrt(Hz)	Package
C30662EH	200	2.5	800	70	40	90	0.14	10	9.3	100	TO-18
C30662ECERH	200	2.5	800	70	40	90	0.14	10	9.3	100	Ceramic carrier
C30645EH	80	1.25	1000	35	40	90	0.14	10	9.3	25	TO-18
C30645ECERH	80	1.25	1000	35	40	90	0.14	10	9.3	25	Ceramic carrier
C30644EH	50	0.6	2000	25	40	90	0.14	10	9.3	15	TO-18
C30644ECERH	50	0.6	2000	25	40	90	0.14	10	9.3	15	Ceramic carrier

Graph 1

**Typical Spectral Responsivity @ 22°C**

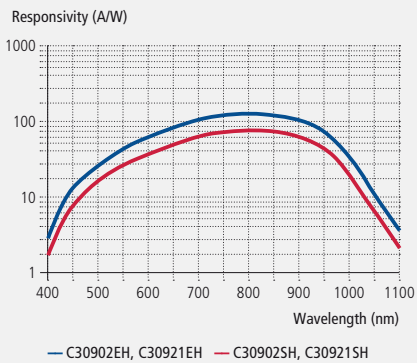


Figure 1

**Package Drawing – TO-8 Flange**

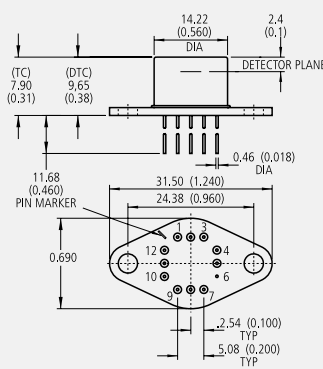


Figure 2

**Typical TO-5 Package\***

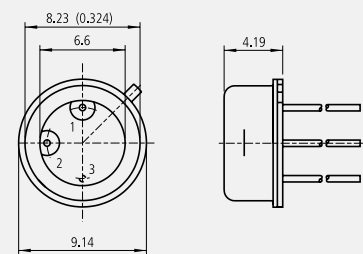


Figure 3

**Typical TO-8 Package\***

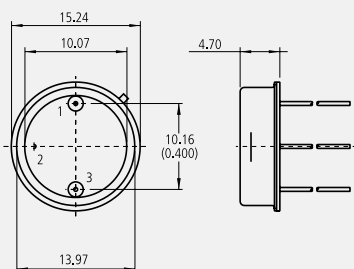


Figure 4

**Ceramic Carrier**

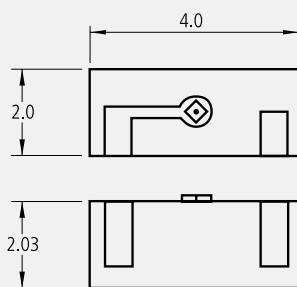
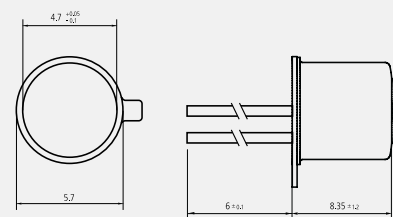


Figure 5

**Typical TO-18 Package\***



\*Note: Package dimension for indication only. Exact package dimension can be found on products datasheets.