

## **C30739ECERH Series**

# **Short Wavelength Enhanced Silicon Avalanche Photodiode**



The C30739ECERH large area silicon avalanche photodiode (APD) is intended for use in a wide variety of broadband low light level applications covering the spectral range from below 400 to over 700nm.

The device is designed to have enhanced short wavelength responsivity with quantum efficiency typically exceeding 80% at 430nm. In addition, this large area APD is optimized for low noise and low capacitance (60pF). Operation at an avalanche gain of up to  $M = 400$  at 430nm is feasible with a special high gain version.

The standard ceramic carrier package allows for easy handling and coupling to scintillating crystals such as LSO and BGO. Combined with the superior short wavelength responsivity, it makes this APD ideal in demanding high volume applications such as Positron Emission Tomography (PET).

While the devices are warranted over the entire specification, customers are welcome to discuss their custom requirements to accommodate special design, packaging or testing needs.

### **Key Features**

- Large area silicon APD
- Short Wavelength enhanced responsivity
- High quantum efficiency (80%) at short wavelength(430nm)
- Easy coupling to scintillating crystals
- Non-magnetic package
- Custom packaging available
- Excellent timing resolution
- RoHS compliant

### **Applications**

- Molecular imaging (PET)
- Nuclear medicine
- Fluorescence detection
- High energy physics
- Safety radiation detection
- Optical tomography
- Environmental monitoring

Table 1 – Package and Chip Dimensions

Parameter	Measurement	Unit
Package Size	8.50 x 8.00 x 1.55	mm
Chip size	6.65 x 6.65	mm
Active area	5.6 x 5.6	mm

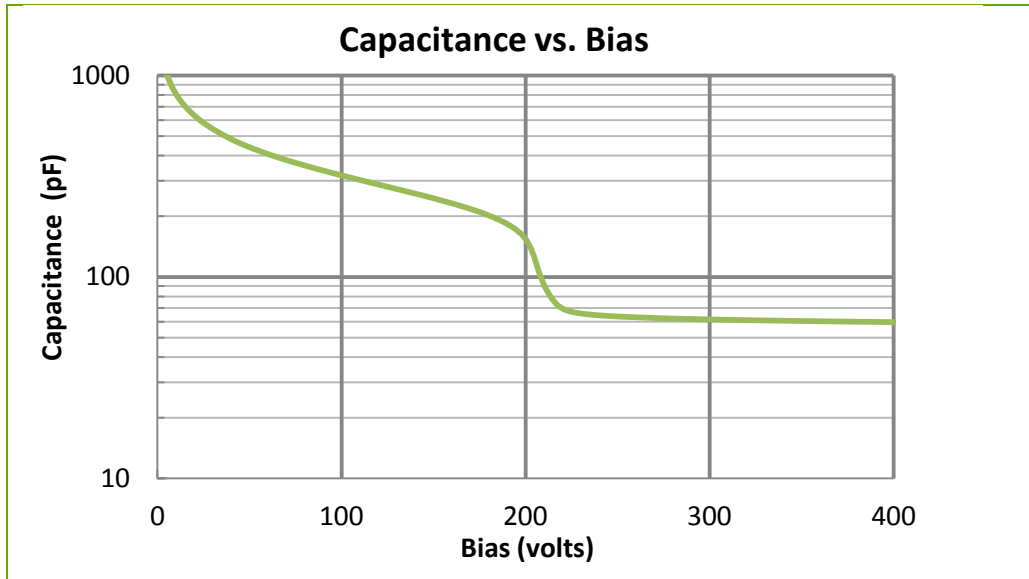
Table 2 – Electrical Characteristics, at  $T_A = 22\text{ }^\circ\text{C}$ ; at typical dV

Symbol	Parameter	C30739ECERH (standard version)			C30739ECERH-2 (high gain version)			Unit	Conditions
		Min	Typ	Max	Min	Typ	Max		
$V_{op}$	Operating Voltage	-	400	420	-	400	450	V	
dV	$dV = V_{br} - V_{op}$	-	15	-	-	10	-	V	defines relation of operating voltage $V_{op}$ to breakdown voltage $V_{br}$
M	Gain at $V_{op}$	80	100	-	180	200	-		
Q.E.	Quantum Efficiency	65	80	-	65	80	-	%	at 430 nm
R	Responsivity	-	26	-	-	52	-	A/W	at 430 nm and Typical Gain M
$T_{coeff}$	Temp. Coefficient for constant gain		1.2			1.2		V/ $^\circ\text{C}$	
$C_J$	Capacitance	-	60	-	-	60	-	pF	at $V_{op}$
$t_R$	Rise Time	-	2	-	-	2	-	ns	
$I_D$	Dark Current	-	1.5	-	-	2	-	nA	at $V_{op}$
$I_N$	Noise Current	-	0.3	-	-	0.4	-	pA/ $\sqrt{\text{Hz}}$	at $V_{op}$

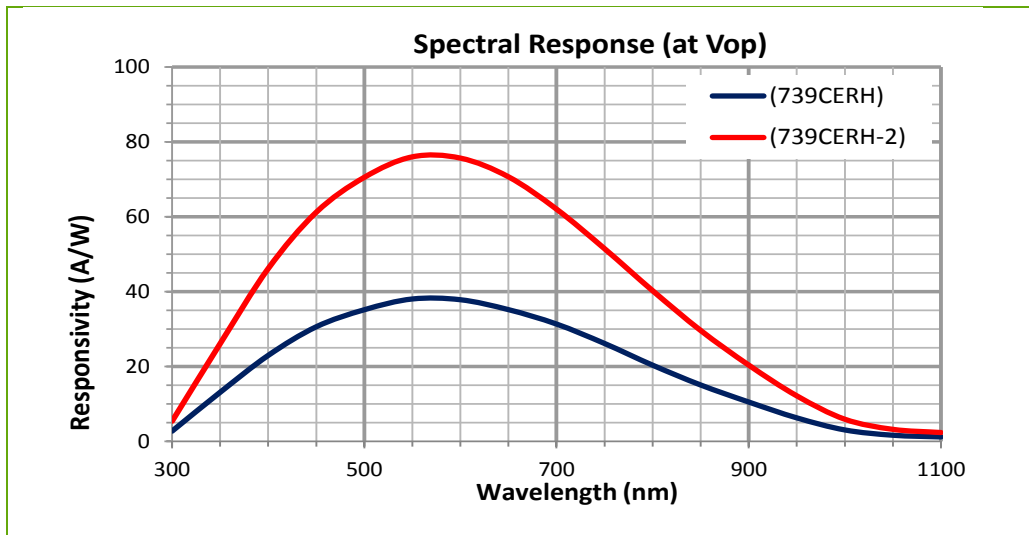
Table 3 – Maximum ratings

Parameter	Min	Typical	Max	Unit
Operating Temperature	0	-	50	$^\circ\text{C}$
Storage Temperature	-20	-	70	$^\circ\text{C}$
Maximum Humidity (non-condensing)	-	-	60	%

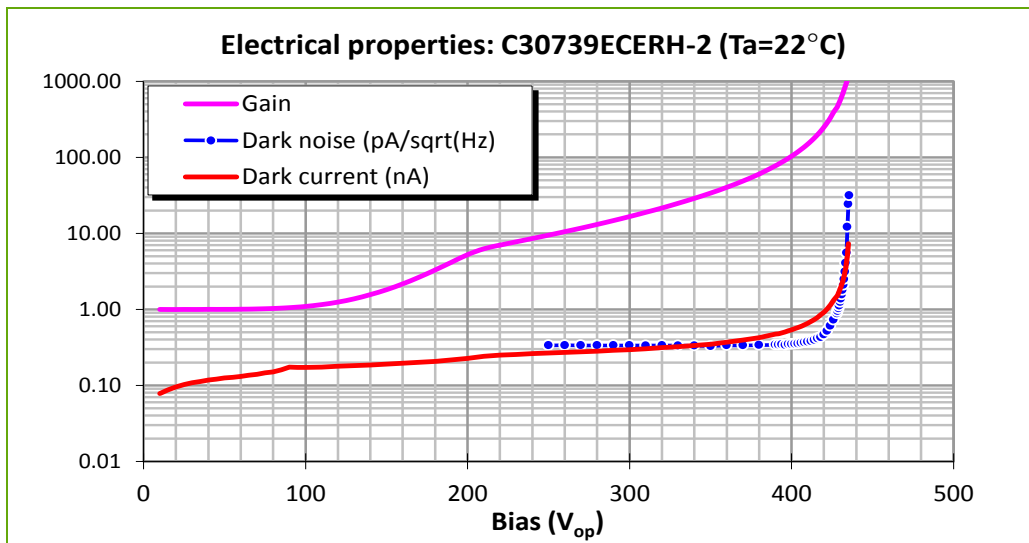
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**Figure 1**  
Capacitance vs. operating voltage



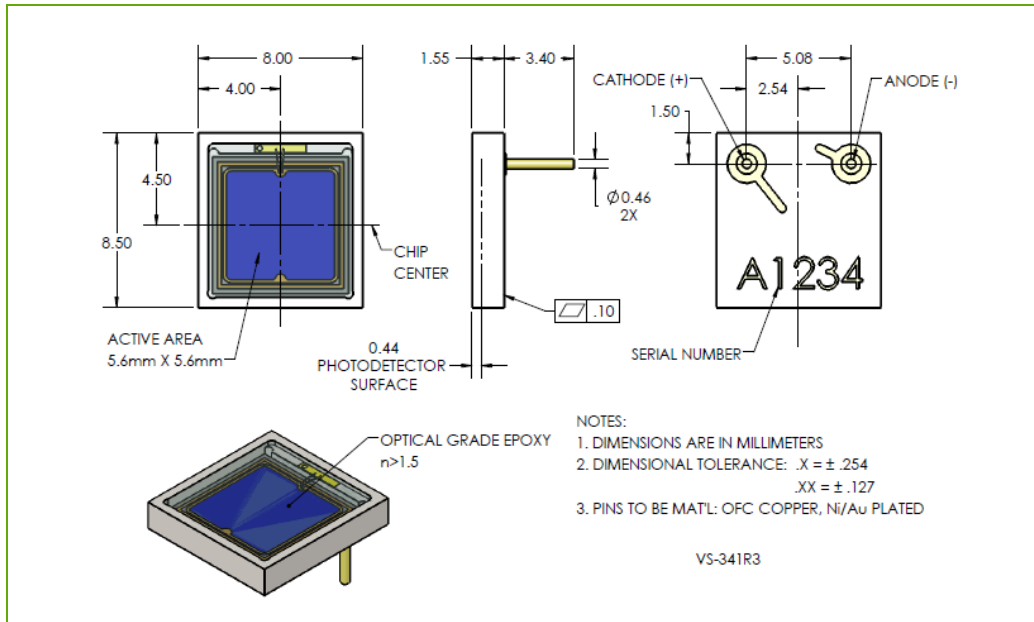
**Figure 2**  
Spectral Response vs. Wavelength



**Figure 3**  
Electrical properties vs. bias voltage

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## RoHS Compliance

The C30739ECERH Si APD is designed and built to be fully compliant with the European Union Directive 2011/65/EU – Restriction of the use of certain Hazardous Substances (RoHS) in Electrical and Electronic equipment.



## Warranty

A standard 12-month warranty following shipment applies.

## About Excelitas Technologies

Excelitas Technologies is a global technology leader focused on delivering innovative, customized solutions to meet the lighting, detection and other high-performance technology needs of OEM customers.

Excelitas has a long and rich history of serving our OEM customer base with optoelectronic sensors and modules for more than 45 years beginning with PerkinElmer, EG&G, and RCA. The constant throughout has been our innovation and commitment to delivering the highest quality solutions to our customers worldwide.

From aerospace and defense to analytical instrumentation, clinical diagnostics, medical, industrial, and safety and security applications, Excelitas Technologies is committed to enabling our customers' success in their specialty end-markets. Excelitas Technologies has approximately 3,000 employees in North America, Europe and Asia, serving customers across the world.

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