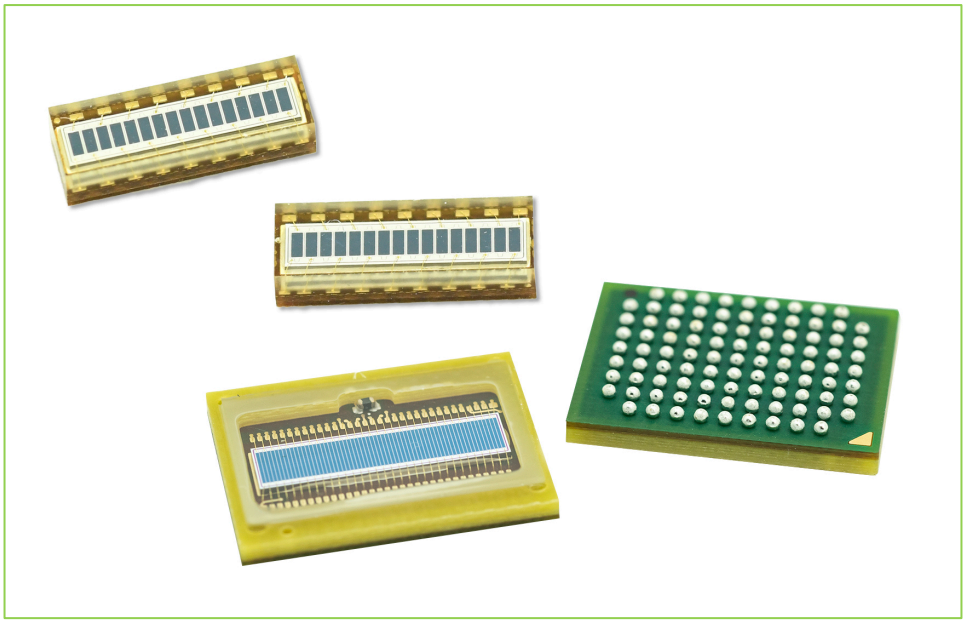
C30737 Array Series

Silicon Avalanche Photodiode Arrays (APD Arrays) for LiDAR, range finding and laser meters



Key Features

- High gain at low bias voltage
- Low breakdown voltage
- Low noise ~ 0.1pA/√ Hz
- High responsivity at 905nm
- Fast rise time at 905nm
- Ultra-compact “MA” SMT package
- BGA Package “GA” SMT package

Applications

- LiDAR
- Range-finding
- Speed measurement
- Area scanners for safety, surveillance, automatic door opening
- 3D laser scanning
- Gesture recognition
- Optical communication

The Excelitas C30737 Silicon APD array series provide high responsivity between 500nm and 1000nm.

Standard versions of these APD arrays are available with 16 or 64 elements. The standard versions are available either in a compact surface-mount “top-looking” leadless package (C30737MA) or in a BGA type “top-looking” package (C30737GA). Both packages are ideally suited for high volume, cost-effective applications where a high gain APD is required.

The leadless SMD and BGA packaged parts are RoHS-compliant and suitable for reflow soldering.

Customization of these APDs is available to meet your unique design challenges. Options for these APDs include breakdown voltage selection (binning), number of elements (8 to 64) and individual APD element sizes. Note that APD arrays with more than 32 elements are controlled by the Dual-Use list.

Table 1 – Electrical characteristics at T_A = 22 °C; at operating voltage-V_{op}

Characteristic	Symbol	Test Condition	C30737MA-05-16-90			C30737GA-02-64-90			Units
			Min	Typical	Max	Min	Typical	Max	
No of elements				1 x 16			1 x 64		
Active area **Height** **Width**				 1000 430			 2500 170		µm
Dead space				70			30		µm
Pitch				500			200		µm
Breakdown voltage	Vbd	Ir=2µA	180	220	260	180	220	300	V
Temperature coefficient	Tc			1.3			1.3		V/°C
Peak sensitivity				900			900		nm
Gain @905nm	M			50			50		
Responsivity		M=50, 905nm	27	30		27	30		A/W
Dark current	Id	M=50, per element		0.5			0.5		nA
Noise current	In	M=50, per element		0.3			0.3		pA/√Hz
Capacitance	C	M=50, per element		1.0			1.2		pF
Bandwidth	BW	M=50, @-3dB		300			300		MHz
Photo current uniformity		M=50, 905nm		+/- 5	+/- 15		+/- 5	+/- 20	%
Cross-talk					-46			-46	dB

Table 2 – Maximum ratings (APD)

Parameter	Symbol	Min	Max	Units
Optical energy that would damage the APD (un-biased)			1	J/cm^2/pulse
Current limit for one APD channel			100	µA
Worst case supply current for the APD			500	µA
Peak current limit per illuminated unit area (pulsed, 10ns, 150kHz rep rate)			1	A/cm^2

Table 3 – Maximum ratings (Package)

Parameter	Symbol	MA Package		GA Package		Units
		Min	Max	Min	Max	
Storage temperature	T_s	-20	70	-60	125	°C
Operating temperature	T_{op}	-20	70	-40	105	°C

Figure 1 – Typical responsivity (M=50) vs. wavelength.

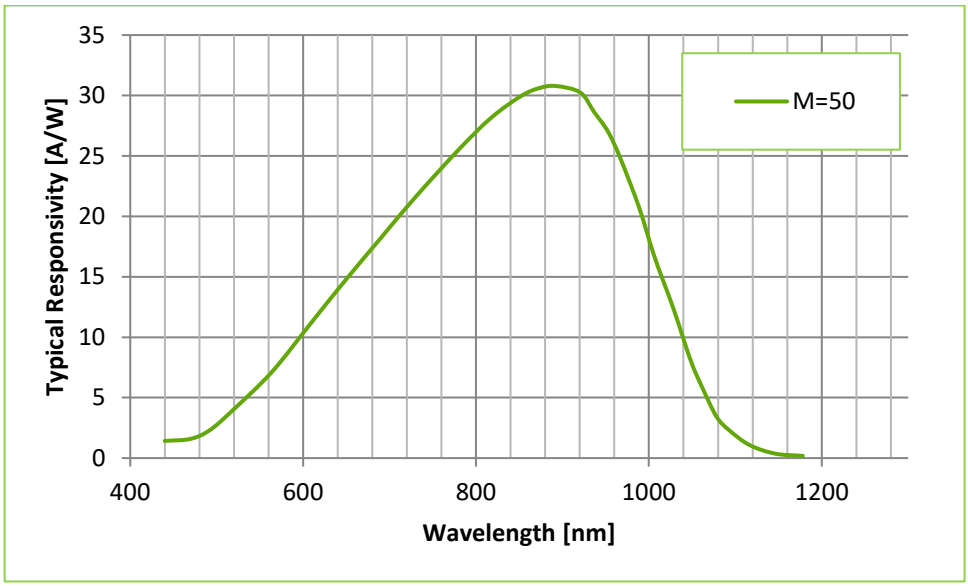


Figure 2 – Typical element capacitance vs. bias voltage (C30737MA-05-16-90).

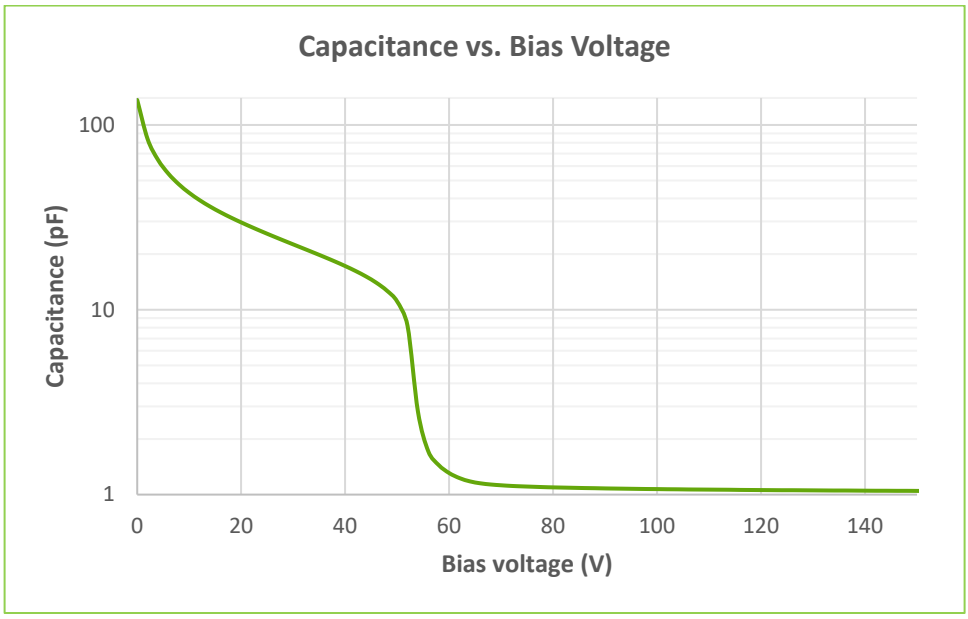


Figure 3 – Typical element gain vs. bias voltage

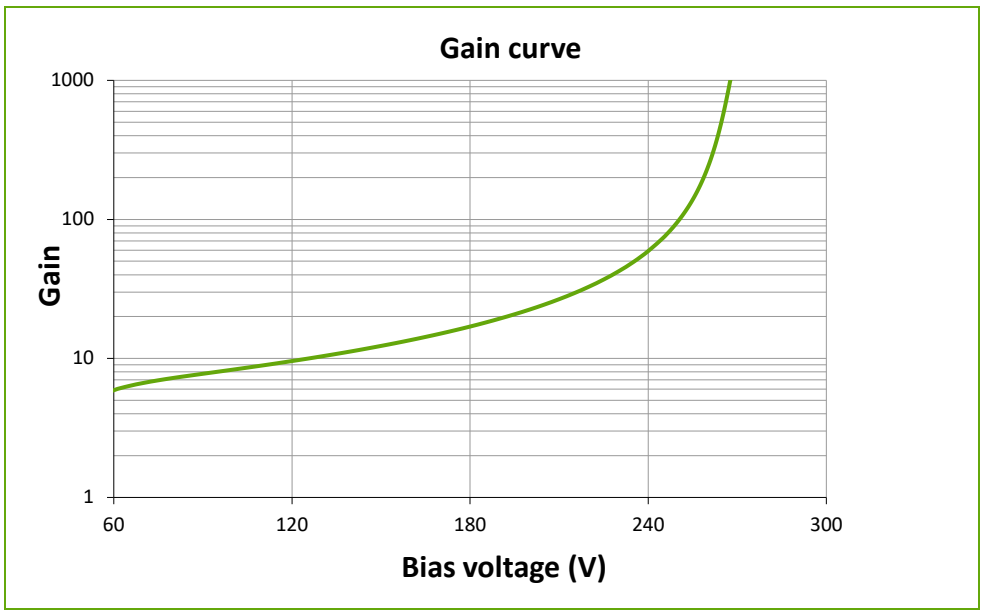


Figure 4 – Leadless laminate carrier (LLC) MA package - C30737MA-05-16-90. Dimensions in mm.

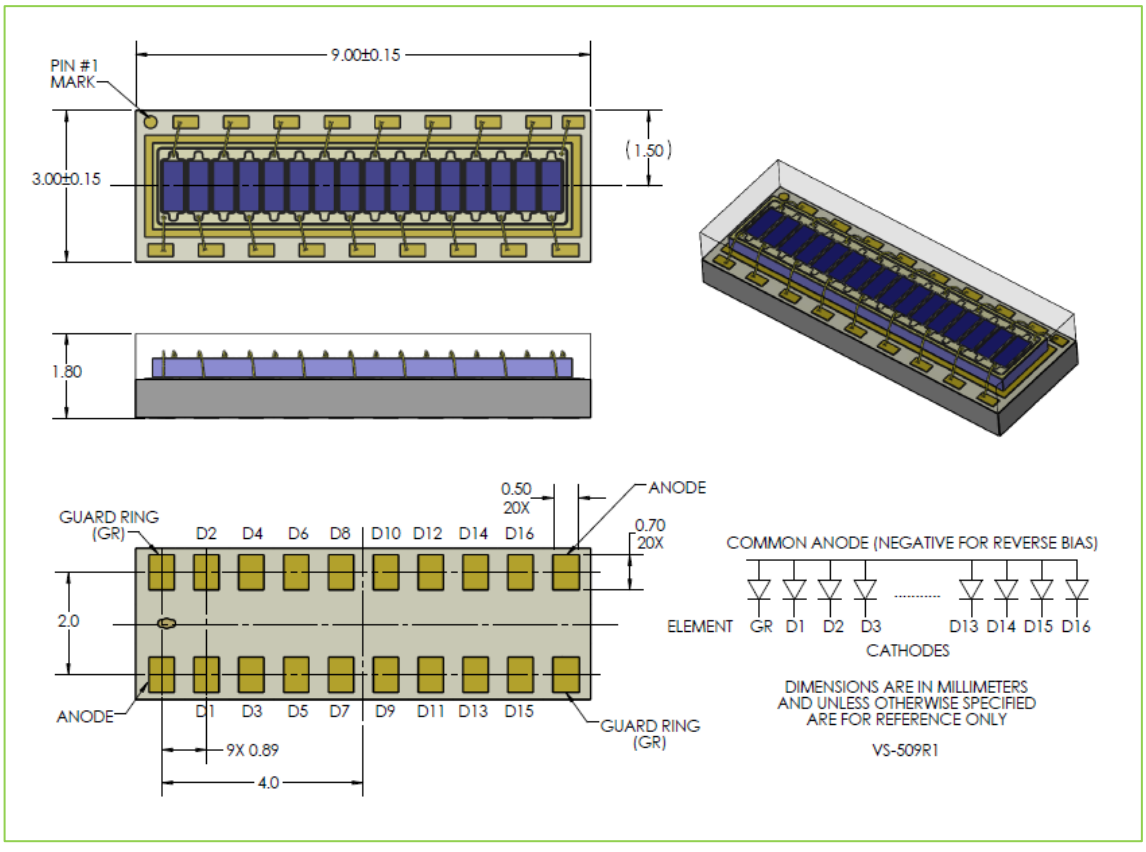


Figure 5 – Ball Grid Array (BGA) GA package - C30737GA-02-64-90. Dimensions in mm.

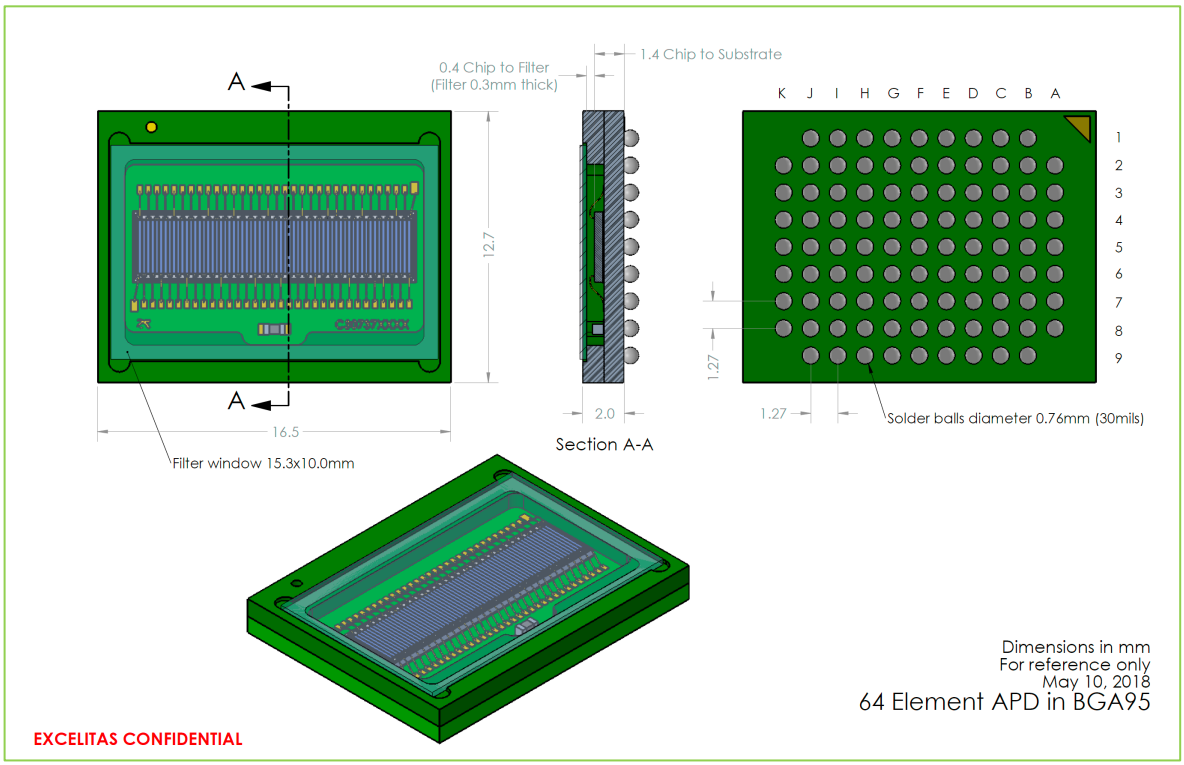
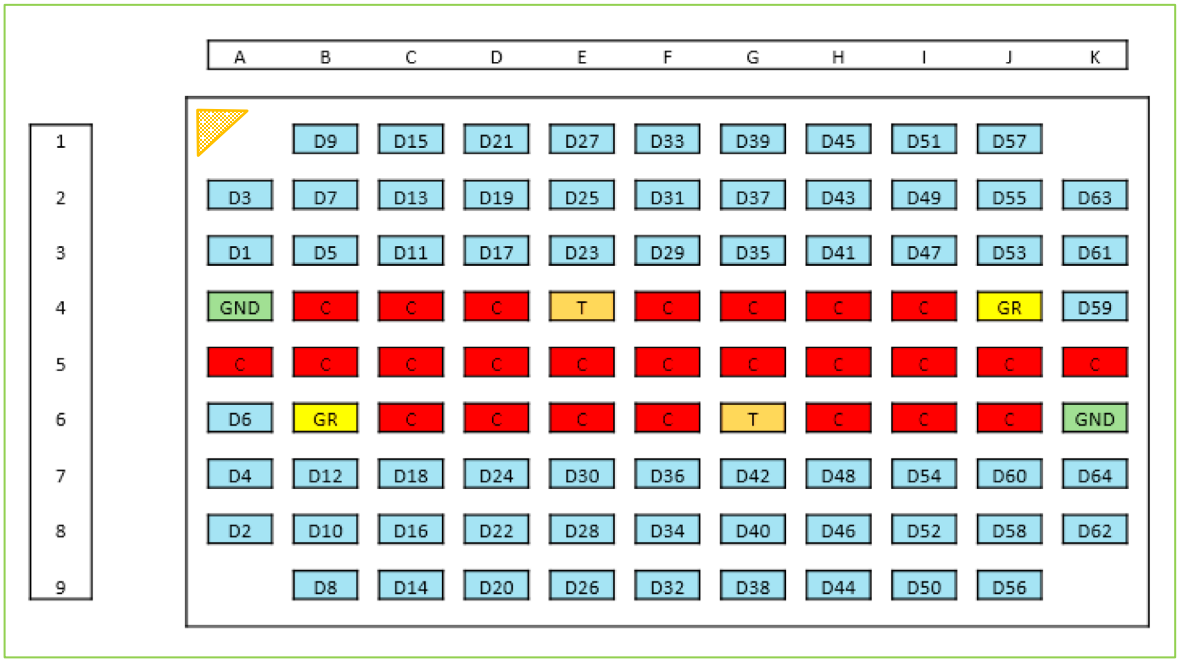


Figure 6 – Pinout (Top view) - C30737GA-02-64-90.



The pin out has on-axis symmetry, so the package can be flipped around 180 degrees and still function.
The pin out is the following:

- 25 balls for heat dissipation (common anode): C
- 64 balls for the element signals (cathodes): D
- 2 balls for guard ring: GR
- 2 balls for thermistor: T
- 2 balls for ground plane: GND

Thermistor

The BGA (GA) package parts have a built-in thermistor, Vishay part # NTCS0402E3473FXT

Table 4 – Part Number Reference Guide (1)

	C30737	AA-	BB-	CC-	D-	E(2)
Epitaxial structure Si APD	C30737					
Leadless laminate carrier		MA-				
Ball Grid Array		GA-				
Element pitch = 500 µm			05-			
Element pitch = 200 µm			02-			
Number of elements = 16				16		
Number of elements = 64				64		
Optimum chip response λ @ 900 nm					9	
No filter						0
With 905 nm filter						2

(1) Not all part variants are available, please consult with the factory.
(2) Filter option is only available for the BGA (GA) package option.

RoHS Compliance

This series of APDs 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.

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