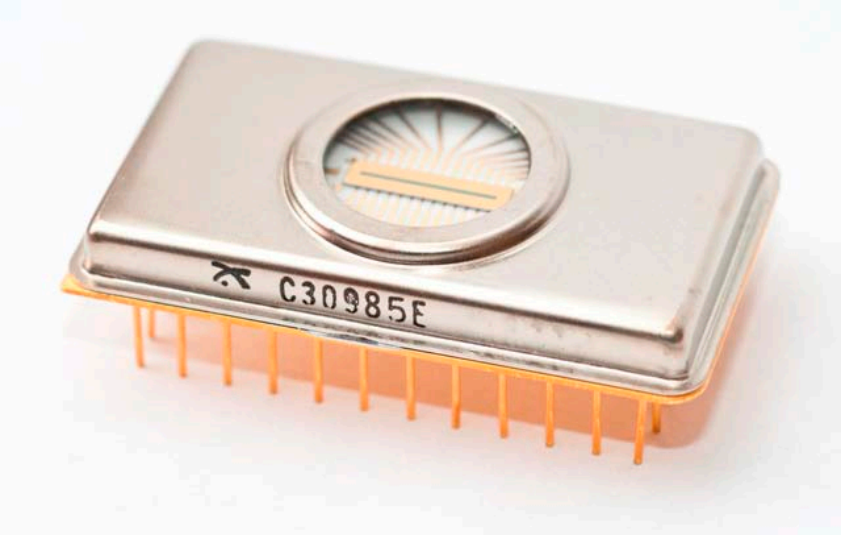
C30985E

25-Element Silicon Avalanche Photodiode (Si APD) Linear Array



The C30985E is a 25-element silicon avalanche photodiode (Si APD) consisting of a double diffused “reach through” structure. This structure provides high responsivity up to 1060 nm incidence radiation and even beyond, as well as fast rise and fall times at all wavelengths.

Because the fall time characteristic has no “tail”, the responsivity of the C30985E is independent of modulation frequency up to 200 MHz.

The C30985E is hermetically sealed behind a flat glass window in a low profile rectangular 34 pin package.

Recognizing that different applications have different performance requirements, Excelitas offers a range of customization options for this Si APD array to meet your design challenges. Operating and breakdown voltage selection, dark current and NEP screening, custom device testing and packaging are among many of the application-specific solutions available. A 12- and 20-element array are also available as custom options.

Key Features

- High quantum efficiency
- Fast response time
- Wide operating temperature range
- Standard AR coating for 800 - 1060 nm optimal response

Applications

- LIDAR /LADAR
- 3D LIDAR mapping
- Analytical instrumentation

Table 1 Electrical Characteristics at T_A = 22C

Parameter	Minimum	Typical	Maximum	Unit
Breakdown voltage, V_{BR}	350	450	525	V
Operating voltage [1], V_R	275	-	425	
Operation point from breakdown (V_{BR}-V_R), ΔV	-	100	-	V
Temperature coefficient of V_R for constant Gain	-	2.4	-	V/°C
Gain, M	-	50	-	
Element to element gain non-uniformity	-	+/- 15	+/- 20	%
Responsivity At 900 nm At 1060 nm	 25 6	 31 7.5	 - -	A/W
Quantum efficiency, QE At 900 nm At 1060 nm	 - -	 85 18	 - -	%
Dark Current, i_D Guard Ring Each Element	 - -	 100 1	 300 -	nA
Noise current, i_n F = 10kHz, Δf = 1.0Hz All Elements Each Element	 - -	 0.5 0.1	 1.0 0.3	pA/Hz ½
Capacitance, Cp Total Each Element Interelectrode	 - - -	 15 0.5 0.2	 - - -	pF
Series Resistance Each Element	 -	 -	 100	Ω
Rise Time, t_τ R_L = 50 Ω, λ = 900nm 10% to 90% points	 -	 2	 3.5	ns
Fall Time R_L = 50 Ω, λ = 900 nm 90% to 10% points	 -	 2	 3.5	Ns
Operating Temperature	-40		+70	°C
Storage Temperature	-60		+100	°C

[1]At the DC reverse operating voltage (V_R) supplied with the device and a light spot diameter of 0.025 mm (0.001") centered on a typical element, unless otherwise specified. When the photodiode is operated at this specified operating voltage (V_R), the device will meet the electrical characteristic limits shown above.

Table 2 Maximum Ratings

Parameter	Value	Unit
Reverse Bias Current, Total	200	μA
Photocurrent density (J_p) @ 22°C Average Value, continuous operation Peak Value	 5 20	 mA/mm^2 mA/mm^2
Forward current (I_F) @ 22°C Average Value, continuous operation Peak Value	 5 50	 mA mA
Maximum total electrical power dissipation@ 22°C	0.1	W
Soldering for 5 seconds	200	°C

Table 3 Mechanical Characteristics – Photosensitive Surface

Parameter	Value	Unit
Total Active Length	7.5	mm
Useful Active width	0.3	mm
Center-to-Center Spacing	0.3	mm
Dead Space between elements (typical)	75	µm

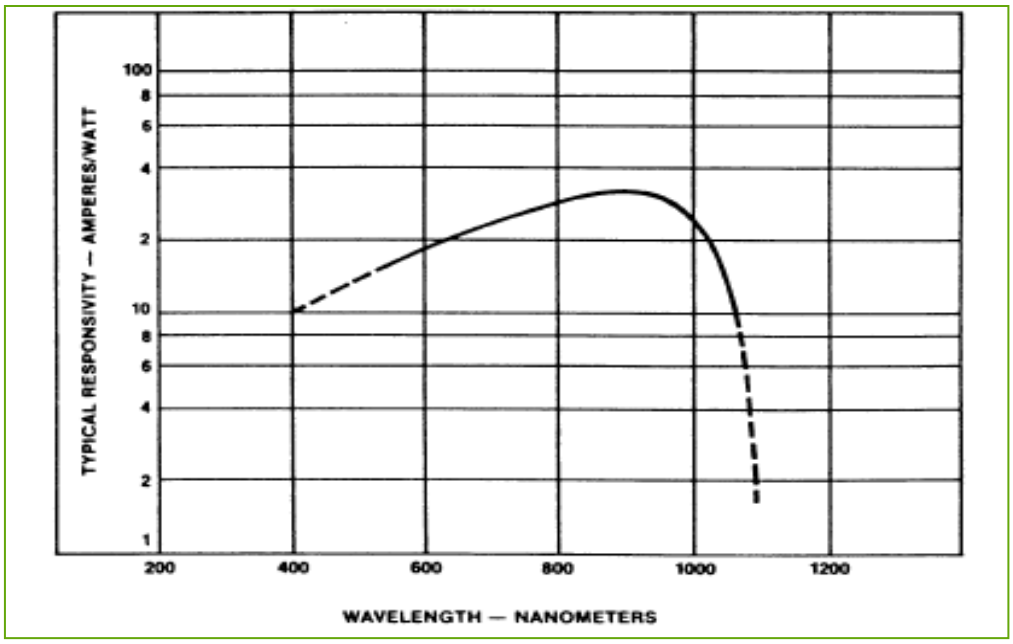


Figure 1

Typical spectral responsivity characteristics at a M= 50

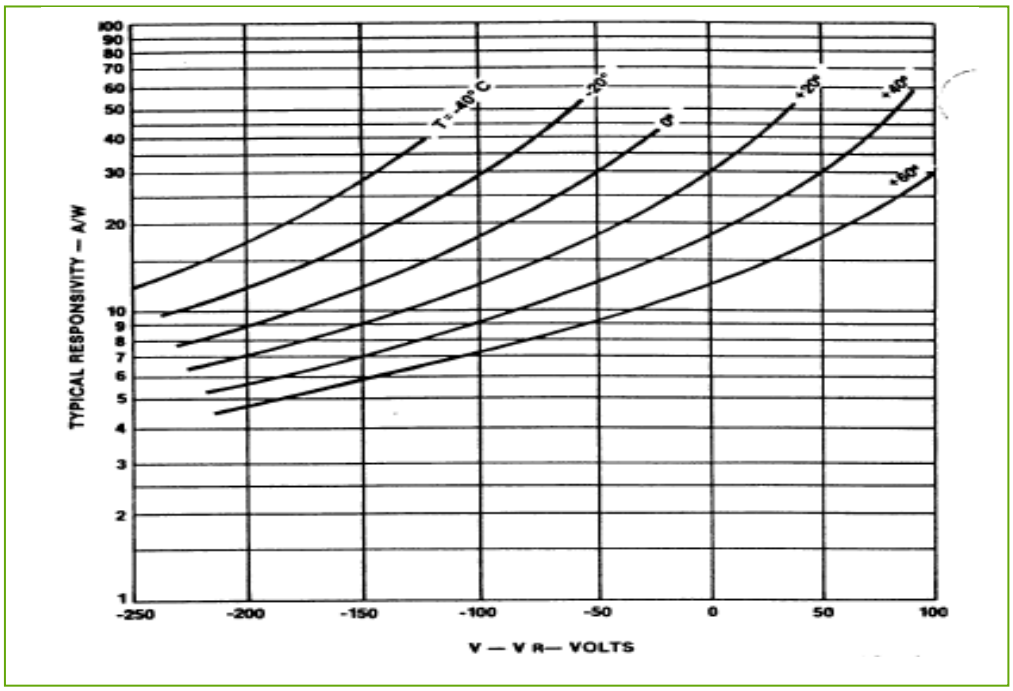


Figure 2

Typical variation of responsivity at 900 nm vs. temperature and ΔV from V_R

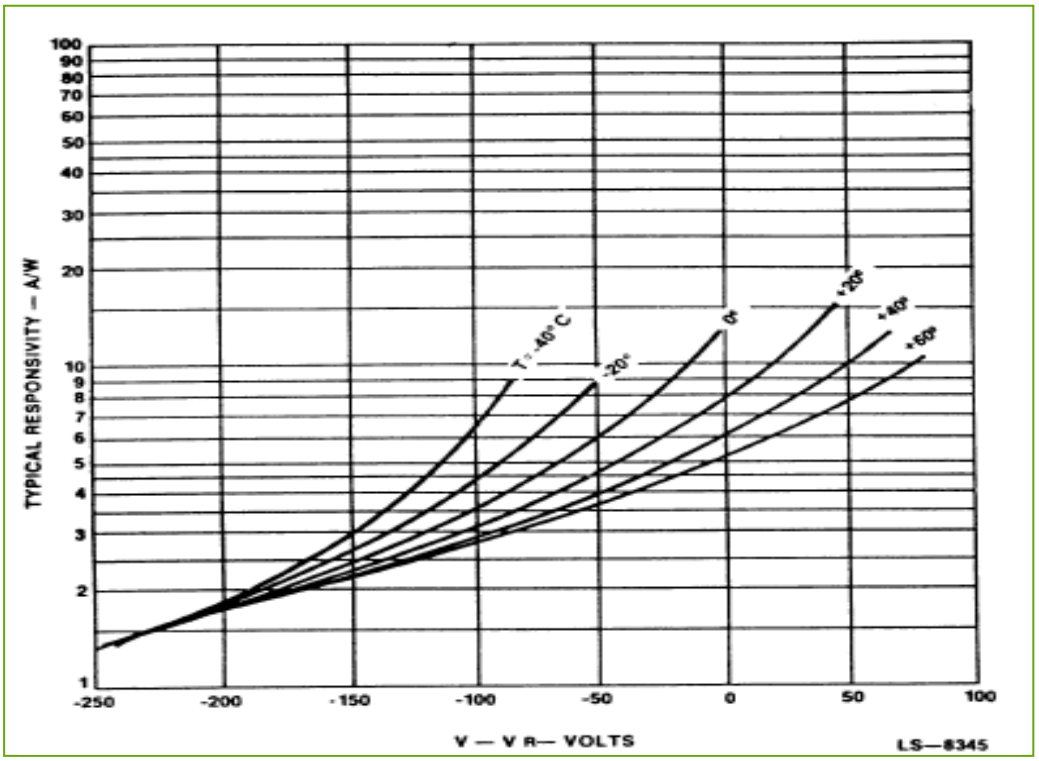


Figure 3

Typical variation of responsivity at 1060 nm vs. temperature and ΔV from V_R

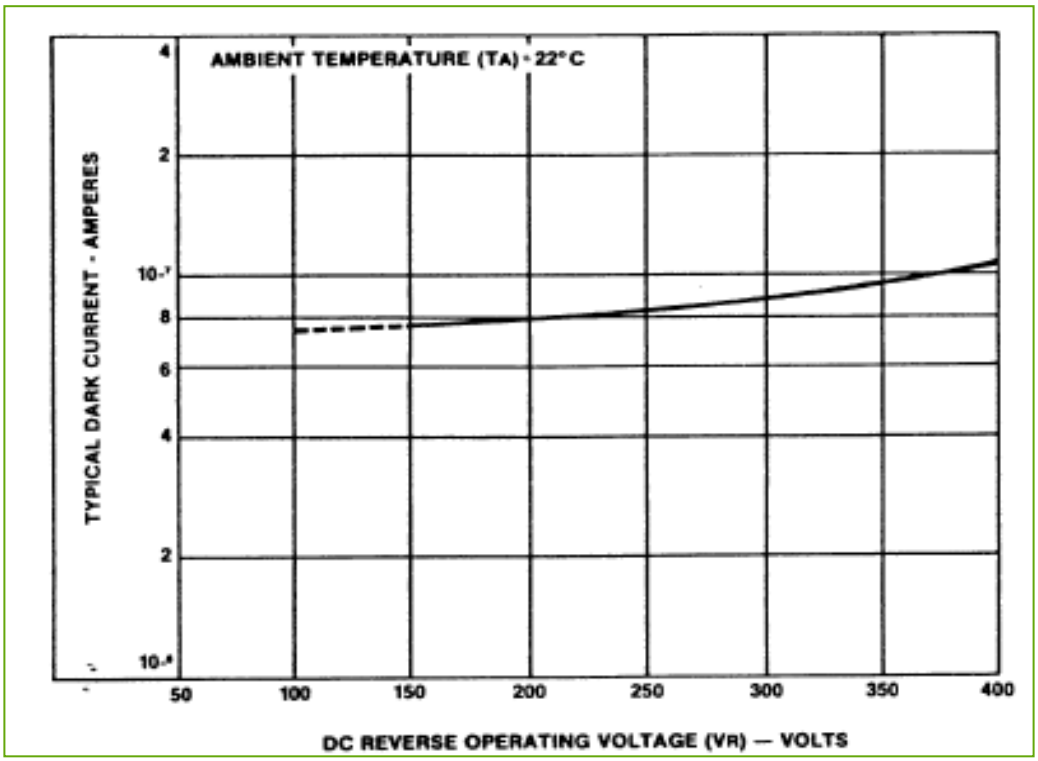


Figure 4

Typical guard ring dark current vs. operating voltage (V_R)

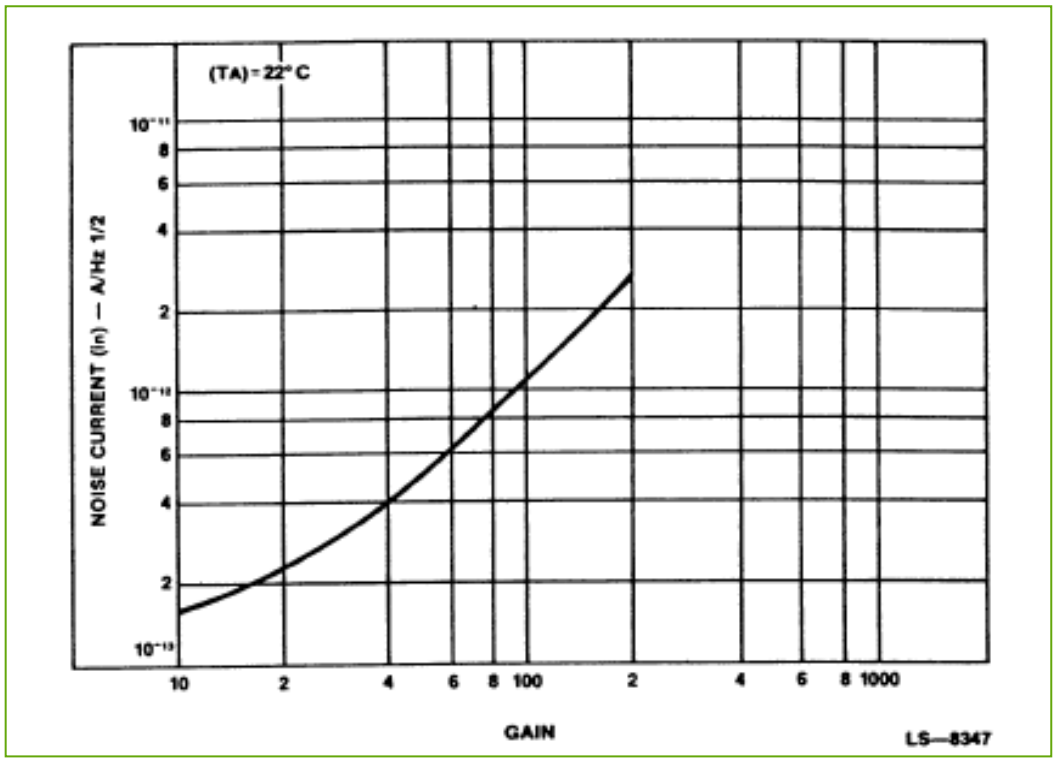


Figure 5

Typical noise current vs. Gain (M), all elements connected together

Figure 6 Gain scan of typical array (spot size = 0.025mm)

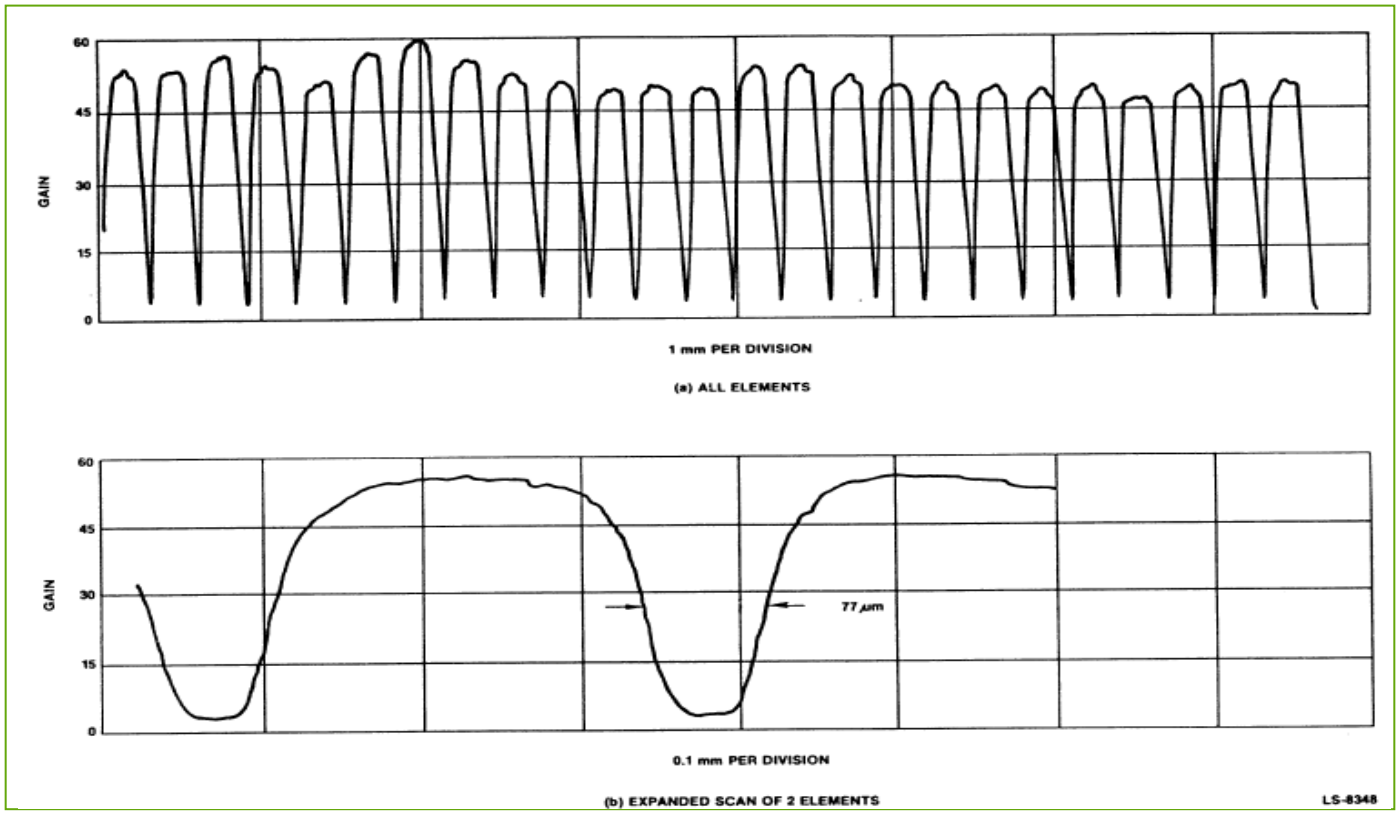
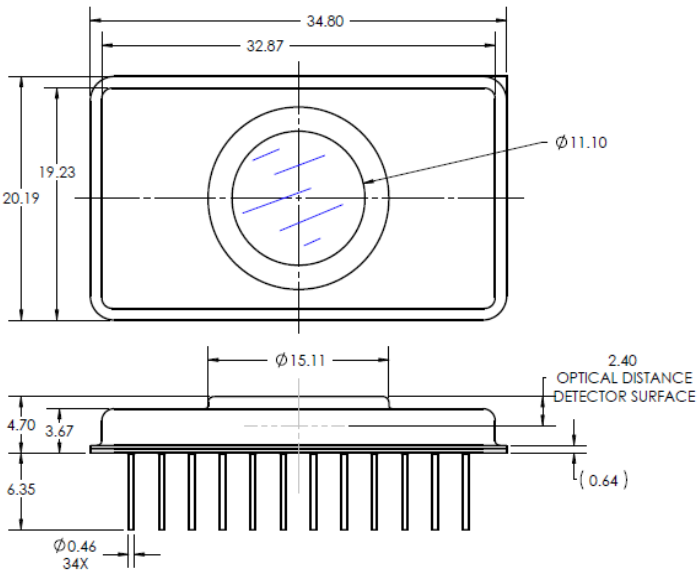
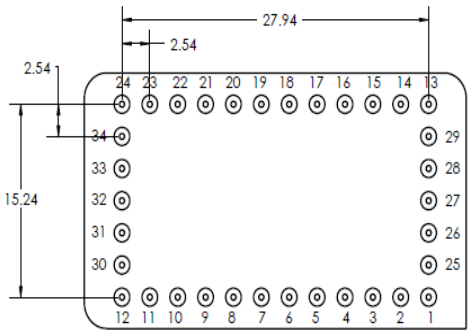


Figure 7 Dimensional outline and pin connections





DIMENSIONS ARE MILLIMETERS

PIN CONNECTIONS

1: ELEMENT 1	8: ELEMENT 15	15: ELEMENT 6	22: ELEMENT 20	29: GUARD RING
2: ELEMENT 3	9: ELEMENT 17	16: ELEMENT 8	23: ELEMENT 22	30: ELEMENT 25
3: ELEMENT 5	10: ELEMENT 19	17: ELEMENT 10	24: ELEMENT 24	31: N/C
4: ELEMENT 7	11: ELEMENT 21	18: ELEMENT 12	25: N/C	32: CASE GND
5: ELEMENT 9	12: ELEMENT 23	19: ELEMENT 14	26: N/C	33: N/C
6: ELEMENT 11	13: ELEMENT 2	20: ELEMENT 16	27: BIAS (NEGATIVE)	34: GUARD RING
7: ELEMENT 13	14: ELEMENT 4	21: ELEMENT 18	28: N/C	

About Excelitas Technologies

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