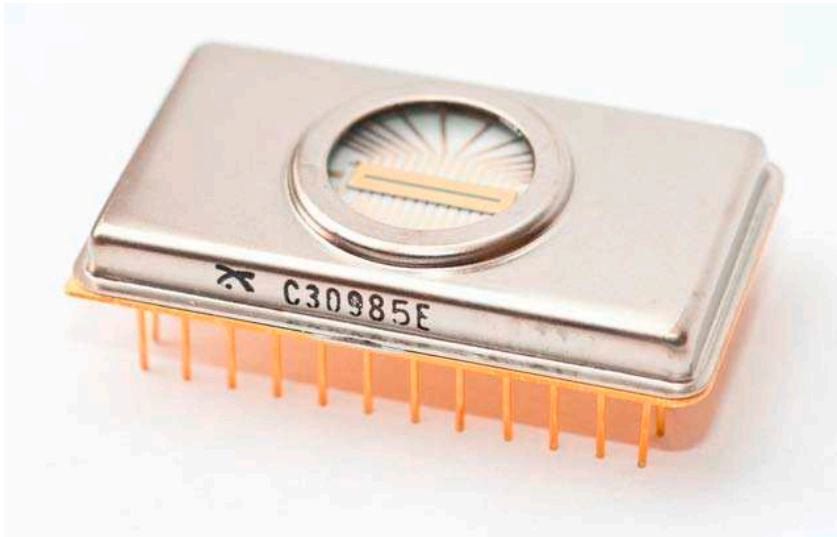


## **C30985E**

# **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

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

**Table 1 Electrical Characteristics at  $T_A = 22^\circ\text{C}$** 

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

<sup>1</sup>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	$\mu\text{A}$
Photocurrent density ( $J_p$ ) @ $22^\circ\text{C}$		
Average Value, continuous operation	5	$\text{mA}/\text{mm}^2$
Peak Value	20	$\text{mA}/\text{mm}^2$
Forward current ( $I_F$ ) @ $22^\circ\text{C}$		
Average Value, continuous operation	5	mA
Peak Value	50	mA
Maximum total electrical power dissipation@ $22^\circ\text{C}$	0.1	W
Soldering for 5 seconds	200	$^\circ\text{C}$

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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

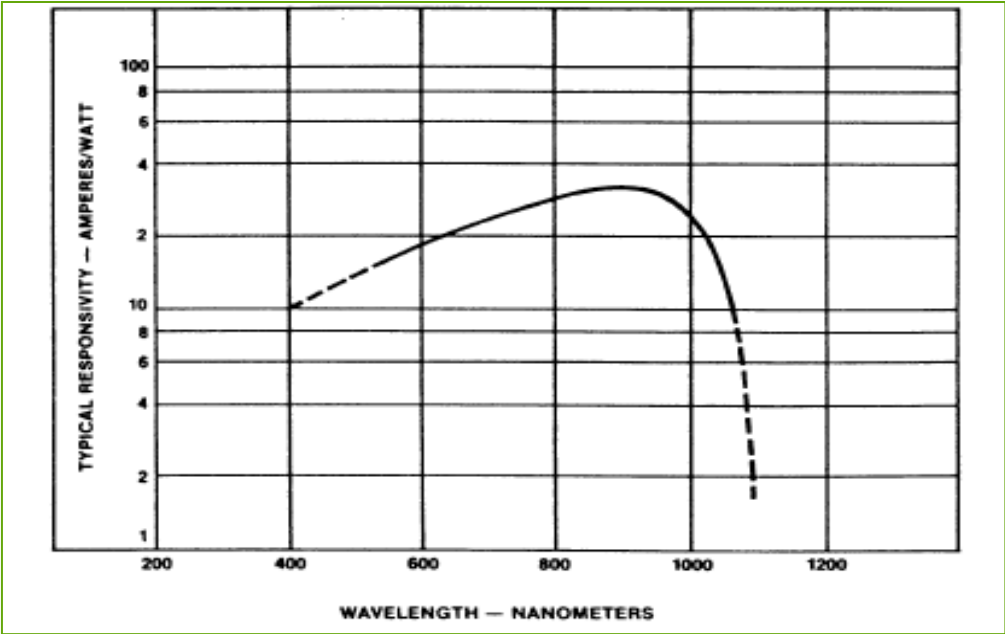


Figure 1

Typical spectral responsivity characteristics at a  $M= 50$

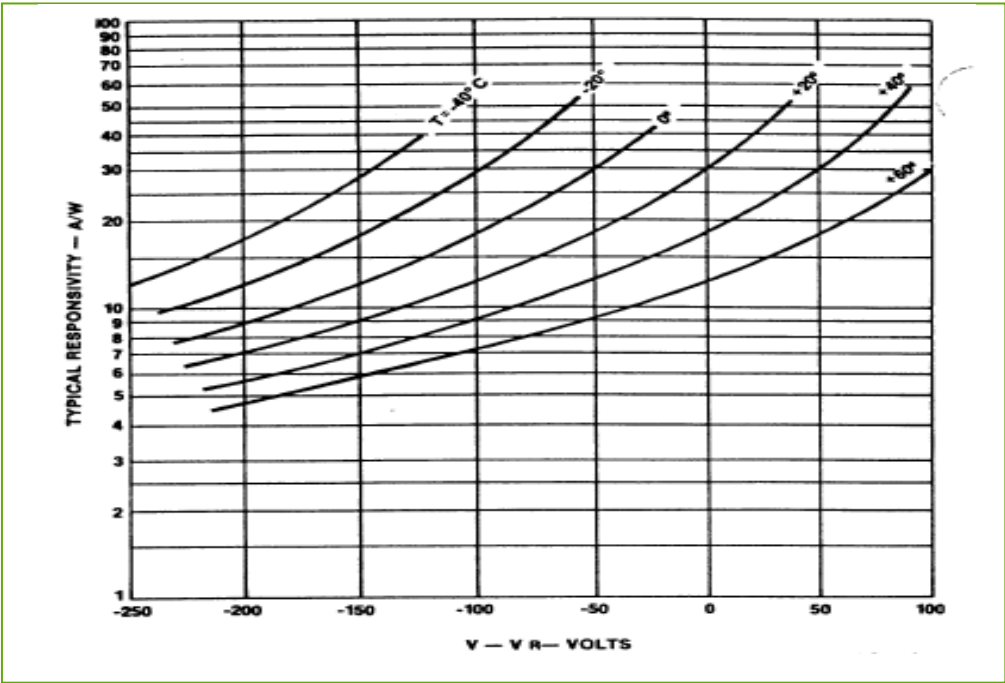


Figure 2

Typical variation of responsivity at 900 nm vs. temperature and  $\Delta V$  from  $V_R$

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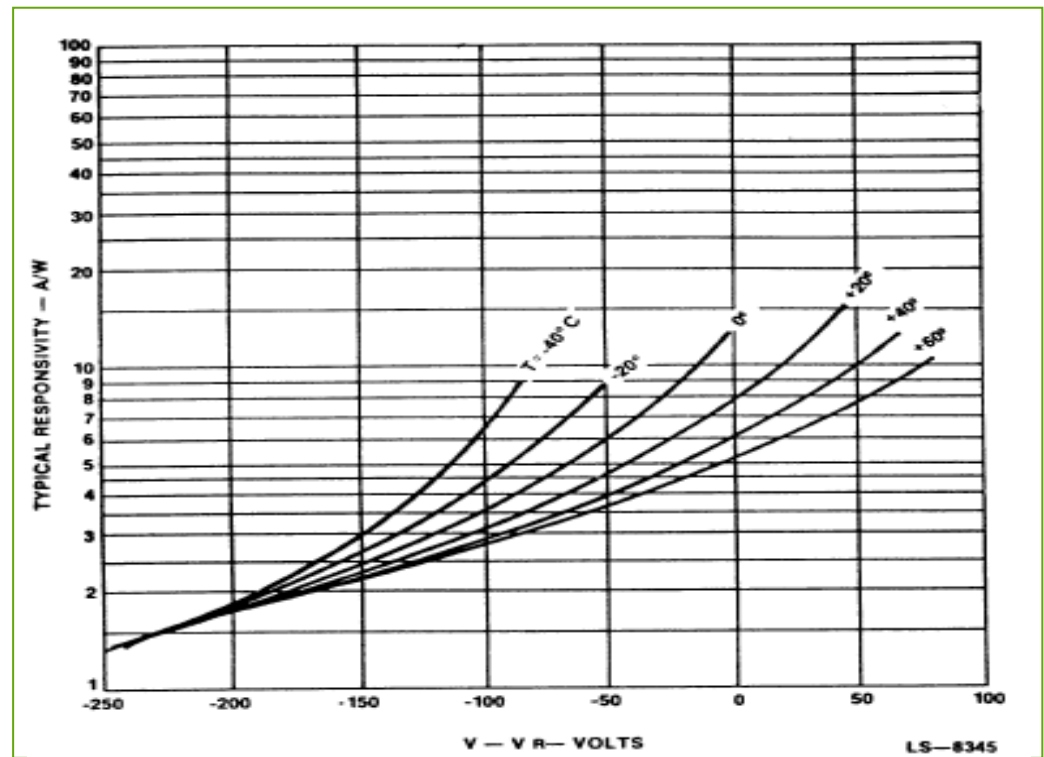


Figure 3

Typical variation of responsivity at 1060 nm vs. temperature and  $\Delta V$  from  $V_R$

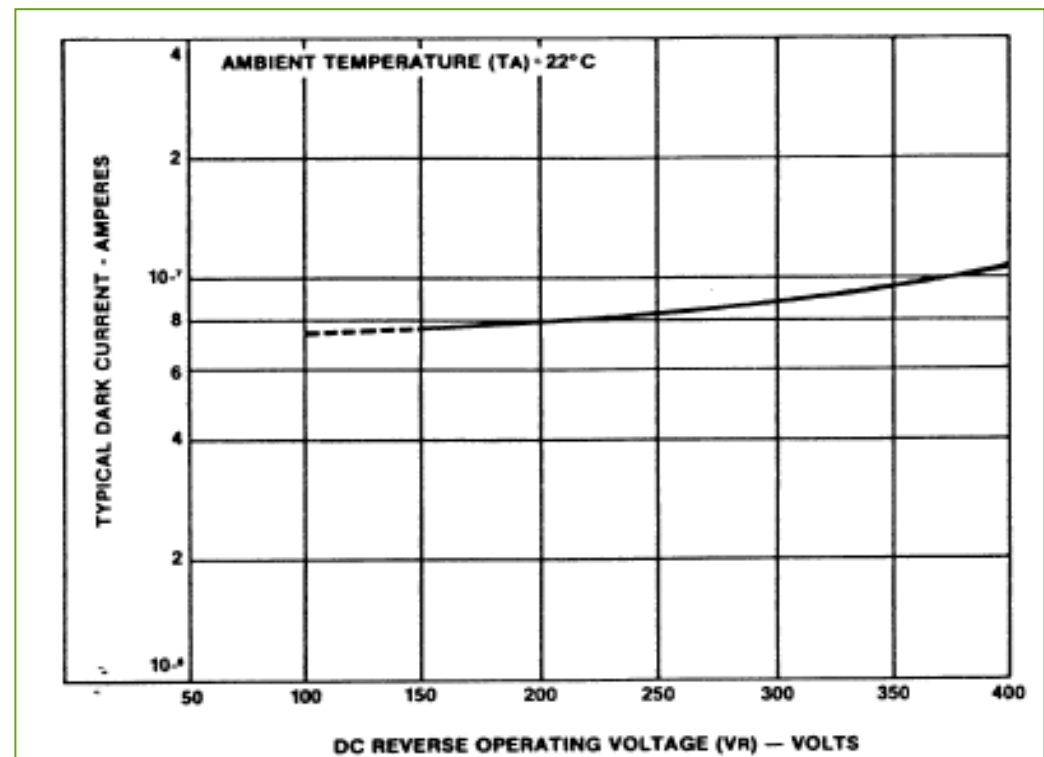


Figure 4

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

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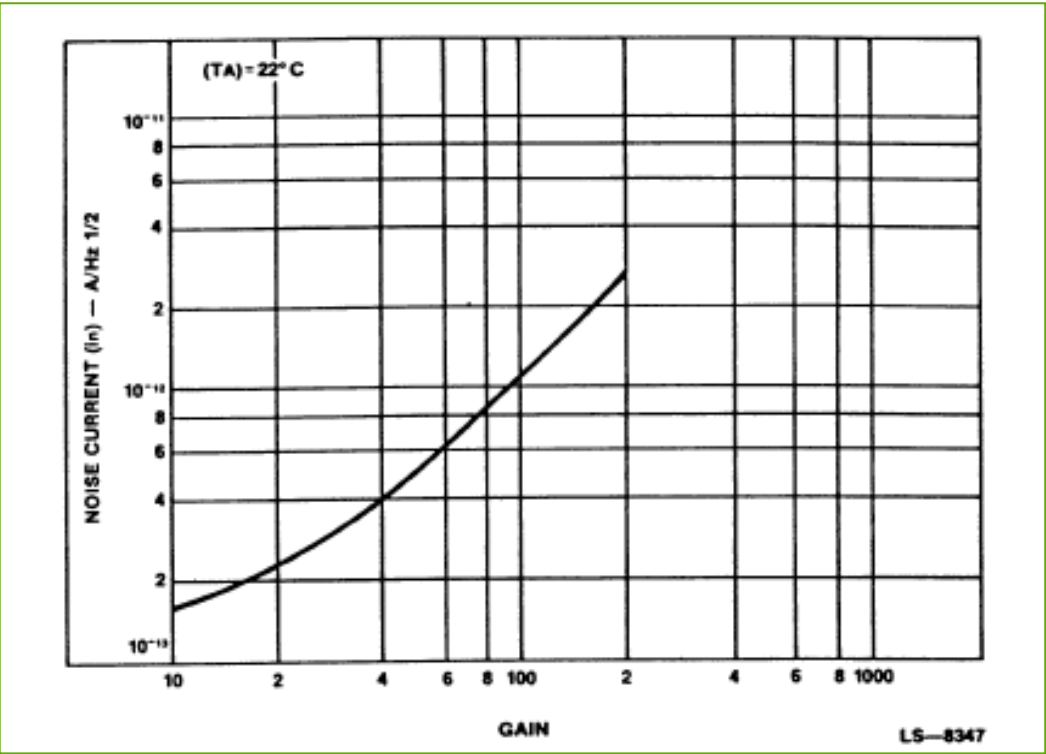
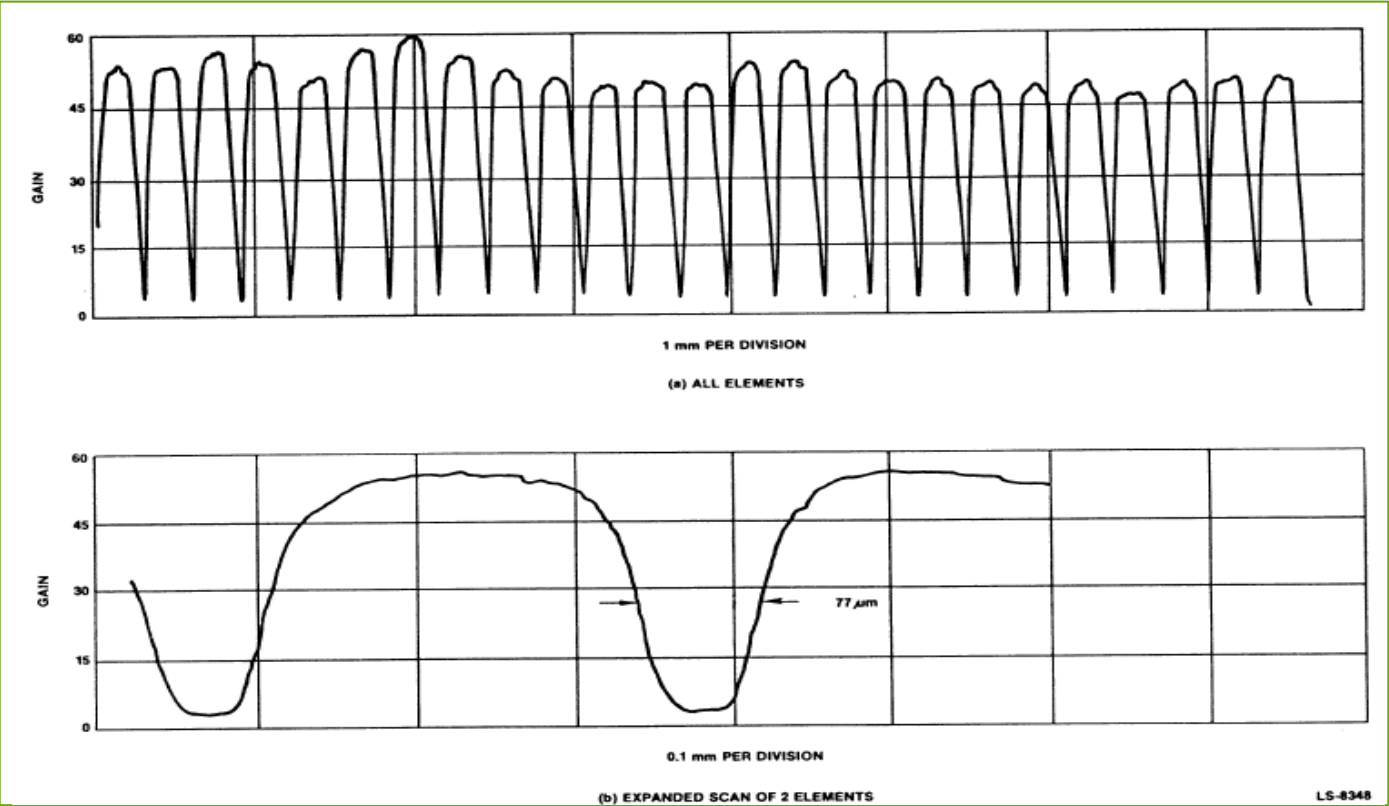


Figure 5

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

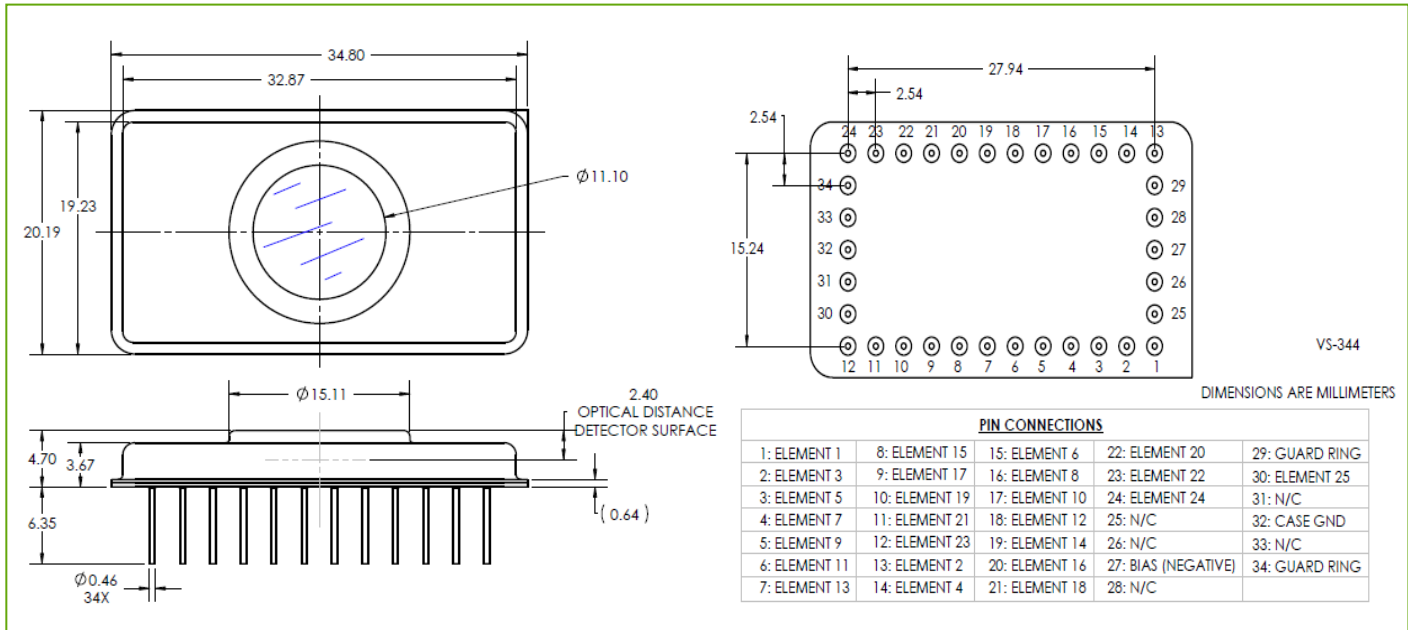
Figure 6 Gain scan of typical array (spot size = 0.025mm)



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Figure 7 Dimensional outline and pin connections



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.

From analytical instrumentation to clinical diagnostics, medical, industrial, safety and security, and aerospace and defense 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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