C30884EH

Silicon Avalanche Photodiode With Very High Modulation Capability

The C30884EH is a silicon avalanche photodiode having high responsivity and fast rise and fall times. Because the fall time characteristic has no “tail”, the responsivity of the device is independent of modulation frequency up to about 400 MHz.

This device is made using a double-diffused “reach-through” structure and is optimized for high responsivity at wavelengths of below 1000 nanometers.

The C30884EH is hermetically sealed behind a flat glass window in a modified low-profile TO-5 package.

The fast time response characteristics and high responsivity of this device make it highly useful in a wide variety of applications including optical communications, laser range finding and high-speed switching systems.

Key Features

- High Quantum Efficiency –
  85% typical at 900 nm
  10% typical at 1060nm
- Spectral Response Range–
  (10% Points) 400 to 1100 nm
- Fast Time Response –
  Rise time typically 1 ns
  Fall time typically 1 ns
- Wide operating Temperature Range –
  -40°C to 70°C
- Hermetically Sealed Low-Profile TO-5 package

Applications

- Optical Communications
- Laser Range Finding
- High Speed Switching Systems

Table 1 – Mechanical and Optical Characteristics

Parameter	Symbol		Unit	Remarks/Conditions
Photosensitive Surface: Useful area Useful diameter	 A d	 0.5 0.8	 mm² mm	Shape : Circular
Field of View: Nominal field of view α (See Figure 7) Nominal field of view α’ (See Figure 7)	FoV	 119 132	Degrees	

Table 2 – Electro-Optical Characteristics

Test conditions: Case Temperature T_A = 22 °C; at the DC reverse operating voltage V, V_{op} supplied with the device[3]

Parameter	Symbol	Minimum	Typical	Maximum	Unit
Breakdown Voltage	V_{br}	190		290	V
Operating Voltage	V_{op}	180		260	V
Temperature Coefficient of V_{op} for Constant Gain[1]	V_{op}		1.1		V/°C
Gain	M		100		
Responsivity at 900 nm at 1060 nm	R	 55 6	 63 8		A/W
Quantum Efficiency at 900 nm at 1060 nm	Q.E.		 85 10		%
Dark Current[2]	I_d			75	nA
Noise Current f=10kHz, Δf=1.0Hz	i_n			1	pA/sqrt(Hz)
Rise/Fall Time, R_L = 50Ω: 10% to 90% points 90% to 10% points	 t_r t_f		 1 1	 1.5 1.5	ns
Capacitance	C_d		4	6	pF
Series Resistance				15	Ω
Storage Temperature	T_{stg}	-60		100	°C
Operating Temperature	T_o	-40		70	°C

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[1] For V_{br} at other temperatures, see Figures 2 and 3.

[2] See Figure 4.

[3] Each individual APD is supplied with its own test data at shipment

Table 3 – Maximum Ratings, Absolute Maximum Values

Parameter	Symbol	Maximum	Unit	Remarks/Conditions
Reverse Bias Dark Current		100	µA	
Photocurrent average value peak value	i_p	500 2	µA mA	For 1 second duration, non-repetitive.
Forward Current average value peak value	I_F	5 50	mA	For 1 second duration, non-repetitive.
Total power		0.1	W	Dissipation at 22°C

Figure 1 – Typical Spectral Responsivity Characteristics at a Gain of 100

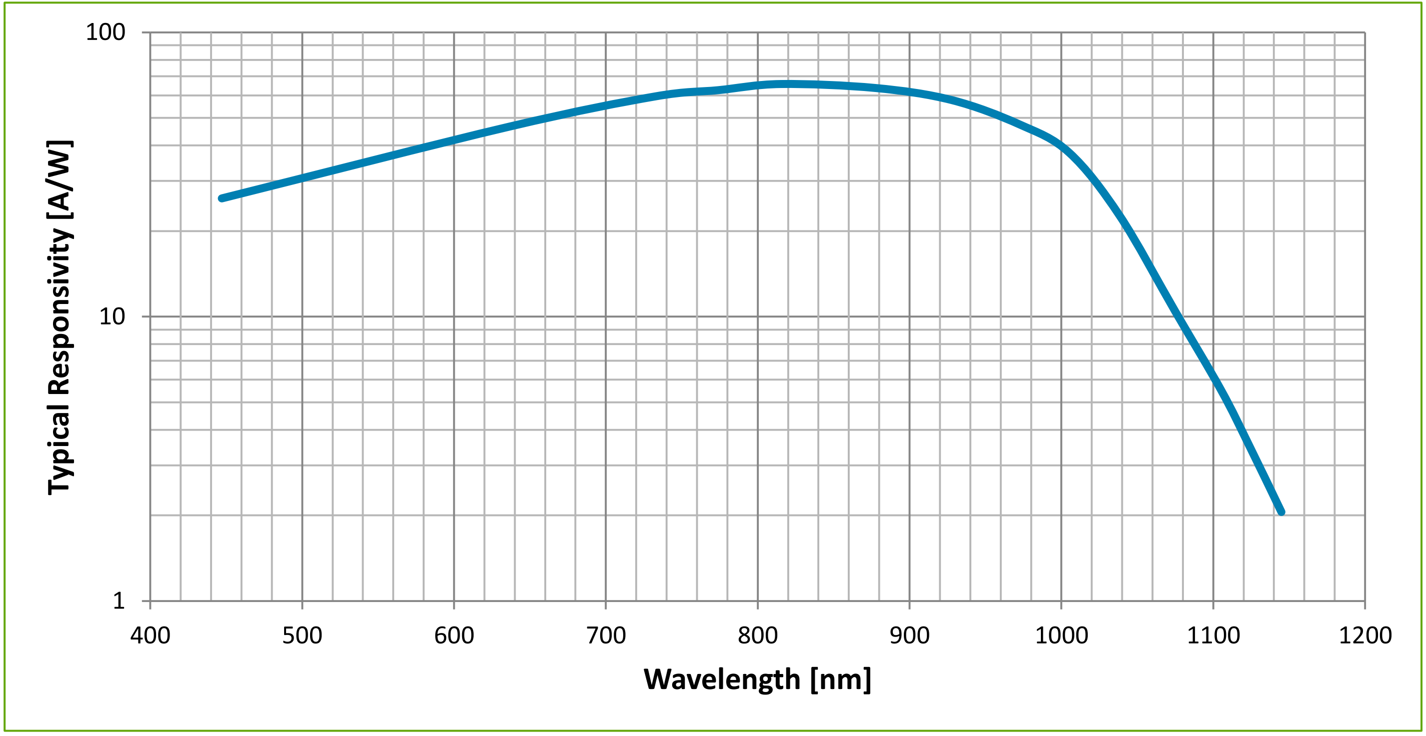

Figure 2 – Typical Responsivity at 900 nm as a function of Operating Voltage, V_{op}

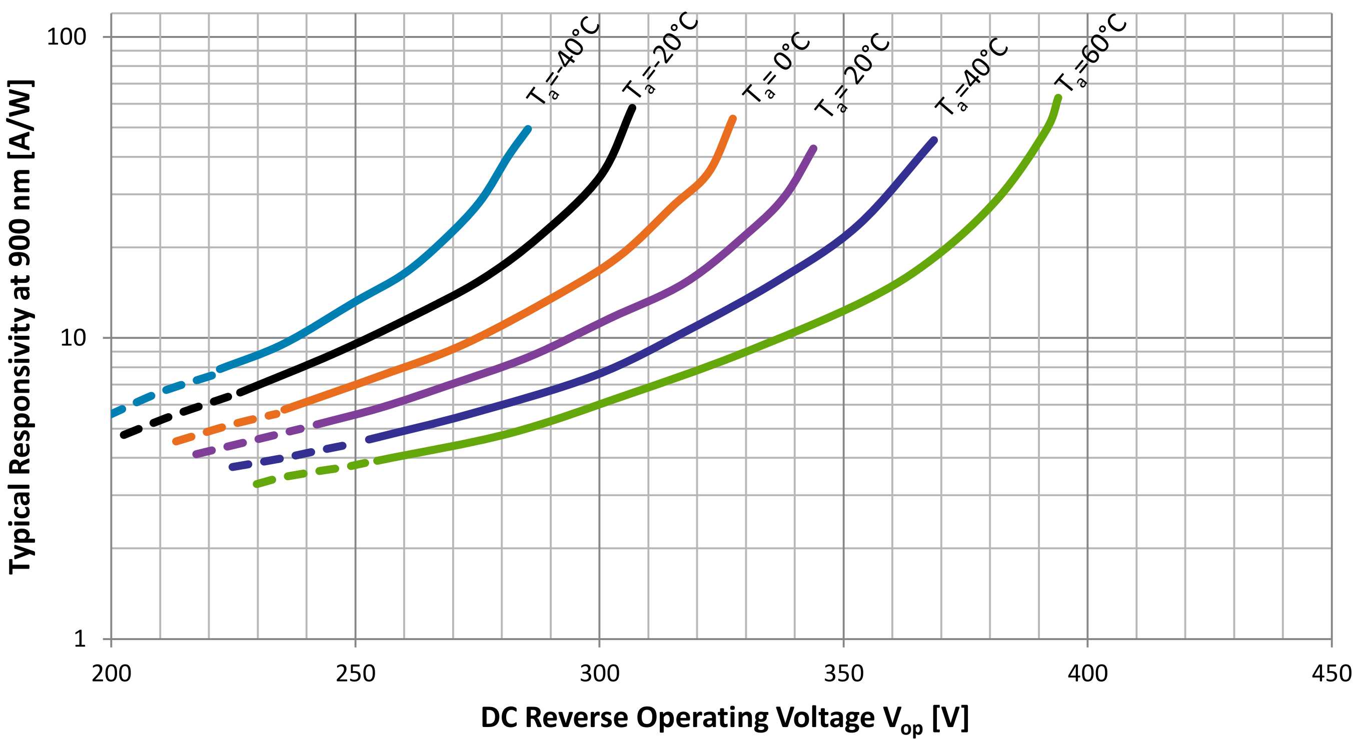

Figure 3 – Typical Responsivity at 1060 nm as a function of Operating Voltage, V_{op}

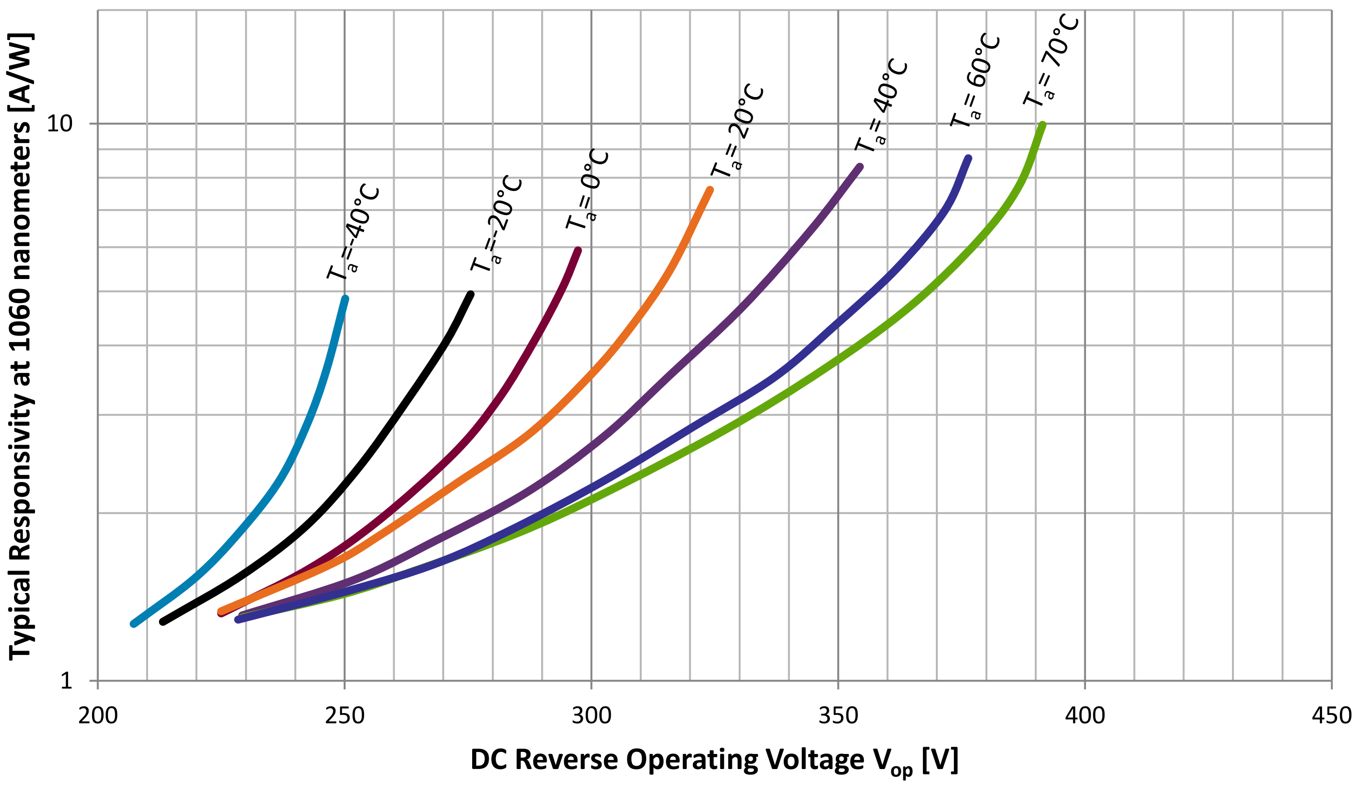

Figure 4 – Typical Dark Current as a function of Operating Voltage, V_{op}

Test conditions: Case temperature = 22˚C

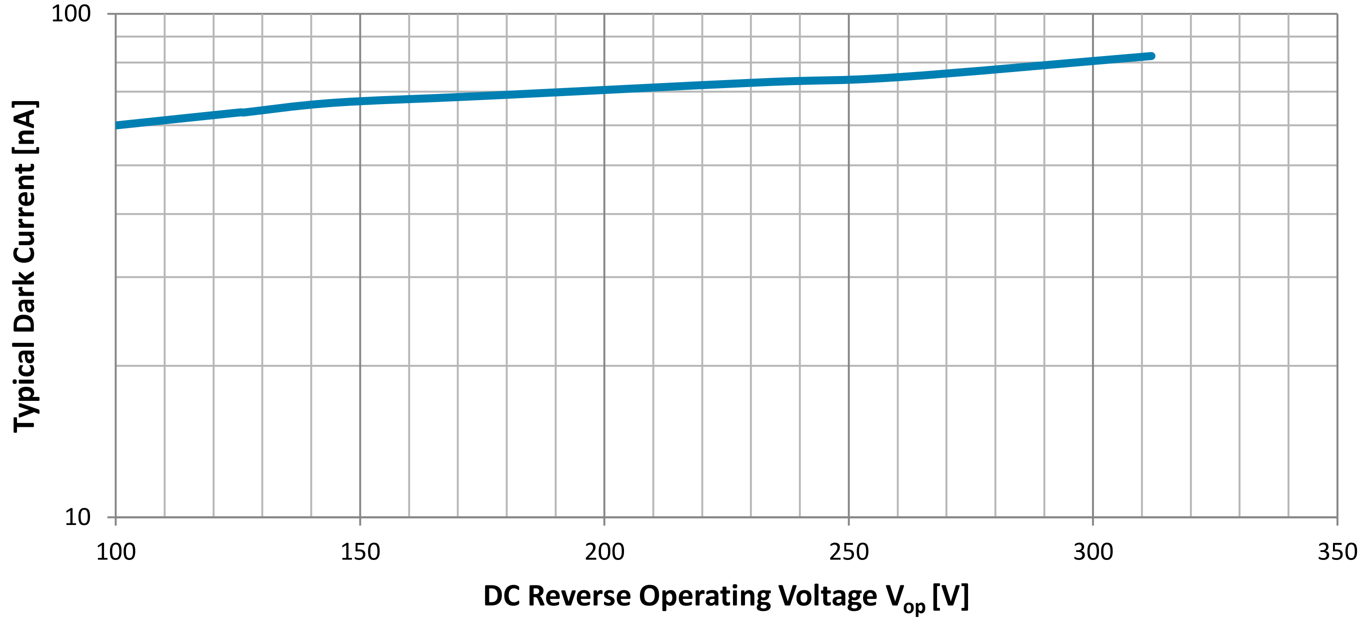

Figure 5 – Typical Gain as a function of Light Spot Position

Test conditions: Case temperature = 22˚C, Detector center = 0, Spot diameter= 0.0254 mm

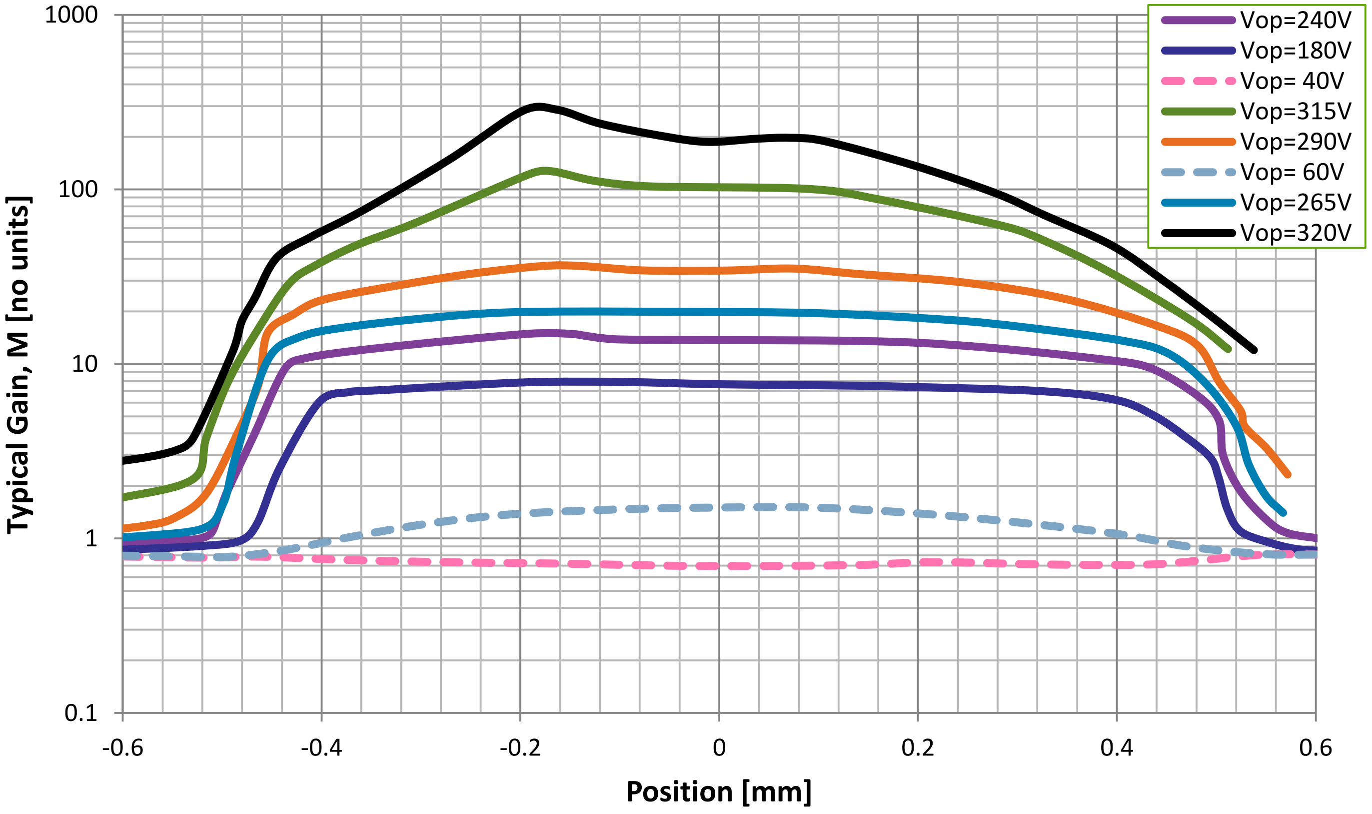

Figure 6 – Approximate field of view

For incident radiation at angles $\leq \alpha/2$, the photosensitive surface is totally illuminated.
For incident radiation at angles $> \alpha/2$, but $\leq \alpha'/2$, the photosensitive surface is partially illuminated

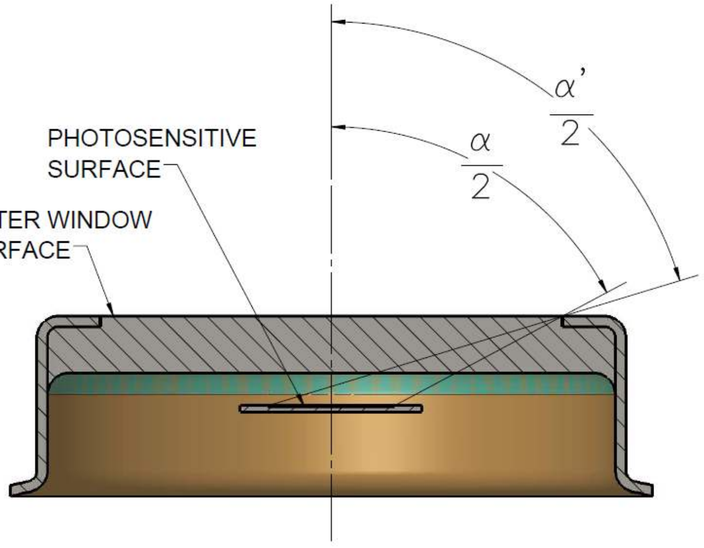

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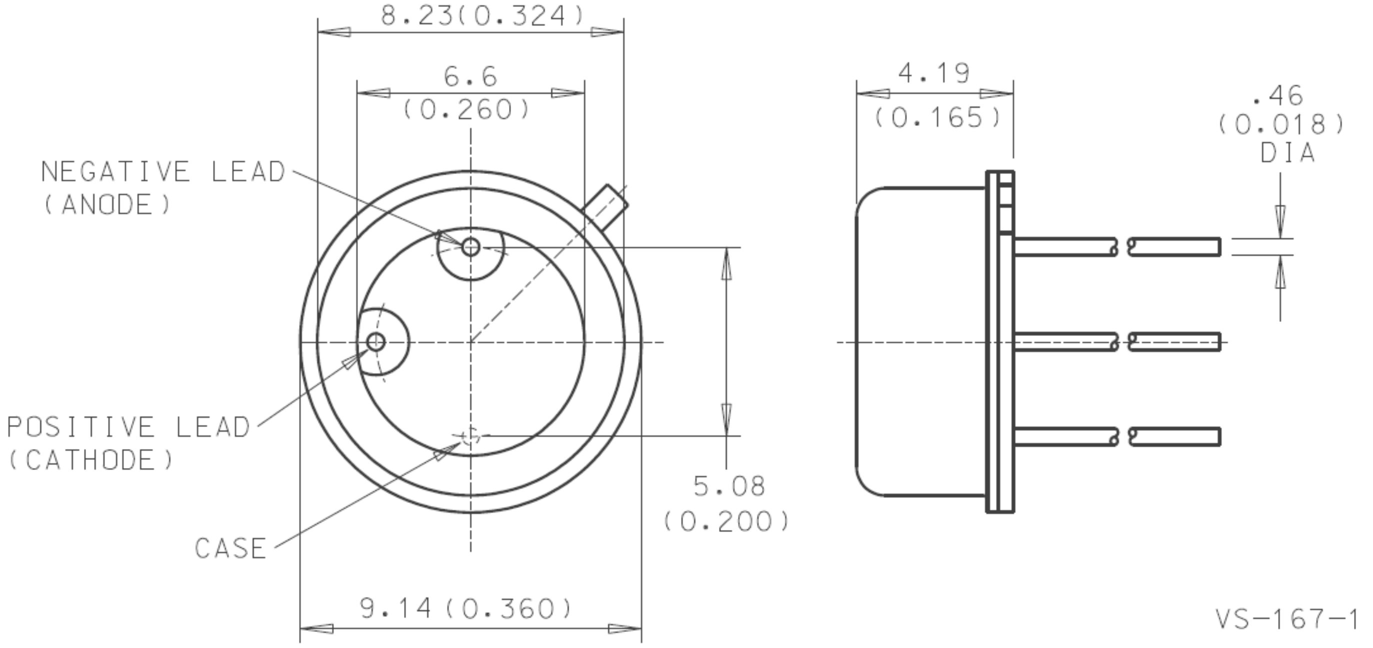
Figure 7 – Dimensional Outline



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RoHS Compliance

The C30884EH 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.

RoHS
COMPLIANT
2011/65/EU

Warranty

A standard 12-month warranty following shipment applies. Any warranty is null and void if the photodiode window has been opened.

About Excelitas Technologies

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