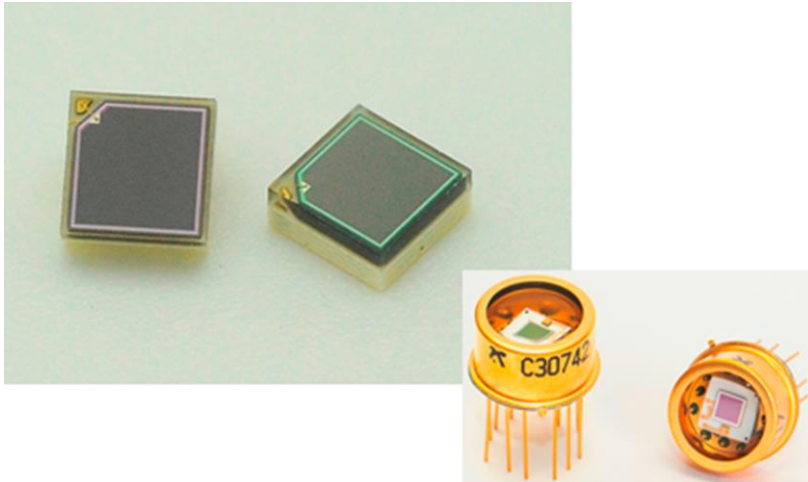## C30742-33 Series

Silicon Photomultipliers with 3x3 mm² active area

The Excelitas C30742-33 Series SiPM is offered in 3 standard package configurations: Leadless laminated carrier surface mount, the hermetically sealed TO-8 package with built-in single stage TE cooler, and the two-lead ceramic mount (not pictured).

Key Features

- Low timing resolution
- High gain at low bias voltage
- Low dark count rate
- High photon detection efficiency
- Low capacitance
- Excellent gain – temperature – voltage characteristics
- RoHS-compliant

Applications

- Photon Counting
- Positron Emission Tomography (PET)
- Flow Cytometry
- Analytical Detection
- High Energy Physics experiments
- Radiation Detection
- Fluorescence Detection

The Excelitas C30742-33 Series Silicon Photomultiplier is designed for photon detection in the 350 nm to 850 nm range. Its innovative design based on Excelitas' proprietary high-performance APD processes is optimized for low timing resolution, low dark count, low cross talk and high photon detection efficiency. This unique set of performance parameters makes the Excelitas SiPM especially advantageous for demanding high volume applications such as Positron Emission Tomography (PET), high energy physics experiments, analytical measurements and radiation detection.

The Excelitas C30742-33 SiPM is offered in 3 standard package configurations: Hermetically sealed TO-8 package with built-in single stage TE cooler, two-lead ceramic mount and our patented leadless laminated carrier surface mount (XLLC, SMT, tile-able) allowing for easy handling and coupling to scintillating crystals such as LSO and BGO.

Excelitas Technologies is committed to supplying the highest quality product to our customers. This specification sheet covers our standard products. Please contact us directly to discuss your custom requirements and how we can accommodate your special design, packaging, or testing needs.

C30742-33 Series
Silicon Photomultipliers

Table 1: Electrical Characteristics, at TA = 25 °C, typical V_{op}[1] - unless otherwise indicated

Parameter	Symbol	Minimum	Typical	Maximum	Unit
			C30742-33-50[2]		
Active area	-		3x3		mm
# of microcells	-		3600		-
Microcell size	-		50		um
Breakdown Voltage	V_{bd}		95		V
Over Voltage [1]	ΔV		5	12	V
Spectral response range	L		350-850		nm
Photon detection efficiency [3] @ 420nm @ 520nm @ 635nm	PDE		30 33 18		%
Dark count	DCR		1350	4050	Kcps
Dark count / mm^2			150	450	Kcps
Dark Current	I_d		0.7	2.1	μA
Terminal Capacitance	C_t		175		pF
Gain	M		1.7×10^6		
Single photon timing resolution (FWHM) at 440nm	SPTR		300		ps
Temperature coefficient of Vbr	$T_c = \delta V/\delta T$		90		mV/°C
Gain variation with over-voltage	δM/MδV		1.0		%/50mV
Gain variation with temperature	δM/MδT		1.8		%/°C

Note 1: Typical recommended operating voltage is $V_{op} = V_{bd}$ +5V
Note 2: See Table 2 for part number system of this series of SiPM.
Note 3: True PDE value on potted device. After pulse and crosstalk are not included.

Table 2: Ordering Guide

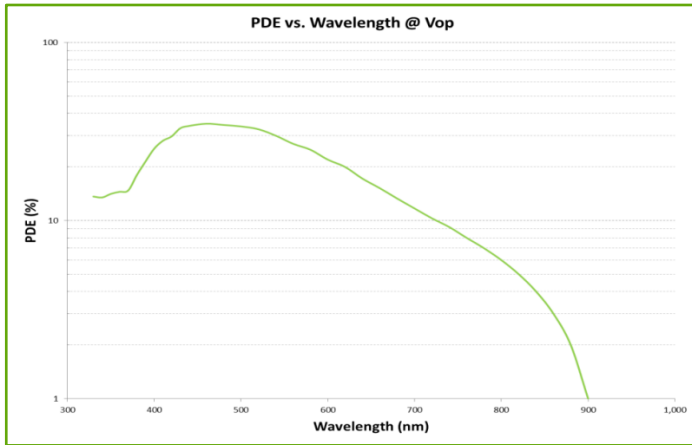| Excelitas **C30742-33 Series SiPM**	50 x 50 μm² microcell size
Ceramic Package with Pins	C30742-33-050-C
XLLC (Leadless Laminate Carrier)	C30742-33-050-X
TO-8 Hermetic package with Single stage TEC	C30742-33-050-T1

Silicon Photomultipliers

Figure 1:

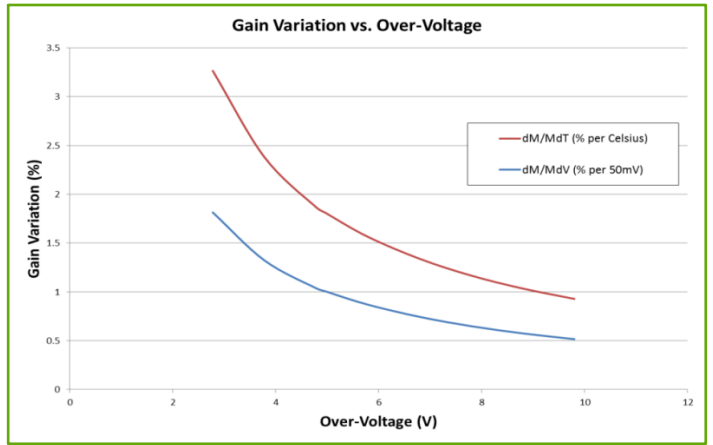Photon Detection Efficiency (PDE) vs. Wavelength

Figure 2:
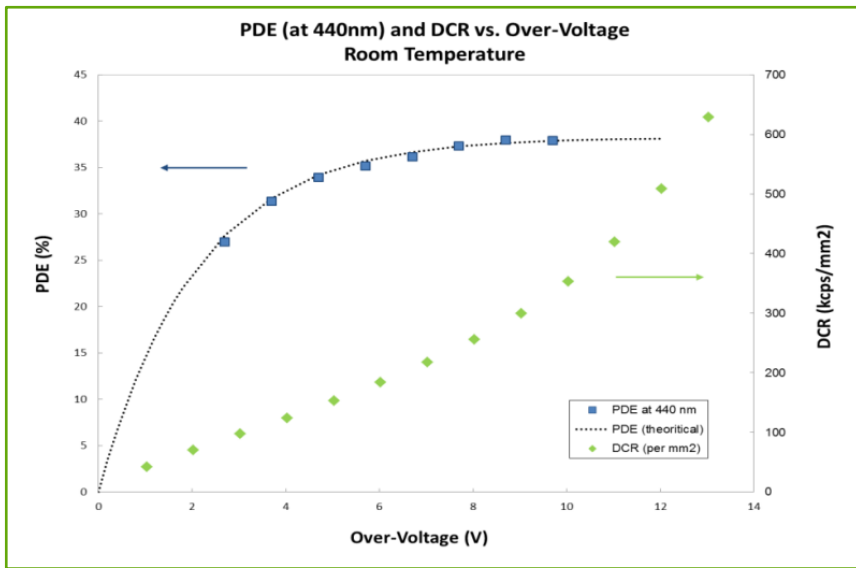
Gain variation vs. over-voltage

Figure 3:

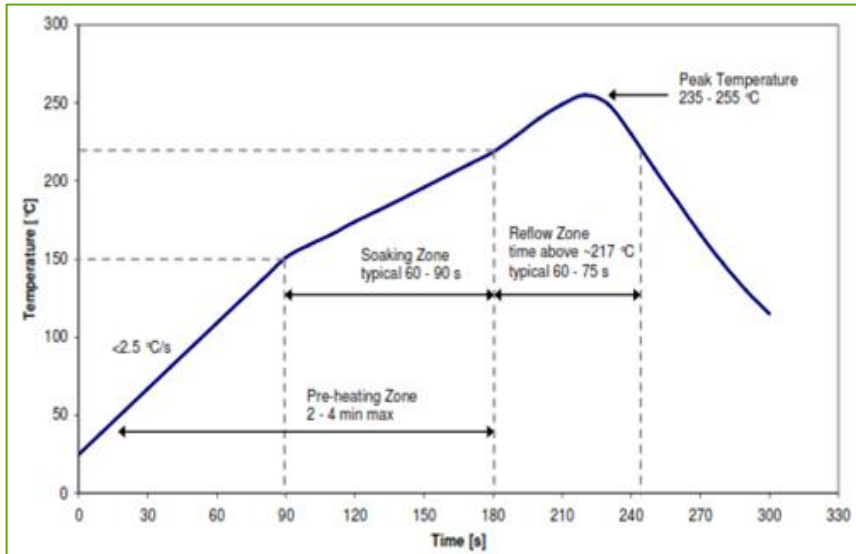PDE and Dark Count vs. over-voltage at room temperature

Figure 4:

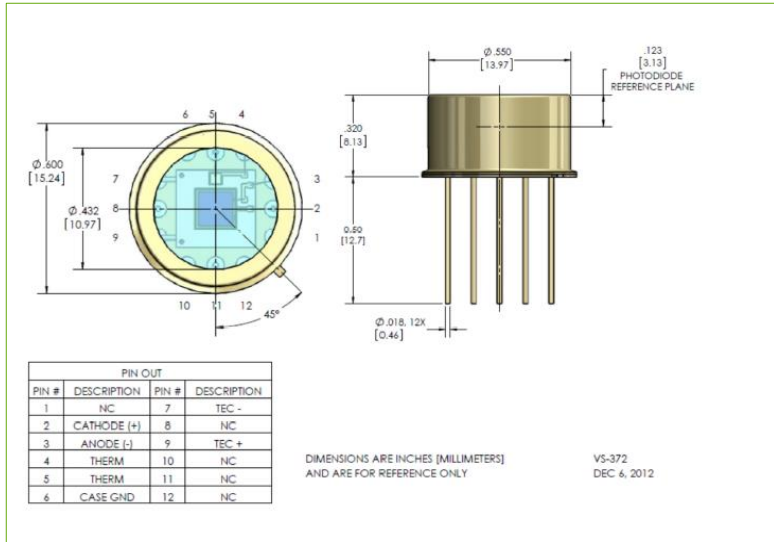Typical reflow solder profile for lead free solder SAC305

Silicon Photomultipliers

Figure 5:
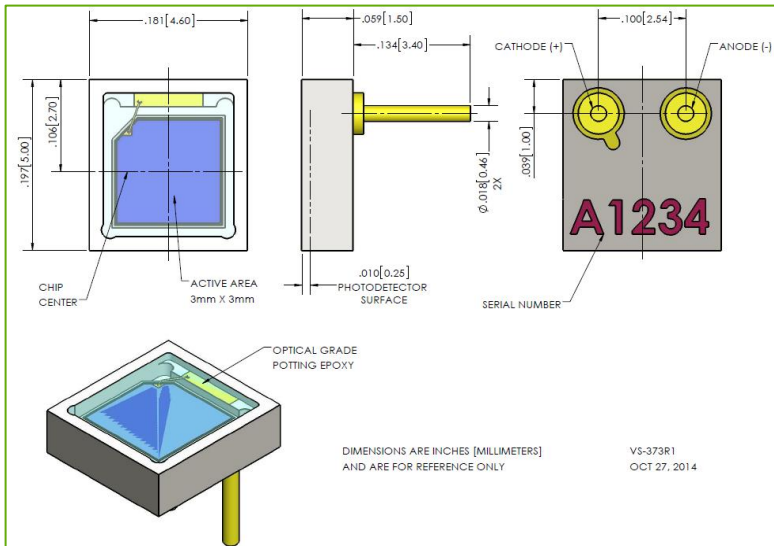TO-8 Hermetic Package drawing
Part#: C30742-33-050-T1

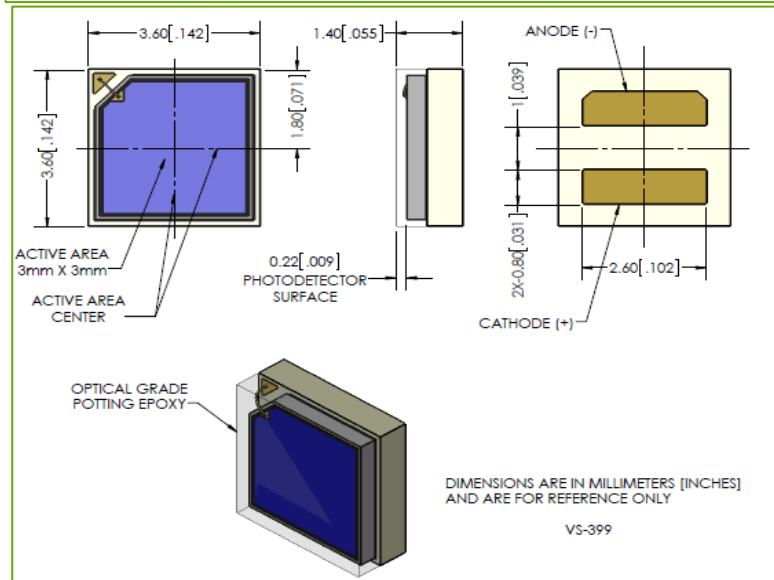**Figure 6:**
Two-lead ceramic carrier dimensions,
Part#: C30742-33-050-C

Figure 7:
Leadless laminated carrier surface mount
(XLLC) dimensions, Part#: C30742-33-050-X

Soldering Conditions

The C30742-33-050-C can be lead-free reflow soldered according JEDEC 020D. See Figure 4 for typical soldering reflow profile.

Packaging

Plastic shipping tray or tape-and-reel packaging are available. The tape-and-reel shipping pack option is for quantities of 3000 units per reel. This packing option should be indicated at the time of order placement.

RoHS Compliance

The C30742 series SiPM 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.   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 5,000 employees in North America, Europe and Asia, serving customers across the world.