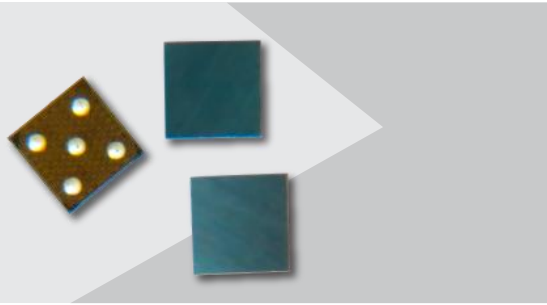
excelitas®

XPD-100-1



Space saving photo diode

The XPD-100-1 photo diode is a high-sensitive, high-speed, low-cost silicon photodiode for industrial and consumer applications. These photodiodes are designed to be used in a reverse-bias mode, whereas the reverse bias voltage can be between 1.5 and 20 Volts.

The diodes feature a very high quantum efficiency of 90 % in the near IR range, a reverse breakdown voltage of up to 30 Volts and a response time down to less than 70ns.

The advanced chip scale package (CSP) makes this device ideal for miniaturized systems where a minimal space requirement is the key.

These photodiodes have an anti-reflection coating on the photosensitive surface. It is optimized for 850 nm wavelength with a reflectivity below 0.4 % over an incidence angle of 35°. Other reflectance optimized center wavelength AR coatings are available upon request.

Typical applications are, among others, light barriers, smoke detectors, proximity sensors, light curtains, liquid detectors, level detectors, heartbeat monitors, oximeters, position detection (linear, rotary, angle, etc.), IR remote control.

These photo diodes are manufactured on an 8 inch silicon CMOS process. The spacing between the photo diode dies is 0.1 mm. Thus, photo diode arrays can be offered by cutting the wafer upon customer request.

APPLICATIONS

- Light barriers and curtains
- Proximity sensors
- Position detection (linear, rotary, angular)
- Liquid and level detectors

YOUR BENEFITS

- Very small footprint with chip scale package
- Very high dynamic range of 5 decades
- Easy SMT assembly by tape-on-reel packing
- No shelf-time limitation due to all non-organic materials used

SPECIFICATIONS

- Photo-sensitive area 1.65 x 1.65 mm
- Quantum efficiency 90 % @ 850 nm
- Low noise of 1.2×10^{-14} W/√Hz
- Rise/fall time 70 ns @ 10 V

Key characteristics

Parameter	Conditions	Symbol	Min	Typ	Max	Units
Bias Voltage		Vbd	1.5		20	V
Responsivity	λ = 850 nm	R		0.61		A/W
Wavelength		λ	400		1030	nm
Quantum Efficiency	λ = 850 nm	QE		90		%
Half angle		ϕ		± 75		°
Open Circuit Voltage	0.5 mW/cm^2	V_O		250		mV
Photo Current	λ = 850 nm V_R = 5 V I_e = 1 mW/cm^2	I_P		18.7		µA
Dark Current	V_R = 5 V T_A = 20°C	I_R		2		nA
Capacitance	V_R = 5V ƒ = 100 kHz E = 0	C_0		22		pF
Noise Equivalent Power	V_R = 5V	NEP		1.2 x 10^{-14}		W/√Hz

FIG 1. SPECTRAL SENSITIVITY

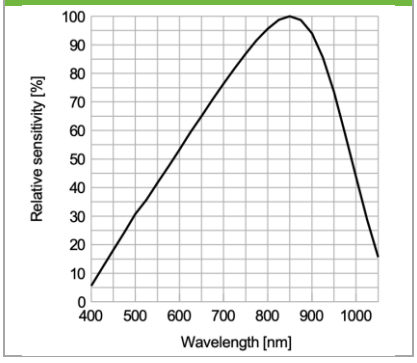


FIG 2. ANGULAR SENSITIVITY

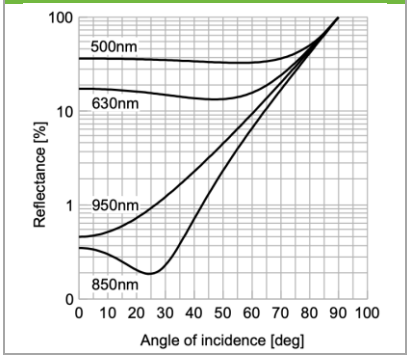


FIG 3. RISE/FALL TIME

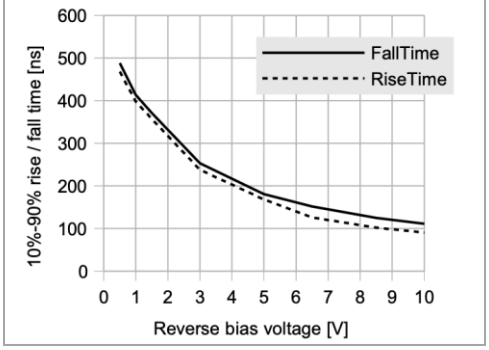
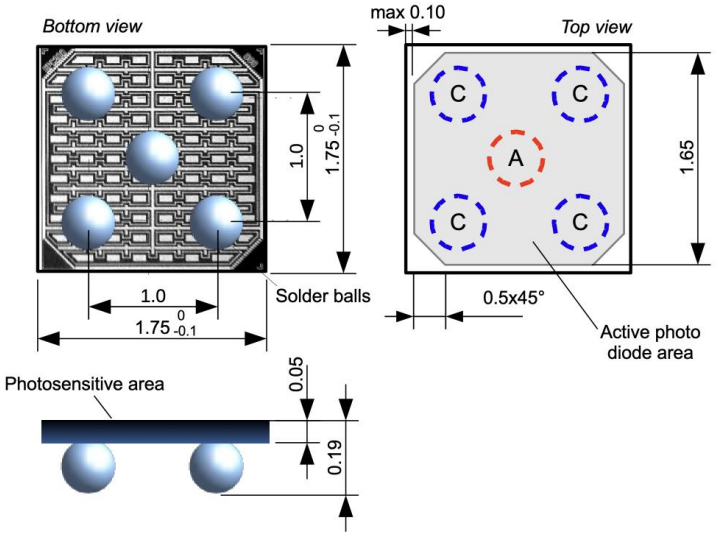


FIG 4. MECHANICAL DIMENSIONS

Note:

1) 'A' refers to the anode, 'C' to the cathode of the diode

2) Cathodes are internally connected



Testing and operation methods

Excelitas verifies the electro optical specifications on every device.

Visual inspection during fabrication is performed as per our quality standard and failed dies are removed.

Excelitas Technologies is certified to meet ISO-9001.

Packaging and shipping

The devices are mounted on embossed tape for automatic placement systems. Tape width is 8 mm, pitch from part to part is 4 mm. The tape is wound on 178 mm (7 inch) or 330 mm (13 inch) reels and individually packaged for shipment. General tape-and-reel specification data are available in a separate datasheets and indicate the tape sizes for various package types. Further tape-and-reel specifications can be found in the Electronic Industries Association (EIA) standard 481-1, 481-2, 481-3.

Storage and handling

Excelitas highly recommends following the notes below:

- Keep devices in an ESD controlled environment until final assembly.
- Open the sealed packing just before SMT assembly. Once the sealed packing is open, keep the devices under N2 atmosphere to avoid corrosion and oxidation of the solder ball surface.
- PCB design and SMD manufacturing process shall be according to our Chip-Scale Package Assembly Process Guidelines.

RoHS compliance

This series of silicon photo diodes is designed and built to be fully compliant with the European Union Directive on restrictions on the use of certain hazardous substances in electrical and electronic equipment.



Warranty

A standard 12-month warranty following shipment applies.



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