

## YAG series – YAG-444-4AH, YAG-444N-4AH and YAG-555-4AH quadrants Silicon PIN Quadrant Detector



*The YAG series high-performance Si PIN photodiodes are well-suited for applications such as munition guidance, laser spot tracking and others.*

Excelitas Technologies' YAG series of Silicon PIN quadrant detectors are high-performance N-type or P-type Si PIN photodiodes in hermetically sealed TO packages. These photodiodes perform well over the 400 nm to 1100 nm wavelength range, with enhanced IR responsivity, making them ideal for 1064 nm detection applications.

A guard ring collects current generated outside the active area, ensuring the current will not contribute to noise.

The YAG-444-4AH, YAG-444N-4AH, and YAG-555-4AH are quadrant photodiodes with circular active area with four pie-shaped quadrant sections created from the doping process, each with an isolated signal lead. There is no "dead" space between the elements.

Recognizing that different applications have different performance requirements, Excelitas offers a wide range of customization of these photodiodes to meet your unique design challenges. Various active area, custom device testing/qualification and packaging options (hermetic metal can, high-shock resistance packaging, ceramic carrier, custom pin-out configuration, heater-options, etc.) are among many of the application specific solutions available.

### Key Features and Benefits

- High quantum efficiency at 1064 nm
- Wide spectral range
- Crosstalk <1% between elements
- No "dead zones" between quadrants
- Linearity over wide dynamic range
- Oxide passivated
- Planar diffused structure
- Operation temperature: -55 to 125°C
- Package style: TO-36
- RoHS-compliant
- Available in N- and P-type configuration
- Available with lead-solder

### Applications

- Laser spot tracking
- Munition guidance
- Laser seeker head
- Semi-Active Laser (SAL) sensor

# YAG-444-4AH, YAG-444N-4AH and YAG-555-4AH

## Silicon PIN Quadrant Detector

**Table 1 – Operating data and specifications at 23°C (typical performance at 180V voltage bias)**

Parameter (See notes 1 and 2)	YAG-444-4AH			YAG-444N-4AH PRELIMINARY			YAG-555-4AH			Units
	Min	Typical	Max	Min	Typical	Max	Min	Typical	Max	
Number of elements	4			4			4			
Active area (per element)		25			25			39		mm <sup>2</sup>
Active area, overall diameter		11.5			11.5			14.1		mm
Spectral range	400-1150									nm
Responsivity (See Figure 2) at 900 nm at 1064 nm		0.60 0.44			0.60 0.44			0.60 0.44		A/W
Bandwidth, 50Ω load		60						60		MHz
Rise time		12			12			12		ns into 50Ω
Operating voltage (V <sub>op</sub> )		0-180			0-180			0-180		V
Breakdown voltage (V <sub>br</sub> )	200			200			200			V
Wafer type (See Figure 3) Bias configuration	P-type Common Anode			N-type Common Cathode			P-type Common Anode			
Capacitance		9	15		9	15		12	20	pF
Dark current (I <sub>d</sub> )		30	100		30	100		50	150	nA
Channel resistance		>1			>1			>1		MΩ
Series resistance		320						320		Ω
Noise current		0.20			0.10			0.20		pA/√Hz
Noise equivalent power (NEP) 900 nm, 1 MHz 1064 nm, 1MHz		0.25 0.30			0.20 0.25			0.25 0.30		pW/√Hz
Response linearity		<1%			<1 %			<1%		Over 7 decades
Crosstalk		<1%			<1 %			<1%		
Field of View (See Figure 1) Nominal field of view α Nominal field of view α'		110 160			110 160			85 162		degrees

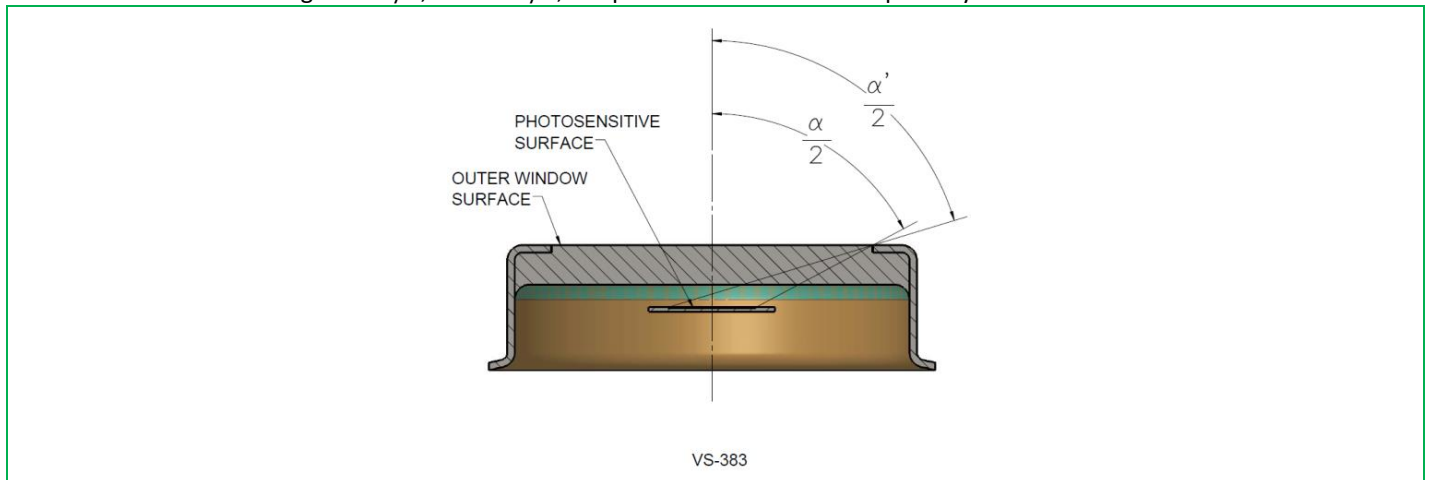
### Notes:

- Active area and all characteristics are listed per element.
- Breakdown voltage (V<sub>br</sub>) measurement at 100 μA dark current (I<sub>d</sub>), in appropriate polarity depending on wafer type

### Figure 1 – 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 2 – Typical Spectral Response

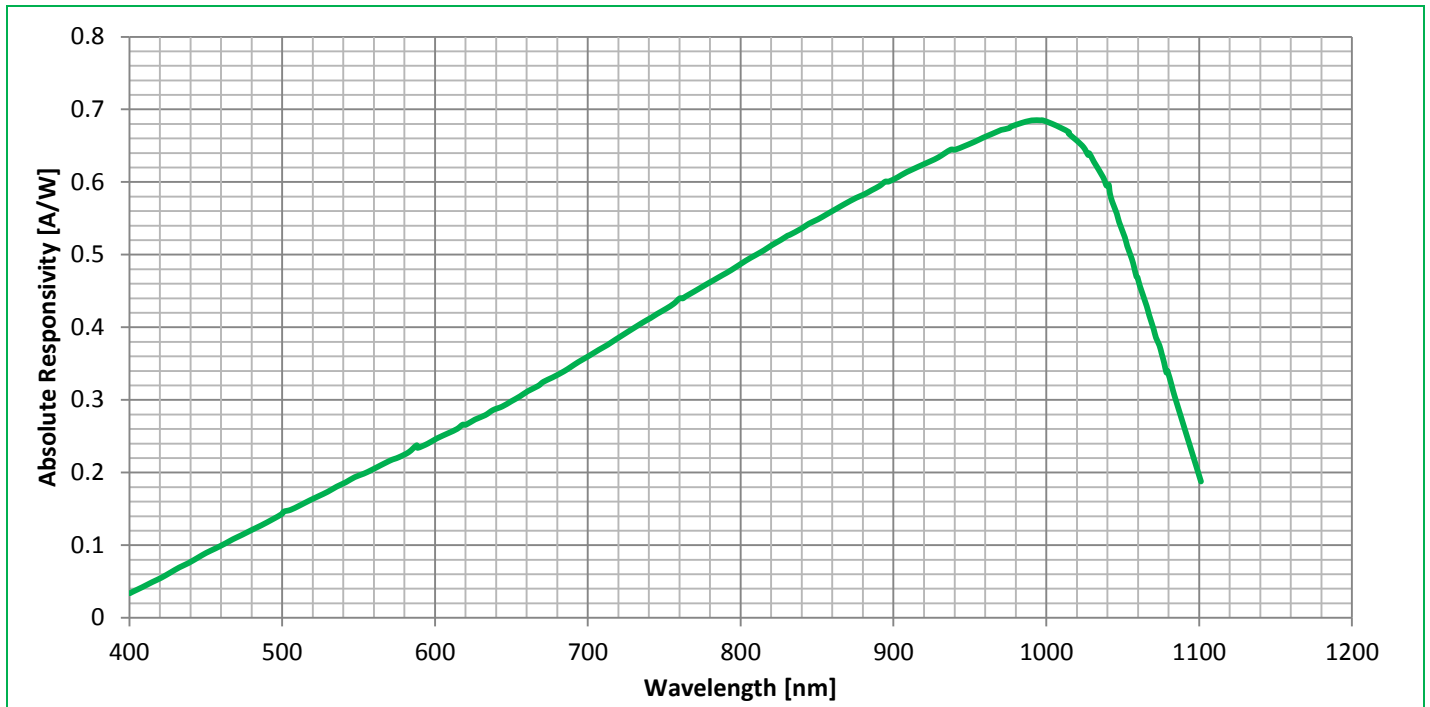
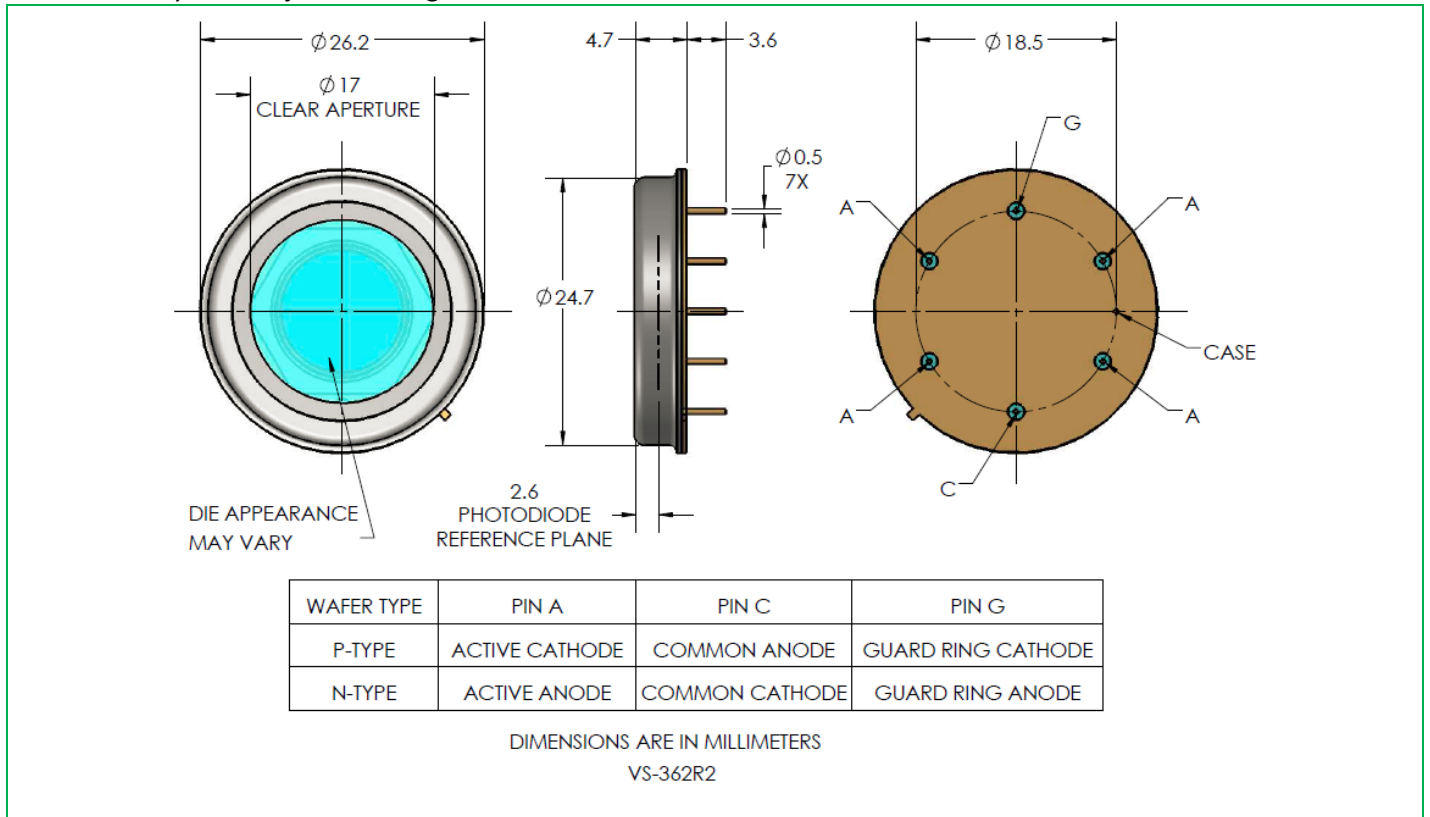


Figure 3 – Package Dimensions and Pin Assignment

Reference only and subject to change without notice



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## Silicon PIN Quadrant Detector

### Export controls

Due to specific features some items may be subject to international export controls and may not be exported without official authorization.

### RoHS Compliance

The YAG-series of quadrant detectors 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. Any warranty is null and void if the photodiode window has been opened.

### 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.

Excelitas has a long and rich history of serving our OEM customer base with optoelectronic sensors and modules for more than 45 years beginning with PerkinElmer, EG&G, and RCA. The constant throughout has been our innovation and commitment to delivering the highest quality solutions to our customers worldwide.

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