

## Features

- Low capacitance high sensitivity back-side illuminated (BSI) design
- 950–1700nm response
- Low operating bias, 0.5-1V
- Custom sizes and layout available upon request

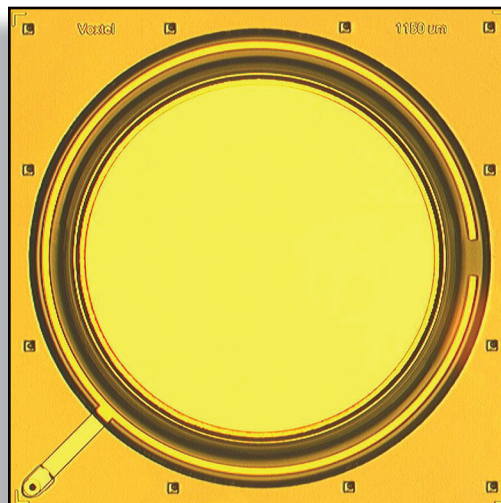
## Applications

- Free-space optical communications
- Laser range finding
- Optical time domain reflectometry
- Optical coherence tomography
- Fluorescence measurements, spectroscopy, chromatography and electrophoresis
- Telecommunications
- LADAR/LIDAR

## Metolius BSI™

### p-i-n Photodiode Submounted Die

High-Quantum Efficiency p-i-n (HQE-PIN) Photodiode



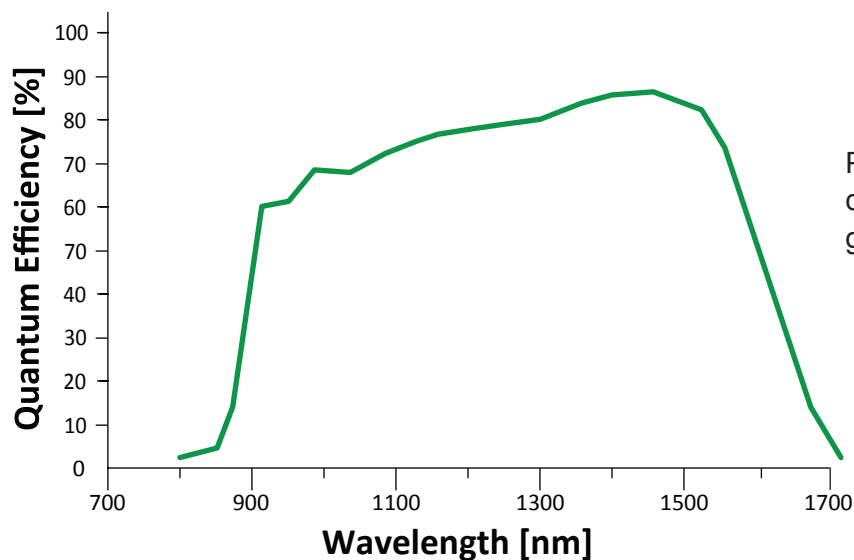
### Model PPE1-xBZA Series Submounted Die

The Metolius BSI™ PPE-1000 series InGaAs p-i-n detector combines high sensitivity NIR light detection with large-diameter active area, operation under minimal reverse bias (0.5-1V) and low dark current.

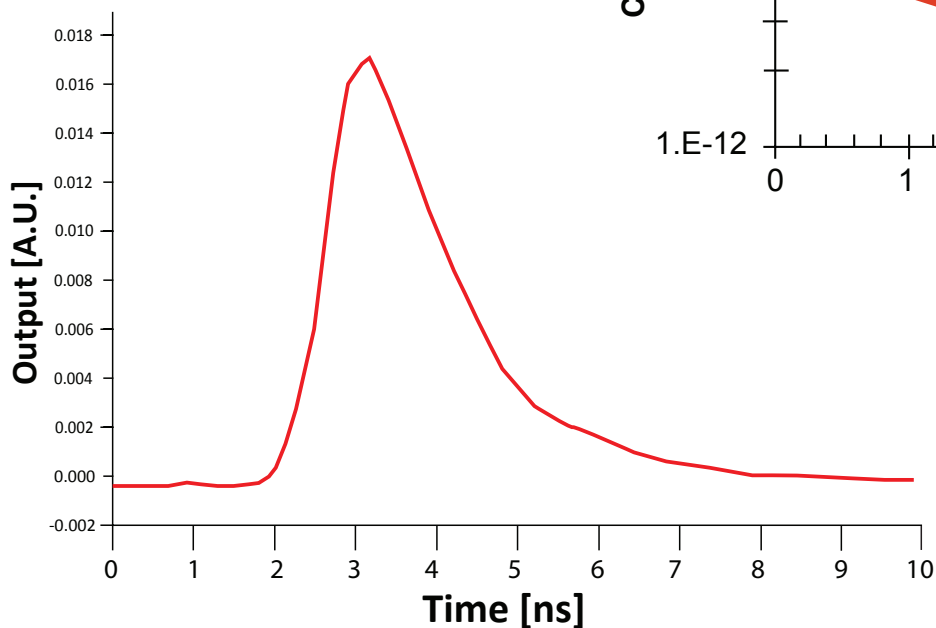
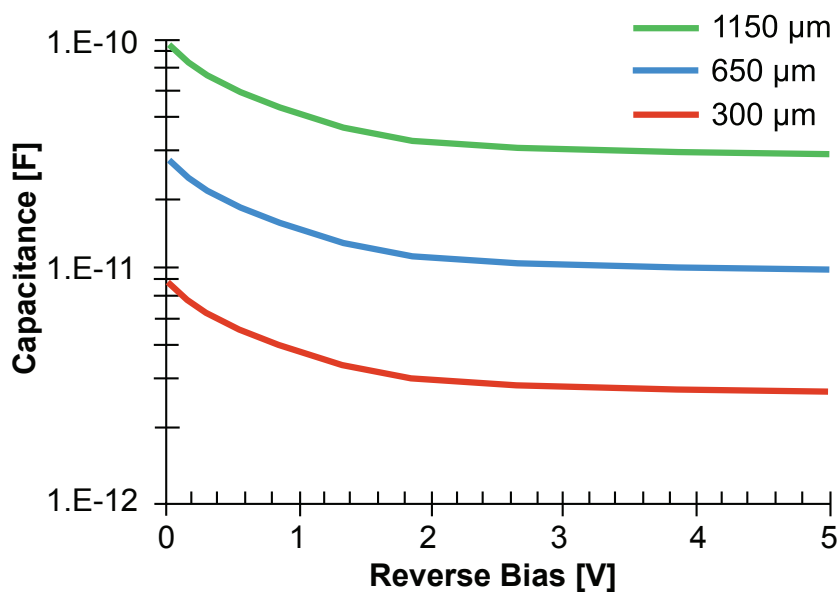
This back-side illuminated detector provides both higher sensitivity and lower capacitance than competing frontside-illuminated photodiodes. While the detector capacitance is minimized at a bias of 3 to 5 Volts, the device can operate with at least 90% of its specified responsivity and a fraction of the dark current at a bias of only 0.7 V.

For ease of intergration, these HQE-PIN die are provided on a ceramic submount with or without a co-mounted temperature sensor. Packaging of these diodes in either a windowed TO-46 header or with a 3-stage thermoelectric-cooler (TEC) in a 6-pin windowed TO-8 header is also available upon request.

### Metolius BSI™ PPE-1000 Series



PPE-1000 series capacitance vs. voltage



MODEL PPE1-SBZA

PPE-1000 Series Near-Infrared HQE-PIN  
1150-micron HQE-PIN

Specifications

Parameter	Min	Typical	Max	Units
Spectral Range, $\lambda$	950	1000–1600	1750	nm
Active Diameter		1150		$\mu\text{m}$
Responsivity		0.70 1.05		A/W @ 1064 1550nm
Noise Spectral Density		27		fA/Hz <sup>1/2</sup>
Dark Current <sup>1</sup>	1.7	2.2	2.6	nA
Dark Current Dependence on Temperature <sup>2</sup>		0.30		dB/K
Total Capacitance <sup>3</sup>		38		pF
Maximum Instantaneous Optical Input			500 est.	mW
Absolute Operating Temperature	-73 200	-40 -30 233-303	75 348	°C K
Temperature Sensing Diode Voltage and $\Delta V/K^4$	0.48	0.50 -2.18mV/K	0.51	V

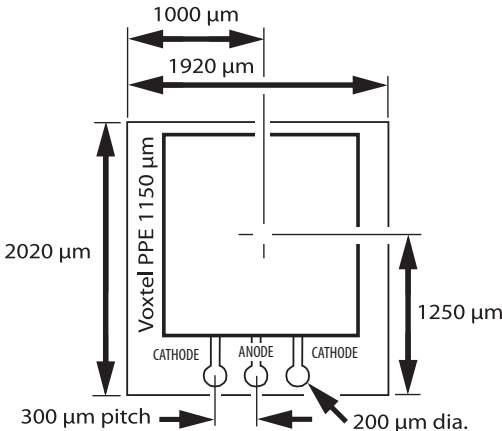
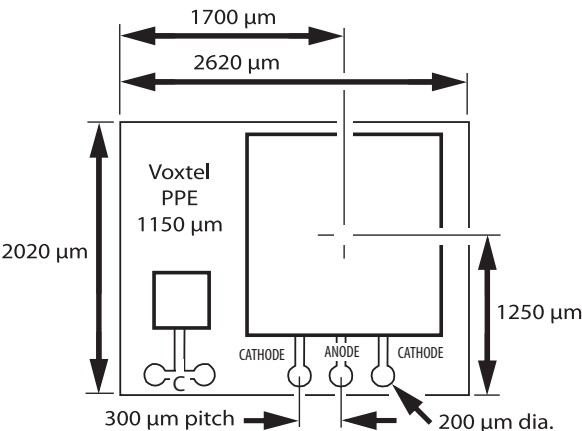
<sup>1</sup>  $V_{Bias} = 3V$ ,  $T=298K$

<sup>2</sup>  $240K < T < 300K$

<sup>3</sup>  $V_{Bias} = 5V$

<sup>4</sup> Sourcing 10 $\mu A$  and 298K

Mechanical  
dimensions of the  
submounted die. The  
submount is 250 $\mu\text{m}$   
thick aluminum-nitride  
and the photodiode  
is 350 $\mu\text{m}$  thick



MODEL PPE1-RBZA

PPE-1000 Series Near-Infrared HQE-PIN  
650-micron HQE-PIN

Specifications

Parameter	Min	Typical	Max	Units
Spectral Range, $\lambda$	950	1000–1600	1750	nm
Active Diameter		650		$\mu\text{m}$
Responsivity		0.70 1.05		A/W @ 1064 1550nm
Noise Spectral Density		20		fA/Hz <sup>1/2</sup>
Dark Current <sup>1</sup>	0.9	1.2	1.7	nA
Dark Current Dependence on Temperature <sup>2</sup>		0.30		dB/K
Total Capacitance <sup>3</sup>		12		pF
Maximum Instantaneous Optical Input			100 est.	mW
Absolute Operating Temperature	-73 200	-40 -30 233-303	75 348	°C K
Temperature Sensing Diode Voltage and $\Delta V/K$ <sup>4</sup>	0.48	0.50 -2.18mV/K	0.51	V

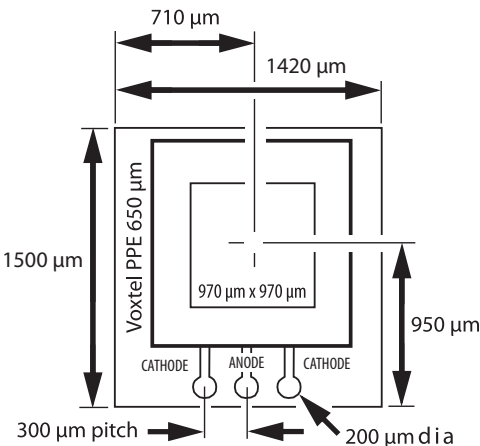
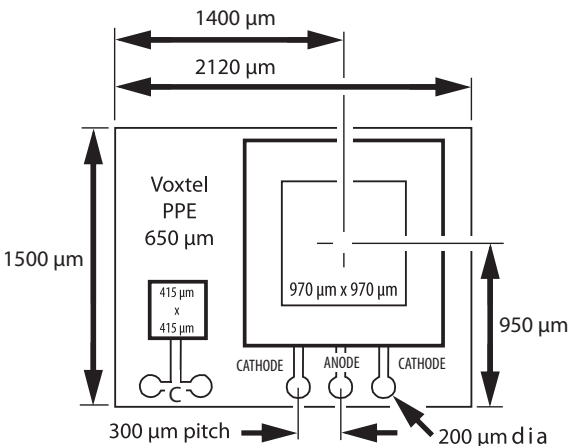
<sup>1</sup>  $V_{Bias} = 3V$ ,  $T=298K$

<sup>2</sup>  $240K < T < 300K$

<sup>3</sup>  $V_{Bias} = 5V$

<sup>4</sup> Sourcing 10 $\mu\text{A}$  and 298K

Mechanical  
dimensions of the  
submounted die. The  
submount is 250 $\mu\text{m}$   
thick aluminum-nitride  
and the photodiode  
is 350 $\mu\text{m}$  thick



MODEL PPE1-QBZA

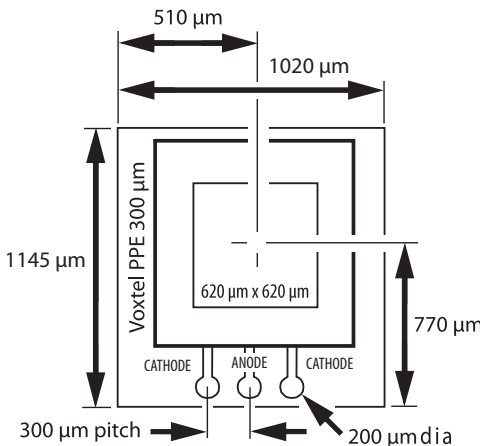
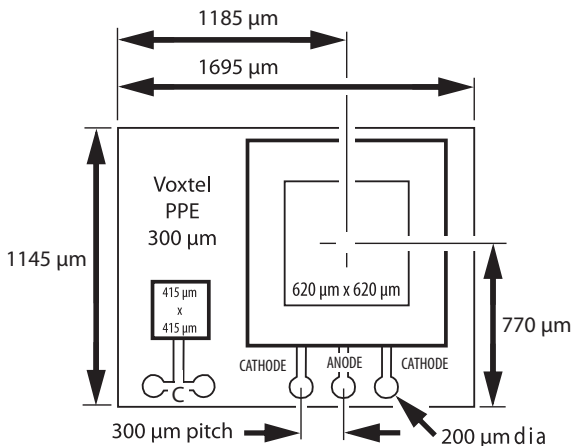
PPE-1000 Series Near-Infrared HQE-PIN  
300-micron HQE-PIN

Specifications

Parameter	Min	Typical	Max	Units
Spectral Range, $\lambda$	950	1000–1600	1750	nm
Active Diameter		300		$\mu\text{m}$
Responsivity		0.70 1.05		A/W @ 1064 1550nm
Noise Spectral Density		13		fA/Hz <sup>1/2</sup>
Dark Current <sup>1</sup>	0.4	0.5	1.0	nA
Dark Current Dependence on Temperature <sup>2</sup>		0.30		dB/K
Total Capacitance <sup>3</sup>		2.9		pF
Maximum Instantaneous Optical Input			50 est.	mW
Absolute Operating Temperature	-73 200	-40 -30 233-303	75 348	°C K
Temperature Sensing Diode Voltage and $\Delta V/K$ <sup>4</sup>	0.48	0.50 -2.18mV/K	0.51	V

<sup>1</sup>  $V_{Bias} = 3V, T=298K$   
<sup>2</sup>  $240K < T < 300K$   
<sup>3</sup>  $V_{Bias} = 5V$   
<sup>4</sup> Sourcing 10 $\mu$ A and 298K

Mechanical dimensions of the submounted die. The submount is 250 $\mu$ m thick aluminum-nitride and the photodiode is 350 $\mu$ m thick



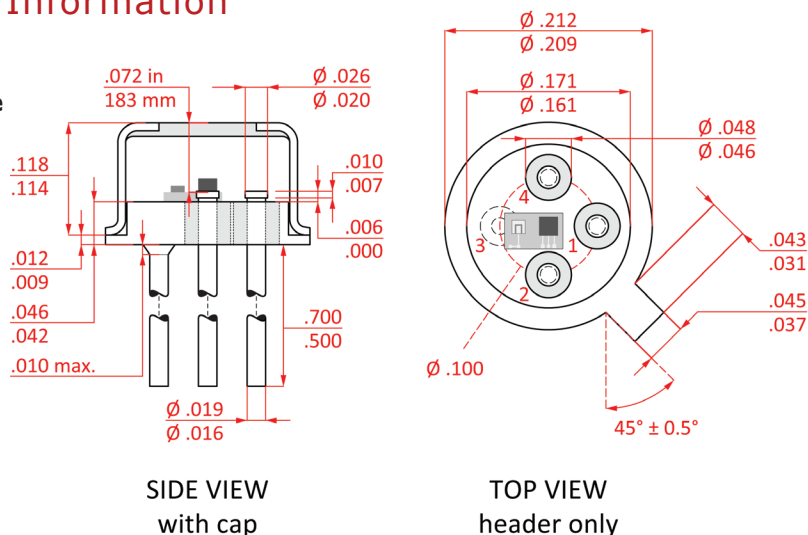
### Ordering Information For PPE-1000 Series Submounted Die

P	P	E	1	-	-	-	A
Device	Device Type	Detector		Diameter	Package	Window	Revision
P=non-APD photodiode	P=p-i-n photodiode	E=Metolius BSI™ HQE-PIN	1=Single Element	Q=300µm R=650µm S=1150µm	B=Ceramic Submount C=TO-46 K=TO-8 w/3-stage TEC	A=Flat Z=None	

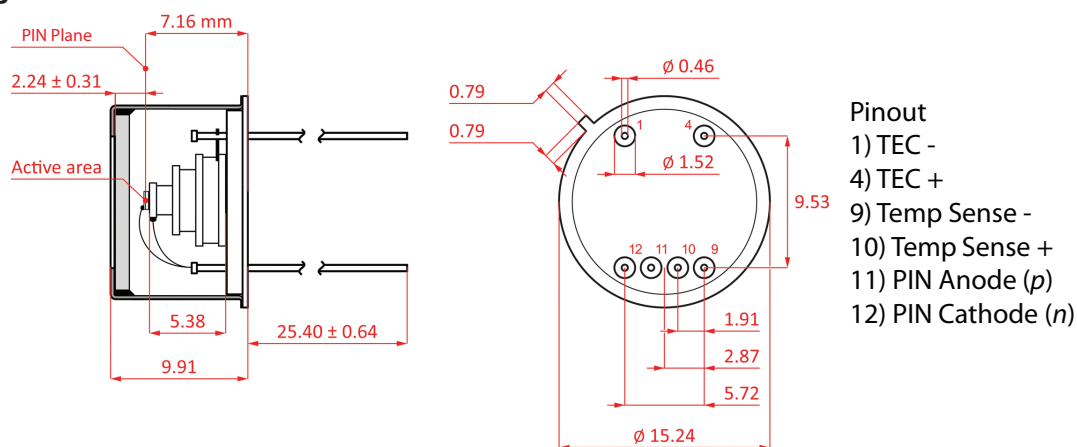
Not all combinations of product features are available. Please contact Voxel for specific ordering information and parts availability.

### Mechanical Information

#### TO-46 Package



#### TO-8 Package



Upon request, Voxel will gladly assist customers in implementing the proper controls to ensure safe and reliable operation of detectors in their system.