

## Data Sheet PCA-44-16-16-1030

Photoconductive THz antenna for laser excitation wavelength ~ 1030 nm  
and Butterfly structure



PCA – Photo Conductive Antenna

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## 1 Mounting Options

PCA-44-16-16-1030-0	Unmounted PCA chip
PCA-44-16-16-1030-h	Mounted on hyperhemispherical Si lens
PCA-44-16-16-1030-c	Mounted on collimating aspheric Si lens
PCA-44-16-16-1030-a	Mounted on aspheric focusing Si lens

## Nomenclature

PCA-44-16-16-1030-X

PCA-44-16-16-1030-X-Y	Antenna design	Butterfly
PCA-44-16-16-1030-X-Y	Antenna length	44 $\mu\text{m}$
PCA-44-16-16-1030-X-Y	Gap distance	16 $\mu\text{m}$
PCA-44-16-16-1030-X-Y	Gap width	16 $\mu\text{m}$
PCA-44-16-16-1030-X-Y	Excitation wavelength	1030 nm
PCA-44-16-16-1030-X-Y	Mounted Si lens	0 / h / c / a

## 2 PCA Specification

### 2.1 PCA-44-16-16-1030-0

- Unmounted PCA chip

Table 1: Specification PCA-44-16-16-1030-0

Parameter		Min	Recommended	Max
Laser source	Wavelength	990 nm	1030 nm	1060 nm
	Avg. optical power	-	30 mW	40 mW
	Avg. power density	-	-	12 000 W/cm <sup>2</sup>
	Fluence	-	-	200 μJ/cm <sup>2</sup>
	Pulse duration	-	100 fs	200 fs
	Repetition rate	70 MHz	80 MHz	-
	Spot diameter	16 μm	20 μm	-
Bias source	Voltage [V <sub>e</sub> ]	-	-	50 V
	Modulation frequency	0 Hz (Dc)	10 kHz	10 MHz
Dark resistance [R <sub>d</sub> ] <sup>1</sup>		> 5 GΩ	-	-
Parameter		Typical		
PCA chip	Width	2 mm ± 0.2 mm		
	Depth	2 mm ± 0.2 mm		
	Height	625 μm ± 25 μm		
THz Beam	Focal length	Dot source		

<sup>1</sup> Measurement conditions: room temperature & measuring voltage of 3.3 V

## 2.2 PCA-44-16-16-1030-h

- Mounted on hyperhemispherical Si lens (LSH-D12-T7.13)

Table 2: Specification PCA-44-16-16-1030-h

Parameter		Min	Recommended	Max
Laser source	Wavelength	990 nm	1030 nm	1060 nm
	Avg. optical power	-	30 mW	40 mW
	Avg. power density	-	-	12 000 W/cm <sup>2</sup>
	Fluence	-	-	200 μJ/cm <sup>2</sup>
	Pulse duration	-	100 fs	200 fs
	Repetition rate	70 MHz	80 MHz	-
	Spot diameter	16 μm	20 μm	-
Bias source	Voltage [V <sub>e</sub> ]	-	-	50 V
	Modulation frequency	0 Hz (Dc)	10 kHz	10 MHz
Dark resistance [R <sub>d</sub> ] <sup>2</sup>		> 5 GΩ	-	-
Parameter		Typical		
Package		Max. diameter 25.4 mm Min. length 9.5 mm		
THz Beam	Virtual focal length <sup>3</sup>	26.5 mm		
	Divergence angle	17°		

<sup>2</sup> Measurement conditions: room temperature & measuring voltage of 3.3 V

<sup>3</sup> Measured from the apex

## 2.3 PCA-44-16-16-1030-c

- Mounted on collimating Si lens (LSA-D20-T13.77)

Table 3: Specification PCA-44-16-16-1030-c

Parameter		Min	Recommended	Max
Laser source	Wavelength	990 nm	1030 nm	1060 nm
	Avg. optical power	-	30 mW	40 mW
	Avg. power density	-	-	12 000 W/cm <sup>2</sup>
	Fluence	-	-	200 µJ/cm <sup>2</sup>
	Pulse duration	-	100 fs	200 fs
	Repetition rate	70 MHz	80 MHz	-
	Spot diameter	16 µm	20 µm	-
Bias source	Voltage [V <sub>e</sub> ]	-	-	50 V
	Modulation frequency	0 Hz (Dc)	10 kHz	10 MHz
Dark resistance [R <sub>d</sub> ] <sup>4</sup>		> 5 GΩ	-	-
Parameter		Typical		
Package		Max. diameter 25.4 mm Min. length 16.0 mm		
THz Beam	Focal length <sup>5</sup>	∞		
	FWHM <sup>6</sup>	11.0 mm		

<sup>4</sup> Measurement conditions: room temperature & measuring voltage of 3.3 V

<sup>5</sup> Measured from the apex

<sup>6</sup> Full Width at Half Maximum

## 2.4 PCA-44-16-16-1030-a

- Mounted on focusing Si lens (LSA-D20-T14-F50)

Table 4: Specification PCA-44-16-16-1030-a

Parameter		Min	Recommended	Max
Laser source	Wavelength	990 nm	1030 nm	1060 nm
	Avg. optical power	-	30 mW	40 mW
	Avg. power density	-	-	12 000 W/cm <sup>2</sup>
	Fluence	-	-	200 μJ/cm <sup>2</sup>
	Pulse duration	-	100 fs	200 fs
	Repetition rate	70 MHz	80 MHz	-
	Spot diameter	16 μm	20 μm	-
Bias source	Voltage [V <sub>b</sub> ]	-	-	50 V
	Modulation frequency	0 Hz (Dc)	10 kHz	10 MHz
Dark resistance [R <sub>d</sub> ] <sup>7</sup>		> 5 GΩ	-	-
Parameter		Typical		
Package		Max. diameter 25.4 mm Min. length 16.0 mm		
THz Beam	Focal length <sup>8</sup>	50.0 mm		
	Convergence angle	10°		

<sup>7</sup> Measurement conditions: room temperature & measuring voltage of 3.3 V

<sup>8</sup> Measured from the apex

### 3 Application Note

#### 3.1 Measurement Setup

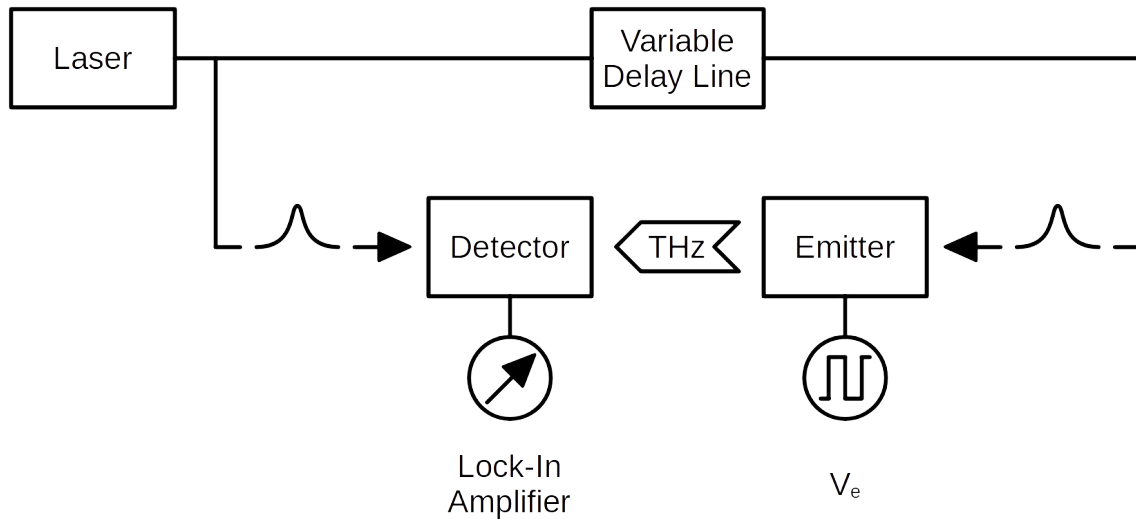


Figure 1: Setup for THz measurements

#### 3.2 PCA Design

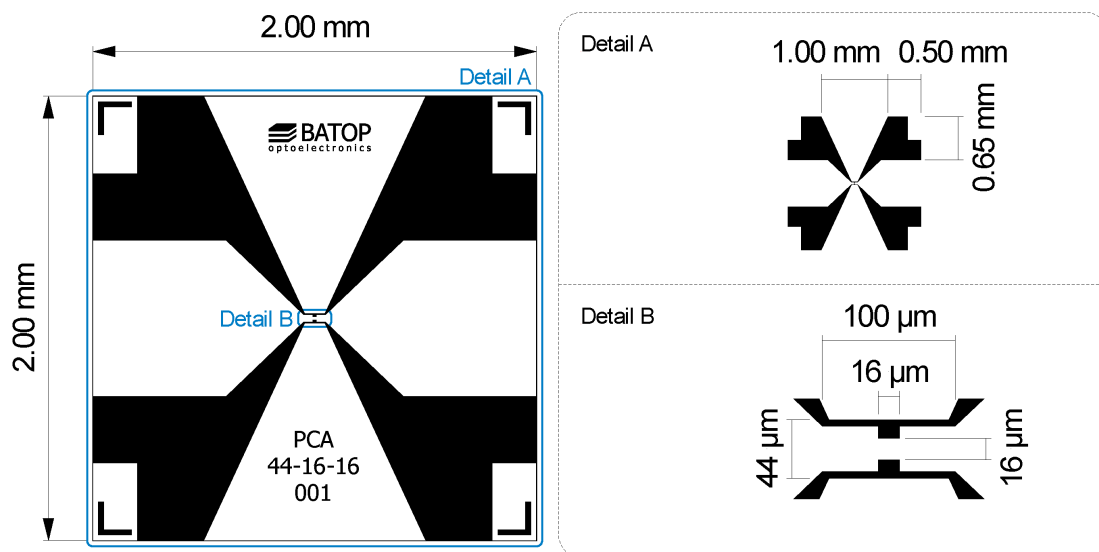


Figure 2: PCA dimensions

Antenna length = 44  $\mu\text{m}$  / Gap distance = 16  $\mu\text{m}$  / Gap width = 16  $\mu\text{m}$

## 4 Contact Details

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