

## Data Sheet PCA-30-14-14-800

Photoconductive THz antenna for laser excitation wavelength ~ 800 nm  
and Butterfly structure



PCA – Photo Conductive Antenna

### Table of Contents

	Page
<b>1 Mounting Options</b> .....	<b>1</b>
<b>2 PCA Specification</b> .....	<b>2</b>
2.1 PCA-30-14-14-800-0 .....	2
2.2 PCA-30-14-14-800-h .....	3
2.3 PCA-30-14-14-800-c .....	4
2.4 PCA-30-14-14-800-a .....	5
<b>3 Application Note</b> .....	<b>6</b>
3.1 Measurement Setup .....	6
3.2 PCA Design .....	6
<b>4 Contact Details</b> .....	<b>7</b>

## 1 Mounting Options

PCA-30-14-14-800-0	Unmounted PCA chip
PCA-30-14-14-800-h	Mounted on hyperhemispherical Si lens
PCA-30-14-14-800-c	Mounted on collimating aspheric Si lens
PCA-30-14-14-800-a	Mounted on aspheric focusing Si lens

## Nomenclature

PCA-30-14-14-800-X

PCA-30-14-14-800-X-Y	Antenna design	Butterfly
PCA-30-14-14-800-X-Y	Antenna length	30 $\mu\text{m}$
PCA-30-14-14-800-X-Y	Gap distance	14 $\mu\text{m}$
PCA-30-14-14-800-X-Y	Gap width	14 $\mu\text{m}$
PCA-30-14-14-800-X-Y	Excitation wavelength	800 nm
PCA-30-14-14-800-X-Y	Mounted Si lens	0 / h / c / a

## 2 PCA Specification

### 2.1 PCA-30-14-14-800-0

- Unmounted PCA chip

Table 1: Specification PCA-30-14-14-800-0

Parameter		Min	Recommended	Max
Laser source	Wavelength	650 nm	780 nm	850 nm
	Avg. optical power	-	30 mW	40 mW
	Avg. power density	-	-	20 000 W/cm <sup>2</sup>
	Fluence	-	-	300 μJ/cm <sup>2</sup>
	Pulse duration	-	100 fs	200 fs
	Repetition rate	70 MHz	80 MHz	-
	Spot diameter	14 μm	16 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>		> 10 MΩ	-	-
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-30-14-14-800-h

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

Table 2: Specification PCA-30-14-14-800-h

Parameter		Min	Recommended	Max
Laser source	Wavelength	650 nm	780 nm	850 nm
	Avg. optical power	-	30 mW	40 mW
	Avg. power density	-	-	20 000 W/cm <sup>2</sup>
	Fluence	-	-	300 μJ/cm <sup>2</sup>
	Pulse duration	-	100 fs	200 fs
	Repetition rate	70 MHz	80 MHz	-
	Spot diameter	14 μm	16 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>		> 10 MΩ	-	-
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-30-14-14-800-c

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

Table 3: Specification PCA-30-14-14-800-c

Parameter		Min	Recommended	Max
Laser source	Wavelength	650 nm	780 nm	850 nm
	Avg. optical power	-	30 mW	40 mW
	Avg. power density	-	-	20 000 W/cm <sup>2</sup>
	Fluence	-	-	300 μJ/cm <sup>2</sup>
	Pulse duration	-	100 fs	200 fs
	Repetition rate	70 MHz	80 MHz	-
	Spot diameter	14 μm	16 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>		> 10 MΩ	-	-
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-30-14-14-800-a

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

Table 4: Specification PCA-30-14-14-800-a

Parameter		Min	Recommended	Max
Laser source	Wavelength	650 nm	780 nm	850 nm
	Avg. optical power	-	30 mW	40 mW
	Avg. power density	-	-	20 000 W/cm <sup>2</sup>
	Fluence	-	-	300 µJ/cm <sup>2</sup>
	Pulse duration	-	100 fs	200 fs
	Repetition rate	70 MHz	80 MHz	-
	Spot diameter	14 µm	16 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>7</sup>		> 10 MΩ	-	-
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

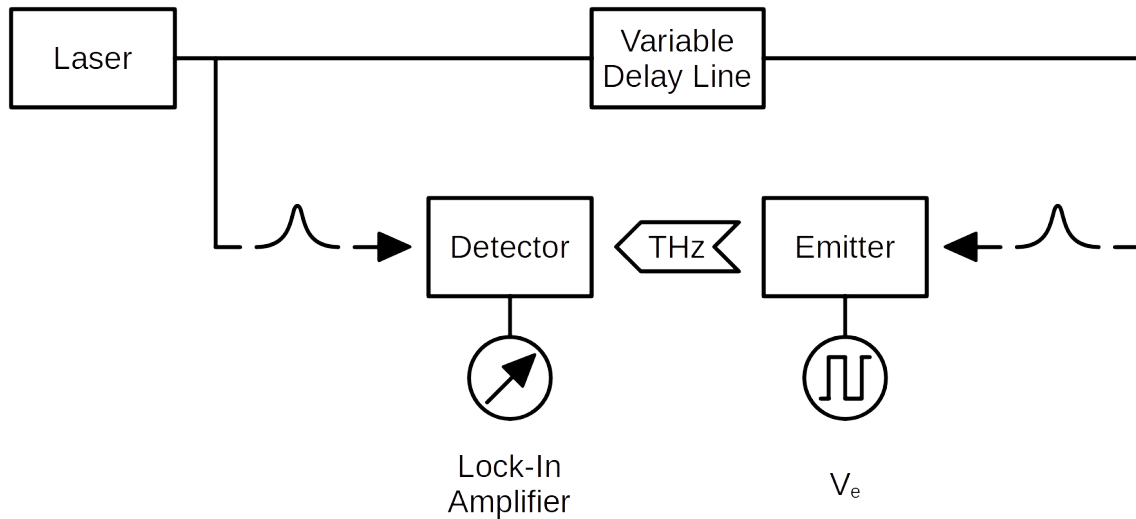


Figure 1: Setup for THz measurements

#### 3.2 PCA Design

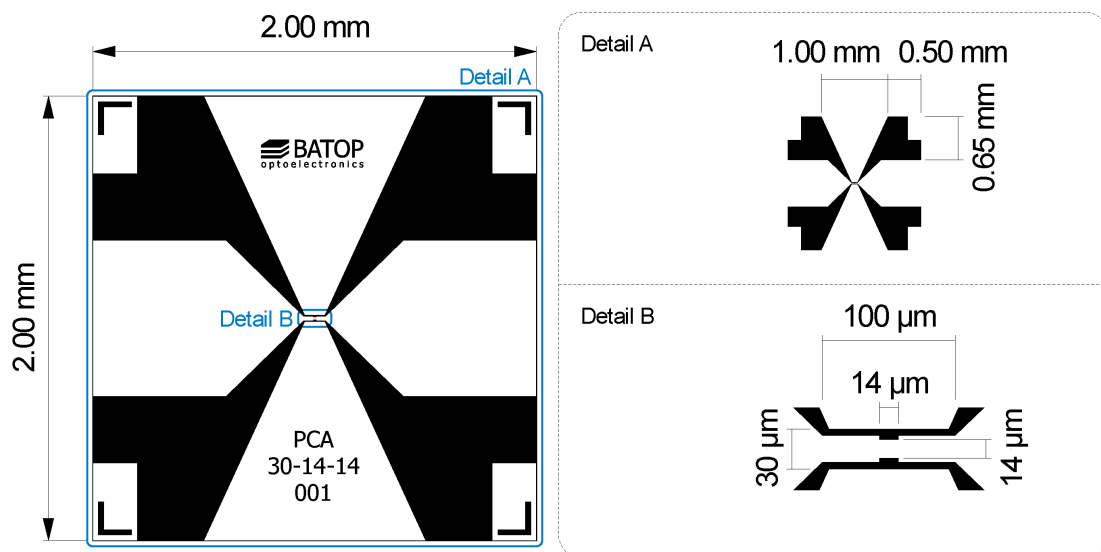


Figure 2: PCA dimensions

Antenna length = 30  $\mu\text{m}$  / Gap distance = 14  $\mu\text{m}$  / Gap width = 14  $\mu\text{m}$

## 4 Contact Details

BATOP GmbH  
Stockholmer Straße 14  
07747 Jena  
Germany

E-Mail: info@batop.de (Sales)  
thz@batop.de (Support)  
Phone: 0049 3641 634009 0