

## Data Sheet iPCA-21-05-1000-800

Broad area interdigital photoconductive THz antenna with micro lens array

For laser excitation wavelength ~ 800 nm



PCA – Photo Conductive Antenna

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## 1 Mounting Options

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iPCA-21-05-1000-800-h	Mounted on hyperhemispherical Si lens (HSL-12)
iPCA-21-05-1000-800-c	Mounted on collimating Si lens (CSL-20)

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## Nomenclature

iPCA-21-05-1000-800-X

iPCA-21-05-1000-800-X	Antenna design	interdigital array
iPCA-21-05-1000-800-X	Dipol length	21 $\mu\text{m}$
iPCA-21-05-1000-800-X	Gap distance	5 $\mu\text{m}$
iPCA-21-05-1000-800-X	Gap width	1000 $\mu\text{m}$
iPCA-21-05-1000-800-X	Excitation wavelength	800 nm
iPCA-21-05-1000-800-X	Mounted Si lens	h / c

## 2 PCA Specification

### 2.1 iPCA-21-05-1000-800-h

Table 1: Specification iPCA-21-05-1000-800-h

Parameter		Min	Recommended	Max
Laser source	Wavelength	650 nm	780 nm	850 nm
	Avg. optical power	-	1 W	3 W
	Avg. power density	-	-	170 W/cm <sup>2</sup>
	Fluence	-	-	2.4 μJ/cm <sup>2</sup>
	Pulse duration	-	100 fs	200 fs
	Repetition rate	70 MHz	80 MHz	-
	Beam diameter	300 μm	1500 μm	-
Bias source	Voltage [V <sub>e</sub> ]	-	± 10 V	± 15 V
	Modulation Frequency	0 Hz (DC)	10 kHz	10 MHz
Dark resistance [R <sub>d</sub> ] <sup>1</sup>		> 40 kΩ	-	-
Parameter		Typical		
Package		Max. diameter 25.4 mm Min. length 9.5 mm		

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

## 2.2 iPCA-21-05-1000-800-c

Table 2: Specification iPCA-21-05-1000-800-c

Parameter		Min	Recommended	Max
Laser source	Wavelength	650 nm	780 nm	850 nm
	Avg. optical power	-	1 W	3 W
	Avg. power density	-	-	170 W/cm <sup>2</sup>
	Fluence	-	-	2.4 μJ/cm <sup>2</sup>
	Pulse duration	-	100 fs	200 fs
	Repetition rate	70 MHz	80 MHz	-
	Beam diameter	300 μm	1500 μm	-
Bias source	Voltage [V <sub>e</sub> ]	-	± 10 V	± 15 V
	Modulation Frequency	0 Hz (DC)	10 kHz	10 MHz
Dark resistance [R <sub>d</sub> ] <sup>2</sup>		> 40 kΩ	-	-
Parameter		Typical		
Package		Max. diameter 25.4 mm Min. length 16.0 mm		

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

### 3 Application Note

#### 3.1 Measurement Setup

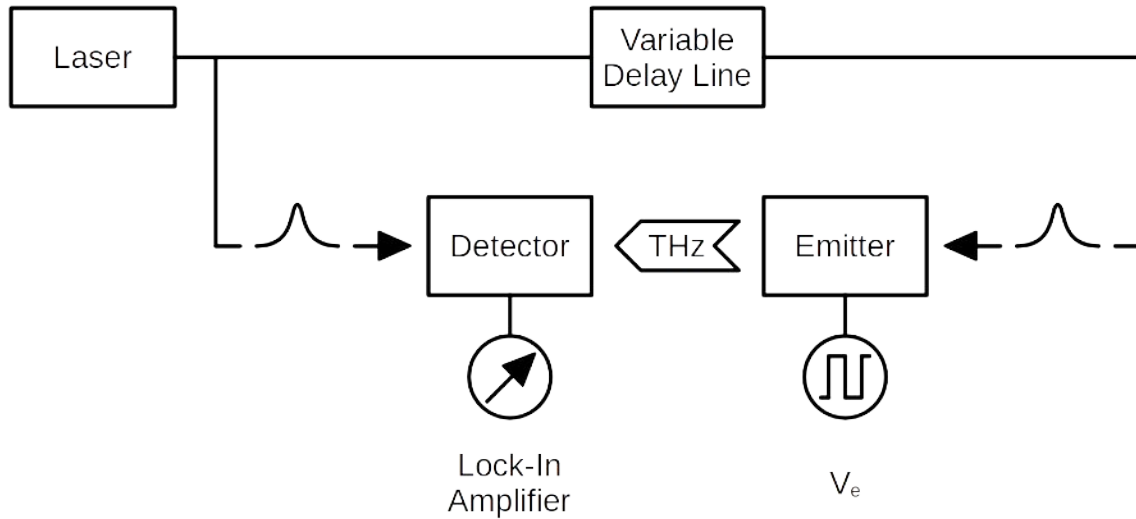


Figure 1: Setup for THz measurements

### 3.2 PCA Design

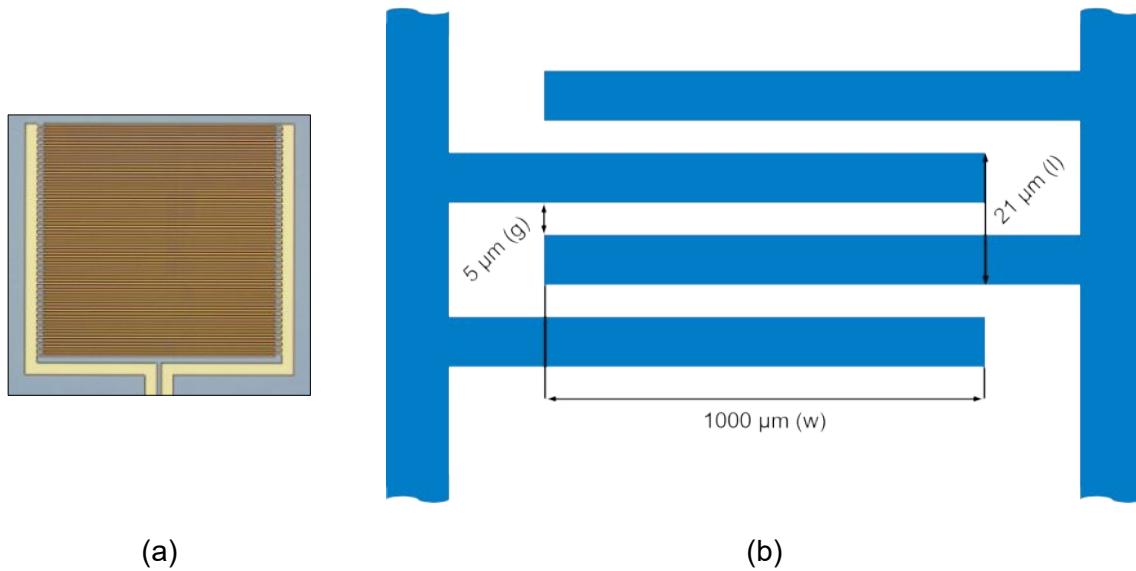


Figure 2: Overview (a) and dimensions (b) of the active area (1000 x 1000 μm) of the PCA

- l Dipol Length
- g Gap Distance
- w Gap Width

The interdigital array antenna is equipped with an aligned micro lens array.

### 3.3 PCA Performance

Performance of the PCA combination:<sup>3</sup>

iPCA-21-05-1000-800 (Emitter) & PCA-40-05-10-800 (Detector)

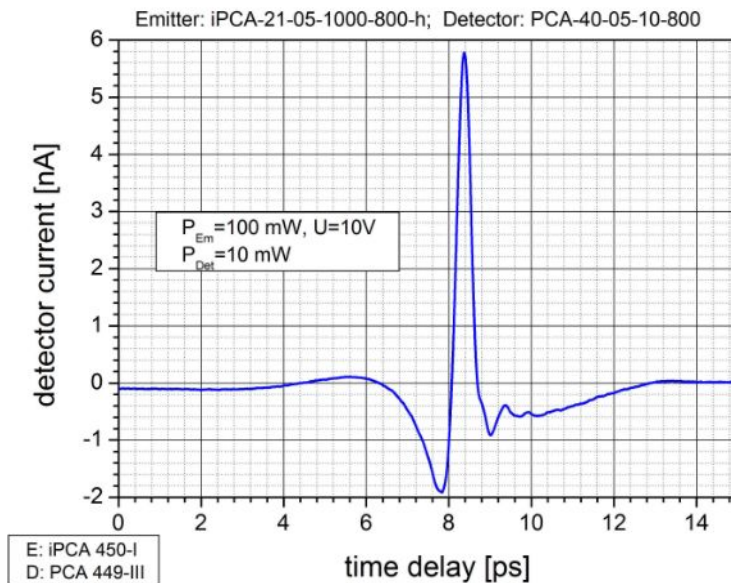


Figure 3: THz signal

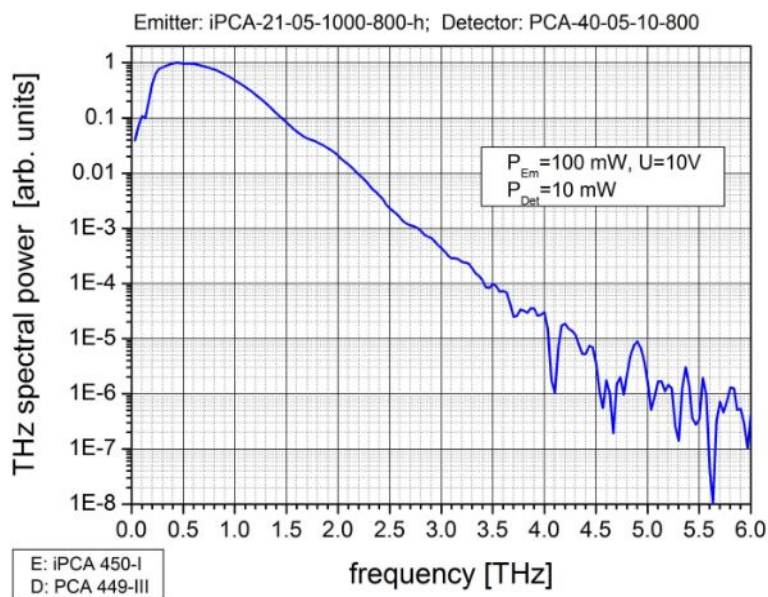


Figure 4: THz spectrum

<sup>3</sup> Measured by Michael Williams of the Schmuttenmaer Research Group, Department of Chemistry, Yale University, USA

## 4 Contact Details

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