# Data Sheet iPCA-21-05-300-800

Broad area interdigital photoconductive THz antenna with micro lens array

For laser excitation wavelength ~ 800 nm

PCA – **P**hoto **C**onductive **A**ntenna

## Table of Contents

# 1 Mounting Options

| | |
|---|---|
| iPCA-21-05-300-800-h | Mounted on hyperhemispherical Si lens (HSL-12) |
| iPCA-21-05-300-800-c | Mounted on collimating Si lens (CSL-20) |

## Nomenclature

iPCA-21-05-300-800-X

| | | |
|---|---|---|
| iPCA-21-05-300-800-X | Antenna design | interdigital array |
| iPCA-21-05-300-800-X | Dipol length | 21 µm |
| iPCA-21-05-300-800-X | Gap distance | 5 µm |
| iPCA-21-05-300-800-X | Gap width | 300 µm |
| iPCA-21-05-300-800-X | Excitation wavelength | 800 nm |
| iPCA-21-05-300-800-X | Mounted Si lens | h / c |

# 2 PCA Specification

## 2.1 iPCA-21-05-300-800-h

Table 1: Specification iPCA-21-05-300-800-h

| Parameter | | Min | Recommended | Max |
|---|---|---|---|---|
| Laser source | Wavelength | 650 nm | 780 nm | 850 nm |
| | Avg. optical power | - | 300 mW | 500 mW |
| | Avg. power density | - | - | 310 W/cm² |
| | Fluence | - | - | 4.5 µJ/cm² |
| | Pulse duration | - | 100 fs | 200 fs |
| | Repetition rate | 70 MHz | 80 MHz | - |
| | Beam diameter | 100 µm | 450 µm | - |
| Bias source | Voltage [$V_e$] | - | ± 10 V | ± 15 V |
| | Modulation Frequency | 0 Hz (DC) | 10 kHz | 10 MHz |
| Dark resistance [$R_d$][1] | | > 40 kΩ | - | - |

| Parameter | Typical |
|---|---|
| Package | Max. diameter 25.4 mm<br>Min. length 9.5 mm |

[1] Measurement conditions: room temperature & measuring voltage of 3.3 V

## 2.2 iPCA-21-05-300-800-c

Table 2: Specification iPCA-21-05-300-800-c

| Parameter | | Min | Recommended | Max |
|---|---|---|---|---|
| Laser source | Wavelength | 650 nm | 780 nm | 850 nm |
| | Avg. optical power | - | 300 mW | 500 mW |
| | Avg. power density | - | - | 310 W/cm² |
| | Fluence | - | - | 4.5 µJ/cm² |
| | Pulse duration | - | 100 fs | 200 fs |
| | Repetition rate | 70 MHz | 80 MHz | - |
| | Beam diameter | 100 µm | 450 µm | - |
| Bias source | Voltage [$V_e$] | - | ± 10 V | ± 15 V |
| | Modulation Frequency | 0 Hz (DC) | 10 kHz | 10 MHz |
| Dark resistance [$R_d$][2] | | > 40 kΩ | - | - |

| Parameter | Typical |
|---|---|
| Package | Max. diameter 25.4 mm<br>Min. length 16.0 mm |

[2] Measurement conditions: room temperature & measuring voltage of 3.3 V

# 3 Application Note

## 3.1 Measurement Setup

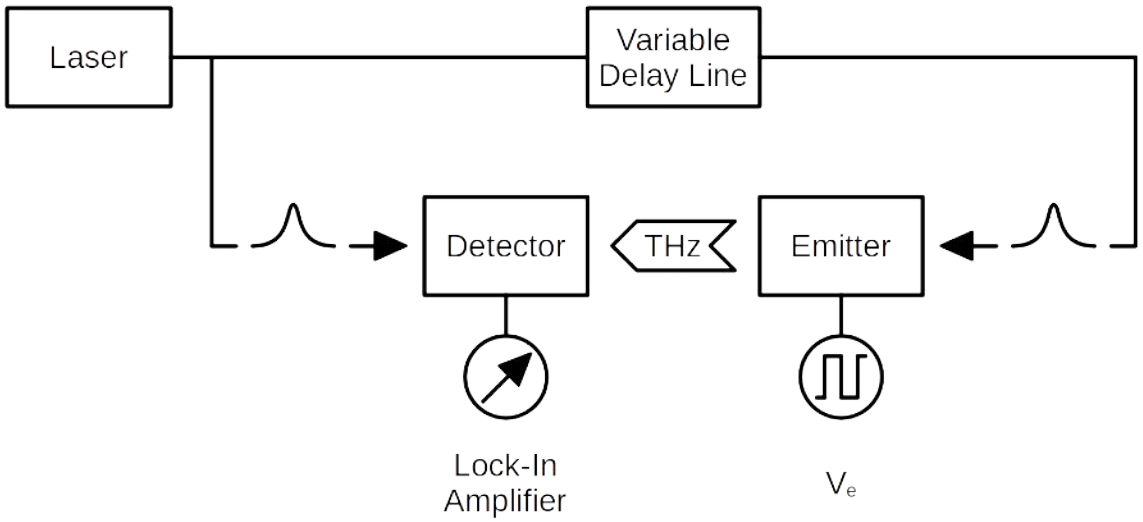
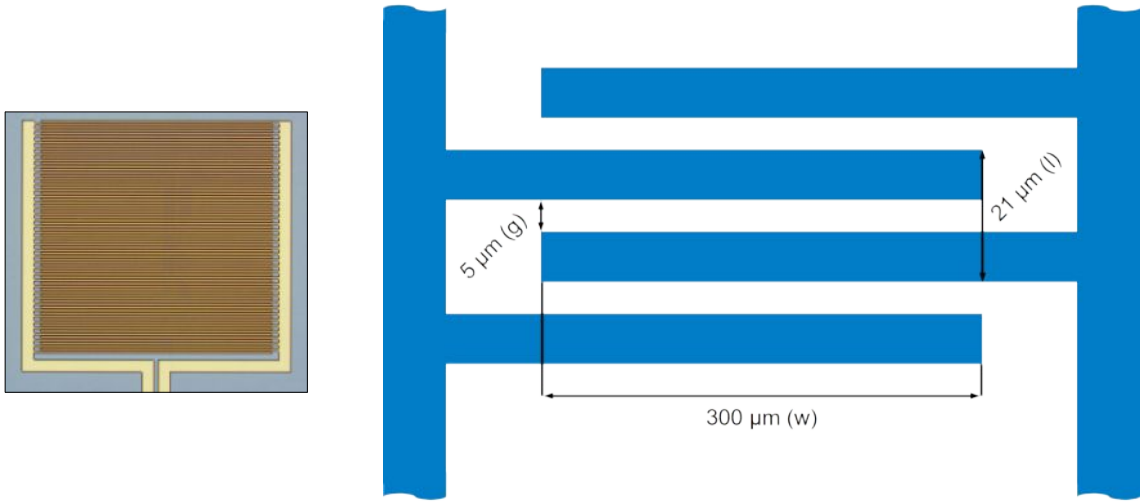



Figure 1: Setup for THz measurements

## 3.2 PCA Design




(a) (b)

Figure 2: Overview (a) and dimensions (b) of the active area (300 x 300 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:[3]

iPCA-21-05-300-800 (Emitter) & PCA-44-06-10-800 (Detector)

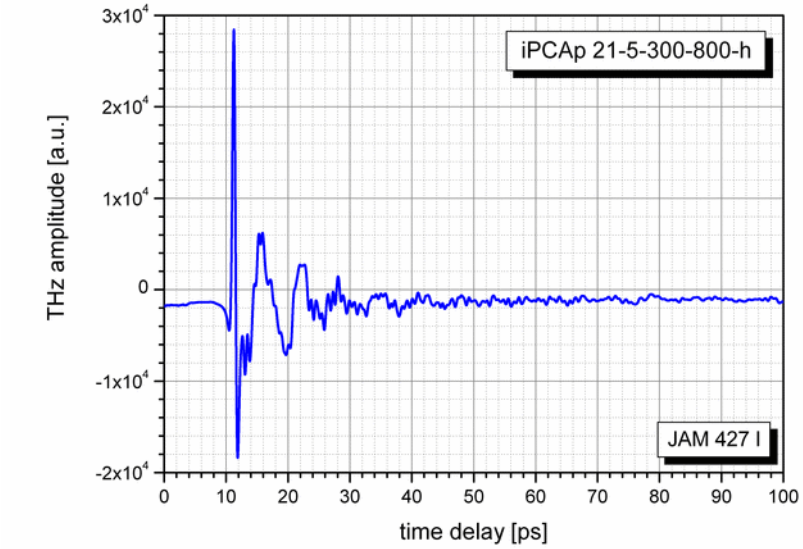



Figure 3: THz signal

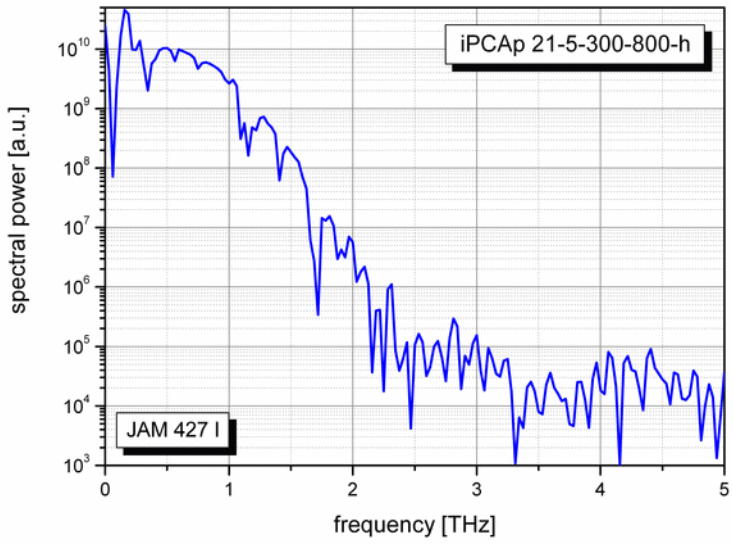



Figure 4: THz spectrum

[3] Measured by Gabor Matthäus, Institute of Applied Physics, University of Jena, Germany

## 4 Contact Details

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