

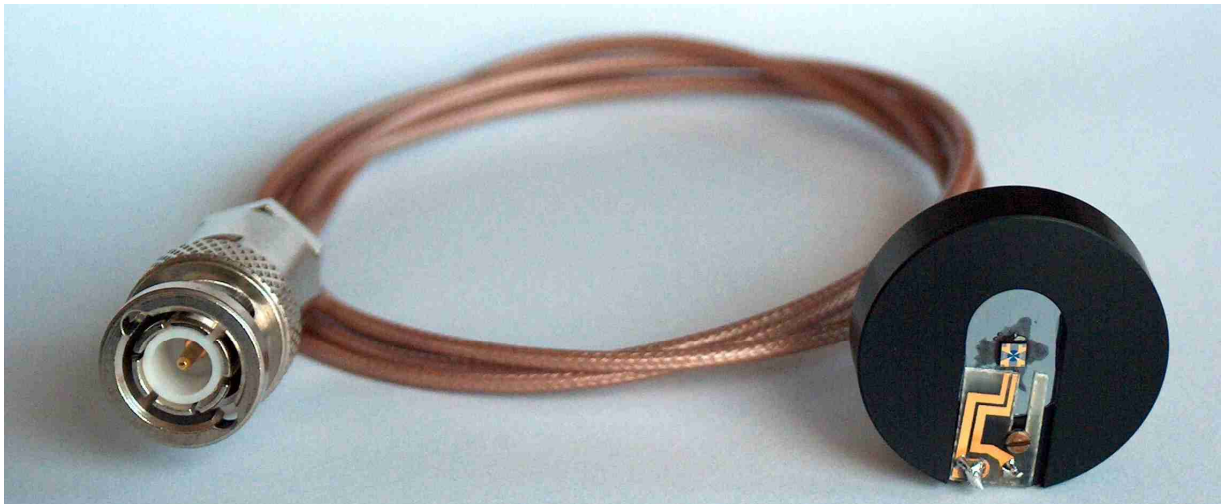
Instruction manual and data sheet PCA-44-06-10-800-x

Photoconductive THz antenna for laser excitation wavelengths $\lambda \sim 500 \text{ nm} \dots 850 \text{ nm}$

PCA – Photoconductive Antenna

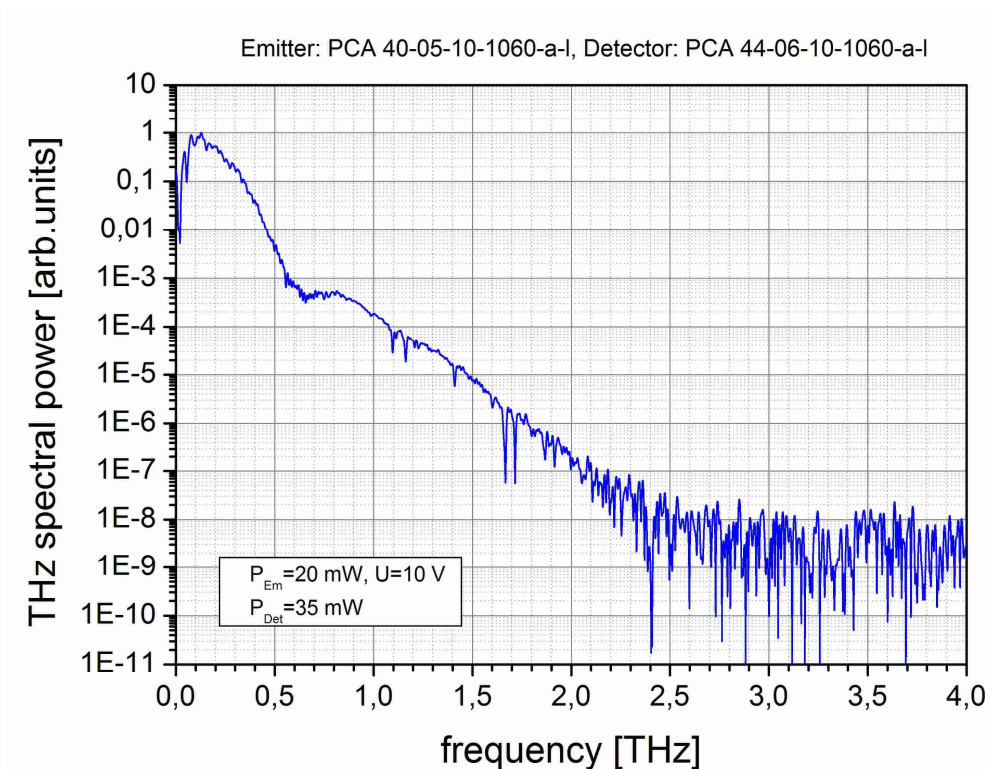
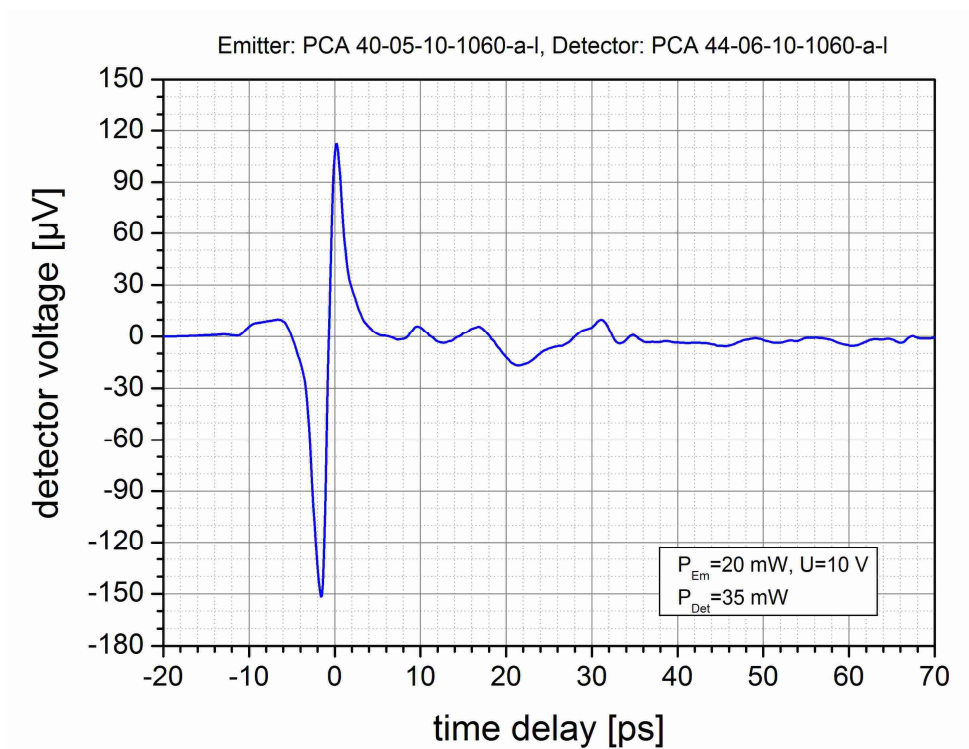
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1. Spectral performance

This antenna shows a high sensitivity especially at low frequencies. But if the antenna is used as emitter, then multiple pulses can be measured as a result of reflections of the electrical pulse within the antenna structure. Therefore we recommend the use of this butterfly antenna mainly as detector.



2. Antenna parameters

Parameter	minimum ratings	standard	maximum ratings
Dark resistance	2 GΩ	3 GΩ	5 GΩ
Voltage		20 V	30 V
Optical mean power		20 mW	30 mW
Pulse fluence		200 μJ/cm ²	300 μJ/cm ²

Attention: The F-number of the optical lens focusing the laser beam onto the antenna gap must be larger than a certain value to avoid too high pulse fluency. This means, that the minimum diameter of the focused beam waist must be about 120 % of the gap distance g . For a Gaussian beam the minimum focus length f_{\min} of the optical lens can be estimated as

$$f_{\min} = \frac{0.3 \cdot \pi \cdot g \cdot D}{\lambda}$$

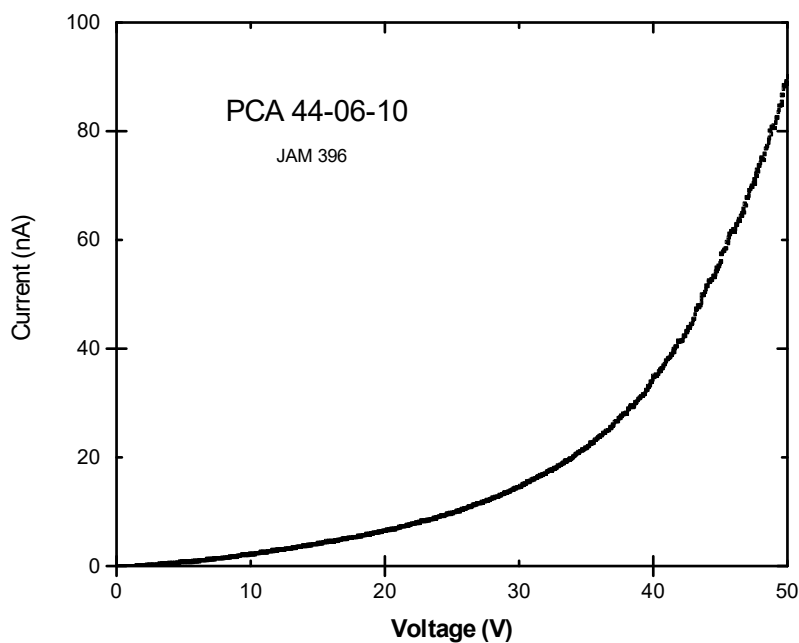
with g – gap distance of the antenna

λ - laser wavelength

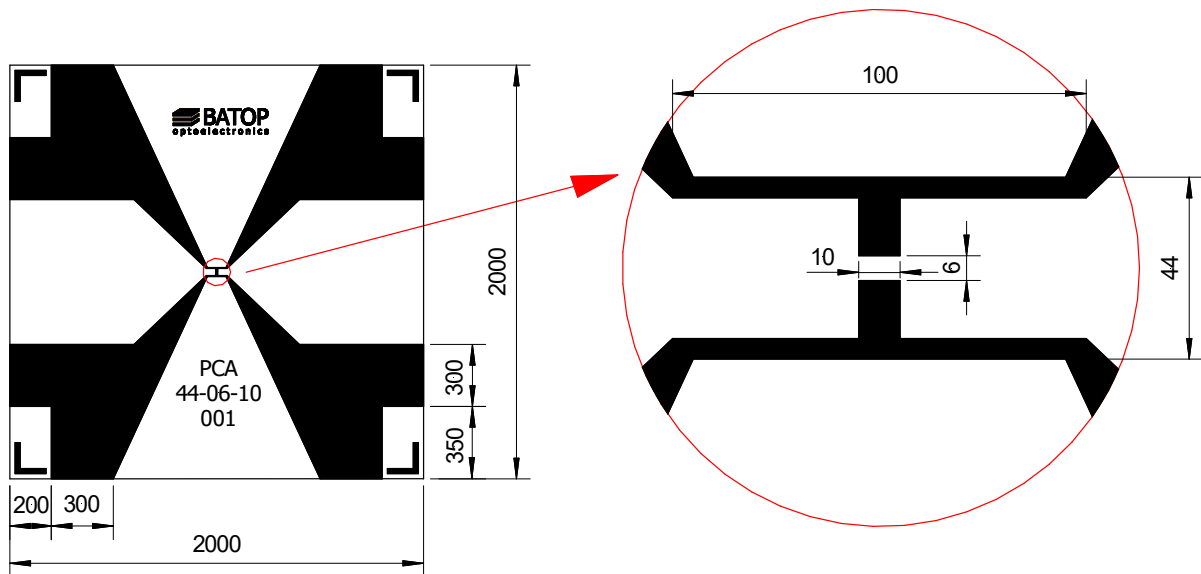
D – diameter of the laser beam hitting the focusing lens.

For $\lambda = 0.8 \mu\text{m}$ and $g = 6 \mu\text{m}$ the minimum possible F-number of the lens is $f_{\min}/D = 7$

Dark current voltage characteristic



3. Antenna design



all dimensions in micrometers

Photo PCA 44-06-10 (survey)



Photo PCA 44-06-100

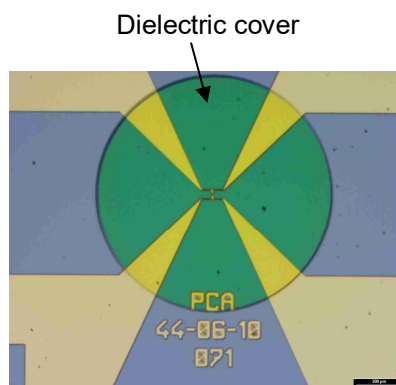
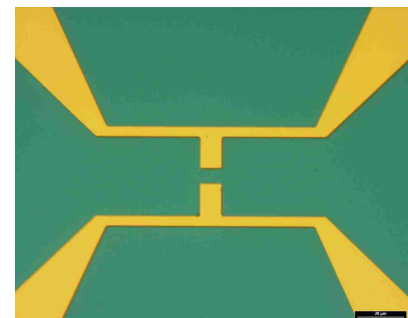


Photo PCA 44-06-10 (detail)

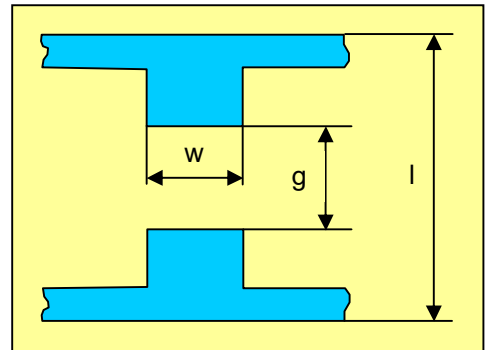


Main PCA data

- Laser excitation wavelength 800 nm
- Antenna gap: 6 μm
- Antenna length 44 μm
- Antenna chip size 2 mm x 2 mm

4. Order information

PCA-44-06-10-800-x Photoconductive antenna
 length $l = 44 \mu\text{m}$
 gap $g = 6 \mu\text{m}$
 width $w = 10 \mu\text{m}$
 laser wavelength $\lambda = 800 \text{ nm}$
 (500 nm ... 850 nm)



x denotes the type of mounting as follows:

- x = 0** unmounted chip 2 mm x 2 mm with 4 bond contact pads
- x = h** mounted on an Al disc with 25.4 mm \varnothing and hyperhemispherical silicon substrate lens, 1m coaxial cable with BNC or SMA connector
- x = a** mounted on an Al disc with 25.4 mm \varnothing and aspheric focusing silicon substrate lens, 1m coaxial cable with BNC or SMA connector
- x = c** mounted on an Al disc with 25.4 mm \varnothing and aspheric collimating silicon substrate lens CL-12 for 12 mm THz beam diameter, 1m coaxial cable with BNC or SMA connector
- x = h-f** fiber coupled antenna with hyperhemispherical silicon substrate lens
- x = l** with aspheric focusing optical lens for free space laser excitation
- x = p** with preamplifier for detector antenna