

Instruction manual and data sheet PCA-40-05-10-1550-x

Photoconductive THz antenna for laser excitation wavelengths $\lambda \sim 1550$ nm

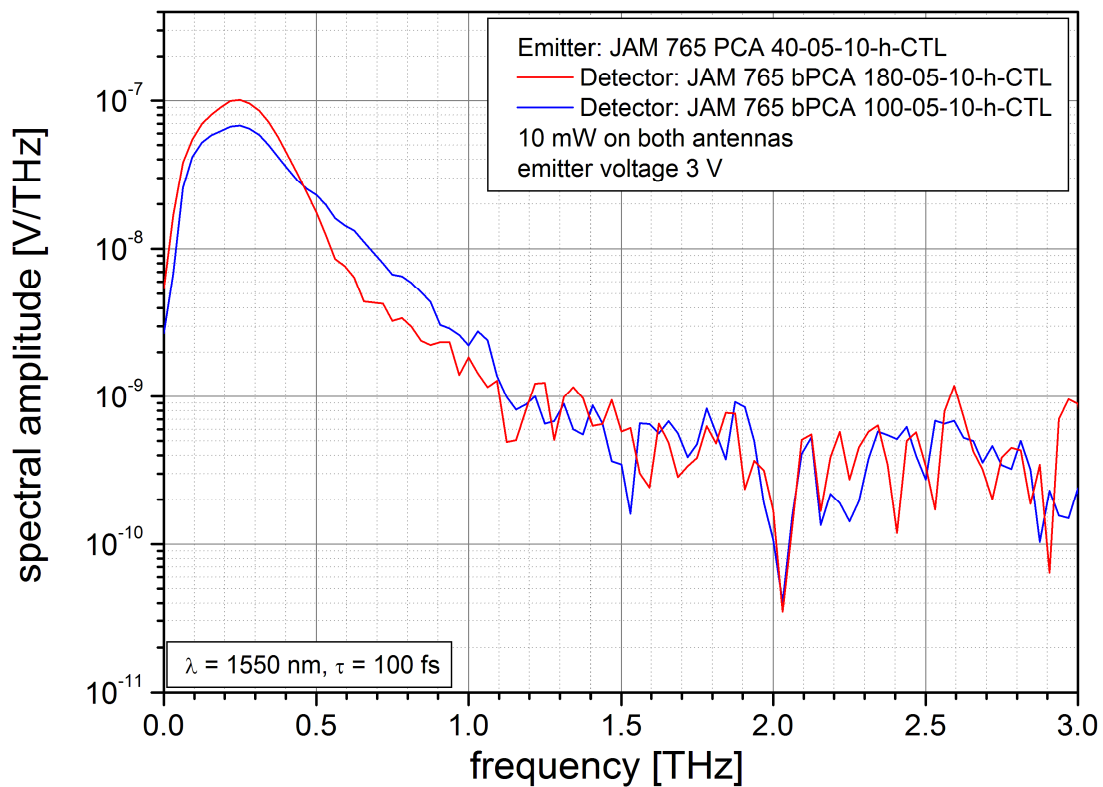
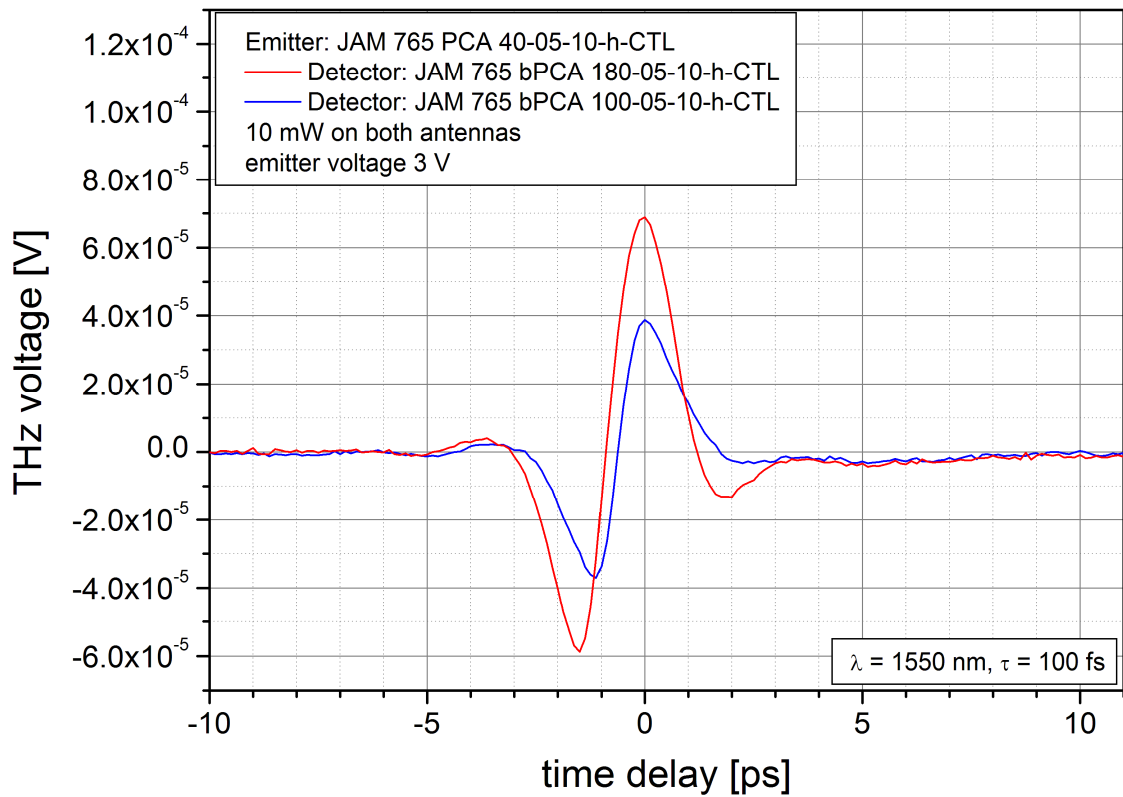
PCA – Photo Conductive Antenna

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1. Spectral performance



2. Antenna parameters

Parameter	minimum ratings	standard	maximum ratings
Dark resistance	2.0 k Ω	3.5 k Ω	5 k Ω
Voltage		3 V	3 V
Optical mean power @ 50 – 100 MHz repetition rate		8 mW	10 mW
Pulse fluence		200 $\mu\text{J}/\text{cm}^2$	250 $\mu\text{J}/\text{cm}^2$

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

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

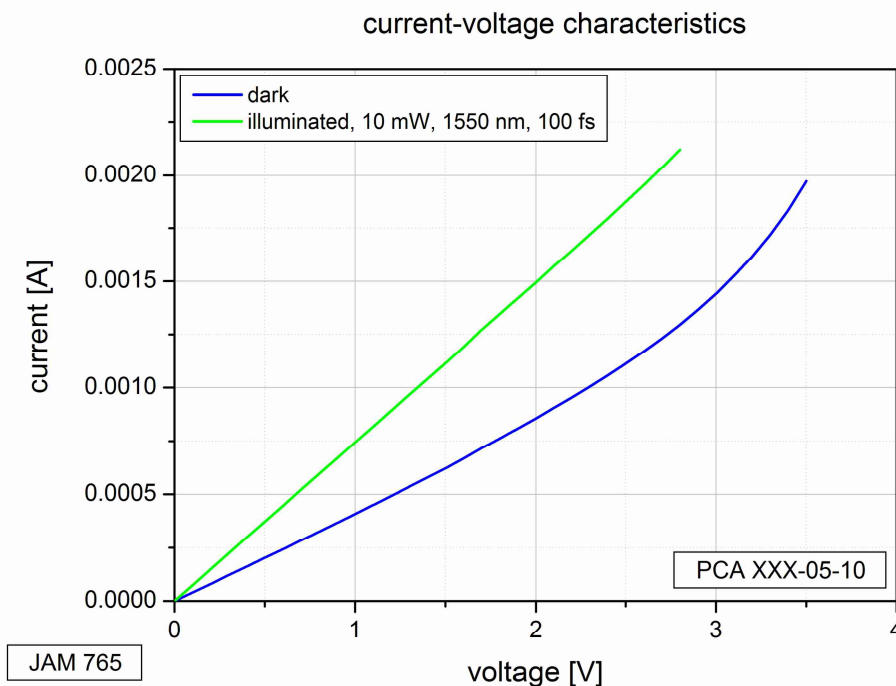
with g – gap distance of the antenna

λ - laser wavelength

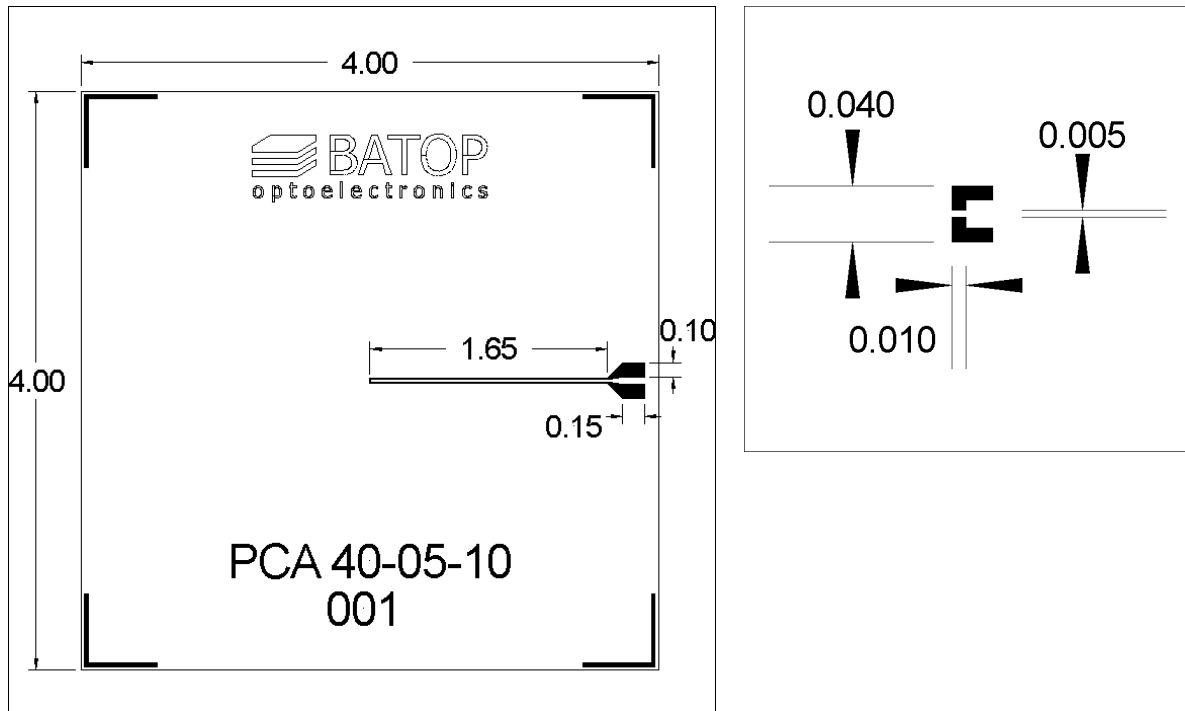
D – diameter of the laser beam hitting the focusing lens.

For $\lambda = 1,5 \mu\text{m}$ and $g = 5 \mu\text{m}$ the minimum possible F-number of the lens is $f_{\min}/D = \pi$.

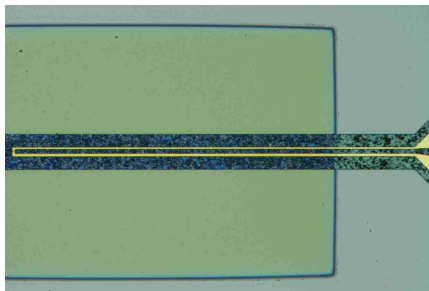
Current-voltage characteristics



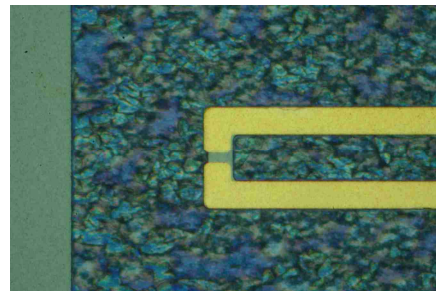
3. Antenna design



antenna dimensions in mm



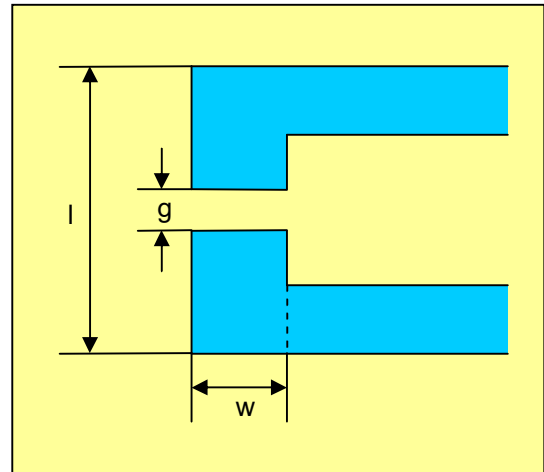
PCA 40-05-10-1550



bPCA 40-05-10-1550 (detail)

4. Order information

PCA-40-05-10-1550-**x** Photoconductive antenna
 length $l = 40 \mu\text{m}$
 gap $g = 5 \mu\text{m}$
 width $w = 10 \mu\text{m}$
 laser wavelength $\lambda = 1550 \text{ nm}$



x denotes the type of mounting as follows:

- x** = 0 unmounted chip 4 mm x 4 mm with 2 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 CSL-20 for 20 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