Instruction manual and data sheet PCA-40-05-10-800-x

Photoconductive THz antenna for laser excitation wavelengths λ ~ 800 nm

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

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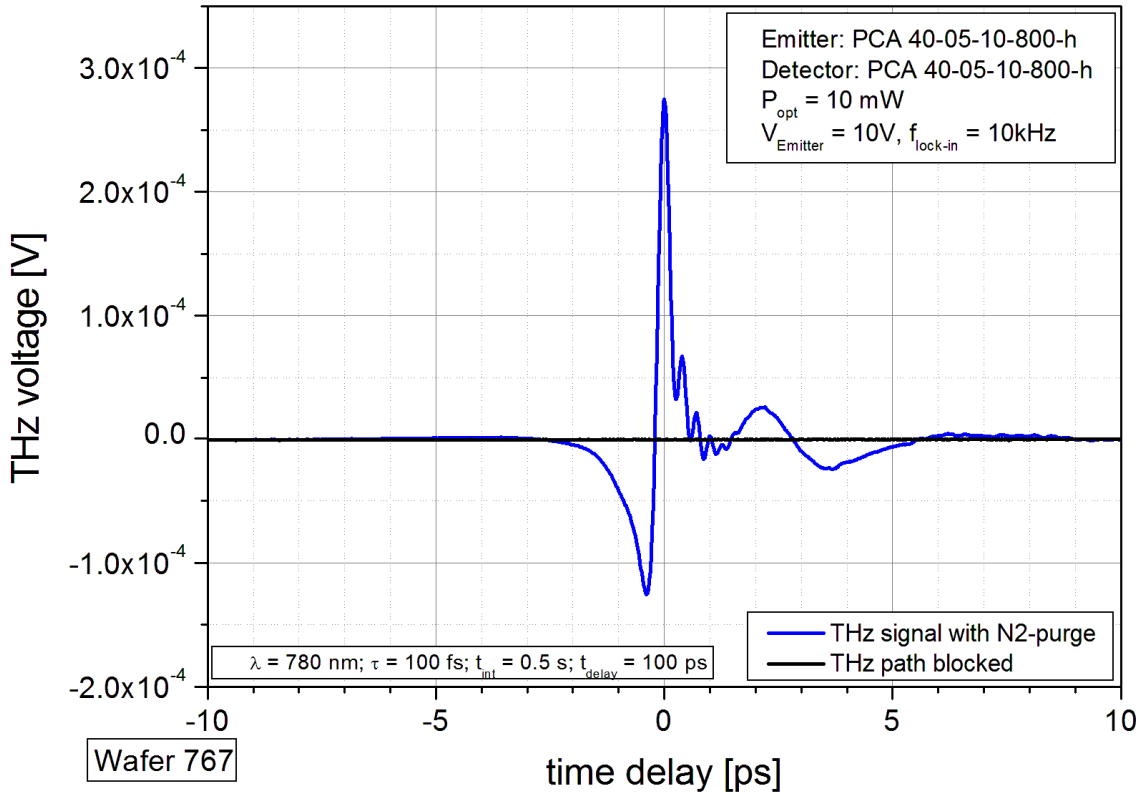
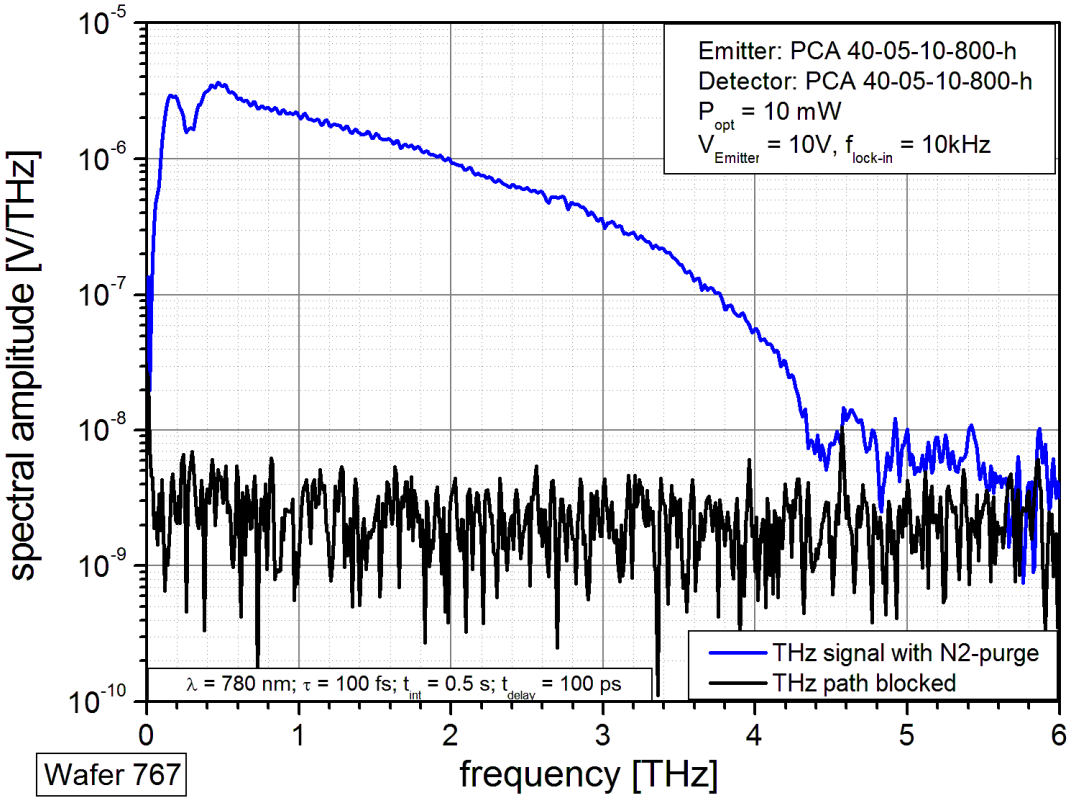
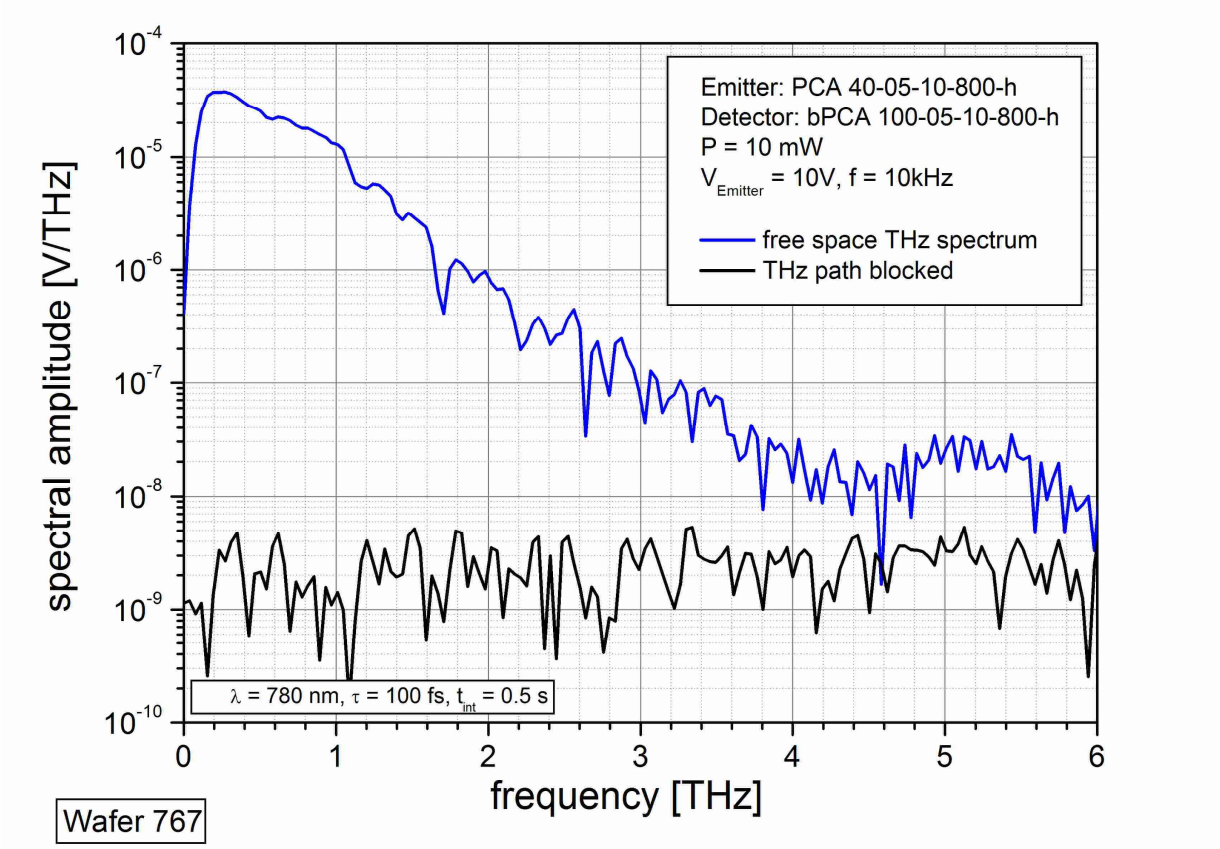
1. Spectral performance: 2 x PCA-40-05-10-800-h-CTL-D25mm, N_2 purged





Performance of recommended THz antenna combination

PCA-40-05-10-800-h- CTL-D25mm + bPCA-100-05-10-800-h- CTL-D25mm in air



2. Antenna parameters

Parameter	minimum ratings	standard	maximum ratings
Dark resistance	600 kΩ	900 kΩ	2000 kΩ
Voltage		10 V	15 V
Optical mean power @ 50 – 100 MHz repetition rate		10 mW	15 mW
Pulse fluence		200 µJ/cm^2	250 µJ/cm^2

Attention: The F-number of the optical lens focusing the laser beam onto the antenna gap must be larger then 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

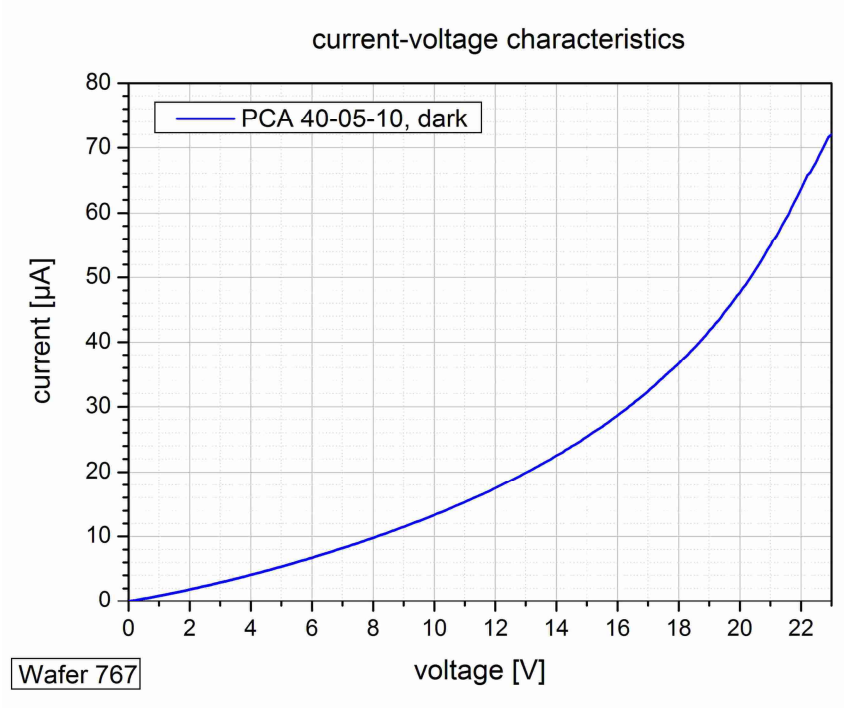
$$f_{\min} = \frac{0.3 \cdot \pi \cdot g \cdot D}{\lambda}$$

with g – gap distance of the antenna

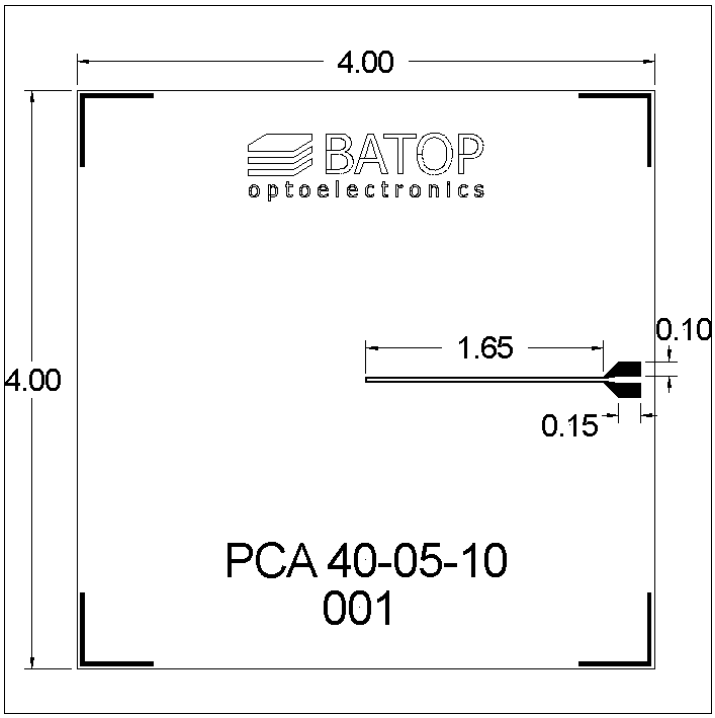
λ - laser wavelength

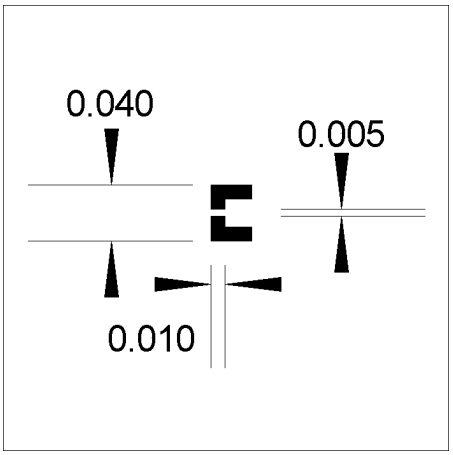
D – diameter of the laser beam hitting the focusing lens.

For λ = 0.8 µm and g = 5 µm the minimum possible F-number of the lens is $f_{min}/D = 1.9\pi$.

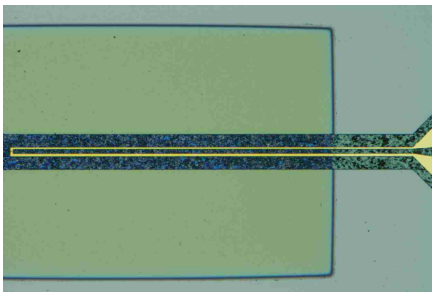


3. Antenna design

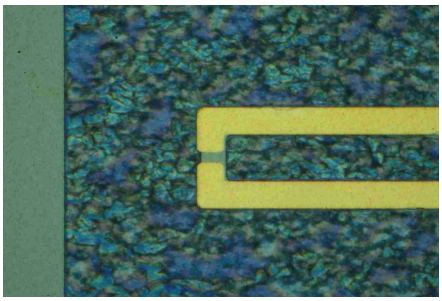




antenna dimensions in mm



PCA 40-05-10-800



bPCA 40-05-10-800 (detail)

4. Order information

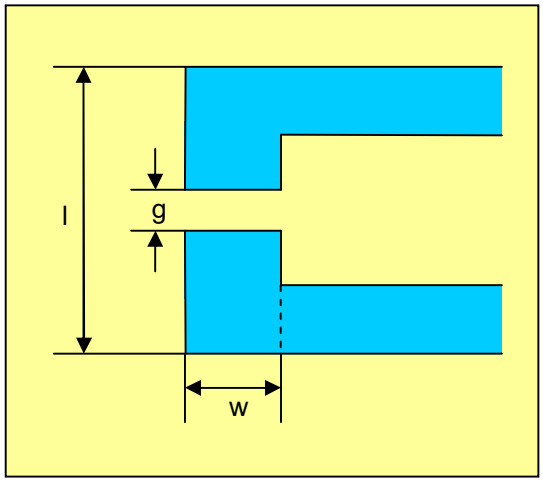
PCA-40-05-10-800-**x** Photoconductive antenna

length l = 40 µm

gap g = 5 µm

width w = 10 µm

laser wavelength λ = 800 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 ∅ and hyperhemispherical silicon substrate lens, 1m coaxial cable with BNC or SMA connector
x = a	mounted on an Al disc with 25.4 mm ∅ 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 ∅ 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