



# THz TIP

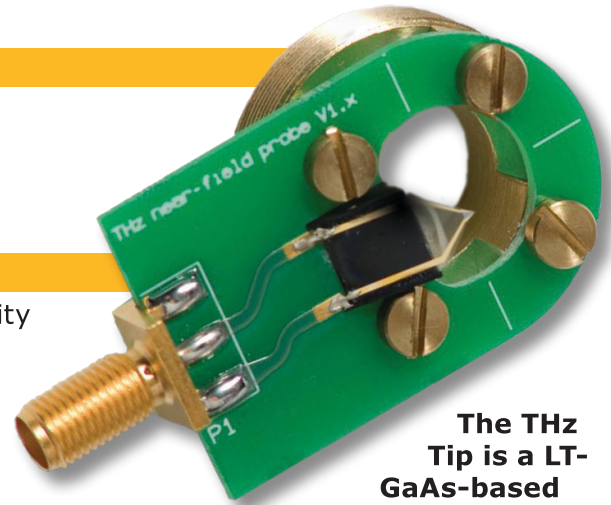
## Near Field Photoconductive electric-field probe-tip

### Applications

- Terahertz near-field microscopy (THz-SNOM)
- On-chip MMIC/MMMIC testing
- THz time- and frequency-domain spectroscopy

### Key features

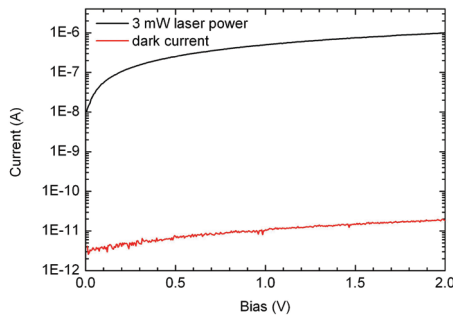
- Tapered electrodes for field-singularity enhanced sensitivity
- PC probe-tip with unprecedented near-field spatial resolution
- Low-invasive probing through ultra-thin (1.3  $\mu\text{m}$ ) probe design
- Easy to integrate into existing optical systems (cw or pulsed)
- Convenient tip-sample approximation through probe mounting with built-in tilt angle
- Versatilely applicable for near- and far-field measurements
- Polarization sensitive (10:1)



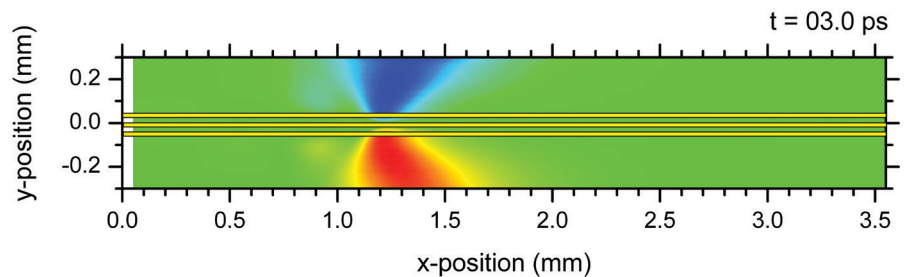
**The THz Tip is a LT-GaAs-based photoconductive probe-tip designed for the detection of electromagnetic fields from dc to terahertz frequencies**

### Specifications

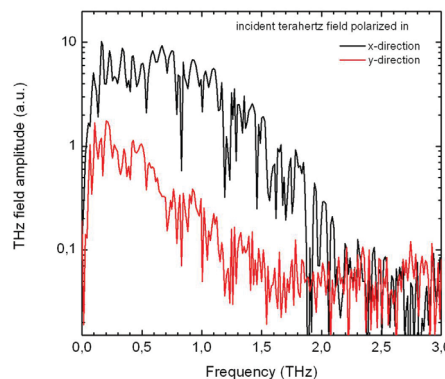
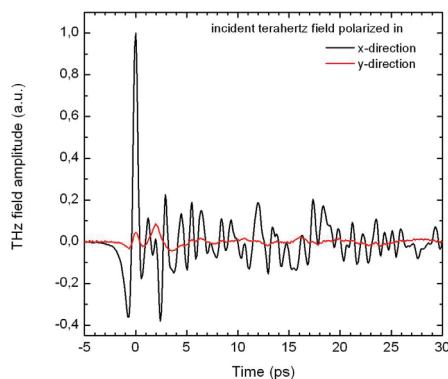
#### Typical current – voltage characteristics



#### 2D near-field amplitude distribution on coplanar waveguide measured with THz Tip



#### Typical THz field amplitude detected in the far-field



### Test conditions

- Optical source: Ti:Sa oscillator at  $\lambda = 800 \text{ nm}$ ,  $\tau_{\text{FWHM}} = 150 \text{ fs}$  and  $f_{\text{rep}} = 80 \text{ MHz}$
- THz emitter: InAs surface field emitter, excitation power  $P = 300 \text{ mW}$
- THz detector: THz Tip, excitation power  $P = 3 \text{ mW}$
- Lock-in detection with mechanical chopper at  $1.5 \text{ kHz}$  and  $100 \text{ ms}$  integration time in ambient air

#### References:

- [1] M. Wächter, M. Nagel, and H. Kurz, "Tapered photoconductive terahertz field probe-tip with subwavelength spatial resolution", Appl. Phys. Lett 95, 041112 (2009)
- [2] German patent application No. 10 2009 000 823.3

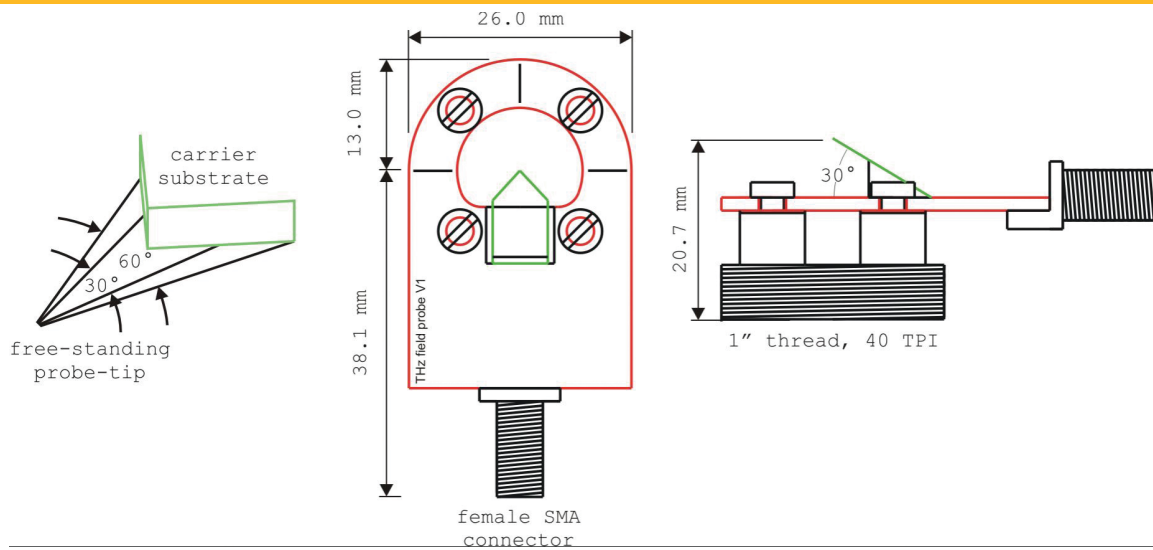




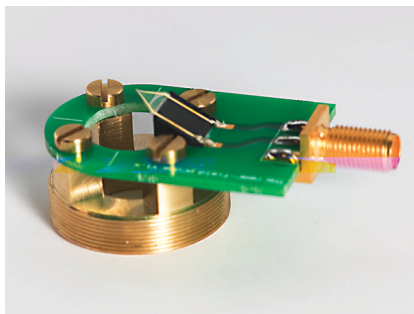
## Technical data

	Min.	Standard	Max.
<b>Gap size at apex</b> [ $\mu\text{m}$ ]	1.5	3	4.5
<b>Spatial resolution</b> [ $\mu\text{m}$ ] @100 GHz - 3 THz	5		
<b>Dark resistivity</b> [ $\text{M}\Omega$ ]	50	100	
<b>Photocurrent ratio</b> $I_{\text{power}}/I_{\text{dark}}$ ( $U_{\text{Bias}} = 1 \text{ V}$ , $P = 5 \text{ mW}$ )	5e4	1e5	
<b>Bias</b> [V]		1	1.5
<b>Excitation wavelength</b> [nm]	700	800	850
<b>Excitation power</b> ( $\lambda=800 \text{ nm}$ , $f_{\text{rep}} = 80 \text{ MHz}$ , $\tau_{\text{FWHM}} = 150 \text{ fs}$ ) [mW]		5	10

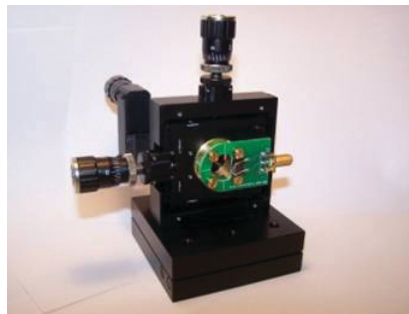
## Schematic



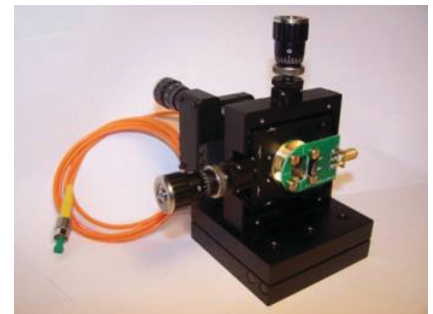
## Pictures



Mounted THz probe-tip  
(article no.: THz Tip)



Mounted THz probe-tip with translation and focusing mechanics for free-space excitation on a magnetic baseplate  
(article no.: THz Tip+Mount free1)



Mounted THz probe-tip with translation and focusing mechanics for fiber-coupled excitation on a magnetic baseplate  
(article no.: THz Tip+Mount fiber1)

## Order information

THz Tip 2,500 €  
 each delivered device is tested  
 THz Tip+Mount free1 3,900 €  
 THz Tip+Mount fiber1 4,100 €  
 Discount: 10% for 3 - 5 pieces  
 20% for more than 6 pieces

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