PULSED TERAHERTZ EMITTER AND RECEIVER MODULES

Fraunhofer HHI

AT A GLANCE

Photoconductive switches for 1.5 µm optical wavelength, emitted THz power confirmed by PTB (Physikalisch Technische Bundesanstalt)

Features

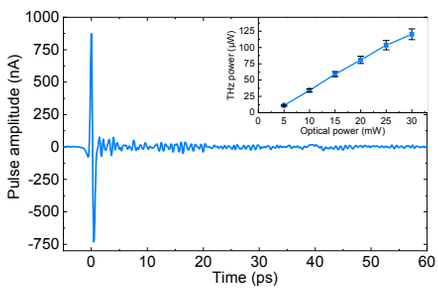
- Up to 100 µW THz power
- Photoconductive emitter and receiver
- Mesa-structured InGaAs chips
- Small module footprint
- Plug and play design

Applications

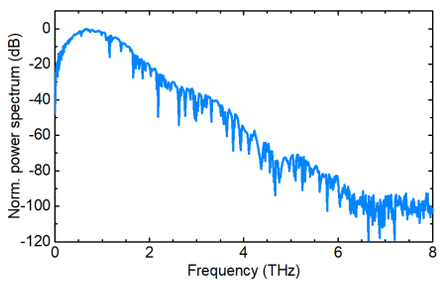
- High-bandwidth terahertz spectroscopy
- Industrial process control
- Non-contact coating film thickness measurement
- High-speed measurements

Technical background

In terahertz time-domain spectroscopy (TDS), a device under test (DUT) is probed with a short THz pulse. The frequency dependence of loss and refractive index is extracted from the detected pulse via a Fourier transform. Typical applications for pulsed THz radiation are depth-resolved imaging for e.g. 3D quality inspection and spectroscopic measurements beyond 3 THz. HHI's high power THz modules allow for faster measurements and therefore facilitate the transfer of THz technology to industrial applications and environments.



THz pulse trace for 20 mW optical power. The inset shows the emitted THz power vs. optical illumination power.



Frequency spectrum recorded with HHI's pulsed Terahertz modules. Operation conditions are given in the specifications.

Specifications

- THz power (typ.) >75 µW
- Spectral range 0.1 - 6.5 THz
- Dynamic range (peak) >95 dB
- Optical wavelength 1.5 µm
- Maximum optical power 30 mW
- Optical pulse duration 100 fs*
- Emitter bias voltage 100 V
- Diameter of module 25 mm

* at emitter position

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