

THZ DETECTORS

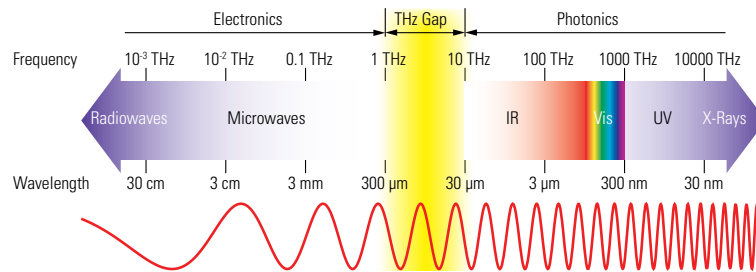
PRESENTATION

WHAT IS TERAHERTZ RADIATION?

The THz portion of the electromagnetic spectrum fills the gap between the far infrared and the microwaves. More precisely, it is nestled between the high-frequency edge of the microwave band, 300 GHz (3×10^{11} Hz), and the long-wavelength edge of far-infrared light, 3000 GHz (3×10^{12} Hz or 3 THz). In wavelengths, this range corresponds to 0.1 mm (or 100 μ m) infrared to 1.0 mm microwave. The THz band is set in the region where electromagnetic physics can best be described by its wave-like characteristics (microwave) and its particle-like characteristics (infrared).^a

Figure 1.

The electromagnetic spectrum showing the THz gap from 100 μ m to 1000 μ m or 3 THz to 0.3 THz



WHAT IS IT USED FOR?

THz radiation is interesting because of the way it interacts with matter:

- It can penetrate things like wood, plastics, clothing, and other materials.
- It is also absorbed by water, or a material that contains water, like human skin.
- It is non-ionizing and therefore not harmful to humans like X-rays can be.

One of the first uses is the "full body scan" used at airports. It also has uses in medical applications for early detection of cancer cells.

HOW IS IT MEASURED?

THz sources come in many varieties, including those with CW or Pulsed outputs. They range in power from nW to mW and in energy from nJ to mJ. Like most electromagnetic sources, they must be characterized for performance and/or control.

Older THz detection methods include:

- Golay Cells
- Micro-bolometers
- Pyroelectric detector and electrical devices like photo-acoustic and Schottky diode detectors

WHY ARE GENTEC-EO PRODUCTS BETTER?

- **Golay Cells** used to be the detector of choice, but they are costly and often very large.
- **Pyroelectric Detectors** (like the ones used in our THz Detectors) used to have lower performances, but recent advances placed them on the same technical level as Golay Cells, and even higher. Pyroelectric Detectors in THz measuring show several benefits to the user:
 - Broadband thermal response from 0.25 to 3000 μ m
 - Can be used at room temperature with high sensitivity (measure nW of power and nJ of energy)
 - Wider power range (from nW to mW)
 - Lower cost

a. Source: Wikipedia

PRESENTATION

OVERVIEW OF THE DIFFERENT MODELS

We have a unique line of sensors and meters for the terahertz region. You can choose either a standalone device with on-board electronics or go with our T-Rad meter and a separate sensor. We also have small terahertz detectors that come as discrete pyroelectric units for integration.



Available with
integra

THZ-D

- Flatest Spectral Response:
Get the best precision across the entire THz range
- Works with our standard universal displays & PC interfaces:
MAESTRO and M-LINK
- Large Apertures of 9 and 12 mm Ø

- FLATEST SPECTRAL RESPONSE IN THE THz
- WORKS WITH OUR STANDARD DISPLAYS & PC INTERFACES

See page **136**



THZ-I-BNC

- THz Detectors with Integrated Analog (BNC) Module (no need for a monitor)
- Wide Dynamic Range from nW to µW
- Battery or AC Powered
- Compatible with an Oscilloscope or Lock-In Amplifier

- INTEGRATED BNC MODULE

See page **138**



THZ-B

- Large Apertures:
5 mm and 9 mm Ø
- Wide Dynamic Range:
50 nW to 200 mW
- Choice between Analog and Digital versions
- User-Friendly Software (when used with the T-Rad module)

- WORKS WITH OUR T-Rad MODULES

See page **140**



QS-THZ

- Hybrid Pyroelectric Detectors
- Small TO5/TO8 Packages
- Available in 2 Sizes: 5 and 9 mm Ø Apertures
- Wide Dynamic Range from nW to mW
- QS-I-TEST Test Box Available

- DISCRETE PYROELECTRIC DETECTORS
- SMALL TO5/TO8 PACKAGES

See page **144**

Catalogue 2019_V1.0