Product Overview

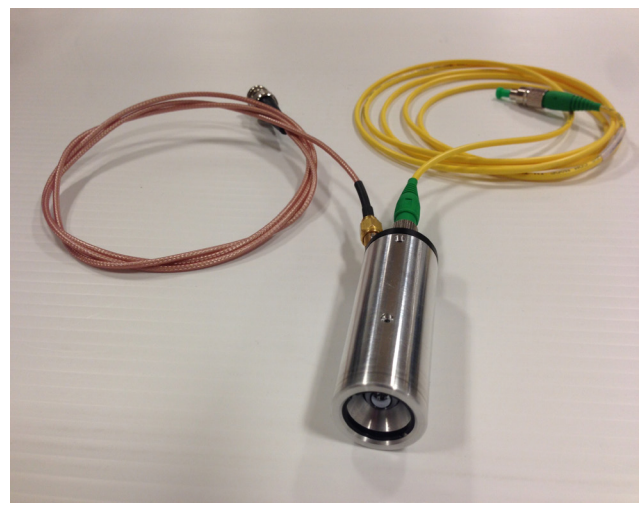
The T-Era-20D-1550-fiber terahertz photoconductive antenna (THz-PCA) is used to generate and detect high power and wide-band terahertz pulses in THz time-domain systems. The T-Era-20D-1550-fiber THz-PCA is made on high resistive ultra-fast epitaxially grown multi-quantum well InGaAs-InAlAs substrates and is packaged in TeTechS' patent pending terahertz chip fiber coupled enclosure module. The enclosure module houses the THz-PCA with a collimating high-resistive silicon lens attached to the back side of the THz-PCA chip, an FC/APC fiber connector and optical collimating and focusing lenses.

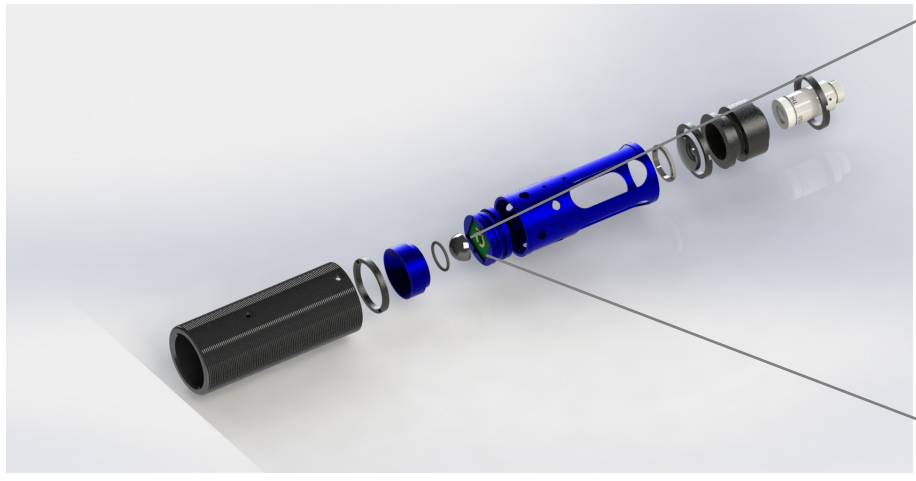
An input bias voltage can be applied to the chip through an isolated MMCX connector. In the receiving operation mode, the detected THz photocurrent can be measured through the MMCX connector. The standard Ø1" treaded body makes it convenient to attach the module to other standard optical components or mount it on an optical bench.

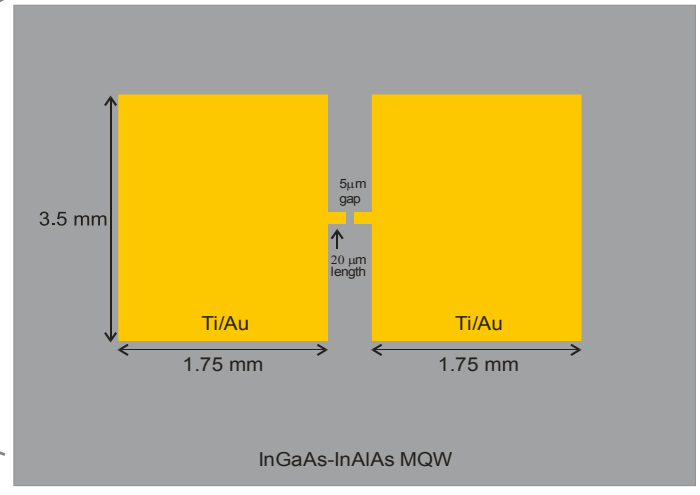
When excited by optical pulses with 10 mW average optical power, a pair of transmitter and receiver T-Era-20D-1550-fiber THz-PCAs generate 0.5 nA peak terahertz photocurrent on the receiver antenna with 50 dB terahertz power spectrum dynamic range.

Product Specifications

Optical Excitation Wavelength	1540 nm-1560 nm
Average Optical Power	1 mW-15 mW
Bias Voltage	1 V-15 V
Dark Resistance	0.276 MΩ
Spectrum Bandwidth	1 THz
Power Spectrum Dynamic Range	50 dB
Size (O.D., L)	1", 2.5"







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I-V Curves

I. Dark current versus bias voltage

Figure 1 shows the dark current versus applied bias voltage across the T-Era-20D-1550-fiber THz-PCA. A dark resistance around 0.278 MΩ is measured.

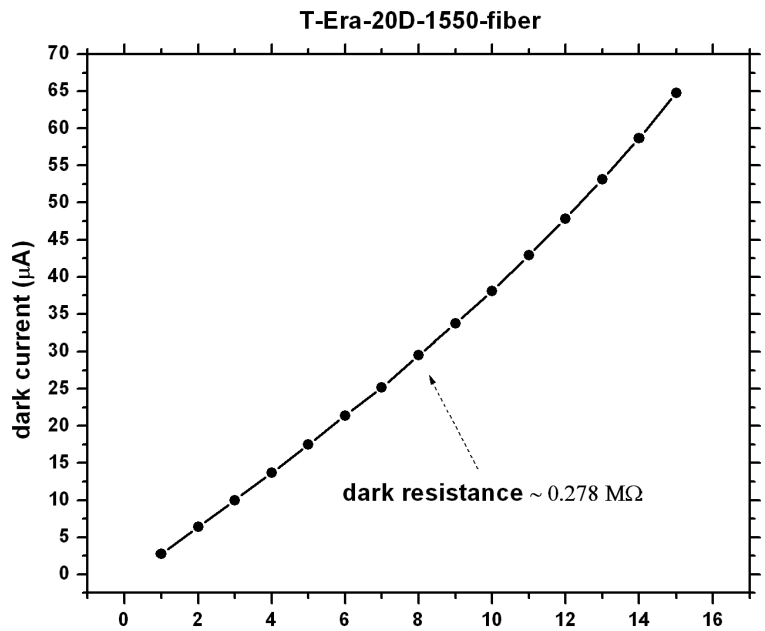

Figure 1. Dark current versus applied bias voltage across the T-Era-20D-1550-fiber THz-PCA.

Dark current versus bias voltage measurement settings

THz-PCA Under Test	T-Era-20D-1550-fiber
Average Optical Power on THz-PCA	0 mW
Bias Voltage on THz-PCA	1V-15V

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II. Photocurrent versus bias voltage

Figure 2 shows the photocurrent versus bias voltage across the T-Era-20D-1550-fiber THz-PCA. The average optical power on the device is fixed at 10 mW. The photocurrent shows a linear increase with bias voltage.

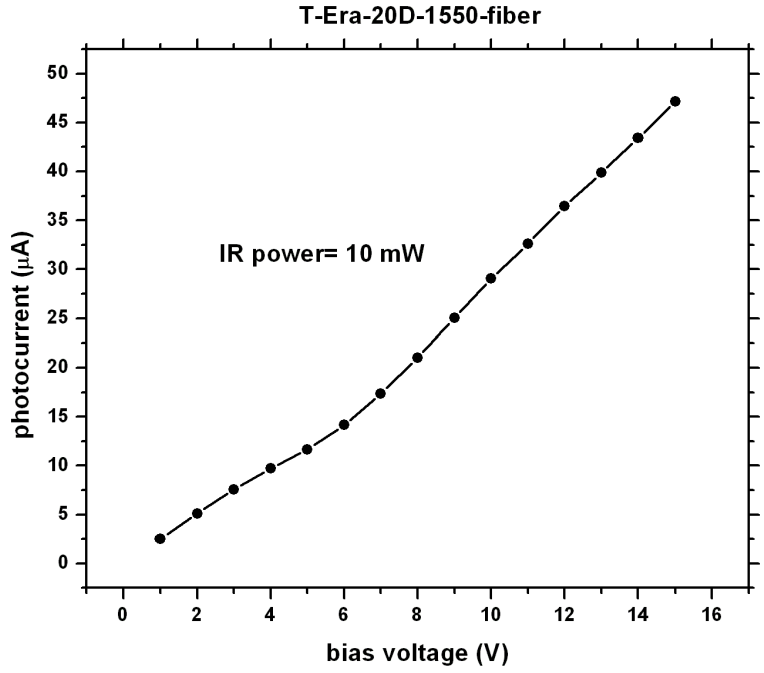

Figure 2. Photocurrent versus applied bias voltage across the T-Era-20D-1550-fiber THz-PCA.

Photocurrent versus bias voltage measurement settings

THz-PCA Under Test	T-Era-20D-1550-fiber
Optical Excitation Wavelength	1550 nm
Optical Pulse Duration	100 fs
Average Optical Power on THz-PCA	10 mW
Bias Voltage on THz-PCA	1V-15V

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III. Photocurrent versus optical power

Figure 3 shows the photocurrent versus average optical power on the T-Era-20D-1550-fiber THz-PCA. The bias voltage across the device is fixed at 10 V. The photocurrent starts to saturate for average optical power beyond 15 mW.

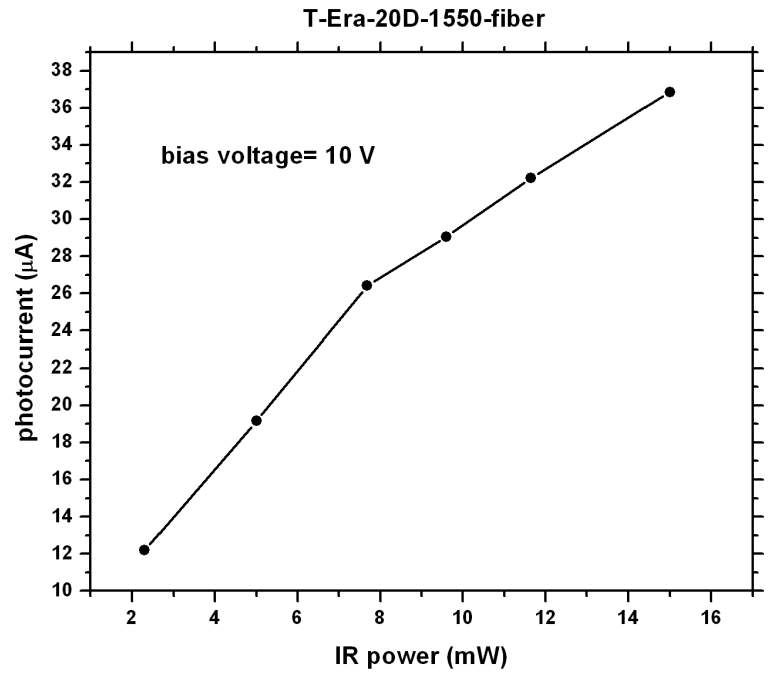

Figure 3. Photocurrent versus average optical power over the T-Era-20D-1550-fiber THz-PCA.

Photocurrent versus optical power measurement settings

THz-PCA Under Test	T-Era-20D-1550-fiber
Optical Excitation Wavelength	1550 nm
Optical Pulse Duration	100 fs
Average Optical Power on THz-PCA	2.5mW-15mW
Bias Voltage on THz-PCA	10 V

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IV. Terahertz Measurement Setup

Figure 4 shows a terahertz response measurement setup for T-Era-20D-1550-fiber THz-PCA.

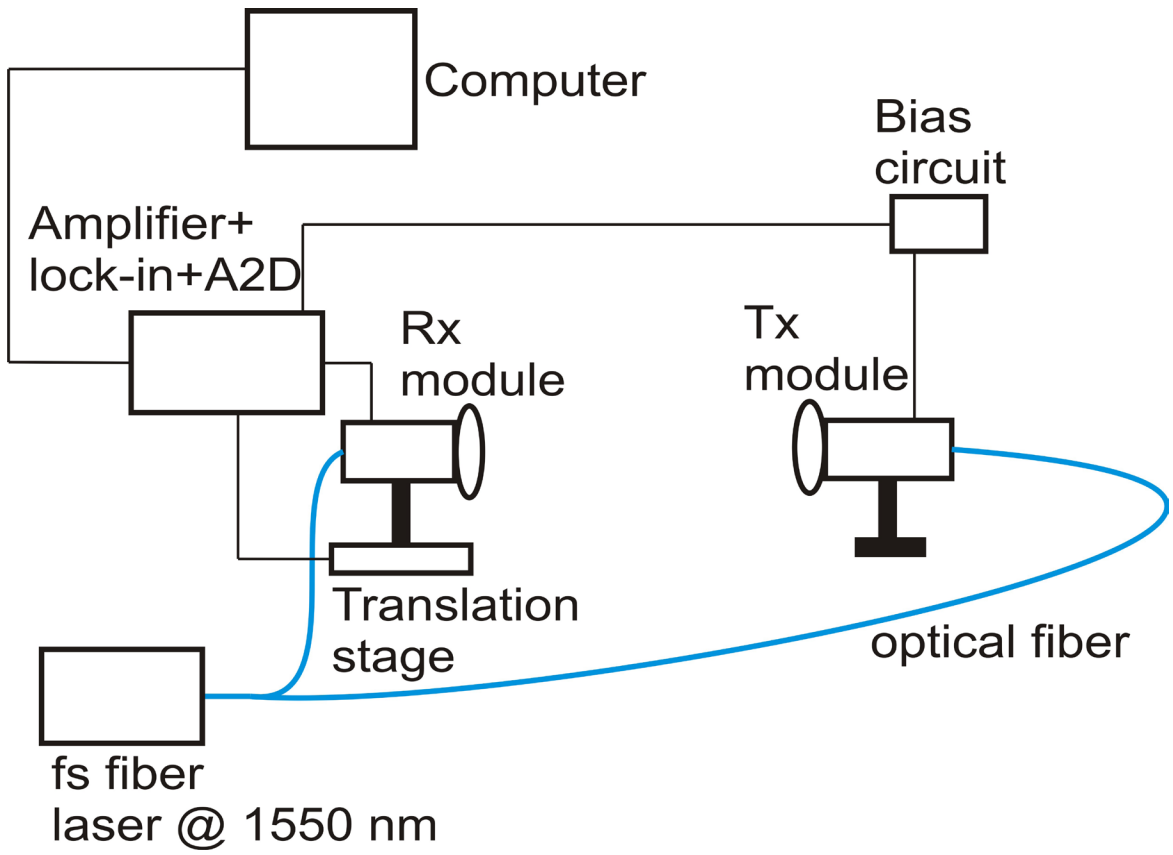

Figure 4. A terahertz response measurement setup for T-Era-20D-1550-fiber THz-PCA.

Typical THz Time-Domain Measurement Settings

Transmitter Module	T-Era-20D-1550-fiber
Receiver Module	T-Era-20D-1550-fiber
Optical Excitation Wavelength	1550 nm
Optical Pulse Duration	100 fs
Average Optical Power on Transmitter	15 mW
Average Optical Power on Receiver	10 mW
Bias Voltage on Transmitter	±10 V

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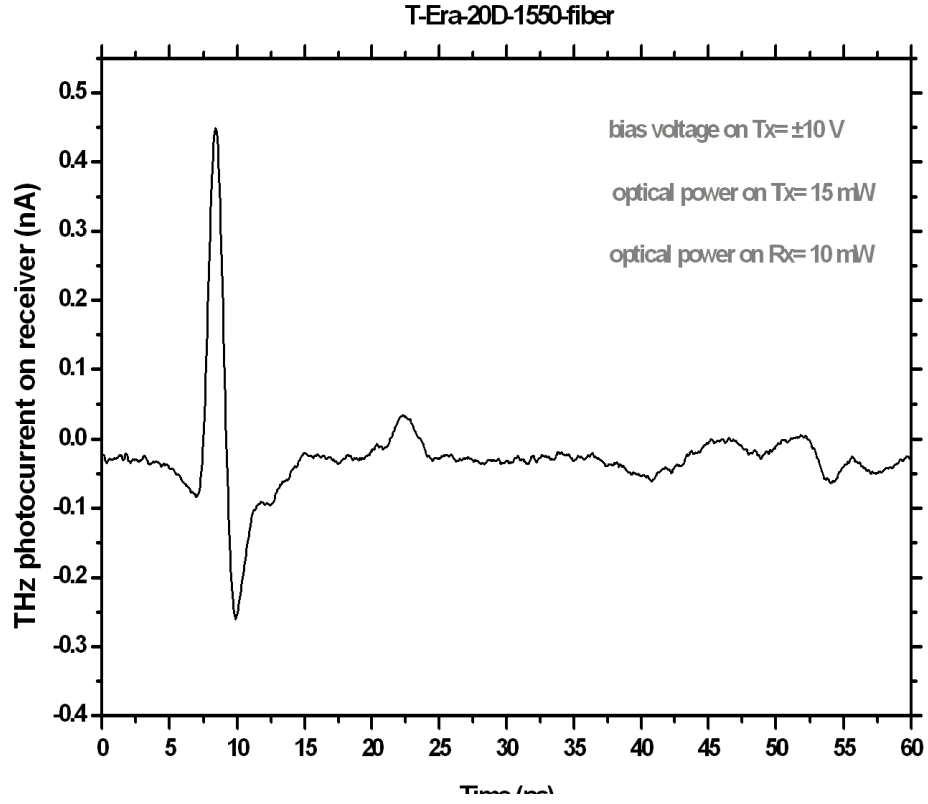
V. Terahertz Response

Figure 5 shows a typical THz pulse and its corresponding power spectrum generated and detected by a pair of T-Era-20D-1550-fiber THz-PCAs in a terahertz time-domain system.



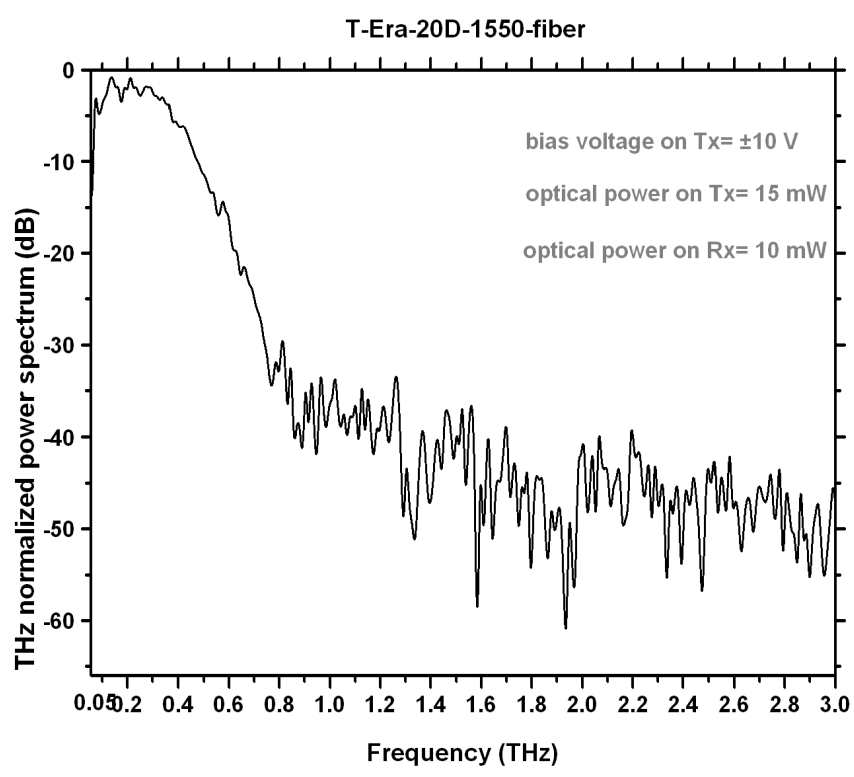


Figure 5. Typical THz pulse and its corresponding power spectrum generated by a T-Era-20D-1550-fiber transmitter module and detected by a T-Era-20D-1550-fiber receiver module

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VI. Terahertz peak photocurrent versus bias voltage

Figure 6 shows the terahertz peak photocurrent versus bias voltage on the T-Era-20D-1550-fiber THz-PCA transmitter. The average optical power on the transmitter and receiver devices is fixed at 10 mW.

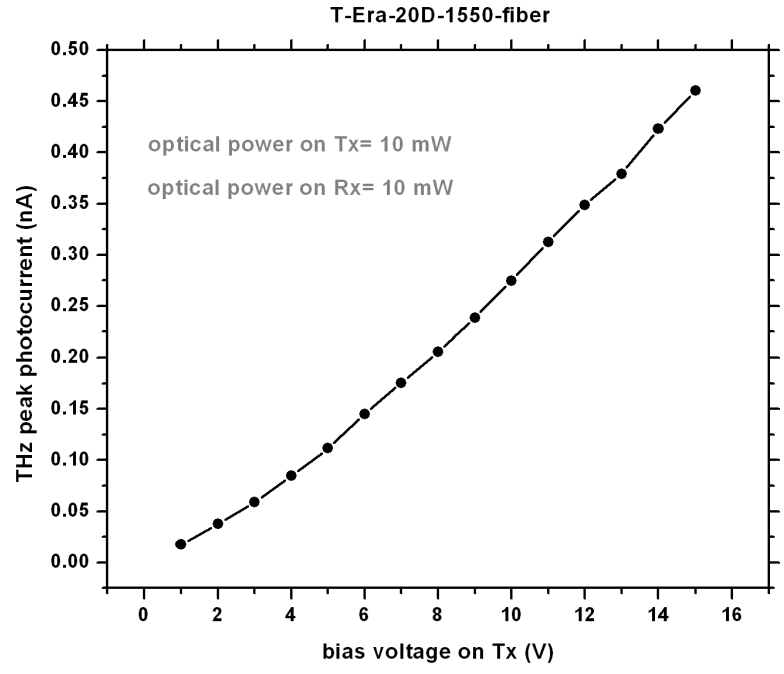

Figure 6. Terahertz peak photocurrent versus bias voltage over the T-Era-20D-1550-fiber THz-PCA.

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