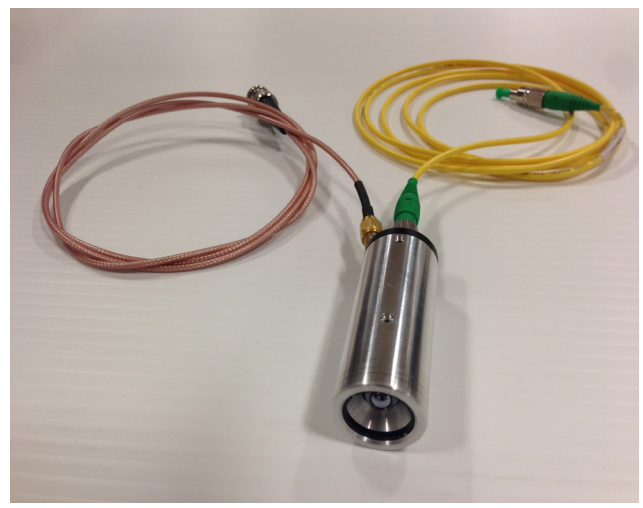
Product Overview

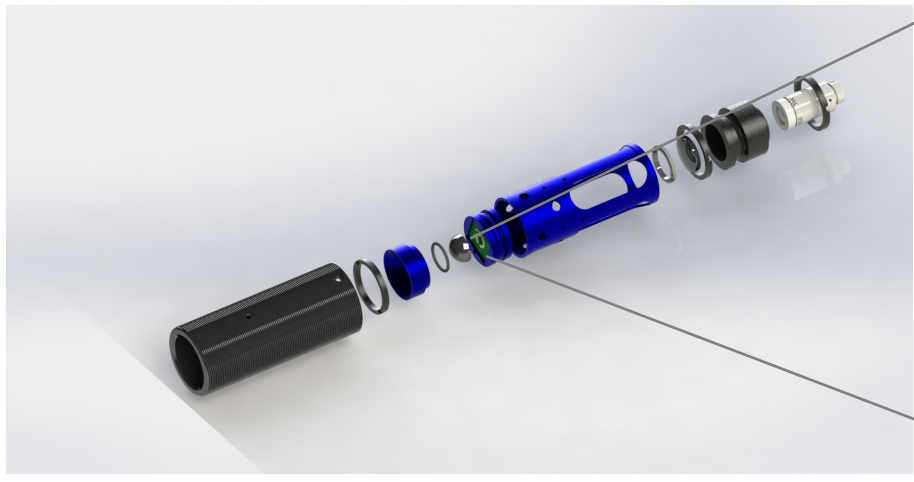
The T-Era-20D40P-1550-fiber terahertz photoconductive antenna (THz-PCA) is used to detect wideband terahertz pulses in terahertz time-domain systems. The T-Era-20D40P-1550-fiber THz-PCA is made on high resistive ultra-fast epitaxially grown multi-quantum well InGaAs-InAlAs substrates and is packaged 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. The device is packaged in a modular format so that it is easy to change the THz-PCA chip inside the enclosure at a fraction of cost. The device is shipped with the silicon lens aligned and packaged on the back side of the THz-PCA chip. The silicon lens can be re-aligned after changing the THz-PCA chip using our silicon lens setting fixtures.

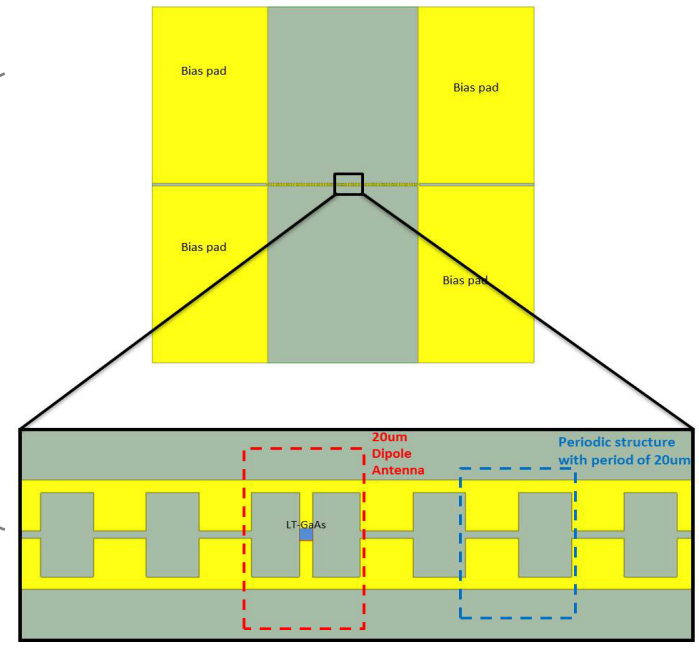
In the receiving operation mode, the detected THz photocurrent can be measured through the MMCX connector. The standard Ø1" treaded body makes it convenient to attach the module to other standard optical components or mount it on an optical bench. When excited by optical pulses with 8 mW average optical power, the T-Era-20D40P-1550-fiber THz-PCA generates 200 pA peak terahertz photocurrent with more than 50dB terahertz power spectrum dynamic range.

Product Specifications

Optical Excitation Wavelength	1540 nm-1560 nm
Average Optical Power	1 mW-15 mW
Bias Voltage for Optical Alignment	5 V
Dark Resistance	1 MΩ
Spectrum Bandwidth	>2.5 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-20D40P-1550-fiber THz-PCA. A dark resistance around 1 MΩ is measured.

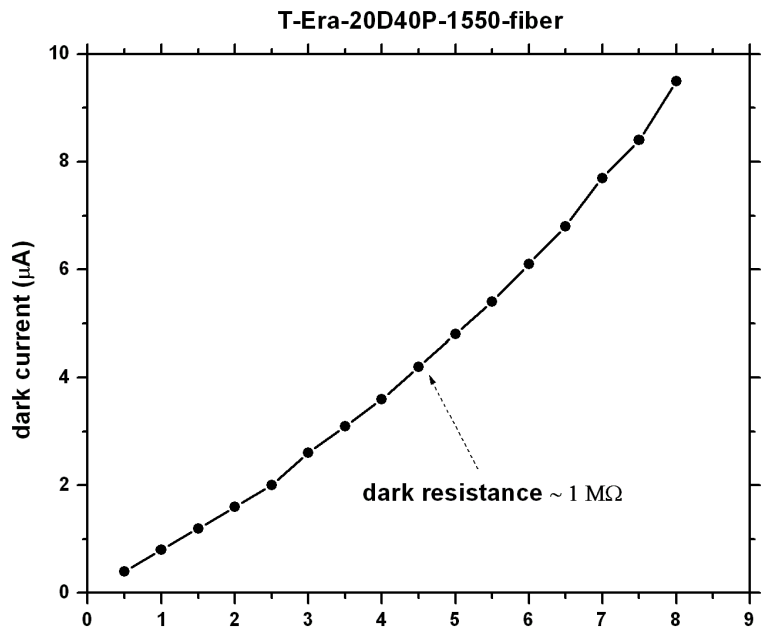

Figure 1. Dark current versus applied bias voltage across the T-Era-20D40P-1550-fiber THz-PCA.

Dark current versus bias voltage measurement settings

THz-PCA Under Test	T-Era-20D40P-1550-fiber
Average Optical Power on THz-PCA	0 mW
Bias Voltage on THz-PCA	0.5V-8V

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II. Photocurrent versus bias voltage

Figure 2 shows the photocurrent versus bias voltage across the T-Era-20D40P-1550-fiber THz-PCA. The average optical power on the device is fixed at 20 mW. The photocurrent shows a linear increase with bias voltage.

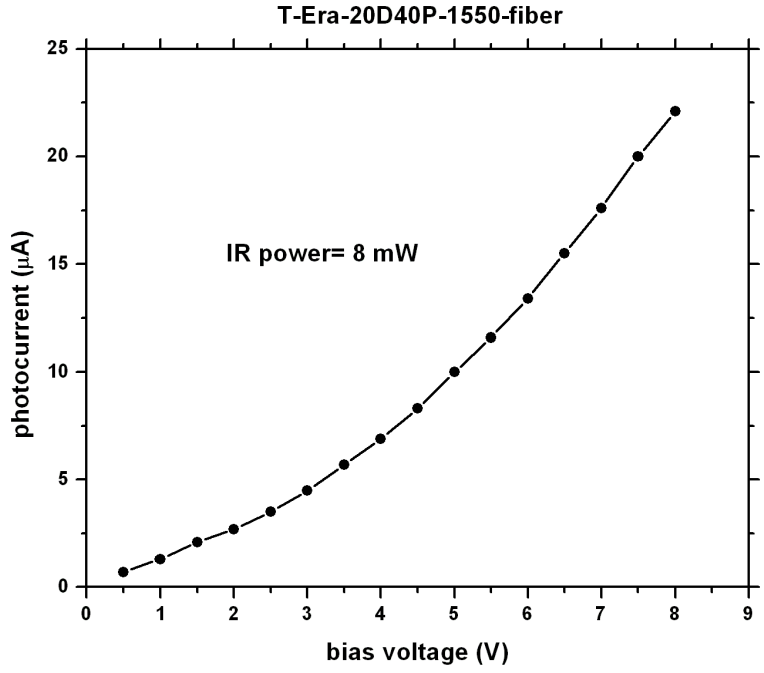

Figure 2. Photocurrent versus applied bias voltage across the T-Era-20D40P-1550-fiber THz-PCA.

Photocurrent versus bias voltage measurement settings

THz-PCA Under Test	T-Era-20D40P-1550-fiber
Optical Excitation Wavelength	1550 nm
Optical Pulse Duration	100 fs
Average Optical Power on THz-PCA	8 mW
Bias Voltage on THz-PCA	0.5V-8V

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III. Terahertz Measurement Setup

Figure 3 shows a terahertz response measurement setup for T-Era-20D40P-1550-fiber THz-PCA.

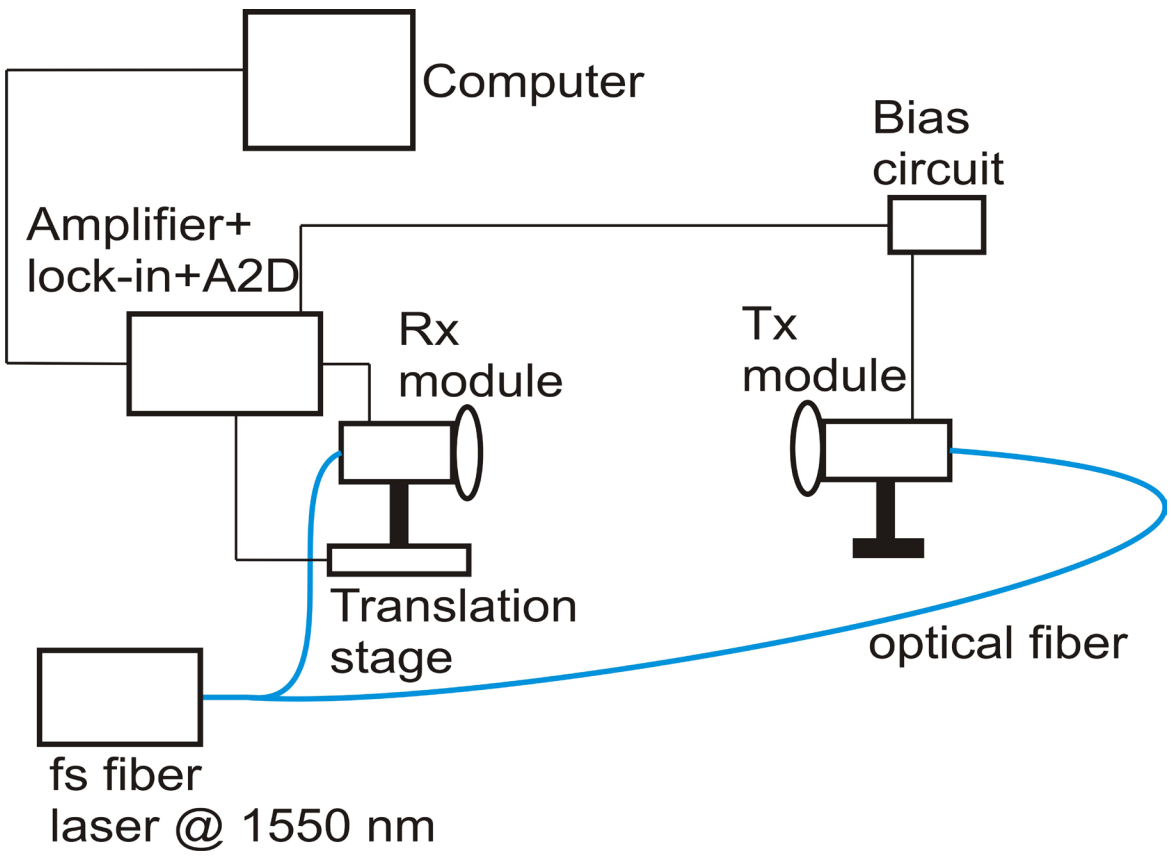

Figure 3. A terahertz response measurement setup for T-Era-20D40P-1550-fiber THz-PCA.

Typical THz Time-Domain Measurement Settings

Transmitter Module	T-Era-100A-1550-fiber
Receiver Module	T-Era-20D40P-1550-fiber
Optical Excitation Wavelength	1550 nm
Optical Pulse Duration	100 fs
Average Optical Power on Transmitter	14 mW
Average Optical Power on Receiver	8 mW
Bias Voltage on Transmitter	40 V

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IV. Terahertz Response

Figure 4 shows a typical THz pulse and its corresponding power spectrum generated by a T-Era-100A-1550-fiber THz-PCAs and detected by a T-Era-20D40P-1550-fiber THz-PCAs in a terahertz time-domain system.

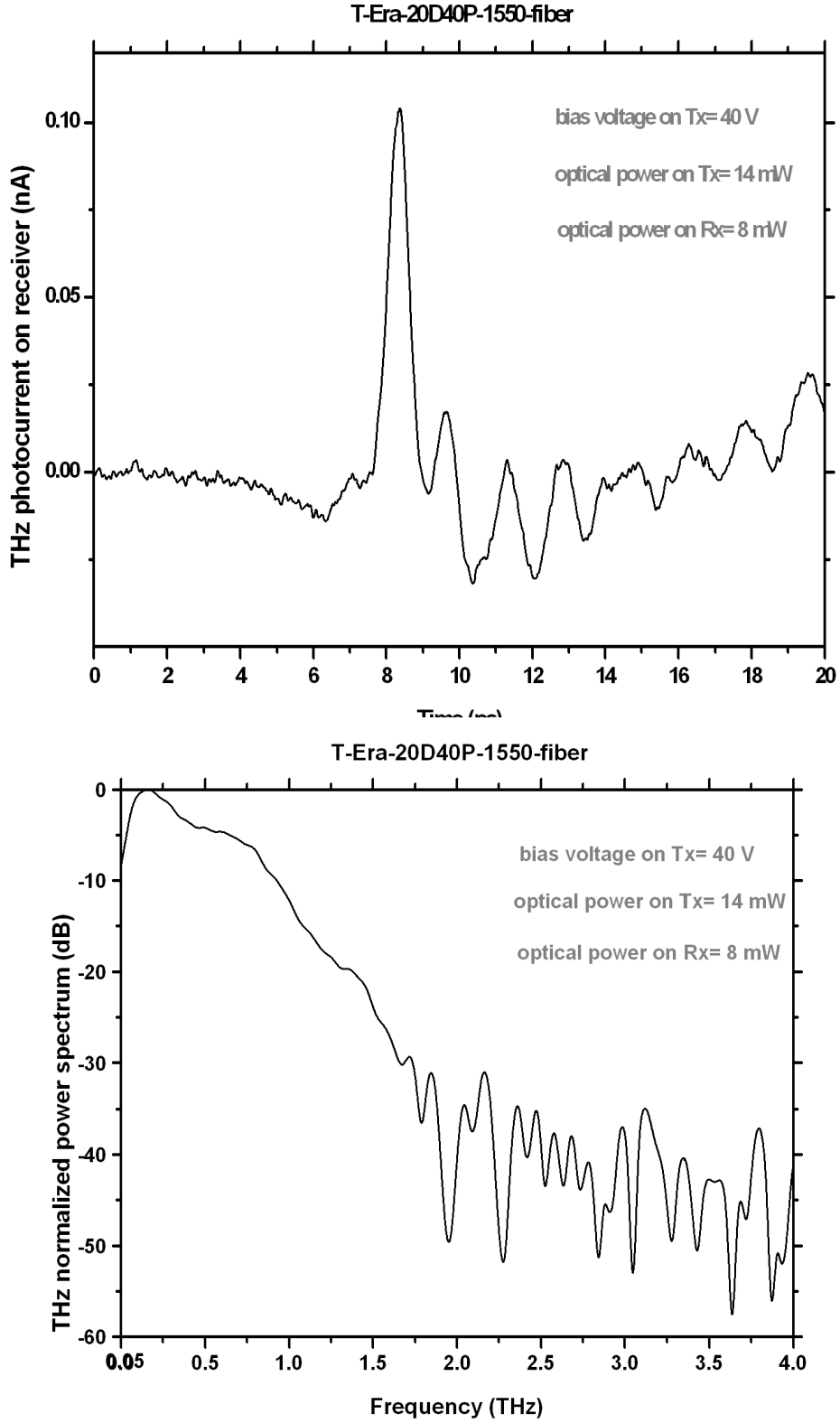

Figure 4. Typical THz pulse and its corresponding power spectrum generated by a T-Era-100A-1550-fiber transmitter module and detected by a T-Era-20D40P-1550-fiber receiver module.

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V. Terahertz peak photocurrent versus bias voltage

Figure 5 shows the terahertz peak photocurrent on the T-Era-20D40P-1550-fiber receiver versus bias voltage on the T-Era-100A-1550-fiber transmitter. The average optical power on the transmitter antenna is 14 mW and on the receiver antenna is 8 mW.

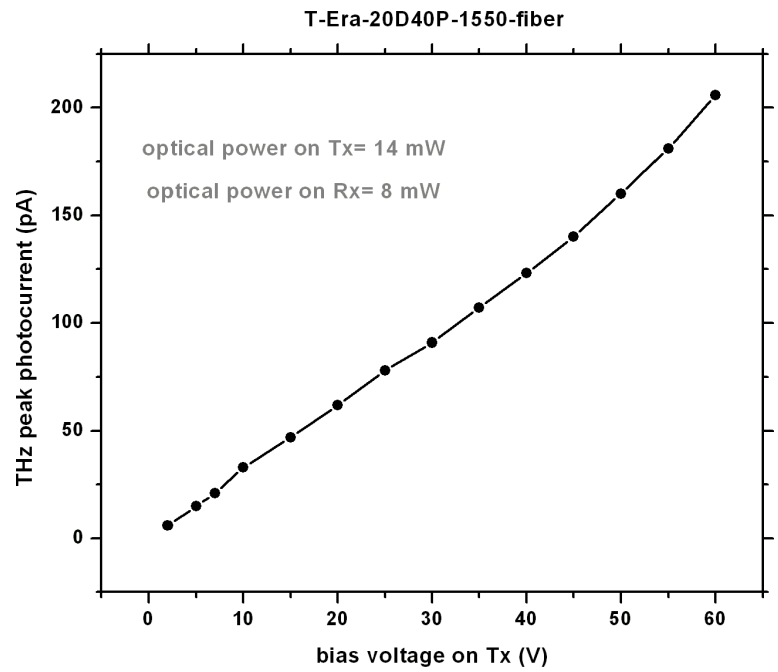

Figure 5. Terahertz peak photocurrent versus bias voltage on the T-Era-20D40P-1550-fiber receiver versus bias voltage on the T-Era-100A-1550-fiber transmitter.

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