



Terahertz Parametric Oscillator TPO-850

Key Specifications:

Central Frequency: 850 GHz

Spectral Width: 100 GHz

Average Power: 0.1 mW

Peak Power: 140 mW

Applications:

THz imaging



Product description:

TPO-850 is based on difference frequency generation in quasi-phase matched GaAs crystal placed inside an optical parametric oscillator (OPO) pumped by an ultrafast fiber laser. It generates 6-10 ps THz pulses at repetition rate of 110 MHz, delivering 0.1 mW of average power and over 140 mW of peak power. Central frequency of 850 GHz and spectral width of 100 GHz fits perfectly into one of the atmospheric transmission windows, making this source ideal for THz imaging application. Very high peak power makes TPO-850 suitable for imaging systems employing non-linear optical effects, while sufficiently high average power makes it suitable for thermal detector array imaging as well.

The mode locked fiber laser pumps the OPO with 10 W average power in 6 picosecond pulses at 1064 nm. These are parametrically down converted to 2.1 micron signal and idler pulses separated by 850 GHz in spectrum. Difference frequency generation between signal and idler pulses in a quasi-phase matched gallium arsenide placed inside the OPO cavity Produces stable output at 850 GHz. The THz waves are extracted from the OPO cavity via a right angle parabolic mirror with a passage for the mid IR so that the THz waves are collimated and reflected out of the cavity. A THz long pass filter is used as a window for the THz waves while filtering out any low power IR that may have inadvertently been scattered inside the OPO to provide a pure 850 GHz output. Additional outputs at 1 and 2 μm are available on request for pump-probe and time domain experimentation.

Specifications:

Parameter	Nominal	Typical
Central Frequency	850 GHz +/- 50 GHz	850 GHz
Spectral Width	<200 GHz	70 GHz
Average Power	>100 μ W @ 850 GHz	130 μ W
Peak Power	>140 mW @ 850 GHz	180 mW
Pulse duration	6 +/-2 ps	5.9 ps
Repetition rate	110 +/- 1 MHz	109.7 MHz
Long term power stability	+/- 10%	+/- 3%
Dimensions	Laser: 14" x 10" x 5.5" OPO: 30" x 18" x 7.5"	Laser: 14" x 10" x 5.5" OPO: 30" x 18" x 7.5"
Weight (OPO only)	80 lbs.	80 lbs.

Typical THz spectrum

