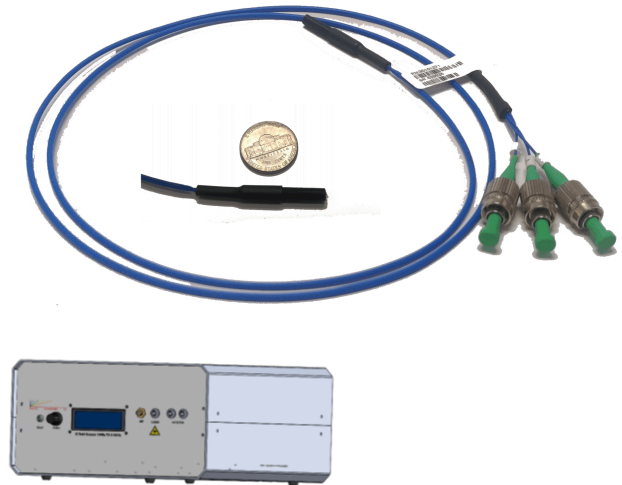


EO THz Sensor – MZ

Partow THz E-field sensor uses Mach-Zehnder modulators made from lithium niobate thin films for detecting the THz wave. The sensor can replace bulky optical elements based on polarization modulation in time domain THz spectroscopy applications. The sensors can achieve high spatial resolution and can be operated from near DC frequencies up to several THz. The sensor can be made from all dielectric materials or it can be made with THz antenna. For low THz field values antenna can enhance the sensitivity by a factor of 10. Dielectric type sensors do not perturb measurand electric field and can be used for applications with higher THz field. Since fiber optic cables are used no alignment is needed and the sensor can be readily placed in THz beam path for sampling of THz signals. The sensor operates at an eye safe wavelength of 1550nm. The device can be used to replace bulky electro-optic sampling crystals in THz time domain spectroscopy applications. Partow is currently developing devices for THz generation and for THz detection at higher frequency range up to 10THz.



Features

- Based on thin film lithium niobate
- Electro-optic Mach-Zehnder modulator
- DC frequency up to THz frequencies
- All dielectric materials
- Immune from electromagnetic interference
- High spatial resolution

Mach-Zehnder THz sensor, P/N MZ-XX-Q-B-YY

Mach-Zehnder E-field sensor datasheet

Parameter	High Bandwidth	High Sensitivity
<i>Dynamic range</i>	<i>10 V/m – 2MV/m</i>	<i>1 V/m – 200kV/m</i>
<i>Sensitivity</i>	<i>10 V/(m. Hz^{0.5})</i>	<i>1 V/(m. Hz^{0.5})</i>
<i>Selectivity (Orthogonal components rejection)</i>	<i>>30 (dB)</i>	<i>>30 (dB)</i>
<i>Optical insertion loss of the sensor</i>	<i>-12 (dB)</i>	<i>-12 (dB)</i>
<i>Operating wavelength</i>	<i>1550 (nm)</i>	<i>1550 (nm)</i>
<i>Measurement Direction (YY) With respect to fibers</i>	<i>PL: Parallel</i>	<i>PL: Parallel</i>

Parameter	High Bandwidth	High Sensitivity
-3dB Bandwidth of optical coupler	50(nm)	50(nm)
-3dB modulation bandwidth*	600 GHz	60 GHz
Active interaction length XX	600 microns	6000 microns
E_p	23 MV/m	2.3 MV/m
Packaged sensor size	3(mm) x 25(mm)	3(mm) x 25(mm)
Fiber length	1(m)	1(m)
Fiber type, conector	3 PM, FC/APC	3 PM, FC/APC

*Measured using THz time domain spectroscopy setup

E-field THz sensor controller system, P/N: L-1550-THz-D-400-B

Parameter	Value	Additional Information
Laser Power	10 (mW)	
Operating Wavelength	1550 (nm)	
Measurement Range	1 GHz – 1 THz	Depending on the sensor used
Typical Response gain	0.4 ($\mu\text{V}/(\text{V}/\text{m})$)	0.04($\mu\text{V}/(\text{V}/\text{m})$) for 600micron devices
Max output frequency	100 MHz	
Interrogator dimension	300x264x134(mm)	Down to 6psec rise time is possible
Interrogator dimension	1 (kg)	
Interrogator output	SMA-50 ohm	
Input power	110-220 volt, 50-60Hz	