Multiplex, Inc.
Photonics for Communications

MTX510EW

10Gb/s 1550nm Electro-absorption Modulated Laser (EML)

The MTX510EW electro-absorption modulated laser (EML) module consists of a multi-quantum –well DFB laser device with 1550nm nominal emission and a monolithically integrated electro-absorption (EA) modulator in a 7-pin, hermetically-sealed package with a GPO connector. State-of-the-art, epoxy-free laser-welding is utilized. The laser module also contains a thermoelectric cooler and a monitor photodiode.

The device is designed for high transmission rates for Metro and long-haul applications. The MTX510EW is optimized to operate at a bit-rate of 10Gb/s for OC-192 and STM-64 Metro and long-haul transmission with excellent reliability. The EML module is available in nominal 1550nm versions, and in wavelengths to match the ITU grid.

The incorporated thermoelectric cooler keeps the laser chip at a well-controlled temperature. This allows the device to emit at the exact wavelength and output power at a case temperature range of 0°C to +70°C.

The MTX510EW module comes with a 1.5 meter strand of single-mode fiber and a FC/PC connector.

APPLICATIONS

- WDM fiber-optic telecommunications
- OC-192 and STM-64 high-speed transmission systems
- High-speed long-haul and Metro transmissions
- 10Gb/s Ethernet

FEATURES

- InGaAsP SLMQW DFB laser and monolithically integrated MQW modulator
- High-speed design optimized for modulation at 10Gb/s
- Integrated optical isolator
- Available in wavelengths to match ITU grid
- C- and L-band wavelengths available
- Industry-standard 7-pin package with high-speed GPO connector
- 50 Ω RF impedance matching
- Low threshold current and low modulation voltage

Optical and Electrical Characteristics

PARAMETER	SYMBOL	CONDITION	MIN	MAX	UNIT
DFB Laser:					
Set temperature for laser operation	T_{set}	Temperature set for Thermistor & thermoelectric cooler in the module	15	30	°C
Threshold current	I_{th}	At $T_{set,}$ CW operation	-	35	mA
Operating current	I_{op}	At $T_{set,}$ $P_{f,}$ = 0 dBm	50	100	mA
Peak wavelength	λo	At T_{set}, I_{op}	1530	1610	nm
Side mode suppression ratio	SMSR	At T_{set}, I_{op}	30	-	dB
CW fiber output power	P_f	At T_{set}, I_{op}, V_{EA} = 0 V	0	-	dBm
Laser relative intensity noise	RIN	From 1 MHz to 10 GHz, at I_{op}, V_{EA} = 0 V	-	-120	dB/Hz
EA Modulator:					
Mark offset voltage	V_{mark}	DC offset to modulator (on-level modulator voltage)	-1.0	-0.01	V
Peak-to-peak RF drive voltage	V_{pp}	Peak-to-peak amplitude of pulsed pattern, input to modulator	-	2.7	V
RF return loss (up to 5 GHz)	S_{11}	From 300 kHz to 5 GHz, 50 Ω test system, V_{EA} = V_{mark}	10	-	dB
RF return loss (5 to 10 GHz)	S_{11}	From 5 to 10 GHz, 50 Ω test system, V_{EA} = V_{mark}	5	-	dB
Small signal –3dB modulation bandwidth	BW	At T_{set}, I_{op}, V_{EA} = -1V	10	-	GHz
Module:					
Extinction ratio	Er	V_{mark}, biased, modulated with V_{pp}	10	-	db
Rise/fall time	t_r/t_f	20% to 80%	-	35	ps
Monitor photodiode current	I_{pd}	At T_{set}, I_{op} = 100 mA, P_F = 0 dBm	0.05	0.5	mA
Modulated fiber output power	<P_f>	Modulated output measured by power meter	-2.0	-	dBm
Optical isolation	-	From output fiber to device, module at T_{set}	25	-	dB
Case temperature	T_{case}	Operating case temperature	0	70	°C
Transmission penalty due to dispersion	DP	V_{mark}, modulated with V_{pp}, 1000 ps/nm	-	2	dB

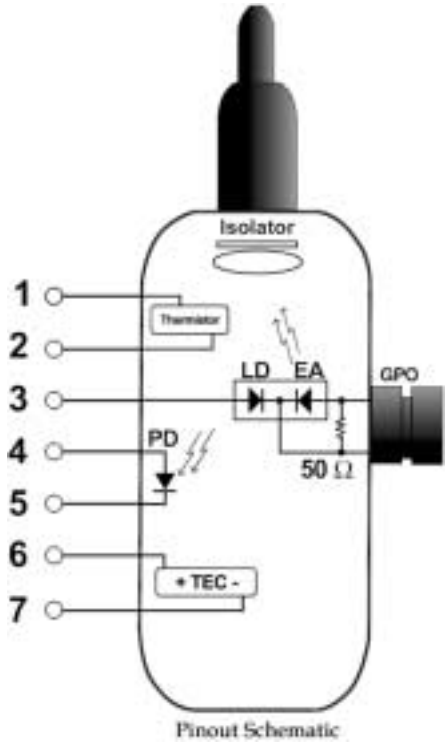
Table Notes: (1) V_{EA} is the DC voltage applied to the modulator when the EML is not modulated.
(2) L-Band wavelengths available

Absolute Maximum Ratings

Stresses in excess of the absolute maximum ratings can cause permanent damage to the device. Exposure to absolute maximum ratings for extended periods can adversely affect device reliability.

PARAMETER	CONDITIONS	SYMBOL	MIN	MAX	UNIT
Laser Diode Reverse Voltage	CW	V_{RL}	-	2	V
Laser Diode Forward Current	CW	I_{FL}	-	150	mA
Optical Output Power	CW	P		10	mW
Laser Chip Temperature		T_{LD}	-	35	°C
Modulator Reverse Voltage	-	V_{Mr}		5	V
Modulator Forward Voltage		V_{Mf}		1	V
Photodiode Reverse Voltage	-	V_{RPD}	-	10	V
Photodiode Forward Current	-	I_{FPD}	-	1	mA
Thermoelectric Cooler Current		I_{TEC}	-	1.5	A
Thermistor Voltage		V_{Th}	-	5	V
Thermistor Current		I_{Th}	-	2	mA
Operating Case Temperature Range		T_{Opr}	0	+70	°C
Storage Case Temperature Range		T_{stg}	-40	+85	°C

Multiplex, Inc.
Photonics for Communications



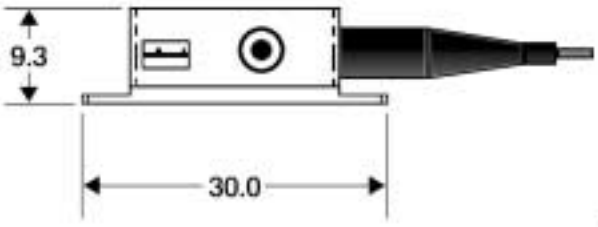
Pinout Schematic

Pin Configuration

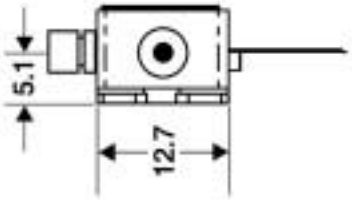
Pin Number	Description
1	Thermistor (Resistance = 10 kΩ)
2	Thermistor
3	Laser Anode
4	Detector Monitor Anode
5	Detector Monitor Cathode
6	Thermoelectric Cooler (+)
7	Thermoelectric Cooler (-)
GPO	RF and CaseGround (Laser Cathode)

Package Drawings
(all dimensions in mm)

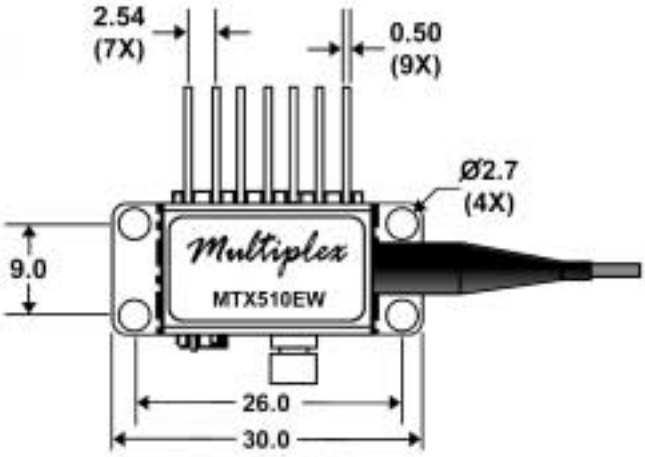
Side View

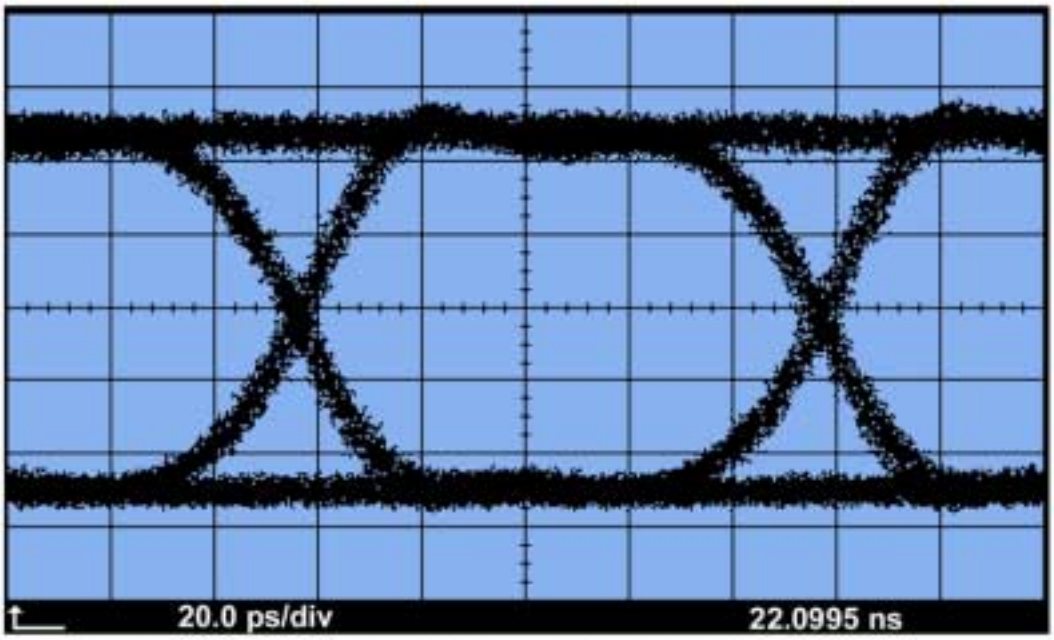


Front View



Top View



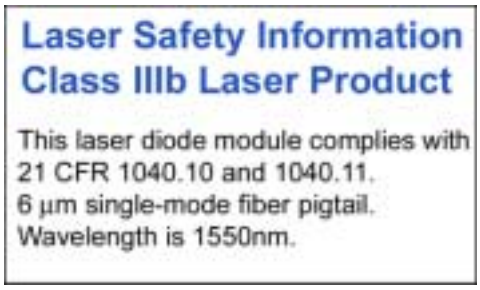


Actual oscilloscope readout of the MTX510EW's eye

Because of its small size, safety information is not printed on the actual laser module. This is, however, attached to the outside of the shipping carton.

Warranty

Unless otherwise noted, Multiplex warrants all standard laser products, when operated at or below noted optical power and within specified temperature and electrical limits, against defects in material and workmanship for a period of one year from date of shipment.



Multiplex, Inc.
Photonics for Communications

115115 Corporate Blvd., So Plainfield, NJ 07080 USA
US 908.757.8817 Fax: 908.757.8910
wwwww.multiplexinc.com