

PowerBit™ F10

10 – 12.5 Gb/s Intensity Modulator with Low Drive Voltage



Oclaro intensity modulators are based on the Mach-Zehnder Interferometer architecture. They are manufactured using the highly reliable Titanium indiffusion technology in x-cut or z-cut, y-propagating Lithium Niobate substrates.

The F10-0 is a zero-chirped, x-cut single-drive modulator designed for high bit rate advanced Metro to Long Haul communication systems that requires the superior performance of x-cut Lithium Niobate.

The F10-Z is a pre-chirped, z-cut single-drive modulator for extended span applications that requires the superior performance of z-cut Lithium Niobate.

Both variants use Oclaro's standard F10 package for 4" 300-pin MSA transponders, making it a very cost-effective solution.

The electrical and mechanical interface of the F10-Z is fully compatible with existing transponder designs that support Oclaro F10-0 modulator. Therefore a single Tx module design can accommodate either the zero-chirped or the negative-chirped modulator version.

A small footprint and low profile makes the modulator compatible with the 10 Gb/s MSA Transponder standard and exceptionally low drive voltage enables low power consumption reducing the overall transmitter cost.

Suitable driver amplifiers are available through Oclaro recommended partners.

Features:

- Very Low Drive Voltage
- GPO (male) RF input
- Standard "F"-type footprint for 4" MSA
- C and L-Band Operation
- Enhanced E/O Bandwidth for up to 12.5 Gb/s Modulation Speed
- Low Insertion Loss
- High Extinction Ratio
- Integrated Monitor Photodiode
- F10-0 Zero-Chirped Modulator
- F10-Z Negative-Chirped Modulator for Extended Spans (< 2 dB Penalty at 1600 ps/nm)
- Integrated Polarizer
- Surface Mountable with Gull-Wing DC Pins
- RoHS Compliant

Applications:

- External Intensity Modulation from 10 Gb/s to 12.5 Gb/s NRZ and Electrical RZ
- Uncompensated Metro-Links up to 1600 ps/nm Dispersion Load (approx. 100 km)
- SDH/SONET-DWDM Systems
- Long Reach 10 Gb/s MSA Transponders with sFEC

Absolute Maximum Ratings

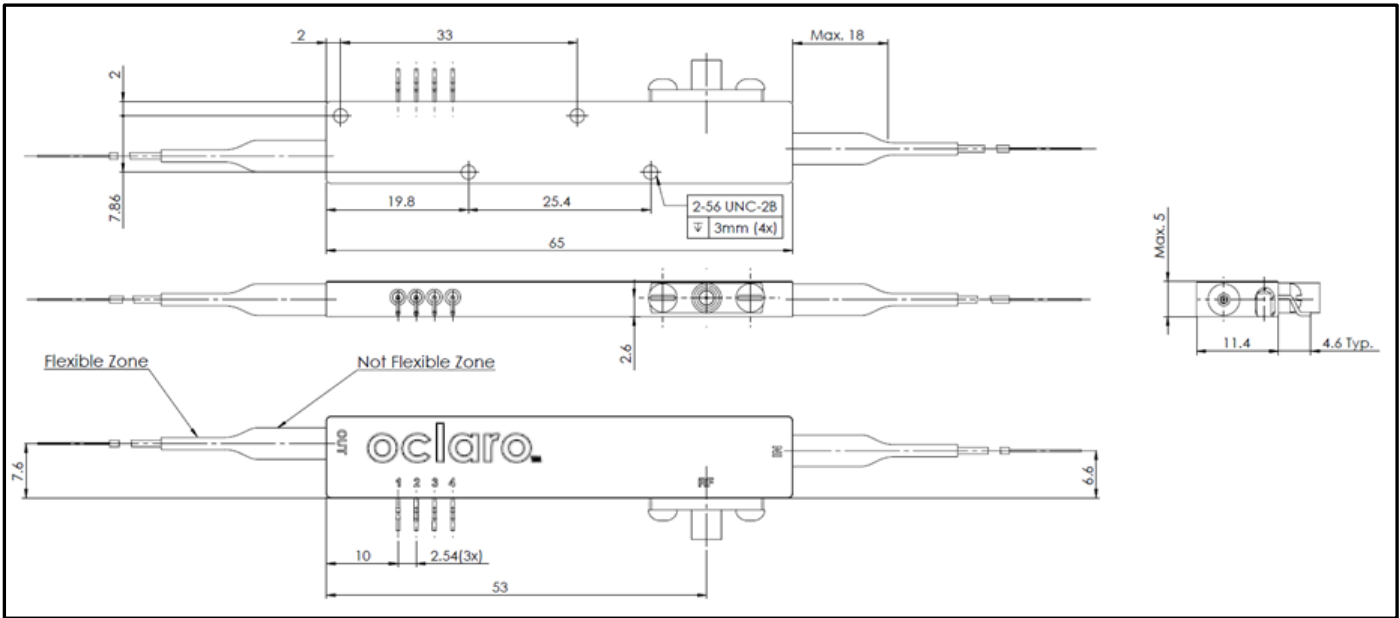
Parameter	Min	Typ	Max	Unit	Conditions
Maximum Input Power (Electrical)			25	dBm	RF-port, AC coupled
Maximum Input Power (Optical)			100	mW	CW
Maximum Operating Temperature Variation Rate			1	°C/min	
Storage Temperature Range	-40		+85	°C	
Operating Temperature Range	0		+70	°C	

Optical and Electrical Specification

$T_{op}=25^{\circ}\text{C}$, unless otherwise specified

Typical values shown unless otherwise stated

Optical	Value F10-0	Value F10-Z	Unit
Operating Wavelength Range	C and L Band		
Insertion Loss	4		dB
Extinction Ratio (DC)	≥ 20		dB
Chirp	0	-0.7	nominal
Optical Return Loss (without connectors)	≥ 45		dB
Frequency Range	Value		Unit
S_{21} Electro Optical Bandwidth (-3 dBc)	12	11	GHz
S_{11} Electrical Return Loss	≤ -10		dB
RF V_{π} Voltage (@ 1 kHz)	4.5		V
Bias V_{π} Voltage (@ 1 kHz)	≤ 5.0		V
PRBS Electrical Drive Voltage (V_{amp})	4.5	4.5	V
Dynamic Extinction Ratio	14	13.5	dB
Photodiode Responsivity (referred to output power)	≥ 20		mA/W
Photodiode Linearity	± 10		%



Higher resolution drawing available on request.

Pin-Out Information

Pin Number	Symbol	Description
1	PD-C	Photodiode Cathode
2	PD-A	Photodiode Anode
3	B	MZ DC Bias
4	GND	Ground
5	RF	RF Input (GPO Male)

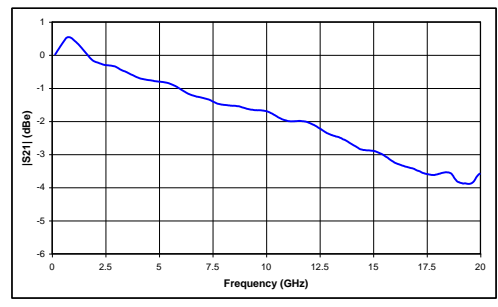
Pin-Out and Fibre Specification

Parameter	Description
RF Connector	GPO male
Bias and PD Connector	Lead pins
Input Fibre	Corning / Fujikura SM15P UV/UV400
Output Fibre	Corning SMF-28™ [1]

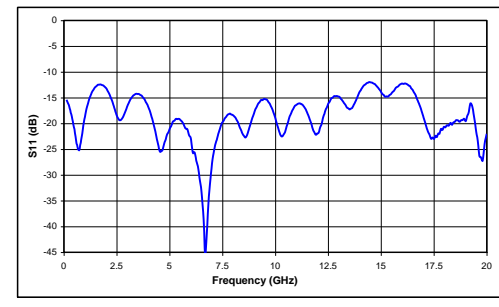
[1] Other output fibre options available on request

Performance Characteristics F10-0

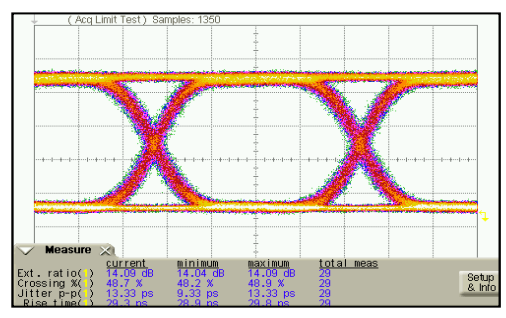
Electro Optical Response



Electrical Return Loss

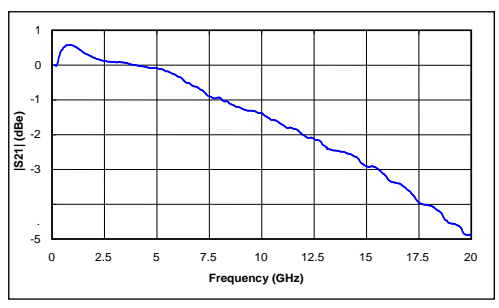


Electro Optical Response

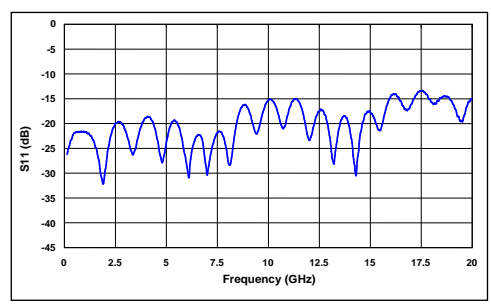


Performance Characteristics F10-Z

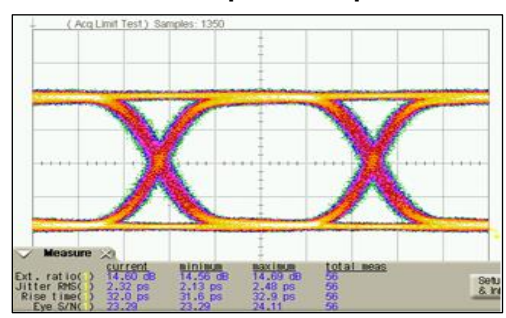
Electro Optical Response



Electrical Return Loss



Electro Optical Response



Ordering Information

Please refer to your Oclaro sales representative for product variant availability and product ordering information.

Flammability Rating

The Fibre Pigtails are rated UL 94 V-0 (Fujikura fibre) or are compliant to ASTM D-2863-87 requirements (Corning fibre SMF-28) Boots, Loose tube and Connectors are UL94 V-0 rated.

RoHS Compliance



Oclaro is fully committed to environment protection and sustainable development and has set in place a comprehensive program for removing polluting and hazardous substances from all of its products. The relevant evidence of RoHS compliance is held as part of our controlled documentation for each of our compliant products. RoHS compliance parts are available to order, please refer to the ordering information section for further details.

Contact Information

www.oclaro.com

Important Notice

Performance figures, data and any illustrative material provided in this data sheet are typical and must be specifically confirmed in writing by Oclaro before they become applicable to any particular order or contract. In accordance with the Oclaro policy of continuous improvement specifications may change without notice. Further details are available from any Oclaro sales representative.



Caution - use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

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