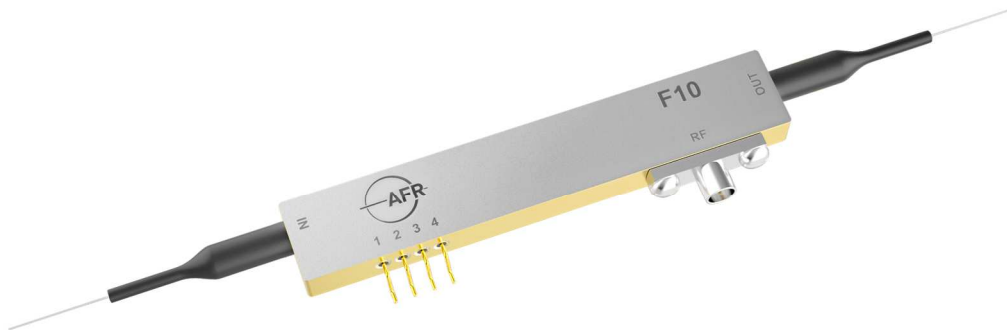


High Bandwidth Zero-Chirp Modulator

F10



AFR high bandwidth zero-chirp modulators are based on the Mach-Zehnder Interferometer (MZI) architecture. They are manufactured using the highly reliable titanium indiffusion technology in x-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 niobite.

The F10-0 modulator contains an integrated photo detector that may be used to set and lock the DC bias on the modulator as well as provide an estimate of the modulator output optical power.

Key Features

- Very low drive voltage
- GPO (male) RF input
- C- and L-band operation
- Enhances E/O bandwidth for up to 12.5Gb/s modulation speed
- Low insertion loss
- High extinction ratio
- Integrated monitor photodiode
- F10-0 zero-chirped modulator
- Integrated polarizer
- Surface mountable with gull-wing DC pins
- RoHS compliant

Applications

- External intensity modulation from 10 to 12.5Gb/s NRZ and electrical RZ
- High frequency fiber optic links
- Analog microwave over fiber (RoF)
- Instrumentation

Absolute Maximum Ratings

Parameters	Min.	Max.	Unit	Conditions
Maximum RF input power (Electrical)		25	dBm	AC coupled
Maximum input power (Optical)		20	dBm	CW
Maximum operating temperature variation rate		1	°C/min	
Monitor PD Reverse current		2	mA	
Monitor PD Forward current		10	mA	
Monitor PD Reverse voltage		15	V	
Operating case temperature	-5	+75	°C	
Storage temperature	-40	+85	°C	

Top=25°C, unless otherwise specified

Optical and Electrical Specifications

Parameter (Condition ⁽¹⁾)	Min	Value Typical	Max	Unit
Optical				
Operating wavelength	1525		1570	nm
Insertion loss (BOL) ⁽²⁾			4.5 ⁽³⁾ 5.0 ⁽⁴⁾	dB
Extinction ratio (@ DC)	20	24		dB
PRBS eye extinction ratio (10.7Gb/s PRBS 2 ³¹ -1)	13			dB
Chirp, Alpha parameter	-0.1	0	0.1	nominal
Optical return loss (without connectors)	45			dB
Electrical – RF Port				
PRBS electrical drive voltage (10.7Gb/s PRBS 2 ³¹ -1)		4.5	6.0	V _{pp}
S ₂₁ electro-optic bandwidth (-3dB, wrt 130MHz)	11			GHz
Bandwidth ripple (130MHz-12.5GHz wrt 5° order polynomial approximation)	-1		1	dB
S ₁₁ electrical return loss (130MHz – 12.5GHz)	10	11		dB
RF V _π voltage (@ 1 kHz)		5	6.5	V
Electrical – Bias Port				
Bias V _π voltage (@ 1 kHz)		5.5	6.0	V
Quadrature voltage range (EOL operating temperature)	-15		15	V
Bias port impedance (@ DC)	1			MΩ
Photodiode Characteristic				
Photodiode responsivity (Bias at quadrature voltage)	20		130	mA/W
Linearity	-10		+10	%
Tracking error	-3		+3	°
Extinction ratio	6			dB

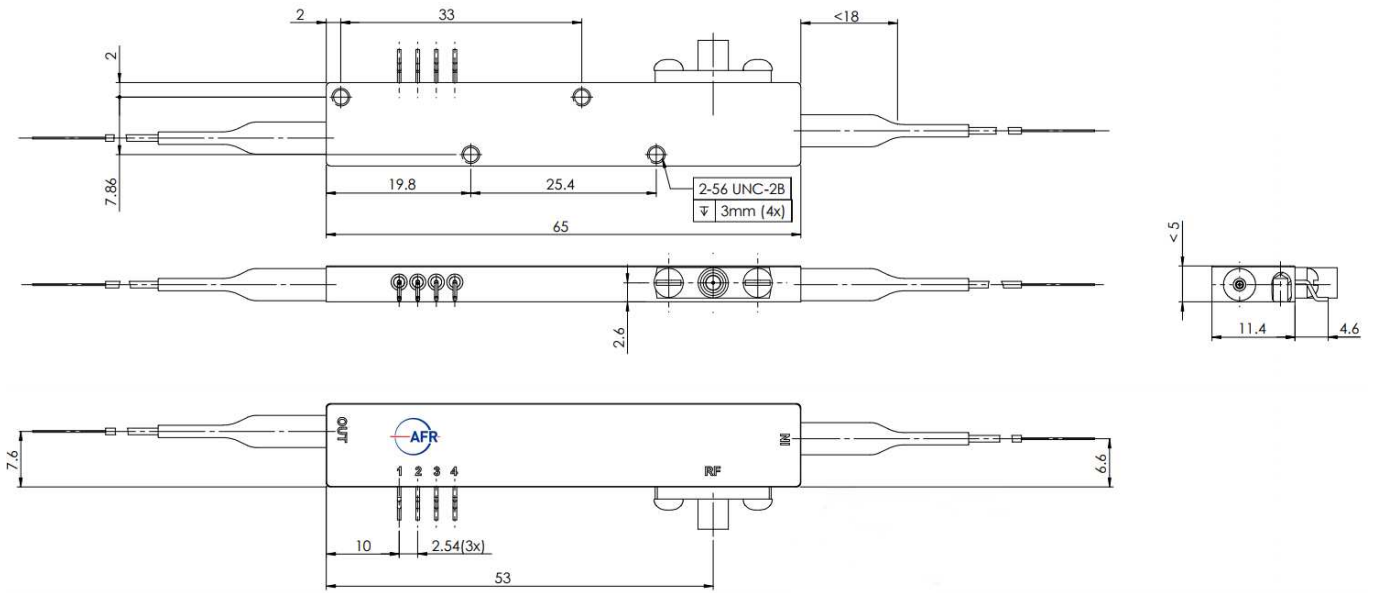
(1) T_{op}=25°C, BOL, wavelength at 1550nm, unless otherwise specified

(2) Insertion loss at the maximum of the modulator's transfer function and does not include the 3dB loss when operating in quadrature

(3) The maximum insertion loss is testing without any connector

(4) The maximum insertion loss is testing with connectors at both fiber end

Mechanical Outline



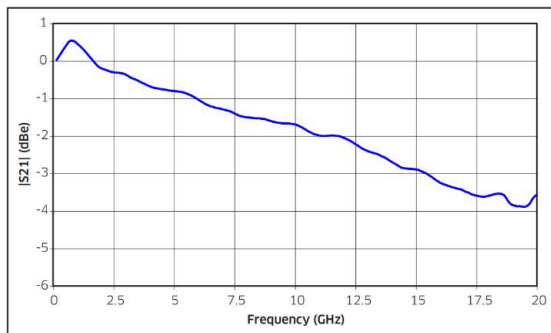
Pinout Information

Pin	Name/Description	Note
1	PD-C	Photodiode cathode (-)
2	PD-A	Photodiode anode (+)
3	Bias	MZ DC bias
4	GND	Ground
5	RF	RF input (GPO male)

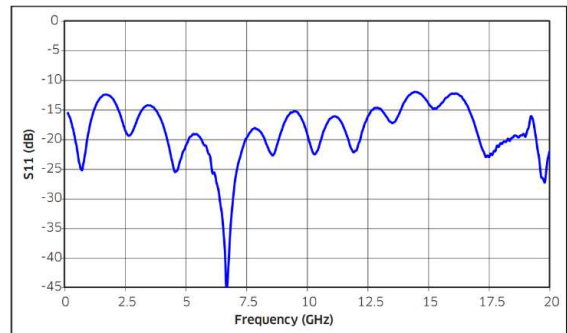
Pin-Out and Fiber Specifications

RF connector	GPO male
Bias and PD connector	LEAD pins
Input fiber	Corning/Fujikura SM15P UV/UV400 (Panda fiber), > 1m
Output fiber	Corning SMF-28™, > 1m, or SM15P UV/UV400 (Panda fiber)

Performance Characteristics F10-0



Electro optical response



Electrical return loss

Flammability Rating

The fiber pigtails are rated UL 94 V-0 (Fujikura fiber) or are compliant to ASTM D-2863-87 requirements, (Corning fiber SMF-28) boots, loose tube and connectors are UL94 V-0 rated.

Electrostatic Discharge (ESD)

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



RoHS Compliance

AFR is fully committed to environment protection and sustainable development and has set in place a comprehensive program for removing polluting and hazardous substrates 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 or by contact your local AFR account manager.

Reliability Requirements

The F10-0 is designed to meet Telcordia GR-468-Core requirements.

Ordering Information:

Product Description	Part Number
High Bandwidth Zero-Chirp Modulator with low drive voltage, F10-0 (>1m fiber, PMF(Black)-SMF(Blue) 900um loose tube, no connectors)	792000770
High Bandwidth Zero-Chirp Modulator with low drive voltage, F10-0 (>1m fiber, PMF(Black)-SMF(Blue) 900um loose tube, FC/PC connectors)	792000771
High Bandwidth Zero-Chirp Modulator with low drive voltage, F10-0 (>1m fiber, PMF(Black)-PMF(Black) 900um loose tube, no connectors)	792000960
High Bandwidth Zero-Chirp Modulator with low drive voltage, F10-0 (>1m fiber, PMF(Black)-PMF(Black) 900um loose tube, FC/PC connectors)	792000961

Contact Information:

For more information, please contact your local AFR account manager or AFR directly at sales@fiber-resources.com.



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