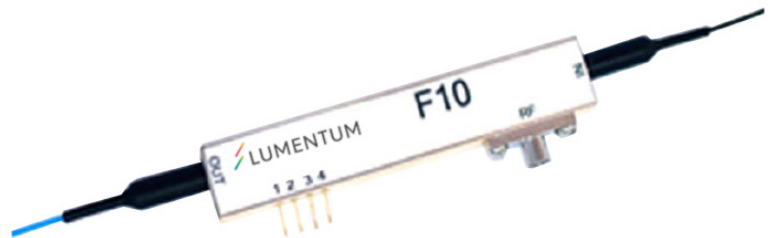


# Intensity Modulator with Low Drive Voltage

F10



Lumentum intensity modulators are based on the Mach-Zehnder interferometer 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 niobate.

The F10 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
- Enhanced E/O bandwidth for up to 12.5G 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 10G to 12.5G NRZ and electrical RZ
- High-frequency fiber optic links
- Analog microwave over fiber (RoF)
- Instrumentation

**Absolute Maximum Ratings**

Parameter	Min	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	

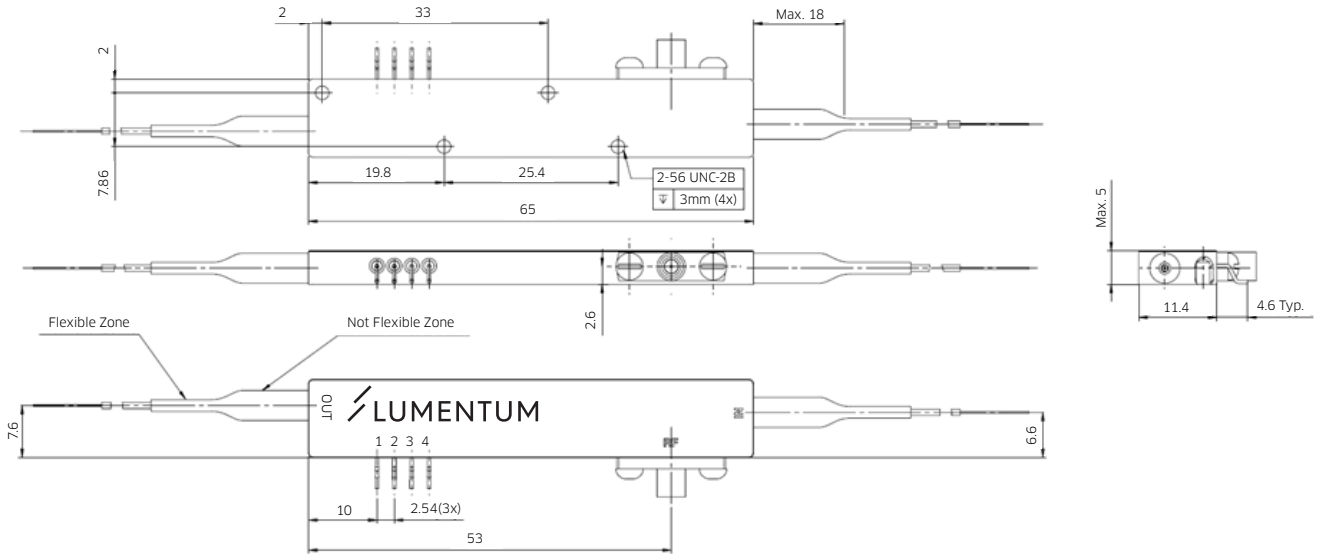
**Optical and Electrical Specification**

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

Typical values shown unless otherwise stated

Parameter	Value	Unit
<b>Optical</b>		
Operating wavelength range	C and L band	
Insertion loss	$\leq 5$	dB
Extinction ratio (DC)	24	dB
Chirp	0	nominal
Optical return loss (without connectors)	$\geq 45$	dB
<b>Electrical</b>		
$S_{21}$ electro optical bandwidth (-3 dB)	$\geq 10$	GHz
$S_{11}$ electrical return loss	11	dB
RF $V_{\pi}$ voltage (@ 1 kHz)	$\leq 6.5$	V
Bias $V_{\pi}$ voltage (@ 1 kHz)	5.5	V
PRBS electrical drive voltage ( $V_{amp}$ )	4.5	V
Dynamic extinction ratio	$\geq 13$	dB
Photodiode responsivity (referred to output power) - non-inverting	$\geq 20$	mA/W
Photodiode linearity	$\pm 10$	%

**Mechanical Outline**



Higher resolution drawing available on request.

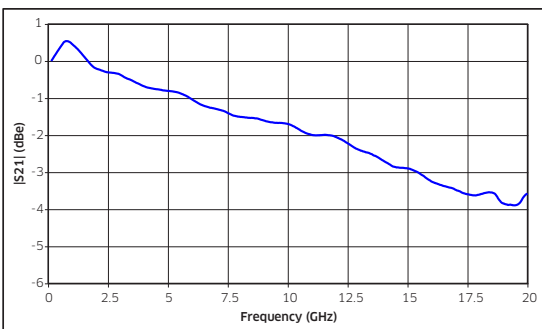
**Pinout Information**

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

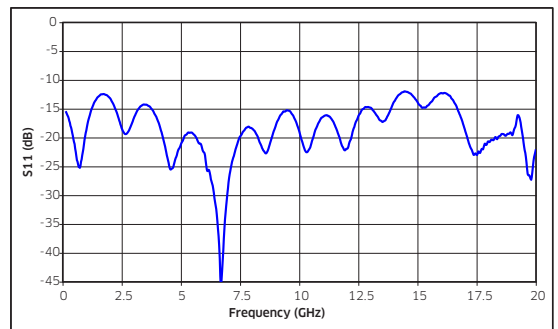
**Pinout and Fiber Specification**

Pin	Note
RF connector	GPO male
Bias and PD connector	Lead pins
Input fiber	Corning / Fujikura SM15P UV/UV400
Output fiber	Corning SMF-28™

**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.

### RoHS Compliance

Lumentum 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.

### Electrostatic Discharge (ESD)



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

### Ordering Information:

For more information on this or other products and their availability, please contact your local Lumentum account manager or Lumentum directly at [customer.service@lumentum.com](mailto:customer.service@lumentum.com).