JDS Uniphase

Product Bulletin

APE™ Microwave Analog Intensity Modulators

1320 nm and 1550 nm

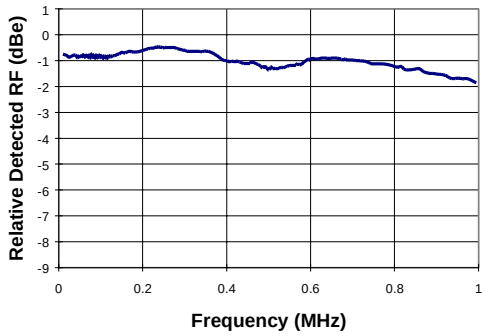
The low loss, high stability and flat response of JDS Uniphase microwave modulators make them the preferred device for this demanding market. JDS Uniphase analog intensity modulators cover frequencies from DC to 18 GHz. Single and dual output devices are available at 1300 nm or 1550 nm. These modulators are used in microwave fiberoptic transmitters and electromagnetic field sensors in terrestrial and airborne applications. The operating points are set for linear operation, so bias control may not be required for applications covering suboctave bandwidths. In addition, because APE optical waveguides provide over 50 dB of polarization extinction, no polarizing components are required in the system. The modulators are supplied with polarization-maintaining fiber at the optical input port to simplify alignment of the laser output with the modulator waveguides.

Key Features

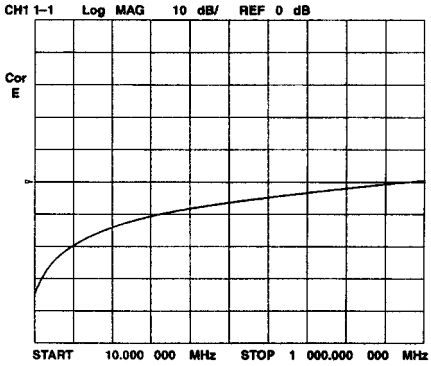
- 1, 3 &12 GHz bandwidths
- Efficient power transfer
- Low fiber-to-fiber insertion loss
- Single-polarization operation
- Superior bias stability
- Separate DC bias electrode
- 50-Ohm input impedance

Applications

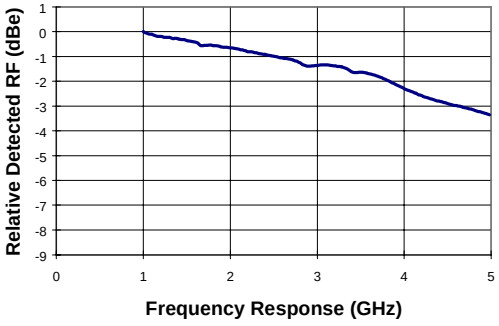
- Microwave frequency signal distribution
- Antenna remoting



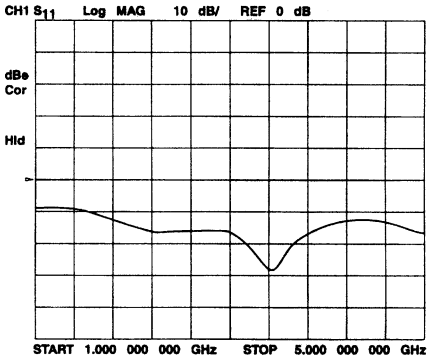
Frequency Response S21, 860 MHz



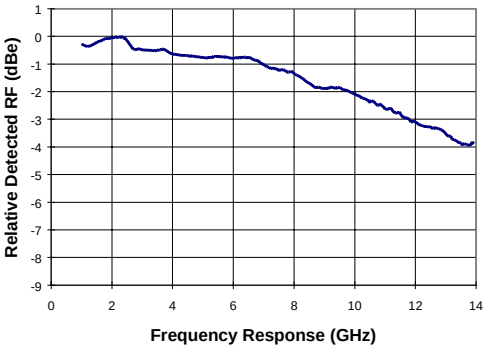
Electrical Return Loss S11, 860 MHz



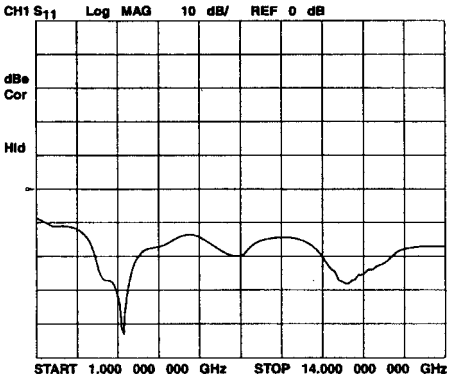
Frequency Response S21, 3 GHz



Electrical Return Loss S11, 3 GHz



Frequency Response S21, 12 GHz



Electrical Return Loss S11, 12 GHz

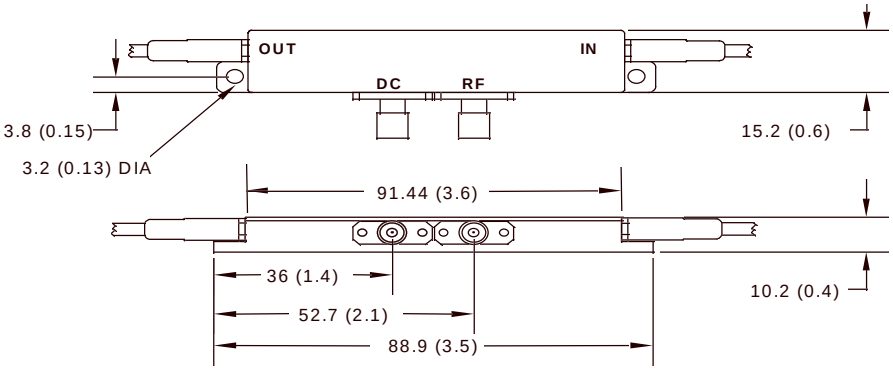
Microwave Performance Specifications

General	
Material	$LiNbO_3$
Crystal orientation	x-cut, y-propagating
Electrical connectors (package)	SMA connectors
Fibers	
1320 nm device	PM input: Fujikura SM 13-P-7/125-UV/UV-400
	SM output: Corning SMF 28
1550 nm device	PM input: Fujikura SM 15-P-8/125-UV/UV-400
	SM output: Corning SMF 28

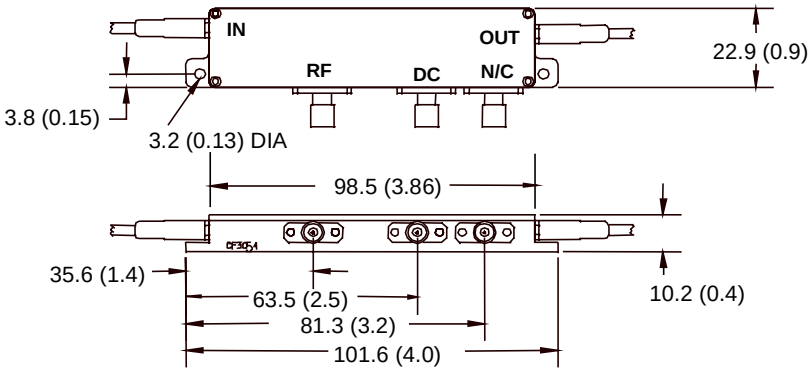
Absolute	
Input optical power	200 mW maximum
Operating temperature	0°C minimum, 70°C maximum
Storage temperature	-40°C minimum, 85°C maximum

Model Description	**FY-150-009**	**MZ 130-030**	**MZ/YB-130-120**	**MZ-150-030**	**MZ/YB-150-120**
Optical[1]					
Operating Wavelength, MZ, min (nm)	-	1300	1300	1530	1530
Operating Wavelength, MZ, max (nm)	-	1340	1340	1570	1570
Operating Wavelength, YBBM, min (nm)[5]	1545	-	1315	-	1545
Operating Wavelength, YBBM, max (nm)[5]	1555	-	1325	-	1555
Insertion loss, maximum (dB)[6]	4.0	4.0	4.0	4.0	4.0
On/off extinction ratio, minimum (dB)	20	20	20	20	20
Optical return loss, minimum (dB)	50	50	50	50	50
Passive bias point, relative to quadrature at center of wavelength band (Degrees)	±10	±10	±10	±10	±10
Electrical[1]					
RF port					
Bandwidth, typical (GHz)	0.86[4]	3[3]	12[3]	3[3]	12[3]
Vπ at DC, maximum (V)	7.3	3.0	7.8	3.5	9.8
Pπ at 1 GHz, typical (dBm)	N/A	16.5	26	18.5	28
Pπ at 100 MHz, typical (dBm)	21	N/A	N/A	N/A	N/A
Impedance, typical (Ω)[3]	50	50	50	50	50
Max RF power (dBm)	+ 24	+24	+ 24	+ 24	+ 24
S11, maximum (dB)	-8	-8	-8	-8	-8
DC port					
Vπ at DC, max (V)	7.5	6.5	6.5	7.5	7.5
Impedance (kΩ))	> 10	> 100	> 10	> 10	> 10

Notes:
1. All measurements made at 23°C unless otherwise noted.
2. Vπ is specified at the modulator. Pπ is the power required to generate full extinction at the RF connector at a specific frequency.
3. Bandwidth measured relative to 1 GHz. Input impedance transformer is inactive below 1 GHz (impedance becomes 25 ohms).
4. Bandwidth measured relative to 40 MHz.
5. Output coupler restricts wavelength range. Operation outside wavelength window results in degraded on/off extinction ratio and insertion loss balance performance. Bandwidth and S11 performance is not affected.
6. Optical loss is measured at the maximum of the modulator transfer function and does not include the 3 dB loss incurred when operated at quadrature.



mm (inches)
FY MODULATOR



mm (inches)
MZ, YB MODULATORS

Ordering information

Indicate your requirements by selecting one option from each configuration table. For more information on this or other products and their availability, please contact your local JDS Uniphase sales representative or JDS Uniphase directly at 860 769-3000, or by fax 860 769-3001, or via email at sales.ct@us.jdsunph.com, or visit our Web site at www.jdsunph.com.

Sample: FY-130-009-T-1-3-C2

AA-BBB-CCC-T-1-D-EE

AA	Product Line	BBB	Wavelength	CCC	Frequency	T	1	Input fiber	D	Output Fiber	EE	Fiber Cabling
FY	Low frequency, dual output	130	1300 nm	009	086 GHz	Used in 3 GHz	1	Fujukura PM	1	Fujukura PM	C1	3 mm loose tube
MZ	Mach-Zehnder, single output	150	1550 nm	030	3 GHz	and 12 GHz			3	Corning SM	C2	900 micron loose tube
YB	High frequency, dual output			120	12 GHz	models only						

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