2.5 Gb/s Bias-Free Modulator with Integral Attenuator

Key Features

- **Bias-free operation for fast transmitter development and manufacturing**
- **Built-in 20 dB variable optical attenuator**
- **Single package for less splicing, lower overall insertion loss and more usable board space**
- **1535 to 1565 nm operation; L-band versions available**
- **Low drive voltage; compatible with commercial drivers**
- **Low chirp for maximum transmission distance (>1000 km)**
- **Voltage-controlled lithium niobate attenuator provides proven high reliability**

Applications

- Medium- and long-haul DWDM transmission requiring dynamic optical power leveling
- Transmitters with limite component space

The 2.5 Gb/s bias-free modulator with integral attenuator combines a modulator and a 20 dB variable attenuator within one small-outline package, simplifying component count and fiber splicing. The bias point of the interferometer is set to operate at about the half-intensity point (quadrature). A bias control circuit is not required. The attenuator is based on proven integrated optical waveguide technology, making it highly reliable. The modulator provides superior signal quality over a wide range of wavelengths in the C and L bands, and can be used to modulate tunable lasers. These devices are used for 2.5 Gb/s modulation and dynamic power leveling in dense wavelength division multiplexing (DWDM) systems.

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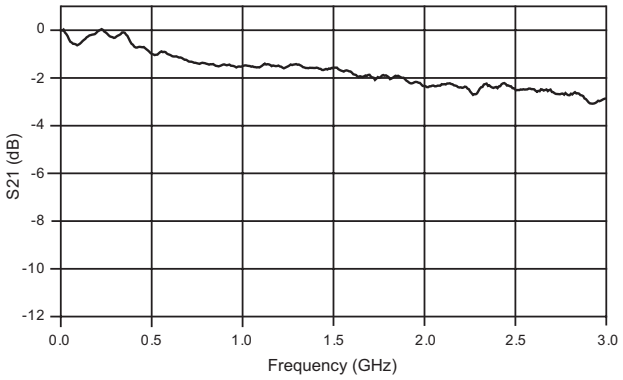
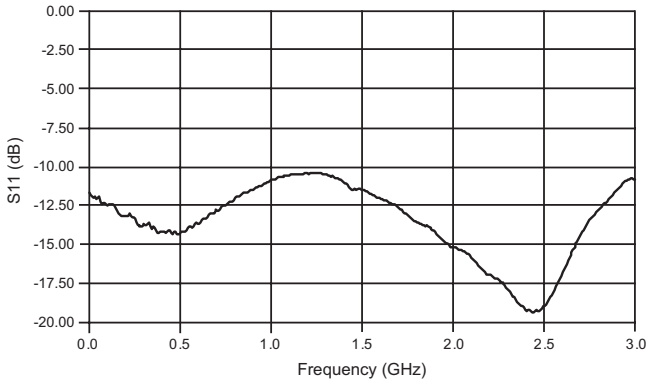
Typical Performance Characteristics

Typical Frequency Response Curve, S21

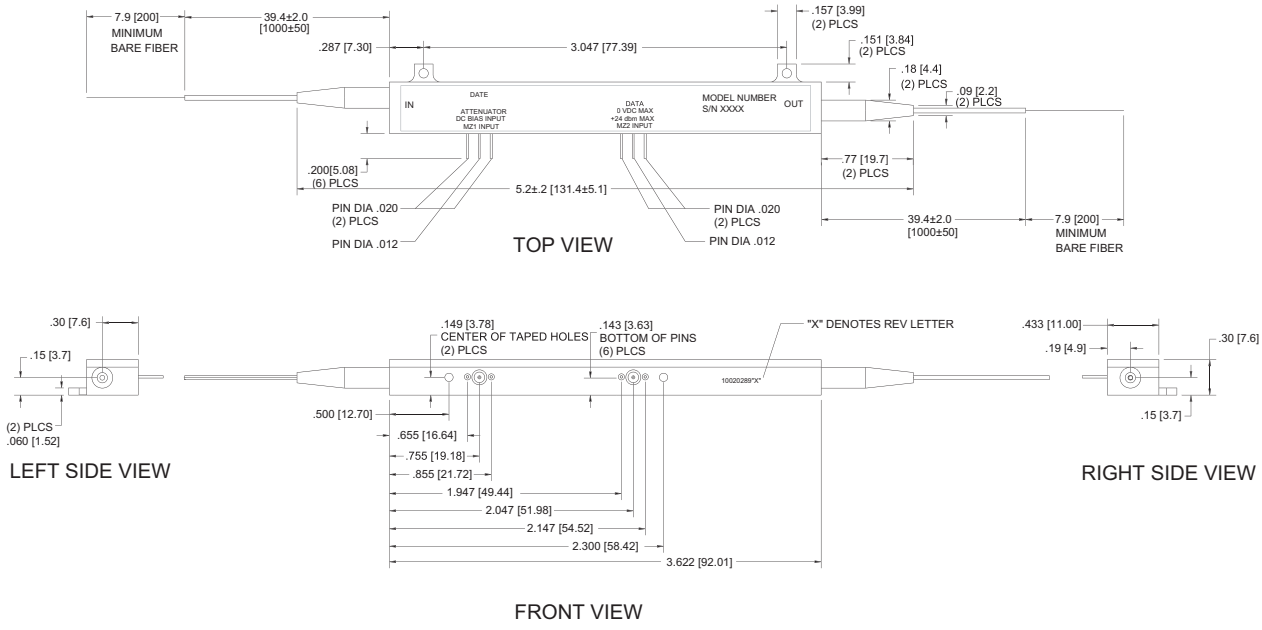


Typical Return Loss Curve, S11



Dimensions Diagram

(Specifications in inches [mm] unless otherwise noted.)



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Specifications

Parameter	Specification
General	
Material	Lithium niobate
Crystal orientation	x-cut, y-propagating
Waveguide process	APE/titanium-indiffused
Optical	
Operating wavelength	1535 to 1565 nm
Insertion loss, no connectors (note[2])	≤6.5 dB
On/off extinction ratio, low frequency	≥20 dB
Optical return loss	≥50 dB
Electrical	
RF port	
Drive voltage, V peak-to-peak, at 2.5 Gb/s PRBS (note[3])	3.6 V typical
V_π at 100 kHz (note[3])	≤3.7 V
S21 electro-optic bandwidth (-3 dBe) (note[1, 3])	≥2.5 GHz
S11 return loss	
0.03 to 2.5 GHz (note[3])	≤-9.5 dB
RF input power	≤24 dBm
Chirp, alpha parameter	$\|\alpha\|<0.2$
Attenuator port	
V_π at DC	≤5.0 V
Impedance	≥1 MΩ
Mechanical	
Input	Fujikura SM-15-P-8/125-UV/UV-400
Output (note[4])	SMF-28
RF connection	Pins
Bias connection	Pins
Environmental	
Operating temperature	0 to 65 °C
Storage temperature	-40 to 85 °C

1. Relative to 30 MHz.
2. Insertion loss is measured at the maximum of the modulator's transfer function and does not include the 3 dB loss incurred when operating at quadrature.
3. Variances with temperature and wavelength included.
4. PM output fiber also available.

Ordering Information

For more information on this or other products and their availability, please contact your local JDSU account manager or JDSU directly at 1-800-498-JDSU (5378) in North America and +800-5378-JDSU worldwide or via e-mail at customer.service@jdsu.com.

Sample: 10021970

Product Code	Description
10021970	2.5 Gb/s modulator with integral attenuator and no optical connectors
10021971	2.5 Gb/s modulator with integral attenuator and FC/SPC optical connectors

Note: Other connectors available upon special request. Call JDSU for more information.