Fiber Optical Phase Modulator

200MHz, 1064 nm

DATASHEET

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The LNPM is a high-performance, fiber-coupled phase modulator with operating frequencies ranging from DC to 200MHz, covering the 1030-1070 wavelength band. It is constructed using optical waveguides on high-efficiency X-cut $LiNbO_3$ material and is coupled with polarization-maintaining input and output fibers.

A phase modulator does not require bias control. Using a phase modulator together with a polarizer to construct an intensity modulator may result in unstable operation due to birefringence.

Note: This component is intended for OEM system integration and is not designed for standalone laboratory use. Units supplied without a protective benchtop enclosure are provided without warranty, as they are susceptible to damage from improper handling, installation, or operation.

Features

- X-cut LiNaO3 Waveguide
- High Polarization Extinction Ratio
- High Optical Power Handling
- PM Input & Output

Applications

- Coherent Communications
- Optical Chirping
- Optical Sensing
- FM Spectroscopy
- Frequency Shifting
- Laser Linewidth Broadening

Specifications

Parameter	Min	Typical	Max	Unit
Input Optical Power			300	mW
Operating Wavelength	1030		1070	nm
Insertion Loss		3	3.5	dB
Polarization Extinction Ratio	20			dB
Optical Return Loss	45			dB
S21Bandwidth		100	200	MHz
S11 Return Loss	-9			dB
RF Vπ @ 10 KHz		1.3	1.6	V
RF Input Power			10	Vpp
Impedance		High Z		Ω
Operating Temperature	-25		75	°C
Storage Temperature	-50		80	°C
Operating Humidity	0		90	%

RoHS COMPLIANT

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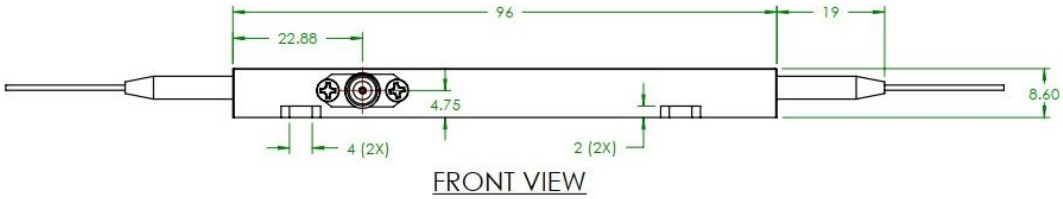
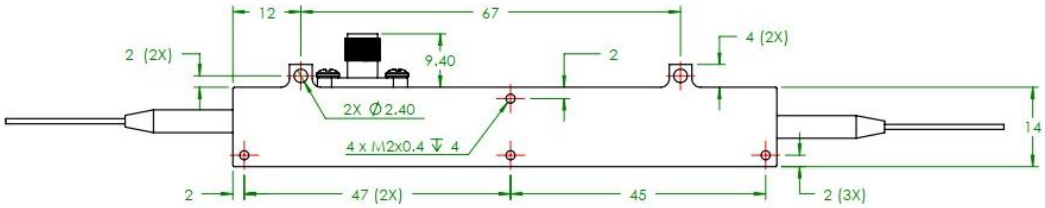
Dimensions (mm)



FRONT VIEW



BOTTOM VIEW

Unit: mm

*Product dimensions may change without notice. This is sometimes required for non-standard specifications.

Electrical Connection

PIN	Symbol	Description
1	-	N/A
2	-	N/A
3	-	N/A
4	-	N/A
5	-	N/A
6	-	N/A
7	-	N/A
RF	RF connector*	2.92 mm female

Ordering Information (Part Number)

	2	1	☐	☐	☐	☐	☐	☐	☐
Prefix	**Configuration**		**Wavelength**	**Frequency**	**Input Fiber**	**Output Fiber**	**Cable**	**Fiber Length**	**Connector[1]**
LNPM-	Phase = 2		1060nm =1	200MHz = 1	PM980 = 9	PM980= 9	0.9mm Tube = 1	0.5m = 1 Special = 0	FC/APC= 3 FC/PC = 2 Special = 0

[1]. The default connector configuration uses fiber with 0.9 mm buffer protection. The connector cannot be installed directly onto bare fiber because the bare fiber is prone to damage during shipping. However, the connector can be assembled on bare fiber if a 3 cm protective loose tube is added for reinforcement. The customer may remove this protective tube after testing. The optical power handling of a standard connector is less than 0.5 W for SMF-28 fiber and decreases further for smaller-core fibers.

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TYPICAL EO REPONSE

Application Notes

Fiber Core Alignment
Note that the minimum attenuation for these devices depends on excellent core-to-core alignment when the connectors are mated. This is crucial for shorter wavelengths with smaller fiber core diameters that can increase the loss of many decibels above the specification if they are not perfectly aligned. Different vendors' connectors may not mate well with each other, especially for angled APC.

Fiber Cleanliness
Fibers with smaller core diameters (<5 μm) must be kept extremely clean, contamination at fiber-fiber interfaces, combined with the high optical power density, can lead to significant optical damage. This type of damage usually requires re-polishing or replacement of the connector.

Maximum Optical Input Power
Due to their small fiber core diameters for short wavelength and high photon energies, the damage thresholds for device is substantially reduced than the common 1550nm fiber. To avoid damage to the exposed fiber end faces and internal components, the optical input power should never exceed 20 mW for wavelengths shorter 650nm. We produce a special version to increase the how handling by expanding the core side at the fiber ends.

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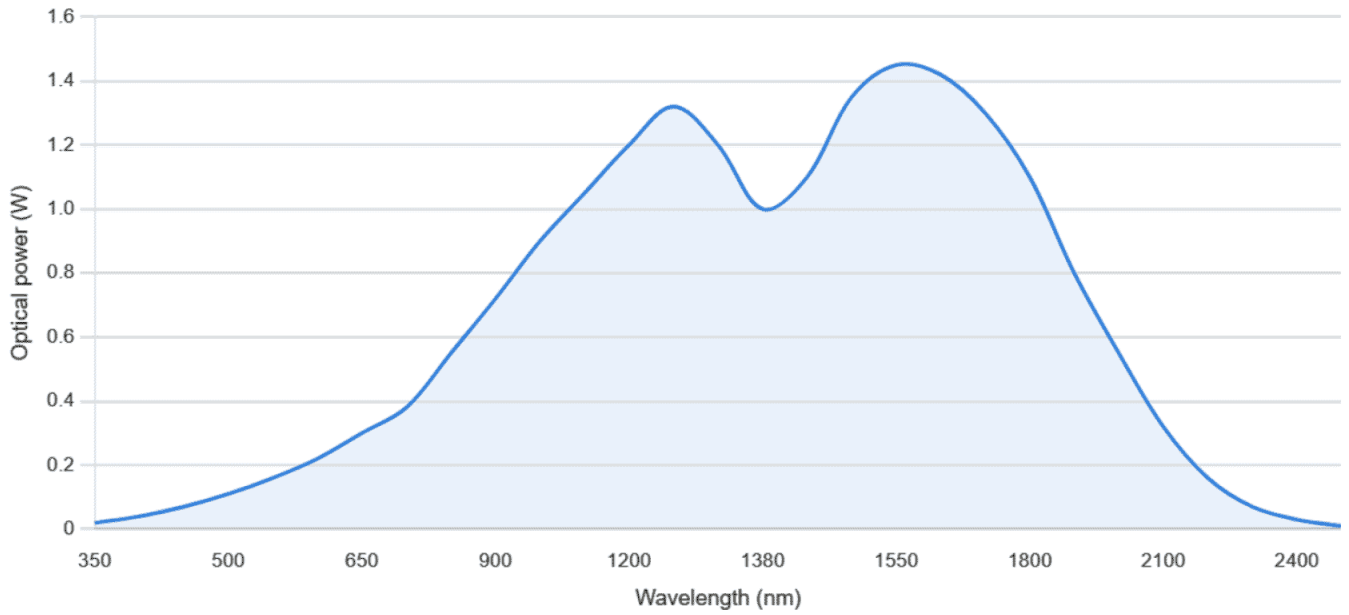
Regular Single Mode / Polarization Maintaining Fiber Optical Power Handing vs Wavelength



Single mode fiber optical power is limited by nonlinear effects in addition to absorption that increase loss and generate heat. The curve shows the approximate safe CW power envelope for standard single-mode fiber. Actual limits depend on fiber design, core size, length, and laser characteristics. Specialty fibers can significantly increase the power limit.

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