High Speed Fiber Optical Phase Modulators

Low Voltage Thin Film Lithium Niobate

1550nm 20, 40, 60 GHz, 2.8 low half voltage

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The Thin-Film Lithium Niobate Fiberoptic Modulators (TLNM) series offers the advantages of low half-wave driving voltage and broadband high-speed operation up to 60 GHz. These improvements over conventional bulk Lithium Niobate fiberoptic modulators are enabled by the thin-film $LiNbO_3$ platform, which allows shorter and more efficient waveguides. The reduced operating voltage improves RF-to-optical conversion efficiency and makes it practical to drive the device directly from a function generator in laboratory settings. High-speed modulation is applied through an RF connector, and the induced optical phase shift is approximately proportional to the applied voltage, as shown in the curve on the last page. To reach the highest frequency performance, an RF amplifier is recommended. We offer cost-effective broadband amplifiers suitable for both 20 GHz and 40 GHz operation.

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

- Low Half-Wave Voltage ~2.8V
- Up to 40GHz Speed
- Bidirectional

Applications

- Radar
- RoF
- Laboratory Uses
- Concept Proving
- Instrumentation

Specifications

Parameter		Min	Typical	Max	Unit
Operation Wavelength		1520		1567	nm
Insertion Loss			4.5	5.5	dB
Return Loss		27		40	dB
Optical Input Power			12	18	dBm
RF Driving Voltage		3.3 (1kHz)	4 (1GHz)		V
Vp at 50kHz		2.8		3	V
3dB Bandwidth S21 (from 2GHz)		20	40	60	GHz
RF Return Loss S11(10MHz to 40 GHz)				10	dB
RF Port Resistance (DC)				50	Ω
RF Input Power				30	dBm
Bias Port Resistance (DC)				1	MΩ
Heater Bias Voltage		0		4	V
RF Swing Voltage	X2:4	-4.46		+4.46	V
	X2:5	-891		+891	
ER RMS Voltage	X2:4			3.16	V
	X2:5			6.30	
Operating Temperature		-1		60	°C
Storage Temperature		-45		85	°C

Notes:

Over the maximum power input will burn the device over time

RoHS COMPLIANT

Rev 07/09/26

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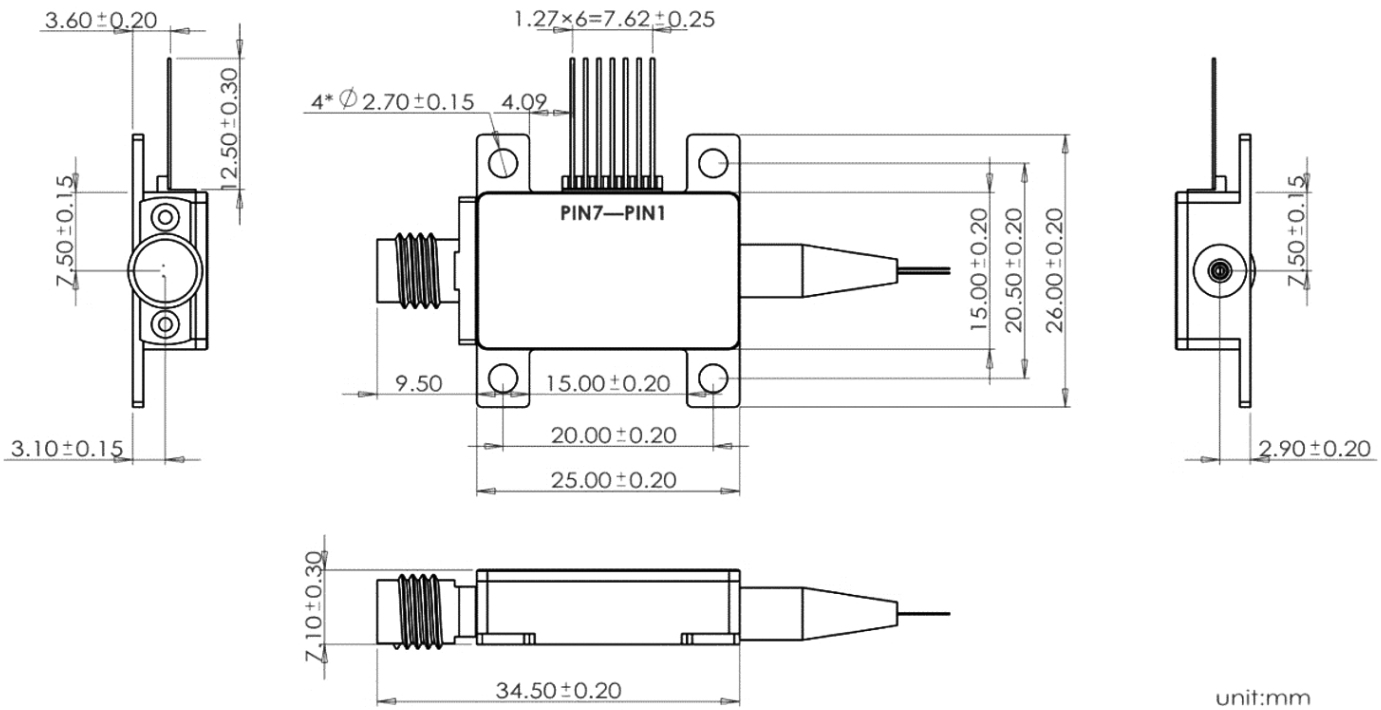
Dimensions (mm)



Electrical Pin Diameter: ***0.35 mm × 0.25 mm***
Electrical Pin Pitch: ***1.27 mm***

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

Electrical Connection (no bias)

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*	2.92mm connector
In	Input fiber	FC/APC, PMF
Out	Output fiber	FC/APC, PMF

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Ordering Information (Part Number)

	2	☐	☐	☐	☐	☐	☐	☐	☐
Prefix	**Configuration**	**Amplifier**	**Wavelength**	**Frequency**	**Input Fiber**	**Output Fiber**	**Cable**	**Fiber Length**	**Connector [1]**
TLNM-	Phase = 2	No = 1 16dB Gain = 3 Special = 0	1520-1570nm = 2 1310nm = 3	20GHz = 2 40GHz = 4 50GHz = 5 60GHz = 6	PM1550 = 5 PM1310 = 3	PM1550 = 5 SMF28e = 1 PM1310 = 3	0.9mm tube = 1 Special = 0	0.5m = 1 Special = 0	None = 1 FC/PC = 2 FC/APC = 3 Special = 0

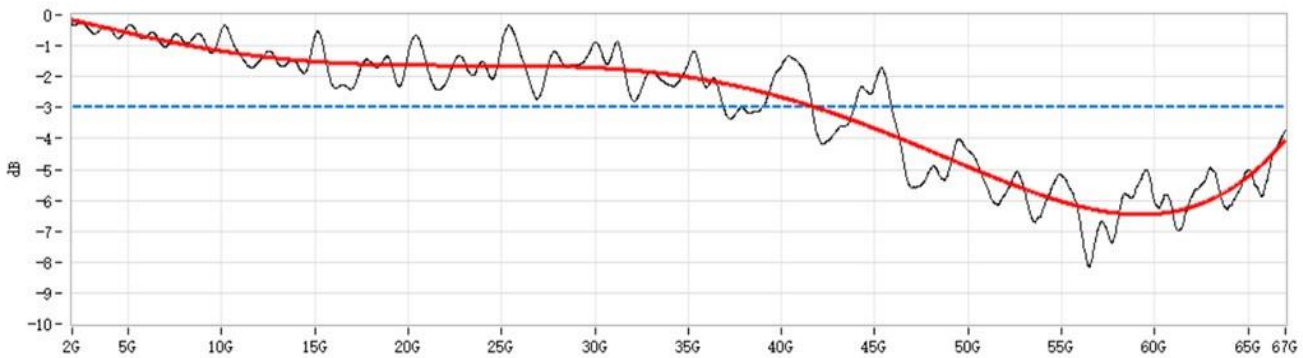
[1]. The default connector configuration uses fiber with 0.9 mm buffer protection. The connector cannot be installed directly onto bare fiber because the bare fiber is prone to damage during shipping. However, the connector can be assembled on bare fiber if a 3 cm protective loose tube is added for reinforcement. 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.

Matching RF Amplifier

- **20GHz 4.5V** https://agiltron.com/product/broadband-low-noise-rf-amplifier-lna-50khz-18ghz/

- **40GHz 7.5V** https://agiltron.com/product/ultrabroadband-rf-amplifier-30khz-45ghz/

Typical RF S21 Performance



Vp vs Frequency