110 GHz C-Band Thin-Film Lithium Niobate Intensity Modulator



Description

The Thin-Film Lithium Niobate Ultra-High Bandwidth Intensity Modulator is a high-performance electro-optic conversion device independently developed by our company, with full proprietary intellectual property rights. The product is packaged using high-precision optical coupling and assembly techniques, achieving an electro-optic 3 dB bandwidth of up to 110 GHz.Compared with traditional bulk lithium niobate crystal modulators, this product features low half-wave voltage (Vπ), high stability, compact device size, and thermo-optic bias control. It can be widely applied in digital optical communications, microwave photonics, backbone communication networks, and communication-related research projects.

Features

- RF bandwidth up to 110 GHz
- Low half-wave voltage
- Low insertion loss down to 5 dB
- Small device size

Product parameters: C band

Category	Parameters	Symbol	Unit	Index
Optical performance (@25°C)	Operating Wavelength (*)	λ	nm	~1550
	Optical Extinction Ratio (@ DC) (**)	ER	dB	≥20
	Optical Return Loss	ORL	dB	≤-27
	Optical Insertion Loss	IL	dB	Maximum value: 9 Typical value: 7.5
Electrical Performance (@25°C)	3 dB Electro-Optical Bandwidth (from 2 GHz)	S21	GHz	Minimum value: 100 Typical value: 105
	RF Half-Wave Voltage (@ 50 kHz)	Vπ	V	≤4
	Thermal Bias Half-Wave Power	Pπ	mW	≤50
	RF Return Loss	S11	dB	≤-10
Operating Conditions	Operating Temperature (*)	TO	°C	-20~70

* Customizable. ** High extinction ratio (> 25 dB) available on request.

Damage threshold

If the device operates beyond the maximum damage threshold, it will cause irreversible damage to the device.

Parameters	Symbol	Min.	Max.	Unit
RF input power	Sin	-	18	dBm
RF input swing voltage	Vpp	-2.5	+2.5	V
RF input RMS voltage	Vrms	-	1.78	V
Optical input power	Pin	-	20	dBm
Thermal bias voltage	Uheater	-	4.5	V
Thermal bias current	Iheater	-	50	mA
Storage temperature	TS	-40	85	℃
Relative humidity (non-condensing)	RH	5	90	%

S21 test sample image (110 GHz typical)

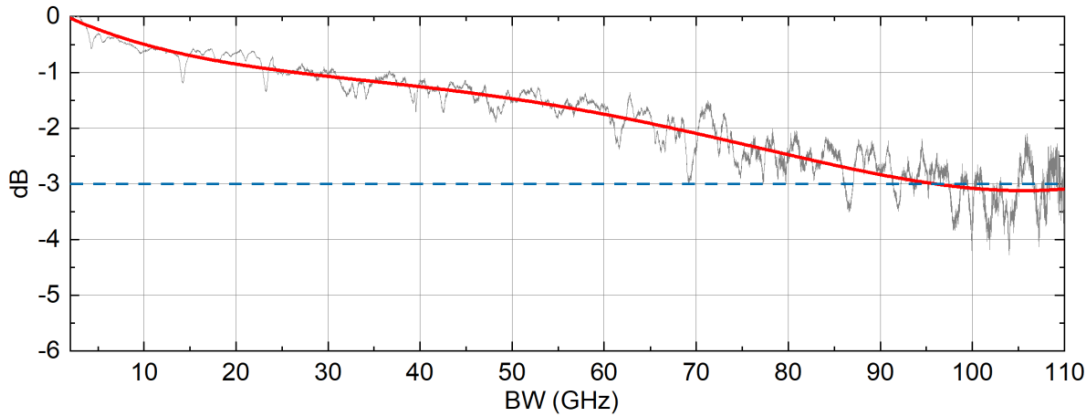


Figure 1: S21

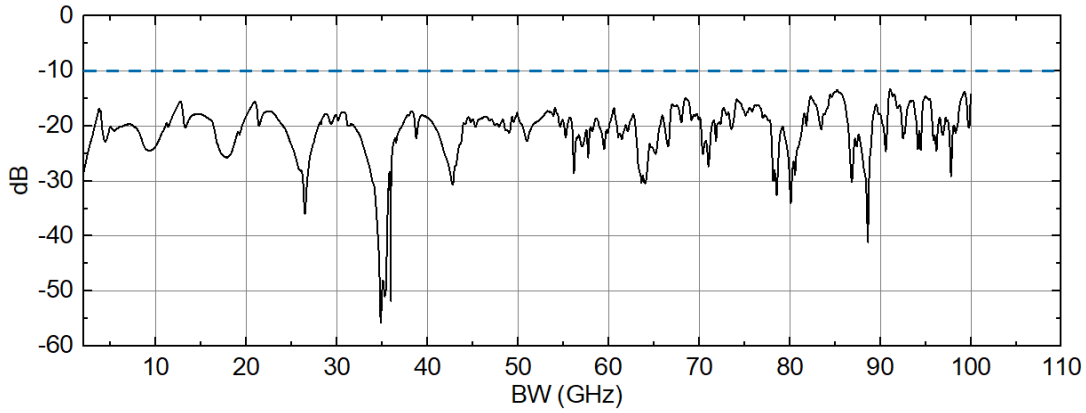


Figure 2: S11

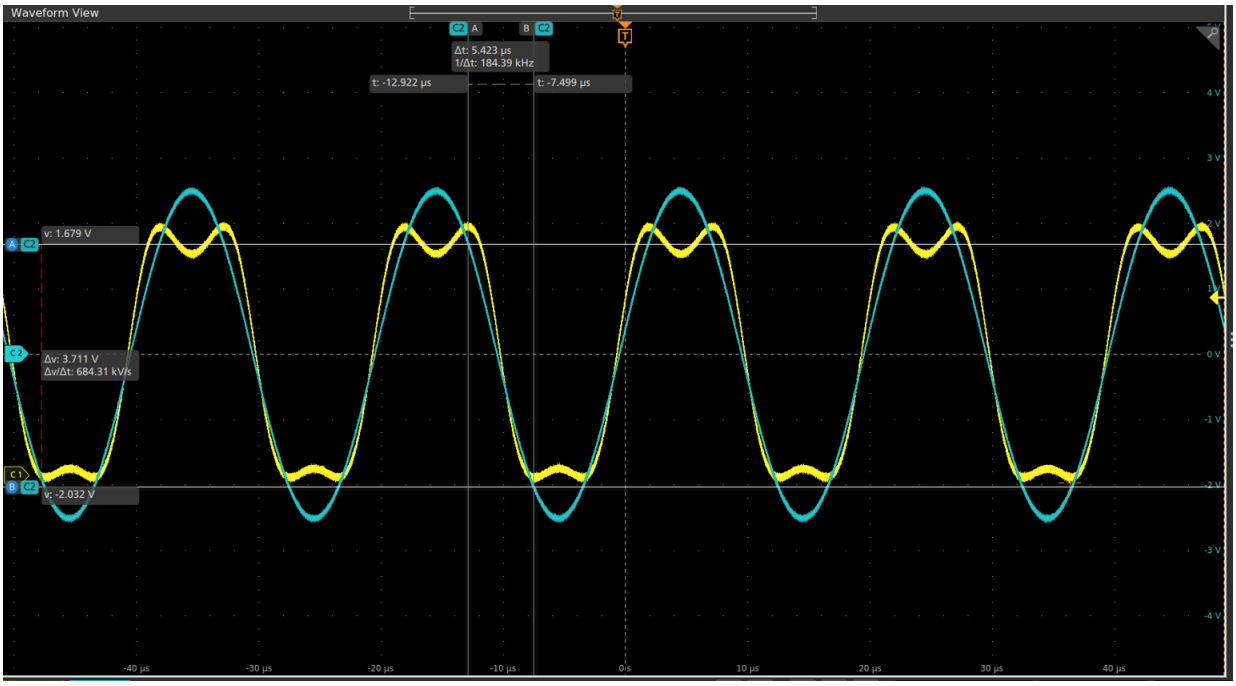


Figure 3:Modulator RF-Vπ Test Results (Typical Values)

Electrostatic Discharge (ESD) Protection

This product contains ESD-sensitive components (MPDs). Necessary ESD protection measures must be taken when using it.



Dimension and Pin definitions（Unit in mm)

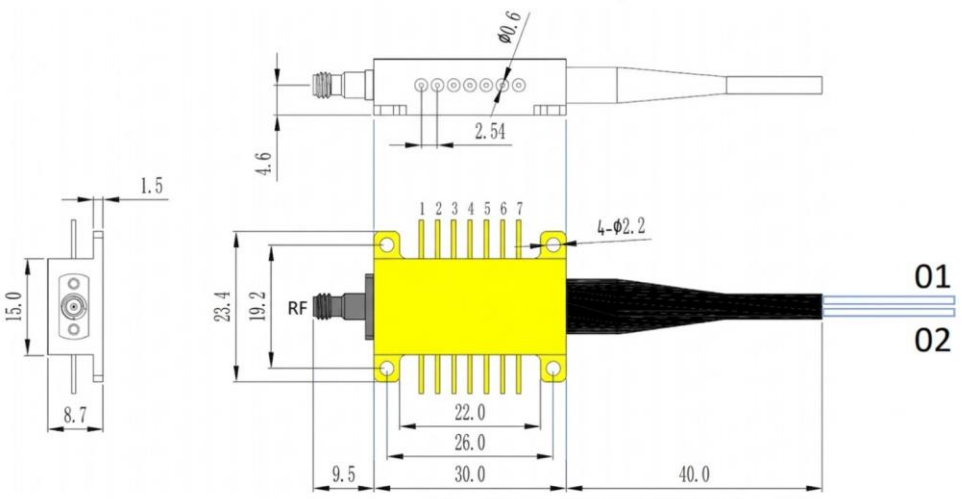


Figure 4: Outline dimensions

Pin definition

Pin No.	Definition	Remarks
1	NC	-
2	NC	-
3	Heater+	Bias Voltage Positive (+)
4	Heater-	Bias Voltage Negative (-)
5	NC	-
6	MPD0+	MPD0 Anode (GND)
7	MPD0-	Output Optical Power onitoring MPD0 (+3V)
RF	RF Input	1.0mm Female Connector
01	PM Fiber Output	Standard FC/APC
02	PM Fiber Input	Standard FC/APC

Precautions：

Electrostatic Discharge (ESD) Protection: Handle with proper ESD precautions to prevent damage.
RF Input: Do not apply DC voltage to the RF port. (Ensure DC block is used if necessary).
RF Power: Maximum RF input power should not exceed +15 dBm.
Heater Control: When adjusting the heater voltage, do not exceed +5V. The current must be limited to 70 mA.