Thin-film lithium niobate intensity modulator (Integrated Light Source)

Product description

Thin film lithium niobate intensity modulator (integrated light source) is a high-performance and highly integrated electro-optic conversion device, which is independently developed by our company and has complete independent intellectual property rights. The product integrates a low-noise DFB laser and a high-stability thin-film lithium niobate modulator chip, and is packaged by high-precision coupling technology to achieve ultra-high electro-optical conversion efficiency. Compare with that traditional lithium niobate crystal modulator, the product has the characteristics of low half-wave voltage, high stability, small device size and thermal-optical bias control, and can be widely apply to the fields of digital optical communication, microwave photonics, backbone communication networks, communication scientific research projects and the like.

Product features

Integrated low RIN laser sources
RF bandwidth up to 40 GHz
Half-wave voltage down to 3.0 V
High integration, small device size
The output optical power of the modulator is up to 12 dBm at full on.

Technical parameters

Category	Parameter	Symbol	Unit	Indicators

Optical properties	Operating wavelength (@TEC 25 °C, LD 350 mA)	λ	nm	1550 ± 2	
	Optical Extinction Ratio (@ DC) (*)	ER	dB	≥ 20	
	Optical return loss	ORL	dB	≤ -27	
	Modulator full-open output optical power (@TEC 25 °C, LD 350 mA) (**)	P_{out}	dBm	Maximum: 12 Typical value: 10	
	Relative intensity noise (@ 2 GHz, TEC 25 °C, LD 250 mA)	RIN_{LD}	dBc/Hz	Maximum: -158 Typical value: -160	
Electrical properties	3 dB electro-optic bandwidth (From 2 GHz)	S_{21}	GHz	X_1: 2 Minimum: 18 Typical value: 20	X_1: 4 Minimum: 36 Typical value: 40
	RF half-wave voltage (@ 50 kHz)	V_π	V	Maximum: 3.5 Typical value: 3.0	
	Thermally adjusted offset half-wave power	P_π	mw	≤ 50	
	Recommended TEC Set Temperature Range	T_{TEC}	°C	10~40	

	Thermistor resistance (@ room temperature)	R_{th}	Ohm	10 K±1.0%
	RF return loss (2 to 40 GHz)	S_{11}	dB	≤ -10
Working conditions	Operating Temperature (@ TEC 40 ° C)	T_O	℃	-40~70

* High extinction ratio (> 25 dB) is customizable.

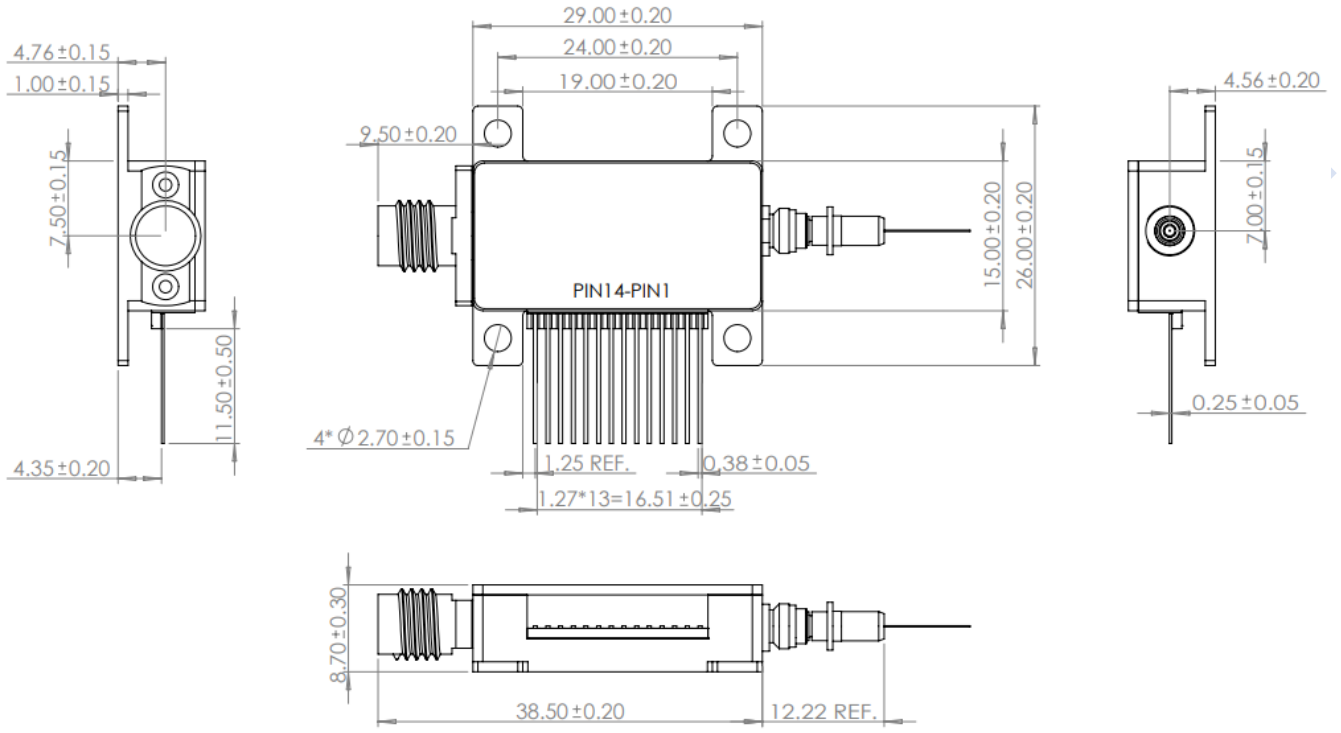
* * High full output optical power (> 12 dBm) is customizable.

Damage threshold

If the device works beyond the maximum damage threshold, it will cause irreversible damage to the device, and such device damage is not within the scope of maintenance service.

Parameter	**Symbol**	**Minimum value**	**Maximum value**	**Unit**
RF input power	S_{in}	-	18	dBm
RF Input Swing Voltage	V_{pp}	-2.5	+2.5	V
RF Input RMS Voltage	V_{rms}	-	1.78	V
Laser current	I_{LD}	-	400	mA
TEC current	I_{TEC}	-	1.5	A
Hot-tuned bias voltage	U_{heater}	-	4.5	V
Thermal adjustment of bias current	I_{heater}	-	50	mA
Storage temperature	T_S	-40	85	℃
Relative humidity (no condensation)	RH	5	90	%

Package dimensions and pin definitions (mm)



Note: Data marked with REF. Are reference values only.

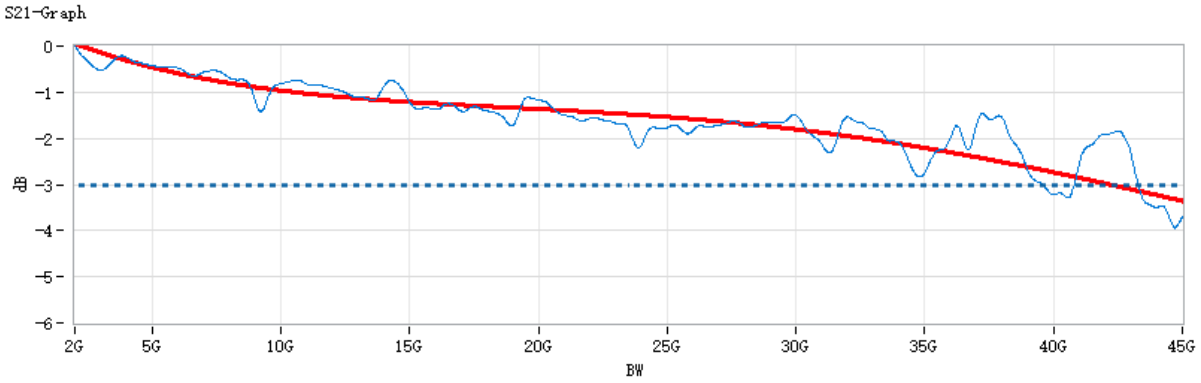
Pin	Symbol	Description
1	TEC+	TEC positive pole
2	TEC-	TEC negative electrode
3	LD+	Laser anode
4	LD-	Laser cathode
5	MPD2+	Laser backlight monitoring PD anode
6	MPD2-	Laser backlight monitoring PD cathodic
7	Rth	Thermistor electrode
8	Rth	Thermistor electrode
9	MPD1-	Modulator outgoing light monitoring PD cathodic
10	MPD0-	Modulator incident light monitoring PD cathodic
11	MPD1 & MPD0 +	Common anode of light monitor PD in and out of modulator

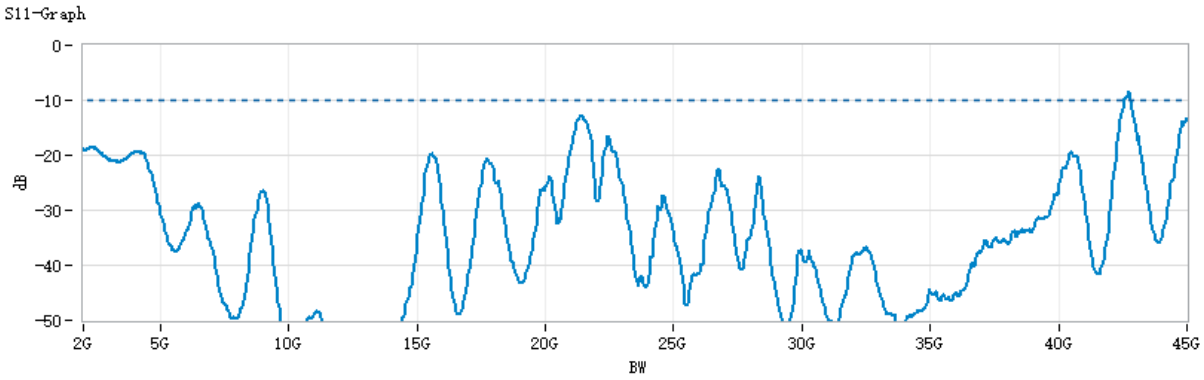
12	Heater	Thermally adjusted bias electrode
13	Heater	Thermally adjusted bias electrode
14	-	No definition
RF	RF Connector (*)	2.92 mm K connector
Out	Light emitting fiber (* *)	FC/APC, SMF

* Customizable 1.85 mm connector or J connector.

* * Polarization-maintaining fiber can be customized.

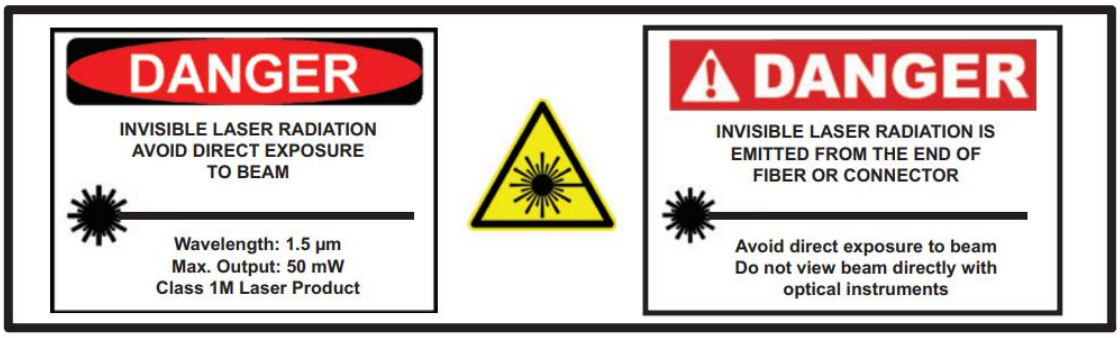
S21 & S11 Test Sample (40 GHz Typical)





Laser safety

This product is a Class 1M laser product. It is necessary to follow the corresponding rules of use. Do not use it under optical systems such as magnifying glasses, microscopes and telescopes or look directly at the light outlet.



Electrostatic discharge (ESD) protection

This product contains ESD sensitive components (LD, MPD), and necessary ESD protection measures shall be taken during use.

Ordering information: HC-LB-X1CXNPBB61

Optional X1	Description	Option number
20G	3 dB electro-optic bandwidth	2
40G	3 dB electro-optic bandwidth	4

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