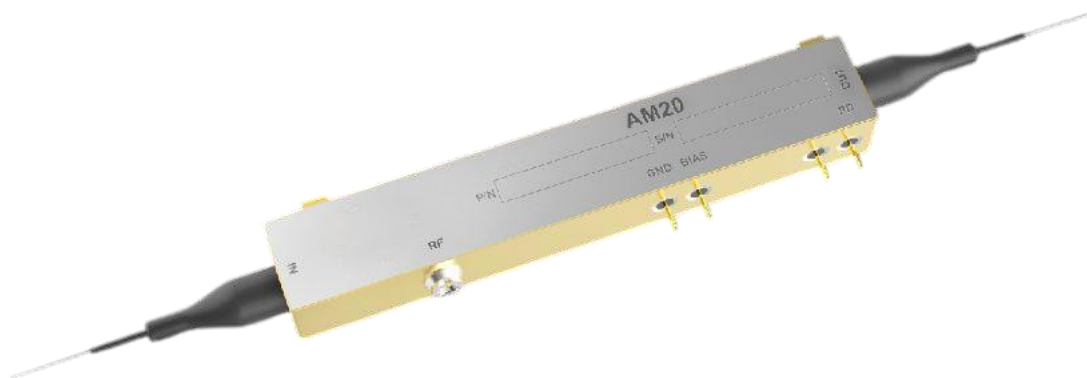


20/40 GHz LiNbO₃ intensity modulator

AM20, AM40



The analog intensity modulators offered by HC Optical combine high linearity with low drive voltage and small package size, with bandwidths ranging from 20 GHz (AM20) to a wider 40 GHz (AM40). Due to the increasing bandwidth requirements in analog fiber transmission applications, LiNbO₃(lithium niobate) intensity modulators for high-bandwidth analog applications from HC Optical can meet higher-end requirements and provide more suitable solutions. Our experience also allows us to provide customized services to our customers.

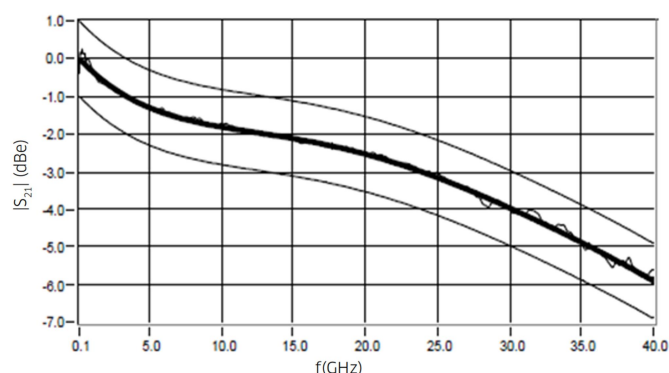
Main characteristics

- Titanium diffused waveguides
- X-cut lithium niobate crystal
- Low drive voltage compatible with commercially available drives
- Low optical insertion loss
- Operating bandwidths up to 60 GHz
- Integrated photodiodes
- Integrated polarizer

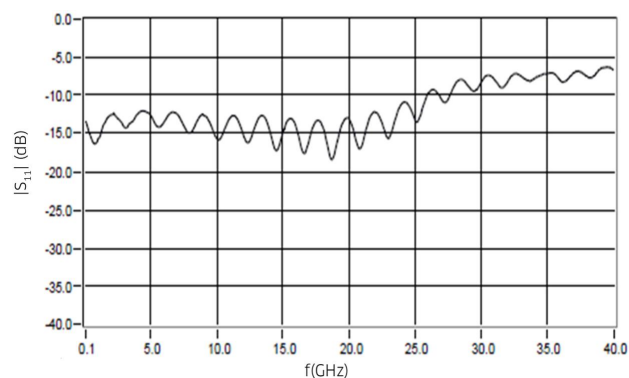
Application

- Digital transmission
- Analog transmission
- High frequency fiber connectivity
- Delayed telemetry system
- Instrumentation

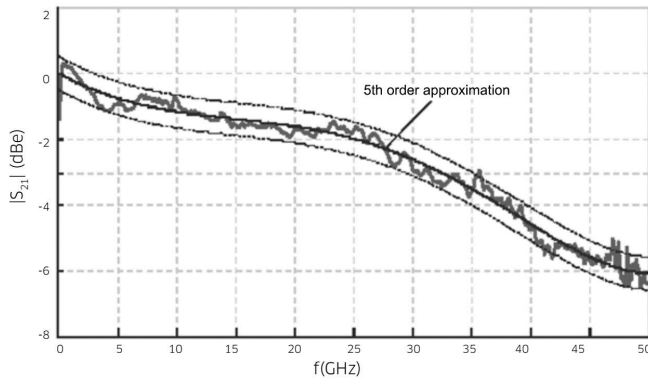
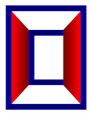
Performance characteristics:



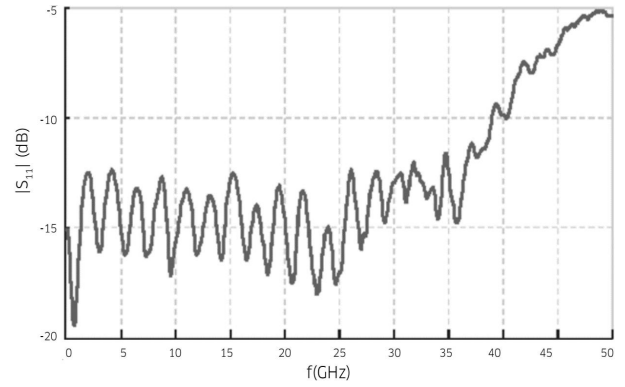
Optical Response (20 GHz)



Return loss (20 GHz)



Optical Response (40 GHz)



Return Loss 40G Hz

LiNbO3 Intensity Modulator for 20/40 GHz Analog Signal Applications, AM20/AM40

Absolute maximum rating

Parameter	Condition	Minimum value	Maximum value	Unit
Maximum RF input power (electrical)	RF port AC-coupled AC	-	25	dBm
Maximum input optical power (optical)	Continuous power CW	-	100	mW
Enclosure operating temperature	-	0	+ 70	°C
Storage temperature	-	-40	+ 85	°C
Rate of change of maximum operating temperature	-	-	1	°C/min
Operating humidity	-	5	85	%
Pin Soldering Temperature	-	-	250	°C
Maximum lead bonding time	-	-	10	s

Technical parameters

Parameter	Condition	Value (AM20)	Value (AM40)	Unit
Optical parameters				
Operating wavelength range	-	1525 - 1615	1525 - 1615	nm
Insertion Loss, IL	No connector With connector	(3.5 typical) < 4.5 (4.0 typical) < 5.0	(4.0 typical) < 5.0 (4.5 typical) < 5.5	dB
Return Loss, RL	No connector	> 45	> 45	dB
Extinction Ratio, ER	-	> 20 (23 typical)	> 20 (23 typical)	dB
Electrical parameters				
S21 electro-optic bandwidth	-3dBe	> 20 (23 typical)	> 30 (33 typical)	GHz
S11 return loss	40 MHz – 20 GHz 20 GHz – 35 GHz	< -10 (-12 typical) -	< -10 (-12 typical) < -8 (-10 typical)	dB
RF V_{π} voltage	@ 1 kHz	< 5.0 (4.5 typical)	< 5.2 (4.7 typical)	V
RF V_{π} voltage	@ 20 GHz	6.0	6.0	V
RF input impedance	-	50	-	Ω
Bias V_{π} voltage	@ 1 kHz	< 5.5 (5.0 typical)	< 5.5 (5.0 typical)	V
Bias input impedance	@ DC	1	1	M Ω
Photodiode responsivity	-	> 1×10^{-3}	> 1×10^{-3}	mA/W
The linearity	-	$\pm 10\%$	$\pm 10\%$	

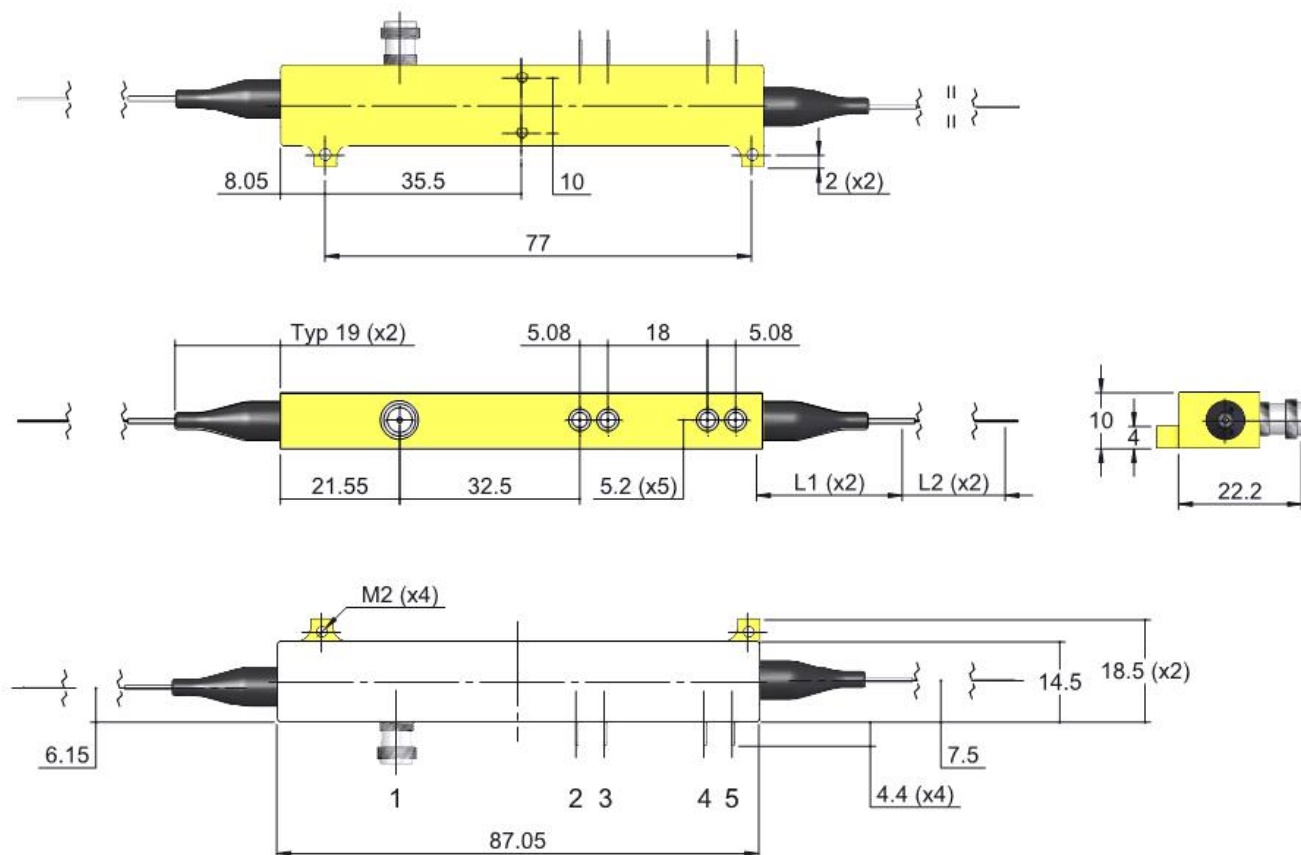
Pin-out and fiber specification

RF connector	V-connector ¹
Bias and photodiode connector	LEAD pin
Input fiber	Corning/Fujikura SM15P UV/UV250 (PMF), L1 (900 μ m sleeve) > 1.3m, L2 (bare fiber) > 5cm
Output fiber	Corning/Fujikura SM15P UV/UV250 (PMF), L1 (900 μ m sleeve) > 1.3m, L2 (bare fiber) > 5cm

1. V-Connector is a registered trademark of Anritsu Corporation

LiNbO₃ Intensity Modulator for 20/40 GHz Analog Signal Applications, AM20/AM40

Package appearance



Pin definitions

Pin #	Name	Explain
1	RF	RF Input
2	GND	Grounding
3	Bias	Bias voltage
4	PD-C	Photodiode cathode (-)
5	PD-A	Photodiode anode (+)

Flammability rating

HC Optical uses fiber optic patch cords that comply with UL 94 V-0 (Fujikura Fiber) or compatible with ASTM D-2863-87 grade requirements. Optical fiber protective sleeves, connectors, and boots are also UL 94 V-0 rated.

Ordering information

Product description	Model
AM20, C-Band LiNbO ₃ Intensity Modulator for 20 GHz Analog Signal Applications (Polarization-maintaining/polarization-maintaining optical fiber larger than 1.3 m (900 μm ferrule) + 5 cm bare fiber without optical connector)	HC-AM-20-511
AM40, C-Band LiNbO ₃ Intensity Modulator for 40 GHz Analog Signal Applications (Polarization-maintaining/polarization-maintaining optical fiber larger than 1.3 m (900 μm ferrule) + 5 cm bare fiber without optical connector)	HC-AM-40-512