

## CA-AM20-OO/CA-AM40-OO 20/40 GHz Intensity Modulators for Analog Applications

### Overview

CA-AM20-OO/CA-AM40-OO broadband analog intensity modulators combine high linearity with low driving voltage and small footprint, covering all the frequency range from 20 GHz to beyond 40 GHz (CA-AM20-OO: 20 – 30 GHz; CA-AM40-OO: > 30 GHz). The increasing demand to shift the transmission frequency in microwave fiber optic links towards higher frequency finds in CA OPTRONICS GROUP analog modulators the most advanced and suitable answer. The experience and know-how of CA OPTRONICS GROUP engineers is available to customize our products to the customer's specific requirements.



### Applications

- Antenna remoting
- High frequency fiber optic links
- Analog microwave over fiber (RoF)
- Delay lines telemetry systems
- Instrumentation (optical network analyzers)

### Features

- Titanium indiffused waveguides
- X-cut LiNbO3
- Low drive voltage compatible with commercially available drivers
- Low optical insertion loss
- Operating up to 60 GHz
- Smooth frequency response up to >60 GHz
- Integrated photodiode
- Integrated polarizer

## Absolute Maximum Ratings

Parameters	Conditions	Min.	Max.	Unit
Operating case temperature		0	+70	°C
Storage temperature		-40	+85	°C
Maximum operating temperature variation rate			1	°C/min
Maximum input power (Electrical)	RF port AC coupled		25	dBm
Maximum input power (Optical)	CW		100	mW

## Specification

Parameters	Value (CA-AM20-OO)	Value (CA-AM40-OO)	Unit
<b>Optical</b>			
Operating wavelength range	1525 - 1610	1525 - 1610	nm
Insertion loss	(3.5 typ) < 4.5 (no connector) (4.0 typ) < 5.0 (with connector)	(3.5 typ) < 5.0 (no connector) (4.0 typ) < 5.5 (with connector)	dB
Optical return loss (without connectors)	> 45	> 45	dB
Polarization Extinction ratio	> 20 (23 typ)	> 20 (23 typ)	dB
<b>Electrical</b>			
S <sub>21</sub> electro-optic bandwidth (-3dB <sub>e</sub> )	> 20 (23 typ)	> 30 (32 typ)	GHz
S <sub>11</sub> return loss	< -10 (-12 typ)	< -10 (-12 typ) (40 MHz – 20 GHz) < -8 (-10 typ) (20 GHz – 35 GHz)	dB
RF V <sub>π</sub> voltage (@ 1 kHz)	< 5.0 (4.5 typ)	< 5.2 (4.7 typ)	V
RF V <sub>π</sub> voltage (@ 20 GHz)	6.0	6.0	V
Bias V <sub>π</sub> voltage (@ 1 kHz)	< 5.5 (5.0 typ)	< 5.5 (5.0 typ)	V
Bias port impedance (@ DC)	1	1	MΩ
Photodiode responsivity	> 1x10 <sup>-3</sup>	> 1x10 <sup>-3</sup>	mA/W
Linearity	± 10%	± 10%	

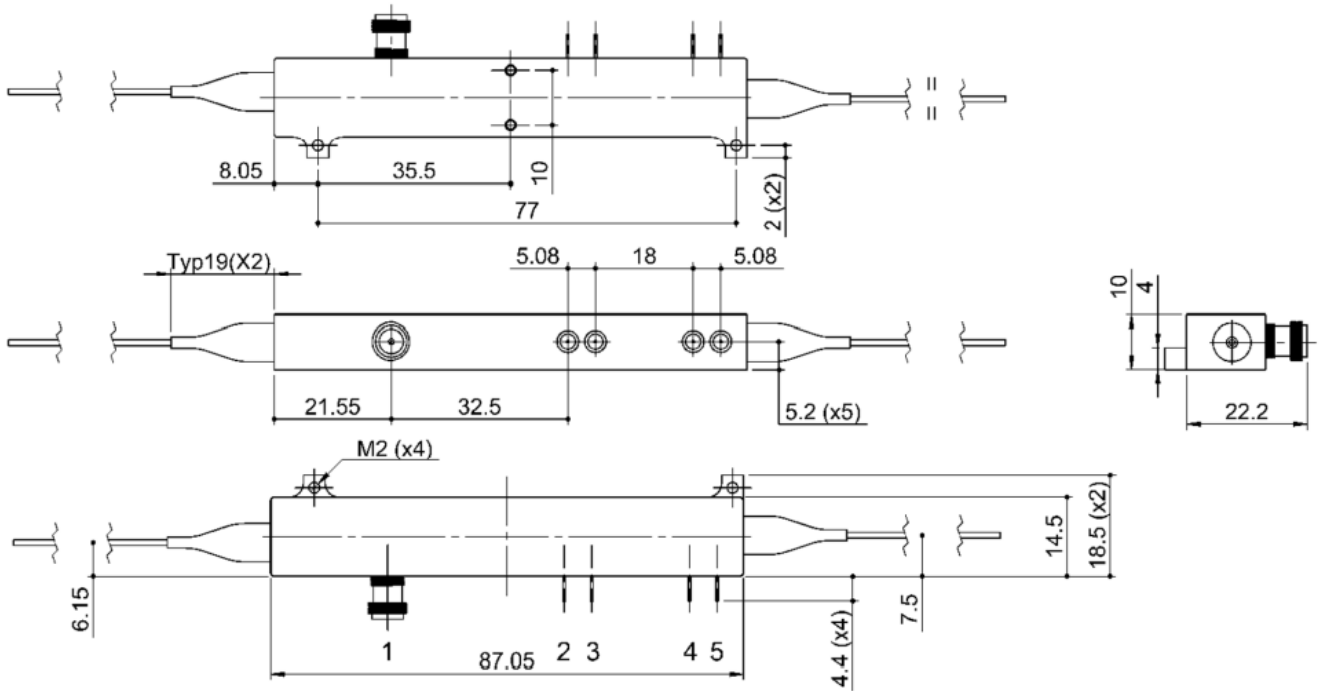
## Pin-Out and Fiber Specifications

RF connector	V-Connector <sup>1</sup>
Bias and PD connector	LEAD pins
Input fiber	Corning/Fujikura SM15P UV/UV250 (Panda fiber), > 1m, 900um loose tube
Output fiber	Corning/Fujikura SM15P UV/UV250 (Panda fiber), > 1m, 900um loose tube

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

## Outline Drawing

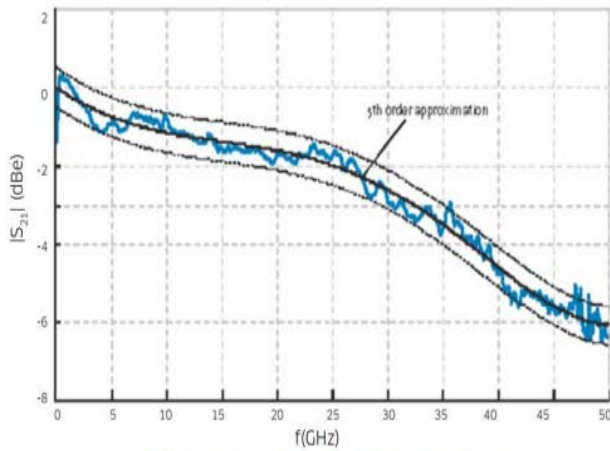
CA-AM20-OO and CA-AM40-OO have same footprint. Dimension in mm.



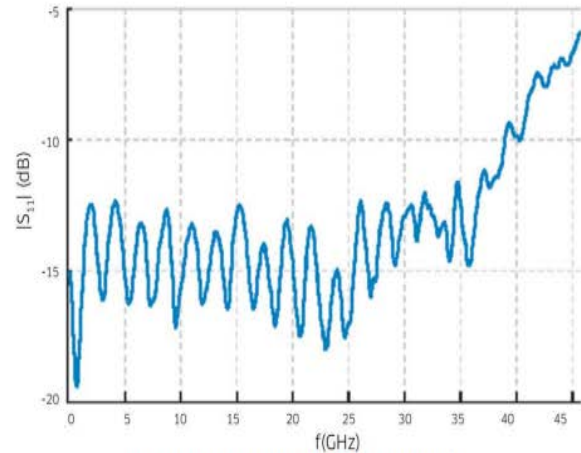
## Pin Assignments

Pin#	Description
1	RF input
2	Ground
3	Bias
4	Photodiode cathode (-)
5	Photodiode anode (+)

## Performance Characteristics



Electrical optical response (40 GHz example)



Electrical return loss (40 GHz example)

## Ordering Information:

Product Description	Part Number
20 GHz Intensity modulator for analog applications, CA-AM20-OO (>1m fiber, PMF-PMF, 900um loose tube, no connectors)	CA-7910511-A
20 GHz Intensity modulator for analog applications, CA-AM20-OO (>1m fiber, PMF-PMF, 900um loose tube, <b>FC/PC</b> connectors)	CA-792000980
40 GHz Intensity modulator for analog applications, CA-AM40-OO (>1m fiber, PMF-PMF, 900um loose tube, no connectors)	CA-7910512-A
40 GHz Intensity modulator for analog applications, CA-AM40-OO (>1m fiber, PMF-PMF, 900um loose tube, <b>FC/PC</b> connectors)	CA-792000990