

# MD-20-M



## DEVICE

## 20 GHz Modulator Driver/RF Amplifier

## OVERVIEW

The Optilab MD-20-M Modulator Driver (MD) is a 20 GHz Bandwidth RF Amplifier in a compact and user-friendly module that provides a high-quality, single-ended voltage to drive an optical modulator. Typical applications include driving EML, EAM, and Mach-Zehnder devices, and it can also be used as a wideband RF amplifier with useable bandwidth of up to 20 GHz, including its +24 dBm adjustable output, making it suitable for many RF link applications. The MD-20-M amplifies 23 Gb/s data input signals to >7.5 Vp-p drive levels, and the flat gain and group delay response yield a high quality, low-jitter electrical drive signal for digital applications. Featuring a 12 V DC power supply, this versatile module also has an anodized, precision-machined aluminum housing designed for efficient heat dissipation during prolonged use. In addition to its amplification function, the MD-20-M also features a manually adjustable DC bias output voltage port, to further complement its effectiveness when used with a standard optical modulator. The MD-20-M also supports duplexed RF + DC port configurations for full optical modulator compatibility. Contact Optilab for more information.

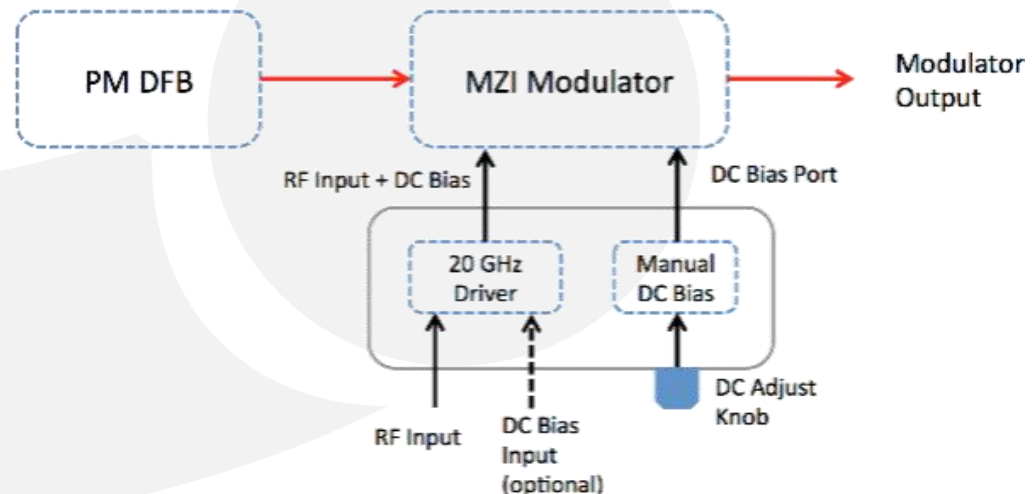
## FEATURES

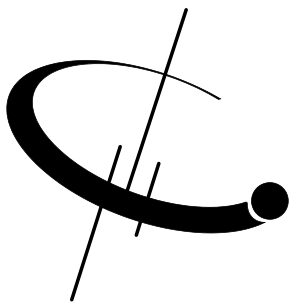
- Optional duplexed DC input port
- Variable Gain Control via USB
- Built in heat sink
- Bandwidth from 0.1 to 20 GHz
- Output power of 26 dBm
- Data rates exceed 23 Gb/s
- Manual DC bias output port to 10 volt

## USE IN

- 20 GHz Analog RfOf link
- Amplified RF signals to 20 GHz
- General laboratory test and measurement
- 23 Gb/s digital modulation

## FUNCTIONAL DIAGRAM





# MD-20-M

## SPECIFICATIONS

3 dB S21 Bandwidth	18 GHz typ.
Small Signal Gain	24 dB typ.
Input 1 dB Compression Point	0 dBm

## GENERAL

S11 Characteristics	< -10 dB from 1 to 15 GHz, < -5 dB from 15 to 20 GHz
S22 Characteristics	< -10 dB from 1 to 12 GHz, < -5 dB from 12 to 20 GHz
RF Gain	19 dB to 24 dB, variable
Gain Adjustment Range	5 dB typ.
Gain Ripple	< ± 0.5 dB
Input, Output Impedance	50 Ω
Input VSWR to -10 GHz	1.6 : 1 typ.
Output VSWR	2.0 : 1 typ.
Manual DC Bias Adjustment Range	0 to +10 VDC

## ANALOG APPLICATIONS

RF Bandwidth	20 GHz typ.
Max. Output	26 dBm typ.
Input IP3	12 dBm typ.
Group Delay	± 70 ps
Noise Figure	9 dB typ.

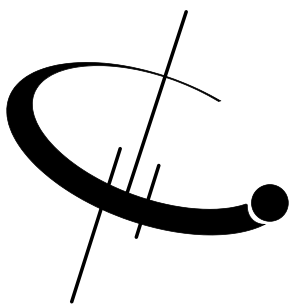
## DIGITAL APPLICATIONS

Data Rate	Up to 23 Gb/s
Output Amplitude	7.5 V <sub>p-p</sub> typ.
Pulse Response	10%, rise time 35 ps typ.
Input Range	500 mW to 1.5 V

## MECHANICAL

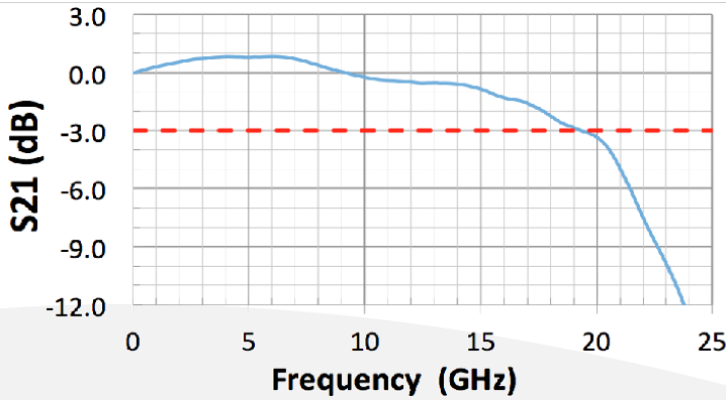
Operating Temperature	-20°C to +70°C
Storage Temperature	-45°C to +100°C
Operating Humidity	85%
Power Supply Requirements	+12 V DC, 1 A max.
Total Power Dissipation	10 W max.
Accessories Included	Cables
RF Input/Output Connector	Input: SMA Female, Output: SMA Male
Electrical Power Connector	4-pin Molex
Remote Interface	USB 2.0
Dimensions	160mm x 65mm x 32.5mm



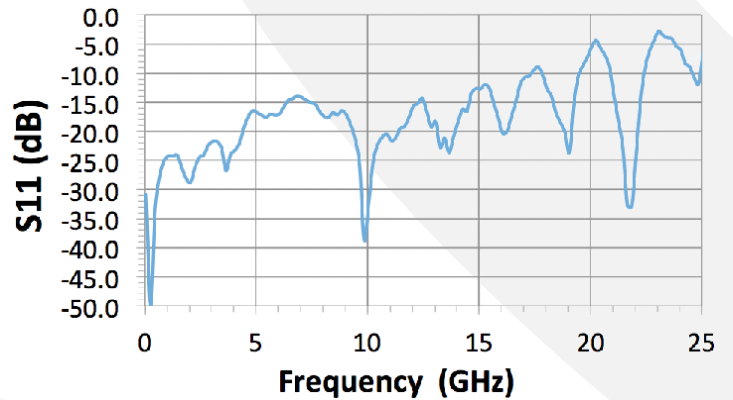


# MD-20-M

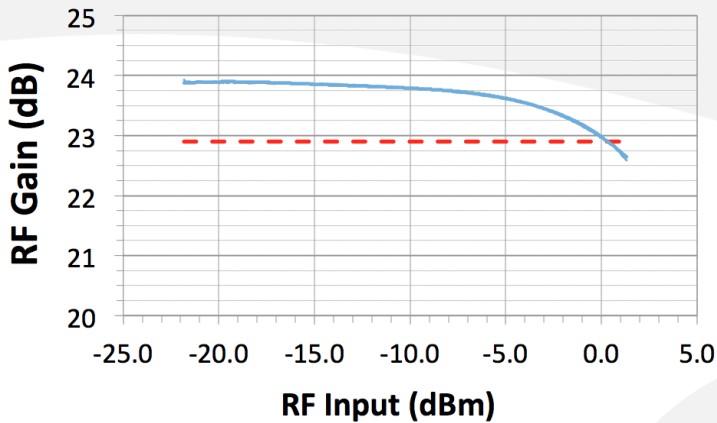
TYPICAL S21 RESPONSE



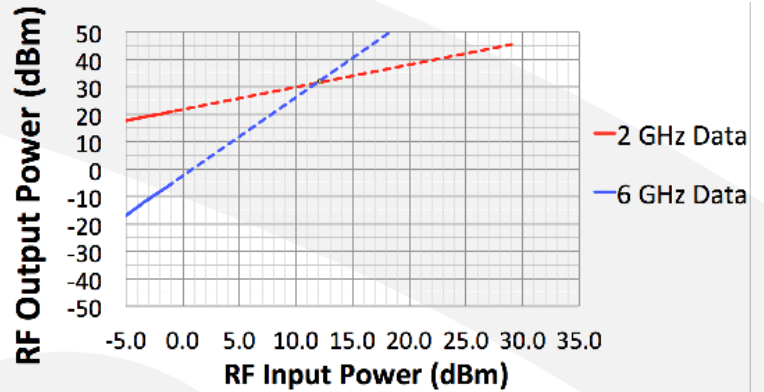
TYPICAL S11 RESPONSE



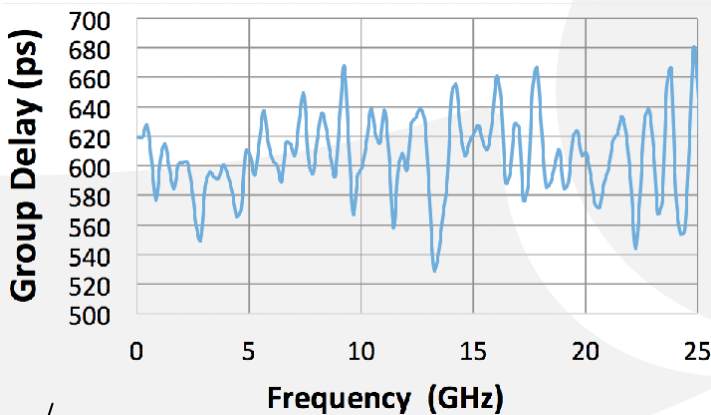
1 DB COMPRESSION



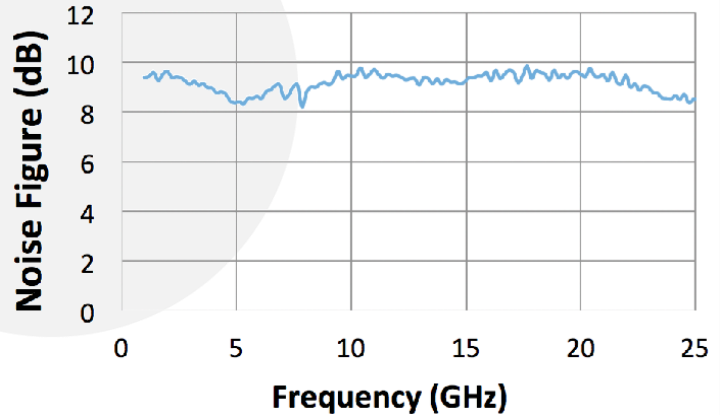
THIRD ORDER INTERCEPT

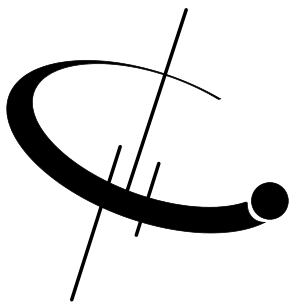


GROUP DELAY



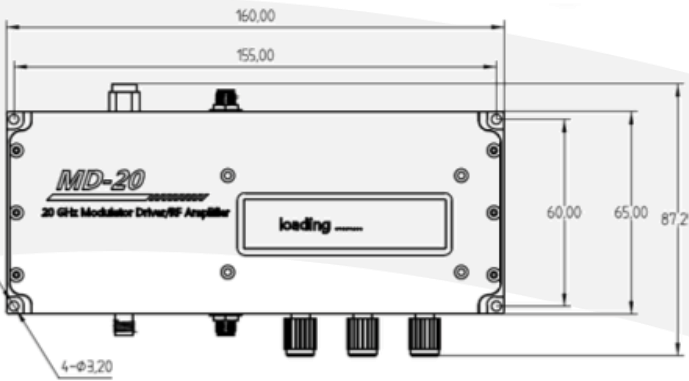
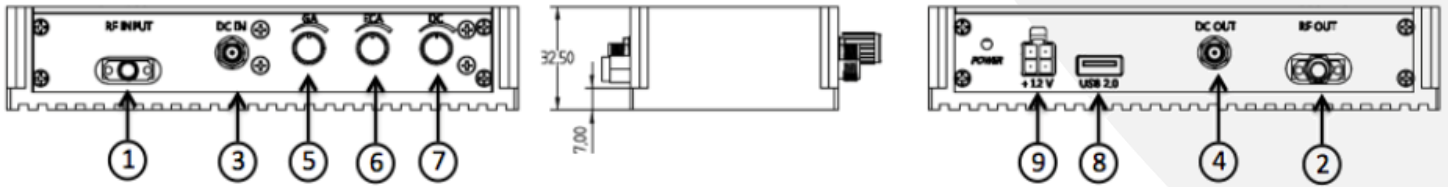
NOISE FIGURE





# MD-20-M

## MECHANICAL DRAWING



Unit: mm

## Port Function Description

Port Number	Function Description
1	RF input
2	RF output
3	DC bias input
4	DC bias output
5	RF gain adjust knob
6	Eye crossing adjust knob
7	DC output adjust knob
8	USB 2.0
9	Power input molex

## REMOTE LABVIEW INTERFACE

Optilab offers remote interface via LabVIEW software, for parameter adjustment and status monitoring, contact Optilab for more details.

