

# DR-AN-20-MO

## 20 GHz Analog Driver Module



Delivering Modulation Solutions

### Analog Driver



#### Features

- Output voltage up to 9 V<sub>pp</sub>
- Linear amplifier
- Flat gain up to 20 GHz
- Single voltage power supply
- Low group delay variation

#### Applications

- LiNbO<sub>3</sub> modulators
- OFDM, RF over fiber
- Linear amplification
- Research & Development

#### Options

- Heat-sink
- Alternative RF connectors gender

The DR-AN-20-MO is a wideband RF amplifier module designed for analog applications at frequencies up to 20 GHz.

The DR-AN-20-MO is characterized by a low Noise Figure and a linear transfer function whose 1 dB compression point is above 20 dBm. It exhibits flat Group Delay and Gain curves with reduced ripple over the entire bandwidth.

The DR-AN-20-MO operates from a single power supply for safety and ease of use, and offers gain control over 3 dB. It comes in a compact 52 mm x 25.6 mm housing with K type RF connectors (compatible SMA) and with an optional heat sink.

This amplifier module is ideally suited to drive optical modulators for analog applications.

#### Performance Highlights

Parameter	Min	Typ	Max	Unit
Cut-off frequencies	100 k	20 G	-	Hz
Output voltage	0	-	9	V <sub>pp</sub>
Gain	-	30	-	dB
Saturated output power	23	-	-	dBm
Output power 1dB comp	20	21	-	dB
Harmonics	-	-	-15	dBc
Noise Figure	-	5	-	dB

Measurements for V<sub>bias</sub> = 12 V, V<sub>amp</sub> = 1.2 V, I<sub>bias</sub> = 305 mA

**Analog Driver**

**DC Electrical Characteristics**

Parameter	Symbol	Min	Typ	Max	Unit
Supply voltage (fixed)	$V_{bias}$	-	12	-	V
Current consumption	$I_{bias}$	-	310	-	mA
Gain control voltage	$V_{amp}$	-	1.2	-	V

**Electrical Characteristics**

Conditions: S parameters -30 dBm,  $T_{amb} = 25\text{ }^{\circ}\text{C}$ , 50  $\Omega$  system

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Lower frequency	$f_{3dB, lower}$	-3 dB point	-	-	100	kHz
Upper frequency	$f_{3dB, upper}$	-3 dB point	18	20	-	GHz
Gain	$S_{21}$	Small signal, $f < 15\text{ GHz}$	-	30	-	dB
Gain ripple	-	$f < 15\text{ GHz}$	-	$\pm 1.5$	-	dB
Input return loss	$S_{11}$	$f < 10\text{ GHz}$	-	-10	-	dB
Output return loss	$S_{22}$	$f < 20\text{ GHz}$	-	-10	-	dB
Isolation	$S_{12}$	$f < 20\text{ GHz}$	-	-60	-	dB
Output power 1dB	$P_{1dB}$	$2\text{ GHz} < f < 14\text{ GHz}$	21	-	-	dBm
Saturated output power	$P_{sat}$	$2\text{ GHz} < f < 12\text{ GHz}$	23	-	-	dBm
Output voltage	$V_{out}$	Linear	0	-	7	$V_{pp}$
		Maximum swing	0	-	9	
Noise Figure	NF	$f < 7\text{ GHz} \ \& \ f > 14\text{ GHz}$	5	-	7	dB
		$7\text{ GHz} < f < 14\text{ GHz}$	3	-	5	
Harmonics	Harm	@ $P_{1dB}$ , $f < 5\text{ GHz}$	-	-	-15	dBc
Power dissipation	P	Small signal	-	3.7	-	W

**Absolute Maximum Ratings**

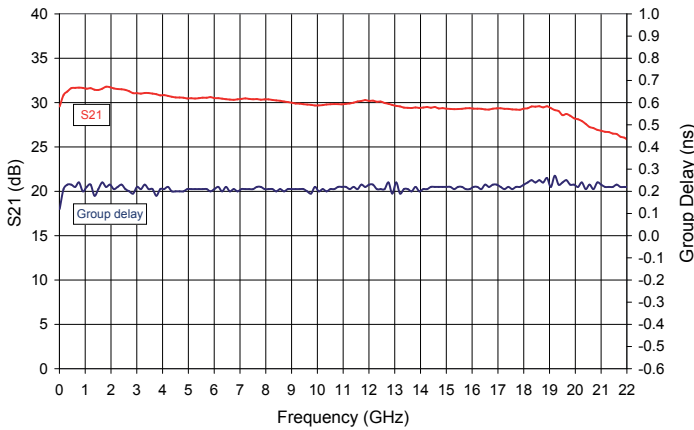
Stresses in excess of the absolute maximum ratings can cause permanent damage to the device. These are absolute stress ratings only. Functional operation of the device is not implied at these or any other conditions in excess of those given in the operational sections of the data sheet. Exposure to absolute maximum ratings for extended periods can adversely affect device reliability.

Parameter	Symbol	Min	Max	Unit
RF input voltage	$V_{in}$	-	1	$V_{pp}$
Supply voltage	$V_{bias}$	7	15	V
DC current	$I_{bias}$	0	0.4	A
Gain control voltage	$V_{amp}$	0	1.3	V
Power dissipation	$P_{diss}$	-	4.8	W
Temperature of operation	$T_{op}$	0	+50	W
Storage temperature	$T_{st}$	-20	+70	$^{\circ}\text{C}$

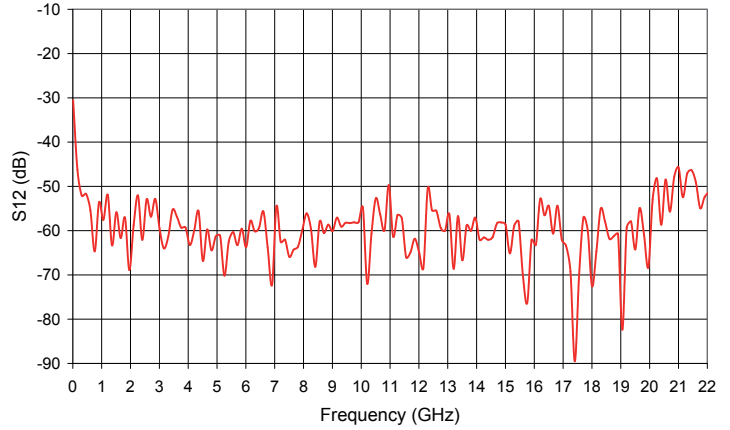
**Analog Driver**

**S21 and Group Delay Parameter Curves**

Conditions:  $V_{bias} = 12\text{ V}$ ,  $V_{amp} = 1.2\text{ V}$ ,  $I_{bias} = 305\text{ mA}$

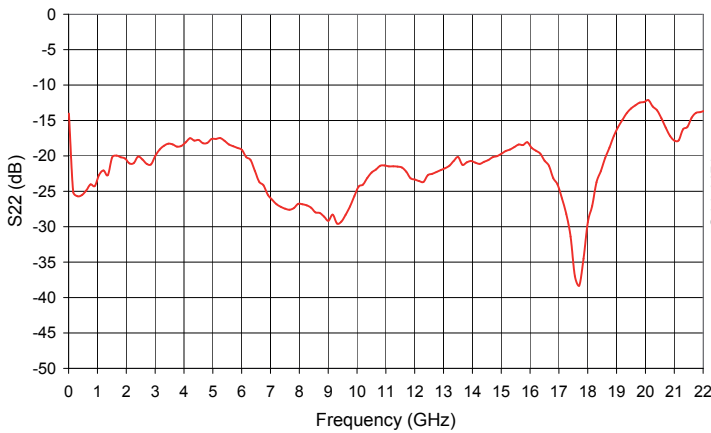


**S21 Parameter Curve**

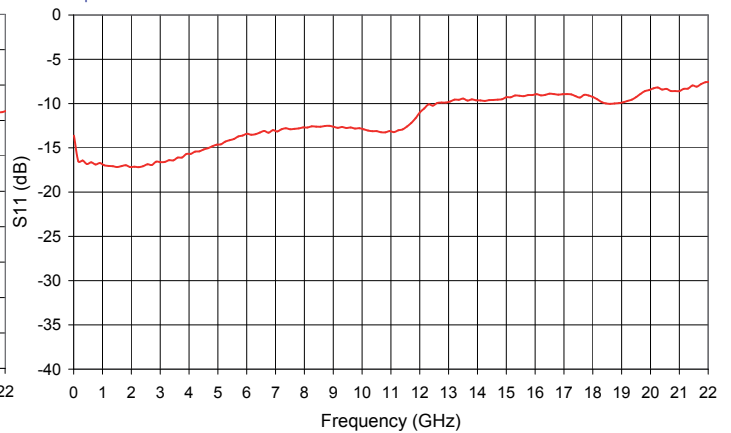


**S22 Parameter Curve**

Conditions:  $V_{bias} = 12\text{ V}$ ,  $V_{amp} = 1.2\text{ V}$ ,  $I_{bias} = 305\text{ mA}$

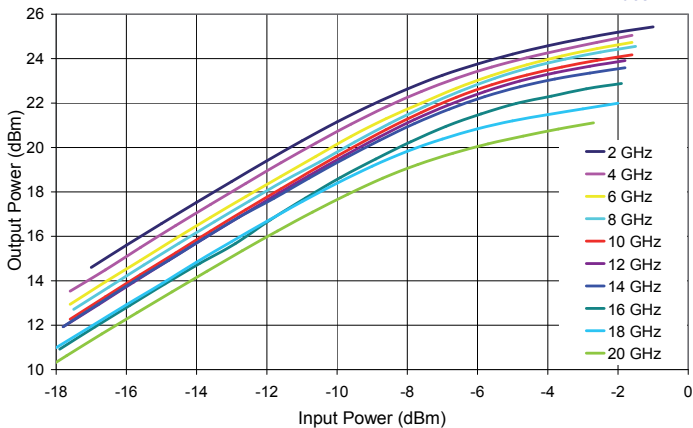


**S11 Parameter Curve**

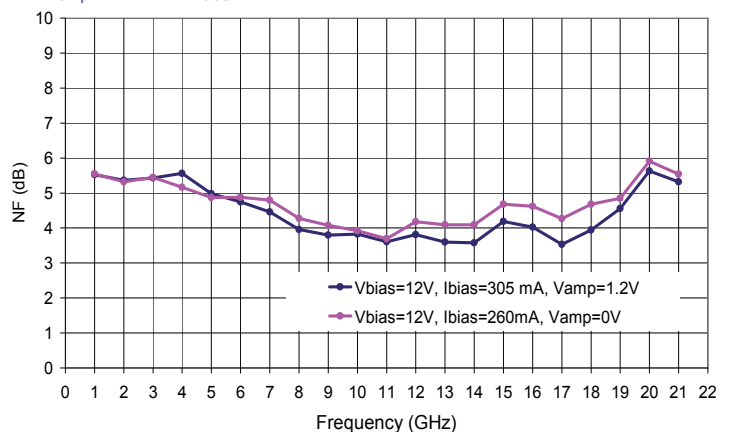


**Saturated Output Power Curve**

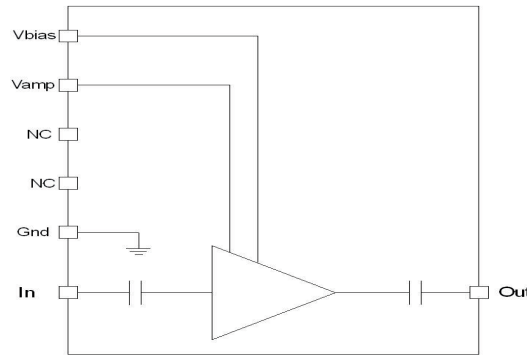
Conditions:  $V_{bias} = 12\text{ V}$ ,  $V_{amp} = 1.2\text{ V}$ ,  $I_{bias} = 305\text{ mA}$



**Noise Figure Curve**

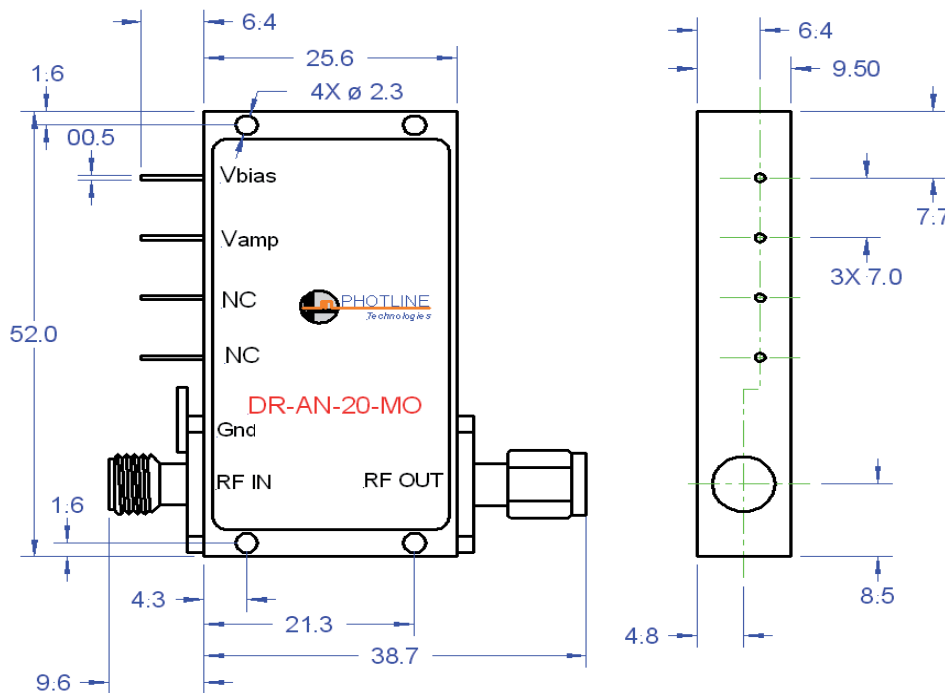


### Electrical Schematic Diagram



### Mechanical Diagram and Pinout

All measurements in mm



The heatsinking of the module is necessary. It's user responsibility to use an adequate heatsink. Refer to page 5 for Photline Technologies recommended heatsink.

PIN	Function	Operational Notes
IN	RF In	K-connector female
OUT	RF Out	K-connector male
V <sub>bias</sub>	Power supply voltage	Set at typical operating specification
V <sub>amp</sub>	Output voltage amplitude adjustment	Adjust for gain control tuning

**DR-AN-20-MO**  
20 GHz Analog Driver Module

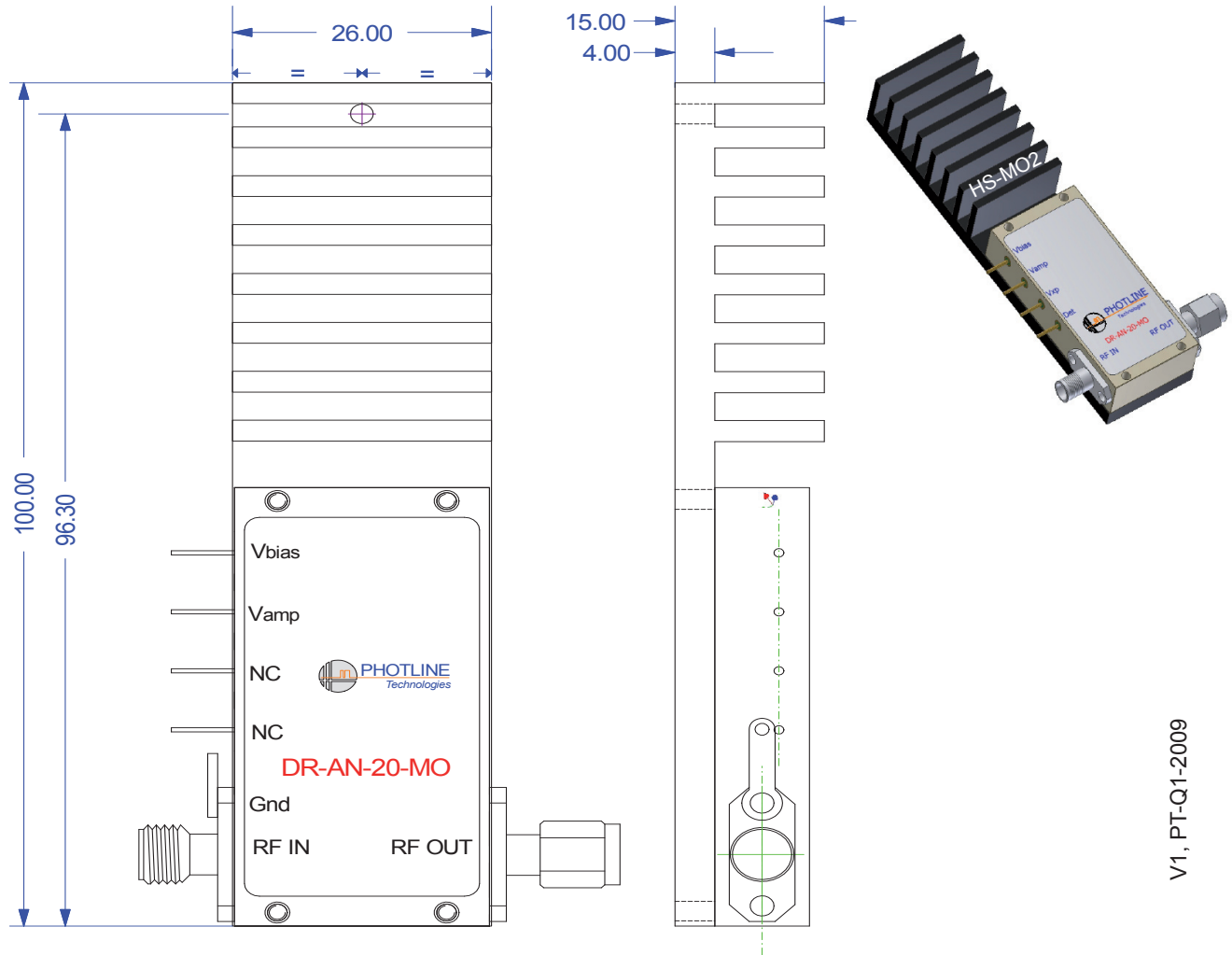


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**Mechanical Diagram and Pinout with HS-MO2 Heatsink**

All measurements in mm



V1, PT-Q1-2009

**ABOUT US**

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Photline Technologies  
phone : +33 (0) 381 853 180  
fax : +33 (0) 381 811 557  
16, rue Auguste Jouchoux  
F-25 000 Besançon

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