



## FEATURES

- Output voltage up to 9 V<sub>pp</sub>
- Linear amplifier
- Flat gain up to 12 GHz
- Single voltage power supply
- Low group delay variation

## APPLICATIONS

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

## OPTIONS

- Heat-sink

The Photline DR-AN-10-MO is a wideband RF amplifier module designed for analog applications at frequencies up to 12 GHz.

The Photline DR-AN-10-MO is characterized by a low Noise Figure and a linear transfer function whose 1 dB compression point is above 21 dBm. It exhibits flat Group Delay and Gain curves with reduced ripple over the entire bandwidth.

The Photline DR-AN-10-MO operates from a single power supply for safety and ease of use, and offers gain control over 3 dB. The amplifier 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	50 k	11 G	-	Hz
Output voltage	0	-	9	V <sub>pp</sub>
Gain	28	30	-	dB
Saturated output power	23	-	-	dBm
Output power 1dB comp	21	22	-	dB
Harmonics	-	-	-15	dBc
Noise Figure	3	-	6	dB

Measurements for V<sub>bias</sub> = 12 V, V<sub>amp</sub> = 1.2 V, I<sub>bias</sub> = 310 mA

## DC Electrical Characteristics

Parameter	Symbol	Min	Typ	Max	Unit
Supply voltage (fixed)	$V_{bias}$	-	12	13	V
Current consumption	$I_{bias}$	-	300	400	mA
Gain control voltage	$V_{amp}$	-	1.2	1.3	V

## Electrical Characteristics

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Lower frequency	$f_{3dB}$ lower	-3 dB point	50	-	-	kHz
Upper frequency	$f_{3dB}$ upper	-3 dB point	-	11	-	GHz
Gain	$S_{21}$	Small signal, $f < 10$ GHz	28	30	-	dB
Gain ripple	-	$f < 10$ GHz	-	-	$\pm 1.5$	dB
Input return loss	$S_{11}$	$f < 10$ GHz	-	-10	-	dB
Output return loss	$S_{22}$	$f < 10$ GHz	-	-15	-	dB
Isolation	$S_{12}$	$f < 10$ GHz	-	-60	-	dB
Output power 1dB	$P_{1dB}$	$2 \text{ GHz} < f < 10 \text{ GHz}$	21	22	-	dBm
Saturated output power	$P_{sat}$	$2 \text{ GHz} < f < 10 \text{ GHz}$	23	-	-	dBm
Output voltage	$V_{out}$	Linear	0	-	7	$V_{pp}$
		Maximum swing	0	-	9	
Noise Figure	NF	$2 \text{ GHz} < f < 10 \text{ GHz}$	3	-	6	dB
Harmonics	Harm	@ $P_{1dB}$ , $f < 5 \text{ GHz}$	-	-	-15	dBc
Power dissipation	P	Small signal	-	3.6	5.2	W

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

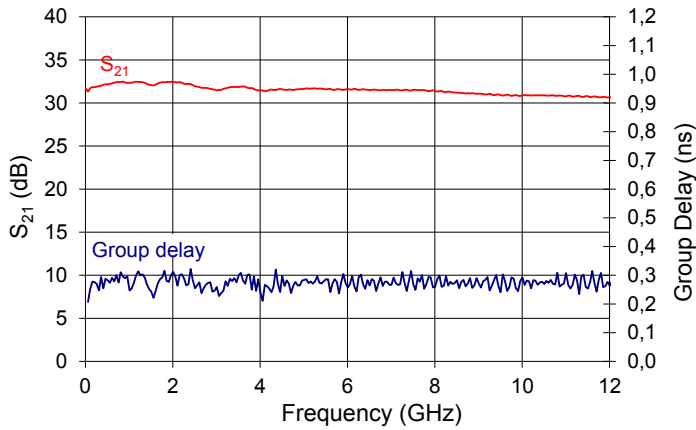
## Absolute Maximum Ratings

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	$V_{in}$	-	0.6	$V_{pp}$
Supply voltage	$V_{bias}$	0	13	V
DC current	$I_{bias}$	0	400	mA
Gain control voltage	$V_{amp}$	0	1.3	V
Power dissipation	$P_{diss}$	-	5.2	W
Temperature of operation	$T_{op}$	0	+50	W
Storage temperature	$T_{st}$	-10	+70	$^\circ\text{C}$

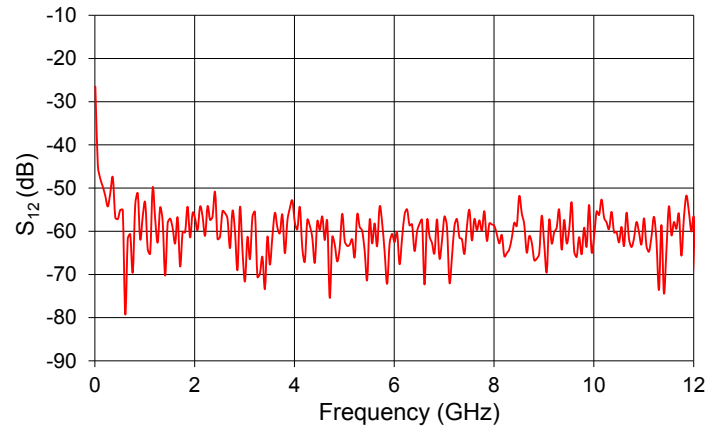
### $S_{21}$ and Group Delay Parameter Curves

Conditions:  $V_{bias} = 12\text{ V}$ ,  $V_{amp} = 1.2\text{ V}$ ,  $I_{bias} = 310\text{ mA}$



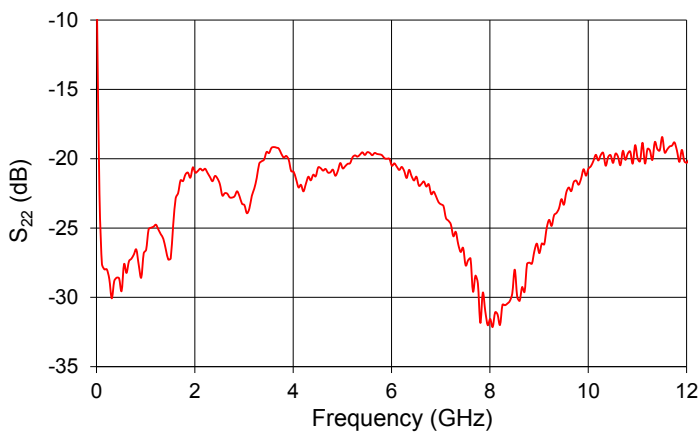
### $S_{12}$ Parameter Curve

Conditions:  $V_{bias} = 12\text{ V}$ ,  $V_{amp} = 1.2\text{ V}$ ,  $I_{bias} = 310\text{ mA}$



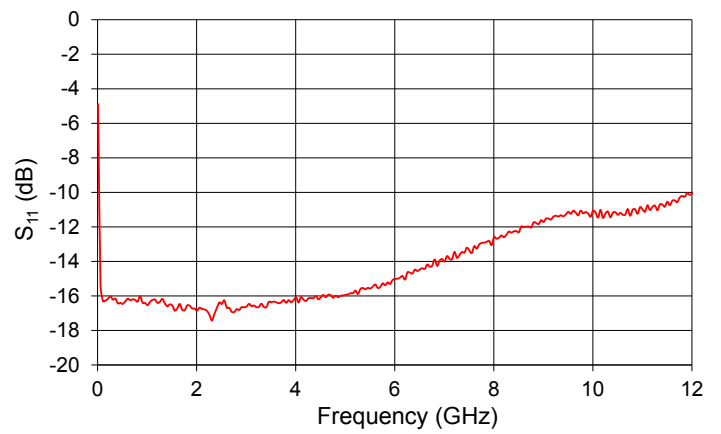
### $S_{22}$ Parameter Curve

Conditions:  $V_{bias} = 12\text{ V}$ ,  $V_{amp} = 1.2\text{ V}$ ,  $I_{bias} = 310\text{ mA}$



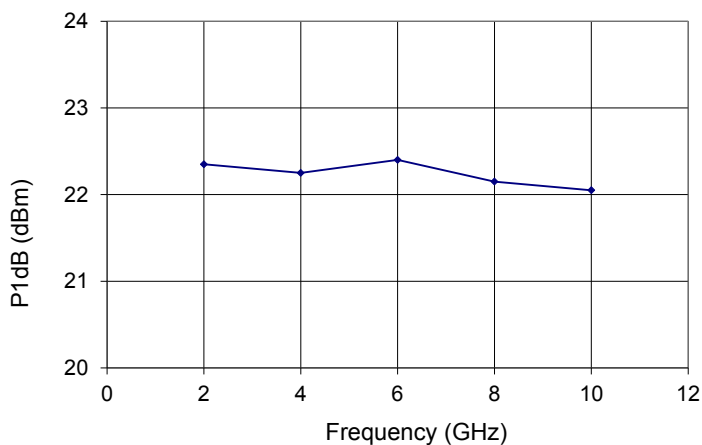
### $S_{11}$ Parameter Curve

Conditions:  $V_{bias} = 12\text{ V}$ ,  $V_{amp} = 1.2\text{ V}$ ,  $I_{bias} = 310\text{ mA}$



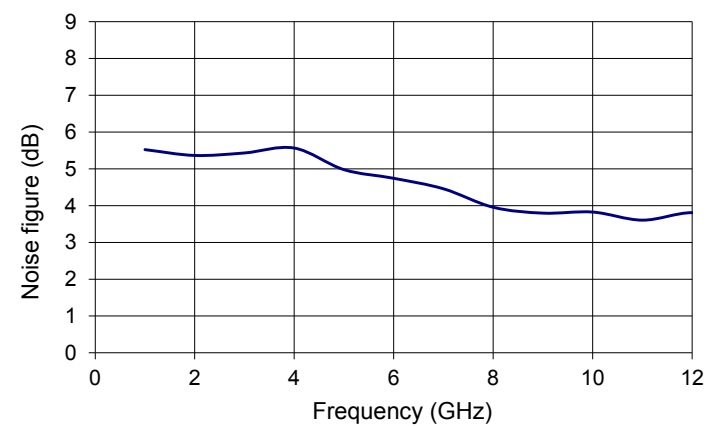
### Saturated Output Power Curve

Conditions:  $V_{bias} = 12\text{ V}$ ,  $V_{amp} = 1.2\text{ V}$ ,  $I_{bias} = 310\text{ mA}$

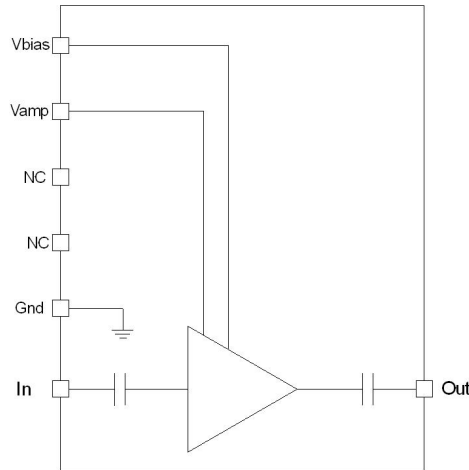


### Noise Figure Curve

Conditions:  $V_{bias} = 12\text{ V}$ ,  $V_{amp} = 1.2\text{ V}$ ,  $I_{bias} = 310\text{ mA}$

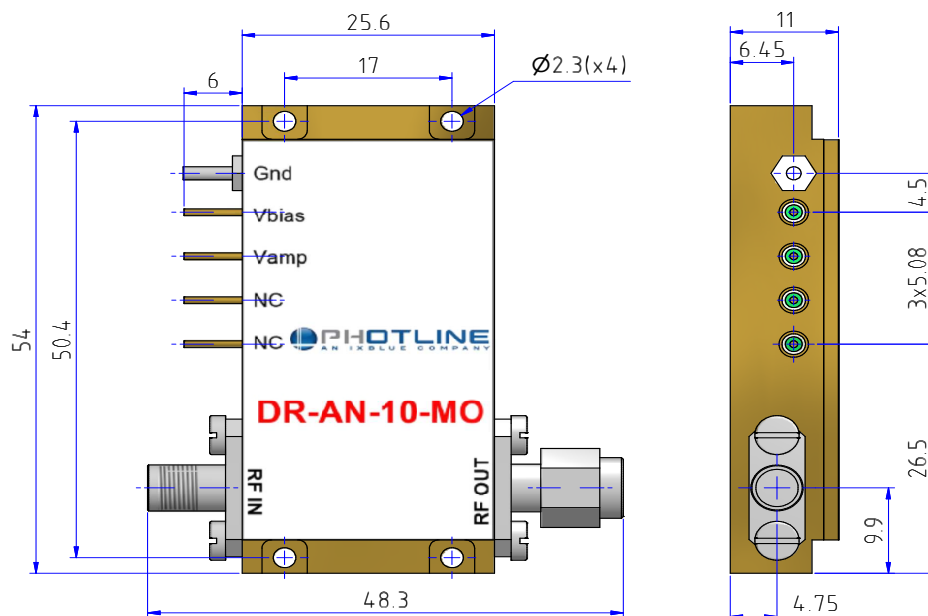


### Electrical Schematic Diagram



### Mechanical Diagram and Pinout

All measurements in mm

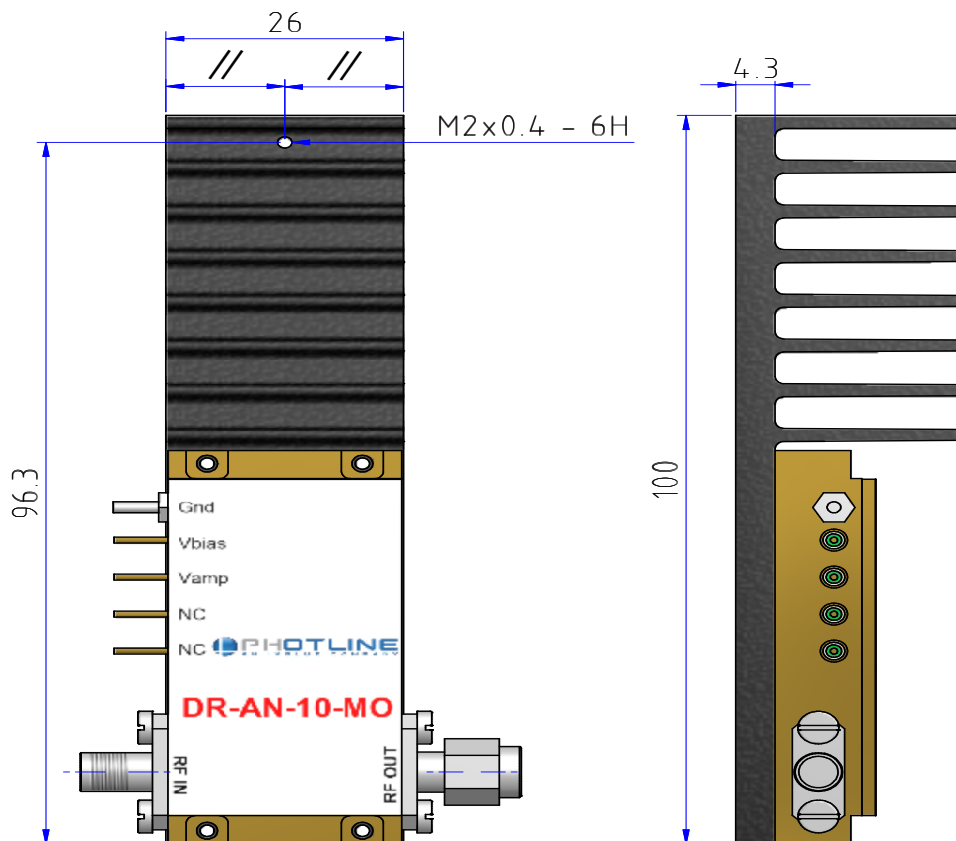


The heatsinking of the module is necessary. It's user responsibility to use an adequate heatsink. Refer to page 5 for ixBlue recommended heatsink.

PIN	Function	Operational Notes
IN	RF In	K-connector female
OUT	RF Out	K-connector male
$V_{bias}$	Power supply voltage	Set at typical operating specification
$V_{amp}$	Output voltage amplitude adjustment	Adjust for gain control tuning

## Mechanical Diagram and Pinout with HS-MO2 Heatsink

All measurements in mm



## About us

iXBlue Photonics includes iXBlue iX Fiber brand that produces specialty optical fibers and Bragg gratings based fiber optics components and iXBlue Photline brand that provides optical modulation solutions based on the company lithium niobate (LiNbO<sub>3</sub>) modulators and RF electronic modules.

iXBlue Photonics serves a wide range of industries: sensing and instruments, defense, telecommunications, space and fiber lasers as well as research laboratories all over the world.

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