

## FEATURES

- Output voltage up to 20 V<sub>pp</sub>
- Linear / Pulse / Digital amplifier
- Bandwidth from DC up to 200 MHz

## APPLICATIONS

- Laser beam combining
- Low RAM phase modulation
- Spectrum broadening
- Laser frequency locking / PDH
- Low frequencies NRZ modulation

## RELATED EQUIPMENTS

- NIR/NIR800/NIR950-MPX-LN-0.1 phase modulators
- MX-LN-10 amplitude modulators

The DR-VE-0.1-MO is a VErsatile RF amplifier module that can be used for analog, pulse and digital applications.

The DR-VE-0.1-MO is an amplifier generating  $\pm 10$  V with a fixed gain factor for both negative and positive voltages.

Simple and inexpensive, the DR-VE-0.1-MO is a DC-coupled voltage amplifier that operates over a DC to 200 MHz bandwidth. It draws very little current.

The DR-VE-0.1-MO is a useful driver for low frequency external modulation applications using LiNbO<sub>3</sub>: phase modulators (MPX-LN-0.1, NIR-MPX-LN-0.1, NIR-MPX800-LN-0.1, NIR-MPX950-LN-0.1), amplitude modulators MX-LN-10 family.

## Performance Highlights

Parameter	Min	Typ	Max	Unit
Low cut-off frequency	DC	-	-	-
High cut-off frequency	-	200	-	MHz
Output voltage (10 k $\Omega$ Z <sub>IN</sub> modulator)	-	20	-	V <sub>pp</sub>
Output voltage (50 $\Omega$ Z <sub>IN-Mod</sub> modulator)	-	10	-	V <sub>pp</sub>
Gain (10 k $\Omega$ Z <sub>IN-Mod</sub> modulator)	25	26	-	dB
Gain (50 $\Omega$ Z <sub>IN-Mod</sub> modulator)	19	20	-	dB

### Input Electrical Characteristics

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Input impedance matching	$Z_{IN}$	-	-	50	-	$\Omega$
Input voltage	$V_{IN}$	-	-	1	-	V <sub>pp</sub>
Supply voltage	$V_{bias}^+$	-	11.5	12	13	V
Current consumption	$I_{bias}^+$	-	20	-	100	mA
Supply voltage	$V_{bias}$	-	-11.5	-12	-13	V
Current consumption	$I_{bias}$	-	-20	-	-100	mA

### Output Electrical Characteristics

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Lower frequency	$f_{lower}$	-	DC			-
Upper frequency	$f_{upper}$	-3 dB point	-	200	-	MHz
Modulator $Z_{IN}$ matching	$Z_{IN-Mod}$	Modulator input impedance	-	10 k or 50	-	$\Omega$
Gain	G	@10 MHz, 10 k $\Omega$ $Z_{IN-Mod}$ modulator	25	26	-	dB
		@10 MHz, 50 $\Omega$ $Z_{IN-Mod}$ modulator	19	20	-	dB
Output voltage	$V_{OUT}$	@10 MHz, 10 k $\Omega$ $Z_{IN-Mod}$ modulator	-	20	-	V <sub>pp</sub>
		@10 MHz, 50 $\Omega$ $Z_{IN-Mod}$ modulator	-	10	-	V <sub>pp</sub>
Saturation output voltage	$V_{SAT-OUT}$	@10 MHz, 10 k $\Omega$ $Z_{IN-Mod}$ modulator	-10	-	+10	V
		@10 MHz, 50 $\Omega$ $Z_{IN-Mod}$ modulator	-5	-	+5	V
Pulse width	PW	Pulse mode	8	-	-	ns
Frequency repetition rate	FRR	Pulse mode	0	-	50	MHz
Rise and fall times	Rt / Ft	Pulse mode	-	6	10	ns
Data-rate	PRBS	Digital mode	-	-	150	Mb/s
Input return loss	$S_{11}$	$f < 200$ MHz	-	-10	-	dB
Output return loss	$S_{22}$	$f < 200$ MHz	-	-10	-	dB

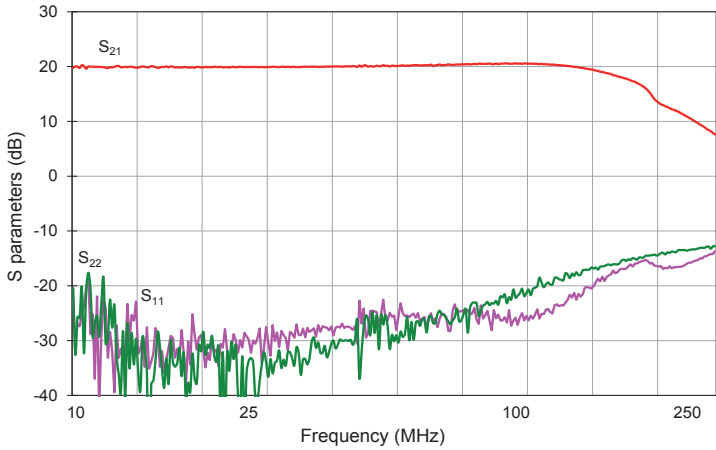
### Absolute Maximum Ratings

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	$V_{in}$	-	10	V <sub>pp</sub>
Supply Voltage	$V_{bias}$	-16	16	V
Temperature of operation	$T_{op}$	0	+55	°C
Storage temperature	$T_{st}$	-40	+85	°C

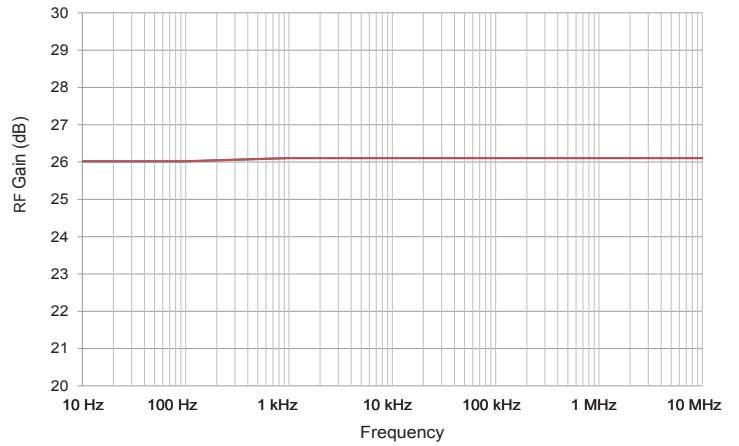
S Parameters curve

Conditions:  $V_{bias} = 12\text{ V} \& -12\text{ V}, 50\ \Omega$



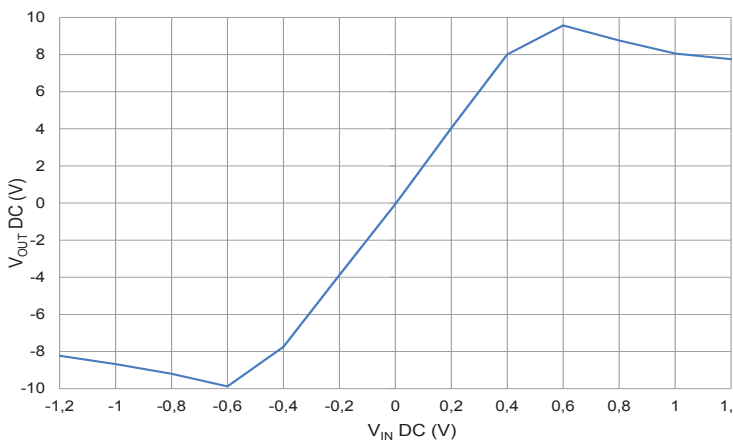
Low frequencies small signal gain

Conditions:  $V_{bias} = 12\text{ V} \& -12\text{ V}, V_{IN} = 50\text{ mV}, 10\text{ k}\Omega$



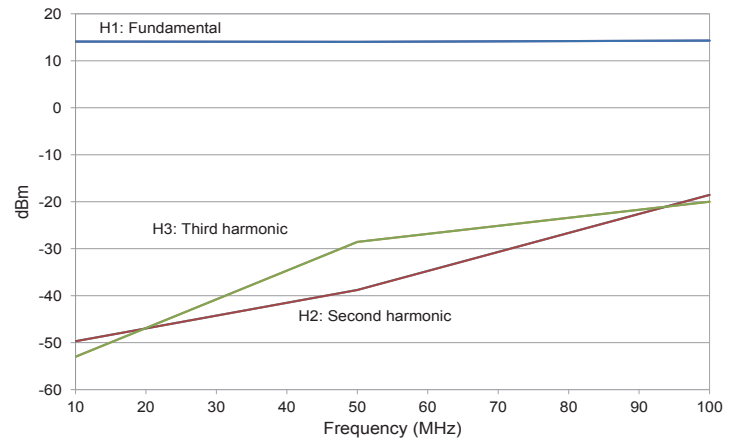
DC signal gain

Conditions:  $V_{bias} = 12\text{ V} \& -12\text{ V}, V_{IN} = 50\text{ mV}, 10\text{ k}\Omega$

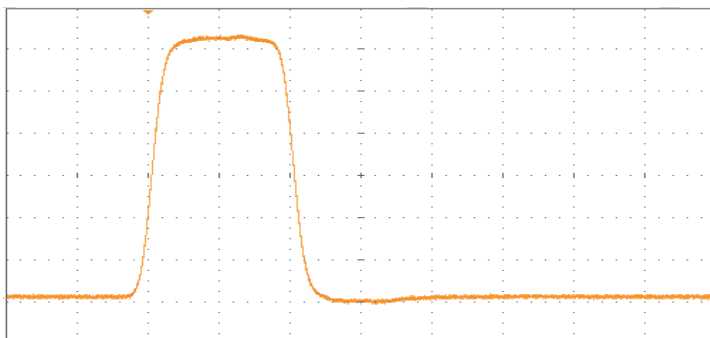


Harmonics vs frequency - Linearity driver response

Conditions:  $V_{bias} = 12\text{ V} \& -12\text{ V}, P_{IN} = 10\text{ dBm}, 10\text{ k}\Omega$

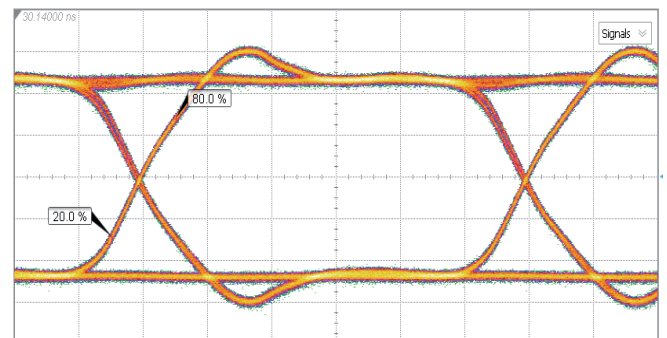


Electrical pulse - Pulse driver response



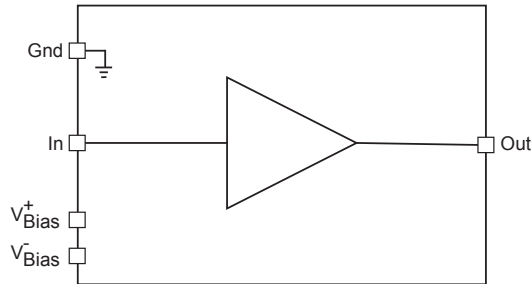
Pulse Width: 20 ns  
Output voltage: 8 Vpp

100 Mb/s NRZ Eye Diagram - Digital driver response



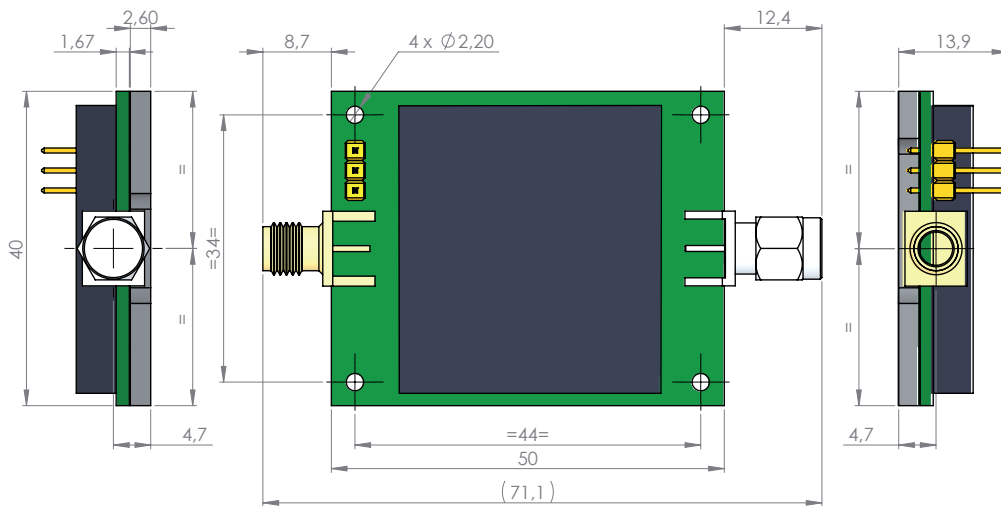
Rise Time: 1.6 ns  
RMS jitter: 42 ps - Peak-peak jitter: 265 ps  
SNR: 30

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.

PIN	Function	Unit
IN	RF In	SMA connector female
OUT	RF Out	SMA connector male
$V_{bias}$	Power supply voltage	3 PINS - Cables are supplied

About us

ixBlue Photonics produces specialty optical fibers and Bragg gratings based fiber optics components and 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.

3, rue Sophie Germain  
25 000 Besançon - FRANCE  
Tel. : +33 (0) 381 853 180 - Fax : + 33 (0) 381 811 557

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