

## DRIVER

# DR-VE-0.1-MO

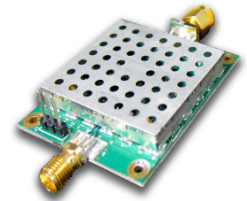
## Low frequencies VEratile Medium Output Voltage Driver

The DR-VE-0.1-MO is a VEratile 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.



### Features

- Output voltage up to  $20 V_{PP}$
- 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 modulator

### 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

DRIVER | DR-VE-0.1-MO | 2/4

**DR-VE-0.1-MO**

Low frequencies VErsatile Medium Output Voltage Driver

**Input Electrical Characteristics**

Parameter	Symbol	Min	Typ	Max	Unit
Input impedance matching	$Z_{IN}$	-	50	-	$\Omega$
Input voltage	$V_{IN}$	-	1	-	$V_{FP}$
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.

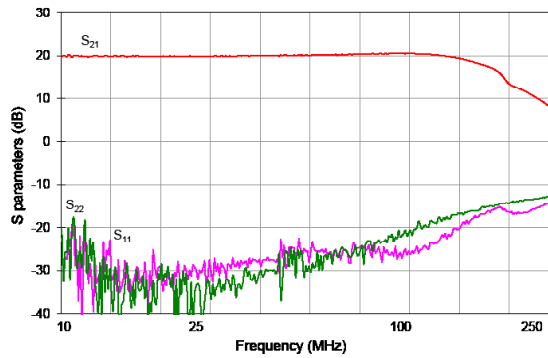
Parameter	Symbol	Min	Max	Unit
RF input voltage	$V_{in}$	-	10	$V_{PP}$
Supply voltage	$V_{bias}$	-16	16	V
Operating temperature	$T_{op}$	0	+55	°C
Storage temperature	$T_{st}$	-40	+85	°C

DRIVER | DR-VE-0.1-MO | 3/4

# DR-VE-0.1-MO

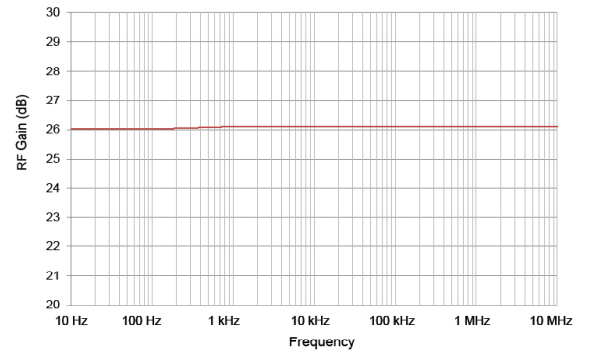
### S Parameters curve

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



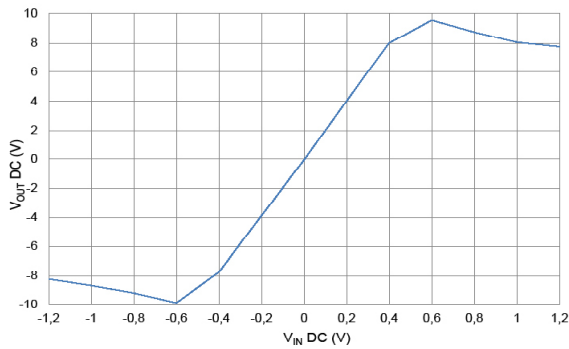
### Low frequencies small signal gain

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



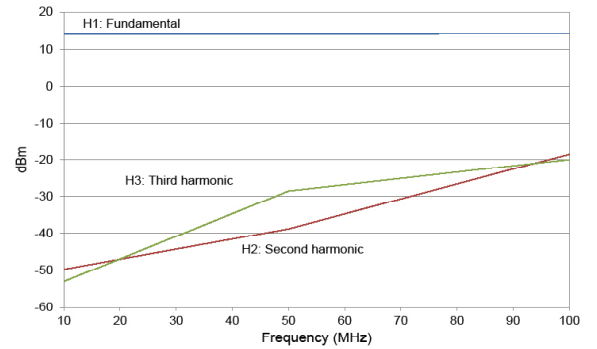
### DC signal gain

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

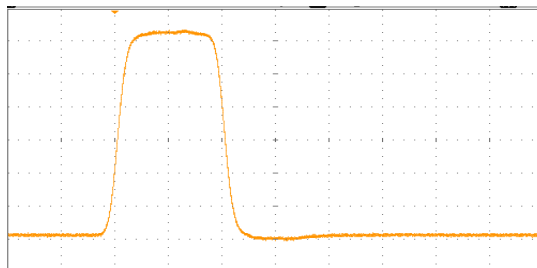


### Harmonics vs frequency - Linearity driver response

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

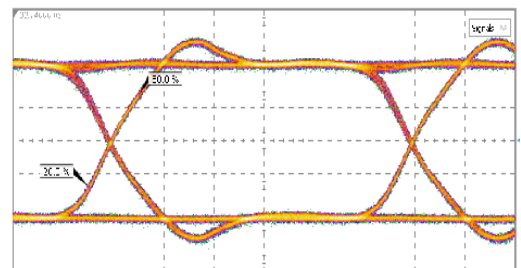


### Electrical pulse - Pulse driver response



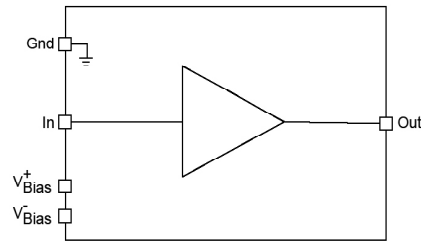
Pulse Width: 20 ns  
Output voltage: 8 Vpp

### 100 Mb/s NRZ Eye Diagram - Digital driver response



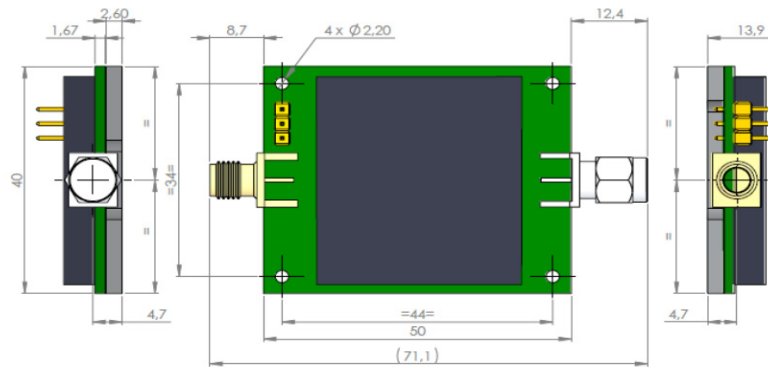
Rise Time: 1.6 ns  
RMS jitter: 42 ps - Peak-peak jitter: 265 ps  
SNR: 30

DRIVER | **DR-VE-0.1-MO** | 4/4  
**Electrical Schematic Diagram**



**Mechanical Diagram and Pinout**

All measurements in mm



The heat-sinking of the module is necessary. It's user responsibility to use an adequate heat-sink.

Port	Function	Unit
IN	RF In	SMA Female connector
OUT	RF Out	SMA Male connector
V <sub>bias</sub>	Power supply voltage	3 PINS - Cables are supplied

**About us**

Exail 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. Exail 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.

Exail reserves the right to change, at any time and without notice, the specifications, design, function or form of its products described herein. All statements, specification, technical information related to the products herein are given in good faith and based upon information believed to be reliable and accurate at the moment of printing. **However, Exail provides no warranty (whether express or implied or statutory) as to the description, sufficiency, accuracy or completeness, merchantability or fitness for a particular purpose of any information or specification detailed herein.** No liability is assumed for any inaccuracies and/or as a result of use of the products. The user must validate all parameters for each application before any use and he **shall** assume all risks and responsibilities in connection with the use of the products.

03\_2023\_ED3 / 00024987