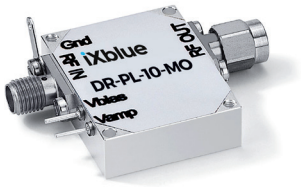
DR-PL-10-MO

Pulse Medium Output Voltage Driver Module

DRIVER



The DR-PL-10-MO RF drivers are amplifiers module designed to drive $LiNbO_3$ optical modulators so as to generate undistorted optical pulses.

Electrical pulsed signals differ from classical telecom signals by long periods with no signal, when telecom signals are usually well balanced in 1 and 0. They also differ from analog signal by a wider frequency content. In order to generate clean optical pulses with sharp edges, sustained high and low levels and no overshoot, pulsed signals do require specific amplifiers.

The DR-PL-10-MO driver is optimized for low and high Pulse Repetition Frequency (PRF) signals from 10 Hz to GHz. The bandwidth up to 10 GHz accommodates 100 ps narrow pulse width with short rise and fall time (down to 25 ps) and can withstand longer pulses up to 100 ns.

The DR-PL-10-MO drivers come in compact connectorized modules that match directly with Photline modulators, they use a single voltage power supply for ease and safety of use and feature an output voltage control for maximum flexibility. An optional heat sink is proposed as an accessory.

FEATURES

- Specific design for pulse signals
- Accommodate a variety of pulse formats
- High pulse fidelity

APPLICATIONS

- Pulse generation
- Pulse picking
- Spectroscopy
- Lidar

OPTIONS

- Heat-sink
- Custom design: higher PW, lower PRF

Performance Highlights

Parameter	Min	Typ	Max	Unit
Cut-off frequencies	45 k	-	8 G	Hz
Output pulse amplitude	2.5	-	8.5	V_{pp}
Gain	-	21	-	dB
Pulse repetition frequency	10	-	1 G	Hz
Pulse width	100 p	-	100 n	s
Rise / Fall time	-	40	-	ps

DC Electrical Characteristics

Parameter	Symbol	Min	Typ	Max	Unit
Supply voltage (fixed)	V_{bias}	9	12	13	V
Driver Supply Current	I_{bias}	-	300	400	mA
Gain control voltage	V_{amp}	0	0.25	0.9	V

Electrical Characteristics

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Lower frequency	f_{3dB}, lower	-3 dB point	45	50	-	kHz
Upper frequency	f_{3dB}, upper	-3 dB point	6	8	-	GHz
Gain	S_{21}	Small signal, P_{in} = -30 dBm	-	21	-	dB
Gain ripple	-	< 7 GHz	-	±1.5	-	dB
Input / Output return loss	S_{11} / S_{22}	50 kHz < f < 10 GHz	-	-10	-	dB
Output pulse amplitude	V_{out}	V_{in} = 300 mV_{pp}	2.5	5	8	V_{pp}
Sat output pulse amplitude	V_{out}	V_{in} = 500 mV_{pp}	-	-	8.5	V_{pp}
Pulse repetition frequency	PRF	100 ps < PW < 100 ns	10	-	1 G	Hz
Pulse width	PW	10 Hz < PRF < 1 GHz	100 p	-	100 n	s
Rise / Fall time	t_R / t_F	20 % - 80 %	-	25	30	ps
Delay time	D_t	-	-	400		ps
Power dissipation	P	-	-	3.6	5.2	W

Conditions: S parameters -30 dBm, T_{amb} = 25°C, 50 Ω system

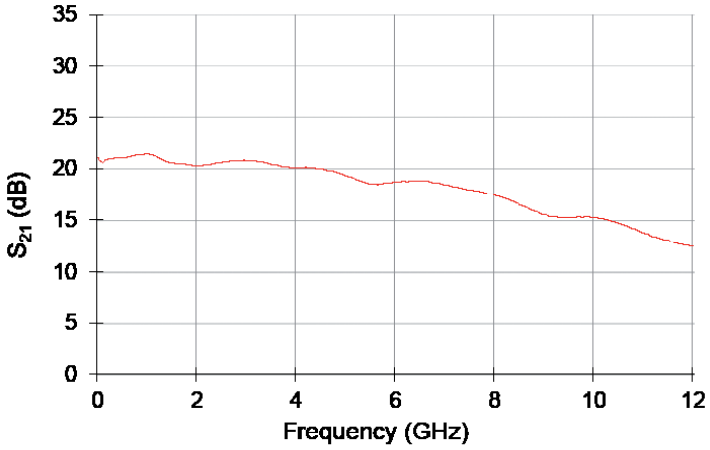
Absolute Maximum Ratings

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}	-	0.5	V_{pp}
Supply voltage	V_{bias}	0	13	V
DC current	I_{bias}	0	400	mA
Gain control voltage	V_{amp}	0	0.9	V
Power dissipation	P_{diss}	-	5.2	W
Temperature of operation	T_{op}	-5	+50	°C
Storage temperature	T_{st}	-40	+70	°C

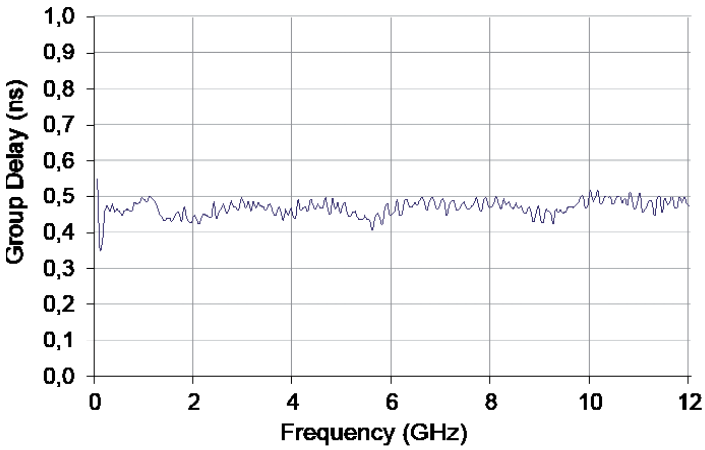
S_{21} Parameter Curve

Conditions: V_{bias} = 12 V, V_{amp} = 0.47 V, I_{bias} = 350 mA



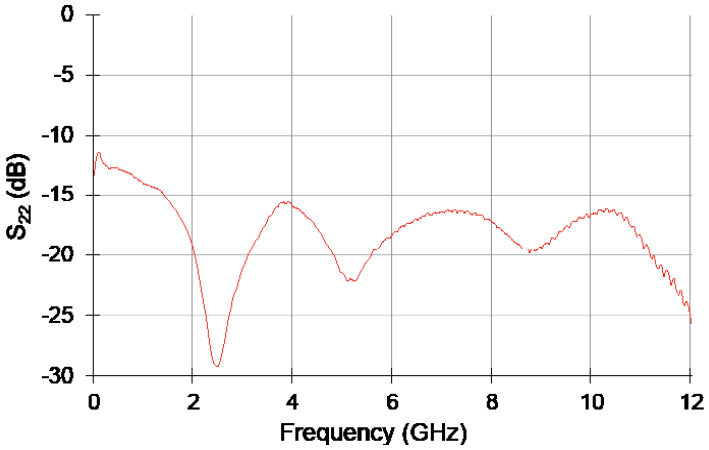
Group Delay Parameter Curve

Conditions: V_{bias} = 12 V, V_{amp} = 0.47 V, I_{bias} = 350 mA



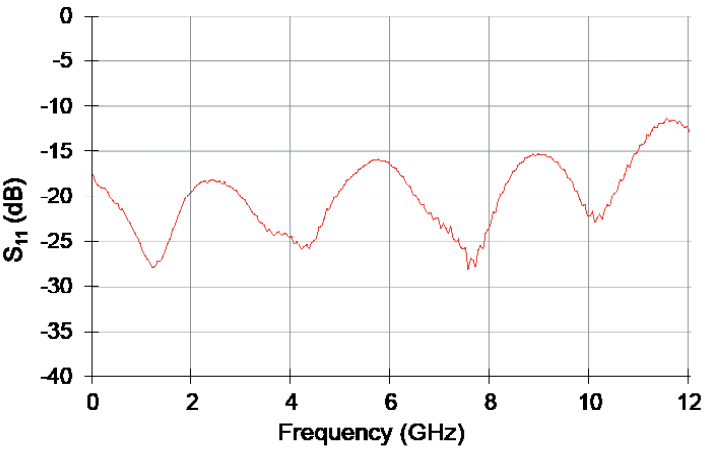
S_{22} Parameter Curve

Conditions: V_{bias} = 12 V, V_{amp} = 0.47 V, I_{bias} = 350 mA



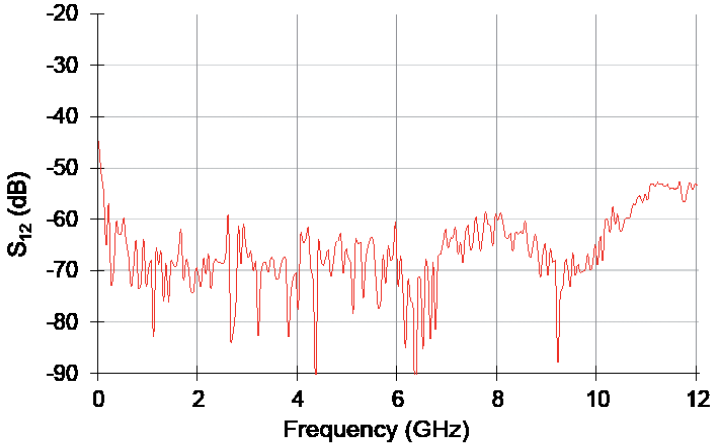
S_{11} Parameter Curve

Conditions: V_{bias} = 12 V, V_{amp} = 0.47 V, I_{bias} = 350 mA



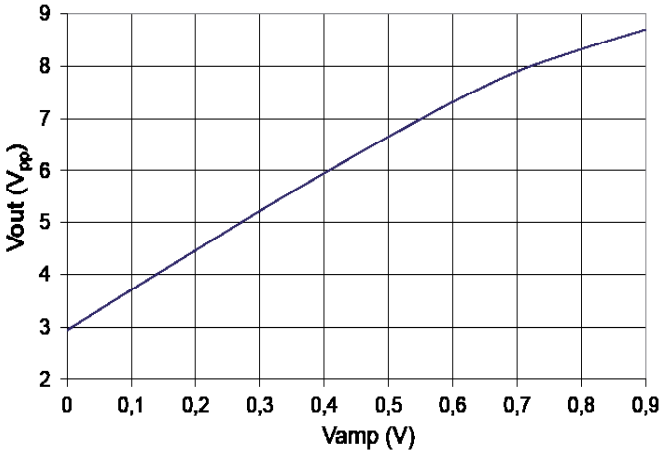
S_{12} Paremeter Curve

Conditions: V_{bias} = 12 V, V_{amp} = 0.47 V, I_{bias} = 350 mA



Typical Output Voltage Amplitude vs V_{amp}

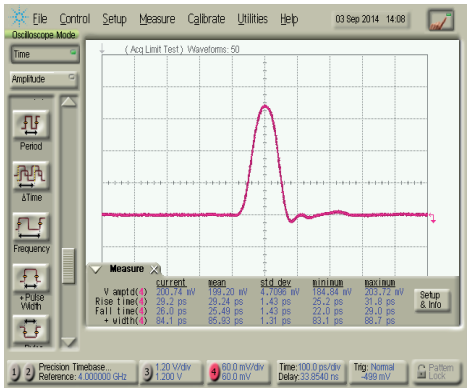
Conditions: V_{bias} = 12 V, V_{IN} = 0.3 V_{pp}



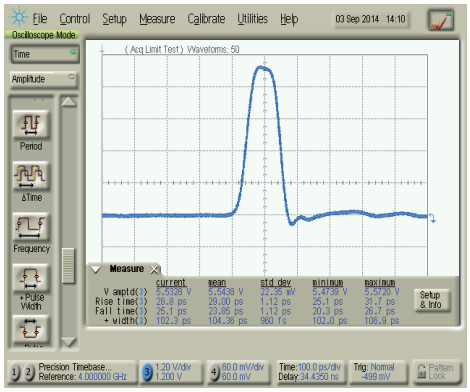
Pulses Measurements

Conditions: Input signal
The input electrical signal is genrated by Anritsu MP1800A. Measured using Agilent 86100B with two 50 GHz 8348A channels module, and the output optical signal measured using Agilent 86100B with two 50 GHz 8348A channels module.

Low frequency repetition rate width wide pulse width: PW = 100 ps, PRF = 100 MHz

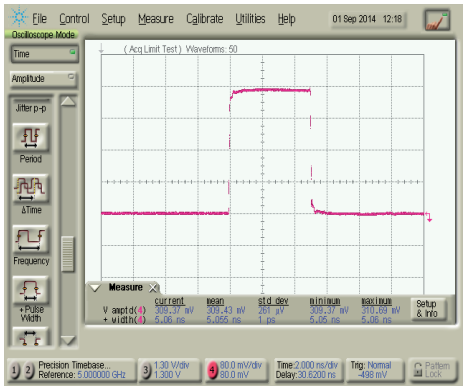


Input signal: Pulse amplitude = 0.200 V_{pp}, Rise time = 29 ps

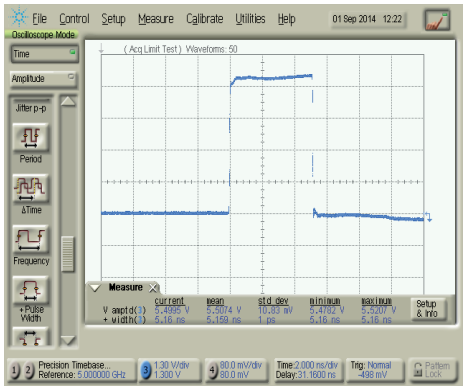


Output response: Pulse amplitude = 5.5 V_{pp}, Rise time = 29 ps

Short frequency repetition rate with medium pulse width: PW = 5 ns, PRF = 10 kHz

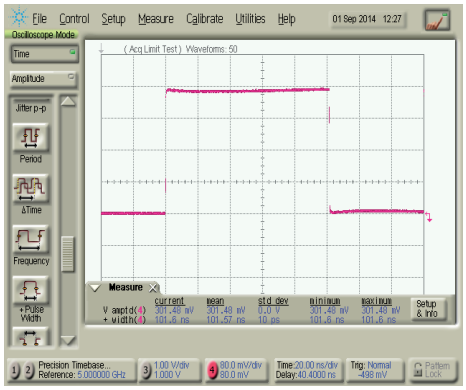


Input signal: Pulse amplitude = 0.31 mV_{pp}, Rise time = 16 ps

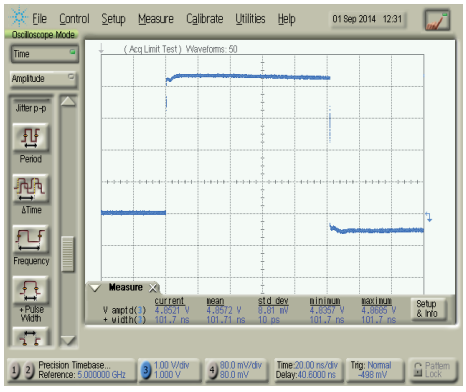


Output response: Pulse amplitude = 5.5 V_{pp}, Rise time = 24 ps

Short frequency repetition rate with long pulse width: PW = 200 ps, PRF = 20 MHz

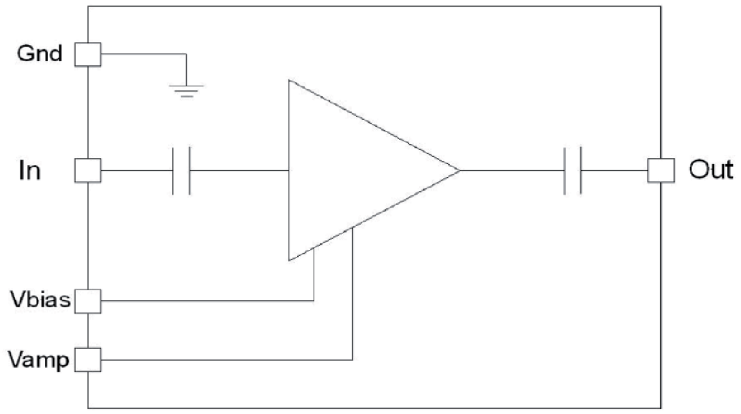


Input signal: Pulse amplitude = 0.37 mV_{pp}, Rise time = 16 ps



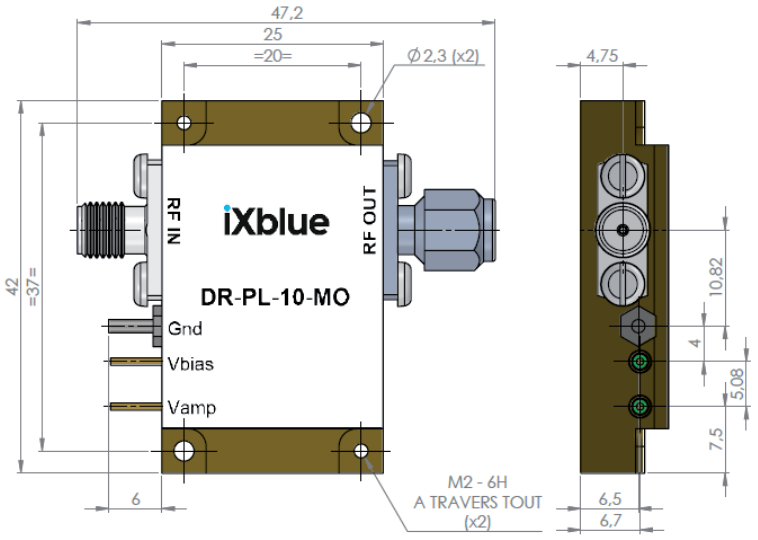
Output response: Pulse amplitude = 4.8 V_{pp}, Rise time = 24 ps

Electrical Schematic Diagram



Mechanical Diagram and Pinout

All measurements in mm

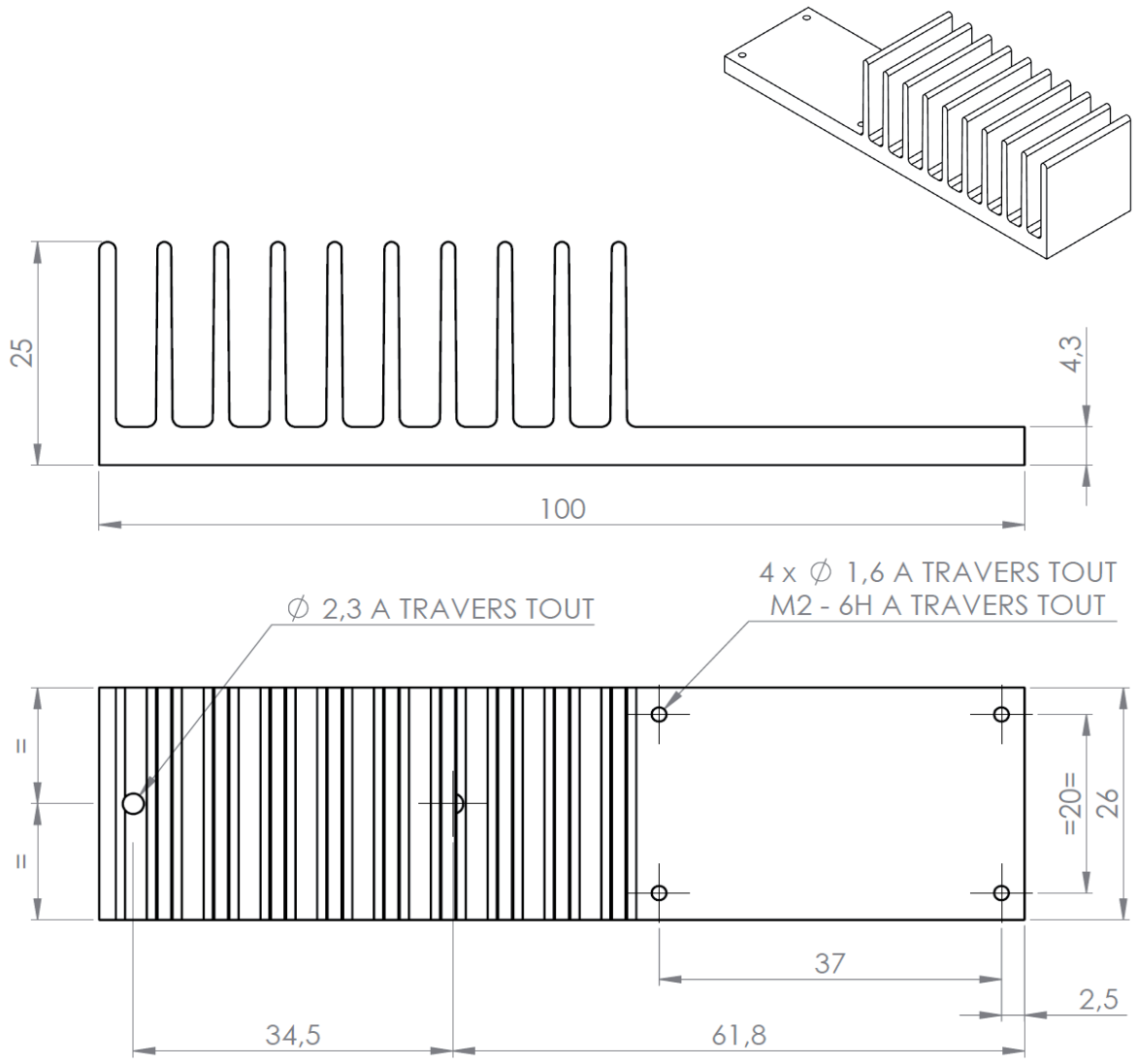


The heatsinking of the module is necessary. It's user responsability to use an adequate heatsink. Refer to page 6 for iXBlue recommended heatsink.

PIN	Function	Operational Notes
IN	RF In	SMA-connector female
OUT	RF Out	SMA-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-HO1 Heatsink

All measurements in mm



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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 ($LiNbO_3$) 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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