

**DR-PL-10-MO-LR/HR**  
Pulse Medium Output Voltage  
Driver Module

**Pulse Driver**



**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

DR-PL series RF drivers are amplifiers modules designed to drive LiNbO<sub>3</sub> 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-LR driver is optimized for low Pulse Repetition Frequency (PRF) signals, with bandwidths up to 10 GHz. It accommodates pulse trains with repetition rate as low as several seconds, short rise and fall time (down to 25 ps), high extinction ratio and width up to 10 ns.

The DR-PL-10-HR is optimized for signals with higher Pulse Repetition Frequency and can withstand longer pulses up to 100 ns.

DR-PL 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.

**Performance Highlights**

Parameter	Min	Typ	Max	Unit
Cut-off frequencies	50 k	-	7 G	Hz
Output voltage	3.5	-	6.5	V <sub>pp</sub>
Gain	-	20	-	dB
Saturated output power	20	-	-	dBm
Pulse repetition frequency	10	-	1 G	Hz
Pulse width	100 p	-	100 n	s
Rise / Fall time	-	40	-	ps

Measurements for V<sub>bias</sub> = 12 V, V<sub>amp</sub> = 0.3 V, I<sub>bias</sub> = 370 mA

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## Digital Driver

### DC Electrical Characteristics

Parameter	Symbol	Min	Typ	Max	Unit
Supply voltage (fixed)	$V_{bias}$	-	12	-	V
Current consumption	$I_{bias}$	-	0.370	-	A
Gain control voltage	$V_{amp}$	0	0.4	-	V

### Electrical Characteristics

Conditions:  $V_{in} = 0.25 V_{pp}$ ,  $T_{amb} = 25\text{ }^{\circ}\text{C}$ ,  $50\text{ }\Omega$  system

Parameter	Symbol	Model	Condition	Min	Typ	Max	Unit
Lower frequency	$f_{3dB, lower}$	DR-PL-10	-3 dB point	-	-	45	kHz
Upper frequency	$f_{3dB, upper}$	DR-PL-10	-3 dB point	7	-	-	GHz
Gain	$S_{21}$	DR-PL-10	Small signal, $P_{in} = -30\text{ dBm}$	-	21	-	dB
Gain ripple	-	DR-PL-10	< 7 GHz	-	$\pm 1.5$	-	dB
Input / Output return loss	$S_{11} / S_{22}$	DR-PL-10	50 kHz < f < 10 GHz	-	-10	-	dB
Saturated output power	$P_{sat}$	DR-PL-10	$V_{in} = 0.2 V_{pp} - 0.5 V_{pp}$	20	-	-	dBm
Output voltage	$V_{out}$	DR-PL-10	$V_{in} = 0.2 V_{pp} - 0.5 V_{pp}$	3.5	5.5	6.5	$V_{pp}$
Pulse repetition frequency	PRF	DR-PL-10-LR	100 ps < PW < 10 ns	10	-	100 M	Hz
		DR-PL-10-HR	100 ps < PW < 100 ns	50 k	-	1 G	Hz
Pulse width	PW	DR-PL-10-LR	10 Hz < PRF < 100 Mz	100 p	-	10 n	s
		DR-PL-10-HR	50 kHz < PRF < 1 GHz	100 p	-	100 n	s
Rise / Fall time	$t_R / t_F$	DR-PL-10	20 % - 80 %	-	25	-	ps
Delay time	$D_t$	DR-PL-10	-	-	400	-	ps
Power dissipation			$V_{out} = 8 V_{pp}$	-	3.2	-	W

### Absolute Maximum Ratings

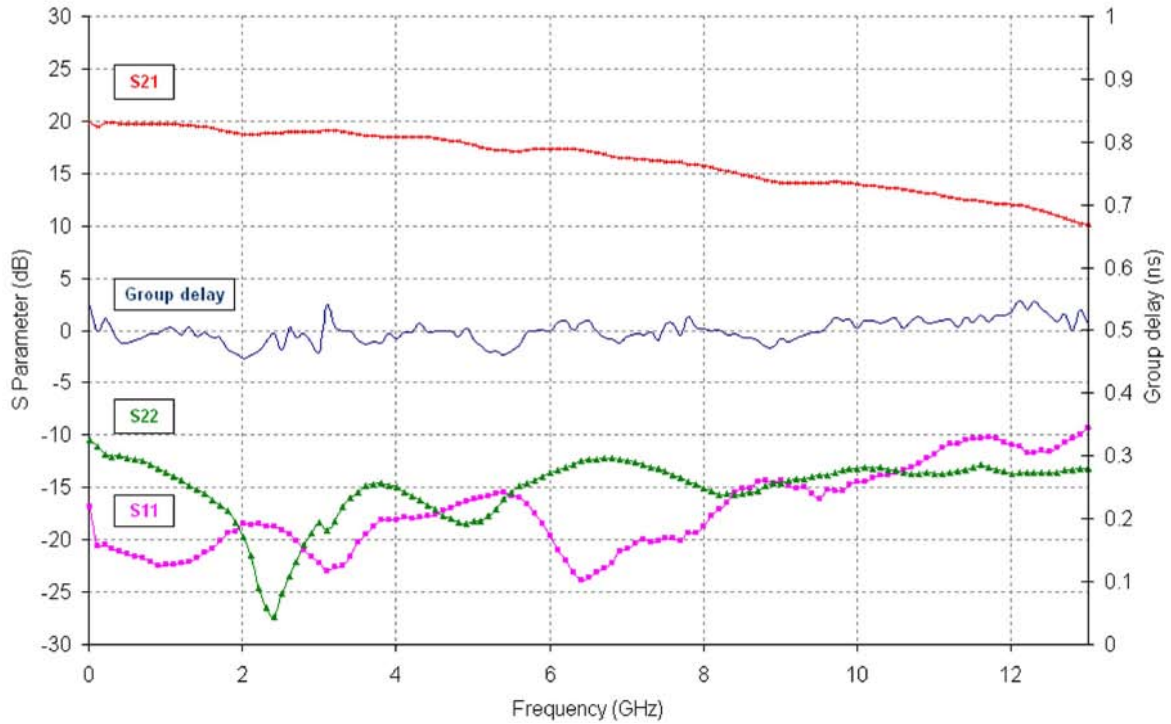
Stresses in excess of the absolute maximum ratings can cause permanent damage to the device. These are absolute stress ratings only. Functional operation of the device is not implied at these or any other conditions in excess of those given in the operational sections of the data sheet. Exposure to absolute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

Parameter	Symbol	Min	Max	Unit
RF input voltage	$V_{in}$	-	0.6	$V_{pp}$
Supply voltage	$V_{bias}$	0	13	V
DC current	$I_{bias}$	0	0.4	A
Gain control voltage	$V_{amp}$	0	0.6	V
Power dissipation	$P_{diss}$	-	5.2	W
Temperature of operation	$T_{op}$	-5	+50	W
Storage temperature	$T_{st}$	-40	+70	$^{\circ}\text{C}$



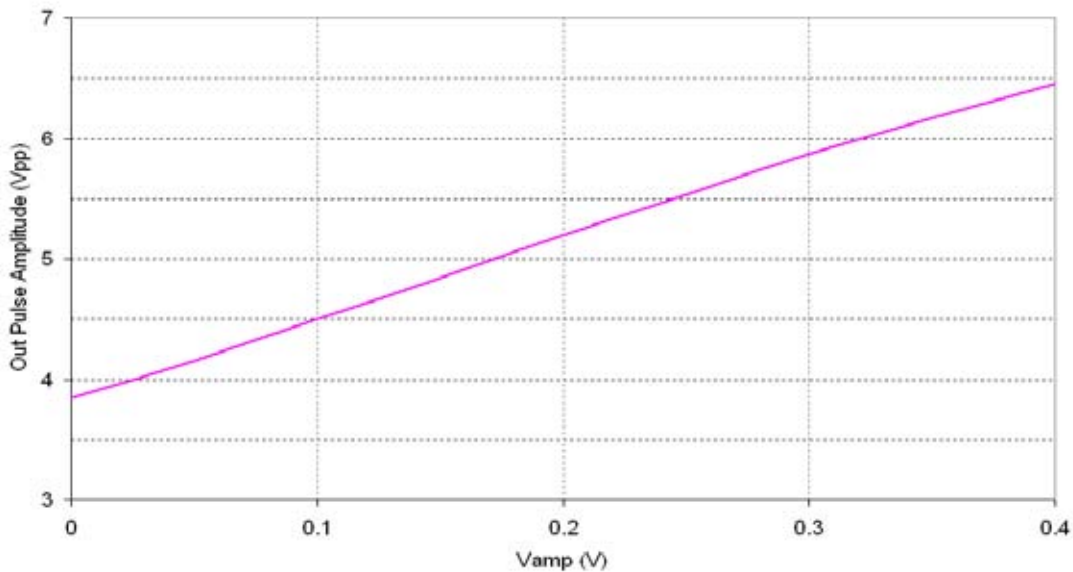
### S Parameters Curves

Conditions:  $V_{bias} = 12\text{ V}$ ,  $V_{amp} = 0.3\text{ V}$ ,  $I_{bias} = 366\text{ mA}$



### Typical Output Voltage Amplitude vs $V_{amp}$

Conditions:  $V_{bias} = 12\text{ V}$



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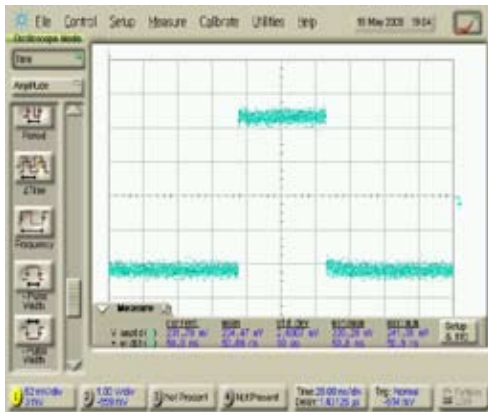
**Digital Driver**

**Eye Diagrams**

Low frequency repetition rate width wide pulse width

PW = 40 ns, PRF = 100 kHz

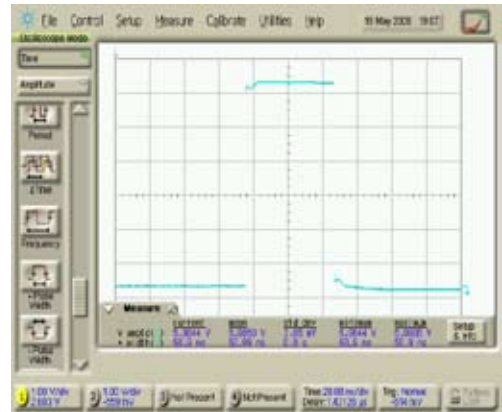
$V_{bias} = 12\text{ V}$ ,  $V_{amp} = 0.3\text{ V}$ ,  $I_{bias} = 370\text{ mA}$



**Input signal**

Generated by Anritsu MP1758A

Eye amplitude =  $0.25\text{ V}_{pp}$ , Rise time = 17 ps



**Output response**

Measured using Agilent 86100B with two 50 GHz

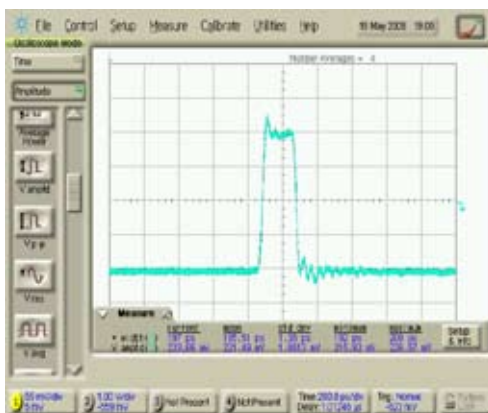
8348A channels module, and without precision time-base module

Eye amplitude =  $6\text{ V}_{pp}$ , Rise time = 27 ps

Wide frequency repetition rate with short pulse width

PW = 200 ps, PRF = 20 MHz

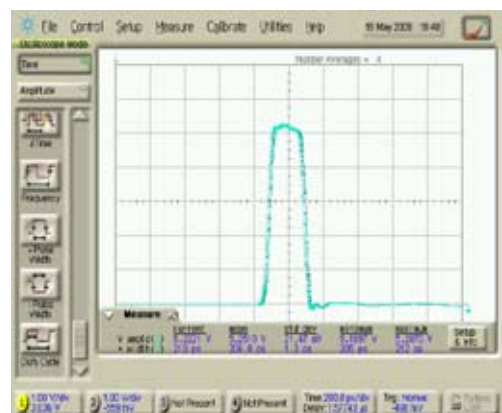
$V_{bias} = 12\text{ V}$ ,  $V_{amp} = 0.3\text{ V}$ ,  $I_{bias} = 370\text{ mA}$



**Input signal**

Generated by Anritsu MP1758A

Eye amplitude =  $0.25\text{ mV}_{pp}$ , Rise time = 16 ps



**Output response**

Measured using Agilent 86100B with two 50 GHz

8348A channels module, and without precision time-base module

Eye amplitude =  $6.18\text{ V}_{pp}$ , Rise time = 24 ps

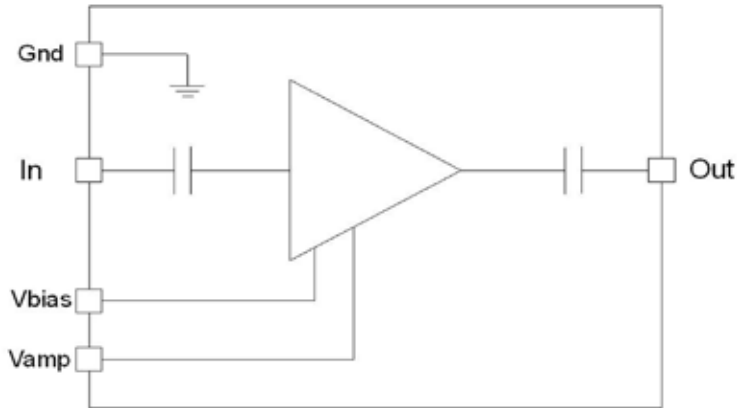


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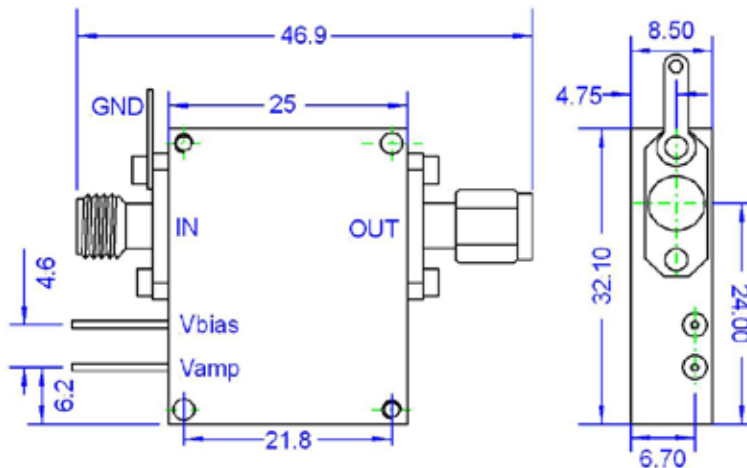
### Digital Driver

#### 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 6 for Photline Technologies 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

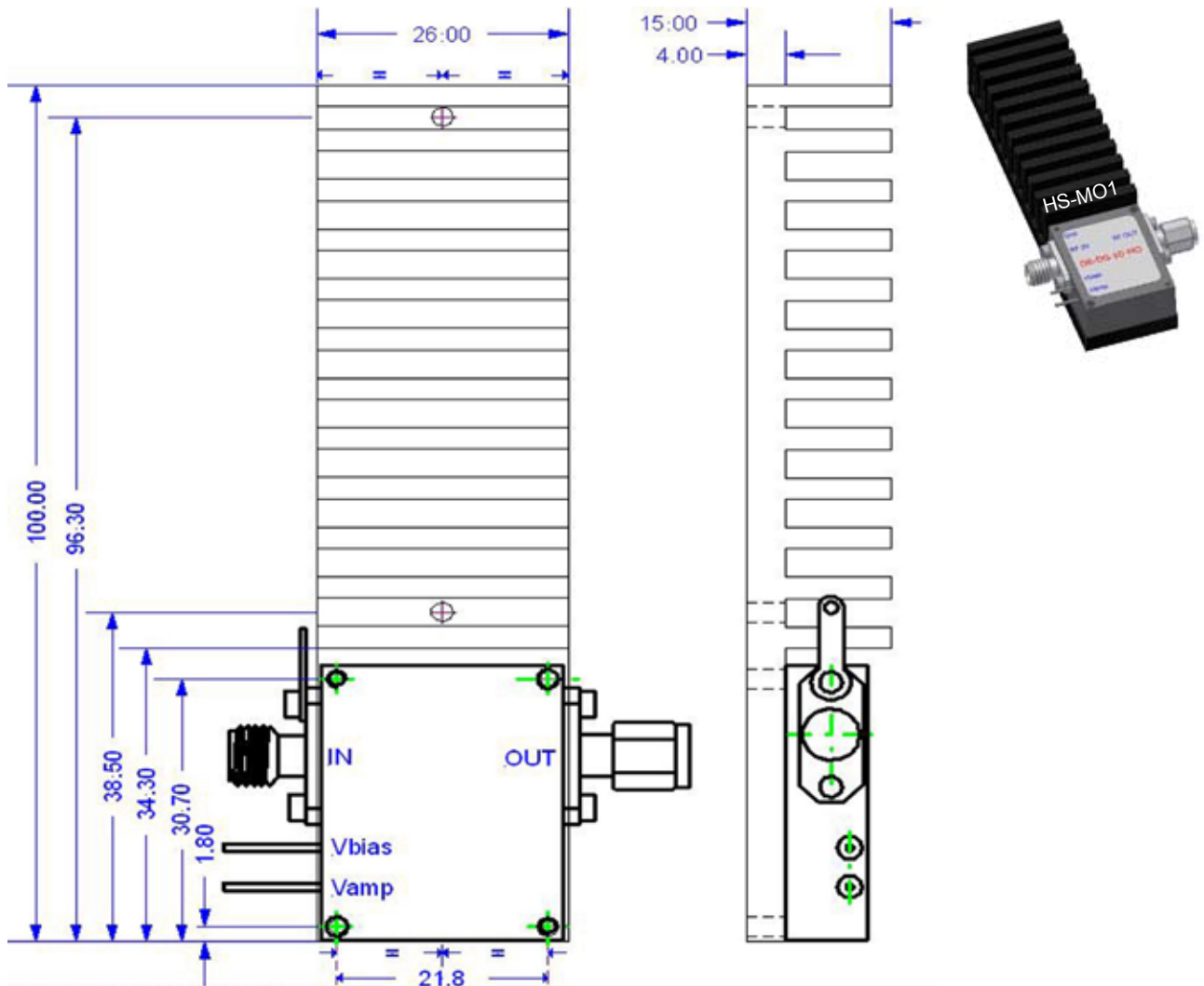


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**Mechanical Diagram and Pinout with HS-MO1 Heatsink**

All measurements in mm



**ABOUT US**

Photline Technologies is a provider of Fiber Optics Modulation Solutions based on the company LiNbO3 modulators and high-speed electronics modules. Photline Technologies offers high speed and high data rate modulation solutions for the telecommunication industry and the defense, aerospace, instruments and sensors markets. The products offered by the company include : comprehensive range of intensity and phase modulators (800 nm, 1060 nm, 1300 nm, 1550 nm), RF drivers and modules, transmitters and modulation units.

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