DR-DG-10-MO-RZ
12.5 Gbps RZ Medium Output Voltage Driver Module

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Delivering Modulation Solutions

The DR-DG-10-MO-RZ is a driver module specially designed for 10 Gbps / 12.5 Gbps data transmission with RZ format. It exhibits a 20 dB gain and can deliver an output signal up to 8 V_{pp}.

The DR-DG-10-MO-RZ is a key component to obtain high quality 12.5 Gbps eye diagrams with high SNR, low jitter and short rise and fall time. It operates from a single power supply for safety and ease of use, and offers gain control over 3 dB. It comes with SMA type RF connectors (female in, male out) and with an optional heat sink.

Features

- Output voltage 8 V_{pp}
- High SNR > 25
- Flat gain up to 7 GHz
- Single voltage power supply

Applications

- $LiNbO_3$ modulators
- 12.5 Gbps RZ
- OC-192 SONET / SDH
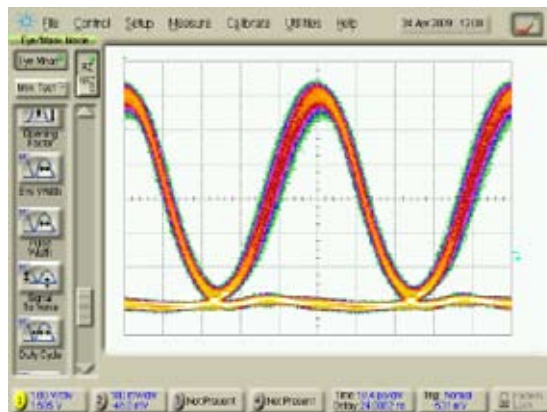- Research & Development

Options

- Heat-sink
- Alternative RF connectors
- High output voltage version (12 V_{pp})
- High bandwidth version (15 GHz)

Performance Highlights

Parameter	Min	Typ	Max	Unit
Cut-off frequencies	50 k	-	7 G	Hz
Output voltage	-	6	-	V_{pp}
Gain	-	21	-	dB
Saturated output power	21	-	-	dBm
Added jitter	-	1.1	-	ps
Rise / Fall times	-	22 / 22	-	ps

Measurements for V_{bias} = 12 V, V_{amp} = 0.4 V, I_{bias} = 340 mA

10.709 Gbps Output Response

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DC Electrical Characteristics

Parameter	Symbol	Min	Typ	Max	Unit
Supply voltage (fixed)	V_{bias}	-	12	-	V
Current consumption	I_{bias}	-	0.340	-	A
Gain control voltage	V_{amp}	0	0.4	-	V

Electrical Characteristics
Conditions: V_{in} = 0.5 V_{pp}, T_{amb} = 25 °C, 50 Ω system

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	6	7	-	GHz
Gain	S_{21}	Small signal	-	21	-	dB
Gain ripple	-	< 7 GHz	-	±1.5	-	dB
Input return loss	S_{11}	50 kHz < f < 10 GHz	-	-10	-	dB
Output return loss	S_{22}	50 kHz < f < 10 GHz	-	-10	-	dB
Saturated output power	P_{sat}	V_{in} = 0.5 V_{pp}	21	-	22	dBm
Output voltage	V_{out}	V_{in} = 0.5 V_{pp}	4	-	8	V_{pp}
Rise / Fall time	t_r / t_f	20 % - 80 %	-	22 / 22	-	ps
Added jitter	J_{RMS}	$J_{RMS}= \sqrt{J^2_{RMS\text{-}total} - J^2_{RMS\text{-}source}}$	-	1.1	-	ps
Power dissipation	P	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}	-	1.5	V_{pp}
Supply voltage	V_{bias}	0	13	V
DC current	I_{bias}	0	0.4	A
Gain control voltage	V_{amp}	0	1	V
Power dissipation	P_{diss}	-	5.2	W
Temperature of operation	T_{op}	-5	+50	W
Storage temperature	T_{st}	-40	+70	°C

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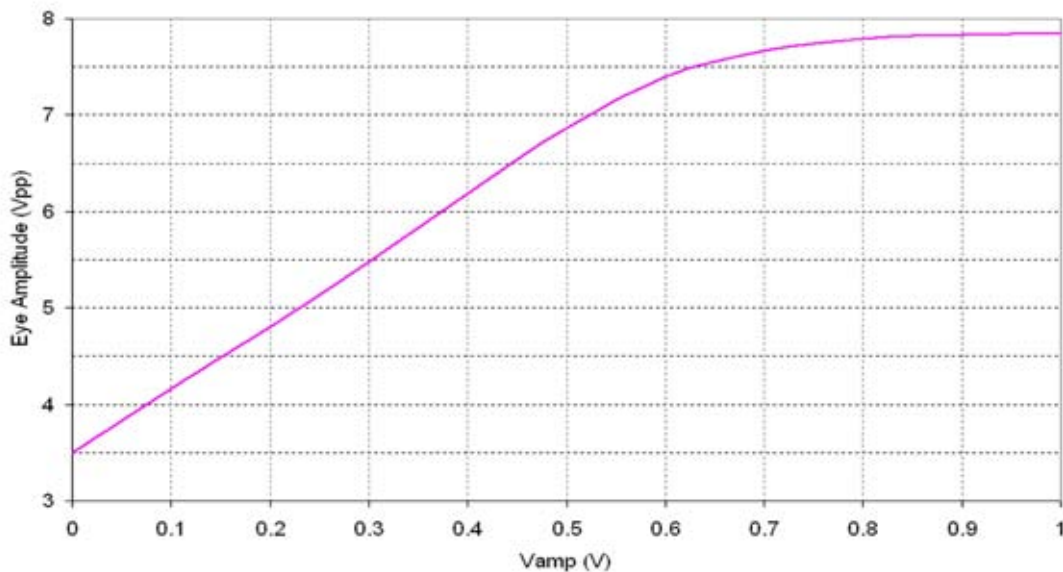**Technologies**
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S Parameters Curves
Conditions: V_{bias} = 12 V, V_{amp} = 0.4 V, I_{bias} = 334 mA
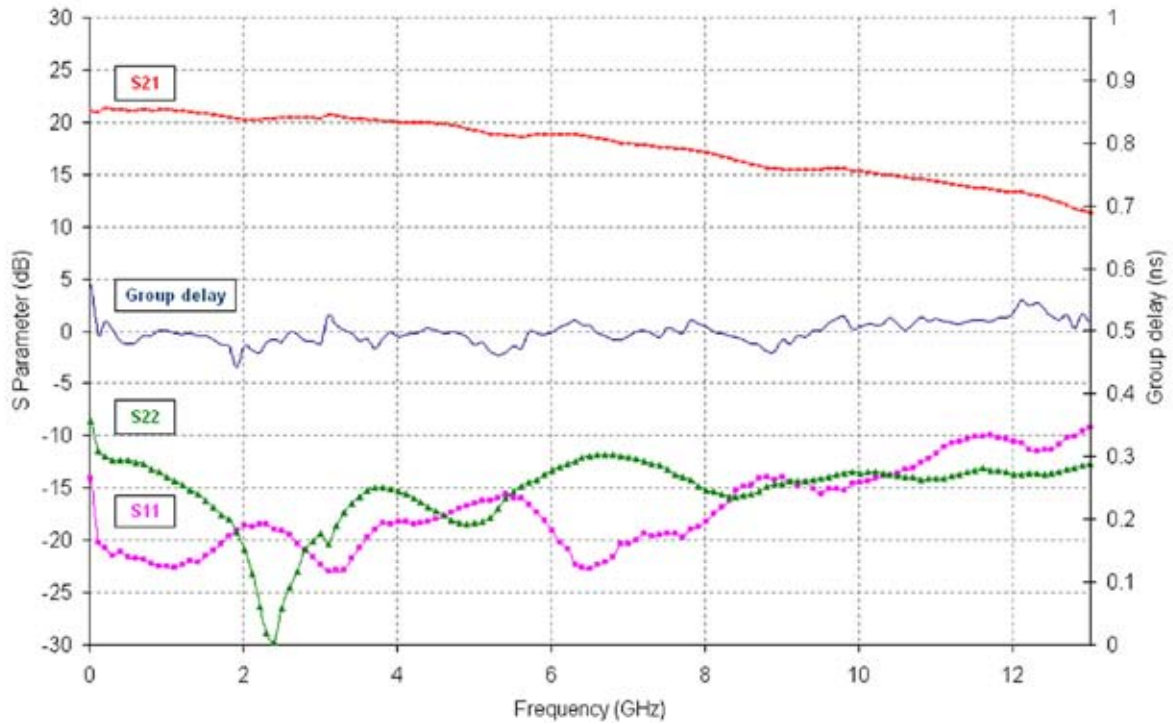
Typical Output Voltage Amplitude vs V_{amp}
Conditions: V_{bias} = 12 V

DR-DG-10-MO-RZ
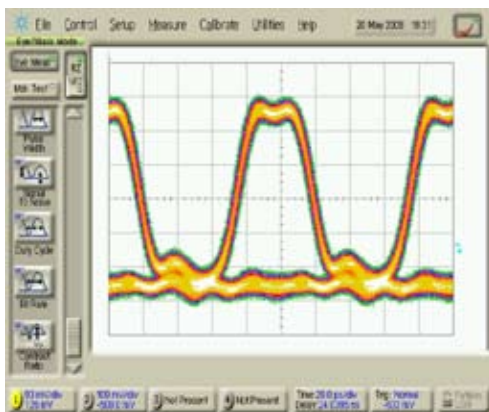## 12.5 Gbps RZ Medium Output Voltage Driver Module

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Eye Diagrams

9.952 Gbps data rate

Conditions: Ratio $\frac{1}{2}$, Pattern 2^{31}-1

V_{bias} = 12 V, V_{amp} = 0.27 V, I_{bias} = 304 mA

Input signal

Genrated by Anritsu MP1758A

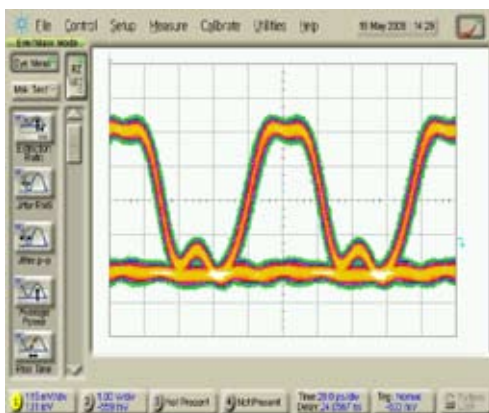Eye amplitude = 0.47 V_{pp}, Rise time = 11.6 ps
Jitter RMS = 1.05 ps, SNR = 19.8
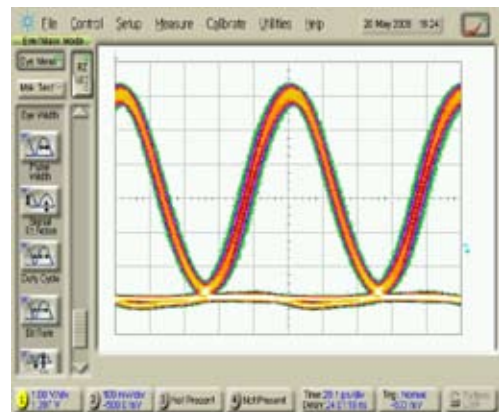
Output response

Measured using Agilent 86100B with two 50 GHz

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

Eye amplitude = 6 V_{pp}, Rise time = 21.4 ps
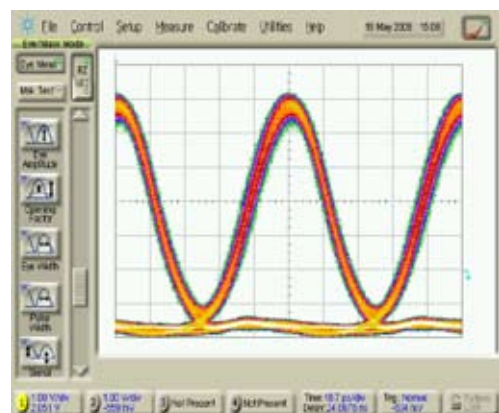Jitter RMS = 1.34 ps, SNR = 30.6

10.709 Gbps data rate

Conditions: Ratio $\frac{1}{2}$, Pattern 2^{31}-1

V_{bias} = 12 V, V_{amp} = 0.4 V, I_{bias} = 334 mA

Input signal

Generated with a NEL MOF15A 2:1 selector

Eye amplitude = 0.47 V_{pp}, Rise time = 11.6 ps
Jitter RMS = 1.08 ps, SNR = 20

Output response

Measured using Agilent 86100B with two 50 GHz

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

Eye amplitude = 6.4 V_{pp}, Rise time = 19.9 ps
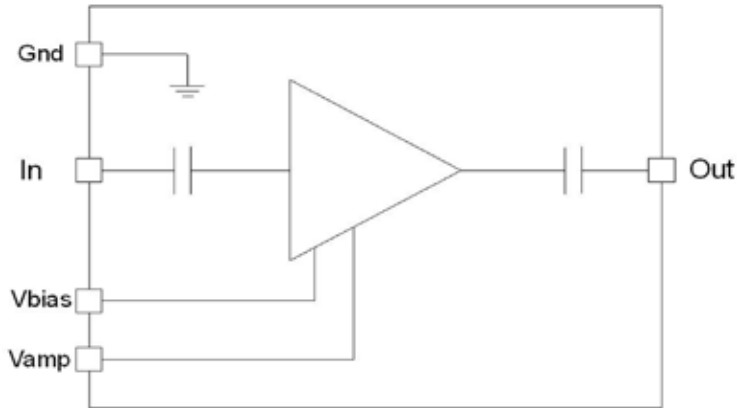Jitter RMS = 1.27 ps, SNR = 25.3

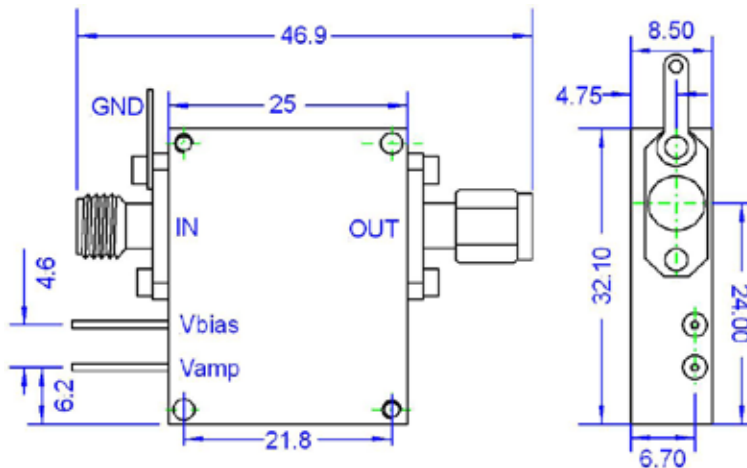# DR-DG-10-MO-RZ
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Electrical Schematic Diagram

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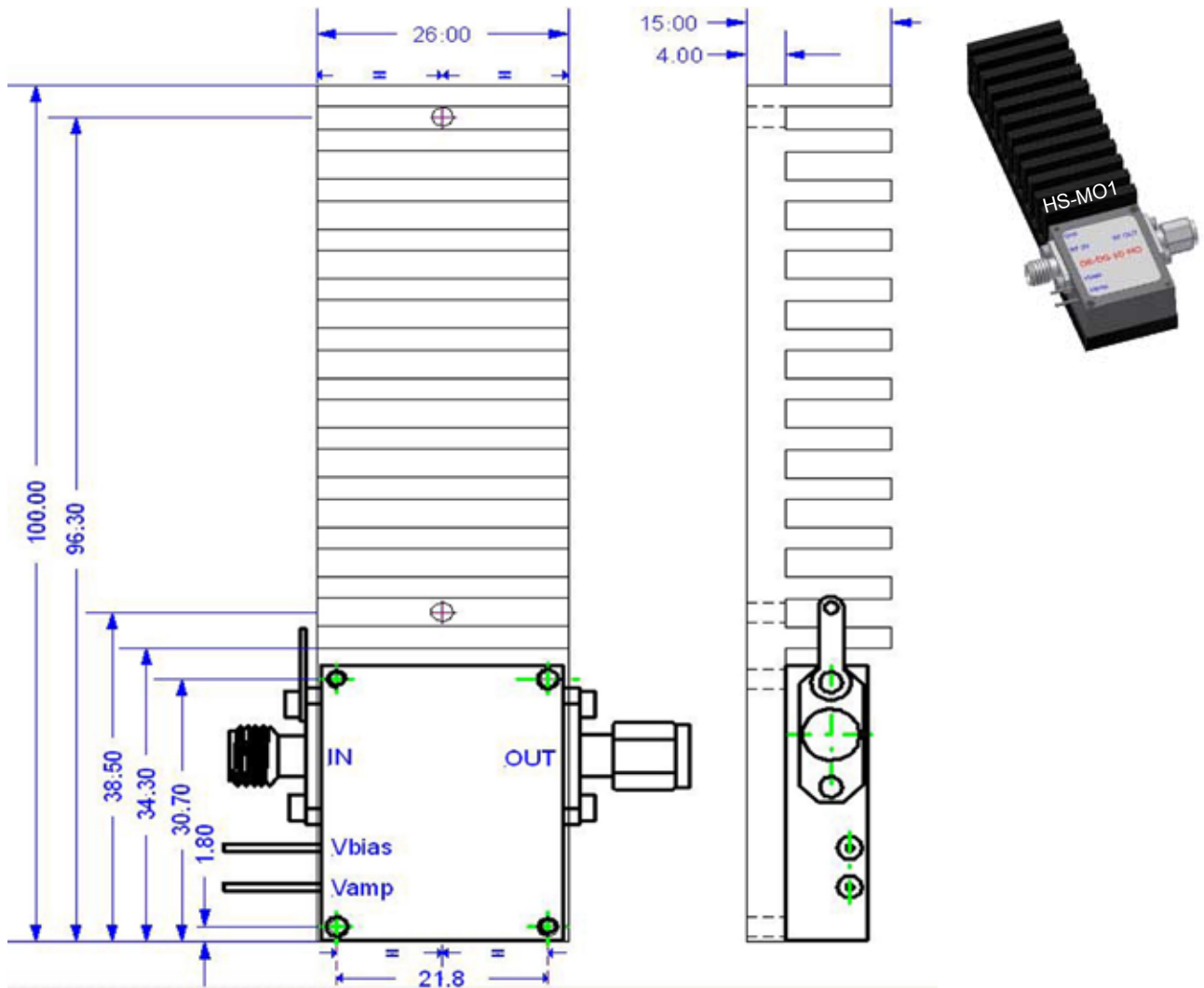
PIN	Function	Operational Notes
IN	RF In	SMA-connector female
OUT	RF Out	SMA-connector male
V_{bias}	Power supply voltage	Set at typical operating specification
V_{amp}	Output voltage amplitude adjustment	Adjust for gain control tuning

Digital Driver

Mechanical Diagram and Pinout with HS-MO1 Heatsink
All measurements in mm

V1, PT-Q1-2009

ABOUT US

Photline Technologies is a provider of Fiber Optics Modulation Solutions based on the company LiNb03 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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