DRIVER

# DR-AN-40-MO

## 40 GHz Analog Medium Output Voltage Driver

The DR-AN-40-MO is a wideband RF non-inverting amplifier module designed for analog applications at frequencies up to 40 GHz.

The DR-AN-40-MO is characterized by a low Noise Figure and a linear transfer function whose 1 dB compression point is above 17 dBm. It exhibits flat Group Delay and Gain curves with reduced ripple over the entire bandwidth.

The DR-AN-40-MO operates from a single power supply for safety and ease of use, and offers gain control over 3 dB. It comes in a compact housing with V type RF connectors and with an optional heat-sink.

This amplifier module is ideally suited to drive optical modulators for analog applications.




### Features

- Output voltage up to 6 $V_{pp}$
- Linear amplifier
- Flat gain up to 30 GHz
- Single voltage power supply
- Low group delay variation

### Applications

- $LiNbO_3$ & InP modulators
- OFDM, RoF, phase modulation
- Research & Development

### Options

- Heat-sink
- Low output voltage version for EAM

### Related Equipments

- MX-LN-40, MXAN-LN-40 modulators
- MBC-AN Automatic Bias Controllers

### Performance Highlights

| Parameter | Min | Typ | Max | Unit |
|---|---|---|---|---|
| Cut-off frequencies | 50 k | - | 40 G | Hz |
| Output voltage | - | - | 6.3 | $V_{pp}$ |
| Gain | - | 26 | - | dB |
| Saturated output power | - | - | 20 | dBm |
| Output power 1 dB comp | 15 | 17 | - | dB |
| Noise figure | 3 | - | 5 | dB |

Measurements for $V_{bias}$ = 8 V, $V_{amp}$ = 1.5 V, $V_{xp}$ = 2.2 V, $I_{bias}$ = 300 mA

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### DC Electrical Characteristics

| Parameter | Symbol | Min | Typ | Max | Unit |
|---|---|---|---|---|---|
| Supply voltage (fixed) | $V_{bias}$ | 7 | 8 | 9 | V |
| Current consumption | $I_{bias}$ | - | 300 | 350 | mA |
| Gain control voltage | $V_{amp}$ | 0 | 1.5 | 1.7 | V |
| Cross point control Voltage | $V_{xp}$ | 0 | 2.2 | 2.3 | V |

### Electrical Characteristics

| 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 | 36 | 40 | - | GHz |
| Gain | $S_{21}$ | Small signal | - | 26 | - | dB |
| Gain ripple | - | < 40 GHz | - | ± 1.5 | - | dB |
| Input return loss | $S_{11}$ | 50 MHz < f < 30 GHz | - | -10 | - | dB |
| Output return loss | $S_{22}$ | 50 MHz < f < 30 GHz | - | -10 | - | dB |
| Isolation | $S_{12}$ | 50 MHz < f < 30 GHz | - | -60 | - | dB |
| Output power 1 dB | $P_{1\,dB}$ | 2 GHz < f < 20 GHz | 15 | 17 | - | dBm |
| Saturated power | $P_{sat}$ | f < 20 GHz | - | 20 | - | dBm |
| Output voltage | $V_{out}$ | Linear | 0 | 4.5 | - | $V_{pp}$ |
| | | Maximum swing | 0 | 6.3 | - | |
| Noise figure | NF | f < 1 GHz | 5 | - | - | dB |
| | | 1 GHz < f < 26 GHz | 3 | - | 5 | |
| Power dissipation | P | - | - | 2.4 | 3.2 | W |

### Absolute Maximum Ratings

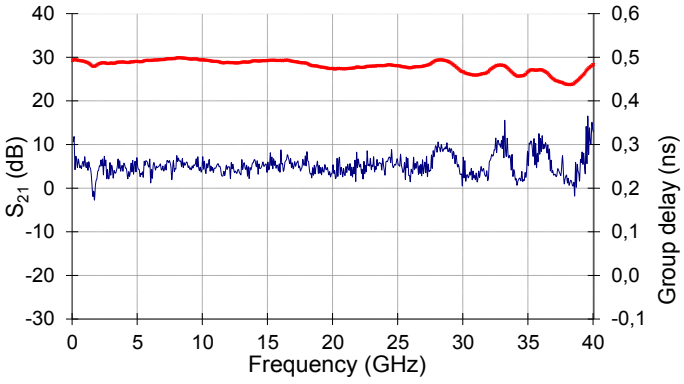
Stresses in excess of the absolute maximum ratings can cause permanent damage to the device. These are absolute stress ratings only. Functional operation of the device is not implied at these or any other conditions in excess of those given in the operational sections of the data sheet. Exposure to absolute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

| Parameter | Symbol | Min | Max | Unit |
|---|---|---|---|---|
| RF input voltage | $V_{in}$ | - | 0.63 | $V_{pp}$ |
| Supply voltage | $V_{bias}$ | 0 | 9 | V |
| DC current | $I_{bias}$ | 0 | 350 | mA |
| Gain control voltage | $V_{amp}$ | 0 | 1.7 | V |
| Output power control voltage | $V_{xp}$ | 0 | 2.3 | V |
| Power dissipation | $P_{diss}$ | - | 3.2 | W |
| Operating temperature | $T_{op}$ | 0 | +40 | °C |
| Storage temperature | $T_{st}$ | -20 | +70 | °C |

# DR-AN-40-MO

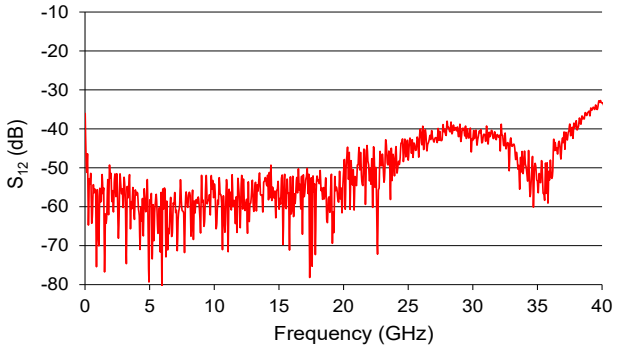
## $S_{21}$ and Group Delay Parameter Curves

Conditions: $V_{bias}$ = 8 V, $V_{amp}$ = 1.5 V, $V_{xp}$ = 2.2 V, $I_{bias}$ = 300 mA



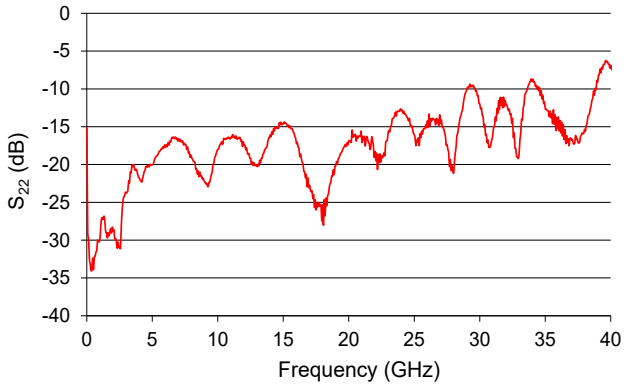

## $S_{12}$ Parameter Curve

Conditions: $V_{bias}$ = 8 V, $V_{amp}$ = 1.5 V, $V_{xp}$ = 2.2 V, $I_{bias}$ = 300 mA



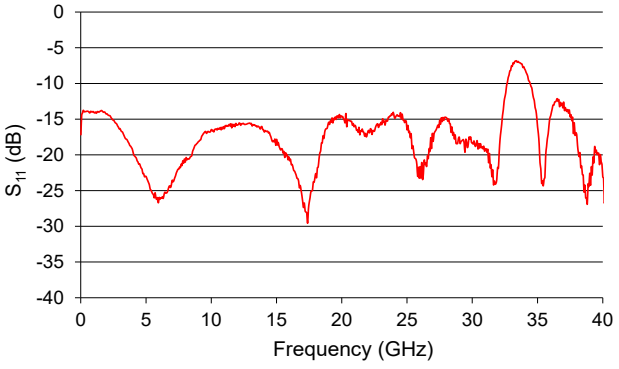

## $S_{22}$ Parameter Curve

Conditions: $V_{bias}$ = 8 V, $V_{amp}$ = 1.5 V, $V_{xp}$ = 2.2 V, $I_{bias}$ = 300 mA



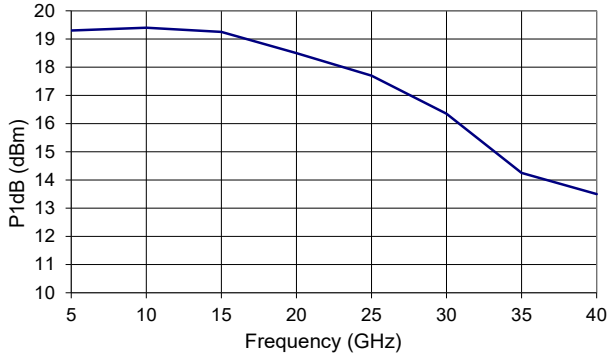

## $S_{11}$ Parameter Curve

Conditions: $V_{bias}$ = 8 V, $V_{amp}$ = 1.5 V, $V_{xp}$ =2.2 V, $I_{bias}$ = 300 mA



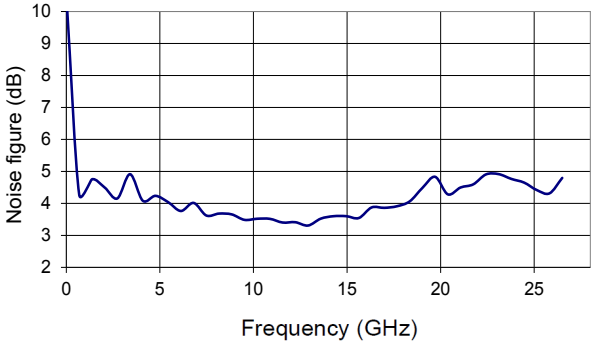

## Saturated Output Power Curve

Conditions: $V_{bias}$ = 8 V, $V_{amp}$ = 1.5 V, $V_{xp}$ = 2.2 V, $I_{bias}$ = 300 mA

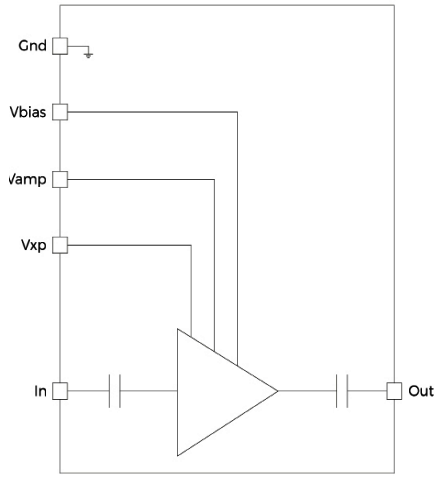



## Noise Figure Curve

Conditions: $V_{bias}$ = 8 V, $V_{amp}$ = 1.5 V, $V_{xp}$ = 2.2 V, $I_{bias}$ = 300 mA

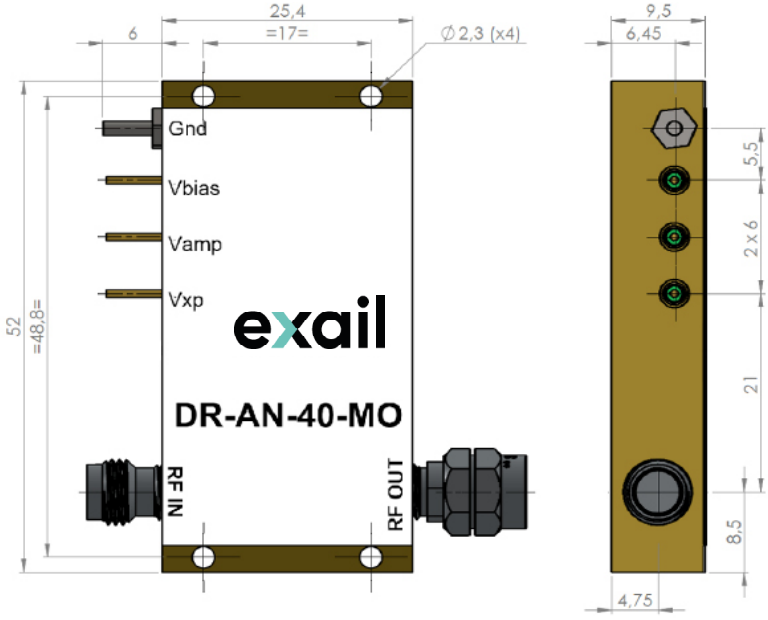


## Electrical Schematic Diagram




## Mechanical Diagram and Pinout

All measurements in mm

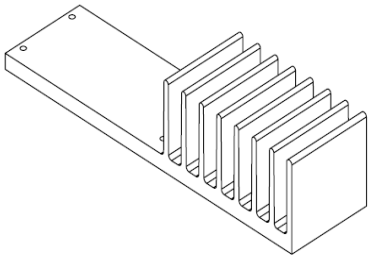


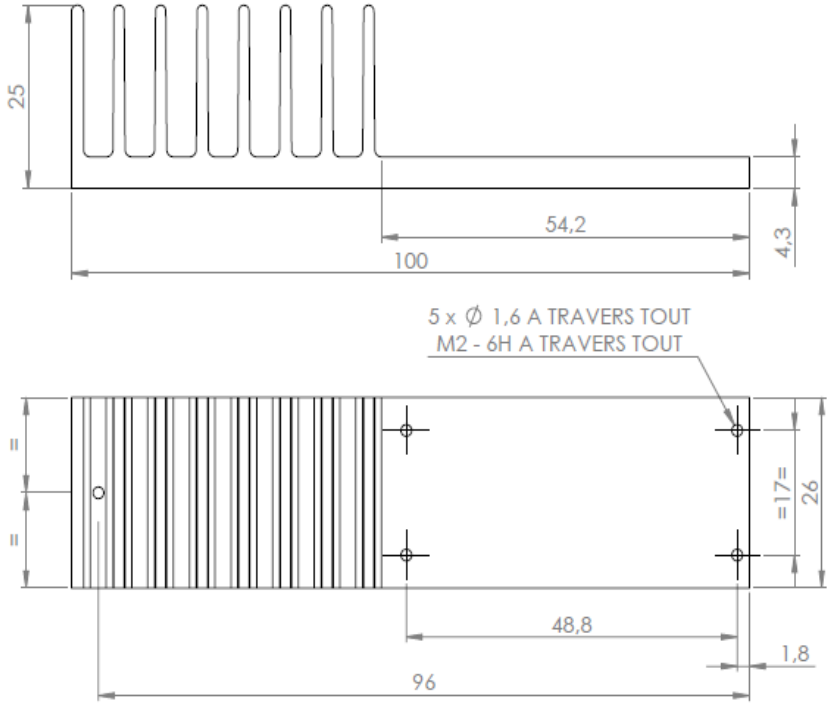

The heat-sinking of the module is necessary. It's user responsability to use an adequate heat-sink. Refer to page 5 for Exail recommended heat-sink.

| Port | Function | Unit |
|---|---|---|
| IN | RF In | Female V connector |
| OUT | RF Out | Male V connector |
| $V_{bias}$ | Power supply voltage | Set a typical operating specification |
| $V_{amp}$ | Output voltage amplitude adjustment | Adjust for gain control tuning |
| $V_{xp}$ | Output power adjustment | Adjust for power tuning |

## Mechanical Diagram and Pinout with HS-MO4 Heat-sink

All measurements in mm






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