

Product Bulletin



VM12EMD Series 12 Gb/s Drivers for M-Z Light Modulators or EMLs

These rugged, low-cost, high performance modulator-drivers utilize single-substrate COPLANAR MIC thin-film technology and state-of-art GaAs active devices. Systems using these drivers will achieve improved EYE opening, increased phase margin over time and temperature, higher extinction ratios, and lower BER. Useful to 20 Gb/s NRZ.

A highly rectangular EYE is produced at rates to 12 Gb/s, and a sinusoidal EYE at 20 Gb/s. Designed to drive Mach-Zehnder external modulators from ECL/SCFL input levels, they feature (a) a built-in bias terminal, (b) an EYE symmetry adjust terminal, (c) a “digitized” output for very high extinction ratios even when the input data is relatively “dirty”, (d) constant output over temperature and V_{in} , and (e) well-matched input and output impedances.

The output, though “saturated”, is electrically adjustable over a wide range. Typical output rise and fall times at nominal input and output approach 20 ps. Pulse parameters such as rise and fall times and EYE opening at 10 Gb/s are guaranteed. Supplied with solderable contact pins for DC and removable SMA-F RF connectors.

Key features

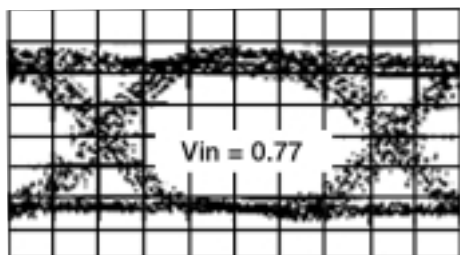
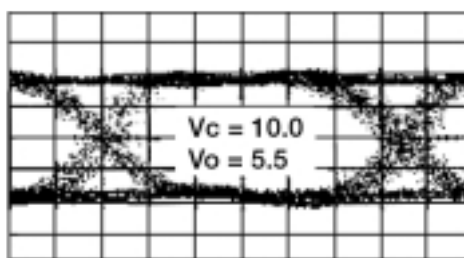
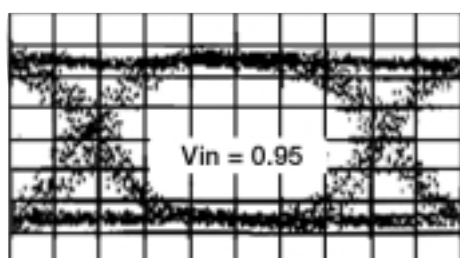
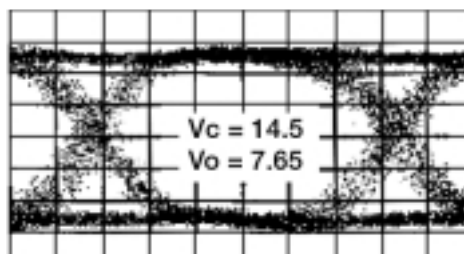
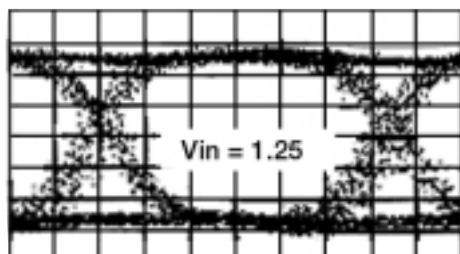
- Advanced GaAs technology
- SCFL input levels: outputs up to 7.2 Vp-p
- Saturating mode “repairs” input deficiencies
- Adjustable output voltage, Vp-p
- Rise and fall times < 30 ps
- Constant output over temperature, input level variations
- Internal DC regulation and protection
- Small package
- Integrated bias terminal for modulator
- Symmetry adjustment terminal

Applications

- Driver electronics for high quality NRZ terrestrial fiber-optic communication systems to 20 Gb/s

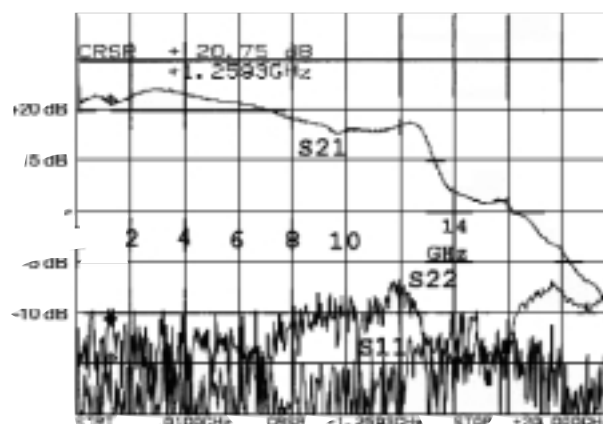
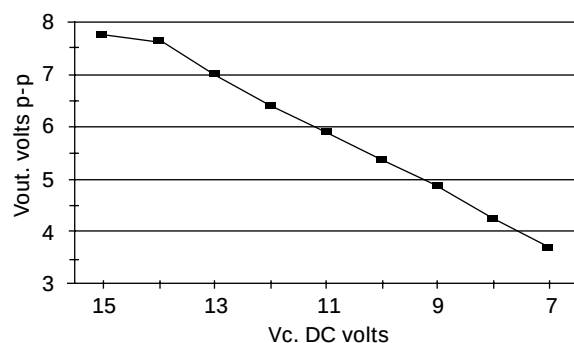
Operating Characteristics

Vc Varied
VM12EMD-418



All EYE data: 10Gbps, 2³¹- 1 word scales 15ps/DIV,
1.5V/DIV

Swept Response
VM12EMD-418



0.01-20 Ghz small-signal; 5dB/DIV and 2 GHz/DIV

12 Gb/s Modulator Driver Performance Specifications

Model # VM12EMD - xxx	Vin, p-p Volts p-p	Vo Vp-p ¹	3-dB BW GHz ² MIN/TYP	Idc MAX/TYP mA@ +15V	Idc mA@ -15V	Vc Volts	Vs Volts MIN/MAX	Output Polarity
- 418	0.9 - 1.1	4.0 - 7.2	11/12	380/310	<20	0 - 15	-5/+5	Non-Inverted
- 425	0.4 - 0.8	4.0 - 7.2	10/11	410/360	<20	0 - 15	-5/+5	Inverted

- Adjustable electrically over at least this range while meeting specifications.
- Small-signal; operating bandwidth is larger due to saturation.

Other Specifications

- Minimum EYE opening 85% at 10 Gbps, 95% TYP
- Tr, Tf < 30 ps, 23 ps for -418; <33 ps for -425
- S11 < -10 dB from 10 MHz to 8 GHz; S22 < -10 dB from 100 KHz to 10 GHz
- Input and output ports are DC blocked to $\pm 20V$ (capacitively coupled)
- MAX input level 2 Vpp
- DC requirement +15 V; -15 V or optionally -5 V (internal regulation)
- Reverse voltage protection 50 V
- Output level control, Vc: 0 to +15 V at 10 mA MAX; Vout largest at +15 V
- Bias terminal $\pm 10 V$ MAX AT 3 mA MAX (High-Z, 1k-ohm)
- Symmetry control, Vs: -5 to +5 V at <5 mA (no contact or 0 V = no effect)

Reliability

High reliability screening, visual inspections and other screening per VMI Level III, including centrifuge, burn-in, temperature cycle, seal and final test are optional at extra cost.

Factory Testing Technique

Pattern generator with 20 ps rise/fall time, 10 Gbs/s (NRZ), 2.0 Vpp fixed output. Variable attenuator. Sampling oscilloscope with 26 GHz bandwidth (14ps). Input to DUT is $(2^{31} - 1)$ word length. Observed Tr, Tf corrected for system speed, using sum of squares rule.

Mechanical Data

Aluminum 6061-T6, nickel plate. RF pins .015" dia. gold plated KOVAR with SMA-F replaceable shells. DC pins are 0.03" dia. Heat removal through case (conduction). Wire harness/connector available. All VM12EMD packages are 0.5" thick and 0.99" wide.

Bias Terminal

The integrated bias terminal permits application of a DC voltage bias to the output of the device; this may be needed to operate modulators at 1/2 of V-pi. The internal circuit is high impedance (about 1k-ohm) and will not pass current > 3mA. Low-level, low-frequency AC may also be applied to this terminal.

Symmetry Terminal

The crossover point of the EYE may be adjusted $\pm 10\%$ by application of $\pm 5V$ at < 2 mA to this terminal. No contact or 0.V produces nominal EYE crossover.

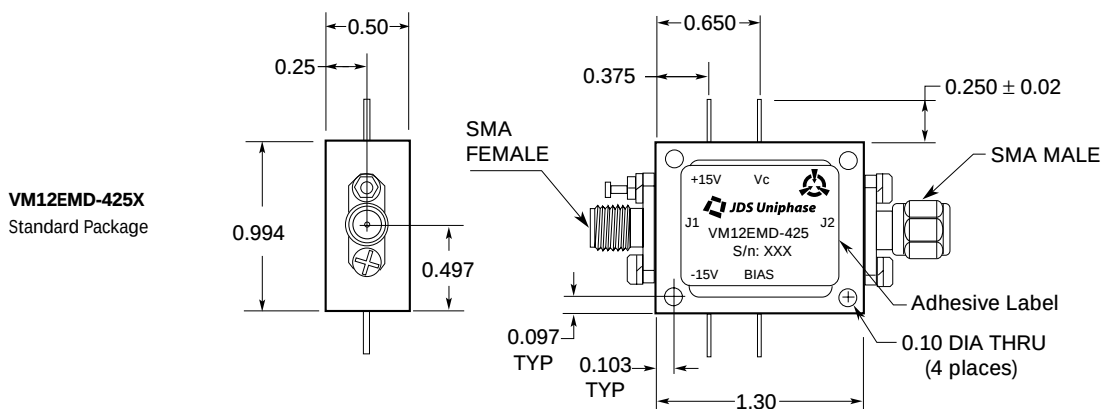
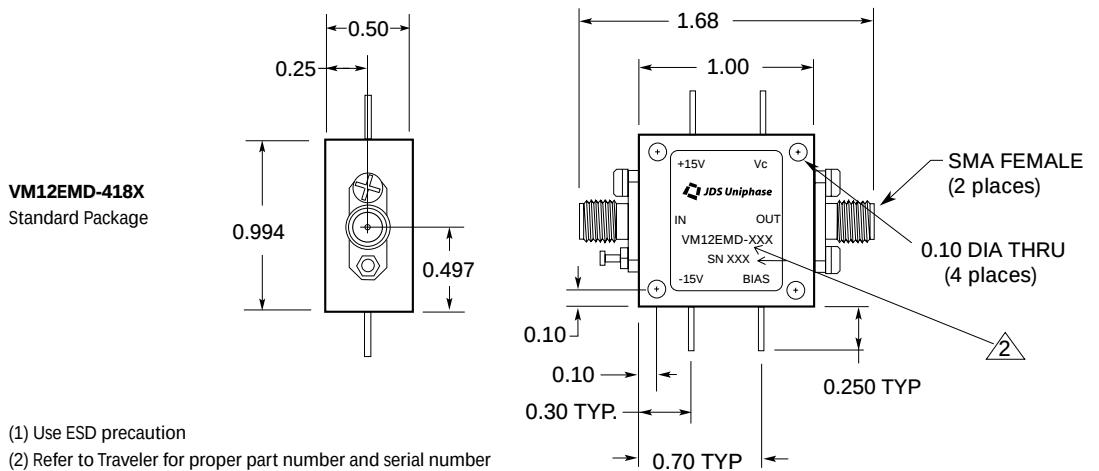
Output Level Adjust

The output can be precisely set to the desired level by adjusting Vc. Once set, the output will be essentially independent of temperature and input level variations. Current requirement is <2 mA at + 14.5 volts, at which point the output will be maximized. This control is nearly linear:

$V_o \sim (V_c - 0.5)/2$. Modulation may be applied.

Package Dimensions

Dimensions in inches except where indicated



Ordering information

For more information on this or other products and their availability, please contact your local JDS Uniphase sales representative or JDS Uniphase directly at 732 465-2800, or by fax 732 465-2801, or via email at sales.nj@us.jdsuniphase.com. Visit our Web site at www.jdsuniphase.com.



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