



Fiber Optic Products

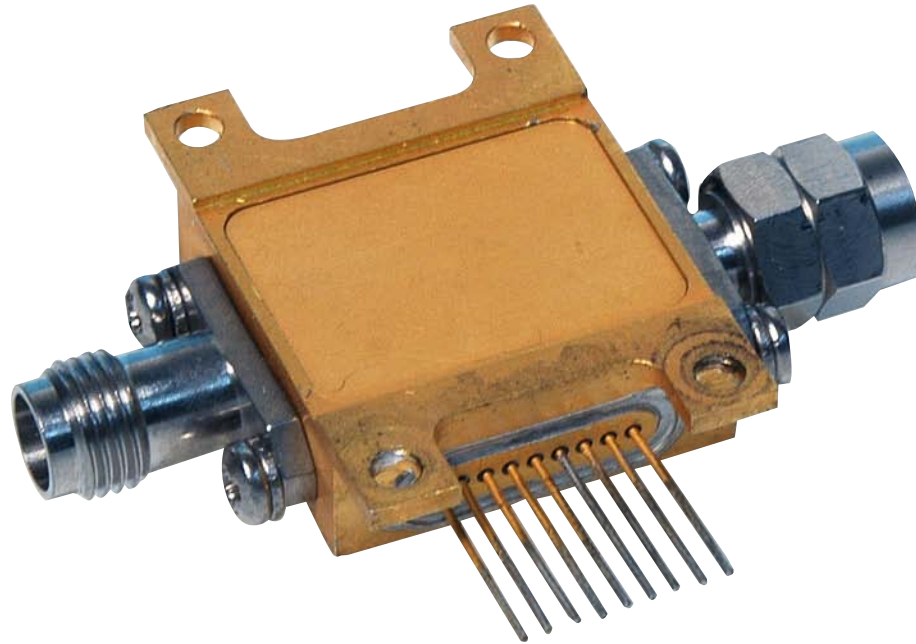
OC-768 Modulator Driver Amplifier

Model FO-MDA-40-13

3.5Vpp Output Driver

Model FO-MDA-40-10

6Vpp Output Driver



Applications:

- ◆ Drive Optical Modulators
- ◆ 40Gbps Baseband Amplifier

Features

- ◆ Output Voltage Control
- ◆ Electronic Crossing % Control
- ◆ Output Voltage Dither Capability
- ◆ Integrated Bias Tee for Output DC Bias Adjustment
- ◆ Small Form Factor
- ◆ Laser Sealed Hermetic Package

Data Rates

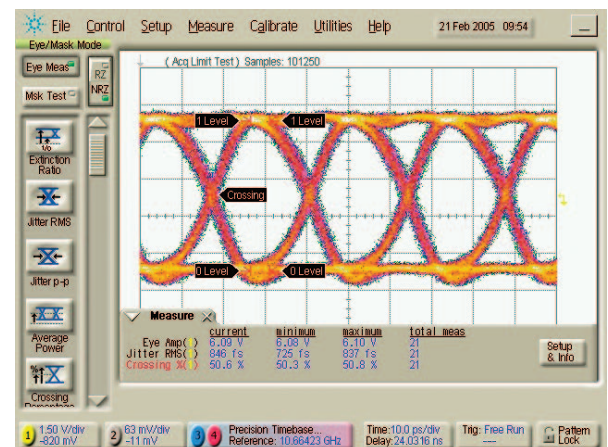
Data rates to 44Gbps

Input/Output Voltage

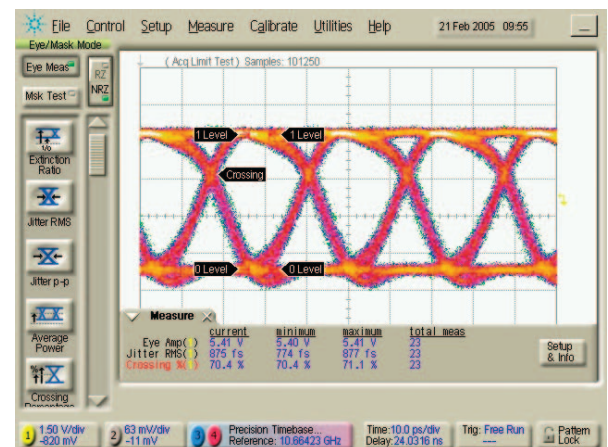
- ◆ 0.5Vpp Input Amplitude
- ◆ Output Amplitude
 - ◆ FO-MDA-40-10: 2.5Vpp to 4Vpp
 - ◆ FO-MDA-40-13: 4Vpp to 6Vpp

Connectors

- ◆ V Connectors
- ◆ GPPO (Option)



50% Zero Crossing



70% Zero Crossing

RF Specifications

PARAMETER	SYMBOL	UNIT	MINIMUM	TYP	MAXIMUM
Data Rate	DR	Gbps	39		43
Small Signal 3dB Low Freq BW	F3dBLow	kHz			85
Input Voltage	V _{ipp}	V _{pp}		0.5	
Output Signal Amplitude (Max)	V _{oppMx}	V _{pp}			
-13 Model			3.4	3.7	
-10 Model			5.5	6	
Output Signal Amplitude (Min)	V _{oppMn}	V _{pp}			
-13 Model				2.5	2.6
-10 Model				4.2	4.5
Small Signal Gain @ 20 GHz	G				
-13 Model		dB		21	
-10 Model		dB		26	
Input Return Loss	IRL	dB		10	
Output Return Loss	ORL	dB		10	
RMS Additive Jitter	J _{rms}	ps		0.75	
Additive Rise Time (20%-80%)	Tr	ps		10	
Additive Fall Time (20%-80%)	Tf	ps		10	
Zero Crossing Point Control	Xp	%	40		70

Connectors

PARAMETER	SPECIFICATION
Data Input	V Female (GPPO Optional)
Data Output	V Male (GPPO Optional)
DC	Pins (See Outline Drawing)

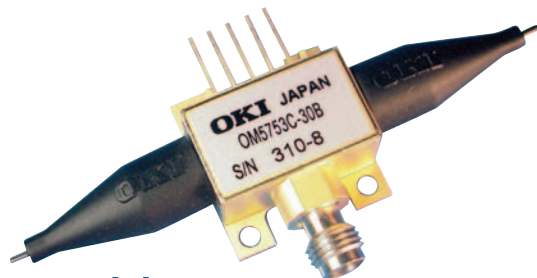
Absolute Maximum Ratings

PARAMETER	SYMBOL	UNIT	MINIMUM	MAXIMUM
Input Voltage Peak-Peak	V _{ipp}	V _{pp}		0.55
1st Stage Drain Voltage	VD1	V		4
1st Stage Drain Current	ID1	mA		170
2nd Stage Drain Voltage	VD2	V		7
2nd Stage Drain Current	ID2	mA		175
1st Stage Gate Voltage	VG1	V	-1.5	0
2nd Stage Gate Voltage	VG2	V	-2	0
1st Stage Control Voltage	VC1	V	-0.2	1.5
Output Bias Adjustment Voltage	VB	V	-5	5
Output Bias Adjustment Current	IB	mA	-120	120
Operating Case Temperature Range	T _c	Deg C	0	70
Storage Temperature Range	T _s	Deg C	-25	125

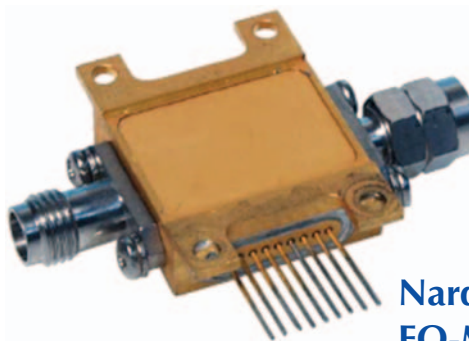
Recommended Bias Conditions

PARAMETER	SYMBOL	UNIT	MINIMUM	TYP	MAXIMUM
1st Stage Gate Voltage	VG1	V		GND	
1st Stage Drain Voltage	VD1	V	3	3.3	3.6
1st Stage Drain Current	ID1	mA	80	110	140
1st Stage Control Voltage	VC1	V		Open	
2nd Stage Gate Voltage	VG1	V	-1	-0.5	0
2nd Stage Drain Voltage	VD2	V			
-13 Model			2	5	7
-10 Model			3	5	7
2nd Stage Drain Current	ID2	mA			
-13 Model				100	
-10 Model				130	

Performance Data

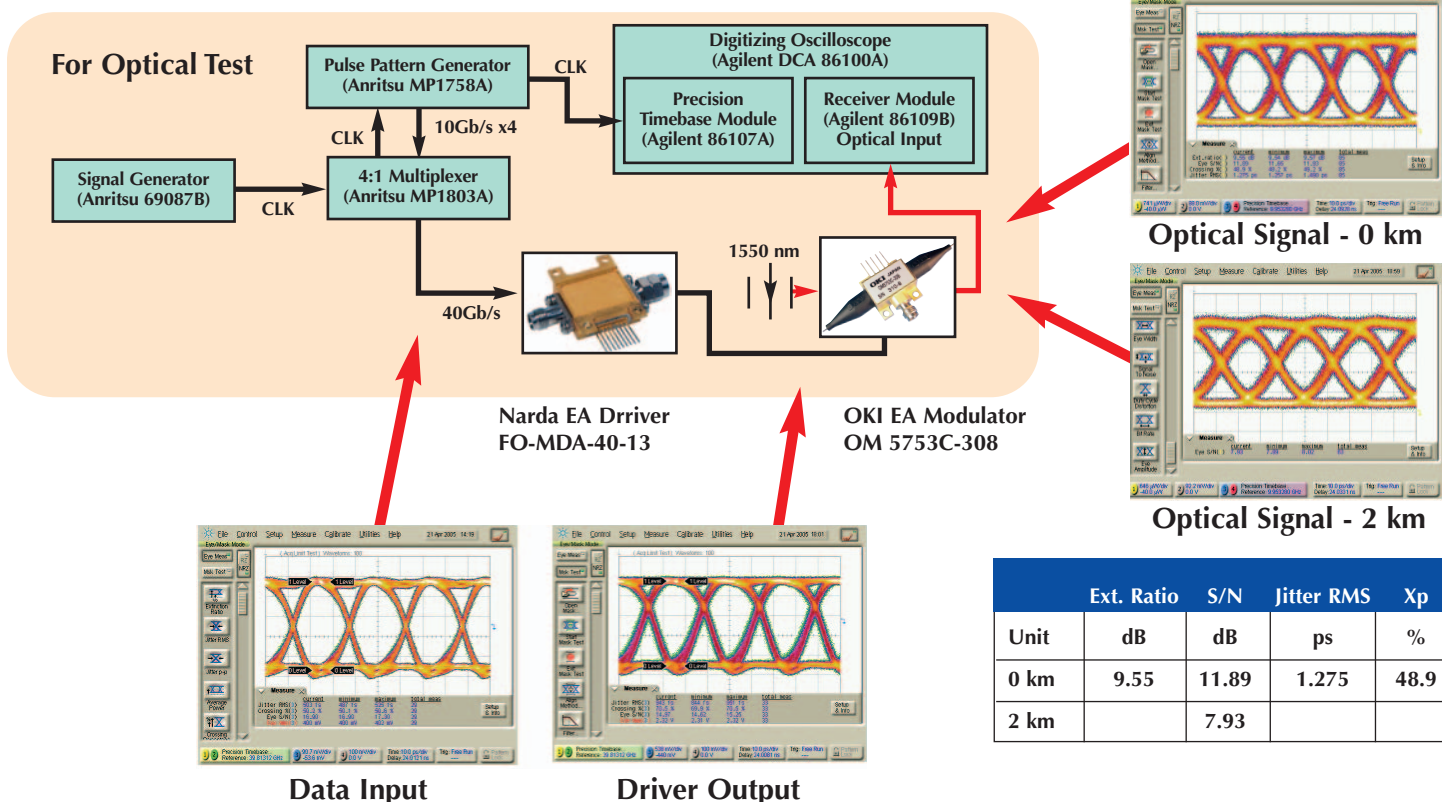


**OKI EA Modulator
OM5753C-30B**



**Narda EA Driver
FO-MDA-40-13**

40 Gb/s Optical Performance - Narda EA Driver and OKI EA Modulator



	Ext. Ratio	S/N	Jitter RMS	Xp
Unit	dB	dB	ps	%
0 km	9.55	11.89	1.275	48.9
2 km		7.93		

	Vpp	Eye Amp	S/N	Jitter RMS	Jitter p-p	Xp	Tr 20-80	Tf 20-80	Eye Height	Eye Width
Unit	V	V	---	ps	ps	%	ps	ps	V	ps
Input	0.45	0.40	16.9	0.5	3.6	50.2	8.2	8.0	0.33	22.1
Output	2.64	2.32	15.0	0.9	7.3	70.5	8.7	8.4	1.85	19.5

Input: PRBS31. 40Gb/s

Driver: VD1 = 3.4V, ID1 = 99mA, VD2 = 2.5V, ID2 = 58mA, VG2 = -0.74V, IG2 = -3.4mA, VB = -1.3V

EAM: Oki EA Modulator, Temp. = 25 degC, Optical Input Power = 13dBm, Wavelength = 1550 nm, VB = -1.3V, Average Output Power = 2.74dBm

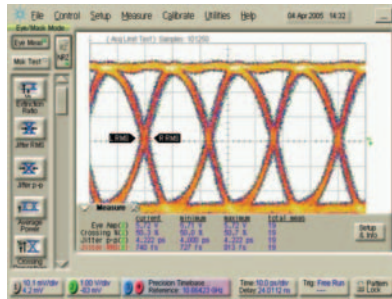
Driver Test Data

Typical Performance Data FO-MDA-40-10 Input Voltage 0.45Vp-p, 42.7Gbps, PRBS 2^31-1

50% Zero Crossing

Bias Conditions

VD1: 3.3V
VD2: 5.0V
VG2: -0.42V
ID1 (RF on): 99mA
ID1 (RF off): 98mA
ID2 (RF on): 125mA
ID2 (RF off): 135mA

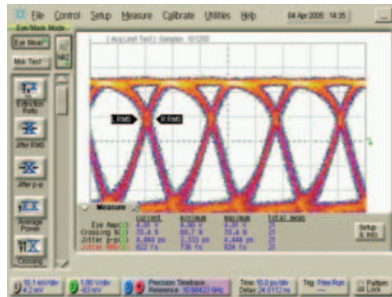


	Current	Minimum	Maximum	Total Meas
Eye Amp	5.72 V	5.71 V	5.72 V	19
Crossing %	50.3%	50.0%	50.7%	19
Jitter - rms	740 fs	727 fs	813 fs	19
Jitter - p to p	4.222 ps	4.000 ps	4.222 ps	19
Rise Time	9.56 ps	9.11 ps	9.56 ps	19
Fall Time	9.11 ps	8.89 ps	9.33 ps	19
Eye S/N	14.99	14.81	15.02	19

70% Zero Crossing

Bias Conditions

VD1: 3.3V
VD2: 5.0V
VG2: -0.85V
ID1 (RF on): 99mA
ID1 (RF off): 98mA
ID2 (RF on): 97mA
ID2 (RF off): 58mA



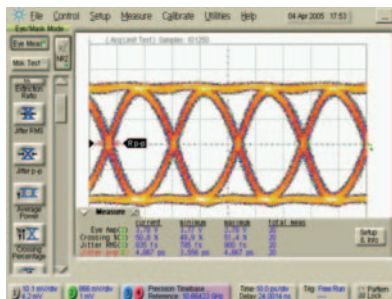
	Current	Minimum	Maximum	Total Meas
Eye Amp	4.91 V	4.90 V	4.91 V	21
Crossing %	70.4%	69.7%	70.4%	21
Jitter - rms	822 fs	736 fs	824 fs	21
Jitter - p to p	4.444 ps	3.333 ps	4.444 ps	21
Rise Time	9.33 ps	9.11 ps	9.33 ps	21
Fall Time	8.44 ps	8.22 ps	8.67 ps	21
Eye S/N	10.51	10.51	11.15	21

Typical Performance Data FO-MDA-40-13 Input Voltage 0.45Vp-p, 42.7Gbps, PRBS 2^31-1

50% Zero Crossing

Bias Conditions

VD1: 3.3V
VD2: 5.0V
VG2: -0.27V
ID1 (RF on): 99mA
ID1 (RF off): 98mA
ID2 (RF on): 96mA
ID2 (RF off): 104mA

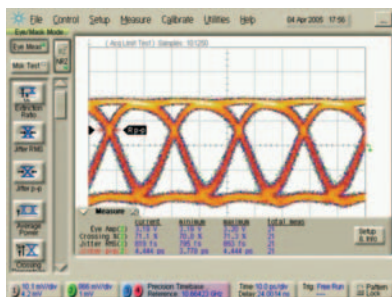


	Current	Minimum	Maximum	Total Meas
Eye Amp	3.78 V	3.77 V	3.78 V	20
Crossing %	50.8%	49.9%	51.4%	20
Jitter - rms	835 fs	785 fs	900 fs	20
Jitter - p to p	4.667 ps	3.556 ps	4.667 ps	20
Rise Time	9.56 ps	9.33 ps	9.78 ps	20
Fall Time	9.56 ps	9.56 ps	10.00 ps	20
Eye S/N	16.75	16.72	17.35	20

70% Zero Crossing

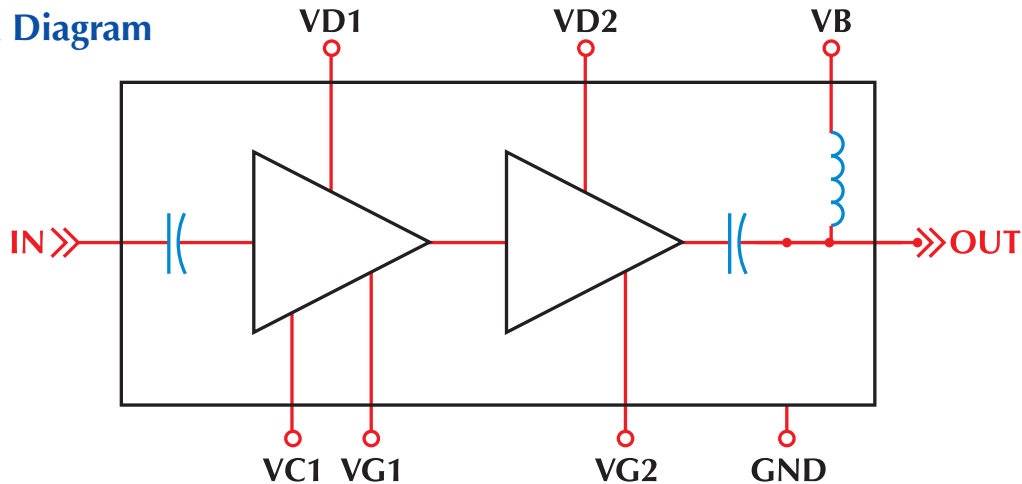
Bias Conditions

VD1: 3.3V
VD2: 5.0V
VG2: -0.65V
ID1 (RF on): 99mA
ID1 (RF off): 98mA
ID2 (RF on): 75mA
ID2 (RF off): 48mA

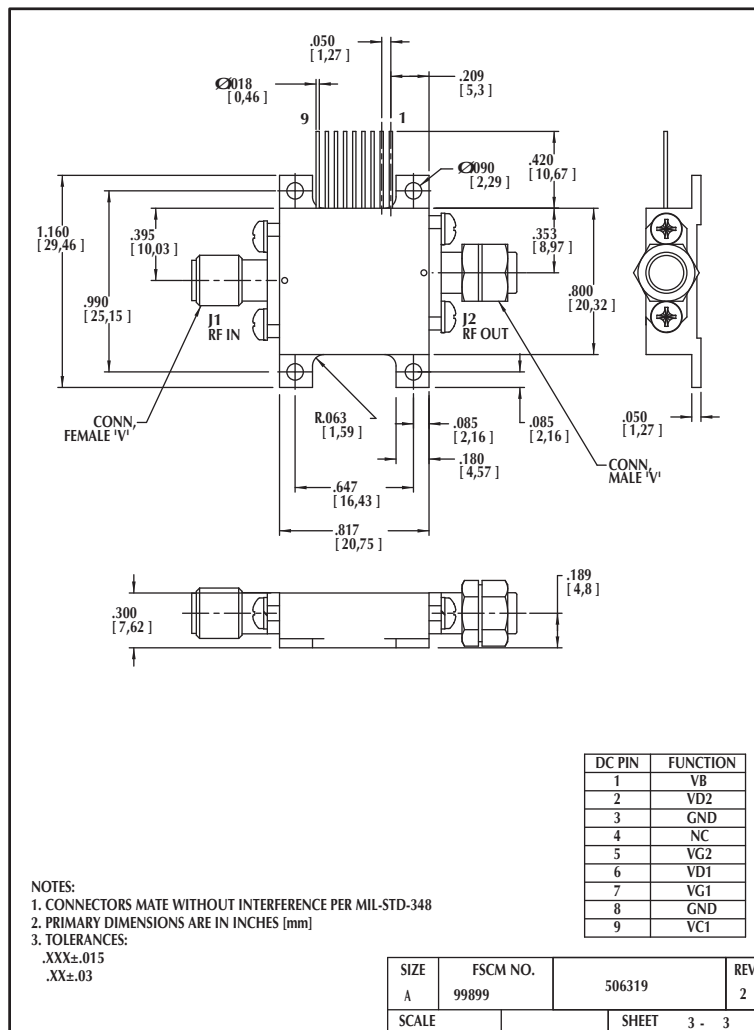


	Current	Minimum	Maximum	Total Meas
Eye Amp	3.19 V	3.19 V	3.20 V	21
Crossing %	71.1%	70.8%	71.34%	21
Jitter - rms	819 fs	795 fs	853 fs	21
Jitter - p to p	4.444 ps	3.778 ps	4.444 ps	21
Rise Time	8.44 ps	8.22 ps	8.44 ps	21
Fall Time	9.33 ps	9.11 ps	9.56 ps	21
Eye S/N	10.84	10.7	10.82	21

Circuit Block Diagram



Outline Drawing



Contact Narda for your custom requirements.

L-3 Communications has patent applications pending which protects this and related fiber optic products. These products may also be protected by other intellectual property rights including trademarks and copyrights.

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