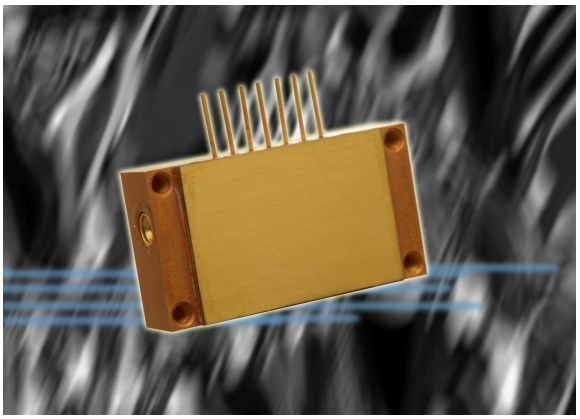
100 Davids Drive • Hauppauge, NY 11788
Tel: (631) 436-7400 • FAX: (631) 436-7430
www.miteq.com

AMFOD-30K450

Mach–Zehnder 43.2 Gb/s Optical Modulator Driver Amplifier



Product Highlights

- High Modulator Drive Voltage >8.0 Volts
- 30 dB Gain
- 3 dB Bandwidth of 30 kHz to 40 GHz
- Adjustable Zero Eye Crossing from 40% to 70%
- RMS Additive Jitter < 850 fs
- Low power dissipation

Description

Using MITEQ proprietary MMICs the AMFOD-30K450 provides high drive voltage of 8.0 volts with an exceptional 45 GHz bandwidth to Lithium Niobate modulators. Package is hermetically sealed with straight or bent pin options.

Applications

OC-768 long haul fiber optic communications applications.

Electrical Specifications @ +85ºC

Parameter	*Symbol*	*Min*	*Typical*	*Max*	*Unit*
Small signal low frequency BW	$F_{-3dBLow}$			30	KHz
Small signal gain 1 MHz – 26 GHz 26 GHz – 40 GHz	$\|S_{21}\|$	29.8	31 30	33.3	dB
Input Match 1 MHz – 40GHz	$\|S_{11}\|$			-9	dB
Complementary Input Match 1 MHz – 40GHz	$\|S_{11}\|$			-9	dB
Output Match 1 MHz – 40 GHz	$\|S_{22}\|$			-9	dB
Gain Flatness 80 KHz – 40 GHz	$\Delta\|S_{21}\|$			4	dB

100 Davids Drive • Hauppauge, NY 11788
Tel: (631) 436-7400 • FAX: (631) 436-7430
www.miteq.com

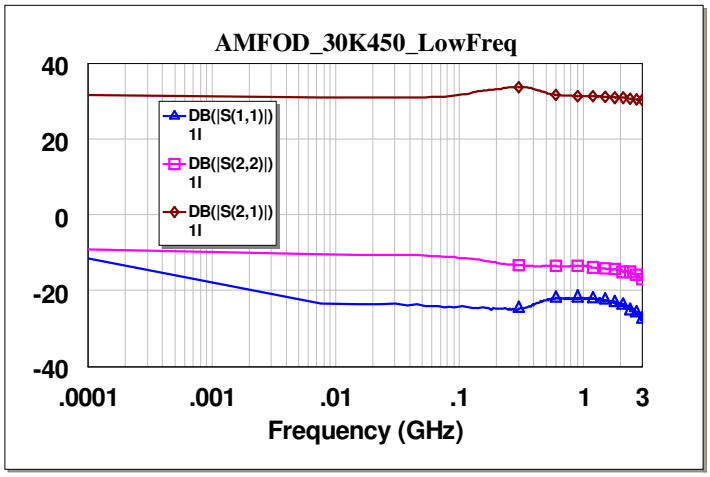
Time Domain Specifications @ +25 ºC

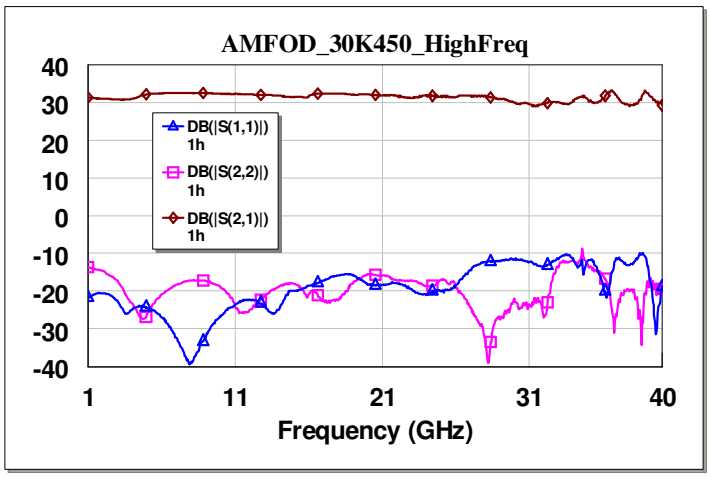
Parameter	*Symbol*	*Min*	*Typical*	*Max*	*Unit*
Data Rate	DR			43.2	Gb/s
Operation input voltage	Vi_{pp}		0.5		V_{pp}
Eye Opening	Eye_{op}	55			%
RMS Added Jitter	T_{jms}		0.75	0.88	ps
Rise Time/Fall Time	T_r/T_f		8	10	ps
Zero Crossing Point Control	X_p	45		55	%
High amplitude peak-peak output eye amplitude	V_{EHPP}(HG)	7.0			V_{pp}
Low amplitude peak-peak output eye amplitude	V_{EHPP}(LG)			4.3	V_{pp}

Absolute Maximum Ratings

Parameter	*Symbol*	*Rating*	*Unit*
Drain-source Voltage	V_d	+8	V
Gate-source Voltage	Vg	-2, 0	V
Maximum Drain Current	I_d	230 individual; 450 total	mA
Maximum Input RF Power	P_{in}	-5	dBm
Maximum Base Temperature	T_b	+85	^{0}C

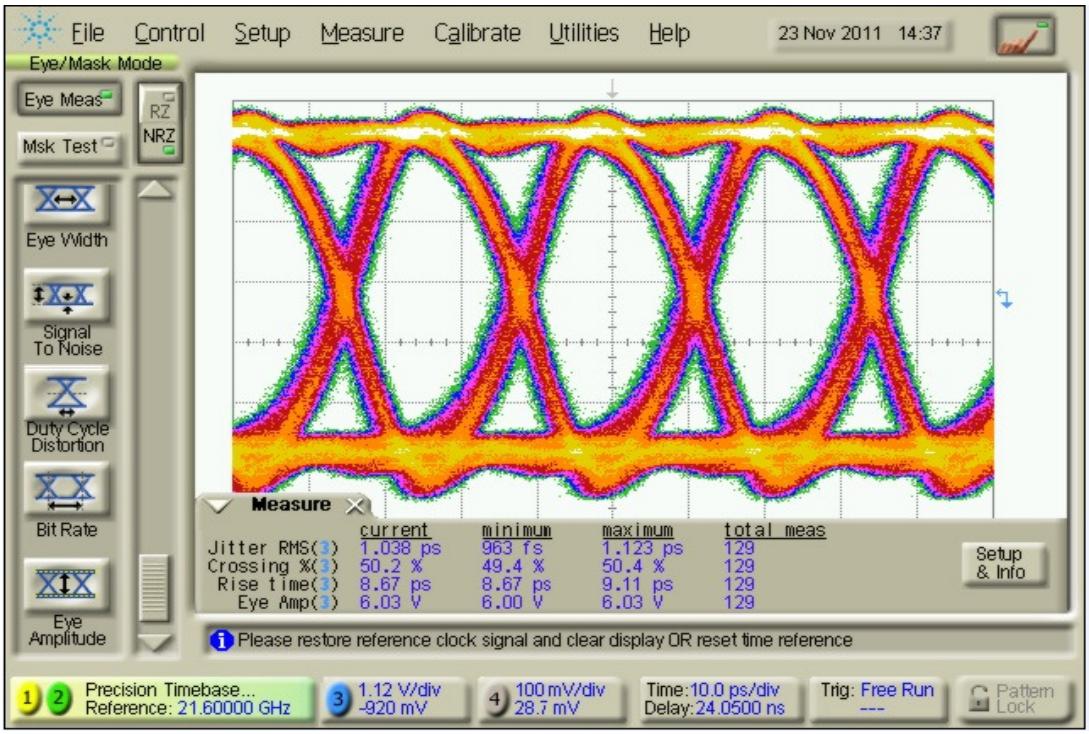
Measured S Parameters





100 Davids Drive • Hauppauge, NY 11788
Tel: (631) 436-7400 • FAX: (631) 436-7430
www.miteq.com

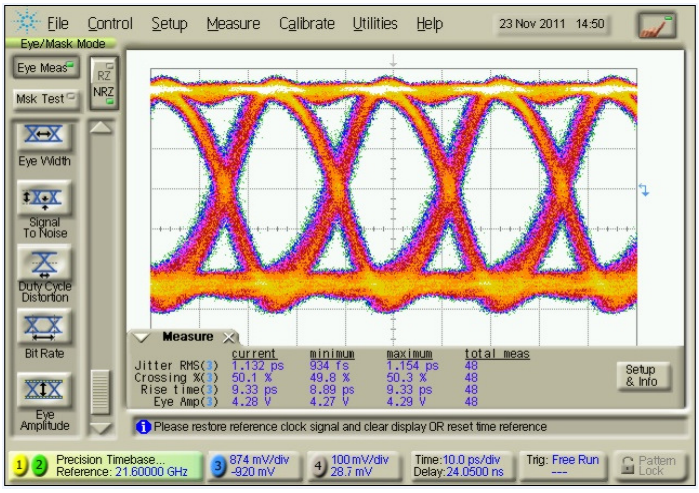
Typical Output Eye Diagram



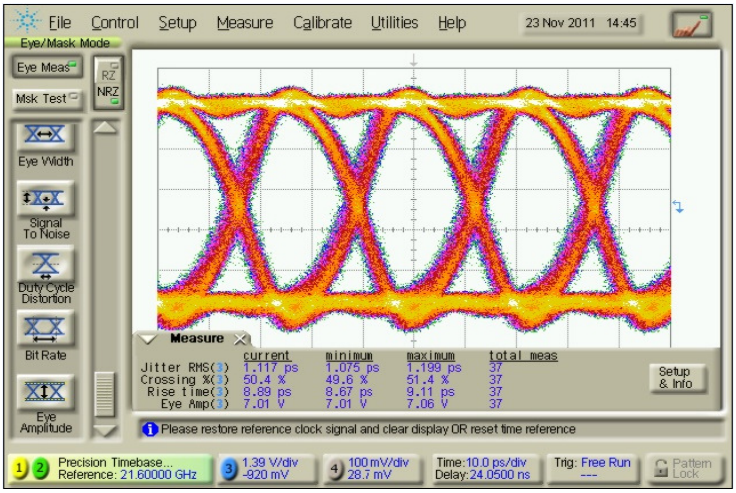
Source signal from Agilent 81250 ParBERT Testing Set:
Jitter RMS: 721 fs (typ), 751 fs (max)
Rise Time: 6.3 ps (max)
Eye Amplitude: 0.5 V

Output signal:
Additive Jitter RMS: 0.75 ps
Rise Time: 8.5 ps
Fall Time: 9.0 ps
Eye Amp: 6.5 V
Eye Width: 16.5 ps
Eye Height: 4.5 V

Output Eye Diagram with Different Output Eye Amplitudes



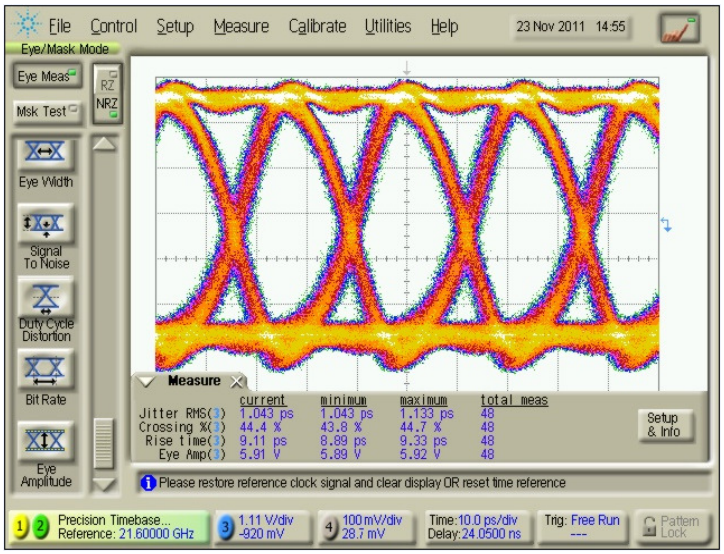
Low Amplitude (4.3V)



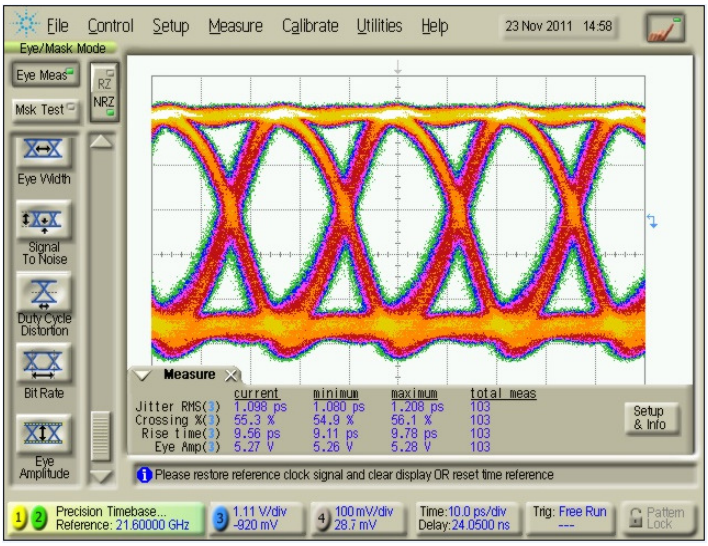
High Amplitude (7.0V)

100 Davids Drive • Hauppauge, NY 11788
Tel: (631) 436-7400 • FAX: (631) 436-7430
www.miteq.com

Output Eye Diagram with Zero Crossing Control



45% Zero Crossing



55% Zero Crossing

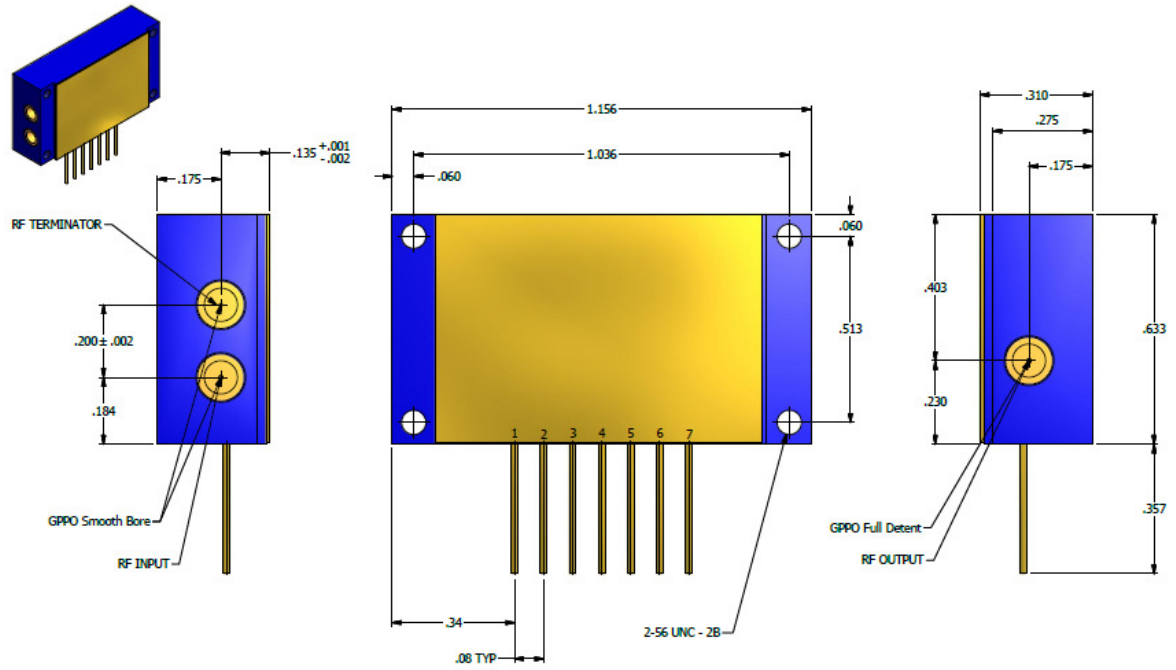
Nominal Operating Bias Setting

Parameter	*Symbol*	*Typical*	*Units*	*Notes*	*Pin Number*
First Stage Gate Voltage	V_{g1}	-0.39	V		Pin 1
First Stage Drain Voltage	V_{d1}	+6.0	V		Pin 2
First Stage Drain Current	I_{dq1}	100	mA	I_{RF1} = 100	
Second Stage Gate Voltage	V_{g2}	-0.44	V		Pin 4
Second Stage Drain Voltage	V_{d2}	+6.0	V		Pin 5
Second Stage Drain Current	I_{dq2}	120	mA	I_{RF2} = 130	
Third Stage Gate Voltage	V_{g3}	-0.31	V		Pin 6
Third Stage Drain Voltage	V_{d3}	+6.0	V		Pin 7
Third Stage Drain Current	I_{dq3}	160	mA	I_{RF3} = 185	

Note: Pin 3 is ground

100 Davids Drive • Hauppauge, NY 11788
Tel: (631) 436-7400 • FAX: (631) 436-7430
www.miteq.com

Outline



Pin and Port Definition

Pin Number	***Function***
1. (V_{g1})	1st stage gate bias
2. (V_{d1})	1st stage drain bias
3. GND	Ground
4. (V_{g2})	2nd stage gate bias
5. (V_{d2})	2nd stage drain bias
6. (V_{g3})	3rd stage gate bias
7. (V_{d3})	3rd stage drain bias
Port	***Function***
RF_{in}	RF Input
RF_{out}	RF Output
RF_{term}	RF Terminator

Important Note:

This is an unreleased design specification and is subject to change.
This document should not be used for a final product design requirement, and it is not a guarantee or implication of such by MITEQ to supply such a part. Please contact MITEQ for product development status and current specifications.