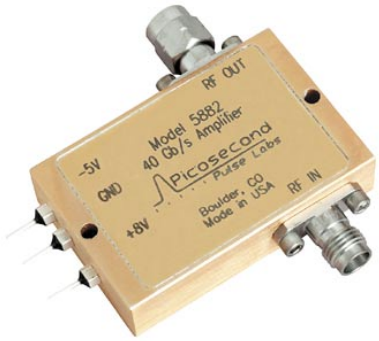
MODEL 5882

40 GB/S BROADBAND AMPLIFIER

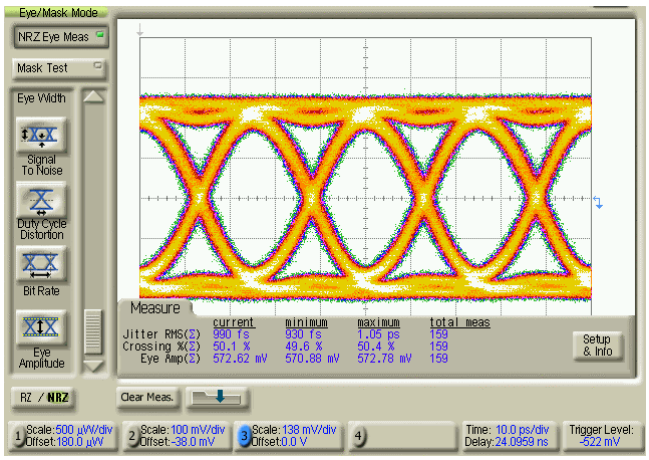
- **Electro-Absorption Modulator driver or optical receiver amplifier**
- **25 kHz - 45 GHz bandwidth**
- **9 ps risetime**
- **2.7 V_{amp} eye amplitude**
- **16 dB gain**



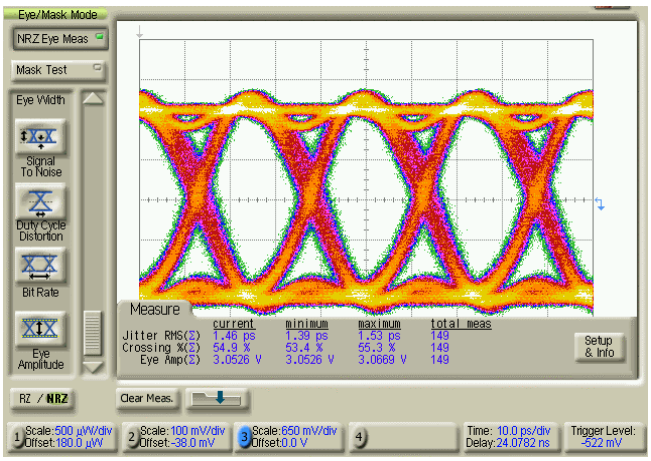
The Picosecond Pulse Labs Model 5882 is a member of Picosecond's 588X series of 40 Gb/s amplifiers. The 588X series consists of three models, each with different gain (8.5, 16, or 24 dB). The 5882 is the middle model in this series with respect to gain and pricing. This amplifier is intended for use in optical receivers or driving electro-absorption modulators.

The 5882 is extremely broadband, covering over 6 decades from 25 kHz to 45 GHz. It also demonstrates a very clean time domain response, resulting in high quality 40 Gb/s eye diagrams. The 5882 includes internal reverse voltage protection, power supply regulation, and sequencing circuitry, making it insensitive to power supply voltage variation and application sequence.

Typical 40 Gb/s Eye Measurements



Input Test Signal [1,2]
Eye amplitude 573 mV



Output Response [2]
Eye amplitude 3.0 V

[1] Input test signal is 40 Gb/s NRZ, 2^{31}-1 PRBS.
[2] Responses measured using Agilent 86100A 50 GHz bandwidth oscilloscope.

5882 Electrical Specifications

PARAMETER	SYMBOL	UNITS	MIN	TYPICAL	MAX	COMMENTS
Polarity						Non-inverting
High Frequency f_{-3dB}	f_{HIGH}	GHz	35	45		
Low Frequency f_{-3dB}	f_{LOW}	kHz		25	40	
Output Eye Voltage	V_{OUT}	V_{amp}	2.4	2.7		V_{in} = 0.6 V_{amp}, 12.5 Gb/s PRBS
Gain		dB	14.5	16		Measured at 100 MHz
Gain Ripple		dB		±1	±2	50 MHz < f < 35 GHz
Output Power at 1 dB Gain Compression	P_{1dB}	dBm		12 11		f < 25 GHz 25 GHz < f < 40 GHz
Noise Figure	NF	dB		6		Measured at 1.5 GHz
Group Delay Variation		ps		±10	±20	3 GHz < f < 35 GHz, 0.8 GHz aperture
Deconvolved Rise Time	t_r	ps		9		10% to 90%, root-sum-of-squares extraction, 16 ps system rise time
Overshoot / Undershoot		%		±7		1 ns window, 16 ps system rise time
Input Return Loss 50 MHz < f < 10 GHz 10 GHz ≤ f < 30 GHz	S_{11}	dB		 -18 -10	 -14 -8	
Output Return Loss 50 MHz < f < 10 GHz 10 GHz ≤ f < 30 GHz	S_{22}	dB		 -13 -10	 -10 -8	

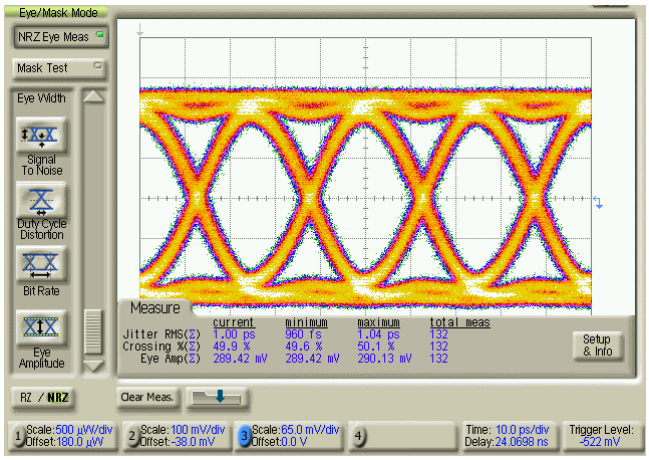
Specifications valid at case temperature of 23C

5882 Operating Specifications

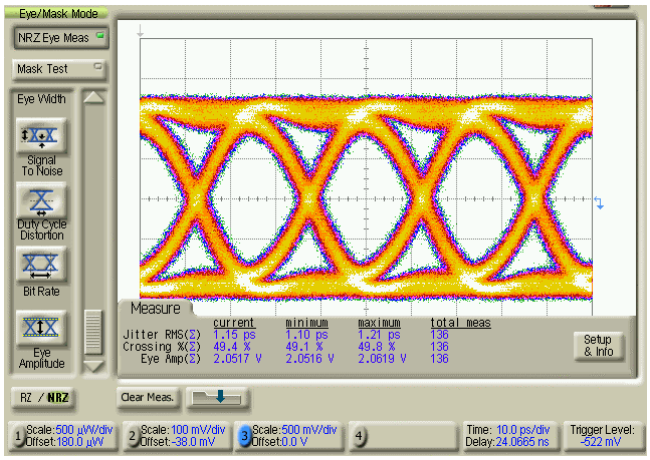
PARAMETER	SYMBOL	UNITS	MIN	TYPICAL	MAX	COMMENTS
Maximum Allowed Input Power		dBm			16	Damage threshold
DC Voltage Supply (pos)	$+V_{DC}$	V_{DC}	7	8	9	155 mA typical
DC Voltage Supply (neg)	$-V_{DC}$	V_{DC}	-5.5	-5	-4.5	10 mA typical
DC Voltage Applied to RF Input or Output		V_{DC}	-4		+8	Damage threshold
Operating Temperature	T_{CASE}	°C	0		70	Case temperature

Static sensitive device, limited 30 day warranty.

Typical 40 Gb/s Eye Measurements

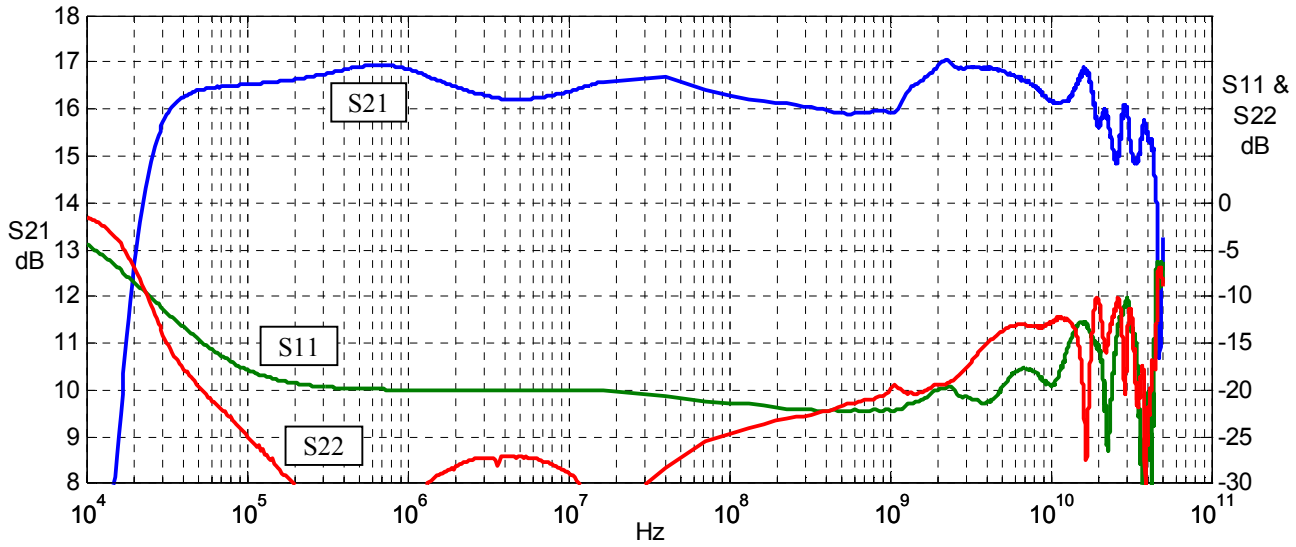


Input Test Signal [1,2]
Eye amplitude 289 mV

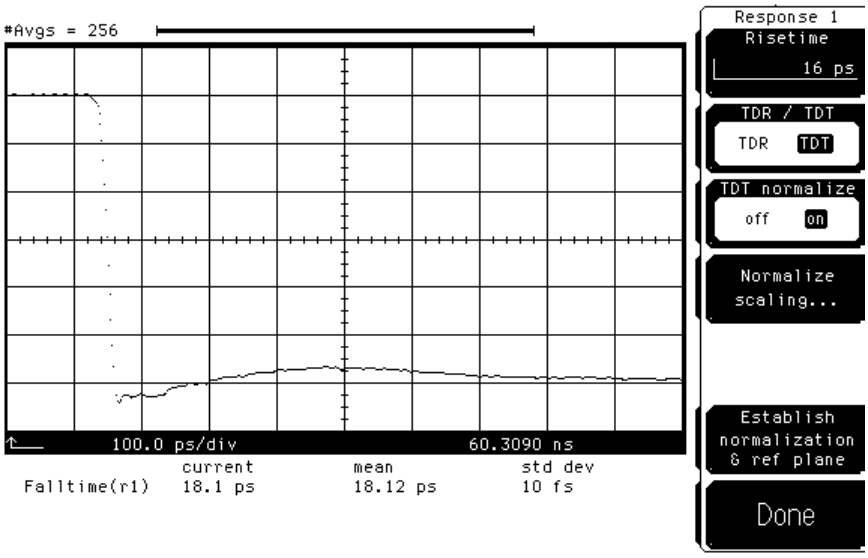


Output Response [2]
Eye amplitude 2.0 V

[1] Input test signal is 40 Gb/s NRZ, 2^{31}-1 PRBS.
[2] Responses measured using Agilent 86100A 50 GHz bandwidth oscilloscope.



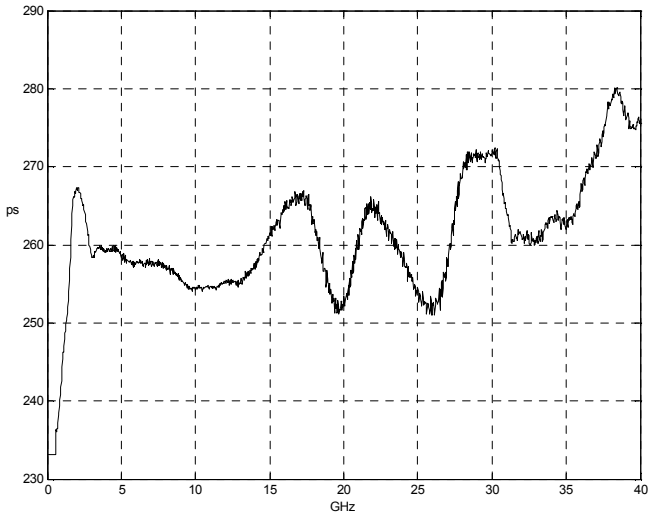
Typical S21, S11, and S22 from 10 kHz to 50 GHz



Typical Step Response

Input signal is 16 ps falltime. Measured using a PSPL 4015C pulse generator and Agilent 54750 50 GHz oscilloscope.

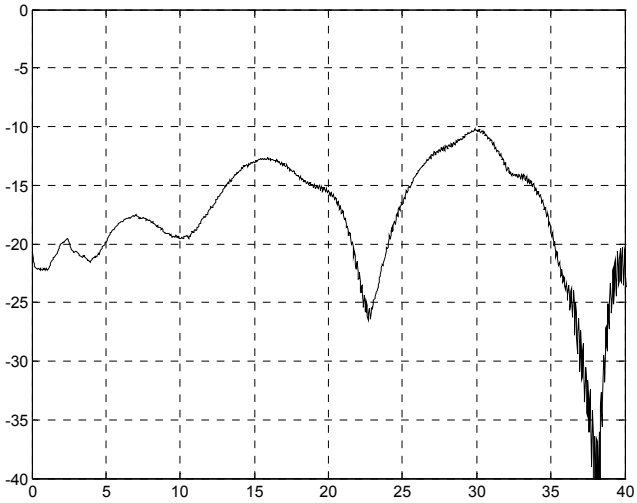
$$t_{r(amplifier)} = \sqrt{[t_{r(system)}]^2 - [t_{r(generator)}]^2}$$



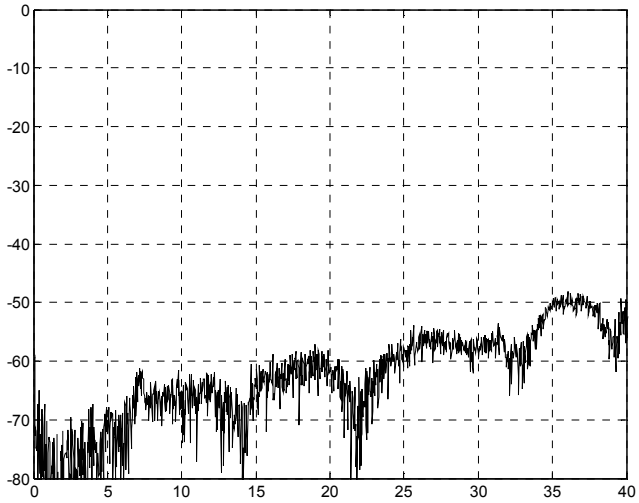
Typical Group Delay

10 ps/div, 5 GHz/div, 0.8 GHz aperture.

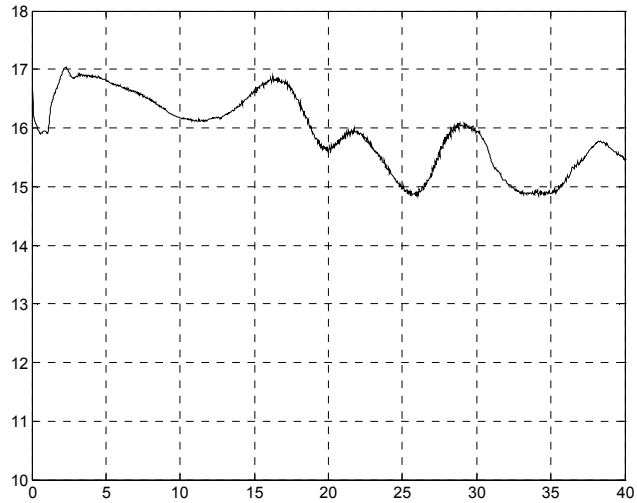
Typical 40 MHz - 40 GHz Frequency Response



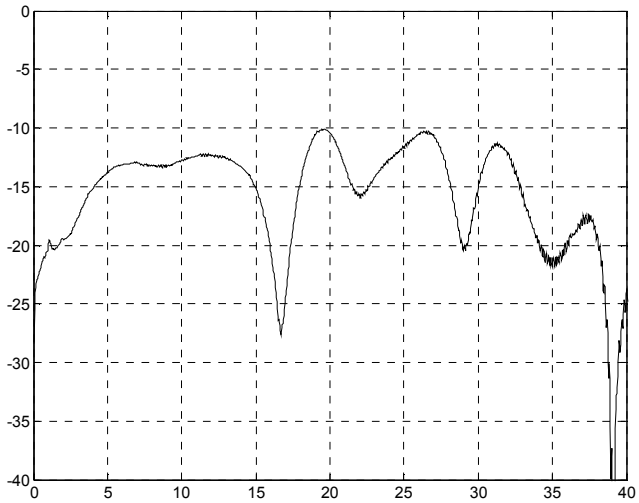
S11
5 dB/div, 5 GHz/div



S12
10 dB/div, 5 GHz/div



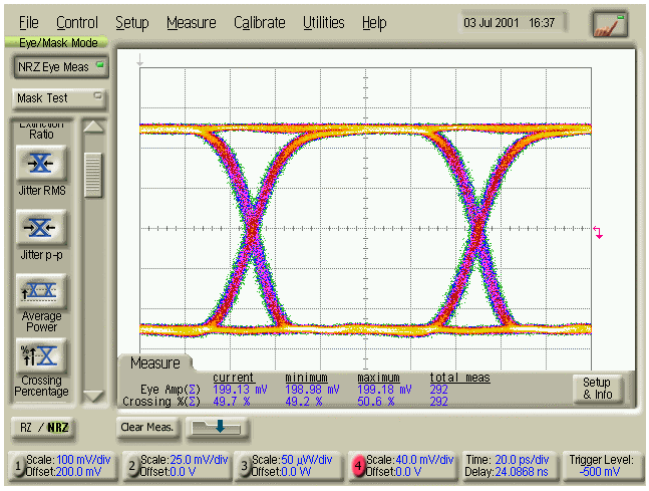
S21
1 dB/div, 5 GHz/div



S22
5 dB/div, 5 GHz/div

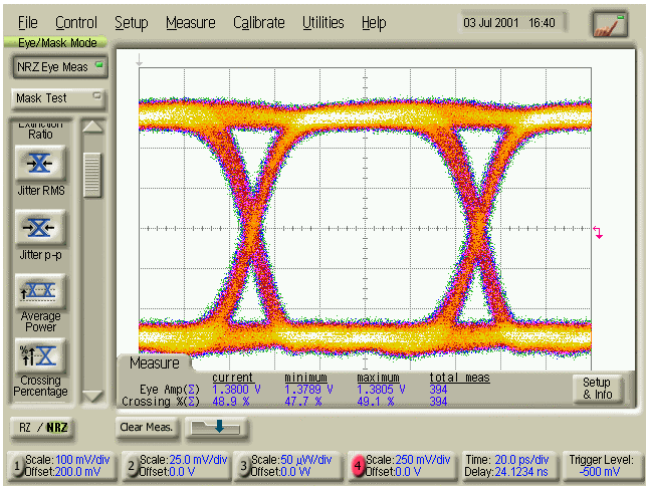
10 Gb/s Measurements

Measurements made on 40 GHz Agilent 86100A.



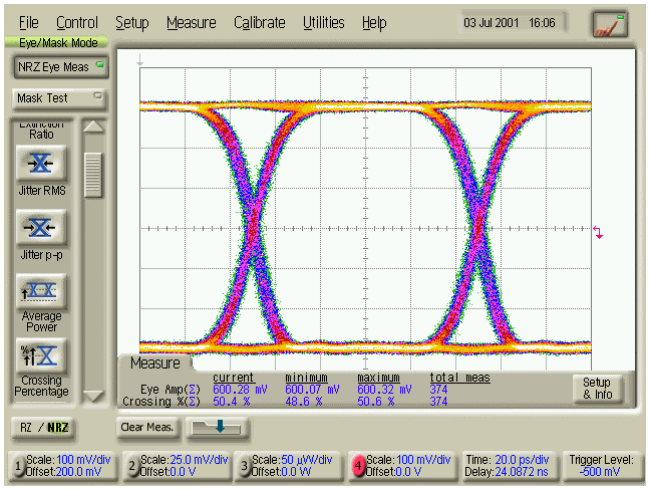
0.2 V Input Test Signal

Input signal is NRZ, 2^{31}-1.
Eye amplitude 0.2 V, 50% crossing point.



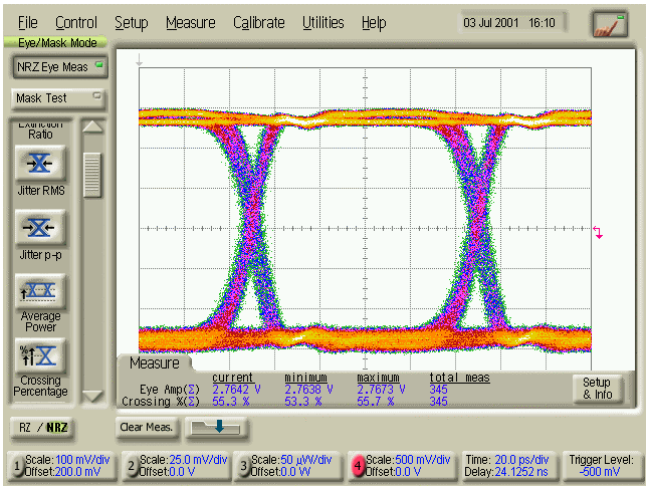
Output Response to 0.2 V

Amplifier in linear range.
Eye amplitude 1.38 V, 49% crossing point.



0.6 V Input Test Signal

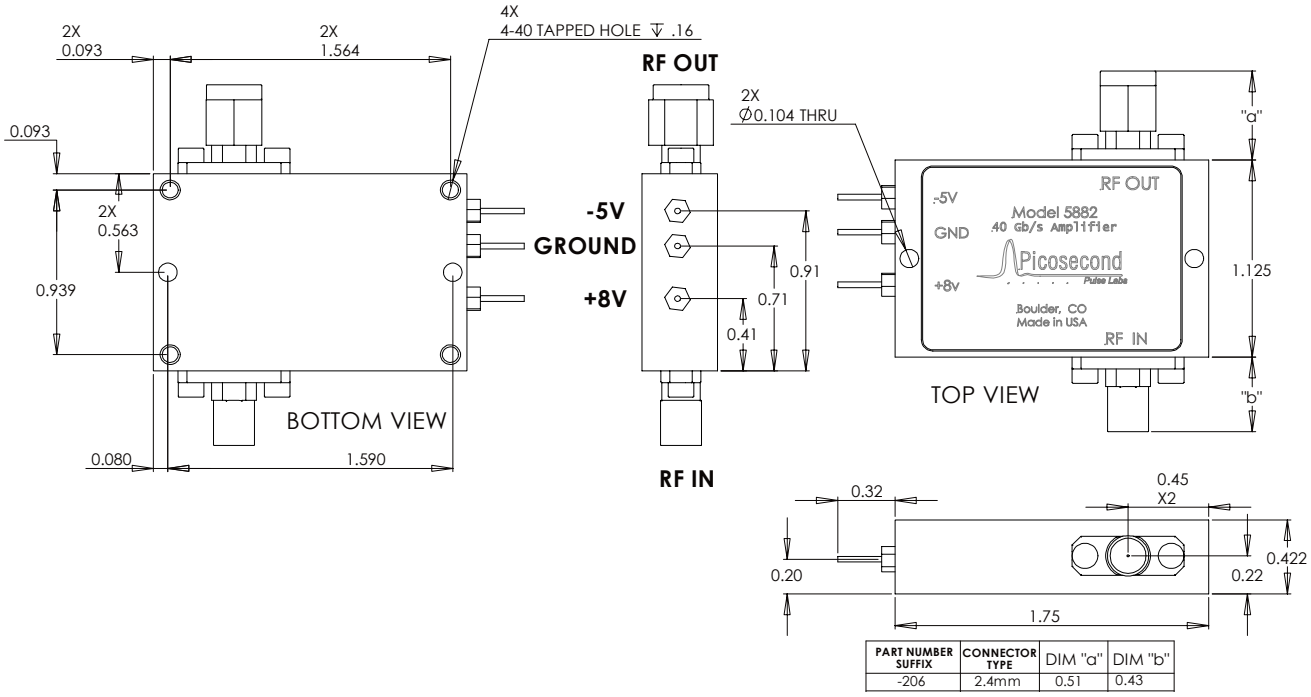
Input signal is NRZ, 2^{31}-1.
Eye amplitude 0.6 V, 50% crossing point.



Output Response to 0.6 V

Amplifier in compression (~3.5 dB).
Eye amplitude 2.76 V, 55% crossing point.

Model 5882 Dimensions



PART NUMBER SUFFIX	CONNECTOR TYPE	DIM "a"	DIM "b"
-206	2.4mm	0.51	0.43

Ordering Information

Part #: 5882-206

Where 206 denotes connector configuration of RF input 2.4 mm jack, RF output 2.4 mm plug, solder pins. Other connector configurations (1.85mm, 2.4 mm, or 2.92 mm) are available upon request.

Contact Information

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