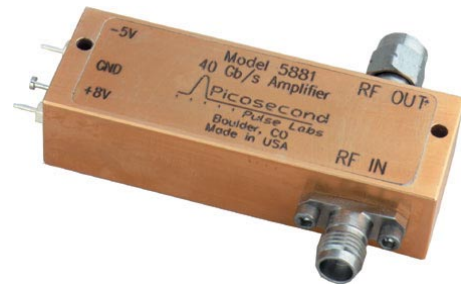




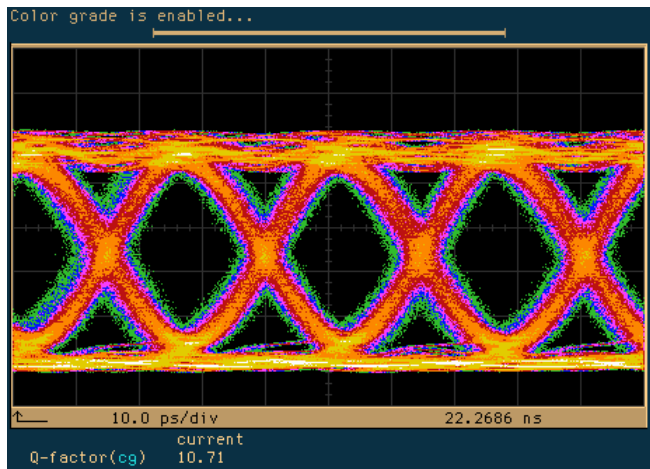
MODEL 5881 40 GB/S BROADBAND AMPLIFIER

- Electro-Absorption Modulator driver or optical receiver amplifier
- 20 kHz - 43 GHz bandwidth
- 8 ps risetime
- 2.7 V_{amp} eye amplitude
- 8.5 dB gain

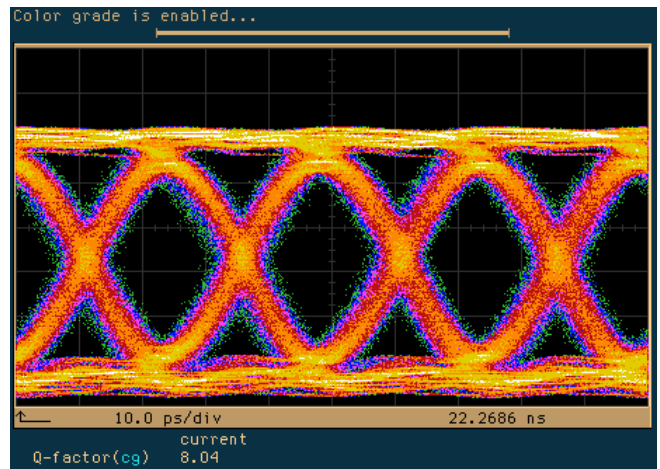


The 5881 is extremely broadband, covering over 6 decades from 20 kHz to 43 GHz. It also demonstrates a very clean time domain response, resulting in high quality 40 Gb/s eye diagrams. The 5881 includes internal reverse voltage protection, power supply regulation, and sequencing circuitry, making it insensitive to power supply voltage variation and application sequence.

Typical 40 Gb/s Eye Measurements



Input Test Signal [1]
Eye amplitude 0.5 V



Output Response [1]
Eye amplitude 1.3 V

[1] Measured on 50 GHz Agilent 54750 oscilloscope.



MODEL 5881 • 40Gb/s BROADBAND AMPLIFIER

5881 Electrical Specifications

PARAMETER	SYMBOL	UNITS	MIN	TYPICAL	MAX	COMMENTS
Polarity						Inverting AC coupled input and output
High Frequency f_{-3dB}	f_{HIGH}	GHz	35	43		
Low Frequency f_{-3dB}	f_{LOW}	kHz		20	35	
Output Eye Voltage	V_{OUT}	V_{amp}	2.4	2.7		$V_{in} = 1.5 V_{amp}$, 12.5 Gb/s PRBS
Gain		dB	7.5	8.5		Measured at 100 MHz
Gain Ripple		dB		± 0.75	± 1.5	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		5		Measured at 1.5 GHz
Group Delay Variation		ps		± 10	± 15	3 GHz < f < 35 GHz, 0.8 GHz aperture
Deconvolved Rise Time	t_r	ps		8		10% to 90%, root-sum-of-squares extraction, 15 ps system rise time
Overshoot / Undershoot		%		± 6		500 ps window, 15 ps system rise time
Input Return Loss 50 MHz < f < 10 GHz 10 GHz \leq f < 30 GHz	S_{11}	dB		-20 -10	-15 -8	
Output Return Loss 50 MHz < f < 10 GHz 10 GHz \leq f < 30 GHz	S_{22}	dB		-13 -10	-10 -8	

Specifications valid at case temperature of 23C

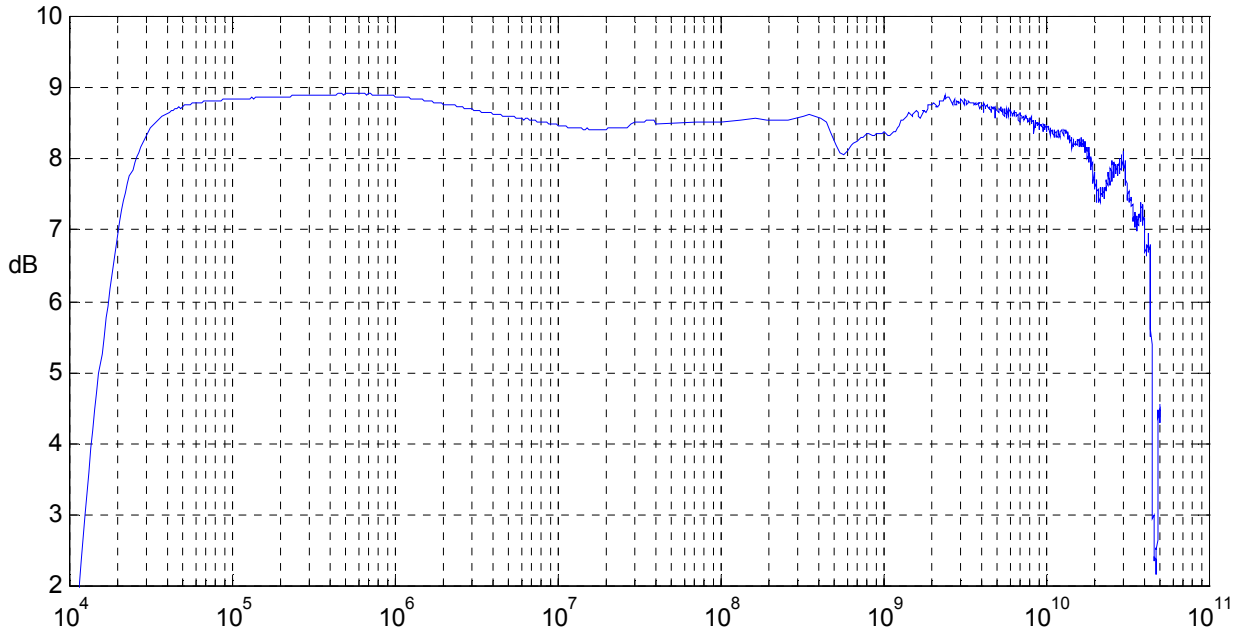
5881 Operating Specifications

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	80 mA typical
DC Voltage Supply (neg)	$-V_{DC}$	V_{DC}	-5.5	-5	-4.5	15 mA typical
DC Voltage Applied to RF Input or Output		V_{DC}	-4		+8	Damage threshold
Operating Temperature	T_{CASE}	$^{\circ}C$	0		70	Case temperature

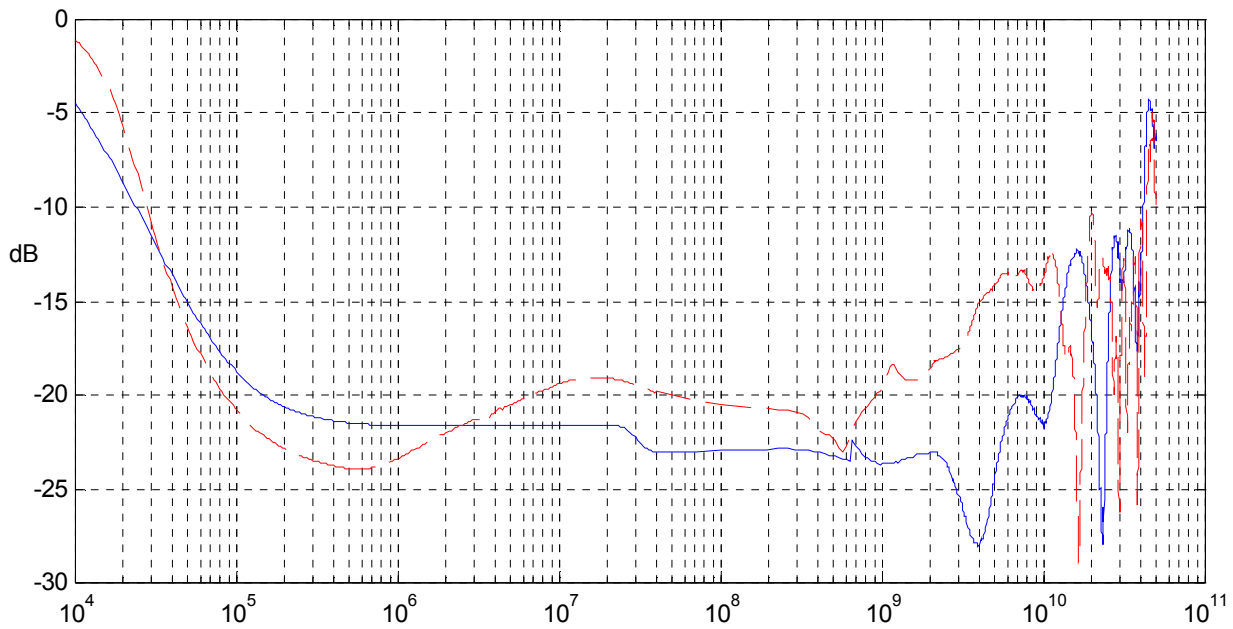
Static sensitive device, limited 30 day warranty.



MODEL 5881 • 40Gb/s BROADBAND AMPLIFIER



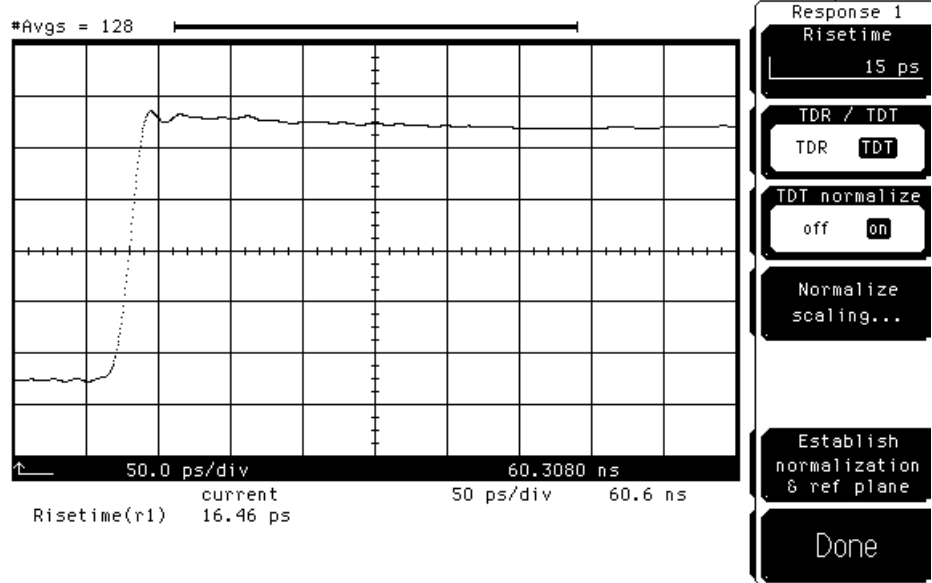
Typical S21 from 10 kHz to 50 GHz



Typical Return Loss from 10 kHz to 50 GHz
 S11 is the solid blue trace, S22 is the dashed red trace.



MODEL 5881 • 40Gb/s BROADBAND AMPLIFIER

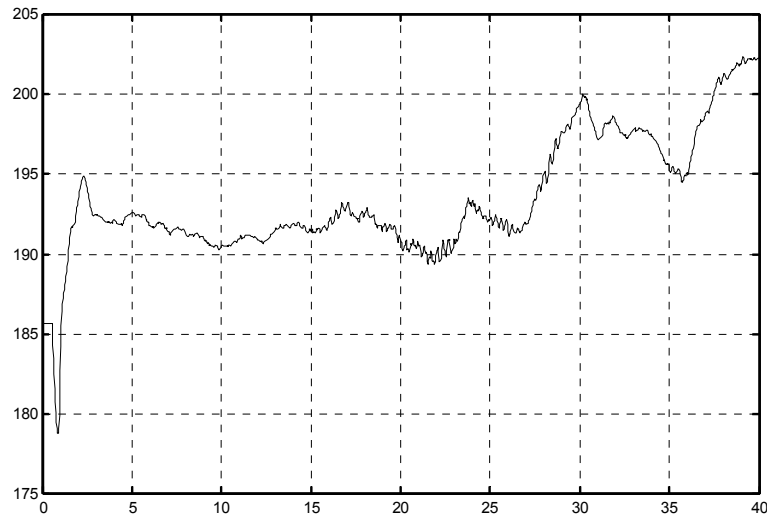


Typical Step Response

Input signal is 15 ps risetime.

Measured using a PSPL 4015C pulse generator and Agilent 54750 50 GHz oscilloscope.

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



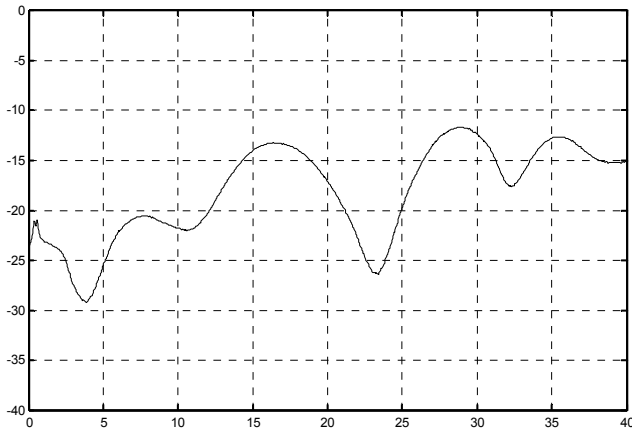
Typical Group Delay

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

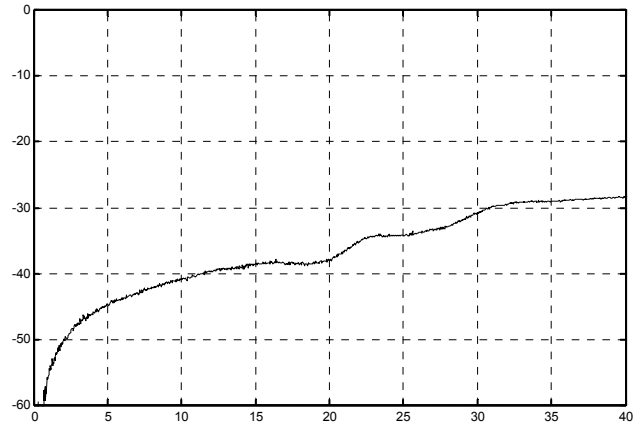


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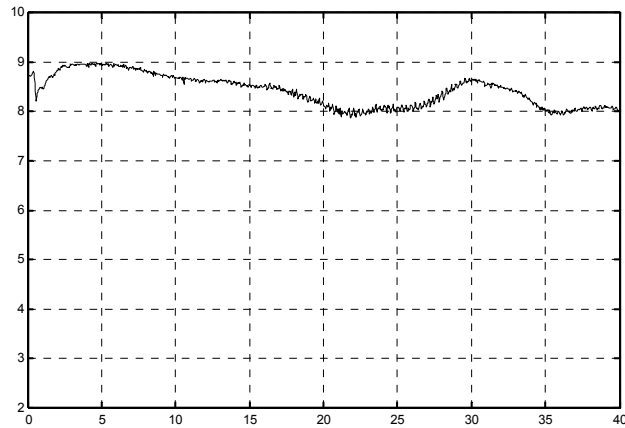
Typical 40 MHz - 40 GHz Frequency Response



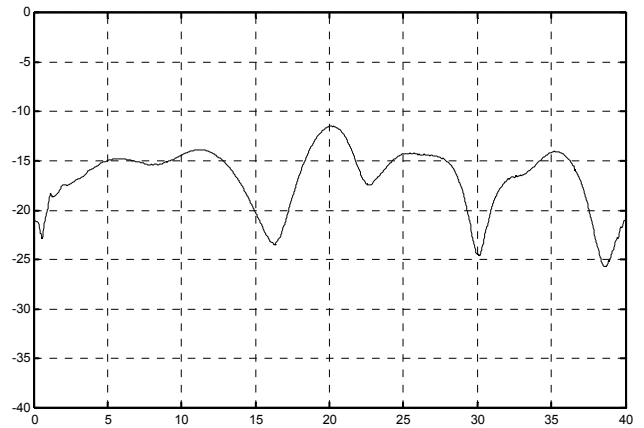
S11
5 dB/div, 5 GHz/div



S12
10 dB/div, 5 GHz/div



S21
1 dB/div, 5 GHz/div

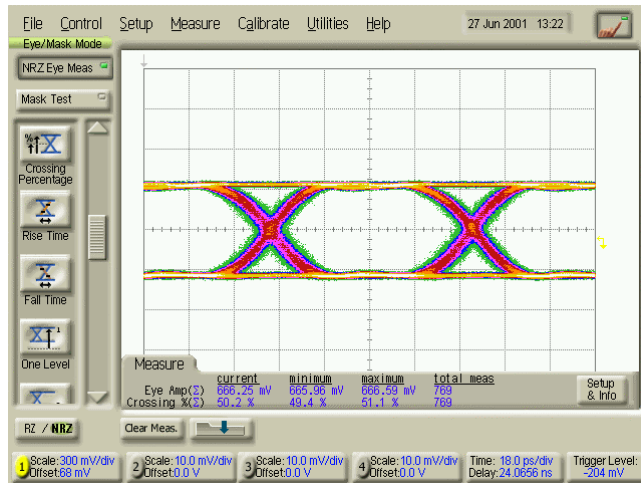


S22
5 dB/div, 5 GHz/div

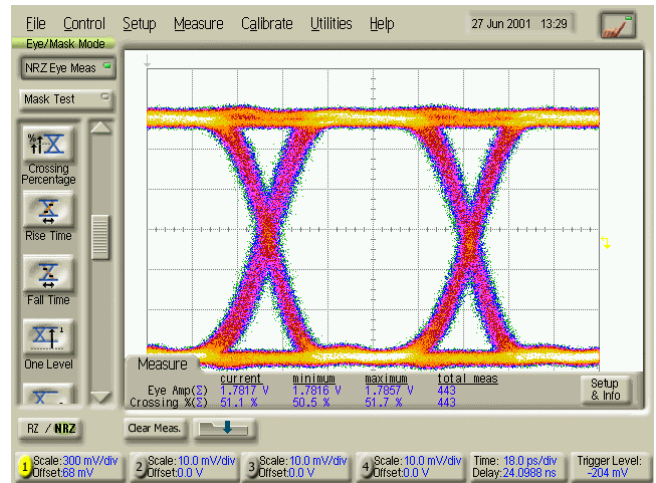


MODEL 5881 • 40Gb/s BROADBAND AMPLIFIER

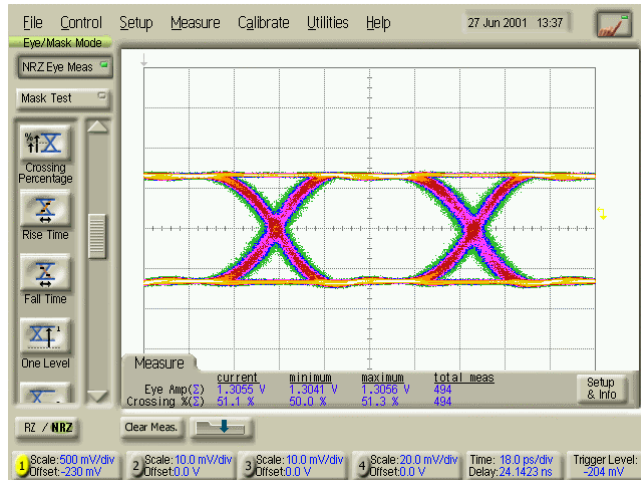
12.5 Gb/s Measurements
Measurements made on 50 GHz Agilent 86100A.



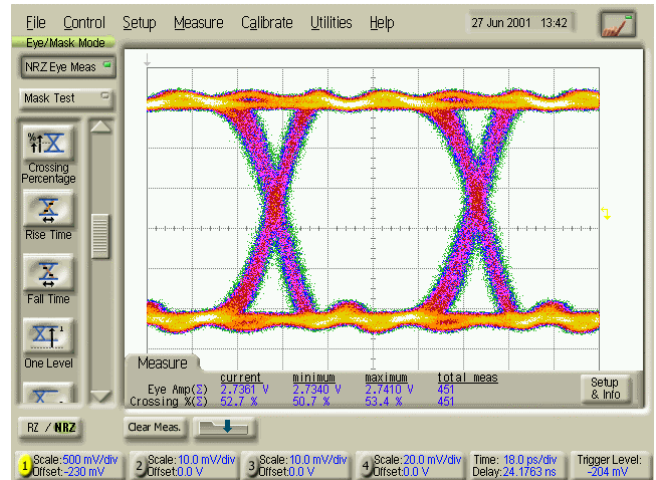
0.67 V Input Test Signal
Input signal is NRZ, $2^{31}-1$.
Eye amplitude 0.67 V, 50% crossing point.



Output Response to 0.67 V
Amplifier in linear range.
Eye amplitude 1.8 V, 51% crossing point.



1.3 V Input Test Signal
Input signal is NRZ, $2^{31}-1$.
Eye amplitude 1.3 V, 51% crossing point.

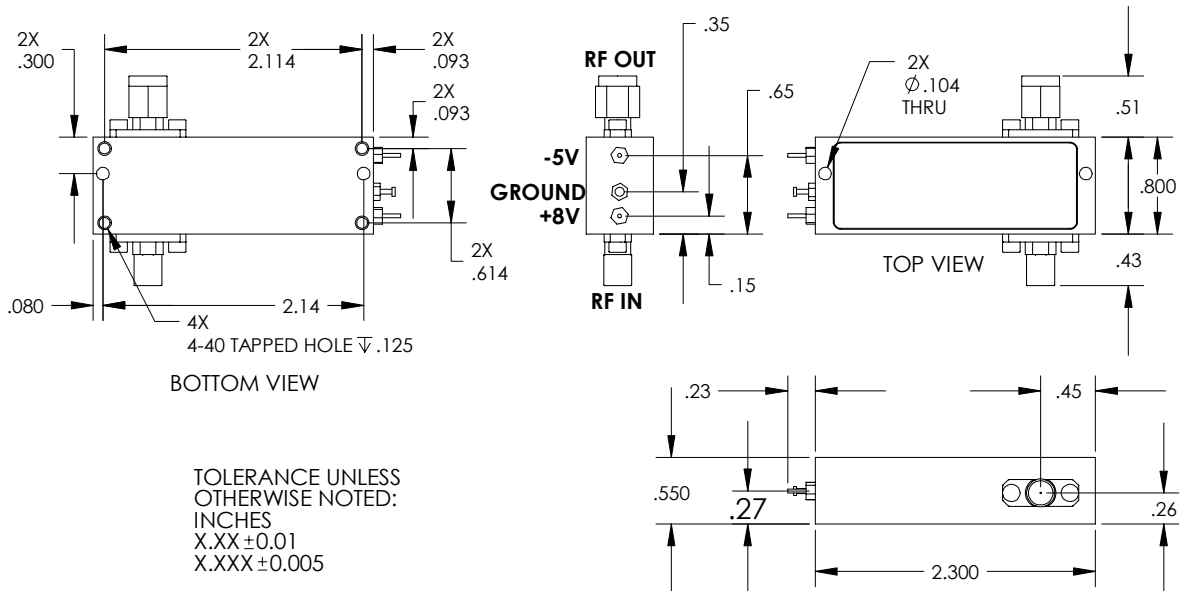


Output Response to 1.3 V
Amplifier in compression (~2dB).
Eye amplitude 2.7 V, 53% crossing point.



MODEL 5881 • 40Gb/s BROADBAND AMPLIFIER

Model 5881 Dimensions



Ordering Information

Part #: 5881-206

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

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