

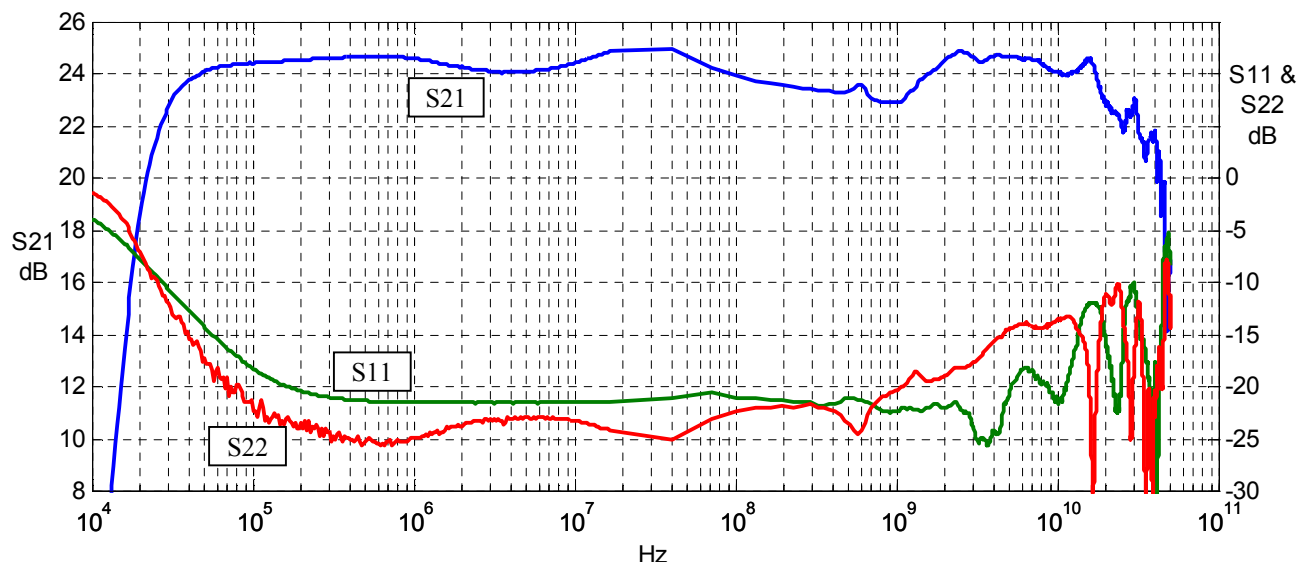
- 25 kHz - 35 GHz Bandwidth
- 12 ps Risetime
- 2.7 V eye amplitude
- 24 dB gain



The Picosecond Pulse Labs Model X5883 is an amplifier intended for use in optical receivers and driving electro-absorption modulators. It is extremely broadband, covering over 6 decades from 25 kHz to 35 GHz. It includes internal reverse voltage protection, power supply regulation and sequencing circuitry, making it insensitive to power supply voltage variation and application sequence.

The X5883 is currently in the prototype stage of development. The specifications outlined below are preliminary, but realistic based on measurements made in the PSPL laboratories. These specifications are subject to change.

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



X5883 Preliminary Specifications

PARAMETER	SYMBOL	UNITS	MIN	TYPICAL	MAX	CONDITIONS
Polarity						INVERTING
High Frequency f_{-3dB}	f_{HIGH}	GHz	30	35		
Low Frequency f_{-3dB}	f_{LOW}	kHz		25	40	
Gain		dB	22	24		at 100 MHz
Gain ripple		dB		± 1	± 2	50 MHz - 15 GHz
Output power at 1dB gain compression	P_{1dB}	dBm		12 11		$f < 25$ GHz 25 GHz $< f < 40$ GHz
Output Eye Amplitude (max)		V	2.4	2.7		measured with 12.5 Gb/s NRZ, 0.25 V eye amplitude input signal
Noise Figure	NF	dB		6		measured at 1.5 GHz
Group Delay Variation		ps		± 17	± 25	4 – 35 GHz, calc using 0.8GHz aperture
Risetime	t_r	ps		12		16ps system t_r , root-sum-of-squares to extract DUT t_r . 1 ns window. Amp in linear operation.
Overshoot/undershoot		%		± 8		1ns window, 16 ps system t_r
DC Power Supply, positive	v_+	V	7	8	9	current draw is approx 230 mA
DC Power Supply, negative	v_-	V	-5.5	-5	-4.5	current draw is approx 15 mA
Input Return Loss	S_{11}	dB		< -18 < -10	-14 -8	50 MHz $< f < 10$ GHz 10 GHz $< f < 30$ GHz
Output return loss	S_{22}	dB		< -13 < -10	-10 -8	50 MHz $< f < 10$ GHz 10 GHz $< f < 30$ GHz
Max Input Power		dBm			+16	damage threshold
DC voltage applied to RF input or RF output		V	-4		+8	damage threshold
Dimensions		Inch [cm]				case: 1.470 x 1.750 x 0.422 [3.73 x 4.45 x 1.07] overall: 2.410 x 2.070 x 0.422 [6.12 x 5.26 x 1.07]
Operating Case Temperature		$^{\circ}\text{C}$	0		70	

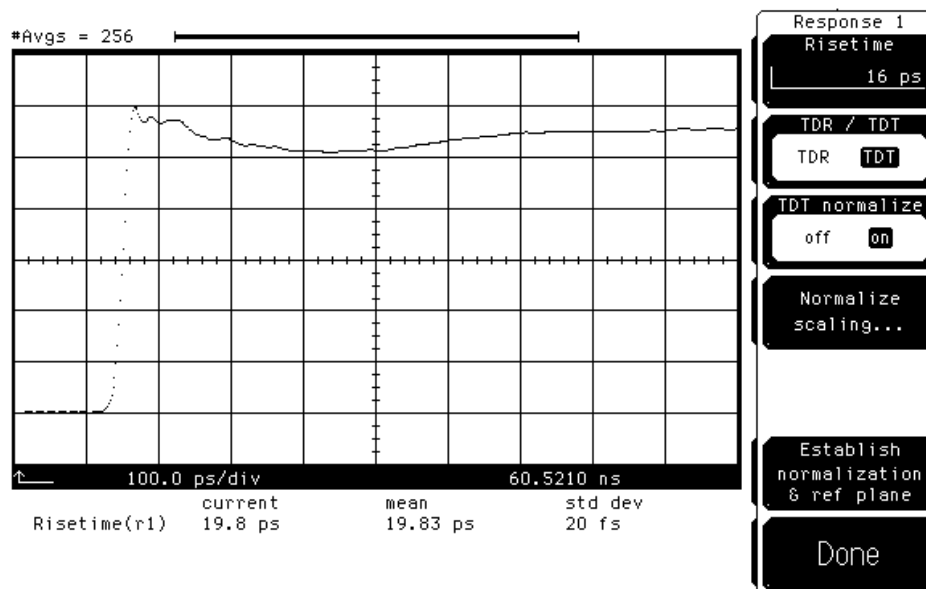
Specifications valid at case temperature of 23 C. Static-sensitive device. Avoid static discharges.

Ordering Information

Model Number	Connector Configuration
X5883-206	2.4mm jack on RF input, 2.4mm plug on RF output

Other connector combinations in 2.4mm or 2.92mm are available.

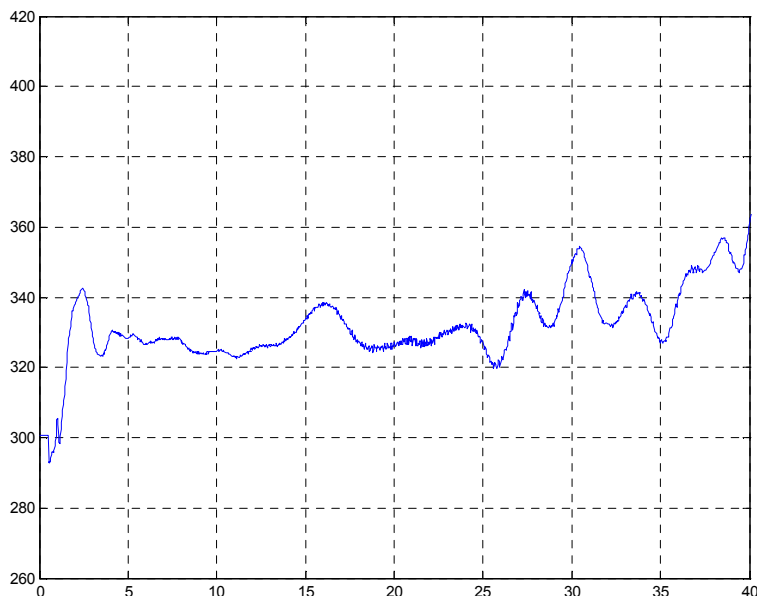
Warranty: Static sensitive device, limited 30 day warranty.



Typical Step Response

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

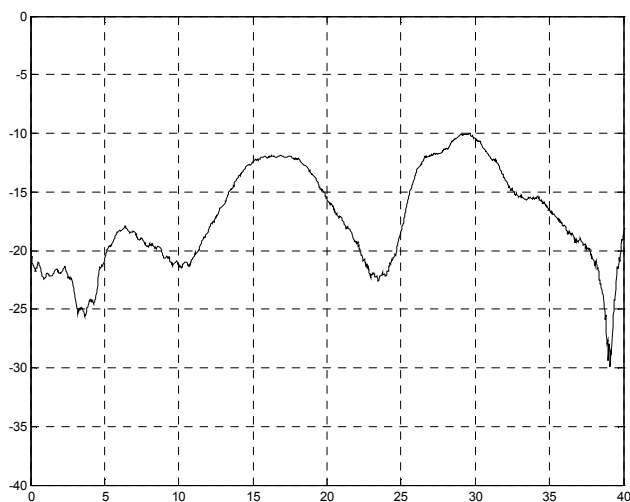
$$t_{r(\text{amplifier})} = \sqrt{[t_{r(\text{system})}]^2 - [t_{r(\text{generator})}]^2}$$



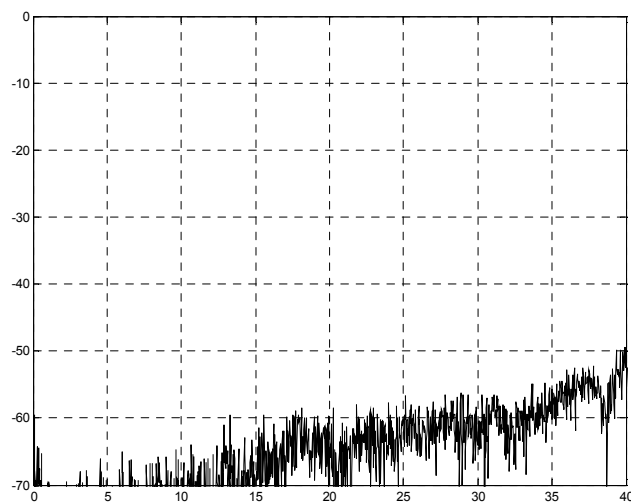
Typical Group Delay

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

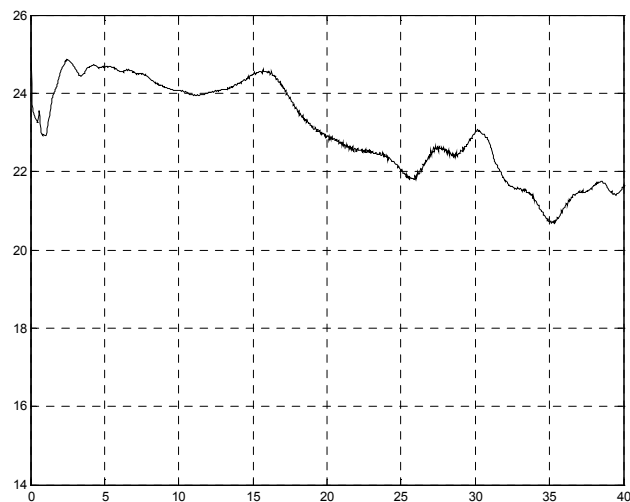
Typical 40 MHz - 40 GHz Frequency Response



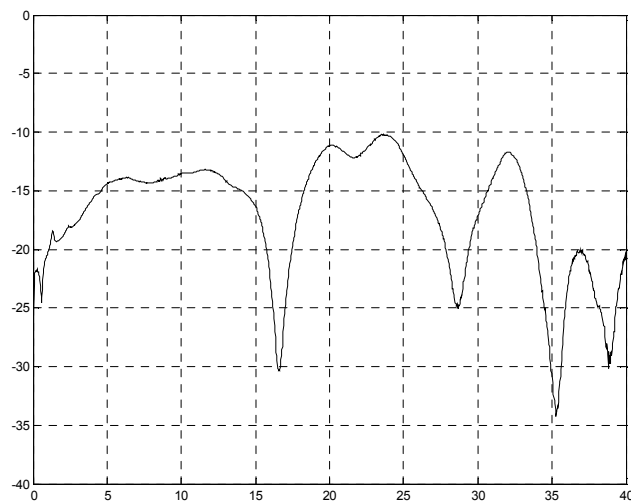
S11
5 dB/div, 5 GHz/div



S12
10 dB/div, 5 GHz/div



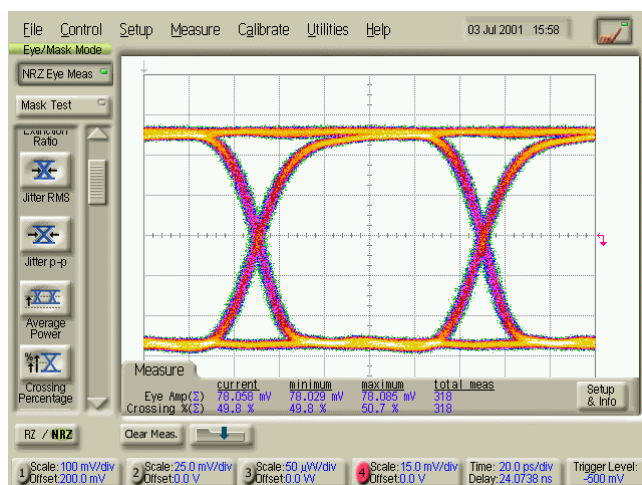
S21
2 dB/div, 5 GHz/div



S22
5 dB/div, 5 GHz/div

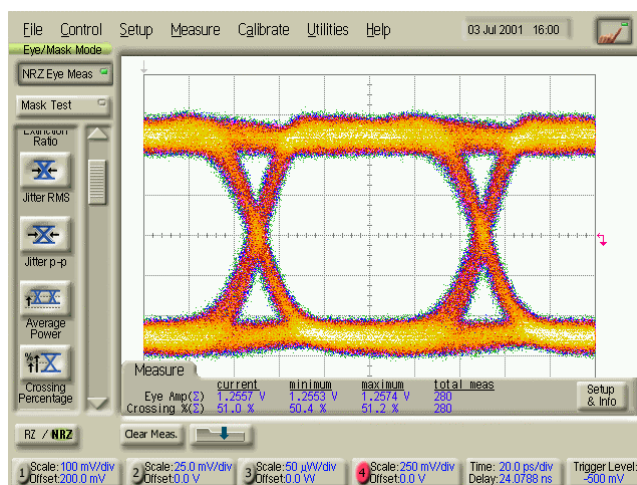
10 Gb/s Measurements

Measurements made on 40 GHz Agilent 86100A.



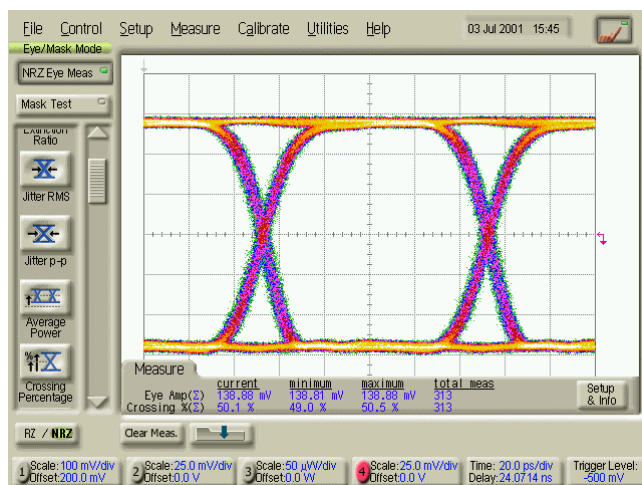
78 mV Input Test Signal

Input signal is NRZ, 2^31-1 , 78 mV eye amplitude, 50% crossing point.



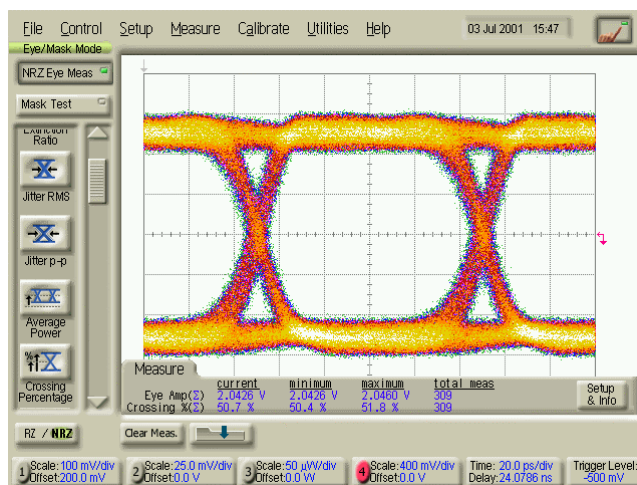
Output Response to 78 mV

Amplifier in linear range.
 Eye amplitude 1.26 V, 51% crossing point.



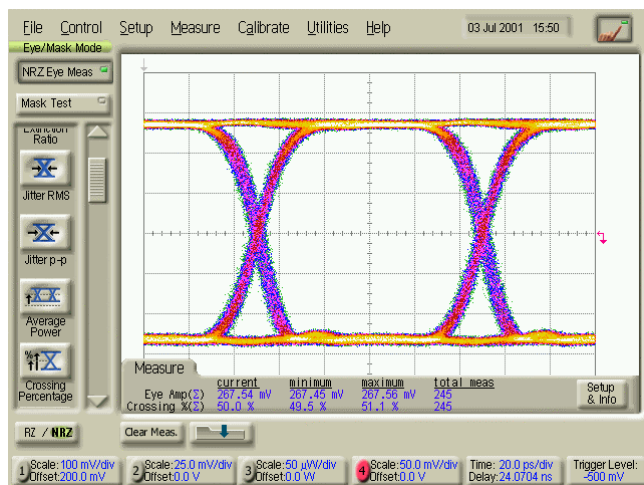
0.14 V Input Test Signal

Input signal is NRZ, 2^31-1 , 0.14 V eye amplitude, 50% crossing point.



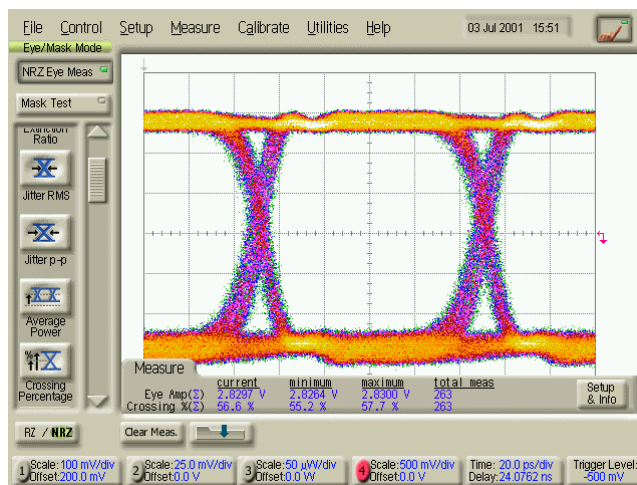
Output Response to 0.14 V

Amplifier in compression (~1 dB)
 Eye amplitude 2.04 V, 51% crossing point.



0.27 V Input Test Signal

Input signal is NRZ, 2³¹-1, 0.27 V eye amplitude, 50% crossing point.



Output Response to 0.27 V

Amplifier in compression (~3.5 dB)
Eye amplitude 2.83 V, 57% crossing point.

Model X5883 Dimensions

