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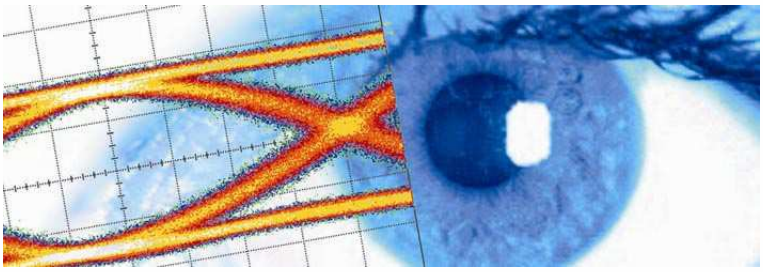


Datasheet

SHF 611 A

32 GBaud 3-Bit DAC

Description

The SHF 611 A is a 3-Bit Digital-to-Analog Converter (DAC) operating at data rates up to 32 GBaud for use in broadband test setups and telecom transmission systems. Three 32 Gbps single ended serial data streams are accepted by the DAC and converted into one differential 8-Level data signal at a nominal output data rate of 32 GBaud. By using only two input ports it is possible to convert two single ended input data serial data streams into a 4-Level output signal. A single ended clock signal (nominally 32 GHz) with the same frequency as the output data rate drives the SHF 611 A.

All data input ports are re-timed by the clock input signal. The RF input ports are AC-coupled. The RF output ports are DC-coupled. Unused in- and output ports should be terminated.

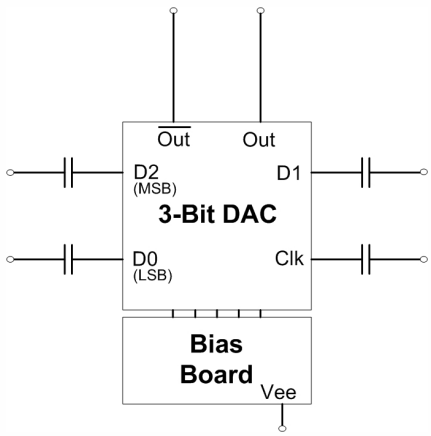
Features

- Broadband operation up to 32 GBaud
- Differential data output, 900 mV single ended output swing
- Single ended clock and data inputs
- Latched input ports
- Output level control
- Bias board

Applications

- 100G Ethernet development and prototyping
- 200G and 400G systems
- OC-768 / STM-256 applications
- Telecom transmission
- Fibre Channel®
- Broadband test and measurement equipment

Block Diagram



® Fibre Channel is a registered trademark of the Fibre Channel Industry Association

Bias Board

At delivery, the bias board is mounted on a common base plate, together with the SHF 611 A 3-Bit DAC. All bias voltages are provided by this bias board which is controlled by a PC via a USB interface. The easy to use software package is a complementary part of each delivery.

For system applications it is possible to remove the bias board. In that case the operating voltages have to be supplied by the customer's circuitry.

Specifications

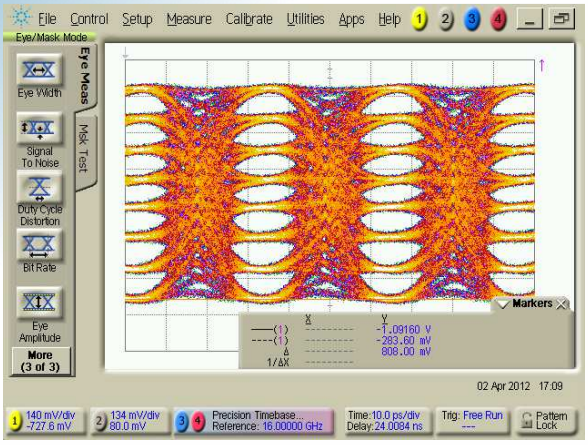
Parameter	Unit	Symbol	Min.	Typ.	Max.	Comment
Input Parameters						
Data Input Voltage	mV	$V_{data\ in}$	100	200	300	Clock input amplitude = 150mV
Clock Input Frequency	GHz	f_{in}	1		32	
Clock Input Voltage	mV_{pp}	$V_{clk\ in}$	100	150	250	Data input amplitude = 200mV
Output Parameters						
Minimum Output Data Rate	GBaud	$R_{in,min}$			1	
Maximum Output Data Rate	GBaud	$R_{in,max}$	32			
Output Amplitude	mV	V_{out}		930		Single ended, full scale, adjustable up to -3dB, see table below
Power Requirements						
Supply Voltage	V	V_{ee}	-5.2	-5	-4.8	
Supply Current	mA	I_{ee}		350	380	
Power Dissipation	mW	P_d		1750		@ V_{EE} = -5V
Bias Voltages						
Bias Adjust 1 for D0, D1 & D2	V	V_{Bias1}	-3.3		0	
Bias Adjust 2 for D0, D1 & D2	V	V_{Bias2}	-3.3		0	
Conditions						
Operating Temperature	°C	$T_{ambient}$	15		35	

Maximum Output Amplitude			
Input D2	**Input D1**	**Input D0**	**Output Amplitude (typ. ±10%) [mV]**
-	-	On	**150**
-	On	-	**270**
-	On	On	**390**
On	-	-	**540**
On	-	On	**680**
On	On	-	**800**
On	On	On	**930**

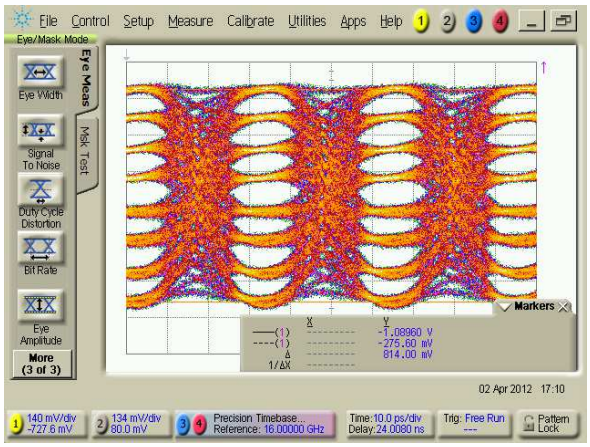
Typical Output Eye Diagrams

The measurements below had been performed using a SHF 12103 A Bit Pattern Generator (PRBS 2^{31}-1) and an Agilent 86100D Digital Communication Analyzer (DCA) with Precision Time Base Module (86107A) and 70 GHz Sampling Head (86118A). The outputs of the DAC module had been connected directly to the DCA input.

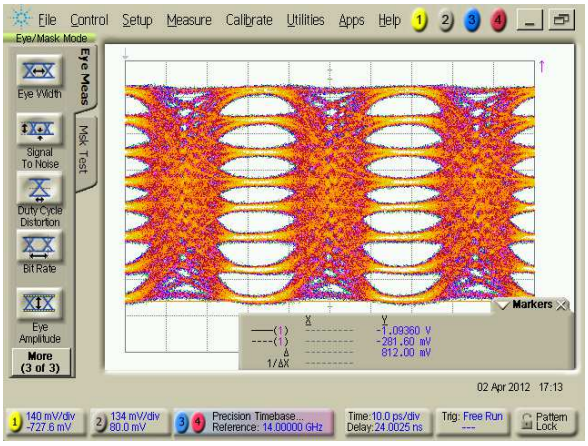
8-Level Output Signal Measurement



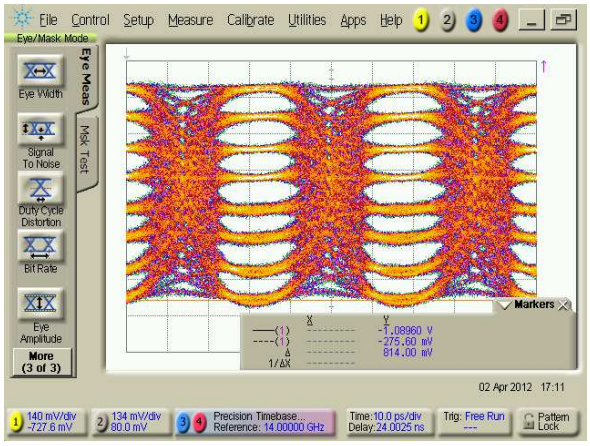
Out @ 32 GBaud



Out! @ 32 GBaud



Out @ 28 GBaud



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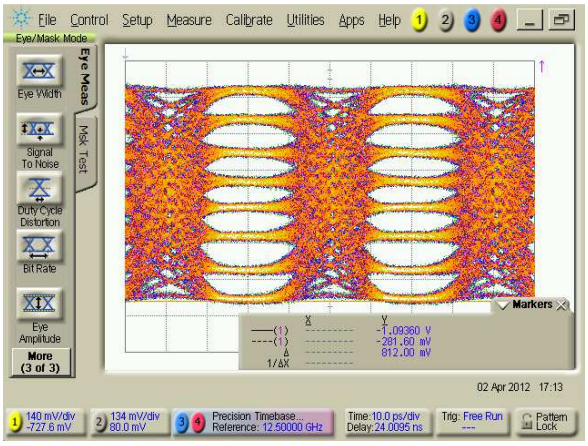
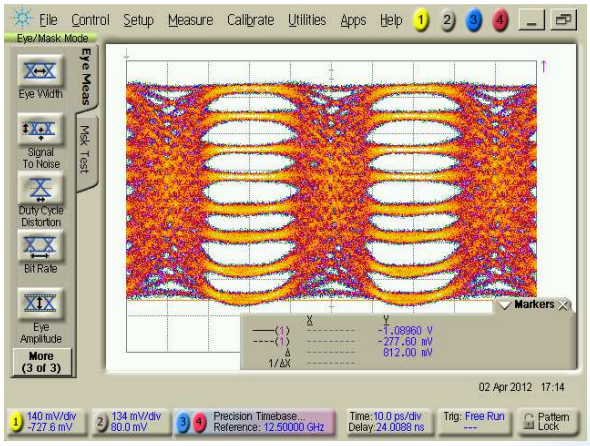


Out @ 25 GBaud



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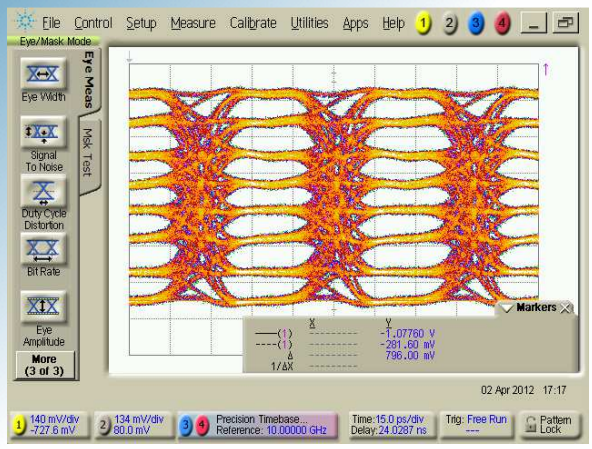
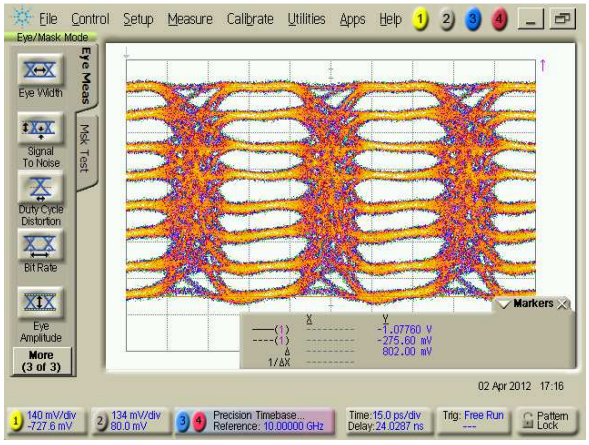


Out @ 20 GBaud



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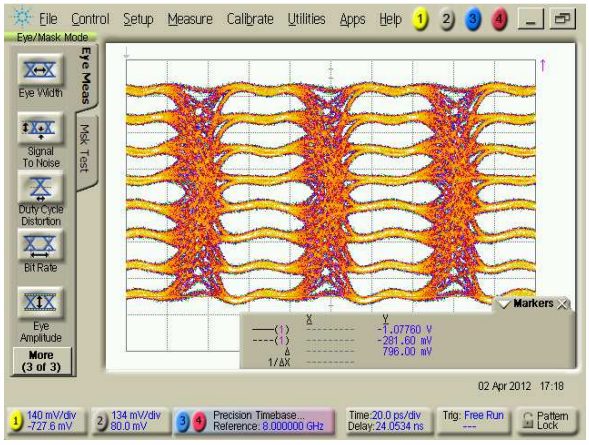
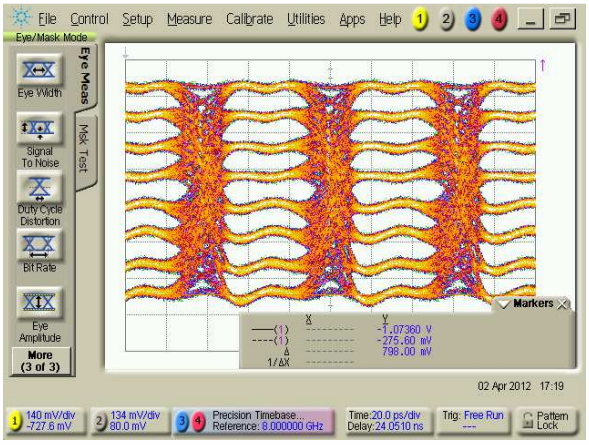


Out @ 16 GBaud



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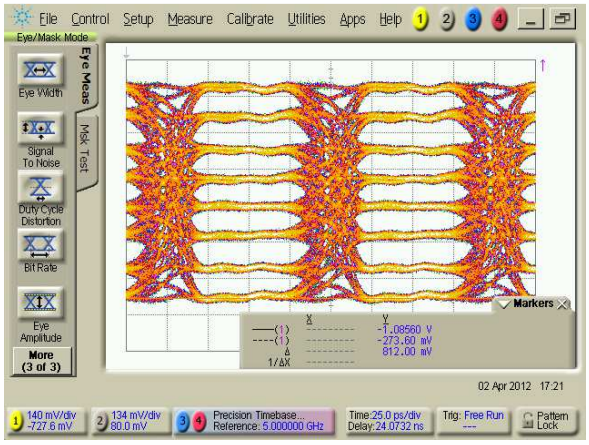

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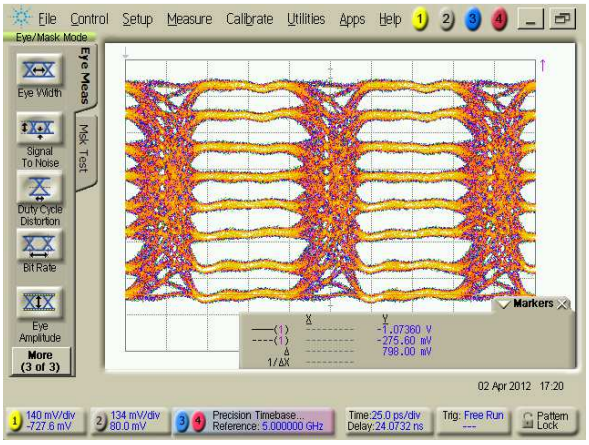
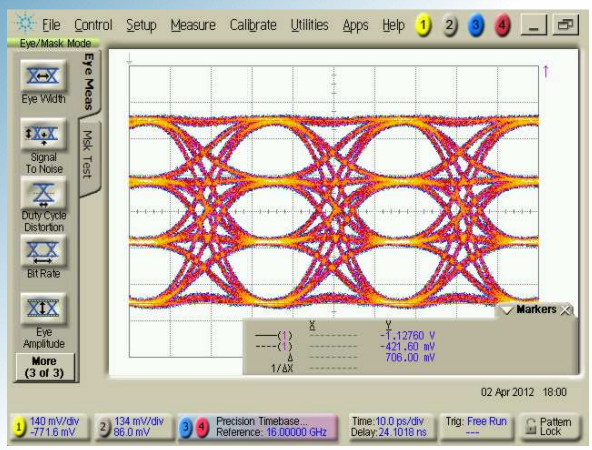
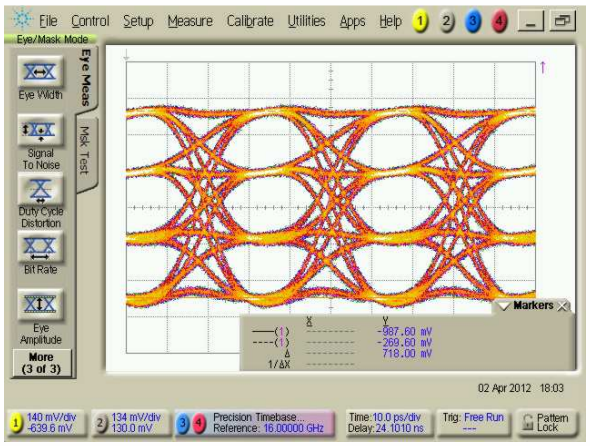


Out! @ 10 GBaud

4-Level Output Signal Measurement



Out @ 32 GBaud



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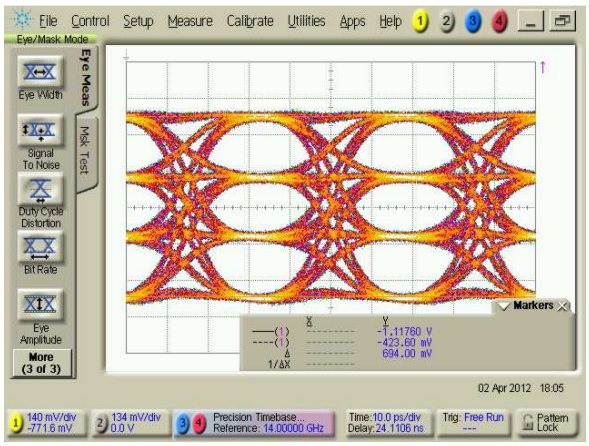

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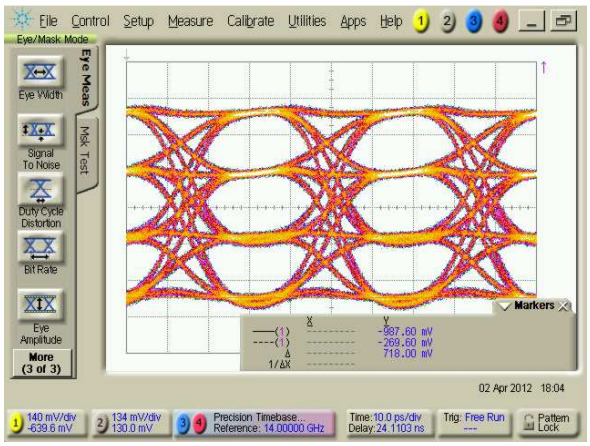

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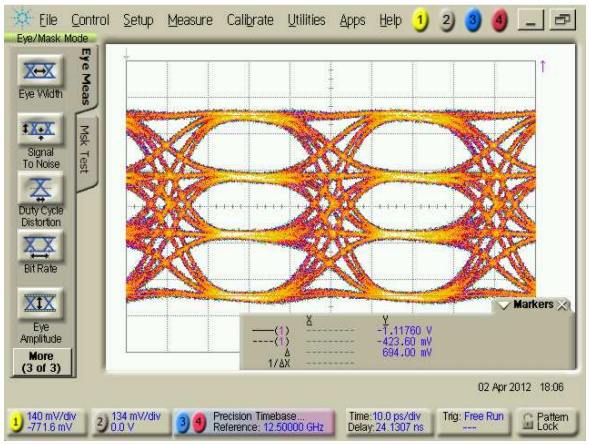

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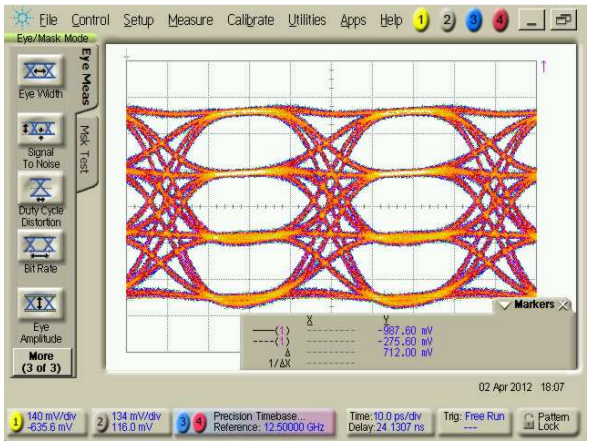

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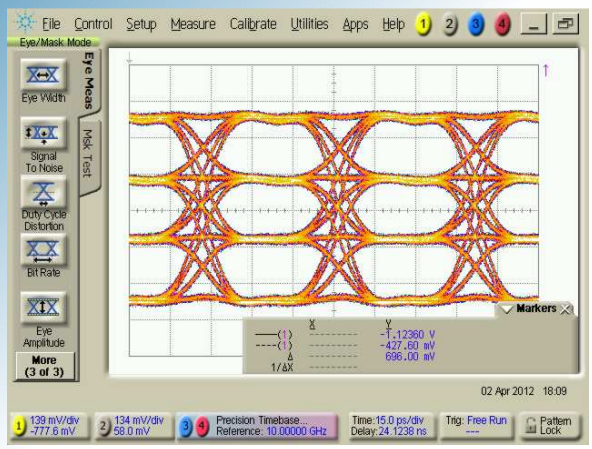

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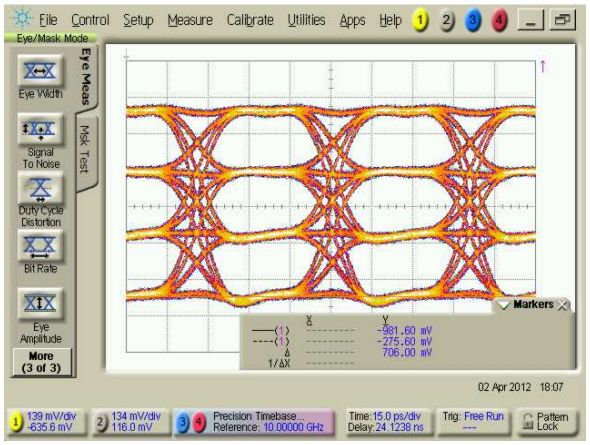

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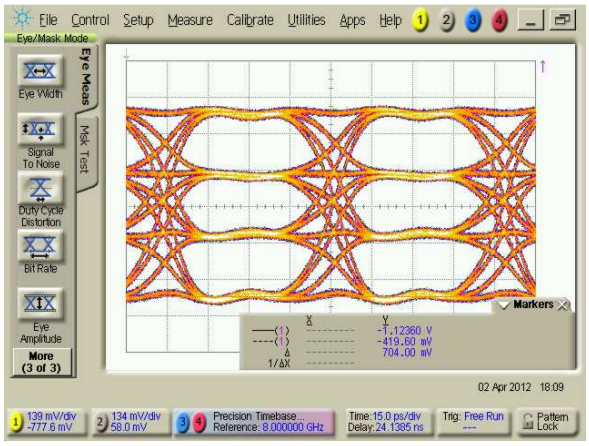

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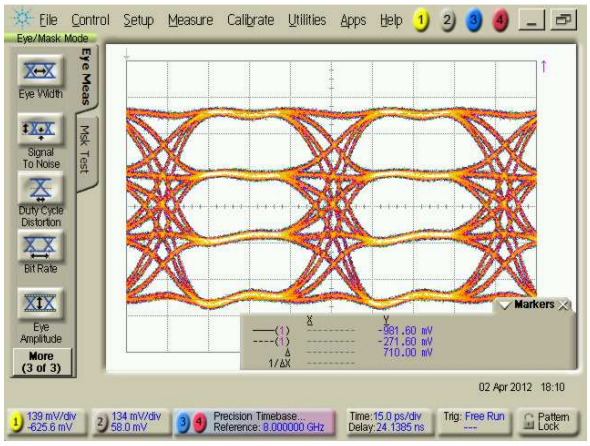

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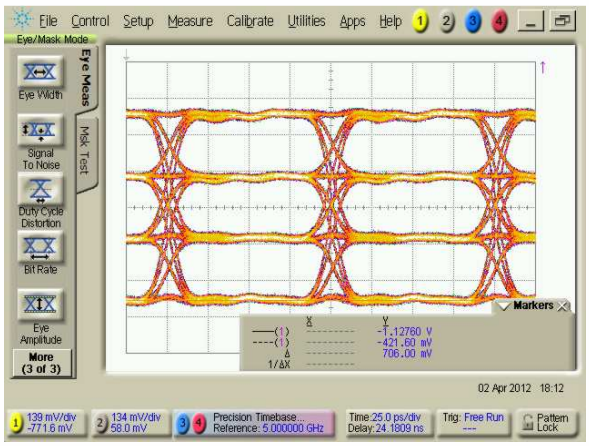

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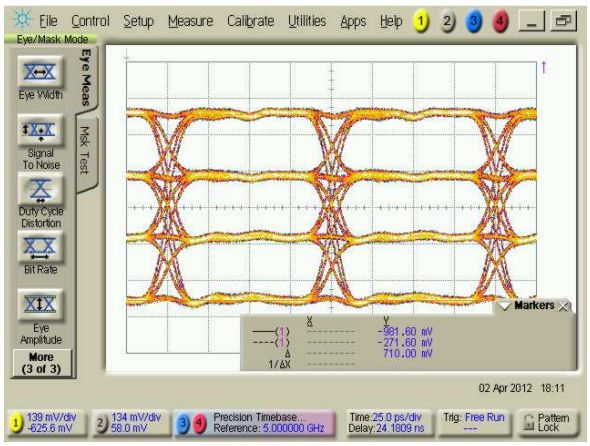
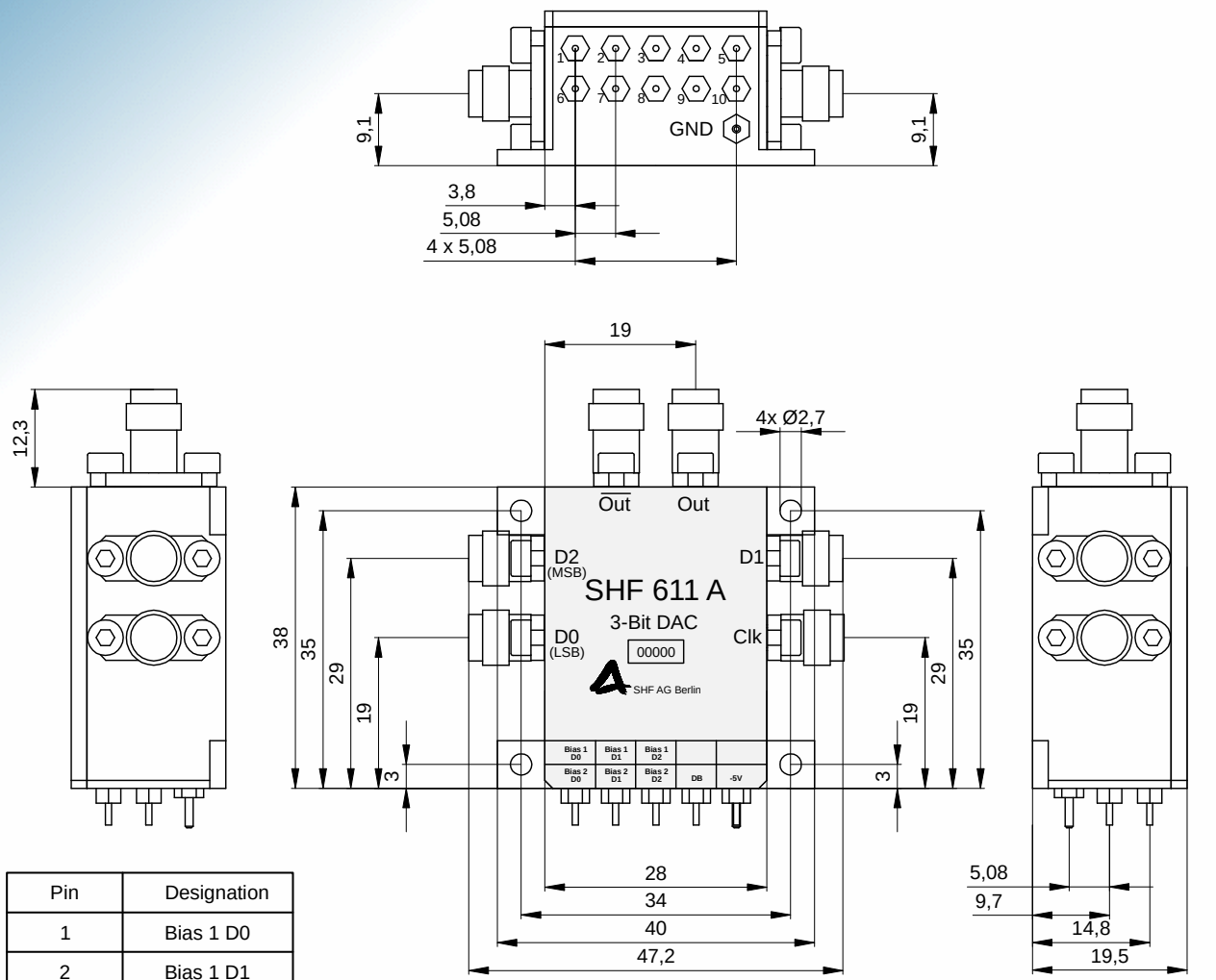


Out! @ 10 GBaud

Outline Drawing - Module



Pin	Designation
1	Bias 1 D0
2	Bias 1 D1
3	Bias 1 D2
4	nc
5	nc
6	Bias 2 D0
7	Bias 2 D1
8	Bias 2 D2
9	DB
10	-5V

Port	Connector
Out	1.85mm (V) female
$\overline{\text{Out}}$	1.85mm (V) female
D0	2.92mm (K) female
D1	2.92mm (K) female
D2	2.92mm (K) female
Clk	2.92mm (K) female