SHF Communication Technologies AG

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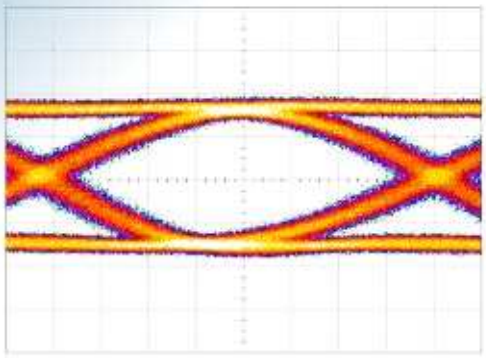
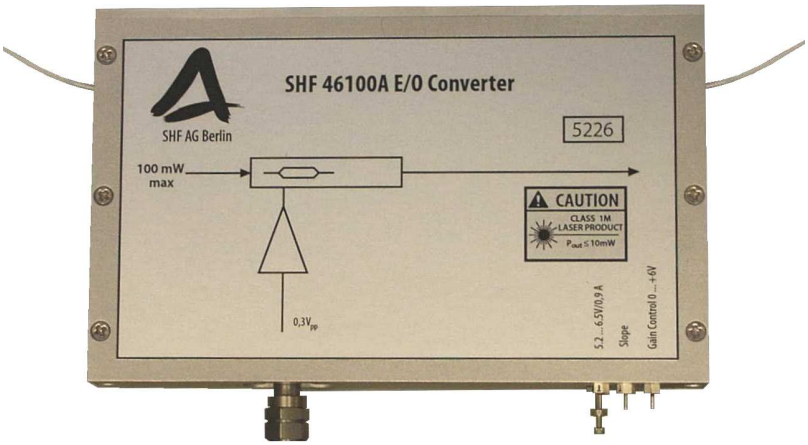


Datasheet

SHF 46100 A

E/O Conversion Module



Description

The SHF 46100 A is a module which converts electrical signals to optical signals. The module is a compact, low cost solution which offers superb performance while including easy to use features.

An automatic bias circuit sets the modulator bias so that the output signal quality is optimal. It is also possible to change the bias conditions so that the polarity of the output signal can be inverted.

Further details about the operation and use of the SHF 46100 A can be found in the Application Note AN46100-1 (available in the Downloads section of our web site).

Features

- Broad band operation to at least 44 Gbps
- Chirp-free operation
- High dynamic signal to noise performance
- High dynamic extinction ratio
- Single-ended electrical drive
- Selectable bias slope
- Automatic modulator DC bias voltage control (ABC)
- Small size

Applications

- R&D for optical communication systems up to 44 Gbps
- Microwave photonics
- Characterization of high speed optical components
- Subsystem prototyping and OEM applications

Options

The standard configuration is PM fiber at the in- and output, having a length of approximately 1 m equipped with an FC/PC optical connector.

Various other kinds of precision optical connectors can be mounted to the module and have to be specified with the order.

Option for analog applications with manual DC bias adjustment is available on request. Model: SHF 46100B. This version has a by-passed modulator ABC and the small signal parameter will be specified.

A version with an extended temperature range of up to 60°C case temperature is available as an option.

Specifications

Parameter	Unit	Min.	Typ.	Max.	Conditions
Optical parameters					
Wavelength range		C- and L-band			
Insertion loss	dB		7.5	9	Connector to connector. Data modulation & ABC operation
Extinction ratio	dB		20		
Return loss	dB		50		Without optical connector
Residual chirp (α-parameter) Positive slope Negative slope			 0.02 -0.02		Small signal measurement method [1] Chirped (+/-0.7) version also available
Electrical and electro-optic parameters					
Bit rate	Gbps	1		44	Operation up to 50 Gbps possible, but with reduced performance
Optical input power	dBm	8		13	Higher input power on request
Driver amplifier S11	dB			-10	
Drive amplifier input level (peak-peak)	V (dBm)	0.25(-8)	0.3(-7)	0.35(-5)	Amplitude at 44 Gbps [2]
Dynamic extinction ratio	dB	12			At 44 Gbps, over case temperature range
Dynamic signal/noise ratio		14			At 44 Gbps, over case temperature range
Output rise and fall times	ps		8	10	20 to 80 % at 44 Gbps
Output timing jitter <RMS>	ps		1.0	1.1	At 44 Gbps, over case temperature range. De-embedded from input electrical data source.
Position of crossing point	%	45		55	Over case temperature range
Auto-bias control[3]					
Dither signal frequency	kHz		10		
Dither signal amplitude (of 40Gbps drive data signal)	%		1		
Absolute maximum ratings					
Optical input power	dBm			20	CW
Amplifier input power	dBm			10	NRZ data
General					
Dimensions	mm		122x75x 19		Metal housing exterior only
Power supply	V	6	6.3	6.5	
Supply current	A		0.9		
Power consumption	W		6.3		
Operating case temperature	℃	15		40	Extended temperature range (15℃… 60℃) on request
Storage temperature	℃	-20		85	
RF connectors					V (1.85 mm) female [3]
Optical connector					FC/PC [4]

All parameters measured using 44 Gbps electrical output signal from SHF BPG44, 2^{31}-1 PRBS pattern length. Signal amplitude 250 mV, S/N> 12, rms jitter < 500fs. Optical CW test signal 10 mW, 1550 nm. Unless otherwise stated, the minimum specifications are guaranteed over the case temperature range of 15 to 40° C, based on SHF BPG4 4 data source. Unless otherwise stated, all parameters are as defined in accordance to Agilent DCA measurement procedure.

Notes:

1) F. Devaux, Y. Sorel and J.F. Kerdiles, "Simple Measurement of Fiber Dispersion and of Chirp Parameter of Intensity Modulated Light Emitter", J. Lightwave Technol., vol. 11, no. 12, December 1993

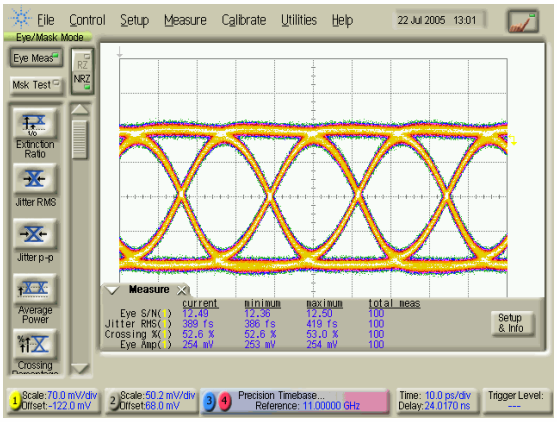
2) Application of external voltage to gain control pin may be required for optimum performance as per recommendation

3) V (1.85 mm) male option available upon request

4) Customer to specify other options

Signal Waveforms

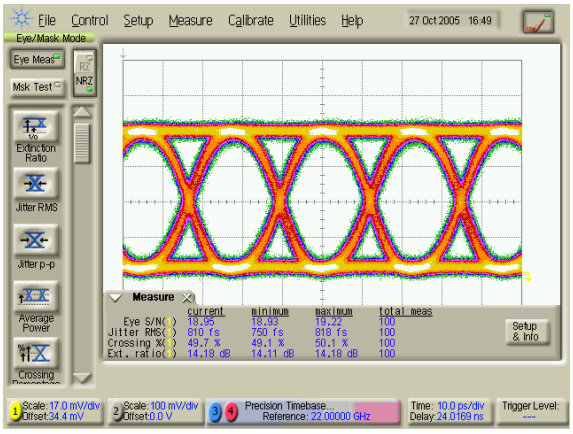
Input electrical drive signal at 44 Gbps



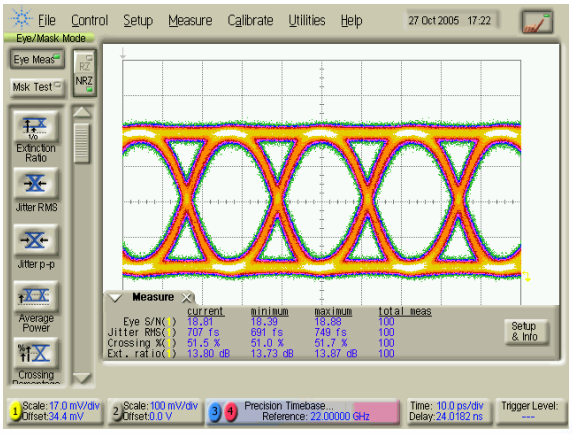
Input amplitude: 250 mV_{pp}
S/N: 12.5
Jitter: 0.39 ps rms Crossing: 52.6 %

Signal generator: SHF BPG 44 E LJ + 50 cm Sucoflex 104EA + 6 dB V-attenuator.

Output optical signal at 44 Gbps



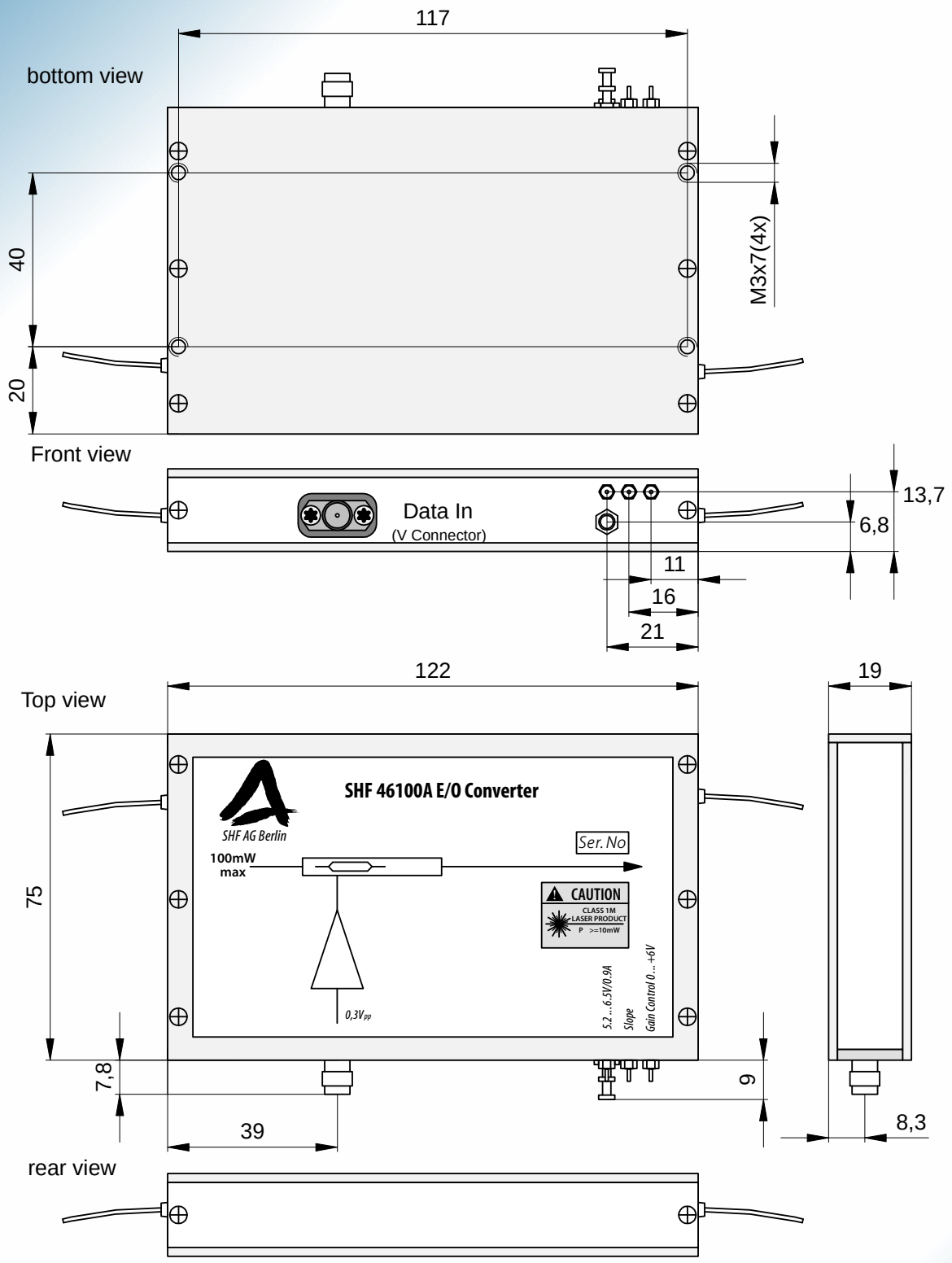
Case temperature 15°C
S/N: 19 ER: 14.2 dB
Jitter: 0.81 ps rms Crossing: 49.7 %



Case temperature 40°C
S/N: 19 ER: 13.8 dB
Jitter: 0.71 ps rms Crossing: 51.5 %

70 GHz photodetector + Agilent DCA 86100A + 50 GHz sampling head 83484A + precision time base.

Module Outline



all dimensions in mm