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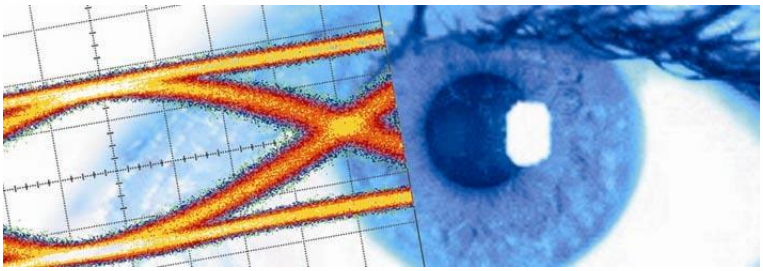
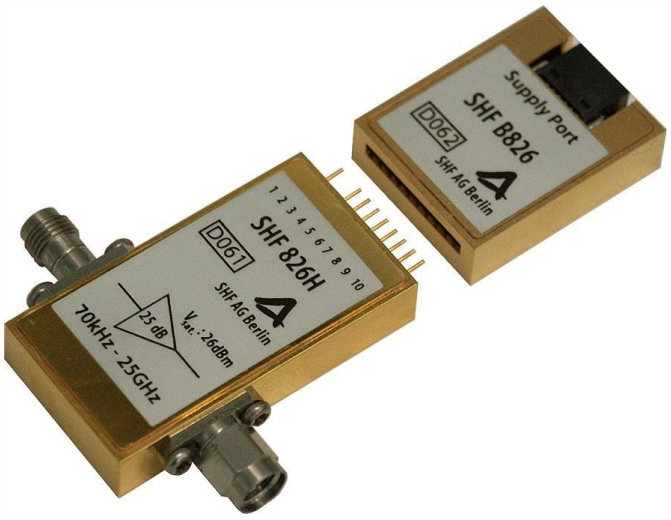


Datasheet

SHF 826H

Broadband Amplifier



Description

The SHF 826H is a two stage amplifier based on special designed monolithic microwave integrated circuits (MMICs) to achieve ultra wide bandwidth and low noise performance.

The amplifier will be delivered with a removable Bias Box. This feature allows the use without any additional bias circuitry. The box should be used with the included ribbon cable which is made for the connection to standard laboratory connectors (for power supply and voltage level detector).

Due to this concept the amplifier provides the same ease of use like all other well known SHF laboratory amplifiers. Nevertheless the use without the bias box offers a flexibility which makes this amplifier to the ideal product for system applications.

Applications

- Optical Communications
- High-Speed Pulse Experiments
- Satellite Communications
- Research and Development
- Antenna Measurements
- Data Transmission

Available Options

- 01: DC return on input (max. ±1.75 V, max. 35 mA)
- 02: Built-in bias tee on input
- 03: DC return on output (max. ±1.75 V, max. 35 mA)
- 04: Built-in bias tee on output
- MP: Matched Pair. Two amplifiers will be matched. A matched pair has a gain variance ≤ 1dB, a propagation delay variance ≤ 5ps and an output amplitude variance ≤ 0.5V

The following options cannot be combined:

01 and 02
03 and 04
02 and 04

Specifications

(Typical data at 45°C case temperature, unless otherwise specified)

Parameter	Symbol	Unit	Min	Typ	Max	Comment
High Frequency 3 dB Point	f_{HIGH}	GHz	25			0 dB @ 40 MHz
Low Frequency 3 dB Point	f_{LOW}	kHz			70	0 dB @ 40 MHz
Small Signal Gain	G_P	dB	24	25		
Input Eye Amplitude	V_{IN}	V_{pp}			1	
Output Eye Amplitude	V_{OUT}	V_{pp}	11.8	12.3		V_{in} ~ 0.68 V_{pp}
Saturated Output Eye Amplitude	V_{SAT}	V_{pp} (dBm)	12.6 (26)			
Controllable Output Voltage Range		V_{pp}	V_{OUTmin}		V_{OUTmax}	V_{in} ~ 0.68 V_{pp},
Level Control Voltage	V_{OVC}	V	0		12.6	V_{OUTmin} = (V_{OUTmax} – 3 V); see note 1
Crossing Control Voltage	V_{XC}	V	-5		0	see note 2
Output Jitter, RMS Value	J	ps		1	1.5	calculated value; see note3
Input Return Loss	S_{11}	dB		-10		< 19 GHz
Output Return Loss	S_{22}	dB		-10 -5		< 13 GHz < 16 GHz
Level Detector Output Voltage	V_{LD}	V			6	
				1.5		with load 1 kΩ, 20 Gbps, NRZ, 2^{31}-1
Input Bias Tee Voltage	V_{bias_in}	V	-5		+5	with option 02, max. 100 mA
Output Bias Tee Voltage	V_{bias_out}	V	0		12	with option 04, max. 100 mA
Supply Voltage	V_S	V	11.5	12	12.6	
Supply Current	I_S	mA		700	750	
Power Dissipation	P_D	W		9		@12V Supply Voltage
Case Temperature	T_{case}	°C			50	With SHF heat sink ensured at $T_{ambient}$ ≤ 28 °C
Input Connector						1.85 mm (V); female
Output Connector						1.85 mm (V); male
Dimensions		mm				81x26x9, w/o connectors

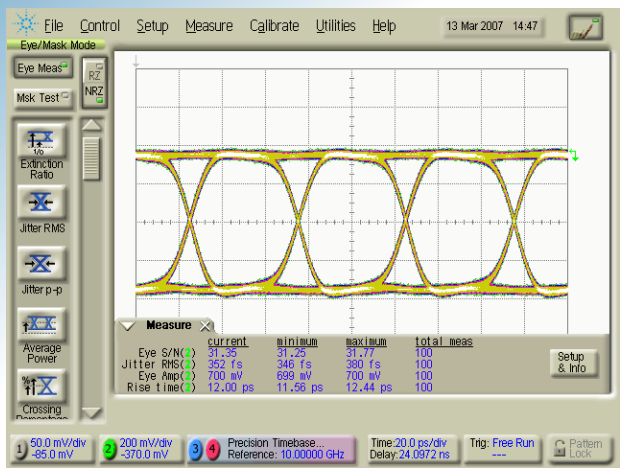
Notes:

1: To maintain maximum amplitude keep the OVC-Input left floating or V_{OVC} as high as ~ +11 V (max 12.6 V).

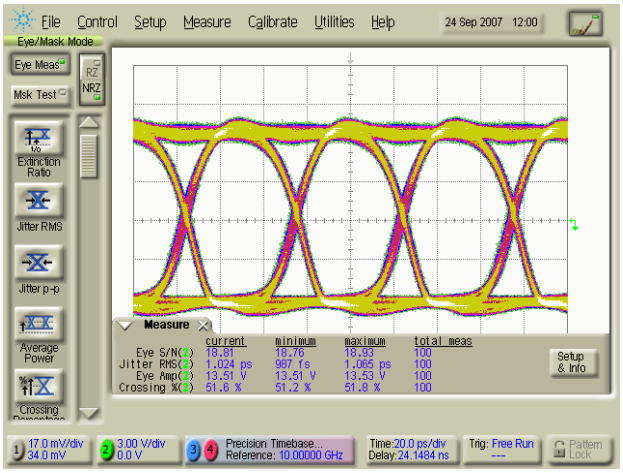
2: If the output amplitude is reduced a crossing control voltage is required to get an output eye with 50% crossing.

3: Signal source SHF BPG 44 E (20 Gbps; 2^{31}-1 NRZ; Jitter: ~350 fs), V_{out}: ~12 V_{pp}; T_{Case} = 45 °C.
Jitter will increase at higher temperatures. Jitter calculated according to the formula: $J = (J_{out}^2 - J_{in}^2)^{½}$

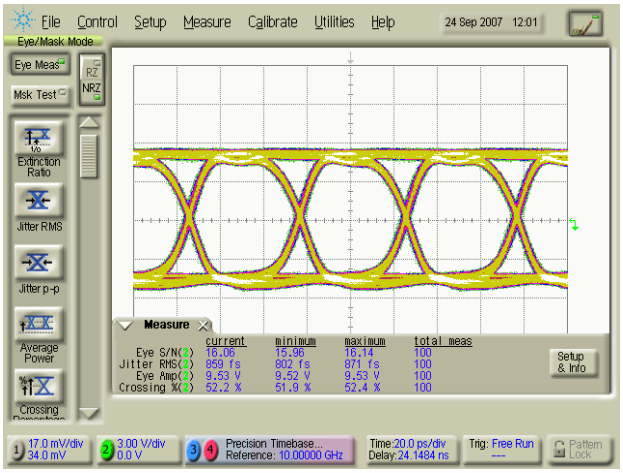
Typical Output Waveforms



Input Signal: *0.7* V_{pp} @ 20 Gbps



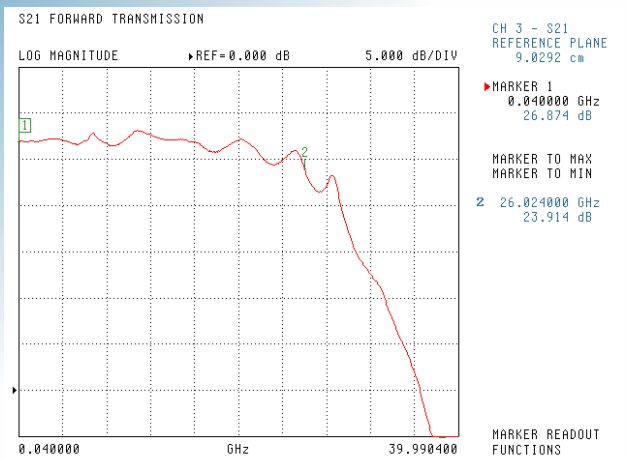
Output Signal: *13.51* Vpp @ 20 Gbps
V_{OVC} = > 11 V or Input left floating;
V_{XC} = 0 V or Input left floating

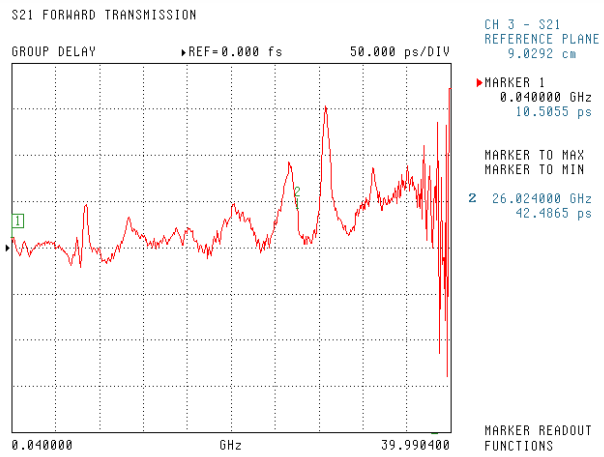


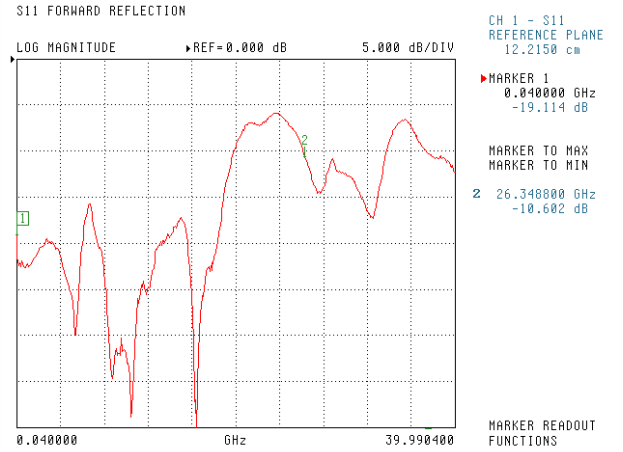
Reduced Output Signal: *9.5* Vpp @ 20 Gbps
V_{OVC} = 0 V; V_{XC} = -2.7 V (for 50% crossing)

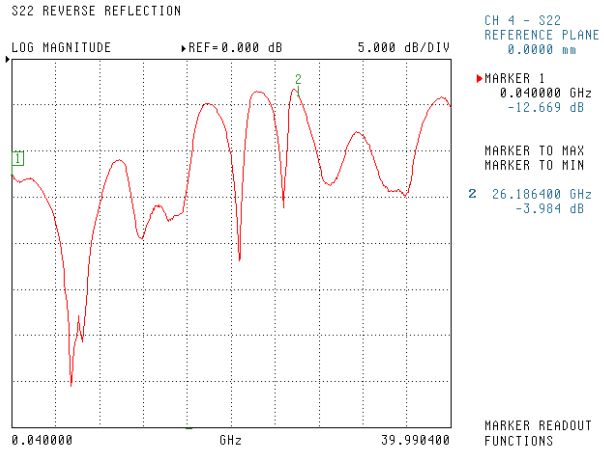
Measured with Agilent 86100A with 86118A plug-in (70 GHz) and 86107A precision time base. Signal source: SHF BPG 44 E; Pattern length: 2^{31}-1(NRZ).

Typical S-Parameters

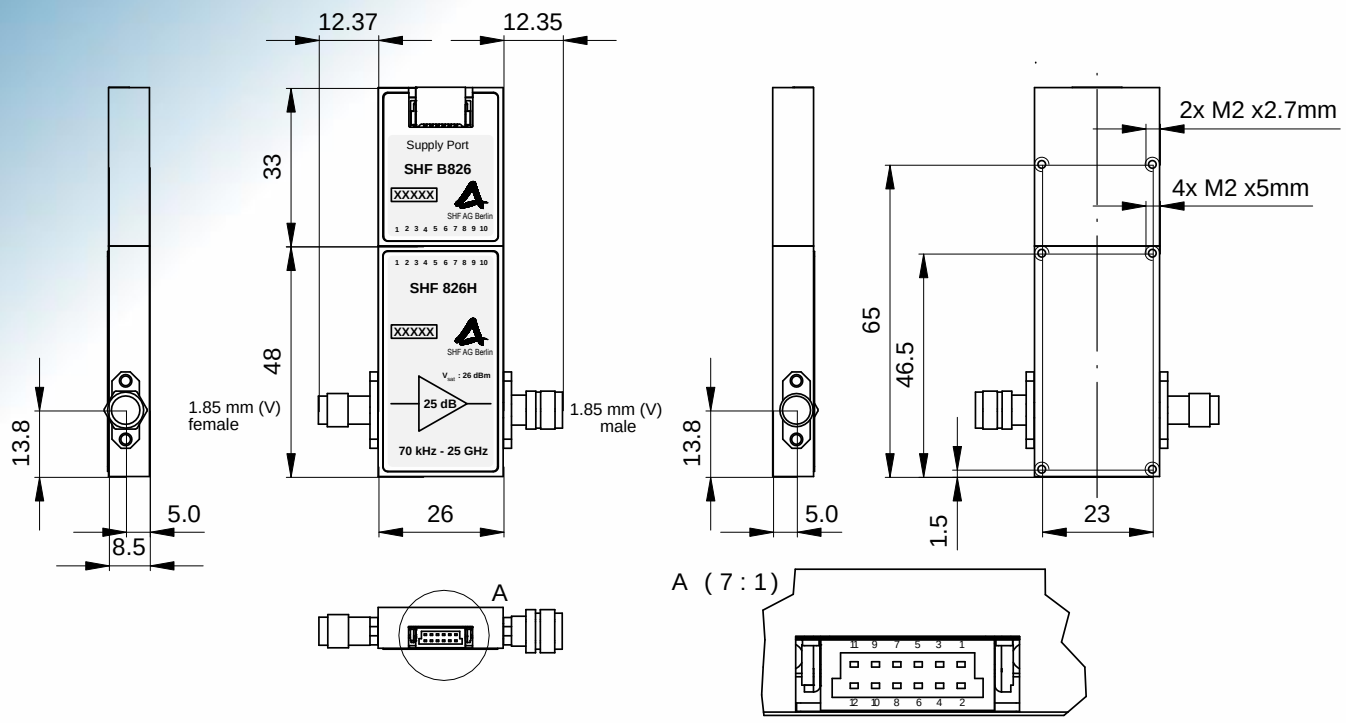








Mechanical Drawing without Heat Sink

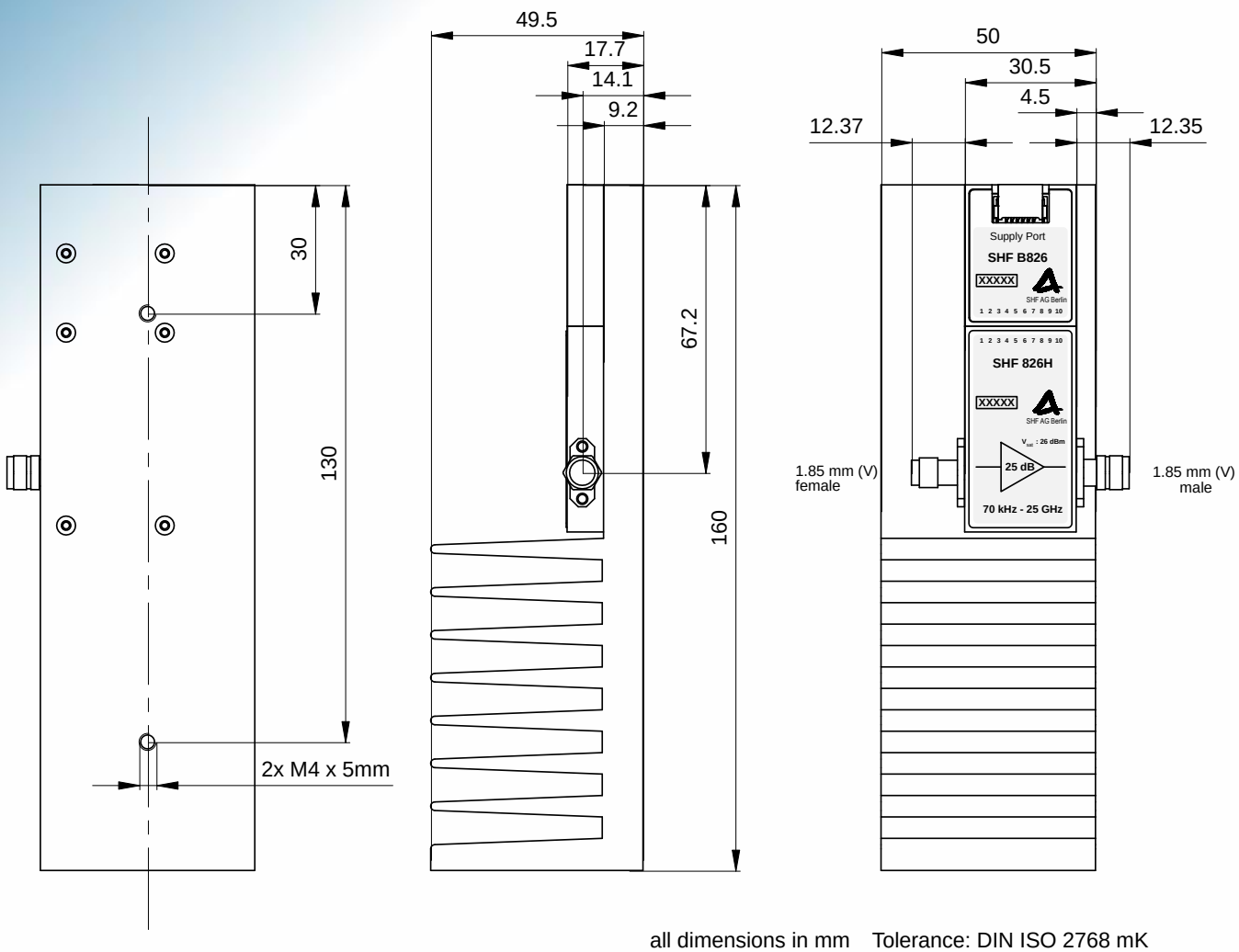


all dimensions in mm Tolerance: DIN ISO 2768 mK

Pin	Function
1	Bias- Tee
2	Reserved
3	Reserved
4	Crossing Control Input / V_{XC}
5	Not Connected
6	Level Detector Output / V_{LD}

Pin	Function
7	GND
8	Reserved
9	Supply Voltage / V_S
10	Output Voltage Control Input / V_{OVC}
11	Supply Voltage / V_S
12	GND

Mechanical Drawing with Heat Sink



all dimensions in mm Tolerance: DIN ISO 2768 mK

Thermal resistance of heat sink approximately 2.1 K/W

For permanent mounting remove the heatsink from the amplifier. In that case please ensure that adequate cooling of the amplifier is guaranteed. To remove the heatsink from the amplifier unscrew the six screws on the bottom side of the heatsink.

Bias Cable – SHF 826H

Pin	Function	Colour
1	Bias-Tee	brown
2	Reserved	
3	Reserved	
4	Crossing Control Input / V_{XC}	white
5	Not Connected	
6	Level Detector Output / V_{LD}	blue
7	GND	black
8	Reserved	green
9	Supply Voltage / V_S	red
10	Output Voltage Control Input / V_{OVC}	yellow
11	Supply Voltage / V_S	red
12	GND	black

Please ensure that always <u>both</u> available pins (7 & 12 for ground and 9 & 11 as supply voltage) are used.