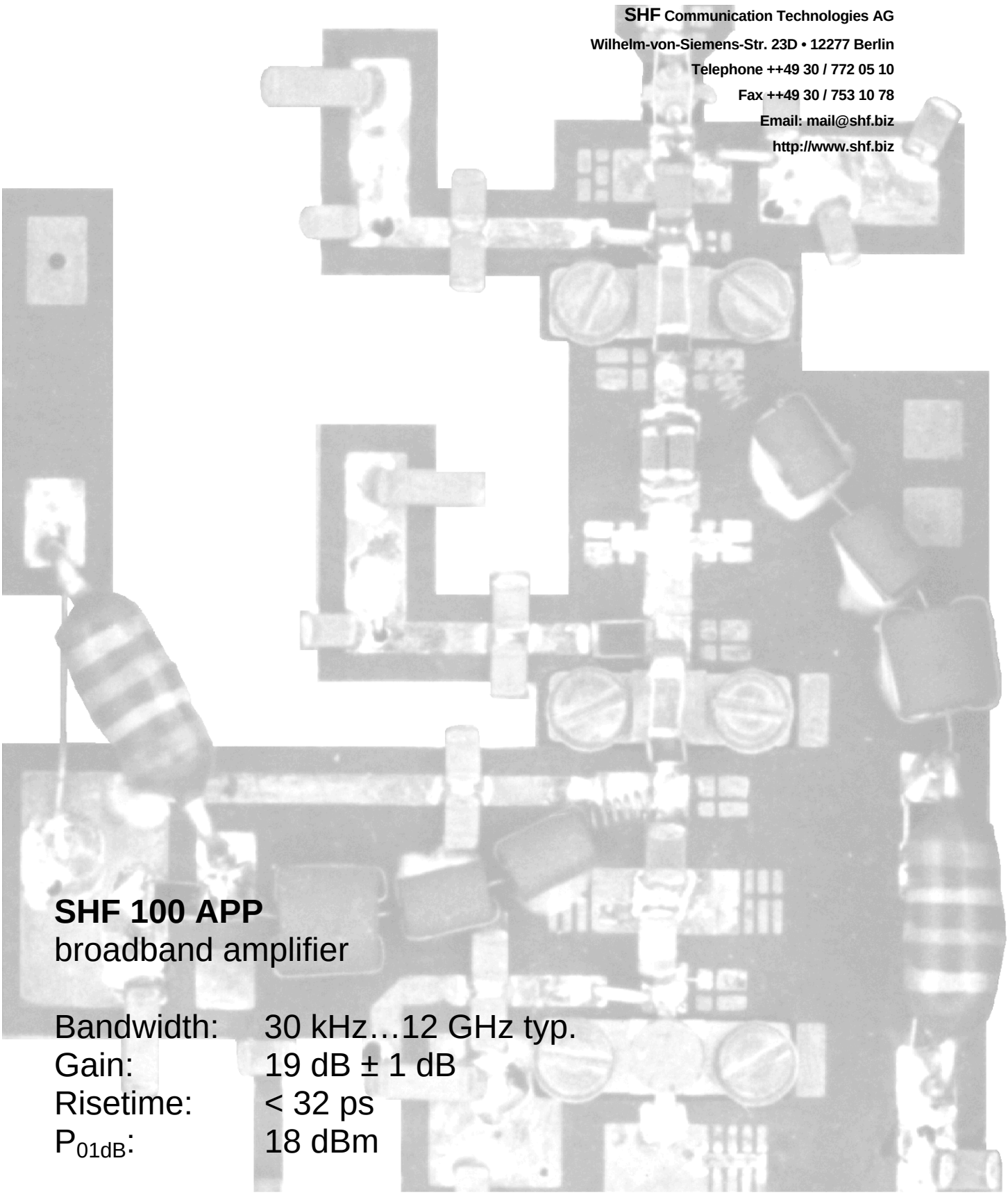
Datasheet
SHF 100 APP
broadband amplifier

SHF Communication Technologies AG
Wilhelm-von-Siemens-Str. 23D • 12277 Berlin
Telephone ++49 30 / 772 05 10
Fax ++49 30 / 753 10 78
Email: mail@shf.biz
http://www.shf.biz



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Bandwidth:	30 kHz…12 GHz typ.
Gain:	19 dB ± 1 dB
Risetime:	< 32 ps
P_{01dB}:	18 dBm

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Parameter	Symbol	Min.	Typ.	Max.	Units	Conditions
Low Frequency 3 dB point	f_{LOW}			30	kHz	
High Frequency 3 dB point	f_{HIGH}	12			GHz	
Gain		18	19	20	dB	non-inverting
Gain control voltage		0		-5	V	reduces gain by up to 3 dB
Gain ripple			±1.5		dB	
Output power at 1dB compression	P_{01dB}	18 17			dBm	<10 GHz <12 GHz
Input return loss	S_{11}			-12 -10		<12 GHz <20 GHz
Output return loss	S_{22}			-10		<20 GHz
Maximum input power				4 10	dBm	in operation without power supply
Rise time / Fall time	t_r/t_f			26	ps	20% to 80%
Supply voltage		9		15	V	0.4 A, reverse voltage protected
Power consumption			3.6		W	using 9V supply voltage
Input connector						SMA female
Output connector						SMA female
Dimensions (L x W x H)					mm	51 x 59 x 32.2 incl. connectors and heatsink 51 x 40 x 16 without connectors and heatsink

The SHF 100 APP is a two stage amplifier design using special monolithic microwave integrated circuits (MMICs) inside hermetic carriers to achieve ultra wide bandwidth and low noise performance. The custom made MMIC carrier is optimized for good input return loss between its interior and the 50Ω outside hybrid technology. The computer optimized broadband circuit is specially tuned for minimum passband ripple. A voltage regulator IC makes the amplifier insensitive to overvoltage and line ripple.

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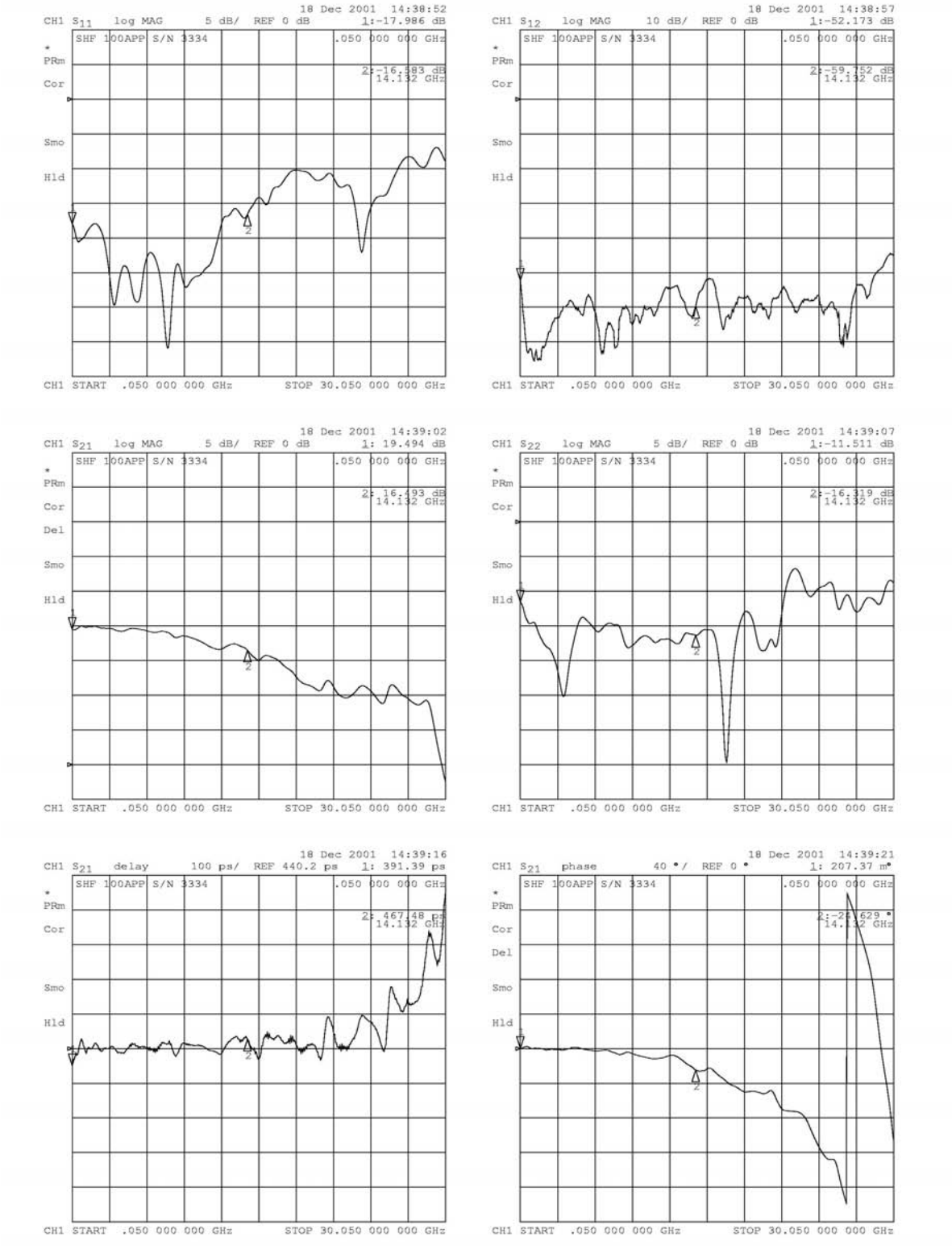
S-Parameters, group delay and phase response at maximum gain



Aperture of Group Delay measurement: 100MHz

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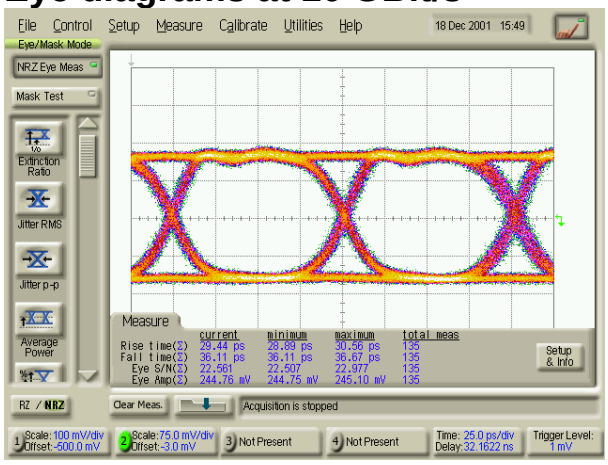
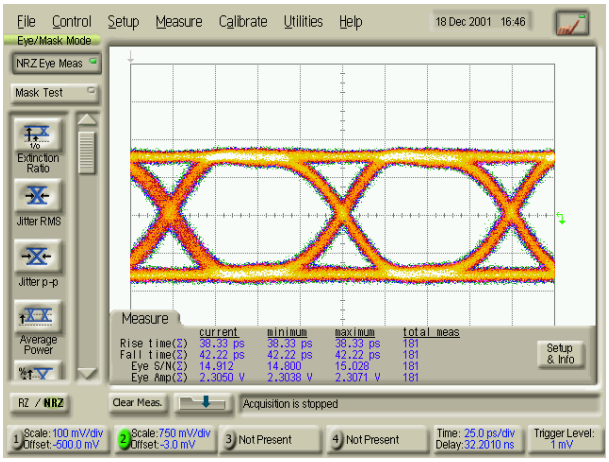
Eye diagrams at 10 GBit/s

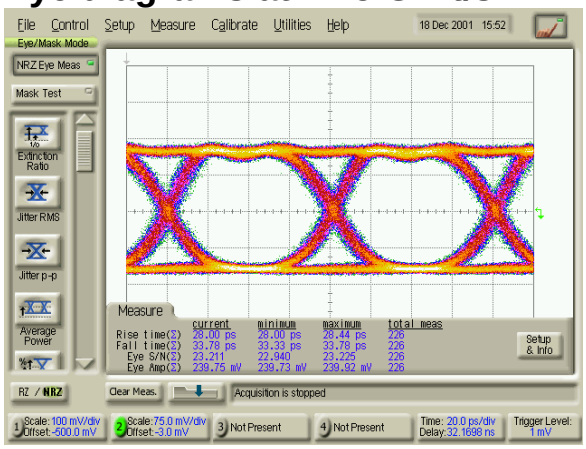


Input signal

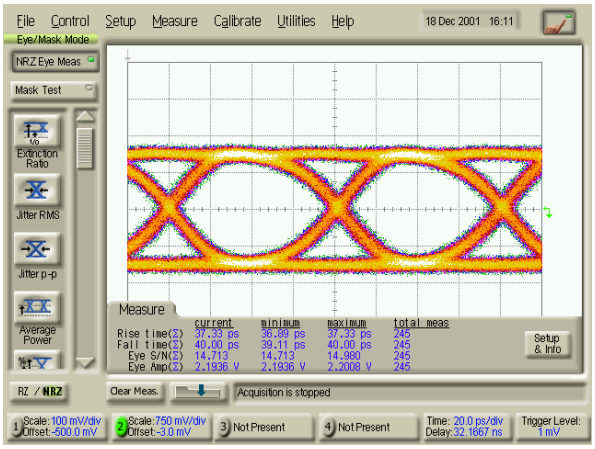


Output signal

Eye diagrams at 12.5 GBit/s



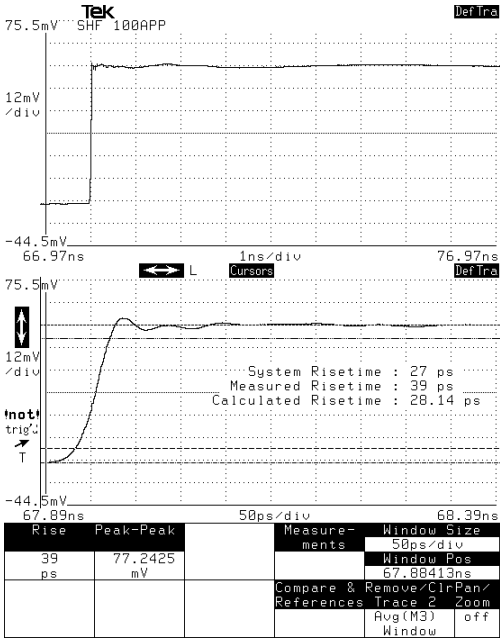
Input signal



Output signal

Step Response

(measured with 26 GHz Sampling head Tektronix SD-26)
Rise time calculated as 10% to 90%



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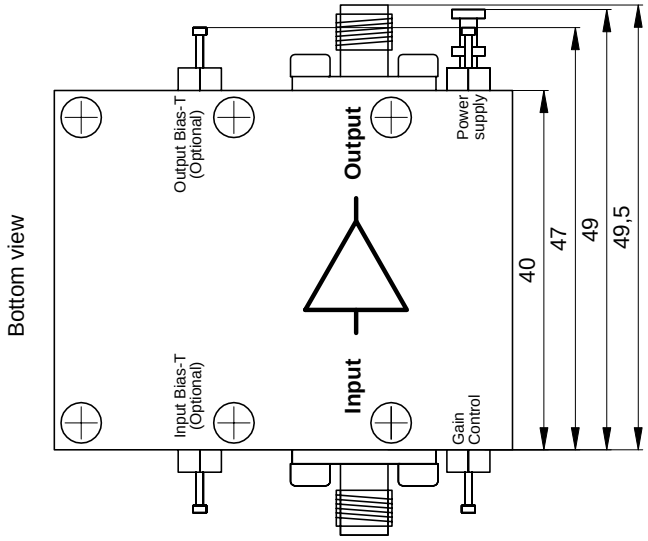
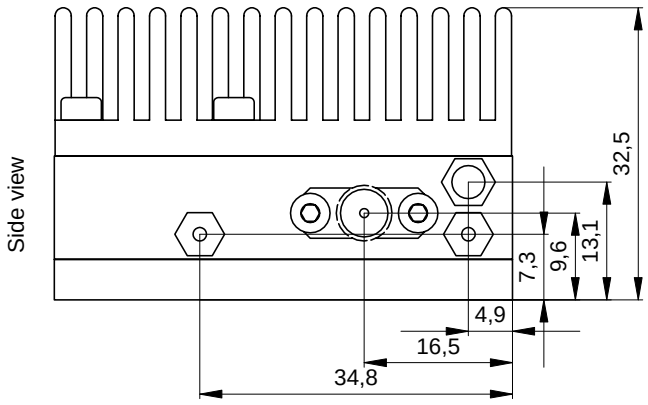
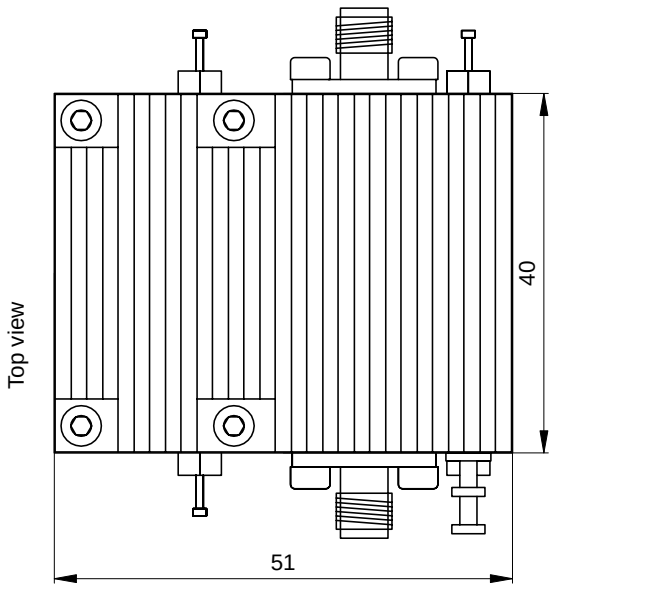
- **Pulse optimized applications**

Low overshoot
for data transmission

High bandwidth with
smooth gain roll-off







Thermal resistance of heatsink approx 4.5 K/W

For permanent mounting, remove the heatsink from the amplifier. In that case, ensure that adequate cooling of the amplifier is guaranteed.

To remove the heatsink from the amplifier, unscrew the four screws on the heatsink.

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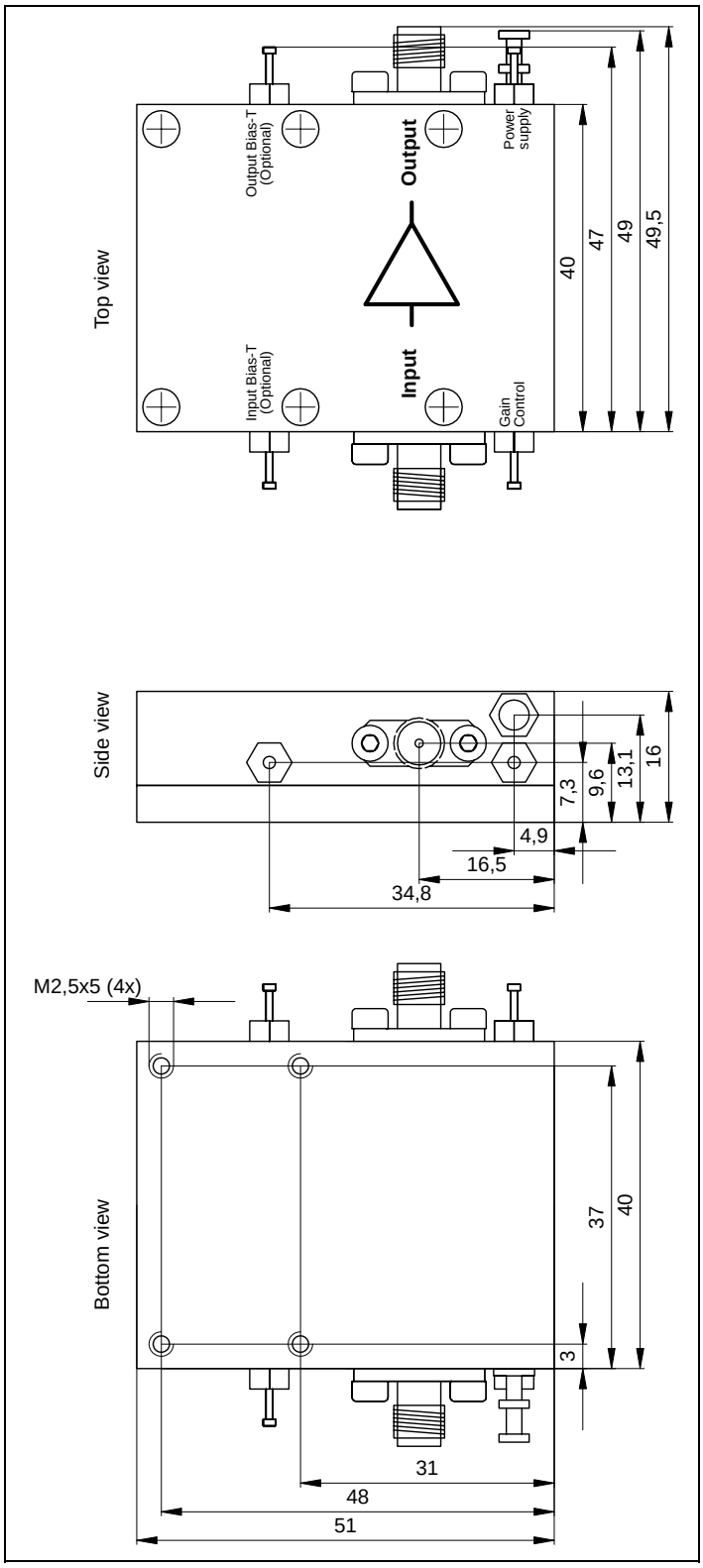

▪ Available Options

01: DC return on input

02: Built-in bias-T on input

03: DC return on output

04: Built-in bias-T on output

MP: Matches the phase of two amplifiers

The following options cannot be combined:
01 and 02
03 and 04
02 and 04

User Instructions

ATTENTION!

ELECTROSTATIC SENSITIVE GaAs FET AMPLIFIER

1. **To prevent damage through static charge build up, cables should be always discharged before connecting them to the amplifier!**
2. **Attach a 50 Ohm output load BEFORE supplying DC power to the amplifier!**
3. **The supply voltage can be taken from any regular 9 to 15 V, 0.4 A DC power supply and can be connected to the supply feed-through filter via an ON / OFF switch.**
4. **The minimum supply voltage is 9 V. A higher one increases the power dissipation of the internal voltage stabilizer.**
5. **Using a 3 dB or 6 dB input attenuator will result in a 6 dB or 12 dB increase of the input return loss. For minimal degradation of amplifier rise time, these attenuators should have a bandwidth specification of greater 50 GHz (V/ 1.85mm or 2.4mm attenuators)!**
6. **An input signal of about 0.63 V_{pp}, equivalent to 0 dBm, will produce the full swing output of 5 V_{pp} .**
7. **Higher input voltages will drive the amplifier's output stage into saturation, leading to waveform peak clipping.**
8. **While using a reflective load, the output voltage has to be reduced to a safe operating level below 5 V_{pp} according to the magnitudes of the reflections.**

   ATTENTION: At frequencies up to 20 GHz, a capacitive load can be transformed to an inductive one through transmission lines! With an output stage driven into saturation this will lead to the immediate destruction of the amplifier (within a few ps)!
9. **The input voltage should never be greater than 1 V_{pp}, equivalent to 4 dBm input power. Without DC power supplied to the amplifier, the input voltage should never be greater than 2 V_{pp}, equivalent to 10 dBm input power.**
10. **Hint: Pulse shape tuning of the amplifier has been performed after warm up at about 40 °C case temperature. Considerably more over- and undershoot will be present at low temperature!**