Datasheet
SHF 100 CPP
broadband amplifier

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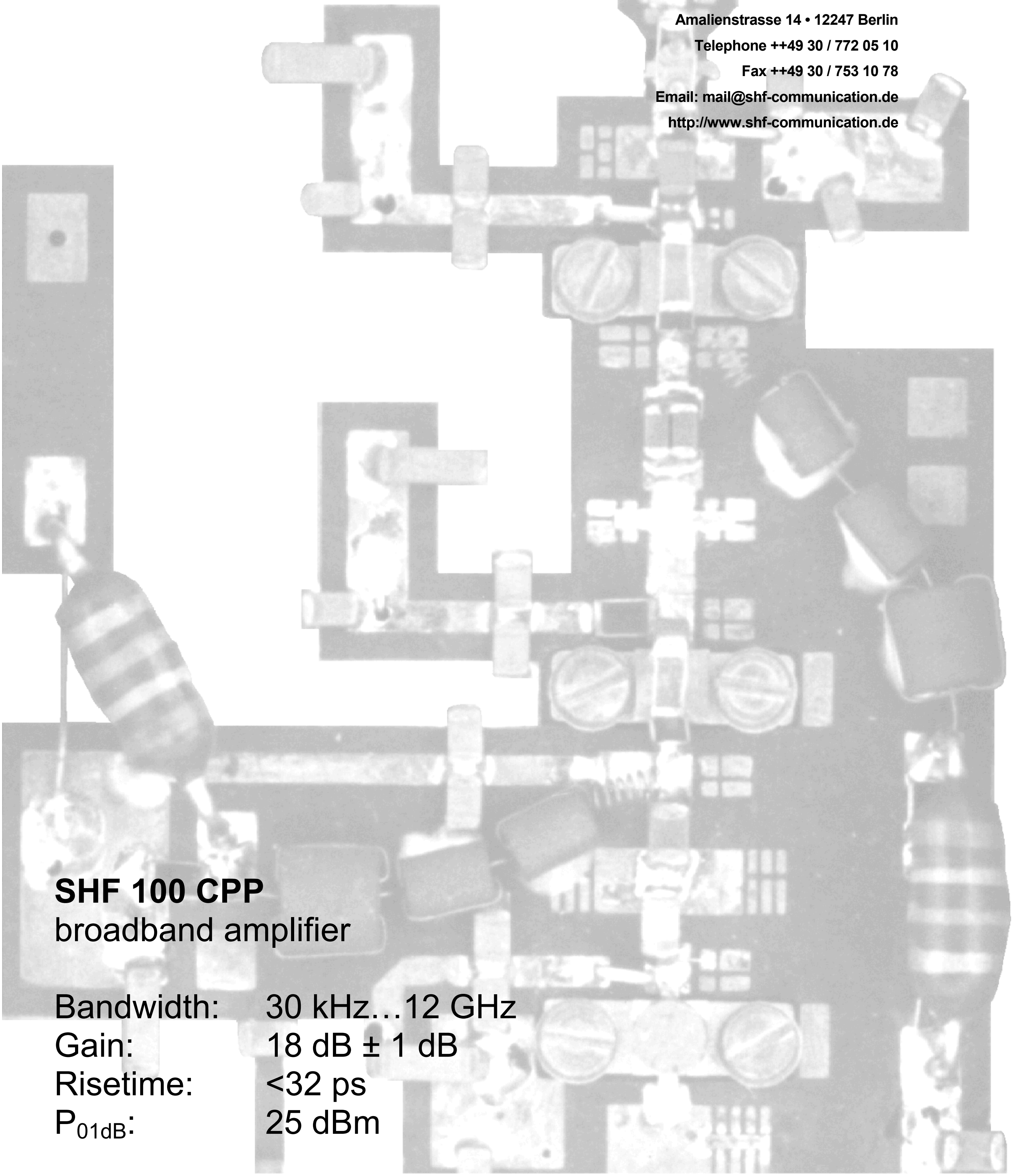

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Bandwidth:	30 kHz…12 GHz
Gain:	18 dB ± 1 dB
Risetime:	<32 ps
P_{01dB}:	25 dBm

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Parameter	Symbol	Min.	Typ.	Max.	Units	Conditions
Low Frequency 3 dB point	f_{LOW}		20	30	kHz	
High Frequency 3 dB point	f_{HIGH}	12			GHz	
Gain		17	18	19	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}	 23	25 24		dBm	<10 GHz <12 GHz
Input return loss	S_{11}			-12 -10		<10 GHz <12 GHz
Output return loss	S_{22}			-10		<12 GHz
Maximum input power				10 10	dBm	in operation without power supply
Rise time / Fall time	t_r/t_f			26	ps	20% to 80%
Supply voltage		11		15	V	0.65 A, reverse voltage protected
Power consumption			7.15		W	using 11V supply voltage
Input connector						SMA female
Output connector						SMA female
Dimensions (L x W x H)					mm	59 x 144 x 40 incl. connectors and heatsink 51 x 40 x 16 without connectors and heatsink

The SHF 100 CPP is a two stage amplifier design using special monolithic microwave integrated circuits (MMICs) inside special 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 50 Ohm outside hybrid technology. The computer optimized broadband circuit is specially tuned for minimum passband ripple to achieve a near Bessel response. A voltage regulator IC makes the amplifier insensitive to overvoltage and line ripple.

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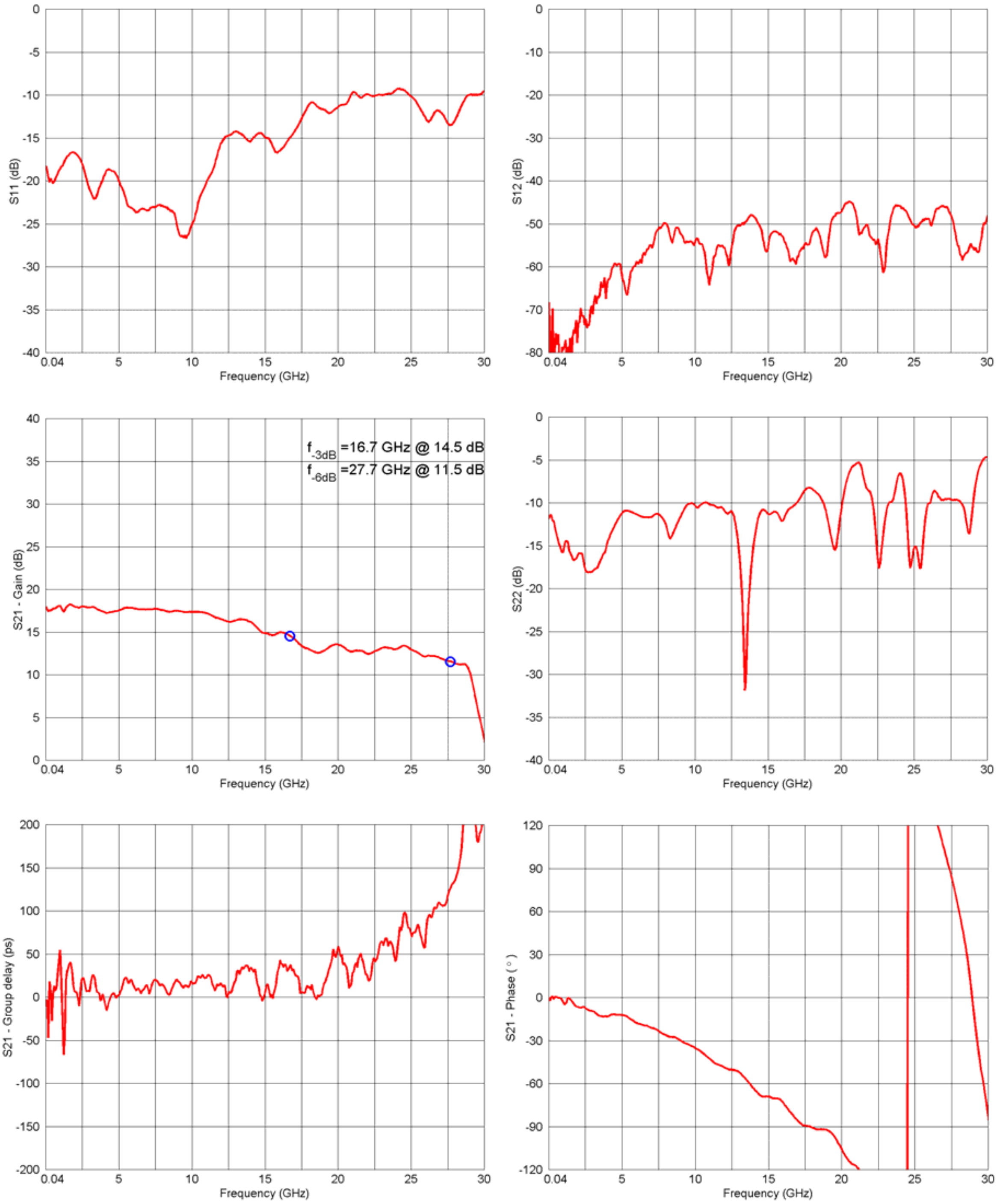
S-Parameters, group delay and phase response (full gain)



Aperture of Group Delay measurement: 100MHz

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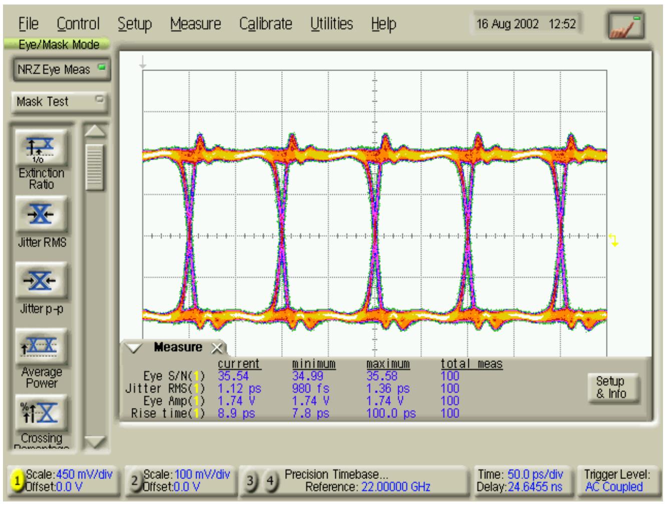
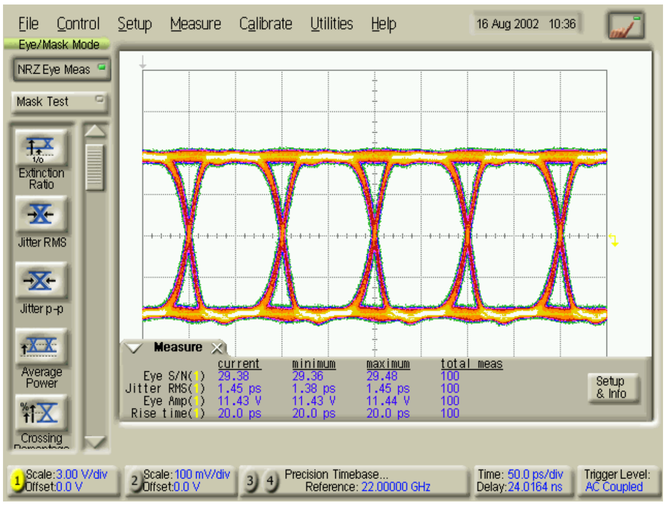
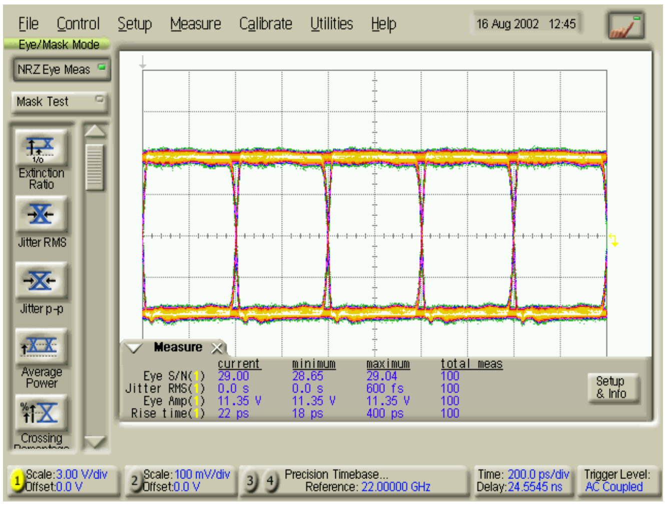
Eye Diagrams



Electrical input signal at 10 GBit/s

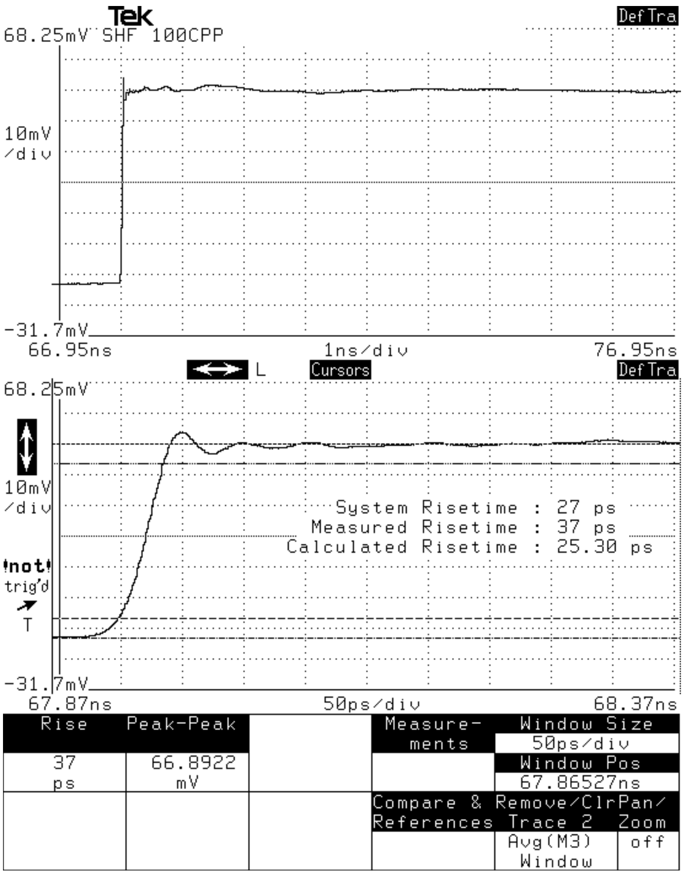


Electrical output signal at 10 GBit/s



Electrical output signal at 2.5 GBit/s

Step Response



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

▪ 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

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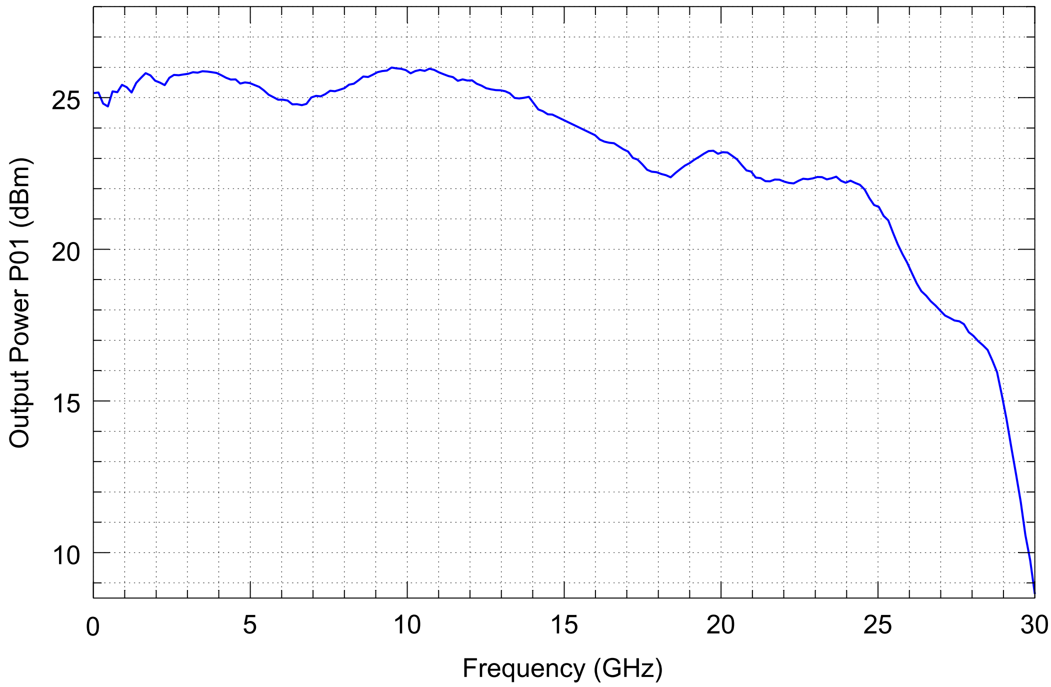
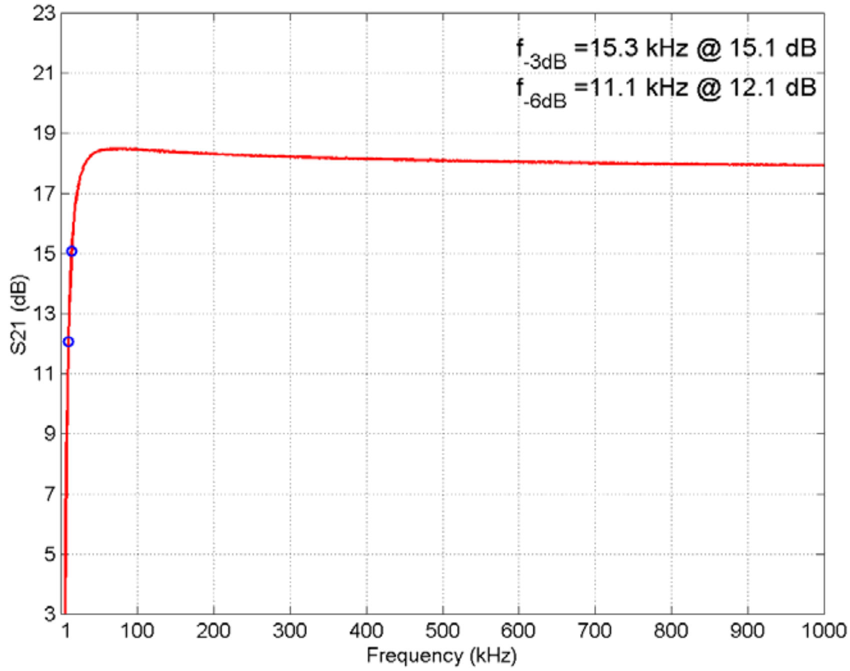
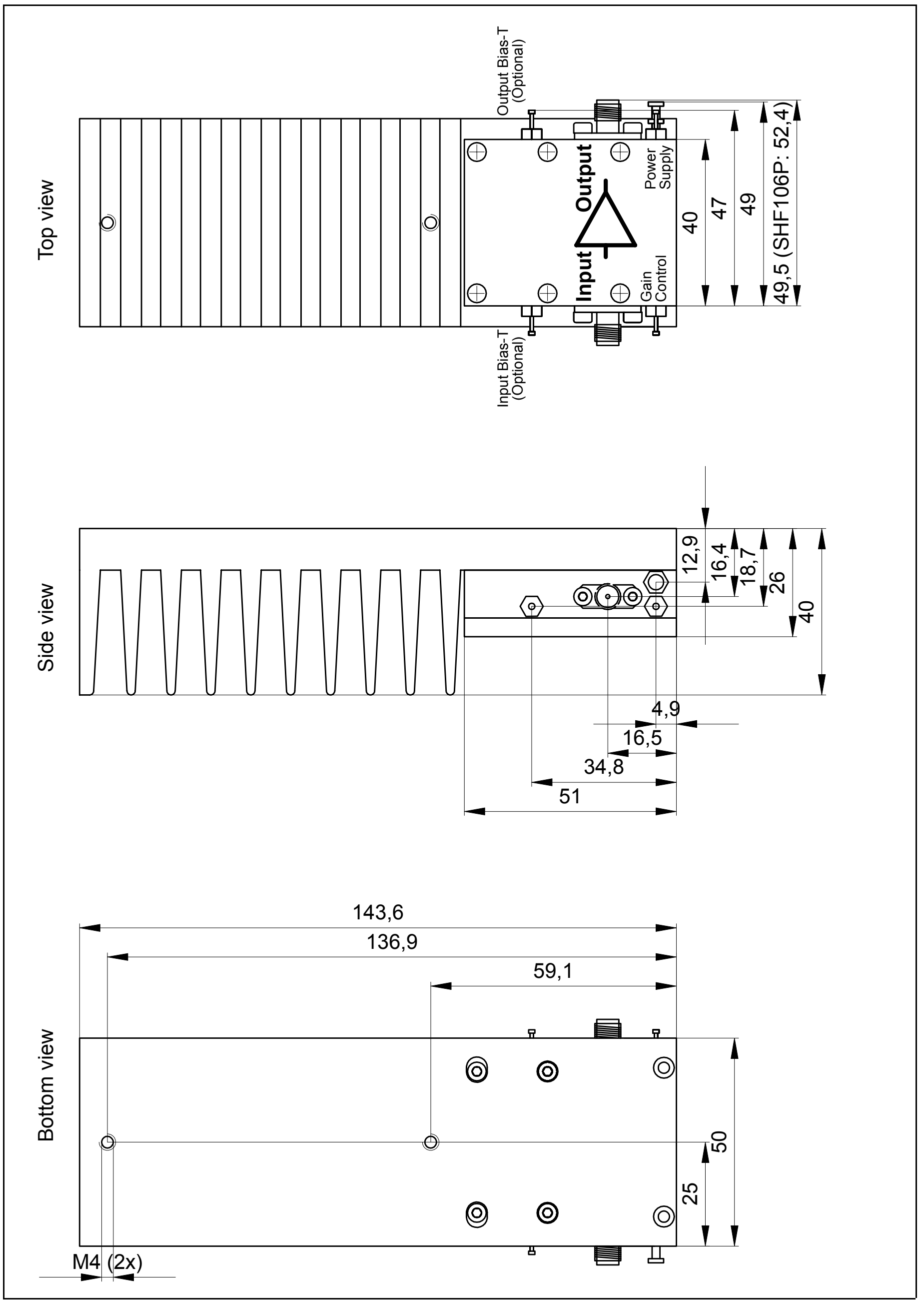
Output Power



Low Frequency Response





Thermal resistance of heatsink approx 1.5 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.

A diagram of the amplifier without heatsink is shown on the next page

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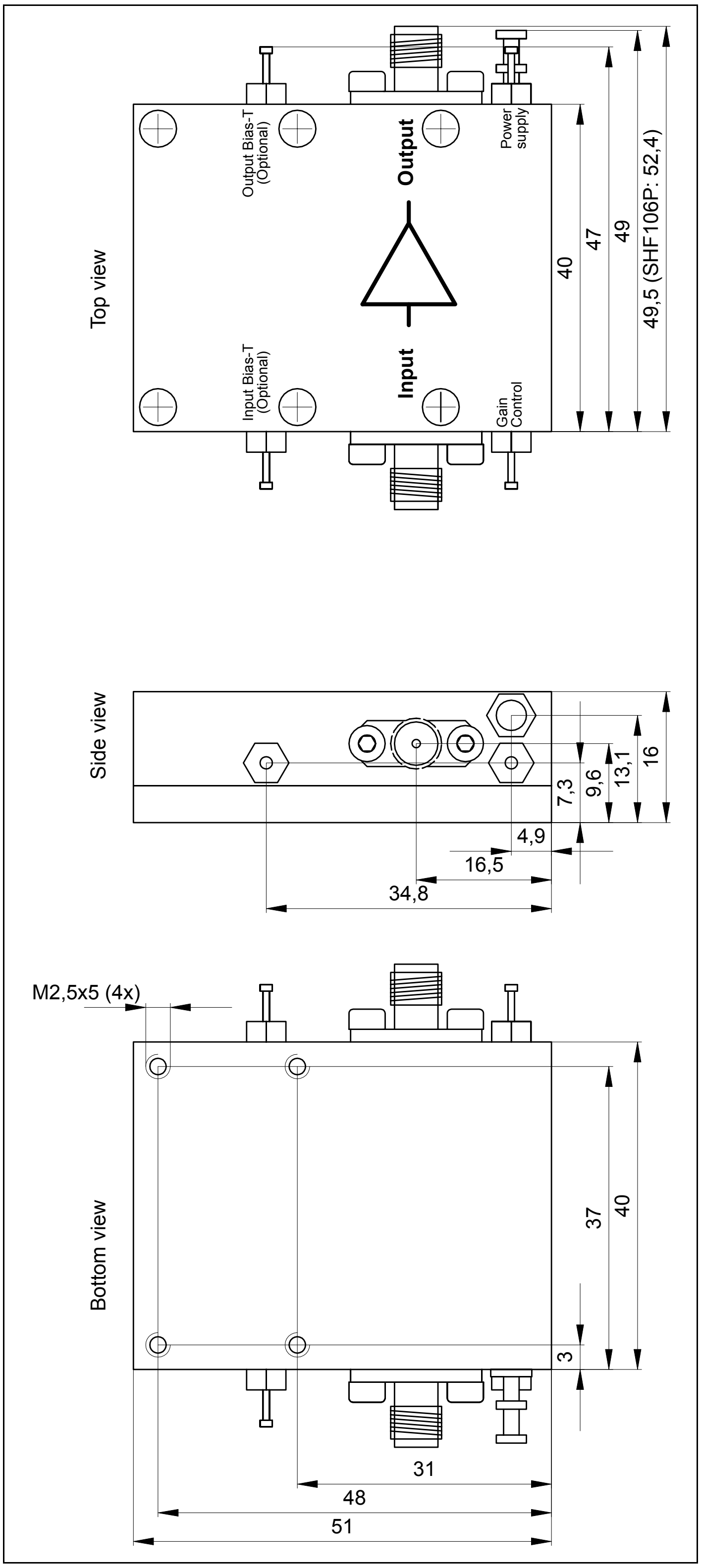
▪ Applications

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



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 11 to 15 V, 0.6 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 11 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 than 40 GHz (K/2.9 mm attenuators)!**
6. **An input signal of about 1.6 V_{pp}, equivalent to 8 dBm, will produce the full swing output of 11.2 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 13 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. **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!**