Datasheet
SHF 315 P
active RZ / NRZ converter

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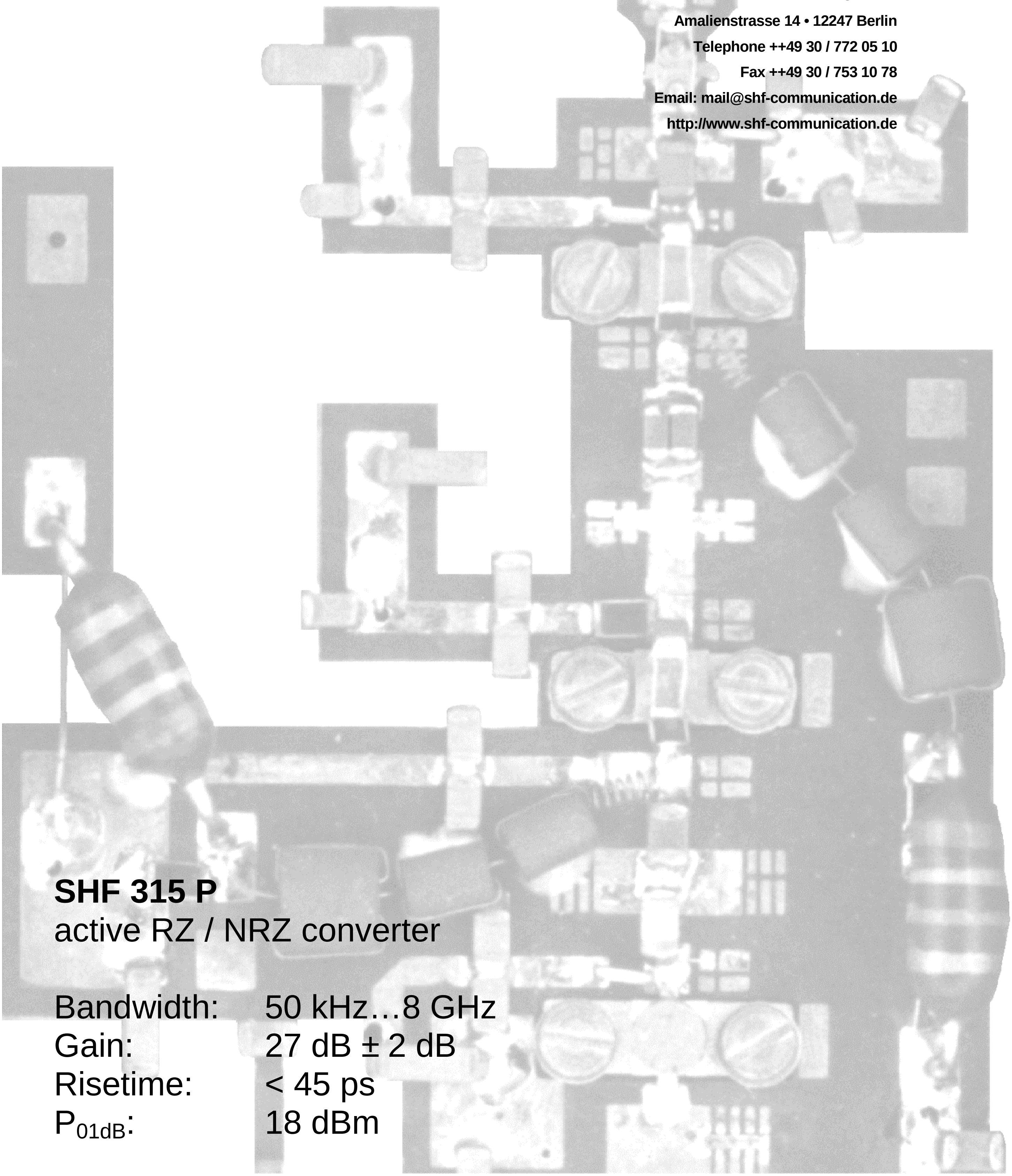

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Bandwidth:	50 kHz…8 GHz
Gain:	27 dB ± 2 dB
Risetime:	< 45 ps
P_{01dB}:	18 dBm

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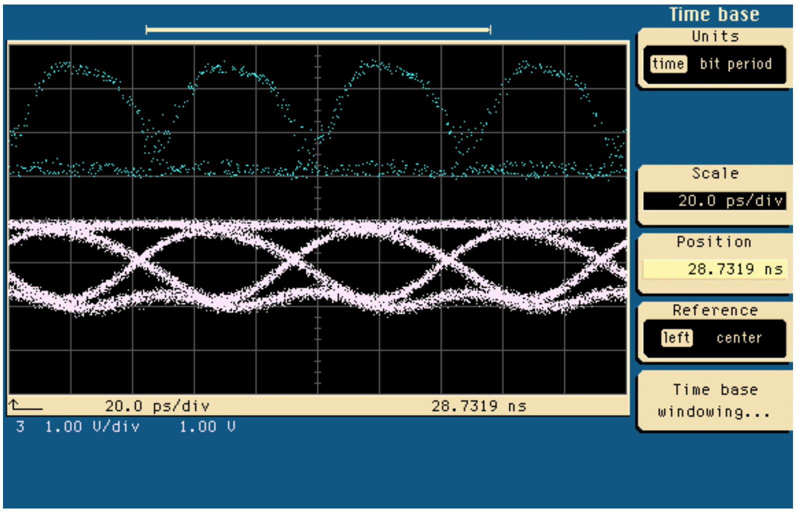
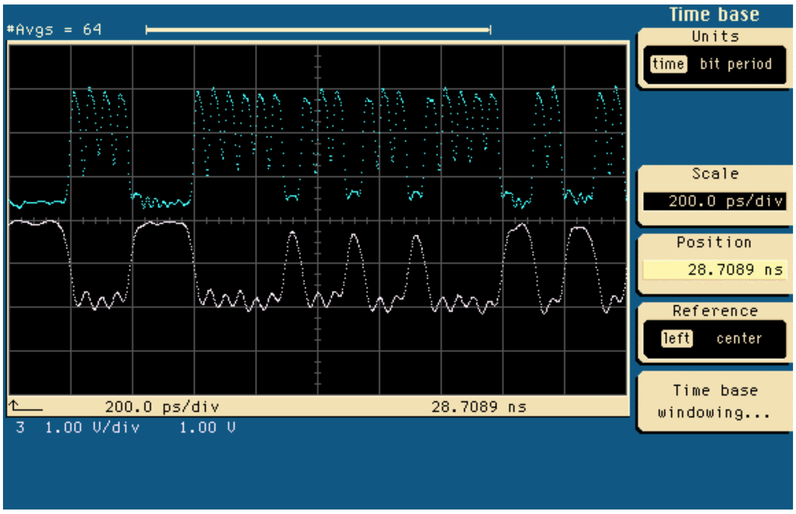
Bandwidth	50 kHz…8 GHz
Gain	27 dB ± 2 dB max. inverting
Gain ripple relative to gain slope	± 1.5 dB typ
Temperature coefficient	– 0.06 dB/°C
Output power at 1 dB compression	17 dBm < 50 kHz…10 MHz, 18 dBm > 10 MHz…< 10 GHz, 17 dBm < 20 GHz
Input impedance	50 Ω
Input return loss	S_{11}: <–15 dB <10 GHz, <–12 dB <15 GHz, <–10 dB <20 GHz
Output return loss	S_{22}: <–10 dB typ
Maximum input power	4 dBm, 1 V_{pp}
Rise time / Fall time	< 45 ps
Noise figure	7 dB >200 MHz…<10 GHz
Supply voltage	9…15 V, 0.55 A, reverse voltage protected
Input connector	SMA female
Output connector	SMA female
Dimensions (L × W × H)	51 × 40 × 16 mm + SMA connectors (excluding heatsink)

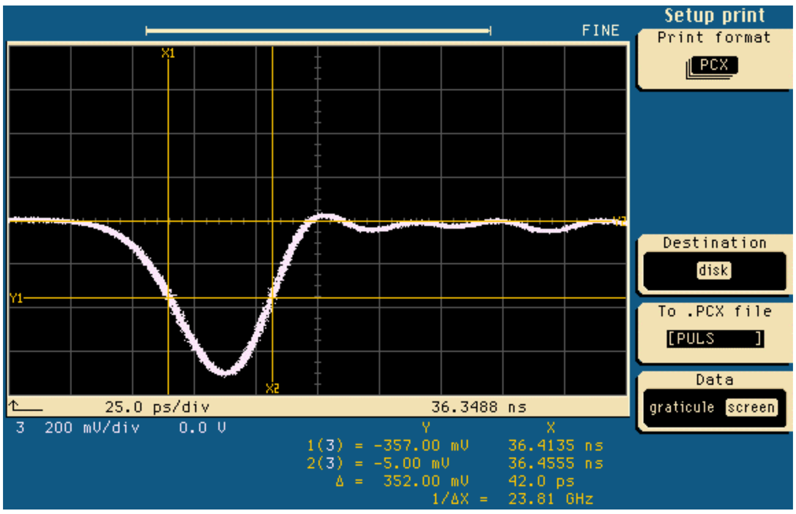
The SHF 315 P is a specially tuned three stage amplifier design using monolithic microwave integrated circuits (MMICs) inside hermetic containers to achieve ultrawide bandwidth and low noise performance. The custom made MMIC carrier is optimised for good input return loss between its interior and the 50 Ohm outside hybrid technology. The computer optimised broadband circuit is individually tuned for optimised RZ/NRZ conversion to get a near Bessel response. A voltage regulator IC makes the amplifier insensitive to overvoltage and line ripple.



Top trace, input eye diagram at 20 GBit/s RZ; bottom trace, output eye diagram at 20 GBit/s NRZ

Top trace, input pattern at 20 GBit/s RZ; bottom trace, output pattern at 20 GBit/s NRZ





Impulse response at input signal 10 ps FWHM

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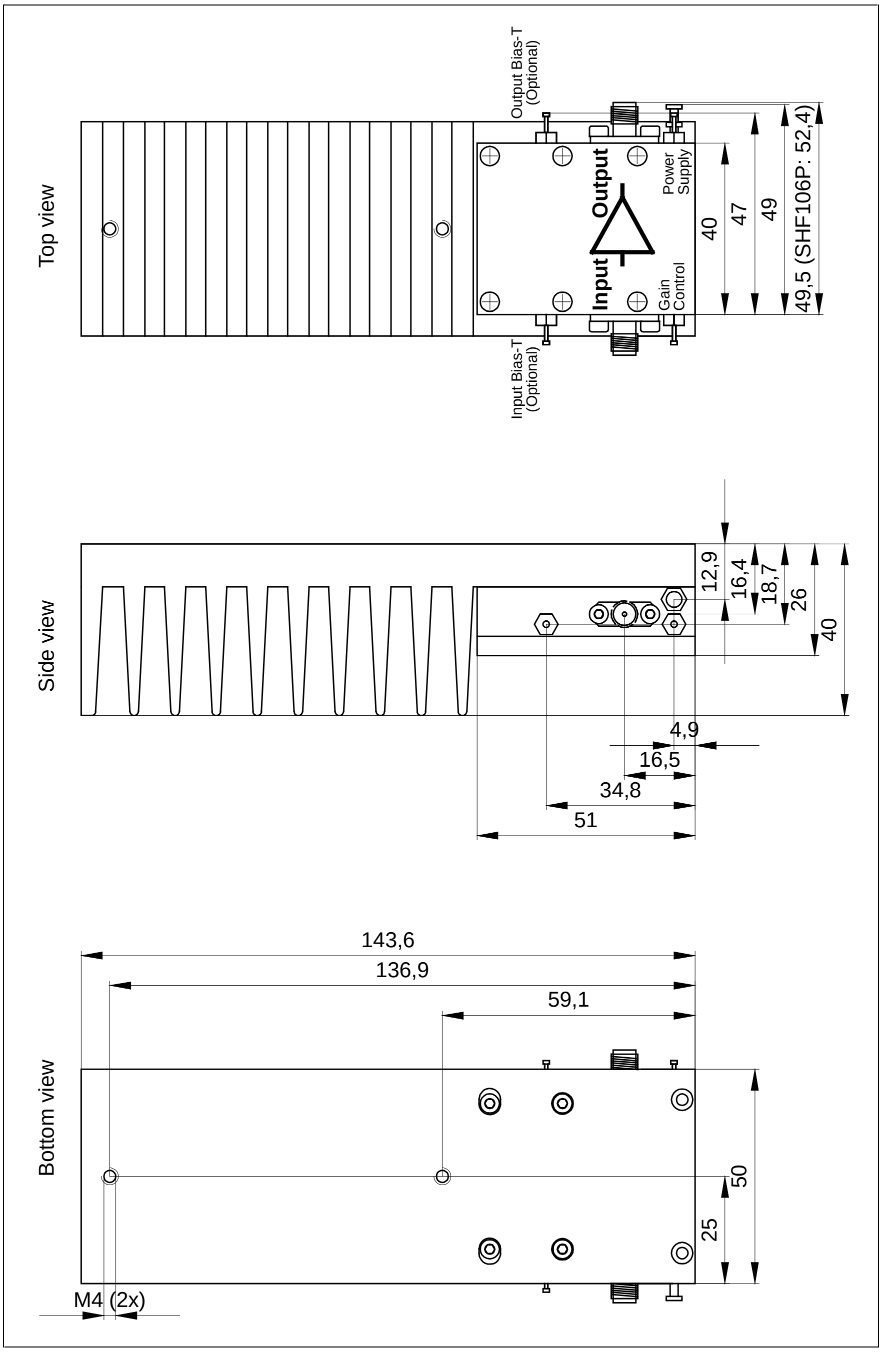

Thermal resistance of heatsink approx. 1.5 K/W

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.

The view of the amplifier without heatsink is shown on the following page.

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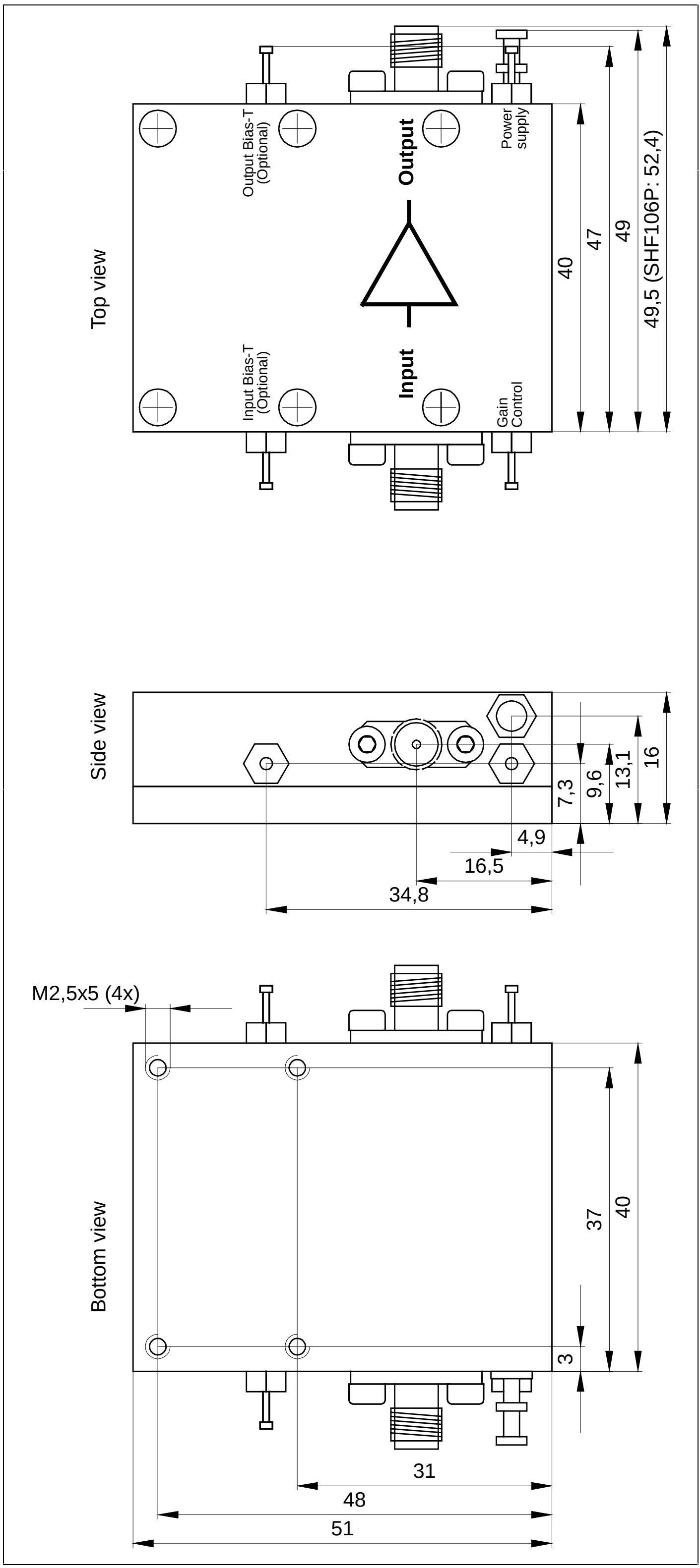
- **Applications**
  Optical Communications
  High-Speed Pulse Experiments
  Satellite Communications
  Research and Development
  Antenna Measurements
  Data Transmission



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 9 to 15 V, 0.3 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/ 1.85 mm or 2.4 mm attenuators)!**
6. **An input signal of about 0.25 V_{pp}, equivalent to –8 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. **Saturated output voltages can only be used within the operating frequency range without damage while the amplifier is connected to a 50 Ohm precision load with a VSWR of less than 1.2 or better than 20 dB return loss up to the highest operating frequency (i.e, that limited by the K- or V-attenuator).**
9. **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)!
10. **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.**
11. **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!**