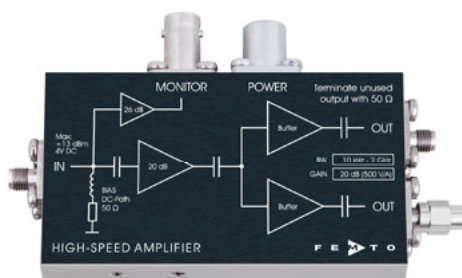
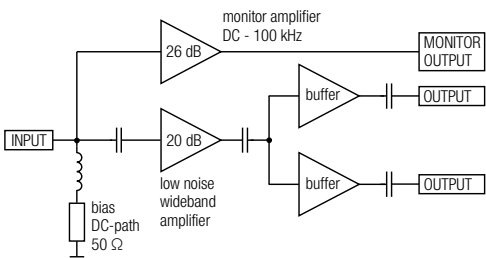


Datasheet

HSA-Y-2-20

1 GHz High-Speed Amplifier



Features	• Bandwidth 10 kHz – 2 GHz • Exceptional low 10 kHz lower cut-off frequency for optimal pulse processing without shape distortion • Rise time 175 ps • Gain 20 dB • Input return loss 23.1 dB • Integrated bias circuit • Monitor output • Two identical signal outputs
Applications	• Preamplifier for ultra-fast detectors (microchannel-plates, photomultipliers, avalanche-photodiodes, PIN-photodiodes etc.) • Oscilloscope and transient-recorder preamplifier • Time-resolved pulse and transient measurements
Block Diagram	 BS-HSA-Y_23_R01
Intended Use	The HSA-Y-2-20 amplifier is a fixed gain wideband GHz amplifier. It is designed for ultra fast amplification of small voltage and current signals in the frequency range from 10 kHz to 2 GHz. Operation is mostly self-explanatory. If in doubt, consult this document or contact support@femto.de. For safe operation, please refer to the damage thresholds specified in the "Absolute Maximum Ratings", "Temperature Range" and "Power Supply" sections of this document.
Application Notes	CAUTION! Do not exceed the maximum allowable input power of +13 dBm (20 mW). If in doubt, use attenuators on the amplifier input. The HSA-Y-2-20 offers two identical RF outputs. For operation it is mandatory that both RF outputs are terminated with 50 Ω loads. If only one output is used, the unused SMA output socket must be terminated with a 50 Ω terminator which is included in delivery.

SOPHISTICATED TOOLS FOR SIGNAL RECOVERY

F E M T O

HSA-Y-2-20_R5/TH, JMa/12SEP2024

Datasheet

HSA-Y-2-20

1 GHz High-Speed Amplifier

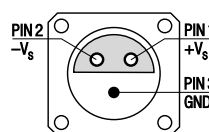
Available Accessories	PS-15-25-L		Power supply Input: AC 100 – 240 V Output: DC ± 15 V
Related Models	HSA-Y-1-40 HSA-Y-1-60 HSA-Y-2-40	Gain 40 dB, 10 kHz – 1 GHz, noise figure 1.9 dB Gain 60 dB, 10 kHz – 1.1 GHz, noise figure 1.9 dB Gain 40 dB, 10 kHz – 1.9 GHz, noise figure 4.9 dB	
Specifications	Test conditions	$V_s = \pm 15$ V, $T_A = 25$ °C, system impedance 50 Ω , warm-up 20 minutes (min. 10 minutes recommended)	
Gain	Gain Transimpedance gain Gain accuracy Gain drift vs. temperature	20 dB ($\times 10$) 500 V/A (50 Ω input impedance $\times 10$ gain) ± 1 dB 0.015 dB/°C typ.	
Frequency Response	Lower cut-off frequency (–3 dB) Upper cut-off frequency (–3 dB)	10 kHz 2 GHz	
Time Response	Rise/fall time (10% - 90%) Group delay	175 ps 0.8 ns typ.	
Input	DC input impedance RF input impedance 50 Ω noise figure Equ. input noise voltage Equ. input noise current Input reflection S11	50 Ω 50 Ω 5.2 dB (@ $f < 1$ GHz) 680 pV/ $\sqrt{\text{Hz}}$ (@ $f < 1$ GHz) 13.6 pA/ $\sqrt{\text{Hz}}$ (calculated: 680 pV/ $\sqrt{\text{Hz}}$ divided by 50 Ω) –23.1 dB (@ $f < 1.5$ GHz) –16.5 dB (@ $f < 3$ GHz)	
Output	Two identical RF outputs: Output peak-peak voltage range Output power P_{1dB} Output impedance Output reflection S22 Isolation between outputs	2.5 V (± 1.25 V) (@ < 500 MHz, for linear amplification) +12.5 dBm (@ $f < 1$ GHz) 50 Ω (terminate with 50 Ω load) –7.4 dB (@ $f < 3$ GHz) 15 dB (@ $f < 3$ GHz)	
Monitor Output	Gain Monitor output impedance Lower cut-off frequency Upper cut-off frequency Output voltage	26 dB (1 kV/A) 50 Ω (terminate with ≥ 10 k Ω load, for best performance) DC 100 kHz ± 10 V (@ 10 k Ω load)	
Power Supply	Supply voltage Supply current	± 15 V (± 14.75 V ... ± 16.5 V) +160 / –10 mA typ. (depends on operating conditions, recommended power supply capability min. ± 250 mA)	
Case	Weight Material	190 g (0.42 lbs) including 50 Ω SMA terminator AlMg4.5Mn, nickel-plated	
Temperature Range	Storage temperature Operating temperature	–40 °C ... +85 °C 0 °C ... +60 °C	
Absolute Maximum Ratings	DC input voltage RF input power Power supply voltage	± 4 V +13 dBm ± 20 V	

SOPHISTICATED TOOLS FOR SIGNAL RECOVERY
F E M T O

HSA-Y-2-20_RS/TH_JMa/12SEP2024

Datasheet
HSA-Y-2-20
1 GHz High-Speed Amplifier
Connectors

Input	SMA jack (female)
RF Output	2 × SMA jack (female)
Monitor output	BNC jack (female)
Power supply	LEMO® series 1S, 3-pin fixed socket (mating plug type: FFA.1S.303.CLAC52)



Pin 1: +15 V
Pin 2: -15 V
Pin 3: GND

Scope of Delivery

HSA-Y-2-20, 50 Ω SMA terminator, LEMO® 3-pin connector, datasheet, transport package

Ordering Information

HSA-Y-2-20	High-speed GHz amplifier
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SOPHISTICATED TOOLS FOR SIGNAL RECOVERY
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HSA-Y-2-20_R5/TH, JMa/12SEP2024

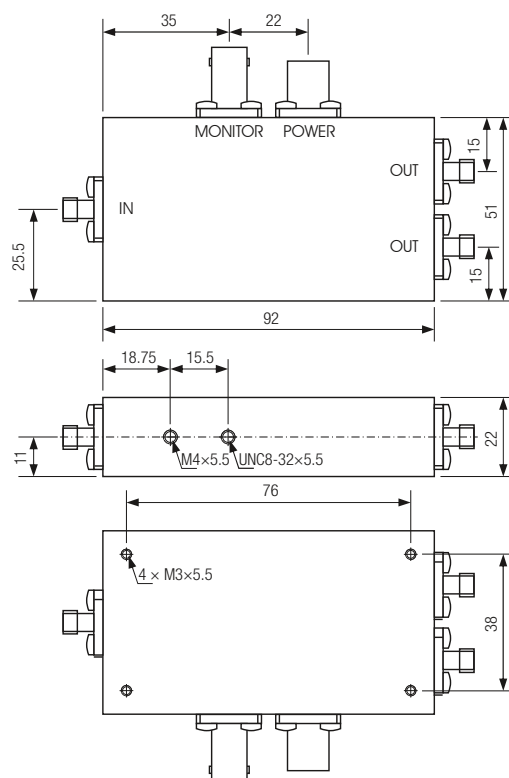
Datasheet

HSA-Y-2-20

1 GHz High-Speed Amplifier

Dimensions

HSA-Y-2-20



DZ-HSA-Y_23_R01

all dimensions in mm unless otherwise noted

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