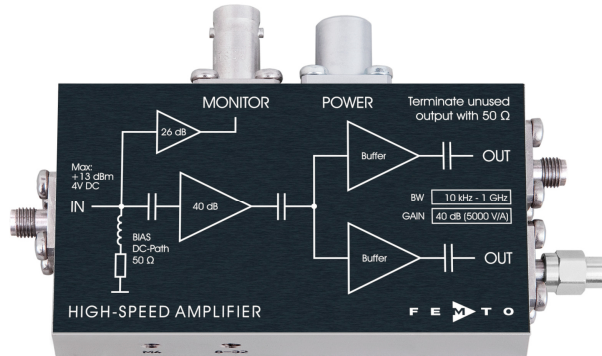



1 GHz High-Speed Amplifier



<p>Features</p>	<ul style="list-style-type: none"> • Bandwidth 10 kHz – 1 GHz • Exceptional low 10 kHz lower cut-off frequency for optimal pulse processing without shape distortion • Rise time 330 ps • Gain 40 dB • Noise figure 1.9 dB • Integrated bias circuit • Monitor output • Two identical signal outputs
<p>Applications</p>	<ul style="list-style-type: none"> • Preamplifier for ultra-fast detectors (microchannel-plates, photomultipliers, avalanche-photodiodes, PIN-photodiodes etc.) • Oscilloscope and transient-recorder preamplifier • Time-resolved pulse and transient measurements
<p>Block Diagram</p>	
<p>Intended Use</p>	<p>The HSA-Y-1-40 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 1 GHz. Operation is mostly self-explanatory. If in doubt, consult this document or contact support@femto.de.</p> <p>For safe operation, please refer to the damage thresholds specified in the "Absolute Maximum Ratings", "Temperature Range" and "Power Supply" sections of this document.</p>
<p>Application Notes</p>	<p>CAUTION! Do not exceed the maximum allowable input power of +13 dBm (20 mW). If in doubt, use attenuators on the amplifier input.</p> <p>The HSA-Y-1-40 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.</p>

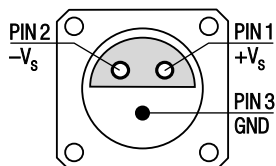
1 GHz High-Speed Amplifier

Available Accessories	PS-15-25-L 	Power supply Input: AC 100 – 240 V Output: DC ±15 V																																																																																																
Related Models	HSA-Y-1-60 HSA-Y-2-20 HSA-Y-2-40	Gain 60 dB, 10 kHz – 1.1 GHz, noise figure 1.9 dB Gain 20 dB, 10 kHz – 2 GHz, noise figure 5.2 dB Gain 40 dB, 10 kHz – 1.9 GHz, noise figure 4.9 dB																																																																																																
Specifications	<table border="0"> <tr> <td>Test conditions</td> <td colspan="2">$V_S = \pm 15\text{ V}$, $T_A = 25\text{ }^\circ\text{C}$, system impedance $50\ \Omega$, warm-up 20 minutes (min. 10 minutes recommended)</td> </tr> <tr> <td>Gain</td> <td>Gain</td> <td>40 dB ($\times 100$)</td> </tr> <tr> <td></td> <td>Transimpedance gain</td> <td>5,000 V/A ($50\ \Omega$ input impedance $\times 100$ gain)</td> </tr> <tr> <td></td> <td>Gain accuracy</td> <td>$\pm 1\text{ dB}$</td> </tr> <tr> <td></td> <td>Gain drift vs. temperature</td> <td>0.024 dB/$^\circ\text{C}$ typ.</td> </tr> <tr> <td>Frequency Response</td> <td>Lower cut-off frequency (-3 dB)</td> <td>10 kHz</td> </tr> <tr> <td></td> <td>Upper cut-off frequency (-3 dB)</td> <td>1 GHz</td> </tr> <tr> <td>Time Response</td> <td>Rise/fall time (10% - 90%)</td> <td>330 ps</td> </tr> <tr> <td></td> <td>Group delay</td> <td>1.2 ns typ.</td> </tr> <tr> <td>Input</td> <td>DC input impedance</td> <td>$50\ \Omega$</td> </tr> <tr> <td></td> <td>RF input impedance</td> <td>$50\ \Omega$</td> </tr> <tr> <td></td> <td>$50\ \Omega$ noise figure</td> <td>1.9 dB (@ $f < 700\text{ MHz}$)</td> </tr> <tr> <td></td> <td>Equ. input noise voltage</td> <td>330 pV/$\sqrt{\text{Hz}}$ (@ $f < 700\text{ MHz}$)</td> </tr> <tr> <td></td> <td>Equ. input noise current</td> <td>6.6 pA/$\sqrt{\text{Hz}}$ (calculated: 330 pV/$\sqrt{\text{Hz}}$ divided by $50\ \Omega$)</td> </tr> <tr> <td></td> <td>Input reflection S11</td> <td>-15 dB (@ $f < 3\text{ GHz}$)</td> </tr> <tr> <td>Output</td> <td>Two identical RF outputs:</td> <td></td> </tr> <tr> <td></td> <td>Output peak-peak voltage range</td> <td>2 V ($\pm 1\text{ V}$) (@ $< 500\text{ MHz}$, for linear amplification)</td> </tr> <tr> <td></td> <td>Output power $P_{1\text{dB}}$</td> <td>+11.5 dBm (@ $f < 500\text{ MHz}$)</td> </tr> <tr> <td></td> <td>Output impedance</td> <td>$50\ \Omega$ (terminate with $50\ \Omega$ load)</td> </tr> <tr> <td></td> <td>Output reflection S22</td> <td>-13 dB (@ $f < 3\text{ GHz}$)</td> </tr> <tr> <td></td> <td>Isolation between outputs</td> <td>20 dB (@ $f < 3\text{ GHz}$)</td> </tr> <tr> <td>Monitor Output</td> <td>Gain</td> <td>26 dB (1 kV/A)</td> </tr> <tr> <td></td> <td>Monitor output impedance</td> <td>$50\ \Omega$ (terminate with $\geq 10\text{ k}\Omega$ load, for best performance)</td> </tr> <tr> <td></td> <td>Lower cut-off frequency</td> <td>DC</td> </tr> <tr> <td></td> <td>Upper cut-off frequency</td> <td>100 kHz</td> </tr> <tr> <td></td> <td>Output voltage</td> <td>$\pm 10\text{ V}$ (@ $10\text{ k}\Omega$ load)</td> </tr> <tr> <td>Power Supply</td> <td>Supply voltage</td> <td>$\pm 15\text{ V}$ ($\pm 14.75\text{ V} \dots \pm 16.5\text{ V}$)</td> </tr> <tr> <td></td> <td>Supply current</td> <td>+200 / -10 mA typ. 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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-1-40, 50 Ω SMA terminator, LEMO® 3-pin connector, datasheet, transport package

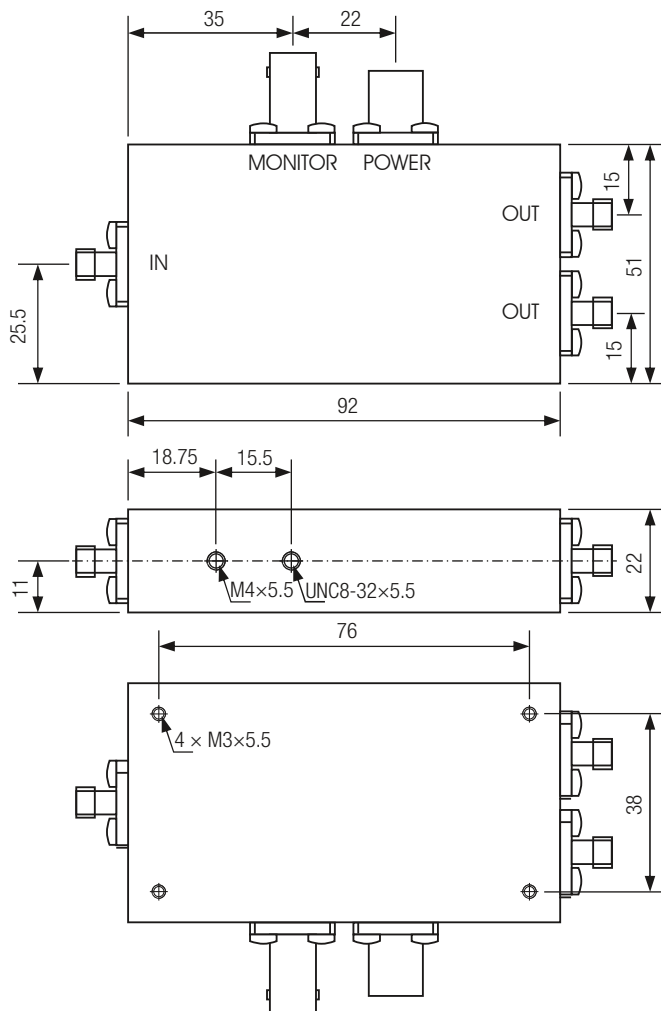
Ordering Information

HSA-Y-1-40	High-speed GHz amplifier
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1 GHz High-Speed Amplifier

Dimensions

HSA-Y-1-40



DZ-HSA-Y_23_R01

all dimensions in mm unless otherwise noted

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