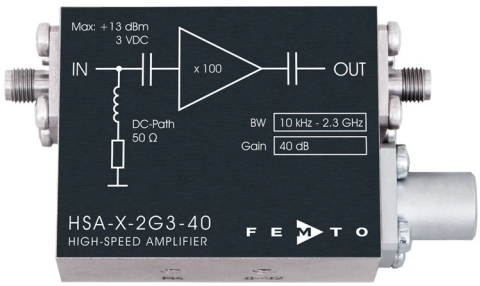
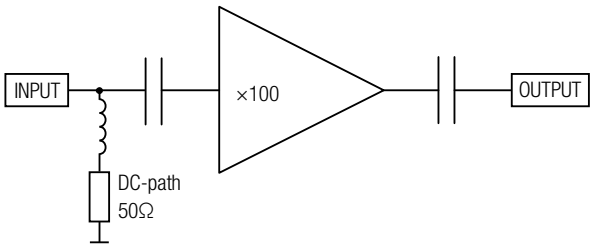
2.3 GHz High-Speed Amplifier



Features	• **Bandwidth 10 kHz – 2.3 GHz** • **Rise time 170 ps** • **Integrated bias circuit**
Applications	• **Preamplifier for ultra-fast detectors (microchannel-plates, photomultipliers, avalanche-photodiodes and PIN-photodiodes)** • **Oscilloscope and transient-recorder preamplifier** • **Time-resolved pulse and transient measurements**
Block Diagram	 BS01-HSA-X_R02
Intended Use	The HSA-X-2G3-40 is a low noise, ultra-fast fixed-gain amplifier. Thanks to its integrated bias-T, it is suitable for signal acquisition from photodiodes and photomultipliers. 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. The operating environment must be free of smoke, dust, grease, oil, condensing moisture, and other contaminants that could affect the operation or performance.
Related Models	HSA-X-1-40 gain 40 dB, bandwidth 1.2 GHz HSA-X-2-20 gain 20 dB, bandwidth 2.5 Ghz HSA-X-2-40 gain 40 dB, bandwidth 2.0 GHz, limited availability HSA-X-I-2-40 gain 40 dB, bandwidth 2.2 GHz, inverting
Available Accessories	PS-15-25-L  Power Supply Input: 100 – 240 VAC Output: ±15 VDC

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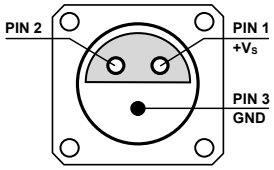
Specifications	Test conditions	V_S = +15 V, T_A = 25 °C, system impedance 50 Ω, warm-up 20 minutes (min. 10 minutes recommended)
Gain	Gain	40 dB (×100)
	Transimpedance gain	5.0×10^3 V/A (40 dB × 50 Ω)
	Gain accuracy	±1 dB
Frequency Response	Lower cut-off frequency (–3 dB)	10 kHz (±25 %)
	Upper cut-off frequency (–3 dB)	2.3 GHz (±15 %)
Time Response	Rise/fall time (10 % – 90 %)	170 ps (±15 %)
Input	DC input impedance	50 Ω
	RF input impedance	50 Ω
	50 Ω noise figure	2.8 dB (@f < 1GHz)
	Equivalent input voltage noise	430 pV/√Hz
	Equivalent input noise current	8.6 pA/√Hz (calculated: 430 pV/√Hz divided by 50 Ω)
	Input VSWR	1.45 : 1 (@ f < 2 GHz)
	Input reflection S11	-15 dB (@ f < 2 GHz)
Output	Output impedance	50 Ω
	Output VSWR	1.4 : 1 (@ f < 3 GHz)
	Output reflection S22	-15.5 dB (@ f < 3 GHz)
	Output power P1dB	+12.5 dBm (@ f < 1 GHz)
	Output peak-to-peak voltage	2.0 V (@ f < 500 MHz, for linear amplification)
	Output noise	typ. 3.0 mV RMS or 20 mV PP* (measurement BW: 4 GHz)
	* The peak-to-peak output noise is derived from the RMS noise as follows: $V_{PP} = V_{RMS}$ x 6.6 (99.9% of the time the output noise voltage will be within the specified peak-to-peak value.)	
Power Supply	Supply voltage	+15 V
	Supply current	135 mA (depends on operating conditions, recommended power supply capability min. 200 mA)
Case	Weight	100 g (0.23 lbs)
	Material	AlMg4.5Mn, nickel-plated
Temperature Range	Storage temperature	–40 °C ... +100 °C
	Operating temperature	0 °C ... +60 °C
Absolute Maximum Ratings	Power supply voltage	+20 V
	DC and LF input voltage	±3 V
	RF input power	+13 dBm
Connectors	Input	SMA jack (female)
	Output	SMA jack (female)
	Power supply	LEMO® series 1S, 3-pin fixed socket (mating plug type: FFA.1S.303.CLAC52)



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

Scope of Delivery	HSA-X-2G3-40, LEMO® 3-pin connector, datasheet, transport package
Ordering Information	HSA-X-2G3-40 gain 40 dB, bandwidth 2.3 GHz

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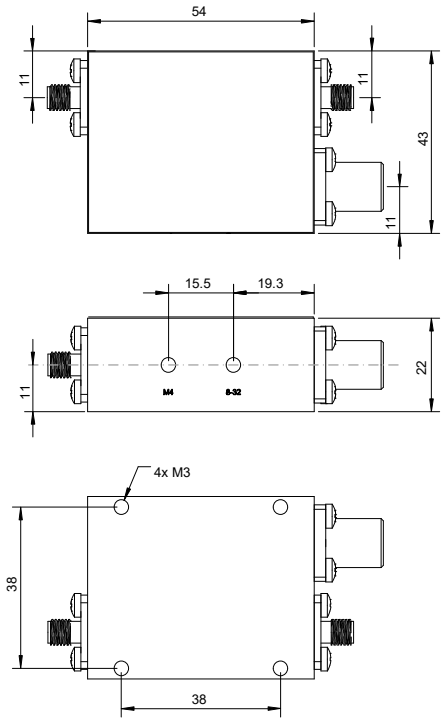
Dimensions

HSA-X-2G3-40



DZ-HSA-X_R3

all dimensions in mm unless otherwise noted

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