LNAM-FBX
Low-Noise Amplifier Module

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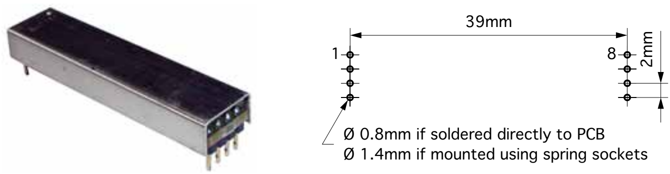
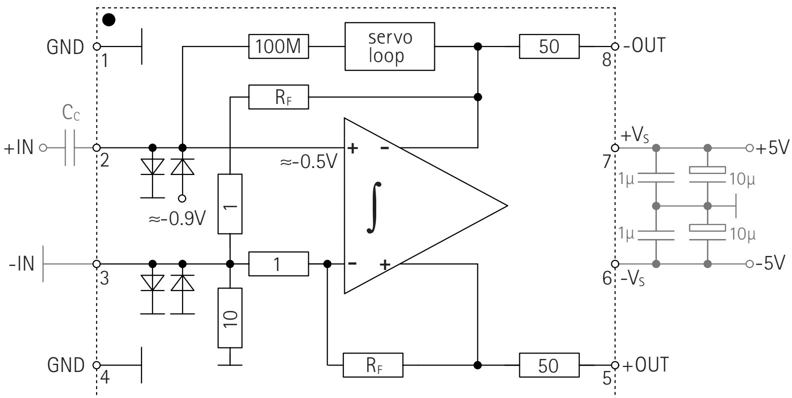
Data Sheet

Ultra-low-noise voltage amplifier module (LNAM) with ac coupled FET input allowing measurements between 1 Hz and 20 MHz. High gain precision and low distortion are achieved by using internal negative feedback and >1000 V/µs output stages.
For optimum performance the module should be mounted in a solid metal box providing thermal stabilization and rf shielding. A Cu cover further improves thermal stability and noise below 10 Hz. The coupling capacitor C_C is not built-in to increase design flexibility. Ceramic capacitors with NPO/COG dielectric are well suited. The use of a ground plane under the LNAM is recommended. Proper power supply bypassing is important. A parallel combination of surface-mount 1 µF ceramic capacitors and 10 µF tantalum capacitors is adequate. The ceramic capacitors should be placed within a few mm from the supply pins, whereas the tantalum capacitors may be located in a larger distance of up to several cm. Low-noise voltage regulators (e.g., MIC5205, LT1761, LT1964, TPS7A4901, TPS7A3001, or equivalent parts) are recommended to preserve the excellent amplifier noise performance.
To increase design flexibility the LNAM is delivered with spring sockets for plug-in mounting. Single channel evaluation boards are available. For low-power versions with correspondingly increased voltage noise (e.g., 1 nV/√Hz at 10 mA supply current) or high-speed versions without internal feedback (80 MHz bandwidth at gain 400), please contact Magnicon GmbH.



Photograph of the LNAM-FBX prototype and recommended PCB layout.



Functional block diagram.

Typical Specifications (${T_A}$ = 25 °C, $\pm V_S$ = ±5 V, R_L = 1 MΩ, unless otherwise noted)

Parameter	LNAM-FBX-400	LNAM-FBX-1000[a)]	Unit
Board size	41.5 x 10		mm^2
Height without pins	5.9		mm
Supply voltage range $\pm V_S$ PSRR @ 1 kHz	±4…±6[b)] 80		V dB
Quiescent current @ input shorted	37		mA
Voltage gain @ 1 kHz Gain stability	400 50	1000 100	 ppm/°C
Input resistance Input inductance Input capacitance	250[c)] 75[c)] 41	100[c)] 30[c)] 56	kΩ kH pF
Max. coupling capacitance C_C Max. charging time @ 10 V input step	0.4[d)] 10[d)]	1[d)] 25[d)]	µF s
CMRR @ 1 kHz	42		dB
Input offset voltage	-500		mV
Input bias current (-IN)	66		µA
Max. current through input prot. diodes	±100		mA
THD @ 1 kHz, 4 V p-p at output	0.013	0.025	%
Voltage noise @ 1 MHz @ 1 kHz 1/f corner	0.52 0.53 25		nV/√Hz nV/√Hz Hz
Current noise (+IN) @ 1 MHz @ 1 Hz to 3 KHz	360[e)] 15		fA/√Hz fA/√Hz
-3 dB bandwidth	22	18	MHz
Rise time (10%-90%)	16	19	ns
Output voltage swing @ R_L = 1 MΩ @ R_L = 50 Ω	±3.9 ±1.7		V V

a) *The FBX-1000 version has two marks on the cover at the pin 1 corner.*

b) *Do not exceed 12.6 V between $+V_S$ and $-V_S$.*

c) *Realized by negative feedback.*

d) *For Bessel-type high-pass behavior.*

e) *Frequency dependence $\sqrt{S_I} \propto f^{\,0.75}$.*