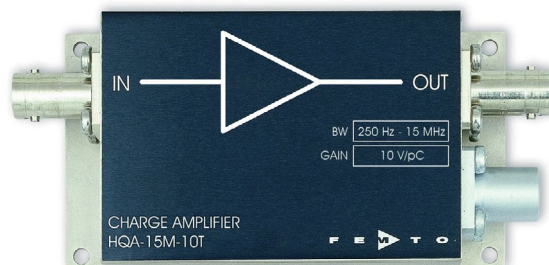




Preliminary Datasheet

HQA-15M-10T

High Frequency Charge Amplifier



Features	<ul style="list-style-type: none"> • High Gain of 10 V/pC • Wide Operating Range from 250 Hz to 15 MHz • Low Input Noise of 40×10^{-21} C/$\sqrt{\text{Hz}}$ and 700 pV/$\sqrt{\text{Hz}}$ • Optimized for Sinusoidal Signals from AC Coupled Charge Sources 		
Applications	<ul style="list-style-type: none"> • Pyro- and Piezoelectric Detectors • Tuning Fork Quartz Crystals • Length Extension Resonators • Atomic Force Microscopy • Optical Measurements • Charged Particle Beam Monitoring 		
Specifications	<i>Test Conditions</i>	<i>$V_s = \pm 15 \text{ V}$, $T_a = 25^\circ\text{C}$</i>	
Gain	Charge Gain	10^{13} V/C	
	Equivalent Current Gain	$1.6 \times 10^6 \text{ V/A}$	(@ 1 MHz sinusoidal input signal)
	Gain Accuracy	$\pm 3 \%$	
Bandwidth	Lower Cut-Off Frequency (-3 dB)	250 Hz	
	Upper Cut-Off Frequency (-3 dB)	15 MHz	(with max. 100 pF source capacitance)
Input	Input Impedance	$1 \text{ G}\Omega // 10 \text{ nF}$	
	Effective AC Input Impedance	$20 \text{ }\Omega @ 1\text{MHz}$	
	Input Charge Noise	$40 \times 10^{-21} \text{ C}/\sqrt{\text{Hz}}$	(with open input)
		$90 \times 10^{-21} \text{ C}/\sqrt{\text{Hz}}$	(with 100 pF source capacitance)
	Equivalent Input Current Noise	$250 \text{ fA}/\sqrt{\text{Hz}}$	(with open input)
	(@ 1 MHz sinusoidal input signal)	$570 \text{ fA}/\sqrt{\text{Hz}}$	(with 100 pF source capacitance)
	Input Voltage Noise	$700 \text{ pV}/\sqrt{\text{Hz}}$	(@ 1 MHz)
Output	Max. Input Charge	1 pC peak-peak	
	Output Voltage Range	10 V peak-peak	(@ $\geq 1 \text{ M}\Omega$ load, for linear operation)
	Output Impedance	$50 \text{ }\Omega$	(terminate with $\geq 1 \text{ M}\Omega$ load for best performance)
Power Supply	Integrated Broadband Noise	typ. 20 mV peak-peak or 3.5 mV rms	(@ $\geq 1 \text{ M}\Omega$ load)
	Supply Voltage	$\pm 15 \text{ V}$	
Case	Supply Current	$\pm 35 \text{ mA typ.}$ (depends on operating conditions, recommended power supply capability min. $\pm 100 \text{ mA}$)	
	Weight	200 g (0.44 lb.)	
Temperature Range	Material	AlMg4.5Mn, nickel-plated	
	Storage Temperature	-40°C to $+100^\circ\text{C}$	
	Operating Temperature	$+20^\circ\text{C}$ to $+40^\circ\text{C}$	

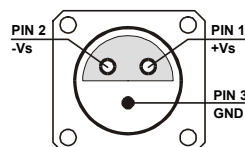
High Frequency Charge Amplifier

Absolute Maximum Ratings

Input Voltage	20 V peak-peak
Power Supply Voltage	± 18 V

Connectors

Input	BNC
Output	BNC
Power Supply	LEMO series 1S, 3-pin fixed socket Pin 1: + 15V Pin 2: - 15V Pin 3: GND



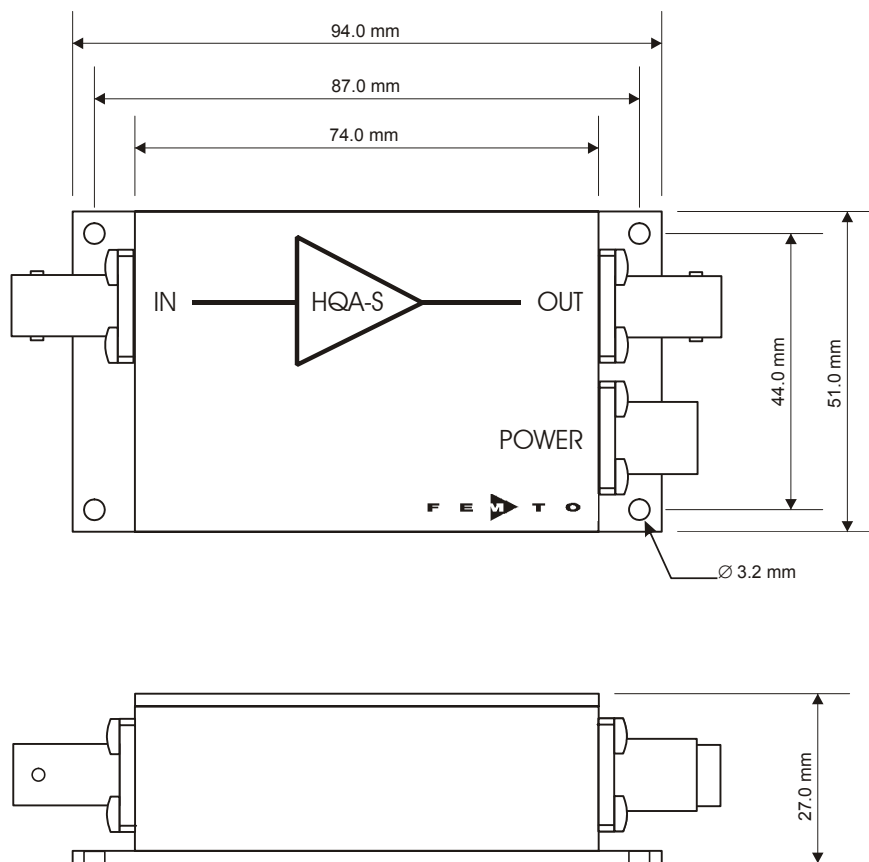
Operation

General:

The amplifier is AC coupled for direct use with a charge sensor producing sinusoidal signals with no DC background. A source capacitance of less than 1 nF is recommended for proper operation. If the effective source capacitance (sensor plus cable capacitance) is small relative to the effective input impedance of the amplifier (10 nF) the amplifier acts as a virtual ground and most of the charge flows into the amplifier input. At 1 MHz the amplifier input capacitance of 10 nF corresponds to a complex input impedance of 20Ω . An input resistor of $1 \text{ G}\Omega$ is incorporated to prevent buildup of static charge. The amplifier is not suited for sources producing an average DC background current as this would saturate the device.

High Frequency Charge Amplifier

Dimensions



DZ01-2299001-R1

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