

## Description

The HA circuit is an instrumentation amplifier designed to work over a +/-18V dual supply. It offers an excellent combination of accuracy, low power consumption, wide output range and excellent gain performance.

Hybrid technology allows to have a **small volume size** ( $\varnothing 7 \times 3.6\text{mm}$ ).

Output connection wiring are done by the customer by soldering

Gain is set by the customer by a single resistance  $R_{\text{gain}}$  (0805 format) and can be from 1 to 1000V/V.

Bandwidth can be reduced by addition of a capacitor  $C_{\text{ext}}$ . (first order).

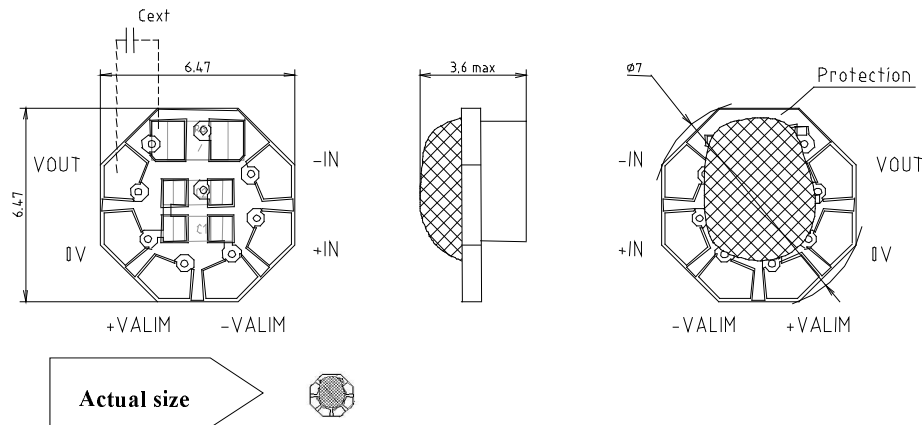
$$\text{Cut-off frequency} = \frac{1}{2 \cdot \pi \cdot (100\text{K}\Omega) \cdot C_{\text{ext}}}$$

## Applications

Pressure, force and acceleration sensors.

Severe application in aeronautic, military and industrial field.

## Mechanicals drawing



## INSTRUMENTATION AMPLIFIER

## HA HYBRID

### Electricals specifications

( $V_s = \pm 15\text{V}$   $V_{\text{cm}} = 0\text{V}$   $T_A = 25^\circ\text{C}$  unless otherwise noted)

PARAMETER	SYM	CONDITION	VALUES			UNIT
			Min	Typ	Max	
<b>INPUT</b>						
Input Offset voltage	$V_{\text{io}}$	$25^\circ\text{C}$		80	600	$\mu\text{V}$
Input impedance				4		$\text{G}\Omega$
Common mode rejection	CMRR	$G=100$	80	100		dB
Input bias current	$I_b$			0.5	5	nA
Offset voltage drift		$T_{\text{min}}$ to $T_{\text{max}}$		0.5	6	$\mu\text{V}/^\circ\text{C}$
<b>GAIN</b>						
Gain range	$G$		1		1000	V/V
Gain equation	$G$			$G = 100\text{k} / R_g$		V/V
Gain error		$T=25^\circ\text{C}$		0.4	0.75	%
Gain temperature drift	$dG/dT$	$G=100$		$\pm 50$		$\text{ppm}/^\circ\text{C}$
<b>OUTPUT</b>						
Bandwidth	BW	$G=1$ (-3dB)		0.7		MHz
Output Voltage high	$V_{\text{oh}}$	$R_l = 2\text{k}\Omega$ $T_{\text{min}}$ to $T_{\text{max}}$	$+V_{\text{alim}} - 2$ $+V_{\text{alim}} - 2.5$	$+V_{\text{alim}} - 1.6$		V
Output voltage low	$V_{\text{ol}}$	$R_l = 2\text{k}\Omega$ $T_{\text{min}}$ to $T_{\text{max}}$			$-V_{\text{alim}} + 0.5$ $-V_{\text{alim}} + 0.5$	V
Short circuit limit	$I_{\text{sc}}$	$T_{\text{min}}$ to $T_{\text{max}}$		$\pm 20$		mA
Power supply rejection	PSRR		85			dB
Voltage noise	$e_{\text{n,p-p}}$	0.1 to 10 Hz		0.5		$\mu\text{Vp-p}$
<b>POWER SUPPLY</b>						
Power supply voltage	$V+$	Dual supply	-18		+18	V
Power supply current	$I+$	$25^\circ\text{C}$ $T_{\text{min}}$ to $T_{\text{max}}$		0.75	0.9 1.1	mA mA
<b>TEMPERATURE</b>						
Electrical specification			-40		+85	$^\circ\text{C}$
Operating temperature	$T_a$		-40		+125	$^\circ\text{C}$
Storage range	$T_s$		-55		+125	$^\circ\text{C}$

HA circuit can be used in single supply with connecting  $-V_{\text{alim}}$  to GND. The user have to adjust voltage input for normal working.

### Example of application with the HREF hybrid circuit

