



Micromachined Accelerometer

±40g Amplified

The MMAS40G family of silicon capacitive, micro-machined accelerometers features integral signal amplification, signal conditioning, a 4-pole low-pass filter and temperature compensation. Zero-G offset, full scale span and filter roll-off are factory set and require no external passives. A calibrated self-test feature mechanically displaces the seismic mass with the application of a digital self-test signal.

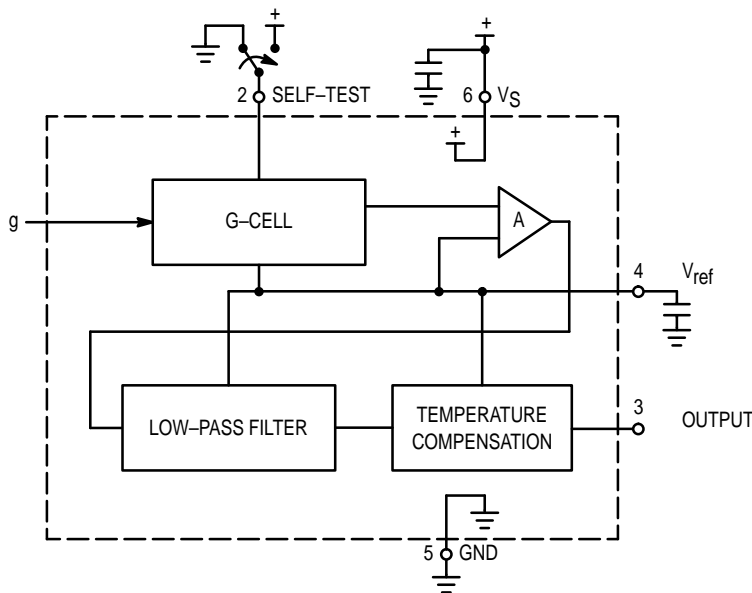
The MMAS40G incorporates a single polysilicon seismic mass, suspended between two fixed polysilicon plates (G-cell). The forces of acceleration move the seismic mass, thereby resulting in a change in capacitance. The G-cell is sealed at the wafer level, creating a particle-free environment. The G-cell features built-in damping and over-range stops to protect it from mechanical shock.

MMAS40G accelerometers are ideally suited for automotive crash detection and recording, vibration monitoring, automotive suspension control, appliance control systems, etc.

Features

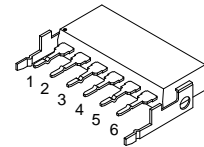
- Minimum Full Scale Measurement ±40g
- Calibrated, True Self-Test
- Senses Parallel to the Printed Circuit Board
- Integral Signal Conditioning and 4-Pole Filter
- Linear Output
- Robust, High Shock Survivability

SIMPLIFIED BLOCK DIAGRAM



MMAS40GWB

**MICROMACHINED
ACCELEROMETER**
±40g **AMPLIFIED**
(Wingback)



WB PACKAGE
CASE 456-03

PIN NUMBER (WB)

1	NC (1)	4	V _{ref} (2)
2	Self-Test	5	GND
3	Output	6	V _S (2)

NOTES:

1. Connect to ground.
2. Bypass at pin to ground with 0.1 μF ceramic capacitor for specified performance.

(Replaces XMMAS40GWB)

MMAS40GWB

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Acceleration (biased each axis)	G	±500	g
Acceleration (unbiased each axis)	G	±2000	g
Supply Voltage	V _{Smax}	-0.3 to +7.0	Vdc
Storage Temperature	T _{stg}	-40 to +105	°C
Operating Temperature(6)	T _A	-40 to +85	°C

OPERATING CHARACTERISTICS (V_S = 5.0 Vdc, T_A = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
Acceleration Range	G	±40	±55	—	g
Output Drive Capability	—	-0.2	—	0.2	mA
Supply Voltage	V _S	4.75	5.0	5.25	V
Supply Current	I _O	—	5.0	7.0	mA
Full Scale Output Range	V _{FSO}	0.3	—	V _S - 0.3	V
Sensitivity (over temperature range) (2) (3)	ΔV/ΔG	36	40	44	mV/g
Zero Acceleration Output (over temperature range) (3) (4)	V _{off}	2.2	2.5	2.8	V
Linearity	—	—	0.5	2.0	%FSO
Transverse Sensitivity	—	—	1.0	3.0	%FSO
Frequency Bandwidth	—	300	400	500	Hz
Noise	—	—	15	25	mV _{pk}
Self-Test Output Equivalent (5)	G _S	20	25	30	g
Self-Test Input Low	V _{STL}	—	—	1.6	V
Self-Test Input High	V _{STH}	3.4	—	—	V
Self-Test Input Current	—	10	70	200	μA

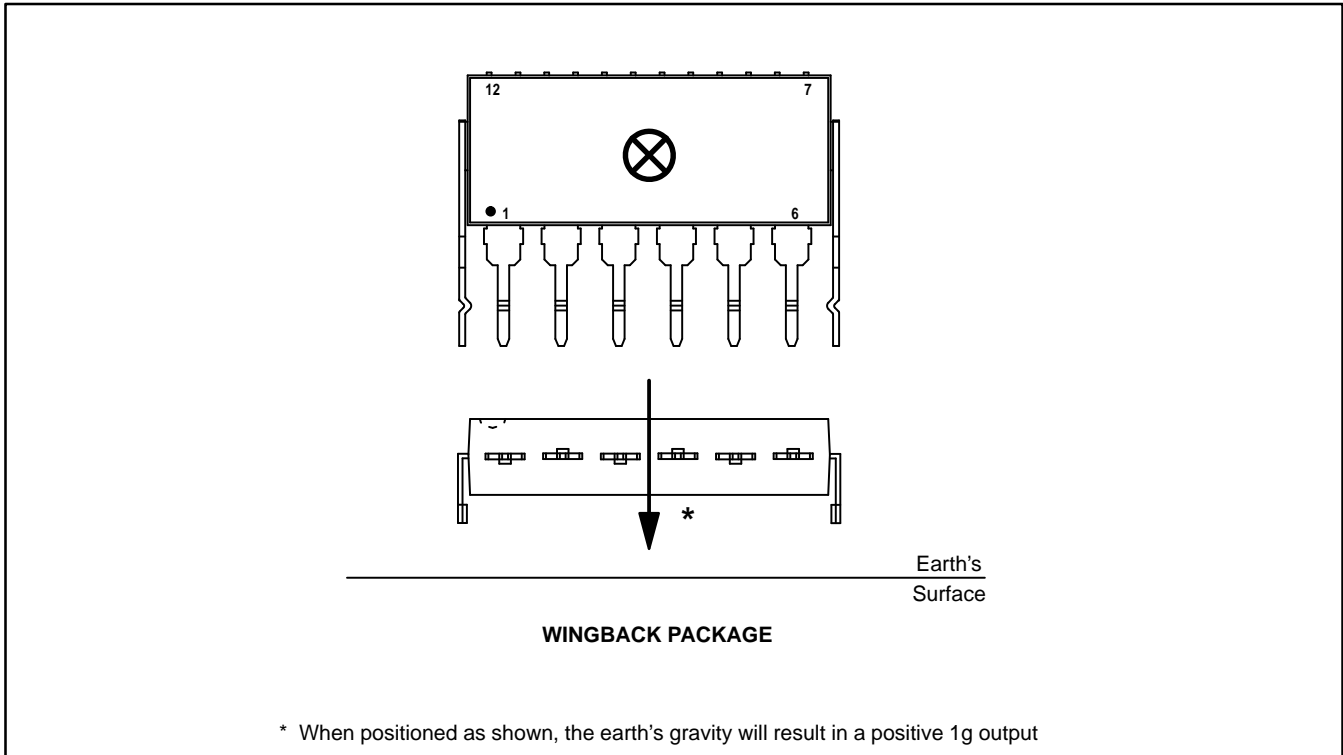
NOTES:

1. The output voltage increases from the Zero Acceleration Output for positive acceleration and decreases for negative acceleration. The typical sensitivity is 40 mV/g. For example, with V_S = 5.0 V, a +20g input will result in a 3.3 V output. (V_{output} = 2.5 + 0.040 × 20) and a -20g input will result in a 1.7 V output.
2. Sensitivity is a ratiometric parameter: $\Delta V/\Delta G(V_S) = \Delta V/\Delta G(5\text{ V}) \times (V_S/5\text{ V})$.
3. The compensated temperature operating range is -40 to +85°C.
4. Zero Acceleration Output is a ratiometric parameter: $V_{\text{off}}(V_S) = V_{\text{off}}(5\text{ V}) \times (V_S/5\text{ V})$.
5. Equivalent output in response to a Logic Level One on the self-test pin.
6. Additional temperature range available. Consult factory.

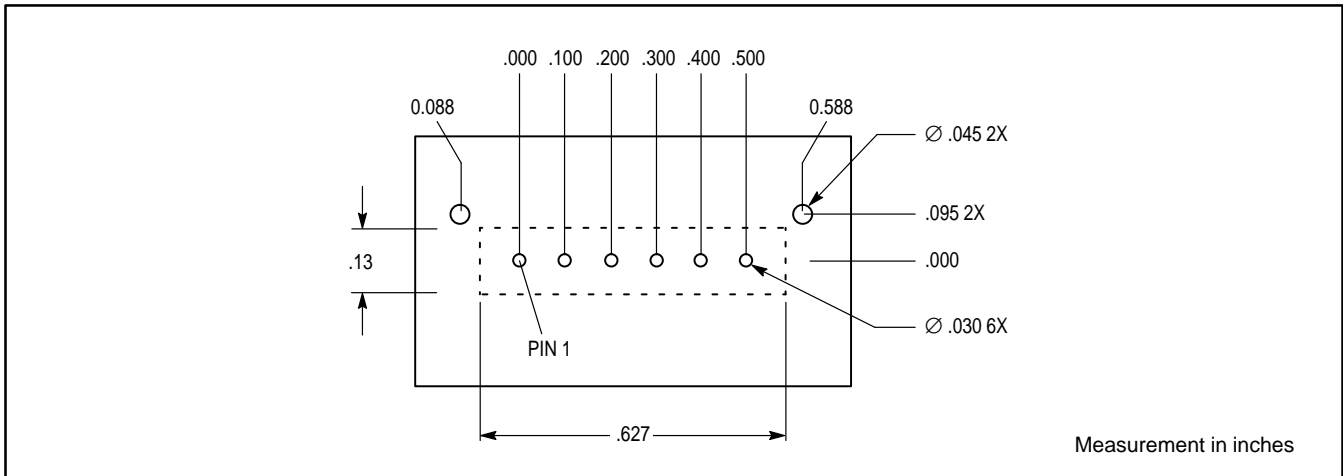
ORDERING INFORMATION

Device	Temperature Range	Case No.	Package
MMAS40GWB	-40 to +85°C	456-03	Plastic Wingback

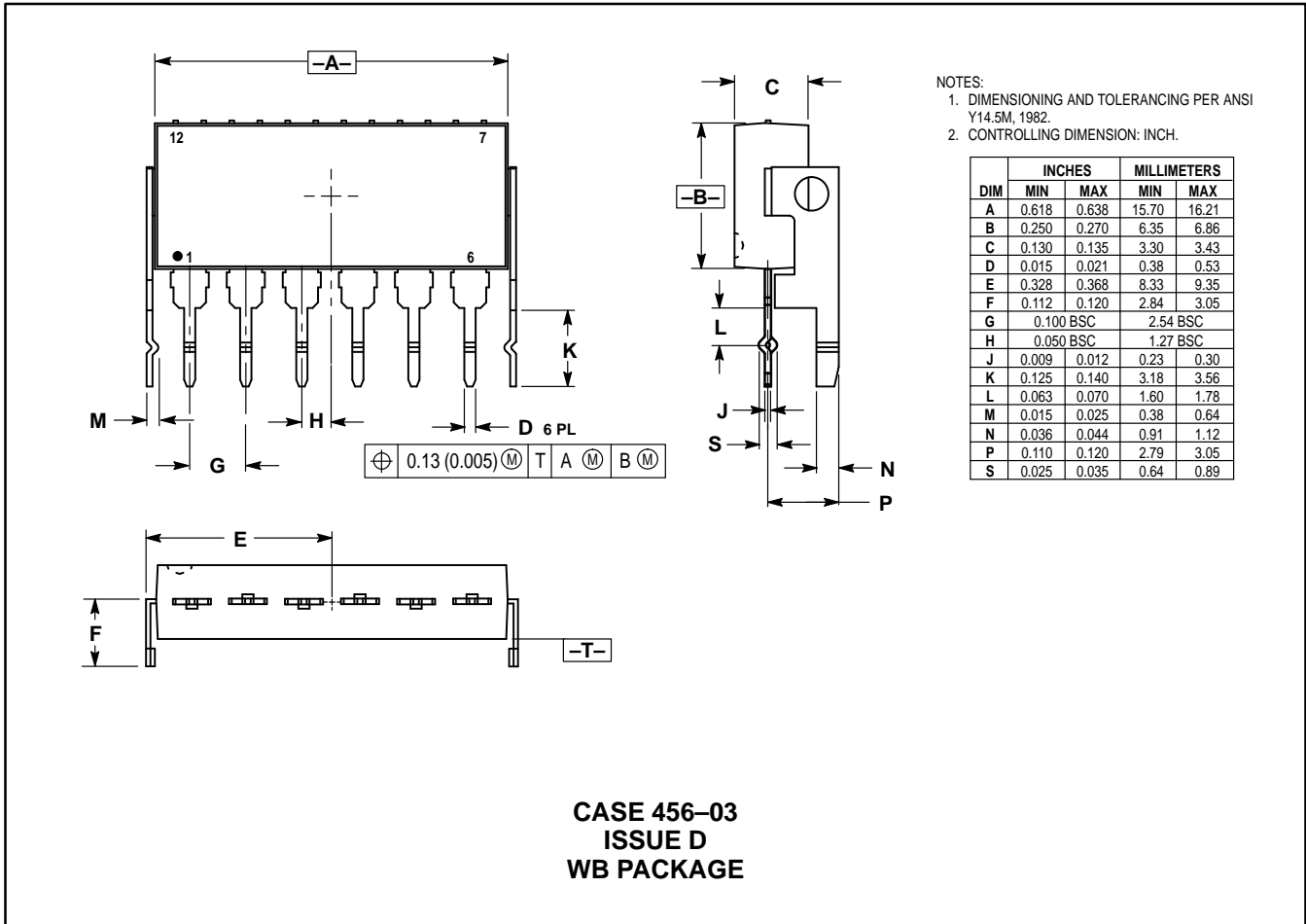
POSITIVE ACCELERATION SENSING DIRECTION



WINGBACK PACKAGE DRILLING PATTERN



PACKAGE DIMENSIONS



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