MMAS40G10D

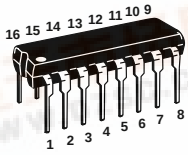
Micromachined Accelerometer
±40g

MICROMACHINED ACCELEROMETER ±40g

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.



DIP PACKAGE
CASE 648C–03

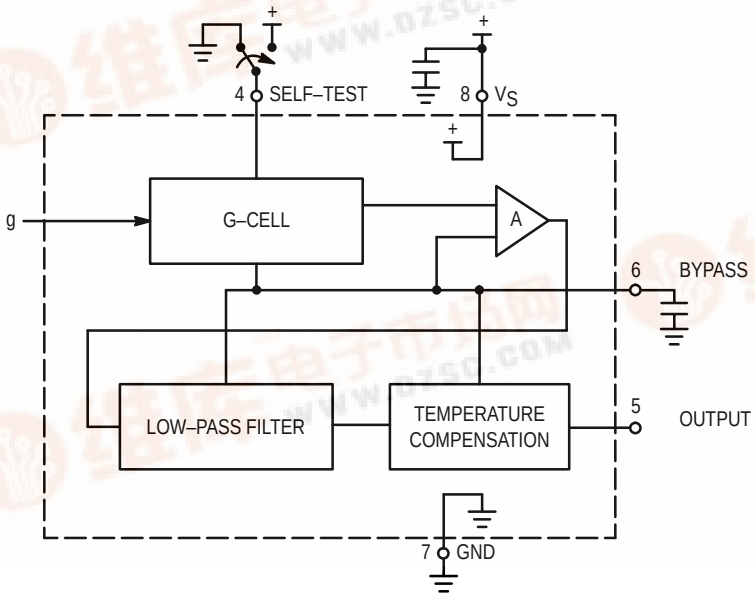
Features

- Minimum Full Scale Measurement ±40g
- Calibrated, True Self–Test
- Standard 16–Pin Plastic DIP package
- Senses Perpendicular to the Printed Circuit Board
- Integral Signal Conditioning and 4–Pole Filter
- Linear Output
- Robust, High Shock Survivability

PIN NUMBER (DIP)			
1	N/C (1)	9	N/C (1)
2	N/C (1)	10	N/C (1)
3	N/C (1)	11	N/C (1)
4	Self–Test	12	N/C (1)
5	Output	13	N/C (1)
6	Bypass (2)	14	N/C (1)
7	GND	15	N/C (1)
8	V_S (2)	16	N/C (1)

NOTES:
1. Internal connections. All N/C should be tied to gnd, except pin 11 which must be tied to pin 8.
2. Bypass to ground with 0.1 µF ceramic capacitor for specified system performance.

SIMPLIFIED BLOCK DIAGRAM



MMAS40G10D

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)	$\Delta V/\Delta G$	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

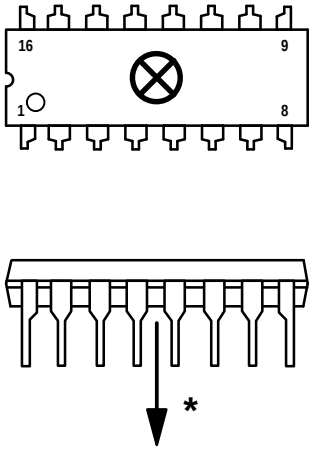
NOTES:

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 x 20) and a – 20g input will result in a 1.7 V output.
2. Sensitivity is a ratiometric parameter: $\Delta V/\Delta G_{(Vs)} = \Delta V/\Delta G_{(5\ V)} \times (V_S / 5\ V)$.
3. The compensated temperature operating range is –40 to +85°C.
4. Zero Acceleration Output is a ratiometric parameter: $V_{off(Vs)} = V_{off(5\ V)} \times (V_S / 5\ V)$.
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
MMAS40G10D	–40 to +85°C	Case 648C–03	Plastic DIP

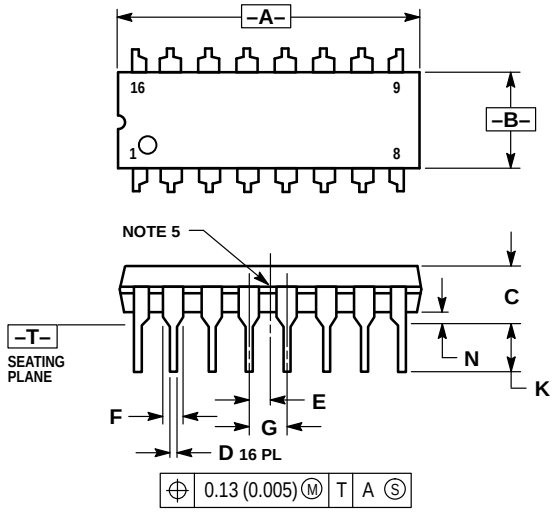
POSITIVE ACCELERATION SENSING DIRECTION

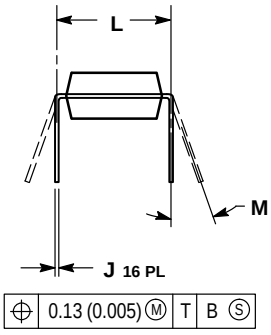


DIP PACKAGE

* When positioned as shown, gravity will result in a positive 1g output

PACKAGE DIMENSIONS





NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION L TO CENTER OF LEADS WHEN FORMED PARALLEL.
4. DIMENSION B DOES NOT INCLUDE MOLD FLASH.
5. INTERNAL LEAD CONNECTION BETWEEN 4 AND 5, 12 AND 13.

	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	0.740	0.840	18.80	21.34
B	0.240	0.260	6.10	6.60
C	0.145	0.185	3.69	4.69
D	0.015	0.021	0.38	0.53
E	0.050 BSC		1.27 BSC	
F	0.040	0.70	1.02	1.78
G	0.100 BSC		2.54 BSC	
J	0.008	0.015	0.20	0.38
K	0.115	0.135	2.92	3.43
L	0.300 BSC		7.62 BSC	
M	0°	10°	0°	10°
N	0.015	0.040	0.39	1.01

CASE 648C–03
ISSUE C
DIP PACKAGE

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