

MSA220

FEATURES

- 2mg resolution at 60Hz
- Wide supply voltage range: 2.5V to 3.6V
- Low power: 1mA at $V_{DD}=3V$ (typ)
- Good zero g bias stability
- Good sensitivity accuracy
- BW adjustment with a single capacitor
- Single-supply operation
- 10,000g shock survival

APPLICATIONS

- Cost-sensitive motion- and tilt-sensing applications
- Smart hand-held devices
- Mobile phones
- Sports and health-related devices
- PC security and PC peripherals
- Consumer IC

GENERAL DESCRIPTION

The MSA220 is a low cost, low power, dual-axis accelerometer with signal conditioned voltage outputs, which are all on a single monolithic IC. The product measures acceleration with a full-scale range of $\pm 2g$ (typical). It can also measure both dynamic acceleration (vibration) and static acceleration (gravity).

The MSA220's typical noise floor is $250\mu g/\sqrt{Hz}$, which allowing signals below 2mg to be resolved in tilt-sensing applications using narrow bandwidths(<60Hz). The user selects the bandwidth of the accelerometer using capacitors C_{OUT} at the out pins. Bandwidths of the 0.5Hz to 2.5KHz may be selected to suit the application.

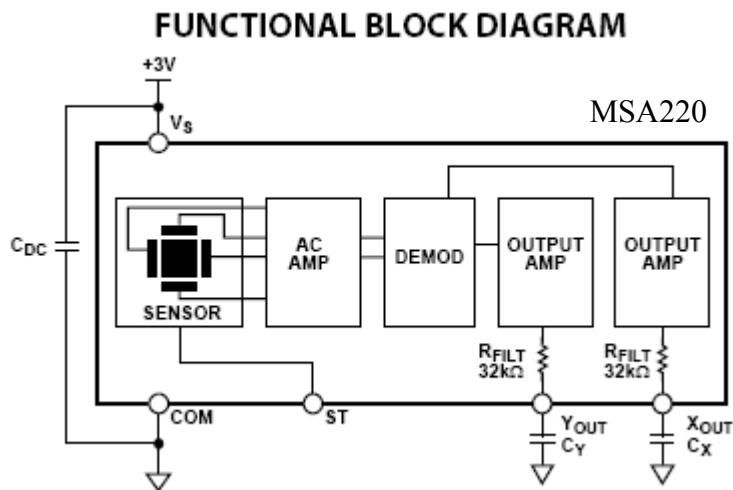


Figure 1

SPECIFICATIONS

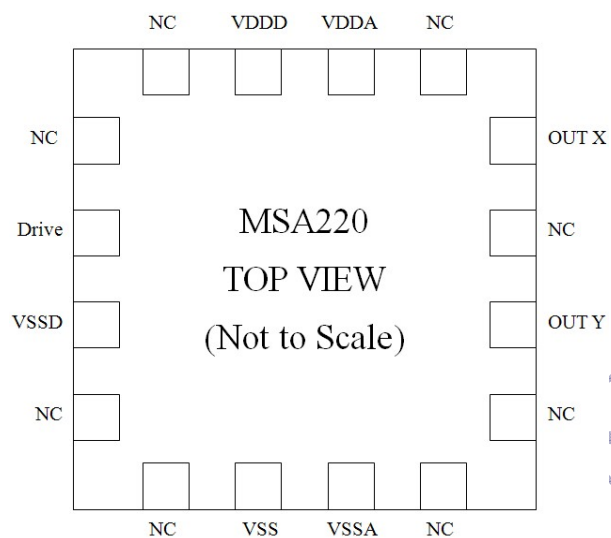
$T_A = 25^{\circ}C, V_{DD} = 3V, C_{out} = 0.1\mu F$, Acceleration=0g, unless otherwise noted.

Table1.

Parameter	Conditions	Min	Tpy	Max	Unit
SENSOR INPUT					
Measurement Range			± 2		g
Nonlinearity	% of full scale		± 0.2		%
Package Alignment Error			± 1		Degrees
Alignment Error	X sensor to Y sensor		--		Degrees
Cross Axis Sensitivity			--		%
SENSITIVITY (RATIOMETRIC)					
Sensitivity at X_{OUT}, Y_{OUT}	$V_{DD} = 3V$	378	420	462	mV/g
Sensitivity change due to temperature	$V_{DD} = 3V$		0.01		%/ $^{\circ}C$
ZERO g BIAS LEVEL (RATIOMETRIC)					
0 g Voltage at X_{OUT}, Y_{OUT}	$V_{DD} = 3V$	1.3	1.5	1.7	V
0 g Offset Versus Temperature			± 0.6		mg/ $^{\circ}C$
NOISE PERFORMSANCE					
Noise Density	@ $25^{\circ}C$		250		$\mu g / \sqrt{Hz_{rms}}$
FREQUENCY RESPONSE					
C_{OUT} Range		0.002		10	μF
R_{FILT} Tolerance			$32 \pm 15\%$		k Ω
Sensor Resonant Frequency			5.5		kHz
OUTPUT AMPLIFIER					
Output Swing Low	No load		0.3		V
Output Swing High	No load		2.5		V
POWER SUPPLY					
Operating Voltage Range		2.5		3.6	V
Quiescent Supply Current			1		mA
Turn-On Time			20		ms
TEMPERATURE					
Operating Temperature Range		-20		70	$^{\circ}C$

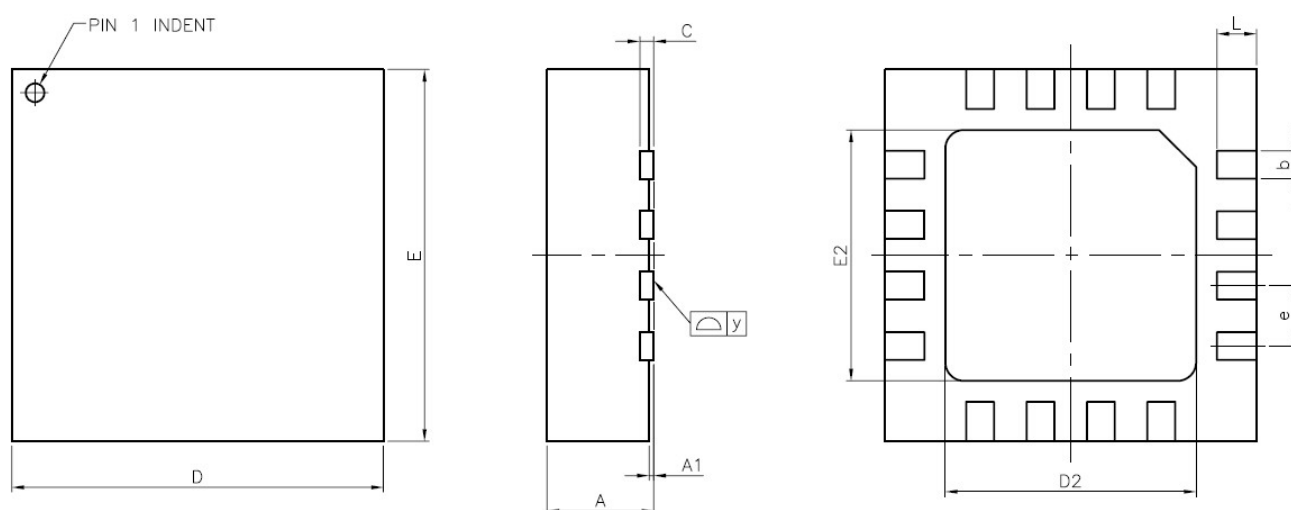
- All minimum and maximum specifications are guaranteed. Typical specifications are not guaranteed.
- Sensitivity is essentially ratiometric to V_{DD} . For $V_{DD} = 2.7V$ to $3.3V$, sensitivity is 138 mV/V/g to 142 mV/V/g typical.
- Defined as the output change from ambient-to-maximum temperature or ambient-to-minimum temperature.
- Actual frequency response controlled by user-supplied external capacitor (C_X, C_Y).
- Bandwidth = $1/(2 \times \pi \times 32 k\Omega \times C)$. For $C_X, C_Y = 0.002 \mu F$, bandwidth = 2500 Hz. For $C_X, C_Y = 10 \mu F$, bandwidth = 0.5 Hz.
Minimum/maximum values are not tested.
- Self-test response changes cubically with V_{DD} .
- Larger values of C_X, C_Y increase turn-on time. Turn-on time is approximately $160 \times C_X$ or $C_Y + 4$ ms, where C_X, C_Y are in μF .

PIN CONFIGURATION AND FUNCTION DESCRIPTIONS



Pin No.	Description	Pin No.	Description
1. NC	Do Not Connect	9. NC	Do Not Connect
2. Drive	Self-Test	10. OUT Y	Y-Channel Output
3. VSSD	Common	11. NC	Do Not Connect
4. NC	Do Not Connect	12. OUT X	X-Channel Output
5. NC	Do Not Connect	13. NC	Do Not Connect
6. VSS	Common	14. VDDA	2.5V to 3.6V
7. VSSA	Common	15. VDDD	2.5V to 3.6V
8. NC	Do Not Connect	16. NC	Do Not Connect

OUTLINE DIMENTIONS



NOTE :

1. THE TERMINAL #1 IDENTIFIER IS A LASER MARKED FEATURE

SYMBOLS	DIMENSIONS IN MILLIMETERS		
	MIN	NOM	MAX
A	1.10	1.15	1.20
A1	0.00	0.02	0.05
b	0.25	0.30	0.35
C	—	0.15 REF	—
D	3.90	4.00	4.10
D2	2.65	2.70	2.75
E	3.90	4.00	4.10
E2	2.65	2.70	2.75
e	—	0.65	—
L	0.35	0.40	0.45
y	0.00	—	0.075