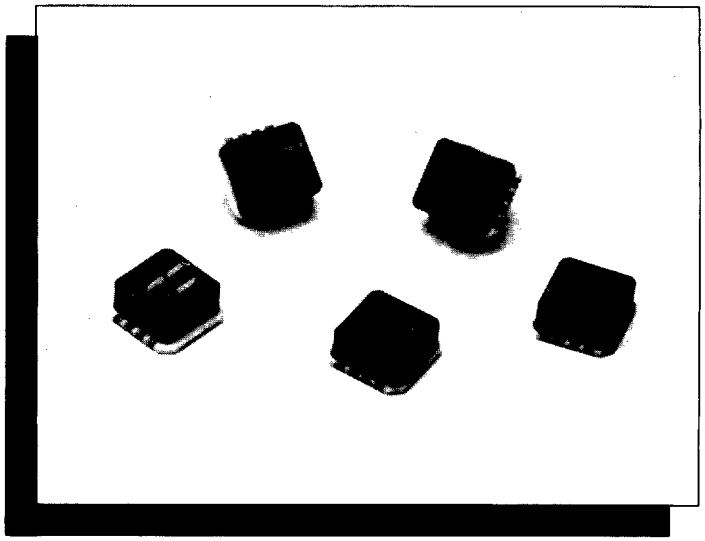
SENSORS

# Accelerometer Model 3031

## OEM Accelerometer Piezoresistive Low Cost Surface Mount Package



### Features

- DC Response
- Wide Bandwidth
- High Sensitivity
- Built-In Damping
- Miniature Size
- Low Mass
- Built-In Overrange Stops
- Solid State Reliability

### Typical Applications

- Military Arming and Fuzing
- Automotive Suspension Control
- Automotive Braking Control
- Automotive Crash Testing
- Machine Tool Monitoring
- Industrial Vibration Monitoring
- Computer Peripherals
- Modal Analysis

### Standard Ranges

± 2g
± 5g
± 10g
± 20g
± 50g
± 100g
± 200g
± 500g

### Description

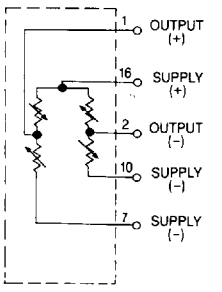
The Model 3031 is a solid-state, piezoresistive accelerometer and is packaged in a surface mount configuration. It is intended for high volume applications where small size, light weight and low cost are required.

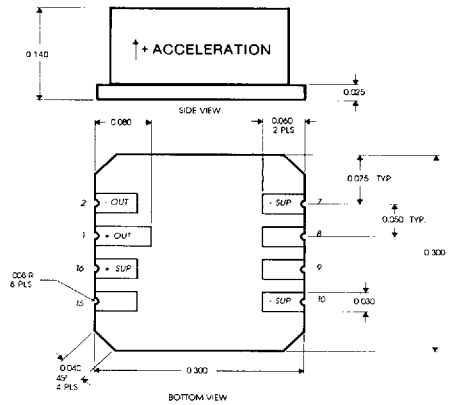
The accelerometer consists of a micromachined silicon mass suspended by multiple beams from a silicon frame. Piezoresistors located in the beams change their resistance as the motion of the suspended mass changes the strain in the beams. Silicon caps on the top and the bottom of the device are added to provide over range stops and unusually high shock resistance and durability. As a result of this unique three-layer silicon structure, these accelerometers also have a very low profile and low mass and are batch fabricated at a very low cost. An added result of this structure is built-in damping, which allows a wider useable bandwidth to be achieved.

The devices are available in standard acceleration ranges from ± 2g to ± 500g. Device performance characteristics and packaging can be easily tailored on a special order basis to meet the requirements of specific applications.

### Connections/Dimensions

ACCELEROMETER EQUIVALENT CIRCUIT




ALL DIMENSIONS ARE IN INCHES

# Models 3031 Accelerometer

## Performance Specifications

Supply = 5 Volts & Ambient Temperature = 25° C (Unless otherwise specified)

| PARAMETER | RANGE | | | |
|---|---|---|---|---|
| | ±2g | ±5g | ±10g | ±20g |
| Frequency Response (MIN) (See Note 10) | 0-350 Hz | 0-400 Hz | 0-500 Hz | 0-600 Hz |
| Mounted Resonant Frequency (MIN) | 1500 Hz | 1500 Hz | 1500 Hz | 1500 Hz |
| Sensitivity (mV/g) (MIN/MAX) | 1.75/3.0 | 1.50/3.0 | 1.35/3.0 | 1.25/3.0 |

| PARAMETER | RANGE | | | |
|---|---|---|---|---|
| | ±50g | ±100g | ±200g | ±500g |
| Frequency Response (MIN) (See Note 10) | 0-1000 Hz | 0-1500 Hz | 0-2000 Hz | 0-2400 Hz |
| Mounted Resonant Frequency (MIN) | 2000 Hz | 3000 Hz | 4000 Hz | 5000 Hz |
| Sensitivity (mV/g) (MIN/MAX) | 0.60/1.5 | 0.30/0.6 | 0.15/0.3 | 0.06/0.15 |

| PARAMETER | ALL RANGES | | | | |
|---|---|---|---|---|---|
| | MIN | TYP | MAX | UNITS | NOTES |
| Zero Acceleration Output | | 5 | 25 | ±mV | |
| Damping Ratio | 0.4 | 0.7 | 0.9 | | 3 |
| Linearity | | 0.2 | 1 | ±%Span | 4 |
| Transverse Sensitivity | | 1 | 3 | ±%Span | |
| Input & Output Resistance | 2.5 | 3.5 | 6.5 | kΩ | |
| Temperature Coefficient - Span | | 1.0 | | ±%Span | 2,5 |
| Temperature Coefficient - Zero | | 1.0 | | ±%Span | 2,5 |
| Supply Voltage | | 5.0 | 10.0 | VDC | |
| Output Noise | | 1.0 | | μVp-p | 11 |
| Output Load Resistance | 2 | | | MΩ | 6 |
| Acceleration Limits (Any Direction) | | 20X | | Rated | 7 |
| Operating Temperature | -40° C to +125° C | | | | |
| Storage Temperature | -55° C to +150° C | | | | |
| Weight | 0.3 Grams | | | | |

## Notes

1. Output voltage increases for positive acceleration; output voltage decreases for negative acceleration.
2. Percentage values are with external compensation.
3. Damping factor is controlled to within ±10% over operating temperature range. Alternate damping ratios are available on a special order basis.
4. Best Fit Straight Line linearity.
5. Temperature range: 0-50° C in reference to 25° C.
6. Prevents increase of TC-Span and sensitivity decrease due to output loading.
7. 400g for ±2g, ±5g, and ±10g versions. 20x or 2000g for other versions, whichever is less.
8. Solder on pads is 63% Tin, 37% Lead. Maximum allowable temperature during mounting is 220° C for 1 minute. Contact factory if a higher mounting temperature will be used.
9. The standard package is ideally suited for mounting to ceramic substrates. In addition, mounting to printed circuit boards is possible under certain conditions. Contact factory for additional information.
10. The useful frequency range is defined as the range of frequencies over which the device sensitivity is within ±5% of the DC value.
11. 10 Hz to 1 kHz

## Ordering Information

3031 - 100

- 100 — Acceleration Range
- 3031 — Model

## Represented By



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