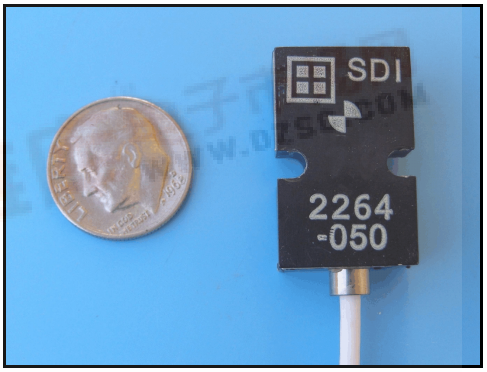
SILICON DESIGNS, INC

P-Cap™ Model 2264
ANALOG ACCELEROMETER MODULE

- Accurate, Easy-to-Use Alternative to Piezoresistive Accelerometers
- Sensitivity Insensitive to Variations in Excitation Voltage, Temperature and Cable Resistance
- Frequency Response Insensitive to Temperature
- 6 to 22V Excitation (dual or single supply)
- Differential Output Signal / EMI Resistant
- Capacitive Micromachined
- Nitrogen Damped to 0.7 (nominal)
- Sensitivity Accurate to 2% (typical)
- -40 to +85°C Operation
- Traditional Four Wire Connection
- Responds to DC and AC Accelerations
- Rugged Anodized Aluminum Module & PTFE Cable
- Serialized for Traceability
- Non-Standard g Ranges Available
- Other Output Sensitivities Available



ORDERING INFORMATION

Full Scale Acceleration	Model Number
± 5 g	2264-005
± 10 g	2264-010
± 25 g	2264-025
± 50 g	2264-050
±100 g	2264-100
±200 g	2264-200

DESCRIPTION

The P-Cap™ model 2264 accelerometer is a high performance and wide temperature range accelerometer intended to directly replace piezoresistive units for existing and new applications. It uses a capacitive sensing element and an advanced ASIC to simulate the operation of a piezoresistive bridge. It is tailored for zero to medium frequency instrumentation applications. The anodized aluminum case is epoxy sealed and is easily mounted via two #4 (or M3) screws. Internal regulation is provided to eliminate the effects of excitation voltage variation. Unlike piezoresistive elements, its sensitivity, bias and frequency response are insensitive to temperature changes or thermal gradients. The cable's shield is electrically connected to the case while the ground (GND) wire is isolated from the case. An optional initial calibration sheet (2264-CAL) and periodic calibration checking are also available.

OPERATION

The P-Cap™ model 2264 can be operated from supply voltages ranging from ±3 to ±11 VDC. It produces two analog voltage outputs which vary with acceleration as shown in the graph on the next page. The sensitive axis is perpendicular to the bottom of the package, with positive acceleration resulting from a force pushing on the bottom of the package. The signal outputs are fully differential about a common mode voltage that is midway between the two supply voltages which is 0 volts when equal plus and minus supplies are used. The output sensitivity or scale factor is independent of changes in the excitation voltage. At zero acceleration, the output differential voltage is nominally 0 volts DC; at ±full scale acceleration the output differential voltage is ±0.5 volts DC respectively. Single supply operation is also possible by connecting **-Exc** to ground and **+Exc** to +6 to +22 VDC but the average value of the **+OUT** and **-OUT** signals will be at ½ the supply voltage and each output will swing from ±0.25 volts around the ½ supply voltage level. Standard cable length is 1 meter.

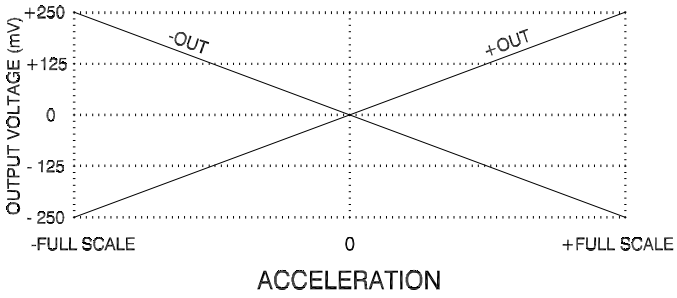
APPLICATIONS

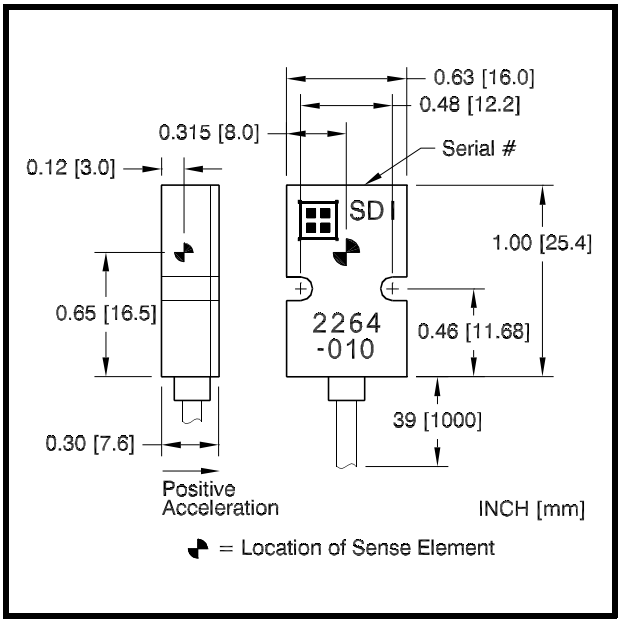
- CRASH TESTING
- VIBRATION MONITORING
- VIBRATION ANALYSIS
- MACHINE CONTROL
- MODAL ANALYSIS
- ROBOTICS
- FLIGHT TESTING
- MACHINERY INSTRUMENTATION

SIGNAL DESCRIPTIONS *(28 gauge wires + shield)*

Power: +Exc (Red) and -Exc (Black): +Exc (+3 to +11 VDC) and -Exc (-3 to -11 VDC).

+Out (Green) and -Out (White): +Out minus -Out voltage is proportional to acceleration; +Out voltage increases and -Out decreases with positive acceleration. At zero acceleration both outputs are nominally equal to mid-way between the +Exc and the -Exc values. The device experiences positive (+1g) acceleration with its lid (part number) facing up in the Earth's gravitational field. Either output can be used individually or the two outputs can be used differentially. (See output response plot below)





PERFORMANCE - By Model: +Exc=+5, -Exc=-5VDC, T_C=25°C							
MODEL NUMBER	**2264-005**	**2264-010**	**2264-025**	**2264-050**	**2264-100**	**2264-200**	**UNITS**
Input Range	±5	±10	±25	±50	±100	+/-200	g
Frequency Response (Nominal, -3 dB)	0 - 600	0 - 1000	0 - 1500	0 - 2000	0 - 2500	0 - 3000	Hz
Sensitivity, Differential	100	50	20	10	5	2.5	mV/g
Output Noise, Differential (RMS, typical)	9	10	25	50	100	200	µg/(root Hz)
Max. Mechanical Shock (0.1 ms)	2000						g

PERFORMANCE - All Models: Unless otherwise specified, +Exc=+5, -Exc=-5VDC, T_C=25°C, Differential Mode.					
PARAMETER		**MIN**	**TYP**	**MAX**	**UNITS**
Cross Axis Sensitivity			2	3	%
Bias Calibration Error				5	% of span
Bias Temperature Shift (T_C= -40 to +80°C)			50	200	(ppm of span)/°C
Sensitivity Calibration Error [2]			2	5	%
Sensitivity Temperature Shift (T_C= -40 to +80°C)		-250	0	+250	ppm/°C
Non-Linearity (-90 to +90% of Full Scale) [1, 2]	-005 thru -050		0.15	0.5	% of span
	-100		0.25	1.0	
	-200		0.40	1.5	
Sensitivity Change with Excitation Voltage (6-22 volts)			0.1	0.3	%
Small Signal Differential Output Impedance			1225		Ω
Output Common Mode Voltage		-0.25	0	+0.25	VDC
Operating Voltage (+Exc/-Exc) [3]		±3	±5	±11	VDC
Operating Current (+Out and -Out open)			10	13	mA DC
Change in Operating Current to Excitation Voltage			0.25		mA/volt
Shunt Calibration Sensitivity		600	612	624	µV/µA
Mass (not including cable)			6		grams
Cable Mass			14		grams/meter

Note 1: 100g versions and above are tested from -65g to +65g.
Note 2: Tighter tolerances available upon request.
Note 3: Voltage between +Exc and -Exc must not exceed 24V.