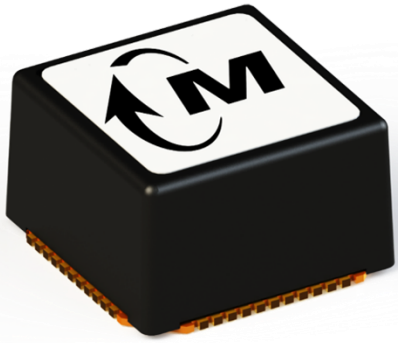
MEMSENSE

Customer Focused Inertial Solutions

SMD IMU



Product Specification & User Guide

Document Number: DOC00254

Document Revision: T

MEMSENSE.COM

888.668.8743

TABLE OF CONTENTS

1.0 OVERVIEW

The SMD is a robust inertial sensor providing analog outputs of triaxial acceleration and triaxial angular rate. The packaging employed encapsulates the gyroscopes and accelerometers making the sensor extremely robust. Configured versions of the SMD can be ordered with mixed gyro dynamic ranges enabling a perfect fit for specific applications. The SMD is provided in a surface mount package measuring 0.7 in. x 0.7 in. x 0.4 in.

2.0 SPECIFICATIONS

Table 1 - Specifications

ACCELERATION				*UNITS*	*NOTES*
Dynamic Range	**± 2**	**± 5**	**± 10**	g	Minimum
Bias Instability	33	75	163	µ*g*	Typical
Zero g Output	2.5	2.5	2.5	V	Typical
Nonlinearity	± 0.4	± 0.4	± 0.4	% of FS	Typical
Velocity Random Walk	0.030	0.080	0.140	m/s/h $^{-1/2}$	Typical
Noise Density	81	207	363	µ*g*/Hz$^{-1/2}$	Typical
Scale Factor	1000	400	200	mV/*g*	Typical
Bandwidth [1]	50	50	50	Hz	-3dB point

ANGULAR RATE				*UNITS*	*NOTES*
Dynamic Range	**± 150**	**± 300**	**± 1200**	°/s	Minimum
Bias Instability	20	20	20	°/h	Typical
Zero Rate	2.5	2.5	2.5	V	Typical
Nonlinearity	± 0.1	± 0.1	± 0.1	% of FS	Typical
Angle Random Walk	2.0	2.0	2.0	°/h $^{-1/2}$	Typical
Noise Density	0.04	0.05	0.05	°/s /Hz$^{-1/2}$	Typical
Scale Factor	12.5	5.0	1.25	mV/°/s	Typical
Bandwidth [1]	50	50	50	Hz	-3dB point

TEMPERATURE		UNITS	NOTES
Voltage at 25 °C	2.5	V	
Scale Factor	9.0	mV/°C	

PHYSICAL		UNITS	NOTES
Dimensions	0.720 x 0.720 x 0.417	in.	(L x W x H)
Mass	5	grams	

OPERATIONAL REQUIREMENTS		UNITS	NOTES
Supply Voltage	4.75 to 5.25	VDC	Regulated
Supply Current	21	mA	

ABSOLUTE MAXIMUM RATINGS		UNITS	NOTES
Acceleration Powered	2000	*g*	0.5 ms any axis
Supply Voltage	-0.3 (min) to +6.0 (max)	VDC	
“C” Temperature Range	0 to 70	°C	
“M” Temperature Range	-40 to 85	°C	
Storage Temperature	-65 to +150	°C	

1) Other bandwidth configurations are available upon request.
2) Other configurations are available on a special order basis. Contact sales for more information.
3) Custom correction temperature profiles are available. Contact sales for more information.
4) Typical Values at 25°C, Supply Voltage = 5.0 VDC, 0 °/s, unless otherwise noted.

3.0 MECHANICAL

3.1 Dimensions

The SMD is available in a custom surface mount package measuring 0.720 in. length × 0.720 in. width × 0.417 in. height. Castellated pads are located on the 4 sides of the device. See the SMD installation procedure for details on mounting the device. Hand soldering attachment is required.

DO NOT REFLOW
HAND SOLDER ONLY

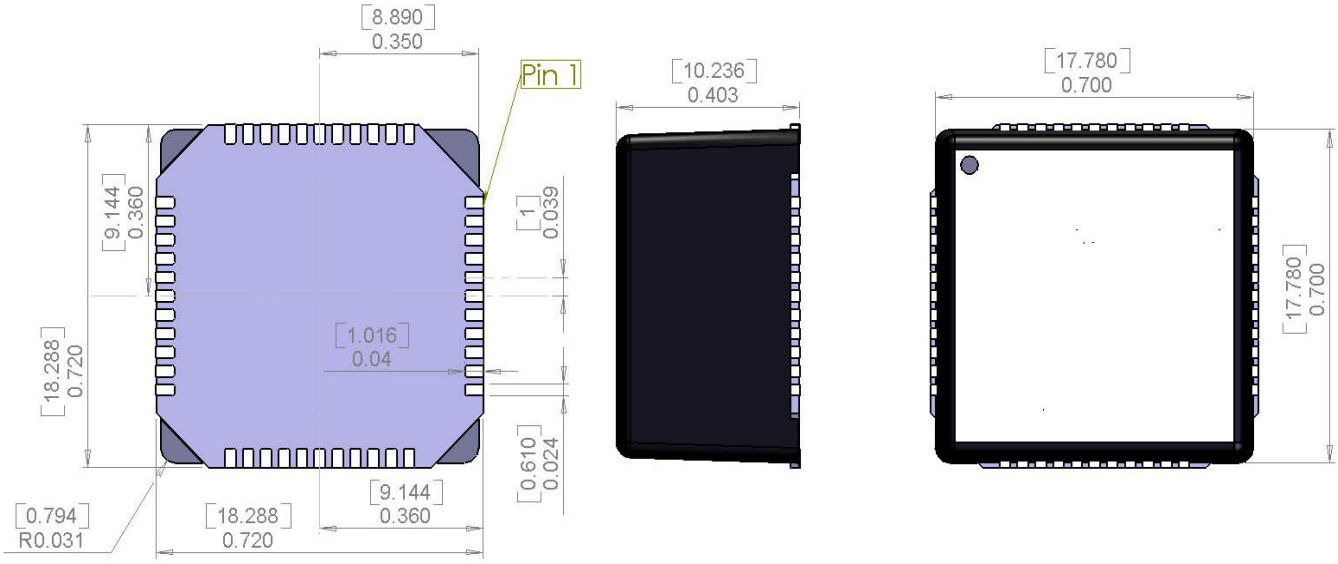


Figure 1 - Physical Dimensions

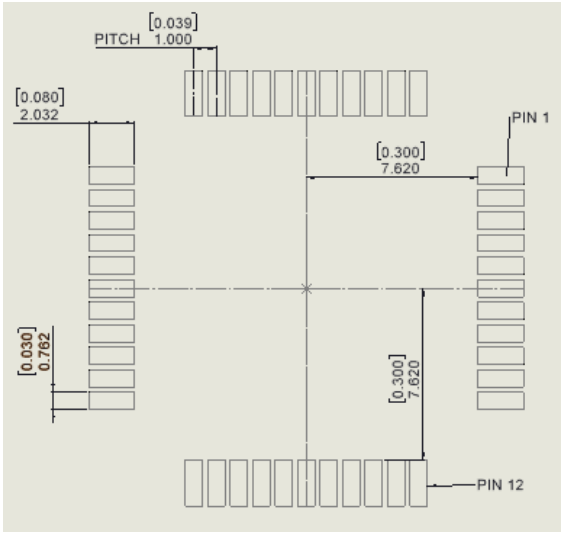


Figure 2 – Recommended Land Pattern

4.0 SIGNAL DESCRIPTIONS

Table 2 – SMD Signal Descriptions

Pin	Name	Description
1	XREF	X axis analog precision reference output. [3]
2	XRATE	X axis analog rate signal output.
3	ZREF	Z axis analog precision reference output. [3]
4	ZRATE	Z axis analog rate signal output.
5	TEMPZ	Analog temperature voltage output, Z gyro.
6	AGND	Analog power supply return.
7	TEMPX	Analog temperature voltage output, X gyro.
8	TEMPY	Analog temperature voltage output, Y gyro.
9-35		No electrical connection required (open) [1]
36	AGND	Analog power supply return.
37	VDDA	Analog power supply.
38	TESTN	High-level activated digital input stimulating X, Y and Z rate to Ref – 1.9 V.[2]
39	TESTP	High-level activated digital input stimulating X, Y and Z rate to Ref +1.9 V.[2]
40	YACCEL	Y axis analog acceleration signal output.
41	ZACCEL	Z axis analog acceleration signal output.
42	XACCEL	X axis analog acceleration signal output.
43	YREF	Y axis analog precision reference output. [3]
44	YRATE	Y axis analog rate signal output.

1. Physical solder connection recommended.
2. The 300°/s and 1200°/s rate sensor will produce a 417 mV and 104.25 mV output change respectively.
3. **Do NOT ground 2.5V Precision Reference Outputs, Damage to the device may occur (Recommend floating, or the use of a 20k resistor or higher).**

4.1 Coordinate System

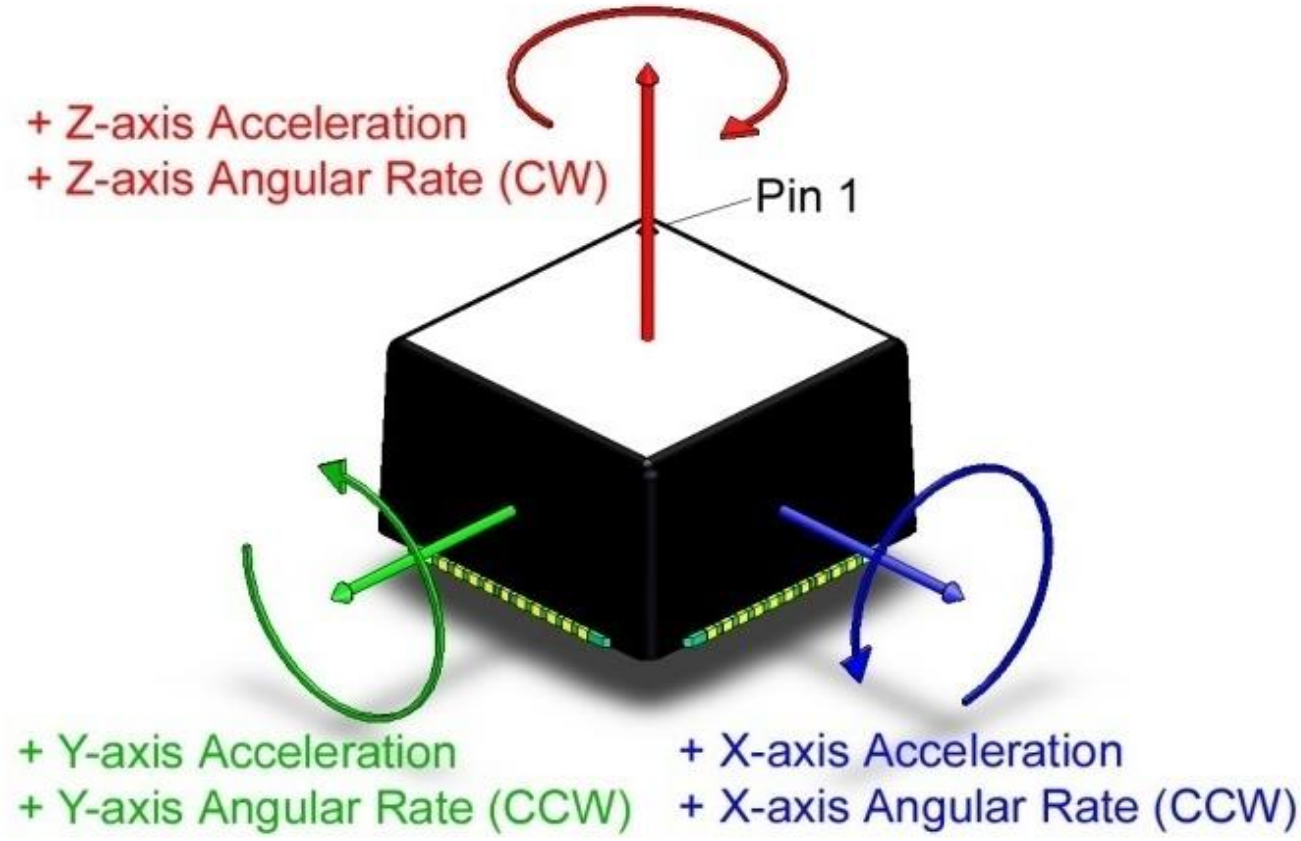


Figure 3 – SMD coordinate system

5.0 OPTIONS

5.1 Part Numbers

Table 3 - Standard Part Number

Part Number	Acceleration (g)	Angular Rate (°/s)	Bandwidth (Hz.)
SMD05-0300S050	±5	±300	50

1.) Temperature Range of 0°C to 70°C append a "C" to the Part Number
2.) Temperature Range of -40°C to 85°C append an "M" to the Part Number
3.) Custom bandwidth and mixed dynamic ranges can be ordered contact sales for more information.