

TriRate Triaxial MEMS Gyroscope

Revision D

± 150 , ± 300 or ± 1200 °/s

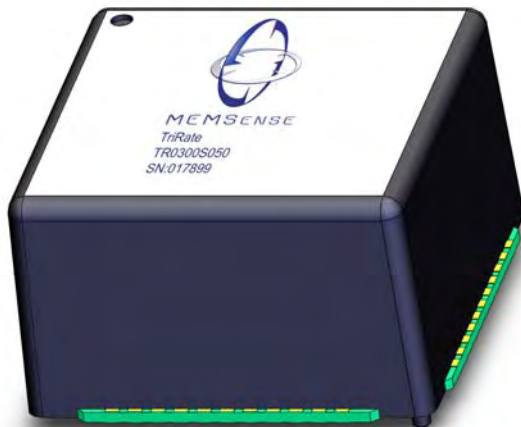
FUNCTIONAL DESCRIPTION

The TriRate is a complete triaxial angular rate sensor based on a surface-micromachining technology capable of sensing angular motion about three orthogonal axes. The TriRate provides analog outputs for angular rate and precision references about the X, Y, and Z-axes. A temperature output is also provided allowing the implementation of compensation techniques. Two digital self-test inputs electromechanically excite each axis to test proper operation of both sensors and the signal conditioning circuits.

The TriRate is available in a custom SMT package measuring 0.70 in x 0.70in x 0.40 in.

APPLICATIONS

- Antenna Stabilization
- Automotive Control
- Inertial Measurement Units
- Orientation Sensing
- 3D Simulators
- Industrial Automation
- Gaming Devices
- Industrial Automation



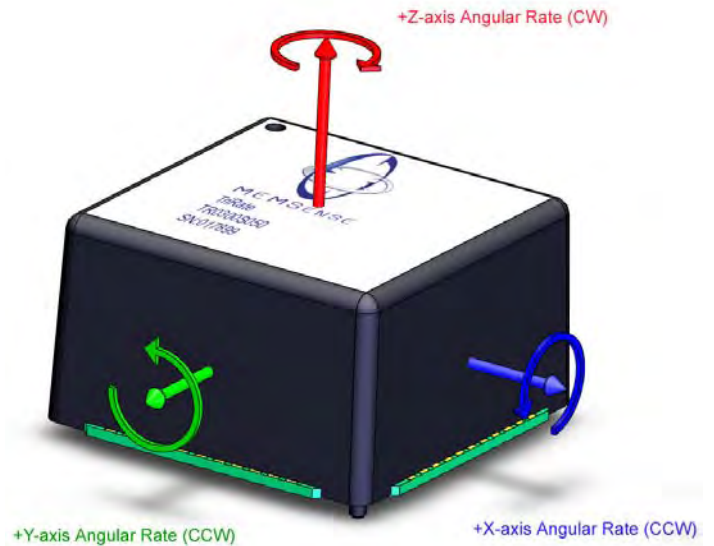
FEATURES

- Triaxial Angular Rate Sensor
- Solid State MEMS Reliability
- Low Noise
- Low Power
- SMT Miniature Package
- 2000g Powered Shock Operation
- 5 V Single Supply Operation

ORDERING INFORMATION

Part	Rate (°/s)
TR0150S050	± 150
TR0300S050	± 300
TR1200S050	± 1200

ORIENTATION DIAGRAM



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Table 1 – Specifications

Parameter	Specification			Units	Conditions
Sensor					
Operating Voltage Range	4.75 to 5.25			V	Typical, (Maximum) Maximum
Supply Current	18, (24)			mA	
Mass	5			Grams	
Commercial Temperature Range					
	0 to +70			°C	Temperature for max and min specs.
Military Temperature Range					
	-40 to +85			°C	Temperature for max and min specs.
Rate Output					
	0150S050	0300S050	1200S050		
Dynamic Range	±150	± 300	±1200	°/s	Full scale range over specified temperature
Sensitivity	12.5	5.0	1.25	mV/°/s	Best fit straight line
Nonlinearity	0.1	0.1	0.1	% of FS	
Zero Rate	2.50	2.50	2.50	V	
Turn On Time	35	35	35	ms	Power on to ± ½ °/s of Final
Rate Noise Density	0.05	0.1	0.1	°/s/Hz ^½	Factory set 3dB point
Bandwidth ¹	50	50	50	Hz	
Cross Axis Sensitivity	1	1	1	%	
Rate Reference Output					
Voltage Value	2.5			V	4.75 Vs to 5.25 Vs Deviation from 25°C
Power Supply Rejection	60			db	
Temperature Drift	5.0			mV	
Temperature Output					
Voltage at 25 °C	2.50			V	
Scale Factor	8.4			mV/°C	
Absolute Maximum Ratings					
Acceleration Powered	2000 max			g	Any axis 0.5ms Minimum, Maximum
Vdd	-0.3, +6.0			V	
Operating Temperature	-40 to +85			°C	
Storage Temperature	-65 to +150			°C	
Typical Values at 25 °C, Vdd = 5.0V, 0 °/s unless otherwise noted					

1. Other rate bandwidth configurations are available upon request.

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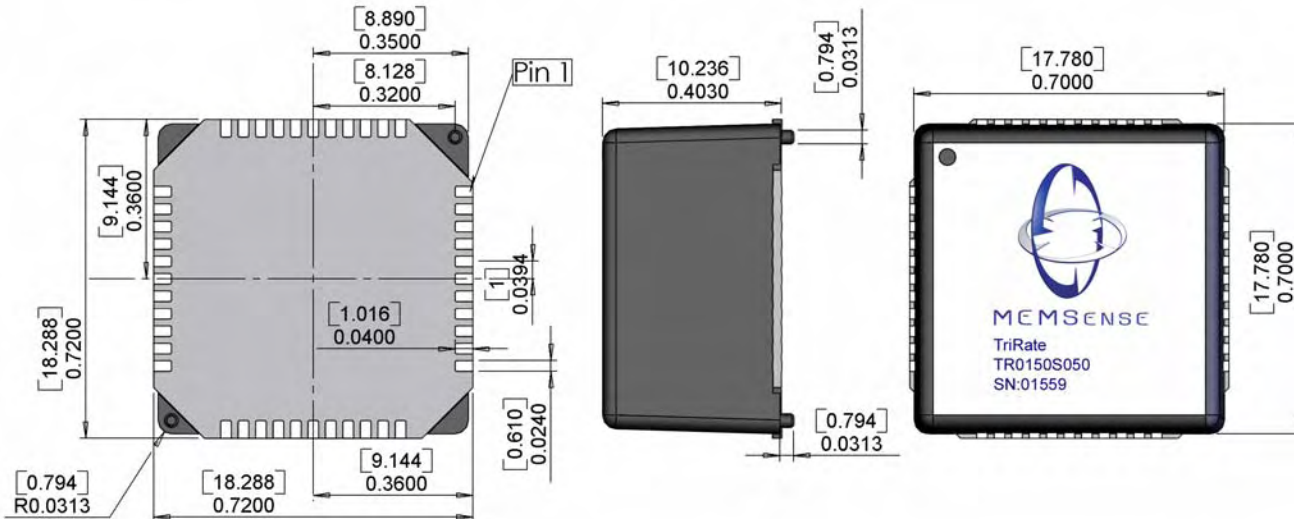
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Table 2 - Pin Function Descriptions

Pin No.	Name	Function
1	XREF	X axis analog precision reference output.
2	XRATE	X axis analog rate signal output.
3	ZREF	Z axis analog precision reference output.
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 connect (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 – 660mV. ²
39	TESTP	High-level activated digital input stimulating X, Y and Z rate to Ref +660mV. ²
40 - 42		No connect (open) ¹
43	YREF	Y axis analog precision reference output.
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 270 mV and 67.5 mV output change respectively.

Figure 1 – TriRate Physical Dimensions



All dimensions in [mm] inches - Hand solder attachment recommended