

TITLE PRODUCT SPECIFICATION FOR SINGLE AXIS SILICON VIBRATING STRUCTURE GYRO	DOC. NUMBER CRS04-01-PS	REV. A
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NOTICE

NOTICE: This Product Specification defines product performance under the declared conditions only. This Specification does not constitute any form of warranty as to the suitability or fitness of the Product for any particular purpose.

Applications that require extra reliability and quality possibly affecting the safety of living things (e.g. transport, combustion, security, etc.) or any applications, which are thought to be beyond the focus of the product, should be consulted with SSS first.

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WARNING**Limitations**

The product to which this specification refers is currently in development and is subject to change in design and performance. Some changes to performance parameters may occur as a result of ageing processes.

The following limitations must be applied to avoid damage.

Electrical

Absolute maximum voltage +V = 6.0 V

The unit has no protection against reverse polarity connection of the power supply.

The positive rail is protected against transients of up to +6V.

Mechanical

Do not drop from more than 300mm onto a hard surface.

Environmental

-25 degC to +85 degC operation.

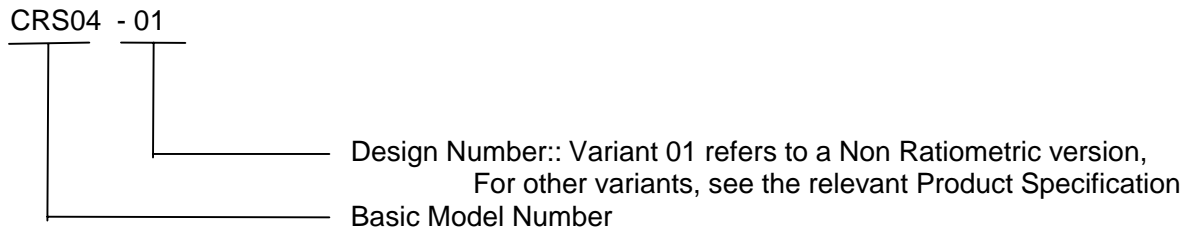
1. DESCRIPTION

The silicon vibrating structure gyroscope (Si-VSG) is a solid state single axis rate sensor. It is a stand alone unit with dc supplies and dc output proportional to the rate of rotation.

The gyro is configured so that rate applied in a counter-clockwise direction, perpendicular to the plane of the pcb and viewed on the sensor head side, will cause the dc output to increase more positively.

The gyro is operated with a unipolar power supply.

2. MODEL NUMBER



3. MECHANICAL DESCRIPTION

3.1 EXTERNAL DIMENSIONS

The dimensions of the gyro unit including the electronics for signal processing are:

Height (Sensor Head)	: Nominal 8.45mm (0.333 inch)	Maximum 9.00mm (0.354 inch)
Length (Excluding Header)	: Nominal 30.0mm (1.18 inch)	Maximum 30.2mm (1.189 inch)
Width	: Nominal 30.0mm (1.18inch)	Maximum 30.2mm (1.189 inch)

Note: Dimensions in inches are for reference only.
An installation drawing is given in Figure 1.

3.2 MASS

The sensor, including its electronics, has a total mass of 11g typical (12g max).
The centre of mass is within +/-1cm in all axis.

4. POWER SUPPLY REQUIREMENTS

Operating voltage	+4.85 to +5.15V
Noise and Ripple	DC to 100Hz :<15mV rms
Operating current	< 35 mA (Typ), 40mA Max.

The unit has no protection against reverse polarity connection of the power supply and the positive rail is protected against transients of up to +6V.

A connection scheme is given in Figure 2.

5. PERFORMANCE

Rate Range	+/- 150 deg/s.
Output Type	Analogue voltage Non Ratiometric Output impedance : 100 ohms typ.
Output current	0.5mA (Min.)
Sensor resonance	No resonant modes below 4.5KHz
Scale Factor (Non ratiometric)	12.75 mV/deg/s
Setting tolerance (ambient)	+/-4% of nominal
Variation with temperature	+/-3% of ambient value -25 degC to +85 degC
Non Linearity	<+/-0.6% of full scale. Non Linearity is the maximum deviation from the best straight line (least squares fit).
Bias (Zero Offset)	
Non Ratiometric version: Bias setting tolerance (ambient)	2.4 to 2.6 Volts
Bias change over temp. range	+/- 10 deg/s -25 degC to +85 degC
Bias drift vs. time	<+/- 0.55 deg/s in 1 sec to 31 sec or any 30sec period
Bias sensitivity to static linear acceleration	<+/- 0.1 deg/s/g on any axis
Total bias variation (All above errors)	<+/- 18 deg/s
Cross axis sensitivity	
Sensitivity to cross axis rotation	Less than 5% of cross axis rotation rate. Relative to mounting datum, all axis
Cross axis sensitivity change	Less than 0.3%
Noise under quiescent conditions	0.75 deg/s (rms) (1 to 101 Hz)
Maximum Noise under quiescent conditions	1.00 deg/s (rms) (1 to 101Hz)
Ready time, from application of power	0.6 seconds

6. FREQUENCY RESPONSE

Phase at 10 Hz	<=15 degree (Lagging)
Gain peaking	<+3 dB

7. INTERCONNECTIONS

7.1 PIN DEFINITION

The interconnections are defined below :

Pin Number	Function
1	+VDC
2	Rate Output
3	Commanded BIT input
4	BITE output
5	Ground

7.2 CBIT operation

The CBIT input is a CMOS compatible signal, which when connected to Vcc, causes the rate sensor output to change by approximately 25 degrees per second. This facility is provided to monitor the overall operation of the closed loop sensor, and is NOT to be used for calibration of the rate loop. When asserted, CBIT will cause temporary rate signal loss, for a period of up to 50ms. Similarly, when deasserted, there will be a 50ms loss of rate information. If unused, this pin should be tied to 0V.

7.3 BITE operation

The BITE output is a signal which is asserted if any of a number of internal loop parameters exceeds a preset threshold. Like, CBIT, it confirms the basic operation of the loop. Unlike CBIT, it is available at all times, and does not affect loop operation.

8. ENVIRONMENTAL CONDITIONS

The gyro performance specifications of Section 5 are not degraded unless otherwise stated when subjected to the following environment.

8.1 CLIMATIC ENVIRONMENT

Operating Temperature	-25 degC to +85 degC (Full Performance Specification) The sensor can operate over the range of -40 degC to +85 degC, but the performance will be limited and not guaranteed.
Storage Temperature	-40 degC to +85 degC
Operating Temperature Change Rate	Less than +/-3 degC /min
Operating Barometric Pressure	8.5 to 14.9 psi
Storage Barometric Pressure	1.6 to 14.9 psi
Humidity	5 to 95 %RH Non-condensing. The sensor is conformally coated as protection against light dewing only. This product is not intended for constant moist environments.

8.2 MECHANICAL ENVIRONMENT

Operating / Storage Shock	200g's 1ms half sine Approximation
Operating / Storage Vibration	2 g rms 20Hz to 2kHz (Random)

8.3 EMI

2V/m 26MHz to 1GHz

9. LIFE

9.1 OPERATING

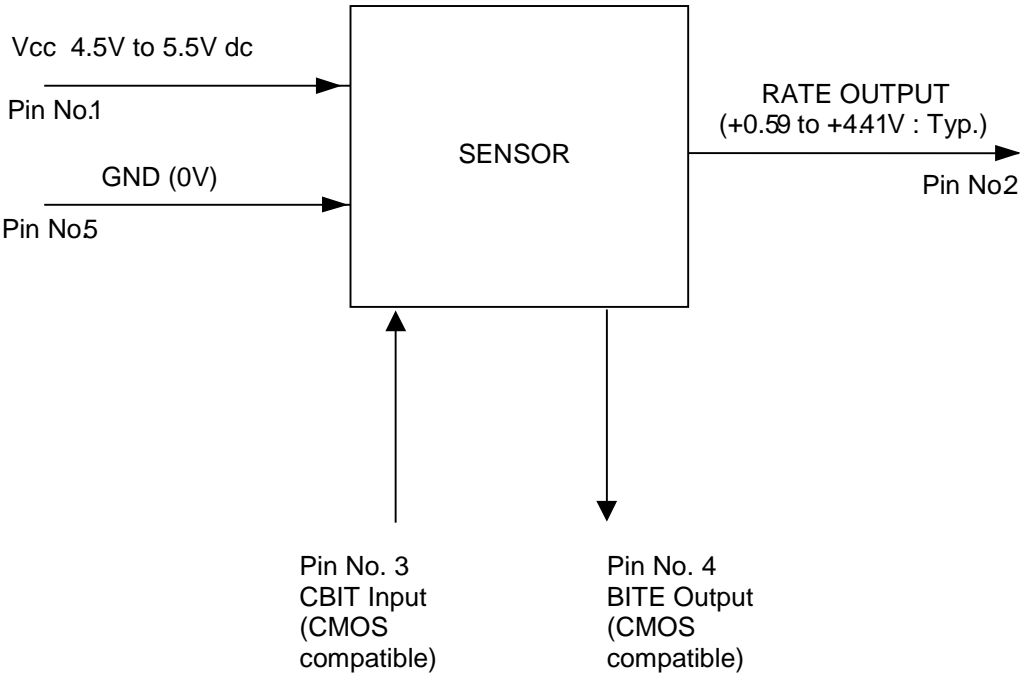
The gyro will have a MTBF of 100,000 hours, under the operation at 35 degC in normal environment.

9.2 STORAGE

The storage life of the gyro is greater than 10 years.

10. MAINTENANCE

The gyro is designed to have a long operating and storage life without requiring maintenance.



**FIGURE 2
CONNECTION SCHEME**