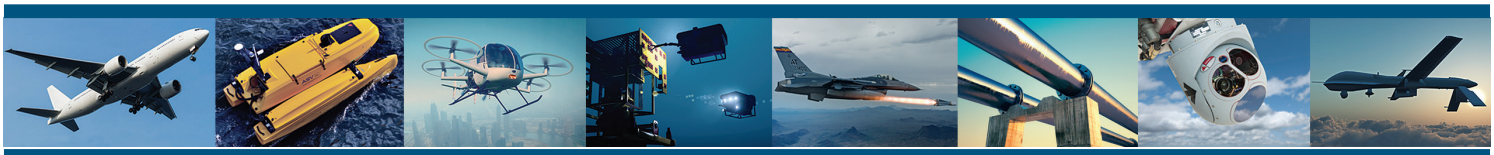
QRS116

Quartz MEMS Angular Rate Sensor

emcore®



DATASHEET | NOVEMBER 2022

Transforming Navigation

Applications

- Stabilization
- Flight Control
- Ground & Marine Vehicle Control
- Guidance
- Navigation
- Instrumentation

Key Performance Features

- DC Input/High Level DC Output
- Extremely Low Noise
- Outstanding Bias Stability
- Internal Electronics
- High MTBF
- Fast Start-Up
- Unprecedented Low Angle Random Walk

Ideal for High-Precision Military Applications

The QRS116 meets state-of-the-art systems requirements for very high accuracy, very low noise angular rate sensing. The QRS116 is a form, fit and function-enhanced alternative to the popular, highly-reliable QRS11. Using a next generation version of EMCORE's unique quartz micro-machined sensing element, the QRS116 delivers excellent bias stability, signal to noise ratio and vibration performance characteristics in a small, lightweight package.

SYSTRON DONNER QUARTZ MEMS

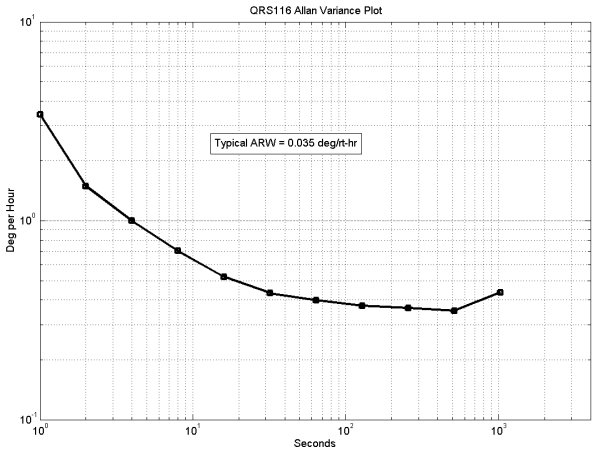
With no moving parts and no scheduled maintenance, the QRS116 provides reliable service and low total cost of ownership.

Performance Highlights

Parameter	QRS116-0100-200
Standard Range Full Scale**	± 100°/sec
Full Scale Output	± 2.5 Vdc
Scale Factor Calibration (at 22°C)	≤ 1% of value
Scale Factor over Temperature (Dev. from 22°C)	≤ 0.03%/°C
Bias Variation with Temperature (Modeled with 3rd order polynomial 1σ)	36 deg/hr
Short Term Bias Stability - Note 6 (1 sigma)	3 deg/hr
Bandwidth (-90° Phase Shift)	> 60 Hz

** Other rate ranges available, consult factory

QRS116 Allan Variance Plot



NON ITAR

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Transforming Navigation

Performance Specifications

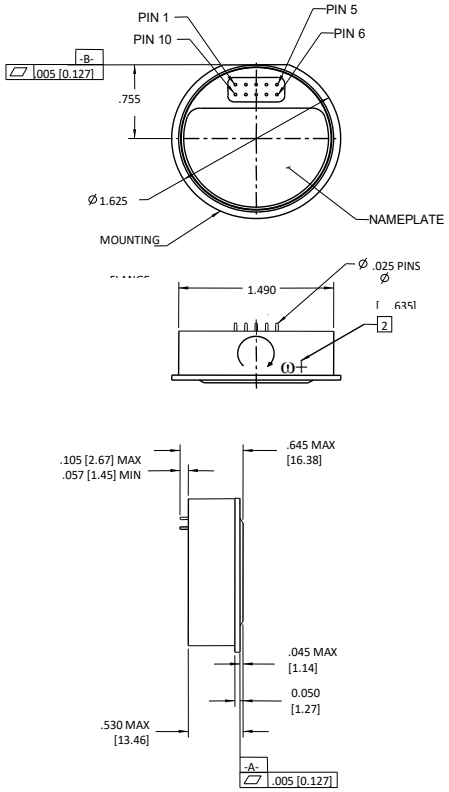
Parameter	QRS116-0100-200
Power Requirements	
Input Voltage	+ and – 5 Vdc ± 5 % regulation
Input Current	< 20 mA (each supply)
Performance	
Standard Range Full Scale**	± 100°/sec
Full Scale Output	± 2.5 Vdc
Scale Factor Calibration (at 22°C)	≤ 1% of value
Scale Factor over Temperature (Dev. from 22°C)	≤ 0.03%/°C
Bias Variation with Temperature (Modeled with 3rd order polynomial 1σ)	36 deg/hr
Short Term Bias Stability - Note 6 (1 sigma)	3 deg/hr
G Sensitivity	< 0.02°/sec/g
Start-Up Time	< 1.5 sec.
Bandwidth (-90° Phase Shift)	> 60 Hz
Non-Linearity (% Full Range)	< 0.05%
Threshold/Resolution	< 0.004°/sec
Output Noise (DC to 100Hz)	≤ 0.002 °/sec./ √Hz
Environments	
Operating Temperature	-55°C to +85°C
Storage Temperature	-55°C to +100°C
Vibration Operating***	10 grms 20 Hz to 2 kHz Random - flat spectrum
Vibration Survival	20 grms 20 Hz to 2 kHz random
Shock	1,000g, any axis
Weight	≤ 60 grams
Temperature Sensor	
Temp. Sensor (Offset @ +22°C)	0 ± 0.5 Vdc @ 22°C
Scale Factor	0.007 to 0.012 V/°C

* Performance levels indicated are "Typical" unless otherwise noted

** Other rate ranges available, consult factory

*** Consult factory for other vibration level requirements, and see user's guide for more information regarding vibration tolerance and sensitivity

Dimensions/Scale



QRS116 INPUTS/OUTPUTS

Self Test Input (see Note 4)	Internal Temperature Sensor
+Vdc Input	Rate Output
Power Ground	Signal Ground
BIT Output (see Note 5)	-Vdc Input

Notes

1. QRS116 is supplied with two mounting rings, mounting screws & mating test connector.
2. Angular rate applied as shown will produce a more positive output (not marked on unit)
3. Unit of measure is inches/[mm]
4. Initiated BIT - Grounding Self Test Input produces a step change of +1.0 to +1.5 VDC @ Rate Output
5. BIT Output > +2.4 Vdc when "ready"
6. Allan Variance 100 second correlation time

For More Information

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MADE IN USA

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