

# QRS116

## MEMS Quartz Angular Rate Sensor

### Ideal for High-Precision Military 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

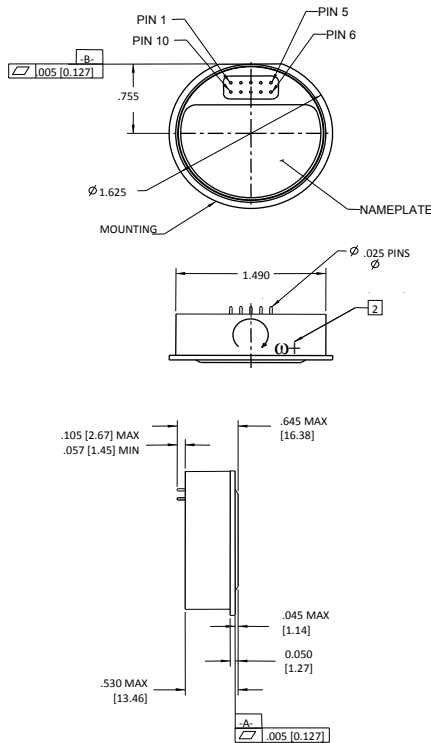


The QRS116 meets state-of-the-art systems requirements for very high accuracy, very low noise angular rate sensing. The QRS116 is a form, fit and function-enhanced alternative to the popular, highly-reliable QRS11. Using a next generation version of EMCORE's unique quartz micro-machined sensing element, the QRS116 delivers excellent bias stability, signal to noise ratio and vibration performance characteristics in a small, lightweight package. With no moving parts and no scheduled maintenance, the QRS116 provides reliable service and low total cost of ownership.

[www.emcore.com/nav](http://www.emcore.com/nav)

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### Notes:

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

\* Performance levels indicated are "Typical" unless otherwise noted

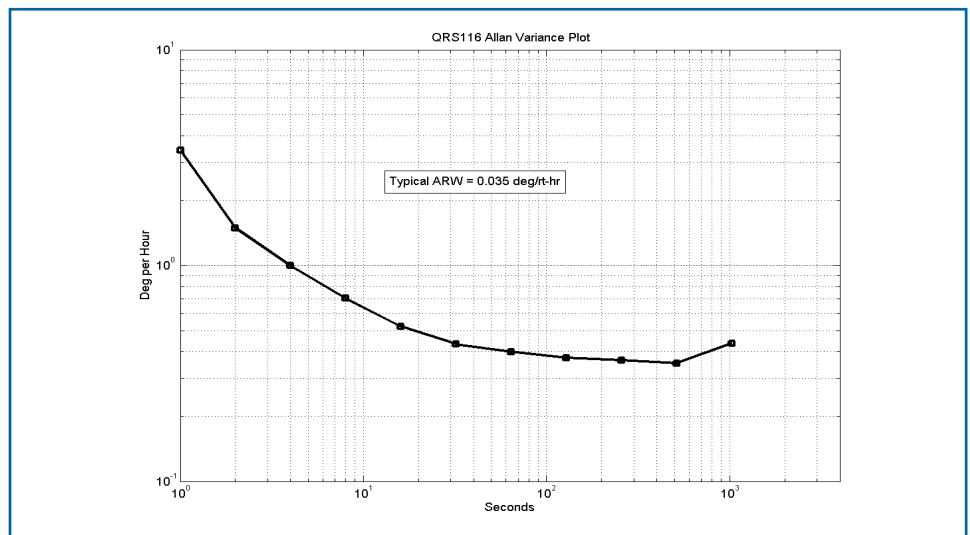
\*\* Other rate ranges available, consult factory

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

### QRS116 INPUTS/OUTPUTS

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

QRS116-0100-200	
<b>Power Requirements</b>	
Input Voltage	+ and - 5 Vdc $\pm$ 5 % regulation
Input Current	< 20 mA (each supply)
<b>Performance</b>	
Standard Range Full Scale**	$\pm$ 100°/sec.
Full Scale Output	$\pm$ 2.5 Vdc
Scale Factor Calibration (at 22°C)	$\leq$ 1% of value
Scale Factor over Temperature (Dev. from 22°C)	$\leq$ 0.03%/°C
Bias Variation with Temperature (Modeled with 3rd order polynomial 1 $\sigma$ )	20 deg/hr.
Short Term Bias Stability - Note 6	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)	$\leq$ 0.002 °/sec./ $\sqrt{\text{Hz}}$
<b>Environments</b>	
Operating Temperature	-55°C to +85°C
Storage Temperature	-55°C to +100°C
Vibration Operating***	10 g <sub>rms</sub> 20 Hz to 2 kHz Random - flat
Vibration Survival	20 g <sub>rms</sub> 20 Hz to 2 kHz random
Shock	1,000g, any axis
Weight	$\leq$ 60 grams
<b>Temperature Sensor</b>	
Temp. Sensor (Offset @ +22°C)	0 $\pm$ 0.5 Vdc @ 22°C
Scale Factor	0.007 to 0.012 V/°C



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