

# BEI GYROCHIP™

## Model AQRS

Micromachined Angular Rate Sensor



### Applications

- Yaw Stability Control
- Vehicle Navigation/Location
- Adaptive Cruise Control
- Rollover Detection
- Incident Recording
- Platform Stabilization
- Instrumentation

### Description

The BEI GyroChip™ Model AQRS is a compact, rugged micromachined vibrating quartz gyroscope, designed specifically for demanding automotive and commercial applications. It operates from +5 Vdc and features a 3-wire interface with ratiometric output signal for greater flexibility. Internal circuitry provides protection for reverse voltage and over voltage conditions, and an end-to-end Built-in-Test (CBIT™) continuously monitors sensor performance for safety-critical applications.

### Features

- Micromachined Sensor
- Rugged, High Reliability
- Continuous Built-in-Test (CBIT™)
- Low Cost
- Ratiometric Output Signal
- Reverse Voltage, Over Voltage Protection
- Wide Bandwidth
- Fast Start-Up

### Operation

The BEI GyroChip™ Model AQRS utilizes a micromachined double-ended quartz tuning fork fabricated from monocrystalline piezoelectric quartz. Applying the Coriolis effect, a rotational motion about the sensor's input axis produces a DC voltage proportional to the rate of rotation. Use of piezoelectric quartz material simplifies the active element, resulting in exceptional stability over temperature and product life.



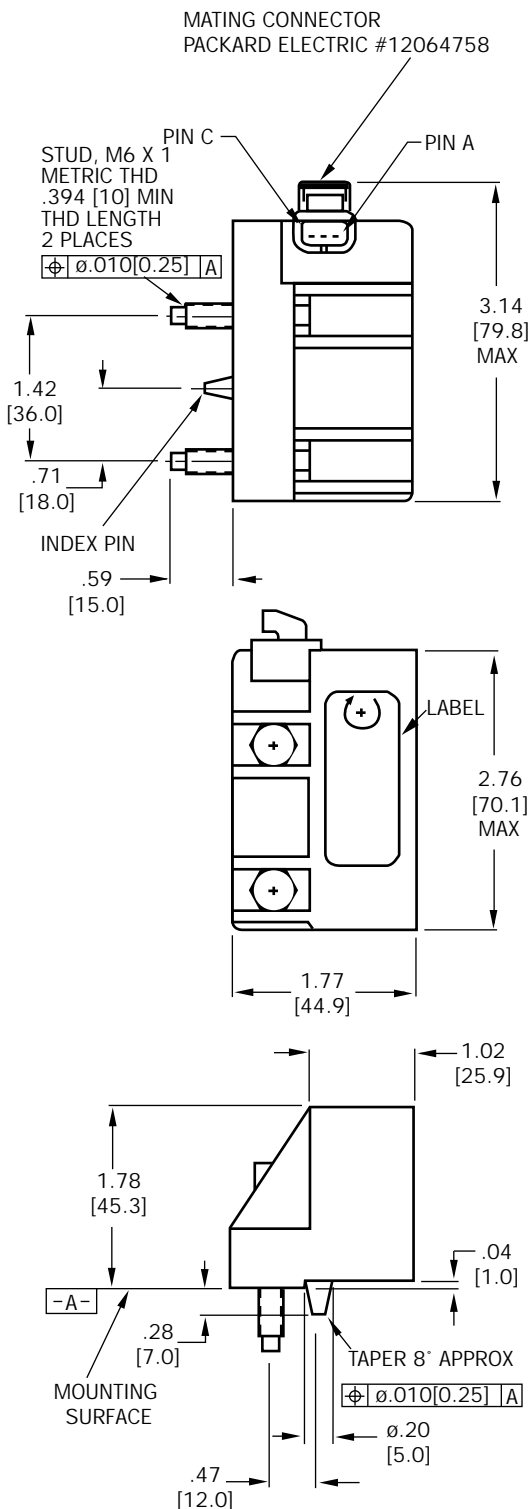
**BEI** SYSTRON DONNER INERTIAL DIVISION  
BEI TECHNOLOGIES, INC.

For applications assistance or more information on any of  
Systron Donner Inertial Division's micromachined inertial sensors,  
Call 1-800-227-1625.

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- NOTES:
1. ANGULAR RATE APPLIED AS SHOWN SHALL PRODUCE A MORE POSITIVE OUTPUT.
  2. UNIT OF MEASURE IN INCHES/[MM].

Connector Pin	Assignment
A	+5 Vdc Input
B	Power/Signal Return
C	Rate Out (1Kohm output impedance)

PARAMETER	SUMMARY SPECIFICATIONS	
Part Number	AQRS-00XXX-104**	AQRS-00XXX-109**
<b>Power Requirements</b>		
Input Voltage	+5 Vdc ±5% Vdc	
Input Current	<20 mA	
<b>Performance</b>		
Standard Ranges	±64, 75°/sec	
Full Range Output (Nominal)	+0.25 to +4.75 Vdc	
Scale Factor Calibration (at 22°C)	±3% (including temp)	±5% (including temp)
Bias Calibration (at 22°C)	+2.50 Vdc Nominal	
Bias Variation over Temperature (Dev. from 22°C)	<4.5°/sec	<7.0°/sec
Short Term Bias Stability (100 sec at const. temp)	≤0.05°/sec	
Long Term Bias Stability (1 year)	≤1.0°/sec	
G Sensitivity	≤0.06°/sec/g	
Start-Up Time	<1.0 sec	
Bandwidth (-90°)	>50 Hz	
Non-Linearity	≤0.05% of F.R.	
Threshold/Resolution	≤0.004°/sec	
Output Noise (DC to 100Hz)	≤0.025°/sec/√Hz	
Operating Life	10 years, typical	
<b>Environments</b>		
Operating Temperature	-40°C to +85°C	
Storage Temperature	-55°C to +100°C	
Vibration Operating	1.5 g <sub>rms</sub> 20 Hz to 2 kHz random	
Vibration Survival	3 g <sub>rms</sub> 20 Hz to 2 kHz random	
Shock	2000 g	
Weight	≤125 grams	

\*\*"XXX" designates ± range.

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BEI TECHNOLOGIES, INC.

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