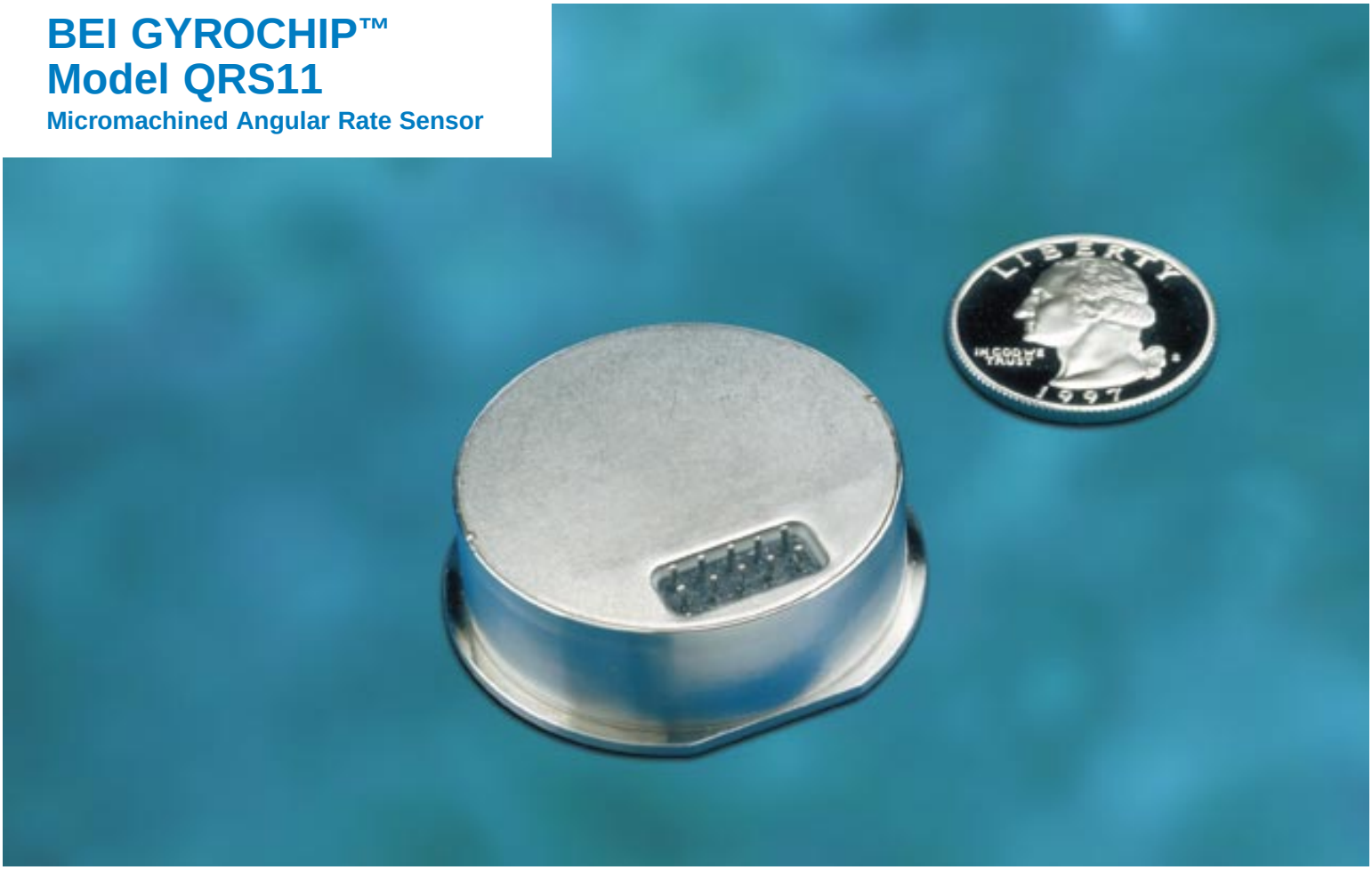
BEI GYROCHIP™
Model QRS11
Micromachined Angular Rate Sensor



Applications

- Stabilization
  - – Satellite Communication Antennas
  - – Optical Line-of-Sight Systems
  - – Missile Seekers
- Controls
  - – Aircraft & Missile Flight Control
  - – Attitude Control
  - – Yaw Dampers
- Guidance
  - – Missile Mid-Course Guidance
  - – Inertial/GPS Navigation Systems
- Instrumentation
  - – Rocket Boosters
  - – Simulation & Training Aids

Description

The BEI GyroChip™ Model QRS11 is a “MEMS ” technology, solid-state “gyro on a chip.” This DC input/high-level DC output device is fully self contained, extremely small and lightweight. No external support electronics are required. Since the inertial sensing element is comprised of just one micromachined piece of crystalline quartz (no moving parts), it has a virtually “unlimited” life. The Model QRS11 is a mature product in high volume production. It is fully qualified and used on numerous advanced aircraft, missile, and space systems.

Features

- High-Performance Inertial Sensor
- Compact, Rugged Package
- Long Operating Life
- Over 100,000 Hours MTBF
- Internal Electronics
- DC Input/High Level DC Output
- Wide Bandwidth
- Fast Start-Up

Operation

The BEI GyroChip™ Model QRS11 utilizes a one piece, micromachined, vibrating quartz tuning fork sensing element. Applying the Coriolis effect, a rotational motion about the sensor’s input axis produces a DC voltage output 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 GyroChip

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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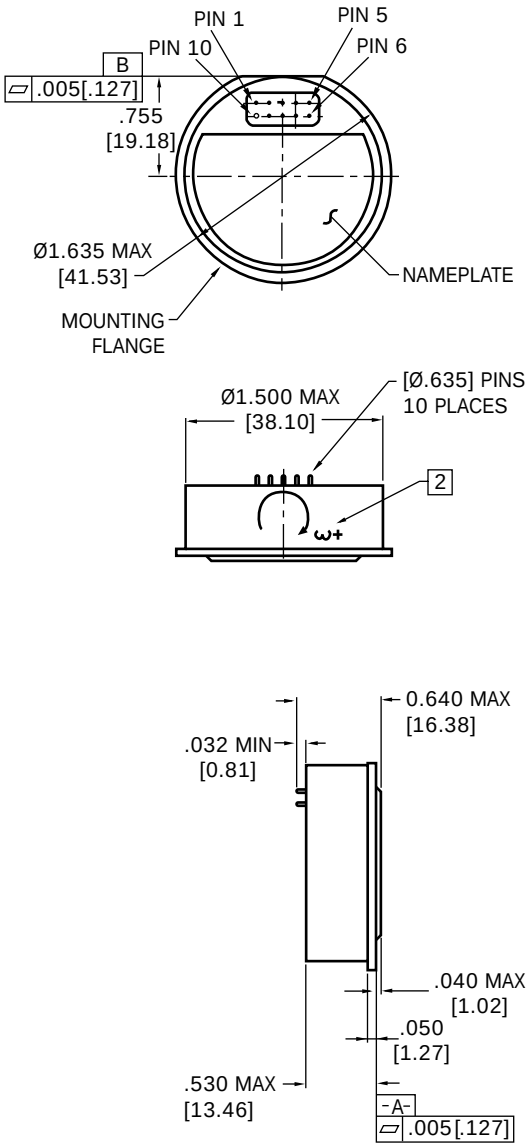

NOTES:
1. QRS11 IS SUPPLIED WITH TWO MOUNTING RINGS, MOUNTING SCREWS & MATING TEST CONNECTOR.
2. ANGULAR RATE APPLIED AS SHOWN WILL PRODUCE A POSITIVE OUTPUT (NOT MARKED ON UNIT).
3. UNIT OF MEASURE IS IN INCHES/[MM].
4. A DC VOLTAGE INPUT (±4 0 Vdc MAX.) APPLIED TO THE SELF-TEST WILL RESULT IN A CORRESPONDING PROPORTIONAL DC OUTPUT VOLTAGE.
5. TTL COMPATIBLE BIT OUTPUT SIGNAL OF ≥2.4 Vdc (REFERENCED TO POWER GROUND) INDICATING A PROPERLY FUNCTIONING UNIT.

QRS11-XXXXX-XXX	
Solder Pin	**Assignment**
1	No Connection, Leave Open
2	Self Test Input[4]
3	+Vdc Input
4	Power Ground
5	BIT Output[5]
6	No Connection, Leave Open
7	Rate Output
8	Signal Ground
9	-Vdc Input
10	Case Ground

PARAMETER	SUMMARY SPECIFICATIONS	
Part Number	**QRS11-0XXXX-100****	**QRS11-0XXXX-101****
Performance Level	Standard	High
Power Requirements		
Input Voltage	+ and - 5 Vdc ±5% regulation	
Input Current	≤80mA (each supply)	
Input Power Noise Limits	<10 mV_{rms} wideband, except at 8.7 ±0.5 KHz, <1 mV_{rms}	
Performance		
Standard Ranges	±50, 100, 200, 500, 1000˚/sec	
Full Range Output (Nominal)	±2.5 Vdc	
Scale Factor Calibration (at 22˚C)	≤1% of value	
Scale Factor over Temperature (Dev. from 22˚C)	≤0.03%/˚C	
Bias Calibration (at 22˚C)	≤2.0˚/sec*	≤0.5˚/sec*
Bias Variation over Temperature (Dev. from 22˚C)	≤1.80˚/sec*	≤0.35˚/sec*
Short Term Bias Stability (100 sec at const. temp)	≤0.002˚/sec*	
Long Term Bias Stability (1 year)	≤0.2˚/sec	
G Sensitivity	≤0.02˚/sec/g	
Start-Up Time	<1 sec	
Bandwidth (-90˚)	>60 Hz	
Non-Linearity	≤0.05% of F.R.	
Threshold/Resolution	≤0.004˚/sec*	
Output Noise (DC to 100Hz)	≤0.010˚/sec/√Hz*	
Operating Life	10 years, typical	
Environments		
Operating Temperature	-40˚C to +80˚C	
Storage Temperature	-55˚C to +100˚C	
Vibration Operating	8 g_{rms} 20 Hz to 2 kHz random (Consult factory for other vibration level requirements)	
Vibration Survival	20 g_{rms} 20 Hz to 2 kHz random, 5 minutes/axis	
Shock	200 g, any axis	
Weight	≤60 grams	

AVAILABLE OPTIONS

- Special Ranges
- Low Noise
- Extended Temperature Range
- Extended Bandwidth
- Flying Leads

*Values indicated for ±100˚/sec range. **"XXXX" designates ± range.

BEI SYSTRON DONNER INERTIAL DIVISION
BEI TECHNOLOGIES, INC.

DIVISION HEADQUARTERS
Systron Donner Inertial Division
2700 Systron Drive, Concord, CA 94518-1399
Tel: 1-925-671-6400 or 1-800-227-1625
Fax: 1-925-671-6590
E-mail: service@systron.com
World Wide Web: http://www.systron.com

EUROPEAN HEADQUARTERS
Systron Donner Inertial Division
Evegate Business Centre, Evegate Park Barn
Smeeth Ashford, Kent, England TN25 6SX
Tel: ++44 (0) 1303 812778
Fax: ++44 (0) 1303 812708
E-mail: systron@easynet.co.uk