

HIGH PERFORMANCE GYRO SENSOR

-250 to 250 °/s / -100 to 100 °/s

Features

- **Horizontal or vertical mounting**
- **High reliability and robustness over long lifetime**
- **Low vibration sensitivity**
- **High overload and shock capability (5000 g)**
- **Butterfly balanced design for high mechanical common mode rejection**
- **Closed-loop force feedback operation with electrostatic frequency tuning**
- **Low bias drift**
- **Ideal mono crystalline Si material**
- **Wafer level sealing with controlled Q-factor**
- **Low power**
- **Single supply +5 VDC**
- **Fully digital with SPI communication and on chip OTP calibration**
- **Digitally controlled sample rate up to 2000 SPS**
- **Bandwidth defined by built in 4th order digital LP filter**
- **Intrinsic continuous diagnostic monitoring**
- **Temperature sensor**
- **No external components required**



Description

The SAR100 contains a ButterflyGyro™ MEMS die and a BiCMOS mixed mode ASIC, housed in a rigid custom ceramic LCC package to accommodate for either horizontal or vertical mounting. The sensor is factory-calibrated and compensated for temperature effects to provide high-accuracy digital output over a broad temperature range.

A perfect tuning of the excitation and detection frequency as well as perfect mechanical and electrical balancing the dual masses result in very low sensitivity to shock and vibrations.

By utilizing a unique sealed cavity technology, the vibrating masses are contained within the low-pressure hermetic environment needed for creating low dynamic damping and high Q factors, without any degradation over the lifetime of the device whatever tough environmental conditions.

The bias stability can be ordered at an applicable grad according to the given application needs. For the most demanding stability requirements, a better than 50°/h In-run Allan Variance stability can be provided.

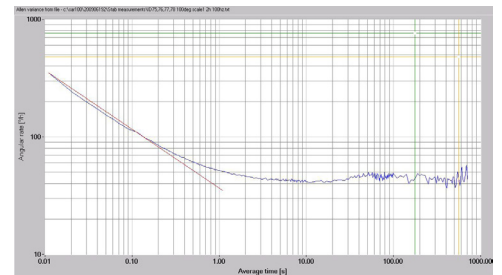
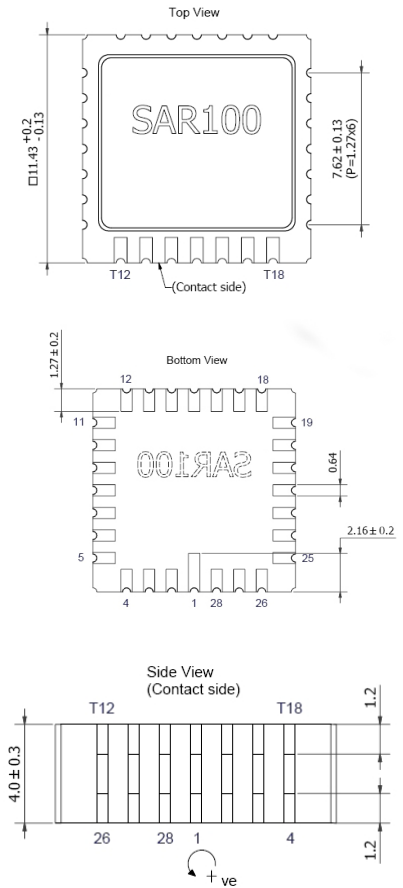
A SPI interface enables an easy and effective communication between the application and the SAR100. The angular rate data output is in a 12-bit 2's complement format at a maximum rate of 2000 samples per second. A number of functions are available through the digital SPI interface including advanced self diagnostics.

SAR100

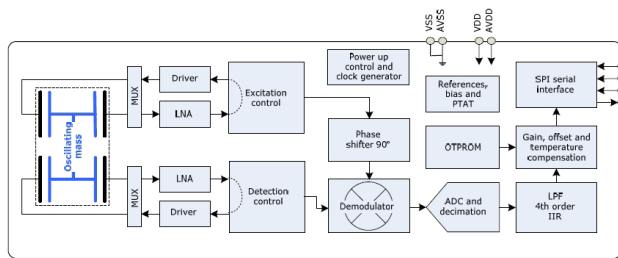
SPECIFICATIONS

Parameter	Min	Nom	Max	Unit
Weight		1.5		grams
Functional Characteristics				
Input Range		$\pm 100/\pm 250$		$^{\circ}/s$
Operating Temperature	-40		+90	$^{\circ}C$
Power Supply		5.0		V
Supply Current			17	mA
Start-Up Time		90		ms
Maximum Sampling Frequency		2000		samples/s
Storage Temperature	-55		+125	$^{\circ}C$
Dynamic Overload		5000		$^{\circ}/s$
Mechanical Shock			5000	g
Angular rate measurements				
Word length		12		bits
Scale factor $\pm 250^{\circ}/s$		0.25		$^{\circ}/s/LSB$
Scale factor $\pm 100^{\circ}/s$		0.10		$^{\circ}/s/LSB$
Scale Factor Temperature Accuracy		± 0.5		%
Bias Temperature Accuracy		± 0.5		$^{\circ}/s$
Sensitivity Accuracy		± 1		%
In-Run Bias Stability	GRADE 50	50		$^{\circ}/h$
	GRADE 75	75		$^{\circ}/h$
	GRADE 100	100		$^{\circ}/h$
Angular Random Walk $\pm 250^{\circ}/s$		1.6		$^{\circ}/\sqrt{hr}$
Angular Random Walk $\pm 100^{\circ}/s$		1.0		$^{\circ}/\sqrt{hr}$
Bandwidth (-3dB)		50		Hz
Non-Linearity		0.1		%FS
G Sensitivity		0.03		$^{\circ}/s/g$
Temperature measurements				
Word length		8		bits
Scale factor				$^{\circ}C/LSB$
Accuracy		± 2		$^{\circ}C$
SPI interface				
Datarate			8.5	Mbits/s

MECHANICAL DIMENSIONS



TYPICAL IN-RUN ALLAN VARIANCE



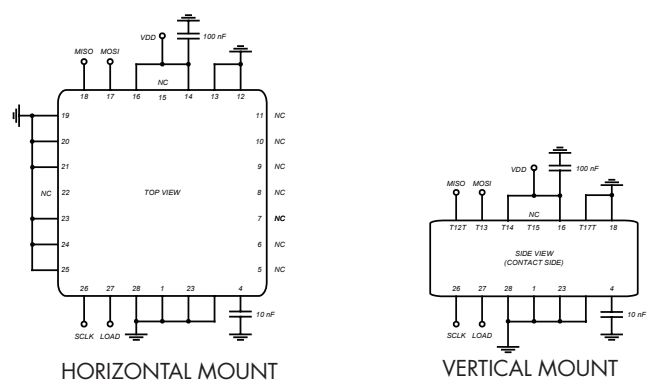
SAR100 BLOCK DIAGRAM

ORDERING INFORMATION

Default configuration options are in **bold** letters

Product	Range	Grade
SAR100	-	100
	250	-
		50
		75
		100

ELECTRICAL CONNECTIONS



CONTACT INFORMATION

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