

# ULTRA-HIGH PERFORMANCE GYRO MODULE



STIM210

PRODUCT BRIEF

- Small size, low weight and low cost
- ITAR free
- Insensitive to magnetic fields
- $10^\circ/\text{h}$  bias error over temperature gradients
- $0.5^\circ/\text{h}$  bias instability
- $0.15^\circ/\sqrt{\text{h}}$  angular random walk
- $\pm 400^\circ/\text{s}$  angular rate input range
- 2000 samples per second
- 1500g shock capability



(39mm x 45mm x 22mm)

STIM210 is a multi-axis gyro module with up to 3 axes of highly accurate MEMS gyros. Each axis is factory calibrated for bias and sensitivity, and compensated for temperature effects. This new design of the STIM200-series allows for improved bias error over temperature gradients ( $10^\circ/\text{h}$ ) and improved non-linearity (50ppm BSL over FS). STIM210 industrialization is realized by combining the well proven Sensoror ButterflyGyro™ technology with full digital operation.

## Input range, orthogonality and output formats

The STIM210 full-scale angular rate input range is  $400^\circ/\text{s}$  and the output is capped at  $\pm 480^\circ/\text{s}$ . 3-axis modules feature electronic axis alignment, improving orthogonality between axis (down to 1mrad). Selectable output formats are angular rate, increment angle, average angular rate and integrated angle, at sample rates up to 2000 samples per second.

## Reliability and robustness

STIM210 modules have MTBF > 120k hours per axis (according to MIL-HDBK

217), which is outperforming current FOG systems. Tuning of excitation and detection frequencies, as well as perfectly balanced vibrational masses, result in very low vibration and shock sensitivity in any direction.

## Power and interface

The unit is powered by a single +5V supply and communicates via a Plug-and-Play high-level RS422 interface at bit rates up to 1.8 Mbits/s.

## Device configurations and self diagnostics

The use of a 32-bit RISC ARM microcontroller provides flexibility in device configuration. Choices for output unit, sample rate, LP filter cut-off frequency, RS422 transmission bit rate, line termination ON/OFF, etc. can be done in device Service Mode. The Service Mode also provides the ability to perform single measurements on demand and access detailed diagnostics information.

## Evaluation kits

STIM210 evaluation kits for PCI and USB connectivity are available. The PCI kit is

the recommended choice for thorough characterization. The PCI kit supports all STIM210 RS422 transmission bit rates (374400, 460800, 921600 and 1843200 bits/s). The USB kit is the alternative solution, e.g. for smaller, portable laptop setups, providing an excellent choice for quick gyro module configurations and shorter measurement series. The USB kit supports the default STIM210 RS422 transmission bit rate (460800 bits/s).

## Application areas

STIM210 applications are typically found within Industrial, Aerospace and Defense markets, for various platform stabilizations, pointing and navigation systems (e.g. antennas, cameras and gimbals), attitude heading reference systems (AHRs), inertial navigation systems (INSs) for UAVs, AUVs, AGVs, UGVs and ROVs, smart munitions, 3D mapping systems, range finders, trains, robotics, and more.

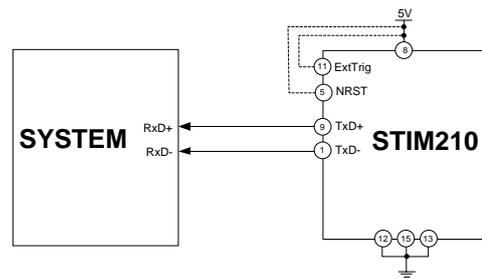
For many applications STIM210 directly replaces FOGs and improves system solutions with respect to robustness, reliability, size, weight, power and cost. STIM210 can also open new markets, where adequate solutions previously have not yet been possible to realize.

SPECIFICATIONS

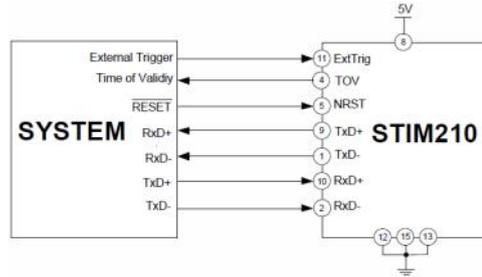
Parameter	Min	Nom	Max	Unit
Weight		52		g
Input range		±400 <sup>1</sup>		°/s
Resolution		24		bit
Operating temperature	-40		85	°C
Storage temperature	-50		90	°C
Power supply	4.5	5.0	5.5	V
Supply current			300	mA
Start-up time		3		s
Sample rate			2000	SPS
Mechanical shock			1500	g
Bias instability (Root Allan Variance)		0.5		°/h
Angular random walk (Root Allan Variance)		0.15		°/√h
Bias error over temperature gradients		±10		°/h rms
Bandwidth (-3dB)		262		Hz
Group delay		1.6		ms
Non-linearity (BSL over FS)		50		ppm
Scale Factor accuracy		500		ppm
RS422 bit rate			1.84	Mbit/s
Linear acceleration effect		7		°/h/g
Logic levels NRST, EXT TRIGGER and TOV pins	CMOS and TTL compatible			

1) Optional ranges are available

ELECTRICAL CONNECTIONS

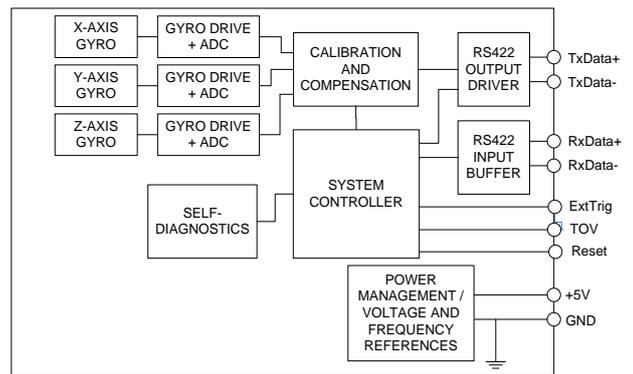


(TRANSMIT ONLY)

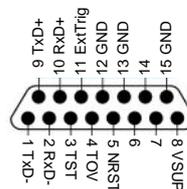


(FULL FUNCTION)

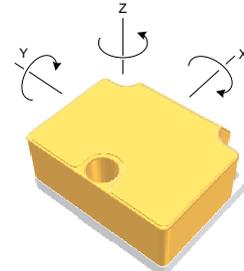
FUNCTIONAL BLOCK DIAGRAM



PIN OUT

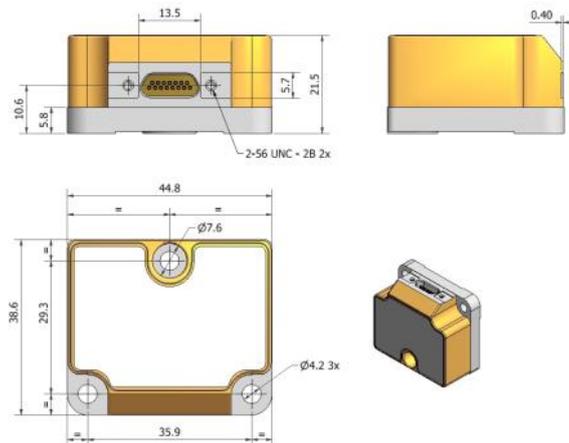


AXIS DEFINITIONS



MECHANICAL DIMENSIONS

All dimensions in mm.



Volume < 2,0 cu. in (33cm<sup>3</sup>)

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