

Panasonic 6in1 sensor, „EWTS5 series“

The brand of 6DoF inertial sensor

July 19th, 2024

Panasonic Industry Europe GmbH

Product Marketing dept.

Senior Product Manager: Ryosuke Toda

Vision

We'll achieve 0 traffic accident in all advanced mobilities together with you.

THE VISION OF OUR INERTIAL SENSOR BUSINESS



Dear all IMU users and system developers,

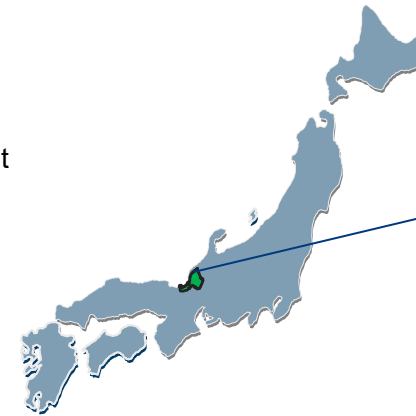
Maybe you know, when you develop the systems with IMU, there're lots of things that you have to take into account to achieve your target system performance thru entire product life. If your soldering method is appropriate, if SMT mounters don't damage MEMS in IMU, if this IMU performance degraded and becomes out of spec range, and all anxieties behind like what'll happen if this system doesn't work in the market, and so on...

Till today, we've been supporting more than 100 customers' production sites, supplying more than 500Mil. pcs of IMUs. In this journey, we got lots of lessons learned, sometimes we paid huge „the tuition“, however we've been keeping moving forward in this automotive industry, established the quality inspection system at our production where we inspect and qualify IMU performance with $\pm 5\sigma$ range std. deviations.

(6in1 series achieved its delivery record, More than 4M pcs, with field Return:0.27ppm @Mar.2023)

All what we're doing and we'll do is for supporting you thru your entire product life with our technology, quality and humanity as professional inertial sensor consultancy. Let's cooperate together and achieve this vision for society.

Panasonic Industry, Fukui Factory Kanazu Branch



Visit us in Awara city, Fukui prefecture!!

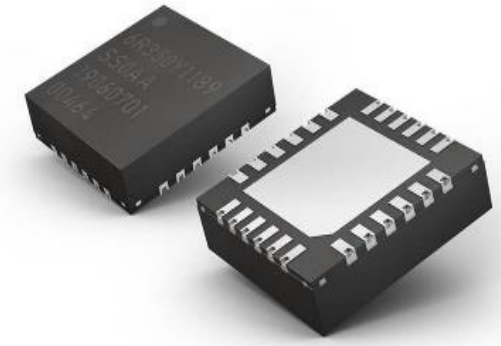


Fukui factory Kanazu branch,
Awara city, Fukui prefecture, Japan.

Factory Dir. Hiroshi Yamanaka
Eng. GM: Michihiko Hayashi

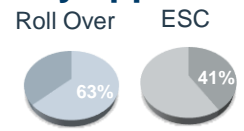
01. History and roadmap

- 1994** Gyroscope Production started
- 2000** Accelerometer Production started

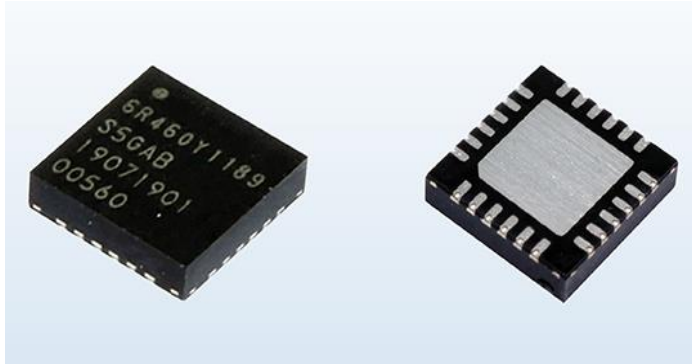


6 in 1 Sensor
Combo sensor series
 6 AXIS COMBO // FUNCTIONAL SAFETY

6in1 Ver.1.5 SOP Aug. 2020
 6in1 Ver.2.0 SOP Sep. 2023



02. 6in1 sensor EWTS5 series



We support you to choose IMU, 1st evaluation, integration, and



thru entire R&D, production preparation,



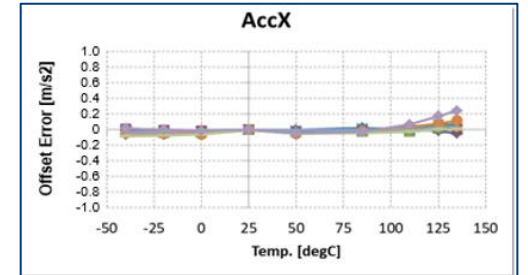
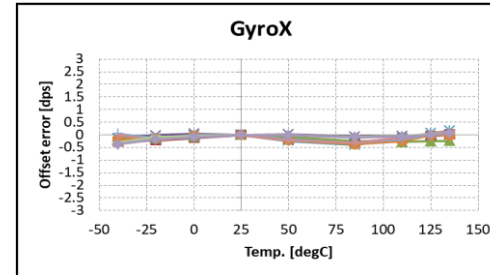
till your product life ends.

6in1 key performance data

Gyro offset error temperature drift

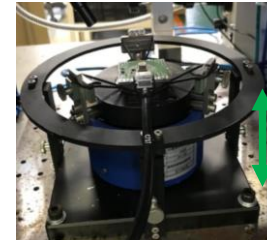
Test condition N=10, Ver.1.5

- Measurements: Gyro status flags, Acc. status flags
- Applied rates: 0 dps, 0 m/s²
- Supply voltage: 3.3V
- Temperatures (Gyro): -40°C up to +135°C, 20 °C - 25°C steps,
- Temperatures (Acc.): -40°C, -25 °C , 0 °C , +25 °C, +50 °C, +85 °C, +110 °C, +125°C, +135°C, settled ≥15 min after each temp. step changed.

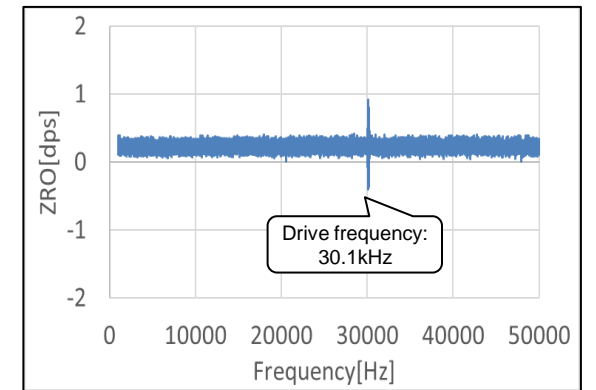


Vibration robustness

- Vibration direction : Z axis
- Acceleration : 6G
- Frequency : 1k-50kHz, 1kHz/min
- Data: Gyro-Z axis



Vibration direction



Main Features

- 3-axis gyro & 3-axis accelerometer
- ASIL-B(D) compliant
- AEC-Q100 Grade 1
- 4.5x4.5x1.1mm QFN
- SPI Interface
- Current consumption ≤ 10 mA
- Orthogonality of axes ≤ 0.01 deg
- User selectable dynamic range and LPF
- Robust against vibration and temperature

Part Number

Ver.1.5 EWTS5GND21 (2K pcs on reel)

EWTS5GNC21 (500 pcs on reel)

Ver. 2.0 EWTS5GNB21 (2K pcs on reel)

EWTS5GXB21 (500 pcs on reel)

Production:

Ver.1.5 in production

Ver. 2.0 in production

03. Basic spec table

Item		6in1 Ver. 1.5	6in1 Ver. 2.0
Package size		[mm]	4.5 * 4.5 * 1.1
Operating temperature		[degC]	-40 to +125
Supply voltage		[V]	3.3V / 5.0V
Interface		-	SPI (32bit)
FuSa	ASIL	-	B(D)
Gyro & Accel	Cross-axis sensitivity	[%]	±1.7%
Gyro & Accel	Orthogonality	[deg]	< 0.01
Gyro	Guaranteed measurement range	[dps]	±300, ±150, ±120, ±60, 30
	Total offset error	[dps]	±2.0
	Total sensitivity error	[%]	±3.0
	Bias instability (Ave.)	[dph]	15
	Angle Random Walk	[dps/sqrt(h)] 1σ	0.37
	Noise @60Hz DLPF	[dps rms]	0.1
	DLPF cut off frequency	[Hz]	10, 12.5, 27, 30, 46, 60
Accel.	Guaranteed measurement range	[g]	±16, ±8, ±2, ±1
	Mechanical headroom	[g]	Min. 130
	Total offset error	[mg]	±50 (X, Y) ±84(Z)
	Total sensitivity error	[%]	±3.0
	Bias Instability	[μg]	110
	Velocity Random Walk	m/s/sqrt(h), 1σ	0.14
	Noise @60Hz DLPF	[mg rms]	4
DLPF cut off frequency	[Hz]	10, 46, 60, 250, 300, 400	
Milestone		(CY)	In production

04. Applications and sample types

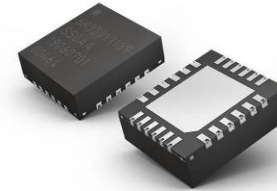
Examples of applications



And more and more. Please contact us if you'd know more about our target applications.

Available sample types

Sensor chip, Ver.1.5 and Ver.2.0 available.



Chip on small PCB



Sensor evaluation kit (with Ver. 2.0 available)



Items	Quick Sense Suite (6in1 evaluation kit)
Interface	UART, CAN, Ethernet, USB
Function	Output, display and record all 6 axis sensor data
	Modify 6in1 sensor's configuration (Dynamic range, LPF)

Panasonic
INDUSTRY