



# IMU330BA

Automotive Grade 6DOF IMU



The ACEINNA IMU330BA is a small form factor high-performance 6-DOF automotive grade inertial measurement unit. The IMU330BA features a 3-Axis Accelerometer and a 3-Axis Rate Gyroscope and is qualified to AEC-Q104 Class C qualified and suitable for use in demanding automotive applications requiring improved angle random walk and Bias Instability specifications. It is powered by a 32 Bit ARM Cortex-M4 CPU with Floating Point Unit. The IMU330BA can support customer system integration for Attitude and GPS-Aided Position-Velocity-Time (PVT) measurement.





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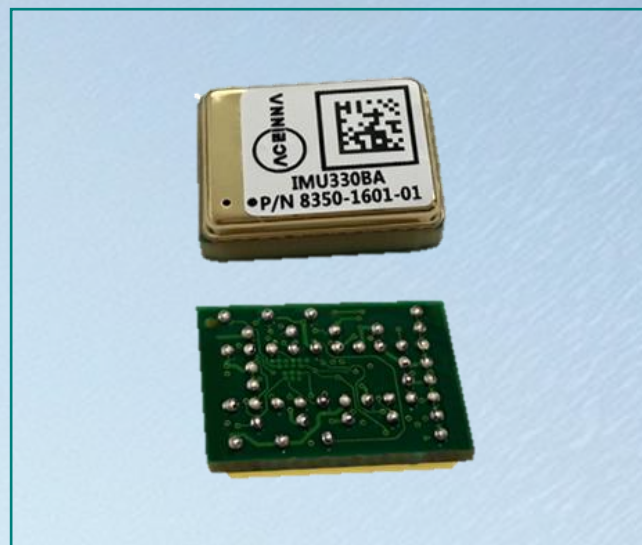
## Automotive Grade 6DOF IMU

### IMU330BA – Automotive Grade 6DOF IMU

The ACEINNA IMU330BA is designed for use in high volume automotive Level 3 autonomous vehicles and ADAS systems requiring calibrated inertial measurement data. The IMU330BA combines high-performance 6DOF IMU functionality with the small, low-cost packaging to meet the challenging performance, reliability and cost requirements of the automotive market.

### Applications

- Autonomous Vehicles
- Self-Driving Taxis/Delivery Vehicles
- ADAS
- Electronic Stability Control
- Lane Keep Assist



### Features

- Automotive Qualified – AEC-Q104, Grade 2
- Calibrated 3 axis MEMS Accelerometer with  $\pm 8$  g full scale range
- Calibrated 3 axis MEMS Angular Rate sensor with  $\pm 400$  dps full scale range
- ARM Cortex-M4 architecture
- SPI and UART interfaces
- Light Weight (2g)
- Small (11 x 15 x 4.7) mm package
- Wide Temp Range, -40C to +105C
- High Reliability, MTBF > 50k hours
- Pin Compatible with ACEINNA OpenIMU330BI

This product has been developed exclusively for commercial applications. It has not been tested for, and makes no representation or warranty as to conformance with any military specifications or its suitability for any military application or end-use. Additionally, any use of this product for nuclear, chemical or biological weapons, or weapons research, or for any use in missiles, rockets, and/or UAV's of 300km or greater range, or any other activity prohibited by the Export Administration Regulations, is expressly prohibited without the written consent and without obtaining appropriate US export license(s) when required by US law. Diversion contrary to U.S. law is prohibited. Specifications are subject to change without notice.



## Technical Characteristics

Ta = 25°C, VDC = 3.3V, unless otherwise stated

Ready-to Use Algorithms	Outputs		
IMU	Calibrated Accel, Gyro		
Angular Rate	MIN	TYP <sup>2</sup>	MAX
Range (°/s)	-400		400
Resolution UART (°/s)		0.019	
Resolution SPI (°/s/LSB)		0.0156	
Scale Factor error (%)		0.1	
Bias Instability (°/hr) <sup>1</sup>		3	
Bias Stability over Temp (°/s)		0.1	
Axis to Axis Misalignment (Degree)		0.1	
Nonlinearity (%FSR) <sup>3</sup>		0.02	
Angle Random Walk (°/√hr) <sup>1</sup>		0.28	
Configurable Bandwidth (Hz)	5		50
Acceleration	MIN	TYP <sup>2</sup>	MAX
Range (g)	-8		+8
Resolution UART (mg)		0.3	
Resolution SPI (mg/LSB)		0.25	
Scale Factor error (%)		0.1	
Bias Instability (μg) <sup>1</sup>		31	
Bias Stability over Temp (mg)		4	
Axis to Axis Misalignment (Degree)		0.1	
Nonlinearity (±1g) (%FSR) <sup>3</sup>		0.1	
VRW (m/s/√hr) <sup>1</sup>		0.04	
Configurable Bandwidth (Hz)	5		50
Electrical	MIN	TYP	MAX
Input Voltage (V)	3.0	3.3	3.6
Current Consumption (mA)		40	
Interface	SPI or UART		
Output Data Rate – SPI (Hz)			200
Output Data Rate – UART (Hz)			100
Environment			
Calibrated Temperature (°C)	-40 °C to 85°C		
Operating Temperature (°C)	-40 °C to 105°C		
Non-Operating Temperature (°C)	-40 °C to 105°C		
Physical			
Size (mm)	11 x 15 x 4.7		
Weight (g)	2		
Interface Connector	44 ball, ball grid array (BGA)		

Note 1: Allen variance curve, constant temperature

Note 2: Typical values are 1 sigma values unless otherwise noted

Note 3: Best line straight fit



## EVALUATION KIT

### EVALUATION KIT HARDWARE

- Evaluation Kit Includes an IMU330BA mounted in a cast Aluminum Housing with interface PCB for convenient connection and evaluation of the product.
- Virtual COM-port USB interface, providing connectivity to IMU330BA from PC
- Solder pads for connection to SPI Interface
- Test terminals for connecting oscilloscope or logic analyzers to the dedicated IMU330BA signals

### EVALUATION SOFTWARE

- NAV-VIEW provides an easy to use graphical interface to display, record, playback, and analyze all of the IMU330BA system parameters.
- NAV-VIEW can also be used to set a wide range of user-configurable fields in the IMU330BA to optimize the system performance for highly dynamic applications.
- NAV-VIEW software is available for download from ACEINNA's website at: [www.aceinna.com/support](http://www.aceinna.com/support)

## Ordering Information

Part Ordering Information	
Model Number	Description
IMU330BA	Automotive Grade 6 DOF IMU, FSR = 400dps / ±8g
IMU330BA EVK	IMU330BA Evaluation Kit