

Overview

Tactical Grade Inertial Systems
+RTK +Dual GNSS



The **IMX-5**™ is a 10-DOF sensor module consisting of a

tactical grade Inertial Measurement Unit (IMU), magnetometer, and barometer. Output includes angular rate, linear acceleration, magnetic vector, and barometric pressure and altitude. IMU calibration consists of bias, scale factor, cross-axis alignment, and temperature compensation. The IMX-5 includes Attitude Heading Reference System (AHRS) sensor fusion to estimate roll, pitch, and heading. Adding GNSS input to the IMX-5 enables onboard Inertial Navigation System (INS) sensor

The **RUG-3-IMX-5**™ series adds a rugged aluminum enclosure and RS232, RS485, and CAN bus to the IMX-5.

fusion for roll, pitch, heading, velocity, and position.

The **RUG-3-IMX-5-RTK**™ includes a multi-frequency GNSS receiver with RTK precision position enabling INS sensor fusion for roll, pitch, heading, velocity, and position.

The **RUG-3-IMX-5-Dual**<sup>™</sup> includes two multi-frequency GNSS receivers with RTK precision position and dual GNSS heading/compass.

The Inertial Sense SDK is an open-source software development kit for quick integration to configure and communicate with Inertial Sense products. The SDK includes data logger, math libraries, and interface for Linux, Windows, and embedded platforms.

## **Applications**

- Drone Navigation
- Unmanned Vehicle Payloads
- Ground and Aerial Survey
- Automotive Navigation
- Stabilized Platforms
- Antenna and Camera Pointing
- First Responder and Trackers
- Health, Fitness, and Sport Monitors
- Robotics and Ground Vehicles
- Maritime

#### **RUG-3-IMX-5**

Size: 30.5 x 25.4 x 9.9 mm Weight: 10.5 g



#### IMX-5

Size: 15.6 x 12.5 x 2.9 mm

Weight: 0.8 g

INS: External GNSS Input



#### RUG-3-IMX-5-RTK/Dual

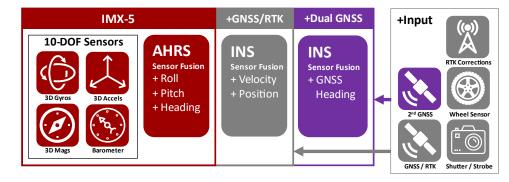
Size: 30.5 x 25.4 x 14.8 mm

Weight: 14 g

GNSS: Multi-Band L1/L2/E5

### **Features**

- Tactical Grade IMU
  - Gyro: 1.5 °/hr Bias Instability, 0.16 °/Vhr ARW
  - O Accel: 19 μg Bias Instability, 0.02 m/s/vhr VRW
- 0.04° Dynamic Roll/Pitch
- 0.13° Dynamic Heading
- Surface Mount Reflowable (PCB Module)
- Up to 1KHz IMU Output Data Rate
- External GNSS Support (Multi-Band)
- Attitude (Roll, Pitch, Yaw, Quaternions), Velocity, and Position UTC Time Synchronized
- Triple Redundant IMUs Calibrated for Bias, Scale Factor, Cross-axis Alignment, and G-sensitivity
- -40°C to 85°C Sensor Temperature Calibration
- Binary and NMEA ASCII Protocol
- Barometric Pressure and Humidity
- Strobe In/Out Data Sync (Camera Shutter Event)
- Fast Integration with SDK and Example Software
- Data Logging (SDK and Application Software)
- RUG-3-IMX-5: RS232, RS485, CAN bus





Tactical Grade Inertial Systems
+RTK +Dual GNSS

# **Specifications**

Operating Range         ±4000 °/sec         ±16 g         ±2500 μT         30–125           In-Run Bias Stability         < 1.5 °/hr         < 19 μg            Random Walk         0.16 °/vhr         0.02 m/s/vhr            Non-linearity         0.02 % FSR         0.02 % FSR            Noise Density         5 mdps/vHz         60 μg/vHz         Pa/vHz           Bias Error over -40C to 85C         0.3 °/s RMS         3,7 mg RMS           Max Output Rate         1 KHz         1 KHz         100 Hz         50 Hz           Bandwidth         250 Hz         218 Hz         50 Hz         5 Hz           Alignment Error         0.03°         0.03°         0.05°           Resonant Freq.         2.6/2.17 KHz         20 KHz           Sampling Rate         8 KHz         4 KHz         300 Hz         200 Hz           *1KHz resolution after oversampling         (2 cm           IMX <sup>TM</sup> +RTK         +Dual	Performance (AHRS, INS, RUG-3)		Тур		
Static Heading *** (RMS)			0.04°		
Static Heading w/Dual Compass* (RMS)         0.4°           Static Heading w/magnetometer (RMS)         1.0°           *1 in baseline distance between GNSS anternas.         *** In baseline distance between GNSS anternas.           ***With GNSS input and periodic motion >0.8 m/s² acceleration and >2 m/s velocity.         *** RTK           Performance (INS, RUG-3)         RUG-3         **RTK           Horizontal Position (w/ SBAS)         1.5 m CEP         1 cm + 1 pPM of Company (MS)           Angular Resolution         0.05°         **Oom /s           Operation Limits         Velocity (external GNSS)         500 m/s           Altitude (external GNSS)         50 km         **Institute (MS)           Altitude (external GNSS)         50 km         **Institute (MS)           Altitude (Barometric)         10 km         **Institute (MS)           GNSS cold start time to fix         24 s         -           Performance         Typ         **Institute (MS)         1 us           Startup Time         0.8 s         **Institute (MS)         1 us           Max Output Data Rate (IMU / INS*)         1 kHz / 62*Hz         ***Institute (MS)           Max Output Bata rate will increase to 100Hz in a future firmware update.         ****Absolute Maximum Ratings         Max           Acceleration         10,000 g			0.1°		
Static Heading W/magnetometer (RMS)         1.0°           *1 m baseline distance between GNSS antennas.** "With GNSS input and periodic motion >0.8 m/s² acceleration and >2 m/s velocity."           Performance (INS, RUG-3)         RUG-3         +RTK           Horizontal Position (w/ SBAS)         1.5 m CEP         1 cm + 1 ppm of control of the periodic motion >0.05°           Velocity (GPS and INS)         0.03 m/s         Angular Resolution         0.05°           Operation Limits         500 m/s         Altitude (external GNSS)         500 km         10 km           Altitude (external GNSS)         50 Km         Altitude (Barometric)         10 km         20 cm model           GNSS cold start time to fix         24 s         -         -           Performance         Typ         Startup Time         0.8 s         Nax           Ins/AHRS Timestamp Accuracy (RMS)         1 us         1 us         1 us           Max Output Data Rate (IMU / INS*)         1 kHz / 62*Hz         1 us           Mus Signal latency         4 ms         4 ms         4 ms           *NSOutput data rate will increase to 100Hz in a future firmware update.         4 ms         4 ms           Absolute Maximum Ratings         Max         Acceleration         10,000 g           Operating Temperature         -40 to ta25 °C         <	, , ,		0.13°		
**Im baseline distance between GNSS antennas. **With GNSS input and periodic motion > 0.8 m/s² acceleration and >2 m/s velocity.  Performance (INS, RUG-3)  RUG-3			0.4°		
"Im baseline distance between GNSS antennas. ""With GNSS input and periodic motion > 0.8 m/s² acceleration and >2 m/s velocity.  Performance (INS, RUG-3) Horizontal Position (w/ SBAS) Velocity (GPS and INS) Angular Resolution Operation Limits Velocity (external GNSS) Altitude (external GNSS) Altitude (external GNSS) Altitude (Barometric) Altitude (Barometric) In 0 km  GNSS cold start time to fix  Performance Typ  Startup Time  0.8 s INS/AHRS Timestamp Accuracy (RMS) Max Output Data Rate (IMU / INS*) INU signal latency *NS output data rate willincrease to 100Hz in a future firmware update.  Absolute Maximum Ratings Acceleration In 0,000 g Operating Temperature 40 to 85 °C Storage Temperature 40 to 125 °C Overpressure 600 kPa  SD rating ± 2 kV Human body model Solder Reflow Temperature Limit 217 °C liquidus: 40 −60 s  Sensors IMU - Gyros IMU - Gyros IMU - Accels In-Run Bias Stability √ 1.5 °/hr √ 1.9 µg Random Walk 0.16 °/whr 0.02 m/s/hrh Non-linearity 0.02 % FSR Noise Density 5 mdps/Hz Bias Error over - 40C to 85° 0.3 °/s RMS 3,7 mg RMS Max Output Rate 1 KHz 1 KHz 1 KHz 1 KHz 1 00 Hz 2 50 Hz Bandwidth 250 Hz Ba	Static Heading w/magn	etometer (RMS)	1.0°		
Performance (INS, RUG-3) Horizontal Position (w/ SBAS) 1.5 m CEP 1 cm + 1 ppm of Velocity (GPS and INS) 0.03 m/s Angular Resolution 0.05° Operation Limits Velocity (external GNSS) Altitude (external GNSS) 500 m/s Altitude (garometric) 10 Km Altitude (Barometric) 10 Km GNSS cold start time to fix 24 s  Performance Typ Startup Time 0.8 s INS/AHRS Timestamp Accuracy (RMS) Max Output Data Rate (IMU / INS*) 1 KHz / 62*Hz IMU signal latency 4 ms *INS output data rate will increase to 100Hz in a future firmware update.  Absolute Maximum Ratings MAX Acceleration 10,000 g Operating Temperature 4-00 to 85 °C Storage Temperature 4-0 to 85 °C Storage Temperature 4-0 to 85 °C Storage Temperature 4-0 to 85 °C Solder Reflow Temperature Max 245 °C Solder Reflow Temperature Limit 217 °C liquidus: 40 – 60 s  Sensors IMU - Gyros Operating Range ±4000 °/sec ±16 g ±2500 µT 30-125 In-Run Bias Stability - 1.5 */hr - 19 µg Random Walk 0.16 °/vhr 0.02 m/s/vhr Non-linearity 0.02 % FSR 0.02 % FSR Noise Density 5 mdps//Hz Bias Error over -40C to 85C 0.3 °/s RMS 3,7 mg RMS  Max Output Rate 1 KHz 1 KHz 1 00 Hz 5 DHz Bandwidth 250 Hz 218 Hz 50 Hz 50 Hz Bandwidth 250 Hz 218 Hz 50 Hz 50 Hz Bandwidth 250 Hz 28 Hz 28 Hz 300 Hz 29 OD ** Resolution *0.03° 0.03° 0.05° *1KHz resolution after oversampling (2 cm Function  IMX <sup>M</sup> +RTK +Dual					
Horizontal Position (w/ SBAS)	= -			<u> </u>	
Velocity (GPS and INS)         0.03 m/s           Angular Resolution         0.05°           Operation Limits         Velocity (external GNSS)         500 m/s           Altitude (external GNSS)         500 km           Altitude (Barometric)         10 km           GNSS cold start time to fix         24 s         -           Performance         Typ         -           Startup Time         0.8 s         INS/AHRS Timestamp Accuracy (RMS)         1 us           Max Output Data Rate (IMU / INS*)         1 kHz / 62*Hz         -           IMU signal latency         4 ms         -           *INS output data rate will increase to 100Hz in a future firmware update.         Absolute Maximum Ratings         MAX           Acceleration         10,000 g         MAX           Acceleration Temperature         40 to 85°C         C           Storage Temperature         40 to 85°C         C           Overpressure         600 kPa         ESD rating         ± 2 kV         Human body model           Solder Reflow Temperature Max         245°C         C         Solder Reflow Temperature Max         245°C         Solder Re	•				
Angular Resolution 0.05°  Operation Limits  Velocity (external GNSS) 500 m/s  Altitude (external GNSS) 500 km  Altitude (Barometric) 10 km  GNSS cold start time to fix 24 s -  Performance Typ  Startup Time 0.8 s  INS/AHRS Timestamp Accuracy (RMS) 1 us  Max Output Data Rate (IMU / INS*) 1 kHz / 62*Hz  IMU signal latency 4 ms  *INS output data rate will increase to 100Hz in a future firmware update.  Absolute Maximum Ratings MAX  Acceleration 10,000 g  Operating Temperature 40 to 85 °C  Storage Temperature 40 to 125 °C  Over pressure 600 kPa  ESD rating ±2 kV Human body model solder Reflow Temperature Limit 217 °C liquidus: 40 – 60 s  Sensors IMU - Gyros IMU - Accels Mags Pressu Operating Range ±4000 °/sec ±16 g ±2500 μT 30-125 In-Run Bias Stability <1.5 °/hr <19 μg  Random Walk 0.16 °/vhr 0.02 m/s/vhr  Non-linearity 0.02 % FSR 0.02 % FSR  Noise Density 5 mdps/vHz 60 μg/vHz Pa/vHz  Bias Error over -40C to 85C 0.3 °/s RMS 3,7 mg RMS  Max Output Rate 1 kHz 1 kHz 100 Hz 50 Hz  Bandwidth 250 Hz 218 Hz 50 Hz 50 Hz  Alignment Error 0.03° 0.03° 0.05°  Resonant Freq. 2.6/2.17 kHz 20 kHz  Sampling Rate 8 kHz 4 kHz 300 Hz 200 Hz  Resolution *0.0076 °/sec *122 μg 0.3 μT 0.03 F*  *IKHz resolution after oversampling (2 cm)		SBAS)			1 + 1 PPM CEP
Operation Limits  Velocity (external GNSS) 500 m/s  Altitude (external GNSS) 50 Km  Altitude (Barometric) 10 Km  GNSS cold start time to fix 24 s -  Performance Typ  Startup Time 0.8 s  INS/AHRS Timestamp Accuracy (RMS) 1 us  Max Output Data Rate (IMU / INS*) 1 KHz / 62*Hz  IMU signal latency 4 ms  *INS output data rate will increase to 100Hz in a future firmware update.  Absolute Maximum Ratings MAX  Acceleration 10,000 g  Operating Temperature -40 to 85 °C  Storage Temperature -40 to 125 °C  Overpressure 600 kPa  ESD rating ±2 kV Human body model  Solder Reflow Temperature Max 245 °C  Solder Reflow Temperature Max 245 °C  Solder Reflow Temperature Limit 217 °C liquidus: 40 – 60 s  Sensors IMU - Gyros IMU - Accels Mags Pressu  Operating Range ±4000 °/sec ±16 g ±2500 µT 30-125  In-Run Bias Stability <1.5 °/hr <19 µg  Random Walk 0.16 °/vhr 0.02 m/s/vhr  Non-linearity 0.02 % FSR 0.02 % FSR  Noise Density 5 mdps/VHz 60 µg/VHz Pa/VH  Bias Error over -40C to 85C 0.3 °/s RMS 3,7 mg RMS  Max Output Rate 1 KHz 1 KHz 100 Hz 50 Hz  Bandwidth 250 Hz 218 Hz 50 Hz 5 Hz  Alignment Error 0.03° 0.03° 0.05°  Resonant Freq. 2.6/2.17 KHz 20 KHz  Sampling Rate 8 KHz 4 KHz 300 Hz 200 Hz  Resolution *0.0076 °/sec *122 µg 0.3 µT 0.03 F*  *1KHz resolution after oversampling (2 c m)					
Velocity (external GNSS) 500 m/s  Altitude (external GNSS) 50 Km  Altitude (Barometric) 10 Km  GNSS cold start time to fix 24 s  Performance Typ  Startup Time 0.8 s  INS/AHRS Timestamp Accuracy (RMS) 1 us  Max Output Data Rate (IMU / INS*) 1 KHz / 62*Hz  IMU signal latency 4 ms  *INS output data rate will increase to 100Hz in a future firmware update.  Absolute Maximum Ratings MAX  Acceleration 10,000 g  Operating Temperature -40 to 85 °C  Storage Temperature 600 kPa  ESD rating ±2 kV Human body model  Solder Reflow Temperature Limit 217 °C liquidus: 40 – 60 s  Sensors IMU - Gyros IMU - Accels Mags Pressu  Operating Range ±4000 °/sec ±16 g ±2500 μT 30–125 In-Run Bias Stability <1.5 °/hr <19 μg  Random Walk 0.16 °/vhr 0.02 m/s/vhr  Non-linearity 0.02 % FSR 0.02 % FSR  Noise Density 5 mdps/VHz 60 μg/VHz Pa/VH  Bias Error over -40C to 85C 0.3 °/s RMS 3,7 mg RMS  Max Output Rate 1 KHz 1 KHz 100 Hz 50 Hz  Alignment Error 0.03° 0.03° 0.05°  Resonant Freq. 2.6/2.17 KHz 20 KHz  Sampling Rate 8 KHz 4 KHz 300 Hz 200 Hz  Resolution *0.0076 °/sec *122 μg 0.3 μT 0.03 F*  *1KHz resolution after oversampling (2 c m)  Function IMX™ +RTK +Dual			0.05°		
Altitude (external GNSS) 50 Km  Altitude (Barometric) 10 Km  GNSS cold start time to fix 24 s	•				
Altitude (Barometric) 10 Km  GNSS cold start time to fix 24 s -  Performance Typ  Startup Time 0.8 s  INS/AHRS Timestamp Accuracy (RMS) 1 us  Max Output Data Rate (IMU / INS*) 1 KHz / 62*Hz  IMU signal latency 4 ms  *INS output data rate will increase to 100Hz in a future firmware update.  Absolute Maximum Ratings MAX  Acceleration 10,000 g  Operating Temperature -40 to 85 °C  Storage Temperature -40 to 125 °C  Overpressure 600 kPa  ESD rating ± 2 kV Human body model  Solder Reflow Temperature Limit 217 °C liquidus: 40 – 60 s  Sensors IMU - Gyros IMU - Accels Mags Pressu  Operating Range ±4000 °/sec ±16 g ±2500 µT 30-125  In-Run Bias Stability < 1.5 °/hr < 19 µg  Random Walk 0.16 °/vhr 0.02 m/s/vhr  Non-linearity 0.02 % FSR 0.02 % FSR  Noise Density 5 mdps/VHz 60 µg/VHz Pa/VHz  Bias Error over -40C to 85C 0.3 °/s RMS 3,7 mg RMS  Max Output Rate 1 KHz 1 KHz 100 Hz 50 Hz  Bandwidth 250 Hz 218 Hz 50 Hz 5 Hz  Alignment Error 0.03° 0.03° 0.05°  Resonant Freq. 2.6/2.17 KHz 20 KHz  Sampling Rate 8 KHz 4 KHz 300 Hz 200 Hz  Resolution *0.0076 °/sec *122 µg 0.3 µT 0.03 Fe  *1KHz resolution after oversampling (2 cm)	• • • • • • • • • • • • • • • • • • • •				
GNSS cold start time to fix         24 s         -           Performance         Typ           Startup Time         0.8 s           INS/AHRS Timestamp Accuracy (RMS)         1 us           Max Output Data Rate (IMU / INS*)         1 KHz / 62*Hz           IMU signal latency         4 ms           4 ms           Absolute Maximum Ratings         Max           Absolute Maximum Ratings         Max           Acceleration         10,000 g           Operating Temperature         -40 to 85° C           Storage Temperature         -40 to 125 °C           Overpressure         600 kPa           ESD rating         ± 2 kV         Human body model           Solder Reflow Temperature Limit         217 °C liquidus: 40 − 60 s           Sensors         IMU - Gyros         IMU - Accels         Mags         Pressu           Sensors         IMU - Gyros         IMU - Accels         Mags         Pressu	'				
Startup Time   0.8 s	· ·	•		1	
Startup Time         0.8 s           INS/AHRS Timestamp Accuracy (RMS)         1 us           Max Output Data Rate (IMU / INS*)         1 KHz / 62*Hz           IMU signal latency         4 ms           *INS output data rate will increase to 100Hz in a future firmware update.           Absolute Maximum Ratings         MAX           Acceleration         10,000 g           Operating Temperature         -40 to 85 °C           Storage Temperature         -40 to 125 °C           Overpressure         600 kPa           ESD rating         ± 2 kV         Human body model           Solder Reflow Temperature Max         245 °C           Solder Reflow Temperature Limit         217 °C liquidus: 40 −60 s           Sensors         IMU - Gyros         IMU - Accels         Mags         Pressu           Sensors         IMU - Gyros         IMU - Accels         Mags         Pressu           Sensors         IMU - Gyros         IMU - Accels         Mags         Pressu           Sensors         Imute Human body model           Scholer Reflow Temperature Limit         217 °C liquidus: 40 −60 s           Sensors         IMU - Gyros         IMU - Accels         Mags         Pressu           Sensors         Imute Human body model	GNSS cold start time to	fix	24 s		-
NS/AHRS Timestamp Accuracy (RMS)   1 us	Performance		Тур		
Max Output Data Rate (IMU / INS*)         1 KHz / 62*Hz           IMU signal latency         4 ms           *INS output data rate will increase to 100Hz in a future firmware update.           Absolute Maximum Ratings         MAX           Acceleration         10,000 g         Operating Temperature           -40 to 85 °C         Storage Temperature         -40 to 125 °C         Overpressure           ESD rating         ± 2 kV         Human body model         Solder Reflow Temperature Max         245 °C         Solder Reflow Temperature Limit         217 °C liquidus: 40 –60 s         Sensors         IMU - Gyros         IMU - Accels         Mags         Pressure           Sensors         IMU - Gyros         IMU - Accels         Mags         Pressure           Sensors         IMU - Gyros         IMU - Accels         Mags         Pressure           Sensors         IMU - Gyros         IMU - Accels         Mags         Pressure           Sensors         Imune Image	Startup Time		0.8 s		
MU signal latency	INS/AHRS Timestamp A	Accuracy (RMS)	1 us		
*INS output data rate will increase to 100Hz in a future firmware update.  Absolute Maximum Ratings	Max Output Data Rate	(IMU / INS*)	1 KHz / 62	2*Hz	
Absolute Maximum Ratings         MAX           Acceleration         10,000 g           Operating Temperature         -40 to 85 °C           Storage Temperature         -40 to 125 °C           Over pressure         600 kPa           ESD rating         ± 2 kV         Human body model           Solder Reflow Temperature Max         245 °C           Solder Reflow Temperature Limit         217 °C liquidus: 40 – 60 s           Sensors         IMU - Gyros         IMU - Accels         Mags         Pressure           Operating Range         ±4000 °/sec         ±16 g         ±2500 μT         30-125           In-Run Bias Stability         < 1.5 °/hr	IMU signal latency		4 ms		
Acceleration       10,000 g         Operating Temperature       -40 to 85 °C         Storage Temperature       -40 to 125 °C         Overpressure       600 kPa         ESD rating       ± 2 kV       Human body model         Solder Reflow Temperature Max       245 °C         Solder Reflow Temperature Limit       217 °C liquidus: 40 – 60 s         Sensors       IMU - Gyros       IMU - Accels       Mags       Pressuration         Operating Range       ±4000 °/sec       ±16 g       ±2500 μT       30–125         In-Run Bias Stability       < 1.5 °/hr	*INS output data rate will incre	ase to 100Hz in a future	e firmware update.		
Operating Temperature         -40 to 85 °C           Storage Temperature         -40 to 125 °C           Overpressure         600 kPa           ESD rating         ± 2 kV         Human body model           Solder Reflow Temperature Max         245 °C         Solder Reflow Temperature Limit         217 °C liquidus: 40 –60 s           Sensors         IMU - Gyros         IMU - Accels         Mags         Pressure           Operating Range         ±4000 °/sec         ±16 g         ±2500 μT         30–125           In-Run Bias Stability         < 1.5 °/hr	Absolute Maximu	m Ratings	MAX		
Storage Temperature         -40 to 125 °C           Overpressure         600 kPa           ESD rating         ± 2 kV         Human body model           Solder Reflow Temperature Max         245 °C           Solder Reflow Temperature Limit         217 °C liquidus: 40 − 60 s           Sensors         IMU - Gyros         IMU - Accels         Mags         Pressure           Operating Range         ±4000 °/sec         ±16 g         ±2500 μT         30-125           In-Run Bias Stability         < 1.5 °/hr	Acceleration		10,000 g		
Overpressure         600 kPa           ESD rating         ± 2 kV         Human body model           Solder Reflow Temperature Max         245 °C           Solder Reflow Temperature Limit         217 °C liquidus: 40 – 60 s           Sensors         IMU - Gyros         IMU - Accels         Mags         Pressure           Operating Range         ±4000 °/sec         ±16 g         ±2500 μT         30–125           In-Run Bias Stability         < 1.5 °/hr	Operating Temperature	9	-40 to 85 °C		
Overpressure         600 kPa           ESD rating         ± 2 kV         Human body model           Solder Reflow Temperature Max         245 °C           Solder Reflow Temperature Limit         217 °C liquidus: 40 – 60 s           Sensors         IMU - Gyros         IMU - Accels         Mags         Pressure           Operating Range         ±4000 °/sec         ±16 g         ±2500 μT         30–125           In-Run Bias Stability         < 1.5 °/hr	Storage Temperature		-40 to 125 °C		
Solder Reflow Temperature Max         245 °C           Solder Reflow Temperature Limit         217 °C liquidus: 40 –60 s           Sensors         IMU - Gyros         IMU - Accels         Mags         Pressure Press	Overpressure		600 kPa		
Solder Reflow Temperature Limit         217 °C liquidus: 40 – 60 s           Sensors         IMU - Gyros         IMU - Accels         Mags         Pressure Pressure           Operating Range         ±4000 °/sec         ±16 g         ±2500 μT         30–125           In-Run Bias Stability         < 1.5 °/hr	ESD rating		± 2 kV	Human bo	ody model
Sensors         IMU - Gyros         IMU - Accels         Mags         Pressure           Operating Range         ±4000 °/sec         ±16 g         ±2500 μT         30-125           In-Run Bias Stability         < 1.5 °/hr	•		245 °C		
Operating Range         ±4000 °/sec         ±16 g         ±2500 μT         30–125           In-Run Bias Stability         < 1.5 °/hr	Solder Reflow Tempera	ture Limit	217 °C liquidus: 40	-60 s	
Operating Range         ±4000 °/sec         ±16 g         ±2500 μT         30–125           In-Run Bias Stability         < 1.5 °/hr	Sensors	IMU - Gyros	IMU - Accels	Mags	Pressure
In-Run Bias Stability	Operating Range				30–125 kPa
Random Walk         0.16 °/vhr         0.02 m/s/vhr           Non-linearity         0.02 % FSR         0.02 % FSR           Noise Density         5 mdps/vHz         60 μg/vHz         Pa/vHz           Bias Error over -40C to 85C         0.3 °/s RMS         3,7 mg RMS           Max Output Rate         1 KHz         1 KHz         100 Hz         50 Hz           Bandwidth         250 Hz         218 Hz         50 Hz         5 Hz           Alignment Error         0.03°         0.03°         0.05°           Resonant Freq.         2.6/2.17 KHz         20 KHz           Sampling Rate         8 KHz         4 KHz         300 Hz         200 Hz           Resolution         *0.0076 °/sec         *122 μg         0.3 μT         0.03 Fz           *1KHz resolution after oversampling         (2 cm           Function         IMX <sup>TM</sup> +RTK         +Dual					
Non-linearity         0.02 % FSR         0.02 % FSR           Noise Density         5 mdps/VHz         60 μg/VHz         Pa/VF           Bias Error over -40C to 85C         0.3 °/s RMS         3,7 mg RMS         AlkHz         100 Hz         50 Hz           Max Output Rate         1 KHz         1 KHz         100 Hz         50 Hz         50 Hz           Bandwidth         250 Hz         218 Hz         50 Hz         5 Hz           Alignment Error         0.03°         0.03°         0.05°           Resonant Freq.         2.6/2.17 KHz         20 KHz           Sampling Rate         8 KHz         4 KHz         300 Hz         200 F           Resolution         *0.0076 °/sec         *122 μg         0.3 μT         0.03 F           *1KHz resolution after oversampling         (2 cm           Function         IMX <sup>TM</sup> +RTK         +Dual	•	•			
Noise Density         5 mdps/VHz         60 μg/VHz         Pa/VHz           Bias Error over -40C to 85C         0.3 °/s RMS         3,7 mg RMS           Max Output Rate         1 KHz         1 KHz         100 Hz         50 Hz           Bandwidth         250 Hz         218 Hz         50 Hz         5 Hz           Alignment Error         0.03°         0.03°         0.05°           Resonant Freq.         2.6/2.17 KHz         20 KHz           Sampling Rate         8 KHz         4 KHz         300 Hz         200 Hz           Resolution         *0.0076 °/sec         *122 μg         0.3 μT         0.03 Fz           *1KHz resolution after oversampling         (2 cm           IMX <sup>TM</sup> +RTK         +Dual	Non-linearity	· · · · · · · · · · · · · · · · · · ·			
Bias Error over -40C to 85C         0.3 °/s RMS         3,7 mg RMS           Max Output Rate         1 KHz         1 KHz         100 Hz         50 Hz           Bandwidth         250 Hz         218 Hz         50 Hz         5 Hz           Alignment Error         0.03°         0.03°         0.05°           Resonant Freq.         2.6/2.17 KHz         20 KHz           Sampling Rate         8 KHz         4 KHz         300 Hz         200 Hz           Resolution         *0.0076 °/sec         *122 μg         0.3 μT         0.03 Fz           *1KHz resolution after oversampling         (2 cm           Function         IMX <sup>TM</sup> +RTK         +Dual					Pa/VHz
Max Output Rate         1 KHz         1 KHz         100 Hz         50 Hz           Bandwidth         250 Hz         218 Hz         50 Hz         5 Hz           Alignment Error         0.03°         0.03°         0.05°           Resonant Freq.         2.6/2.17 KHz         20 KHz           Sampling Rate         8 KHz         4 KHz         300 Hz         200 Hz           Resolution         *0.0076 °/sec         *122 μg         0.3 μT         0.03 Fz           *1KHz resolution after oversampling         (2 cm           Function         IMX <sup>TM</sup> +RTK         +Dual					,
Bandwidth         250 Hz         218 Hz         50 Hz         5 Hz           Alignment Error         0.03°         0.03°         0.05°           Resonant Freq.         2.6/2.17 KHz         20 KHz           Sampling Rate         8 KHz         4 KHz         300 Hz         200 Hz           Resolution         *0.0076 °/sec         *122 μg         0.3 μT         0.03 Fz           *1KHz resolution after oversampling         (2 cm           Function         IMX <sup>TM</sup> +RTK         +Dual	Max Output Rate	•		100 Hz	50 Hz
Alignment Error         0.03°         0.03°         0.05°           Resonant Freq.         2.6/2.17 KHz         20 KHz           Sampling Rate         8 KHz         4 KHz         300 Hz         200 Hz           Resolution         *0.0076 °/sec         *122 μg         0.3 μT         0.03 F           *1KHz resolution after oversampling         (2 cm           Function         IMX <sup>TM</sup> +RTK         +Dual	•				5 Hz
Resonant Freq.         2.6/2.17 KHz         20 KHz           Sampling Rate         8 KHz         4 KHz         300 Hz         200 Hz           Resolution         *0.0076 °/sec         *122 μg         0.3 μT         0.03 F           *1KHz resolution after oversampling         (2 cm           Function         IMX <sup>TM</sup> +RTK         +Dual					
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$					
Resolution *0.0076 °/sec *122 $\mu g$ 0.3 $\mu T$ 0.03 F *1KHz resolution after oversampling (2 cm Function IMX <sup>TM</sup> +RTK +Dual	•	•		300 Hz	200 Hz
*1KHz resolution after oversampling (2 cm Function IMX™ +RTK +Dual					0.03 Pa
Function IMX™ +RTK +Dual	•		MO	υ.υ μι	(2 cm)
	, ,		IMX™	+RTK _	· · · · ·
CIVILLO ALL EIPLOIDELPI LIIVILII	Gyro & Accelerometer (IMU)		•	·	• Duai
Magnetometer & Barometer • • •			<u> </u>	-	•
Roll, Pitch, Heading (AHRS)	<u> </u>		-	•	•
Heading, Velocity, Position (INS)		•		•	•

Electrical (IMX-5)				
Power Draw	Min	Тур	Max	Units
IMU @ 1KHz		95	105	mW
w/ AHRS, INS @ 250Hz		100	110	mW
Supply Voltage (Vcc)	3.0	3.3	3.6	V
I/O Pin MAX Voltage Range	-0.5		3.6	V
Total Output Current, All Pins			100	mA
I/O Pin Output Current			20	mA
I/O Pin Input low-level	0.99			V
I/O Pin Input high-level	2.31	3.3	3.6	V
I/O Pin Output high-level		3.3		V
STROBE input frequency			1	KHz
Rising Slope of VIN*	2.4			V/ms

\*The supply rising slope must be higher than minimum rating for proper function.

Electrical (RUG-3)				
	Min	Тур	Max	Units
Supply Voltage (VIN)	4.0		20	V
RUG-3-IMX-5-RTK + Antenna				
Current Draw @ 5V, 250Hz*		185		mA
Power Consumption @250Hz*		927		mW
Power Consumption @100Hz*				mW
Power Consumption – Dual		1470		mW
*Navigation filter update rate.				

Mechanical (II	VIX-5)		
		Units	
Size	15.6 x 12.5 x 2.9	mm	
Weight	0.8	grams	
Mechanical (R	UG-3)		
		Units	Conditions
Size	30.5 x 25.4 x 9.9	mm	RUG-3
	30.5 x 25.4 x 14.8		RUG-3-RTK/Dual
IP Rating	40		No liquid protection
Mounting Tab	30.836	mm	
Hole Spacing			
Weight	14.0	grams	
Connectors	Main: Harwin# G125-N	/IV11205L1P,	GPS 1/2: MMCX
Communication	ons & I/O		
IMX-5 Interface	USB, U	JART x3, SPI	
RUG-3 Interface	USB, UART x2, RS232, RS485, CAN*, SPI		
Max Baud Rate:			

וועות-ט ווונפוומנפ	USB, UART XS, SFI
RUG-3 Interface	USB, UART x2, RS232, RS485, CAN*, SPI
Max Baud Rate:	
SPI	10 Mbps
UART, RS422, RS485	3 Mbps
RS232	500 Kbps
Strobe Inputs / Outputs	4/1

<sup>\*</sup> Available in future firmware release.



Development Kits available on our website.

