



# MTLT305 Series

Dynamic Tilt Sensor / IMU Module



The ACEINNA MTLT305 Series products are dynamic tilt sensors with 3D Accelerometer and 3D Rate Sensor (Gyro) with CAN J1939 and RS232 Interfaces. The MTLT305x integrates highly reliable MEMS based accelerometers and gyroscopes, a 32-bit microprocessor, protection and supporting circuitry for robust operation in many environments. The MTLT305x uses advanced sensor fusion, Extended Kalman Filtering, and calibration algorithms to achieve 0.5 degree pitch and roll, and <10 milli-g acceleration accuracy in a wide variety of dynamic conditions. The MTLT305D is packaged in a rugged over-molded plastic enclosure. The MTLT305M is packaged and potted in a rugged metal housing. Both models feature an IP67 rated Ampseal 16 6-position connector. Mounting dimensions are the same for both housings.

### Applications

- Construction (boom tilt measurement, bucket leveling)
- Tilt/slope safety for dynamic vehicles (forklift, aerial lifts)
- Vehicle Attitude Monitoring
- Robotics Control



Construction



Aerial Lift



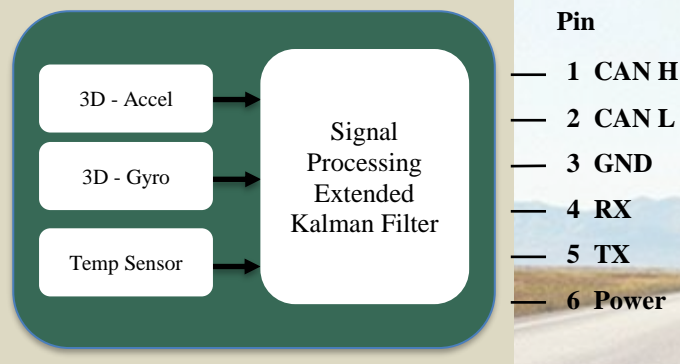
Platform



### Features

- High Performance 3 axis MEMS Accelerometer and Inclination Sensor
- Gyro compensated with Extended Kalman Filter for accurate Pitch and Roll in dynamic conditions
- 0.15° Static accuracy
- 0.50° Dynamic accuracy
- CAN 2.0 J1939 Interface
- Miniature IP68, 69K enclosure
- Wide Temp Range, -40C to +85C
- High Reliability, MTBF > 50k hours
- CE Certified
- RoHS REACH Compliant
- ITAR- Free

### MTLT305D



### Tools and Support

- NAV-VIEW provides an easy to use graphical interface to display, record, playback, and analyze all the MTLT305x parameters over the RS232 port.
- NAV-VIEW can also be used to set a wide range of user-configurable fields in the MTLT305x to optimize the system performance for your dynamic applications.
- NAV-VIEW software is available for download from ACEINNA's website at: [www.aceinna.com/support](http://www.aceinna.com/support)



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## Performance Characteristics

Ta = 25°C, VDC = 15.0V, unless otherwise stated

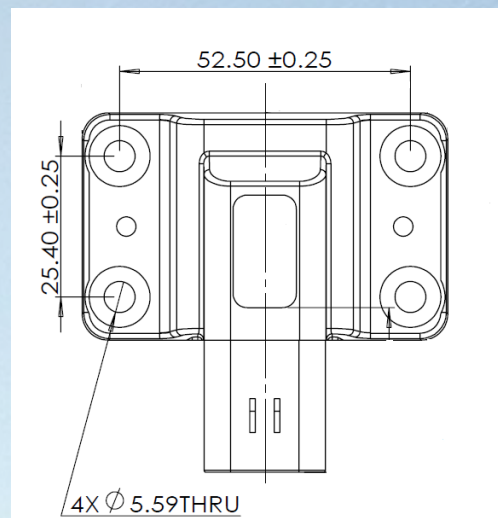
Sensor Performance	
Axes (Tilt)	Pitch; Roll
Range	±70°, ±180°
Resolution	<0.05°
Max Angular Rate	≤400 °/s
Static Accuracy <sup>1</sup> TA = 25 C	0.15°
Dynamic Accuracy <sup>2</sup>	0.50°
Temperature Stability <sup>3</sup>	0.05°
Axes (Acceleration)	X, Y, Z
Range	±78 m/s/s
Resolution	0.01 m/s/s
Accuracy (±1g input; -40 to 85C)	±0.1 m/s/s
Output Data Rate (Hz)	Selectable to 100 Hz
Electrical	
Input Voltage	4.9 V – 32 V
Power Consumption	<400 mW
Interface	CAN 2.0 J1939
Environment	
Operating Temperature	-40 °C to 85 °C
Storage Temperature (MTLT305D)	-55 °C to 105 °C
Storage Temperature (MTLT305M)	-55 °C to 85 °C
Physical	
Enclosure	Plastic
Interface	Ampseal 16 6-Position
Footprint (mm)	65 x 66
Protection Class	IP 68, 69K (IP67 Mated)

Note 1: RMS Error over entire operating angle range

Note 2: RMS Error during 50-minute Passenger Vehicle Drive test, referenced to Novatel system

Note 3: RMS Error of deviation from 25C value. Pitch and Roll = 0

## Mounting Dimensions



Please Reference User Manual for full-dimensional drawings of MTLT305D and MTLT305M

## Absolute Maximum Ratings

Input Voltage (V)	36 (1hr)
Load Dump	ISO16750-2(2010) pulse 5b (Vc = 56V, Ri = 8Ω)
Shock	1000 g ½ sine 0.1 ms any Axis

## Part Ordering Information

Part Number	Description
MTLT305D	Over-molded plastic rugged housing - Dynamic Pitch, Roll, 3D Linear Acceleration and 3D Rotational Rate Sensor
MTLT305M	Metal, potted housing - Dynamic Pitch, Roll, 3D Linear Acceleration and 3D Rotational Rate Sensor
MTLT305D Cable	Mating Connector with Flying leads

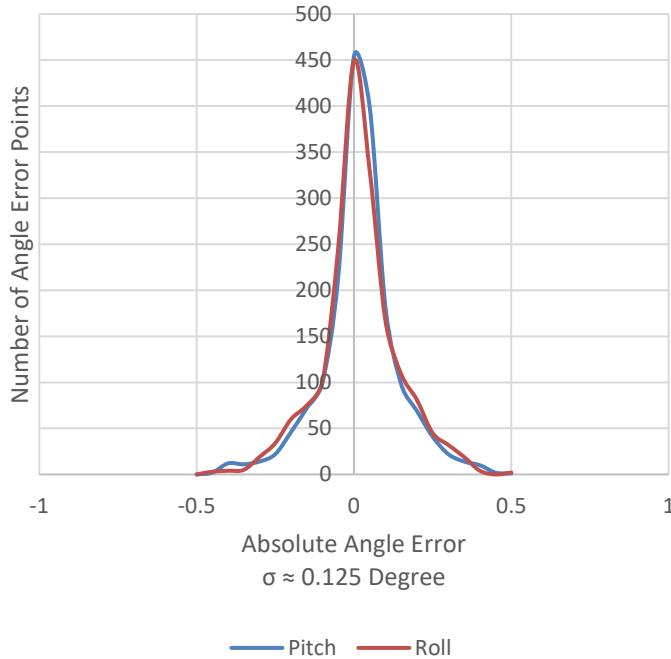
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### Supplemental Performance Information Static Angle Accuracy and Temperature Stability

#### MTLT305x Error over Angle Range

90 Random Production Devices

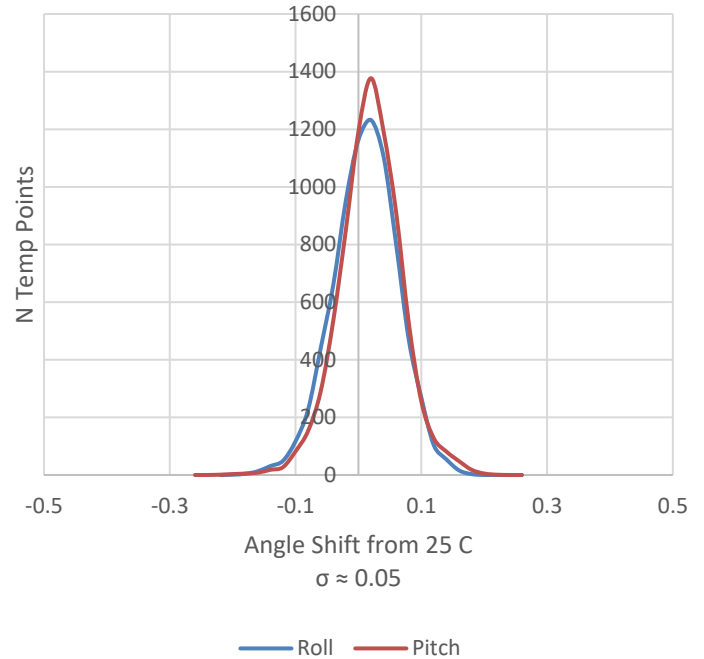
$T_A = 25C$



#### MTLT305x - Angle Deviation from 25C

30 Random Production Device

-40 C to + 85 C

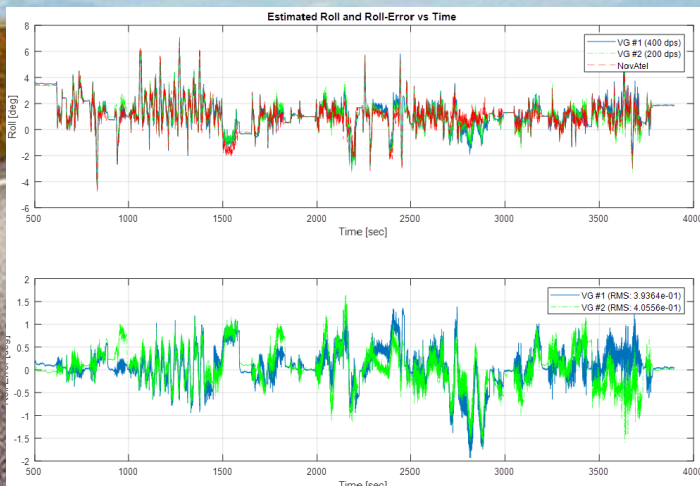


### Dynamic Performance

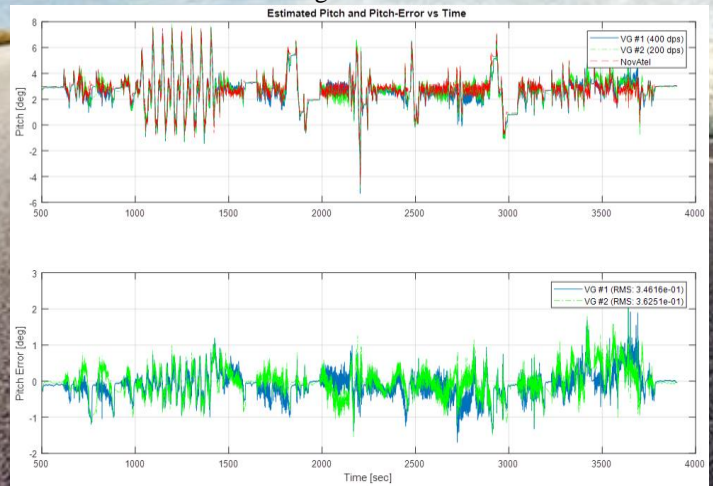
RMS Error of MTLT305x as compared to Novatel Reference unit during 50 minute passenger vehicle Drive Test

Roll RMS Error	Pitch RMS Error
0.394	0.346

#### Roll and Roll Error During Drive Test



#### Pitch and Pitch Error During Drive Test



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