

# MEMS Sensors & Sensing Elements





## Accelerometers

Murata has 30 years of experience in low-g acceleration sensors for industrial and safety critical automotive applications. The extensive accelerometer product range includes high performance digital accelerometers based on 3D MEMS technology.

Murata accelerometers offer a number of excellent product features for the most demanding applications. The robust sensing element design with over damped frequency response enables excellent performance even in harsh and vibrating environments. The sensing element is also environmentally protected, resulting in excellent performance and reliability in humid environments and varying temperatures..

| Series  | No. of axes | Range                  | Supply voltage | Temperature range | Sensitivity                            | Signal bandwidth              | Output type | Typical applications  |
|---------|-------------|------------------------|----------------|-------------------|--|-------------------------------|-------------|---|
| SCA800  | 1           | ±2 g                   | 3.3 V          | -40 ... +125 °C   | 900 LSB/g                              | 50 Hz                         | Digital/SPI | Automotive safety critical applications, IMU, Industrial applications |
| SCA2100 | 2           | ±2 g                   | 3.3 V          | -40 ... +125 °C   | 900 LSB/g                              | 45 Hz                         | Digital/SPI |   |
| SCA3100 | 3           | ±2 g<br>±6 g           | 3.3 V          | -40 ... +125 °C   | 900 LSB/g<br>650 LSB/g                 | 45 Hz                         | Digital/SPI |   |
| SCA3300 | 3           | ±3 g<br>±6 g<br>±1.5 g | 3.3 V          | -40 ... +125 °C   | 2700 LSB/g<br>1350 LSB/g<br>5400 LSB/g | 70 Hz<br>70 Hz<br>70 Hz/10Hz* | Digital/SPI |   |

\* user selectable via SPI bus



## Inclinometers

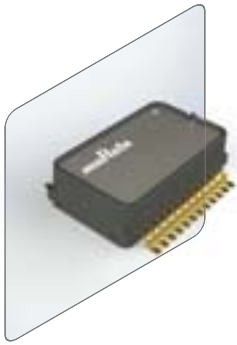
Murata inclination sensors are an optimum choice for high accuracy leveling and inclination measurement instruments. Highest accuracy 3-axis inclination measurement is available with Murata's SCL3300. This sensor also features direct inclination angle output making it a perfect choice for variety of different use cases and applications.

With the best shock durability available on the MEMS market, Murata inclinometers provide trouble-free measurements in moving machines, vehicles, airplanes, construction machines and handheld devices.

| Series  | No. of axes | Range                 | Supply voltage | Temperature range | Sensitivity                                     | Signal bandwidth | Output type | Typical applications  |
|---------|-------------|-----------------------|----------------|-------------------|---|------------------|-------------|---|
| SCA830  | 1           | ±90°, ±1 g            | 3.3 V          | -40 ... +125 °C   | 32000 LSB/g                                     | 6.25 Hz          | Digital/SPI | Levelling, Tilt sensing, Machine control, Structural health monitoring, Inertial measurement units (IMUs), Robotics, Positioning and guidance systems |
| SCL3300 | 3           | ±1.8g/±90°            | 3.3 V          | -40 ... +125 °C   | 6000 LSB/g/*182 LSB/°                           | 40 Hz            | Digital/SPI |   |
|         |             | ±3.6g/±90°<br>- /±10° |                |                   | 3000 LSB/g/*182 LSB/°<br>12000 LSB/g/*182 LSB/° | 70 Hz<br>10 Hz   |             |   |

\* Inclination output

Murata Electronics Oy's product range also includes inclination modules and sub-assemblies. For more information, please refer to the product datasheets available online at [www.murata.com](http://www.murata.com)



## Gyroscopes

Murata develops and manufactures gyroscope components based on the company's proven 3D MEMS technology and highly integrated electronics.

Industrial gyros offer a performance level that typically has been available only for expensive module products. The sensing elements and measuring circuitry are assembled into a premolded plastic dual-in-line (DIL) package, protected with silicon gel and covered with a stainless steel lid. All products are RoHS compatible and suitable for lead-free reflow soldering.

| Series  | No. of axes                          | Range                          | Supply voltage  | Temperature range           | Sensitivity  | Signal bandwidth                          | Output type | Typical applications   |
|---------|--------------------------------------|--------------------------------|-----------------|-----------------------------|--|---|-------------|--|
| SCC2130 | X-axis gyro<br>3-axis accelerometer  | ±125°/s, ±6 g                  | 3.3 V           | -40 ... +125 °C             | 50 LSB/(°/s)<br>1962 LSB/g                           | 60 Hz/10 Hz*                              | Digital/SPI |  |
| SCR2100 | X-axis gyro                          | ±125 °/s                       | 3.3 V           | -40 ... +125 °C             | 50 LSB/g   | 60 Hz/10 Hz*                              | Digital/SPI |  |
| SCC2230 | Z-axis gyro<br>3-axis accelerometer  | ±125°/s, ±6 g<br>±125°/s, ±2 g | 3.3 V           | -40 ... +125 °C             | 50 LSB/(°/s)<br>1962 LSB/g (6 g)<br>5886 LSB/g (2 g) | 60 Hz/10 Hz*                              | Digital/SPI | Platform stabilization, Motion analysis and control, Guidance and navigation systems |
| SCC3134 | X-axis gyro<br>3-axis accelerometer  | ±300°/s<br>±6 g (14.6 g)       | 3.0 V ... 3.6 V | -40 ... +110 °C<br>(+125°C) | 80 LSB/(°/s)<br>3924 LSB/g<br>(1962 LSB/g)           | 13 Hz, 20 Hz,<br>46 Hz, 200 Hz,<br>300 Hz | Digital/SPI |  |
| SCC3234 | Z-axis gyro<br>3-axis accelerometer  | ±300°/s<br>±6 g (14.6 g)       | 3.0 V ... 3.6 V | -40 ... +110 °C             | 80 LSB/(°/s)<br>3924 LSB/g<br>(1962 LSB/g)           | 13 Hz, 20 Hz,<br>46 Hz, 200 Hz,<br>300 Hz | Digital/SPI |  |
| SCC3334 | XZ-axis gyro<br>3-axis accelerometer | ±300°/s<br>±6 g (14.6 g)       | 3.0 V ... 3.6 V | -40 ... +110 °C             | 80 LSB/(°/s)<br>3924 LSB/g<br>(1962 LSB/g)           | 13 Hz, 20 Hz,<br>46 Hz, 200 Hz,<br>300 Hz | Digital/SPI |  |

\* User selectable via SPI bus



## 6DoF Components

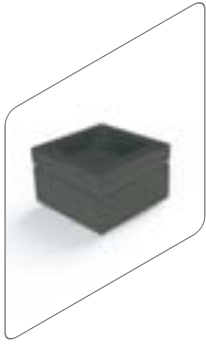
Murata has developed new MEMS (Micro-Electro-Mechanical Systems) 6DoF (Six Degrees of Freedom) inertial sensors for safety critical automotive applications, autonomous off road vehicles, dynamic inclination sensing and GNSS positioning support. The sensor enables further advancement in technology and novel solutions for advanced driver / operator assistance systems, autonomous vehicles and GNSS based measurement instruments.

Orthogonality of measurement axes are calibrated at Murata, enabling system integrators to leave out this costly and performance critical process step. Both industrial and automotive versions include several advanced self-diagnostic features and can achieve full compliance with ASIL-D (Automotive Safety Integrity Level).

The sensors are a perfect starting point for system integrators to create high performance IMUs for various applications.

| Series  | No. of axes             | Range                   | Supply voltage  | Temperature range | Sensitivity                       | Signal bandwidth               | Output type |
|---------|-------------------------|-------------------------|-----------------|-------------------|-----------------------------------|--------------------------------|-------------|
| SCHA634 | 3-axis gyro 3-axis acc. | ±125 or ±300°/s<br>±6 g | 3.0 V ... 3.6 V | -40 ... +110 °C   | 160 or 80 LSB/(°/s)<br>4905 LSB/g | 13 Hz, 20 Hz,<br>46 Hz, 300 Hz | Digital/SPI |
| SCHA63T | 3-axis gyro 3-axis acc. | ±125 or ±300°/s<br>±6 g | 3.0 V ... 3.6 V | -40 ... +110 °C   | 160 or 80 LSB/(°/s)<br>4905 LSB/g | 13 Hz, 20 Hz,<br>46 Hz, 300 Hz | Digital/SPI |

For more information, please refer to the product datasheets available online at [www.murata.com](http://www.murata.com)



## Pressure Sensing Elements

Murata SCB10H capacitive absolute pressure sensing elements have been designed for applications that require a small size and ultra low power consumption. The SCB10H pressure sensing elements are ideal for implantable medical devices thanks to their inherent accuracy, reliability, small size and enabled low power consumption.

The SCB10H pressure sensing element allows the possibility for volume OEM customers to integrate pressure measurement functions in an optimal way into their products.

| Parameter                    | Unit   | B012          | B250                              | Typical applications           |
|------------------------------|--------|---------------|-----------------------------------|--------------------------------|
| Measuring range              | kPa    | 30–120        | 100–2500                          |                                |
| Capacitance at min. pressure | pF     | 7.8           | 7.3                               |                                |
| Capacitance at max. pressure | pF     | 11.8          | 13.9                              | Medical devices,<br>Barometers |
| Capacitance dynamics         | pF     | 4.0           | 6.6                               |                                |
| Sensitivity                  | ff/kPa | 55 (@100 kPa) | 1.3 (@100 kPa)<br>6.5 (@2500 kPa) |                                |

For more information, please refer to the product datasheets available online at [www.murata.com](http://www.murata.com)