



Murata
products for IoT applications

Murata products for IoT applications

Avnet Abacus offers a wide range of Murata products for IoT applications, including PIR, shock, MEMS and ultrasonic sensors, as well as RF components and modules for wireless communication applications. Murata's modules are used in a variety of applications and the extensive range of products includes WiFi, BLE, LPWAN, RFID reader/writer, and others. In addition, a range of high-energy storage devices complements the sensor and wireless range, and is suitable for a wide variety of applications from battery back-up to energy harvesting systems. To download datasheets visit avnet-abacus.eu/murata-products-for-iot.

FURTHER RESOURCES

For further design resources including Murata's 3D MEMS brochure and product highlights, and to view the on-demand webinar 'Designing LoRa and Sigfox nodes', visit avnet-abacus.eu/murata.

Content

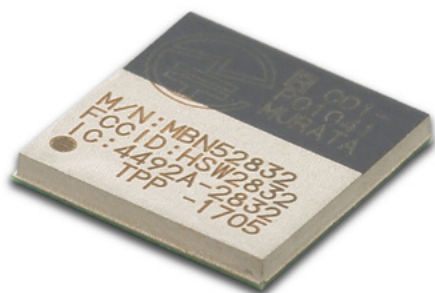
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Wireless modules

Murata's RF modules offer customers the benefits of simplified and quicker product development cycles and small size, as well as radio certification across a range of wireless technologies. They allow developers to make their new generation products "connected" with minimum effort put into the radio hardware, offering time to concentrate on making the products stand out in the market.

MBN52832 BLE module



MBN52832 is a Bluetooth Low Energy/NFC module. It enables ultra-low power connectivity for data communication. The module integrates Nordic Bluetooth Low Energy IC, RF front end and crystal into a very small form factor. The built-in ARM Cortex M4 core with 64KB RAM and 512KB flash provides a high performance engine and rich interfaces for a variety of IoT applications such as sensor networks, device control etc. This RF certified module can significantly reduce the system designer's burden and help to reduce the time-to-market.

This is an ideal solution for smart devices, medical and healthcare and M2M applications.

Features and benefits

- Bluetooth® v5, ANT, NFC Tag
- Nordic nRF52832 Bluetooth Smart®
- Built-in ARM Cortex M4 with 64KB RAM and 512KB flash
- Dimension 7.4 x 7.0 x 0.9mm
- Packaging: LGA
- Bluetooth/ANT antenna configuration:
 - > On-board PCB antenna
 - > Supports external antenna from pin pad
- Maximum transmit power: +4.0dBm (@ antenna port LDO mode)
- Receive sensitivity: -93dBm @ 1Mbps (LDO mode)
- Power consumption:
 - > TX 7mA @ 3.5dBm (DC-DC mode)
 - > RX 6mA (DC-DC mode)
- Host interface : UART, SPI
- Other interfaces : 20 GPIO, 5 ADC, UART, SPI (master and slave), I2C, PWM and Debug SWD
- Operating temperature range: -40 to 85°C
- RoHS compliant
- MSL level 3 in accordance with JEDEC J-STD-020
- Regulatory certificates: FCC, IC, ETSI, TELEC (plan)

ZY - BLE MODULE

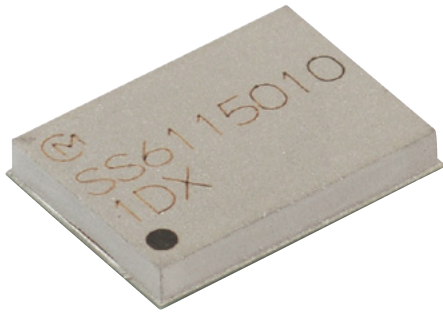


Type ZY Bluetooth SMART module supports Bluetooth v4.1 BLE standard. All protocol stacks required for Bluetooth low energy communication are built in, including various healthcare profiles.

Features and benefits

- Bluetooth low energy (BT4.1)
- BLE chip – dialog DA14580
- Size: 7.4 x 7.0 x 1.0 mm (l x w x h)
- Package – LGA (37 pads)
- Antenna configurations – pcb trace antenna
- Transmit power – -1dBm typ
- Host interfaces – UART/SPI/I2C
- Other interfaces – ADC, GPIO
- ARM Cortex-M0 with 32kB OTP (+ROM+SRAM)
- Operating temperature range: -40°C to 85°C
- RoHS compliant
- FCC/IC certified; CE compliant

1DX – RF WiFi AND BT MODULE



The Type 1DX is an ultra-small module, including 2.4GHz WLAN and Bluetooth functionality. Based on Cypress CYW4343W, the module provides high-efficiency RF front-end circuits. The module is designed to fit into small spaces and minimal external circuitry is required to complete a radio design; add an antenna, power source, clocks, processor, and associated interface hardware and the hardware is complete. To ease Wi-Fi certification, the type 1DX module complies with IEEE 802.11b/g/n and Bluetooth version 4.1 plus EDR, power class 1 (10dBm max) + BLE. The Module is supported for use with WICED SDK and MCU or with i.MX6 processor and Linux or Android O/S. Avnet can offer support for use with Xilinx Zynq platform using MiniZED starter kit.

Features and benefits

- 2.4GHz IEEE 802.11b/g/n radio technology
- Classic and Smart Bluetooth support (BT4.1)
- RF chip – Broadcom BCM4343W
- Size: max 6.95 x 5.15 x 1.1 mm (l x w x h)
- Package – LGA (46 pads)
- External antenna
- WiFi transmit power – +19dBm max
- Bluetooth transmit power – +14dBm
- Host interfaces – SDIO / UART, PCM
- Operating temperature range: -30°C to 70°C
- RoHS compliant
- Supported for WICEDTM software
- Supported for i.MX6 Platform

LPWAN – LOW POWER WIDE AREA MODULE



The CMWX1ZZABZ-078 is a stand-alone, compact and low power solution that supports the LoRaWAN™ and Sigfox wireless protocol. Measuring 12.5 x 11.6 x 1.76 mm, in a metal shielded 57 pad LGA package, this Murata module is one of the world's smallest solutions for adding LoRa or Sigfox connectivity to applications. The module is designed to be a stand-alone solution incorporating an SX1276 RF transceiver from Semtech and a STM32LO Cortex M0+ microcontroller from ST Microelectronics, with 192Kbytes of flash memory available as open MCU solution. This module supports 860~930MHz for EU, US and APAC support in a single part.

Features and benefits

- Radio Chip – Semtech SX1276
- MCU – STMicro STM32L (Cortex M0+)
- Antenna configurations – external
- Host interfaces – UART/SPI/I2C
- Other interfaces – GPIO/ADC
- RF Tx Power – +14dBm (+20dBm with PA boost)
- Vdd – 2.2V ~ 3.6V
- Operating temperature range – -40°C ~ +85°C
- RoHS compliant
- Metal shield can
- FCC/IC certified and CE compliant
- LoRa Alliance certified

Sensors

Murata's sensors are widely used in many different applications, such as consumer electronics, automobiles, industrial and others. Avnet Abacus has put together a selection of sensors from the wide product line-up to illustrate how Murata's products can help in optimising your efforts towards IoT and smart technologies.

TEMPERATURE

NCP SERIES

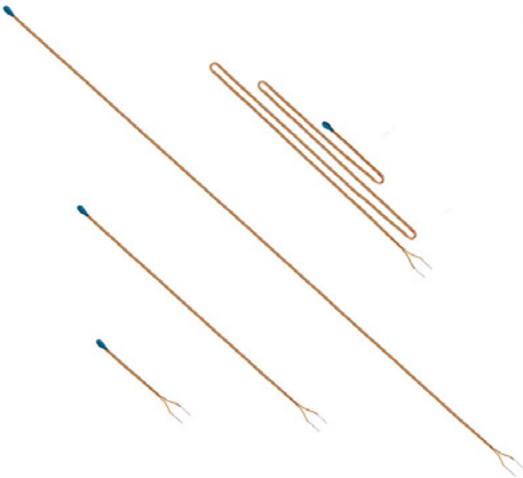


The NCP series offers chip type sensors ideal for temperature sensing and compensation. Available in sizes from 0603 to 2012 mm, NCP sensors are widely used in mobile phones, PCs, and LED lighting equipment.

Applications

- Temperature compensation for transistor, IC and crystal oscillator in mobile communications
- Temperature compensation in general use of electric circuits
- Temperature sensor for rechargeable batteries

NXFT SERIES

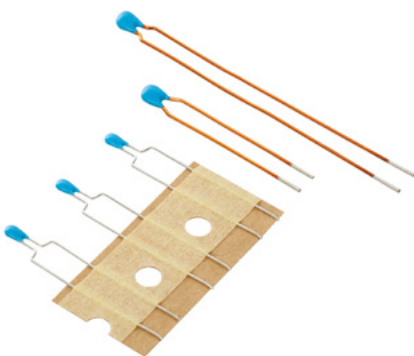


The Murata NXF series of lead NTC thermistors offers temperature sensors featuring one of the industry's smallest sensor heads, allowing for compact size and fast response. The flexible leads are available in lengths from 25 - 150 mm. Murata's outstanding ceramic technology gives these NTC thermistors the characteristics to meet various customer requirements.

Features and benefits

- Flexible lead wire type
- Small head: 2mm diameter max
- Good thermal response and accuracy
- Length: 25~150, 10mm step
- Resistance at 25°C: 10kohm+/-1%, 100kohm+/-1%

NXRT SERIES

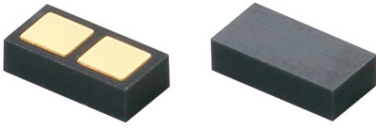


The Murata NXR series of self-standing lead NTC thermistors is based on NTC chips. Designed for use in room-temperature sensors, these thermistors can detect temperatures with high sensitivity and precision. Murata's unique technology for attaching lead wires achieves high lead strength in the NXR thermistors, allowing the customer to bend them for production of equipment. NXR series products can be supplied in taped formats.

Features and benefits

- Standard lead type
- Good thermal response and accuracy
- Length (uncoated): 10~40, 10mm step
- Length (coated): 25~45, 10mm step
- Resistance at 25°C: 2k,10k, & 100kohm+/-1%

FTN SERIES



The FTN series consists of the resin-moulded chip NTC thermistor, so the basic electro characteristics are the same as Murata's chip NTC thermistor. The FTN series can be attached to a metal heatsink or chassis directly by its electrical isolation, offering easy design for customers. The FTN series is stronger under mechanical stress due to resin mould, and offers good endurance.

Features and benefits

- Insulation by resin mould
- Strong under mechanical stress
- Quick response time
- Low profile
- Flip chip mounting by soldering
- Wire bonding technology available
- RoHS compliant

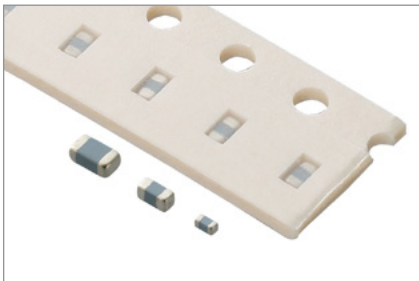
Applications

- Skin temperature detection
- Healthcare and medical wearables
- Temperature detection
- IGBT
- Handheld devices

HEAT / OVERCURRENT

PRG SERIES

The PRG series (resettable fuse) of PTC thermistors for short protection devices features rapid operation to protect the circuit if an abnormal current is generated, for example due to a short circuit. These products automatically return to their initial state when the overcurrent is eliminated, and can be used repeatedly. Use of ceramics means high reliability and quick protection after short circuits, allowing the customer to make equipment safer and easy to maintain. Compared with organic PTC elements and chip resistors with the same characteristics, the PRG series features high reliability with less change after mounting, meaning a long life cycle. This helps the customer achieve high performance with downsized materials.



Features and benefits

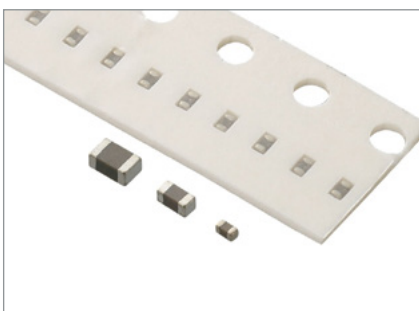
- Compact design to save board space
- Low profile
- Less characteristics change after mounting and energisation
- RoHS compliant and halogen free
- Safety standard (UL: E137188 VDE, TUV etc.)
- Wide range of operating temperatures: -20 to 85°C
- Fastest time to trip
- Current: 10 to 75mA
- Voltage: up to 32V

Applications

- Automotive (LED lamp, navigation, motor, electrical component)
- Factory automation equipment (motor drive, sensor controller)
- Charger
- USB port protection
- Mobile phone battery and port protection
- Note PC, tablet PC

PRF SERIES

Exploiting the PTC characteristic (a sharp increase in resistance above a certain temperature), the PRF series chip thermistors are used for over-temperature sensing in FETs, power ICs, and other heat generating areas. Use of the sharp change in electrical resistance translates into outstanding noise resistance. Sharp changes in resistance make it possible to accurately detect overheating in multiple areas using a very simple circuit connecting PTC thermistors in series. This allows the customer to reduce the number of IC ports, thereby downsizing equipment.



Features and benefits

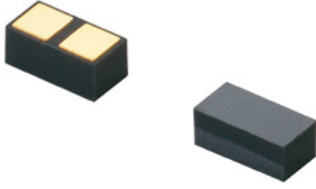
- Fast response
- Wide sensing temperature
- Compact design to save board space
- Low profile
- High reliability
- RoHS compliant and halogen free
- Safety standard (UL: E137188 VDE, TUV etc.)

Applications

- Automotive (LED lamp, navigation, motor, electrical component)
- Mobile phone
- Note PC, tablet PC
- Battery
- Power supply
- Motor and motor controller

FTP SERIES

The FTP series controls temperature and generates heat at a specified temperature when voltage is applied. Its small size means the FTP series can heat the required small parts, and electricity loss can be minimised. These help the customer downsize their heating construction without compromising on performance.



Features and benefits

- Self-temperature control by PTC characteristics
- Low voltage operation
- Top surface insulated SMD part
- Compact light design
- Fast time heating operation
- Small spot heating
- Design free heating layout

Applications

- Heating electric device for temperature compensation
- Removal of dew condensation or freeze (camera, mirror etc.)
- Beauty and health-care application (massager etc.)
- Paper dryer for PPC printer
- Automotive

INFRARED / LIGHT

PYRO ELECTRIC INFRARED SENSOR AND FRESNEL LENS - IRA-S210ST01



The IML-0685 and IML-0688 sensors detect infrared rays using the effects of pyroelectric ceramics, a kind of piezoelectric product. Used mainly in security equipment, the IRA series offers sensors that deliver high sensitivity and reliable performance enabled by Murata's ceramic technology and Hybrid IC technique expertise. The IRA-E series includes high quality and reliable products due to improvements in the manufacturing process. Combining high performance with low costs, the IRA-S series simplifies the use of pyroelectric infrared sensors in security applications and general consumer equipment.

Features and benefits

- Excellent S/N
- Low voltage operation available

Applications

- Intrusion detectors
- Lighting automation

ULTRASONIC

OPEN TYPE ULTRASONIC TRANSDUCERS - MA40S4R, MA40S4S



The MA40S4S and MA40S4R are ultrasonic transducers for various detections. The MA40S4S is used to transmit ultrasonic waves, the MA40S4R to receive them. Both consist of piezoelectric ceramics, a metal plate, resonator and resin case. The resonator has a funnel shape to transmit ultrasonic waves, which is generated by vibration of a resonator to the air efficiently (or to concentrate ultrasonic waves from the air on the centre of resonance). Sound pressure level (S.P.L.) is the most important characteristic for ultrasonic transducers. For example, in measuring distance application, high S.P.L. transducers enable detection over further distances. Due to their open type structure, MA40S4S / MA40S4R cannot be used in outdoor or automotive applications.

Features and benefits

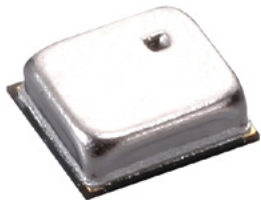
- High S.P.L. and sensitivity
- Compact size (10.0mm dia.)
- Open type structure (indoor applications)

Applications

- Object detection
- Measuring distance
- Dynamic body detection

BAROMETRIC PRESSURE

BAROMETRIC PRESSURE SENSOR – ZPA SERIES



This product is a capacitive type MEMS pressure sensor, consisting of an MEMS element, a Capacitor-to-Digital Converter (CDC) and a digital block with the digital correction, calibration non-volatile memory bits, FIFO, SPI and I2C interfaces. The product calculates pressure using two kinds of capacitance value, C_{sense} and C_{ref}, outputted from the MEMS element. It can offer low-current consumption, low drift for temperature change and low noise performance. Full calibration function implementation is included in ASIC, adding to ease of use.

Features and benefits

- Very low current consumption
- Very stable in temperature drift
- Very low noise
- Small size SMD package: 2.3 x 2.6 x 0.875 mm (l x w x h)

Applications

- Mobile/wearable device
- Weather forecasting
- Indoor navigation
- Z-axis detection
- Falling detection

INERTIAL FORCE

SHOCK SENSOR – PKGS-00GXP1-R, PKGS-00LDP1-R, PKGS-25SXAP1-R



The shock sensor detects vibration or acceleration induced as a result of shock and generates electrical charges which are proportional to the applied acceleration. The core technology is piezoelectric ceramic and applications include predictive maintenance, and a range of consumer applications including hard disc drives, gaming devices and digital photo frames.

Features and benefits

- Acceleration sensor device which is using charge amplifier based on unique Piezo ceramic technology
- Strong robustness for mechanical shock, smaller package with low profile and low power consumption

Applications

- Factory automation equipment
- Air-conditioner, air fans
- Transportation equipment

ACCELEROMETERS

SCA3100-D04

SCA3100-D04 is a high performance three-axis accelerometer component based on Murata capacitive 3D-MEMS technology. The component integrates high accuracy micromechanical acceleration sensing with a flexible SPI digital interface. Dual flat lead (DFL) housing guarantees reliable operation over product lifetime. SCA3100-D04 is designed, manufactured and tested for the high stability, reliability and quality requirements of automotive applications. The accelerometer has extremely stable output over a wide range of temperature, humidity and vibration. The component is qualified against AEC-Q100 standard and has several advanced self-diagnostics features. The DFL housing is suitable for SMD mounting and the component is compatible with RoHS and ELV directives. SCA3100-D04 is a part of Murata digital accelerometer family and fully compatible with single axis accelerometers (SCA800 series) and other multi axis accelerometers (SCA2100 series and SCA3100 series). SCA3100-D04 is targeted to applications with high stability requirements.



Features and benefits

- 3.3V supply voltage
- 2g measurement range
- 3-axis measurement XYZ directions
- 30mg offset stability over temp range
- Size: 7.6 x 3.3 x 8.6 mm (w x l x h)
- Qualified to AEC-Q100 standard
- Package, pin-out and SPI protocol compatible with Murata digital accelerometer product family
- Compatible with RoHS and ELV directives
- Dual Flat Lead (DFL) plastic package suitable for lead free soldering process

Applications

- Hill Start Aid (HSA)
- Electronic Parking Brake (EPB)
- Roll Over detection
- Suspension control
- Inclinerometers
- Motion and position measurements

SCA3100-D07

SCA3100-D07 is a high performance two-axis accelerometer component based on VTI capacitive 3D-MEMS technology. The component integrates high accuracy micromechanical acceleration sensing with a flexible SPI digital interface. Dual flat lead (DFL) housing guarantees robust operation over the product lifetime. SCA3100-D07 is designed, manufactured and tested for high stability, reliability and quality requirements of automotive applications. The accelerometer has extremely stable output over a wide range of temperature, humidity and mechanical noise and has several advanced self-diagnostics features. The component is AEC-Q100 qualified and is compatible with RoHS and ELV directives. SCA3100-D07 is a part of VTI digital accelerometer family and fully compatible with single axis accelerometers (SCA800 series) and other multi axis accelerometers (SCA2100 series and SCA3100 series). The SCA3100-D07 is targeted to automotive applications with high stability requirements and vibration robustness.



Features and benefits

- 3.3V supply voltage
- 6g measurement range
- 3-axis measurement XYZ directions
- ± 70 mg offset accuracy over temp range
- Internal temperature sensor
- Size: 7.6 x 3.3 x 8.6 mm (w x l x h)
- Package, pin-out and SPI protocol compatible with VTI digital accelerometer product family
- RoHS compliant Dual Flat Lead (DFL) plastic package suitable for lead free soldering process and SMD mounting

Applications

- Electronic Stability Control (ESC)
- Hill Start Aid (HSA)
- Electronic Parking Brake (EPB)
- Roll Over
- Suspension
- Inclination
- Integrated inertial measurement
- Industrial applications

SCA100-D07

The SCA100T-D07 is a 3D-MEMS-based dual axis accelerometer that enables tactical grade performance for Inertial Measurement Units (IMUs) operating in tough environmental conditions. The measuring axes of the sensor are parallel to the mounting plane and orthogonal to each other. Wide measurement range and bandwidth, low repeatable temperature behaviour, low output noise, together with robust sensing elements and packaging, make the SCA100T-D07 the ideal choice for challenging inertial sensing applications with high stability and tough environmental requirements.



Features and benefits

- Measurement range $\pm 12g$
- Measurement bandwidth 400 Hz
- Low noise ratiometric analogue voltage outputs
- Excellent bias stability over temperature and time
- Digital SPI temperature output
- Comprehensive failure detection features
- True self-test by deflecting the sensing element's proof mass with electrostatic force
- Continuous sensing element interconnection failure check
- Continuous memory parity check

- RoHS and lead free soldering process compliant
- Robust design, high shock durability (20000g)

Applications

- IMU, AHRS
- Avionics
- UAV
- Navigation and guidance instruments
- Platform stabilisation
- Vibration monitoring
- Oil & gas surveying and drilling
- Train and rail industry

INCLINOMETERS

SCA100T

The SCA100T series is a 3D-MEMS-based dual axis inclinometer family that provides instrumentation grade performance for levelling applications. The measuring axes of the sensing elements are parallel to the mounting plane and orthogonal to each other. Low temperature dependency, high resolution and low noise, together with a robust sensing element design, make the SCA100T the ideal choice for levelling instruments. Due to their over-damped sensing elements, the Murata inclinometers are insensitive to vibration, and can withstand mechanical shocks of up to 20000g.



Features and benefits

- Dual axis inclination measurement (X and Y)
- Measuring ranges $\pm 30^\circ$ SCA100T-D01 and $\pm 90^\circ$ SCA100T-D02
- 0.0035° resolution (10 Hz BW, analogue output)
- Sensing element controlled over damped frequency response ($\sim 3dB$ 18Hz)
- High stability over temperature and time
- Single +5 V supply
- Ratiometric analogue voltage outputs
- Digital SPI inclination and temperature output
- Comprehensive failure detection features
- True self-test by deflecting the sensing elements' proof mass by electrostatic force
- Continuous sensing element interconnection failure check

- Continuous memory parity check
- RoHS compliant
- Compatible with Pb-free reflow solder process

Applications

- Platform levelling and stabilisation
- 360° vertical orientation measurement
- Levelling instruments
- Construction levels

SCA103T

The SCA103T series is a 3D-MEMS-based single axis inclinometer family that uses the differential measurement principle. The high calibration accuracy combines extremely low temperature dependency, high resolution and low noise together with a robust sensing element design, to make the SCA103T an ideal choice for high accuracy levelling instruments. The Murata inclinometers are insensitive to vibration due to having over damped sensing elements, and can withstand mechanical shocks of 20000g.



Features and benefits

- Measuring ranges $\pm 15^\circ$ SCA103T-D04 and $\pm 30^\circ$ SCA103T-D05
- 0.001° resolution (10 Hz BW, analogue output)
- Sensing element controlled over damped frequency response (-3dB 18Hz)
- Excellent stability over temperature and time
- Common mode error and noise reduction using the differential measurement principle
- Single +5 V supply
- Ratiometric analogue voltage outputs
- Digital SPI inclination and temperature output
- Comprehensive failure detection features
- True self-test by deflecting the sensing elements' proof mass by electrostatic force

- Continuous sensing element interconnection failure check
- Continuous memory parity check
- RoHS compliant
- Compatible with Pb-free reflow solder process

Applications

- Platform levelling and stabilisation
- Rotating laser levels
- Levelling instruments
- Construction levels

SCA61T SERIES

The SCA61T series is a 3D-MEMS-based single axis inclinometer family that provides instrumentation grade performance for levelling applications. Low temperature dependency, high resolution and low noise together with robust sensing element design make the SCA61T an ideal choice for levelling instruments. The Murata inclinometers are insensitive to vibration, due to their over-damped sensing elements and can withstand mechanical shocks of 20000g.



Features and benefits

- Measuring ranges $\pm 30^\circ$ SCA61T-FAHH1G and $\pm 90^\circ$ SCA61T-FA1H1G
- 0.0025° resolution (10 Hz BW, analogue output)
- Sensing element controlled over-damped frequency response (-3dB 18Hz)
- Excellent stability over temperature and time
- Single +5 V supply
- Ratiometric analogue voltage outputs
- Digital SPI inclination and temperature output
- Comprehensive failure detection features

- True self-test by deflecting the sensing elements' proof mass by electrostatic force
- Continuous sensing element interconnection failure check
- Continuous memory parity check
- RoHS compliant
- Compatible with Pb-free reflow solder process

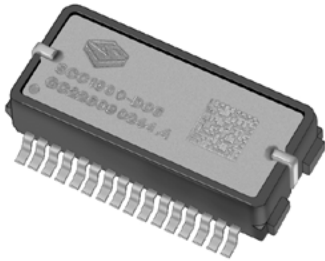
Applications

- Platform levelling and stabilisation
- Levelling instruments
- Acceleration and motion measurement

GYRO SENSORS

SCC1300 SERIES

The SCC1300 series of combined high performance gyroscopes and accelerometer components is based on Murata's proven capacitive 3D-MEMS technology. The components integrate angular rate and acceleration sensing with flexible, separate digital SPI interfaces. The small, robust packaging guarantees reliable operation over the product's lifetime. The housing is suitable for SMD mounting. The components are compatible with RoHS and ELV directives, and are designed, manufactured and tested for high stability, reliability and quality requirements. The angular rate and acceleration sensors provide highly stable output over wide ranges of temperature and mechanical noise. The angular rate sensor bias stability is in the elite of MEMS gyros. The components are also exceptionally insensitive to all mechanical vibrations and shocks, and have several advanced self-diagnostics features. The SCC1300 series is targeted at applications demanding high stability with tough environmental requirements.



SCC1300-D02

Features and benefits

- ± 100 °/s angular rate measurement range
- ± 2 g 3-axis acceleration measurement range
- Angular rate measurement around X axis
- Angular rate sensor exceptionally insensitive to mechanical vibrations and shocks
- Superior bias stability for MEMS gyroscopes ($<1^\circ/h$)
- Small size: 8.5 x 18.7 x 4.5 mm (w x l x h)
- RoHS compliant robust packaging suitable for lead-free soldering process
- Temperature range -40 °C... $+125$ °C

Applications

- Inertial Measurement Units (IMUs) for highly demanding environments
- Platform stabilisation and control
- Motion analysis and control
- Roll over detection
- Robotic control systems
- Guidance systems
- Navigation systems

SCC1300-D04

Features and benefits

- ± 300 °/s angular rate measurement range
- ± 6 g 3-axis acceleration measurement range
- Angular rate measurement around X axis
- Angular rate sensor exceptionally insensitive to mechanical vibrations and shocks
- Superior bias stability for MEMS gyroscopes
- Small size: 8.5 x 18.7 x 4.5 mm (w x l x h)
- RoHS compliant robust packaging suitable for lead-free soldering process
- Temperature range -40 °C... $+125$ °C

Applications

- Inertial Measurement Units (IMUs) for highly demanding environments
- Platform stabilisation and control
- Motion analysis and control
- Roll over detection
- Robotic control systems
- Guidance systems
- Navigation systems

SCC2000 SERIES

The SCC2000 series of combined high performance angular rate and accelerometer sensor components based on Murata's proven capacitive 3D-MEMS technology. Signal processing is done in one mixed signal ASIC that provides angular rate and acceleration output via flexible SPI digital interface. Sensor elements and ASIC are packaged to 24 pin pre-moulded plastic housing that guarantees reliable operation over the product's lifetime. The series is designed, manufactured and tested for high stability, reliability and quality requirements, and has extremely stable output over a wide range of temperature, humidity and vibration. The components have several advanced self-diagnostics features, are suitable for SMD mounting and are compatible with RoHS and ELV directives. The SCC2000 series is targeted at applications demanding high stability with tough environmental requirements.



SCC2130-D08

Features and benefits

- $\pm 125^\circ/\text{s}$ X-axis angular rate measurement range
- $\pm 6\text{g}$ 3-axis acceleration measurement (XYZ) range
- $-40^\circ\text{C} \dots +125^\circ\text{C}$ operating range
- 3.0V...3.6V supply voltage
- Size: 15.0 x 8.5 x 4.3 mm (l x w x h)
- RoHS compliant robust SOIC plastic package suitable for lead free soldering process

Applications

- Inertial Measurement Units (IMUs) for highly demanding environments
- Platform stabilisation and control
- Motion analysis and control
- Roll over detection
- Robotic control systems
- Machine control systems
- Navigation systems



SCC2230-D08

Features and benefits

- $\pm 125^\circ/\text{s}$ Z-axis angular rate measurement range
- $\pm 6\text{g}$ 3-axis acceleration measurement (XYZ) range
- $-40^\circ\text{C} \dots +125^\circ\text{C}$ operating range
- 3.0V...3.6V supply voltage
- Size: 15.0 x 8.5 x 4.3mm (l x w x h)
- RoHS compliant robust SOIC plastic package suitable for lead free soldering process

Applications

- Inertial Measurement Units (IMUs) for highly demanding environments
- Platform stabilisation and control
- Motion analysis and control
- Roll over detection
- Robotic control systems
- Machine control systems
- Navigation systems



SCC2230-E02

Features and benefits

- $\pm 125^\circ/\text{s}$ Z-axis angular rate measurement range
- $\pm 2\text{g}$ 3-axis acceleration measurement (XYZ) range
- $-40^\circ\text{C} \dots +125^\circ\text{C}$ operating range
- 3.0V...3.6V supply voltage
- Size: L15.0 x W8.5 x H4.3 mm (l x w x h)
- RoHS compliant robust SOIC plastic package suitable for lead free soldering process

Applications

- Inertial Measurement Units (IMUs) for highly demanding environments
- Platform stabilisation and control
- Motion analysis and control
- Roll over detection
- Robotic control systems
- Machine control systems
- Navigation systems

MAGNETIC

FR SERIES



The FR sensor uses a semiconductor MR element (SMR) and a permanent magnet. It outputs a para-sine wave depending on the turn and movement of the ferromagnetic gear or rack which it faces.

Features and benefits

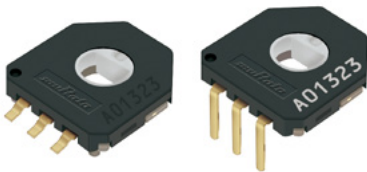
- The rotary sensor to detect gear or rack for motor
- The output wave pattern of this para-sine wave is close to an ideal sine wave, therefore a wave pattern can be divided by an electric circuit
- Strong on the outside of magnetic field, cutting oil, dust, vibration
- Can give Z signal for the origin detection

Applications

- Spindle motor of the machine tool
- Motor (speed control and ABS use) of the train
- Needle position detection of the knitting machine
- Linear stroke detection of the cylinder

ANGLE

SV01 SERIES



Value analysis type for consumer and automotive market. These small 12mm-size position sensors can be operated at temperatures from -40 to +85°C, and have endurance of up to 1M cycles.

Features and benefits

- High durability: 1M cycles
- Pb free soldering: 260°C
- Operating temperature: -40°C to +85°C
- Terminal shape: SMD type and lead type
- Rotational rotor: through hole type
- Thin type: 2.1mm
- RoHS compliant

Applications

- Switches for white goods
- Switches for automotive
- Car audio
- Multi-function printer
- Robo
- Motor drive unit

SV03 SERIES



Value analysis type for consumer and automotive market. Small 12mm-size position sensors can be operated at temperatures from -40 to +125°C, and have endurance of up to 300,000 cycles.

Features and benefits

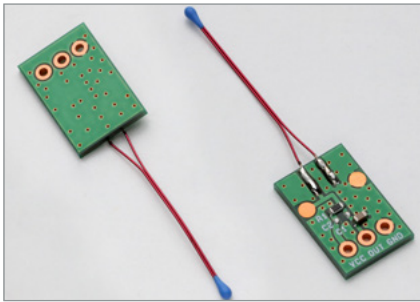
- High durability: 300k cycles
- Pb free soldering: 260°C
- Operating temperature: -40°C to +125°C
- Terminal shape: SMD type and lead type
- Rotational rotor: through hole type
- Thin type: 2.1mm
- RoHS compliant

Applications

- Switches for white goods
- Switches for automotive
- Car audio
- Multi-function printer
- Robo
- Motor drive unit

Evaluation boards

NTC THERMISTOR EVALUATION BOARD, MTHMR-N-0002A

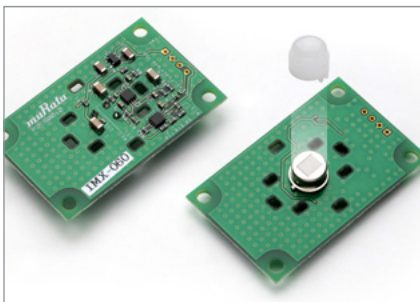


The evaluation board provides a simple way to test temperature sensors such as the NTC thermistor and NXFT series, as it can be connected to your micro or single-board computer. As a result, this is an integrated thermistor and peripheral circuit where the resistive component value varies in response to its temperature. The NXFT15XH103FA2B030 has 10kohm at 25°C as a standard item for a starter kit.

Applications

- Temperature sensing
- Temperature control for general automotive and healthcare equipment

PYROELECTRIC INFRARED SENSOR EVALUATION BOARD, IMX -070

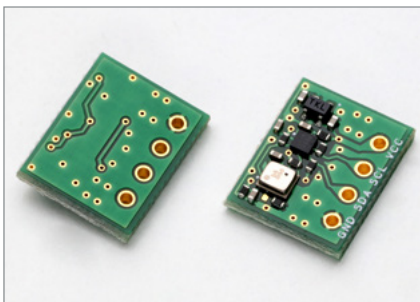


Every objects emits infrared radiation in response to its temperature. Murata's pyroelectric infrared sensor detects "change" of IR distribution within its sensing area, when the sensing area is determined by lens design. Amplifier and comparator circuits on the evaluation board amplify the sensor's output signal and generate digital high/low signals.

Application

- Human detection

BAROMETRIC PRESSURE SENSOR EVALUATION BOARD MEX-1031



This evaluation board will support you when checking and studying the function and performance of our barometric pressure sensor (ZPA2326-0311A). This is a capacitive type MEMS device, combined with ASIC incorporating an I2C interface. As its voltage level is 1.8V, this board includes a level converter which enables the user to connect directly to 3.3V system. Via I2C, we can also obtain information about the barometric pressure and temperature.

Application

- Atmospheric pressure measurement

Energy storage devices

Murata offers various energy devices that can contribute to performance improvement or miniaturisation of equipment. Murata's supercapacitors (EDLC), having ultra-low ESR and high reliability, can be used as a small auxiliary power supply for peak load assist, battery peak load levelling and high power back up.

Murata's small energy devices are secondary batteries which achieve better charge/discharge characteristics and have an extended service life superior to conventional batteries. Well suited as a power supply for wearable devices or sensor nodes for wireless sensor networks, these devices maintain flat voltage characteristics while accommodating a wide range of load characteristics.

SUPERCAPACITORS (EDLC)

Murata has introduced a range of high peak current supercapacitors (EDLC) in a variety of small, low profile packages. Murata's supercapacitor features low resistance (40m ohm to 300m ohm) and stable temperature characteristics, enabling it to be charged and discharged frequently over the operating range of -40°C to +70°C for the DMF series and -40 to +85°C for the DMT series. Capacitance values are available from 220mF to 1000mF to support a variety of energy requirement demands.

Murata has recently released the DMH series, which has an ultra-thin profile of 0.4mm, with a capacitance value of 35mF and rated voltage of 4.5V, ideal for compact devices.

DMT SERIES



Features and benefits

- High operational temperature up to 85°C
- High power - discharge up to 10A max. per piece
- High power density / small and slim package - optimum for portable devices or devices with limited space
- High energy / flexible charge-discharge
- Higher power is available by connecting several supercapacitors in series or parallel
- Low leakage current - 5µA@96hrs
- Long life cycle
- High reliability

Applications

- Backup: SSD, PLC, UPS, ATM, etc.
- Peak power assist: wearable devices, RKE, handy terminals, smart meters (wireless communication system, valve operation), motor-driven devices, etc.
- Battery peak load levelling: portable devices, GPS/GPRS tracking system, POS, insulin pump etc.
- Energy harvest: supercapacitor can be used as maintenance-free storage device with flexible charge-discharge

DMF SERIES



Features and benefits

- World's highest level output power - discharge up to 50W per piece
- High power density / small and slim package - optimum for portable devices or devices with limited space
- High energy / flexible charge-discharge - higher power is available by connecting several supercapacitors in series or parallel
- Low ESR and stable ESR even at lower temperatures
- Low leakage current - less than 5µA* @96hrs (example spec: DMF3Z5R5H474M3DTA0)

- High reliability - characteristic degradation is reduced by excellent package sealing and optimized electrochemical system
- Long charge-discharge life cycle

Applications

- Peak power assist for LED flash (DVC, DSC, smart phones), smart meters, electronic tag, e-paper application, RKE
- Battery peak load levelling for point of sale (POS) equipment, tablet PCs, audio, USB/MHL bus power, GPS/GPRS tracking systems, small motor applications, portable audio, power tools, etc.
- Energy-harvesting system: maintenance-free energy storage device

DMH SERIES



Features and benefits

- Low profile design (0.4mm)
- Rated voltage 4.5V
- Can be optimally used for peak power assist with lithium-ion batteries
- High capacitance 35mF and low ESR 300m ohm in slim package enables peak power assist in tens of milliseconds with 1A, for example.
- Operating temperature -40 to 85°C

Applications

- Wearable and tracking devices
- Smart card and card type devices
- E-paper devices/e-tags/electronic labels
- Patch type devices (mobile type electro-cardiogram, advanced wound care machine, wearable device etc.)
- Any portable device driven by coin cell battery

SMALL ENERGY DEVICES – UMA SERIES

Murata has developed the UMA series of small, large capacity energy devices. The UMA devices can be used as a small secondary battery in the same manner as a capacitor, but achieving high-rate charge/discharge characteristics and extended cycle life superior to conventional secondary batteries. As a power supply for wearable devices or sensor nodes for wireless sensor networks, the UMA series maintains a flat voltage characteristic whilst accommodating a wide range of load characteristics.

UMAC



A small, cylinder-type energy device.

Features and benefits

- High-rate charge/discharge - max. charge/discharge rate (current): 10 C (30 mA)
- Highly safe design - thermal runaway does not occur because of its small capacity and the use of chemically stable materials. UL1642 safety standard certification
- Extended service life cycle - charge (capacity) recovery rate of 80% or higher after 5,000 cycles
- Charge/discharge in wide input/output range
- Long working time due to low leakage current
- Quick start without pre-charging due to low leakage current
- Can backup system whilst replacing main battery

- Long backup time over 30sec
- High power discharge is available
- Can be charged with high input (10C,30mA)
- Quick start due to high input

A large-capacity, low profile laminate-type energy device.



Features and benefits

- High-rate charge/discharge - max. charge/discharge rate (current): 10C (240mA)
- Highly safe design: thermal runaway does not occur because of its small capacity and the use of chemically stable materials
- Extended service life cycle - charge (capacity) recovery rate of 90% or higher after 5,000 cycles
- Charge/discharge in wide input/output range
- Long working time due to low leakage current
- Quick start without pre-charging due to low leakage current
- Can backup system whilst replacing main battery
- UL 1642 safety standard
- Long backup time over 30sec
- High power discharge is available
- Can be charged with high input (10C, 240mA)
- Quick start due to high input

Applications

- Energy harvesting system
- Energy device for wireless sensor node
- Quick charge solution
- Back-up power supply for electronic devices

TECHNICAL SUPPORT

Avnet Abacus' team of technical specialists works closely with Murata to offer the most efficient solutions for your IoT design. To find out more or to discuss your specific design requirements, contact this team in your local language at [avnet-abacus.eu/ask-an-expert](https://www.avnet-abacus.eu/ask-an-expert).

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