Murata products for a Smart future

muRata
INNOVATOR IN ELECTRONICS

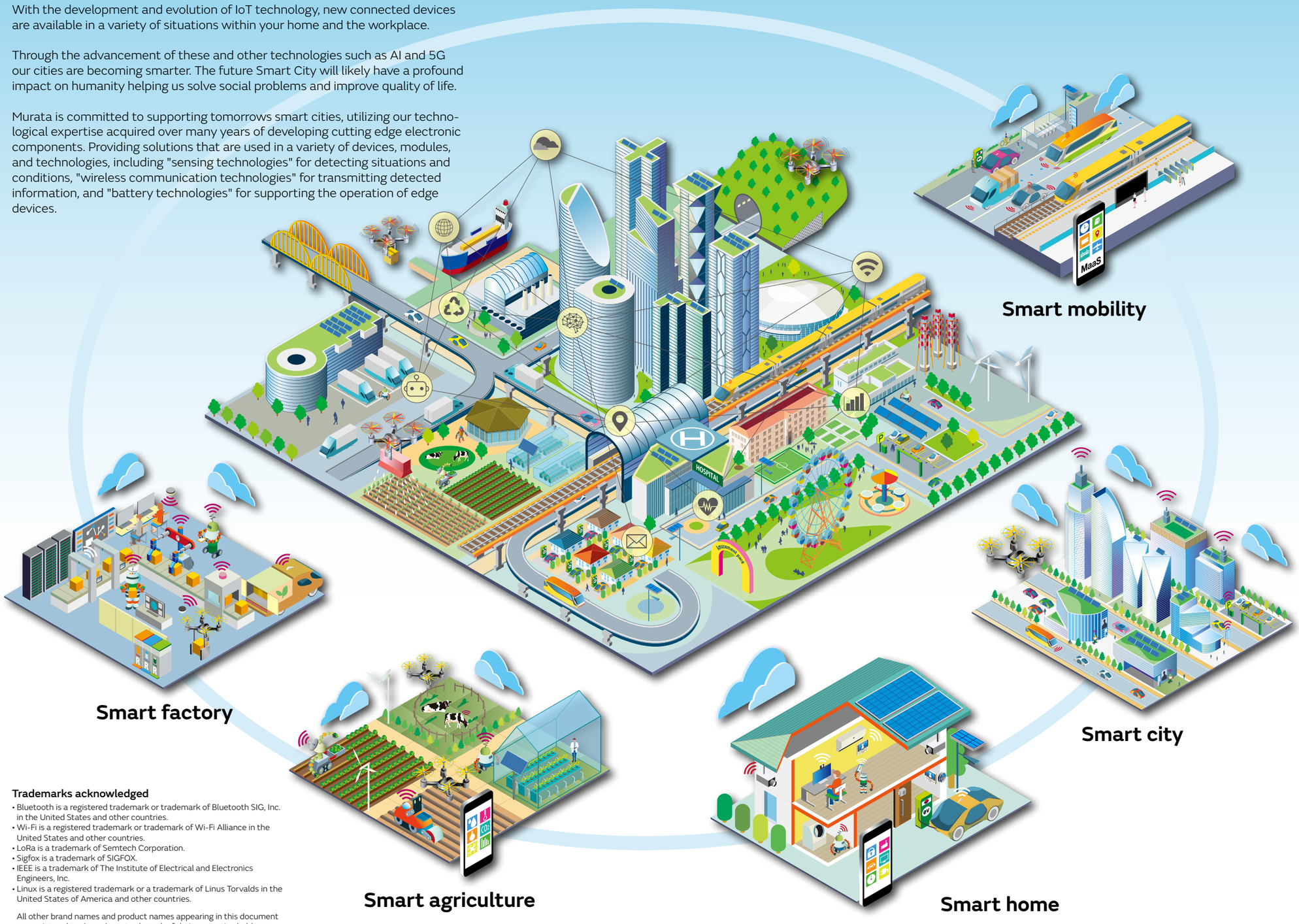
K71E.pdf
Sep.1,2020

Adding the smartest technology to a smart society

With the development and evolution of IoT technology, new connected devices are available in a variety of situations within your home and the workplace.

Through the advancement of these and other technologies such as AI and 5G our cities are becoming smarter. The future Smart City will likely have a profound impact on humanity helping us solve social problems and improve quality of life.

Murata is committed to supporting tomorrows smart cities, utilizing our technological expertise acquired over many years of developing cutting edge electronic components. Providing solutions that are used in a variety of devices, modules, and technologies, including "sensing technologies" for detecting situations and conditions, "wireless communication technologies" for transmitting detected information, and "battery technologies" for supporting the operation of edge devices.



Smart mobility

Smart factory

Smart agriculture

Smart home

Smart city

Wireless communications

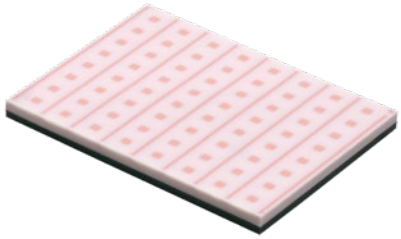
Sensors

Energy device solution

Power products solution

K71E.pdf
Sep.1,2020

60GHz Wi-Fi® module



Murata develops antenna module which applies to 802.11ad/11ay, one of the next generation wireless communication standard.
This standard is classified in mmwave technology and used band width per one channel is very broad.

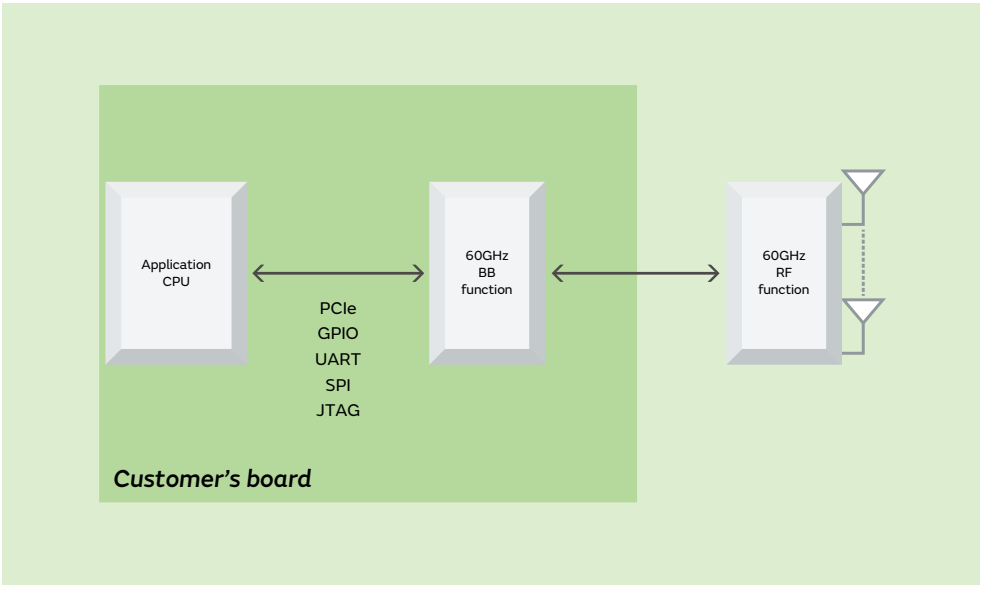
So, this standard can realize high communication speed (max. 10.01Gbps) and upload/download large data in short time.
Also, our module have optimum number of antennas in a variety of applications.

Features

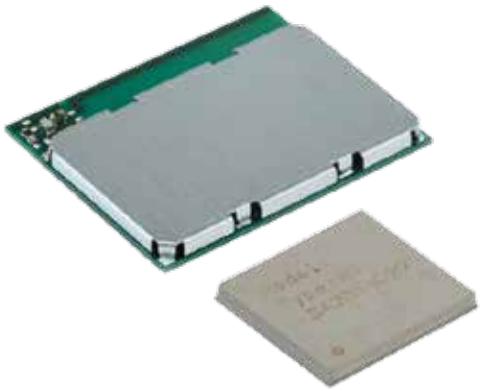
- **Suitable for outdoor situations with its high resistance to radio interference**
- **Short time transmission of large data such as 4K video**
- **Support application such as VR with low latency communication**

Product name	Dimensions (LxWxT)	Applications	Module type
Type1SV-TEMP	24.8x17.8x1.8mm (max.)	Outdoor	SMD
Type1WU-TEMP	12.3x3.3x1.74mm (max.)	Smartphone/AR	with connector
Type2AK-TEMP	15.0x8.0x1.72mm (max.)	VR	with connector

Block diagram



Wi-Fi® smart module



Murata is market leader in Wi-Fi® modules for embedded systems, providing superior quality and high-performance modules for high volume production. Murata's wireless modules will streamline your assembly operations, thus significantly reducing customer's design time. Additionally, we offer a variety of low-power products for sensor networks.

Type 1HD

Features

- **Highly integrated**
- **FCC/IC/CE/TELEC compliant**
- **Stand-alone complete Wi-Fi® 11b/g/n module**
  - CPU, Wi-Fi® function and stack (TCP/IP, Supplicant) are embedded.

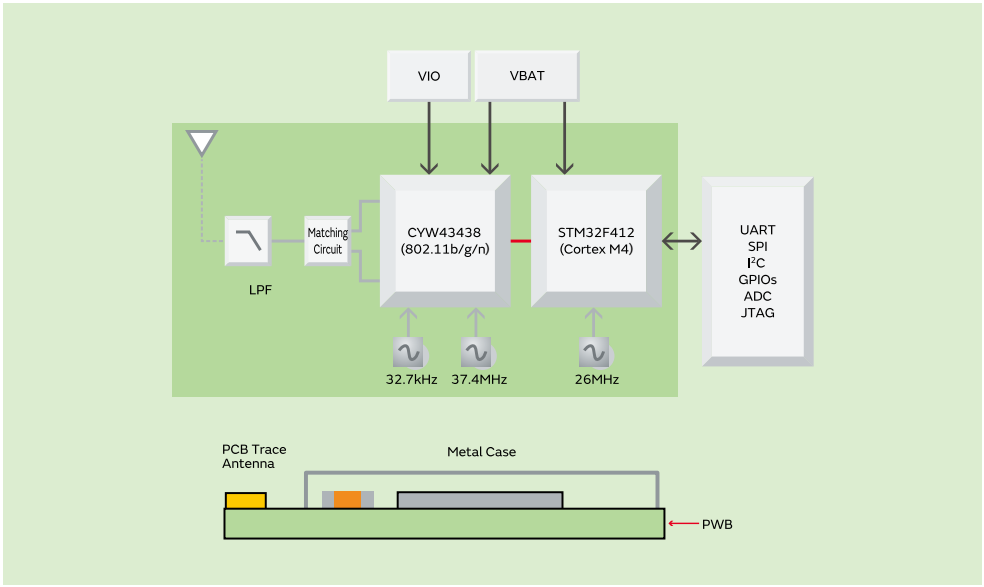
Applications

- **Home and building automation**
  - Lighting control
  - Heating, Ventilation, Air-conditioning
- **EMS (Energy Management System)**
- **Simple sensor network**
- **Home security**
- **Healthcare & fitness**

Product specifications

- **Wi-Fi® chipset**
  - Cypress CYW43438, 802.11b/g/n
- **MCU chipset: STM32F412**
  - ARM Cortex-M4 processor
  - ROM: 1MB, RAM: 256KB
- **Size: 21.0x17.5x2.3 (max.) (mm)**
- **Metal can shield FCC/CA/CE/TELEC certified**
- **Software**
  - Web server
  - Wi-Fi® STA and Soft AP modes
  - Network stack
- **WEP, WPA-PSK, WPA2-PSK**
- **Diverse peripheral interfaces**
  - UART/SPI/I²C/GPIOs/JTAG

Block diagram



Bluetooth® low energy module

BLE is an ultra-low power communication technology that enables up to years of operation with a button battery. Widespread adoption is expected in fields such as health management, fitness and home networks. BLE has also been adopted as a communication method by the Continua Health Alliance, a non-profit organization of healthcare and technology companies.

Type MBN52832

Features

- **Powerful MCU core with large RAM and flash for user application**
  - ARM Cortex M4; 64K RAM; 512K flash
- **Low power consumption**
  - Tx 7mA @ 3.5dBm (DCDC mode)
  - Rx 6mA (DCDC mode)
- **Rich peripheral interface – 20 GPIO ports**
- **Very small size**
  - 7.4x7.0x0.9mm (max.)
- **Fully certified**
  - FCC (US), IC (Canada), ETSI (EU), TELEC (Japan)
  - BT SIG Certificate
- **Support both on-board and external antenna version**
  - On-board PCB pattern antenna
  - External patch antenna
  - External dipole antenna

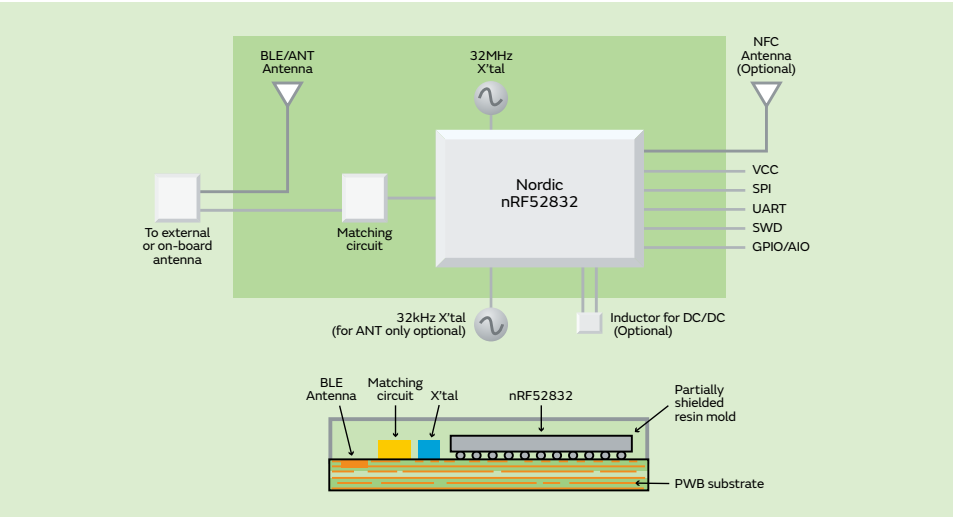
Product specifications

- **Chipset:** nRF52832 Bluetooth® LE IC
- **Dimension:** 7.4x7.0x0.9mm
- **Package:** LGA
- **Antenna:** on-board or external
- **Max output power:** +4dBm (LDO mode)
- **Interfaces:** UART, SPI, 20 GPIO, 5ADC, SWD, PWM, I²C
- **Operating voltage:** 1.7V to 3.6V
- **Operating temperature range:** -40 to 85 °C
- **OTA firmware upgrade**
- **RoHS compliant**
- **Regulatory certificate:** FCC/IC/ETSI/TELEC
- **Bluetooth® SIG qualification**

Applications

- **Proximity services**
- **Building automation**
- **Medical/Healthcare**
- **Beacon**

Block diagram



LPWA module

LPWA stands for Low-Power Wide Area wireless technology. LPWA wireless technology enables the IoT (Internet of Things) applications, which usually require lower power consumption and longer range coverage. Although the data transfer rates are comparatively slower than existing wireless communication technologies such as Wi-Fi®, Bluetooth®, mobile network, etc., LPWA technology is predicted to be widely used in the IoT and M2M as it enables lower consumption of connected devices. Murata have several solutions, LoRa®, Sigfox®, CAT-M1, NB-IoT.

Type ABZ

Features

- **Compact and low cost**
- **Battery life**
  - 10 years
- **Long range**
  - 10km
- **Pre-certified radio regulatory approvals**
  - 868 & 915 MHz spectrum

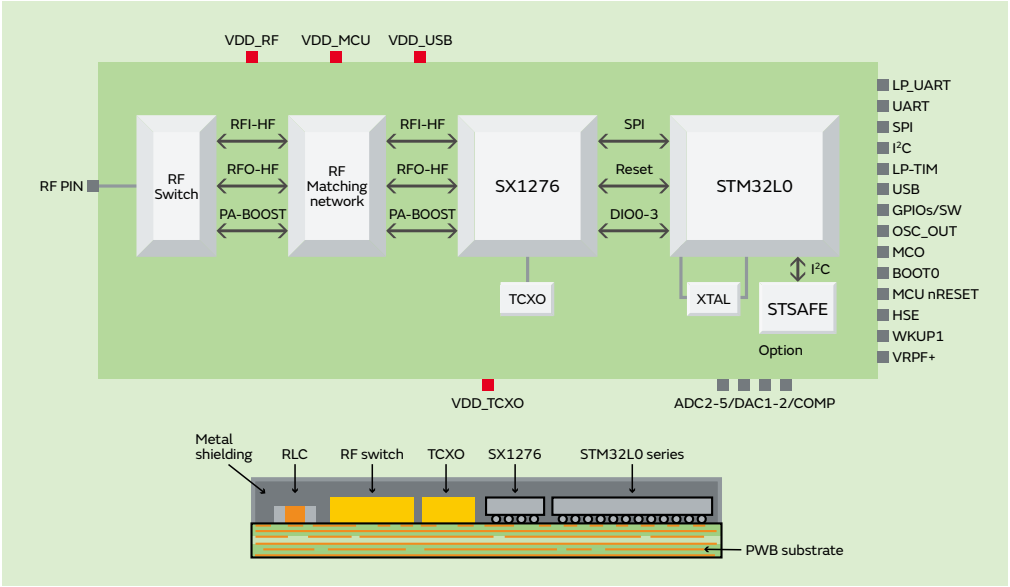
Applications

- **Smart metering**
- **Wearable**
- **Tracking**
- **M2M**
- **IoT edge nodes**

Product specifications

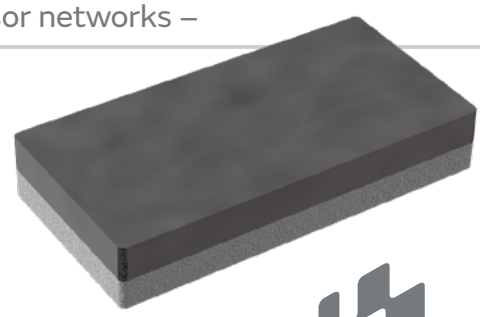
- **RF/BB chipset:** SX1276
- **MCU chipset:** STM32L0 series
  - CPU: Cortex M0+
  - RAM: 20KB
  - Flash: 192KB
- **Peripheral interfaces:** UART/SPI/I²C/GPIOs/ADC
- **Radio certification (Plan) :** FCC, IC, CE (R&TTE)
- **Module size:** 12.5x11.6x1.76mm
- **Package:** Metal shielding
- **Frequencies:** EU / US / India / Pacific
- **Operating temp:** -40 to +85 °C
- **Supply voltage:** 2.2V to 3.6V
- **RF transmit power:** +14dBm / +20dBm (with PA boost)
- **RF sensitivity:** -135dBm
- **Frequency band:** 860MHz-930MHz

Block diagram



Other LPWA solutions
NBIoT: 1SS, 1YS
Cat-M1/NBIoT: 1SC, 1WG

RFID technology



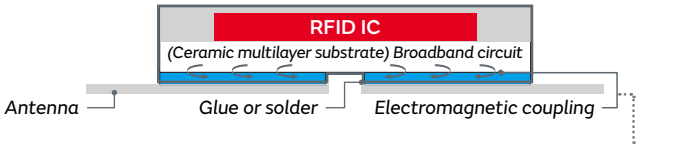
MAGICSTRAP

Our unique multi-layered circuit RF technology enabled "one of the world's smallest RFID tag". MAGICSTRAP has a robust package with built-in IC compliant with industry standards.

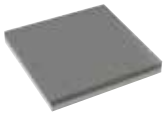
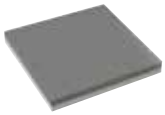
Features

- Small size
- Includes RF function into LTCC
- Both HF and UHF band

Construction diagram



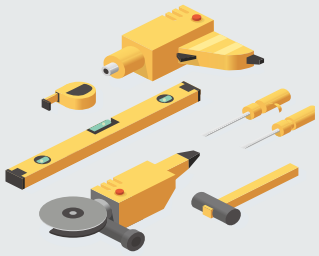
MAGICSTRAP for item level tagging

	LXMSJZNCMF-210	LXMS33HCNG-134	LXMS33HCNK-171
Appearance			
Standard	ISO18000-63 and EPC Global Gen2v2	ISO15693 NFC forum type 5	ISO14443 type A NFC forum type 2
Frequency band	UHF (865-928MHz)	HF (13.56MHz)	
Dimensions	1.2x1.2mm	3.2x3.2mm	3.2x3.2mm
Thickness	0.55mm max.	0.7mm max.	0.75mm max.
Read range (typ.)	10mm (500mW reader)	20mm (200mW reader)	15mm (200mW reader)
IC	Impinj Monza® R6	NXP ICODE® SLIX	NXP NTAG®210

Contents subject to change without notice

Applications

Tool management

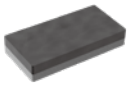


Anti-counterfeit / Authentication

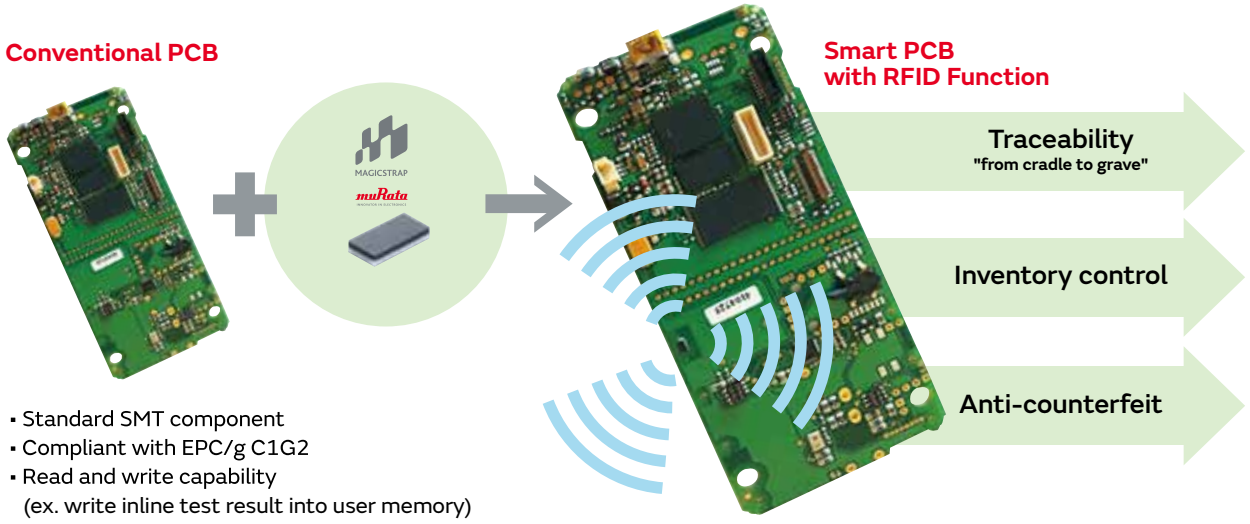
Auto counting

Verification

MAGICSTRAP for life-cycle management

	LXMS21ACMF-183
Appearance	
RFID standard	ISO18000-63 and EPC Global Gen2v2
Frequency	UHF (865-928MHz)
Dimensions	2.0x1.25mm
Thickness	0.5mm max.
Read range (typ.)	9m with external antenna (4W EIRP)
IC	Impinj Monza® R6

Contents subject to change without notice



- Standard SMT component
- Compliant with EPC/g C1G2
- Read and write capability
  (ex. write inline test result into user memory)

Contents subject to change without notice.

World-leading solutions

Murata wireless modules already account for more than 40% of the world market.

Our market-leading position in module design also extends to low power and battery operated sensor nodes, gateways/border routers, software development for both embedded, application software, and more.

We go beyond thinking about just the modules, to identify the optimal approach and platform for the complete end-to-end solution.

A wide range of modules

Murata offers an extensive range of wireless modules based on Cypress and NXP chipsets.

Modules with integrated MCU are used in combination with Cypress WICED software. Wi-Fi® and Bluetooth® are integrated and the MCU can be used to run an application.

Others are radio-only modules and they are used in combination with a MPU (Linux®) or MCU (RTOS).

These modules cover a wide range of specifications. From Single band Wi-Fi® 2.4GHz to dual band Wi-Fi® 11ac 2.4GHz and 5GHz with MIMO. Most of the options also include Bluetooth®.

With this variety of wireless modules we can cover a wide range of applications that can go from a small connected gadget or a sensor node to a high data rate video streaming device.

NXP GOLD PARTNER

Module with MCU

Type ABR
802.11 b/g/n Wi-Fi®
- *NXP 88MW320 chipset*
- *ARM Cortex-M4 200MHz*

Radio-only modules

Type 1ZM
Wi-Fi® 11/a/b/g/n/ac + Bluetooth® 5.1
- *NXP 88W8987 chipset*

Type 1YM
Wi-Fi® 11/a/b/g/n/ac MIMO + Bluetooth® 5.1
- *NXP 88W8997 chipset*

Modules with MCU

Type 1LD
Shielded ultra-small Wi-Fi® 11b/g/n + Bluetooth® 4.2 + MCU
- *Cypress CYW43438 chipset*
- *STM32 (ARM Cortex-M4F) MCU*

Type 1GC
Shielded ultra-small dual band Wi-Fi® 11a/b/g/n + Ethernet + MCU
- *Cypress CYW43907 chipset*
- *Processor: ARM Cortex-R4*

Radio-only modules

Type 1FX
Shielded ultra-small Wi-Fi® 11b/g/n
- *Cypress CYW43364 chipset*

Type 1DX
Shielded ultra-small Wi-Fi® 11b/g/n + Bluetooth® 5.1
- *Cypress CYW4343W chipset*

Type 1LV
Shielded ultra-small dual band Wi-Fi® 11a/b/g/n/ac + Bluetooth® 5.0
- *Cypress CYW43012 chipset*

Type 1MW
Shielded ultra-small dual band Wi-Fi® 11a/b/g/n/ac + Bluetooth® 5.0
- *Cypress CYW43455 chipset*

Type 1CX
Shielded ultra-small dual band Wi-Fi® 11a/b/g/n/ac 2x2 MIMO + Bluetooth® 5.0
- *Cypress CYW4356 chipset*

Type 1XA
Shielded ultra-small dual band Wi-Fi® 11a/b/g/n/ac 2x2 MIMO / RSDB + Bluetooth® 5.0
- *Cypress CYW54591 chipset* *(PCIe)*

Type 1XZ (SDIO)
Shielded ultra-small dual band Wi-Fi® 11a/b/g/n/ac 2x2 MIMO / RSDB + Bluetooth® 5.0
- *Cypress CYW54591 chipset* *(SDIO)*

Soldered-down in major development platforms

Many of Murata's extensive range of wireless modules are designed into to leading development platforms including Linux®, FreeRTOS and others, for example:

NXP i.MX
- i.MX 8M Quad EVK - **Type 1CX**
- i.MX 8M Mini EVK - **Type 1MW**
- i.MX 8M Nano EVK - **Type 1MW**
- i.MX 7ULP EVK - **Type 1DX**
- i.MX RT Alexa Voice Board - **Type 1DX**

Cypress WICED
- PSoC® 6 WiFi-BT Pioneer Board & Prototyping Kit - **Type 1DX/Type 1LV**
- CYW43907 Eval Kit - **Type 1GC**

ST Micro - Linux®
- STM32MPI Discovery Kit - **Type 1DX**

Micropython
- Arduino Portenta H7 - **Type 1DX**

i.MX 8M Nano EVK

STM32MP1 Discovery Kit

Arduino Portenta H7

PSoC® 6 MCU

Making IoT connectivity easier

Hardware team · Software team

Start	Evaluate	Select	Develop	Test	Qualify	Launch
	Ready-to-go hardware	Multiple module-down platforms plus fully modular solutions	Leverage existing designs Affordable off-the-shelf hardware	Reference designs Murata documentation and test	Leverage Murata reference certification to reduce test cost and time	Get to market faster

A rich support ecosystem throughout your projet lifecycle

muRata INNOVATOR IN ELECTRONICS

K71E.pdf
Sep.1,2020

Modular solutions

M.2 boards

Our M.2 modules, co-developed by Embedded Artists, are designed for evaluation, integration and ease-of-use. These professionally designed and proven M.2 modules provide easy evaluation of different Wi-Fi®/Bluetooth® solutions, lower your risk and shorten your time to market.

Features

- **Standard M.2 form factor**
- **Reference-certified antennas & snap-off option**
- **UFL connectors for antenna or conducted testing**
- **Comprehensive interface support including SDIO, PCIe, UART, PCM, and radio control lines**

Type 1XA
Dual band Wi-Fi® 11a/b/g/n/ac 2x2 MIMO / RSDB + Bluetooth® 5.0 *(PCIe)*

Type 1XZ
Dual band Wi-Fi® 11a/b/g/n/ac 2x2 MIMO / RSDB + Bluetooth® 5.0 *(SDIO)*

Type 1CX
Dual band Wi-Fi® 11a/b/g/n/ac 2x2 MIMO + Bluetooth® 5.0

Type 1YM
Dual band Wi-Fi® 11a/b/g/n/ac 2x2 MIMO + Bluetooth® 5.1

Type 1DX
Wi-Fi® 11b/g/n + Bluetooth® 5.1

Type 1MW
Dual band Wi-Fi® 11a/b/g/n/ac + Bluetooth® 5.0

Type 1LV
Dual band Wi-Fi® 11a/b/g/n/ac + Bluetooth® 5.0

Type 1ZM
Dual band Wi-Fi® 11a/b/g/n/ac + Bluetooth® 5.1

Fully modular system

Murata and Embedded Artists have developed a full modular system which offers IoT designers a quick, easy and cost-effective route to world-class connectivity.

Developer's Kits are available for use as your evaluation/prototyping platform. The kits includes the hardware and software components needed to get up-and-running with your software development on day 1.

- **Easily evaluate different Wi-Fi®/BT solutions – by just switching M.2 modules**
- **Fast-to-market integration**
- **Less regulatory burden**
- **Use certified antennas**
- **Re-use FCC certification**

1. Choose a COM/OEM board

Embedded Artists have developed a suite of COM (Computer-on-Modules) and OEM boards, integrating all core components around a variety of NXP processors and microcontrollers:

- **i.MX RT1062**
- **i.MX RT1052**
- **i.MX 8M Quad**
- **i.MX 8M Mini uCOM**
- **i.MX 8M Nano uCOM**
- **i.MX 6Quad**
- **i.MX 6DualLite**
- **i.MX 6Ultralite**
- **i.MX 6SoloX**
- **i.MX 7Dual**
- **i.MX 7Dual uCOM**
- **i.MX 7ULP uCOM**

2. Plug into COM carrier board

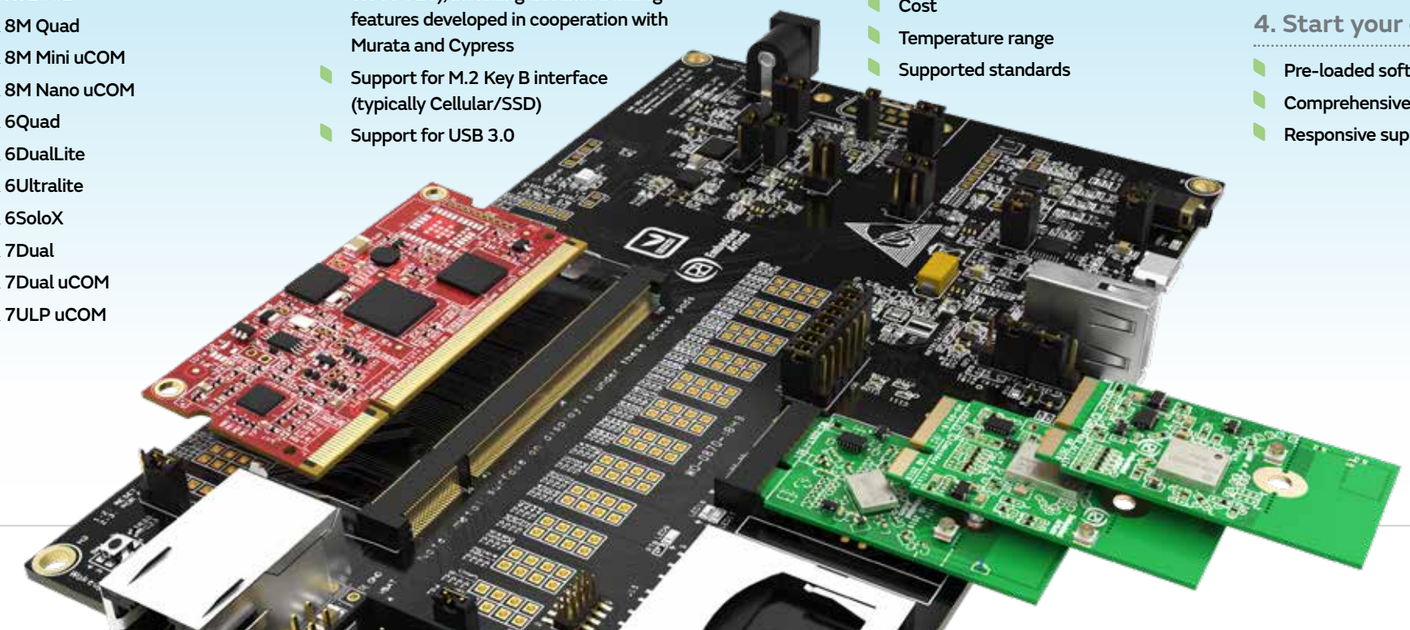
There are two types of carrier boards: One for i.MXRT family boards (with a slot for the COM or OEM board) and one which is suitable for the MPU COM boards and offers...

- **Support for i.MX8 designs**
- **Support for M.2 Key E interface (typically Wi-Fi®/BT), including advanced debug features developed in cooperation with Murata and Cypress**
- **Support for M.2 Key B interface (typically Cellular/SSD)**
- **Support for USB 3.0**

3. Plug in your connectivity

Choose the Murata/Embedded Artists M.2 connectivity module appropriate for your application in terms of:

- **Performance**
- **Power consumption**
- **Range**
- **Cost**
- **Temperature range**
- **Supported standards**



4. Start your evaluation

- **Pre-loaded software drivers**
- **Comprehensive user manuals**
- **Responsive support**

Embedded Artists

µSD adapter

Murata's µSD-M2 adapter board offers an out-of-the-box experience for NXP i.MX with Murata's M.2 module family. All WLAN/BT-necessary signals are included on M.2 connector pins (Key 'E') including:

- **WLAN SDIO**
- **WLAN PCIe**
- **BT H4 UART**
- **BT PCM/I2S**
- **GPIOs**

GOLD PARTNER NXP

EVKs

- **RT1020**
- **RT1050**
- **RT1060**
- **RT1064**
- **6UL/6ULL/6ULZ**
- **6SL/6SLL**
- **6SoloX**
- **6DL/6Q/6QP**

Software

Murata has developed resources and made key strategic partnerships to create a strong software ecosystem support model for customers.

WICED - Cypress' WICED FreeRTOS-based solution provides comprehensive IDE and SDKs enabling rapid development of software for wireless IoT products.

Modus Toolbox - Cypress' Modus Toolbox provides multiple O/S solutions (MBED O/S, Amazon AWS and FreeRTOS) for the Cypress PSoC®6 MCU evaluation kits enabled with both Murata Type 1DX and 1LV.

MCUXpresso - NXPs MCUXpresso FreeRTOS-based solution provides strong and flexible IDE and SDKs which currently enable Murata Type 1DX, 1MW, and 1LV.

MicroPython - The Arduino Portenta H7 platform provides a MicroPython-based solution. Both Arduino Community and the MicroPython Forum provide end customers with support for this MCU platform with Murata Type 1DX module soldered down.

Documentation - Murata provides extensive documentation support (hardware, software, testing, regulatory certification) openly at Murata's wireless connectivity site.

K71E.pdf
Sep.1,2020

Pyroelectric infrared sensor

Extra high sensitivity, lead-type pyroelectric infrared sensor

Our newly developed low-cost, high-sensitivity, high-RFI (Radio Frequency Immunity) and high-WLI (White Light Immunity) characteristic lead-type infrared sensor.
The IRA-S series has an improved RFI characteristic for the security market to comply with EN regulation for detection levels, such as peripheral circuitry. Its high sensitivity and high reliability make a great contribution to ergonomics and energy conservation for a wide range of appliances.

Features

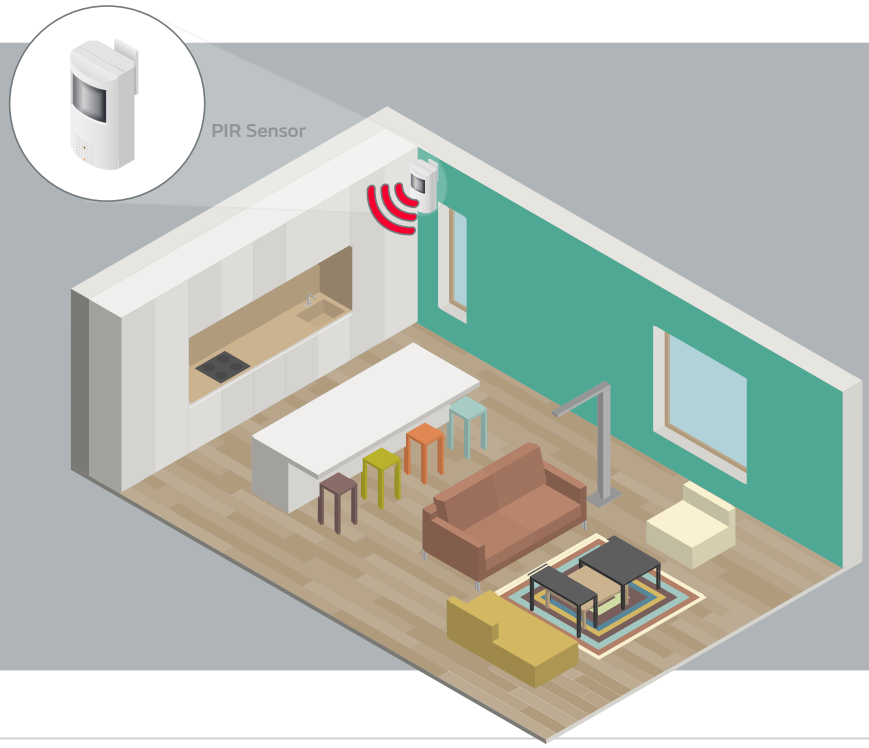
- **Excellent immunity characteristic to electromagnetic waves**
- **Easy human movement detection**
- **Wide detection area using lens**

Applications

- **Security systems**

Type	Part number	Sensitivity (500K, 1Hz, mVp-p)	Dimensions (mm)	Benefits
Dual	**IRA-S200ST01A01**	4.6	ø9.2x4.7	New and cost effective model High RFI (Radio Frequency Immunity) For security, automatic ECO switch for display and other appliance
Serial quad	**IRA-S400ST01A01**	7.0		

Security system applications



AMR magnetic sensor

Design flexibility, narrower sensitivity range and higher reliability

MRMS205A-001
2.9mm x 2.8mm

The AMR series consists of sensors that include an IC to detect changes in the magnetic resistance of a magneto resistive element that is effected by an external magnetic field. This is achieved from a ferromagnetic NiFe alloy thin film that is deposited over the IC circuit. We offer more than 30 models that support a broad range of applications backed by our experienced design consulting service.

Open-close detection

Part number	Sensitivity (mT)	Dimensions (mm)	Features	Applications
MRMS20 series	0.5 to 2.5	2.9x2.8x1.1	Std. performance, compact package	Std. open-close, position detection Low-speed rotation detection

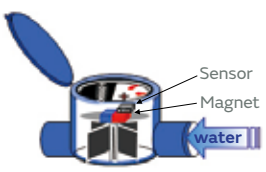
Flow metering by rotation detection

Part number	Sensitivity (mT)	Dimensions (mm)	Features	Applications
MRSS29DR-001	1.2 to 3.2	2.9x2.8x1.1	High voltage operation (3.5 to 30V) High speed detection (Typ. 5kHz) Built-in voltage regulator	Flow metering for industrial equipment

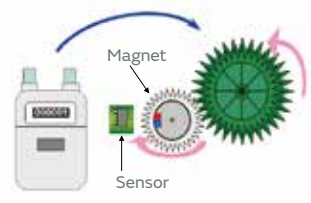
Cylinder control by position detection

Part number	Sensitivity (mT)	Dimensions (mm)	Features	Applications
MRMS541E	0.9 to 2.7	1.45x1.45x0.55	Typ. 1kHz (min.) Built-in temp. compensation circuit	Position, proximity detection High-speed rotation detection for industrial equipment
MRMS543E	0.5 to 3.1	1.45x1.45x0.55	High accuracy, high-speed detection (Typ. 500Hz (min.)) Built-in temp. compensation circuit Low voltage, low power operation	

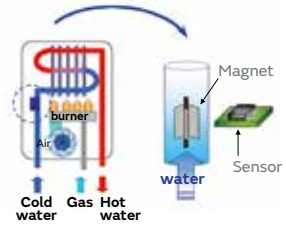
Water meter



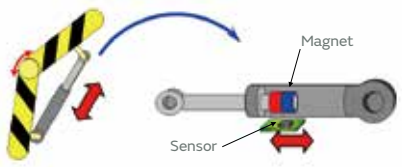
Gas meter



Water boiler

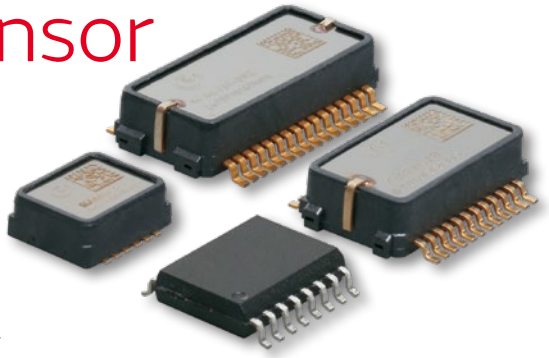


Cylinder control



High accuracy MEMS sensor

3D MEMS technology enables higher performance at lower cost.



Murata offers high performance accelerometers, inclinometers, gyroscopes and combo sensors. Gyroscope components and combined sensors (including gyroscope and accelerometer) are based on our proven 3D MEMS technology and highly integrated electronics. Industrial gyroscopes offer a performance level that has typically been available only for expensive module products. All products are RoHS compatible and suitable for lead-free reflow soldering.

Features

- **Robust MEMS technology**
- **Field proven reliability & high performance in demanding applications**
- **Good offset stability over temperature and time**
- **High accuracy in demanding applications**
  (eg, high temperature variation, high vibration environment, etc.)
- **Excellent mechanical shock endurance**
- **Can withstand high impact/dropping**

For construction monitoring
(Distortion, abnormal vibration, etc.)

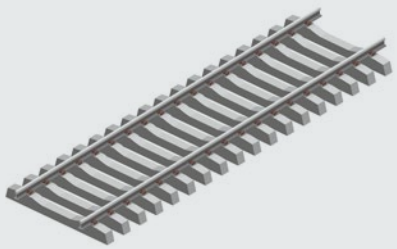
Inclinometers

Recommended product	Product description	Accuracy	Features
SCL3300-D01	Digital SPI output 3 axis inclinometer	Accuracy ± 0.5 degree over operating temperature	3-axis inclination sensor with digital true inclination angle output Four user selectable measurement modes for sensor performance optimization for different applications and their requirements Ultra-low noise density for high measurement resolution Mechanically damped sensing element design for excellent vibration robustness Extensive self-diagnostic features SPI digital interface -40 to +125 °C operating range Proven capacitive 3D-MEMS technology

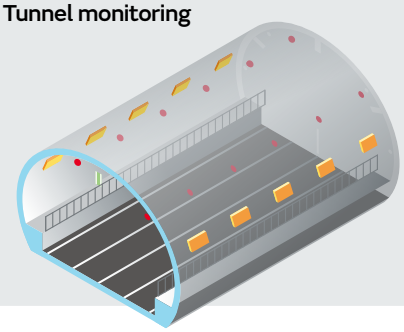
Applications

Structural health monitoring

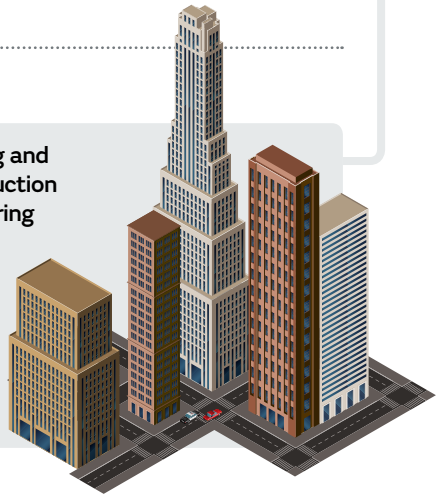
Railway track monitoring



Tunnel monitoring

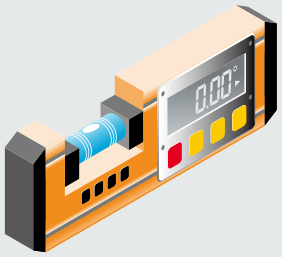


Building and Construction monitoring

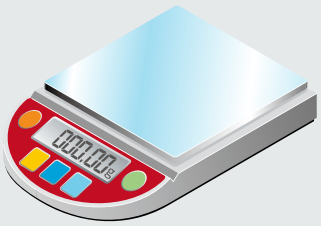


Levelling

Digital bubble levels



Weight scales



GPS surveying equipment

Accelerometers & gyros

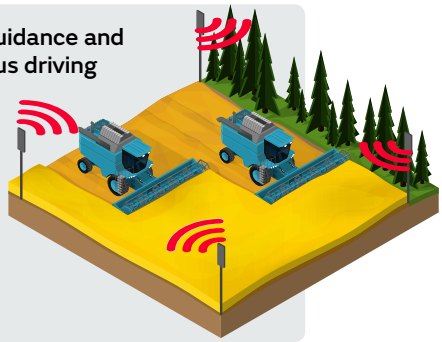
Recommended product	Product description	Benefits	Features
SCA3300	Digital SPI 3 axis accelerometer for inclination measurement	Reliability	Good performance vibrating environment High offset accuracy over temperature and time High mechanical shock endurance Competitive price Self-diagnostic features
SCC2000	Digital SPI 1 axis gyro & 3 axis accelerometer (X or Z axis)	Combined sensor Reduced PCB size	
SCC3000	Digital SPI 2 axis gyro and 3 axis accelerometer	Combined sensor Small size	
SCHA600	Digital SPI 3 axis gyro and 3 axis accelerometer	Excellent bias stability and noise 6 DoF sensor	

Applications

Moving machines

- **Precision agriculture products help to minimize farming costs and maximize yields.**
- **Agricultural Machines (tractors, combines, harvesters)**
- **Construction machines (excavators, wheel loaders, bull-dozers...)**
- **Professional Drones**
- **Material handling equipment**
- **Optical sensor pose detection**

Machine guidance and autonomous driving



Murata benefits & advantages:

- **Gyroscope performance:**
  Bias stability
  Low noise
  Accuracy
- **Accelerometer performance:**
  Low noise
  Offset stability over temperature
  Good performance in vibrating environment

Professional Drones

Material handling equipment

Ultrasonic sensor

Low-cost solution for distance detection

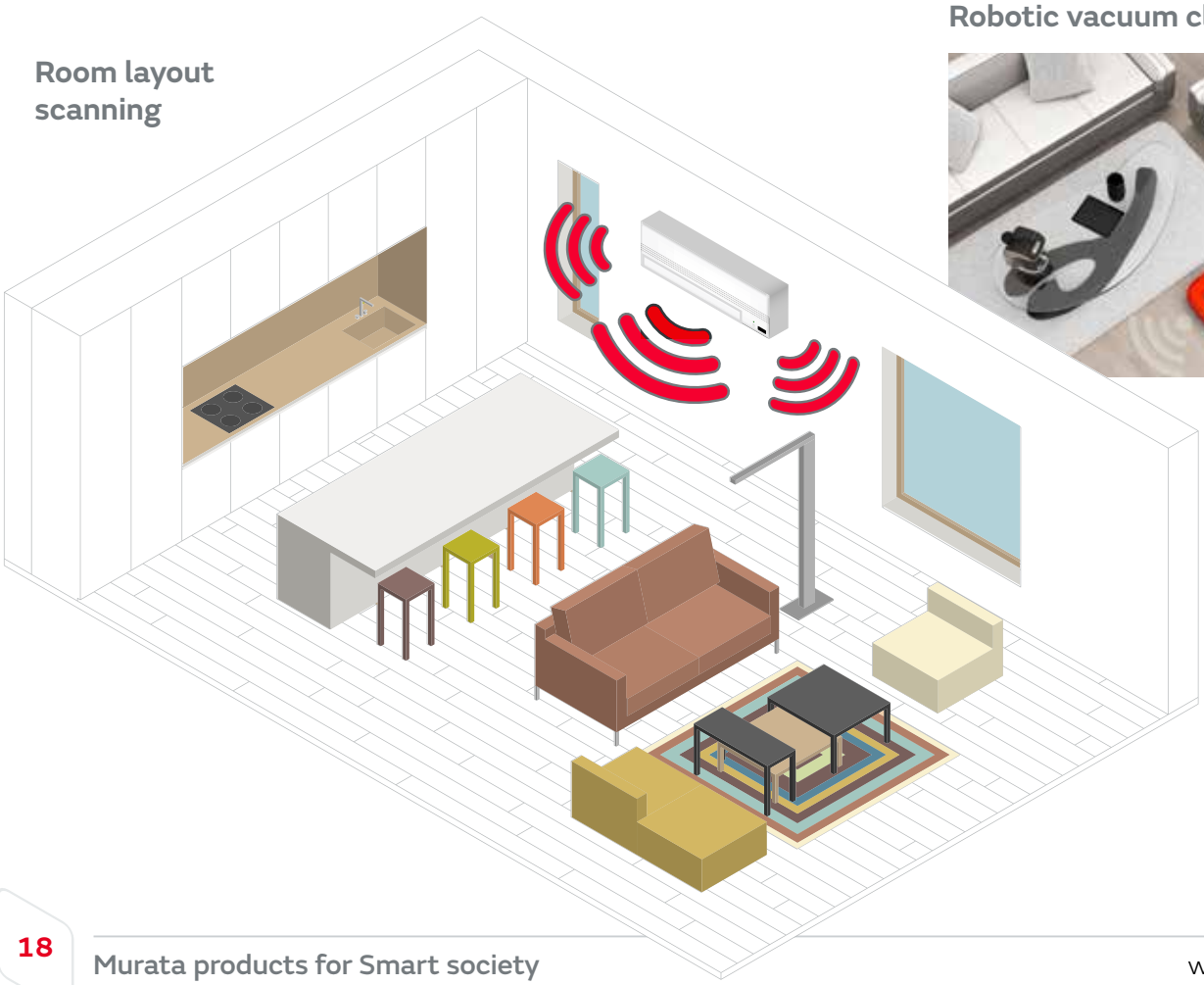
Small and lightweight, ideally suited for short-distance range detection and home security.

Applications

- **Robotics (consumer use)**
- **Room layout scanning**

Type	Using method	Part number	Driving frequency (kHz)	Diameter (mm)	Capacitance (pF)	Directivity (degree, typ.)	Sound pressure level	Sensitivity	Max. Input voltage
Open type	Transmitter	**MA40S4S**	40	9.9±0.3	2550±20%	80	120dB typ. (0db=0.02mPa)	—	20Vp-p Continuous signal
	Receiver	**MA40S4R**		9.9±0.3	2550±20%		—	-63dB typ. (0db=10V/Pa)	—
SMD type	—	**MA40H1S-R**		5.2x5.2x 1.15±0.1	4500±20%		95dB min. (0dB=20μPa)	-65dB min. (0dB=1V/Pa)	7.2Vp-p (at 40kHz, Square wave)

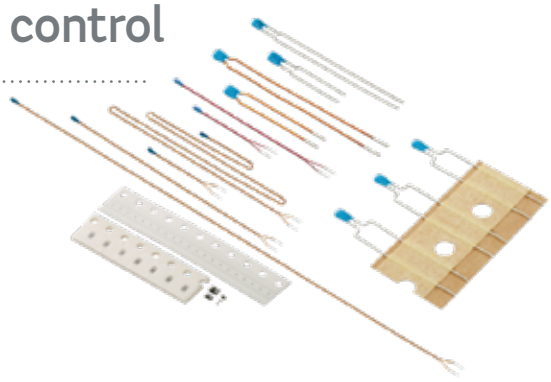
Room layout scanning



Robotic vacuum cleaner

Temperature sensor (Thermistor)

Excellent thermal response for thermal control



Excellent thermal response suitable for temperature sensing, temperature compensation for various application

Applications

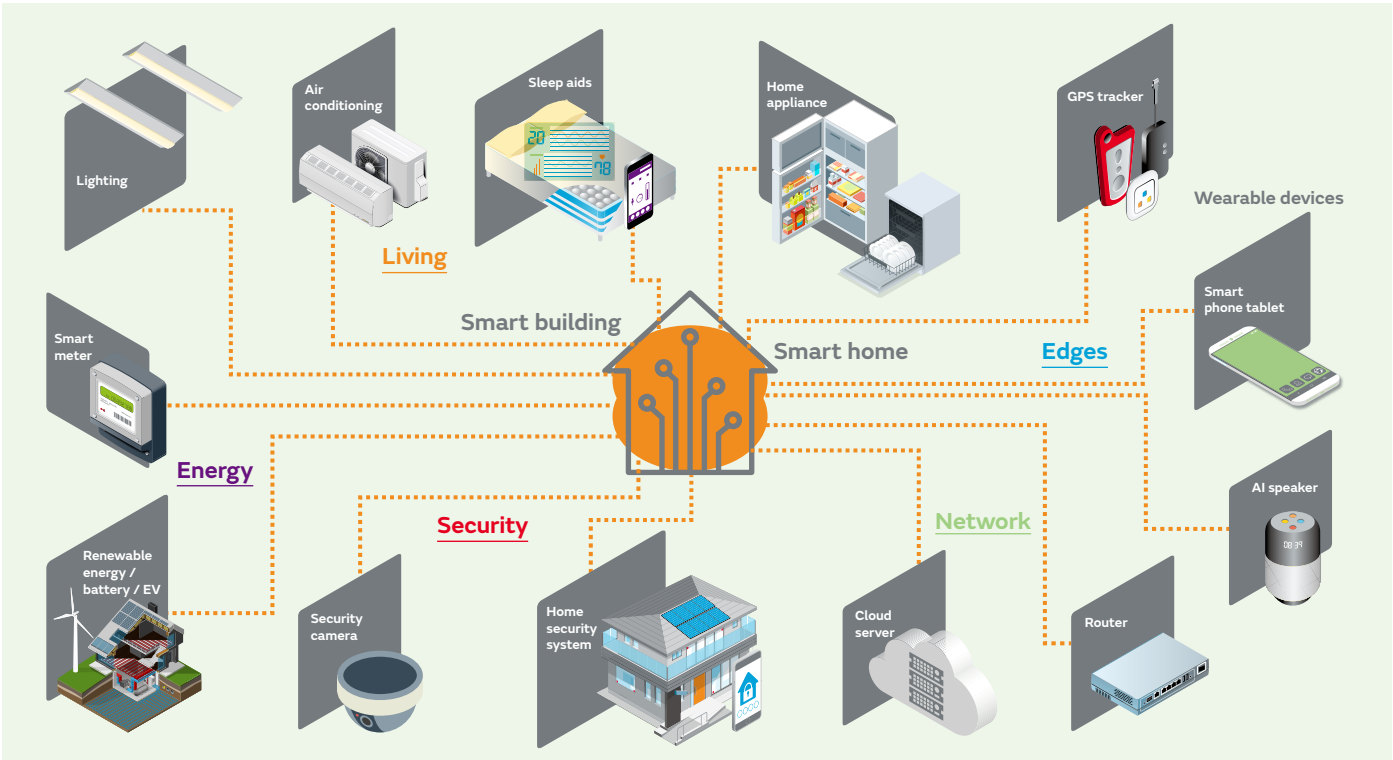
- Smart building control
- Smart home control

NTC Thermistor

Series	Resistance (25°C) (Ω)	B-constant (25/50°C) (K)	Maximum operating current (25°C)(mA)	Maximum voltage (V)	Type (in inch)	Operating temperature (°C)
NCP	220 to 470k	3380 to 4500	0.015 to 0.674	5	Chip type (0402 to 0603)	-40 to 125
NCU	10k to 470k	3380 to 4250	0.032 to 0.1		Chip type (0402 to 0603)	
NXFT	2k to 100k	3380 to 4250	0.04 to 0.27		Lead type 21 to 150mm	
NXRT	2k to 100k	3380 to 4250	0.05 to 0.36		Lead type 25 to 50mm	

PTC Thermistor

Series	Resistance (25°C) (Ω)	Maximum voltage (V)	Sensing temperature (°C)	Type (in inch)	Operating temperature (°C)
PRF	470 to 10k	32	65 to 150	Chip type (0402 to 0805)	-40 to 160



NDIR CO_2 sensor

Long-term stability using auto-calibration

CO_2 sensor is a product with long-term stability and high measurement accuracy that promises to improve maintainability through an automatic calibration feature based on a unique calibration curve algorithm and a dual wavelength (for measurement and reference) NDIR system.

For agricultural applications, it can be installed in greenhouses or plant factories to monitor the carbon dioxide concentration to help increase plant yields by supplying the carbon dioxide (CO_2 application) required for photosynthesis.

In a BEMS application, install the CO_2 sensor in building ventilation ducts to ventilate the air when needed by monitoring the carbon dioxide concentration, therefore contributing to overall building energy conservation.

Features

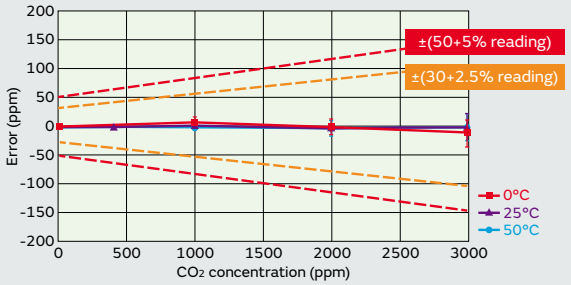
- **Low influence of other gases by NDIR principle**
- **Excellent temperature characteristics and high accuracy**
- **Excellent long-term stability and high reliability by automatic calibration**

Applications

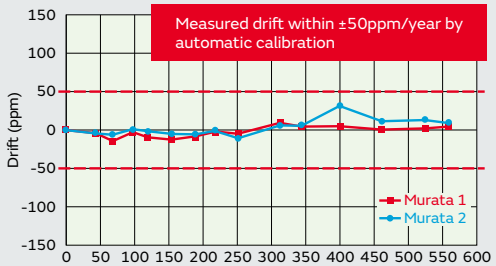
- **Smart agriculture (IMG-CA series)**
  Promotion of photosynthesis by CO_2 concentration control
  In greenhouse and plant factory
  Efficient usage of CO_2 gas
- **BEMS (IMG-CB series)**
  Building Energy Management System
  Ventilation control in building

Item	Target specification
Operating temperature	0 to 50 °C
Storage temperature	-20 to 50 °C
Measurement range	0 to 2000ppm, 0 to 3000ppm
Accuracy	± (50ppm+5% of reading)
	Typ. ± (30ppm+2.5% of reading)
Long-term stability (Drift)	±50ppm/Year @ 1000ppm
Power input	AC/DC 24V, DC12V
Peak power consumption	Avg. 0.5W/Max. 2.0W
Output interface	Analog 0 to 5V
Measurement interval	5s
Dimensions	67x92x20mm

Measurement accuracy

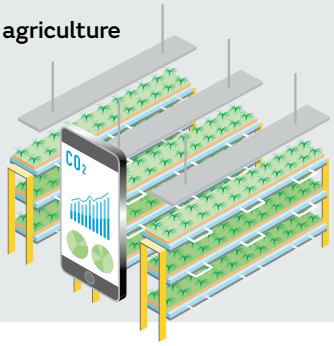


Long-term test in building



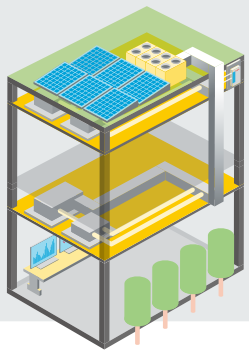
Tested by TODA Corp.
Tested by standard gas @ 1000ppm

Smart agriculture



Promotion of photosynthesis by CO_2 concentration control

BEMS



Ventilation control ⇒ to keep it less than 1000ppm regulated by 'Building administration law' in Japan

Small lithium ion secondary battery

Small lithium-ion secondary battery with high rate charge/ discharge, long cycle life and high safety

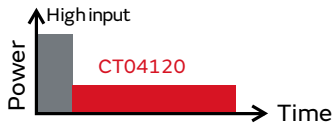
Features

- **Quick charge characteristics**
  - High-rate charging (10C) is possible, and charging control IC is unnecessary.
- **Excellent discharge characteristics**
  - Continuous discharge with a maximum discharge rate of 10C is possible. In addition, since the internal resistance is low and the voltage drop is small, stable discharge is possible even under a large peak load or low temperature.
- **Long cycle life**
  - Charge (capacity) recovery rate keeps over 80% even after 5000 cycles.
- **High safety**
  - No thermal runaway occurs because of using chemically stable lithium titan.

Benefits & Applications

Small power equipment

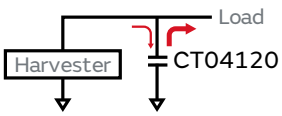
- **Quick charge with High rate (10C, 30mA) is available**
- **Constant voltage charge is available**
- **Able to use many times due to long cycle life**
- **High safety and small weight saving**

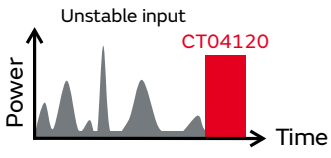


Application example
- Stylus pen
- Wearable equipment

Energy harvesting systems

- **Chargeable/dischargeable in wide rate ranges**
- **Long operating time due to low leakage current**
- **High power output is available**
- **Resistant to over discharge**
- **Operation temperature is wide**

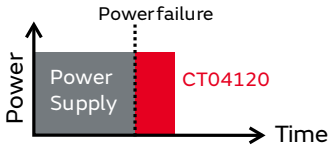


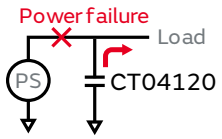


Application example
- Solar battery charger equipment
- Sensor node with wireless sensor network in combination with micro and macro energy harvesting systems

Backup

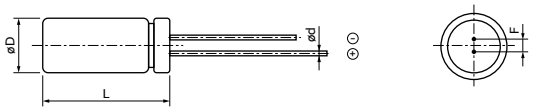
- **System backup even when the main battery is replaced or the battery is disconnected**
- **High power discharge is available**
- **Constant voltage charge is available**
- **Charge control IC is unnecessary.**





Application example
- Handy terminal/barcode reader
- POS (payment terminals, etc.)
- Other battery powered equipment

Product name	CT04120	Dimensions	
Nominal voltage	2.3V	øD	4mm
Charge voltage	2.7V	L	12mm
End of discharge voltage	1.8V	ød	0.45mm
Discharge capacity	3mAh	F	1.5mm
ESR	1000mΩ	Operating temp	-20 to 70 °C



Micro battery

Murata offers a wide range of primary micro batteries with high performance and reliability, taking advantage of 40+ years technology development and manufacturing expertise.

Coin manganese dioxide lithium batteries (CR batteries)

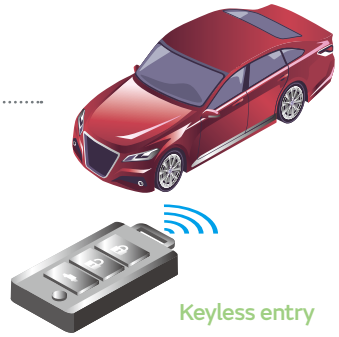
- **Wide range of CR batteries including heat-resistant type and high drain type**
- **High voltage, high energy density and excellent self-discharge performance**
- **Acquisition of ISO/TS16949 certification**

Battery types	CR (Standard)	CR (Extended temperature)	CR (Heat-resistant)	CR (High drain)
Nominal voltage	3.0V	3.0V	3.0V	3.0V
Operating temp.	-30 to +70°C	-40 to +85°C	-40 to +125°C	-30 to +70°C
Nominal capacity	30 to 1000mAh	220 to 2000mAh	210 to 1000mAh	200 to 500mAh
Diameter	12.5 to 24.5mm	20.0 to 36.5mm	20.0 to 24.5mm	20.0 to 24.5mm
Thickness	1.6 to 7.7mm	3.2 to 7.7mm	3.2 to 7.7mm	3.2 to 5.0mm
Weight	0.67 to 11g	3.0 to 20g	3.1 to 11g	3.0 to 6.0g
Max plus discharge*1	30mA	30mA*2	30mA	50mA

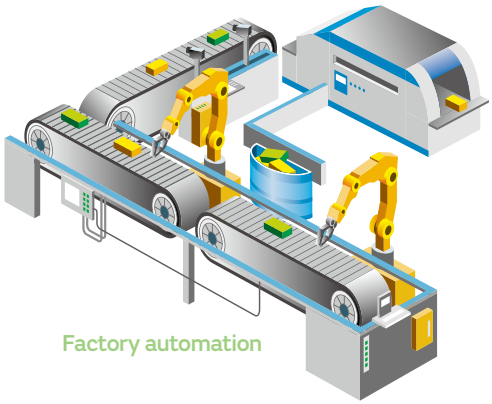
*1 50% depth of discharge battery's maximum pulse discharge current over 2V for 3s (23°C)
*2 CR3677X max plus discharge is 80mA

Applications

- **Tire pressure monitoring system**
- **Keyless entry/Smart key**
- **Factory automation**
- **Smart meters**
- **Tracking devices**
- **Sensors**



Keyless entry



Factory automation

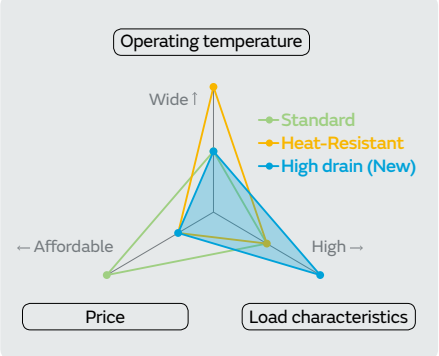
New products

In response to the expansion of IoT applications and increasing demand for small, reliable power sources, Murata developed two types of coin manganese dioxide lithium batteries; High drain type and Extended temperature type.

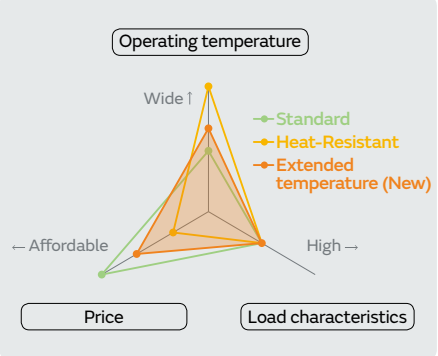
LoRa® Alliance Member

Coin manganese dioxide lithium batteries selection guide

High drain

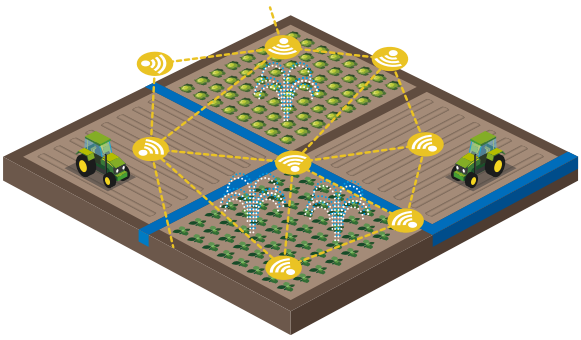


Extended temperature



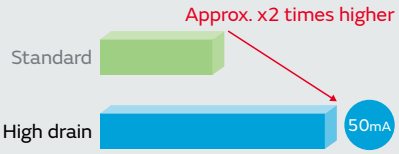
High drain

Excellent high-current discharge performance to support LPWA data transmission



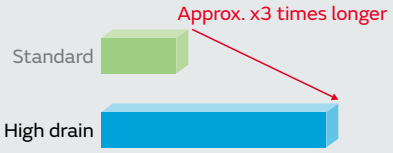
Tracking devices

Max. pulse discharge current



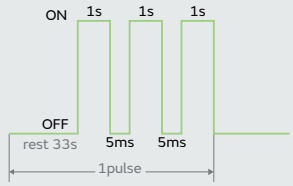
*50% depth of discharge battery's maximum pulse discharge current over 2V for 3s (23°C)

Discharge time (45mA pulse discharge)



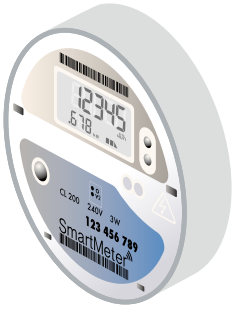
*Pulse discharge condition: 45mA x 3s, 33s off, 2V cut-off (23°C)

Pulse discharge condition: LPWA



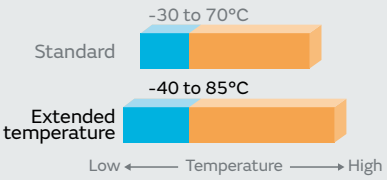
Extended temperature

Recommend for automotive and outdoor devices

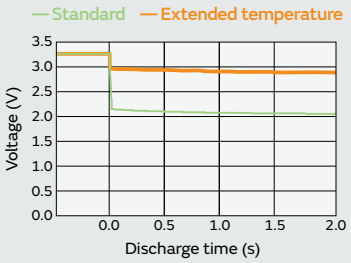


Smart meters

Operating temperature



Voltage comparison after 85°C storage



Silver oxide batteries (SR batteries)

Murata is the world's number one supplier of SR batteries, and was the first to manufacture mercury-free silver oxide batteries, providing excellent stable discharge characteristics.

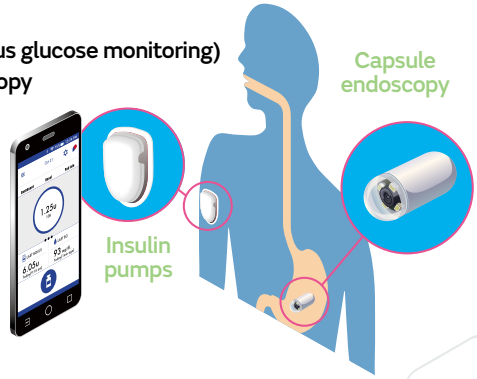
Battery types	SR Silver oxide batteries	LR Alkaline manganese batteries
Nominal voltage	1.55V	1.5V
Nominal capacity	20 to 160mAh	45 to 120mAh
Diameter	6.8 to 11.6mm	7.9 to 11.6mm
Thickness	2.1 to 5.4mm	3.05 to 5.4mm
Weight	0.31 to 2.17g	0.6 to 2.0g
Operating temp.	-10 to +60°C	-10 to +60°C

Alkaline manganese batteries (LR batteries)

- High safety with unique technologies to prevent leakage and swelling
- Excellent high-drain pulse discharge characteristics

Applications

- Insulin pumps
- CGM (Continuous glucose monitoring)
- Capsule endoscopy



Olivine type lithium iron phosphate lithium ion secondary battery

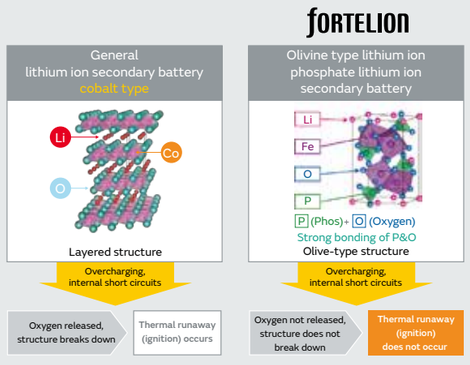
"FORTELION" is a lithium ion secondary battery with a cathode composed of olivine-type lithium iron phosphate, and has an expected life of 15 years or more with a high level of safety.
"FORTELION" is a word created by combining the Italian word 'Forte (strong)' and Li-ion. This name incorporates the meaning of 'stronger safety, stronger life, and stronger environmental performance' with compared to typical lithium ion batteries.

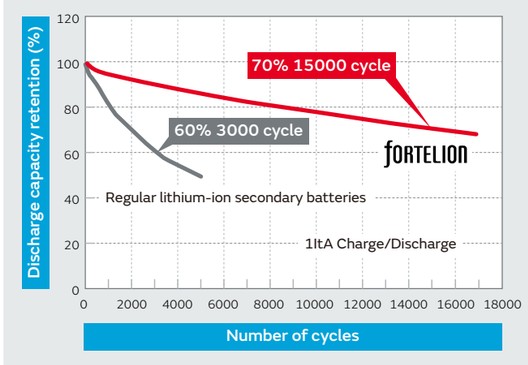
Features

High safety
Thanks to the stable crystalline structure made possible by employing olivine-type lithium iron phosphate as the cathode material, "FORTELION" is less vulnerable to breakage, less likely to catch fire, even if subjected to a large impact or significant pressure, and maintains a reliable battery performance even under intense workloads.

Long life (cycle)
The crystalline structure is solid and stable, so capacity deterioration does not accelerate even with repeated charging/discharging.

*70% capacity maintained over 15,000 charge/discharge cycles, DOD100% (room temperature 23°C)





High input/output
6C discharge and 1C charge is possible.
This makes these batteries ideal for the instantaneous voltage drop countermeasures and backup power that are important in the event of natural disasters, and applications where power is required such as stabilization of renewable energy.

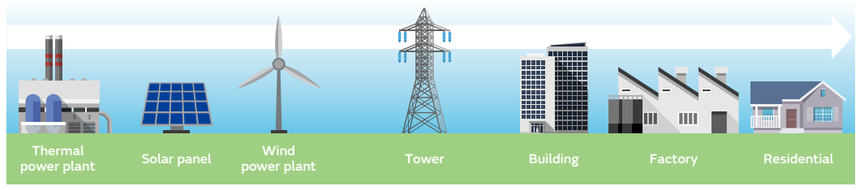
Cobalt free
The use of cathodes mainly composed of iron poses fewer resource constraints and is environmentally friendly.

Certification and international standard
- First lithium ion secondary battery in Japan to obtain fire protection certification
- First in Japan to obtain the international standard 'UL9540A' report
  Report of cell and module level
- Energy storage system acquires world's first U.S. safety standards certification to 'UL Subject 1973' from UL

FORTELION Series

Our safe lithium-ion secondary batteries expand the range of applications

Power generation	Transmission & distribution	Demand
▶Output levelling of renewable energy	▶Voltage support	▶Measures against instantaneous voltage drop
▶Micro grid/off grid system	▶Frequency adjustment	▶Peak cut/peak shift
	▶Ancillary services	▶Emergency load management
	▶System stabilization measures	▶BCP countermeasure



Contribution of SDGs
Murata contributes to realize a safe and highly disaster resistant sustainable society with the long-life and safe "FORTELION."

Ensure access to affordable, reliable, sustainable and modern energy

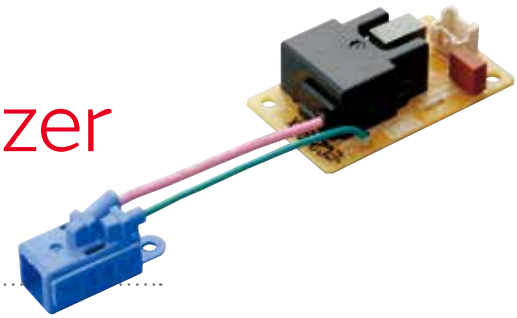
Build resilient infrastructure, promote sustainable industrialization and foster innovation

Make cities inclusive, safe, resilient and sustainable

K71E.pdf
Sep.1,2020

Small, high efficiency ionizer

Ionissimo MHM series

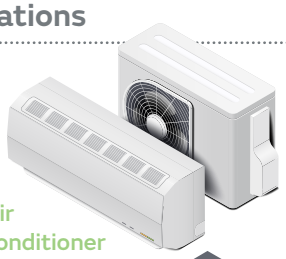


Today, the emphasis on health improvement and disease prevention is higher than ever. In related application areas, there is growing demand for ways to eliminate germs, mold and odors in the home and office.
Additionally, equipment production sites are becoming ever denser and more crowded, leading to a growing need for static elimination in order to prevent defects caused by static electricity. To respond to these needs, we have expanded our development and production of ion generating elements and small modules integrated with these elements.

Features

- **High ion output**
  Optimization of module structure has made high ion output possible.
- **Low driving voltage**
- **Small size**
  Our original structural design and circuit design technologies have enabled us to develop a small-sized product.

Applications



Air conditioner

Air purifier

Vacuum cleaner

DC12V input type

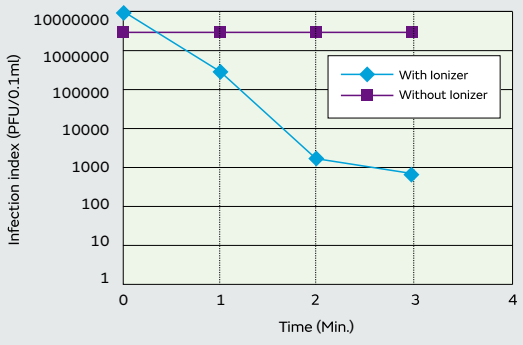
Part number	Ion polarity	Ozone amount	Main function
MHM305	Negative	0.15mg/H max.	Air purifier, moisture keeping, static elimination
MHM306	Negative	0.6mg/H typ.	Air purifier, moisture keeping, static elimination, deodorant, sterilizing, preserving from mold
MHM314	Negative (High ion amount)	0.15mg/H max.	Air purifier, moisture keeping, static elimination
MHM400	Positive	0.15mg/H max.	Static elimination

AC input type

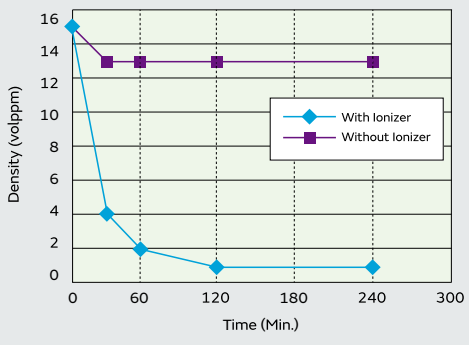
Part number	Ion polarity	Ozone amount	Main function
MHM402 (AC230V input)	Negative	0.4mg/H typ.	Air purifier, moisture keeping, static elimination, deodorant, sterilizing, preserving from mold
MHM403 (AC100V input)	Negative + Positive	—	Hair dryer, static elimination

*Typical value under the condition 20°C/50%RH

Sterilizing influenza virus (HK A H 3 N2)

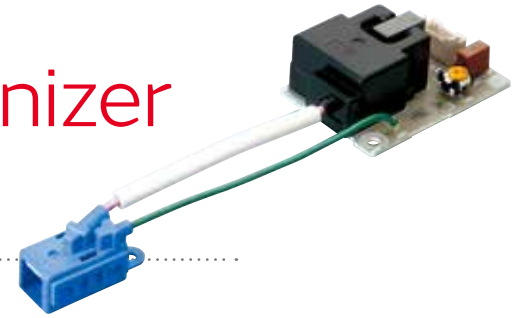


Deodorizing test for formaldehyde



Small, high efficiency ozonizer

Ionissimo MHM series



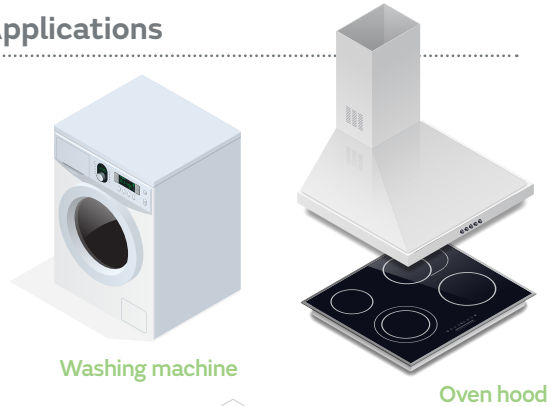
What is an Ozonizer?

Surface discharge is made by AC high voltage applied between the top and bottom of the dielectric substrate. The discharge makes ozone from oxygen molecules around the electrode. $O_2+O=O_3$ The ozonizer module will ozonize oxygen molecules efficiently utilizing this principle.

Features

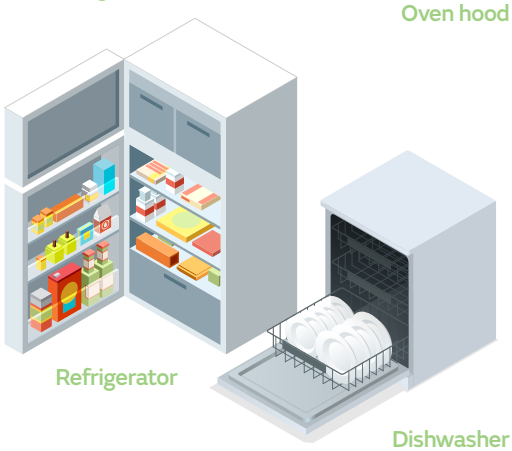
- **Our unique design is capable of creating large amounts of ozone with high efficiency.**
- **Ozone density will be duty cycled controlled.**
- **Intermittent operation can save power consumption of the ozonizer module.**
- **The ozonizer module can have a longer life than the needle type.**

Applications



Washing machine

Oven hood



Refrigerator

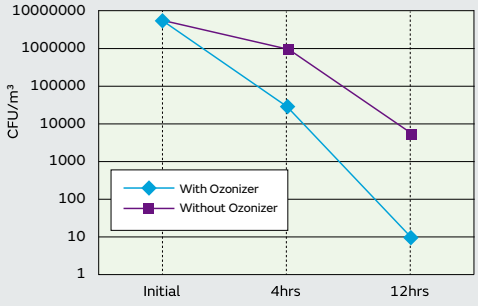
Dishwasher

DC12V input type

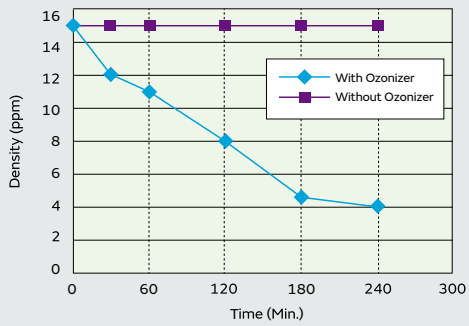
Part Number	Ozone amount	Main function
MHM500	3.5mg/H typ.	Deodorant, sterilizing preserving from mold
MHM501	3.0mg/H typ.	
MHM502	45mg/H typ.	
MHM503	2.0mg/H typ.	

*Typical value under the condition 20°C/50%RH

Sterilizing test data in refrigerator colon bacillus



Deodorizing test for hydrogen sulfide (H2S)



Isolated DC-DC converters for PoE

An increasing number of network devices are utilizing PoE to eliminate the need for installing AC power supplies and in order to reduce wiring.
The expanding functionality and sophistication of these network devices is driving the need for miniaturization of the power supply section. The combination of these trends has led to Murata's development of the MYBSP series DC-DC converters. Incorporating hardware classification protocol functions that conform to the IEEE® 802.3af and at PoE communication standard, the product utilizes a sheet-type transformer resulting in a miniaturized design with high dielectric strength.

PD module

PSE module

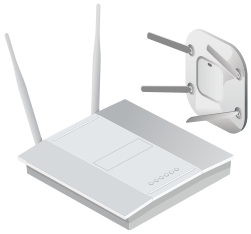
Features

- Compliant to IEEE® 802.3af or IEEE® 802.3at
- Small and low profile SMD type
- Available at Ta=+85°C
- Low EMI
- 2250Vdc input-output isolation
- Fewer values of external capacitor

Applications

- Conference system
- LED lighting
- IP phone
- Security camera
- Biometric authentication
- Wireless access point
- Digital signage
- IoT Gateway

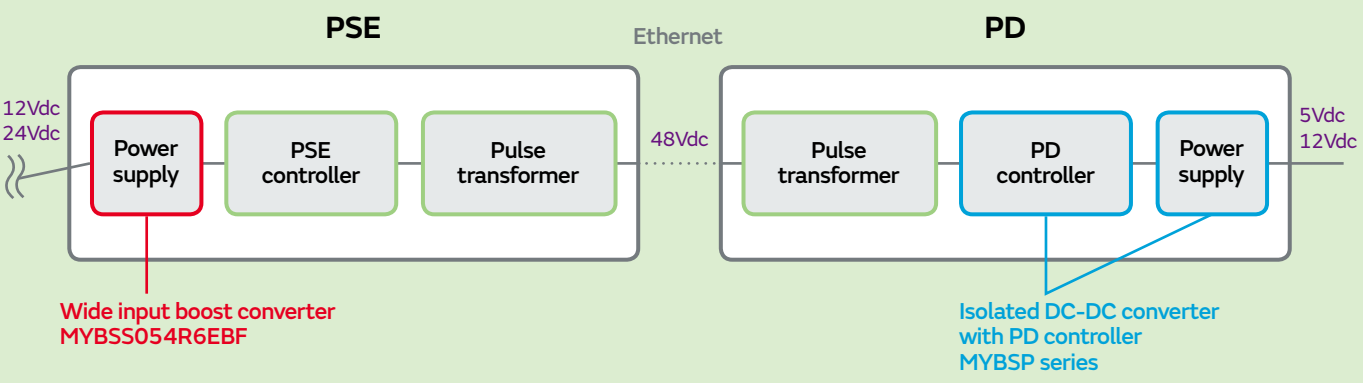
Security camera



Wireless access point

Digital signage

Power modules in PoE

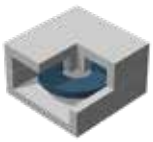


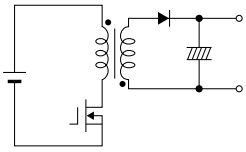
Small and low profile

Discrete solution

Traditional transformer

Sheet-type transformer





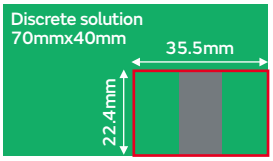
Murata PoE modules

High efficiency
Smaller and thinner size
Available at Ta=+85°C

Benefits

- **Reduce PCB space**
- **Lower profile**

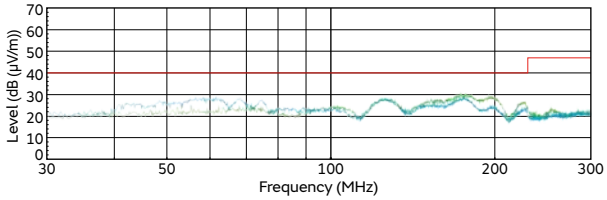
72% down



Low noise

Radiation noise

Compliant with CISPR32 Class B



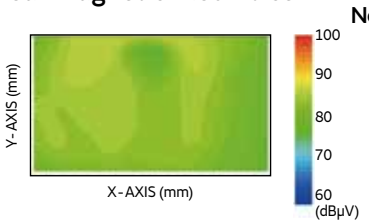
No additional components for EMI suppression

Benefits

- **Efficient use of PCB space**
- **Reduce time to market**
- **Lower total cost**

Near magnetic filed noise

No red area



Lineup

		Power	Dimensions (mm)	Part number	Output	Adapter oring	T2P	Features
For PD	PoE / af	10W	 26x14.8x6	**MYBSP00502ABF**	5V/2A	N/A	N/A	Compliant to IEEE® 802.3af class 0 operation Low profile SMD type Operating temperature range -40 to +85°C Low EMI : compliant with CISPR class A 2250Vdc input-output isolation
		12W		**MYBSP01201ABF**	12V/1A	N/A	N/A	
	PoE+ / at	25.5W	 35.5x22.4x10.55	**MYBSP0055AABFT**	5V/5.1A	Available	Available	Compliant to IEEE® 802.3at class 4 operation Low profile SMD type Available continuous 25.5W at +85°C Low EMI : compliant with CISPR class B 2250Vdc input-output isolation Available T2P and adapter-oring No external capacitor operation
				MYBSP0122BABFT	12V/2.125A	Available	Available	
For PSE	Boost-up	30W	 35.5x22.4x8.9	**MYBSS054R6EBF**	54V/0.6A	N/A	N/A	Low profile SMD type Available from -40 to +85°C Operations input from 10.8V to 27V 2250Vdc input-output isolation

Switching power supply for LED lighting

LED Ballast series

Various dimming and switching on and off of led lighting devices requires the power supply circuit that links the LED devices to the dimming system.

Murata has developed a power supply module that can be directly coupled with the dimming module to help develop seamless lighting systems

Features

- **Constant current LED drive**
- **Wide range AC input (100 to 242V)**
- **Varied line-up**
- **Primary-Secondary isolation structure**
- **Meets safety standard PSE**
- **PWM, DALI dimming interface (MPA1948 Series)**

Model	MPA1948A	MPA1960A	MPA1968A	MPL0076DD4
Features	Intelligent power supply suitable for ambient lighting system			
Operating temp. range	-10 to 50°C			
Storage temp. range	-20 to 55°C			-20 to 50°C
Rated input voltage	AC100/242V			
Rated input voltage range	AC90 to 267V			
Input frequency	50/60Hz			
Number of output channels	1			
Output voltage range	30 - 50V			10 - 50V
Output current	700mA	1400mA	1050mA	700mA
Output power	35W max.	70W max.	50W max.	35W max.
Output current ripple	20% or less of maximum output current			10% or less of maximum output current
Control interface (dimming range)	PWM (5 to 100%), DALI (1 to 100%)			DALI (0.1 to 100%)
Lifetime	50,000 hr or more	40,000 hr or more	50,000 hr or more	40,000 hr or more
Efficiency	83.8% typ.	86.2% typ.	86.1% typ.	83.5% typ.
Harmonic current	JIS C 61000-3-2 class C, EN 61000-3-2 class C			
EMI	CISPR15, CISPR22 class B			
Safety standard	PSE, EN61347	PSE		
Dimensions	224x70x35mm	234x85x35mm		230.2x45.8x31.7mm

Magnetic products

3000A and 3000B series power inductors

Filtering components play a vital role in a variety of applications found in the IoT market. Suited to multiphase converter applications commonly used on processor mother boards to power CPUs, GPUs, ASICs and FPGAs, the 3000A and B series are just two such products found in computing and communications equipment. With their low R_{DC} values and low-loss core materials they minimize losses and the consequential self-heating, thus improving overall power conversion efficiency.

Features

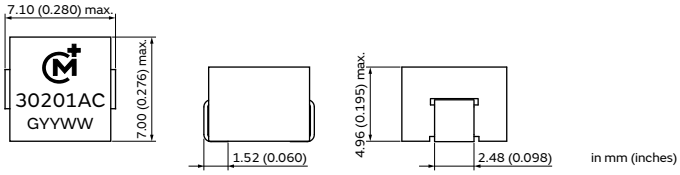
- **Low R_{DC}**
- **High efficiency**
- **High saturation current**
- **Compact size**

Applications

- **Cloud storage**
- **Desktop computing**
- **VRM modules**
- **Energy storage**
- **Filtering**

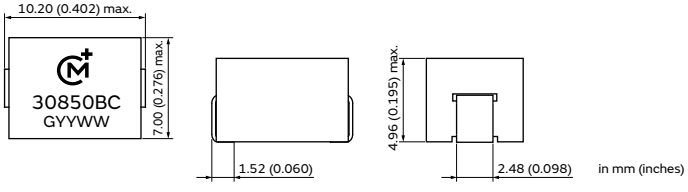
3000A series

Order code	Inductance (1MHz, 0.1V)		I_{DC}[3]	I_{SAT} (Typ.)[4]		DC resistance	
	±20%	Typ. @ I_{DC}	Typ.	25°C	100°C	Typ.	Max.
	nH	nH	A	A	A	mΩ	mΩ
30800AC	80	82	37	57	47	0.19	0.35
30101AC	97	105	36	48	41	0.20	0.35
30151AC	145	120	29	33	29	0.19	0.35
30201AC	191	162	22	24	22	0.21	0.35



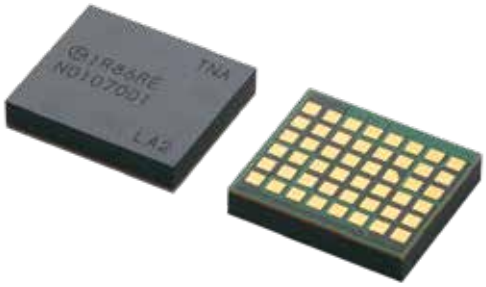
3000B series

Order code	Inductance (1MHz, 0.1V)		I_{DC}[3]	I_{SAT} (Typ.)[4]		DC resistance	
	±20%	Typ. @ I_{DC}	Typ.	25°C	100°C	Typ.	Max.
	nH	nH	A	A	A	mΩ	mΩ
30850BC	85	84	37	78	71	0.29	0.42
30101BC	100	102	37	66	58	0.29	0.42
30121BC	114	112	37	59	50	0.29	0.42
30151BC	154	143	37	43	38	0.29	0.42
30221BC	200	169	29	32	29	0.29	0.42



Buck DC-DC integrated PMICs

MYTNA1R86RELA2RA



Murata announces next generation buck regulator, world's smallest, most efficient, fully integrated buck DC-DC PMICs

Features & Benefits

- Fully-integrated 6A module with unique architecture dramatically reduces solution size/height while increasing conversion efficiency
- Low EMI signature with fixed switching frequency suits noise-sensitive applications
- Fast transient performance with minimal output capacitance
- Very low input ripple minimizes input filter requirements
- Class-leading voltage set point accuracy, load-regulation and line-regulation
- I²C interface for feature-rich programming capability and telemetry

Applications

- LPDDR memory for 2-cell and 3-cell NVDC notebooks
- 12V point-of-load applications: micro-servers, SSDs, networking, PCIE cards, powering FPGAs, DDR memory and ASICs

Server

Optical router

Base station

Buck DC-DC integrated PMICs

Part number	Vin	Vo	Io max.	I/O	Package size
MYTNA1R84RELA2RA	6.0-14.4V 10.8-14.4V	0.7-1.35V 0.7-1.8V	4A	N/A	9x10.5x2.1mm LGA
MYTNC1R84RELA2RA	6.0-14.4V 10.8-14.4V	0.7-1.35V 0.7-1.8V	4A	I²C	9x10.5x2.1mm LGA
MYTNA1R86RELA2RA	6.0-14.4V 10.8-14.4V	0.7-1.35V 0.7-1.8V	6A	N/A	9x10.5x2.1mm LGA
MYTNC1R86RELA2RA	6.0-14.4V 10.8-14.4V	0.7-1.35V 0.7-1.8V	6A	I²C	9x10.5x2.1mm LGA

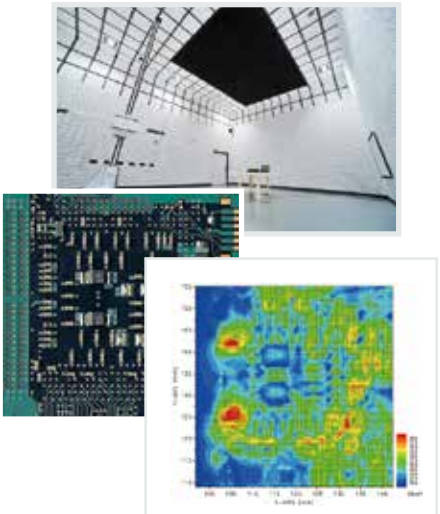
Software and certification support

As the market leading supplier of wireless communications modules manufacturer, our experienced engineers provide high quality technical and software support from our numerous offices located around the world. Wireless, sensors, embedded OS such as Linux® and RTOS are just a few of the architectures installed in various areas, such as consumer goods, industrial equipment, and smart factories. For all these applications and more, we focus on your problems and design challenges in order to provide the optimal solution for the data communications between the device drivers, cloud servers and the operating application. Furthermore, your time-to-market and engineering costs will be reduced by our verification and certification support with official wireless test beds. We are confident that you will be satisfied with our technical support.

EMC support with EMC lab

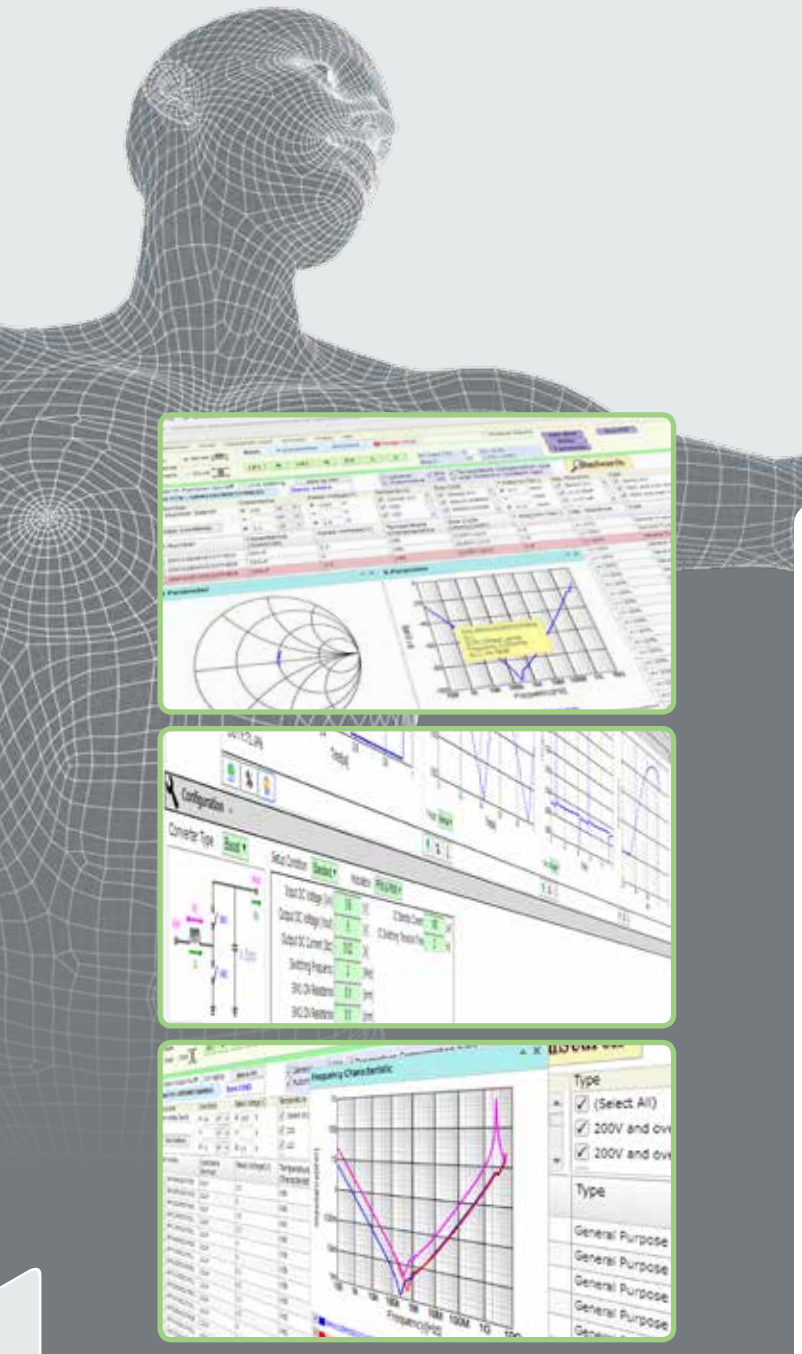
Because almost all devices related to "internet of things" applications have a communication function, it is necessary to comply with the technical standards stipulated by law in various countries such as CCC and CE and part of that standard includes EMC issues.

We have our own EMC lab stocked with state-of-the-art equipment. Our highly skilled engineers are working to develop unique products with less noise and also to support our customers in reducing noise in their own products.



SimSurfing

The best partner for your circuit design



SimSurfing is a web application which allows circuit designers to see our components' characteristics data, and to select the one that best suits the requirement.

Features

- **View and download data**
  You can see various characteristics graphs for our products with easy operation, or download data files including s-parameter, spice models, etc.
- **Simulate circuit conditions**
  SimSurfing includes advanced equivalent circuit models which show the characteristics data close to actual measurement (for some components including MLCC & RF inductors).
- **Compare characteristics**
  Easily compare characteristics data on the same graph.

For more information about ***SimSurfing*** visit

www.murata.com/tool/simsurfing

or visit the SimSurfing site directly at

www.murata.com/simsurfing

my Murata

Find what you need, when you need it

The new 'my Murata' portal is designed to respond to your individual needs. This space acts as a conference room in which you and Murata can meet.

Focused on products and solutions, this service provides you with the information you need - quickly. Our aim is to help you feel like you have a Murata salesman or engineer at your side.

New Murata web service registration only portal site

Get your login credentials at:
https://my.murata.com/en/

Get the latest product information

You can find out about the latest ceramic capacitor product lines, updated regularly as well as some unreleased product information, exclusively available on 'my Murata'. Plus much more...

'my Murata' knowledge exchange

To get feedback from the engineering community post your questions onto the 'Forum' which is provided to allow customers with similar experiences to exchange ideas and knowledge through discussions with Murata engineers. Find product specifications, mounting know-how, noise suppressions solutions, plus much more...

Enhanced design tool

Simulate the characteristics of Murata products using the enhanced version of our 'SimSurfing' software available on the 'my Murata' portal.

Cat. No. K71E-4

Murata products for Smart society

Global locations

For details please visit www.murata.com

Note

1 Export Control

For customers outside Japan:

No Murata products should be used or sold, through any channels, for use in the design, development, production, utilization, maintenance or operation of, or otherwise contribution to (1) any weapons (Weapons of Mass Destruction [nuclear, chemical or biological weapons or missiles] or conventional weapons) or (2) goods or systems specially designed or intended for military end-use or utilization by military end-users.

For customers in Japan:

For products which are controlled items subject to the "Foreign Exchange and Foreign Trade Law" of Japan, the export license specified by the law is required for export.

2 Please contact our sales representatives or product engineers before using the products in this catalog for the applications listed below, which require especially high reliability for the prevention of defects which might directly damage a third party's life, body or property, or when one of our products is intended for use in applications other than those specified in this catalog.

1. *Aircraft equipment*
2. *Undersea equipment*
3. *Medical equipment*
4. *Traffic signal equipment*
5. *Data-processing equipment*
6. *Aerospace equipment*
7. *Power plant equipment*
8. *Transportation equipment (vehicles, trains, ships, etc.)*
9. *Disaster prevention / crime prevention equipment*
10. *Application of similar complexity and/or reliability requirements to the applications listed above*

3 Product specifications in this catalog are as of September 2020. They are subject to change or our products in it may be discontinued without advance notice. Please check with our sales representatives or product engineers before ordering. If there are any questions, please contact our sales representatives or product engineers.

4 Please read rating and CAUTION (for storage, operating, rating, soldering, mounting and handling) in this catalog to prevent smoking and/or burning, etc.

5 This catalog has only typical specifications. Therefore, please approve our product specifications or transact the approval sheet for product specifications before ordering.

6 Please note that unless otherwise specified, we shall assume no responsibility whatsoever for any conflict or dispute that may occur in connection with the effect of our and/or a third party's intellectual property rights and other related rights in consideration of your use of our products and/or information described or contained in our catalogs. In this connection, no representation shall be made to the effect that any third parties are authorized to use the rights mentioned above under licenses without our consent.

7 No ozone depleting substances (ODS) under the Montreal Protocol are used in our manufacturing process.

Download Smart future catalog

Murata Manufacturing Co., Ltd.

www.murata.com

muRata
INNOVATOR IN ELECTRONICS

K71E.pdf
Sep.1,2020