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New wireless MCU eases development of smaller, more efficient smart Bluetooth devices

The STMicroelectronics STM32WB09 Bluetooth® wireless microcontroller supports the latest Bluetooth Low Energy 5.4 specification, enabling designers to implement advanced features such as real-time location finding and indoor positioning.

STMicroelectronics has released the STM32WB09, a Bluetooth wireless microcontroller which enables the next generation of better, smaller short-range wireless connectivity devices to extend battery run-time.

Complying with the latest Bluetooth v5.4 specification, the STM32WB09 opens up the opportunity for designers to make smarter products such as wireless beacons and devices that can calculate their location indoors with centimeter accuracy. The chip supports advanced Bluetooth capabilities including direction finding for accurate position detection, thereby enabling applications such as real-time location, indoor positioning, item finding, and asset tracking.

This new MCU puts all the processing power and Bluetooth radio-frequency technology needed in a single chip. The STM32WB09 is supplied with a Bluetooth v5.4 protocol stack, as well as free PC-based design tools, essential software and sample code to accelerate application development. The chip is based on an Arm® Cortex®-M0+ CPU core – backed by 512 kbytes of Flash memory and 64 kbytes of RAM – which hosts the application, while the ST state-of-the-art radio manages the Bluetooth wireless connection.

While providing generous on-chip memory, ST has prioritized features that make the biggest difference in the target applications. These include support for power-control options in the Bluetooth radio, and the ability for users to fine-tune the RF output power in 1 dBm steps. This tuning optimizes battery life and system reliability, and ensures coexistence with other nearby wireless devices.

FEATURES

- RF performance:
  - Up to -104 dBm sensitivity
  - +8 dBm output power
  - 4.9 mA peak Transmit current
  - 3.6 mA peak Receive current
- Integrated balun and crystal
- Works with 2-layer PCB

APPLICATIONS

- Industrial equipment
- Smart home
- IoT devices
- Remote controls
- Wearable devices
- Wireless sensors
- Warehouse inventory management systems
- Smart meters
- Disposable medical sensors
- Access controls equipment

FREE DEV BOARD

Bluetooth Low Energy evaluation board demonstrates low-power operation of STM32WB09.

Orderable Part Number
NUCLEO-WB09KE

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Miniature modem provides global LTE-M network coverage

The new Type 1SC cellular network module from Murata provides a ready-made radio system for machine-to-machine connectivity over LTE-M mobile phone networks, and has certificates for operation in most countries worldwide.

The Type 1SC from Murata is a new, compact wireless module which acts as a modem for connectivity with LTE-M cellular networks.

A stand-alone module which operates via an external antenna, the Type 1SC measures just 11.1 mm x 11.4 mm x 1.5 mm. Based on the Altair ALT1250 chipset, the module is supplied in a silver resin shielded package. An integrated precision oscillator with low thermal drift provides an accurate clock source for the RF transceiver.

This Murata modem supports the low and mid bands used in LTE-M networks, and conforms to the specifications of the 3GPP release 17 standard for LTE-M and non-terrestrial networks (NTN). Providing Transmit power of +23 dBm, the modem is optimized for LTE Class 3 applications.

This Murata module is notable for its low sleep mode power consumption. In eDRX mode, average current is 43 µA. In PSM mode, it is 1.4 µA, supporting battery life of more than 10 years.

LTE-M is the abbreviation for the LTE Cat-M1 protocol. This technology enables IoT devices to connect directly to a 4G network without a gateway, and supports operation on battery power.

LTE-M is a type of low-power wide-area network (LPWAN) radio technology which enables a wide range of cellular devices and services, especially for machine-to-machine communication and the IoT. Compared to an NB-IoT network, LTE-M has a higher data rate and supports mobility, but requires more bandwidth, and unlike NB-IoT cannot be put into guard band frequency bands.

The Type 1SC modem can be ordered with LBAD0XX1SC series part numbers. It is supplied in a surface-mount LGA package.

muRata
INNOVATOR IN ELECTRONICS

FEATURES

- Supports over-the-air firmware upgrades
- Regulatory certificates:
  - FCC
  - IC
  - RED
  - TELEC
  - KC
  - NCC
  - GCF
  - PTCRB
- AT&T, Vodafone, Deutsche Telekom, Telefonica and Softbank carrier certificates
- GNSS, GPS and Glonass satellite positioning
- NTN capability
- Operating-temperature range: -40°C to 85°C

APPLICATIONS

- Smart meters
- Wearable devices
- Tracking devices
- M2M communications
- IoT edge nodes

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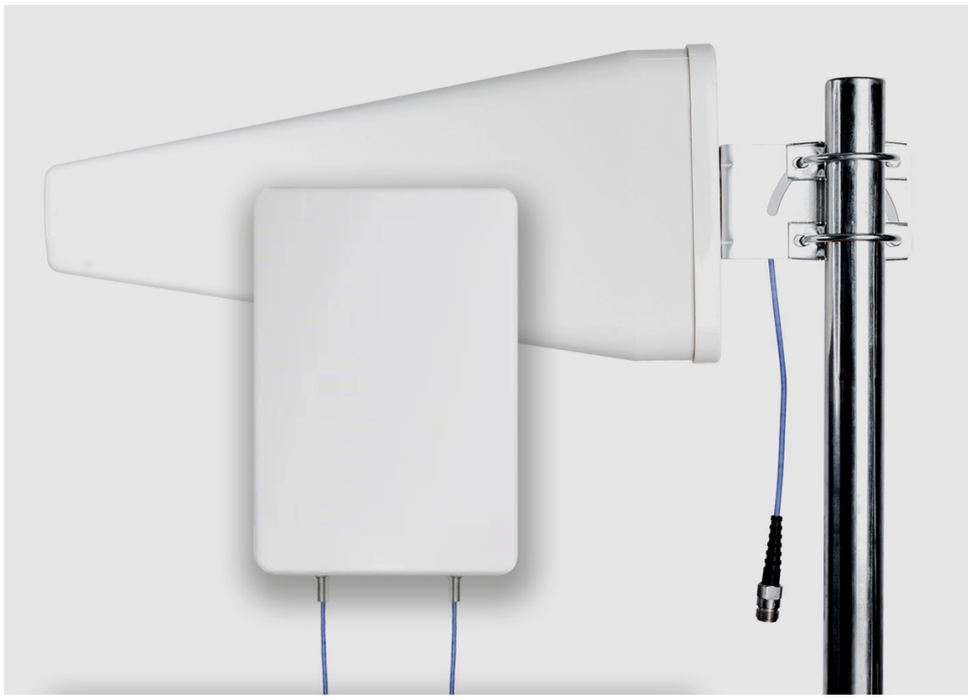
Distributed antenna system solutions enhance mobile signals indoors

The Pulse range of distributed antenna system (DAS) antennas from YAGEO offers a compact solution for extending cellular network coverage inside buildings, and gives broad frequency coverage up to 6 GHz.



YAGEO PULSE

FEATURES

- Less than -155 dBc PIM rating
- Up to 9.0, ±1.0, dBi gain
- Rugged ultraviolet-rated housing
- Two-year warranty

APPLICATIONS

- Mobile network radio systems
- Base stations
- Stadiums
- Arenas
- Hospitals
- Airports
- Office blocks
- Car parks
- Tunnels
- Underground rail networks

YAGEO supplies a range of indoor cellular distributed antenna system (DAS) antennas which are compatible with the frequency bands used by 5G and 4G mobile networks.

Marketed under the Pulse brand, the YAGEO DAS antenna solutions support a diverse range of frequencies, including UHF, TETRA, VHF, 5G FR1, 4G LTE, and Wi-Fi® 6E. Whether in portable or fixed designs, these antennas meet the dynamic needs of modern communications infrastructure.

The Pulse DAS range includes the LD617-6000S143, a directional 5G antenna supporting a 4G and 5G frequency range from 617 MHz to 6 GHz. For pole mounting indoors, the antenna measures 440 mm x 210 mm x 65 mm.

The antenna provides a directional high-gain radiation pattern, with low passive intermodulation (PIM). The antenna is SAR compliant.

The Pulse DAS antenna range also includes the PD698-3800M243, a two-port multiple in/multiple out (MIMO) directional antenna for 4G and 5G FR1 frequencies across the range 698 MHz to 3.8 GHz. Measuring 315 mm x 195 mm x 74 mm, the PD698-3800M243 is for wall mounting indoors. A variant for public safety applications is also available.

Zero-voltage switching power supply ICs help reduce size of power adapters

The Power Integrations InnoSwitch™4-Pro flyback converter ICs achieve efficiency over 95%, and provide a new, more compact option for USB PD and Universal Fast Charging Specification adapters for loads up to 220 W.

power integrations™

FEATURES

- More than 4 kV reinforced isolation
- Auto-restart or latching fault responses
- Protection functions:
  - Over-voltage protection
  - Under-voltage protection
  - Multiple under-voltage fault thresholds
  - Latching or hysteretic primary over-temperature protection
  - Output bus switch short-circuit protection

APPLICATIONS

- Power adapters for:
  - Cellphones
  - Notebook computers
  - Tablets
  - Multi-port accessories
- LED drivers

The InnoSwitch4-Pro family of digitally controllable flyback converter ICs enables manufacturers to substantially reduce the size of power adapters. Incorporating a robust PowiGaN gallium nitride (GaN) primary switch and performing steady-state switching at a frequency of up to 140 kHz, these highly integrated converter ICs reduce the component count and board area required for mains power adapters.

The InnoSwitch4-Pro ICs work with the Power Integrations ClampZero™ family of active clamp ICs to achieve zero-voltage switching (ZVS) in both continuous conduction mode (CCM) and discontinuous conduction mode (DCM). Alongside the efficient GaN switch, ZVS almost eliminates switching losses, enabling designers to eliminate the heat-sinks, spreaders and potting materials typically required for thermal management in compact power adapters.

Capable of supplying an output of up to 220 W, the InnoSwitch4-Pro ICs combine a 750 V PowiGaN primary switch, power controller, FluxLink™ reinforced isolation feedback link for secondary-side control, I2C interface, active clamp drive and synchronous rectification in a compact InSOP™-28 package.

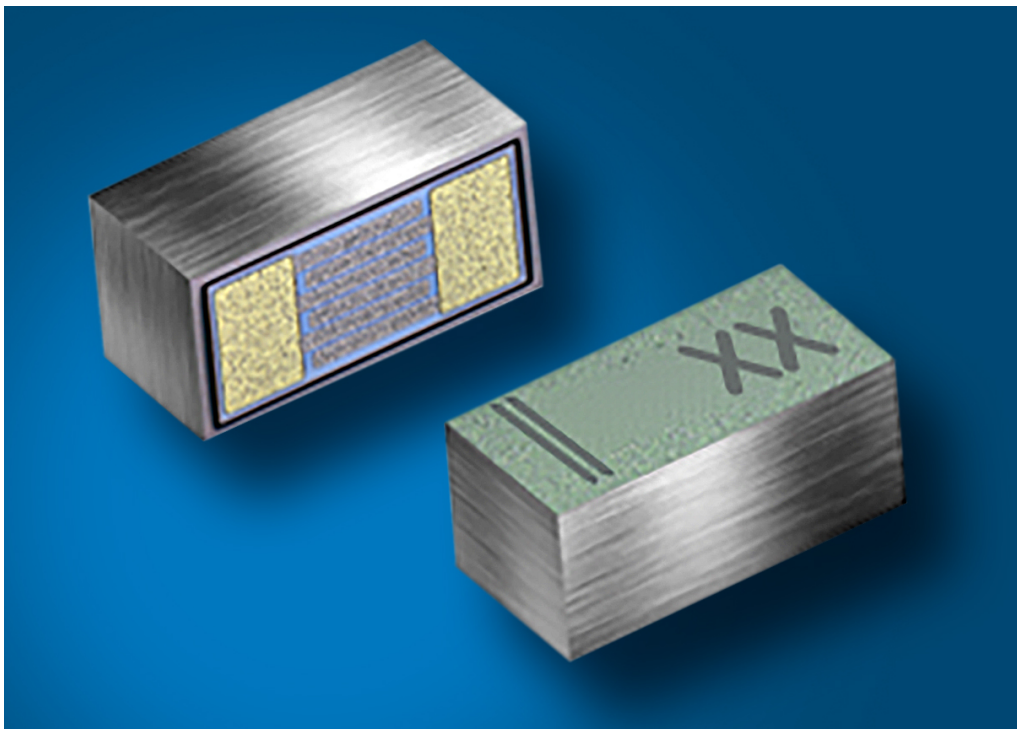
The high level of integration greatly simplifies the development and manufacturing of fully programmable, efficient power supplies for USB Power Delivery (PD) adapters, and adapters conforming to the Universal Fast Charging Specification (UFCS).

InnoSwitch4-Pro flyback switcher ICs provide exceptionally accurate constant voltage/constant current outputs, independent of external components. They consume less than 30 mW when supplying no load, while offering line sensing and comprehensive protection features.

The InnoSwitch4-Pro family is supported by various reference designs including RDR-942 for a USB PD 3.0 power adapter rated for up to 65 W, and DER-960 for a 100 W USB PD 3.0 adapter.

Miniature diodes offer ESD protection up to ±30 kV

The Vishay VCUT and VBUS series of ESD protection diodes in a CLP0603-2L package save space in consumer, automotive and industrial applications, while providing a high level of immunity against high-voltage ESD strikes.



To meet the need for ESD protection in highly space-constrained applications, Vishay offers a range of bidirectional symmetrical, single-line ESD protection diodes in a very small CLP0603-2L chip-level package. The footprint is 0.6 mm x 0.3 mm, and the package is 0.28 mm high.

The VBUS and VCUT series offer a working voltage range of between ±3.3 V and ±15 V. The VBUS series offers very low capacitance, while the VCUT series offers high ESD immunity. The VCUT series ESD protection diodes are AEC-Q101 qualified.

ESD immunity ranges between ±15 kV and ±30 kV for air or contact discharges, according to the specifications of the IEC 61000-4-2 standard.

Part Number	Reverse Standoff Voltage	Peak Pulse Current	Capacitance at 0 V Reverse Voltage	ESD Immunity according to IEC 61000-4-2
VBUS03B1-SD0	3.3 V	2.5 A	0.29 pF	± 16 kV
VBUS05B1-SD0	5.5 V	2.5 A	0.29 pF	± 16 kV
VCUT03G1-SD0	3.3 V	6 A	13 pF	± 30 kV
VCUT05G1-SD0	5.5 V	6 A	13 pF	± 30 kV
VCUT10G1-SD0	10 V	4 A	7.7 pF	± 24 kV
VCUT15G1-SD0	15 V	2.5 A	5.5 pF	± 15 kV

VISHAY

FEATURES

- Leakage current down to less than 0.05 µA
- Capacitance down to less than 0.4 pF
- Operating-temperature range: -55°C to 150°C

APPLICATIONS

- Mobile network devices
- Gaming equipment
- Virtual reality glasses
- Earphones
- Fitness trackers
- Hearing aids
- Automotive systems:
  - Telematics
  - LTE trackers
  - Heads-up and LCD displays
- Industrial automation
- Smart meters
- Motor drives
- Power tools
- Home and building controls
- PCs, notebooks and tablets
- PC peripherals
- Data storage equipment

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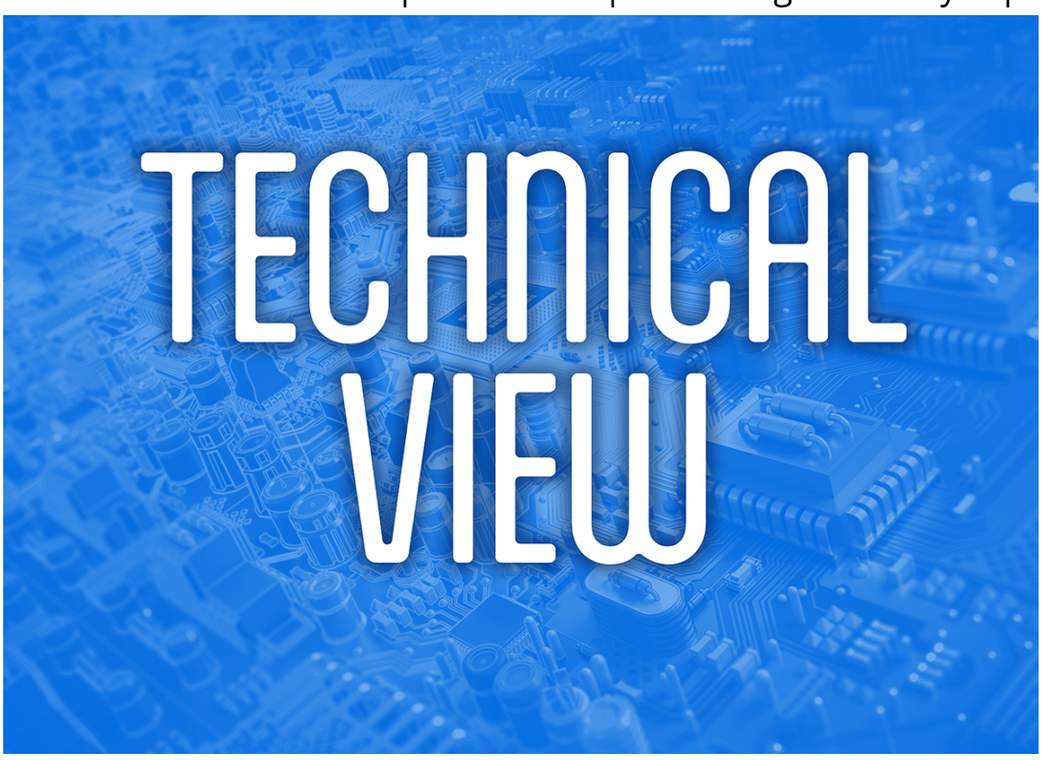
High security, minimal design disruption: how to choose the right hardware for compliance with new IoT cybersecurity regulations

By Nicolas Guilbaud
EMEA Business Development Manager (Cybersecurity), Future Electronics

Read this to find out about:

- New regulations governing cybersecurity, including additions to the Radio Equipment Directive, and the new Cybersecurity Resilience Act
- The company-wide implications of programs to ensure compliance with the regulations
- The three hardware options for implementing a security capability sufficient for compliance



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Development board for implementation of cybersecurity functions with stand-alone secure element.

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DT100104

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OEMs everywhere must deal with a wave of new cybersecurity legislation, including the UK Product and Security Telecommunications Infrastructure (PSTI) law coming into effect in 2024, and the European Union CE RED (Radio Equipment Directive) 2014/53/EU certification for wireless devices, coming into force in August 2025. Implementing security protection features in new embedded product designs is now a task that no OEM can postpone.

The first response of many design engineers will be to evaluate competing hardware products that implement cybersecurity functions. In fact, compliance with cybersecurity regulation calls not only for specific hardware capabilities, but for processes and systems implemented across the product lifecycle from design through deployment to end of life.

The OEM's evaluation of a security component therefore needs to be made in a wider context than just the features and specifications of the device itself. Wider factors to be taken into account include:

- The value of protecting investment in legacy product IP
- The flexibility and security know-how in the OEM production facilities
- The vulnerability of the product/system to cyber attack, and the strength of security protection it requires

The coming wave of cybersecurity regulation

OEMs based in Europe have a special reason to turn their attention to cybersecurity now: the clock is ticking on the introduction of two hugely significant new pieces of legislation enacted by the European Commission, with many more coming in other parts of the world. First in Europe come changes to the articles of the CE RED regulation.

- New article 3.3(d) improves network protection. Device manufacturers will have to include features that avoid harming communication networks and prevent the device from disrupting the functionality of websites or services.
- New article 3.3(e) strengthens personal data and privacy protection. For example, device manufacturers will have to implement measures to prevent unauthorized access or transmission of consumers' personal data, shown in Figure 1.
- New article 3.3(f) reduces the risk of fraud. Device manufacturers will have to include features such as better user authentication to minimize exposure to the risk of fraudulent electronic payments and monetary transfers.

The new regulation covers radio devices that can communicate over the internet, whether directly or via other equipment.

Fig. 1: The EC cited studies highlighting the risk from toys that spy on the actions or conversations of children when explaining the introduction of CE RED [1].

The regulation states the obligations imposed on OEMs. But how is an OEM to demonstrate that it complies? Full details of the compliance regime are still to be defined, but product developers can work on the basis of EN 18031, a harmonized standard governing cybersecurity. This new standard is still in draft form; the existing ETSI 303 645 and IEC 62443-4-2 standards can be used to guide the early stages of cybersecure product development until EN 18031 is ratified.

It is already known, however, that the standard will require new subsystems and capabilities in electronics systems to provide for:

- Secure boot and secure firmware update
- Secure storage of vulnerable or critical data, such as private keys
- A secure access control mechanism to authenticate connections

After CE RED, the second piece of EU legislation is the Cyber Resilience Act (CRA), which will extend the scope of cybersecurity regulation to internet-connected wired devices in 2026 or 2027, and which will add more technical and process requirements on all connected devices, including mandatory tracking of exposure to known threats for a period of up to five years.

Elsewhere, vertical sectors such as medical devices have their own sets of regulatory security requirements in Europe. And globally, governments in North America and Asia are taking cyber threats equally seriously, and enacting new requirements in regulations or guidelines.

Company-wide implications

The provisions in regulations such as the UK PSTI, and the EU CE RED and CRA, mean that cybersecurity compliance has to be about more than just secure hardware design. For instance, the requirement to support secure firmware updates means that an OEM must institute various capabilities:

- Monitoring of common vulnerabilities and exposures (CVE) notices. A hardware and software bill-of-materials maintained for every production unit is required to know which devices in the field, if any, are affected, and need a security patch delivered as a local or an over-the-air (OTA) update.
- A secure update development and delivery system

Similarly, the requirement for storage of security-critical data such as private keys calls not only for a secure repository, protected behind physical and logical barriers, but also a set of processes that are applied across the company, and a culture that reinforces the commitment of staff to following security procedures.

So secure hardware is not sufficient to ensure compliance with the new wave of cybersecurity regulations, but it is necessary. So which factors will affect the component choices that most manufacturers of IoT and other connected devices will make?

Freedom to preserve existing design IP

If the remarks above suggest that cybersecurity compliance involves root-and-branch reinvention of company processes, at least the secure hardware component can entail far less disruption: there is a way to add cybersecurity capability to existing product designs, while preserving the existing product architecture, keeping the same microcontroller or microprocessor, and maintaining IP such as firmware and application software.

This can be achieved by bolting on one of the latest generation of secure elements (SEs) to existing or new designs. Widely available from manufacturers including Infineon, Microchip, NXP Semiconductors and STMicroelectronics, SEs provide a full range of security capabilities compatible with the requirements of CE RED, the CRA and other cybersecurity regulations, shown in Figures 2 to 4. A typical secure element will provide features such as:

- Secure channel establishment with a remote host
- A signature verification service, required for secure boot and OTA updating
- Cryptographic functions
- Key pair generation using certified random number generators
- Secure system architecture offering protection against logical and physical attack

The appeal of the SE as a solution to the problem of regulatory compliance is that it can easily be bolted on to systems based on any kind of controller or processor, even down to small 8-bit microcontrollers. SE manufacturers ease the integration process by providing ready-made drivers and middleware for host controllers, and many support the SE products with security certifications.

In some circumstances, SE manufacturers also provide secure provisioning services for the products: this means that they maintain secure production facilities in which each device can have its unique ID and secure keys programmed into it before shipment to the customer. Future Electronics also offers a secure provisioning service to distribution customers.

Bill-of-materials cost for upgrading cybersecurity protection with an SE is moderate: a good quality SE can be purchased for less than an entry-level MCU. It is, however, important to recognize the limitations of these low-cost devices: secure elements are optimized for storage of secrets only, and provide sufficient bandwidth to transmit these secrets. This means, however, that most SEs do not provide high data storage capacity, and typically only a relatively slow I2C or serial peripheral interface to the host.

Bu entication, secure boot, and strong
res t possible modification of existing design
IP.

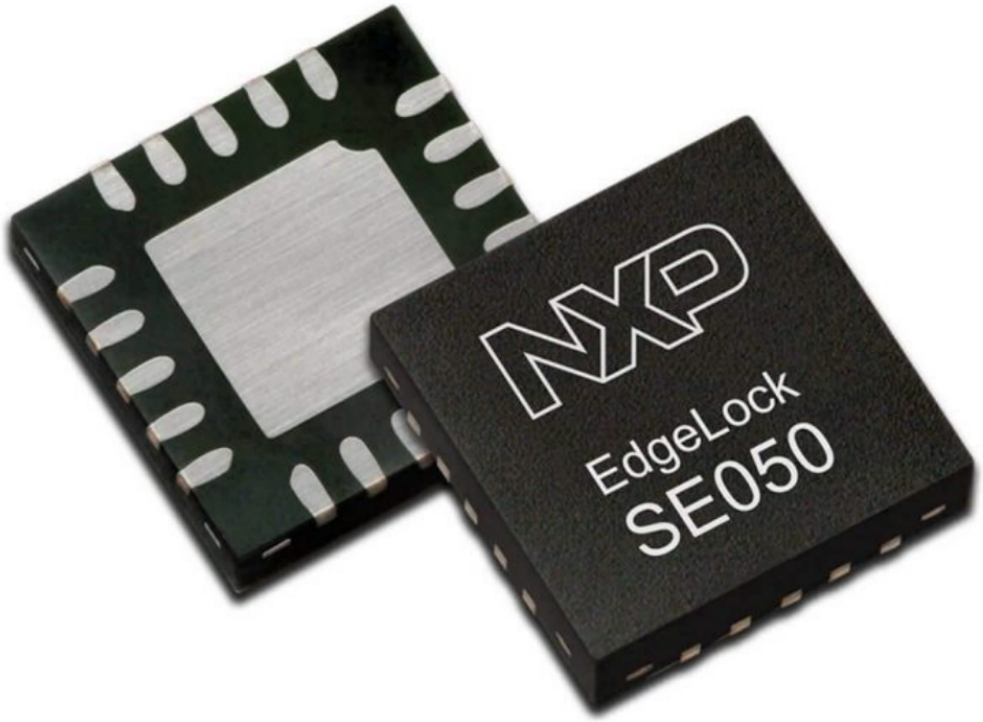


Fig. 2: The EdgeLock SE050 from NXP

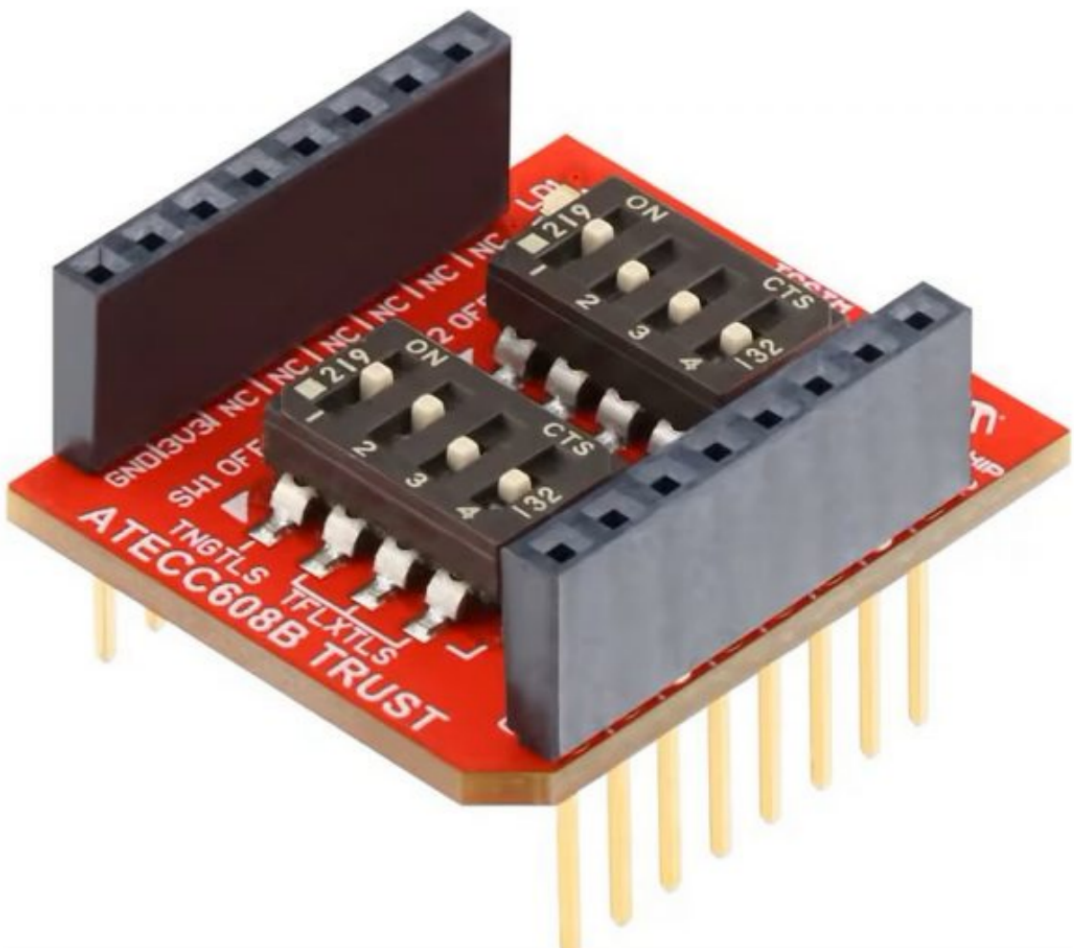


Fig. 3: The

ement from Microchip

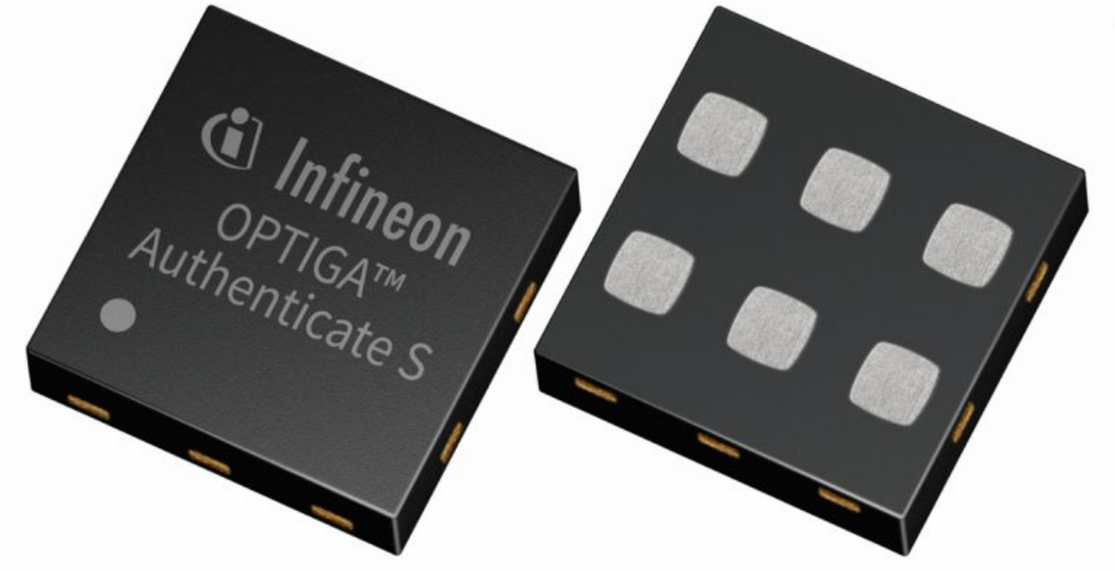


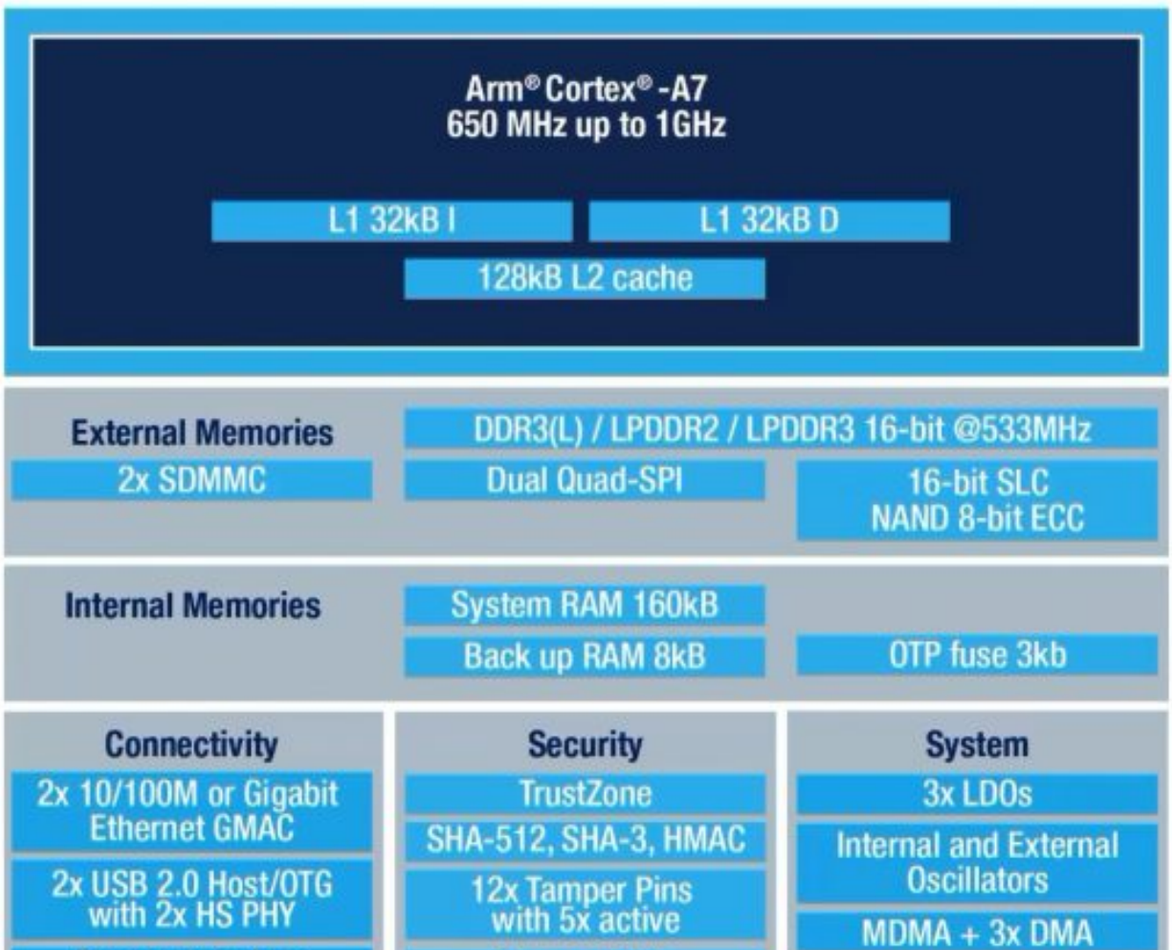
Fig. 4: The Infineon OPTIGA™

Authenticate S, a turnkey hardware-based security solution for enhanced device authentication to protect against counterfeiting

Streamlined system design

Some applications, however, are based on a high-end microcontroller or microprocessor with a high-performance core such as an Arm Cortex -M7 or Cortex-M33, or Cortex-A series. These products generally have a rich set of security features built-in, including cryptographic acceleration, random number generation, and secure partitioning in the form of Arm TrustZone technology, shown in Figure 5. This gives the OEM the possibility of achieving compliance with regulations such as CE RED and the EU CRA without the addition of an external SE.

This will almost certainly be the right option for applications that involve high-speed secure data transfers at rates faster than the SPI or I2C interface of an SE can handle.



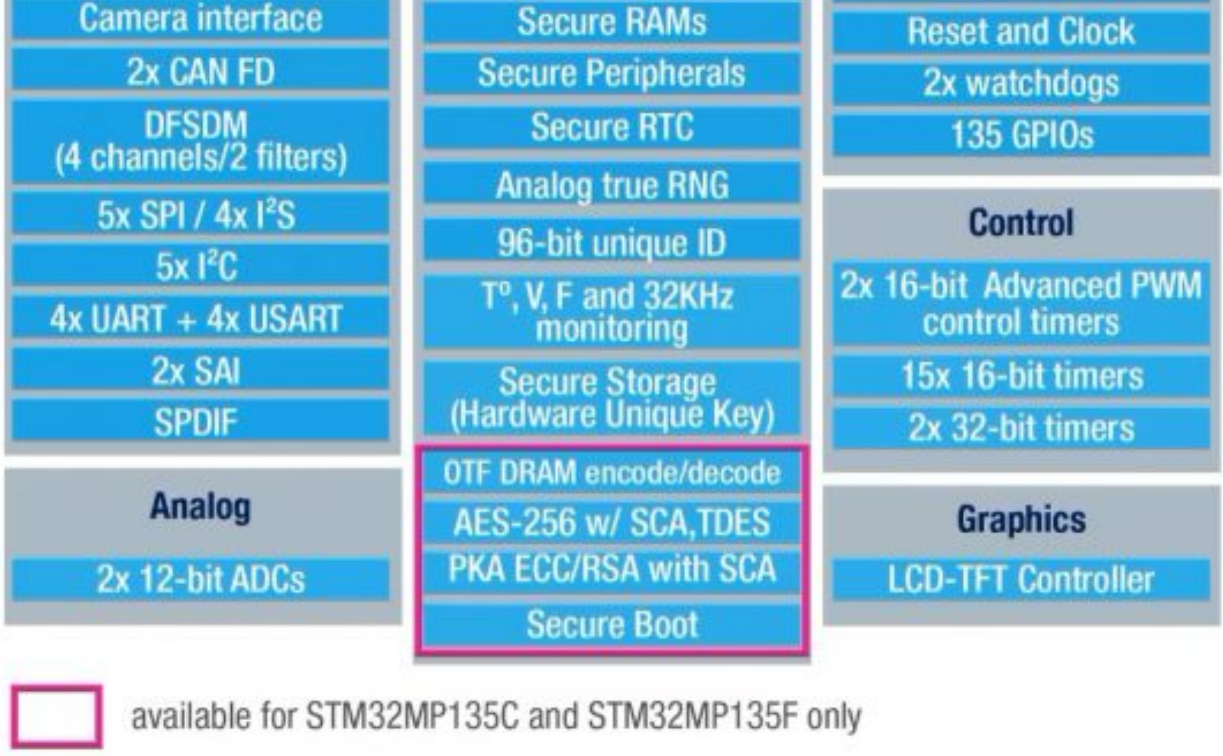


Fig. 5: Block diagram of the STM32MP135F MPU from STMicroelectronics, showing the security capabilities built into the chip, including protection against physical tampering

But for others, the drawbacks of integrated security functionality can outweigh the benefits. First, most high-end MCUs and MPUs lack strong protection against physical attack: this protection is available in an SE. Second, developing a system to run on TrustZone technology is hard: developers need to learn the OP-TEE and TFM software frameworks, and integrate them with the application, and this can often result in extending development time and delaying time-to-market. In addition, TrustZone applications make heavy use of memory resources, this is particularly a problem for MCUs, which have limited on-board RAM and Flash memory.

In practice, then, many applications based on a high-end MCU or MPU use an SE for some or all of the system security functionality, for instance, implementing secure boot in the processor and choosing to have network authentication managed by a secure element. As well as simplifying the development process, this also enables the OEM to take advantage of the broad availability of secure provisioning services for SEs, services for provisioning an MCU or MPU are scarcer and more expensive.

For extreme cybersecurity protection

There is one other broad category of hardware option for compliance with cybersecurity regulation: FPGAs.

An FPGA provides a flexible approach, enabling the OEM to specify exactly the security functions that are needed, and to update the design in response to changes in the external threat environment without requiring a hardware re-spin. This flexibility extends to enabling ultra-high performance security: an FPGA is today the only way to future-proof a design against the risk that quantum computing makes existing asymmetric cryptographic security algorithms obsolete.

Of course, an FPGA is a specialist component that requires knowledge of the VHDL or Verilog design environment provided by the FPGA manufacturer. But when the very strongest security protection is required, an FPGA is normally the right choice of hardware.

Getting the architecture decision right

This article provides high-level guidance on the issues to consider when modifying a design or creating a new design for compliance with security standards. Any embedded design can be made compliant, and the wide choice of SEs on the market allows OEMs to achieve the right balance of cost, performance, and protection.

The hardware should not, however, be the starting point of the 'design for security' process. In fact, not even compliance should be the starting point.

Instead, the right place to start is an assessment of the needs of the application: how big a security threat does it face, and might this threat grow stronger over time? What is the lifetime of the product in the field? How important is it to maintain existing design IP, and a familiar hardware architecture?

By considering these high-level questions, OEMs can ensure that compliance is achieved and the right level of security protection without the risk of over-engineering the solution. An ideal security design minimizes bill-of-materials cost and development time while allowing the OEM to hit the target for launch to market.

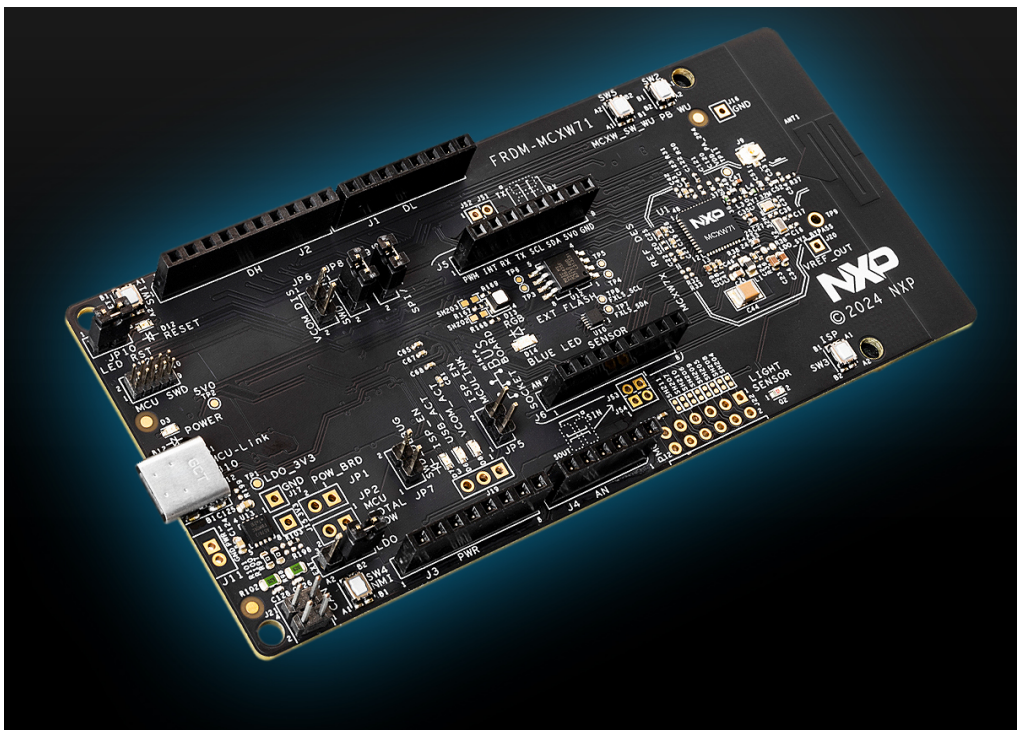
For advice on these architectural considerations, and the appropriate design strategies, cybersecurity experts at Future Electronics can bring advice based on experience across thousands of customer design projects.

Reference

[1] https://single-market-economy.ec.europa.eu/news/commission-strengthens-cybersecurity-wireless-devices-and-products-2021-10-29_en

Dev board for wireless MCU offers multiple expansion options

The NXP FRDM-MCXW71 is a ready-made platform to evaluate and develop with the MCX W71 wireless microcontrollers. Featuring Bluetooth®, Zigbee, Thread and Matter networking capability, the MCX W71 MCUs are backed by strong security capabilities.



The FRDM-MCXW71 is a compact and scalable development board for rapid prototyping of systems based on the MCX W71 family of wireless microcontrollers from NXP Semiconductors.

The FRDM-MCXW71 offers easy evaluation of the MCX W71 multi-protocol RF communications capabilities, as the MCU supports the Bluetooth Low Energy, Zigbee, Thread and Matter wireless protocols.

The board includes an onboard MCU-Link debugger, and Arduino, mikroBUS™ and Pmod™ headers for easy access to the MCU I/Os. NXP also provides the board with an accelerometer and a temperature sensor for use in the application, as well as an 8 Mbyte MX25R6435FM2IL0 external SPI Flash memory.

Multiple add-on boards are available and the FRDM-MCXW71 is backed by a rich set of software resources:

- Application code hub
- MCUXpresso software development kit
- MCUXpresso integrated development environment

The MCX W71x MCUs feature a 96 MHz Arm® Cortex®-M33 CPU core coupled with a multi-protocol radio subsystem supporting Matter, Thread, Zigbee and Bluetooth Low Energy communication. The independent radio subsystem, which has a dedicated CPU core and memory, relieves the main processor of the burden of radio system control.

The MCX W71x MCUs also offer advanced security with an integrated EdgeLock® secure enclave core profile. They will be supported by NXP EdgeLock 2GO cloud services for credential sharing.

The MCX W71x family supports industrial and IoT devices as a single-chip solution or by acting as a co-processor in a hosted architecture.

FEATURES

- RGB user LED
- Reset, in-system programming and wake-up buttons
- Board supplied with quick start guide and USB Type-C® cable

APPLICATIONS

- Industrial systems:
  - Air-conditioning units
  - Building safety equipment
  - Building security equipment
  - Climate control
  - Metering
  - Smart lighting
- Smart city systems
- Smart home systems:
  - Connected small appliances
  - Home control, access and automation
  - Home security and surveillance
  - Smart door locks
  - Smart sensors
  - Thermostats
  - Window coverings

FREE DEV BOARD

Orderable Part Number
FRDM-MCXW71

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Antenna offers high performance at 868 MHz ISM frequency

The ANT-868-JJB-ST from TE Connectivity is a dome antenna which offers long life and a robust mounting arrangement for use in IoT and industrial products such as scanners and energy meters.

FEATURES

- Less than 2.1:1 voltage standing-wave ratio
- 50 Ω impedance

APPLICATIONS

- Fire alarms
- Handheld payment devices
- Barcode scanners
- Smart meters
- Point-of-sale terminals
- Inventory tracking
- Remote process monitoring
- Restaurant ordering systems

TE Connectivity supplies a wide range of antennas for use in the licence-free industrial, scientific and medical (ISM) frequency band. The TE portfolio includes:

- Embedded or internal antennas for short-range communications
- Remote, dipole and terminal-mount external antennas for mid-range communication
- Outdoor-rated external antennas for long-range communication

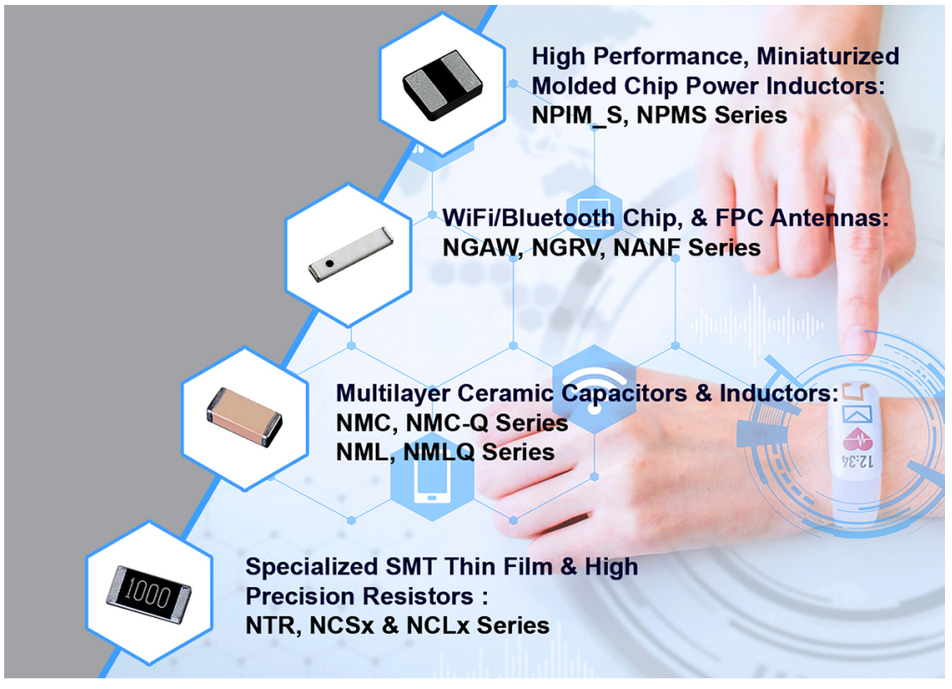
The attributes of the TE antennas for ISM frequencies include durability, modularity, miniaturization, high bandwidth, and high EMI/grounding performance.

A notable example of the TE antennas for ISM frequencies is the ANT-868-JJB-ST, a dome/puck antenna for 868 MHz communications. This single-band antenna for LoRaWAN and LPWAN applications is intended for internal use, embedded in a host device. It has a through-hole/tab-mount arrangement.

Providing an omnidirectional radiation pattern, the single-port ANT-868-JJB-ST offers maximum gain of less than 0 dBi.

Low-profile chip antennas boast robust performance for cutting-edge connected designs

NIC Components supplies a broad portfolio of compact surface-mount chip antennas, which offer stable and reliable operation across various standard frequency bands to support many applications.



The Nxxx chip antennas from NIC Components present a high-reliability solution to antenna integration thanks to the compact, passive design. A reduced ground plane size requirement enables the design of smaller end products, and compatibility with surface-mount assembly processes supports rapid, automated manufacturing for high-density board layouts.

The Nxxx chip antennas support many connectivity protocols, including ISM, LTE, DECT, 5G, GNSS, Bluetooth and Wi-Fi. Some models offer dual connectivity for commonly paired protocols, such as Wi-Fi and Bluetooth within one device.

For example, the NGRM 2.4 GHz Wi-Fi and Bluetooth FR4 monopole antenna offers up to 2 W input power and a peak gain of 1.9 dBi, with an efficiency of 52.1%. The dimensions of this antenna are 5 mm x 1.0 mm x 1.4 mm, and the required ground plane is 40 mm x 40 mm.

NIC also produces a revolutionary vertical chip antenna. Unlike the other Nxxx antennas, which produce a linearly polarized output, the NGRV has a vertically polarized output. The new design of the NGRV results in reduced near-field interactions with the human body in wearable applications, ensuring seamless connectivity between devices.

The Nxxx family also includes the NGCM and NGCP series for ISM and cellular connectivity respectively. The NGCL antennas offer a higher-efficiency ceramic construction in contrast to the standard FR4 material.

NIC COMPONENTS CORP.

FEATURES

- 50 Ω impedance
- Operating temperature range: -40°C to 85°C
- RoHS compliant

APPLICATIONS

- 915 MHz ISM band systems
- LTE full-band, 3G and 2G communications
- 433/450/470 MHz ISM band:
  - Smart meters
  - Wireless alarms and security systems
  - Industrial monitoring and control
  - Machine-to-machine communication
- 5G NR band:
  - Transportation
  - Autonomous aerial vehicles
  - Industrial IoT
  - Trackers
- DECT, GNSS, Wi-Fi and Bluetooth:
  - Smart home
  - Wearables and hearables
  - Gateways
  - Smart meters
  - Trackers
  - Navigation
  - Automotive sensors
  - Handheld consumer devices
  - Wireless cards and USB dongles

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Digital power monitor offers high-precision input channels and MIPI I3C interface

The TSC1641 from STMicroelectronics performs tightly synchronized voltage and current measurements and produces highly accurate power calculations. The I3C interface allows for direct connection to the latest 32-bit microcontrollers.

FEATURES

- 50 nA current in shutdown mode
- 20 pA input bias current at 12 V
- Operating-temperature range: -40°C to 125°C
- 3.0 mm x 3.0 mm plastic DFN10 package

APPLICATIONS

- Dc power supplies
- Industrial battery packs
- Power inverters
- Power tools
- Telecoms equipment

FREE DEV BOARD

Evaluation board for the TSC1641 voltage, current and power monitor.

Orderable Part Number
STEVAL-DIGAFEV1

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STMicroelectronics has introduced the TSC1641, a digital current, voltage, power and temperature monitor which features high-precision input channels and a MIPI I3C bus interface.

The IC monitors dc current and voltage simultaneously through a dual-channel, 16-bit ADC, and produces power computations derived from these measurements internally. Because the current and voltage measurements are precisely synchronized, the power calculations produced by the TSC1641 are highly accurate. Measuring voltages up to a maximum of 60 V, the TSC1641 can be used in a wide variety of industrial settings.

The IC monitors current with an external shunt resistor, which gives the designer flexibility to perform high-side, low-side, or bi-directional measurements. The TSC1641 also performs internal die temperature monitoring.

Via interface options including I2C and SMBus as well as I3C, the digital monitor reports its measurements to a host controller. A dedicated Alert pin enables the TSC1641 to provide alerts for trigger events: over- and under-voltage, over- and under-current, over-power, and over-temperature.

The I3C interface allows designers to connect the TSC1641 directly to state-of-the-art microcontrollers such as the STM32H5 series from ST, to assist system supervision. The interface supports data rates up to 12.5 MHz and requires no pull-up resistors, helping to reduce the bill-of-materials and save board space.

A full set of hardware and software tools is available from ST to enable designers to explore the TSC1641 precision power monitoring capabilities.

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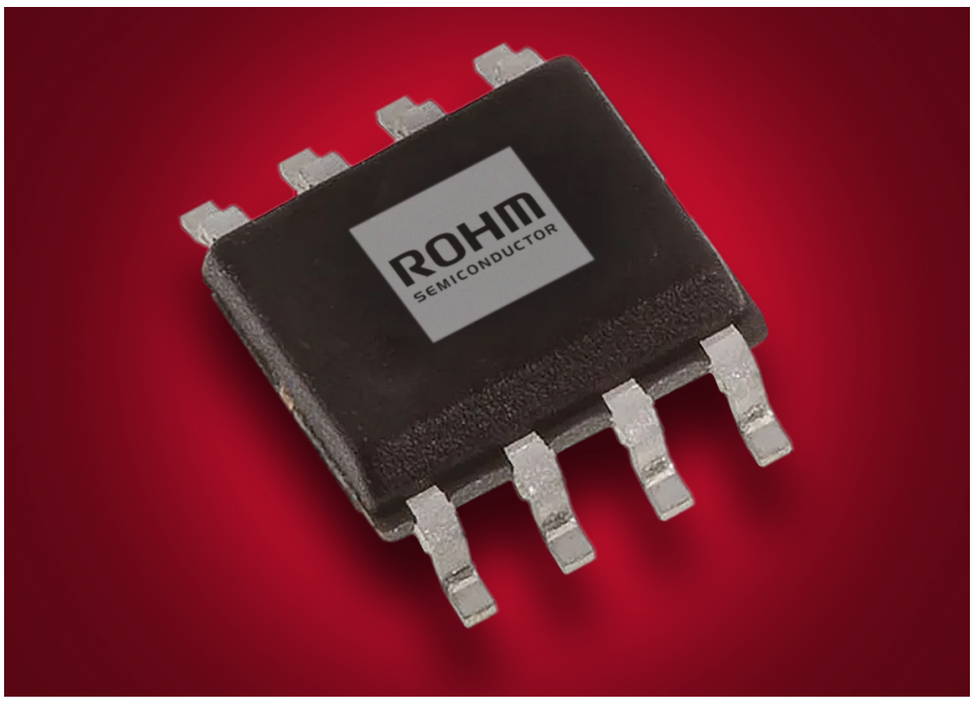
Power controller IC performs tight regulation for auxiliary power supplies

The BD28C5xH/LFJ-LB family of power controllers from ROHM Semiconductor is supplied in various versions to meet the different protection threshold requirements of silicon MOSFETs, IGBTs and silicon carbide MOSFETs.



ROHM SEMICONDUCTOR

FEATURES

- Input-voltage range: 6.9 V to 28.0 V
- 2 mA maximum operating current
- 60 µA start-up current
- Adjustable switching frequency
- Cycle-by-cycle over-current protection

APPLICATIONS

- Industrial motor drives
- EV charging stations
- Solar power systems
- Power supplies
- Uninterruptible power supplies

ROHM Semiconductor has released a new family of PWM controller ICs for auxiliary dc-dc power supplies in industrial applications.

The BD28C5xH/LFJ-LB controllers have tight, accurate electrical characteristics which enable power-system designers to reduce component count and bill-of-materials cost while improving system performance.

The variants in the BD28C5xH/LFJ-LB family offer different under-voltage lockout thresholds, making them suitable for different types of power switch and providing valuable design flexibility.

The power controllers are pin-compatible with competing controllers available on the market today. The controllers are supplied in an SOP-J8 package measuring 4.9 mm x 6.0 mm x 1.65 mm.

Part Number	Under-voltage Lockout Threshold	Target Power Device Type
BD28C55FJ-LB	8.4 V/7.6 V	Silicon MOSFET
BD28C54FJ-LB	14.5 V/9.0 V	Silicon MOSFET or IGBT
BD28C57LFJ-LB	18.8 V/14.5 V	Silicon carbide MOSFET
BD28C57HFJ-LB	18.8 V/15.5 V	Silicon carbide MOSFET

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Fuseholders support automated assembly and high safety

The SCHURTER OGN family of open-frame fuseholders meets high safety requirements, and features a robust construction to withstand high solder temperatures.

SCHURTER ELECTRONIC COMPONENTS

FEATURES

- Suitable for fully automated PCB assembly
- PC1 shock-safe rating
- 500 V ac/dc voltage rating
- 4 W maximum power rating
- More than 3 kV dielectric strength

APPLICATIONS

- Home appliances
- Industrial equipment
- Control electronics

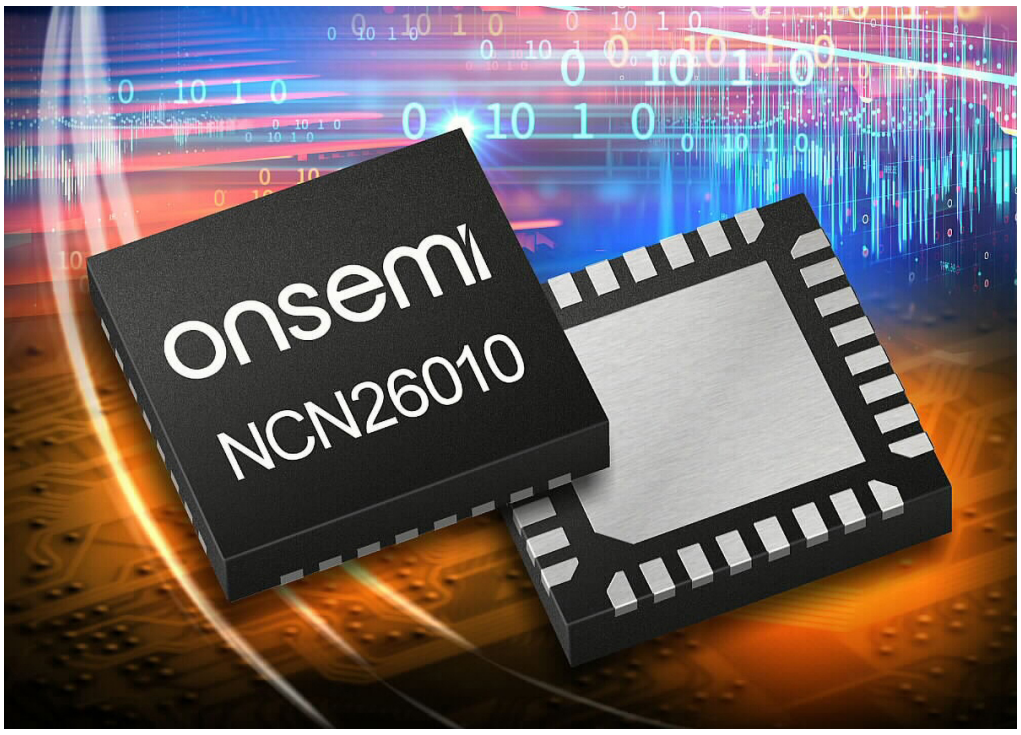
SCHURTER supplies the OGN series of open-frame fuseholder blocks for appliances that are unattended when in use.

The OGN fuseholders meet the strict requirements of the IEC 60335-1 standard for glow wire performance. The fuseholders are supplied in versions for through-hole and surface mounting. The surface-mount variant is available with either tin-plated contacts as standard, or with gold-plated contacts to withstand high solder temperature.

The surface-mount OGN fuseholders are also optionally available pre-assembled with fuses and covers.

IEEE 802.3cg-compliant controller brings Ethernet to the edge of factory networks

The NCN26010 Ethernet controller from onsemi offers high noise immunity, maintaining reliable connectivity over a long range even in noisy industrial environments, and offers multiple node support to reduce the cost of installation.



Factories today commonly use Ethernet networks for supervisory control and station management, but still rely on legacy fieldbus solutions to communicate with field instrumentation. Such legacy protocols need to be replaced and modernized with low-cost, single unshielded-pair Ethernet solutions which will allow factories to run data over Ethernet seamlessly from the cloud to the edge.

The IEEE 802.3cg standard provides a specification for the technology to overcome the gap in industrial Ethernet systems, offering low-cost communication to field devices at a data rate of 10 Mbits/s using two new physical layers:

- 10BASE-T1L for long-range, point-to-point communication over a range of up to 1,000 m
- 10BASE-T1S for multi-point communication over a range up to 25 m

The NCN26010 from onsemi, one of the first 802.3cg-compliant Ethernet controllers, provides a reliable way to take advantage of the benefits of single-pair Ethernet technology.

The noise immunity of the NCN26010 is far higher than is specified in the 10BASE-T1S standard: a proprietary enhanced noise immunity feature provides robust signal detection in noisy industrial environments, and can extend the network range to up to 50 m.

The NCN26010 also offers very low line capacitance, enabling it to support five times the node requirement of the IEEE 802.3cg standard, up to 40 nodes on a 25 m segment. This helps factory operators to save more on the cost of wiring and installation.

Multi-drop Ethernet offers a way to reduce the wiring and installation costs which typically dominate the networking budget in many factories: a network can be completed with up to 70% fewer cables while reducing installation costs by as much as 80%. 10BASE-T1S also offers the flexibility to repurpose nodes after the initial installation.

Additional benefits include:

- Eliminates the need for large switches, gateways, or protocol translators, and the additional wiring and power that are required
- Lowers software maintenance costs as multiple networking technologies no longer need to be maintained, legacy point-to-point and multi-point standards, such as RS 485, CAN, FlexRay, RS-232, or HART may be replaced by 10BASE-T1S Ethernet
- Enables greater data throughput over existing cables, eliminating the need to run new cables, which is often the highest contributor to costs in a networking installation

onsemi

FEATURES

- Best-in-class bit error rate performance
- Collision detection masking
- Physical layer collision avoidance (PLCA)
- Unique PLCA precedence mode
- Supports deterministic real-time performance

APPLICATIONS

- Industrial automation
- Sensor and control interfaces
- Building control systems
- Security equipment
- Field instrumentation
- Human-machine interfaces
- Data center management

FREE DEV BOARD

Development platform for IEEE 802.3cg-compliant industrial networking applications.

Orderable Part Number
NCN26010XMNEVK

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Launch of high-performance wireless MCUs supports compliance with new cybersecurity regulations

The highly integrated STM32WB5 family from STMicroelectronics supports multiple wireless technologies and the latest security standards, addressing the market requirements for smart industrial, medical, and consumer devices.

STMicroelectronics has launched the STM32WBA5 family, the next generation of its short-range wireless microcontrollers. These innovative, integrated MCUs enable wearable devices and smart objects to be made smaller, easier to use, more secure and affordable.

The new family includes the STM32WBA55 MCU, which can communicate using multiple wireless standards concurrently, including low-power Bluetooth® Low Energy networking compliant with the v5.4 specifications, Zigbee, Thread, and Matter. The new STM32WB5 MCUs also introduce support for the latest Bluetooth Low Energy audio specifications which enable richer listening and hearing experiences such as the Bluetooth Auracast™ feature.

The MCUs are backed by the STM32CubeWBA MCU package and other parts of an extensive software ecosystem which provides communication stacks, sample code, and tools to enable developers to bring new products to market quickly and efficiently.

Security concerns are comprehensively addressed in the STM32WBA5 series, the first wireless MCUs to achieve the important security evaluation standard for IoT platforms (SESIP) Level 3 security certification. With this capability, smart devices are ready to satisfy the requirements of the US Cyber Trust Mark and EU Radio Equipment Directive (RED) regulations, which are due to become mandatory in 2025.

The STM32WBA55 is based on a 100 MHz Arm® Cortex®-M33 core with the Arm TrustZone® architecture to isolate secure processes and storage. Featuring up to 1 Mbyte of Flash memory, the MCU provides generous provision for code and data storage.

Low-power features include background autonomous mode, flexible power-saving states, and analog and digital peripherals proven in the ST STM32U5 ultra-low-power MCUs.

The latest ST 2.4GHz radio, integrated alongside the MCU, is the first to let the application control the RF output power. The adjustment range extends up to +10 dB to ensure reliable wireless connections even in difficult operating conditions.

FEATURES

- Receive sensitivity:
  - -96 dBm in Bluetooth Low Energy mode at 1 Mbit/s
  - -97.5 dBm in IEEE 802.15.4 mode at 250 kbits/s
- Packet traffic arbitration
- Integrated balun
- ART Accelerator allowing zero wait-state execution from Flash memory
- Real-time clock with hardware calendar, alarms, and calibration
- 12-bit ADC operating at up to 2.5 Msamples/s
- Two ultra low-power comparators

APPLICATIONS

- Smart thermostats
- Tracking devices
- Smart chargers
- Headsets
- Power tools
- Smart meters

FREE DEV BOARD

Development kit for multi-protocol wireless MCU.

Orderable Part Number
STM32WBA55G-DK1

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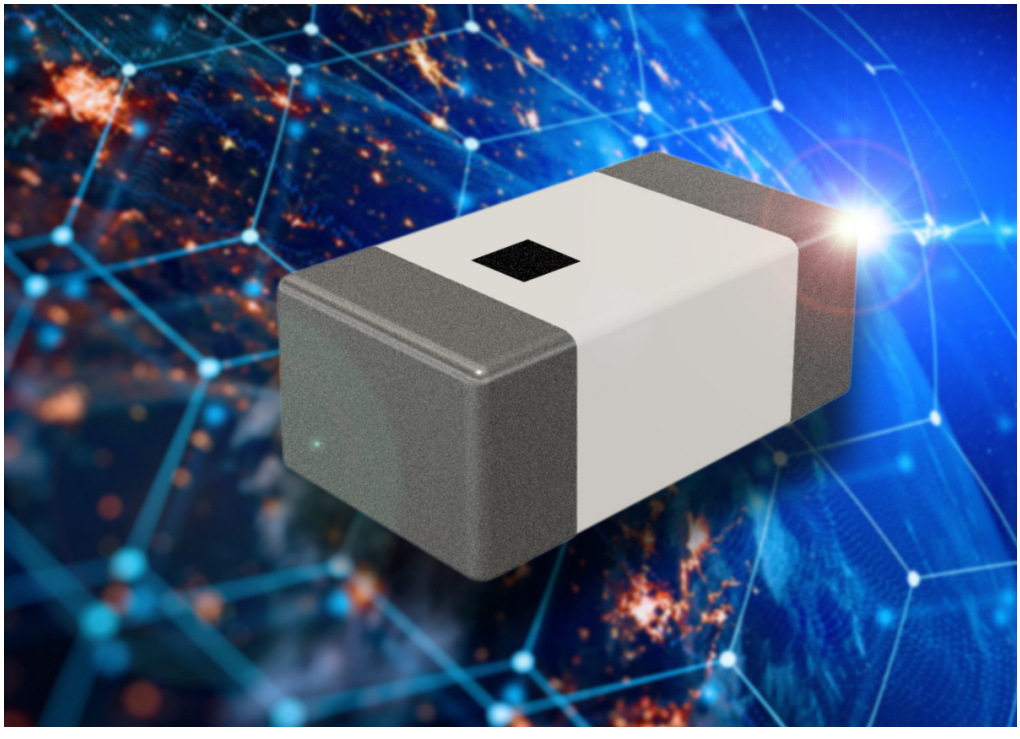
Compact 2.4 GHz antenna produces high RF performance in wireless IoT applications

The surface-mount AMCA31-2R450G-S1F-T3 chip antenna from Abracon provides a linear polarized output for IoT and wearable devices that require a Wi-Fi® or Bluetooth® connection.



ABRACON

FEATURES

- -12.5 dB maximum return loss
- 2:1 voltage standing-wave ratio
- 50 Ω impedance
- Less than 3 W input power

APPLICATIONS

- IoT devices
- Wearable devices
- Wireless remote controls
- Personal area networks
- Industrial and commercial equipment

The Abracon AMCA31-2R450G-S1F-T3 is a small, ceramic chip antenna with a 2.45 GHz frequency rating which provides peak gain of 2.3 dBi and 66% efficiency. The antenna has a 3.2 mm x 1.6 mm footprint and is just 1.2 mm high.

Providing an omnidirectional radiation pattern, the AMCA31-2R450G-S1F-T3 is suitable for use with radio communication protocols including:

- 2.4 GHz Wi-Fi
- Bluetooth
- Zigbee
- ISM band

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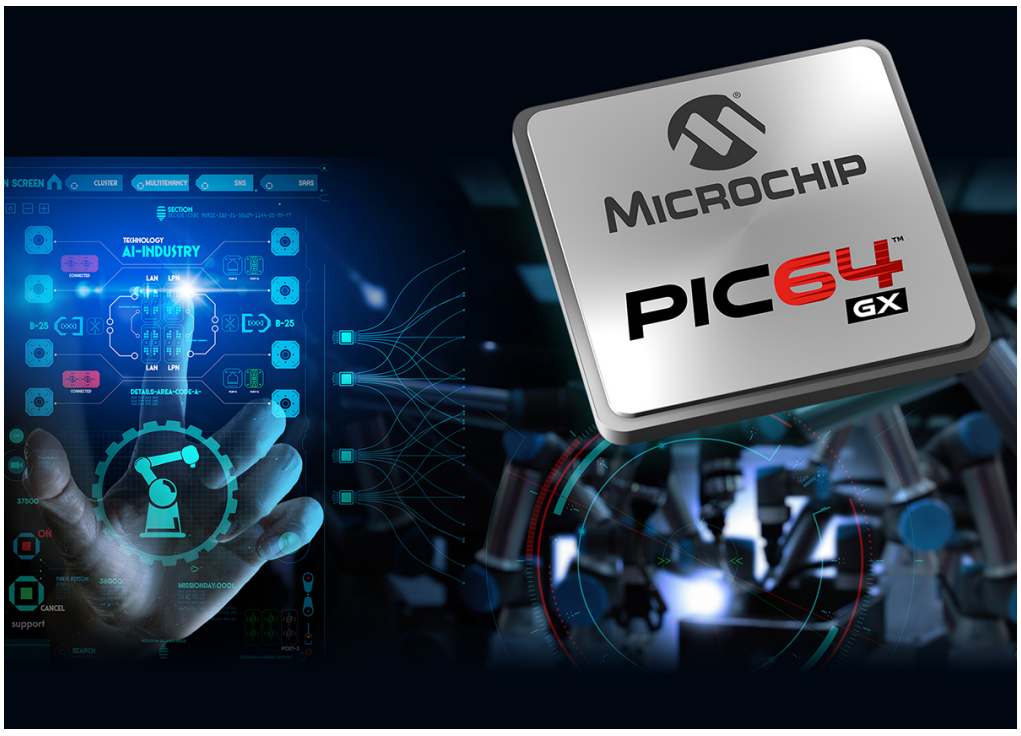
New 64-bit MPU boasts four RISC-V cores and supports real-time embedded applications

Microchip has launched the new PIC64 family of microprocessors, which offers power-efficient asymmetric multiprocessing and deterministic latency in real-time and bare-metal systems while simultaneously running the Linux® operating system.



The PIC64 MPU family from Microchip presents an exciting opportunity for designers looking to build scalable, intelligent systems with machine learning at the edge. In addition to four U54 64-bit RISC-V application processor cores, the PIC64 MPU features a single E51 64-bit monitor processor core. When used together in the PIC64 MPU, systems can simultaneously run a Linux OS and either a real-time OS (RTOS) or bare metal for deterministic performance. This flexible operation is made possible due to the coherence between the application processing cores and the memory subsystem.

Both core systems of the PIC64 MPU run at 600 MHz and include a physical memory protection unit. The configurable memory subsystem supports standard and user-defined secure boot and key management for military-grade security that is not vulnerable to Meltdown or Spectre exploits. Additional single-bit error correction and double-bit error detection on all memories boost system reliability.

While considered a mid-range microprocessor, the PIC64 MPU family meets the rising demands of modern embedded designs across a broad range of markets. Extensive connectivity and video interfaces make the PIC64 MPUs suitable for full-featured products and AI video applications. These interfaces include two CAN 2.0 A and B, two Gigabit Ethernet MACs, SGMII, PCIe Gen 2, two-lane MIPI CSI-2 at 1 Gbit/s, and HDMI 1.4.

To support development using the PIC64 hardware, Microchip offers a comprehensive tool suite serving Yocto Linux, Microchip Buildroot External, Linux4Microchip, Canonical Ubuntu OS, Zephyr RTOS, and MPLAB extensions for VS Code. The PIC64 MPUs are fully pin-compatible with Microchip PolarFire® SoC FPGAs.

Microchip also offers a high-performance variant of the PIC64 MPUs for space and defense applications, with 100 times the compute of current solutions while exhibiting very high radiation and fault tolerance. Standard PIC64 models are available with an extended commercial operating temperature range of 0°C to 100°C or an industrial operating-temperature range of -40°C to 100°C.

MICROCHIP

FEATURES

- Flexible 2 Mbyte L2 memory:
  - Loosely integrated memory for deterministic access
  - Coherent scratchpad memory mode for shared messages
- 128 kbytes of user memory for boot Flash
- 56 kbytes of secure non-volatile memory for user data and key storage
- Built-in tamper detectors and countermeasures
- DPA protection

APPLICATIONS

- Real-time systems
- Linux-based computing
- Bare-metal computing
- Embedded machine vision
- Industrial automation
- Smart camera systems
- Automotive monitoring systems
- IoT devices
- Aerospace and defense

FREE DEV BOARD

Evaluation board for testing the PIC64GX1000 64-bit quad-core MPU.

Orderable Part Number
PIC64GX1000-KIT-ES

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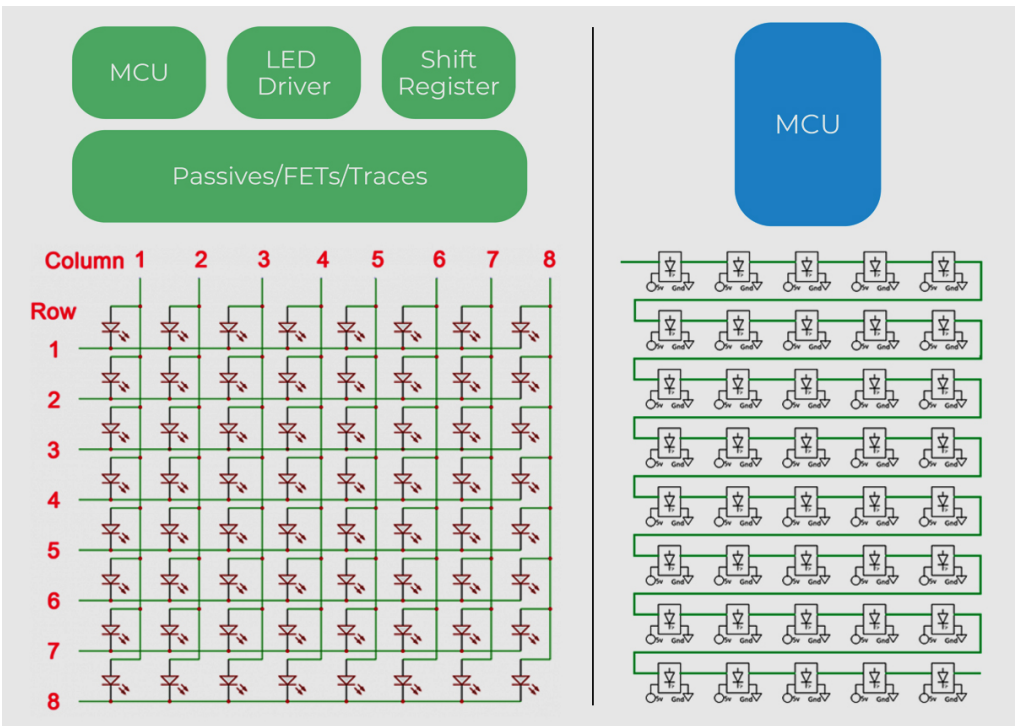
Digital LEDs simplify design and reduce cost of low-power lighting arrays

The IN-PIS63BTPx family of red, green, blue and white LEDs from Inolux include an embedded controller and four pins to enable digital control signals to be passed from LED to LED in a simple daisy-chain configuration.



A circuit based on digital addressable LEDs eliminates the need for an expensive LED driver, as well as additional passive components and board traces

Inolux
LED Design Made Simple

FEATURES

- 12 mA drive current
- 5.0 V forward voltage
- 120° viewing angle
- Operating-temperature range: -30°C to 85°C

APPLICATIONS

- Signage
- Decorative lighting
- IoT devices
- Telecoms and networking equipment
- Aftermarket automotive lighting
- Backlighting
- Wearable devices

The Inolux IN-PIS63BTPx family of digitally addressable monocolor LEDs provides manufacturers of low-power light source systems with a new way to save space, reduce costs, and greatly simplify board layouts.

Traditional lighting system designs using arrays of analogue LEDs require complex board traces to connect each LED individually to an LED driver or a microcontroller with multiple inputs and outputs. This set-up demands numerous peripheral components, such as capacitors and resistors, to manage voltage division and current limiting.

The Inolux IN-PIS63BTPx monocolor LEDs provide for a much simpler circuit design. By using a single wire from the controller IC to the first LED, the control signal can be passed in a daisy-chain configuration to up to 999 other LEDs in the array. This dramatically simplifies wiring, reduces the size of the board layout, and eliminates the need for additional peripheral components, resulting in substantial reductions in both material and assembly costs.

The IN-PIS63BTPx series, the only monocolor digitally addressable LEDs on the market, enables manufacturers to achieve precise and customizable lighting effects in a more compact and efficient package than is possible with conventional LEDs.

Inolux has demonstrated that in a typical application circuit, replacing six conventional LEDs (powered by an 18-channel analogue LED driver and supported by three resistors and two capacitors) with six IN-PIS63BTPx LEDs can reduce bill-of-materials cost by up to 39%. Unlike the conventional approach with standard LEDs, which may require multiple boards, the Inolux addressable LEDs allow all components to be mounted on a single PCB, providing additional savings in board material and assembly costs.

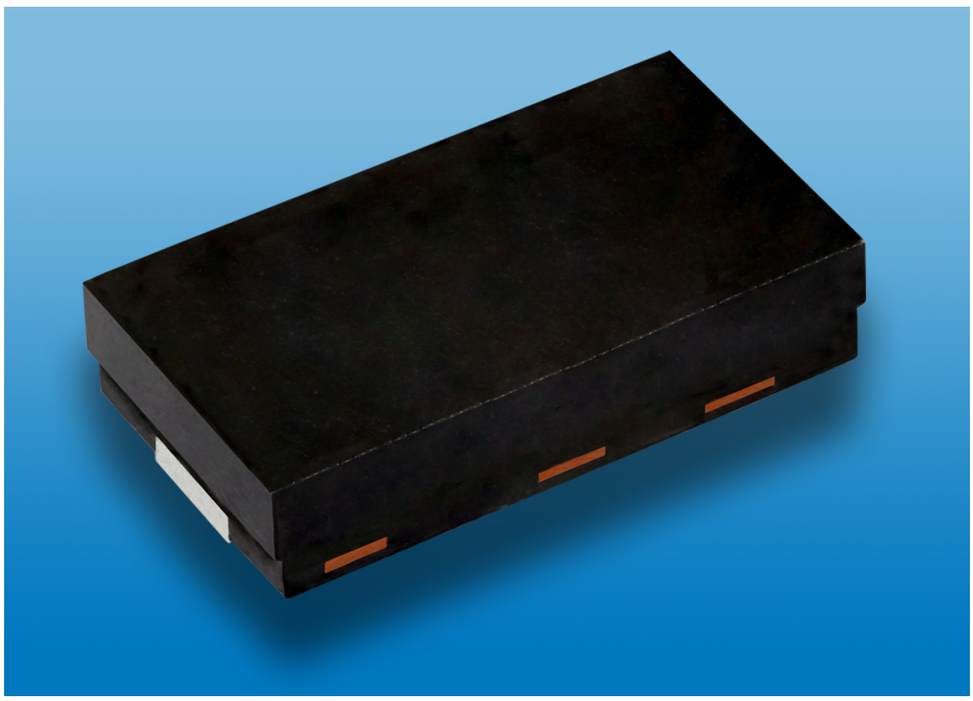
Housed in a surface-mount 0603 package, the IN-PIS63BTPx LEDs support a data rate of 800 kbits/s, enabling a refresh rate of up to 30 frames per second.

Part Number	Color Designation	Color Specification	Luminous Intensity
IN-PIS63BTPR	Red	625 nm	330 mcd
IN-PIS63BTPG	Green	525 nm	520 mcd
IN-PIS63BTPB	Blue	460 nm	110 mcd
IN-PIS63BTPW	White	x 0.275; y 0.265	300 mcd

In addition to the monocolor IN-PIS63BTPx series, Inolux offers other addressable LED solutions such as the IN-PI55TATPRPGPB series of RGB LEDs. These LEDs are housed in a 5050 surface-mount package with an integrated control IC, allowing for precise digital control over millions of color variations, from deep sienna to bright salmon, while maintaining low power consumption.

New low-profile rectifier IC offers footprint compatibility with legacy packages

The Vishay SExxNx series of PowerDFN DFN3820A surface-mount standard rectifiers supports maximum repetitive peak reverse voltages up to 600 V and continuous forward rectified currents up to 2 A.



VISHAY

FEATURES

- 0.86 V instantaneous forward voltage
- AEC-Q101-qualified options
- RoHS compliant

APPLICATIONS

- Power line polarity protection
- Rail-to-rail protection

The DFN3820A series of surface-mount standard rectifiers from Vishay are available in a 3.85 mm x 2.08 mm x 0.88 mm leadless DFN package that is ideal for space-constrained designs. The rectifiers may be used in circuits performing functions including power line polarity protection and rail-to-rail protection.

The inclusion of side-wettable flanks supports automated optical inspection and placement for streamlined manufacturing. The DFN3820A package is also footprint-compatible with designs using rectifiers with a DO-220AA package. This makes the SExxNx series of standard rectifiers suitable for upgrading existing board layouts with more eco-friendly technology.

The SExxNx surface-mount rectifiers feature an oxide planar chip single-junction architecture with low forward-voltage drop. The family includes models supporting a maximum repetitive peak reverse voltage of 200 V, 400 V, or 600 V.

The full operating junction-temperature range of the SE20 rectifiers is -55°C to 175°C, and the reverse current measured at a junction temperature of 125°C is less than 100 µA. The SE20 surface-mount rectifiers can withstand a peak forward current of 32 A for up to 10 ms of half sine-wave surge activity.

New module provides complete Bluetooth Low Energy implementation in small footprint

The highly integrated PAN1783 wireless module from Panasonic is supplied with an onboard chip antenna. It features the latest Bluetooth® Low Energy capabilities including isochronous channels and audio streaming.

Panasonic
INDUSTRY

FEATURES

- Software development kit: nRF Connect supplied by Nordic Semiconductor
- RF approvals:
  - CE RED
  - FCC
  - ISED
  - UKCA
- Operating-temperature range: -40°C to 85°C

APPLICATIONS

- Computer peripherals and I/O devices
- Wearable devices
- Wireless audio devices

Panasonic has launched the PAN1783, a new Bluetooth Low Energy (LE) module which implements valuable features in the latest version 5.3 of the Bluetooth specification, including isochronous channels and LE audio.

The PAN1783 is based on the Nordic Semiconductor nRF5340 Bluetooth system-on-chip (SoC). This SoC features dual Arm® Cortex® -M33 cores, one operating as an application processor at up to 128 MHz with 1 Mbyte of Flash memory, and the other as a network processor operating at 64 MHz with 256 kbytes of Flash. This processing capability means that the PAN1783 can easily be used in stand-alone mode, eliminating the need for an external processor or microcontroller.

The PAN1783 module can satisfy the needs of data-heavy applications, by offering throughput of up to 2 Mbits/s. Other advanced Bluetooth features include advertising extensions, long range, and very low power consumption. The PAN1783 also supports angle of arrival (AoA) and angle of departure (AoD) direction-finding using Bluetooth signals.

The module supports Type 2 NFC-A operation for use in simplified pairing and payment solutions via an external antenna.

This Panasonic module also provides for strong protection against cybersecurity threats. The Cortex-M33 cores offer a rich set of security capabilities, such as a root-of-trust and secure key storage. In addition, Arm TrustZone® technology provides trusted execution by providing hardware isolation between secure and non-secure Flash, RAM, peripherals and GPIOs. The state-of-the-art Arm CryptoCell-312 provides hardware-accelerated cryptography. The module also offers a key management unit.

This Panasonic module is available in two versions:

- The part number ENW-89860A1KF has an integrated chip antenna
- The part number ENW-89860C1KF has a bottom pad for connection of an external antenna

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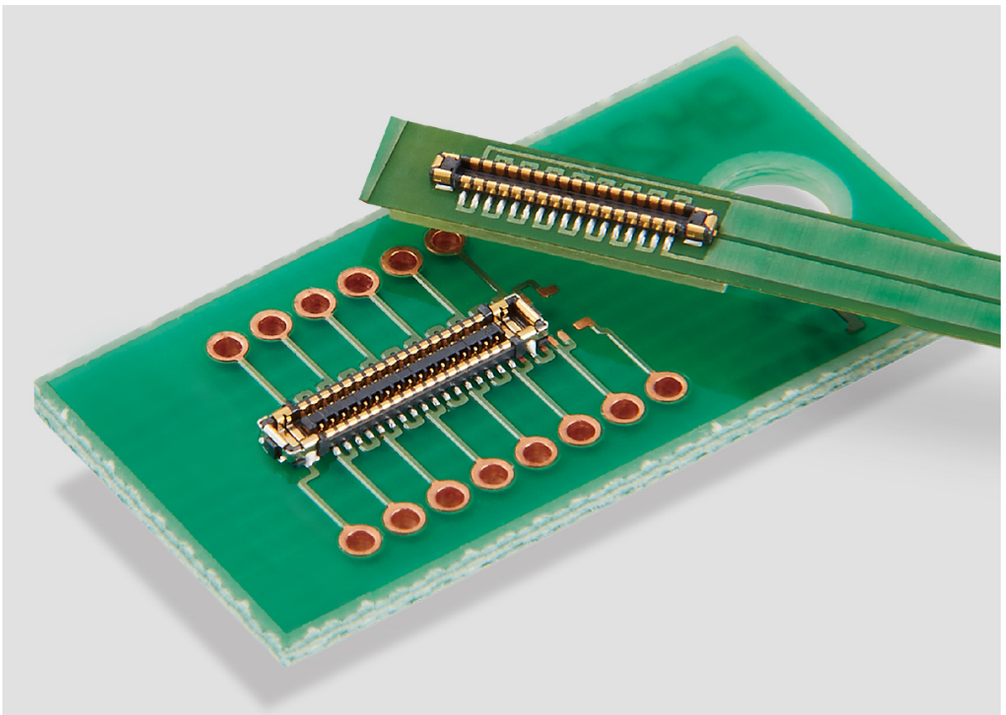
Ultra-compact connectors boast high-speed data transmission for compact end products

The high-performance BM28 connector series from Hirose Electric presents one of the lowest-profile flexible printed circuit (FPC) and board-mounted connector sets on the market, with a stacking height of just 0.6 mm.



HIROSE ELECTRIC EUROPE B.V.

FEATURES

- 0.35 mm contact pitch
- Two power contacts
- Signal contacts from 6 to 60
- Voltage rating: 50 V ac/dc
- 10 mating cycles
- Operating temperature range: -55°C to 85°C

APPLICATIONS

- Mobile phones
- Tablet PCs
- Wearable devices
- Smart watches
- AR/VR headsets
- Drones
- Point-of-sale equipment
- IoT modules
- Small sensors
- Portable devices
- Medical devices

Hirose supplies the BM28 series of hybrid FPC-to-board connectors, which supports signals of up to 0.3 A per contact and power transmission at up to 5 A. The connectors can be used to create robust connections in extremely space-constrained designs, and feature guide ribs to enable self-alignment to within 0.3 mm in both the x and y directions.

The BM28 FPC-to-board connectors feature a two-point contact structure and additional housing around the guide ribs to ensure reliable mechanical connection at all times. This also prevents damage from incorrect mating or un-mating due to shock.

In addition to providing reliable connection of standard signals and power lines in miniaturized applications, the BM28 series supports high-speed data transmission at up to 20 Gbits/s. The pin assignment is compatible with the USB4® Gen2 standard.

To prevent solder wicking during installation, the BM28 series connectors feature an integral molding with no gaps. The contacts are made from gold-plated copper alloy with a maximum resistance of 70 mΩ for the signal contacts and 15 mΩ for the power contacts.

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Discrete security solution provides off-the-shelf Matter security for IoT devices

The OPTIGA™ Trust M MTR from Infineon combines the proven OPTIGA Trust M secure element with a Matter provisioning service. This flexible solution enables Matter-certified security to be added easily to existing IoT device designs.

The existing OPTIGA Trust M secure element from Infineon is already widely used to provide an anchor of trust for connecting IoT devices to the cloud, giving every IoT device its own unique identity. A turnkey solution, the OPTIGA Trust M chip offers secure, zero-touch onboarding and the high performance needed for quick cloud access.

Now Infineon has extended the secure element offering with a Matter-specific provisioning service, to provide a fast and simple solution for embedding secure Matter networking capability into any IoT device.

The OPTIGA Trust M MTR solution is certified to be compliant with the Matter standard specifications, and works with any microcontroller or system-on-chip. Supported by its partner Kudelski IoT, Infineon offers late-stage, personalized device attestation certificate (DAC) injection to give OEMs the flexibility to update DACs until the start of production.

The OPTIGA Trust M MTR chip and its supporting software offer a wide range of security features. In particular, this solution supports common asymmetric cryptography algorithms including:

- RSA cryptography up to 2048
- AES key up to 256, HMAC up to SHA512
- TLS v1.2 PRF and HKDF up to SHA512

The turnkey set-up with full system integration minimizes the design, integration and deployment effort required of product manufacturers. The OPTIGA Trust M MTR development process is certified according to the security standard IEC 62443-4-1, acting as an enabler to achieve component-level certification according to IEC 62443-4-2.

The OPTIGA Trust M MTR chip is supplied in a USON-10 package that has a footprint of 3 mm x 3 mm. It can be ordered with the part numbers SLS32AIA010MMUSON10XTMA2 or SLS32AIA010MMUSON10XTMA1.

Infineon

FEATURES

- CSA certified Matter certificates
- Pre-provisioned TLS certificates
- CC EAL 6+ certified
- ECDH and ECDSA cryptographic algorithms
- ECC NIST curves up to P521
- Cryptographic toolbox
- TRNG AIS-31 certified
- Built-in cryptographic accelerator

APPLICATIONS

- Home and building automation:
  - Access control
  - Lighting, electrical systems
  - Blinds, shades
  - HVAC controls
- Smart home equipment:
  - Access points/bridges
  - Matter controllers
  - TVs
  - Smart speakers
  - Surveillance cameras

FREE DEV BOARD

Shield board for evaluation of secure element for Matter devices.

Orderable Part Number
TRUSTMMTRSHIELDTOBO1

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New op amps bring high-accuracy sensing to industrial and automotive applications

The TSZ151 operational amplifiers from STMicroelectronics, which offer low offset and zero drift, provide wide gain bandwidth in, sensor interfacing, signal conditioning and power conversion circuits.

The TSZ151 from STMicroelectronics is a single operational amplifier which provides very accurate signal conditioning due to very low offset voltage and high temperature stability. The TSZ151 is available in AEC-Q100-qualified and industrial-grade versions.

Producing almost zero drift over the operating-temperature range, this op amp is ideal for high-accuracy sensor interfaces.

Offering an excellent speed/power consumption ratio, the TSZ151 features a 1.6 MHz gain-bandwidth product while drawing just 210 µA at 5 V. The op amp also features an ultra-low input bias current.

Part Number	Industry Classification	Package
TSZ151ICT	Industrial	SC70-5
TSZ151IYCT	Automotive	SC70-5
TSZ151ILT	Industrial	SOT23-5
TSZ151IYLT	Automotive	SOT23-5

FEATURES

- Offset voltage:
  - 7 µV maximum at 25°C
  - 10 µV over full operating-temperature range
- Rail-to-rail input and output
- Supply-voltage range: 1.8 V to 5.5 V
- Low power consumption: 210 µA at 5 V
- Gain bandwidth product: 1.6 MHz
- Operating-temperature range: -40°C to 125°C

APPLICATIONS

- Industrial signal conditioning
- Automotive current measurement
- Automotive sensor signal conditioning
- Server power supplies
- Telecoms equipment

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Miniaturized tuning fork crystal boosts battery life in industrial IoT designs

The ECX-16 32.768 kHz surface-mount tuning fork crystal from ECS Inc features an extended temperature range for industrial applications, and is recommended for use with STM32 microcontrollers and in LoRaWAN® devices.

ECS INC INTERNATIONAL

FEATURES

- Operating temperature range: -40°C to 85°C
- Temperature coefficient: -0.03 ppm/°C²
- 12.5 pF load capacitance
- 90 kΩ ESR

APPLICATIONS

- Automotive timing
- Industrial control
- Industrial monitoring
- Building automation
- Smart meters
- IoT sensor nodes
- Consumer devices
- Low-power real-time click (RTC)

ECS Inc presents an ideal timing solution for low-power real-time clock applications with its ECX-16 32.768 kHz surface-mount tuning fork crystal. This compact timing crystal is available with a footprint of just 1.6 mm x 1.0 mm, which makes it suitable for space-constrained designs such as IoT sensor nodes and consumer products. The low drive level of 0.5 µW also makes the ECX-16 crystal suitable for battery-powered devices where long operating life is key.

The ECX-16 crystals are specified with a frequency tolerance of ±20 ppm at 25°C, with an aging of ±3 ppm in the first year. This high accuracy means that the crystals are recommended by STMicroelectronics as a companion crystal for timing when using the STM32 family of microcontrollers.

Standard-compliant RS-485 transceivers for reliability in noisy industrial environments

The robust STMicroelectronics ST4E1240 and ST4E1216 transceiver ICs are ideal for factory automation equipment, industrial robots and telecoms infrastructure due to high signal integrity and integrated ESD protection.

FEATURES

- Supply-voltage range: 3 V to 5.5 V
- Protection functions:
  - Fail-safe receiver
  - Thermal shutdown protection
  - Hot-swap with parasitic capacitance up to 100 pF
  - Up to 12 kV ESD contact protection
- Low quiescent current in shutdown mode

APPLICATIONS

- Factory automation and control
- Motion control
- Building automation and safety
- Video surveillance
- Backplane busses
- Grid infrastructure
- Smart meters
- Telecoms infrastructure

The ST4E1240 and ST4E1216 from STMicroelectronics are low-power, differential line transceivers for half-duplex RS-485 transmissions which are ideal for multi-point applications over extended cable runs.

With the ST4E1240, STMicroelectronics has extended the capability of its portfolio of RS 485 transceivers to cover data-transfer requirements up to a maximum speed of 40 Mbits/s. The ST4E1216 data rate is up to 16 Mbits/s. Both transceivers are tolerant of high transient ESD voltages, the bus pins withstand contact discharges of up ±12 kV.

Using the ST4E1240 or ST4E1216, equipment designers can configure a bus network with more than 64 transceivers, and up to 100 nodes. Compatible with PROFIBUS network requirements, the differential output voltage exceeds 2.1 V at a 5 V supply. The ST4E1240 and ST4E1216 also meet or exceed the requirements of the TIA/EIA-485A standard.

Both transceivers are supplied in a standard SO-8 package with a 4.9 mm x 3.9 mm footprint. The ST4E1216 operates over a temperature range of -40°C to 125°C, and the ST4E1240 from -40°C to 85°C.

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High-power USB Type-C socket saves space not functionality in portable designs

The USB4205 and USB4210 USB Type-C® receptacles from GCT feature an innovative flag-type design with sideband contacts for audio accessory and alternate modes.

GCT
better connected

FEATURES

- Integrated P+P cap
- 48 V maximum voltage at 5 A, 240 W
- 20,000 mating cycles

APPLICATIONS

- Portable electronics
- Audio and video equipment
- Point-of-sale systems
- Health and fitness devices
- Consumer electronics
- Gaming controllers

The USB4205 and USB4210 flag-type USB Type-C receptacles from GCT offer a space-saving solution for USB 2.0 connectivity. The USB4205 and USB4210 have a mounted height above the PCB of 9.89 mm and 12.5 mm respectively. This is measured from the top surface of the PCB to the top edge of the connector.

The USB4205 and USB4210 flag-type connectors feature SBU1 and SBU2 sideband pins that enable designers to use these receptacles for additional connectivity beyond the functions specified in the USB 2.0 standard. These alternate modes include USB4®, DisplayPort, HDMI, MHL and Thunderbolt over USB Type-C interface, in addition to audio adaptor accessory mode.

The USB4205 and USB4210 flag-type receptacles are installed using 16 surface-mount contact pins and four through-hole shell stakes, with two locating pegs for easy alignment on the PCB.

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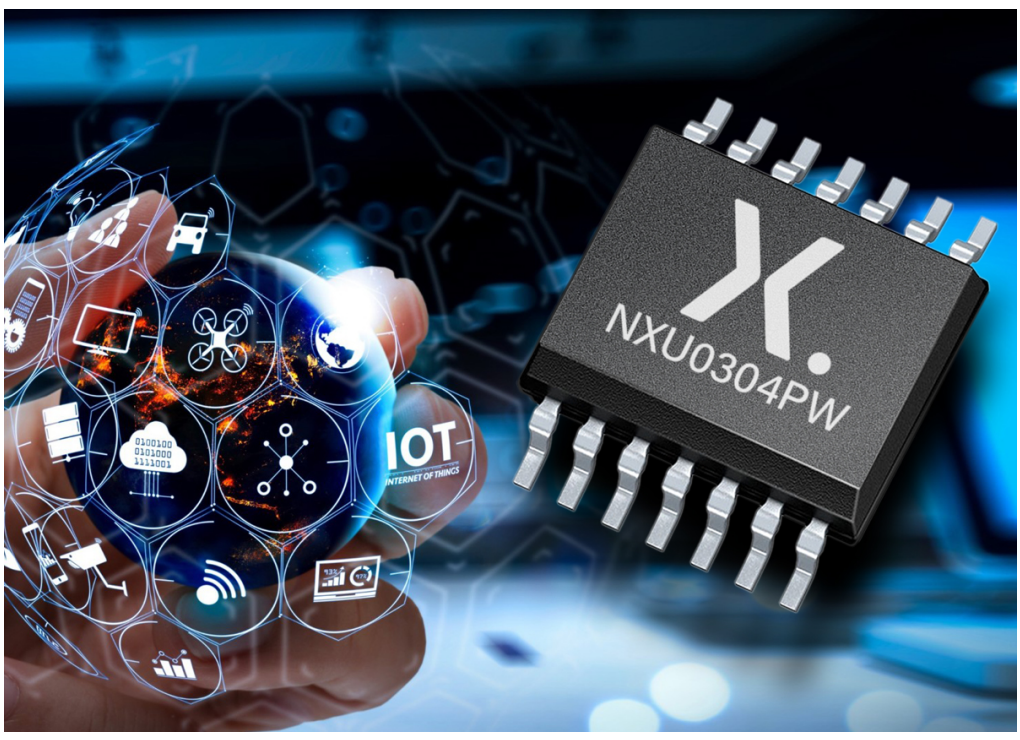
New level shifters support wide voltage range and high data rates while saving power

Nexperia has introduced the NXU0304 4-bit dual-supply translator ICs, which offer three-state operation, a wide shifting range from 0.9 V to 5.5 V, and robust communications at up to 250 Mbits/s.



nexperia

FEATURES

- 5 µA maximum operating current
- High output drive capability
- Built-in Schmitt-trigger inputs for higher noise immunity
- Package options:
  - NXU0304GU12: XQFN12
  - NXU0304BZ: DHXQFN14
  - NXU0304PW: TSSOP14

APPLICATIONS

- IoT devices
- Sensor modules
- Consumer devices
- Mobile phones
- LCD TVs
- LED lighting systems
- Set-top boxes
- Personal computing

The NXU0304 voltage-level translating buffer ICs are the latest devices in the cost-effective NXU family from Nexperia. The NXU translators cover 4-, 2-, and 1-bit operations to solve I/O level mismatches between system components that use common interface standards such as I2C, SPI, UART, JTAG, RMII and GPIO.

The wide voltage range of the NXU0304 level shifters offers increased flexibility for designers building systems with many different I/O voltages. This reduces the requirement for compromises in cost- and space-constrained designs, and eases integration of the most suitable components for the application. The high maximum data rate of the NXU0304 also enables interfacing with leading peripheral and host devices.

The NXU family offers multiple channel direction configurations for optimized operation and reduced system complexity. This means that the NXU translators have a lower pin count than direction-controlled translator ICs, and this enables smaller package sizes for more compact designs.

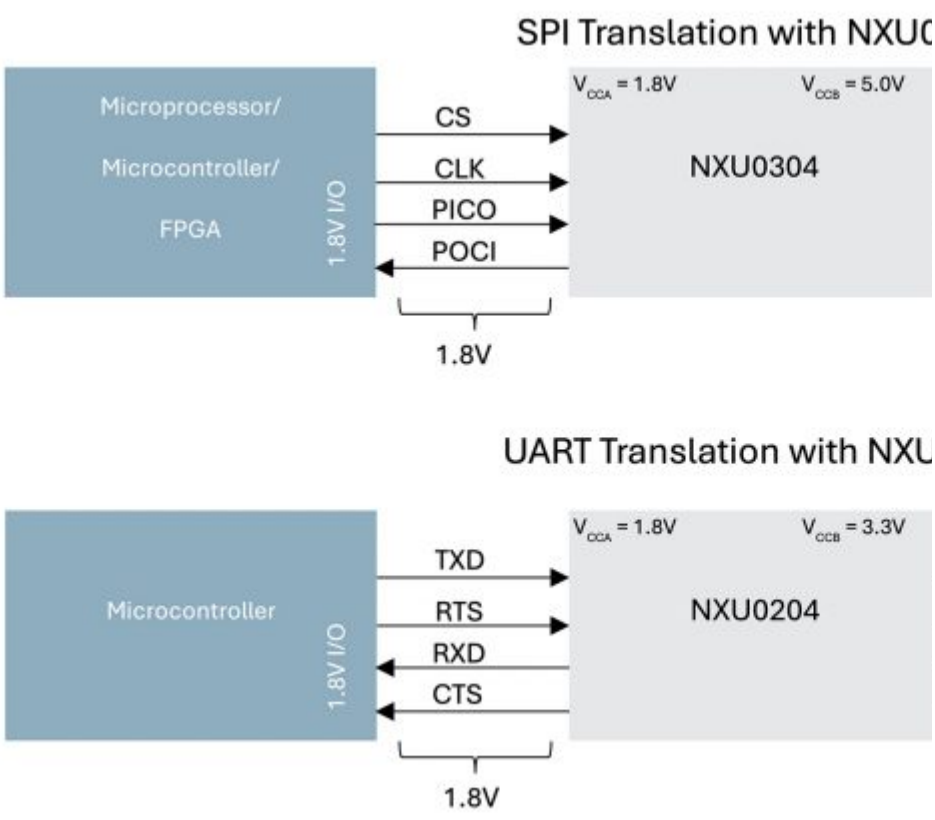


Fig. 1: Using NXU for SPI and UART translation

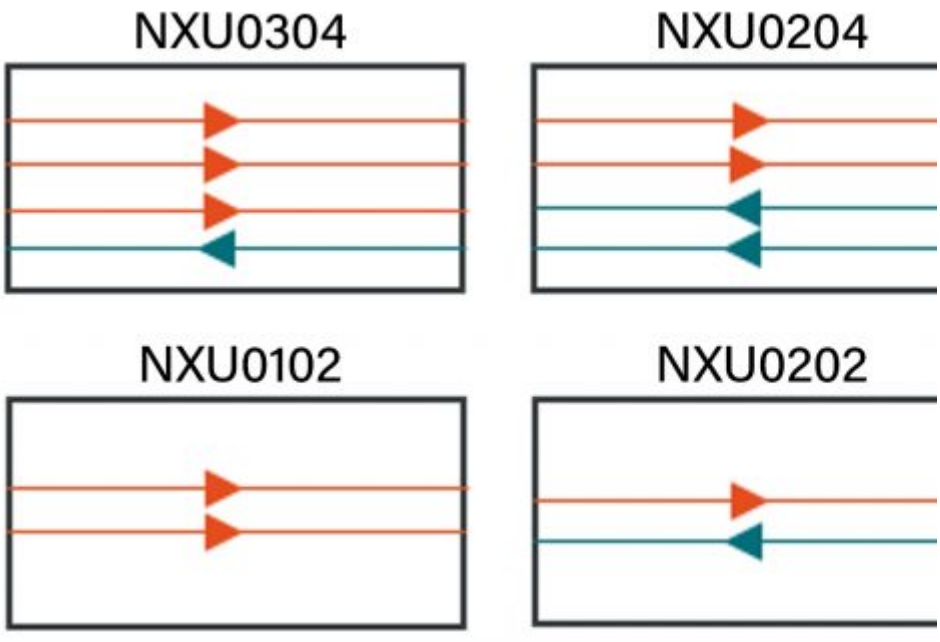


Fig. 2: NXU channel directionality configurations

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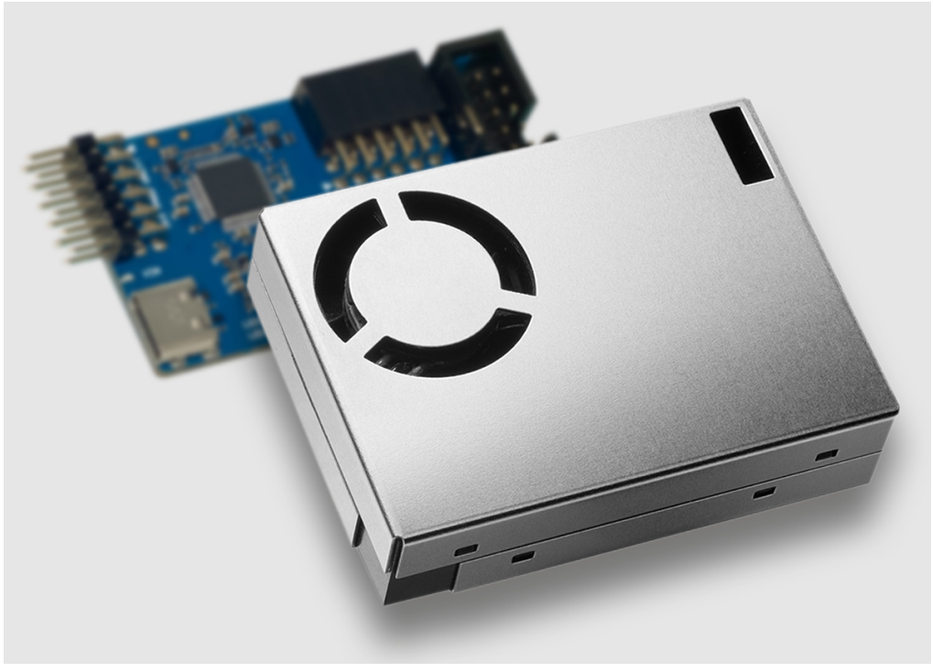
New multi-sensor module integrates AI for next-level air quality monitoring

Renesas enables combined air quality measurements with the new RRH62000 all-in-one sensor module, which delivers critical air quality insights in a 46.6 mm x 34.8 mm x 12 mm package.



The RRH62000 all-in-one sensor module from Renesas presents a compact, intelligent solution for fast development of air quality monitors in a wide variety of applications in which accuracy and robustness are important. The small footprint and streamlined bill-of-materials make the RRH62000 extremely competitive, saving space and development time when compared to discrete solutions or competing modules.

The RRH62000 offers simultaneous measurement of all important air quality parameters, including particulate matter (PM) detection with output mass concentration binning for PM1, PM2.5 and PM10, total volatile organic compounds (TVOCs), indoor air quality index (IAQ), equivalent carbon dioxide (eCO2), temperature and relative humidity (RH). Each of the sensors is fully calibrated at the factory. The required air-flow channel for sampling has a self-cleaning high-speed fan mechanism to protect against malfunctions due to dust accumulation.

The insights provided by the RRH62000 sensor module are output via an I2C or UART interface on a six-pin connector, with on-device correction algorithms for improved measurement accuracy. Processing and control of the sensors are performed using the in-built microcontroller to free resources on the host system. This in-built processing also makes for easy plug-and-play evaluation of the RRH62000 sensor module using the evaluation kit and accompanying PC software.

The standard firmware of the RRH62000 sensor module can also be modified so that the RRH62000 reports in a way that conforms to the requirements and air quality standards of a particular application. The in-built MCU is also powerful enough to implement machine learning algorithms. Using an HVAC system as an example, the RRH62000 can be used to predict when a filter requires replacing. This sensor-fusion AI capability makes the RRH62000 sensor module a useful solution for applications in which machine uptime is of critical importance.

RENESAS

FEATURES

- Laser-based detection of particle sizes from 0.3 µm to 10.0 µm
- Metal oxide-based gas sensor
- Supply-voltage range: 4.5 V to 5.5 V
- Operating current:
  - 40 mA active during measurement
  - 30 µA sleep
- Up to 90% RH operating humidity
- Operating temperature range: -10°C to 60°C
- Robust, siloxane-resistant construction

APPLICATIONS

- Air purifiers
- Demand-controlled ventilation
- Industrial automation
- Building automation
- Duct monitoring
- Hazardous material monitoring
- HVAC controls
- Air quality monitors
- Home appliances
- Smart home devices
- Smart thermostats
- Fume hoods
- Smoke detectors
- Bathroom ventilation
- IoT devices
- Security cameras
- Weather stations

FREE DEV BOARD

RRH62000 integrated sensor module and interfacing board.

Orderable Part Number
RRH62000-EVK

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Low-cost Bluetooth modules offer secure communications for smart applications

Microchip presents the WBZ35x family of wireless modules, which feature a 32-bit Arm Cortex -M4F processor, a fully compliant Bluetooth Low Energy 5.2 transceiver, and a comprehensive range of peripherals.

MICROCHIP

FEATURES

- Radio certifications:
  - WBZ351: FCC, ISED, CE, UKCA, MIC, KCC, NCC and SRRC
  - WBZ350: FCC, ISED and CE
- Package sizes:
  - WBZ351: 15.5 mm x 20.7 mm x 2.8 mm with 39 pins
  - WBZ350: 13.4 mm x 18.7 mm x 2.8 mm with 30 pins
- Operating temperature range: -40°C to 85°C

APPLICATIONS

- Smart home
- IoT sensors
- Bluetooth-connected devices
- Building automation
- Smart appliances

The WBZ35x family of wireless modules from Microchip are built around the high-performance, low-power PIC32CX-BZ3 family of systems-on-chip (SoCs). These low-cost, general-purpose microcontrollers are well suited for IoT and smart environments requiring versatile wireless communications with strict security.

The PIC32CX-BZ3 wireless MCUs support Bluetooth Low Energy and IEEE 802.15.4 wireless connectivity with an ultra low-power 2.4 GHz transceiver. This enables end products to cover large areas with mesh networks while consuming less power than previous designs. The transceiver is also Zigbee 3.0 certified and features software stacks which are built around the robust MPLAB Harmony v3 framework.

The WBZ35x family of wireless modules places all this functionality into a shielded surface-mount package with options for an onboard PCB antenna or external u.FL antenna connection. The WBZ351 and WBZ350 modules are based on the PIC32CX5109BZ31048 and PIC32CX5109BZ31032 SoCs and offer 27 or 14 GPIO pins respectively.

In addition to the processing and wireless capabilities, the WBZ35x modules offer useful peripherals for creating modern smart devices which exceed consumer expectations. These include a capacitive touch interface, up to eight 12-bit ADCs, and a 7-bit general-purpose DAC.

The high level of security offered by the WBZ35x wireless modules is due to the in-built hardware-based security accelerator and public critical hardware of the PIC32CX-BZ3 SoCs. Secure boot, AES security encryption and a hash code generator are also included to create a secure execution environment. Microchip Trust&GO support enables simple cloud authentication when building IoT infrastructure.

FREE DEV BOARD

Development kit for testing the WBZ351 multi-protocol MCU module.

Orderable Part Number
EV19J06A

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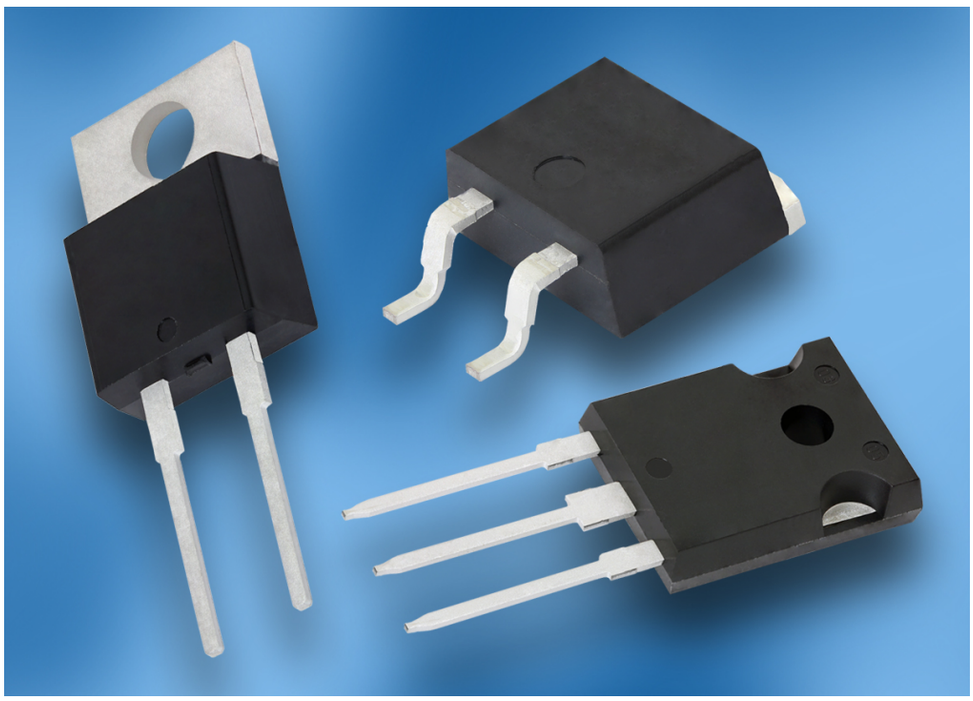
Latest SiC merged-pin Schottky diodes offer improved efficiency and easy paralleling

Vishay has launched the third generation of silicon carbide (SiC) Schottky diodes, which exhibit almost no reverse-recovery tail, no switching losses, and temperature-independent switching behavior at up to 175°C.



VISHAY

FEATURES

- Excellent electrical insulation
- Forward-voltage range: 1.3 V to 1.35 V @ 25°C
- Low reverse leakage current

APPLICATIONS

- Switch-mode power supplies
- Motor drives
- Uninterruptible power supplies
- Telecom and server power supplies
- Solar inverters

The new VS-3C SiC merged-pin Schottky diodes from Vishay, which support peak repetitive reverse voltages of 650 V or 1,200 V, are ideal for power applications which combine high performance and robust operation. The Schottky diodes can operate in circuits for ac-dc power factor correction, dc-dc ultra high-frequency output rectification, and in full-bridge power supplies or LLC converters.

These third-generation Schottky diodes feature improved thin-wafer technology for more efficient hard switching over a junction-temperature range of -55°C to 175°C. This makes the VS-3C family a forward-thinking solution in applications suffering from reverse-recovery problems in silicon devices. A positive forward-voltage temperature coefficient also enables easy paralleling.

The VS-3C are available in a variety of package types. These include two-lead and three lead TO 247AD, two-lead TO-220AC and D2PAK options. A two-lead SlimDPAK package with a height of just 1.3 mm is also available for space-constrained designs.

The VS-3C SiC Schottky diodes support a continuous forward current of 4 A, 5 A, 6 A, 8 A, 10 A, 12 A, 15 A, 16 A, 20 A, or 30 A for devices in two-lead packages. Three-lead TO 247AD packages with a common cathode are available for dual 5 A, 8 A, 10 A, 15 A, or 20 A outputs.

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New wireless chipsets combine Wi-Fi 6 and Bluetooth connectivity in a single chip

Infineon has launched the AIROC™ CYW5551x series, which offers the advanced features of the latest Wi-Fi® 6 and Bluetooth® v5.4 specifications, and will be available in an easy-to-integrate Type 2FY module from Murata.

The reliable, high-performance AIROC CYW5551x chipsets from Infineon combine Wi-Fi and Bluetooth wireless connectivity in a single chip. The introduction of the CYW5551x brings to the embedded market Wi-Fi capabilities which go beyond the Wi-Fi 6/6E standard to provide high-speed data transfers and connectivity for congested networks in IoT, smart home and wearable device applications.

The CYW55513 chipset will be available for ordering by distribution customers in the Type 2FY surface-mount module from Murata. The high-performance LBEE5HY2FY-922 module is supplied in a very small package which facilitates integration into size- and power-sensitive applications, including industrial applications operating at temperatures up to 85°C.

This new AIROC family of 1 x 1 antenna, single-stream wireless transceivers consists of the tri-band 2.4 GHz/5 GHz/6 GHz CYW55513, the dual-band CYW55512, and the single-band CYW55511. All three chips provide an IEEE 802.11ax-compliant Wi-Fi 6/6E media access controller, baseband and radio, alongside a Bluetooth/Bluetooth Low Energy (LE) v5.4 radio sub-system.

Bluetooth system control is performed by a 192 MHz Arm Cortex -M33 processor. The chips support Bluetooth Classic and Bluetooth LE functions running in hosted/controller mode, or in the embedded mode in which the chip relieves the host processor of the burden of running Bluetooth control functions.

The CYW5551x supports various Bluetooth features including LE Audio, LE2 data transfers at 2 Mbits/s, LE1 at 1 Mbit/s, Bluetooth Low Energy long-range (LR) mode, and periodic advertising extensions.

Infineon

FEATURES

- Network off-load power saving features
- WPA2 and WPA3 security
- SDIO and GSPI Wi-Fi host interfaces
- UART and SDIO Bluetooth host interfaces
- 39 GPIOs
- Security features:
  - Secure boot
  - Encryption
  - Authentication

APPLICATIONS

- Smart home equipment
- IoT and industrial IoT devices
- IP cameras and video doorbells
- Smart door locks
- Appliances
- Smart watches
- Smart glasses
- Sensors
- Smart speakers
- Smart lighting

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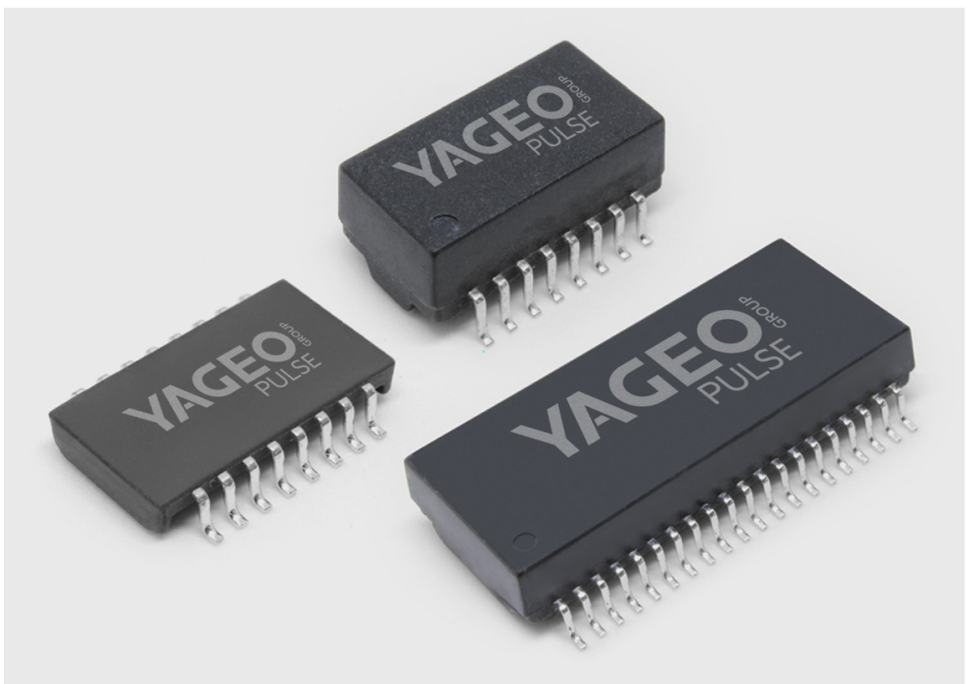
Transformer modules streamline Ethernet connectivity in industrial designs

The HB and HXB series of highly integrated Ethernet isolation modules from Pulse Electronics, a YAGEO company, are compatible with all major PHYs and offer surface-mount and through-hole package options.



YAGEO supplies the Pulse HB and HXB transformer modules, which provide an optimized, compact solution for Ethernet connectivity across a wide range of applications. The HB and HXB offer isolation solutions for 1 Gbit/s and multi-rate 2.5 Gbit/s, 5 Gbit/s, and 10 Gbit/s Ethernet connectivity in single-, dual-, or quad-port options.

The HB and HXB provide many package options to suit space-constrained installations such as handheld consumer devices or IoT sensor nodes. These include low-profile options with a height as low as 2 mm for devices offering 1 Gbit/s data rates. The footprint of this 16-pin module is 12.7 mm x 9.6 mm.

The Pulse HB and HXB isolation modules also include options that support Power over Ethernet (PoE) with a rating of 30 W, 60 W or 90 W. The HB and HXB provide excellent electrical circuit isolation which meets various IEEE 802.3 standards across the whole product range. The minimum breakdown voltage of these transformer modules is 1,500 Vrms, with higher breakdown voltages available within the product family.

YAGEO GROUP PULSE

FEATURES

- Backwards compatibility with lower data rates
- Multiple operating temperature range options:
  - Commercial: 0°C to 70°C
  - Industrial: -40°C to 85°C, 90°C or 105°C
- RoHS compliant and halogen free

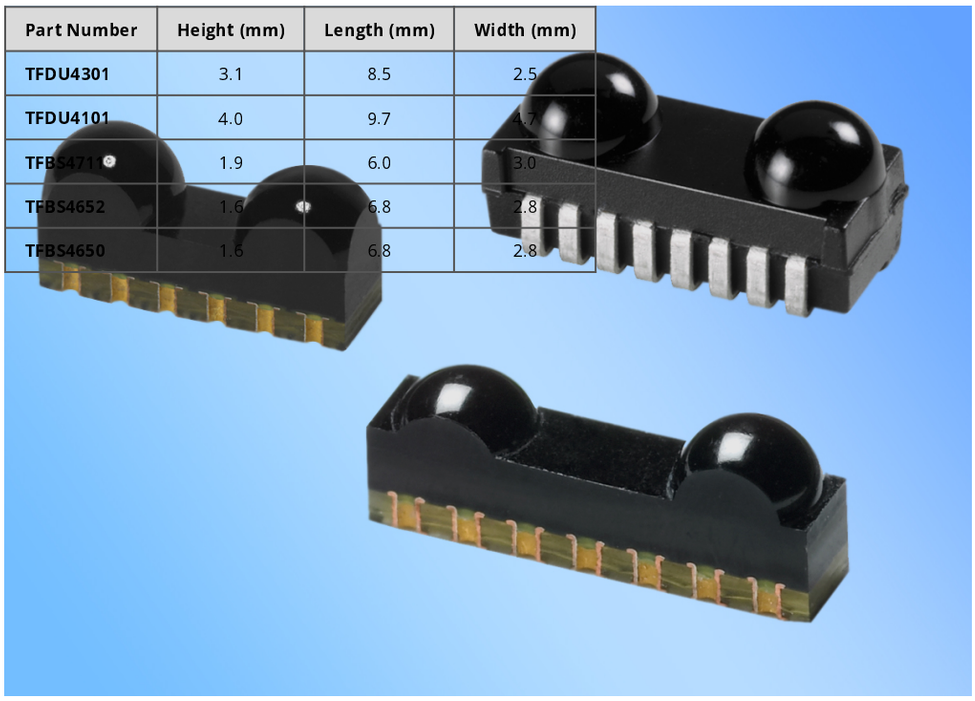
APPLICATIONS

- Industrial:
  - Test and measurement equipment
  - Factory automation and robotics
  - Sensor systems
  - Image processing
- Telecoms equipment:
  - Switches and routers
  - Gateways and base stations
  - xDSL modems and fiber routers
  - Wireless access points and radio networks
  - Edge and blade servers
  - Network interface controller cards
- Security:
  - Remote access
  - Camera systems
- Building automation
- Medical image processing
- Robotics, drones and small autonomous vehicles
- AI Notebooks, PCs and server equipment
- Gaming and entertainment devices
- IoT devices
- PoE switches

IrDA infrared transceiver modules extend battery life with ultra-low idle current

The TF family of infrared (IR) transceiver modules from Vishay comply with the latest IrDA physical layer specification, and offer data rates up to 115.2 kbits/s at a link distance of 1 m.

Part Number	Height (mm)	Length (mm)	Width (mm)
TFDU4301	3.1	8.5	2.5
TFDU4101	4.0	9.7	4.7
TFBS4711	1.9	6.0	3.0
TFBS4652	1.6	6.8	2.8
TFBS4650	1.6	6.8	2.8



Vishay offers an interesting solution for IrDA communications with the TF family of infrared transceiver modules. Each transceiver integrates a PIN photodiode and an IR emitter at each end of the longer side, and a low-power control IC. The TF transceivers comply with the latest IrDA physical layer specification, and are backwards-compatible with previous versions.

The TF family's use of the latest chip technologies assures manufacturers of the long-term availability of Vishay IR transceiver products.

The idle current drawn by the TF transceivers is less than 70 µA, and this is reduced to less than 1 µA in shutdown mode for long battery life in handheld devices. For repetitive pulse operation, current increases to up to 430 mA for a pulse duration of less than 90 µs with a duty cycle of less than 20%.

Vishay produces the TF family of IR transceiver modules in several form factors to suit different installation requirements.

VISHAY

FEATURES

- Offered in top- and side-view surface-mount packages
- Operating-voltage range: 2.4 V to 5.5 V
- Operating-temperature range: -25°C to 85°C
- ESD protection up to 2 kV
- Lead and halogen free

APPLICATIONS

- Industrial data loggers and controls
- Mobile phones
- Laptop computers
- Gaming devices
- Toys
- Cameras
- Printers
- Short-distance wireless communications
- Short-distance data transfer
- Environments with high RF sensitivity
- Medical devices

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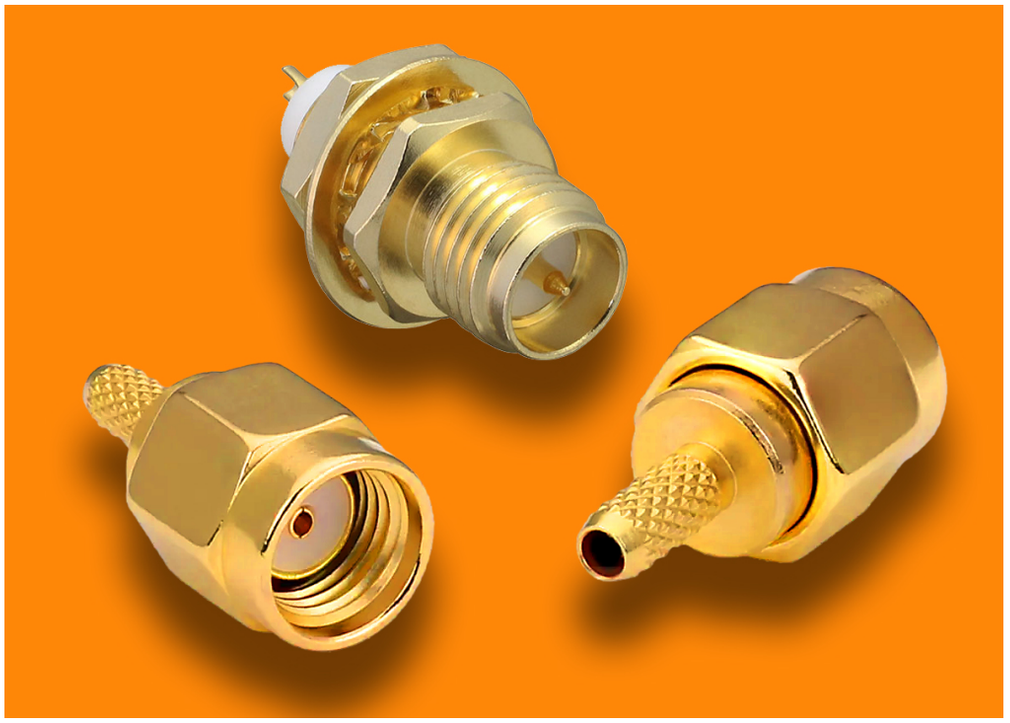
Reverse-polarity SMA connectors promote safety by opposing untested antennas

The CONREVSMA connectors by TE Connectivity offer a standard SMA jack and plug with a reversed center pin. This prevents unwanted connections while still allowing engineers to use existing tooling.



FEATURES

- Operating frequency:
  - Jack: 12.5 GHz
  - Plug: 18 GHz
- 50 Ω impedance
- Straight connection orientation
- Compatible with RG 174, RG 188 and RG 316 cabling
- Operating-temperature range: -65°C to 165°C

APPLICATIONS

- Routers and gateways
- IoT devices
- Building automation systems
- Industrial equipment
- Scientific research
- Quantum computing
- Broadcasting equipment

TE Connectivity offers a complete connectivity solution with the CONREVSMA004-G reverse-polarity SMA jack and CONREVSMA007-G reverse-polarity SMA plug. The jack is terminated on the PCB, and the plug is secured to a cable by crimping.

By reversing the polarity of the center pin in an SMA connection, engineers can secure end products against the use of untested third-party connections, including antennas. This enhances safety and prevents the system from operating beyond the limits of its certification and affecting surrounding radio equipment through unintended radiation.

The CONREVSMA connectors feature the standard threaded housing expected by engineers working with coaxial connections. Additionally, the gold-plated brass construction with PTFE dielectric matches what is expected of such connectors in most applications and product areas.

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100 W USB PD sink power controller with flexible management and protection features

The STMicroelectronics STUSB4500, which can operate in stand-alone mode with no need for a microcontroller, can be used in USB Type-C connections, and is backed by a comprehensive set of protection functions.

The STUSB4500 from STMicroelectronics is a USB Power Delivery (PD) controller which provides robust and flexible management of devices sinking up to 100 W at 20 V/5 A.

The STUSB4500 gives designers the flexibility to use a USB channel as a power source without the need for a microcontroller. The PD controller implements a proprietary algorithm which allows the negotiation of a power delivery contract with a source in auto-run mode, without an MCU. The STUSB4500 stores up to three customizable power data object (PDO) profile configurations in an integrated non-volatile memory. The power profile can also optionally be customized by the application microcontroller. An open source library of code for this is available.

The controller is compliant with the USB PD 2.0 specifications, and with the USB Type-C rev 1.2 standard. The controller supports the USB PD standard dead battery mode, which means that sink devices may be powered from a dead battery state with a high-power charging profile.

Robust operation is assured by the controller's comprehensive set of protection features. These include short-circuit protection up to 22 V, and high-voltage capability up to 28 V on the bus voltage pins that are directly connected to its power path.

FEATURES

- Zero power consumption when unplugged
- Fault management:
  - Automatic restart after fault is cleared
- Dual high-power charging path support
- Integrated bus voltage monitoring
- Internal and/or external bus voltage discharge paths
- Debug accessory mode support
- Operating-temperature range: -40°C to 105°C
- Interoperable with USB PD rev 3.0 devices

APPLICATIONS

- Printers
- Video and still cameras
- IoT devices
- Drones
- LED lighting
- Toys
- Gaming equipment
- Point-of-sale equipment
- Scanners
- Healthcare equipment

FREE DEV BOARD

The STEVAL-ISC005V1 evaluation board is a ready-to-use USB PD sink based on the STUSB4500.

Orderable Part Number
STEVAL-ISC005V1

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IP67-rated tactile switches offer precise specification for electrical height

Littelfuse has tightened the specification for the distance between the KSC2 switches' actuation point and the bottom contact, to enable more precise board assembly in end products.

Littelfuse C&K Switches

FEATURES

- Soft actuator
- 250 Vrms minimum dielectric strength
- 100 mΩ maximum contact resistance
- 1 ms maximum bounce time
- 32 V dc voltage rating
- Current ratings:
  - Silver contacts: 50 mA
  - Gold contacts: 10 mA

APPLICATIONS

- Medical equipment:
  - Surgical tools
  - Wearable medical devices
- Automotive systems:
  - Door handles
  - Window lifters
  - Steering wheel columns
- Power tools
- Lawn mowers
- Snow blowers
- Industrial equipment:
  - Elevators
  - Factory automation
  - Industrial machinery

Littelfuse has introduced an upgraded specification for the C&K Switches KSC2 sealed tactile switch product line.

The surface-mount KSC2 series switches are IP67-rated, 3.5 mm high momentary-action tactile switches featuring a soft actuator. The switches are available in several models and provide various options for electrical lifespan and operating force. The switch footprint is 6.2 mm x 6.2 mm.

The KSC2 tactile switches offer superior durability, and provide clear tactile feedback, making it easier for users to know when an input has been registered.

Now Littelfuse has improved the suitability of the switch for use in high-precision board assembly processes by tightening the specification for device height. The new specification guarantees reliable electrical connections by precisely defining the distance between the actuation point and the bottom contact. By tightly specifying the electrical height of the KSC2 switches, Littelfuse enables manufacturers to confidently apply reduced tolerances in board assemblies.