25-vi
AI, Security & Encryption

Ranging sensor provides optimized data outputs for AI applications

The VL53L8CH, a multi-zone direct time-of-flight (ToF) sensor from STMicroelectronics, includes new histogram data outputs which AI algorithms can use in innovative ways to sense and understand the environment.

FEATURES

- Integrated module in 6.4 mm x 3.0 mm x 1.75 mm package
- Pin-compatible with VL53L8CX
- I2C or serial peripheral interface
- Compatible with many cover glass materials

APPLICATIONS

- Mobile robots
- Camera autofocus
- Industrial bulk storage
- Warehouse equipment
- Drinks makers and dispensers

A ToF optical ranging sensor from STMicroelectronics, the VL53L8CH, provides new raw data outputs which enable a wide variety of innovative AI applications including gesture recognition and recognition of materials such as flooring.

The VL53L8CH, an 8 x 8 multi-zone ToF sensor, offers high-performance features, including high immunity to interference from ambient light, low power consumption, and an eye-safe invisible optical output at 940 nm from a vertical-cavity surface-emitting laser (VCSEL). Diffractive optical elements on both transmitter and receiver enable the VL53L8CH to create a square field of view of 45° x 45°, 65° diagonal.

Like previous ST ToF sensors, the VL53L8CH includes firmware running on an integrated microcontroller which produces outputs computed from the raw optical data, such as distance, peak signal amplitude, and reflectance.

The new feature in the VL53L8CH is that it also produces the sensor's raw optical data as a compact normalized histogram (CNH) output. The CNH data transforms the VL53L8CH from a standard multi-zone ranging sensor to a versatile optical sensor which can enable many AI-based applications, such as:

- Detecting the location and size of a cup in a beverage dispenser
- Recognizing the material from which a floor is made, useful for autonomous vacuum cleaners and other robotics applications
- Recognizing shapes, motion, or hand gestures

The sensor can calculate the distance of objects up to 4 m away, across 64 independent zones, at a rate of up to 30 frames per second. The ST multi-zone sensor with two advanced metasurface lenses offers superior performance to competing devices that have conventional optics, as they support fewer native zones and feature lower sensitivity in the outer areas of the field of view. The VL53L8CH provides uniform sensitivity and accurate ranging across the field of view, with superior range in strong ambient light.

The sensor includes a motion indicator for each zone to detect whether targets have moved, and how they have moved.

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New security controller includes PQC-protected firmware update mechanism

The OPTIGA™ TPM SLB 9672 and SLB 9673 trusted platform modules from Infineon provide a solid foundation for securely establishing the identity and software status of connected devices, and for protecting data integrity and confidentiality.
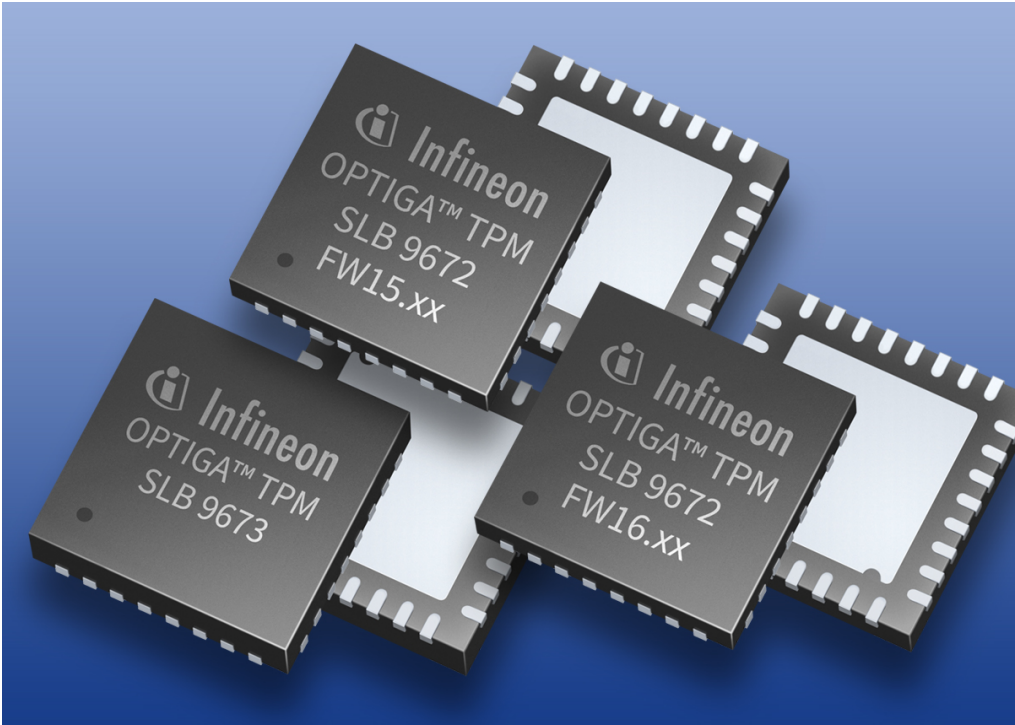
Advanced technology from Infineon provides OEMs with a solution for protecting connected devices from the security threats of tomorrow as well as today. The OPTIGA TPM (Trusted Platform Module) SLB 9672 FW16 is a future-proof security solution which includes a post-quantum cryptography (PQC) protected firmware update mechanism optimized for IoT networks and embedded control devices.

The OPTIGA TPM SLB 9672 FW16, which has a serial peripheral interface, is intended for use in smart building systems, network infrastructure, and industrial automation. A member of the same family of TPMs, the OPTIGA TPM SLB 9673, which has an I2C interface, fits a wider set of applications: health and lifestyle devices, renewable energy and smart mobility, as well as smart building systems, network infrastructure, and industrial automation.

The OPTIGA TPM SLB 967x security controllers use eXtended Merkle Signature Scheme (XMSS) signatures, a mechanism which counteracts the threat of firmware corruption by attackers who have access to quantum computers, and increases the chances of the long-term survival of the device by enabling a quantum computing-resistant firmware upgrade path.

The OPTIGA TPMs provide a unique ID. This is required to monitor IoT devices on connected networks for application security and ease of maintenance. The unique ID cannot be erased.

The OPTIGA TPM SLB 9672 and SLB 9673 also offer a firmware update mechanism which has a 256-bit key length, along with an additional check based on PQC. With this strong and trusted update mechanism, the TPM can be updated even if the standard algorithms are no longer trusted. The design allows for improvements in computing performance, providing fail-safe features which counteract the effects of corrupted firmware. For instance, the TPM firmware can be recovered in accordance with the NIST SP 800-193 platform firmware resilience guidelines.

The product also provides a large non-volatile memory to store features such as additional certificates and cryptographic keys. Security evaluation and certification are performed by independent bodies according to the Common Criteria and FIPS requirements. The new OPTIGA TPMs also fully comply with the Trusted Computing Group (TCG) requirements specified in the TPM 2.0 standard version 1.59, and are certified according to the latest TPM 2.0 standard.

The product is also available in another version: the OPTIGA TPM SLB 9672 FW15 is the preferred choice for Microsoft Windows environments and ecosystems, and connected devices which have a PC architecture.

(Infineon)

FEATURES

- Support for multiple cryptographic algorithms:
  - RSA-4096
  - AES-128
  - AES-192
  - AES-256
  - ECC NIST P384
  - SHA2-384
- Ten-year longevity commitment
- Support and maintenance through Infineon security partner network
- Operating-temperature range: -40°C to 105°C

APPLICATIONS

- Printers
- Industrial robots
- Programmable logic controllers
- Surveillance cameras
- Network infrastructure:
  - Routers
  - Switches
  - Access points
  - Gateways
  - 5G equipment
- PCs
- Servers
- IoT devices
- Renewable energy generation equipment
- Smart mobility applications
- Health and lifestyle monitoring devices

FREE DEV BOARD

Future-proof security controller evaluation board for Raspberry Pi.

Orderable Part Number
TPM9672FW1624RPIEBTOBO1

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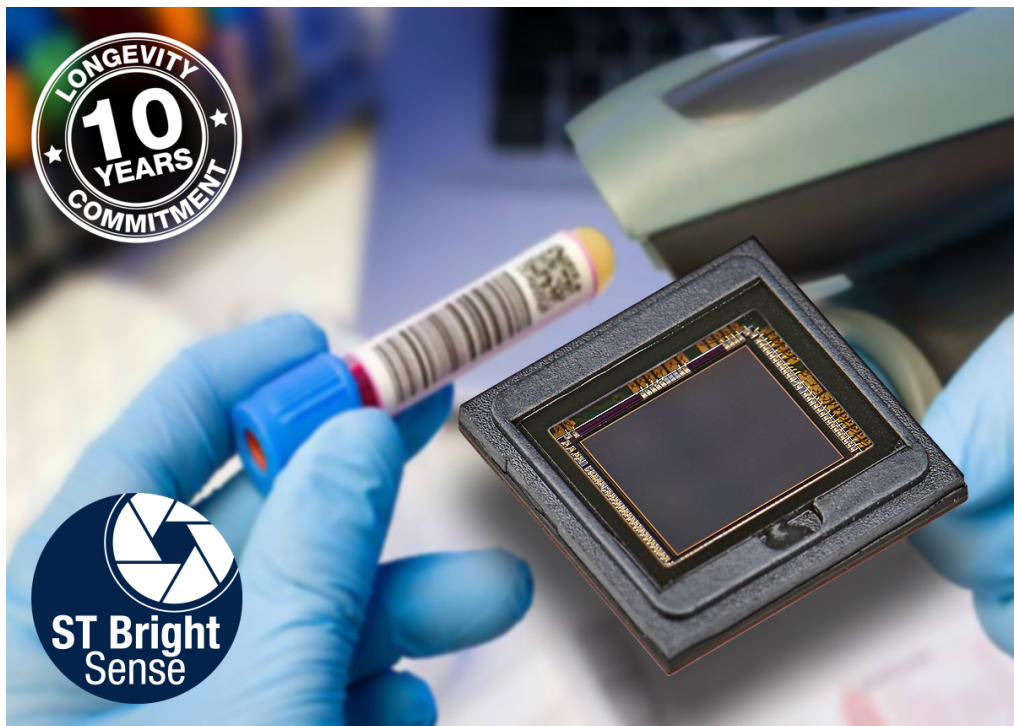
Complete camera modules ease evaluation of monochrome image sensor

The STMicroelectronics CAM-56G3 camera modules provide a choice of lens options, all in compact form factors, to accelerate the set-up of low-power embedded vision system prototypes.

LONGEVITY **10** YEARS COMMITMENT

ST Bright Sense

FEATURES

- Evaluation GUI software and Linux operating system drivers
- Lens options:
  - Ultra wide-angle lens
  - Compact lens with 84° field of view
  - General-purpose lens with 73° field of view
- Same 30-pin FPC connector for all module sizes

APPLICATIONS

- Home and service robots
- Industrial robots
- Automated ground vehicles
- Smart appliances
- AR/VR equipment
- Gaming systems
- Drones and UAVs
- Quality inspection
- 3D stereo imaging
- Barcode readers
- Security and biometrics

The CAM-56G3 modules from STMicroelectronics provide a ready-made camera system for evaluation and integration of the VD56G3 1.5 Mpixel monochrome image sensor. These ready-to-use cameras combine a VD56G3 image sensor, lens holder, lens, and flexible printed circuit connection, integrated into a single module as small as 6.5 mm2.

Multiple GPIOs enable users to synchronize the modules with triggers and illumination. Featuring a MIPI CSI-2 output interface, the modules are ideally suited for use in low-power embedded systems.

The VD56G3 image sensor on which the camera modules are based provides outstanding performance in the visible and near infrared portions of the spectrum. Featuring a proprietary ST pixel design, the image sensor offers a broad toolbox of on-chip functions which include features for optimizing data size and frame rates, such as crop, binning, and programmable sequences.

The sensor is supplied by ST as a bare die, so the CAM-56G3 modules provide an easier integration option for OEMs. The modules are backed by a comprehensive set of free enablement software, drivers and evaluation tools, including drivers for a Linux[®] operating system.

The image sensor is also available in the VD66GZ color RGB version and the VD16GZ RGB-NIR version.

Linux[®] is the registered trademark of Linus Torvalds in the U.S. and other countries.

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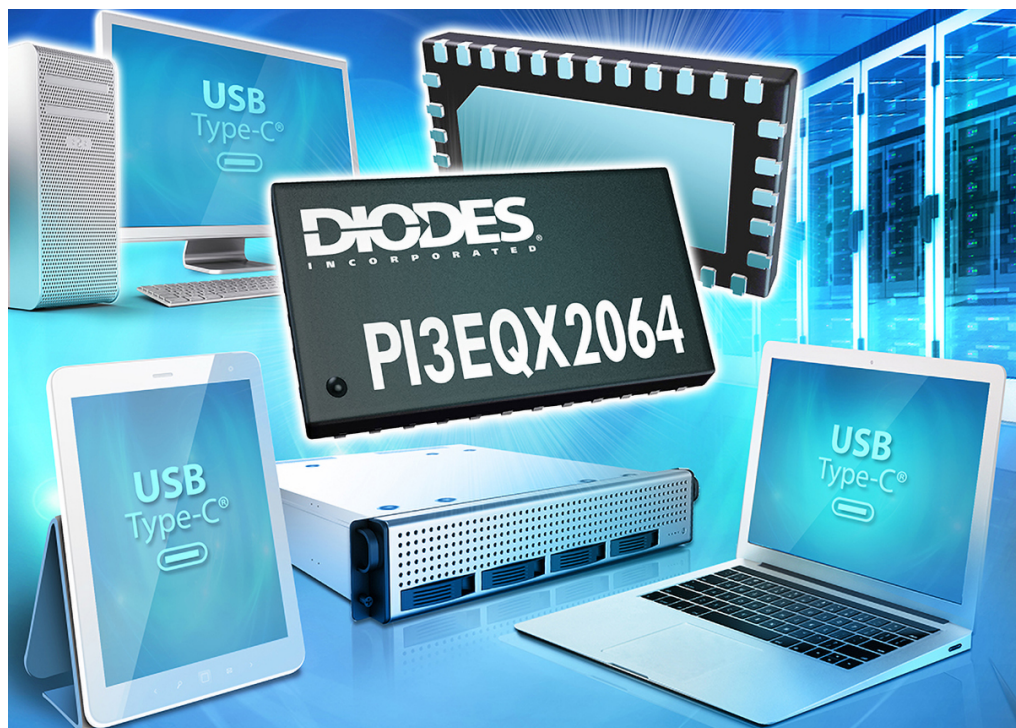
Driver boosts signal quality in high-speed USB Type-C interfaces

The PI3EQX2064 driver from Diodes Incorporated, which enables USB Type-C® signals to be carried over long trace lengths, enables system designers to reduce power consumption while keeping costs to a minimum.

DIODES
INCORPORATED®

FEATURES

- Less than 5 mW power consumption in standby mode
- Four differential signal pairs
- Automatic receiver detect function
- Auto-slumber mode for adaptive power management
- 3.3 V supply voltage

APPLICATIONS

- Laptop computers
- Desktop computers
- Tablet computers
- TVs
- Workstations
- Servers

The PI3EQX2064, a member of the ReDriver™ family of signal booster products, is a low-power, 20 Gbits/s signal driver which conforms to the specifications of the USB 3.2 Gen 2 x 2 standard, and supports backwards compatibility with the USB 3.2 Gen 2 and Gen 1 standards.

The patented ReDriver technology means that systems can share high-speed USB signals over long PCB trace lengths, allowing for more flexible system configurations.

The ability of the PI3EQX2064 to perform adjustment of linear equalization, output swing, and dc flat gain in individual channels allows for compensation for different levels of signal loss over different PCB trace lengths, thus reducing inter-symbol interference.

The PI3EQX2064 is available in a very small and thin QFN package which occupies a footprint of only 2.1 mm x 4.3 mm.

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Compact USB Type-C connectors support 20 Gbits/s data-transfer rate

CX series connectors from Hirose provide the robust mating performance and solid construction needed to meet the requirements of industrial, medical and consumer applications. The connectors are well suited to automated production environments.

HRS ® HIROSE ELECTRIC EUROPE B.V.

FEATURES
- 16 or 24 contacts
- 0.5 mm contact pitch
- Maximum current rating: 5 A or 6 A
- 48 V ac/dc voltage rating
- 10,000 mating cycles

APPLICATIONS
- Smart watches
- Wireless earphones
- Drones
- Medical devices
- Smart meters
- Point-of-sale equipment
- Imaging equipment

The Hirose CX series of USB Type-C® connectors has a compact footprint to save board space.

The CX series connector, which conforms to the specifications of the USB4® Gen 2 x 2 standard, supports data transmission rates up to 20 Gbits/s, enabling data transfers up to four times as fast as those of a 5 Gbits/s USB 3.0 connector. A high-current variant, the CX90M-16P, operates at the USB 2.0 data rate of 480 Mbits/s, and is intended for use in fast battery chargers.

The receptacles feature a hybrid design: they use both surface-mount and through-hole soldering to improve mounting accuracy and to minimize the board mounting space needed. The design also facilitates automated optical inspection, and eases reworking of the solder terminal joints with a visible lead.

The slim plug is reversible, and the user-friendly receptacle features a symmetrical mating face to prevent incorrect insertion. A tactile click can be felt when mating the connectors to ensure correct engagement and prevent incomplete mating.

The series is supplied in two versions: a non-waterproof and a waterproof. The waterproof version has IP54, IP68, IP69K and IPX4 protection, which provides superior dustproofing and waterproofing for use in demanding environments.

USB Type-C® and USB-C® are registered trademarks of USB Implementers Forum.

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ESD protection diodes maintain signal integrity in high-speed data lines

Nexperia's low-capacitance class of ESD protection diodes, which feature low leakage current ratings, support single- and multi-line arrays and rail-to-rail configurations in AI servers and other applications requiring high-speed data transmission.
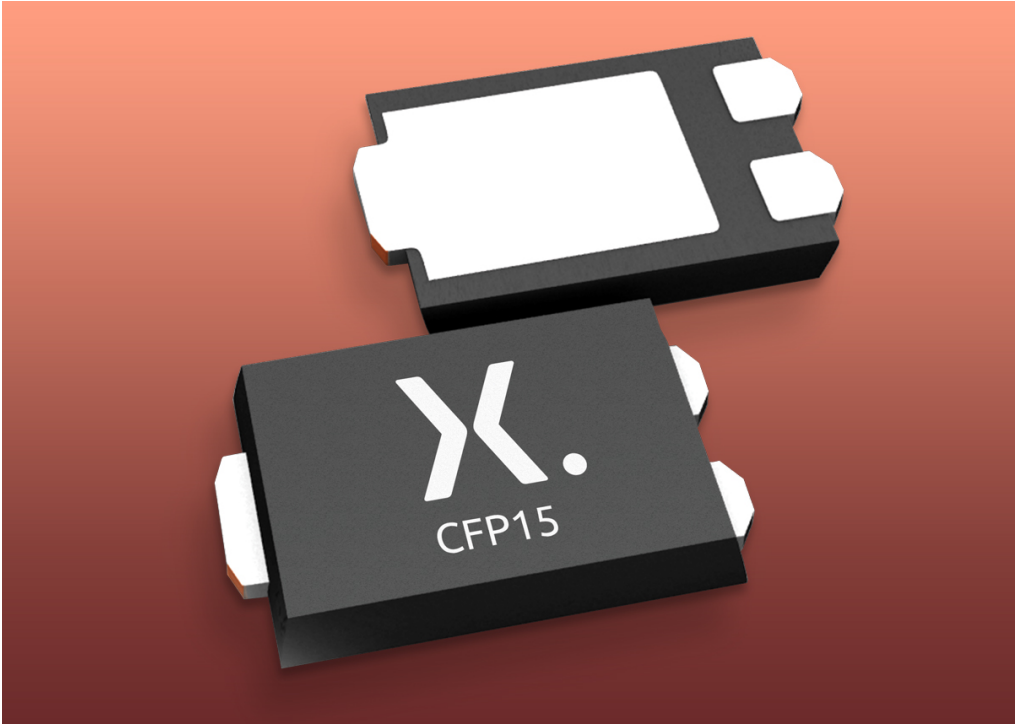
nexperia

FEATURES

- Complies with IEC 61000-4-2 level 4 ESD standard
- Ultra-small package options
- Diode capacitance down to 0.4 pF

APPLICATIONS

- Portable electronic devices
- Cellular headsets
- Infotainment systems
- Communication systems

Nexperia supplies a family of ESD diodes with low capacitance ratings of less than 1 pF which protect high-speed data lines while minimizing signal distortion and delay. These diodes are ideal for the protection of antennas, and a wide variety of high-speed interfaces.

The protection provided by these Nexperia ESD diodes is particularly valuable in artificial intelligence (AI) servers and edge devices, which rely on fast inter- and intra-board data interfaces such as PCIe and USB 3.x. Low-capacitance ESD protection ensures that these lines are shielded without degrading performance. Diodes supporting multi-line arrays reduce the space occupied by ESD protection, a useful feature for densely populated AI server boards.

The Nexperia ESD protection diodes are also notable for low leakage current of as little as 5 nA. In the security domain, this feature is valuable for cryptographic modules, in which even a small amount of current leakage can be a vector for side-channel attacks. The rail-to-rail protection afforded by low-capacitance Nexperia diodes also ensures that all voltage rails are shielded, which is essential in multi-voltage cryptographic systems.

Typical examples of the Nexperia range of ESD protection diodes are the PESD3V3U1UA, PESD3V3U1UB, PESD3V3U1UL-Q, and PESD3V3U1UT. These unidirectional diodes shield one signal line from ESD strikes of up to 30 kV.

Part Number	Package	Reverse Standoff Voltage	Capacitance	Protection Voltage Rating
PESD3V3U1UA	SOD323	3.3 V	2.6 pF	9 kV
PESD3V3U1UB	SC-79	3.3 V	2.6 pF	9 kV
PESD3V3U1UL-Q	DFN1006-2	3.3 V	2.6 pF	9 kV
PESD3V3U1UT	SOT23	3.3 V	0.6 pF	30 kV

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New MPU integrates AI accelerator to give high performance in smart vision systems

The launch of the RZ/V2N by Renesas provides the fast-growing market for endpoint AI devices with a new option for realizing advanced vision applications while reducing system size, power and cost.

RENESAS

FEATURES

- 1.5 Mbytes of on-chip SRAM
- LPDDR4/LPDDR4x DRAM interface
- 2-channel Gigabit Ethernet interface
- USB 2.0 interface
- USB 3.2 Gen2 interface
- 2-lane, single-channel PCIe Gen3 interface
- 6-channel CAN interface
- 24-channel ADC

APPLICATIONS

- Smart city vision systems:
  - Traffic monitoring cameras
- Industrial cameras:
  - Production line visual inspection
- Automotive vision:
  - Driver monitoring systems

FREE DEV BOARD

Evaluation kit for quad-core vision AI MPU.

Orderable Part Number
RTK0EF0186C03000BJ

APPLY HERE NOW

Renesas has launched a new microprocessor, the RZ/V2N, which provides high performance and low power consumption in vision AI applications.

The compact RZ/V2N MPU features the proprietary Renesas AI accelerator core, the dynamically reconfigurable processor DRP-AI3, which enables the MPU to achieve high AI processing efficiency of 10 TOPS/W. This high efficiency minimizes waste heat generation, eliminating the need for cooling fans, and so reducing the size and cost of embedded systems.

Boosted by advanced pruning technology, the RZ/V2N offers AI processing throughput of up to 15 TOPS. With a package footprint of just 15 mm x 15 mm, the 840-pin RZ/V2N reduces board mounting area by 38% compared to the existing RZ/V2H, another member of the RZ/V family.

The new RZ/V2N is based on an array of four 1.8 GHz Arm® Cortex®-A55 CPU cores and a single Cortex-M33 core, supported by an Arm Mali-C55 image signal processor. The RZ/V2N also provides two channels of MIPI camera interfaces, which allow two cameras to be connected to capture dual-angle images. The two-camera system improves spatial recognition performance compared to a single-camera system, and enables more precise human motion line analysis and fall detection.

A dual-camera system also captures images from different locations, allowing a single-chip system, for instance, to count cars in a parking lot and recognize licence plates efficiently.

Comprehensive development environment

Renesas provides software support for AI applications covering more than 50 use cases in the AI Applications and AI software development kit on GitHub. The SDK helps users to quickly evaluate and develop AI applications, with even limited experience in AI system design.

To accelerate development of AI cameras, Renesas has also developed the AI Dash Camera Solution, which consists of the RZ/V2N, a power management IC, and a real-time clock.

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Six-axis motion sensor features built-in AI processing unit

The STMicroelectronics ISM330IS motion sensor combines an accelerometer and gyroscope in a single small package. The internal AI processor runs algorithms at the edge, reducing the burden on the host processor.

FEATURES

- Low power consumption in always-on mode
- Low operating current:
  - 0.59 mA in high-performance mode
  - 0.46 mA in low-power mode with ISPU inactive
- 70 µg/√Hz noise in high-performance mode
- SPI/I2C interface
- Operating-temperature range: -40°C to 85°C
- Embedded temperature sensor

APPLICATIONS

- Industrial robots
- Condition-based monitoring
- Asset tracking
- Smart home automation
- Personal health monitoring equipment

The ISM330IS motion sensor from STMicroelectronics, which combines a three-axis digital accelerometer and a three-axis digital gyroscope, contains a processing unit to provide real-time sensor data to the host application.

Implemented as a system-in-package, the ISM330IS includes an intelligent sensor processing unit (ISPU), an ultra low-power, high-performance programmable core which can execute signal processing and artificial intelligence (AI) algorithms at the edge. The ISPU supports C programming, and is backed by an ecosystem of libraries and third-party tools and development environments. The circuitry is optimized for the real-time execution of algorithms, providing a streamlined implementation of AI in wireless sensor nodes.

The ISM330IS has a full-scale acceleration range of ±2 g/±4 g/±8 g/±16 g. The angular rate range is between ±125 degrees/s and ±2,000 degrees/s.

The sensor provides a programmable interrupt function, and an on-chip sensor hub for the internal accelerometer and gyroscope and up to four external sensors.

The LGA package of the ISM330IS measures 2.5 mm x 3 mm x 0.83 mm.

FREE DEV BOARD

Evaluation kit for intelligent motion sensor backed by AI software library.

Orderable Part Number
STEVAL-MKI233KA

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AI-powered tool streamlines embedded software development

Microchip has launched the MPLAB® AI Coding Assistant, which provides code writing and debugging tools, and a chatbot for personalized support and advice for developers of embedded systems running on Microchip products.

MICROCHIP

FEATURES

- Simple user interface for project settings
- Generate CMake files for building
- Supports MPLAB XC8, XC32 and XC-DSC compilers
- Supports MPLAB Data Visualizer
- Added views to assist with embedded target debugging functions:
  - Memory view
  - I/O view
  - Development kit/evaluation board views
  - Disassembly view

APPLICATIONS

- Embedded systems

Microchip has harnessed the capability of AI to provide a new interactive, real-time support tool which helps developers to create better software more quickly and more easily.

The new MPLAB AI Coding Assistant helps software developers and embedded engineers to write and debug code. A Microsoft® Visual Studio® Code extension, the free tool is based on Continue, the market's leading open-source AI code assistant, and is supplied with a Microchip AI chatbot for real-time support.

The chatbot enables developers to evaluate and iterate code directly from the sidebar. This interactive support enhances the coding experience by providing highly customized, relevant real-time assistance and insights into Microchip-specific products.

Additional features include advanced auto-complete for easier coding, an edit feature, and error detection for efficient code modifications within the current file. The tool also provides access to searchable Microchip documentation within the MPLAB integrated development environment.

Unlike most other code assistants on the market, the MPLAB AI Coding Assistant sidebar chat feature can produce block diagrams directly within the VS Code interface, rather than text responses only. This capability, combined with easy access to a library of documentation on Microchip microcontrollers and microprocessors, streamlines the coding process and helps to enhance accuracy.

Other AI-based advances from Microchip include the release of the PolarFire® FPGA Ethernet Sensor Bridge, a solution which enables the development of AI-driven sensor processing systems compatible with the NVIDIA Holoscan platform1.

Microchip has also partnered with Cartesiam, Edge Impulse, and Motion Gestures to simplify development in MPLAB X of machine learning implementations at the edge running on Microchip Arm® Cortex®-based microcontrollers and microprocessors.

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Compact inductors for space-constrained consumer applications

Murata has launched the DFE252010P series of shielded power inductors which have inductance ratings ranging from 0.33 μH to 4.7 μH, and operate at temperatures up to 125°C.

muRata
INNOVATOR IN ELECTRONICS

FEATURES

- Temperature current-rating range: 1.1 A to 3.2 A
- Operating-temperature range: -40°C to 125°C
- 20 V dc voltage rating

APPLICATIONS

- Consumer devices
- Medical equipment
- Industrial equipment

Murata has unveiled the compact DFE252010P series of purpose-built inductors for consumer applications.

The DFE252012P inductors measure 2.5 mm x 2.0 mm x 1.0mm, which makes them suitable for use in space-constrained consumer products, and in mobile and portable devices.

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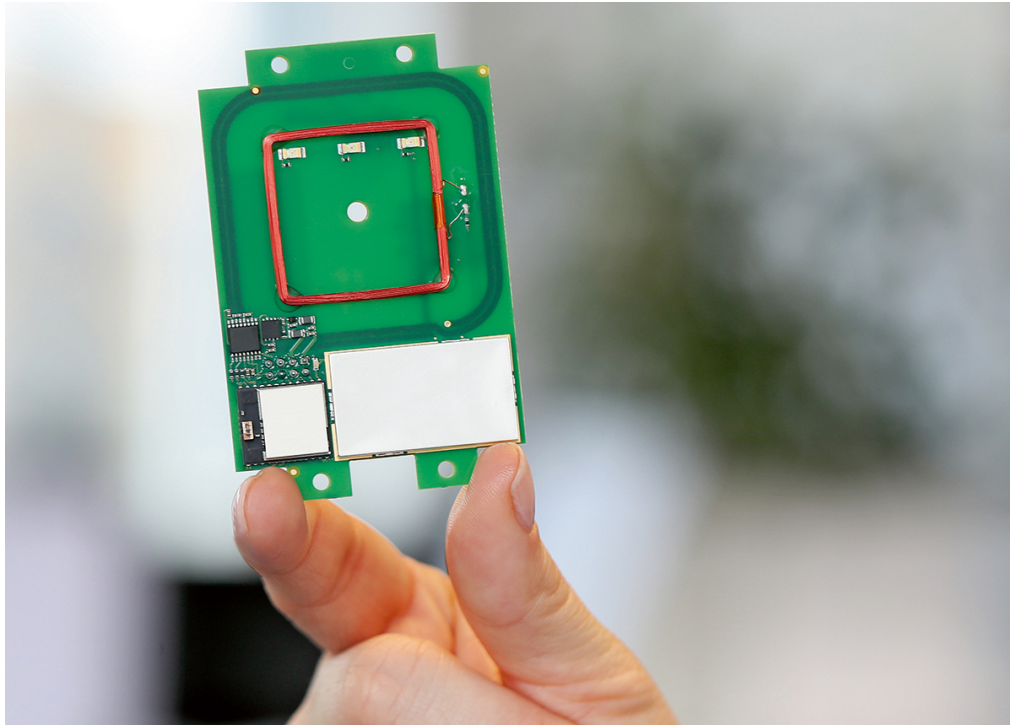ENERGY   **INDUSTRIAL**   LIGHTING   **MEDICAL**   TRANSPORT   SECURITY   **CONSUMER**   TELECOMS

Modules provide ready-made implementation of an RFID and NFC reader

The TWN4 MultiTech 2 RFID reader modules from ELATEC are supplied in a compact form factor and offer numerous interfaces, easing integration into any type of host device.

ELATEC
RFID Systems

FEATURES

- Dimensions: 76 mm x 49 mm x 8.2 mm
- 18 kbytes of user memory
- Supports operation at 125 kHz and 13.56 MHz frequencies
- Communications interfaces:
  - USB
  - RS-232
  - Serial TTL
  - I2C
- Support for CCID and PC/SC 2.01 smartcard standards

APPLICATIONS

- Authentication applications:
  - Printer authentication
  - Machine authentication
  - Authentication for car or bike sharing
  - EV chargers

The TWN4 MultiTech 2 family of contactless RFID readers and modules from ELATEC enables users to read and write to almost any RFID standards-compliant low- and high-frequency tags and labels. They also support NFC connectivity.

These ELATEC modules are available with either an NXP or LEGIC front-end. Support for Bluetooth® Low Energy networking is an optional feature.

The TWN4 MultiTech 2 modules are compatible with the Android™ and iOS smartphone operating systems: this makes it easy to integrate them into mobile identification applications.

The modules are supported by a powerful software development kit which enables developers to write application software which is executed directly on the module. The SDK also provides the capability to upgrade the module's firmware in the field, and enables transparent data exchange via RFID.

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Six-axis IMU features AI core for intelligent motion signal processing at the edge

The STMicroelectronics LSM6DSV16X inertial measurement unit (IMU) combines an accelerometer and gyroscope with a machine learning core in a single compact package, to enable context awareness and configurable motion tracking without needing a host controller.

FEATURES

- 0.65 mA operating current in high-performance mode
- Smart FIFO up to 4.5 kbytes
- Compatible with Android™ operating system
- ±2/±4/±8/±16 g full-scale accelerometer range
- ±125/±250/±500/±1,000/±2,000/±4,000 degrees/s gyroscope full-scale range
- Advanced pedometer, step detector, and step counter
- Significant motion detection
- Tilt detection
- Temperature sensor

APPLICATIONS

- Augmented, virtual, mixed reality equipment
- Wearable devices
- IoT devices
- Smartphones
- Handheld devices
- Cameras

STMicroelectronics has introduced the LSM6DSV16X, a six-axis IMU which features advanced artificial intelligence (AI) capabilities for smart motion sensing in IoT devices at the edge of the network.

The IMU is ideal for functions such as motion tracking and gesture detection, indoor navigation, image stabilization, and vibration monitoring and compensation.

The LSM6DSV16X includes standard IMU components: a three-axis digital accelerometer and a three-axis digital gyroscope. But on top of this, ST has built in a triple core for processing acceleration and angular rate data on three separate channels, the user interface, optical image stabilization, and electronic image stabilization, with dedicated configuration, processing, and filtering functions.

The AI capabilities of the LSM6DSV16X also enable it to apply edge computing functions to the raw motion data that it captures. Its finite state machine (FSM) performs configurable motion tracking, while a machine learning core (MLC) supplies context awareness, and provides exportable AI features for IoT applications.

The LSM6DSV16X supports the adaptive self-configuration feature, which allows the FSM to automatically reconfigure the IMU in real time based on the detection of a specific motion pattern. Reconfiguration can also be driven by the output of a specific decision tree configured in the MLC, without any intervention from the host processor.

The embedded Qvar function detects variation in electric charge, for user interface functions such as tap, double-tap, triple-tap, long press, or L/R or R/L swipe.

The LSM6DSV16X features an analog hub which can interface to an external analog input and convert the input to a digital signal for processing.

DATASHEET

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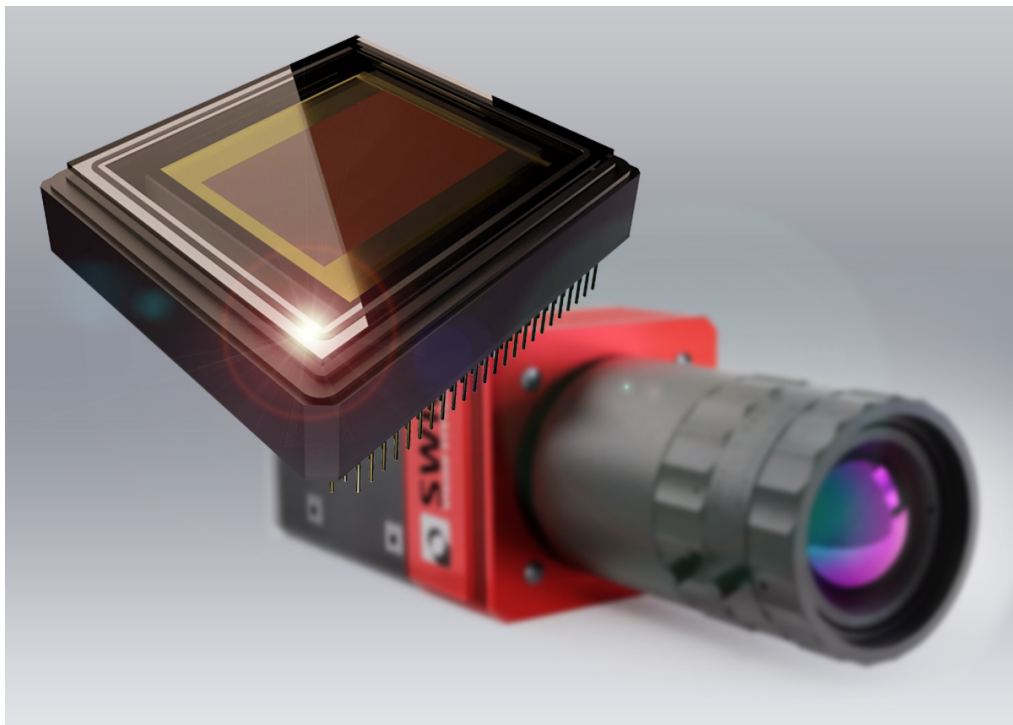ENERGY   INDUSTRIAL   LIGHTING   MEDICAL   TRANSPORT   SECURITY   CONSUMER   TELECOMS

Cameras with extended IR sensitivity see through objects and materials

onsemi uses advanced optical technology to create short-wavelength infrared (SWIR) cameras at lower cost, bringing new inspection and machine vision capabilities to a wider range of product designs.

onsemi™

FEATURES

- Wavelength range options:
  - 400 nm to 1,700 nm for standard SWIR sensors
  - 400 nm to 2,100 nm for eSWIR sensors
- 70 dB dynamic range
- Software GUI for camera control
- Pixel non-uniformity correction
- Compatible with range of SWIR lenses
- Communications interfaces:
  - USB3 Vision
  - GigE Vision
  - Camera Link®

APPLICATIONS

- Surveillance systems
- Silicon wafer inspection
- Machine vision
- Food inspection
- Autonomous vehicles
- Laser beam profiling
- Hyperspectral imaging
- Chemical sensing
- Medical imaging

Acuros® CQD® SWIR cameras from onsemi provide high-resolution imaging and sensing capabilities across the visible, near-infrared (NIR), and SWIR spectrum.

The global shutter cameras, intended for use in demanding industrial applications, offer the flexibility of programmable frame time, exposure time, gain modes, window modes, binning modes, and more.

The family of Acuros cameras is available in a variety of sensor configurations:

- 6 Mpixel resolution in 2098 px x 2040 px format
- 4.2 Mpixel resolution in 2040 px x 2040 px format
- 2.1 Mpixel resolution in 1920 px x 1080 px format
- 1.2 Mpixel resolution in 1280 px x 1024 px format
- VGA resolution in 640 px x 512 px format

onsemi also supplies Acuros SWIR laser profiling cameras for use in systems requiring direct imaging of laser sources without the use of an external lens or other optical components that can impact the beam shape or path.

These cameras are used by laser manufacturers, producers of laser system assemblies, and laser-based manufacturing organizations. They support applications including laser beam diagnostic imaging, laser beam profiling, and laser alignment.

The onsemi Acuros cameras are based on colloidal quantum dot-based (CQD) SWIR technology, which extends the detectable light spectrum to enable devices to see through dense materials, gases, fabrics and plastics, and to capture images that were not previously possible.

The CQD technology uses nanoparticles or crystals with unique optical and electronic properties that can be precisely tuned to absorb an extended wavelength of light. To date, adoption of SWIR technology has been limited because of the high cost and manufacturing complexity of the traditional indium gallium arsenide (InGAas) process.

onsemi, however, has combined its silicon-based CMOS sensors and manufacturing expertise with the CQD technology to produce highly integrated SWIR sensors at lower cost in high volume.

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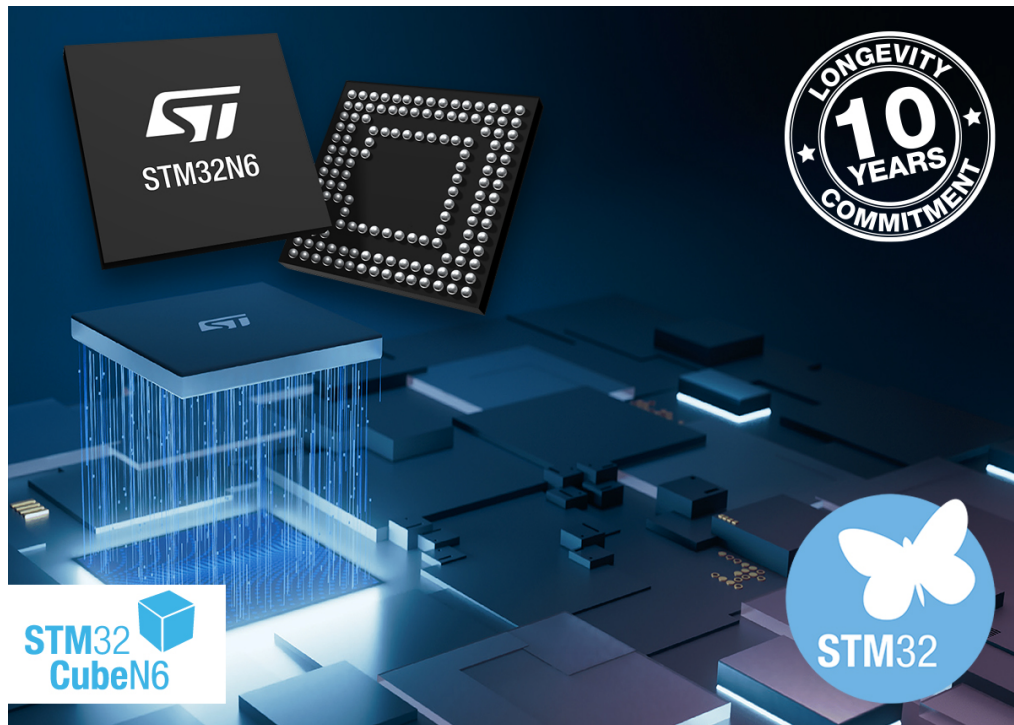ENERGY INDUSTRIAL LIGHTING MEDICAL TRANSPORT SECURITY CONSUMER TELECOMS

Boost to AI at the edge with launch of NPU-accelerated 32-bit microcontrollers

The STM32N6 microcontroller series from STMicroelectronics with new machine-learning capabilities makes it possible to perform computer vision, audio processing, sound analysis and more in consumer and industrial applications at the edge.

FEATURES

- Security features:
  - TrustZone®-aware support
  - Memory protection unit
  - Secure boot ROM
- Neo-Chrom graphic accelerator
- Optional hardware H264 codec
- Hardware JPEG accelerator
- Operating-temperature range: -40°C to 125°C

APPLICATIONS

- Industrial equipment
- Smart home equipment
- Smart cities
- Automotive systems
- Personal electronics devices
- Medical and healthcare equipment

STMicroelectronics has launched a series of 32-bit STM32 microcontrollers which integrate accelerated machine-learning (ML) capabilities alongside a high-performance 800 MHz Arm® Cortex®-M55 CPU core.

The new STM32N6 MCUs are the first to embed the Neural-ART Accelerator, a neural processing unit (NPU). With the on-board NPU, the STM32N6 provides 600 times more machine-learning performance than a current high-end STM32 MCU. This enables cost-sensitive and power-conscious consumer and industrial products to implement AI video and audio functions in small embedded systems.

The high-speed, low-power ML inferencing performed by the STM32N6 is due to the Neural-ART Accelerator NPU, which features nearly 300 configurable multiply-accumulate (MAC) units which can implement up to 600 giga-operations per second (GOPS). The NPU includes dedicated streaming engines which optimize data flow and minimize internal buffer usage and power. The accelerator supports on-the-fly weight decompression and real-time data encryption and decryption.

The high ML performance is complemented by the system control side of the MCU. The Cortex-M55 core achieves a high CoreMark® score of 3,360. The MCU also includes 4.2 Mbytes of RAM, providing sufficient memory to support data-intensive AI and multimedia workloads. Two 64-bit AXI interfaces provide the high intra-chip bandwidth required to unlock the full power of the Neural-ART Accelerator.

To support AI vision applications, the STM32N6 incorporates an image signal processor (ISP) which provides direct signal processing, enabling the use of simple and affordable image sensors. This ISP can be configured using the free ST ISP IQTune software, a cutting-edge tool which enables the developer to customize image signal processing parameters such as exposure time, contrast and color balance.

ST also provides development software to support the implementation of AI functions. The Edge AI Suite is a comprehensive set of software tools for the development of edge ML applications. The software tools enable developers to implement AI models in various formats such as TensorFlow Lite, Keras, and ONNX.

FREE DEV BOARD

Eval board for 32-bit MCUs with on-board AI acceleration.

Orderable Part Number
NUCLEO-N657X0-Q

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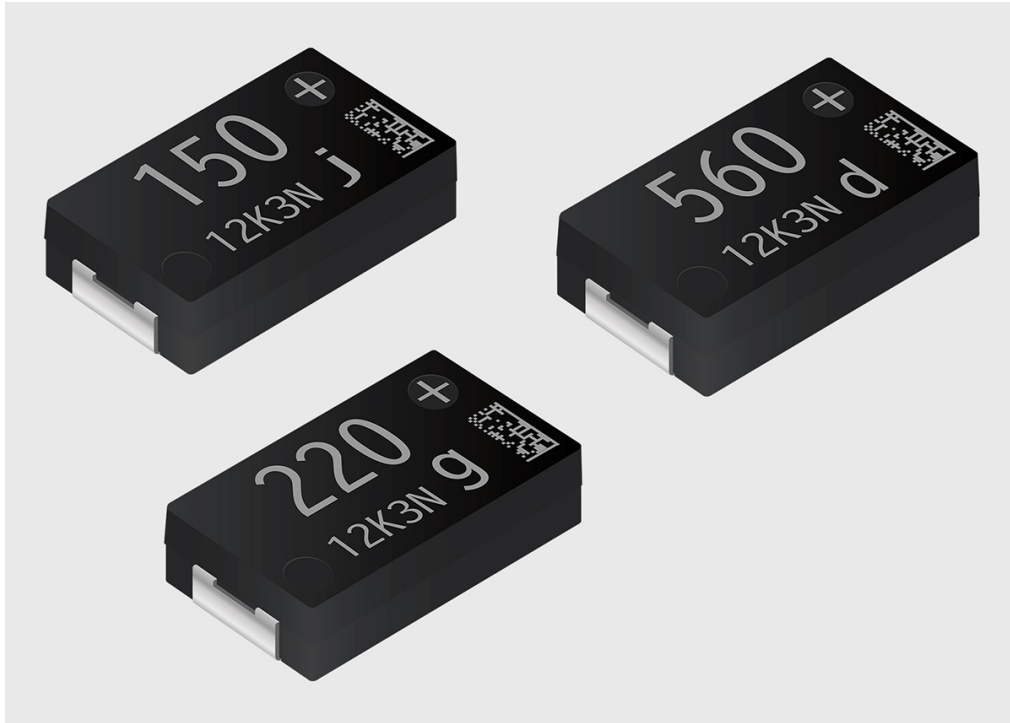ENERGY | INDUSTRIAL | LIGHTING | MEDICAL | TRANSPORT | SECURITY | CONSUMER | TELECOMS

Aluminum polymer capacitors set high benchmark for temperature resistance

Part of the Panasonic SP-Cap portfolio, the KX, JX and TX series capacitors offer higher temperature capability than standard parts, to enable use in densely populated AI processor boards.

Panasonic
INDUSTRY

FEATURES

- Voltage/capacitance ratings range: 2 V/330 µF to 6.3 V/120 µF
- Ideal replacement for X7R/X7S grade MLCCs

APPLICATIONS

- AI data center servers
- Networking equipment
- Accelerators
- Industrial equipment
- Base stations

Panasonic Industry supplies three series of SP-Cap aluminum polymer capacitors which enhance system ability to operate continuously at high temperature, an important requirement for devices mounted near the processors in the latest artificial intelligence (AI) servers.

The TX series offers endurance of 5,500 hours at 135°C, promising high reliability in high temperatures. These capacitors also last for a minimum of 1,000 hours at 85°C and 85% relative humidity, making them suitable for operation in demanding outdoor applications. The JX and KX series of SP-Cap capacitors offer similar reliability in demanding temperature and humidity conditions. The JX capacitors are rated for a lifetime of 3,000 hours at 125°C, and the KX for 5,000 hours at 125°C.

As aluminum polymer capacitors, the TX, KX and JX series are typically specified when an application such as noise reduction or voltage smoothing requires low ESR. These products offer ESR ratings of between 3 mΩ and 15 mΩ.

The SP-Cap capacitors offer an attractive alternative to multilayer ceramic capacitors (MLCCs) and pure tantalum capacitors thanks to the long lifespan and high stability.

The high capacitance also means that designs require fewer capacitors and a smaller PCB. They also produce better performance than other capacitor types, especially in complex, low-profile electronics systems.

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ENERGY INDUSTRIAL LIGHTING MEDICAL TRANSPORT SECURITY CONSUMER TELECOMS

Surface-mount fuse offers high breaking capacity in space-constrained applications

An alternative to through-hole fuses with a high interrupting rating, the surface-mount Nano² 415 series of fuses from Littelfuse supports automated component assembly and saves space.

Littelfuse®

FEATURES

- Current-rating options:
  - 1.0 A
  - 1.25 A
  - 2.0 A
  - 2.5 A
  - 3.15 A
  - 4.0 A
  - 5.0 A
  - 6.3 A
- UL/CSA/NMX 248-1 and 248-14 recognition
- Conforms to EN 60127-1 and EN 60127-7

APPLICATIONS

- EV charging stations
- Lighting systems
- Industrial equipment
- Appliances and white goods
- Ac-dc power adapters

Littelfuse has launched the Nano2® 415 series of surface-mount fuses, which have a high interrupting rating of 1,500 A at 277 V ac.

This addition to the Nano² portfolio measures 15 mm x 5 mm, helping designers to save space in applications that require a small footprint, such as home appliances.

The 415 series fuses can operate over a temperature range of -55°C to 125°C with proper derating. The eight-strong 415 series offers current ratings ranging from 6.3 A and a melting I²t of 200 A²s, down to 1.0 A and an I2t of 3.6 A²s.

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ENERGY   INDUSTRIAL   LIGHTING   MEDICAL   TRANSPORT   SECURITY   CONSUMER   TELECOMS

New secure element provides turnkey security solution for devices connected to the cloud

The STSAFE-A120 from STMicroelectronics provides CC EAL5+-grade security for connected home and industrial products. Authentication functions and a unique identity enable devices to link securely to popular cloud computing services.

STSAFE-A120

STSECURE

LONGEVITY **10 YEARS** COMMITMENT

FEATURES

- Symmetric encryption and decryption
- Secure data storage and counters
- Signature verification service
- Remote cloud authentication
- Enrolment of devices into cloud computing services:
  - Amazon AWS JIT
  - Microsoft Azure DPS

APPLICATIONS

- Consumables
- Accessories
- IoT devices
- Smart home products
- Smart city products
- Industrial equipment
- Consumer electronics devices

The new STSAFE-A120 secure element from STMicroelectronics offers the security functions required to authenticate a connected device and securely attach it to a remote server or to cloud computing services such as AWS or Microsoft Azure.

Running on a CC EAL5+ certified platform, the STSAFE-A120 comes with a rich feature set which ensures strong device authentication based on X509 certificates which are compatible with the Qi 2.0 wireless charging and Matter wireless networking specifications.

The chip capabilities include monitoring device usage, assisting in secure connection establishment via TLS, and safeguarding the integrity of the host platform. The STSAFE-A120 connects to a host microcontroller via an I2C interface.

Integration into secure system designs is eased by the availability of libraries which are compatible with STM32 and other general-purpose MCUs, and the STM32 Nucleo family of expansion boards. Designers using the STM32Cube software development ecosystem can also easily build the STSAFE-A120 into the development flow.

ST supplies STSAFE-A120 interfaces, drivers and source code examples for the Arduino family of system boards.

FREE DEV BOARD

Expansion board based on STSAFE-A120 secure element.

Orderable Part Number
X-NUCLEO-ESE01A1

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INFORMATION   **DATASHEET**   **SAMPLES**

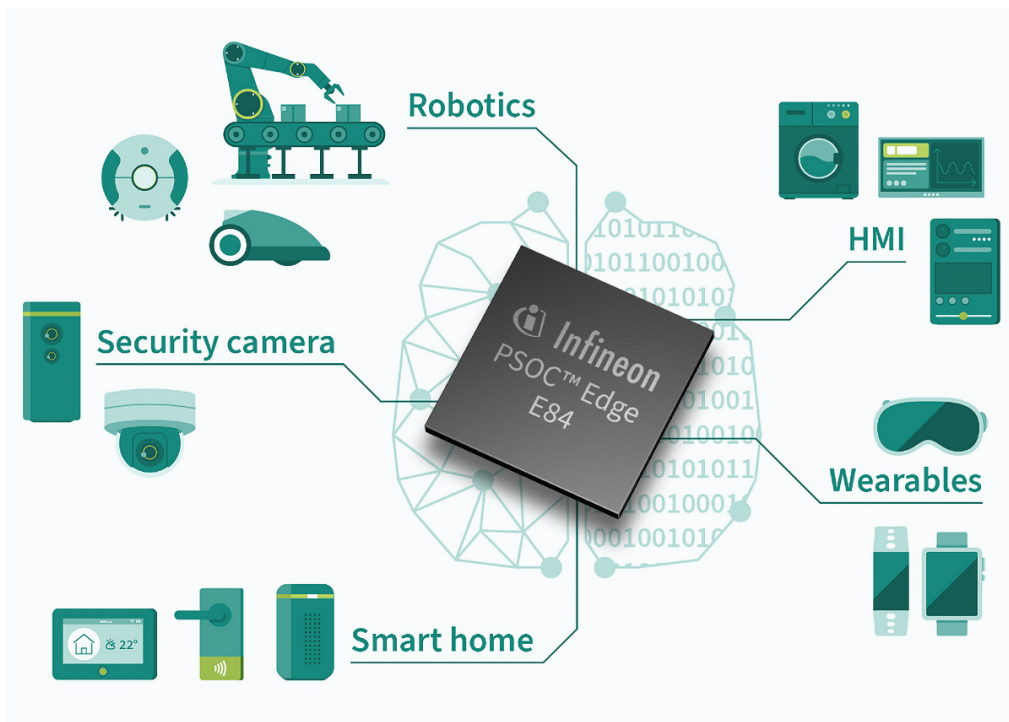ENERGY   INDUSTRIAL   LIGHTING   MEDICAL   TRANSPORT   SECURITY   CONSUMER   TELECOMS

Multi-core MCU includes neural networking accelerators for high AI performance

The Infineon PSOC™ Edge E84 features a sophisticated compute architecture with both high-performance and low-power blocks, both backed by dedicated artificial intelligence (AI) acceleration hardware and fast memory.

Robotics
HMI
Security camera
Wearables
Smart home

Infineon

FEATURES

- HMI functions:
  - Low-power 2.5D graphics processor unit
  - Up to 1024 px x 768 px display controller with MIPI-DSI/DBI interface
  - Audio multi-microphone interface
- Security functions:
  - Secure enclave in low-power always-on domain
  - Infineon Edge Protect Category 4/PSA Level 4
  - Trusted Firmware-M enablement
  - Mbed-TLS for crypto operations

APPLICATIONS

- Wearable devices:
  - Fitness watches
  - Augmented/virtual reality glasses
  - Audio accessories
- Smart home equipment:
  - Smart thermostats
  - Smart locks
  - Smart home appliances
  - Security cameras
- HMIs:
  - Appliances
  - Industrial equipment
  - Factory automation equipment
- Robotics:
  - Vacuum cleaners
 - Service robots
  - Industrial robots

Infineon has announced the launch of the PSOC Edge E84, the latest in its broad PSOC portfolio of microcontrollers, which features hardware-assisted machine learning (ML) acceleration for use in next-generation responsive compute and control applications.

The PSOC Edge MCUs use the capability of AI to improve end-user experiences by enabling end products to be more intelligent and intuitively usable, lowering the barriers to human-machine interaction and adding contextual awareness. They do so while providing robust privacy and safety protection through embedded Infineon Edge Protect technologies.

The PSOC Edge E84 is based on a power-optimized multi-core architecture. A high-performance block features an Arm Cortex-M55 CPU core, including Helium DSP support, paired with an Arm Ethos™-U55 neural processing unit (NPU). A low-power block combines a Cortex-M33 CPU paired with the ultra low-power Infineon NNLite hardware accelerator for neural networks in always-on ML and AI applications. PSOC Edge family MCUs feature advanced memory resources, with up to 6 Mbytes of system SRAM and 512 kbytes of non-volatile RRAM memory shared across the high-performance and low-power blocks.

The MCU provides an always-on acoustic activity detection capability which enables the operation of a human-machine interface (HMI) with low active and standby power consumption. It also includes support for advanced graphics, voice, and audio, as well as standard communication and timing peripherals suitable for a variety of consumer and industrial applications.

Software enablement is based on the ModusToolbox™ development software suite, including integration with the DEEPCRAFT™ Studio AI solution and off-the shelf DEEPCRAFT™ Ready Models. ModusToolbox is a comprehensive collection of multi-platform tools and software libraries which includes board support packages, a peripheral driver library, and middleware libraries.

INFORMATION

SAMPLES

Low-voltage MOSFETs offer efficiency and reliability in AI server power supplies

For the RS7E200BG, RS7N200BH, and RS7N160BH MOSFETs, ROHM Semiconductor has developed a new package which increases die size without increasing board footprint, resulting in lower on-resistance and a wider safe operating area (SOA).
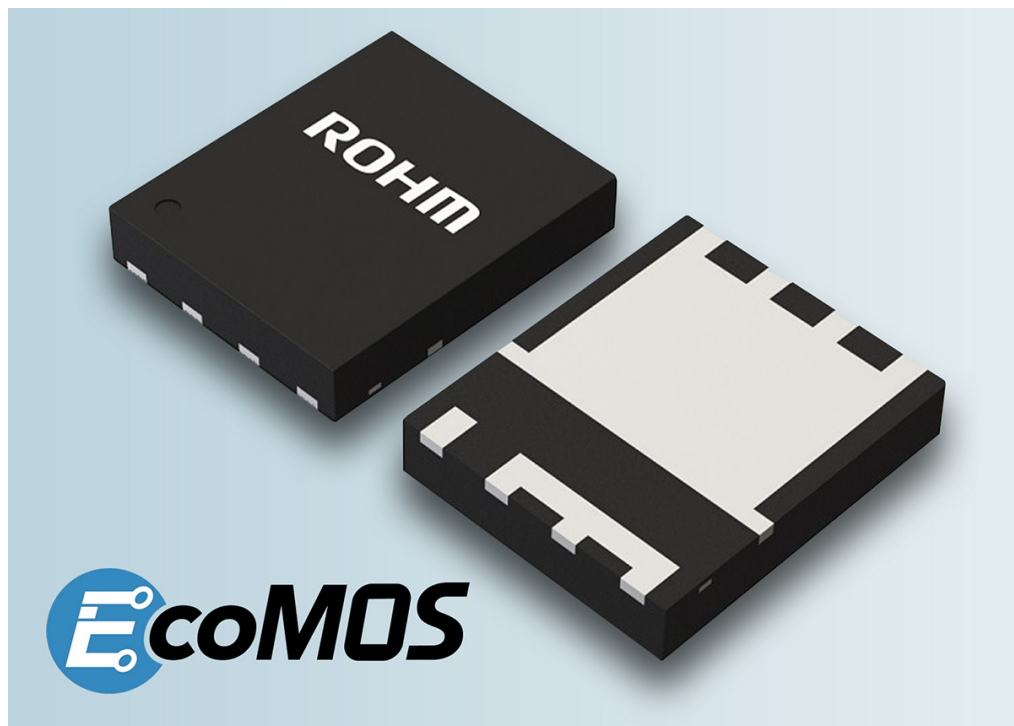
ROHM SEMICONDUCTOR

FEATURES

RS7E200BG

- 390 A maximum continuous drain current
- 180 W maximum power dissipation
- 2.5 V maximum gate threshold voltage
- 135 nC gate charge at 10 V
- Operating-temperature range: -55°C to 150°C

APPLICATIONS

- 12 V and 48 V server power supplies
- 48 V industrial power supplies

ROHM Semiconductor has introduced three N-channel power MOSFETs featuring low on-resistance and a wide SOA which help to improve efficiency and reliability in server power circuits and artificial intelligence (AI) cloud computers.

The new EcoMOS™ product line-up includes three products:

- The 30 V RS7E200BG is suitable for both secondary-side ac-dc conversion circuits and hot-swap controller circuits in the 12 V power supplies used in high-performance enterprise servers
- The 80 V RS7N200BH and RS7N160BH are ideal for secondary ac-dc conversion circuits in 48 V AI server and industrial power supplies

All three MOSFETs are housed in a new DFN5060-8S package which has a footprint of 5 mm x 6 mm. This new package increases the area of the die by approximately 65% compared to MOSFETs in a conventional 5 mm x 6 mm HSOP8 package. This larger die produces both low on-resistance and a wider SOA. The RS7E200BG features on-resistance of 0.53 mΩ, and the RS7N200BH, 1.7 mΩ, both at a gate-source voltage of 10 V.

The wide SOA is valuable in servers equipped with hot-swap capability, which allow for the replacement and maintenance of internal boards and storage devices while powered on, and which experience a high inrush current during hot-swap events. The 30 V RS7E200BG achieves an SOA tolerance of over 70 A for a pulse width of 1 ms at a drain-source voltage of 12 V, twice that of MOSFETs in the conventional HSOP8 package.

| DATASHEET | DATASHEET #2 | SAMPLES |

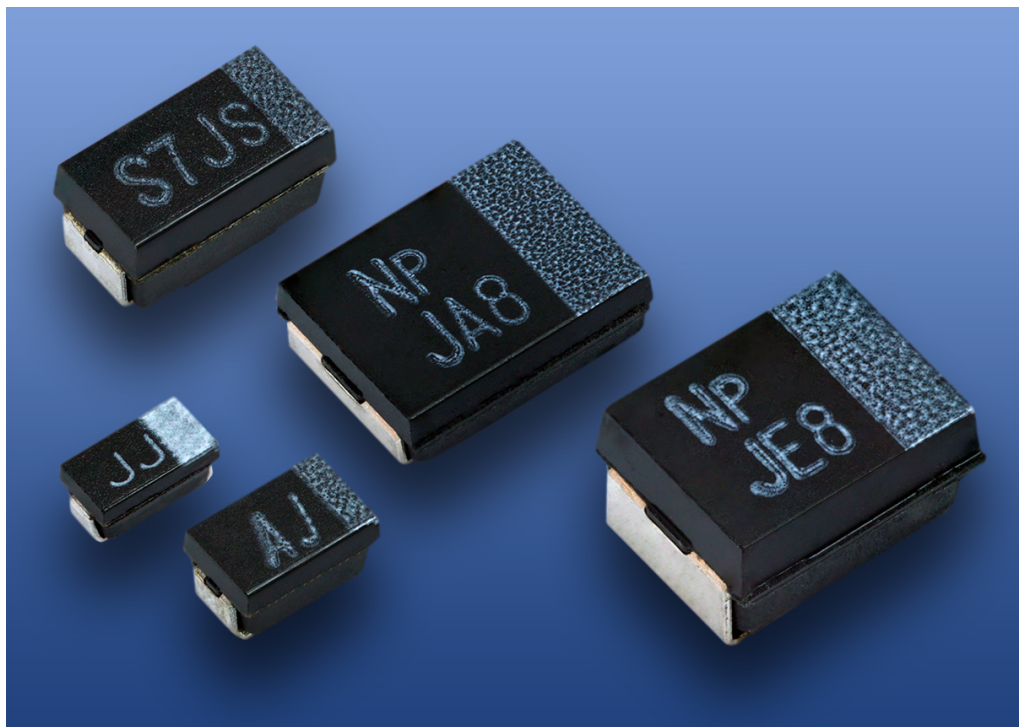ENERGY   **INDUSTRIAL**   LIGHTING   MEDICAL   TRANSPORT   SECURITY   CONSUMER   **TELECOMS**

Tantalum capacitors in small case sizes offer very low resistance values

The T55 series capacitors from Vishay offer a wide range of case sizes with capacitance up to 1,000 μF, and low ESR to reduce the number of capacitors required in the circuit, saving on bill-of-materials cost.

VISHAY

The DNA of tech.

FEATURES

- High ripple-current capability
- Stable capacitance across operating-temperature range
- Good capacitance stability over frequency range
- No wear-out effect
- Operating-temperature range: -55°C to 105°C/125°C

APPLICATIONS

- Laptop computers
- Tablet computers
- Smartphones
- Wireless cards
- Solid-state disks
- USB Type-C® hubs
- Servers
- Storage equipment
- Networking equipment

The T55 series of vPolyTan™ surface-mount polymer tantalum chip capacitors from Vishay offers low ESR values from 500 mΩ down to 7 mΩ.

The T55 series includes chip capacitors in the D case size, EIA 7343-31. Previously only found in larger case sizes, the single-digit ESR values of these new capacitors are as much as 5 mΩ lower than those typically found in capacitors housed in a D case.

The low ESR of the T55 capacitors results in lower energy loss, better frequency response, and high ripple-current ratings, cutting the number of capacitors required on the PCB.

The T55 series ranges in capacitance from 3.3 μF to 1,000 μF over voltage ratings from 2.5 V to 63 V. Supplied in case sizes ranging from an 0603 J case to a D case, the T55 features capacitance tolerance of ±20%. The capacitors are suitable for a wide range of functions, including:

- Battery decoupling
- Smoothing
- Filtering
- Bulk energy storage in wireless cards

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INFORMATION

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SAMPLES

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Low-cost crystal units provide high-frequency stability

Part of the large portfolio of KYOCERA AVX crystal units, the CX2016FB and CX3225FB support the frequencies most widely required in consumer and industrial circuits.

KYOCERA AVX

FEATURES

- ±10 ppm initial frequency tolerance at 25°C
- ±15 ppm frequency tolerance, -30°C to 85°C
- ± 20 ppm frequency tolerance, -40°C to 85°C
- ± 30 ppm frequency tolerance, -40°C to 105°C
- ± 3 ppm frequency aging at 25°C
- 100 μW maximum drive power

APPLICATIONS

- Industrial equipment:
  - Metering
  - Factory automation
  - Security systems
  - Energy solutions
- Consumer devices
  - Home appliances

KYOCERA AVX supplies miniature crystal units which offer high timing accuracy across a wide operating-temperature range.

Supporting many of the most commonly used frequencies, the CXxxxxFB series crystal units are a particularly attractive low-cost option for building a timing circuit. The CX2016FB is supplied in a package with a footprint of 2.0 mm x 1.6 mm. Designers can order a CX2016FB product with a frequency output of 24 MHz, 25 MHz, 26 MHz, 27 MHz, 32 MHz, 3.84 MHz, 40 MHz, 48 MHz, or 50 MHz.

The CX3225FB units in a 3.2 mm x 2.5 mm package also support these frequencies, and can additionally produce a 16 MHz or 20 MHz output.

Available with load capacitance ratings of 6 pF, 7 pF, 8 pF, or 10 pF, these CX devices are suitable for consumer or industrial applications.

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SAMPLES

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