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M A R K E T I N G I N N O V A T I V E P R O D U C T S



2019

04

THE COBOTS

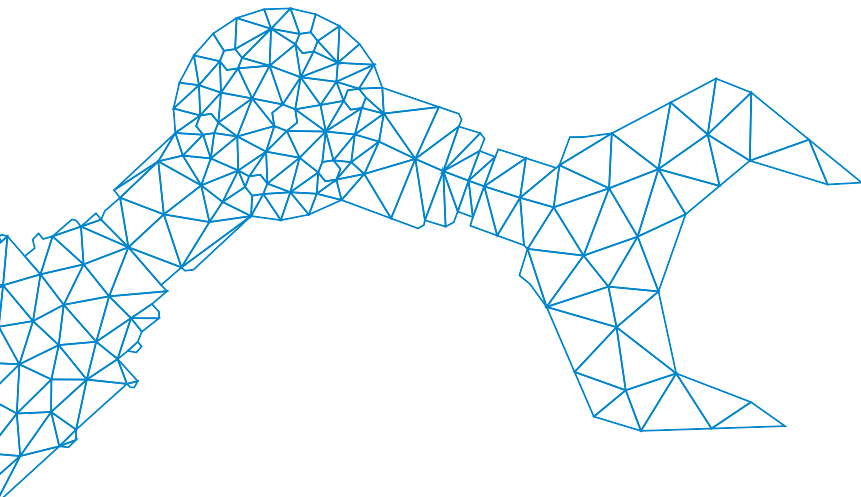


The first thing that comes to mind when talking about a modern factory is a busy production line with industrial robotic arms that perform many repetitive and sometimes dangerous tasks at high speeds and with extreme precision. These industrial robots are typically used for welding, painting, assembly, packaging, labeling, palletizing, testing, and other similar tasks.

As powerful as they may seem, industrial robots have their drawbacks. Production lines with these robots are deterministic by their nature and built for a single purpose. Industrial robots also lack the dexterity, flexibility, and the ability to make decisions. Most importantly, they are not safe enough to be operated among humans, so they must be installed in protected areas or in cages. More sophisticated industrial robots may be equipped with safety features that cause them to stop completely in the presence of humans, which may unnecessarily slow down the entire production line.

The latest advancements in electronics and robotics have made it possible to develop a new type of robot: a smart, flexible, and collaborative robot - a COBOT. Cobots have many qualities that make them more productive and easier to work with. By implementing the latest solutions in the field of Artificial Intelligence such as machine vision and machine learning, the latest generations of cobots are able to interact with the environment in a more organic way. Cobots are one of the technological marvels that the latest industrial revolution brings along.

The most distinctive feature of cobots is their ability to share the workspace with humans, so they do not have to be installed behind protective fences. Typically, they are made of lighter materials, they have no pointy and sharp edges, and all their actuators and wirings are hidden within their bodies, for improved safety. Cobots can sense the applied force, allowing them to detect obstacles in their way, limit the force, and take other necessary actions to prevent injuries. This also allows them to perform more delicate tasks, where the applied force must be carefully controlled.



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In fact, cobots are not limited only to factories. There are models used in healthcare as well: surgical assistance, patient massage, patient transportation... They can also be used in many other industries because they can operate safely in a shared workspace.

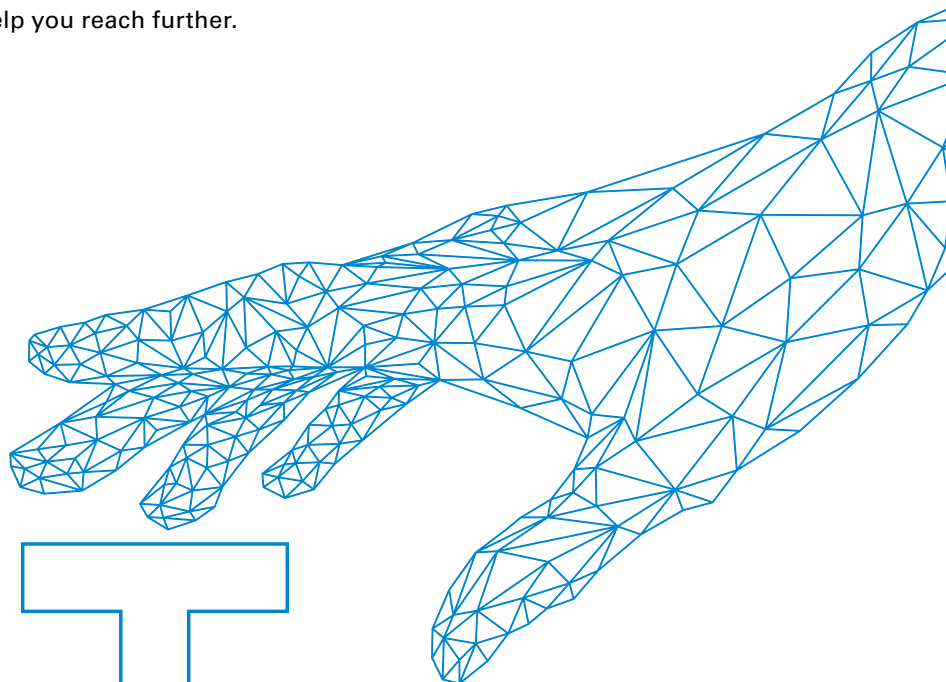
Cobots are designed to be really easy to use. One of the areas where machine learning and machine vision capabilities can be especially useful are pick-and-place and object sorting applications. The latest generation of cobots with cognitive abilities can recognize a particular object and simply pick it up from the pallet, regardless of its position and orientation. They can decide which tool to use, perform various operations on the object - and hand it over to their human colleagues for testing, inspection, and fine-tuning. As demonstrated at the Hannover Messe, cobots can also serve draft beer and play Yahtzee with visitors.

However, cobots are not meant to completely replace people. Mixed human-machine teams can achieve the best results, especially when a lot of customization is required or when the product design changes periodically. Some of the biggest manufacturing companies in the world adopted cobots to help with the customization of their products. By utilizing cobots, they enabled their employees to perform much better and to improve both the quantity and the quality of the produced goods. Flexible, adaptable, versatile, and safe to work with, cobots are a new tool in the hands of Industry 4.0 workers.

EBV Elektronik, a member of the Avnet family of leading global technology solution providers, offers cutting edge technologies and solutions in the areas of Analog & Power, High-End processing, RF & Microwave, Security & Identification, and Smart Sensing & Connectivity, ensuring that YOU are ready for the next industrial revolution - from concept to design, through to production. Let us help you reach further.

LLABORATIVE

BOT



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MRF24G300HS

300 W GaN RF Energy Transistor With Better Efficiency Than Magnetron

DISCRETE



MRF24G300HS

The new RF Energy GaN transistor from NXP is one of the first solid-state devices that exceeds the efficiency of magnetrons. The MRF24G300HS delivers up to 73 % drain efficiency, 5 % above the latest LDMOS. The naturally high output impedance of GaN enables a more broadband match than LDMOS, enabling manufacturing consistency: no production tuning is needed. GaN on SiC combines the high power density of Gallium Nitride with the superior thermal conductivity of Silicon-Carbide. At 48 V, the MRF24G300HS outputs 330 W of CW power. The MRF24G300HS has been designed for CW and long pulses (cycling).

- **73% Efficiency at P1dB Enabling One of The Lowest Power Consumption Systems on The Market**
- **High Gain and Lower Power Dissipation Reduces Total Cost**

- **Easier to Match Thanks to High Output Impedance Ensuring Consistency in Manufacturing**
- **Accurate Power Control, Larger Mean Time to Failure, Easy-to-use**

FEATURES

- Advanced GaN on SiC, for Optimal Thermal Performance
- Characterized for CW, Long Pulse (up to Several Seconds) and Short Pulse Operations
- Device Can Be Used in a Single-Ended or Push-Pull Configuration
- Input Matched for Simplified Input Circuitry
- Qualified up to 55 V
- Suitable for Linear Applications

KEY APPLICATIONS

- Industrial Heating; Welding; Drying
- Emerging Applications: Tune and Magnetron Replacement
- Cooking; Microwave Oven
- Medical; Diathermy; Ablation

MARKET SEGMENT

- Industrial
- Lighting
- Healthcare & Wearables

SUB MARKET

- Medical Instruments
- Factory Automation (PLCs, I/O, Sensors & Actuators)

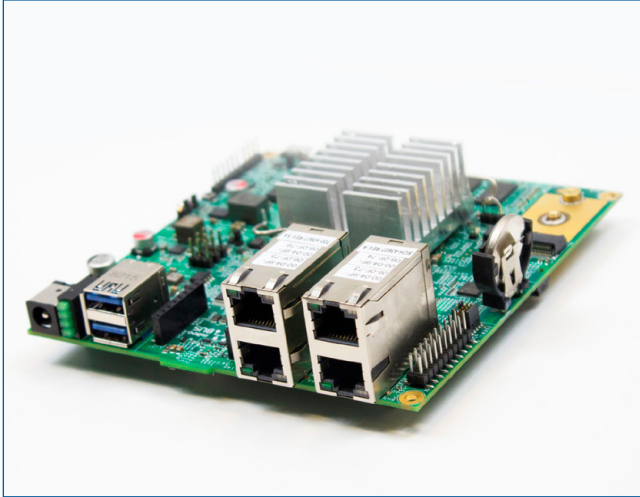
TECHNOLOGY SEGMENT

- Analog & Power



FRWY-LS1046A

Flexible, High-Performance, Small Form Factor, Edge Computing Platform



FRWY-LS1046A Edge Computing Platform

The Freeway LS1046A (FRWY-LS1046A) is a high-performance, low-cost edge computing platform, based on the QorIQ LS1046A quad-core 64-bit processor. The LS1046A supports DDR4, multiple Gigabit Ethernet, USB3.0, and M2_Type_E over PCIe Gen3 for Wi-Fi. The platform can enable high compute applications like AI/ML, industrial gateway, smart building gateway, wireless gateway and many more.

The FRWY-LS1046A-PA is the bare board option. The FRWY-LS1046A-AC comes in an enclosure and includes a plug-in IEEE802.11ac Wi-Fi module. For both options, an HTML page provides pre-installed demos and videos.

- **High Performance 64-bit Quad-core ARM® Cortex®-A72 CPU**

- **EdgeScale Provides Device and Application Security, from HW Root of Trust, to Apps**

- **High-performance, Low-cost Edge Computing Platform, Based on the QorIQ LS1046A**

- **Onboard DDR4, Multiple Gigabit Ethernet, USB3.0 and M2_Type_E over PCIe Gen3 for Wi-Fi**

FEATURES

- LS1046A 4 x Arm®Cortex®-A72 cores delivers 45,600 CoreMarks® of compute performance
- High speed up to 1.8 GHz
- 2 x M.2 slots PCIe Gen3 – Wi-Fi, 4G/LTE, AI/ML Accelerator
- 4 x Gigabit Ethernet
- 2 x USB3.0
- MikroBUS™ socket expansion for the Click board™ line of products – NFC, Sensors, BLE/ZigBee, LoRa, etc.
- 4 GB DDR4 with ECC at 2.1 GT/s
- 4 Gb NAND FLASH
- 64 MB QSPI FLASH
- 32 GB MicroSD Card – Linux, Demos, Videos
- Expansion Headers – I²C, SPI, Clocks, Interrupts, GPIO
- Passive Cooling heat sink (fanless design)
- Layerscape SDK (LSDK), OpenWRT, Yocto, Suse, EdgeScale
- Docker Containers, DPDK, Virtualization (KVM/QEMU)

KEY APPLICATIONS

- Automotive; Gateways
- Industrial; Industrial PCs; Factory and Process Automation
- Enterprise Equipment; Cloud Managed WLAN Access Points
- Service Provider; Access Routers; Cloud Gateway
- Aerospace, Defense and Government; Avionics Networking

MARKET SEGMENT

- Automotive
- Industrial
- Communication & Infrastructure
- Hi-Rel

SUB MARKET

- Connected Car, Body Electronics and Automotive Lighting
- Broadcast
- Aerospace, Defense and High Temp Electronics
- Telecom and Networking
- Point of Sales and Vending machines
- Motion Control, Servo Drives
- Instrumentation, Test and Measurement
- Embedded Computing & Storage
- Factory Automation (PLCs, I/O, Sensors & Actuators)
- Robotics
- Commercial, Construction and Agricultural Vehicles

TECHNOLOGY SEGMENT

- High End Processing



Xilinx® Alveo™ U50 Card

Xilinx® Alveo™ U50 Data Center Acceleration Card, Passive Cooling



Xilinx® Alveo™ U50 Card

The Xilinx® Alveo™ U50 Data Center accelerator card is designed to accelerate memory-bound, compute-intensive applications in financial computing, machine learning, computational storage, and data search and analytics. It is a single-slot, low-profile, passively cooled card, consuming up to 75 W. It supports PCIe Gen3 x 16 or dual Gen4 x 8. It is equipped with 8 GB of high-bandwidth memory (HBM2), and Ethernet networking capability. Alveo™ U50 is supported by Xilinx® SDAccel™ software and deployment shell, simplifying the design process allowing high-level languages (C, C++, and OpenCL™).

- Based on Xilinx Ultrascale+™ FPGA Architecture
- 8 GB Total HBM2 Capacity
- QSFP28 Network Interface
- PCIe Interface

FEATURES

- Two Stacks of 4 GB HBM2 memory, 8 GB Total
 - 32 Channels of 256 MB
 - 8 GB Total Providing a Maximum Bandwidth of 460 GB/s
- 872 kLUTs
- 1743 K Registers
- 5952 DSP slices
- Ethernet Networking Interfaces
 - One QSFP28 Connector Supporting 100 GbE, 40 GbE, or 4 x 10/25 GbE (PQ Card)
- 16-lane Integrated Endpoint Block for PCI Express Connectivity
 - Gen3 x 16 Supporting to x1, x2, x4, x8, x16 Lane Configurations
 - Single or Dual Gen4 x 8

- I²C Bus
- Power Management with System Management Bus (SMBus) Voltage, Current, and Temperature Monitoring
- Passive Cooling
- 75 W Power (TDP)
- SDAccel™ Developer Environment
- Vivado Design Suite

KEY APPLICATIONS

- Financial Computing
- Computational Storage
- Data Search and Analytics
- Machine Learning

MARKET SEGMENT

- Communication & Infrastructure
- Industrial

SUB MARKET

- Telecom and Networking
- Embedded Computing & Storage

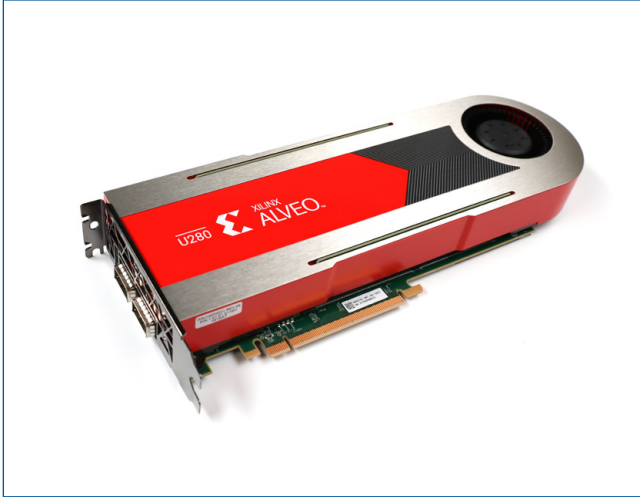
TECHNOLOGY SEGMENT

- High End Processing



Xilinx® Alveo™ U280 Card A

Xilinx® Alveo™ U280 Data Center Accelerator Card with HBM2, Active Cooling



Xilinx® Alveo™ U280 Card

The Xilinx® Alveo™ U280 Data Center accelerator card offers 8 GB of HBM2 460 GB/s bandwidth to provide high-performance, adaptable acceleration for memory-bound, compute-intensive applications, including database, analytics, and machine learning inference. This Alveo card includes PCI Express 4.0 support to leverage the latest server interconnection infrastructure for high-bandwidth host processors.

The U280 A (Active Cooling) card version is intended for development and prototyping while the U280 P (Passive Cooling) version is intended for production and volume-deployment in datacenters.

- **Based on Xilinx Ultrascale+™ FPGA Architecture**
- **30 TB/s Internal SRAM Bandwidth**

- **Highest Performance 24.5 Peak INT8 TOPs**
- **1,079,000 LUTs**

FEATURES

- HBM2 Total Capacity: 8GB
- HBM2 Total Bandwidth: 460 GB/S
- DDR Format: 2 × 16 GB 72b DIMM DDR4
- DDR Memory Capacity: 32 GB
- DDR Total Bandwidth: 38 GB/s
- Internal SRAM Capacity: 41 MB
- Internal SRAM Total Bandwidth: 30 TB/s
- PCI Express: Gen4 × 8 with CCIX
- Network Interfaces: 2 × QSFP28 (100GbE)
- Look-Up Tables (LUTs): 1,079,000
- Maximum Total Power: 225 W
- Active cooling

- SDAccel™ Developer Environment
- Vivado Design Suite
- Width: Dual Slot
- Form Factor: Full Height, Full Length

KEY APPLICATIONS

- Data Center Acceleration
- Memory-Bound Compute Intensive Applications
- Database Search Analytics
- Machine Learning Inference

MARKET SEGMENT

- Communication & Infrastructure
- Industrial

SUB MARKET

- Broadcast
- Telecom and Networking
- Wireless Infrastructure
- Embedded Computing & Storage
- Factory Automation (PLCs, I/O, Sensors & Actuators)
- Instrumentation, Test and Measurement

TECHNOLOGY SEGMENT

- High End Processing



MB85RS64VY

New Product of Automotive FRAM Family With 64 Kb



The MB85RS64VY Automotive FRAM

The MB85RS64VY is a FRAM (Ferroelectric Random Access Memory) chip in a configuration of 8,192 words x 8 bits, using the ferroelectric process and silicon gate CMOS process technologies for forming nonvolatile memory cells. MB85RS64VY adopts the Serial Peripheral Interface (SPI). It is able to retain data without using a back-up battery, as is needed for SRAM. It's memory cells can endure up to 10^{13} read/write operations, which is a significant improvement over the number of read/write operations supported by Flash memory and EEPROM.

- **Fast Overwrite: No Limitation of Block Access, No Erase Time, No Writing Pause Time**
- **High Endurance: 10 Trillion Read/Write Cycles**

- **Low Power Consumption: Charge Pump Not Necessary**
- **Operating Temperature: -40 °C to 125 °C**

FEATURES

- Bit Configuration: 8,192 Words x 8 Bits
- Serial Peripheral Interface: SPI (Serial Peripheral Interface) Correspondent to SPI Mode 0 (0, 0) and Mode 3 (1, 1)
- Operating Frequency:
 - 25 MHz (Max. at 2.7 V to 4.5 V)
 - 33 MHz (Max. at 4.5 V to 5.5 V)
- Data Retention:
 - 30 Years (+85 °C)
 - 10.9 Years (+105 °C)
 - 3.3 Years (+125 °C)
 - Under Evaluation for more than 3.3 Years (+125 °C)
- Operating Power Supply Voltage: 2.7 V to 5.5 V
- Low Power Consumption:
 - 1.8 mA (Max. at 25 MHz),
 - 2.3 mA (Max. at 33 MHz)
 - Standby Current 30 μ A (Max.)
 - Sleep Current 12 μ A (Max.)
- Package: 8-Pin Plastic SOP (FPT-8P-M10)

- 8-Pin Plastic SON (LCC-8P-M04)
- RoHS Compliant

KEY APPLICATIONS

- Direct Data Logging
- Parameter Storage
- Back-Up Memory
- Real-Time Data Writing

MARKET SEGMENT

- Automotive
- Industrial
- Lighting
- Smart Consumer & Building
- Smart Grid
- Healthcare & Wearables
- Communication & Infrastructure

SUB MARKET

- Portable Personal Electronics & Wearables
- Home & Building Control and Automation
- Audio and Video

- Heating, Ventilation and Air Conditioning
- Surveillance, Parking & Traffic Control
- Home & Building Security (Alarms, Access Control)
- Smart Grid Protection and Control
- Metering (Electricity, Flow, Heat)
- Toys, games and entertainment
- Robotics
- Point of Sales and Vending machines
- Wireless Infrastructure
- Telecom and Networking
- Connected Car, Body Electronics and Automotive Lighting
- Commercial, Construction and Agricultural Vehicles
- Medical Instruments
- Human Machine Interface
- Embedded Vision
- Embedded Computing & Storage
- ADAS, Automotive Infotainment & Cluster

TECHNOLOGY SEGMENT

- High End Processing



New Generation of e-MMC

KIOXIA Introduces a New Family of e-MMC Utilizing the Leading Edge BiCS 3D NAND



KIOXIA eMMC

e-MMC is the worldwide preferred solution for applications using embedded managed memory. Utilizing the leading-edge 3D BiCS FLASH™ technology in combination with the new Charge Trap cell structure, KIOXIA introduces the best-in-class family of reliable, easy to integrate, and cost-effective e-MMCs. Besides the existing line-up of 2D Floating Gate based e-MMC in both consumer-grade (4 to 32 GB) or in industrial-grade (8 to 64 GB), these new 3D based e-MMCs (16 to 128 GB) represent a new attractive alternative with superior price competitiveness, longevity, and faster interface.

- Utilizing 3D BiCS FLASH™
- Cost-Effective

- Faster Read & Write Performances
- Densities from 16 GB up to 128 GB

FEATURES

- JEDEC e-MMC Ver. 5.1 Standard
- HS-MMC Interface
- 16 GB, 32 GB, 64 GB, 128 GB
- 2.7 V to 3.6 V (Memory core)
- 1.7 V to 1.95 V (Interface)
- x1 / x4 / x8
- -25 °C to +85 °C
- 153-ball FBGA 11.5 mm × 13.0 mm

KEY APPLICATIONS

- HMI, CoM, Router, STB, Security Camera
- POS, PLC, IPTV, Industrial PC, Customised USB/SD
- GPON, Smart Metering Hub
- Base Station, GPS Tracker, Intelligent Audio Speaker
- Machine Control, Data Logger

MARKET SEGMENT

- Communication & Infrastructure
- Healthcare & Wearables
- Industrial

- Lighting
- Smart Consumer & Building
- Smart Grid

SUB MARKET

- Broadcast
- Telecom and Networking
- Wireless Infrastructure
- Medical Imaging
- Personal Health, Sport & Fitness
- Portable Personal Electronics & Wearables
- Elevators, Escalators, Moving Walkways
- Embedded Computing & Storage
- Embedded Vision
- Factory Automation (PLCs, I/O, Sensors & Actuators)
- Human Machine Interface
- Information Kiosk & Advertising Panels
- Instrumentation, Test and Measurement
- Motion Control, Servo Drives
- Point of Sales and Vending machines
- Professional Gaming, Amusement & Casino Machines

- Robotics
- Surveillance, Parking & Traffic Control
- Specialty Lighting (Digital Signage, Signals, Entertainment, Transportation)
- Audio and Video
- Heating, Ventilation and Air Conditioning
- Home & Building Control and Automation
- Home & Building Security (Alarms, Access Control)
- Home Appliances
- Power Supplies (AC/DC, DC/DC)
- Toys, games and entertainment
- Metering (Electricity, Flow, Heat)
- Power Conversion (Inverters, Welding, Converters)
- Power Supplies (UPS, Chargers)
- Railway (Traction, Control, etc...)
- Renewable Energy Generation
- Smart Grid Protection and Control

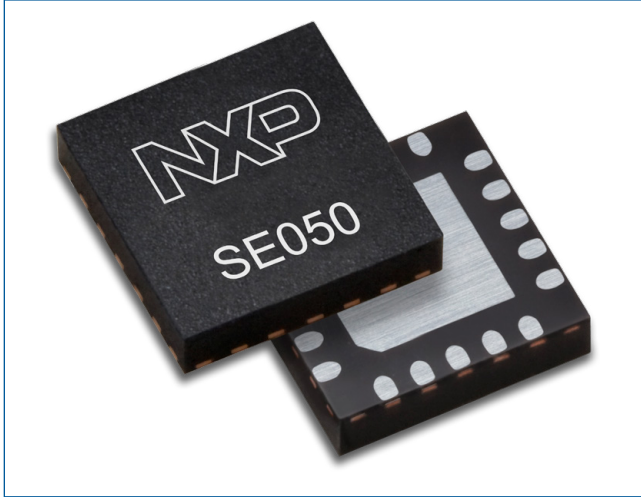
TECHNOLOGY SEGMENT

- High End Processing



EdgeLock™ SE050

Plug & Trust Secure Element Family



EdgeLock™ SE050 Secure Element

The EdgeLock™ SE050 product family of Plug & Trust devices offers enhanced CC EAL 6+ based security for unprecedented protection against the latest attack scenarios. This ready-to-use secure element for IoT device provides a root of trust at the IC level and delivers real end-to-end security – from edge to cloud – without the need to write security code. Delivered as a ready-to-use solution, the EdgeLock™ SE050 includes a complete product support package that simplifies design-in and reduces time to market.

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MICROCONTROLLERS

- **Turnkey Solution for System-level Security Without the Need to Write Security Code**
- **Easy Integration with Different MCU & MPU Platforms and OSs**
- **Plug & Trust for Fast and Easy Design-in with Complete Product Support Package**
- **Ready-to-use Example Codes for Key Use Cases**

FEATURES

- Flagship 40 nm NXP Integral Security Architecture
- CC EAL 6+ Based HW And OS as a Safe Environment to Run Pre-Installed NXP IoT Applets, Supporting Fully Encrypted Communications, and Secured Lifecycle Management
- RSA & ECC Functionalities, High Key Length, and Future Proof Curves (E.G. Brainpool, Edwards And Montgomery)
- AES & DES Encryption and Decryption
- HMAC, CMAC, SHA-1, SHA-224/256/384/512 Operations
- HKDF, MIFARE®KDF, PRF (TLS-PSK)
- Support for Main TPM Functionalities
- Secured Flash User Memory up to 50 Kb
- I²C Slave (High-Speed Mode, 3.4 Mbps), I²C Master (Fast Mode, 400 kbps)
- SCP03 (Bus Encryption and Encrypted Credential Injection on Applet and Platform Level)

- Contactless Interface for Late-Stage Parameter Configuration of Unpowered Devices
- Standard (-25 to +85 °C) and Extended Temp Range for Industrial Applications (-40 to +105 °C)
- Small Footprint HX2QFN20 Package (3 x 3 mm)

KEY APPLICATIONS

- Smart Industry
- Smart Home
- Smart Cities
- Smart Supply Chains

MARKET SEGMENT

- Communication & Infrastructure
- Industrial
- Healthcare & Wearables
- Smart Consumer & Building
- Smart Grid

SUB MARKET

- Telecom and Networking
- Broadcast
- Elevators, Escalators, Moving Walkways
- Smart Grid Protection and Control
- Information Kiosk & Advertising Panels
- Human Machine Interface
- Factory Automation (PLCs, I/O, Sensors & Actuators)
- Portable Personal Electronics & Wearables
- Personal Health, Sport & Fitness
- Medical Instruments
- Wireless Infrastructure
- Robotics
- Surveillance, Parking & Traffic Control
- Metering (Electricity, Flow, Heat)
- Home Appliances
- Home & Building Security (Alarms, Access Control)
- Asset Tracking
- Home & Building Control and Automation

TECHNOLOGY SEGMENT

- High End Processing



NCV-RSL10

Radio SoC, Ultra-Low-Power Multi-protocol Bluetooth® 5 Certified for Automotive



NCV-RSL10

The NCV-RSL10 is a member of the RSL10 family and brings one of the industry's lowest power Bluetooth® Low Energy to automotive.

The wettable flank-plated packaging, built-in data encryption, and an operating temperature range of -40 °C to +105 °C make the NCV-RSL10 automotive ready by any standard.

While maximizing energy efficiency, the NCV-RSL10 helps to enable advanced new functionalities into automotive applications, including keyless entry using a fob or smartphone, active safety and diagnostic alerts, or enhanced infotainment controls.

- **Bluetooth 5 Certified: Supports 2 Mbps Data Rate Latest Generation of Bluetooth Low Energy**
- **AEC-Q100 Qualified, PPAP Capable**

- **Industry's Lowest Power Consumption in Peak Receiving and Deep-Sleep Mode**
- **7 x 7 QFN Package With Wettable Flanks**

FEATURES

- Offers One of the Industry's Lowest Power Power Consumption in Peak Receiving and Deep Sleep Mode
- Bluetooth 5 Certified: Supports 2 Mbps Data Rates Provided by the Latest Generation of Bluetooth Low Energy
- Improved Data Security: AES128 Encryption Module Built Directly Into Hardware to Protect Device Data
- 7 x 7 QFN Wettable Flank-Plated Packaging
- Qualified for Automotive: AEC-Q100, PPAP Capable, Bluetooth 5, FCC, ETSI
- Supported Bluetooth Profiles: Proximity, Time, HID over GATT (HOG), Alert Notification, Phone Alert Status, Location and Navigation, Rezence Wireless Charging

KEY APPLICATIONS

- Automotive
- Keyless Entry
- Infotainment Control
- Active Safety
- Autonomous Driving

MARKET SEGMENT

- Automotive

SUB MARKET

- ADAS, Automotive Infotainment & Cluster
- Connected Car, Body Electronics and Automotive Lighting

TECHNOLOGY SEGMENT

- High End Processing



Renesas RA Family

32-bit MCU with Arm® Cortex®-M core



Renesas RA Family Presentation Image

Renesas Electronics unveils RA Family of 32-bit Arm® Cortex®-M microcontrollers (MCUs) with superior performance and advanced security for intelligent IoT edge applications. The RA family consist of four product series of MCUs, ranging from small mobile devices to larger, high-performance, calculation-intensive embedded system controllers. The RA Family is supported by an open and flexible middleware concept called Flexible Software Package (FSP), based on FreeRTOS. The FSP can be expanded or replaced by any other RTOS or middleware. A common DNA makes these MCUs feature and pin-compatible.

- **True Scalability & Flexible Open SW Architecture**
- **Complete IoT Security with Certified HW Secure Crypto Engine**

- **Choice of Wired (On-chip) and Wireless (Device & Partners) Communication Solutions**
- **Utilizes WW Arm® Technology Partner Network**

FEATURES

- Arm® Cortex®-M23, Arm® Cortex®-M4
- Clock frequency: 48 - 120 MHz
- 256 KB Flash - 2 MB Flash
- 32 KB SRAM - 640 KB SRAM
- 32 to 176-pin Packages
- 24-bit delta-sigma ADC
- Segment LCD, TFT-LCD
- USB, CAN, Ethernet,
- Advanced Security
- Easy Scalability and Code Reusability

KEY APPLICATIONS

- Human-Machine Interfaces (HMI)
- Smart White Goods
- IoT Edge Solutions
- Smart Home Appliances
- Battery-powered Embedded Applications

MARKET SEGMENT

- Industrial
- Healthcare & Wearables
- Smart Consumer & Building
- Smart Grid

SUB MARKET

- Medical Diagnostic and Therapy
- Medical Instruments
- Personal Health, Sport & Fitness
- Portable Personal Electronics & Wearables
- Elevators, Escalators, Moving Walkways
- Factory Automation (PLCs, I/O, Sensors & Actuators)
- Human Machine Interface
- Instrumentation, Test and Measurement
- Motion Control, Servo Drives
- Point of Sales and Vending machines
- Professional Gaming, Amusement & Casino Machines

- Robotics
- Surveillance, Parking & Traffic Control
- Heating, Ventilation and Air Conditioning
- Home & Building Control and Automation
- Home & Building Security (Alarms, Access Control)
- Home Appliances
- Toys, games and entertainment
- Metering (Electricity, Flow, Heat)
- Power Conversion (Inverters, Welding, Converters)
- Renewable Energy Generation
- Smart Grid Protection and Control

TECHNOLOGY SEGMENT

- High End Processing



STM32G4 Series

Mixed-Signal MCUs with DSP and FPU Instructions



STM32G4 Series Mixed-Signal MCUs

The STM32G4 series combines a 32-bit Arm® Cortex®-M4 core with FPU and DSP instructions, running at 170 MHz, with 3 different hardware accelerators: ART Accelerator™, CCM-SRAM routine booster, and mathematical accelerators.

STM32G4 series consists of:

The STM32G4x1 Access Line: general-purpose microcontrollers (MCUs) with an entry-level set of analog peripherals.

The STM32G4x3 Performance Line: general-purpose MCUs with the maximum number of analog peripherals.

The STM32G4x4 Hi-Res Line: high-resolution timer, complex waveform builder, and event handler (HRTIM) for digital power conversion

- **Rich Advanced Analog Peripherals (Comparator, Op-Amps, DAC)**
- **Dual-Bank Flash Memory with Error-Correcting Code (Supports In-Field Firmware Upgrades)**

- **USB Type-C Interface with Power Delivery, Including Physical Layer (PHY)**
- **A Comprehensive Set of Power-Saving Modes Allows Design of Low-Power Applications**

FEATURES

- ADC with Hardware Oversampling (16-bit Resolution)
- Securable Memory Area
- High-Resolution Timer Version 2
- AES Hardware Encryption

KEY APPLICATIONS

- Digital Power Supplies
- Advanced Motor Controls
- Lighting
- Building Automation Products

MARKET SEGMENT

- Lighting
- Industrial
- Smart Consumer & Building

SUB MARKET

- Professional Gaming, Amusement & Casino Machines
- Robotics
- Toys, games and entertainment
- Power Supplies (AC/DC, DC/DC)
- Specialty Lighting (Digital Signage, Signals, Entertainment, Transportation)

- Motion Control, Servo Drives
- Factory Automation (PLCs, I/O, Sensors & Actuators)
- Heating, Ventilation and Air Conditioning
- Lighting Drivers and Electronic Control Gears
- Home & Building Control and Automation

TECHNOLOGY SEGMENT

- High End Processing



STM32H7 Dual-Core Series

STM32H Dual Core Series of High-Performance MCUs with Arm® Cortex®-M7 and M4 Cores



STM32H7 Dual Core Series MCUs

STM32H745/755 and STM32H747/757 devices are based on the high-performance Arm® Cortex®-M7 and Cortex®-M4 32-bit RISC cores. The Cortex®-M7 core operates at up to 480 MHz and the Cortex®-M4 core at up to 240 MHz. Both cores feature a floating-point unit (FPU) which supports Arm® single and double-precision (Cortex®-M7 core) operations and conversions (IEEE 754 compliant), including a full set of DSP instructions and a memory protection unit (MPU) for enhanced application security.

- **32-Bit Arm® Cortex®-M7 With up to 480 MHz and Arm® Cortex®-M4 with up to 240 MHz**
- **Up to 2 MB of Flash and 1 MB of RAM**

- **1 x Ethernet, 2 x CAN FD, 2 x USB OTG**
- **MIPI DSI Host Including a MIPI D-PHY**

FEATURES

- Record-breaking Performance:
 - 2424 + 800 CoreMark (Cortex®-M7 at 480 MHz + Cortex®-M4 at 240 MHz)
- Dual-Core Flexible Architecture for Industrial, Security or AI Applications:
 - Accelerated Graphics, Fast Data Transfer, Advanced Peripherals
- Advanced Security Features:
 - Crypto Hash, Cortex®-M7 Security Services
- Rich Eco-System for Rapid Application Development:
 - SW Tools, HW Boards, Community and Partners

KEY APPLICATIONS

- Motor Drive and Application Control
- Industrial applications: PLC, Inverters, Circuit Breakers
- Alarm Systems, Video Intercom
- Medical Equipment

MARKET SEGMENT

- Communication & Infrastructure
- Healthcare & Wearables
- Industrial
- Lighting
- Smart Grid

SUB MARKET

- Broadcast
- Wireless Infrastructure
- Medical Imaging
- Medical Instruments
- Personal Health, Sport & Fitness
- Portable Personal Electronics & Wearables
- Embedded Computing & Storage
- Embedded Vision
- Factory Automation (PLCs, I/O, Sensors & Actuators)
- Telecom and Networking
- Human Machine Interface
- Point of Sales and Vending machines
- Professional Gaming, Amusement & Casino Machines

- Robotics
- Surveillance, Parking & Traffic Control
- Specialty Lighting (Digital Signage, Signals, Entertainment, Transportation)
- Metering (Electricity, Flow, Heat)
- Railway (Traction, Control, etc...)
- Information Kiosk & Advertising Panels
- Renewable Energy Generation

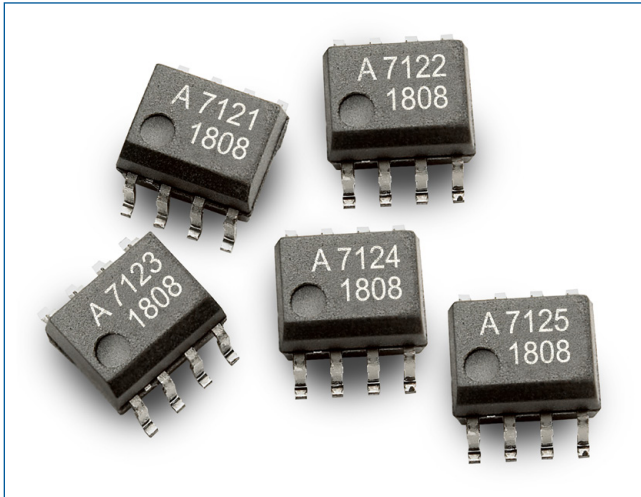
TECHNOLOGY SEGMENT

- High End Processing



ACHS-7124/7125

±40 A and ±50 A Hall Effect Sensors



ACHS Family of Current Sensors

The Broadcom® ACHS-7124/7125 product series is a fully integrated Hall effect-based isolated linear current sensor device family, designed for AC or DC current sensing in industrial, commercial, and communications systems.

Its accuracy is optimized through the close proximity of the magnetic signal to the differential Hall transducers. The internal resistance of the conductive path is 0.7 mΩ typ., resulting in very low-power losses. The terminals of the conductive path are electrically isolated from the signal leads.

The ACHS-7124/7125 product series is available in the SO-8 package.

- **Primary Conductor Resistance:** 0.7 mΩ typ.
- **Wide Operating Temperature Range:** -40 °C to 110 °C
- **Sensing current range:** ±40 A (ACHS-7124); ±50 A (ACHS-7125)
- **Output Sensitivity:** 50 mV/A

FEATURES

- Output Voltage Proportional to AC or DC Currents
- Ratiometric Output from Supply Voltage
- Single Supply Operation: 5.0 V
- Low-Noise Analog Signal Path
- Device Bandwidth Set via FILTER Pin: 80 kHz typ. Bandwidth with 1 nF Filter Capacitor
- Factory-Trimmed for Accuracy
- Extremely Stable Output Offset Voltage
- Near-Zero Magnetic Hysteresis
- Typical Total Output Error Of ±1.5 %
- More than 25 kV/μs Common-Mode Transient Immunity
- Small Footprint, Low-Profile SO-8 Package
- Worldwide Safety Approval: UL, CSA: Isolation Voltage 3 kV (RMS), 1 Minute

KEY APPLICATIONS

- Low-Power Inverter Current Sensing
- Motor Phase and Rail Current Sensing
- Solar Inverters
- Chargers and Converters
- Switching Power Supplies
- E-Bike

MARKET SEGMENT

- Industrial
- Smart Consumer & Building

SUB MARKET

- Elevators, Escalators, Moving Walkways
- Factory Automation (PLCs, I/O, Sensors & Actuators)
- Motion Control, Servo Drives
- Robotics
- Heating, Ventilation and Air Conditioning
- Home & Building Control and Automation
- Power Supplies (AC/DC, DC/DC)

TECHNOLOGY SEGMENT

- Analog & Power



ACNU-250L 1 MBd Digital Optocoupler

in 11 mm Stretched S08 Package



ACNU-250L Fast Optocoupler

The ACNU-250L is a single-channel fast optocoupler device in an 11-mm stretched SO-8 package. The device is equipped with an insulating layer between the LED and an integrated photo detector to provide electrical insulation between the input and the output. Having separate connections for the photodiode bias and output transistor collector reduces the base-collector capacitance and greatly enhances the data speed compared to a conventional photo-transistor coupler. It is suitable for isolated communication logic interfaces, industrial applications, renewable inverters, medical equipment, etc.

- **TTL Compatible**
- **Guaranteed AC and DC Performance Over Wide Temperature: -40 °C to 105 °C**
- **Open-Collector Output**
- **11 mm Creepage and 10.5 mm Clearance in Stretched SO-8 Package**

FEATURES

- Wide Operating V_{CC} Range: 3 to 24 V
- Internal Clearance (DTI): 0.5 mm
- High Speed: 1 MBd/s
- 40 kV/ μ s Minimum Common Mode Rejection (CMR) at $V_{CM} = 1500$ V
- Safety and Regulatory Approvals:
 - UL 1577 Recognized: 5,000 V_{RMS} for 1 Minute
 - CSA Approved
 - IEC/EN 60747-5-5
 - Approved for Reinforced Insulation: $V_{IORM} = 1,414 V_{PEAK}$

KEY APPLICATIONS

- Communication Interface
- Feedback Elements in Switching Power Supplies
- Digital isolation for A/D, D/A Conversion
- High Voltage Power Systems (i.e., 600 V_{AC} Drives)
- Renewable Energy Inverters (i.e., 1 kV DC Solar Inverters)
- Medical imaging and Patient Monitoring

MARKET SEGMENT

- Industrial
- Smart Consumer & Building
- Smart Grid

SUB MARKET

- Elevators, Escalators, Moving Walkways
- Factory Automation (PLCs, I/O, Sensors & Actuators)
- Motion Control, Servo Drives
- Robotics
- Power Conversion (Inverters, Welding, Converters)
- Home & Building Security (Alarms, Access Control)
- Home & Building Control and Automation
- Heating, Ventilation and Air Conditioning
- Power Supplies (UPS, Chargers)
- Railway (Traction, Control, etc. ...)
- Renewable Energy Generation
- Smart Grid Protection and Control

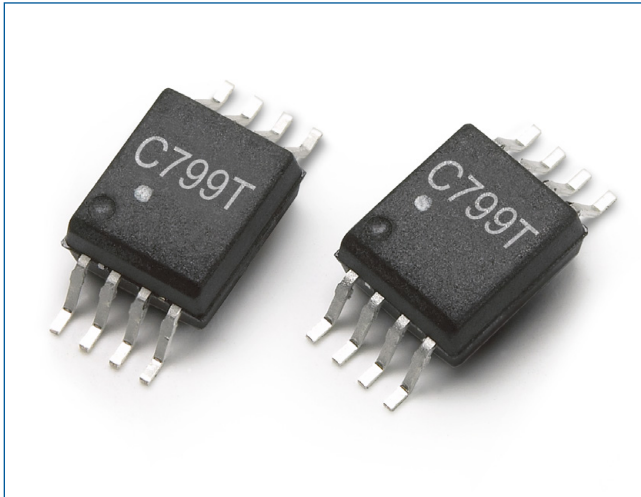
TECHNOLOGY SEGMENT

- Analog & Power



ACPL-C799T

Automotive R²Coupler™ Optically Isolated Sigma-Delta Modulator



ACPL C799T

The Broadcom® ACPL-C799T is a 1-bit, second-order sigma-delta ($\Sigma\Delta$) modulator which converts an analog input signal into a high-speed data stream with galvanic isolation based on optical coupling technology. This isolated ADC delivers reliability, small size, superior isolation, and over-temperature performance, allowing motor drive designers to accurately measure current. Broadcom R²Coupler™ isolation products provide the reinforced insulation and reliability needed for critical automotive and high-temperature industrial applications, in a compact SSO-8 package

- **Qualified to AEC-Q100 Grade 1 Test Guidelines**
- **1-Bit, Second-Order Sigma-Delta Modulator**
- **Differential Inputs of ± 50 mV**
- **10 MHz Internal Clock**

FEATURES

- 16-bit Resolution, No Missing Codes (12 Bits ENOB)
- Signal-to-Noise Ratio: 77 dB Typ.
- Compact, Surface-mount SSO-8 Package
- Superior Optical Isolation and Insulation
- Common-Mode Transient Immunity: 25 kV/ μ s
- Safety and Regulatory Approval:
 - IEC/EN/DIN EN 60747-5-5: 1414 V_{PEAK} Working Insulation Voltage
 - UL 1577: 5000 V_{RMS}/1 Minute Isolation Voltage
 - CSA: Component Acceptance Notice #5

KEY APPLICATIONS

- Automotive Battery Pack Current Sensing
- Automotive Motor Phase and Rail Current Sensing
- Automotive Motor Inverter DC Bus Current Sensing
- Automotive DC/DC Converter Current Sensing
- Automotive AC/DC Charger Current Sensing
- General Purpose Current and Voltage Sensing

MARKET SEGMENT

- Automotive

SUB MARKET

- Automotive Power Train and Chassis

TECHNOLOGY SEGMENT

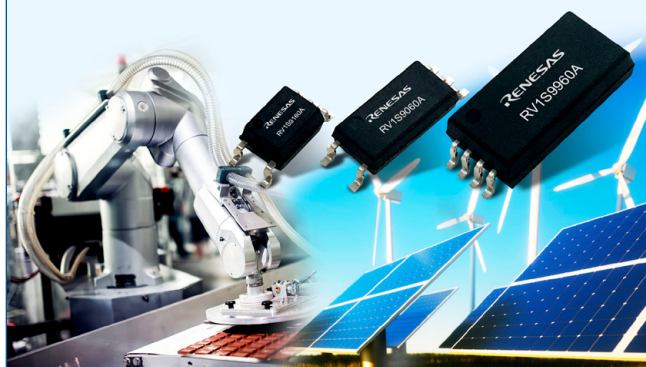
- Analog & Power



Photocoupler RV1S9x60A

Toward Realization of Low Power Consumption and High Speed Communication Equipment

Renesas 15 Mbps Photocouplers Withstand Harsh Operating Environments



RV1S9x60A Family

Today's Industrial equipment trend is toward smaller footprints and greater energy conservation and cost savings. Along with this, the temperature rise that results from a high-density PCB layout and the noise generated due to high-speed power devices creates problems for system designers. The RV1S9x60A photocouplers solve these problems with three key features: low threshold input current (IFHL), high operational temperature, and high noise tolerance to protect MCUs and other logic circuits from high voltage transients when the photocoupler transfers high-speed input signals.

- **High speed: 15 Mbps**
- **Low Current Drive: IFHL 2 mA Max. (RV1S9160A)**
- **Noise Tolerance: CMR 50 kV/μs Min.**
- **Packages: SO-5 (RV1S9160A), LSO-5 (RV1S9060A), LSDIP (RV1S9960A)**

FEATURES

- Propagation Delay Time (tPHL, tPLH): 60 ns Max.
- Pulse Width Distortion (PWD): 20 ns Max.
- Propagation Delay Skew (tPSK): 25 ns Max.
- Low Input Drive Current (IFHL): 2 mA Max. (RV1S9160A), 2.2 mA Max. (RV1S9060A), 3.8 mA Max. (RV1S9960A)
- Low Output IC Circuit Current (IDD): 2 mA Max.
- Supply Voltage (VDD): 2.7 V to 5.5 V
- High Temperature Operation: 125 °C (RV1S9160A, RV1S9060A), 110 °C (RV1S9960A)
- Isolation Voltage: 3.75 kV RMS (RV1S9160A), 5 kV RMS (RV1S9060A), 7.5 kV RMS (RV1S9960A)

- Creepage Distance, Clearance Distance: 4.2 mm (RV1S9160A), 8 mm (RV1S9060A), 14.5 mm (RV1S9960A)
- CTI (Comparative Tracking Index) : 400 (RV1S9160A, RV1S9060A), 175 (RV1S9960A)
- Safety Standards Approval: UL (UL1577), CSA (CAN/CSA-C22.2 No.62368-1), VDE (DIN EN 60747-5-5) (Option)

KEY APPLICATIONS

- Inverters

MARKET SEGMENT

- Smart Grid
- Industrial

SUB MARKET

- Robotics
- Factory Automation (PLCs, I/O, Sensors & Actuators)
- Renewable Energy Generation
- Motion Control, Servo Drives

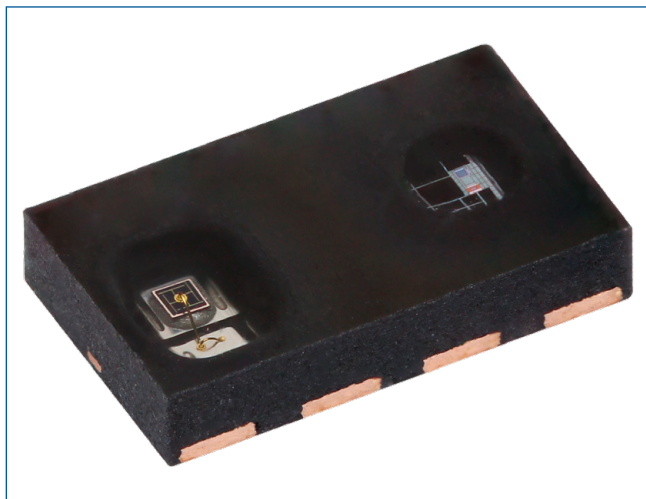
TECHNOLOGY SEGMENT

- Analog & Power



VCNL4030X01

Automotive Grade Proximity and Ambient Light Sensor with Four Different Slave Address



VCNL4030X01

VCNL4030X01 integrates a proximity sensor, ambient light sensor, and a high power IRED into one small package. It incorporates photodiodes, amplifiers, and analog to digital converting circuits into a single chip by CMOS process. The 16-bit high resolution ALS for excellent sensing capabilities with sufficient selections to fulfill most applications whether dark or high transparency lens design. Both ALS and PS offer a programmable interrupt to save power on the microcontroller. The proximity sensor features an intelligent cancellation scheme, so that cross talk is eliminated effectively.

- **AEC-Q101 qualified**
- **Integrated modules: IRED, ALS, proximity sensor (PS), and signal conditioning IC**
- **Orderable in four different slave addresses**
- **Filtrion™ technology adoption for robust background light cancellation**

FEATURES

- Immunity to red glow (940 nm IRED)
- Programmable IRED sink current
- Intelligent cancellation to reduce cross talk phenomenon
- Smart persistence scheme to reduce PS response time
- Selectable for 12- / 16-bit PS output data
- High accuracy of ALS $\pm 10\%$
- Fluorescent light flicker immunity
- Spectrum close to real human eye responses
- Selectable maximum detection range (262 / 524 / 1048 / 2096 / 4192) lux with highest sensitivity 0.004 lux/step
- Programmable interrupt function for ALS and PS with upper and lower thresholds
- Adjustable persistence to prevent false triggers for ALS and PS

KEY APPLICATIONS

- Automotive for presence detection
- Collision detection in robots and toys
- Dimming control for consumer, computing, industrial
- Mobile devices (e.g. smart phones, tablets)

MARKET SEGMENT

- Automotive
- Healthcare & Wearables
- Industrial
- Lighting
- Smart Consumer & Building

SUB MARKET

- ADAS, Automotive Infotainment & Cluster
- Home Appliances
- Professional Gaming, Amusement & Casino Machines

- Point of Sales and Vending machines
- Instrumentation, Test and Measurement
- Information Kiosk & Advertising Panels
- Human Machine Interface
- Portable Personal Electronics & Wearables
- Personal Health, Sport & Fitness
- Toys, games and entertainment

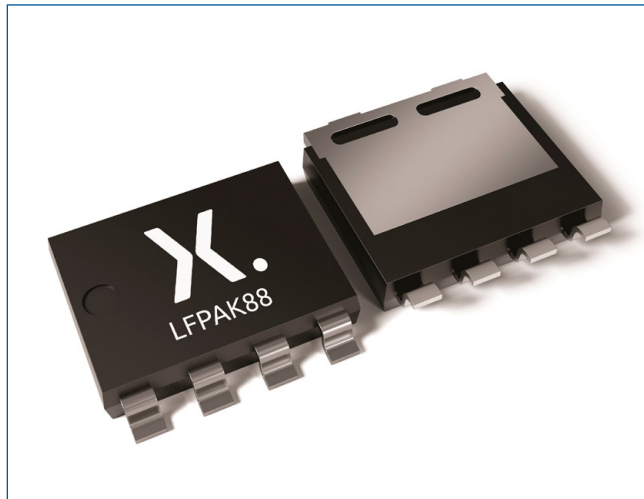
TECHNOLOGY SEGMENT

- Smart Sensing & Connectivity



MOSFETs in LPAK88

Driving Power Density to the Next Level



LPAK88

Providing a true alternative to D²PAK, Nexperia's LPAK88 delivers industry-leading power density up to 48 times when compared to D²PAK devices, in a truly innovative 8 x 8 mm footprint. Delivering two times higher continuous current ratings (up to 425 A), ultimate thermal performance and reliability, and up to 60 % space efficiency, making LPAK88 the MOSFET of choice for the most challenging new designs. Using the latest silicon technology resulting in 40 V MOSFETs delivering a low $R_{DS(ON)}$ of 0.7 m Ω . Available in both automotive AEC-Q101 (BUK) and industrial grades (PSMN).

- **Compact, Space Saving Footprint**
- **Ultra-low On-Resistance**

- **Reliable and Manufacturable**
- **High Current Rating**

FEATURES

- Compact Footprint (D²PAK Replacement; Low Profile)
- Manufacturability & Robustness (Flexible Leads for Temp Cycling Reliability; Compatible with SMD Soldering and AOI)
- High-Performance Silicon (0.7 m Ω Trench 9 40 V; Improved SOA)
- Copper Clip:
 - tested High $I_{D(MAX)}$ Rating (425 A)
 - Low Inductance (1 nH)
 - Current Spreading
 - Low $R_{DS(ON)}$
- Low Thermal Resistance:
 - Low $R_{th(j-mb)}$ Typ. (0.25 K/W)
- Qualification:
 - AEC-Q101
 - +175 °C Rating
 - MSL1
 - Halogen-Free

KEY APPLICATIONS

- 12 V Automotive Systems
- 48 V DC/DC Systems (on 12 V Secondary Side)
- Higher-Power Motors, Lamps, and Solenoid Control
- Reverse Polarity Protection
- LED Lighting
- Ultra-High Performance Power Switching
- Brushless DC motor control
- Synchronous Rectifier in High-Power AC-DC Applications
- Battery Protection
- eFuse and Load Switch
- Hotswap / In-Rush Current Management

MARKET SEGMENT

- Automotive
- Industrial
- Communication & Infrastructure
- Smart Consumer & Building
- Lighting
- Smart Grid
- Hi-Rel

SUB MARKET

- Motion Control, Servo Drives
- ADAS, Automotive Infotainment & Cluster
- Commercial, Construction and Agricultural Vehicles
- Connected Car, Body Electronics and Automotive Lighting
- Home Appliances
- Factory Automation (PLCs, I/O, Sensors & Actuators)
- Robotics
- Telecom and Networking
- Wireless Infrastructure
- Power Conversion (Inverters, Welding, Converters)
- Power Supplies (UPS, Chargers)
- Renewable Energy Generation
- Smart Grid Protection and Control
- Heating, Ventilation and Air Conditioning
- Home & Building Control and Automation
- Automotive Power Train and Chassis

TECHNOLOGY SEGMENT

- Analog & Power



PF8100/PF8200 PMIC series

PF8100/PF8200 PMICs for Automotive and Industrial High-Performance Application Processors



PF8200

The PF8100/PF8101/PF8200/PF8201 PMIC family is designed for high-performance processing applications. Two versions are available: The PF8100/PF8101 are the basic versions of this product with power management and digital control for systems not requiring ASIL-B compliance.

The PF8200/PF8201 with functional safety to comply with the ISO 26262 standard, provides a powerful and flexible solution for ASIL-B automotive applications.

This family of PMICs is ideal for i.MX 8 i.MX 8X and S32V processor-based applications and suitable for Layerscape LS1043A and other high-performance processors.

- **High Power, High Efficiency**
- **Proven and Robust Design**

- **Scalable**
- **Minimize EMC**

FEATURES

- V_{IN} 2.7 to 5.5 V
- Up to 6 Bucks from 0.4 to 1.8 V, 2.5 A (Master/Slave)
- One Buck 1.2 to 4.5 V Independent
- Up to 4 LDOs from 1.5 to 5 V
- Operating Ambient Temperature from -40° C to up to 105° C (150° C T_J)
- Prog Freq., Dynamic Freq. Spread Spectrum, External Clock Synchronization
- Up to 32 Channel AMUX, OverVoltage Protection, UnderVoltage Protection
- Consumer Grade, QM or ASIL-B Safety Level
- 8 x 8 mm 56-LD QFN-EP

KEY APPLICATIONS

- Infotainment
- eCockpit
- Telematics, V2X and Smart Antenna
- Automotive Vision Systems
- Advanced Industrial HMI and Control
- Smart Home Gateway
- UAV Vision and Advanced Sensing

MARKET SEGMENT

- Automotive
- Industrial

SUB MARKET

- ADAS, Automotive Infotainment & Cluster
- Professional Gaming, Amusement & Casino Machines
- Instrumentation, Test and Measurement
- Embedded Computing & Storage
- Point of Sales and Vending machines
- Information Kiosk & Advertising Panels
- Human Machine Interface
- Embedded Vision
- Connected Car, Body Electronics and Automotive Lighting
- Surveillance, Parking & Traffic Control

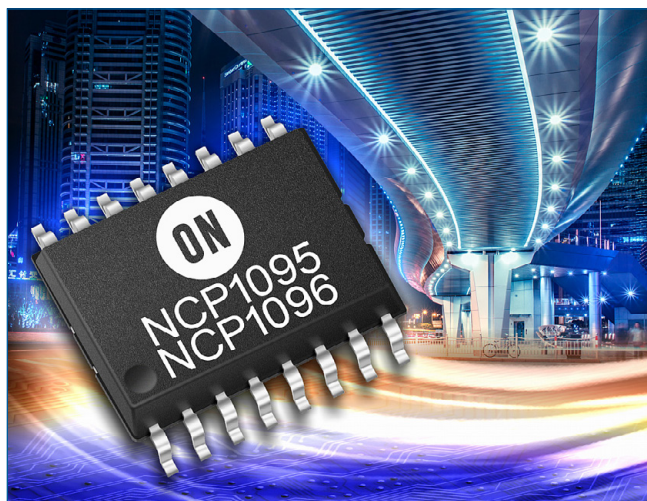
TECHNOLOGY SEGMENT

- Analog & Power



NCP1096

Power Over Ethernet (PoE) Powered Device (PD) Interface Controller IEEE 802.3bt



NCP1095-96-Hires.jpg

The Power Over Ethernet (PoE) Powered Device (PD) Interface Controller NCP1096 contains all features needed to implement an IEEE.3bt, IEEE 802.3af, and/or IEEE 802.3at application. This includes detection, classification, and current limiting during the inrush phase. The NCP1096 supports high power applications up to 90W with an integrated hot swap FET. A power good and auxiliary power supply detection pin guarantee a proper enabling or disabling of the DC/DC converter to comply with type I, II, III and IV operation.

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POWER MANAGEMENT

- **IEEE 802.3bt compliant, supporting high power applications up to 90W**
- **Integrated hot swap transistor & current sense resistor**
- **Auxiliary power supply detection feature and power good pin**
- **Inrush Current Limiting, Current and Temperature Protection Features**

FEATURES

- 802.3bt UHP 90W compliant PoE PD device
- Classification
 - 5 finger (type 1, 2, 3 and 4 PSE)
 - Auto-classification
- Integrated hot swap transistor & current sense resistor, Industry lowest $R_{ds(on)}$ < 70 mΩ @ $T_j = 125^\circ\text{C}$
- Fixed inrush current
- Standard UVLO
- Over current protection / Over temperature protection
- Interface to microcontroller
 - Classification result
 - LCF for Short maintain power signature
- Interface to external DC/DC, Power Good
- Short MPS (Maintain Power Signature)
- Auxiliary power supply detection, Disable pass switch & back-feed protection
- TSSOP-16 package with exposed pad

KEY APPLICATIONS

- Voice over IP
- Video conferencing
- Wireless access points
- IP camera
- Mini base stations
- USB-PD bridge
- Point of sales/retail
- Industrial (motor control units)
- LED lighting

MARKET SEGMENT

- Communication & Infrastructure
- Industrial
- Lighting
- Smart Consumer & Building

SUB MARKET

- Telecom and Networking
- Point of Sales and Vending machines
- Motion Control, Servo Drives
- Home & Building Security (Alarms, Access Control)

- Home & Building Control and Automation
- Audio and Video
- Specialty Lighting (Digital Signage, Signals, Entertainment, Transportation)
- Information Kiosk & Advertising Panels
- Human Machine Interface
- Factory Automation (PLCs, I/O, Sensors & Actuators)
- Embedded Vision
- Wireless Infrastructure
- Surveillance, Parking & Traffic Control

TECHNOLOGY SEGMENT

- Analog & Power



NCP51820

Half-Bridge Gate Driver for GaN Power Switches



NCP51820-Hires

The NCP51820, a high-speed gate driver, is designed to meet the requirements of driving enhancement mode (e-mode) and gate injection transistor (GIT) GaN HEMT power switches in offline, half-bridge power topologies.

Both drive stages employ a voltage regulator to maintain the gate-source drive signal and to fully protect the gate of the GaN power transistor. The gate driver offers short and matched propagation delays as well as -3.5 V to +650 V (typical) common-mode voltage range for the high-side drive. It offers protection functions based on voltage monitoring and thermal shutdown.

- 650 V, High-Side and Low-Side Gate Driver
- Fast and Matched Propagation Delay

- Regulated Gate Driver with Independent Output Stages
- QFN 4 x 4 mm Optimized Pinout Package

FEATURES

- Propagation Delay of 50 ns max.
- Matched Propagation Delay of 5 ns max.
- Level Shift Technology Providing -3.5 V to +650 V (typ.) Common-Mode Voltage Range for the High-Side Drive and -3.5 V to +3.5 V Common-Mode Voltage Range for the Low-Side Drive
- 200 V/ns (dV/dt) Rating for all SW and PGND Referenced Circuitry
- Separate Source and Sink Output Pin
- Regulated 5.2 V Gate Driver with Independent UVLO for High-Side and Low-Side Output Stages
- QFN 4 x 4 mm Packaging with Optimized Pinout

KEY APPLICATIONS

- Resonant Converters
- Half Bridge and Full Bridge converters
- Active Clamp Flyback Converters
- Totem Pole Bridgeless PFC
- Industrial Inverter and Motor Drive
- Server/Cloud Data-Center Offline Power
- Power Supply for OLED TV
- High Power Adapters and Power Supplies
- USD PD Cellphone and Notebook Travel Adapter

MARKET SEGMENT

- Communication & Infrastructure
- Industrial
- Smart Consumer & Building
- Smart Grid

SUB MARKET

- Telecom and Networking
- Wireless Infrastructure
- Motion Control, Servo Drives
- Power Supplies (AC/DC, DC/DC)
- Power Supplies (UPS, Chargers)
- Power Conversion (Inverters, Welding, Converters)

TECHNOLOGY SEGMENT

- Analog & Power



GaN-Based InnoSwitch3

Advanced GaN Technology Yields Significant Increase in Power and Efficiency



InnoSwitch3 Presentation Photo

The Quasi-resonant InnoSwitch3-CP, InnoSwitch3-EP, and InnoSwitch3-Pro ICs combine primary, secondary, and feedback circuits in a single surface-mounted package. In the newly released family members, GaN switches replace the traditional silicon high-voltage transistors on the primary side of the IC, reducing conduction losses when current is flowing, and considerably reducing switching losses during operation. This results in substantially less wasted energy and therefore increased efficiency and power delivery from the space-saving InSOP-24D package.

- **Up To 95% Efficiency Across Full Load Range, up to 100 W in Adapter Without Heatsink**
- **Using an Internally Developed High-Voltage GaN Switch Technology**
- **Integrated FluxLink™, HIPOT-isolated, Feedback Link**
- **Space-saving InSOP-24D Package**

FEATURES

- Quasi-Resonant (QR)/CCM Flyback Controller, High-voltage Primary-side PowiGaN™ Switch, Secondary-side Sensing and Sync. Rectification Driver
- Integrated FluxLink™, HIPOT-isolated, Feedback Link
- Easily Interfaces to Load-directed and Fast-charge Protocol ICs
- Constant Power (CP) Profile Minimizes Charging Time with Continuous Adjustment of Output Current and Voltage
- Accurate CV/CC/CP, Independent of External Components
- External IS Resistor Allows Custom CC Programming
- Instantaneous Transient Response with 0% – 100% – 0% Load Step
- Digitally Controlled via I²C Interface (Pro)
- Dynamic Adjustment of Power Supply Voltage and Current (Pro)

- Telemetry Status Read-back with Processor Interrupt (Pro)
- Comprehensive Set of Configurable Features (Pro)

KEY APPLICATIONS

- High-Efficiency Fly-back Designs
- High Current Chargers/Adapters
- USB-PD
- Set-top Boxes
- Appliances
- Networking

MARKET SEGMENT

- Industrial
- Automotive
- Communication & Infrastructure
- Smart Consumer & Building
- Smart Grid

SUB MARKET

- Automotive Power Train and Chassis
- Audio and Video
- Heating, Ventilation and Air Conditioning
- Home & Building Control and Automation
- Home Appliances
- Power Supplies (AC/DC, DC/DC)
- Toys, games and entertainment
- Power Conversion (Inverters, Welding, Converters)
- Power Supplies (UPS, Chargers)
- Renewable Energy Generation
- Robotics
- Wireless Infrastructure
- Elevators, Escalators, Moving Walkways
- Factory Automation (PLCs, I/O, Sensors & Actuators)
- Motion Control, Servo Drives
- Point of Sales and Vending machines

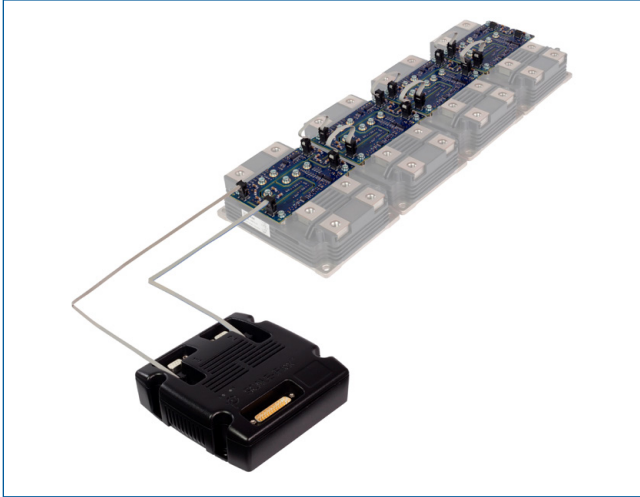
TECHNOLOGY SEGMENT

- Analog & Power



SCALE-iFlex™ Family

Gate Driver Family for 1.2 kV to 3.3 kV IGBT & SiC Dual-Channel Power Modules



SCALE-iFlex Full Assembly

The SCALE-iFlex™ gate driver family consists of a central Isolated Master Control (IMC) 2SI0400T2xxC and up to four Module Adapted Gate Drivers (MAGs) 2SM0120D2xxC. The IMC is designed for operation of power modules with a blocking voltage of up to 3300 V, whereas the MAGs are available in variants optimized for power modules from different suppliers. SCALE-iFlex enables easy paralleling of up to four power modules, providing high flexibility and system scalability with minimum development.

Integrated NTC temperature and DC-link voltage measurements are protected by reinforced isolation.

- **Ready-to-use Gate Driver System (IMC + MAGs)**
- **Easy Paralleling Of up to 4 Modules**

- **Overvoltage Protection by Advanced Soft Shut Down**
- **Supporting IGBT, Hybrid (Si-IGBT/SiC-Diode) and Full-SiC MOSFET Power Modules**

FEATURES

- Electrical Primary-Side Interface with Reinforced Isolation
- Wide Input Supply Voltage Range +15 V to +48 V
- 40 °C to +85 °C Operating Ambient Temperature
- Low Component Count, High MTBF
- High Mechanical Robustness Against Shock and Vibration
- Undervoltage Lock-out (UVLO) Protection for Primary-Side (Low Voltage Side) and Secondary-Side (High Voltage Side)
- Short-Circuit Protection
- NTC Temperature Sensing with Reinforced Isolated, Digital Output Signal (PWM-Coded)

- DC-Link Voltage Measurement with Reinforced Isolated, Digital Output Signal (PWM-Coded)
- Factory Conformal Coating
- 100 % Production Partial Discharge Test
- 100 % Production HIPOT Compliance Testing
- Reinforced Insulation in Accordance With EN 50124-1 and IEC 61800-5-1

KEY APPLICATIONS

- Railway Main and Auxiliary Inverters
- Wind Converters
- Centralized Photovoltaic Converters
- Industrial Drivers
- Other Industrial Applications

MARKET SEGMENT

- Industrial
- Smart Grid

SUB MARKET

- Motion Control, Servo Drives
- Renewable Energy Generation
- Railway (Traction, Control, etc...)
- Power Conversion (Inverters, Welding, Converters)

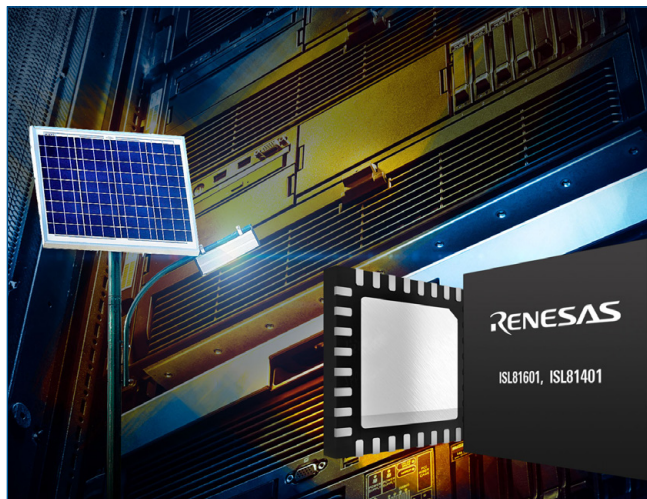
TECHNOLOGY SEGMENT

- Analog & Power



ISL81601

60 V Bidirectional 4-Switch Synchronous Buck-Boost Controller



ISL81601

The ISL81601 by Renesas is a "UPS on a chip": a bi-directional buck-boost controller that can both charge a battery and when the input power is lost, direct the battery power to a load. The ISL81601 automatically steps voltage up or down, always supplying the target load voltage, even when the input varies above and below that target. With current sense amplifiers on both input and output, the ISL81601 protects against faults, regardless of the direction of power flow. The ISL81601 has a wide input range of 4.5 V to 60 V and is perfect for industrial battery systems up to 48 V.

- **Buck-Boost Controller Steps Voltage Up or Down with Only One Inductor**
- **On-the-fly Operation Dynamically Controls Voltage and Current Flow in Two Directions**

- **Proprietary Algorithm Enables Clean Buck-Boost Transitions**
- **Wide Input Voltage Range: 4.5 V to 60 V**

FEATURES

- Wide Output Voltage Range: 0.8 V to 60 V
- Supports Pre-biased Output with Synchronous Rectifier Soft-Start
- Programmable Frequency: 100 kHz to 600 kHz
- Supports Parallel Operation Current Sharing with Cascade Phase Interleaving
- External Sync with Clock Out or Frequency Dithering
- External Bias for Higher Efficiency Supports 8 V to 36 V Input
- Output and Input Current Monitor
- Selectable PWM Mode Operation between PWM/DE/Burst Modes
- Accurate EN/UVLO and PGOOD Indicator
- Low Shutdown Current: 2.7 μ A

- Complete Protection: OCP, SCP, OVP, OTP, and UVP
- Dual-Level OCP Protection with Average Current and Pulse-By-Pulse Peak Current Limit
- Selectable OCP Response with Either Hiccup or Constant Current Mode
- Negative Pulse-by-Pulse Peak Current Limit

KEY APPLICATIONS

- Battery - Solar Systems

MARKET SEGMENT

- Automotive
- Communication & Infrastructure
- Healthcare & Wearables
- Industrial
- Smart Consumer & Building
- Smart Grid

SUB MARKET

- ADAS, Automotive Infotainment & Cluster
- Telecom and Networking
- Medical Instruments
- Factory Automation (PLCs, I/O, Sensors & Actuators)
- Robotics
- Home & Building Control and Automation
- Power Supplies (UPS, Chargers)
- Renewable Energy Generation

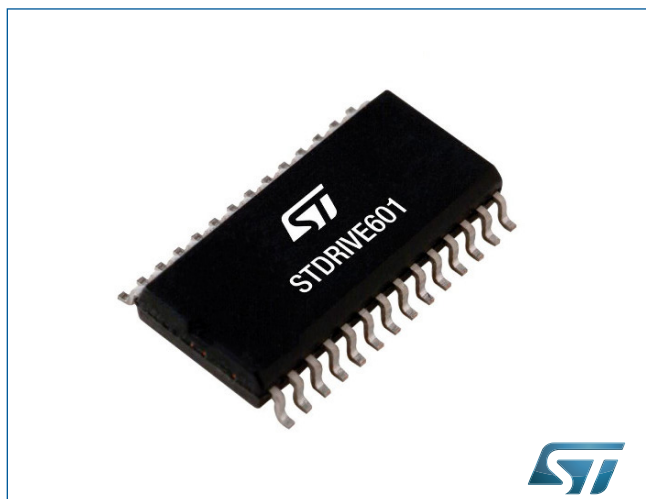
TECHNOLOGY SEGMENT

- Analog & Power



STDRIVE601

Triple Half-Bridge High-Voltage BLDC Gate Driver



STDRIVE601

The STDRIVE601 is a high voltage device manufactured with BCD6s offline technology. It is a single-chip with three half-bridge gate drivers for N-channel power MOSFETs or IGBTs suitable for 3-phase applications. All device outputs can sink and source 350 mA and 200 mA respectively. Prevention from cross-conduction is ensured by interlocking and deadtime function.

- High Voltage Rail up to 600 V
- Transient Immunity (dV/dt): ± 50 V/ns

- Gate Driving Voltage Range: 9 V to 20 V
- Overall Input-Output Propagation Delay: 85 ns

FEATURES

- Driver Current Capability: STDRIVE601:
 - 200 mA Source Current at 25 °C
 - 350 mA Sink Current at 25 °C
- Matched Propagation Delay for All Channels
- 3.3 V, 5 V TTL/CMOS Inputs with Hysteresis
- Integrated Bootstrap Diodes
- Comparator for Fast Overcurrent Protection
- Smart Shutdown Function
- Interlocking and Deadtime Function
- Dedicated Enable Pin
- UVLO Function on Low-Side and High-Side

KEY APPLICATIONS

- 3-Phase Motor Driver
- Industrial Drives and Fans
- Inverters
- Home Appliances

MARKET SEGMENT

- Industrial
- Smart Grid

SUB MARKET

- Factory Automation (PLCs, I/O, Sensors & Actuators)
- Elevators, Escalators, Moving Walkways
- Motion Control, Servo Drives
- Railway (Traction, Control, etc...)

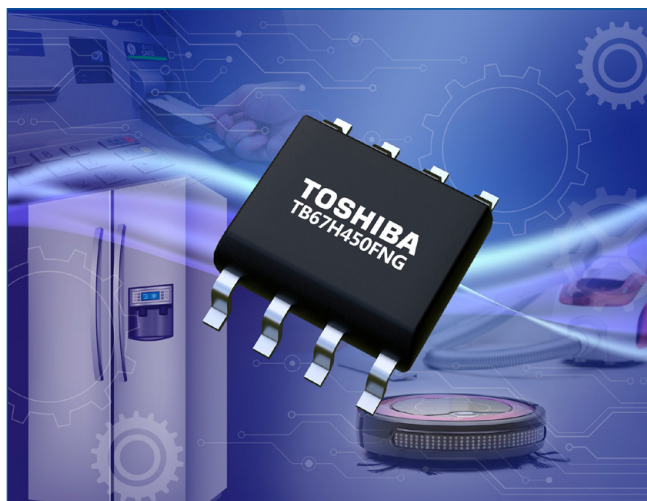
TECHNOLOGY SEGMENT

- Analog & Power



TB67H450FNG

Brushed DC Motor Driver with popular pin-assignment HSOP8 package



Toshiba_TB67H450FNG

Toshiba Electronic Devices & Storage Corporation has launched the TB67H450FNG, the latest addition to its line-up of brushed DC motor driver ICs. The new product with a maximum rating of 50 V and 3.5 A* drives motors with a wide range of operating voltage. It also offers a small HSOP surface-mount package with a popular pin-assignment that enhances the product sourcing possibility. Mass production already started.

** Actual driven motor current depends on the working environment and factors such as ambient temperature and power supply voltage.*

- **Wide Operating Voltage Range**
- **Low Standby Current**

- **Small HTSSOP-8 Package, Only 4.9 x 6.0 mm**
- **Built-in Error Detection**

FEATURES

- 8-pin package:
 - Packaged in an HSOP-8 package
- Power saving:
 - $I_M = 1\mu A$ (Max) at $V_M = 24 V$, $T_A = 25^\circ C$
- Low ON Resistance:
 - $R_{DS(ON)} (H + L) = 0.6 \Omega$ (Typ.)
- Wide Operating Voltage:
 - $V_M = 4.5$ to $44 V$
- Constant Current:
 - Adjustable With VREF Voltage and Sense Resistor
- Built-in Error Detection:
 - ISD, TSD, UVLO
- Very Small Footprint at High Current Capability
- Flexibility in the Design

- Reduction of Unnecessary Wasting of Power
- Reduced PCB Size While Keeping High Current Drive
- Usable for Different Types of Applications

KEY APPLICATIONS

- Industrial Equipment, OA Equipment and Banking Terminals
- Home Appliances incl. Robot Vacuum Cleaners
- Battery Powered Devices
- Devices Using 5V USB Power Supplies
- Electronic Locks and Household Small Robots

MARKET SEGMENT

- Industrial
- Smart Consumer & Building

SUB MARKET

- Factory Automation (PLCs, I/O, Sensors & Actuators)
- Home Appliances
- Toys, games and entertainment
- Robotics

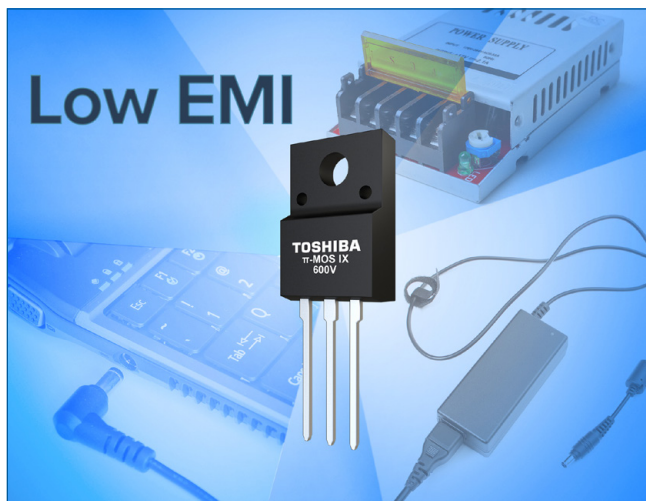
TECHNOLOGY SEGMENT

- Analog & Power



TK650A60F

New series of 600 V planar MOSFETs
(π -MOS IX)



Toshiba TK650A60F

The TK650A60F, a 600 V planar power MOSFET π -MOS IX series products come with optimized chip design. The π -MOS IX series provides 5 dB lower peak EMI noise* than the current π -MOS VII series while maintaining the same level of efficiency. It offers greater design flexibility and therefore helps to reduce design workloads. In addition, the π -MOS IX series has the same rated avalanche current and rated drain current (DC), making it simple to replace existing MOSFETs.

**Compared between the conventional product TK10A60D and the new product TK750A60F, 65 W laptop PC adapter in the 200-MHz region*

- New Generation Planar Power MOSFETs Using π -MOS IX
- Combines High Efficiency and Low Noise

- Rated Avalanche Current Equivalent to the Rated Drain Current
- Lower Peak EMI

FEATURES

- New Generation Planar Power MOSFETs Using π -MOS IX
- Combines High Efficiency and Low Noise
- Rated Avalanche Current Equivalent to the Rated Drain Current

KEY APPLICATIONS

- Small to Medium Switching Power Supplies
- Lighting Power Solutions
- AC Dapters for Laptop PCs, Game Consoles, Chargers, etc.

MARKET SEGMENT

- Smart Consumer & Building
- Industrial
- Lighting

SUB MARKET

- Power Supplies (AC/DC, DC/DC)
- Toys, games and entertainment
- Lighting Drivers and Electronic Control Gears

TECHNOLOGY SEGMENT

- Analog & Power



i.MX 7ULP

Ultra-Low-Power Platform for Portable Applications

32

PROCESSOR



i.MX 7ULP

The i.MX 7ULP represents NXP's latest achievement in ultra-low-power processing for long battery life, targeted for portable and low-power devices.

This device is built upon the heterogeneous asymmetric architecture utilizing ARM® Cortex®-A7 and ARM® Cortex®-M4 cores, with separate isolated domains, providing the ultimate flexibility by enabling a single-chip solution that can run sophisticated operating systems and provide real-time responsiveness.

The i.MX 7ULP features 2D and 3D GPUs, up to 32-bit LPDDR2/LPDDR3 and a number of other interfaces for connecting any kind of peripherals.

- **Ultra Low-Power**
- **Heterogeneous Domain Computing**

- **Efficient 2D/3D Graphics**
- **Memory Options**

FEATURES

- ARM® Cortex®-A7 & ARM® Cortex®-M4
- GC7000 nanoULTRA GPU: OpenGL 2.0/OpenVG
- GC320 Composition Engine
- Independent Real-time Domain
- Ultra-Low Run Current
- QSPI (on the fly decryption)
- 32-bit LPDDR2/3 at 380MHz
- eMMC 5.0/SD3.0
- USB HS OTG with PHY, USB HS HOST HSIC
- I²C x 8, SPI x 4, UART x 8, SDIO x 2, I²S x 2
- High Assurance Boot
- Crypto Acceleration: AES-128/256, SHA-1, SHA-224, SHA-256
- RNG and Tamper Detection
- Operating Temperature Range of -40 °C to +105 °C (Industrial), 0 °C to +95 °C (Consumer)
- Available in 393 BGA (Consumer & industrial) and 361 BGA (Consumer) Packages

KEY APPLICATIONS

- Smart Home Controls
- Wearables
- Portable Healthcare/Patient Monitoring
- Portable Printers and Scanners
- Gaming Accessories
- Building Automation
- General Embedded Control
- IoT Edge Solutions
- SOM Board Solutions

MARKET SEGMENT

- Smart Consumer & Building
- Healthcare & Wearables
- Industrial

SUB MARKET

- Home & Building Control and Automation
- Medical Diagnostic and Therapy
- Medical Instruments
- Personal Health, Sport & Fitness
- Portable Personal Electronics & Wearables
- Factory Automation (PLCs, I/O, Sensors & Actuators)
- Motion Control, Servo Drives
- Professional Gaming, Amusement & Casino Machines
- Asset Tracking
- Home & Building Security (Alarms, Access Control)
- Home Appliances
- Toys, games and entertainment
- Point of Sales and Vending machines
- Robotics

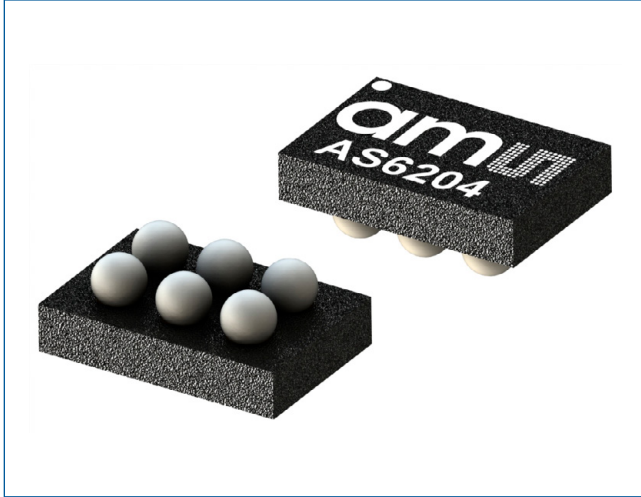
TECHNOLOGY SEGMENT

- High End Processing



AS6204

Digital Temperature Sensor



AS6204

The AS6204 is a complete digital sensor system. It offers a unique combination of ultra-low power consumption, small form factor and high accuracy. The AS6200 provides a fully calibrated and linearized sensor system that can easily be accessed via an I²C interface. It provides a resolution of 12-bit over the full temperature range of -40 °C to 125 °C. The integrated alarm functionality enables micro controller wake-up calls on defined temperature thresholds.

- Accuracy ± 0.4 °C (In The Range from 0 °C to 65 °C)
- Ambient Temp. Range -40 °C to 125 °C

- Small Integration Size:
WL-CSP Package (1.5 mm x 1.0 mm)
- I²C Interface (Four Slave Addresses Available)

FEATURES

- Supply Voltage: 1.8 V to 3.6 V
- Current Consumption: 6 μ A at 4 samples per second (sps)

KEY APPLICATIONS

- HVAC/Air Conditioning units
- Smart Thermostats
- Wristbands
- Thermal monitoring

MARKET SEGMENT

- Communication & Infrastructure
- Healthcare & Wearables
- Smart Consumer & Building

SUB MARKET

- Wireless Infrastructure
- Medical Diagnostic and Therapy
- Personal Health, Sport & Fitness
- Portable Personal Electronics & Wearables
- Audio and Video
- Heating, Ventilation and Air Conditioning
- Toys, games and entertainment

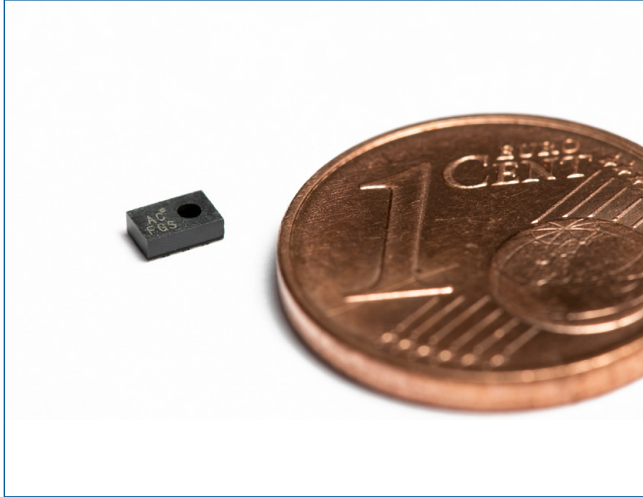
TECHNOLOGY SEGMENT

- Smart Sensing & Connectivity



AS7341

11-Channel Spectral Color Sensor



AS7341 Size Comparison

The AS7341 is one of the industry's first 11-channel spectral sensors that cover the entire visible range. Unlike existing RGB & XYZ sensors, the AS7341 measures light spectrum similar to a spectrometer with a good resolution. It features eight channels for the visible light, one channel for near-IR, and one channel without a filter. Also featuring a flicker detection engine for up to 1.5 kHz, it offers unprecedented precision for ambient light color sensing, light source detection, display analysis, automatic white balance, and reflective color measurement, all in an ultra-low-profile package

- **8 Optical Channels Covering The Entire Visible Range**
- **3 Extra Channels: Clear, Flicker, and NIR Channel**
- **6 Parallel ADCs for Signal Processing**
- **Ultra-low Profile Package: 3.1 mm x 2 mm x 1 mm**

FEATURES

- Spectral Information Enables Highly Accurate Object Color Measurements
- Detection and Rejection of Environmental Influences Such as Light Sources
- Optimized Channel Count and Signal Processing for Fast Measurements
- Smartphone-compatible Package

KEY APPLICATIONS

- Color Matching and Skin Tone Measurement
- Enhanced AI Search and Shop by Color (eCommerce Boost)
- Flicker Compensated Camera Operation and Image Optimization
- Light Source Detection and Improved AWB
- CRI Measurement for Improved Post-processing of Images

MARKET SEGMENT

- Healthcare & Wearables
- Industrial
- Lighting
- Smart Consumer & Building

SUB MARKET

- Personal Health, Sport & Fitness
- Factory Automation (PLCs, I/O, Sensors & Actuators)
- Robotics
- Lighting Fixtures
- Audio and Video
- Home & Building Control and Automation

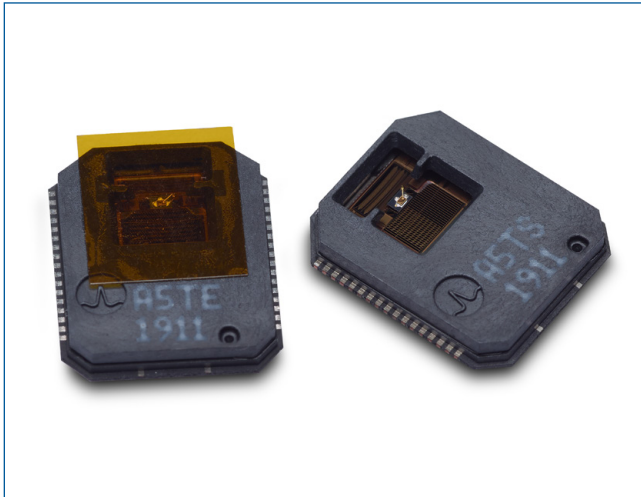
TECHNOLOGY SEGMENT

- Smart Sensing & Connectivity



AR35-L80 Family

Reflective Linear Encoders with Incremental Output



AR35 Series Linear Encoder

The Broadcom®AR35-L80 series is a reflective encoder, designed for linear scale applications with incremental-mode output and user-programmable resolution. The AR35-L80 works in combination with the code strip, which has a window pitch of 80 μm and the full code length of 40.96 mm. There are 5 programmable resolution outputs, offering a quadrature output resolution ranging from 20 μm to 1.25 μm pitch. Employing Broadcom's patented Reflective Optical Encoding Theory, the AR35 series offers high accuracy with correction, which is unattainable by magnetic encoders.

- **Surface Mount DFN 34 package:**
10.9 mm (L) x 9.1 mm (W) x 1.5 mm (H)
- **User-Programmable Resolution Ranging**
From 20 μm to 1.25 μm (Quadrature Output)
- **Differential Output for ABI**
- **High Temperature Range of -40 °C to +115 °C**

FEATURES

- Dual-Mode Operating Voltage of 3.3 V and 5 V
- Selectable Absolute Serial Output Communication Protocol
- SSI-3 Wire Mode
- ESL Mode (Encoder Serial Link)
- RoHS Compliance

KEY APPLICATIONS

- Linear Motor, Linear Actuator
- Laboratory and Measurement Equipment
- Robotic Automation and Engineering
- Factory Automation and Drone
- Medical and Dentistry, Devices and Equipment
- High-Accuracy Portable and Handheld Devices

MARKET SEGMENT

- Industrial
- Healthcare & Wearables

SUB MARKET

- Elevators, Escalators, Moving Walkways
- Factory Automation (PLCs, I/O, Sensors & Actuators)
- Motion Control, Servo Drives
- Robotics
- Medical Instruments
- Medical Diagnostic and Therapy

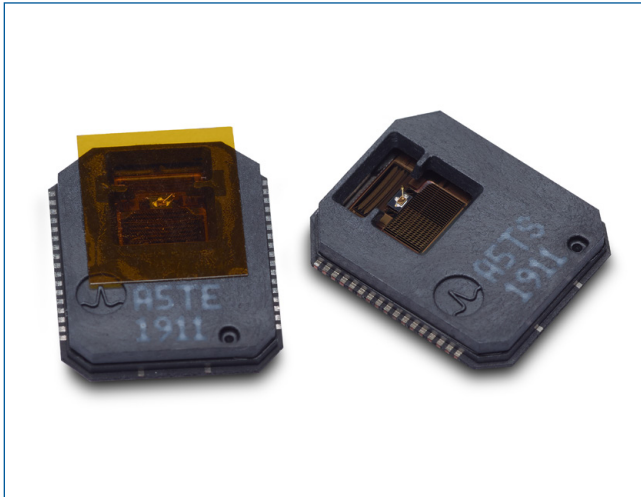
TECHNOLOGY SEGMENT

- Smart Sensing & Connectivity



AR35-T25

Miniature Programmable Through Hole 25-Bit Absolute Encoder



AR35 Hollow Through Encoder Series - Chip Version

The Broadcom® AR35-T25 Hollow Through series is a miniature absolute encoder, designed to cater to the growing demand of space-constrained applications. The AR35-T25 series provides an absolute mode of reading in serial communication output and incremental ABI and UVW in differential mode. It has an overall diameter of 35 mm with the maximum axial through-hole of 9.5 mm for through-shaft motor and axial cabling applications. Employing Broadcom's patented Reflective Optical Encoding Theory, the AR35 series offers high accuracy with correction, which is unattainable with magnetic encoders.

- **Surface Mount DFN-34 Package:**
10.9 mm (L) x 9.1 mm (W) x 1.5 mm (H)
- **User-Programmable Resolution Ranging From:**
17 to 25 Bits Single Turn
- **User-Programmable Incremental Output (ABI)**
Resolution Ranging from 128 to 8192 CPR
- **User-Programmable Commutation Signal (UVW)**
Ranging from 2, 3, 4, 5, 12, 30, 32 Pole Pair

FEATURES

- Differential Output for ABI and UVW
- High Temperature Range of
-40 °C to 115 °C
- Dual-Mode Operating Voltage of
3.3 V and 5 V
- Selectable Absolute Serial Output
Communication Protocol:
 - SSI Mode
 - ESL Mode (Encoder Serial Link)
- RoHS Compliance
- Linear Chip Solution: AR35-L80
- Module Solution: AS35-M23S

KEY APPLICATIONS

- Robotic Automation and Engineering
- Factory Automation and Drones
- Medical and Dentistry Devices
and Equipment
- High-Accuracy Portable and
Handheld Devices
- Miniature Motor, Servo Motor,
Linear Actuator

MARKET SEGMENT

- Industrial

SUB MARKET

- Elevators, Escalators, Moving Walkways
- Factory Automation
(PLCs, I/O, Sensors & Actuators)
- Motion Control, Servo Drives
- Robotics

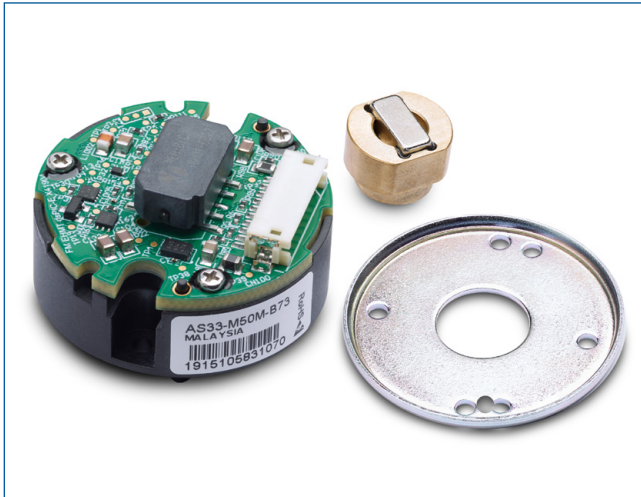
TECHNOLOGY SEGMENT

- Smart Sensing & Connectivity



AS33-M50M

50-Bit Full Magnetic Energy Harvesting Multi-Turn Absolute Encoder Module



AS33-M50M Absolute Magnetic Encoder Series

The AS33-M50M series encoder is a 50-bit absolute magnetic encoder comprising of 18-bit single-turn (ST) and 32-bit multi-turn (MT) counts. It features the state-of-the-art Energy Harvesting Multi-turn technology, high resolution, and a compact size. This encoder has a built-in communication protocol, which is supported by a full-duplex or half-duplex line transmissions drive, offering good noise immunity for more robust data transmission in harsh industrial applications. It is a robust solution against contamination such as dust and fingerprints on the sensing element.

- **Patented Energy Harvesting Technology**
- **Total 50-bit Resolution With 18-bit Single-Turn and 32-bit Multi-Turn**

- **Overall Encoder Outer Diameter Ø33 mm and Maximum Height of 20 mm**
- **Built-in Communication Protocol (Option): Standard SSI, BiSS C & RS-485 Half-Duplex**

FEATURES

- Built-in Temperature Sensor
- Operating Temperature Range -40 °C to 115 °C.
- Magnetic System Robust Against Contaminant
- RoHS Compliance

KEY APPLICATIONS

- Servo Motor
- Robotic Engineering and Automation
- Factory and Automotive Automation
- Specialized Equipment

MARKET SEGMENT

- Industrial

SUB MARKET

- Factory Automation (PLCs, I/O, Sensors & Actuators)
- Elevators, Escalators, Moving Walkways
- Motion Control, Servo Drives
- Robotics

TECHNOLOGY SEGMENT

- Smart Sensing & Connectivity



AS35-M23S

23-bit Single-Turn Absolute Encoder Module



AS35-M23S Series Absolute Optical Encoder

The Broadcom® AS35-M23S series encoder is a high-resolution optical absolute encoder module, which offers up to 23-bit single-turn resolution. The device is available with an RS-485 standard-compliant communication protocol and supported by a half-duplex differential line transmission driver. These features offer good noise immunity for robust data transmission at 2.5 Mb/s in harsh industrial applications. A key advantage of the AS35-M23S series is the low-profile module assembly. ESD protection circuitry is designed to meet the industry standard of IEC-61000-4-2, for class 4 applications.

- **Selectable Resolution up to 23 Bits**
- **High Accuracy: ± 300 arc-sec**

- **Selectable Communication Protocol: Half-Duplex RS485, SSI 1 MHz**
- **Wide Operating Temperature Range: -40 °C to +105 °C**

FEATURES

- High Response Speed up to 12 kRPM
- Compact Size: Ø35 mm, and Height 16.5 mm
- Hassle-Free Installation With One-Touch Calibration
- RoHS Compliance

KEY APPLICATIONS

MARKET SEGMENT

- Industrial

SUB MARKET

- Elevators, Escalators, Moving Walkways
- Factory Automation (PLCs, I/O, Sensors & Actuators)
- Motion Control, Servo Drives
- Robotics

TECHNOLOGY SEGMENT

- Smart Sensing & Connectivity



XGS 12000

12.6 MP CMOS Image Sensor, Global Shutter, 1" optical format



XGS12000-Hires

ON Semiconductor's X-Class image sensor platform allows a single camera design to support multiple product resolutions and also different pixel functionalities.

The initial devices, the XGS 12000 and XGS 8000 in the X-Class family are based on the first pixel architecture to be deployed in this platform: an advanced 3.2 μm global shutter CMOS image sensor that features superior imaging performance, high image uniformity, and low noise.

The XGS 12000 provides 4K / UHD (4096 x 3072) resolution in a 1" optical format and is available in two speed grades: 27 and 90 FPS.

- **Advanced 3.2 μm Global Shutter Pixel Design**
- **High Resolution with High Image Quality and Uniformity**
- **Two Speed Grades, Monochrome and Bayer Color Configurations**
- **Energy Efficient Design in a Compact Package**

FEATURES

- Member of the X-Class Image Sensor Platform: Allows One Camera Design to Support Multiple Resolutions and Different Pixel Designs with Only Minor Modifications
- X-Class Platform Allows for Simplified Design and Faster Time to Market for New Camera Designs
- 12.6 MP (4096 x 3072) 4 K / UHD Resolution Global Shutter CMOS Image Sensor in 1" Optical Format
- Two Speed Grades are Available (27 and 90 FPS)
- Both Monochrome and Bayer Color Configurations Are Supported
- High-Resolution Global Shutter Imaging with High Readout Speed for Industrial Imaging and Machine Vision Customers
- A Compact Package Design and Compatibility with the 29 x 29 mm² Camera Footprint

KEY APPLICATIONS

- Machine Vision
- Industrial Cameras and Systems
- Inspection System
- Security Cameras and Systems
- Broadcast Cameras

MARKET SEGMENT

- Industrial

SUB MARKET

- Embedded Vision

TECHNOLOGY SEGMENT

- Smart Sensing & Connectivity



SDAWIR03

Wireless Flow Rate, Humidity, and Temperature Sensing Evaluation Kit



Sensor Cube with Hub

The SDAWIR03 evaluation kit offers real-time sensor data collection that seamlessly integrates into sensor management services hosted on the Amazon Web Services (AWS) cloud, making it easier for engineers and software developers to design complex IoT solutions and applications, eliminating the need for specific device expertise. The kit offers a complete IoT solution, based on our ZWIR45xx 6LoWPAN module platform that is provisioned and configured for AWS.

- **Wi-Fi Hub with ZWIR4512 (6LoWPAN)**
- **Wireless Sensors Module with HS3001 and FS2012**
- **Micro USB to USB Adapter**
- **Mini HDMI to HDMI Adapter**

FEATURES

- HS3001 Humidity and Temperature Sensor with I²C Interface In The Sensor Cube
- FS2012 Flow Sensor with I²C Interface in the Sensor Cube
- License-Free 868/915 MHz Frequency Bands
- IPv6 Module Addressing
- 4 Channels in EU Mode; 10 Channels in US Mode
- Hub WiFi Connections: 2.4 GHz
- No Software to Install: Apply Power and WiFi Link to the Hub to View Measurements
- The Hub Can Also Link To a Local WiFi Hub to View Measurements
- When Linked to a Local WiFi Hub, the Hub Can Link to Amazon Web Service (AWS) and Write Sensor Data to AWS
- All The Required Setup is Included to Allow Writing Data to the End-user's AWS Account
- Over-The-Air Update (OTAU) Functionality in the Hub and Sensor Cube; Automatic OTAU from IDT, if

- Multiple Cubes with Sensors Installed Can Communicate with the Hub and Have Results Displayed
- Cubes Automatically Mesh if Needed to Complete The Communication Path to the Hub
- The Hub and Sensor Cube Operate from a 5.0 V DC and Micro-USB Connector; Wall-Mount Power Supply Adapters Are Included
- Wall-Mount Adapters Have the AC Mains Connection Plugs Commonly Used Worldwide or in North America

KEY APPLICATIONS

- Home & Building Automation

MARKET SEGMENT

- Communication & Infrastructure
- Healthcare & Wearables
- Industrial
- Smart Consumer & Building
- Smart Grid

SUB MARKET

- Wireless Infrastructure
- Medical Instruments
- Portable Personal Electronics & Wearables
- Factory Automation (PLCs, I/O, Sensors & Actuators)
- Asset Tracking
- Heating, Ventilation and Air Conditioning
- Home & Building Control and Automation
- Home & Building Security (Alarms, Access Control)
- Home Appliances
- Metering (Electricity, Flow, Heat)

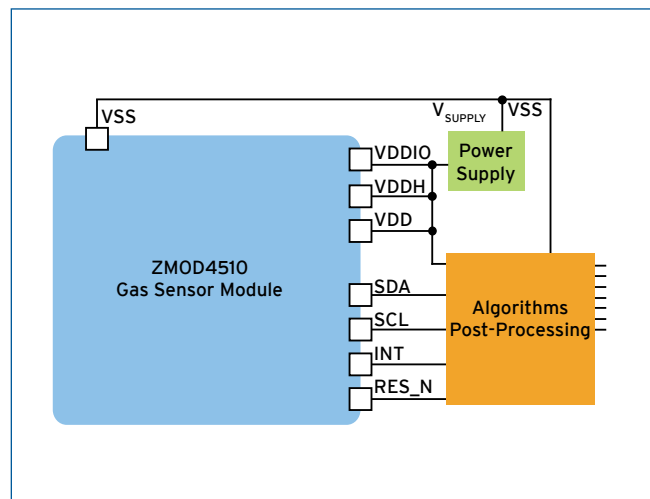
TECHNOLOGY SEGMENT

- Smart Sensing & Connectivity



ZMOD4510

Ozone and Nitrogen Oxides Gas Sensor Module for Total Outdoor Air Quality



ZMOD4510 Block Diagram

Renesas offers Outdoor Air Quality (OAQ) sensors that are calibrated to detect specific gases that contribute to unhealthy air quality, such as ozone (O₃) and nitrogen oxides (NO_x). By measuring these gases and using a rating scale to define levels of air quality, these sensors provide vital information that helps systems efficiently manage smart air handling systems in buildings, factories, and the home.

- **Reliable Detection of Outdoor Air Quality, Based on Nitrogen Oxides (NO_x) and Ozone (O₃)**
- **Correlates with US Environmental Protection Agency (EPA) Air Quality Index (AQI)**
- **Proven MO_x Material with 15 Years Experience**
- **Electrical and Gas Calibrated for Guarantee a lot-to-lot Consistency**

FEATURES

- High Sensitivity and Long Term Stability Allows < 20 ppb Detection Limits of Ozone (O₃) and Nitrogen Dioxide (NO₂)
- The Smallest Sensor in the Market Enables Reduced End Product Size
- Allows Improved Energy Efficiency without Compromising Air Quality
- Enables Rapid Customer Integration with Easy to Use Precompiled Software
- Pre-calibrated Sensors Save in Production Costs

KEY APPLICATIONS

- Outdoor Air Quality Sensing

MARKET SEGMENT

- Communication & Infrastructure
- Healthcare & Wearables
- Industrial
- Lighting
- Smart Consumer & Building
- Smart Grid

SUB MARKET

- Medical Diagnostic and Therapy
- Home & Building Security (Alarms, Access Control)
- Home & Building Control and Automation
- Heating, Ventilation and Air Conditioning
- Audio and Video
- Specialty Lighting (Digital Signage, Signals, Entertainment, Transportation)

- Lighting Fixtures
- Surveillance, Parking & Traffic Control
- Robotics
- Instrumentation, Test and Measurement
- Information Kiosk & Advertising Panels
- Human Machine Interface
- Factory Automation (PLCs, I/O, Sensors & Actuators)
- Portable Personal Electronics & Wearables
- Personal Health, Sport & Fitness
- Medical Instruments
- Home Appliances

TECHNOLOGY SEGMENT

- Smart Sensing & Connectivity



LPS27HHW

MEMS Pressure Sensor: Absolute Digital Output Barometer in Water Resistant Package



LPS27HHW MEMS Pressure Sensor

The LPS27HHW is an ultra-compact piezoresistive absolute pressure sensor which functions as a digital output barometer.

The device comprises a sensing element and an IC interface which communicates through I²C, MIPI I3CSM or SPI from the sensing element to the application.

This integrated pressure sensor is available in a ceramic LGA package with a metal lid. It operates over a temperature range extending from -40 °C to +85 °C. Gel inside the IC protects the electrical components from water and the metal cap is grounded electrically for better ESD robustness.

- **Pressure Sensor in Water-Resistant Package**
- **260 to 1260 hPa Absolute Pressure Range**

- **Current Consumption of 4 µA**
- **Low Pressure Sensor Noise: 0.7 Pa**

FEATURES

- Potting Gel & Grounded Metal Cap
- Absolute Pressure Accuracy: 0.5 hPa
- Embedded Temperature Compensation
- 24-bit Pressure Data Output
- ODR from 1 to 200 Hz
- SPI, I²C or MIPI I3CSM Interfaces
- Embedded FIFO
- Interrupt Functions: Data-Ready, FIFO Flags, Pressure Thresholds
- Supply Voltage: 1.7 to 3.6 V
- ECOPACK Lead-Free Compliant

KEY APPLICATIONS

- Altimeters and Barometers for Portable Devices
- GPS Applications
- Weather Station Equipment
- Sport Watches
- eCigarettes
- Water Depth Monitoring
- Gas Metering

MARKET SEGMENT

- Industrial
- Healthcare & Wearables

SUB MARKET

- Portable Personal Electronics & Wearables
- Factory Automation (PLCs, I/O, Sensors & Actuators)
- Instrumentation, Test and Measurement

TECHNOLOGY SEGMENT

- Smart Sensing & Connectivity

* FIFTY YEARS

THE NETWORK OF OUR SUCCESS!

Celebrating 50 years in the electronics
industry is only achievable with great
partners.

Thank you for making it possible!



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