2/2015
Marketing Innovative Products

INGREDIENTS:
4 cl Marketing
4 cl Innovation
4 cl Products

SUMMER on the Beach

INGREDIENTS:
4 cl Marketing
4 cl Innovation
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EBV Elektronik
I An Avnet Company I

MIP Edition 2/2015
AD7091R-X
1 MSPS, Ultra Low Power, 12-Bit ADC With On-Chip Reference

The AD7091R-2/AD7091R-4/AD7091R-8 family is representing multichannel 12-bit, ultralow power, successive approximation analog-to-converters (ADC) which are available in two, four, or eight analog input channel options.

The family members:
• operate from a single 2.7...5.25 V power supply and is capable of achieving a sampling rate of 1 mega samples per second (MSPS)
• contain a wide bandwidth track-and-hold amplifier that can handle input frequencies in excess of 1.5 MHz
• feature an on-chip conversion clock, an on-chip accurate 2.5 V reference, and a high speed serial interface
• offer up to eight single-ended analog input channels with a channel sequencer that allows a preprogrammed selection of channels to be converted sequentially

The serial port interface (SPI) allows data to be read after the conversion while achieving a 1 MSPS throughput rate. The conversion process and data acquisition are controlled using the CONVST pin.

The device family uses advanced design techniques to achieve ultra low power dissipation at high throughput rates. It also features flexible power management options. An on-chip configuration register allows the user to set up different operating conditions. These include power management, alert functionality, busy indication, channel sequencing, and general-purpose output pins. The MUXOUT and ADCIN pins allow for signal conditioning of the multiplexer output prior to acquisition by the ADC.

KEY FEATURES
• Fast throughput rate: 1 MSPS
• Specified for VDD of 2.7...5.25 V
• Ultra low power: 467 µA typical at 3 V and 1 MSPS
• On-chip accurate 2.5 V reference, 5 ppm/°C typical drift
• 2, 4, and 8 single-ended analog input channels
• Programmable channel sequencer
• Alert function available in 4- and 8-channel versions
• Busy indication available in 4- and 8-channel versions
• GPO pins available in 4- and 8-channel versions

APPLICATION EXAMPLES
• Battery powered systems
• Personal digital assistants
• Medical instruments
• Mobile communications
• Instrumentation and control systems
• Data acquisition systems
• Optical sensors
• Diagnostic/monitoring functions
AD7175-2
24-Bit, 250 kps Sigma Delta ADC with 20 μs Settling and True Rail-to-Rail Buffers

The AD7175-2 is a low noise, fast settling, multiplexed, 2-/4-channel (fully/pseudo differential) ∑-Δ analog-to-digital converter (ADC) for low bandwidth inputs. It has a maximum channel scan rate of 50 kspS (20 μs) for fully settled data.

The output data rates range from 5 samples per second (sps) to 250 kspS. The AD7175-2 integrates key analog and digital signal conditioning blocks to allow users to configure an individual setup for each analog input channel in use. Each feature can be user selected on a per channel basis. Integrated true rail-to-rail buffers on the analog inputs and external reference inputs provide easy to drive high impedance inputs. The precision 2.5 V low drift (2 ppm/°C) band gap internal reference (with output reference buffer) adds embedded functionality to reduce external component count.

The digital filter allows simultaneous 50/60 Hz rejection at 27.27 samples per second output data rate. The user can switch between different filter options according to the demands of each channel in the application. The ADC automatically switches through each selected channel. Further digital processing functions include offset and gain calibration registers, configurable on a per channel basis.

KEY FEATURES

- Fast and flexible output rate:
  - 5...250 kps
  - Channel scan data rate of 50 kps/channel (20 μs settling)
  - 17.2 noise free bits @ 250 kps
  - 20 noise free bits @ 2.5 kps
  - 24 noise free bits @ 20 sps
  - INL: ±1 ppm of FSR
  - 85 dB rejection of 50 Hz and 60 Hz with 50 ms settling
  - User configurable input channels:
    - 2 fully differential or 4 single-ended
    - Crosspoint multiplexer
    - On-chip 2.5 V reference (±2 ppm/°C drift)
  - True rail-to-rail analog and reference input buffers

APPLICATION EXAMPLES

- Process control: PLC/DCS modules
- Temperature and pressure measurement
- Medical and scientific multichannel instrumentation
- Chromatography
The DAC outputs are optimized to interface seamlessly with the ADRF672x analog quadrature modulators (AQM)s.

The serial port interface (SPI) provides for programming/readback of many internal parameters.

JESD204B Subclass 1 support simplifies multichip synchronization in software and hardware design. The quad DAC can be configured as a dual link device with each JESD204B link providing data for a dual DAC pair.

Full-scale output current can be programmed over a typical range of 13.9 mA to 27.0 mA. Programmable transmit enable function allows easy design balance between power consumption and wake-up time.

Small 88-lead LFCSF package with 12 x 12 mm² footprint.

**KEY FEATURES**

- Supports input data rate >1 GSPS
- SFDR = 76 dBc @ 150 MHz
- NOISE SPECTRAL DENSITY: -162 dBm/Hz @ 150 MHz
- Flexible 8-lane JESD204B interface
- Support quad or dual DAC mode at 2.8 GSPS
- Multiple chip synchronization
- Selectable 1x, 2x, 4x, 8x interpolation filter
- Input signal power detection
- Emergency stop for downstream analog circuitry protection
- Transmit enable function allows extra power saving
- High performance, low noise phase-locked loop (PLL) clock multiplier
- Digital inverse sinc filter
- Low power: 1.6 W @ 1.6 GSPS, 1.7 W @ 2.0 GSPS, full operating conditions
- 88-lead 12 x 12 mm² LFCSF with exposed pad

**APPLICATION EXAMPLES**

- Signal Generators
- Wireless communications
- Wideband repeaters
- Software defined radios
- Instrumentation
- Automated test equipment
ADF5355
13.6 GHz, Microwave Wideband Synthesizer with Integrated VCO

The ADF5355 delivers a very wide frequency range (53 MHz to 13.6 GHz) and simultaneously delivers extraordinary low VCO phase noise (-144 dBc/Hz @ 1 MHz offset at 1.8 GHz) in this application market today.

The ADF5355 allows implementation of fractional-N or integer-N phase-locked loop (PLL) frequency synthesizers when used with an external loop filter and an external reference frequency. The wideband microwave VCO design permits frequency operation from 6.8 GHz to 13.6 GHz at one radio frequency (RF) output. A series of frequency dividers at another frequency output permits operation from 54 MHz to 6800 MHz.

The ADF5355 has an integrated VCO with a fundamental output frequency ranging from 3400 MHz to 6800 MHz. In addition, the VCO frequency is connected to divide by 1, 2, 4, 8, 16, 32, or 64 circuits that allow the user to generate RF output frequencies as low as 54 MHz. For applications that require isolation, the RF output stage can be muted.

**KEY FEATURES**

- RF output frequency range: 54...13,600 MHz
- Fractional-N synthesizer and integer-N synthesizer
- High resolution 38-bit modulus
- Phase Frequency Detector (PFD) operation to 125 MHz
- Reference frequency operation to 600 MHz
- Maintains frequency lock over -40...+85 °C
- Low phase noise, voltage controlled oscillator (VCO)
- Programmable divide by 1, 2, 4, 8, 16, 32, or 64 output
- Analog and digital power supplies: 3.3 V
- Charge pump and VCO power supplies: 5 V, typical
- Logic compatibility: 1.8 V
- Programmable dual modulus prescaler of 4/5 or 8/9
- Programmable output power level
- RF output mute function
- Analog and digital lock detect
- Supported in the ADIsimPLL design tool.

**APPLICATION EXAMPLES**

- Wireless infrastructure (W-CDMA, TD-SCDMA, WiMAX, GSM, PCS, DCS, DECT)
- Point to point/point to multipoint microwave links
- Satellites/VSATs
- Test equipment/instrumentation
- Clock generation
FL7734
Phase-Cut Dimmable Single Stage PSR Flyback LED Driver

Active dimming control for dimmer compatibility, programmable dimming curves and input current management, constant LED current regulation in large phase angle range – outstanding features achievable with FL7734.

The FL7734 is a Primary Side Regulated (PSR), high power factor Constant Current (CC) controller for phase-cut dimmable LED applications for power levels from 5 W to 30 W with lowest component count.

An external high voltage switch is used to control the input current at the right time to ensure highest dimmer compatibility. The constant current tolerance is better than 1 % at component level, resulting in a system level constant current tolerance of around 3 %.

The controller can detect if a dimmer is not present and works more efficiently under such conditions. Protection features such as LED open / short, sensing resistor shorted, and over-temperature protection enhance system reliability.

The device is available in a 16 pin SOIC package.

KEY FEATURES

Dimming Performance
• Flicker free with active dimmer control
• Compatibility with SSL 7 A and ENERGY STAR
• Controllable minimum input current function
• Dimming curve control with RDIM & CDIM

System Performance
• High PF, low THD: >0.9/<20 %
• Fast <0.3 s start-up (@ small phase angle)
• Good CC tolerance: ± 1 % (line regulation)
• Low BOM count: single stage PSR

Protection Features
• LED Short Protection (SCP)
• LED Open Protection (OVP-VS, OVP-VDD)
• Output Diode Short Protection (OCP)
• RCS Short and Open Protections (SRSP, SROP)
• Over Temperature Protection (TSD)

APPLICATION EXAMPLES
• Residential LED lighting
• Commercial LED lighting
• Industrial LED lighting

FL7734 Application Diagram
MC3XCM0902
Robust, Low Current, Cost Effective, EMC/ESD Compliant Dual CAN High Speed PHY Layer

The MC33CM0902/MC34CM0902 are high speed CAN transceivers providing the physical interface between the CAN protocol controller of an MCU and the physical two-wire CAN bus.

They are packaged in a 14-pin SOIC with industry standard pin out and offer excellent EMC and ESD performance, without the need for external filter components. Two device variations are available: The MC33CM0902 automotive version has achieved all OEM certifications and has the Transmit Dominant Timeout feature.

The MC34CM0902 industrial version is a very robust high performance transceiver without the Transmit Dominant Timeout feature.

The transceivers automatically adapt to either 3.3 or 5 V MCU communication and have the ability to monitor MCU voltage (V_Io and V_POF) for under-voltage conditions and to respond appropriately.

Please also have a look into MC3x901.

**KEY FEATURES**

- Two high performance transceivers in one package for board space and cost savings
- High level of EMC performance without common mode choke to enable BOM cost reduction
- Low quiescent current (10 µA)
- ESD robustness with no external protection required
- 5 and 3.3 V compatible I/O with auto-detect
- ISO11898-2 and -5 compatible, industry standard compliance, pin-for-pin compatibility
- EVB and user’s guide available

**APPLICATION EXAMPLES**

- Automotive powertrain and safety
- Motor control – safety critical
- Robotics
- Factory automation
POWERSTEP01
System-in-package integrating microstepping controller and 10 A power MOSFETs

Stepper motor driver with integrated 10A/85V mosfets and digital microstep control

The powerSTEP01 is a system-in-package integrating 8 N-channel 16 mΩ MOSFETs for stepper applications up to 85 V with a SPI programmable controller, providing fully digital control of the motion through a speed profile generation and positioning calculations. It integrates a dual low RDS(on) full bridge with embedded non-dissipative overcurrent protection. The device can operate with both voltage mode driving and advanced current control fitting different application needs. The digital control core can generate user defined motion profiles with acceleration, deceleration, speed or a target position easily programmed through a dedicated register set. All application commands and data registers, including those used to set analog values (i.e. current protection trip point, deadline, PWM frequency, etc.) are sent through a standard 5-Mbit/s SPI. Besides increasing the flexibility, this SPI interface greatly simplifies the architecture and the BOM in case of multi-motor solution. A complete set of protections (thermal, low bus voltage, overcurrent and motor stall) make the powerSTEP01 “bullet proof”, as required by the most demanding motor control applications.

KEY FEATURES
• Operating voltage: 7.5...85 V
• Dual full bridge with RDS(on) = 16 mΩ
• 10 A_max maximum output current
• Programmable internal mosfet turn on/off time for EMI improvement
• Programmable speed profile
• Up to 1/128 microstepping
• Sensorless stall detection
• Integrated voltage regulators
• SPI interface
• Programmable non-dissipative overcurrent protection
• Overtemperature protection

APPLICATION EXAMPLES
High power bipolar stepper motor
• Stage lighting
• Surveillance systems
• Textile and sewing machines
• Pick and place machines

Block Diagram
**DS90UB913A-Q1/914A-Q1**

25...100 MHz 10/12-Bit FPD-Link III Serializer/Deserializer

The DS90UB913A-Q1/DS90UB914A-Q1 chipset offers a FPD-Link III interface with a high-speed forward channel and a bidirectional control channel for data transmission over a single coaxial cable or differential pair.

The serializer/deserializer pair is targeted for connections between imagers and video processors in an ECU (Electronic Control Unit). This chipset is ideally suited for driving video data requiring up to 12-bit pixel depth plus two synchronization signals along with bidirectional control channel bus.

The deserializer features a multiplexer to allow selection between two input imagers, one active at a time. The primary video transport converts 10-bit or 12-bit data to a single high-speed serial stream, along with a separate low latency bidirectional control channel transport that accepts control information from an I2C port and is independent of video blanking period.

Using TI’s embedded clock technology allows transparent full-duplex communication over a single differential pair, carrying asymmetrical bidirectional control channel information in both directions. This single serial stream simplifies transferring a wide data bus over PCB traces and cable by eliminating the skew problems between parallel data and clock paths saving system cost by narrowing data paths, etc. Deserializer inputs provide adaptive equalization to compensate for loss from the media over longer distances. Internal DC-balanced encoding/decoding is used to support AC-coupled interconnects.

Packages:
- DS90UB913A-Q1: 32-pin WQFN
- DS90UB914A-Q1: 48-pin WQFN

**KEY FEATURES**

- 25...100 MHz input pixel clock support
- Capable of driving up to 15 m coaxial or 20 m shielded twisted-pair cables
- Programmable data payload:
  - 10-bit payload up to 100 MHz
  - 12-bit payload up to 75 MHz
- Continuous low latency bidirectional control
- I2C interface @400 kHz
- 2:1 multiplexer to choose between two input images
- 4 dedicated general purpose input (GPI) / output (GPO)
- LOCK output reporting pin and @SPEED BIST diagnosis
- Feature to validate link integrity
- 1.8, 2.8 or 3.3 V compatible parallel inputs on serializer
- ISO 10605 and IEC 61000-4-2 ESD compliant
- Automotive: AEC-Q100 grade 2 qualified
  - Temp. range: -40...+105 °C
- Small serializer footprint (5 × 5 mm²)
- EMI/EMC mitigation - deserializer programmable spread spectrum (SSCG) outputs

**APPLICATION EXAMPLES**

- Front or rear-view camera for collision mitigation
- Surround view for parking assistance
TB67S269FTG
50V/2A Stepping Motor Driver

50 V/2 A stepping motor driver with low on-resistance (0.8 Ω or less, upper + lower), 1/32 step mode and available in a small package.

The TB67S269FTG is a bipolar stepping motor driver that offers a high voltage of 50 V and current of 2 A. High speed, high capability motor drives are required in printers, office automation equipment, industrial application and home appliances. At the same time, customer requirements for more compact, stylishly designed equipment put pressure on manufacturers to reduce size wherever possible. This is combined with a need to reduce heat within the equipment. TB67S269FTG reduces heat and increases efficiency by increasing the switching speed and adopting Toshiba’s ADMD motor driving technology. It has a low on-resistance of 0.8 Ω or less. TB67S269FTG offers high-resolution motor driving technology down to 1/32 step mode to reduce vibration and noise. It is housed in a small (7 x 7 x 0.5 mm³) QFN48 package, which supports downsizing and cost reduction. Safety and reliability are enhanced by the inclusion of thermal and overcurrent shutdown circuitry.

TB67S269FTG is pin-compatible with the previously released TB67S109AFTG (50 V/4 A). Its current rating is configured to 2.0 A, which is widely used in home appliances and other applications. Expansion of the product line-up allows customers to select the current variation that best fits their needs.

KEY FEATURES

• Bipolar stepping motor driver
• 50 V/2.0 A
• Full-, half-, quarter-, 1/8-, 1/16-, 1/32-step drive modes
• Low heat generation
• Low output R_on due to a BiCD process
• Low vibration and low noise

• Thermal shutdown (TSD)
• Overcurrent detection (ISD)
• VM power-on reset (POR)
• Clock input interface
• Small QFN48 package
• Pin compatible to Toshiba TB67S109AFTG

APPLICATION EXAMPLES

• Industrial
• Home appliances
• Office equipment
• Printer
• Scanner
• Surveillance camera
• Vending machines
• Banking terminals
• Sewing machines
Next-generation system-on-chip (SoC) for low-cost enterprise and service provider edge and network control applications.

The QorIQ T1024/14 Communications Processors combine dual and single 64-bit e5500 Power Architecture® processor cores with high-performance data path acceleration logic, and network peripheral interfaces required for networking, industrial and telecommunications.

The T1024 and T1014 are ideally suited for use in programmable logic controllers, industrial gateways, general-purpose embedded computing as well as mixed control and data plane applications such as fixed routers, integrated access devices, firewall and other packet filtering applications. Its high level of integration offers significant performance benefits and greatly helps to simplify hardware and software design.

These products are suggested for customers that are using QorIQ P1 and P2 devices and need more performance, similar power consumption and updated high performance I/O and peripherals.

Please also have a look into "QorIQ T1023 and T1013".

### KEY FEATURES

The chip includes the following function and features:

- Dual and single-core Power Architecture® e5500; up to 1.4 GHz; 32/64 b, 256 KB L2 cache
- Memory Controller:
  - DDR 3L/4 SDRAM up to 1600 MT/s
- High Speed Interconnect: 3 PCIe 2.0 Controllers, 1 SATA 2.0, 2 USB 2.0
- CoreNet Switch Fabric (256 kB platform cache)
- Gb-Ethernet: Up to 4 × Controllers (SGMII and RGMII)
- Data path Acceleration (at 1.4 GHz):
  - 15 Mpps IP Forwarding, 64 B packets;
  - SEC 5.x: 4 Gb/s IPSec, large packets
- Trust Architecture: Secure boot, domain partitioning, tamper detect and secure debug.
- Protocols support such as PROFINET, EtherCAT®, POWERLINK, Modbus®-IDA, IEEE® 1588 precision time protocol
- Display Interface
  - Package: 780-pin package, 23 x 23 mm², 0.8 mm pitch

### APPLICATION EXAMPLES

- Wired and wireless branch routers
- WLAN 11 ac enterprise access points
- Service provider WLAN access points
- Unified threat management gateways
- Multifunction printers
- Router and switch controllers
- Line card controllers
- Industrial automation and computing, single board computers
- Aerospace and defense ruggedized network equipment

QorIQ T1024 AND T1014
Built for Speed, Designed to Connect
These high-performance microcontrollers offer high-speed connectivity, advanced peripherals, and integrated security features including AES encryption, OTP key storage, and true random number generation.

NXP’s high-performance LPC18Sxx microcontrollers offer CPU speeds up to 180 MHz with added security features to enable designers to protect application IP and prevent unauthorized access to data messages. With hardware-accelerated AES encryption and decryption, two 128-bit non-volatile OTP memories for encrypted, hardware-randomized key storage, and a true random-number generator for unique key creation, the LPC18Sxx family enables applications to implement secure boot, secure messaging, and more.

LPC18Sxx microcontrollers are supported by a wide range of software solutions available from ecosystem partners that include secure firmware updates, secure IoT connectivity, and secure networking stacks (SSL, TLS). For applications requiring total device integrity, LPC18Sxx microcontrollers can be paired with an NXP A-Series secure element to add tamper detection, secure authentication with hardware accelerated RSA and ECC, extraction proof keys using banking grade security, and more.

### KEY FEATURES
- 180 MHz, 32-bit ARM Cortex-M3
- Up to 1 MB Flash & 200 kB RAM
- Memory expansion
- SPI Flash interface (SPIFI)
- 8/16/32-bit external memory controller (EMC)
- Security features
- AES-128 encryption engine
- True random number generator (TRNG)
- OTP key storage
- Code read protection (CRP)
- Hi-Speed USB 2.0 interface, with on-chip Hi-Speed PHY or ULPI
- 10/100 Ethernet
- Graphic LCD up to 1024 × 768 pixel² resolution
- SCTimer/PWM
- 8-channel GPDMA controller
- Two ADCs, 8-ch.,10-bit, 400 ksps and one 10-bit DAC
- Various I²C, SPI, UARTs, smart card IF, I²S, audio PLL
- Temp. range -40...+85 °C (Flashless)...+105 °C (Flash)

### APPLICATION EXAMPLES
- Secure industrial gateways
- Automotive aftermarket, including telematics
- Smart meters
- Industrial controls
- Industrial automation
- Diagnostic equipment
- White goods HMI
- Data collectors and navigation
- Electronic instruments
STM32F756
ARM Cortex-M7 MCU, High-Performance, DSP with FPU, 200 MHz CPU, 1 Mb Flash, SDRAM, TFT

STM32 F7 series of very high performance MCUs with ARM® Cortex®-M7 core.

The STM32F756xx devices are based on the high-performance ARM® Cortex®-M7 32-bit RISC core operating at up to 200 MHz frequency. The Cortex®-M7 core features a single floating point unit (SFPU) precision which supports all ARM® single-precision data-processing instructions and data types. It also implements a full set of DSP instructions and a memory protection unit (MPU) which enhances application security.

Shown in the diagram, the STM32F756xx devices incorporate several kinds of high-speed embedded memories available in low and lowest power modes, and an extensive range of enhanced I/Os and peripherals connected to two APB and AHB buses each, a 32-bit multi-AHB bus matrix and a multi layer AXI interconnect supporting internal and external memories access. Besides standard and advanced communication interfaces, three ADCs, two DACs, a low-power RTC, numerous general-purpose 16- and 32-bit timers incl. two PWM timers for motor control, a true random number generator (RNG), and a cryptographic acceleration cell are featured by the chips.

KEY FEATURES

Smart architecture with new peripheral set

- Two general purpose DMA controllers and dedicated DMAs for Ethernet, high-speed USB On-The-Go and the Chrom-ART graphic accelerator.
- Peripheral speed independent from CPU speed (dual clock support)
- Interfaces:
  - Audio (SAI with SPDIF output), I²S half-duplex (SPDIF input), USB OTG and Quad SPI

SRAM with scattered architecture:

- 320 KBytes of universal, bus shared and time critical data memory (DTCM)
- 16 Kbytes ITCM supports time critical routines
- 4 Kbytes of backup SRAM (lowest power modes)

Power efficiency:

- 7 CoreMark/mW at 1.8 V and 180 MHz
- 120 µA typical current consumption in Stop mode

Compatibility:

- Cortex M7 is backward compatible with Cortex M4 instruction set
- STM32 F7 series is pin-to-pin compatible to the STM32 F4 series

APPLICATION EXAMPLES

- Industrial display control
- Motor drive and application control
- Medical equipment
- Industrial applications: PLC, inverters, circuit breakers
- Printers, and scanners
- Alarm systems, video intercom, and HVAC
- Home audio appliances
- Mobile applications, Internet of Things
- Wearable devices: smartwatches
ATECC508
Atmel CryptoAuthentication™ Devices

Crypto device to integrate ECDH (Elliptic Curve Diffie–Hellman) key agreement.

The ATECC508A is the first crypto device to integrate ECDH (Elliptic Curve Diffie–Hellman) key agreement, which makes it easy to add confidentiality (encryption/decryption) to digital systems including Internet of Things (IoT) nodes used in home automation, industrial networking, accessory and consumable authentication, medical, mobile and other applications.

In addition to ECDH the ATECC508A also has ECDSA (Elliptic Curve Digital Signature Algorithm) sign-verify capabilities built right in to provide highly secure asymmetric authentication. The combination of ECDH and ECDSA in the ATECC508A makes the device an ideal way to provide all three pillars of security – namely confidentiality, data integrity, and authentication – when used with MCU or MPUs running encryption/decryption algorithms (such as AES) in software.

As with all CryptoAuthentication devices, the ATECC508A delivers extremely low-power consumption, requires only a single GPIO over a wide voltage range, and has a tiny form factor, making it ideal for a variety of applications including those that require longer battery life and flexible form factors.

Similar to all Atmel CryptoAuthentication products, the new ATECC508A employs ultra-secure hardware-based cryptographic key storage and cryptographic countermeasures which are more secure than software-based key storage. This next-generation CryptoAuthentication device is compatible with any microprocessor (MPU) or microcontroller (MCU) including Atmel® | SMART and Atmel AVR® MCUs or MPUs.

In addition to ECDH the ATECC508A also has ECDSA (Elliptic Curve Digital Signature Algorithm) sign-verify capabilities built right in to provide highly secure asymmetric authentication. The combination of ECDH and ECDSA in the ATECC508A makes the device an ideal way to provide all three pillars of security – namely confidentiality, data integrity, and authentication – when used with MCU or MPUs running encryption/decryption algorithms (such as AES) in software.

KEY FEATURES

• Crypto element device with secure hardware-based key storage
• Performs High-Speed Public Key algorithms (PKI): ECDSA and ECDH
• NIST standard P256 elliptic curve support
• SHA-256 hash algorithm with HMAC option
• Host and client operations
• Two high-endurance monotonic counters
• Guaranteed unique 72-bit serial number
• Internal high-quality FIPS Random Number Generator (RNG)
• Storage for up to 16 Keys
• Multiple options for consumption logging and one time write information
• Intrusion latch for external tamper switch or power-on chip enablement
• 2.0...5.5 V supply voltage range
• 1.8...5.5 V IO levels
• <150 nA sleep current
• 8-pad UDFN, 8-lead SOIC, and 3-lead CONTACT packages

APPLICATION EXAMPLES

• Building automation
• Home appliances
• Home entertainment
• Industrial automation
• Internet of Things
• Lighting
• Smart energy
• Mobile electronics
• PC peripherals
Texas Instruments provides a new series of MSP430™ industrial microcontrollers (MCUs) integrated with smart analog for high accuracy, precision and cost savings.

The MSP430i204x MCUs meet the broad temperature range requirements from -40...105 °C needed for industrial and smart grid applications. The new MSP430 i-series MCUs are ideal for a variety of cost-sensitive industrial segments including occupancy sensors, remote temperature and pressure transmitters, power monitoring, and many more.

The MSP430i204x, MSP430i203x, MSP430i202x devices consist of a powerful 16-bit RISC CPU, a digitally controlled oscillator (DCO)-based clock system that generates system clocks, a power management module (PMM) with built-in voltage reference and voltage monitor, two to four 24-bit sigma-delta analog-to-digital converters (ADCs), a temperature sensor, a 16-bit hardware multiplier, two 16-bit timers, one eUSCI-A module and one eUSCI-B module, a watchdog timer (WDT), and up to 16 I/O pins.

MSP430i204x industrial MCUs contain integrated smart analog, including up to four integrated sigma delta analog-to-digital converters (ADCs) that provide accuracy and precision down to 1 percent in smart metering products across a 2000:1 dynamic range. Small package sizes enable designers to reduce board space and lower system costs, while increasing accuracy.

Developers porting to the new MSP430i204x industrial MCUs can scale their designs to include 16 or 32 KB flash memory and integrated analog such as sigma-delta analog front ends (AFEs).

**KEY FEATURES**

- 1 percent accuracy across a 2000:1 dynamic range through -40...+105 °C.
- Small package sizes, 28-pin TSSOP and 32-pin QFP reduce design cost and allows smaller industrial application products.
- Simultaneous sampling of the on-chip 24-bit Sigma Delta ADCs eliminates software compensation for sequential sampling (reduces the size of software code)
- Additional analog provides tamper detection for metering allows designing smart energy meters that can detect unauthorized access.
- For easy design starts, free Energy Library code performs all of the energy and power calculations required for ANSI/IEC qualified meters.

**APPLICATION EXAMPLES**

- Metering
- Submetering
- Power monitoring and control
- Industrial sensors
ACPL-P/W347 AND ACPL-P/W349
1.0 A and 2.5 A Gate Drive Optocouplers for Fast Switching Power Applications

The Avago ACPL-P/W347 and ACPL-P/W349 are 1.0 A and 2.5 A gate drive optocouplers designed to protect and drive fast switching next generation power semiconductors like Silicon Carbide (SiC) and Gallium Nitride (GaN) MOSFETs and IGBTs. The Avago ACPL-P/W347 is a high-speed 2.5 A gate drive optocoupler device that contains an AlGaAs LED, which is optically coupled to an integrated circuit with a power output stage. The device is ideally suited for driving SiC/GaN (Silicon Carbide / Gallium Nitride) MOSFETs and IGBTs used in power conversion applications.

As SiC and GaN MOSFETs gain market adoption and expand into higher power industrial applications, higher performance gate drive optocoupler devices like the Avago ACPL-P/W347 and ACPL-P/W349 ideally complement these fast switching power semiconductors in delivering maximum power conversion efficiency.

Compared to Avago’s previous generation devices, the ACPL-P/W347 and ACPL-P/W349 support wider gate operating voltage up to 30 V enabling higher voltage drive for high power applications such as power inverters, motor drives, and switching power supplies (SPS).

KEY FEATURES
- 110 ns maximum propagation delay
- Wide operating VCC range: 15...30 V
- Rail-to-rail output voltage
- 2.5 A maximum peak output current (ACPL-P/W349)
- 1.0 A maximum peak output current (ACPL-P/W347)
- Under voltage lock-out (ULVO) with hysteresis
- 50 kV/μs minimum high common mode rejection (CMR)
- Small stretched SO6 package minimizing PCB board space and cost
- Safety approvals for CSA, UL and IEC
  - IEC/EN/DIN EN 60747-5-5: V_{IORM} = 891 V_{PEAK} (ACPL-P347/349), V_{IORM} = 1,140 V_{PEAK} (ACPL-W347/349)
  - UL1577: V_{ISO} = 3,750 V_{PEAK} (ACPL-P347/349), V_{ISO} = 5,000 V_{PEAK} (ACPL-W347/349)

APPLICATION EXAMPLES
- SiC/GaN MOSFET and IGBT gate drives
- Motor drives
- Industrial inverters
- Renewable energy inverters
- Switching power supplies (SPS)
The Avago APDS-9960 is a digital RGB, ambient light, proximity and gesture sensor device in a single 8-pin package. The device has an I²C compatible interface providing red, green, blue, clear (RGBC), proximity and gesture sensing with IR LED.

The RGB and ambient light sensing feature detects light intensity under various lighting conditions and through various attenuation materials including darkened glass. In addition, the integrated UV-IR blocking filter enables accurate ambient light and correlated color temperature sensing.

The proximity and gesture feature is factory-trimmed and calibrated to 100 mm proximity detection distance without requiring customer calibrations. Gesture detection utilizes four directional photodiodes, integrated with visible blocking filter, to accurately sense simple up-down-right-left gestures or more complex gestures. The addition of micro-optics lenses within the module provides high efficient transmission and reception of infrared energy. An internal state machine allows the device to be put into a low power state between RGBC, proximity and gesture measurements providing very low power consumption.

**KEY FEATURES**

- Miniature package size: L3.94 × W2.36 × H1.35 mm
- I²C interface compatible with dedicated interrupt pin
- High sensitivity enabling operation behind darkened glass
- RRGB light sensing with integrated UV-IR block filter
- Geometrically arranged RRGB photodiodes providing uniform angular response
- Calibrated to 100 mm detection distance eliminating customer end product calibration
- Four separate photodiodes sensitive to different directions
- Proximity and gesture sensing with integrated visible block filter
- Patented shield design minimizing proximity cross talk
- Integrated optical lens collimating IR LED beam and improving photodiode sensitivity.
- Low power consumption: 1.0 µA typical in sleep mode

**APPLICATION EXAMPLES**

- Display backlight control
- Correlated color temperature sensing
- Cell phone touch-screen disable
- Digital camera touch-screen disable
- Mechanical switch replacement
- Gesture detection
AUTOMOTIVE R² COUPLER
Industry's First Automotive Grade Photovoltaic Driver for Under-the-Hood Applications

Automotive Photovoltaic MOSFET Driver with R² Coupler™ Isolation is an optocoupler-based photovoltaic driver device designed to drive high voltage MOSFET and withstand extreme heat for automotive under-the-hood applications.

The ACPL-K30T is optimized for use in battery management systems of modern electric vehicles (EV), hybrid electric vehicles (HEV) and plug-in hybrid electric vehicles (PHEV) as well as high-temperature power systems of conventional internal combustion engine vehicles.

The ACPL-K30T is the industry’s first solid state photovoltaic driver that is automotive qualified per AEC-Q100 Grade 1. The device features high ESD rating and fast turn-off time, and is compatible with a wide selection of AEC-Q101 qualified MOSFET components to form a solid state relay solution of desired voltage or current rating. The ACPL-K30T is the latest addition to the Avago R2Coupler® family of automotive optocouplers, providing reinforced insulation and reliability for mission critical under-the-hood applications.

The device consists of an AlGaAs infrared light-emitting diode (LED) input stage optically coupled to an output detector circuit. The detector consists of a photovoltaic diode array and a turn-off circuit. The photovoltaic driver is turned on upon a minimum input current of 10 mA through the input LED. The photovoltaic driver is turned off upon an input voltage of 0.8 V or less. The ACPL-K30T is available in a stretched SO-8 package compatible with standard surface mount processes.

KEY FEATURES
- Qualified to AEC-Q100 grade 1 test guidelines
- Automotive operating temperature from -40...+125 °C
- Open circuit voltage: 7 V (Typical at LED Drive Current of 10 mA)
- Short circuit current: 5 µA (Typical at LED Drive Current of 10 mA)
- Fast turn-off time of 40 µs (Typical)
- 2 kV human body model ESD Rating
- Stretched SO-8 package compatible with standard surface mount processes
- Lead (Pb) free and RoHS 6 fully compliant

APPLICATION EXAMPLES
- Battery insulation resistance measurement/leakage detection
- Battery management system
- Solid state relay module
PHOTOCOUPLER – TLP3905/TLP3906
Photovoltaic Couplers in Small-Size SO6 Packages

The TLP3905/TLP3906 are photo-couplers in the SO6 package that consists of an infrared light emitting diode optically coupled to a photodiode array. The photodiodes are connected in series, making the TLP3905/TLP3906 suitable for MOS gate drive applications.

In addition, TLP3906 integrates a control circuit for releasing the MOSFET gate charge, ensuring a turn-off speed of 0.3 ms – approximately one third of TLP3905. TLP3906 also guarantees a minimum LED trigger current I_{FT} (max.) of 3 mA to ensure low power dissipation of LED current. The devices also provide short circuit current I_{SC} of min. 12 μA, the open voltage V_{OC} is min. 7 V.

KEY FEATURES

**TLP3905/TLP3906**
- Open voltage: 7 V (min.)
- Short current: 12 μA (min.)
- Isolation voltage: 3750 V_{RMS} (min.)
- High operating temperature: T_{OPR} = 125 °C (max.)
- Safety standards
  - UL (approved): UL1577 File No. E67349
  - cUL (approved): CSA Component Acceptance Service No. 5A, File No. E67349
  - VDE (approval pending): Option (V4) EN60747-5-5
- Note: When an EN60747-5-5 approved type is needed, please designate the Option (V4)

APPLICATION EXAMPLES

Applications
- Measuring Instruments
- MOSFET Gate Drivers
- Replacement of mechanical relays (in combination with MosFET)

Phottocoupler – TLP3905/TLP3906
Photovoltaic Couplers in Small-Size SO6 Packages

1: Anode (Input)
3: Cathode (Input)
4: Cathode (Output)
6: Anode (Output)

Packaging and Pin Assignment.
The SuperFET® II MOSFET Family is utilizing charge balance technology for outstanding low on-resistance and lower gate charge performance.

The new 800 V MOSFET family from Fairchild has the lowest gate charge for a given \( R_{DS(ON)} \) and the lowest output stored energy. The full product family of 26 devices ranges from a 60 mΩ product in a TO247 package (in development) through a 400 mΩ device in TO-220F to a 4.3 Ω product in IPAK.

The 40 % lower figure of merit results in improved system efficiency and lower thermal losses resulting in simpler heatsink design for high power density solutions. The MOSFETs are very robust with high MOSFET dv/dt ratings (100 V/ns for FCPF650N80Z), high body diode di/dt ratings (200 A/μs for FCPF650N80Z), and high avalanche rating specifications. The body diode performance is excellent with lower reverse recovery time and current specifications than comparable competitor devices.

The best-in-class reliability of the 800 V SuperFET® II MOSFET family, coupled with its excellent efficiency and thermal characteristics, makes it ideal for a variety of applications. Meanwhile, its broad range of package options gives designers tremendous flexibility, particularly with size constrained designs. Key applications for the family include LED lighting, home theater audio equipment, power adapters, servers, industrial power and auxiliary power supplies, as well as solar inverters.

**APPLICATION EXAMPLES**
- LED lighting
- Solar inverters
- Industrial power supplies
- Factory automation
- Smart metering
- Home & professional audio systems

**KEY FEATURES**
- Low figure of merit: \( Q_{GD} \) of 11 nC (for 650 mΩ device)
- Low total gate charge: \( Q_G \) of 27 nC (for 650 mΩ device)
- Low total \( E_{oss} \): 2.8 μJ at 400 V (for 650 mΩ device)
- Excellent body diode characteristics: \( t_{rr} = 365 \text{ ns}, Q_{ss} = 5.9 \mu \text{C}, V_{FMAX} = 1.2 \text{ V} \)
- High MOSFET dv/dt rating: >100 V/ns
- High body diode di/dt rating: >200 A/μs
- Integrated zener diode on gate for high ESD robustness
M-SERIES STGW40M120DF3
40 A, 1200 V Short Circuit Rugged IGBT with Ultrafast Diode

This high voltage and short-circuit rugged IGBT utilizes the advanced PowerMESH™ process resulting in an excellent trade-off between switching performance and low ON-state behavior.

Based on the third generation of trench-gate field-stop technology, the devices also benefit from improved efficiency at turn-on thanks to a latest-generation co-packaged fast recovery anti-parallel diode which also features enhanced softness.

**KEY FEATURES**
- Low on-losses
- High current capability
- Low gate charge
- Short circuit withstand time 10 μs
- IGBT co-packaged with ultrafast free-wheeling diode

**APPLICATION EXAMPLES**
- Motor control
- Inverter

![Internal schematic](image)

![Output Characteristic](image)
TPW LOW VOLTAGE MOSFET SERIES
30...100 V Dual-Side Cooling MOSFET Family

Low voltage MOSFET generation achieves very low power losses and very good cost vs. performance ratio.

The TPW Low Voltage MOSFET Series is coming in a thermally efficient, miniature DSOP Advance package that saves space and improves heat dissipation by more than 30%.

The new packages offer dual-sided cooling to significantly improve heat dissipation. This will help designers of high-component-density applications to minimize the PCB temperature and improve performance without board space penalties.

The DSOP Advance package shares the same 5 x 6 mm² footprint as a SOP Advance device. In comparative tests operating temperatures – when used in conjunction with a suitable heatsink – for 30 V MOSFETs were reduced by more than 34% at currents above 30 A. In addition, in some designs the reduced thermal resistance of a DSOP Advance package may support elimination of a heatsink.

The new series is offered with the existing UMOS VIII-H and its new UMOS IX-H families of MOSFET technologies. These technologies combine lowest on resistance ($R_{DS(ON)}$) ratings with low output capacitance to deliver ultra-efficient switching performance. DSOP Advance options will be available for a number of MOSFETs with voltage ratings between 30 V and 100 V initially.

Target applications for the new DSOP Advance MOSFETs will include high-power density, high-performance switching designs including synchronous rectification circuitry in servers and telecoms power supply equipment, as well as power tools.

KEY FEATURES

- Top-class low $R_{DS(ON)}$
- Low $Q_{oss}$ (output charge) design
- Small foot print package with excellent thermal performance

APPLICATION EXAMPLES

- TV
- STB
- Solar
- Lighting
- White goods
- Solar
- Welding
- Charger
- Converter
- Pumps
- Fan
- UPS
- Drives
- Power supply
**BC3770**

2 A Switch-Mode Dual-Path Battery Charger with High-Speed Recharging in a Small Footprint

Fully programmable switching charger with dual-path output for single-cell Li-Ion and Li-Polymer battery

Supporting a dual power path, the Freescale’s BC3770 battery charger has been designed to operate while charging the battery. Combined with the adaptive input current limiting feature, the BC3770 optimizes a dynamic share between the battery and the system.

To optimize battery lifetime and enable a full charge, the BC3770 features high voltage accuracy over the full temperature range due to the different charging process (constant current, constant voltage and trickle mode) controlled by the I²C bus.

As safety is an important requirement for battery manufacturers, the BC3770 encompasses a set of protection such as thermal regulation and protection as prime examples to avoid damaging any downstream components. Supporting 1.5 MHz switching capabilities combined with a small component count make the BC3770 perfect for system cost optimizations.

**KEY FEATURES**

- 20 V maximum protection input voltage
- Up to 2 A load current for the system or the battery
- Single cell Li-ion and Li-polymer battery support
- Dual output to both charge the battery and run the use case
  - +/-1 % voltage accuracy over full temperature range
  - +/-0.5 % voltage accuracy at 25 ºC
- Programmable interface to monitor the different charging modes
  - Constant current charge
  - Constant voltage charge
  - Trickle mode
  - 1.5 MHz switching frequency
  - 400 kHz I²C interface
  - Boost mode operation for USB OTG
  - Different types of protection (thermal protection, thermal regulation, etc.)
  - 25-bump 2.27 x 2.17 mm² WL CSP package
  - -40...85 ºC temperature range support

**APPLICATION EXAMPLES**

- Internet of Things (IoT)
- Handheld consumer devices
- Wearable market
- PoS terminals
- Medical portable equipment
- Consumer tablets
LM5160A
Wide Input 65 V, 1.5 A
Synchronous Buck/Fly-Buck™ Converter

This Buck Converter with CCM option redundatizes loop compensation.

The LM5160A shares the same features and pin configuration as the LM5160. An external bias supply can be connected to the \( V_{CC} \) pin of the LM5160A in either Buck or Fly-Buck applications. This additional capability can improve efficiency at high input voltages.

**KEY FEATURES**

- Wide 4.5...65 V input voltage range
- Integrated high and low side switches
- No schottky diode required
- 1.5 A maximum load current
- Constant on-time control
- No external loop compensation
- Fast transient response
- Selectable forced CCM or DCM operation
- CCM option supports multi-output fly-buck
- Nearly constant switching frequency
- Frequency adjustable up to 1 MHz
- Programmable soft-start time
- Pre-biased startup
- Peak current limiting protection
- Adjustable input UVLO and hysteresis
- ±1 % feedback voltage reference

**APPLICATION EXAMPLES**

- Industrial programmable logic controller
- IGBT gate drive bias supply
- Telecom primary/secondary side bias
- E-meter power line communication
- Low power isolated DC-DC (fly-buck)
- Automotive electronics

**Typical Sync-Buck Application Circuit**

**Typical Fly-Buck Application Circuit**
SoCrates II results from an upgrade offering more features and improving the functionality including high speed connectivity.

The core device is an Altera Cyclone V SoC device with an 800 MHz Dual Core Arm® Cortex®-A9 processor. The customizable FPGA area in the device offers enough space to implement a variety of different peripherals, making this device ideal for many different processing applications. In addition, it is a very powerful solution for applications that need fast data processing. If the processor performance is a limiting factor, parts of the software can be hardware accelerated. Besides the classic FPGA-design, usually requiring high FPGA-skills, a different and increasingly applied approach is mainly known from high performance computing: OpenCL. The C-like Open Computing Language allows for easy parallelisation of code and offloading the CPU without requiring specific hardware knowledge. With the OpenCL board support package for SoCrates II compute kernels automatically translate into acceleration hardware.

SoCrates II can be used for innumerable applications to get an easy start for a custom specific development.

KEY FEATURES
- Altera Cyclone V SoC device
- 5CGXF6C6U23C7N Dual Cortex A9 HPS + 110k LE, 112 DSP Blocks, 5.4 MBit RAM
- Interfaces
  - 6 x 3.125 Gbit transceiver
  - 1 Gbit Ethernet, USB 2.0 OTG
  - CAN, SPI, I²C, UART-USB converter
  - 3.3 V GPIOs, user LEDs
  - LVDS connector for CMOS-sensor
  - LCD TFT interface
  - Embedded USB Blaster II
  - Dual 100 MBit Ethernet Phy – Add-on board
- Memory
  - 1 GB DDR3 memory 256 Mbit x 32
  - µSD Card Slot
  - 2 x 256 MBit QSPI Flash
- Real-time clock
- Temperature sensor
- Onboard Empirion power supply
- Easy standard development tools
- Operating systems support

APPLICATION EXAMPLES
- Industrial
- Motor control
- Industrial communication (e.g. Profinet, EtherCAT, Ethernet/IP, ...)
- HMI / visualisation / digital signage
- PLC
- Machine vision
- Video surveillance
- Renewable energies
- Solar/wind-inverters
- Smart grid communication
- Medical
- Image processing
- Visualisation
- Automotive
- Advanced driver assistance
- Driver information systems
LSM6DS3
iNEMO Inertial Module: 3D Accelerometer and 3D Gyroscope

LSM6DS3 combos creates new possibilities for the development of battery-powered smart sensor systems to be embedded in mobile and wearable devices and innovative objects for the Internet of Things (IoT).

The LSM6DS3 is a system-in-package featuring a 3D digital accelerometer and a 3D digital gyroscope (total 6-axis) performing at 1.25 mA (up to 1.6 kHz ODR) in high-performance mode and enabling always-on low-power features for an optimal motion experience. LSM6DS3 supports main OS requirements, offering real, virtual and batch sensors with 8 kbyte for dynamic data batching, thus saving power and enabling faster system reaction time. LSM6DS3 has a full-scale acceleration range from ±2...±16 g and an angular rate range from ±125...±2000 dps.

The tiny iNEMO Ultra 6-axis inertial-sensor combo delivers high noise performance while effectively managing system power with state-of-the-art technology.

Flexible FIFO memory allows the LSM6DS3 to save and batch more data before waking up the system processor, saving overall system power, too. Moreover, ST has leveraged its robust manufacturing processes for the production of its micro-machined accelerometers and gyroscopes, while manufacturing its IC interfaces using CMOS technology. This choice allows dedicated circuits to better match sensing-element characteristics.

**KEY FEATURES**

- “Always-on” experience with low power consumption for both accelerometer and gyroscope
- Power consumption: 0.42 mA in low power mode, 0.9 mA in combo normal mode and 1.25 mA in combo high-performance mode up to 1.6 kHz.
- Smart FIFO up to 8 kbyte based on features set
- Compliant with Android K and L
- Acceleration: ±2...±16 g full scale
- Angular rate: ±125...±2000 dps full scale
- Analog supply voltage: 1.71...3.6 V
- Independent IOs supply (from 1.62 V)
- Compact footprint, 2.5 x 3 mm x 0.83 mm³
- SPI/I²C serial interface with main processor data synchronization feature
- Embedded temperature sensor
- ECOPACK®, RoHS and “Green” compliant
- Sensor Hub: up to 4 external sensors with configurable data acquisition (synchronisation, data rate, number of data)
- Embedded specific IP blocks with negligible power consumption and high-performance:
  - pedometer functions with step detector and step counters, tilt and significant motion

**APPLICATION EXAMPLES**

Dead Reckoning, IoT and connected devices, Intelligent power saving for handheld devices, Vibration monitoring and compensation, Sport Watch, Gaming...
TDC1000
Ultrasonic Sensing Analog Front End for Level, Concentration, Flow & Proximity Sensing

Not only the high accuracy to identify the correct concentration is special, the TDC1000 is also programmable to adapt to multiple applications and varying tank or pipe sizes!

The TDC1000 is a fully integrated analog front-end (AFE) for ultrasonic sensing measurements of level, fluid identification/concentration, flow, and proximity/distance applications common in automotive, industrial, medical, and consumer markets. When paired with an MSP430/C2000 MCU, power, wireless, and source code, TI provides the complete ultrasonic sensing solution.

TI’s Ultrasonic AFE offers programmability and flexibility to accommodate a wide-range of applications and end equipment. The TDC1000 can be configured for multiple transmit pulses and frequencies, gain, and signal thresholds for use with a wide-range of transducer frequencies (31.25 kHz to 4 MHz) and Q-factors. Similarly, the programmability of the receive path allows ultrasonic waves to be detected over a wider range of distances/tank sizes and through various mediums.

Selecting different modes of operation, the TDC1000 can be optimized for low power consumption, making it ideal for battery powered flow meters, level instrumentation, and distance/proximity measurements. The low noise amplifiers and comparators provide extremely low jitter, enabling picosecond resolution and accuracy for zero and low flow measurements.

KEY FEATURES
- Automotive AEC-Q100 (TDC1000-Q1)
- Measurement range: up to 8 ms
- Operating current: 1.8 µA (2 SPS)
- Transmitter channels TX1/TX2:
  - Supports single or dual-transducer application
  - Programmable excitation: 31.25 kHz to 4 MHz, Up to 31 pulses
- Receiver channels RX1/RX2:
  - STOP cycle-to-cycle jitter: 50 ps (RMS)
- Low-noise and programmable gain amplifiers
- Access to signal chain for external filter design
- Programmable threshold comparator for echoqualification
- Automatic channel swapping for differential time-of-flight (TOF) measurement
- Programmable low power mode for long TOF measurements

APPLICATION EXAMPLES
- Fluid level sensing
- Proximity & distance sensing

Typical Application
As part of Atmel SmartConnect Product Family, now you have a choice of standalone fully integrated FCC-certified Wi-Fi module with MCU and hardware security from a single source.

Atmel offers two different SMART SAMW25 Wi-Fi modules:

- The ATSAMW25H18-MR210PB based on Atmel’s WINC1500 low-power Wi-Fi 2.4 GHz IEEE 802.11 b/g/n SoC (System on Chip), Atmel’s latest ARM® Cortex®-M0+ microcontroller technology and
- The ATSAMW25H18-MR510PB, additionally equipped with Atmel’s ATECC508 CryptoAuthentication device with optimized crypto engine for ultra-secure hardware-based key storage.

The SAMW25 module is the ideal solution for designers with few or no previous Wi-Fi experience with 802.11, TCP/IP Stack or RF. This turnkey system provides ease-of-use for designers by providing an integrated software solution with application and security protocols such as TLS and integrated network services (TCP/IP stack) along with hardware security all paired with a powerful Cortex-M0+ based MCU in a “plug and play” module. There is no need to be a Wi-Fi or CryptoAuthentication expert.

The Wi-Fi SOC and MCUs are optimized for battery-powered applications with a 2.7...3.6 V voltage range and a 4 µA deep sleep current with an instant on/off radio architecture which supports up to 20 dBm output power. This results in an ultra-low power profile when implemented in an IoT edge node sending data to an SSL server several times per day. With the SAMW25, Wi-Fi can now penetrate markets and products requiring years of battery life.

The ATECC508A provides a full turnkey ECDSA engine using key sizes of 256 or 283 bits – appropriate for modern security environments without long computation delay typical for software solutions. Able to generate high quality FIPs random number and employ them for any purpose, e.g. device’s crypto protocols, their inclusion in the protocol calculation ensures that replay attacks (re-transmitting a previously successful transaction) always fails.

### APPLICATION EXAMPLES
- Mobile Electronics
- Smart Energy
- Lighting
- Internet of Things
- Industrial Automation
- Home Entertainment
- Building Automation
- Large I/O Devices

### KEY FEATURES
- IEEE 802.11 b/g/n (1 x 1) for up to 72 Mbps
- Superior sensitivity and range via advanced PHY signal processing
- Wi-Fi Direct, station mode and Soft-AP support
- Supports IEEE 802.11 WEP, WPA
- On-chip memory management engine to reduce host load
- 4 Mbit internal Flash memory with OTA firmware upgrade
- SPI, UART and I2C as host interfaces
- TCP/IP protocol stack (client/server) sockets applications
- Network protocols (DHCP/DNS), including secure TLS stack
- WSC (wireless simple configuration WPS)
- Ease of use:
  - 30+ software examples
  - Extensive documentation
- Atmel Studio support

### ATSAMW25H18-MR210PB
- 4 KB Flash
- 1 KB RAM
- with a powerful Cortex-M0+ based MCU in a “plug and play” module.
- There is no need to be a Wi-Fi or CryptoAuthentication expert.

### ATSAMW25H18-MR510PB
- 4 KB Flash
- 1 KB RAM
- with a powerful Cortex-M0+ based MCU in a “plug and play” module.
- There is no need to be a Wi-Fi or CryptoAuthentication expert.
VESTA – CNX100SB
Wireless Sub-GHz Module for IP500 Mesh Networks

Vesta is a module supporting wireless asynchronous mesh networks in the Sub-GHz frequency bands.

It fulfills the requirements of the IP500 Alliance, an open wireless standard solution for smart building management, smart home and wireless security.

Together with the low power microcontroller and a wide range of peripherals, Vesta uses the best-in-class sub-GHz RF technology to meet the long distance reach requirements, high data rate throughput and security expectations. The native IP500 protocol stack and the BACnet application interface allow an easy integration into customers’ systems by using a standard API through AT commands.

Vesta is ideally suited for web-based smart control and asset tracking due to integrated IPv6 support and generic BACnet application interface.

KEY FEATURES
- Operating frequency 868/915/.../928 MHz
- Modulation scheme O-QPSK
- Asynchronous mesh network
- Native IP500® protocol stack
- IPv6 support
- Ultra low power design
- Sub-GHz operation frequency
- IEEE 802.15.4, 6LoWPAN
- Compact dimensions: 15 x 34 mm²
- Operating supply voltage: 2.7...3.6 V
- Connections: I²C, SPI, UART, antenna
- BACnet application support through AT command interface
- Operating temperature range -40...+85 °C

APPLICATION EXAMPLES
- Smoke detectors
- Emergency lighting
- Emergency door and window controls
- Exit door controls
- Smart commercial buildings and homes
- Wireless automation
- Smart metering
- Low power sensor networks
- Intelligent eco energy management
- Wireless security
The Cypress CYBLE-022001-00 is a pre-certified and pre-qualified module for supporting Bluetooth® Low Energy (BLE) wireless communication.

The CYBLE-022001-00 is a turnkey solution and includes onboard crystal oscillators, chip antenna, passive components, and Cypress PRoC™ BLE.

In addition, the CYBLE-022001-00 supports a number of peripheral functions (ADC, timers, counters, PWM) and serial communication protocols (I²C, UART, SPI) through its programmable architecture.

The CYBLE-022001-00 module includes a royalty-free BLE stack compatible with Bluetooth 4.1 and provides up to 16 GPIOs in a small – 10 × 10 × 1.80 mm³ package. It is a complete solution and an ideal fit for applications requiring BLE wireless connectivity

Bluetooth Qualification: Cypress’s EZ-BLE PRoC module has passed Bluetooth SIG qualification and is now listed on the Bluetooth SIG website.

RF Regulatory Certification: EZ-BLE PRoC module complies with the FCC (USA), IC (Canada), MIC (Japan), CE (Europe) and KC (Korea) regulations. Please check the datasheet for details.

KEY FEATURES

- Small 10 × 10 × 1.8 mm³ footprint
- Pre-certified to enable faster design cycles
- Bluetooth® 4.1 qualified with QDID Compliant with international RF regulations: FCC (USA), IC (Canada), MIC (Japan), CE (Europe) and KC (Korea)
- PSoC® Creator™ Integrated Development Environment
- 48-MHz ARM® Cortex®-M0 microcontroller
- 32-bit processor (0.9 DMIPS/MHz)
- 128-KB flash and 16-KB SRAM
- Bluetooth 4.1 compliant Bluetooth® Low Energy (BLE) radio
- Integrated balun, -91-dBm Rx sensitivity, up to +3-dBm Tx power
- CapSense™ touch controller
- Touch-based buttons/sliders/touchpads SmartSense™ Auto-Tuning
- Multiple interface options
- 2 × serial communication blocks configurable as UART, I²C or SPI
- I²S for audio
- 16 GPIOs
- Additional on-board resources
  - 1 × 12-bit, 1 MspS SAR ADC
  - 4 × Timer/Counter/PWMs
  - 24 MHz and 32.768 kHz crystals on-board

APPLICATION EXAMPLES

The module supports any application that needs simple Bluetooth smart-based wireless connectivity.

PSoC Creator™ provides an easy-to-use integrated design environment (IDE) to configure, develop, program, and test a BLE application.
MAIA
Wireless Sub-GHz Module with proven M-Bus and OMS Stack

High quality, low power RF module in a compact form factor including an industry proven wireless M-Bus and OMS-layer to OMS 3.X and OMS 4.X specifications

Maia is a single embedded low cost wireless M-Bus RF Module developed specially for the AMR (Automatic Meter Reading) smart metering and smart grid infrastructure where the Wireless M-Bus standard (EN13757-4) and OMS standards are used.

The high quality, small form factor makes it ideal for SMD assembly. The module offers low power consumption which is achieved with STM’s ultra-low power microcontroller STM 32L05 and SPIRIT1, the low power Sub-GHz data rate transceiver. Also on board is an ultra-miniature balun, BALF-SPI-01D3 matching SPIRIT1 and supporting the connection to an external antenna, therefore saving space and cost.

In addition, Maia includes an industry proven wireless M-Bus and OMS-layer to OMS 3.X and OMS 4.X specifications. As the user can integrate their region-specific application layer there is no need for an external host controller. The module is also pre-certified, compliant with R&TTE and conform to CE regulations.

KEY FEATURES

- Small size 14.5 x 13.4 mm² for SMD mounting
- 2.0...3.8 V supply voltage, ultra low power modes
- Low power down to 0.27 nA
- Completely shielded
- Output power: +11 dBm
- Wireless m-Bus EN13757-4:2013 and OMS stack with application examples for several kind of meters
- Users application space for customer application
- Connection for external antenna
- Small foot print
- UART/SPI-interface
- Wake-up-Timer using crystal
- Encryption Mode 5 & 7, (AES-128, CMAC)
- Targeted for easy and fast time to market wireless m-Bus and OMS applications

APPLICATION EXAMPLES

- Wireless m-Bus
- Automatic Meter Reading (AMR)
- Advanced Metering Infrastructure (AMI)
- Gas and water meters
- Electricity meters
- Heat meters, heat cost allocators
- Readers and concentrators

Maia Block Diagram
Apps Available at EBV!

Download Now!

For more information, please visit the EBV App Store at www.ebv.com/app.