POWERED UP AND READY TO GO

Renesas and Intersil are now one company

2017.05
RENESAS AND INTERSIL: PROCESSORS AND POWER
To take your design capabilities virtually anywhere.

Complete system solutions at your fingertips.

In today’s fast paced technology environment, designers need to be innovative without compromising time to market. Thinking at the system level is crucial to being able to address design challenges upfront. By offering quality solutions for the two most critical parts of your design, processors and power, Renesas accelerates your development and enables differentiation, while bringing predictability to your application. Whatever your product field – automotive, industrial, home electronics, office automation or information communication technology – Renesas, with Intersil, is the partner you can rely on from design to production.

Renesas Electronics delivers trusted embedded design innovation with complete semiconductor solutions that enable billions of connected, intelligent devices to enhance the way people work and live – securely and safely. The number one global supplier of microcontrollers, and a leader in SoC and analog and power products, Renesas provide the expertise, quality, and comprehensive solutions for a broad range of applications, including automotive, industrial, and home electronics, to help shape a limitless future.

The number one supplier of microcontrollers

The leading provider of innovative power management and precision analog solutions

Intersil’s products form the building blocks of increasingly intelligent, mobile and power hungry electronics, enabling advances in power management to improve efficiency and expand battery life. With a deep portfolio of intellectual property and a rich history of design and process innovation, Intersil is the trusted partner to leading companies in some of the world’s largest markets, including industrial and infrastructure, mobile computing, automotive and aerospace.
SUPERIOR PROCESSING FOR ALL OF YOUR EMBEDDED DESIGN NEEDS

RENESAS SYNERGY™ PLATFORM

Develop from the API and innovate more with the Renesas Synergy Platform

The Renesas Synergy Platform integrates a scalable family of microcontrollers with a commercial-grade real-time operating system and middleware, and provides application frameworks that expose scalable Application Programming Interfaces (APIs). All the elements of the Synergy Platform are designed from the ground up as a single platform to provide unprecedented scalability and compatibility, not just across hardware, but also across software, allowing unparalleled design reuse.

Standardized API
- Abstracts dependencies, ensures portability, and accelerates product development
- Provides easy access to the SSP and Software Add-Ons

Powerful Software
- Consists of widely-deployed, commercial-grade ThreadX™, RTOS, extensive Middleware, Application Frameworks, Functional Libraries, and Hardware Abstraction Layer (HAL) Drivers

Versatile Microcontrollers
- Comprised of low-power Cortex®-M chips to high-performance Cortex®-A based chips
- Up to 4 MB of flash and cryptographic algorithms in hardware

Rich Tools & Kits
- Includes industry-leading IDE, debugger and design tools: IAR, GNU, and more

Software Add-Ons
- Verified Software Add-ons (VSA) add specially functions from third-party experts, certified by Renesas to be SSP compatible
- Qualified Software Add-ons (QSA) are tested, licensed, and serviced by Renesas

Full Solution
- Application Examples (AEs) to highlight key technologies enabled by the Synergy Platform
- Product Examples (PEs) provide design instances of actual products for a great start

Single-Source Delivery
- Implies the online destination for everything related to Synergy Software
- Go to production with simple click-through licensing

Range, Features, Scalability, and much more.
- The Renesas Synergy Platform includes four different series of upward software-, architecture-, and pin-compatible Synergy MCUs. The advanced ST7 Series (High Performance), S5 Series (High Integration), S3 Series (High Efficiency), and S1 Series (Ultra-Low Power) MCUs utilize the popular ARM® Cortex®-M CPU architecture. The devices implement easy connectivity, rock-solid security, dependable safety, and facilitate the creation of easy-to-use human-machine interfaces.

The high-performance ST7 Series MCUs feature secure connectivity and industry-leading flash memory density. The highly integrated S5 Series MCUs balance processing performance with large memory and an extensive array of built-in features. High-efficiency S3 Series MCUs are low-power chips that integrate up to 1 MB of Flash and 192 KB of SRAM. Ultra-low-power S1 Series MCUs operate down to 16 V and feature low-power operating modes and fast wake-up times.

The Renesas Synergy Gallery

To learn more, visit: synergygallery.renesas.com

To learn more, visit: www.renesas.com/RZ
High Performance

- With the RX21 core, newer RX00/RX0100 MCUs offer 2.0 DMIPS/MHz and 4.25 CoreMark/MHz with enhancements for floating point and DSP operations
- Industry’s only 40 nm embedded flash process with zero wait states up to 120 MHz, integrating up to 4 MB Flash and 512 KB SRAM
- With RX21 CPU core and 40 nm, RX00/RX0101 consume only 133 μA per MHz with peripherals off

Superior Connectivity

- Dual Ethernet with IEEE 802.11
- Dual USB with high-speed support
- 16-bit parallel data interface
- Camera Interface with 8-bit parallel interface
- Two-channel 8-bit compliant serial sound interface

Low Power/Fast Wake-up

- 180 μA/MHz (peripheral off)
- 350 nA in standby mode
- 4 μs wake-up time

DSP Ready

- Single-cycle MAC
- Hardware-based divide
- Extended DSP library

Best-In-Class Performance

- 3.08 CoreMark™/MHz
- 1.82 DMIPS/MHz

Advanced Peripherals

- Capacitive Touch
- USB 2.0
- LCD Control
- Safety

To learn more, visit: www.renesas.com/RX

RL78 FAMILY MICROCONTROLLERS

The True Low Power™ Microcontroller Platform

The RL78 Family of microcontrollers combines advanced low-power technology, outstanding performance, and the broadest lineup in its class for the most demanding 8- and 16-bit embedded applications.

RL78 MCUs’ innovative “Snooze” mode achieves ultra-low power by allowing ADC operation and serial communication while the CPU is turned off. This makes the RL78 MCUs best-in-class for low-power applications.

Why RL78?

- World’s leading low-power performance for equivalent MCUs in its class
- Scalability of lineup, including smart pin layout
- Cost-effective features
- Wide voltage operation
- Wide temperature operation
- Built-in safety features

True Low Power

- 65 μA/MHz operation
- 0.57 μA (RTC & LVD)
- Snooze mode

Broad Scalability

- 10 to 128 pins
- 1 KB to 512 KB Flash
- Full compatibility

System Cost Reduction

- Data flash with 1 million erase cycles
- 32 MHz internal oscillator (-3%)
- Built-in temperature sensor and Vref

High Efficiency

- Up to 1.20 DMIPS/MHz
- 1.8 V to 5.5 V operation
- Up to 32 MHz operation

High Quality and Safety

- Flash memory with ECC
- IEC60730 safety functions
- High temperature support

Extensive Ecosystem

- Industry-standard development tools
- Third-party support
- Online resources

To learn more, visit: www.renesas.com/RL78
NEXTE-GENERATION POWER MANAGEMENT AND PRECISION ANALOG PRODUCTS

INTERSIL AUTOMOTIVE ICs
ADAS, Infotainment, EV/HEV, and Display Solutions
High performance and precision infotainment, EV/HEV, and display ICs focused on environment, safety, connectivity, and affordability for the automotive market.

Intersil offers both standard and AEC-Q100-qualified products for automotive applications.

ADAS, Infotainment, and Display
Intersil has leveraged its extensive mixed signal video and display processing expertise to create unique and robust IC products specifically tailored to the requirements of the automotive display market.

Automotive Power and Analog
From single to multiple core embedded processors to GPUs and FPGAs, Intersil has a wealth of power experience to deliver versatile and efficient solutions for your next infotainment, navigation, or telematics platform.

Battery Management
Intersil’s automotive grade Li-ion Battery Management Solutions (BMS) are specifically designed to meet the stringent safety, reliability, and performance requirements of next-generation electric vehicle applications.

ISL78226
Industry’s First 6-Phase Bidirectional PWM Controller Enables Rapid Adoption of 48V Hybrid Powertrains
Intersil’s ISL78226 bidirectional controller is designed to perform buck and boost power conversions between 12V and 48V automotive buses. A single automotive-grade ISL78226 delivers up to 3.75kW at greater than 95% conversion efficiency, and is able to interleave conversions between 12V and 48V automotive buses. A single automotive-grade ISL78226 designed to meet the stringent safety, reliability, and performance requirements of next-generation electric vehicle applications.

Key Features
- Master/slave architecture supports up to 4 ICs in parallel
- Average phase-to-phase current balancing and average current output
- Cycle-by-cycle peak current limiting, negative current limiting, and digitally programmable average current limit
- Dual-output flyback controller and 200mA adjustable output linear regulator
- AEC-Q100 Grade-1 qualified for operation from -40°C to +125°C

ISL79985
Video Decoder with MIPI-CSI2 Interface Generates Excellent 360-Degree Image Quality for ADAS
Intersil’s ISL79985 4-channel video decoder features a MIPI-CSI2 output interface that supports the latest SOCs and ADAS processors, while also lowering the system’s EMI profile. The highly integrated decoder replaces up to nine discrete components with a single chip to preserve critical board space.

Key Features
- Four NTSC/PAL/SECAM analog video decoders and 10-bit ADCs with differential and single-ended inputs
- Programmable automotive short diagnostics — short-to-battery and short-to-ground detection — on each differential input channel
- Automatic Contrast Adjustment (ACA) image enhancement feature dynamically optimizes brightness and contrast levels
- Integrated PLL to generate high-frequency outputs
- AEC-Q100 Grade-2 qualified for operation from -40°C to +105°C

INTERSIL INDUSTRIAL POWER SOLUTIONS
A Complete Power Solution
Intersil offers a complete portfolio of high-performance power solutions for processor, controller, DSP, FPGA, CPLD, DDR memory or other load in your system. Whether you need standard linear regulators, fully flexible PWM controllers, or fully integrated plug-and-play power modules, these products are tailored to meet your design challenges.

LDGs
- Fast transient response
- Best-in-class ±1% initial accuracy and ±2% total DC accuracy over full temp range
- Very low dropout (18mV @ 2A typ)
- Best-in-class package power density (Up to 3A per 9mm2)

Switching Regulators
- Complete portfolio
- Robust and reliable
- High integration

Analog Controllers
- Remote sense, Power-Good, Enable, adjustable soft-start
- Extensive protection (OCP, OVP, OTP, SCP)
- Reference tracking, voltage marging
- Pre-biased startup, external compensation
- External frequency synchronization

FPGA Power Solutions
- Xilinx
- Intel (formerly Altera)
- Microsemi
- Lattice

TARGET APPLICATIONS

PowerCompass Multi-Load Configurator
The PowerCompass™ tool makes product selection easy — quickly find Intersil parts that match your requirements, set up multiple rails if needed, perform high-level system analysis, and generate reference design files.

To learn more, visit: www.intersil.com/powercompass

To learn more, visit: www.intersil.com/12v-buck-regulators
### ISL94202

**Stand-alone Battery Protection System Accurately Monitors and Balances Rechargeable Battery Packs**

The ISL94202 battery pack monitor enables ultra-small two-terminal designs, and accurately monitors, protects, and cell balances rechargeable battery packs to ensure safe operation and charging. The device supports Li-ion and other battery chemistries used in applications such as vacuum cleaners, lawn equipment, handheld power tools, e-bikes, scooters, toys, and energy storage systems.

<table>
<thead>
<tr>
<th>Stand-alone Battery Management System</th>
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<tbody>
<tr>
<td><strong>Five pre-programmed stages that</strong></td>
<td><strong>accurately control each cell of a</strong></td>
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**Programmable Protection and Monitoring Features**

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<td><strong>Safeguard battery packs from catastrophic events such as short-circuit conditions and cell voltage shorts</strong></td>
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<th>Highest Level of Integration</th>
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<td><strong>Cell voltage level shift, automatic cell balance, 14-bit ADC, current sensor monitor, power FET control, temperature sensor interface</strong></td>
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**Target Applications**

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<td><strong>Power tools</strong></td>
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<td><strong>Light electric vehicles</strong></td>
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<tr>
<td><strong>Portable equipment</strong></td>
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To learn more, visit: www.intersil.com/cellbalancing