The RZ/G3S microprocessor is embedded with a Cortex®-A55 (1.1 GHz) CPU and two Cortex®-M33 CPUs (250MHz), 16-bit LPDDR4/DDR4 interface and supports low-power mode. The built-in PCI Express interface enables high-speed connectivity with 5G wireless modules. Additionally, the device boasts enhanced security features such as tamper detection working in low power mode to ensure data security. These features make the device ideal for IoT applications including home gateways, smart meters, and tracking devices.

**Key Features**
- Cortex-A55 1.1GHz
- Cortex-M33 250MHz x 2 cores (One Cortex®-M33 has FPU function)
- LPDDR4 or DDR4 Memory interface
- PCIe Gen2 1lane
- USB2.0 interface 2ch
- SD interface 3ch
- Gigabit Ethernet 2ch
- CAN interface (CAN-FD) 2ch
- 12-bit ADC 8ch

**Benefits**
- Low power standby & fast wake up to Linux application
- Faster processing speed through application load distribution among the three cores - CA55 x1 and CM33 x2 embedded in the CPU system
- Optimize data aggregation with peripherals - PCIe, CAN and ADCs
- Enhanced security with tamper detection

**Applications**
- IoT Edge Equipment
- Secure Home Gateway

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### RZ/G3S Block Diagram

**System**
- Arm Debugger (CoreSight)
- Arm TrustZone
- DMAC
- Interrupt Controller
- PLL/SSCG
- MPU (Message Handling Unit)
- Power management (SLEEP, Software Module standby)
- VBAT Backup (RTC, Tamper Detection)
- 1 x Thermal Sensor Unit

**Timers**
- 1 x RTC
- 8 x 32bit GTM
- 1 x 32bit MTU3
- 8 x 16bit MTU3
- 8 x 32bit PWM
- 3 x WDT

**CPU**
- Cortex-A55 Single
  - 1.1GHz
  - L1-cache: 32KB (Parity)
  - D-cache: 32KB (ECC)
  - L3 cache: 256Kbytes (ECC)
- Cortex-M33
  - 250MHz
  - w/o FPU
  - 8 x 32bit GTM
  - 1 x 32bit MTU3
  - 8 x 16bit MTU3
  - 8 x 32bit PWM
  - 3 x WDT

**Memory**
- RAM 1MB (ECC)

**Audio**
- 4 x SSI (I2S)
- RSPDIF
- 3x PDM
- SRC

**Security**
- Secure Boot
- Secure Crypto Engine
- TRNG
- Secure JTAG
- OTP
- Tamper detection

**Interfaces**
- LPDDR4/DDR4 w/OTFDE*
- 16bit x 1.6Gbps
- xSPI w/OTFDE
- 1 x SDHI(UHS-I/MMC)
- 2 x SDHI(UHS-I)
- 1 x USB2.0 Host / Function (OTG)
- 1 x USB2.0 Host
- 1 x PCIe Gen2 (Root Complex(RC))
- 2x Gbit Ether MAC
- 4 x I2C
- 1 x I3C
- 6 x SCIF (UART)
- 5 x SPI
- 2 x CANFD
- GPIO

**Analog**
- 8 x 12bit ADC (1unit)

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* OTFDE: On-The-Fly Decryption/Encryption
RENESAS RZ/G3S GROUP

Evaluation Board Kit (EVK)

The RZ/G3S EVK consists of a SMARC v2.1 module board and a carrier board. You can easily evaluate each device by replacing the System On Module (SOM).

- P/N: RTK9845S33S01000BE
- Product name: RZ/G3S SMARC Evaluation Board Kit

Module Board Functions
- RZ/G3S R9A08G045S33GBG x1pc
- LPDDR4 SDRAM: 1GB × 1pc
- SPI flash memory: 128Mb × 1pc
- eMMC memory: 64GB × 1pc
- PMIC power supply RAA215300A2GNP#HA3 implemented
- microSD card x2
- I2C connector
- JTAG connector
- ADC x8 channels
- Current monitor (USB Micro B)

Carrier Board Functions
- Gigabit Ethernet x2
- USB2.0 x2ch (OTG x1ch, Host x1ch)
- CAN-FD x2
- microSD card x1
- Mono speaker, Stereo headphone, Mic., and Aux.
- PMOD x2
- USB-Type C for power input
- PCIe Gen2 4-lane slot (G3S supports only 1-lane)
- M.2 Key E
- M.2 Key B and SIM card
- Coin cell battery holder (3.0V support)

Ordering Information

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For more information, visit: renesas.com/rzg3s