General Description

Based on the SmartBond DA14695 Bluetooth® low energy 5.2 system on chip (SoC), the DA14695 Module brings out all the DA14695 hardware features and capabilities. The module integrates all passives, antenna, a 32Mbit QSPI FLASH and is supported by software that is easy to work with. The DA14695 Module targets broad market use and will be certified across regions providing significant reductions in development cost and risks, and time-to-market.

The DA14695 is a multi-core wireless microcontroller, combining the latest Arm® Cortex®-M33 application processor with floating-point unit, advanced power management functionality, a cryptographic security engine, analog and digital peripherals, a dedicated sensor node controller, and a software configurable protocol engine with a radio that is compliant to the Bluetooth® 5.2 low energy standard.

The DA14695 is based on an Arm® Cortex®-M33 CPU with an 8-region MPU and a single-precision FPU offering up to 144 dMIPS. The dedicated application processor executes code from embedded memory (RAM) or external QSPI FLASH via a 16 kB 4-way associative cache controller, which is equipped with an on-the-fly decrypting capability without extra wait states.

Bluetooth® 5.2 connectivity is guaranteed by a new software-configurable Bluetooth® low energy protocol engine (MAC) with an ultra-low-power radio transceiver, capable of +6 dBm output power and -96 dBm sensitivity offering a total link budget of 102 dB.

An optimized programmable sensor node controller allows sensor node operations and data acquisition without CPU intervention, achieving best-in-class power consumption. The advanced power management unit of the DA14695 enables it to run on primary and secondary batteries, as well as provide power to external devices through the integrated SIMO DCDC and integrated LDOs. The on-chip JEITA-compliant hardware charger makes it possible to natively charge rechargeable batteries over USB. A variety of standard and advanced peripherals enable interaction with other system components and the development of advanced user interfaces and feature-rich applications.

Key Features

- Bluetooth
  - Compatible with Bluetooth® 5.2, ETSI EN 300 328 and EN 300 440 Class 2 (Europe), FCC CFR47 Part 15 (US) and ARIB STD-T66 (Japan)
  - Supports up to eight connections
  - Supports up to 2 Mbps throughput
  - Renesas registered BD address preprogrammed in OTP
- Processing and memories
  - 32 kHz up to 96 MHz 32-bit Arm Cortex-M33 with 16 kB, 4-way associative cache and FPU
  - A flexible and configurable Bluetooth® LE MAC engine implementing the controller stack up to HCI
  - A sensor node controller running uCode for sensors manipulation
  - 4 MB onboard FLASH
  - 512 kB RAM
  - 128 kB ROM
  - 4 kB OTP
- Current Consumption
  - 1.8 mA RX at V_{BAT} = 3 V
  - 3 mA TX at VBAT = 3 V and 0 dBm
  - 18.4 µA at sleep with all RAM retained
- Radio
  - Programmable RF transmit power from -18 to +6 dBm
  - -96 dBm receiver sensitivity
- Interfaces
  - Up to 40 General Purpose IOs
  - Decrypt-on-the-fly QSPI FLASH interface and Separate QSPI PSRAM interface
  - SPI LCD Controller with own DMA
  - 4-channels 10-bit SAR ADC, 3.4 Msamples/sec
  - 4-channels 14-bit ΣΔ ADC, 1000 samples/sec
  - 2 x general purpose timers with PWM
  - 3 x UARTs up to 1 Mbps, one UART extended to support ISO7816
  - 2 x SPI+™ controllers

- 2 x I2C controllers at 100 kHz, 400 kHz, or 3.4 MHz
- 1 x PDM interface with HW sample rate converter
- 1 x I2S/PCM master/slave interface up to eight channels
- USB 1.1 Full Speed device interface

- Power Management
  - Operating range: from 2.4 V to 4.75 V
  - Hardware charger (up to 5.0 V) with programmable curves and JEITA support
  - Programmable thresholds for brownout detection
- Other
  - Real Time Clock
  - Trimmed 32 MHz Crystal
- Packaging
  - 15.85 mm x 20 mm x 2.5 mm package
- Module software Development Kit
  - SDK10 support
  - MicroPython/Zephyr support
- Module software tools
  - Flash/OTP programmer
  - SUOTA support
  - Battery Life Estimation
  - Data Rate Monitoring
  - Real-Time Power Profiling
  - Production Line Testing
- Standards conformance
  - BT SIG QDID 149229
  - Europe (CE/RED)
  - US (FCC)
  - Canada
  - Japan
  - South Korea
  - Taiwan
  - South Africa
  - Brazil
  - China
  - Thailand
  - India

Applications

- Beacons
- Positioning
- Proximity tags
- Low Power Sensors
- Commissioning/Provisioning
- RF pipe
- Industrial applications
- Data acquisition
- Wellness
- Infotainment
- IoT
- Robotics
- Gaming

Operation frequency; 2402MHz-2480MHz

Max antenna gain: -0.2dBi