

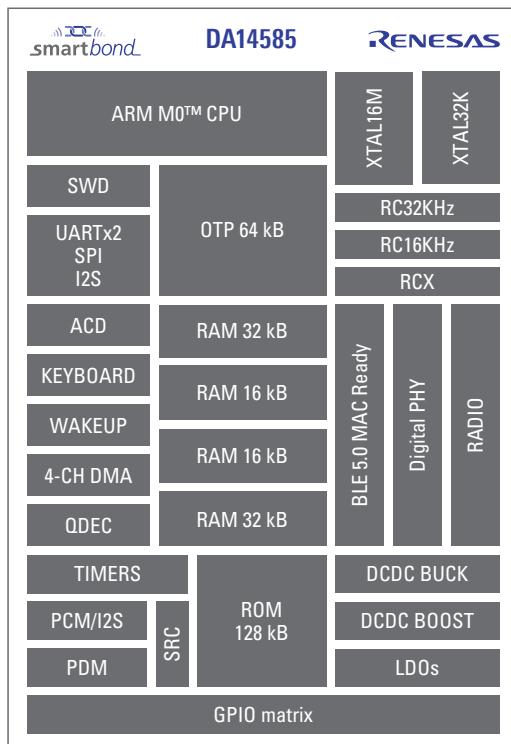
Smallest, lowest power and most integrated Bluetooth 5 SoC

# SMARTBOND™ DA14585

Connected devices are constantly evolving. New generations appear that are smarter, more full featured and have longer battery lifetimes. To enable this, **SmartBond** has evolved too. The DA14585 offers designers all the benefits of the industry-leading DA14580 but with even greater flexibility to create more advanced applications from the smallest footprints and power budgets.

As part of the Renesas SmartBond family, the DA14585 is the smallest, lowest power and most integrated Bluetooth® solution available. This versatile SoC is ideal for adding Bluetooth low energy to products like remote controls, proximity tags, beacons, connected medical devices and smart home nodes. It supports all Bluetooth developments up to and including Bluetooth 5 and Bluetooth low energy Mesh. Plus, with 96 kB of RAM, the DA14585 has double the memory for user applications of its predecessor to take full advantage of the standard's features. It also includes an integrated microphone interface for voice support at low additional cost. The wide supply voltage range (0.9–3.6 V) covering a larger choice of energy sources and gives full design flexibility.

Like all SmartBond solutions, the DA14585 is easy to design-in and supports standalone as well as hosted applications. It is supported by a complete development environment and Renesas' **SmartSnippets™** software that helps you optimize your software for power consumption.



## Applications

- Remote controls
- Proximity tags and trackers
- Beacons
- Connected medical devices
- Smart home
- Human Interface Devices
- VR controllers
- Connected sensors
- Wireless charging

## SoC Features

- Complies with Bluetooth 5.0, ETSI EN 300 328 and EN 300 440 Class 2 (Europe), FCC CFR47 Part 15 (US) and ARIB STD-T66 (Japan)
- Supports up to 8 Bluetooth LE connections
- Fast cold boot in less than 50 ms
- Processing units
  - 16 MHz 32 bit ARM Cortex-M0 with SWD interface
  - Dedicated Link Layer Processor
  - AES-128 bit encryption Processor
- Memories
  - 64 kB One-Time-Programmable (OTP) memory
  - 96 kB Data/Retention SRAM
  - 128 kB ROM Operating System and protocol stack
- Power management
  - Integrated Buck/Boost DCDC converter
  - P0, P1, P2 and P3 ports with 3.3 V tolerance
  - Easy decoupling of only 4 supply pins
  - Supports coin (typ. 3.0 V) and alkaline (typ. 1.5 V) battery cells
  - 1.8 V cold boot support-buck mode
  - 0.9 V cold boot support-boost mode
  - 10-bit ADC for battery voltage measurement
- Digital controlled oscillators
  - 16 MHz crystal ( $\pm 20$  ppm max) and RC oscillator
  - 32 kHz crystal ( $\pm 50$  ppm)
  - RCX oscillator ( $\pm 500$  ppm max)
- Flexible Reset Circuitry
  - System & Power On Reset in a single pin
- General purpose, Capture and Sleep timers
  - Digital interfaces
  - Gen. purpose I/Os: 14 (WL-CSP34), 25 (QFN40), 32 (QFN48)
  - 2 UARTs with hardware flow control up to 1 MBd
  - SPI+™ interface
  - I<sup>2</sup>C bus at 100 kHz, 400 kHz
  - 3-axes capable Quadrature Decoder
- Analog interfaces
  - 4-channel 10-bit ADC
- Radio transceiver
  - Fully integrated 2.4 GHz CMOS transceiver
  - Single wire antenna: no RF matching or RX/TX switching required
  - Current consumption with supply voltage equal 3 V:
    - TX: 3.4 mA, RX: 3.7 mA (with ideal DC-DC)
  - +0 dBm transmit output power
  - -20 dBm output power in 'Near Field Mode'
  - -93 dBm receiver sensitivity
- Packages
  - QFN 40 pins, 5 mm x 5 mm x 0.9 mm
  - WLCSP 34 pins, 2.40 mm x 2.66 mm x 0.39 mm

## Bluetooth 5.0

Supporting the Bluetooth 5.0 core specification, DA14585 enables new enhanced Bluetooth low energy functionality ideal for applications such as remote controls, beacons, connected sensors and innovative medical devices. Among the new features, DA14585 supports Data Packet Length Extension, Link Layer Privacy v1.2, Secure Connections, Bluetooth low energy Mesh and Efficient connectable Advertising.

## Audio Unit

The integrated Audio Unit (AU) is equipped with a Pulse-Density Modulation (PDM) interface that can be connected to up to 2 input devices (e.g. MEMS microphones) or output devices, a Pulse-Code modulation (PCM) controller which provides an up to 192 kHz synchronous interface to external audio devices, ISDN circuits and serial data interfaces (I2S) and a 24-bit Sample Rate Converting unit (SRC) used to convert the sampling rate of audio samples between the various interfaces. PDM and PCM functionality can be mapped to any GPIO through the user programmable pin logic. An integrated DMA controller handles all data transfers between the AU and the RAM providing the CPU with the freedom to cope with other tasks.

## Enhanced Memory

The DA14585 has a large memory capacity for user applications: 96 kB of Data RAM with retention capability, 128 kB of ROM and 64 kB of One-Time-Programmable (OTP) memory. The granularity of the RAM cells (32 kB/16 kB/16 kB/32 kB) allows retaining only the RAM needed and achieves the minimum power consumption during sleep time.

## Wide Input Voltage

The DA14585 can be configured in buck or boost mode to support a multitude of power sources from zinc-air batteries to alkaline or coin cells. Furthermore, in order to maximize the available power from zinc air or coin cell and build products with long battery lifetimes, the DA14585 is able to cold boot at 0.9 or 1.8 V respectively exploiting the full capacity of the connected battery.

## Compatibility

As part of the SmartBond family and successor of the DA1458x product family, DA14585 is fully pin-compatible with DA14580, DA14581 and DA14583 existing designs may be quickly upgraded. DA14585 is suitable for fully hosted applications without an external MCU.

## Software and Tools

The DA14585 is also supported by Renesas SmartSnippets Studio, a royalty-free software development platform for all SmartBond devices, which contains:

- SmartSnippets Toolbox: A tool suite covering all software developer needs, including power profiling, FLASH or OTP programming and testing
- SmartSnippets DA1458x Software Development Kit and documentation

## Ordering Information

Part number	Package	Pitch(mm)	Size (mm)	Shipment	Pack Quantity
DA14585-00000AT2	QFN40	0.4	5 x 5 x 0.9	Reel	100/1000/5000
DA14585-00000VV2	WL-CSP34	0.4	2.40 x 2.66 x 0.39	Reel	100/1000/7500

For more information and purchasing please visit:

[www.renesas.com/DA14585](http://www.renesas.com/DA14585)



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