SmartBond™ DA1468x Product Family

Bluetooth® low energy SoCs with unparalleled integration and flexibility

Create next-generation Bluetooth low energy solutions without compromising functionality or battery life with the SmartBond DA1468x family, the world's first single-chip solution in volume production that provides connectivity for rechargeable devices, including wearables, smart home and other emerging Internet of Things (IoT) devices. DA14680 and DA14681 deliver the highest performance, lowest power consumption, smallest footprint and lowest system cost.

This highly integrated solution supports the latest Bluetooth 4.2 standard. An ARM® Cortex™ M0 processor, with various embedded memory options, delivers flexible processing power when you need it and saves power when you don't, enabling the management of multi-sensor arrays and always-on sensing. Its integrated PMU can efficiently power up to three external devices in addition to an on-chip charger and fuel gauge, allowing the SoC to recharge batteries over a USB interface, while a dedicated hardware crypto engine delivers banking-level security with end-to-end encryption to safeguard personal data.

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Applications

- (Multi-sensor) wearable devices:
  - Fitness / activity trackers
  - Sport watches
  - Smartwatches
- Virtual reality
- Smart home
- Apple HomeKit
- Consumer appliances
- Voice-controlled remote controls
- Rechargeable keyboards
- Toys
- Industrial automation

Key benefits

- Lowest power consumption
- Smallest system size
- Lowest system cost
- High security levels

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DA14680 and DA14681

The lowest power consumption
All the hardware in this product range is designed to save you power. That includes the 30 µA / MHz ARM Cortex-M0 application processor, integrated sensor hub functionality and hardware crypto engine. With an integrated Power Management Unit including system power rails, a battery charger and fuel gauge, it supports rechargeable Li-Ion and Li-Polymer batteries natively and can power a complete wearable system. Plus our SmartSnippets™ tooling helps you optimize your software to reduce power consumption even further and speed up your time to market.

Processing power on demand
The DA14680 and DA14681 deliver outstanding application processor performance – up to an impressive 84 DMIPS. What's more, its unique FlexPower feature ensures that performance is there when you need it and saves you power when you don't. You can dynamically control the processor speed through software, from 32 kHz to 96 MHz to match your application's requirements.

Flexible memory for complete design freedom
For maximum design freedom, the DA14680 and DA14681 can respectively execute code from internal or external Flash or one-time programmable (OTP) memory. Flash offers the potential for unlimited execution space and over-the-air (OTA) updates, while OTP provides a simple cost-down path.

Maximum security
The dedicated hardware encryption engine includes support for hashing functions (SHA-512), symmetric (AES-256) and asymmetric cryptography algorithms (ECC) and a true random number generator. It delivers banking-level security with end-to-end encryption to keep personal data safe – while reducing power consumption.

Key features

- Supports the full Bluetooth 4.2 features
- 32-bit ARM® Cortex®-M0 microcontroller:
  - Low power consumption, just 30 µA / MHz
  - Dynamically controllable clock frequency from 32 kHz up to 96 MHz
  - Delivers up to 84 Dhrystone MIPS
  - 4-way associative cache controller with 16 kB cache RAM memory
- Dedicated application processor hardware encryption engine
- Flexible memory architecture
  - 8 Mb executable Flash (only on DA14680)
  - 64 kB OTP
  - 128 kB Data SRAM
  - 16 kB Cache SRAM
  - 128 kB ROM
- Outstanding RF performance
  - 0 dBm output power
  - -93 dBm sensitivity
  - Integrated balun
  - 50 Ω matched single-wire antenna interface
  - 3.4 / 3.1 mA Tx / Rx at 3 V
  - Best-in-class 93 dBm link budget
  - Coexistence interface for multi radio systems
- Compact available packages:
  DA14680: AQFN60 (6 x 6 mm)
  DA14681: WL-CSP53 (3.4 x 3.0 mm) and AQFN60 (6 x 6 mm)
- Integrated PMU
  - Integrated Buck DC-DC converter (1.7 V - 4.75 V)
  - Three power supply pins for external devices
  - Supports Li-Polymer, Li-Ion, coin cells, NiMH and alkaline batteries
  - Charger (up to 5.0 V) with programmable curves
  - High accuracy state-of-charge fuel gauge
  - Programmable threshold for brownout detection
  - USB charge detection and protection
- Extensive selection of digital and analog interfaces
  - 37 (AQFN) or 21 (WL-CSP) general purpose I/Os with programmable voltage levels
  - Quad-SPI FLASH interface
  - Two UARTs, one with hardware flow control
  - Two SPI+ interfaces
  - Two I²C bus interfaces at 100 kHz, 400 kHz
  - Three-axis capable Quadrature Decoder
  - PDM interface with HW sample rate converter (2 mics or 2 speakers)
  - I²S/PCM master/slave interface up to 8 channels
  - Keyboard scanner with de-bouncing
  - Infrared (IR) interface (PWM)
  - USB Full Speed (FS) device interface
  - 8-channel 10-bit ADC with averaging capability achieving 11.5 ENOB
  - Three matched white LED drivers
  - Temperature sensor

Dialog Semiconductor Worldwide Sales Offices - www.dialog-semiconductor.com - email: smartbond@diasemi.com

United Kingdom
Phone: +44 1793 757700

Germany
Phone: +49 7021 805-0

The Netherlands
Phone: +31 73 640 88 22

North America
Phone: +1 408 845 8500

Japan
Phone: +81 3 5425 4567

Taiwan
Phone: +886 281 786 222

Singapore
Phone: +65 648 499 29

Hong Kong
Phone: +852 3769 5200

Korea
Phone: +82 2 3469 8200

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