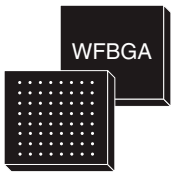
ST53G

Secure system-in-package solutions for optimized wearable applications (card emulation)

Data brief



WFBGA64 4 × 4 mm

Features

- System in package (SiP) integrating a 32-bit secure microcontroller (ST31G480, ST31G384, ST31G320 or ST31G256) and an STS3922 booster for optimized wearable applications (card emulation boosted performance)
- Single power supply pin (VBAT)
- 2.7 to 3.6 V supply voltage range
- Battery voltage supported
- Supports Class B operating conditions
- Ambient operating temperature range: −25 to + 85 °C
- 10-year data retention
- 100 000 Erase/Write cycle endurance
- ESD protection greater than 4 kV (HBM)
- Communication interfaces:
  - SPI
  - ISO 7816
  - ISO 14443A
- Delivery form:
  - WFBGA64: 64-ball, 4 × 4 mm, 0.4 mm pitch, very, very thin profile, fine pitch, ball grid array package

Secure microcontroller

- ARM® SecurCore® SC000™ 32-bit RISC core
- 12 Kbytes of user RAM
- Up to 480 Kbytes of secure, high-density user Flash memory including 128 bytes of user OTP area
- Three 16-bit timers with interrupts
- Watchdog timer
- External clock frequency up to 10 MHz
- CPU clock frequency up to 28 MHz
- Power-saving Standby state
- Asynchronous receiver transmitter (IART) with RAM buffer for high-speed serial data support (ISO/IEC 7816-3 T=0/T=1 compliant)

Booster

- Extended read range in card emulation mode with antennas smaller than 100 mm²
- boostedNFC technology based on active load modulation
- Automatic power control
- Automatic gain control
- Low power consumption

Contactless features

- EMVCo™ and ISO/IEC 14443 compliance for full interoperability with existing payment and ticketing infrastructures
- Card emulation supporting ISO/IEC 14443 Type A at 106 kbps
- MIFARE Plus® and MIFARE® DESFire® EV1 hardware and software implementation
- MIFARE® Classic available as part of MIFARE Plus®(a)

Security features

- Active shield
- Monitoring of environmental parameters
- Three-key triple DES accelerator
- AES accelerator
- AIS-31 Class PTG2-compliant true random number generator (TRNG)
- NESCRYPT coprocessor for public-key cryptography algorithms
- ISO/IEC 13239 CRC calculation block
- Unique serial number for each die
- Protection against multiple attacks

Applications

Ideal for NFC applications on small-footprint devices, such as wearables, to allow payment and ticketing on smart devices, and communication with a microcontroller through an RF interface.

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1 Description

The ST53G device is an all-in-one secure solution that includes the STS3922 near-field communication (NFC) booster and a secure element (SE) certified by EMVCo and available in different memory sizes ranging from 256 to 480 Kbytes (ST31G480, ST31G384, ST31G320 or ST31G256).

Fully manufactured in a secure environment, the ST53G provides the highest performance levels thanks to the ARM® SC300® core of their secure element.

The ST53G is ideal for applications that require card emulation functionality, but have limited space for the antenna. This solution allows a simpler design than the conventional NFC controller-based architecture, and occupies a board footprint approximately one-third smaller.

The ST53G operates in the −25 to + 85 °C temperature range at voltages from 2.7 to 3.6 V.

It is delivered in WFBGA64 packages dimensioned for use in small-footprint devices.

In order to meet environmental requirements, ST offers the ST53G in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: *www.st.com*. ECOPACK® is an ST trademark.

2 Software development tool description

Dedicated SecurCore® SC000™ software development tools are provided by ARM® and Keil™. These include the Instruction Set Simulator (ISS) and C compiler. The corresponding documentation is available from the ARM and Keil websites.

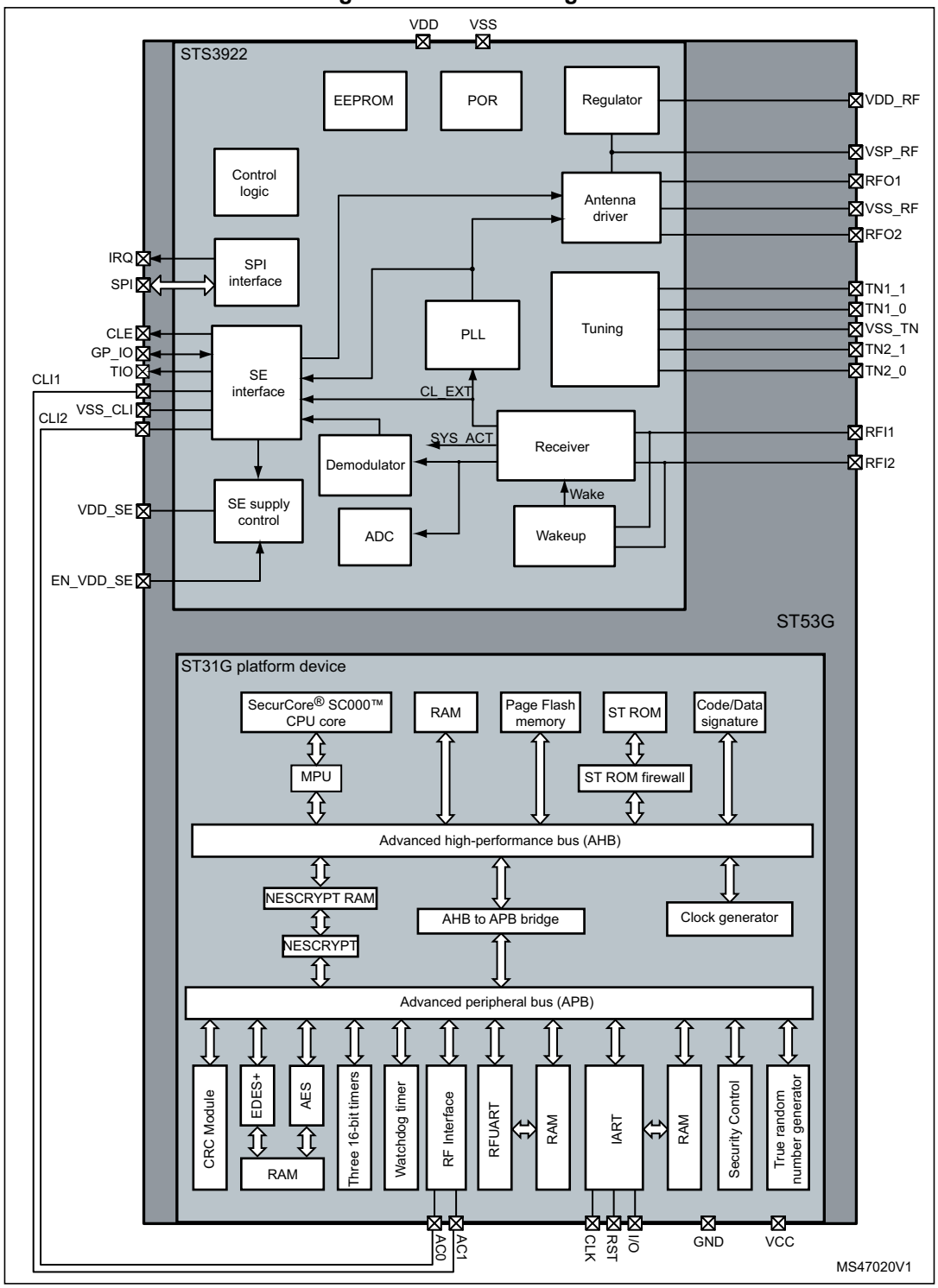
STMicroelectronics provides:

- A time-accurate hardware emulator controlled by the Keil debugger and the ST development environment.
- A complete product simulator based on Keil's ISS simulator for the SecurCore® SC000™ CPU.
- A software and hardware development package

Moreover, STMicroelectronics provides a comprehensive development and design package to:

- Simplify software integration: ST lowers the cost for developers by providing multi-application support with optimized solutions, which include intuitive software development kit (SDK) platforms for integrating contactless services around any microcontroller wearable device architecture.
- Simplify hardware integration: ST provides a set of reference designs, expansion boards and design guidelines.
- Simplify deployment: ST provides turnkey solution partnership with operating system vendors, and precertification services to help to reduce the time-to-market as well as development costs.

Figure 1. SiP block diagram



3 Revision history

Table 1. Document revision history

Date	Revision	Changes
13-Jul-2017	1	Initial release.

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