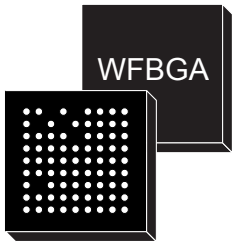
ST21NFCJ

Data brief

Near field communication controller



WFBGA75 4.0 × 4.0 × 0.8 mm

0.35 mm pitch

Features

- Arm® Cortex®-M3 microcontroller
- eFlash for full firmware update
- Enhanced Active load modulation technology
- Enhanced TX drive up to 1.3 W
- Compatible with extremely small or metal frame antennas
- Optimized power consumption modes
- Battery voltage monitoring
- System clock
  - FracN phase-locked loop (PLL) input range from 13 to 76.8 MHz
  - 27.12 MHz external crystal oscillator
- Integrated power management unit (PMU)
  - low-dropout (LDO) regulators for internal voltages
  - 2 × LDO regulators for external voltages
  - Voltage detectors for supplies monitoring
  - Low power mode state machine
- Automatic Wakeup via communication interfaces, internal timers, general-purpose input/output (GPIO), RF field or tag detection
- Support of an external DC/DC converter for TX supply

Product status link
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RF communications

- Active and passive Peer-to-Peer
  - ISO/IEC 18092 - NFCIP-1 Initiator & Target
- Passive mode – Reader/Writer
  - NFC Forum™ Type 1/2/3/4/5 tags
  - ISO/IEC 15693
  - MIFARE Classic®
  - Thinfilm (ex Kovio) Barcode
- Active mode – Card Emulation
  - ISO/IEC 14443 Type A and Type B
  - JIS X 6319 – 4
  - MIFARE Classic® through SWP-CLT

External communication interfaces

- Two single-wire protocol (SWP) master interfaces up to 1.695 Mbit/s
- I²C slave interface up to 3.4 MHz
- Slave and master SPI interface (up to 13 MHz)
- High-speed universal asynchronous receiver transmitter (HSUART) interface up to 6 Mbit/s

Security features

- Secure firmware update mechanism

Electrical characteristics

- Battery voltage support from 2.4 V to 5 V
- I/O dedicated voltage level (V_{PS_IO}) from 1.62 V to 3.3 V
- Supports Class B and C operating conditions for universal integrated circuit cards (UICCs)
- Ambient operating temperature −25 to + 85 °C

Applications

- Mobile devices
- Wearable devices
- Smartwatch
- Secure connected devices

1 Description

The ST21NFCJ is a single near-field communication (NFC) controller IC designed for integration in mobile devices and NFC-compliant products. It includes NFC functions in the three operating modes: Card Emulation, Reader/Writer and Peer-to-Peer communication.

This product is based on an advanced Arm® Cortex®-M3 32-bit microcontroller running at 28 MHz.

All internal operations are synchronized by a clock generator module.

Two clock source options are available:

- using an external quartz.
- using an external reference clock (in order to reduce the number of external components).

Thanks to an enhanced power switch system, the ST21NFCJ manages the power supply of the device and its associated secure elements.

The ST21NFCJ supports NCI 2.0.

The ST21NFCJ comes in a 75-ball WFBGA package. It is pin-compatible with the ST54J product in wafer-level chip-scale package (WLCSP81).

In order to meet environmental requirements, ST offers these devices 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.

The product can come with MIFARE Classic. The availability of the MIFARE Classic R/W mode feature depends on the license conditions.

Note: MIFARE and MIFARE Classic are registered trademarks of NXP B.V. in the U.S and other jurisdictions, and are used under license.

Note: Arm is a registered trademark of Arm Limited (or its subsidiaries) in the US and/or elsewhere.

Revision history

Table 1. **Document revision history**

Date	Version	Changes
04-Sep-2019	1	Initial release.
19-Jan-2021	2	Updated document classification. Added product status link table on cover page.