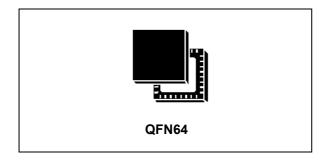# ST25RU3992

UHF RFID Single Chip Reader EPC Class1 Gen2 Compatible

QFN64

Features

- Supply voltage: 4.1 V to 5.5 V
- Filters dedicated to 250 kHz and 320 kHz M4 and M8 DRM operation.
- Available RX modes:
  - BLF = 40 kHz or 160 kHz with FM0, M2, M4, M8
  - BLF = 250 kHz, 320 kHz, 640 kHz with M4, M8
- ISO18000-6C (EPC Gen2) full protocol support
- ISO18000-6A/B compatibility in direct mode
- Programmable dense reader mode filters on chip offering a worldwide shippable device
- Improved RX sensitivity down to -86dBm
- On chip TX pre-distortion
- Integrated low level transmission encoding
- Integrated low level decoders
- Integrated data framing
- Integrated CRC checking

- Parallel 8-bit or serial 4-pin SPI interface to MCU using 24 bytes FIFO
- Voltage range for communication to MCU between 1.8 V and 5.5 V
- Can be powered by USB with no need for step conversion from 4.1 V to 5.5 V
- Configurable clock output for MCU
- Integrated supply voltage regulator (20mA) for external circuitry
- Integrated supply voltage regulator for the RF output stage improving power supply noise rejection
- Internal power amplifier (20 dBm) for short range applications
- ASK or PR-ASK TX modulation
- Adjustable ASK modulation index
- AM & PM demodulation avoiding communication holes with automatic I/Q selection
- Configurable RX gain
- Automatic gain control for reception
- AD converter for measuring TX power using an external RF power detector
- DA converter for controlling an external power amplifier
- Frequency hopping support
- On-board VCO and PLL covering complete RFID frequency range 840 MHz to 960 MHz
- Oscillator using 20 MHz crystal
- Power down, standby and active mode available

Description

The ST25RU3992 is an UHF RFID Reader chip comprising of an integrated analog front-end and protocol handling for ISO18000-6c/b. Equipped with multiple built-in programming options, the device is suitable for a wide range of UHF RFID applications.

The ST25RU3992 is pin to pin and firmware compatible with the previous ST25RU3991 IC. It offers improved receive sensitivity down to -86 dB, a programmable Rx Dense Reader Mode (DRM) filters on chip and a TX pre-distortion feature.

Fully scalable, the ST25RU3992 is ideal for longer range and higher power applications. Offering DRM filtering on chip, combined with improved RX sensitivity and TX pre-distortion allows the ST25RU3992 to be a worldwide shippable IC.

The reader configuration and fine tuning is achieved by setting up control registers The ST25RU3992 reader IC complies with EPC Class 1 Generation 2 protocol (ISO 18000-6C) and ISO 18000-6A/B (in direct mode).

For communication between the host system (MCU) and the reader IC a parallel or serial interface can be selected. When the hardware encoder and decoder are used for transmission and reception, base band data is transferred via a 24 bytes FIFO register. In case of direct transmission or reception, the encoder and decoder are bypassed and the host system can service the analog front end in real time.

The transmitter generates 20 dBm output power when matched to a 50 Ω load and is capable of ASK or PR-ASK modulation. The integrated power supply voltage regulators ensure supply noise rejection of the complete reader system. The transmission system comprises of a low level data coding. Automatic generation of Frame-Sync, Preamble, and CRC check is supported.

The receiver system allows AM and PM demodulation. The receiver features an automatic gain control option (patent pending), selectable gain and signal bandwidth to cover a range of different back scatter link frequencies and coding options. The signal strength of AM and PM modulation can be measured and the result is accessible through dedicated RSSI registers. The receiver output is selectable between digitized sub-carrier signal and decoded sub-carrier signal. The selected decoders deliver bit stream and data clock as outputs. The receiver system also comprises of a framing system. This system performs a CRC check and organizes the data in bytes. The base band data is then accessible to the host system through a 24 byte FIFO register.

To support an external MCU and other circuitries a 3.3 V regulated supply voltage is available along with a clock output. This voltage regulator has a current capability of 20 mA.

The ST25RU3992 is available in a 64-pin QFN (9 mm x 9 mm), ensuring the smallest possible footprint.

1   Revision history

Table 1. Document revision history

Date	Revision	Changes
29-Nov-2016	1	Initial release.

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