FACTSHEET SIC4311

228-Byte ISO14443A RFID/NFC Tag IC with UART Interface

Features Summary

Highlight Features

- Write/read through NFC smartphone and NFC /RFID reader device
- Direct data transfer from RFID to UART or vice versa
- 40nA standby current (through VBAT3V3 pin)
- Operating from either RF power or external DC
- 3.3-V On-chip regulator for power harvesting mode
- Up to 10 mA sourcing capability to power external circuit (Depending on harvested power from RF)
- Compatible with NFC Forum Tag Type 2
- ±2% 1.8432 MHz on-chip factory-trimmed oscillator

Interfaces and Peripheral

- RF interface based on ISO14443A - 106 kbps
- UART interface with Handshaking option
- UART Speed from 9600 to 115200 bps
- 7 programmable GPIOs
- RF Activity indicator pins
  - RF detect
  - RF Busy
  - Reserve Power Ready

Memory

- 228 bytes EEPROM accessible from RF and UART
- 196 bytes user memory
- EEPROM organization enabling NDEF format
- EEPROM erase/write cycle up to 100,000 times
- EEPROM memory retention up to 10 years at 70°C
- 2 x 64-byte deep FIFO for UART data transfer – TX/RX

Operating Conditions

- Operating temperature from -40 to 85°C
- Operating voltage of XVDD from 1.8V to 3.6V
- Typical 40nA current consumption in standby mode

Package

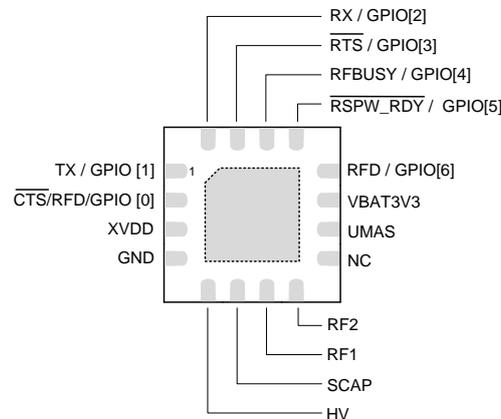- QFN3x3 - 16-Pin Package with Heat sink pad

Reference Design/Evaluation kit

- Ready-to-use module
- Demonstration module
- Example Downloadable Android Applications
- Software / Sample firmware available

APPLICATIONS

- Firmware upgrade via NFC
- NFC bridge for embedded systems
- NFC-interface/NFC-powered sensor
- Metering/vending machines
- Smart interactive poster
- Smart home appliances
- Wireless industrial machine Interface
- Customized/proprietary system RFID
- Smart toys
- Display-less home appliances

General Description

RX / GPIO[2]
$\overline{RTS}$ / GPIO[3]
RFBUSY / GPIO[4]
$\overline{RSPW\_RDY}$ / GPIO[5]

TX / GPIO [1]
$\overline{CTS}$/RFD/GPIO [0]
XVDD
GND

1

RFD / GPIO[6]
VBAT3V3
UMAS
NC

RF2
RF1
SCAP
HV

16-Pin QFN3x3 Package

SIC4311 is a 228-byte NFC tag IC with UART interface. The SIC4311 consists of an RFID Analog-Front-End circuit supporting ISO14443A, an UART controller, an on-chip regulator, GPIOs, register page and 228-byte EEPROM.

The SIC4311 operates from RF energy from RFID/NFC device and provides necessary features such as an on-chip regulator. The SIC4311 is intentionally designed to be a single chip for a minimized BOM NFC-tag-style application.

The SIC4311's analog-front-end is designed to harvest energy from RF field efficiently. The SIC4311 can operate in both passive mode as an ordinary RFID where power source is from RF and active mode as a peripheral device where power source is from a connected embedded system or battery.

The EEPROM memory can be accessible and programmable from both wireless interface, which is RFID/NFC, and wire interface, which is UART. Apart from normal read/write EEPROM, RFID reader/NFC device can configure and control behavior of the SIC4311 via registers and transfers data through build-in UART toward UART connected end device, or vice versa, without wasting time in programming contents into EEPROM and then transferring. NFC applications can interact with the SIC4311 to create various applications for example sensor interface, battery-less interactive toy, smart poster. To serve the trend of
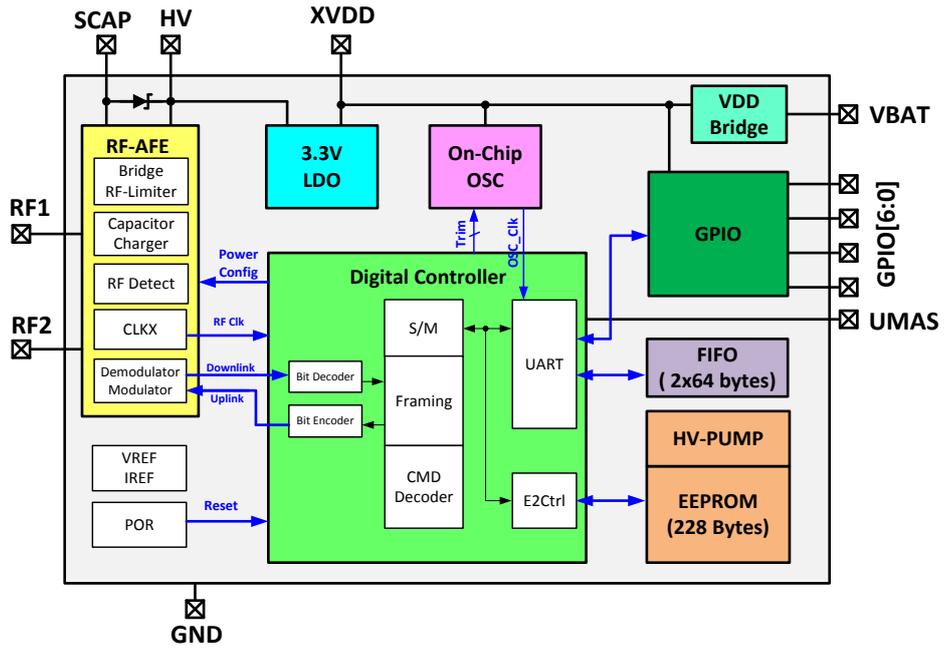
internet of things, the SIC4311 provides a way to connect smart objects to internet via NFC phone.

The UART controller can be configured via control register to perform either UART. The control register related to interface can be set from RF interface or reload from EEPROM during initialization. Two 64-byte FIFO buffers for wired-transmission (TX of UART) and wired-reception (RX of UART) are provided for large block transfer to allow more free time for connected processors to perform other tasks. The UART interface provides connectivity to variety of devices like host-style devices such as MCU or UART-controlled slave device or PC via USB-to-UART converter. The UART signal can be converted to other communication standards such as RS-232, RS-485 via particular bridge devices. The UART speed can be configured to be from 9600 bps to 115.2 kbps. Then, by relying on display in mobile devices and communication through RFID/NFC, the SIC4311 offers the cheapest method to configure smart things wirelessly such as firmware upgrade or parameter update.
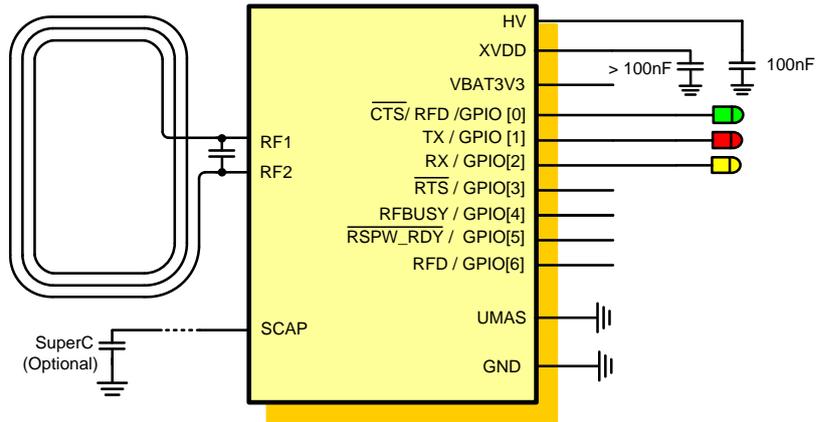
The SIC4311's input/output pins can be configured for user interactive indicator such as LEDs. 7 programmable GPIOs are provided. Moreover, 40nA standby current in battery mode (through VBAT3V3 pin) makes SIC4311 more suitable for battery application.

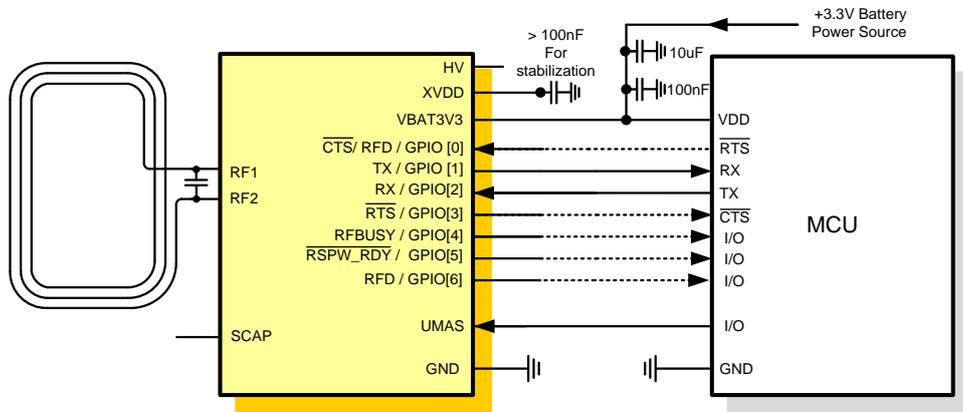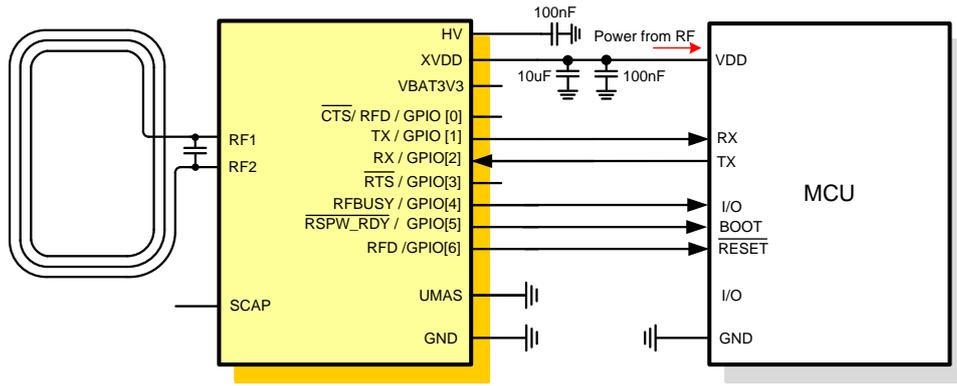The SIC4311 is offered in a low-profile 16-pin QFN3x3.

Functional block diagram

Basic configuration with LED indicator (Power harvesting)

UART connection to MCU with EEPROM accessibility (UMAS connection) in battery-operated device.

RF-powered configuration for firmware upgrade (Power harvesting)

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