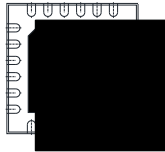


## Compact automotive NFC reader for CCC digital key car access



VFQFPN24  
(4 x 4 mm)

### Product status

ST25R501

## Features

AEC-Q100 qualified



### Operating modes

- Reader/writer

### RF communication - reader/writer

- NFC-A/ISO/IEC 14443A up to 848 kbit/s
- NFC-B/ISO/IEC 14443B up to 848 kbit/s
- NFC-V/ISO/IEC 15693 up to 212 kbit/s
- NFC-F/FeliCa™ up to 424 kbit/s
- Low-level modes to implement MIFARE Classic®-compliant and protocols (Kovio BC, CTS, B')

### Key characteristics

- NFC Forum reader device
- CCC digital key reader
- Low-power inductive card detection
- I/Q demodulator with baseband channel summation
- Dynamic power output (DPO) controls the field strength to stay within given limits (software feature)
- Active wave shaping (AWS) reduces both overshoots and undershoots
- Noise suppression receiver (NSR) allows reception in a noisy environment
- Serial peripheral interface (SPI) up to 10 Mbit/s
- Possibility to drive one differential or two independent single-ended antennas

### Electrical characteristics

- Wide supply voltage range: 2.7 V to 5.5 V
- Wide peripheral communication supply range: 1.65 to 5.5 V
- Wide ambient temperature range: -40 °C to +125 °C
- Quartz oscillator capable of operating with 27.12 MHz crystal with fast startup

## Application

The is suitable for a wide range of applications, among them:

- Automotive access control
- Center console DK
- CCC digital key
- Automotive infrastructure application

## Description

The ST25R501 is a very small and powerful automotive grade high-performance CCC DK NFC reader device housed in a QFN 4x4mm wettable flank package. Designed for CCC (Car Connectivity Consortium®) digital key applications, the device enables fast product development for car access/start applications in areas like door handle or center console.

Being very robust and noise tolerant while at the same time reducing electromagnetic emission, the device works even under harsh conditions, supporting a smoother certification process for electromagnetic immunity and electromagnetic emission.

The device includes an advanced analog front-end (AFE) and a highly integrated data framing system for NFC-A/B (ISO/IEC 14443A/B) reader, including higher bit rates, NFC-F (FeliCa™) reader, NFC-V (ISO/IEC 15693) reader up to 212 kbps.

The device features high RF power with dynamic power output to directly drive antennas at high efficiency, achieving large interaction distances even with small antenna sizes common in door handles.

The device includes additional features, making it incomparable for low-power applications. It offers low-power card detection by performing a measurement of the I and Q channel, which represent the real and imaginary part of the antenna signal.

It meets the most demanding requirements put in place by car and phone OEMs, delivering marketleading performance and ensuring a superior user experience.

It is designed to operate from a wide power supply range (from 2.7 to 5.5 V), ambient temperature range from -40 °C to +125 °C, and a wide peripheral I/O voltage range (from 1.65 to 5.5 V). Due to this combination of high RF output power, low power modes, wide supply range, and AEC-Q100 grade 1 qualification the device is perfectly suited for automotive applications.

## Revision history

Table 1. Revision history

| Date        | Version | Changes          |
|-------------|---------|------------------|
| 14-Apr-2025 | 1       | Initial release. |



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## Contents

|                        |   |
|------------------------|---|
| Revision history ..... | 3 |
| List of tables .....   | 5 |



## List of tables

|          |                            |   |
|----------|----------------------------|---|
| Table 1. | Revision history . . . . . | 3 |
|----------|----------------------------|---|

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