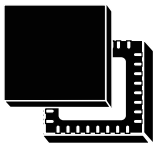
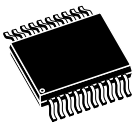
STSAFE-V500

Data brief

Automotive Open Java® Card system-on-chip based on 32-bit Arm®Cortex® - M35P CPU supporting StrongBox, in vehicle CCC digital key, Qi charging applications



UFQFPN32 WF (5 × 5 × 0.55 mm)



TSSOP20 (6.5 × 4.4 mm)

Optional

Features

Hardware features

- AEC-Q100 grade 2
- Arm® Cortex®-M35P 32-bit RISC core cadenced at 63 MHz
- Operating temperature range: −40 °C to 105 °C
- High-stress memory:
  - Endurance of 500 000 erase/write cycles (without hardware wear leveling)
  - Configured to enhance specific objects endurance: up to 10 million write cycles with a total of 1 gigabyte of updated data
    Software wear leveling capability for cycling extension and specific cases
  - 20 years data retention
- Available in a TSSOP20 and UFQFPN32 wettable flank package
- External interfaces:
  - *ISO/IEC*7816-3 (ST Reserved test feature)
  - Slave serial peripheral interface (*SPI*) up to 10 MHz
  - Slave *I²C* interface up to 1 Mb/s
- Class C (1.8 V), Class B (3 V) and 3.3 V supply voltage ranges
- *ESD* protection greater than 4 kV (*HBM*)
- CC EAL 6+ certified

Software features

- Java® Card 3.0.5 classic operating system
- GlobalPlatform® 2.3 support
- Support for GlobalPlatform® SCP03 and SCP11
- Support for GlobalPlatform® *ELF* upgrade
- *Android Ready SE Alliance* secure element
- Dynamic memory management
- *APDU* communication over *I²C*/*SPI* based on the *GlobalPlatform® APDU Transport over I2C/SPI* specification
- Firmware upgrade mechanism
- Support of multiple logical secure element for hypervisor support
- In certification CC EAL5+ according to *Java® Card open protection profile*
- Proprietary Java® Card API for *key derivation function* (KDF)
- Proprietary Java® Card API for *elliptic curves operations*

Applications

- **JC**: Open Java® Card able to host any third party and any Java® Card Applet
- **SB**: StrongBox Android™ Weaver, Android™ Keymint, and Secure storage
- **DK**: In vehicle *Car Connectivity Consortium* v3.1 Car Digital Key
- **Qi**: v1.3 for in vehicle Phone power charging with secure authentication.

Note: Each application is identified as a dedicated product; application switch is not possible

1 General information

The STSAFE-V500 devices are based on Arm® cores.

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

Note: Java is a registered trademark of Oracle and/or its affiliates.

2 Description

The STSAFE-V500 system on chip is a top-class embedded secure element (eSE) able to manage Java® Card applets from different stakeholders (such as the user, original equipment manufacturer (OEM), hardware integrator, or service provider).

The STSAFE-V500 is providing a full range of solutions according to different use cases detailed in this document such as:

- StrongBox (*SB*)
- In vehicle *CCC digital key* (*DK*)
- *Qi charging* (*Qi*)
- *Open Java® Card platform* (*JC*)

Each solution is identified as a standalone *turn key* solution (no dynamic switch possible between the different solutions).

It also proposes an open Java® Card pen platform capable of loading any third-party Java® Card applet.

Both a *turn key* solution and an *Open Java® Card platform solution* offer a common backbone to ease final user integration; this document describes the common set of features (the common backbone) and highlights also specific features relevant for each *turn key* solution.

The device is compliant with Java® Card 3.0.5 with enhanced mechanisms of memory management, security, and data management.

It also supports the *GlobalPlatform® Card Specifications v.2.3* and related amendments:

- *GlobalPlatform® amendment C – Contactless services v1.3* (support of the "cumulative delete" and "get status" sections)
- GlobalPlatform® amendment D – Secure channel protocol SCP03 v1.1.1
- GlobalPlatform® amendment F – Secure channel protocol ‘11’ v1.2.1
- GlobalPlatform® amendment H – Executable load file upgrade v1.1
- GlobalPlatform® access control v1.1
- GlobalPlatform® APDU communication over *I²C*/*SPI* based on the GlobalPlatform® “APDU transport over I2C/SPI” specification v1.0
- GlobalPlatform® SE configuration v2.0

The STSAFE-V500 is integrated with Android™ applications *Keymint* and *Weaver*. It can also host STMicroelectronics applications for secure storage.

It supports multiple logical secure elements that allow multiple Android™ Linux® virtual machines executing on a hypervisor environment accessing Java® Card applications.

It provides state-of-the-art security for the provided functionality, resistant to recent EMVCo/JIL hardware-related attacks subgroup (JHAS) identified vulnerabilities; it ensures a high level of security and isolation between applications, and Common Criteria EAL5+ certification is ongoing (specific for *SB*).

3 Ordering information

Example:	STSAFV50	SB	T2	B	XXX

Platform name

STSAFV50

Application

SB = Strongbox

DK = CCC 3.1

Qi = Qi 1.3

QC = Qi 1.3 + ccc 3.1

JC = Open Java® Card

Package

3W = WQFN32

T2 = TSSOP20

Hardware version

B = ST33K1M5A

Customer code

XXX

Revision history

Table 1. Document revision history

Date	Revision	Changes
27-Jul-2023	1	Initial release.

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