

Flexible programmable secure solution

Data brief



VQFN32

Features

- ECC support for NIST-P-256 and other curves are supported depending on the product
- Digital signature generation and verification with ECDSA
- Key agreement with Diffie-Hellman (ECKA-ECDH) and El Gamal (ECKA-EG)
- ECDH-GM primitive for PACE protocol
- On-chip RSA and ECC key pair generation
- Key pair, public key and PIN objects
- Up to 88.6 Kbytes of user memory
- Extended-length APDUs
- In-house personalization services
- Full ecosystem with expansion board and middleware
- Supports specific application loading
- Different ST applets available for preloading

Platform

- Java Card™ 3.0.4 Classic Edition
- GlobalPlatform® 2.1.1
- GlobalPlatform 2.2 - Amendment D - SCP03
- ISO/IEC 7816 T=0 and T=1 contact protocols
- Standard I²C communication up to 100 kHz

Hardware

- Arm® SecurCore® SC000™ 32-bit RISC core
 - 30-year data retention at 25 °C
 - 500 000 erase/write cycles at 25 °C
- Operating temperature: –40 to +85 °C

- Enhanced NESCRYPT cryptoprocessor for public key cryptography
- Contact assignment compatible with ISO/IEC 7816-3 standards
- Asynchronous receiver transmitter (IART) for high speed serial data support (ISO/IEC 7816-3 and EMV® compliant)
- ESD protection greater than 6 kV (HBM) for contact pads
- 1.62 V to 5.5 V supply voltages
- ECOPACK® 32-lead VFQFPN 5×5 mm (0.5 mm pitch)

Security

- AIS-31 class PTG.2 compliant true random number generator (TRNG)
- AIS-20/31 class DRG.3 deterministic number generator (DRNG)
- Enhanced cryptographic algorithms:
 - DES/3DES, ECC and AES
 - SHA-1, SHA224, SHA-256, SHA384, SHA512, MD5 and CRC16
 - Generic Mapping primitive for Password Authenticated Connection Establishment (PACE) protocol
- Hardware security DES accelerator
- Hardware security AES
- Differential power analysis (DPA) and differential fault analysis (DFA) countermeasures against side-channel attacks
- Active shield
- Unique serial number on each die

Certifications

- Hardware IC Common Criteria certified EAL5+
 - Certificate ANSSI-CC-2015/59 with maintenance report ANSSI-CC-2015/59-M01
- Java Card Platform Common Criteria certification EAL5+ (AVA_VAN.5, ALC_DVS.2)
 - Reference PP: Java Card Closed Configuration Protection Profile, v3.0
 - Certificate ANSSI-CC-2017/23

Applications

Java Card/GlobalPlatform secure element providing authentication, data management and cryptographic services to customer's or ST's embedded Java Card applications.

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1 Description

The STSAFE-J100 is a highly secure solution based on an Arm^{®(a)} SecurCore[®] SC000™ 32-bit RISC core. It acts as a secure element by providing authentication, data management and cryptographic services to a local or remote host.

The device embeds a secure Java Card operating system (3.0.4) compliant with GlobalPlatform (VGP 2.1.1 Configuration 2). It is ported on the latest generation of secure microcontrollers.

Combined with specific applications, the STSAFE-J100 addresses a very wide range of use cases. It can for instance be used for IoT (Internet of Things) devices, utilities, industrial applications and consumer electronics devices.



1.1 Development tools

ST provides a complete set of tools for the integration of the security module:

- STSAFE-J100 test tools
- Development board (reference: STS-J-PROGQ32xxx)

Note: Contact your local ST support office for available host software and drivers.



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

1.2 Pin and signal description

Figure 1. VQFN32 pinout

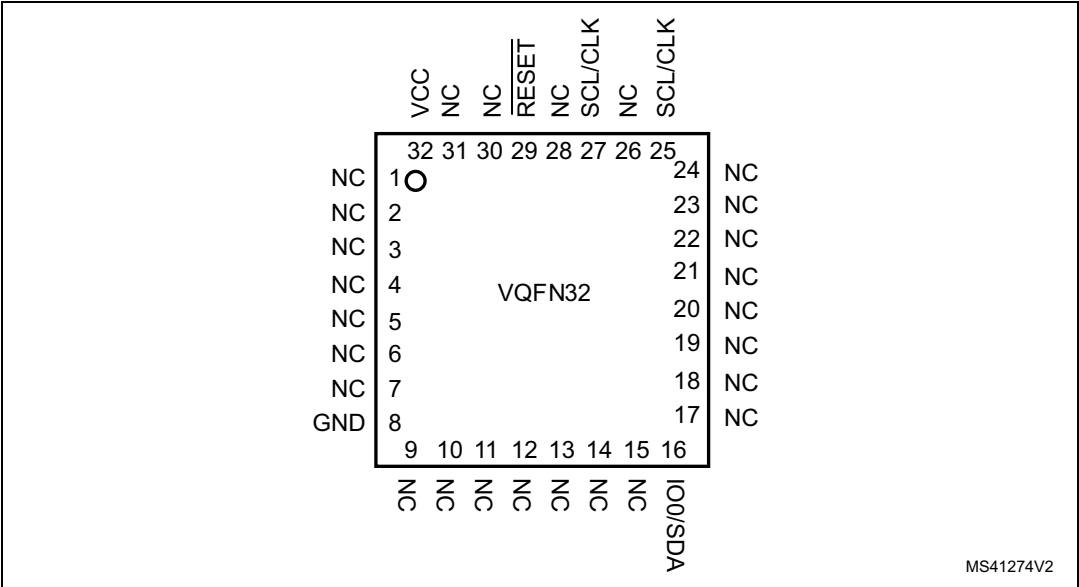


Table 1. Pin descriptions

Signal	Type	Description
GND	Input	GND has to be connected to the main motherboard ground.
RESET	Input	Reset used to re-initialize the device
IO0/SDA	I/O	ISO 7816 IO0 pin or I2C serial data pin depending on the selected configuration (ISO or I2C)
VCC	Power	Power supply pin
SCL/CLK	Input	ISO 7816 clock pin or I2C clock pin ⁽¹⁾ depending on the selected configuration (ISO or I2C)

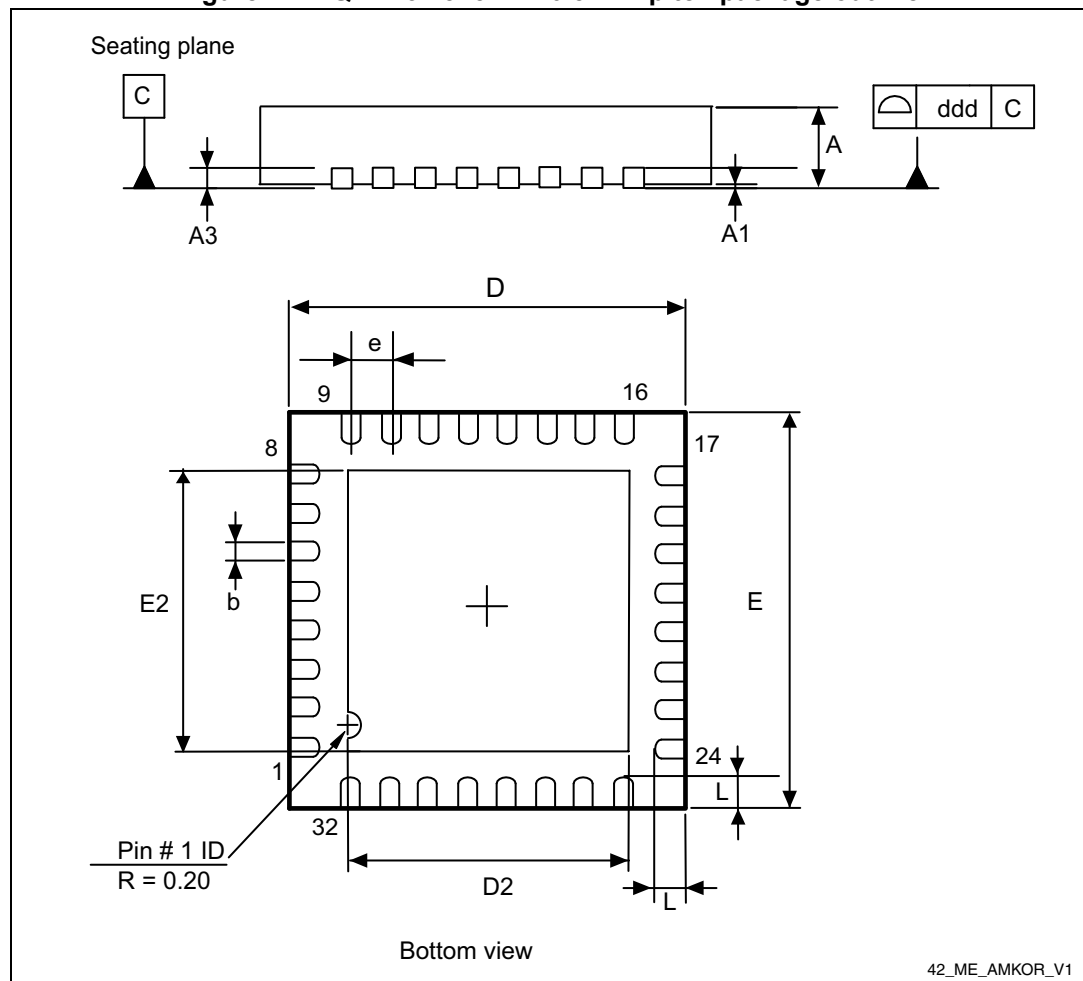
1. Pin 27 and pin 25 are connected internally.

2 Package information

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.

2.1 32-lead very thin fine pitch quad flat pack no-lead (VFQFPN) package information

Figure 2. VFQFPN32 5×5 mm 0.5 mm pitch package outline



1. Drawing is not to scale.

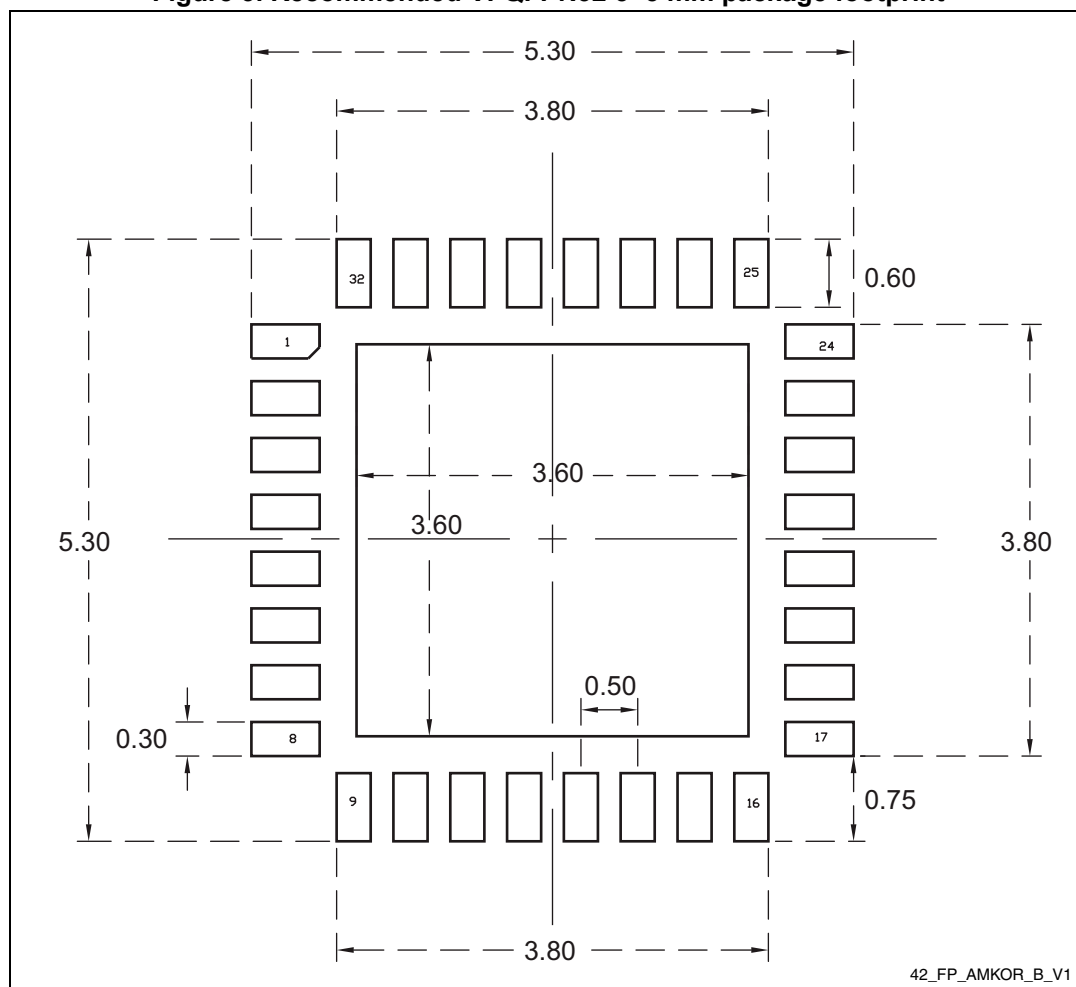
Table 2. VFQFPN32 5×5 mm package mechanical data

Symbol	millimeters			inches ⁽¹⁾		
	Min	Typ	Max	Min	Typ	Max
A	0.800	0.900	1.000	0.0315	0.0354	0.0394
A1	0.000	0.020	0.050	0.0000	0.0008	0.0020
A3	-	0.200	-	-	0.0079	-
b	0.180	0.250	0.300	0.0071	0.0098	0.0118
D	4.850	5.000	5.150	0.1909	0.1969	0.2028
D2	3.500	3.600	3.700	0.1378	0.1417	0.1457
E	4.850	5.000	5.150	0.1909	0.1969	0.2028
E2	3.500	3.600	3.700	0.1378	0.1417	0.1457
e	-	0.500	-	-	0.0197	-
L	0.300	0.400	0.500	0.0118	0.0157	0.0197
ddd	0.050			0.0020		

1. Values in inches are converted from mm and rounded to 4 decimal digits.

2.2 Recommended footprint

Figure 3. Recommended VFQFPN32 5×5 mm package footprint



1. All dimensions in millimeters.

3 Revision history

Table 3. Document revision history

Date	Revision	Changes
29-Jul-2016	1	Initial release.
05-Oct-2016	2	Updated Section 1: Description .
17-Apr-2018	3	Updated user memory size, list of supported enhanced cryptographic algorithms and ambient operating temperature range. Updated certification information. Added Arm logo and trademark notice. Small text changes.

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