

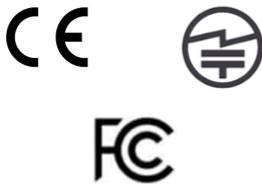
Low-power Wi-Fi 6 - Bluetooth® LE combo coprocessor module



12.28 x 12.28 x 2.4 mm
1.27 mm pitch
32-pin LGA

Product status

| | |
|------------|----------------|
| ST67W611M1 | Pre-production |
|------------|----------------|



Features

Includes ST state-of-the-art patented technology.

Module content

- All-in-one Wi-Fi/Bluetooth® LE/802.15.4 wireless microcontroller
- Embedded 40 MHz high-precision crystal
- All RF components for transmission and reception matching network, including antenna filter
- Three variants: embedded antenna (-B version), RF connector (-U version), RF pin output (-P version)⁽¹⁾

Standard

- IEEE 802.11b/g/n/ax
- Bluetooth® LE 5.4
- IEEE 802.15.4 (Thread)⁽¹⁾

Wi-Fi

- Wi-Fi 6, 2.4 GHz RF transceiver
Wi-Fi 20/40 MHz bandwidth, 1T1R
Wi-Fi security WPS⁽¹⁾/WEP/WPA/WPA2/WPA3
- STA, SoftAP, concurrent STA + SoftAP
- Maximum Tx power: 21 dBm
- Tx power (HE40 and MCS9): 16 dBm
- Rx sensitivity (HE40 and MCS9): -67 dBm
- Application throughput up to 17 Mbps (TCP)
- LDPC, STBC, beamforming, DL/UL OFDMA, MU-MIMO, target wake time (TWT)⁽¹⁾, spatial reuse (SR), dual carrier modulation (DCM), extended range (ER)
- A-MPDU, A-MSDU, immediate block ACK, fragmentation, and defragmentation

Bluetooth® LE

- Maximum Tx power:
 - Bluetooth® LE (2 Mbps): +10 dBm
 - Bluetooth® LE (1 Mbps): +10 dBm
- Rx sensitivity
 - Bluetooth® LE (2 Mbps): -96.5 dBm
 - Bluetooth® LE (1 Mbps): -99 dBm

System peripherals

- SPI
- UART

Security

- PSA Level 1 certified

- Security system encryption engine
- Secure services: Secure boot and OTA (over-the-air)

Voltage

- Input voltage: 2.97 V ~ 3.63 V
- I/O voltage: 1.8 V/3.3 V

Environmental specifications

- Temperature:
 - Operating: -40°C ~ +85°C
 - Storage: -40°C ~ +125°C
- Humidity:
 - Relative: < 90% noncondensing
 - Storage: < 90% noncondensing

1. *This feature is not yet available.*

All packages are ECOPACK2 compliant.

1 Introduction

This document provides information on ST67W611M1 modules, such as description, functional overview, pin assignment and definition, packaging and ordering information.

2 Description

Powered by Qualcomm high-performance 1 × 1 2.4 GHz Wi-Fi 6 and Bluetooth 5.4 QCC743 microcontroller, the STMicroelectronics ST67W611M1 LGA module is purposely designed to pack processing capabilities, Wi-Fi and Bluetooth combo connectivity, and on-module memory into a single 32-pin LGA form factor.

This all-in-one design and capability contribute to reduced costs and enhanced performance, making it an attractive choice for IoT edge devices requiring a single-chip solution.

ST67W611M1 operates as an IoT connectivity transceiver, with an external STM32 host MCU running all upper protocol stacks and applications.

ST67W611M1 integrates:

- A PCB antenna (version -B), a RF connector (version-U) for external antenna, or version with a dedicated RF pin typically for support of multi-antenna implementations with external RF switch
- 4 MB NOR flash
- 40 MHz high-precision quartz for optimal RF performance
- SMPS functionality and associated bill of material (BOM)
- All needed discrete components to reduce the overall board BOM

In addition, the P variant supports:

- External PA/LNA to increase power up to 30 dBm
- Rx antenna diversity to increase the reach of your final product

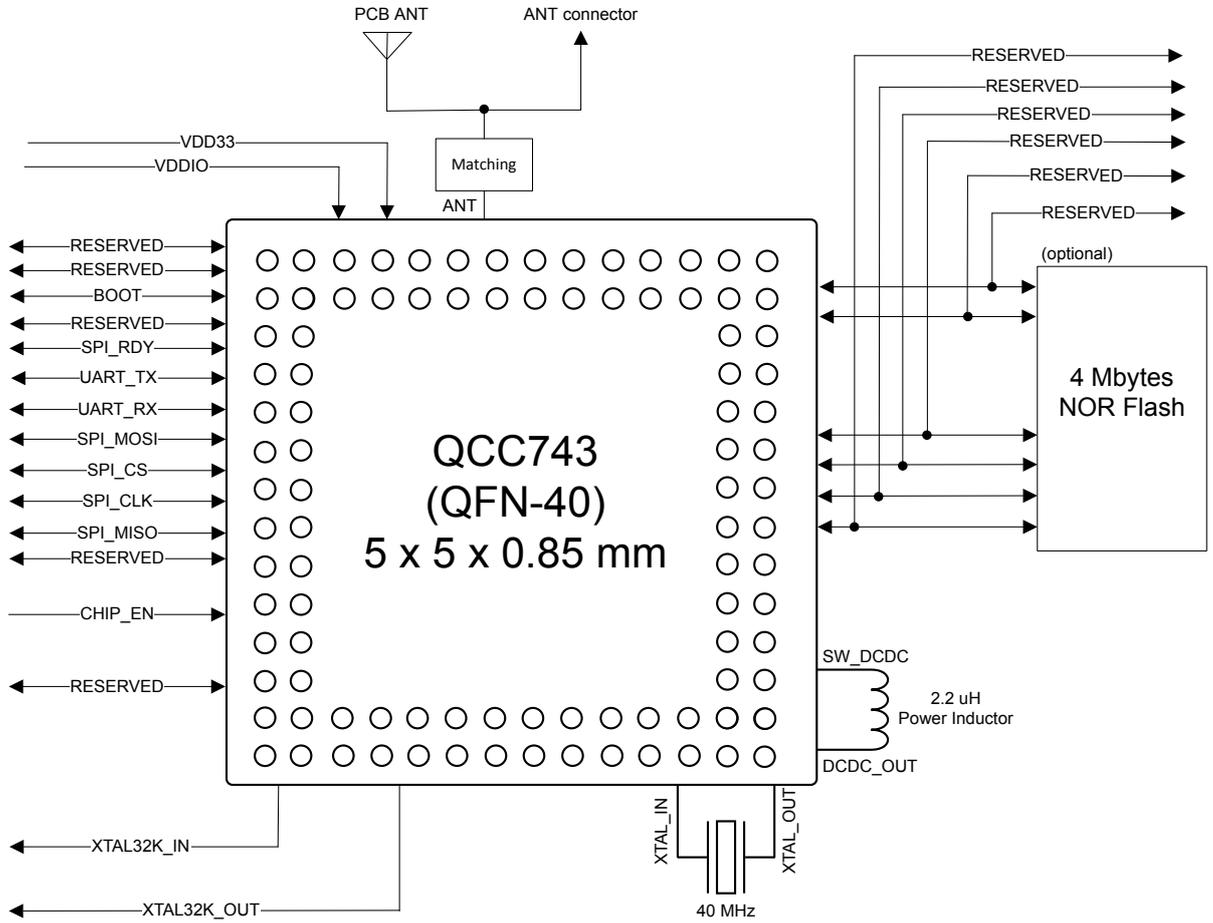
Table 1. ST67W611M1 features

| Feature | Capability |
|---------------------------------|---|
| Security system | Secure services (boot and OTA) |
| Standard | 802.11b/g/n/ax |
| | Bluetooth® LE 5.4 |
| | IEEE 802.15.4 (Thread) ¹ |
| Wi-Fi | Maximum Tx power: 21 dBm |
| | Tx power (HE40 and MCS9): 16 dBm |
| | Rx sensitivity (HE40 and MCS9): -67 dBm |
| Bluetooth® LE | Maximum Tx power |
| | Bluetooth® LE (2 Mbps): +10 dBm |
| | Bluetooth® LE (1 Mbps): +10 dBm |
| | Rx sensitivity |
| | Bluetooth® LE (2 Mbps): -96.5 dBm |
| Bluetooth® LE (1 Mbps): -99 dBm | |
| Peripherals | SPI |
| | UART |
| Voltage | Input voltage: 2.97 V ~ 3.63 V |
| | I/O voltage: 1.8 V/3.3 V |
| Environmental | Temperature |
| | Operating: -40°C ~ +85°C |
| | Storage: -40°C ~ +125°C |
| | Humidity |
| | Relative: < 90% noncondensing |
| Storage: < 90% noncondensing | |

1. This feature is not yet available

Figure 1 shows the general block diagram of the device family.

Figure 1. ST67W611M1 block diagram

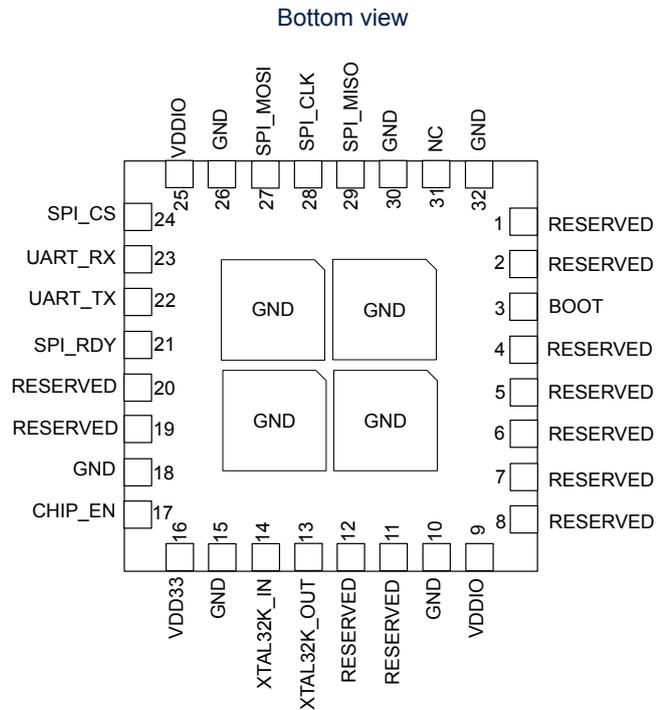


DT75606V1

3 Pinouts and pin description

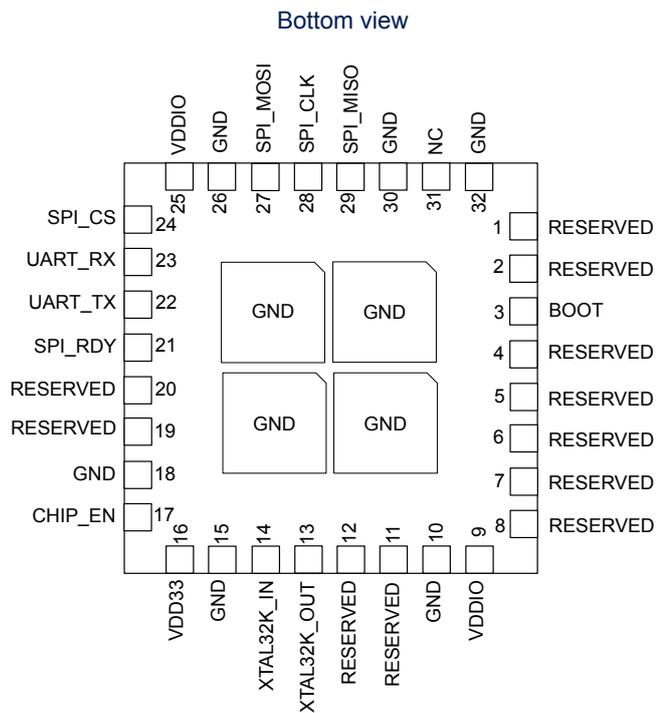
3.1 Pinout schematics

Figure 2. ST67W611M1A6B LGA module PCB antenna



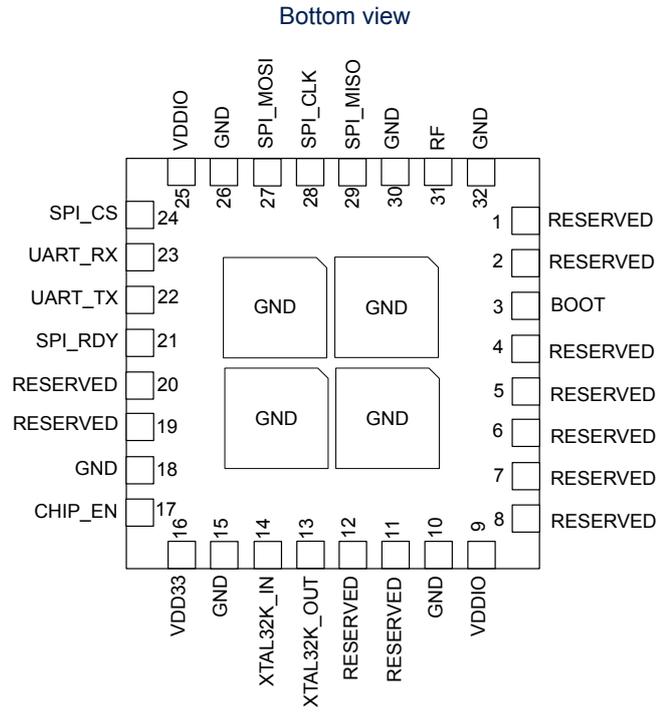
DT75609V1

Figure 3. ST67W611M1A6U LGA module antenna connector



DT75610V1

Figure 4. ST67W611M1A6P LGA module pin connector



DT75647V1

3.2 Pin description

Table 2. ST67W611M1 pin definition

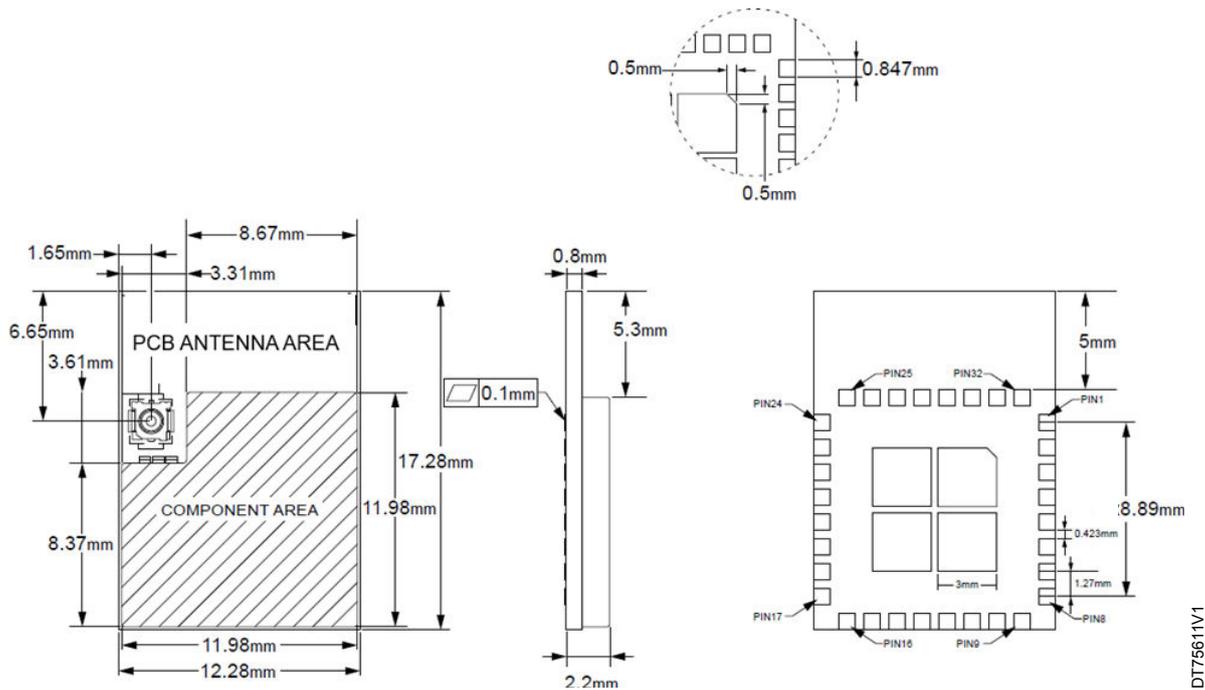
| Pin number | Pin name | Pin type | Power domain | Description |
|------------|-------------|----------|--------------|---|
| 1 | RESERVED | DI/DO | VDDIO | Also known as GPIO0 |
| 2 | RESERVED | DI/DO | VDDIO | Also known as GPIO1 |
| 3 | BOOT | DI/DO | VDDIO | - |
| 4 | RESERVED | DI/DO | VDDIO | Also known as GPIO3 |
| 5 | RESERVED | DI/DO | VDDIO | - |
| 6 | RESERVED | DI/DO | VDDIO | - |
| 7 | RESERVED | DI/DO | VDDIO | - |
| 8 | RESERVED | DI/DO | VDDIO | - |
| 9 | VDDIO | PWR | - | Host I/O voltage input |
| 10 | GND | GND | GND | Ground |
| 11 | RESERVED | DI/DO | VDDIO | - |
| 12 | RESERVED | DI/DO | VDDIO | - |
| 13 | XTAL32K_OUT | DI/DO | VDD33 | Also known as GPIO17. 32.768 kHz quartz is optional. 32.768 kHz coming from host processor can be provided on this pin. |
| 14 | XTAL32K_IN | DI/DO | VDD33 | Also known as GPIO16. 32.768 kHz quartz is optional. If 32.768 kHz is provided by other means, this pin can be used to wake up from hibernation. |
| 15 | GND | GND | GND | Ground |
| 16 | VDD33 | PWR | - | Power input (2.97 V ~ 3.63 V) |
| 17 | CHIP_EN | DI | - | Chip power on |
| 18 | GND | GND | GND | Ground |
| 19 | RESERVED | DI/DO | VDDIO | - |
| 20 | RESERVED | DI/DO | VDDIO | - |
| 21 | SPI_RDY | DI/DO | VDDIO | X-CUBE-ST67W61 corresponding name: SPI_SLAVE_DATA_READY |
| 22 | UART_RX | DI/DO | VDDIO | Also known as GPIO22. |
| 23 | UART_TX | DI/DO | VDDIO | Also known as GPIO21. |
| 24 | SPI_CS | DI/DO | VDDIO | Also known as GPIO28. X-CUBE-ST67W61 corresponding name: LP_WAKEUP |
| 25 | VDDIO | PWR | - | Host I/O voltage input |
| 26 | GND | GND | GND | Ground |
| 27 | SPI_MOSI | DI/DO | VDDIO | Also known as GPIO27. |
| 28 | SPI_CLK | DI/DO | VDDIO | Also known as GPIO29. |
| 29 | SPI_MISO | DI/DO | VDDIO | Also known as GPIO30. |
| 30 | GND | GND | GND | Ground |
| 31 | NC RF | - RF | - | NC: ST67W611M1A6B and ST67W611M1A6U RF: ST67W611M1A6P |
| 32 | GND | GND | GND | Ground |

4 Mechanical information

4.1 Device physical dimensions

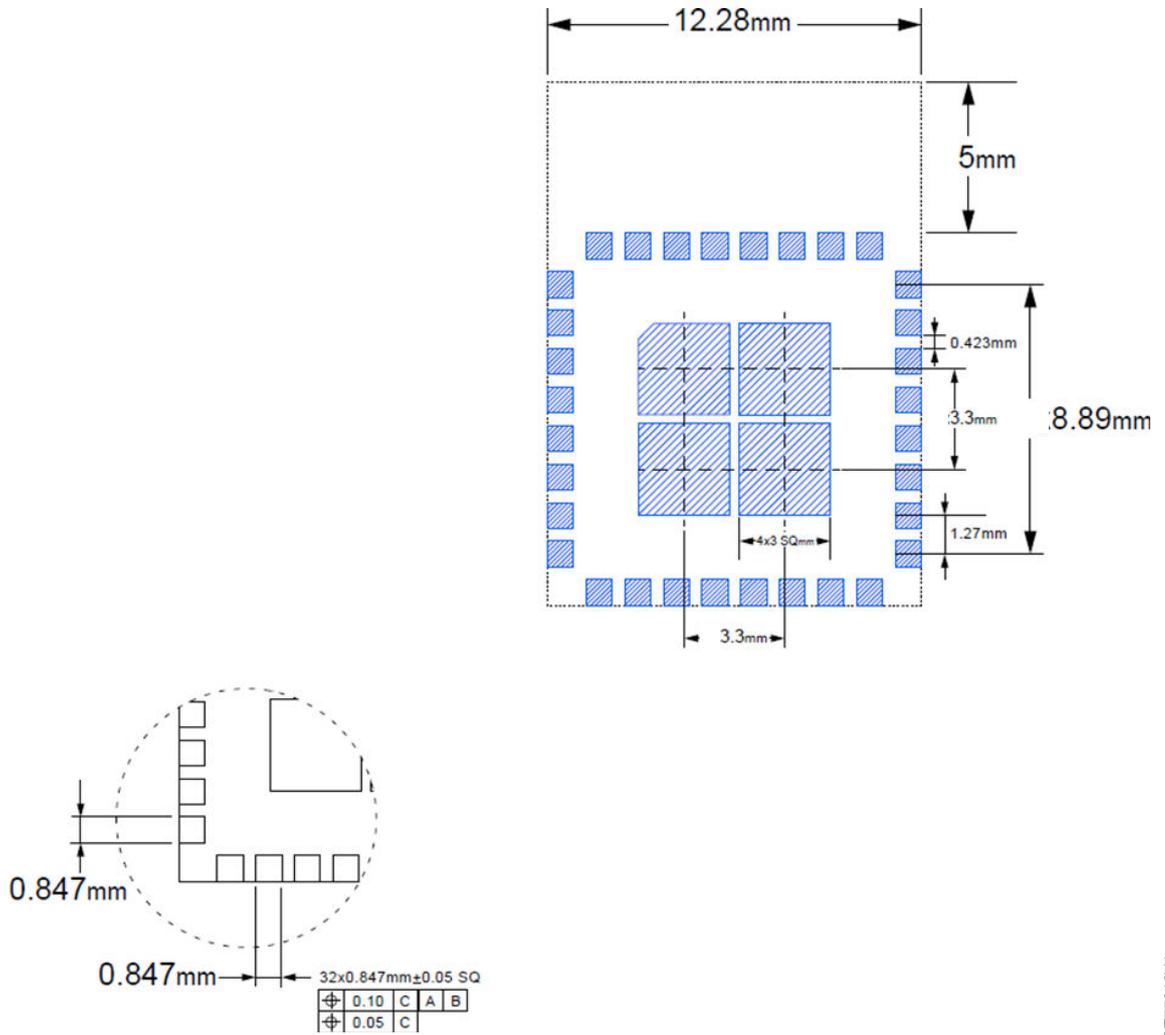
4.1.1 ST67W611M1 LGA module PCB antenna

Figure 5. ST67W611M1 LGA module PCB antenna dimension



DT75611V1

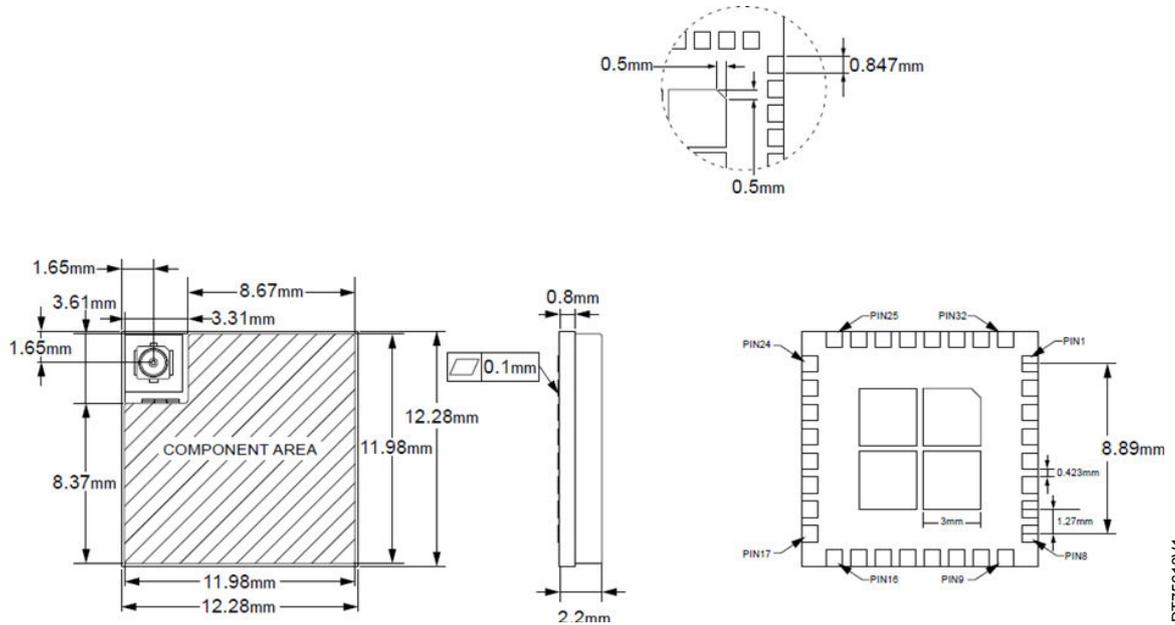
Figure 6. ST67W611M1 LGA module PCB antenna landing pad



DT75612V1

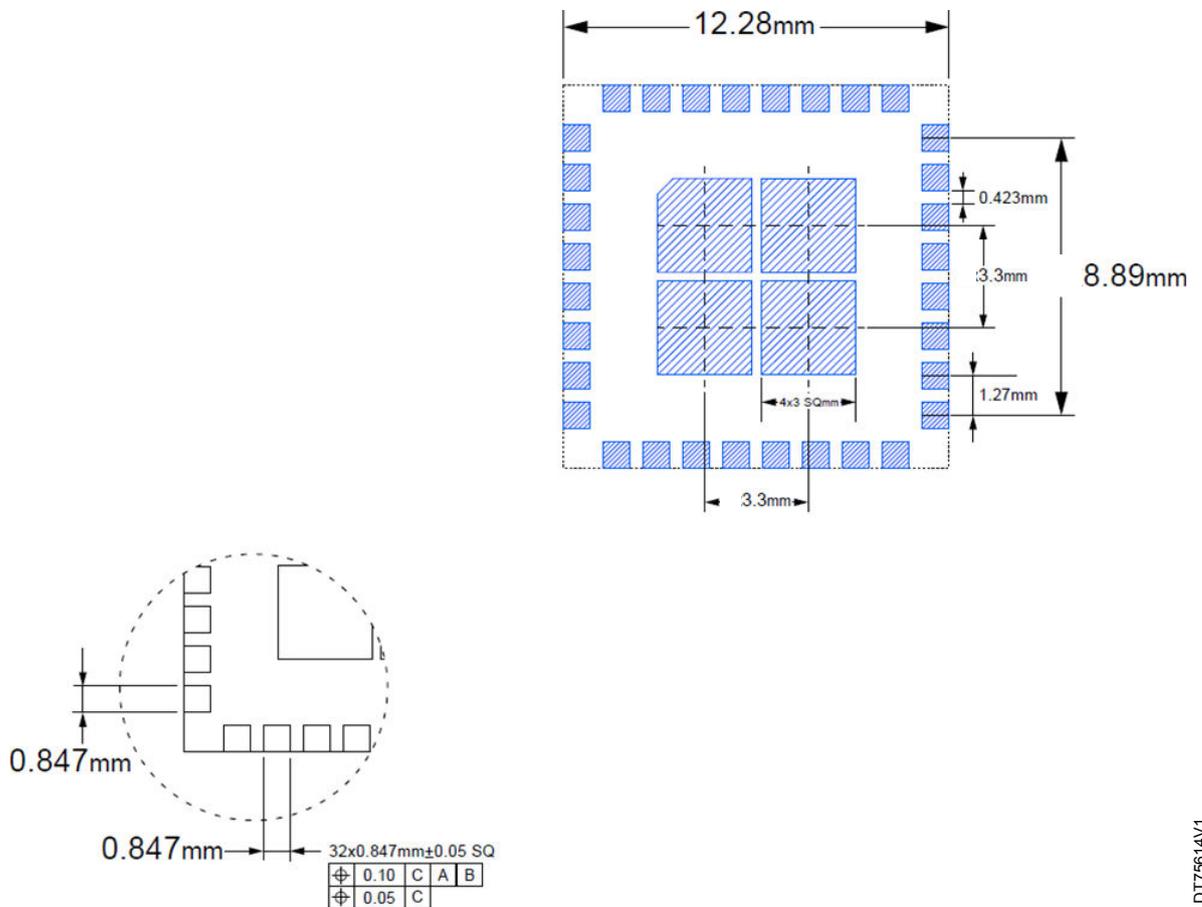
4.1.2 ST67W611M1 LGA module antenna connector

Figure 7. ST67W611M1 LGA module antenna connector dimension



DT75613V1

Figure 8. ST67W611M1 LGA module antenna connector landing pad



DT75614V1

Important security notice

The STMicroelectronics group of companies (ST) places a high value on product security, which is why the ST product(s) identified in this documentation may be certified by various security certification bodies and/or may implement our own security measures as set forth herein. However, no level of security certification and/or built-in security measures can guarantee that ST products are resistant to all forms of attacks. As such, it is the responsibility of each of ST's customers to determine if the level of security provided in an ST product meets the customer needs both in relation to the ST product alone, as well as when combined with other components and/or software for the customer end product or application. In particular, take note that:

- ST products may have been certified by one or more security certification bodies, such as Platform Security Architecture (www.psacertified.org) and/or Security Evaluation standard for IoT Platforms (www.trustcb.com). For details concerning whether the ST product(s) referenced herein have received security certification along with the level and current status of such certification, either visit the relevant certification standards website or go to the relevant product page on www.st.com for the most up to date information. As the status and/or level of security certification for an ST product can change from time to time, customers should re-check security certification status/level as needed. If an ST product is not shown to be certified under a particular security standard, customers should not assume it is certified.
- Certification bodies have the right to evaluate, grant and revoke security certification in relation to ST products. These certification bodies are therefore independently responsible for granting or revoking security certification for an ST product, and ST does not take any responsibility for mistakes, evaluations, assessments, testing, or other activity carried out by the certification body with respect to any ST product.
- Industry-based cryptographic algorithms (such as AES, DES, or MD5) and other open standard technologies which may be used in conjunction with an ST product are based on standards which were not developed by ST. ST does not take responsibility for any flaws in such cryptographic algorithms or open technologies or for any methods which have been or may be developed to bypass, decrypt or crack such algorithms or technologies.
- While robust security testing may be done, no level of certification can absolutely guarantee protections against all attacks, including, for example, against advanced attacks which have not been tested for, against new or unidentified forms of attack, or against any form of attack when using an ST product outside of its specification or intended use, or in conjunction with other components or software which are used by customer to create their end product or application. ST is not responsible for resistance against such attacks. As such, regardless of the incorporated security features and/or any information or support that may be provided by ST, each customer is solely responsible for determining if the level of attacks tested for meets their needs, both in relation to the ST product alone and when incorporated into a customer end product or application.
- All security features of ST products (inclusive of any hardware, software, documentation, and the like), including but not limited to any enhanced security features added by ST, are provided on an "AS IS" BASIS. AS SUCH, TO THE EXTENT PERMITTED BY APPLICABLE LAW, ST DISCLAIMS ALL WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, unless the applicable written and signed contract terms specifically provide otherwise.

Revision history

Table 3. Document revision history

| Date | Revision | Changes |
|-------------|----------|--|
| 05-Dec-2024 | 1 | Initial release. |
| 20-Mar-2025 | 2 | Updated: <ul style="list-style-type: none">• Section Features• Section 2: Description• Section 3.1: Pinout schematics• Section 3.2: Pin description |
| 16-Apr-2025 | 3 | Changed publication scope. |

Contents

| | | |
|--------------|---|-----------|
| 1 | Introduction | 3 |
| 2 | Description | 4 |
| 3 | Pinouts and pin description | 6 |
| 3.1 | Pinout schematics | 6 |
| 3.2 | Pin description | 8 |
| 4 | Mechanical information | 9 |
| 4.1 | Device physical dimensions | 9 |
| 4.1.1 | ST67W611M1 LGA module PCB antenna | 9 |
| 4.1.2 | ST67W611M1 LGA module antenna connector | 11 |
| | Important security notice | 12 |
| | Revision history | 13 |
| | List of tables | 15 |
| | List of figures | 16 |



List of tables

| | | |
|-----------------|-------------------------------------|----|
| Table 1. | ST67W611M1 features | 4 |
| Table 2. | ST67W611M1 pin definition | 8 |
| Table 3. | Document revision history | 13 |

List of figures

| | | |
|------------------|---|----|
| Figure 1. | ST67W611M1 block diagram | 5 |
| Figure 2. | ST67W611M1A6B LGA module PCB antenna | 6 |
| Figure 3. | ST67W611M1A6U LGA module antenna connector. | 6 |
| Figure 4. | ST67W611M1A6P LGA module pin connector | 7 |
| Figure 5. | ST67W611M1 LGA module PCB antenna dimension. | 9 |
| Figure 6. | ST67W611M1 LGA module PCB antenna landing pad. | 10 |
| Figure 7. | ST67W611M1 LGA module antenna connector dimension | 11 |
| Figure 8. | ST67W611M1 LGA module antenna connector landing pad | 11 |

IMPORTANT NOTICE – READ CAREFULLY

STMicroelectronics NV and its subsidiaries (“ST”) reserve the right to make changes, corrections, enhancements, modifications, and improvements to ST products and/or to this document at any time without notice. Purchasers should obtain the latest relevant information on ST products before placing orders. ST products are sold pursuant to ST’s terms and conditions of sale in place at the time of order acknowledgment.

Purchasers are solely responsible for the choice, selection, and use of ST products and ST assumes no liability for application assistance or the design of purchasers’ products.

No license, express or implied, to any intellectual property right is granted by ST herein.

Resale of ST products with provisions different from the information set forth herein shall void any warranty granted by ST for such product.

ST and the ST logo are trademarks of ST. For additional information about ST trademarks, refer to www.st.com/trademarks. All other product or service names are the property of their respective owners.

Information in this document supersedes and replaces information previously supplied in any prior versions of this document.

© 2025 STMicroelectronics – All rights reserved