



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



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

Product status

ST67W611M1	Pre-production
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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® Low Energy 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/WEP/WPA/WPA2/WPA3
- STA, SoftAP, concurrent STA + SoftAP⁽¹⁾
- Maximum Tx Power: 21 dBm
- Tx Power (HE40 and MCS9): 16 dBm
- Rx Sensitivity (HE40 and MCS9): -67 dBm
- 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:
 - BLE (2 Mbps): +10 dBm
 - BLE (1 Mbps): +10 dBm
- Rx Sensitivity
 - BLE (2 Mbps): -97 dBm
 - BLE (1 Mbps): -99 dBm

System peripherals

- SPI
- UART
- JTAG

Security

- PSA Level 1 Certified
- Security system encryption engine



- Secure services: Secure boot, debug, and OTA (Over-The-Air)

Voltage

- Input voltage: 2.97 V ~ 3.63 V
- IO voltage: 1.8 V/3.3 V

Environmental specifications

- Temperature:
 - Operating: -40°C ~ +85°C
 - Storage: -40°C ~ +85°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, electrical characteristics, packaging and ordering information.

ST restricted
DRAFT



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 RFSwitch
- 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, debug, and OTA)
Standard	802.11b/g/n/ax
	Bluetooth Low Energy 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
	BLE (2Mbps): +10 dBm
	BLE (1Mbps): +10 dBm
	Rx Sensitivity
	BLE (2Mbps): -97 dBm
	BLE (1Mbps): -99 dBm
Peripherals	SPI
	UART
	JTAG
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 ~ +85°C
	Humidity
	Relative: < 90% noncondensing

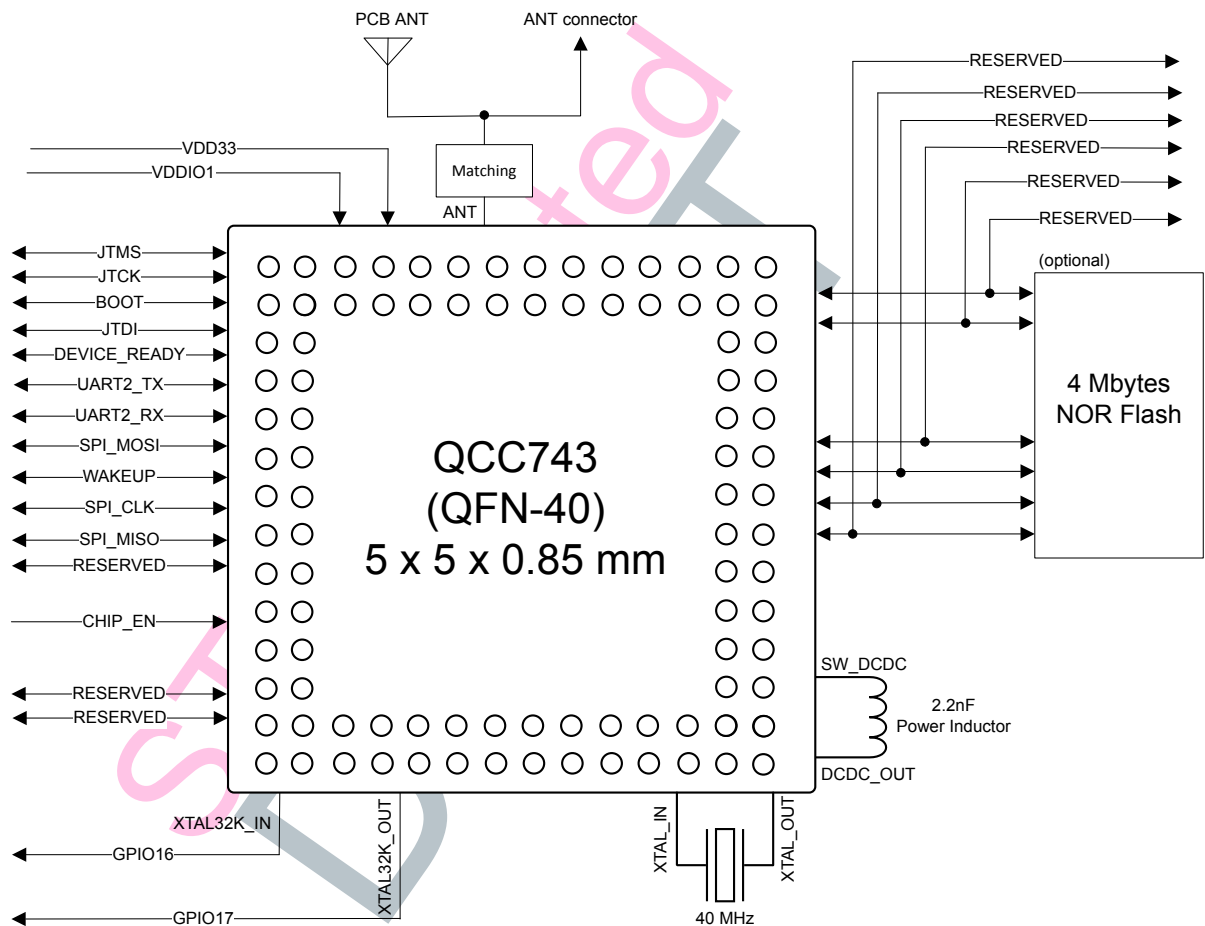


Feature	Capability
Environmental	Storage: < 90% noncondensing

1. This feature is not yet available

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

Figure 1. ST67W611M1 block diagram



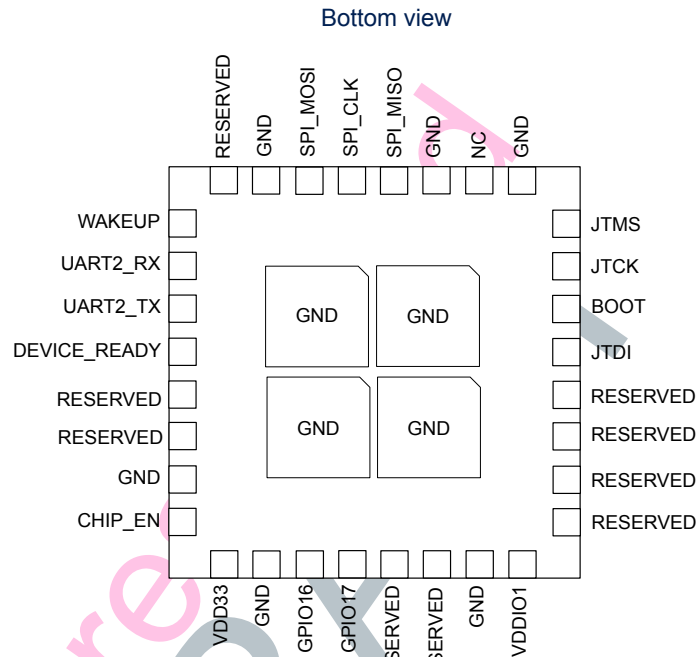
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3 Pinouts and pin description

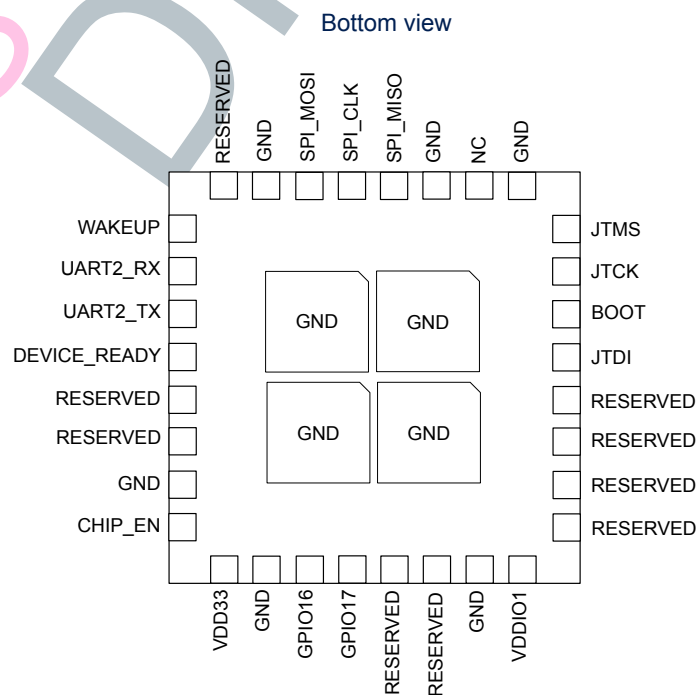
3.1 Pinout schematics

Figure 2. ST67W611M1A6B LGA module PCB antenna

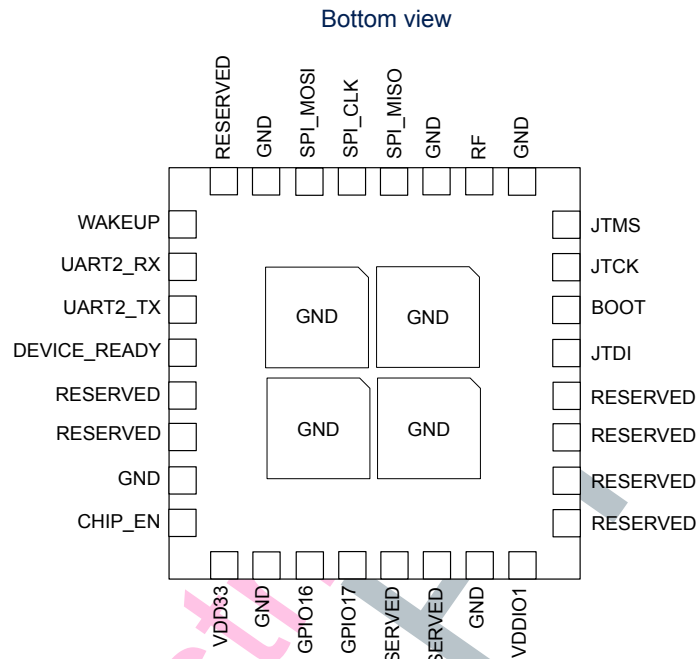


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Figure 3. ST67W611M1A6U LGA module antenna connector



DT75610V1


Figure 4. ST67W611M1A6P LGA module antenna connector


DT75647V1



3.2 Pin description

Table 2. ST67W611M1 pin definition

Pin number	Pin name	Pin type	Power domain	Description
16	VDD33	PWR	-	Power input (2.97 V ~ 3.63 V)
9	VDDIO1	PWR	-	Host I/O voltage input JTMS
25	VDDIO2	PWR	-	Host I/O voltage input SPI_CLK_REQ
10, 15, 18, 26, 30, 32	GND	GND	GND	Ground
31	NC RF	- RF	-	NC: ST67W611M1A6B and ST67W611M1A6U RF: ST67W611M1A6P
17	CHIP_EN	DI	-	Chip power on
1	JTMS	DI/DO	VDDIO1	General purpose I/O
2	JTCK	DI/DO	VDDIO1	General purpose I/O
3	BOOT	DI/DO	VDDIO1	General purpose I/O
4	JTDI	DI/DO	VDDIO1	General purpose I/O
5	RESERVED	DI/DO	VDDIO1	General purpose I/O
6	RESERVED	DI/DO	VDDIO1	General purpose I/O
7	RESERVED	DI/DO	VDDIO1	General purpose I/O
8	RESERVED	DI/DO	VDDIO1	General purpose I/O
11	RESERVED	DI/DO	VDDIO1	General purpose I/O
12	RESERVED	DI/DO	VDDIO1	General purpose I/O
13	GPIO17	DI/DO	VDD33	General purpose I/O
14	GPIO16	DI/DO	VDD33	General purpose I/O
21	SPI_CLK_REQ	DI/DO	VDDIO1	General purpose I/O
22	UART_RX	DI/DO	VDDIO2	General purpose I/O
23	UART_TX	DI/DO	VDDIO2	General purpose I/O
24	DEVICE_WAKEUP	DI/DO	VDDIO2	General purpose I/O
27	SPI_MOSI	DI/DO	VDDIO2	General purpose I/O
28	SPI_CLK	DI/DO	VDDIO2	General purpose I/O
29	SPI_MISO	DI/DO	VDDIO2	General purpose I/O



4 Electrical characteristics

4.1 Absolute maximum ratings

The absolute maximum ratings provided in this section indicate the stress levels that, if exceeded, may result in permanent damage to the device. Functionality outside the specified operating conditions is not guaranteed. Both functionality and reliability are guaranteed only within the defined operating specifications.

Table 3. Absolute maximum ratings

Pin name	Min.	Max.	Unit
VDD33	-0.3	3.63	V
VDDIO1	-0.3	3.63	
ESD protection (HBM)	-	2000	
T _S (storage temperature) ⁽¹⁾⁽²⁾	-55	+150	°C

1. The storage temperature range applies when the device is in the off state (the device is not assembled in any platform and is not electrically connected to any voltage or I/O signals). Damage may occur when the device is subjected to this temperature for any length of time.
2. For devices shipped in tape and reel, the storage temperature range is [+15 °C +35 °C] and < 90 % relative humidity (RH). QTI recommends allowing the device to return to ambient room temperature before usage.

4.2 Operating conditions

Operating conditions include design team-controlled parameters such as power supply voltage, power distribution impedances, and thermal conditions. The ST67W611M1 meets all performance specifications when used within the operating conditions, unless otherwise noted in those sections (provided the absolute maximum ratings have never been exceeded).

Table 4. Recommended power operating range

Pin name	Min.	Typ	Max.	Unit
VDD33	2.97	3.3	3.63	V
VDDIO1	2.97/1.62	3.3/1.8	3.63/1.98	

Table 5. Recommended temperature operating range

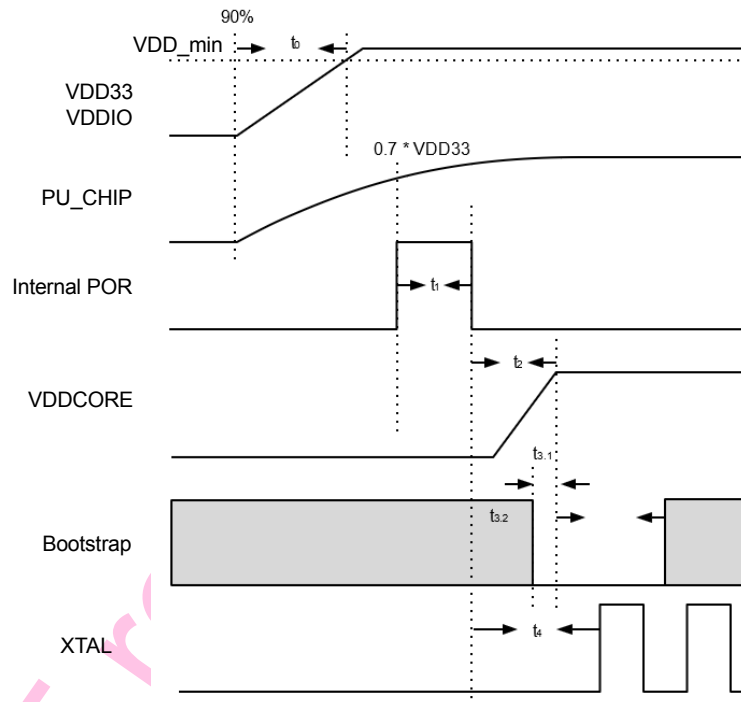
Item	Min.	Max.	Unit
Ambient temperature	-40	85	°C



4.3 Power-on sequence

To ensure that normal power-on startup, the power, reset, and bootstrap pins must meet the corresponding timing requirements.

Figure 5. Power-on sequence



DT75638V1

Table 6. Power-on sequence parameters

Parameters	Description	Min. (ms)	Typ (ms)	Max. (ms)
t_0	The power supply voltage reaches 90% rise time ⁽¹⁾	-	0.1	-
t_1	Internal POR duration	-	3	-
t_2	VDDCORE setting time after internal POR down	-	1	-
$t_{3.1}$	Bootstrap pin ⁽²⁾ preparation time before VDDCORE establishment	0	-	-
$t_{3.2}$	Duration of valid voltage level at the bootstrap pin.	2	-	-
t_4	XTAL startup time after internal POR down	-	1	-

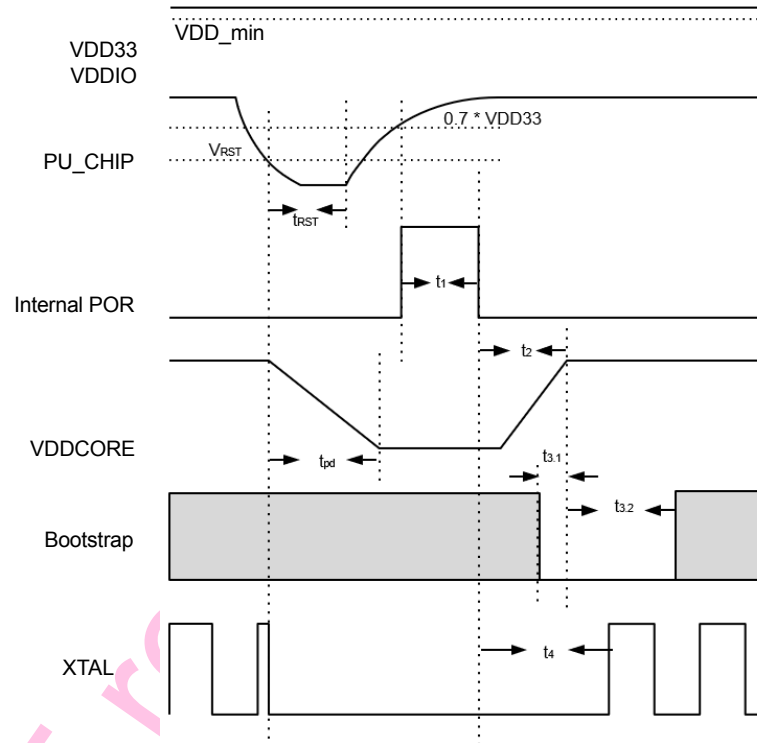
1. VDD_min is the minimum value for proper chip operation.

2. The bootstrap pin is GPIO2.



4.4 Shutdown sequence

Figure 6. Shutdown sequence



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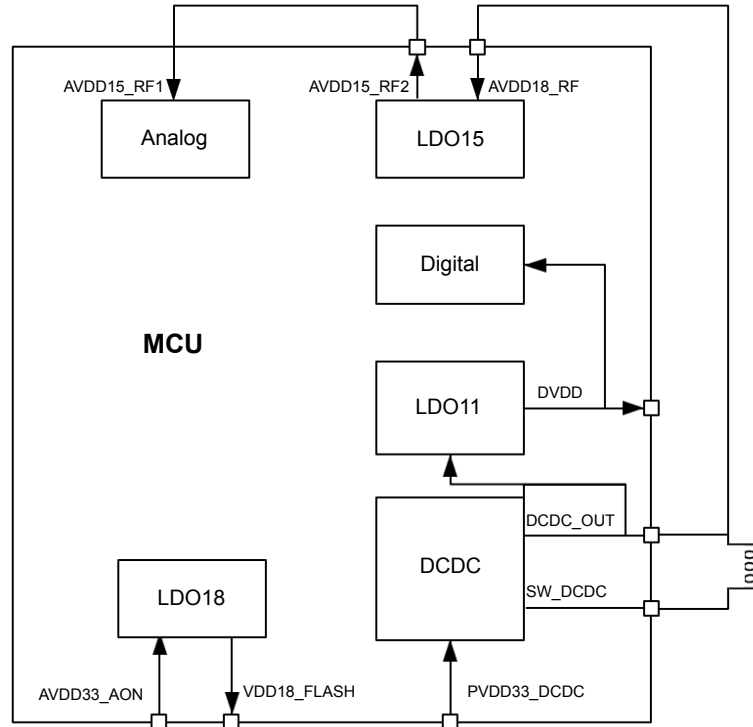
Table 7. Shutdown sequence parameters

Parameters	Description	Min.	Typ	Max.	Unit
V_{RST}	Shutdown occurs after PU_CHIP lower than this voltage	0	$0.1 \times VDD33$	$0.3 \times VDD33$	V
t_{RST}	The required time that PU_CHIP lower than V_{RST}	1	1	-	ms
t_{pd}	Time for VDDCORE to decrease to 0 after shutdown	1	1	-	ms



4.5 Power tree

Figure 7. Power block diagram



DT75640V1

4.6 DC power characteristics

Test conditions: $V_{DDIO} = 3.3\text{ V}$, temperature = 25 °C

Table 8. I/O DC characteristics

Symbol	Description	GPIO number	Conditions	Min.	Typ	Max.	Unit
V_{OH}	Output voltage high	GPIO21-22 GPIO28-29	GPIO drive strength 0, source current = 2.8 mA	-	$0.9 \times V_{DDIO}$	-	V
			GPIO drive strength 1, source current = 9.5 mA	-		-	
			GPIO drive strength 2, source current = 17.4 mA	-		-	
			GPIO drive strength 3, source current = 23.8 mA	-		-	
		GPIO00-20 GPIO23-27 GPIO30-34	GPIO drive strength 0, source current = 2.9 mA	-		-	
			GPIO drive strength 1, source current = 8.5 mA	-		-	
			GPIO drive strength 2, source current = 16.8 mA	-		-	
			GPIO drive strength 3, source current = 22.2 mA	-		-	
V_{OL}	Output voltage low	GPIO21-22 GPIO28-29	GPIO drive strength 0, sink current = 3.4 mA	-	$0.1 \times V_{DDIO}$	-	
			GPIO drive strength 1, sink current = 10.2 mA	-		-	



Symbol	Description	GPIO number	Conditions	Min.	Typ	Max.	Unit
V _{OL}	Output voltage low	GPIO21-22 GPIO28-29	GPIO drive strength 2, sink current = 20 mA	-	0.1 × VDDIO	-	V
			GPIO drive strength 3, sink current = 26.5 mA	-		-	
		GPIO0-20 GPIO23-27 GPIO30-34	GPIO drive strength 0, sink current = 3.1 mA	-		-	
			GPIO drive strength 1, sink current = 9.2 mA	-		-	
			GPIO drive strength 2, sink current = 18.2 mA	-		-	
			GPIO drive strength 3, sink current = 24 mA	-		-	
			-	0.7 × VDDIO	-	-	
V _{IH}	Input voltage high		-	-	-	-	
V _{IL}	Input voltage low		-	-	-	0.3 × VDDIO	

4.7 WLAN RF characteristics

Table 9. WLAN Tx RF characteristics

Mode		Note	Performance at 3.3 V, 25 °C			
			Min.	Typ	Max.	Unit
Transmit power	11ax: MCS0 HE20	-	-	20	-	dBm
	11ax: MCS9 HE20	BCC	-	16	-	
	11ax: MCS0 HE40	-	-	20	-	
	11ax: MCS9 HE40	-	-	17	-	
	11n: MCS0 HT20	-	-	18	-	
	11n: MCS7 HT20	-	-	18	-	
	11n: MCS0 HT40	-	-	18	-	
	11n: MCS7 HT40	-	-	18	-	
	11g: 6 Mbps	-	-	20	-	
	11g: 54 Mbps	-	-	18	-	
	11b: 1 Mbps	-	-	21	-	
	11b: 11 Mbps	-	-	21	-	
EVM	11ax: MCS9 HE20	-	-	≤ -32	-	dB
	11n: MCS7 HT20	-	-	≤ -27	-	
	11g: 54 Mbps	-	-	≤ -25	-	
Accuracy of power control		1 dB/step	-	±1	-	
2.4 GHz harmonics ⁽¹⁾	Second harmonic	-	-	-45	-	dBm
	Third harmonic	-	-	-61	-	
	Fourth harmonic	-	-	-70	-	
	Fifth harmonic	-	-	-44	-	

1. Target 20 dBm - RBW 1 MHz - VBW 3 MHz - Trace AVG - Detector RMS


Table 10. WLAN Rx RF characteristics

Mode		Note	Performance at 3.3 V, 25 °C			
			Min.	Typ	Max.	Unit
Rx sensitivity	11ax: MCS0 HE20	-	-	-93	-	dBm
	11ax: MCS9 HE20	LDPC	-	-70	-	
	11ax: MCS0 HE40	-	-	-89	-	
	11ax: MCS9 HE40	LDPC	-	-67	-	
	11n: MCS0 HT20	-	-	-93	-	
	11n: MCS7 HT20	LDPC	-	-75	-	
	11n: MCS0 HT40	-	-	-89.5	-	
	11n: MCS7 HT40	LDPC	-	-72	-	
	11g: 6 Mbps	-	-	-93	-	
	11g: 54 Mbps	-	-	-77.5	-	
	11b: 1 Mbps	-	-	-99	-	
	11b: 11 Mbps	-	-	-90	-	
Rx maximum input level	11ax: MCS0 HE20	-	-	-10	-	dBm
	11ax: MCS9 HE20	-	-	-10	-	
	11n: MCS0 HT20	-	-	-10	-	
	11n: MCS7 HT20	-	-	-10	-	
	11g: 6 Mbps	-	-	-10	-	
	11g: 54 Mbps	-	-	-10	-	
	11b: 1 Mbps	-	-	5	-	
	11b: 11 Mbps	-	-	5	-	
Adjacent channel rejection	11ax: MCS0 HE20	LDPC	-	32	-	dB
	11ax: MCS9 HE20	LDPC	-	7	-	
	11n: MCS0 HT20	LDPC	-	32	-	
	11n: MCS7 HT20	LDPC	-	14	-	
	11g: 6 Mbps	-	-	39	-	
	11g: 54 Mbps	-	-	24	-	
	11b: 1 Mbps	-	-	49	-	
	11b: 11 Mbps	-	-	49	-	
Nonadjacent channel rejection	11ax: MCS0 HE20	-	-	42	-	dB
	11ax: MCS9 HE20	-	-	18	-	
	11n: MCS0 HT20	-	-	43	-	
	11n: MCS7 HT20	-	-	26	-	
	11g: 6 Mbps	-	-	48	-	
	11g: 54 Mbps	-	-	34	-	
	11b: 1 Mbps	-	-	58	-	
	11b: 11 Mbps	-	-	59	-	
S11	-	-	-	≤10	-	
RSSI accuracy	Range below -20 dBm	-	-3	-	3	



Mode		Note	Performance at 3.3 V, 25 °C			
			Min.	Typ	Max.	Unit
RSSI accuracy	Range above -20 dBm	-	-5	-	5	dB

Table 11. Synthesizer composite characteristics and transmit output power accuracy

Symbol	Parameter	Conditions	Min.	Typ	Max.	Unit
Synthesizer composite characteristics for 2.4 GHz						
F_c	Center channel frequency	Center frequency at 5 MHz spacing	2412	-	2484	MHz
F_{ref}	Reference oscillator frequency	± 20 ppm	-	40	-	MHz
F_{step}	Frequency step size (at RF)	-	-	5	-	MHz
$T_{SPowerUP}$	Time for power-up (from sleep)	-	-	-	50	us
Transmit output power accuracy						
APC ⁽¹⁾	Accuracy of transmit power control at 2.4 GHz at room temperature (3 sigma over top 10 dB of TPC range).	OLPC (Open Loop Power Control)	-	± 1.5	-	dB

1. All APC numbers assume conducted test with 50 Ω load.

4.8

BLE RF performance

Table 12. BLE Tx RF characteristics

Mode		Note	Performance at 3.3 V, 25 °C			
			Min.	Typ	Max.	Unit
Modulation characteristics	1 Mbps, Δf_{1avg}	-	-	252	-	kHz
	1 Mbps, $\Delta f_{2max} > 185$ kHz	-	-	100	-	%
	1 Mbps, $\Delta f_{2avg}/\Delta f_{1avg}$	-	-	0.89	-	-
	2 Mbps, Δf_{1avg}	-	-	502	-	kHz
	2 Mbps, $\Delta f_{2max} > 370$ kHz	-	-	100	-	%
	2 Mbps, $\Delta f_{2avg}/\Delta f_{1avg}$	-	-	0.89	-	-
Carrier frequency offset and drift	1 Mbps, $ f_n $	-	-	<20	-	kHz
	1 Mbps, $ f_0 - f_n $	-	-	<1	-	
	1 Mbps, $ f_1 - f_0 $	-	-	<1	-	
	1 Mbps, $ f_n - f(n-5) $	-	-	<1	-	
	2 Mbps, $ f_n $	-	-	<20	-	
	2 Mbps, $ f_0 - f_n $	-	-	<1	-	
	2 Mbps, $ f_1 - f_0 $	-	-	<1	-	
	2 Mbps, $ f_n - f(n-5) $	-	-	<1	-	
In-band emission	1 Mbps, $F = F_0 \pm 2$ MHz	-	-	-41	-	dBm
	1 Mbps, $F = F_0 \pm 3$ MHz	-	-	-41	-	
	2 Mbps, $F = F_0 \pm 4$ MHz	-	-	-41	-	
	2 Mbps, $F = F_0 \pm 5$ MHz	-	-	-42	-	
	2 Mbps, $F = F_0 \pm 6$ MHz	-	-	-42	-	



Mode		Note	Performance at 3.3 V, 25 °C			
			Min.	Typ	Max.	Unit
Tx power	1 Mbps	-	-	10	20	dBm

Table 13. BLE Rx RF characteristics

Mode		Note	Performance at 3.3 V, 25 °C			
			Min.	Typ	Max.	Unit
Receiver sensitivity	1 Mbps	Packet length 37 bytes, dirty transmitter off	-	-99	-	dBm
		Packet length 37 bytes, dirty transmitter on	-	-98.5	-	
	2 Mbps	Packet length 37 bytes, dirty transmitter off	-	-96.5	-	
		Packet length 37 bytes, dirty transmitter on	-	-96.5	-	
Maximum input level	1 Mbps	-	-	5	-	dBm
	2 Mbps	-	-	5	-	
C/I performance	1 Mbps, $F = F_0$	-	-	5	-	dB
	1 Mbps, $F = F_0 + 1 \text{ MHz}$	-	-	-5	-	
	1 Mbps, $F = F_0 - 1 \text{ MHz}$	-	-	-3	-	
	1 Mbps, $F = F_0 + 2 \text{ MHz}$	-	-	-36	-	
	1 Mbps, $F = F_0 - 2 \text{ MHz}$	-	-	-27	-	
	1 Mbps, $F = F_0 + 3 \text{ MHz}$	-	-	-41	-	
	1 Mbps, $F = F_0 - 3 \text{ MHz}$	-	-	-33	-	
	2 Mbps, $F = F_0$	-	-	6	-	
	2 Mbps, $F = F_0 + 2 \text{ MHz}$	-	-	-8	-	
	2 Mbps, $F = F_0 - 2 \text{ MHz}$	-	-	-6	-	
	2 Mbps, $F = F_0 + 4 \text{ MHz}$	-	-	-40	-	
	2 Mbps, $F = F_0 - 4 \text{ MHz}$	-	-	-35	-	
	2 Mbps, $F = F_0 + 6 \text{ MHz}$	-	-	-42	-	
	2 Mbps, $F = F_0 - 6 \text{ MHz}$	-	-	-42	-	

4.9

Power consumption

- **Active:** Continuous transmitting or receiving on connection to Access Point (AP).
- **Idle:** No active transmitting or receiving. The CPU is in an idle state.
- **DeepSleep:** Wi-Fi, CPU, and peripherals are powered off. This is the DTIM power-saving mode.
- **Hibernation:** No connection to the AP.
- **Shutdown:** The chip is completely shut down.



The power consumption for each state is listed in the table below:

Table 14. Power consumption

Operation Mode	State	Typ	Unit	Comments
Active	MCU Active and Rx Active	38	mA	MCU160MHz, XCLK 40 MHz, BCLK 80 MHz, Flash 40 MHz
	Tx Active	318		MCS0, Tx Power = +18 dBm
Power saving	DeepSleep	90	µA	Wi-Fi, CPU, and peripherals are powered off. This is the DTIM power-saving mode.
	Hibernation	2.5		4 KBRAM retained
	Shutdown	0.2		-
DTIM	DTIM1	720	µA	Ext32k
		720		Xtal32k
		830		RC32k
	DTIM3	300		Ext32k
		230		Xtal32k
		300		RC32k
	DTIM5	240		Ext32k
		240		Xtal32k
		290		RC32k
	DTIM10	130		Ext32k
		130		Xtal32k
		180		RC32k

Table 15. Power consumption for continuous WLAN Tx 2.4 GHz at 3.3 V, 25 °C

Rate	Power (dBm)	Current consumption (mA)
11b1 Mbps	21	372
11b 11 Mbps	21	377
11g6 Mbps	21	352
11g54 Mbps	19	304
MCS0 HT20	18	326
MCS7 HT20	18	311
MCS0 HT40	18	310
MCS7 HT40	18	292
MCS0 HE20	20	317
MCS9 HE20	16	285
MCS0 HE40	20	321
MCS9 HE40	17	262

Table 16. Power consumption for continuous WLAN Rx 2.4 GHz at 3.3 V, 25 °C

Rate	Current consumption (mA)
11b1 Mbps	55
11b 11 Mbps	56



Rate	Current consumption (mA)
11g6 Mbps	59
11g54 Mbps	62
MCS0 HT20	59
MCS7 HT20	63
MCS0 HT40	71
MCS7 HT40	78
MCS0 HE20	60
MCS9 HE20	65
MCS0 HE40	74
MCS9 HE40	77

Table 17. Power consumption for BLE at 3.3 V, 25 °C

Description	Current consumption (mA)
Continuous Rx burst	53
Continuous Tx (+4 dBm)	107
Continuous Tx (+10 dBm)	167
1.28 sec page scan (noninterlaced)	0.75
1.28 sec LE ADV	0.32
Continuous Rx burst	54
Continuous Tx (+20 dBm)	292

Table 18. Power consumption for 802.15.4 at 3.3 V, 25 °C

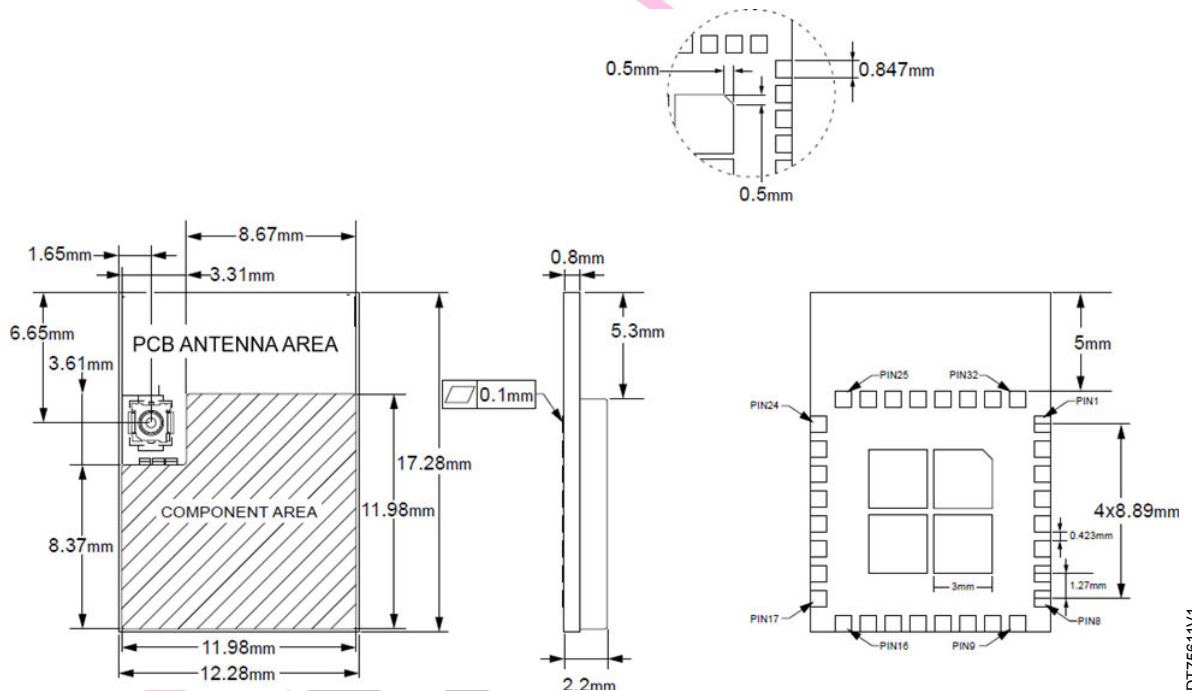
Description	Current consumption (mA)
Continuous Rx burst	54
Continuous Tx (+20 dBm)	292

5 Mechanical information

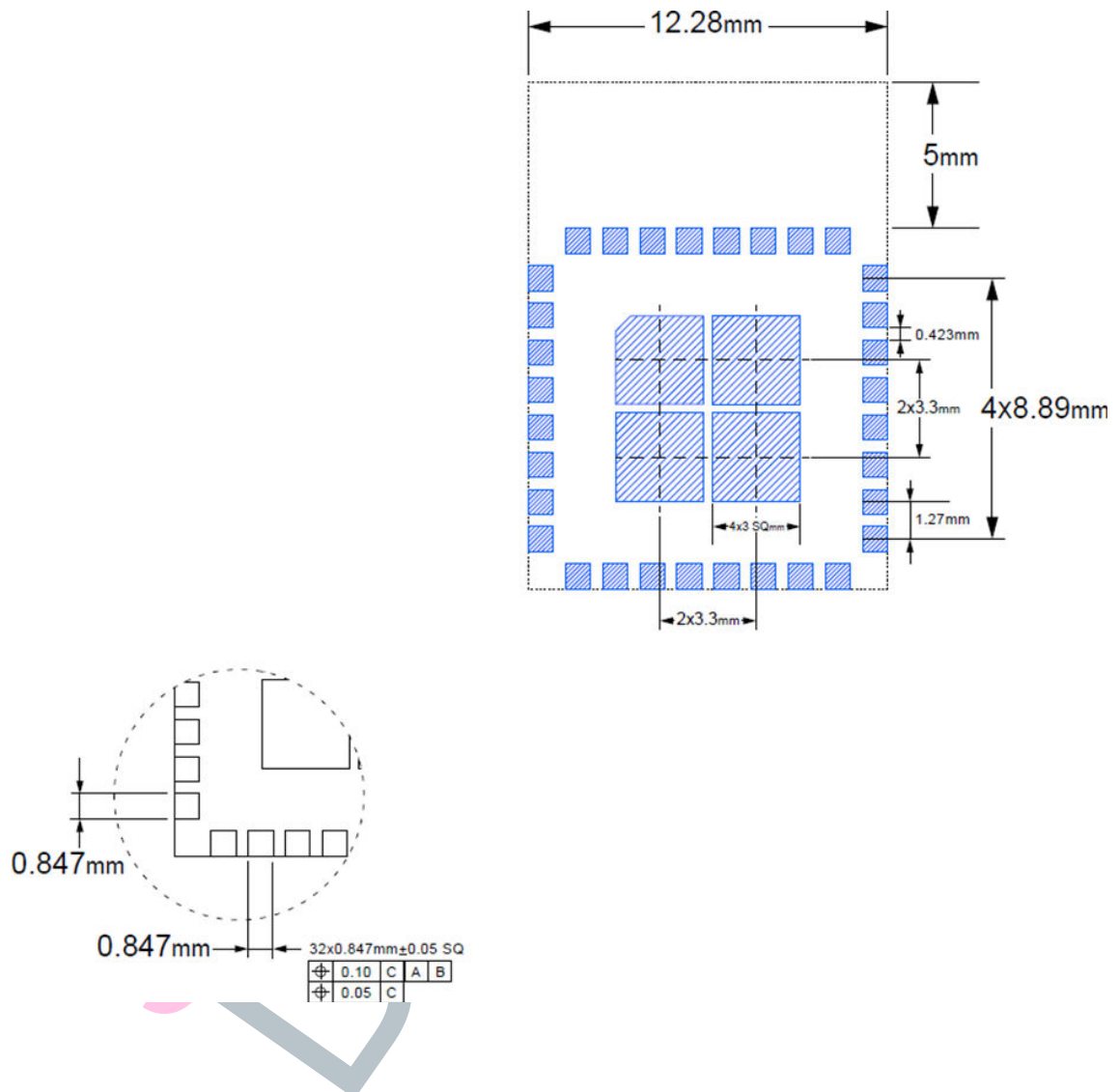
5.1 Device physical dimensions

5.1.1 ST67W611M1 LGA module PCB antenna

Figure 8. ST67W611M1 LGA module PCB antenna dimension



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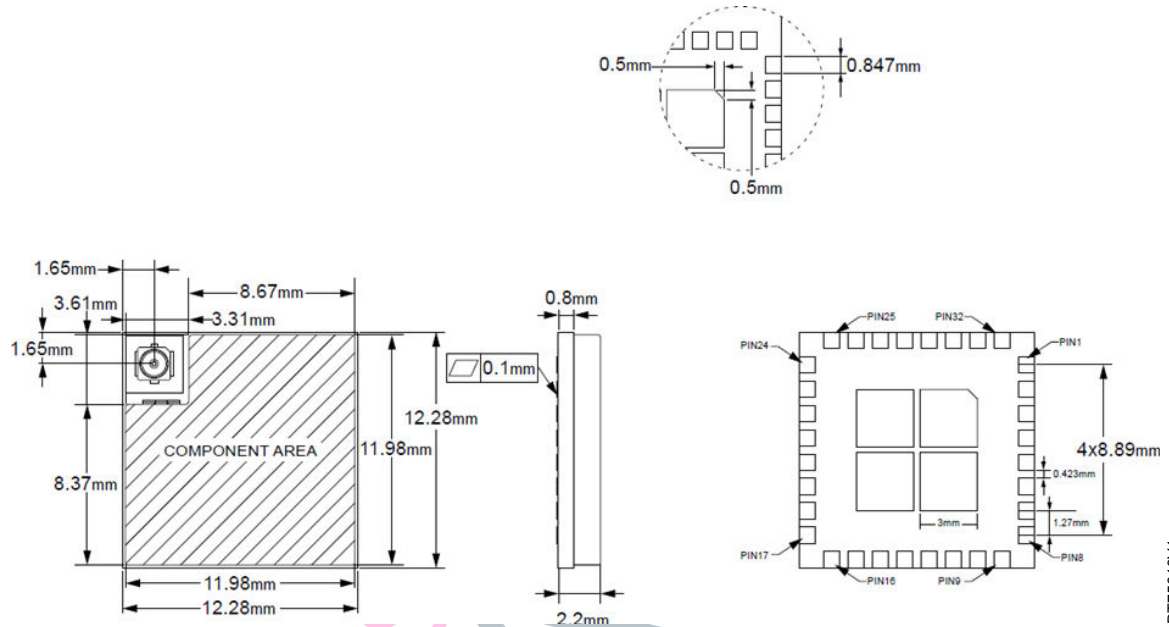

Figure 9. ST67W611M1 LGA module PCB antenna landing pad


DT75612V1



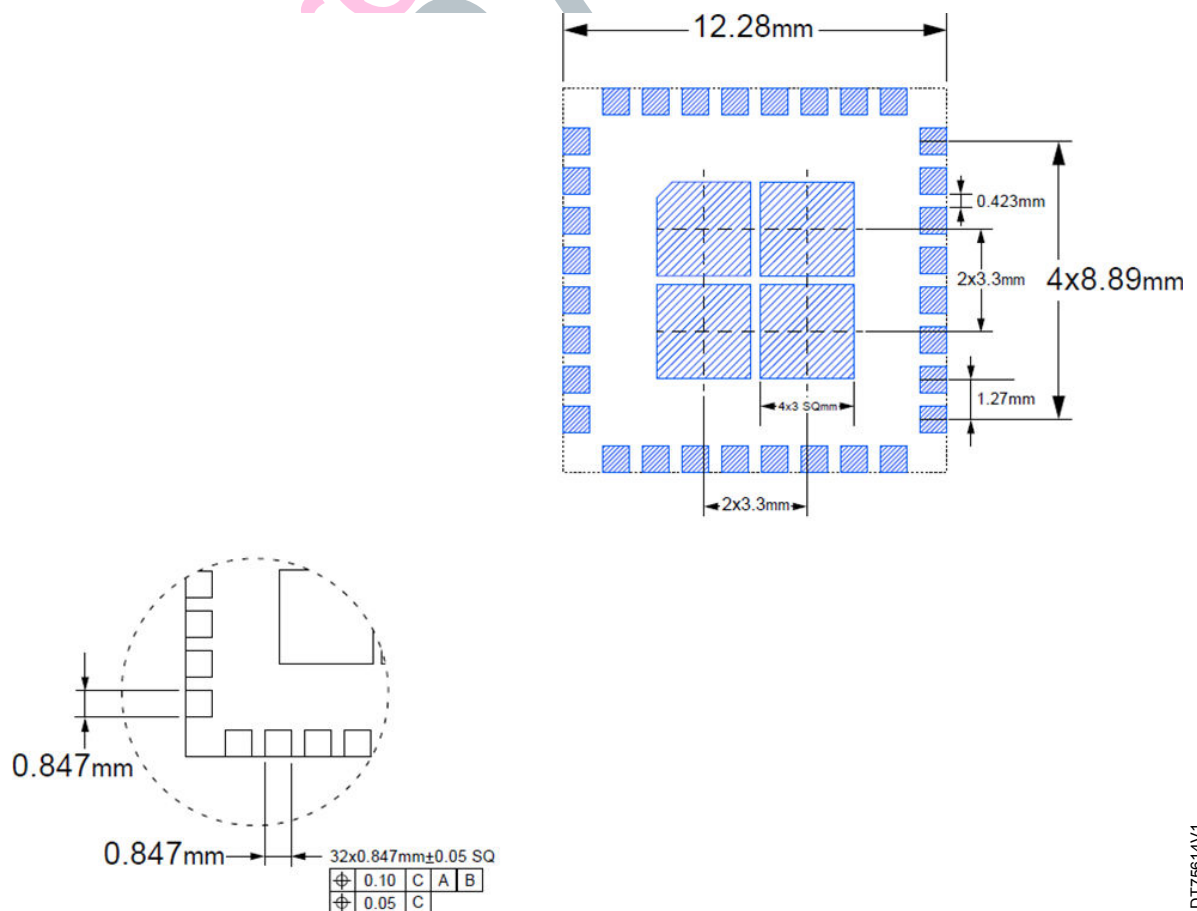
5.1.2 ST67W611M1 LGA module antenna connector

Figure 10. ST67W611M1 LGA module antenna connector dimension



DT75613V1

Figure 11. ST67W611M1 LGA module antenna connector landing pad



DT75614V1

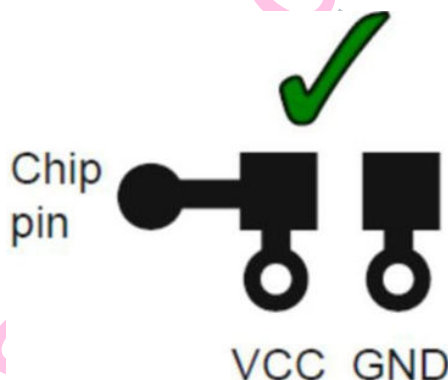
6 Manufacturing guidelines

6.1 Power layout guideline

ST67W611M1 can be powered by either a 3-V battery or a DC 3.3-V power supply. To ensure proper operation, follow these guidelines for power pin connections and decoupling:

1. Place the capacitor as close as possible to the chip and the power pin.
2. Use a capacitor to decouple the power supply from the chip.
3. Use capacitors to prevent noise from coupling back to the power plane.

Figure 12. Power layout guideline

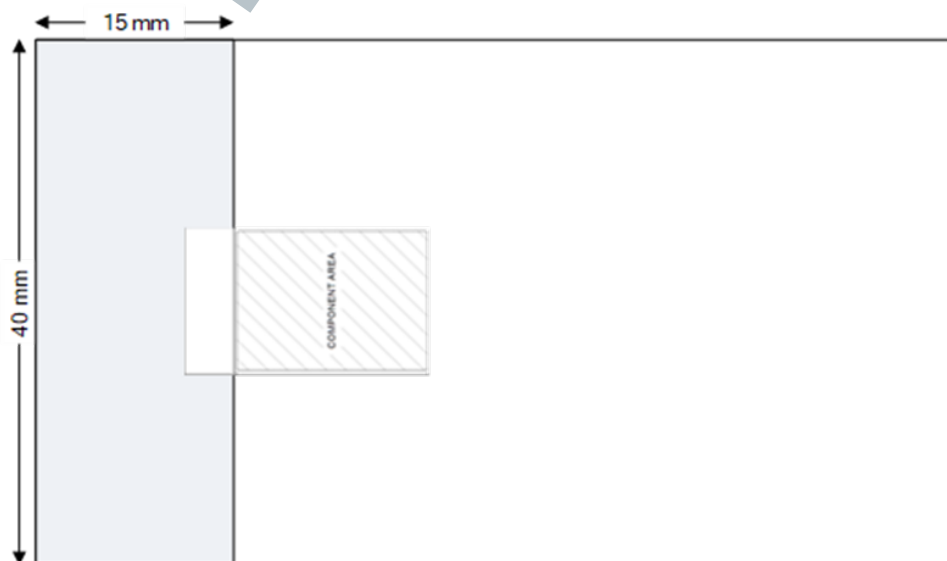


6.2 RF layout guideline

To optimize antenna performance, follow these guidelines for placing ST67W611M1 on the PCB:

1. Place ST67W611M1 in the corner of the PCB as shown in Figure 13.
2. Do not cover the antenna clearance area with copper or traces.
3. Keep the antenna area as far away as possible from the power supply and metal components.
4. Connect all GND pins directly to a solid GND plane.
5. Place GND vias as close as possible to the GND pin.
6. Use a good layout method to avoid excessive noise coupling with signal lines or supply voltage lines

Figure 13. RF layout guideline



DT75615V1

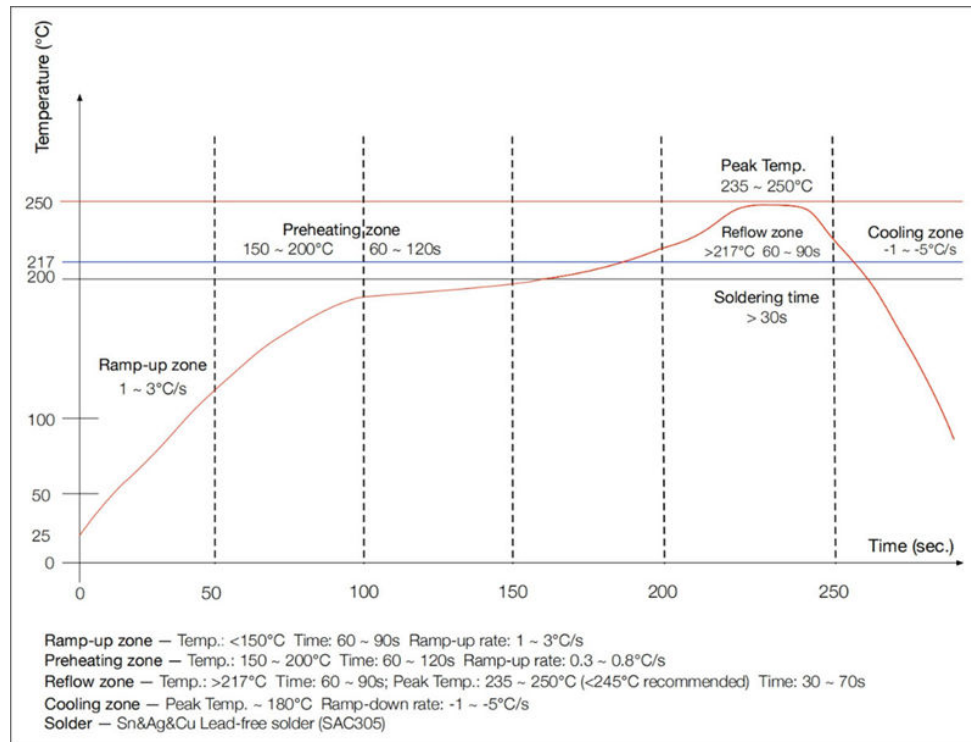
DT75616V1



6.3 Soldering guideline

ST67W611M1 can be SMT on the board following the temperature curve graph.

Figure 14. Soldering guideline



DT75617V1



7 Ordering information

Table 19. Ordering information

Order code	Package	Delivery mode
ST67W611M1A6BTR	32 pin LGA	Tape & reel, 800 units per reel
ST67W611M1A6UTR		



8 FCC- ISED compliance statement

FCC Part 15 compliance statement

Changes or modifications not expressly approved by STMicroelectronics could void the user's authority to operate the equipment.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

FCCID: YCP-67W611M1A01

Product Marketing Name: ST67W611M1A

Models Name: ST67W611M1A

- Applicable FCC rules: This module has been approved under FCC part 15C 15.247 in the frequency range 2400-2483.5MHz. This modular transmitter is only FCC authorized for this specific rule part.
- Specific operational use conditions:
 - The module is limited to OEM installation ONLY.
 - Only the module grantee is permitted to make permissive changes.
 - The OEM integrator is responsible for ensuring that the end-user has no manual instruction to remove or install module.
- Limited module procedures are not applicable to this application.
- Trace antenna: Not applicable
- Radio Frequency (RF) Exposure Compliance of Radio communication: To satisfy FCC RF Exposure requirements, a separation distance of 20cm or more should be maintained between the antenna of this device and persons during operation. To ensure compliance, operation at a closer distance than this is not recommended. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.
- List of antenna type approved for ST67W611M1A6U :
 - External PIFA, max antenna gain: 3.19dBi
 - External dipole, max antenna gain: 3.37dBi
 - External monopole, max antenna gain: 3.12dBi

If other antenna with higher gain or other antennas type, other than the type documented in the filing, a class 2 permissive change must be filed with FCC
- End Product Labeling: The final end product must be labeled in a visible area with the following: *"Contains Transmitter Module FCC ID: YCP-67W611M1A01"*
- End Product User's Manual: The user manual for end users must include the following information in a prominent location: *To satisfy FCC RF Exposure requirements, a separation distance of 20cm or more should be maintained between the antenna of this device and persons during operation. To ensure compliance, operation at a closer distance than this is not recommended. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.*
- Additional testing requirements:

If testing of the host product with this transmitter installed and operating is necessary (to verify that the host product meets all the applicable FCC rules), a test mode for this specific module is available upon request to STMicroelectronics.
- The host product manufacturer is responsible for compliance to any other FCC rules that apply to the host not covered by the modular transmitter grant of certification. (For example, Part 15 Subpart B)

ISED- Industry Canada Licence-Exempt Radio Apparatus

IC: 8976A-67W611M1A01

Product Marketing Name: ST67W611M1A

HVIN: ST67W611M1A6B & ST67W611M1A6U

Note: ST67W611M1A6B & ST67W611M1A6U models share this same user's manual because these two models belong to the same hardware family of the ST67W611M1A module.



This device contains licence-exempt transmitter(s)/receivers(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

1. This device may not cause interference
 2. This device must accept any interference, including interference that may cause undesired operation of the device.
- Applicable ISED-CANADA rules: This module has been approved under RSS-247 in the frequency range 2400-2483.5MHz. This modular transmitter is only ISED authorized for this specific rule part.
 - Specific operational use conditions:
 - The module is limited to OEM installation ONLY.
 - Only the module grantee is permitted to make permissive changes.
 - The OEM integrator is responsible for ensuring that the end-user has no manual instruction to remove or install module.
 - Limited module procedures are not applicable to this application.
 - Trace antenna: Not applicable.
 - Radio Frequency (RF) Exposure Compliance of Radio communication: To satisfy ISED-Canada RF Exposure requirements, a separation distance of 20cm or more should be maintained between the antenna of this device and persons during operation. To ensure compliance, operation at a closer distance than this is not recommended. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.
 - This radio transmitter IC: 8976A-67W611M1A01 has been approved by Innovation, Science and Economic Development Canada to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.
List of antenna type approved for ST67W611M1A6U:
 - External PIFA, max antenna gain: 3.19dBi
 - External dipole, max antenna gain: 3.37dBi
 - External monopole, max antenna gain: 3.12dBi
 If other antenna with higher gain or other antennas type, other than the type documented in the filing, a class 2 permissive change must be filed with ISED-Canada.
 - End Product Labeling: The final end product must be labeled in a visible area with the following: *Contains Transmitter Module IC: 8976A-67W611M1A01*
 - End Product User's Manual: The user manual for end users must include the following information in a prominent location: *To satisfy ISED-Canada RF Exposure requirements, a separation distance of 20cm or more should be maintained between the antenna of this device and persons during operation. To ensure compliance, operation at a closer distance than this is not recommended. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.*
 - Additional testing requirements:
If testing of the host product with this transmitter installed and operating is necessary (to verify that the host product meets all the applicable ISED-Canada rules), a test mode for this specific module is available upon request to STMicroelectronics.
 - The host product manufacturer is responsible for compliance to any other ISED-Canada rules that apply to the host not covered by the modular transmitter grant of certification. (For example, ICES-003)

ISED- Industry Canada Licence-Exempt Radio Apparatus

IC: 8976A-67W611M1A01

Nom de marque du produit: ST67W611M1A

NIVM: ST67W611M1A6B & ST67W611M1A6U

Remarque : les modèles ST67W611M1A6B & ST67W611M1A6U partagent ce même manuel d'utilisation car ces deux modèles appartiennent à la même famille matérielle du module ST67W611M1A.

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence.

L'exploitation est autorisée aux deux conditions suivantes :

1. L'appareil ne doit pas produire de brouillage;
2. L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.



- Règles ISCED-CANADA applicables : Ce module a été approuvé suivant la norme RSS-247 dans la gamme de fréquences 2400-2483.5MHz. Cet émetteur modulaire est uniquement autorisé par ISDE pour cette partie de règle spécifique.
- Conditions opérationnelles spécifiques d'utilisation :
 - Le module est limité à l'installation OEM uniquement.
 - Seul le titulaire de la certification du module est autorisé à apporter des modifications permissives.
 - L'intégrateur OEM est responsable de s'assurer que l'utilisateur final ne dispose d'aucune instruction pour retirer ou installer le module.
- Les procédures de module limité ne sont pas applicables à cette application.
- Conception de la piste d'antenne : Non applicable
- Conformité des communications radio en matière d'exposition aux radiofréquences (RF) : Pour satisfaire aux exigences d'ISDE-Canada en matière d'exposition aux radiofréquences, une distance de séparation de 20 cm ou plus doit être maintenue entre l'antenne de cet appareil et les personnes pendant le fonctionnement. Pour assurer la conformité, il est déconseillé d'utiliser cet équipement à une distance inférieure. Cet émetteur ne doit pas être co-situé ou fonctionner conjointement avec une autre antenne ou un autre émetteur.
- Cet émetteur radio 8976A-67W611M1A01 a été approuvé par Innovation, Sciences et Développement Economique Canada pour fonctionner avec les types d'antennes énumérés ci-dessous, avec le gain maximal autorisé indiqué. Les types d'antennes non inclus dans cette liste, ou qui ont un gain supérieur au gain maximal indiqué pour tout type répertorié sont strictement interdits pour une utilisation avec cet appareil.
Liste des types d'antennes approuvés :
 - Antenna PIFA, gain maximal : 3.19dBi
 - Antenne dipole, gain maximal : 3.37dBi
 - Antenna monopole, gain maximal : 3.12dBi

Si d'autres antennes avec un gain plus élevé ou d'un autre type d'antenne, autre que le type documenté dans le dossier, un changement permissif de classe 2 doit être déposé auprès d'ISDE-Canada.
- Étiquetage du produit final : Le produit final doit être étiqueté dans une zone visible avec les éléments suivants : « Contient IC : 8976A-67W611M1A01 »
- Manuel de l'utilisateur du produit final : le manuel de l'utilisateur destiné aux utilisateurs finaux doit inclure les informations suivantes dans un endroit bien en vue :
Pour satisfaire aux exigences d'ISDE-Canada en matière d'exposition aux RF, une distance de séparation de 20 cm ou plus doit être maintenue entre l'antenne de cet appareil et les personnes pendant le fonctionnement. Pour garantir la conformité, il n'est pas recommandé d'opérer à une distance plus courte que celle-ci. Cet émetteur ne doit pas être colocalisé ou fonctionner en conjonction avec une autre antenne ou émetteur.
- Exigences de tests supplémentaires :
Si un test du produit hôte avec cet émetteur installé et opérationnel est nécessaire (pour vérifier que le produit hôte répond à toutes les règles applicables d'ISDE-Canada), un mode de test pour ce module spécifique est disponible sur demande à STMicroelectronics.
- Le fabricant du produit hôte est responsable du respect de toutes les autres règles ISDE applicables à l'hôte non couvertes par l'octroi de certification de l'émetteur modulaire. (Par exemple, ICES-003)



9 RED Compliance Statement

Déclaration de conformité CE simplifiée

STMicroelectronics déclare que l'équipement radioélectrique du type "ST67W611M1A6B & ST67W611M1A6U " est conforme à la directive 2014/53/UE.

Bande de fréquence utilisée en transmission et puissance maximale rayonnée dans cette bande :

- Bande de fréquence : 2400-2483.5 MHz
- Puissance maximale : 100mW p.i.r.e

Simplified EC compliance statement

Hereby, STMicroelectronics declares that the radio equipment type "ST67W611M1A6B & ST67W611M1A6U " is in compliance with Directive 2014/53/EU.

Frequency range used in transmission and maximal radiated power in this range:

- Frequency range: 2400-2483.5 MHz (Bluetooth®)
- Maximal power: 100mW e.i.r.p



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Revision history

Table 20. Document revision history

Date	Revision	Changes
26-Sep-2024	0.1	Initial draft release.
29-Nov-2024	0.2	Updated Section 4: Electrical characteristics .
12-Feb-2025	0.3	Updated: • RPN number across the document • Section Features • Section 2: Description • Section 3.2: Pin description Added Section 8: FCC- ISED compliance statement and Section 9: RED Compliance Statement .
14-Feb-2025	0.4	Updated: • Section Features • Section 2: Description • Section 3.1: Pinout schematics • Section 4.9: Power consumption • Section 7: Ordering information • Section 8: FCC- ISED compliance statement Removed section 3: Functional overview , section 4.3: Temperature sensor characteristics , section 5: GPIO 16/17 configuration and section 5.1.3 Part marking .



Contents

1	Introduction	3
2	Description	4
3	Pinouts and pin description	6
3.1	Pinout schematics	6
3.2	Pin description	8
4	Electrical characteristics	9
4.1	Absolute maximum ratings	9
4.2	Operating conditions	9
4.3	Power-on sequence	10
4.4	Shutdown sequence	11
4.5	Power tree	12
4.6	DC power characteristics	12
4.7	WLAN RF characteristics	13
4.8	BLE RF performance	15
4.9	Power consumption	16
5	Mechanical information	19
5.1	Device physical dimensions	19
5.1.1	ST67W611M1 LGA module PCB antenna	19
5.1.2	ST67W611M1 LGA module antenna connector	21
6	Manufacturing guidelines	22
6.1	Power layout guideline	22
6.2	RF layout guideline	22
6.3	Soldering guideline	23
7	Ordering information	24
8	FCC- ISED compliance statement	25
9	RED Compliance Statement	28
	Important security notice	29
	Revision history	30
	List of tables	32
	List of figures	33



List of tables

Table 1.	ST67W611M1 features	4
Table 2.	ST67W611M1 pin definition	8
Table 3.	Absolute maximum ratings	9
Table 4.	Recommended power operating range	9
Table 5.	Recommended temperature operating range	9
Table 6.	Power-on sequence parameters	10
Table 7.	Shutdown sequence parameters	11
Table 8.	I/O DC characteristics	12
Table 9.	WLAN Tx RF characteristics	13
Table 10.	WLAN Rx RF characteristics	14
Table 11.	Synthesizer composite characteristics and transmit output power accuracy	15
Table 12.	BLE Tx RF characteristics	15
Table 13.	BLE Rx RF characteristics	16
Table 14.	Power consumption	17
Table 15.	Power consumption for continuous WLAN Tx 2.4 GHz at 3.3 V, 25 °C	17
Table 16.	Power consumption for continuous WLAN Rx 2.4 GHz at 3.3 V, 25 °C	17
Table 17.	Power consumption for BLE at 3.3 V, 25 °C	18
Table 18.	Power consumption for 802.15.4 at 3.3 V, 25 °C	18
Table 19.	Ordering information	24
Table 20.	Document revision history	30



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 antenna connector.	7
Figure 5.	Power-on sequence	10
Figure 6.	Shutdown sequence	11
Figure 7.	Power block diagram.	12
Figure 8.	ST67W611M1 LGA module PCB antenna dimension.	19
Figure 9.	ST67W611M1 LGA module PCB antenna landing pad.	20
Figure 10.	ST67W611M1 LGA module antenna connector dimension.	21
Figure 11.	ST67W611M1 LGA module antenna connector landing pad.	21
Figure 12.	Power layout guideline.	22
Figure 13.	RF layout guideline	22
Figure 14.	Soldering guideline	23

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