



深圳市阿达电子有限公司

登陆央视 **CCTV** 1、4、7及NEWS权威频道

SPECIFICATION

WIFI MODULE

ADA789

V1.0

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1 Product Introduction

ADA789 is a MCU WIFI module with dimension 16 mm x 24 mm x 3.5 mm. It supports -2dBi PCB antenna.

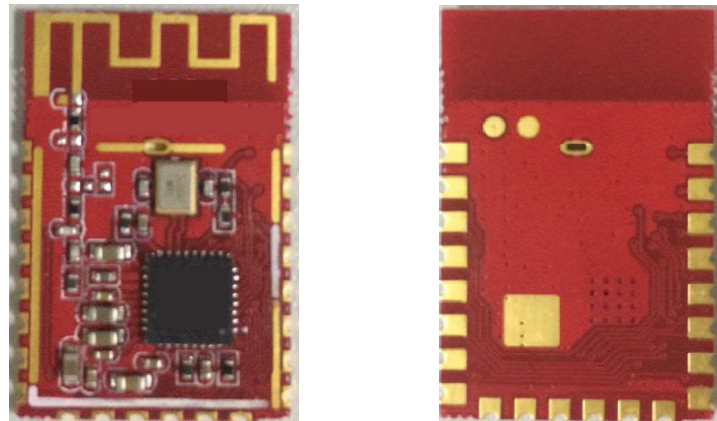


Figure 1-1. ADA789

Table 1-1. ADA789 Specification

Type	Item	Specification
Wireless	Certification	SRRC/FCC/CE
	Wi-Fi protocol	802.11 b/g/n
	Frequency	2412-2462MHz
Hardware	Interface	UART×2, SPI×1, USB×1, ADC×1
	Operating voltage	3.0V ~ 3.6V
	Current	Average:80 mA
	Operating temperature	-20°C ~ 70°C
	Storage temperature	-40°C ~ 85°C
	Dimension	18 mm x 20 mm x 3 mm
	WiFi mode	Station, SoftAP, SoftAP + Station
Software	Encyption	WPA/WPA2/WEP/TKIP/AES
	Firmware programming	SPI/UART/OTA/
	Software development	AT command Develop by SDK
	Network protocol	IPv4/IPv6, TCP/UDP/HTTP/FTP/HTTPS/SSL/MQTT
	IOT Cloud support	Aliyun, Amazon, JD, Suning, Huawei, Microsoft



2Pin Definition

ADA789Pin assignment Top view (Unit: mm)

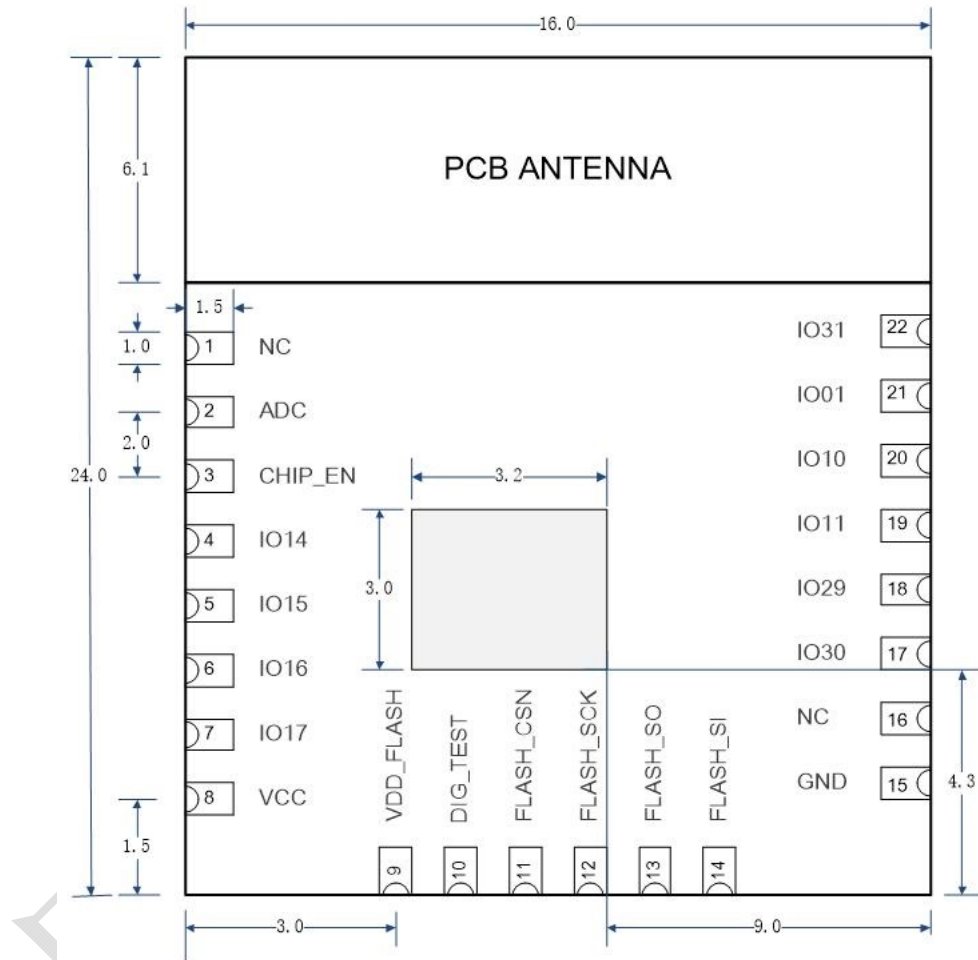


Figure 2-1. ADA789 Dimension Top view

Table 2-1. ADA789 Dimension

Length	Width	Height	PAD size(bottom)	Pitch size
24mm	16 mm	3.5 mm	3.0mm x 3.2 mm	2.0 mm



Table 2-2. ADA789 Pin Definition

NO.	Name	Funtion
1	NC	Not connected
2	ADC	GPIO4/ADC1
3	CHIP_EN	Chip Enable. Internal Pull High in module
4	AOS_GPIO_14	GPIO14/SD_CLK/SPI_CLK
5	AOS_GPIO_15	GPIO15/SD_CMD/SPI_CSN
6	AOS_GPIO_16	GPIO16/SD_DATA0/SPI_MOSI
7	AOS_GPIO_17	GPIO17/SD_DATA1/SPI_MISO
8	VCC_3V3	3.3V power supply (VDD) Note: The max current of power supply should be above 500 mA
9	VDD_FLASH	Power supply for internal flash (for firmware programming)
10	DIG_TEST	Digital test enable, active high (for firmware programming)
11	AOS_FLASH_CSN	GPIO21/I2C1_SDA/JTAG_TMS/FLASH_CSN (for firmware Programming)
12	AOS_FLASH_SCK	GPIO20/I2C1_SCL/JTAG_TCK/FLASH_SCK (for firmware programming)
13	AOS_FLASH_SO	GPIO23/JTAG_TDO/FLASH_SO (for firmware programming)
14	AOS_FLASH_SI	GPIO22/XHO/JTAG_TDI/FASH_SI (for firmware programming)
15	GND	Ground
16	NC	Not connected
17	AOS_GPIO_30	GPIO30/USB_DN
18	AOS_GPIO_29	GPIO29/USB_DP
19	AOS_GPIO_11	GPIO11/UART1_TX (debug UART-TX)
20	AOS_GPIO_10	GPIO10/UART1_RX (debug UART-RX)
21	AOS_GPIO_01	GPIO1/ I2C2_SDA/UART2_RX (user UART-RX)
22	AOS_GPIO_31	GPIO31/ I2C2_SCL/UART2_TX (user UART-TX)



3. Function description

3.1. MCU

ADA789 integrates ARM9 MCU with frequency up to 120MHz.

3.2. RAM, Flash

ADA789 integrates 256Kbytes RAM, and 2Mbytes Flash.

3.3. Clock

ADA789 should work with 26MHz crystal, with 10pF load capacitor, ± 10 PPM accuracy. Clock's operating temperature: $-20^{\circ}\text{C} \sim 70^{\circ}\text{C}$, storage temperature: $-40^{\circ}\text{C} \sim 85^{\circ}\text{C}$.

3.4 Interface

3.4.1 UART

There are two UARTs in ADA789: user UART and debug UART. The max baud rate can be up to 6Mbps.

3.4.2 SPI

ADA789 supports high speed SPI with clock frequency up to 50MHz. Support master and slave mode.

SDIO (in the same pins with SPI) supports master and slave mode with clock frequency up to 50MHz.

3.4.3 I²C

There are two I2C in ADA789, and the max frequency is 400kHz.

3.4.4 USB

Support full speed USB2.0 protocol. Support host and device.

3.4.5 ADC

Support 10-13 bit output.

3.4.6 GPIO

Support up to 14 GPIOs. Every GPIO supports interrupt, and can be wake up pin in sleep mode.

3.4.7 CHIP_EN

CHIP_EN is system enable pin. When in high voltage, module is on. When in low voltage, module is off. Please make sure CHIP_EN is high when power on.

3.5. Software programming

There are 6 test pins in the bottom, and they are connected with module pin10~15. These 6 pins and GPIO_4, GPIO_14 are used for software programming.



Table 3-1. Programming mode and working mode Truth table

Pin	Programming mode	Working mode
DIGTEST	H	L/NC
VDDFLASH	H	/
IO04	H	/
IO14	L/NC	/

3.6. Working mode

ADA789 supports four working modes: bootloader mode, normal work mode, ATE test mode, and QC mode. These mode are configured by three pins: BOOT, STATUS, ELINK.

Note: in below table, 1 means high voltage level, 0 means low voltage level. All the three IOs are internally initialized as input pull high.

Table 3-2. Working mode truth table

PinFunction	BOOT	STATUS	ELINK
Pin	IO31	IO30	IO29
Bootloader mode	0	/	/
Normal work mode	1	1	1
ATE test (RF test)	1	0	1
QC mode	1	1	0

4. Electrical parameters

Note: test condition VDD=3.3V, temperature 25°C

4.1. Absolute maximum rating

Table 4-1. Absolute maximum rating

Item	Specification	Value	Unit
Storage temperature	—	-40 ~ 85	°C
Maximum soldering temperature	—	260	°C
Operating voltage	IPC/JEDEC J-STD-020	3.0 ~ 3.4	V



4.2. Operating condition

Table 4-2. Operating condition

Item	Symbol	Min.	Typ.	Max.	Unit
Operating temperature	—	-20	20	80	°C
Operating voltage	VDD	3.0	3.3	3.4	V

4.3. Digital IO characteristic

Table 4-3. Digital IO characteristics

Item	Symbol	Min.	Max.	Unit
Input low	VIL	-0.3	-0.25 VDD	V
Input high	VIH	0.75 VDD	-VDD + 0.3	V
Output low	VOL	N	0.1 VDD	V
Output high	VOH	0.8 VDD	N	V

4.4. Power consumption

Test condition: VDD=3.3V, temperature 25°C

Table 4-5. Power consumption

Mode	Description	Min.	Typ.	Max.	Unit
RF transmission	Output power 12dBm		170		mA
RF receive	In sensitivity test mode		110		mA
Sleep	All MCU status keep, MCU stop running		100		uA
Standby	All power off, support wake up by GPIO and internal Timer		10		uA

4.5. Electro-Static discharge

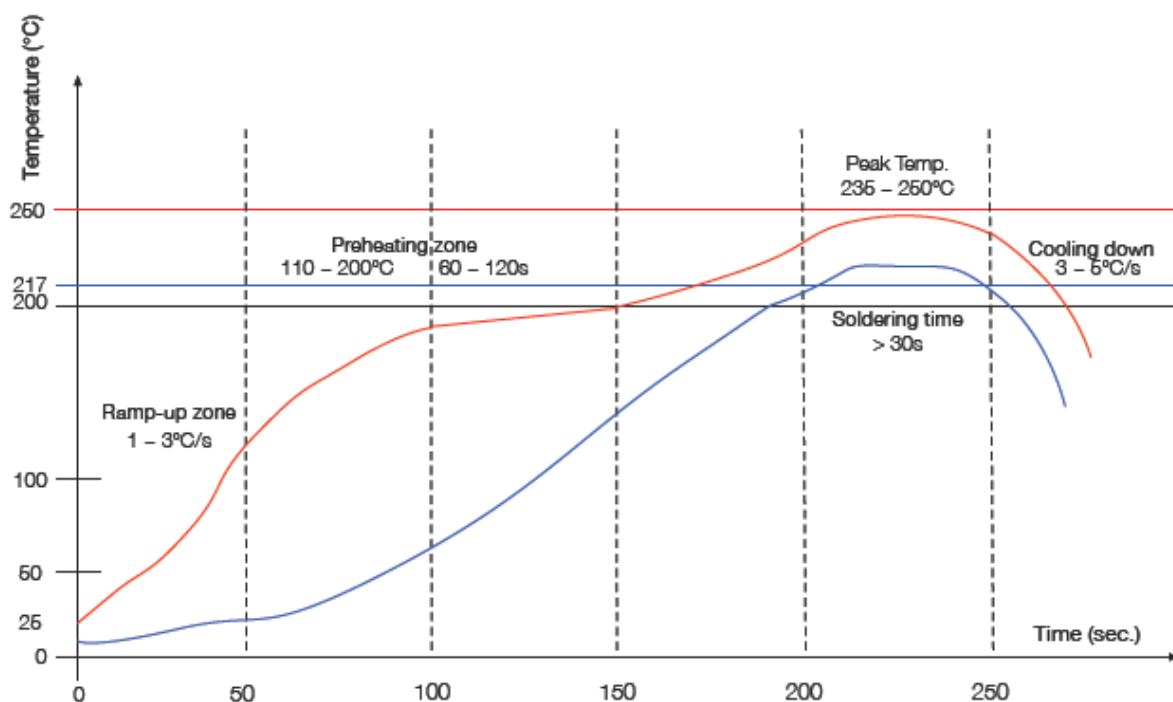
Table 4-6. ESD parameter

Name	Symbol	Specification	Level	Max.	Unit
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ESD(Human Body Mode)	VESD (HBM)	T:23 ±5°C Follow ANSI / ESDA / JEDEC JS - 001 - 2014	2	2000	V
ESD(Charged Device Mode)	VESD (CDM)	T:23 ±5°C Follow JEDEC EIA / JESD22 - C101F	C2	500	V

4.6. Re-flow temperature curve



Ramp-up zone (升温区): Temp. <150°C, Time 60 – 90s, Ramp-up rate 1 – 3°C/s.

Preheating zone (预热恒温区): Temp. 150 – 200°C, Time 60 – 120s, Ramp-up rate 0.3 – 0.8°C/s.

Reflow soldering zone (回流焊接区): Peak Temp. 235 – 250°C (<245°C recommended), Time 30 – 70s.

Cooling down zone (冷却区): Temp. 217 – 170°C, Ramp-down rate 3 – 5°C/s.

Sn&Ag&Cu Lead-free solder (SAC305)/焊料为锡银铜合金无铅焊料



FCC Statement

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.

Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

The modular can be installed or integrated in mobile or fix devices only. This modular cannot be installed in any portable device .

FCC Radiation Exposure Statement

This modular complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter. This modular must be installed and operated with a minimum distance of 20 cm between the radiator and user body.

If the FCC identification number is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. This exterior label can use wording such as the following: "Contains Transmitter Module FCC ID: 2AOM8-ADA789 Or Contains FCC ID: 2AOM8-ADA789"

When the module is installed inside another device, the user manual of the host must contain below warning statements;

1. 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.
- (2) This device must accept any interference received, including interference that may cause undesired operation.

2. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

The devices must be installed and used in strict accordance with the manufacturer's instructions as described in the user documentation that comes with the product.