

AC6968A Datasheet

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Version: V1.0

Date: 2020.06.12

AC6968A Features

CPU

- 32-bit DSP supports hardware Float Point Unit (FPU)
- Up to 160MHz programmable processor
- 64 Vectored interrupts
- 4 Levels interrupt priority

Bluetooth

- Compliant with Bluetooth V5.1+BR+EDR+BLE specification
- Meet class1 class2 and class3 transmitting power requirement
- Support GFSK and $\pi/4$ DQPSK all packet types
- Provides +6dbm transmitting power
- receiver with -90dBm sensitivity
- Fast AGC for enhanced dynamic range
- Supports
a2dp\avctp\avdtp\avrcp\hfp\spp\smp\att\gap\gatt\rfcomm\sdp\l2cap profile

Temperature

- Operating temperature: -20°C to +70°C
- Storage temperature: -65°C to +150°C

Peripherals

- One full speed USB 2.0 OTG controller
- Six multi-function 32-bit timers, support capture and PWM mode
- Three full-duplex basic UART, UART0 and UART1 supports DMA mode
- One hardware IIC interface supports host and device mode
- 10-bit ADC for analog sampling
- External wake up/interrupt on all GPIOs

PMU

- Low voltage LDO for internal digital and analog circuit supply
- 3uA current consumption in the soft-off mode
- Built-in LDO for the core, I/O, Bluetooth and flash
- VBAT is 1.8V to 3.6V
- VDDIO is 1.8V to 3.6V

Packages

- SOP8

Applications

- Bluetooth IOT

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1、 Pin Definition

1.1 Pin Assignment

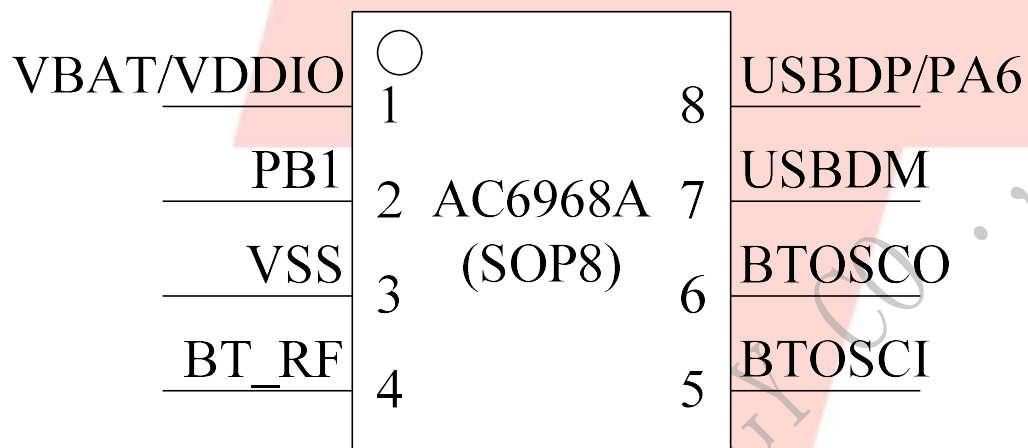


Figure 1-1 AC6968A Package Diagram

1.2 Pin Description

Table 1-1 AC6968A Pin Description

PIN NO.	Name	I/O Type	Drive (mA)	Function	Other Function
1	VBAT	P	/		Battery Power Supply
	VDDIO	P	/		IO Power 3.3v
2	PB1	I/O		GPIO (pull up)	Long Press Reset; ADC5: ADC Input Channel 5; UART0RXB: Uart0 Data In(B);
3	VSS	P	/		Ground
4	BT_RF	/			BT Antenna
5	BTOSCI	I			BT OSC In
6	BTOSCO	O			BT OSC Out
7	USBDM	I/O		USB Negative Data (pull down)	IIC_SDA_A: IIC SDA(A); ADC14: ADC Input Channel 14; UART1RXD: Uart1 Data In(D);
8	USBDP	I/O		USB Positive Data (pull down)	IIC_SCL_A: IIC SCL(A); ADC13: ADC Input Channel 13; UART1TXD: Uart1 Data Output(D);
	PA6	I/O		GPIO	ADC4: ADC Input Channel 4; CAP4: Timer4 Capture; UART0RXA: Uart0 Data In(A);

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2、Electrical Characteristics

2.1 Absolute Maximum Ratings

Table 2-1

Symbol	Parameter	Min	Max	Unit
Tamb	Ambient Temperature	-20	+70	°C
Tstg	Storage temperature	-65	+150	°C
VBAT	Supply Voltage	1.8	3.6	V
V _{3.3IO}	3.3V IO Input Voltage	-0.3	VDDIO+0.3	V

2.2 PMU Characteristics

Table 2-2

Symbol	Parameter	Min	Typ	Max	Unit	Test Conditions
VBAT	Voltage Input	1.8	3.3	3.6	V	
V _{VDDIO}	Voltage output	–	3.3	–	V	

2.3 IO Input/Output Electrical Logical Characteristics

Table 2-3

IO input characteristics						
Symbol	Parameter	Min	Typ	Max	Unit	Test Conditions
V _{IL}	Low-Level Input Voltage	-0.3	–	0.3* VDDIO	V	VDDIO = 3.3V
V _{IH}	High-Level Input Voltage	0.7* VDDIO	–	VDDIO+0.3	V	VDDIO = 3.3V
IO output characteristics						
V _{OL}	Low-Level Output Voltage	–	–	0.33	V	VDDIO = 3.3V
V _{OH}	High-Level Output Voltage	2.7	–	–	V	VDDIO = 3.3V

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2.4 Internal Resistor Characteristics

Table 2-4

Port	General Output	High Drive	Internal Pull-Up Resistor	Internal Pull-Down Resistor	Comment
PA6 PB1	8mA	24mA	10K	10K	1、PB1 default pull up 2、USBDM & USBDP default pull down 3、 internal pull-up/pull-down resistance accuracy $\pm 20\%$
USBDP	4mA	-	1.5K	15K	
USBDM	4mA	-	180K	15K	

2.5 BT Characteristics

2.5.1 Transmitter

Basic Data Rate

Table 2-5

Parameter	Min	Typ	Max	Unit	Test Conditions
RF Transmit Power		4	6	dBm	25°C, Power Supply VBAT=5V
RF Power Control Range		20		dB	
20dB Bandwidth		950		KHz	
Adjacent Channel	+2MHz	-40		dBm	
	-2MHz	-38		dBm	
Transmit Power	+3MHz	-44		dBm	2441MHz
	-3MHz	-35		dBm	

Enhanced Data Rate

Table 2-6

Parameter	Min	Typ	Max	Unit	Test Conditions
Relative Power		-1		dB	25°C, Power Supply VBAT=5V
$\pi/4$ DQPSK	DEVM RMS	6		%	
	DEVM 99%	10		%	
Modulation Accuracy	DEVM Peak	15		%	
Adjacent Channel	+2MHz	-40		dBm	2441MHz
	-2MHz	-38		dBm	
Transmit Power	+3MHz	-44		dBm	
	-3MHz	-35		dBm	

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2.5.2 Receiver

Basic Data Rate

Table 2-7

Parameter		Min	Typ	Max	Unit	Test Conditions
Sensitivity			-90		dBm	25°C, Power Supply VBAT=5V 2441MHz
Co-channel Interference Rejection			-13		dB	
Adjacent Channel	+1MHz		+5		dB	
	-1MHz		+2		dB	
	+2MHz		+37		dB	
Interference Rejection	-2MHz		+36		dB	
	+3MHz		+40		dB	
	-3MHz		+35		dB	

Enhanced Data Rate

Table 2-8

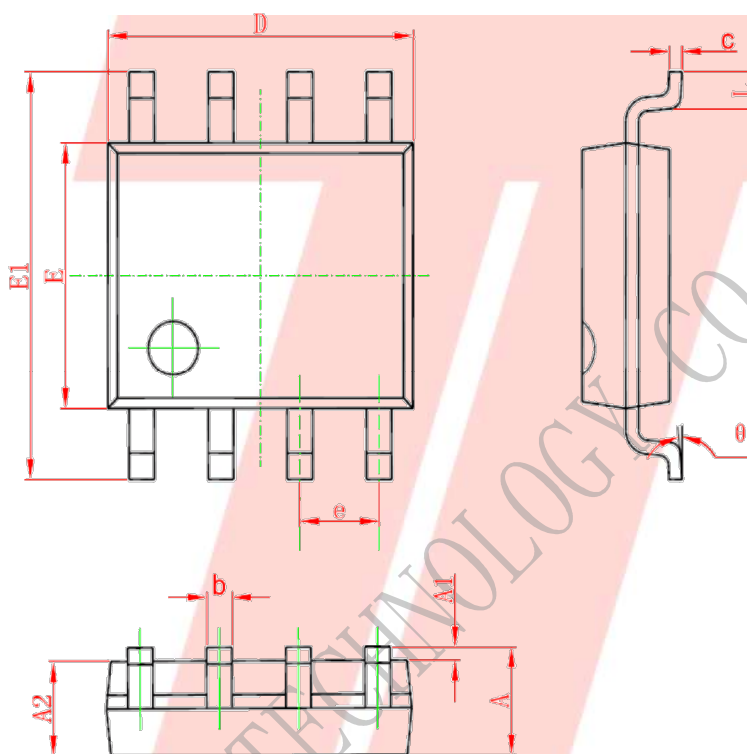
Parameter		Min	Typ	Max	Unit	Test Conditions
Sensitivity			-90		dBm	25°C, Power Supply VBAT=5V 2441MHz
Co-channel Interference Rejection			-13		dB	
Adjacent Channel	+1MHz		+5		dB	
	-1MHz		+2		dB	
	+2MHz		+37		dB	
Interference Rejection	-2MHz		+36		dB	
	+3MHz		+40		dB	
	-3MHz		+35		dB	

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3、 Package Information

3.1 SOP8



Symbol	Dimension In Millimeters		Dimension In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.007	0.010
D	4.700	5.100	0.185	0.201
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.27TYP		0.050TYP	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

Figure 3-1 AC6968A Package

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4、 Revision History

Date	Revision	Description
2020.06.12	V1.0	Initial Release

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