AC6369F Datasheet

Zhuhai Jieli Technology Co.,LTD

Version：V1.2

Date：2024.03.06

AC6369F Features

CPU

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

Bluetooth

- Compliant with Bluetooth V5.4+BR+EDR+BLE specification
- Meet class1 class2 and class3 transmitting power requirement
- Support GFSK and π/4 DQPSK all paket 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: -40℃ to +125℃
- Storage temperature: -65℃ to +150℃

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
- Two SPI interface supports host and device 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 2.2V to 3.4V
- VDDIO is 2.2V to 3.4V

Packages

- SOP16

Applications

- Bluetooth IOT

1、Pin Definition

1.1 Pin Assignment

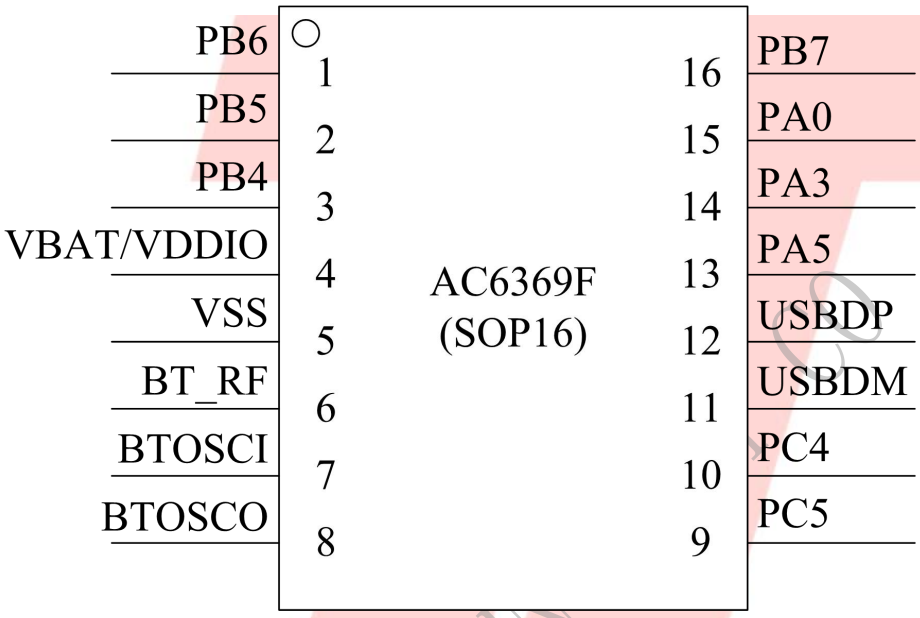


Figure 1-1 AC6369F Package Diagram

1.2 Pin Description

Table 1-1 AC6369F Pin Description

PIN NO.	Name	I/O Type	Drive (mA)	Function	Other Function
1	PB6	I/O		GPIO	IIC_SCL_C：IIC SCL(C); SPI2_CLKA：SPI2 Clock(A); ADC8：ADC Input Channel 8; TMR3：Timer3 Clock Input; UART1TXA：Uart1 Data Out(A);
2	PB5	I/O		GPIO (High Voltage Resistance)	PWM3：Timer3 PWM Output; SPI2_DIA：SPI2 Data In(A); CAP1：Timer1 Capture; UART0TXC：Uart0 Data Out(C); UART0RXC：Uart0 Data In(C);
3	PB4	I/O		GPIO	ADC7：ADC Input Channel 7; UART2TXC：Uart2 Data Out(C); UART2RXC：Uart2 Data In(C);
4	VBAT	P	/		Battery Power Supply
	VDDIO	P	/		IO Power 3.3v
5	VSS	P	/		Ground
6	BT_RF	/			BT Antenna
7	BTOSCI	I			BT OSC In
8	BTOSCO	O			BT OSC Out
9	PC5	I/O		GPIO	IIC_SDA_B：IIC SDA(B); ADC12：ADC Input Channel 12; TMR1：Timer1 Clock Input; UART2RXD：Uart2 Data In(D);
10	PC4	I/O		GPIO	IIC_SCL_B：IIC SCL(B); ADC11：ADC Input Channel 11; PWM1：Timer1 PWM Output; UART2TXD：Uart2 Data Out (D);
11	USBDM	I/O		USB Negative Data (pull down)	IIC_SDA_A：IIC SDA(A); SPI2_DOB：SPI2 Data Out(B); ADC14：ADC Input Channel 14; UART1RXD：Uart1 Data In(D);

12	USBDP	I/O		USB Positive Data (pull down)	IIC_SCL_A：IIC SCL(A); SPI2_CLKB：SPI2 Clock(B); ADC13：ADC Input Channel 13; UART1TXD：Uart1 Data Output(D)；
13	PA5	I/O		GPIO	IIC_SCL_D：IIC SCL(D); PWM0：Timer0 PWM Output； UART0TXA：Uart0 Data Output(A)；
14	PA3	I/O		GPIO	ADC2：ADC Input Channel 2; PWM5：Timer5 PWM Output UART2TXA：Uart2 Data Output(A);
15	PA0	I/O		GPIO	ADC0：ADC Input Channel 0; UART1TXC：Uart1 Data Output(C)；
16	PB7	I/O		GPIO	IIC_SDA_C：IIC DAT(C); SPI2_DOA：SPI2 Data Out(A); ADC9：ADC Input Channel 9; PWM5：Timer5 PWM Output； UART1RXA：Uart1 Data In(A);

2、Electrical Characteristics

2.1 Absolute Maximum Ratings

Table 2-1

Symbol	Parameter	Min	Max	Unit
Tamb	Ambient Temperature	-40	+125	℃
Tstg	Storage temperature	-65	+150	℃
VBAT	Supply Voltage	-0.3	3.6	V
$V_{3.3IO}$	3.3V IO Input Voltage	-0.3	3.6	V

Note : The chip can be damaged by any stress in excess of the absolute maximum ratings listed below

2.2 PMU Characteristics

Table 2-2

Symbol	Parameter	Min	Typ	Max	Unit	Test Conditions
VBAT	Voltage Input	2.2	3.0	3.4	V	
V_{VDDIO}	Voltage Input	_	3.0	_	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

2.4 Internal Resistor Characteristics

Table 2-4

Port		General Output	High Drive	Internal Pull-Up Resistor	Internal Pull-Down Resistor	Comment
PA5 PB4,PB6,PB7 PC4~PC5		8mA	24mA	10K	10K	1、USBDM & USBDP default pull down 2、PB5 can pull-up resistance to 5V 3、internal pull-up/pull-down resistance | accuracy ±20%
PA0	Output 0	8mA	24mA	10K	10K	
	Output 1	8mA	64mA			
PB5		8mA	_	10K	10K	
USBDP		4mA	_	1.5K	15K	
USBDM		4mA	_	180K	15K	

2.5 BT Characteristics

2.5.1 Transmitter

Basic Rate **Table 2-5**

Parameter		Min	Typ	Max	Unit	Test Conditions
RF Transmit Power		-	4	6	dBm	25℃, Power Supply VBAT=3.7V 2441MHz DH5
RF Power Control Range		-	20	-	dB	
20dB Bandwidth		-	950	-	KHz	
In-band spurious Emissions (BQB Test Mode RF_Tx Power=4dBm)	$F=F_0\pm1MHz$	-	-20	-	dBm	
	$F=F_0\pm2MHz$	-	-45	-	dBm	
	$F=F_0\pm3MHz$	-	-35	-	dBm	
	$F=F_0\pm>3MHz$	-	-45	-	dBm	

Enhanced Data Rate **Table 2-6**

Parameter		Min	Typ	Max	Unit	Test Conditions
Relative Power		-	-1	-	dB	25℃, Power Supply VBAT=3.7V 2441MHz 2DH5
π/4 DQPSK Modulation Accuracy	DEVM RMS	-	4	-	%	
	DEVM 99%	-	10	-	%	
	DEVM Peak	-	7	-	%	
In-band spurious Emissions (BQB Test Mode RF_Tx Power=4dBm)	$F=F_0\pm1MHz$	-	-4	-	dBm	
	$F=F_0\pm2MHz$	-	-30	-	dBm	
	$F=F_0\pm3MHz$	-	-30	-	dBm	
	$F=F_0\pm>3MHz$	-	-37	-	dBm	

2.5.2 Receiver

Basic Rate **Table 2-7**

Parameter		Min	Typ	Max	Unit	Test Conditions
Sensitivity		-	-88	-	dBm	25℃, Power Supply VBAT=3.7V 2441MHz DH5
Co-channel Interference Rejection		-	6	-	dB	
Adjacent Channel selectivity C/I	+1MHz	-	-6	-	dB	
	-1MHz	-	-8	-	dB	
	+2MHz	-	-17	-	dB	
	-2MHz	-	-21	-	dB	
	+3MHz	-	-15	-	dB	
	-3MHz	-	-31	-	dB	

Enhanced Data Rate **Table 2-8**

Parameter		Min	Typ	Max	Unit	Test Conditions
Sensitivity		-	-90	-	dBm	25℃, Power Supply VBAT=3.7V 2441MHz 2DH5
Co-channel Interference Rejection		-	9	-	dB	
Adjacent Channel selectivity C/I	+1MHz	-	-10	-	dB	
	-1MHz	-	-13	-	dB	
	+2MHz	-	-11	-	dB	
	-2MHz	-	-21	-	dB	
	+3MHz	-	-13	-	dB	
	-3MHz	-	-40	-	dB	

2.5.3 BLE

1M Data Rate **Table 2-9**

Parameter		Min	Typ	Max	Unit	Test Conditions
Sensitivity		-	-91	-	dBm	
RF Transmit Power		-	6	-	dBm	
In-band Spurious Emission	|M-N|=2MHz	-	-41	-	dBm	25℃ Power Supply VBAT=3.7V 2440MHz
	|M-N|≥3MHz	-	-40	-	dBm	
Modulation Characteristics	Δf1 avg	-	250	-	KHz	
	Δf2 99%	-	210	-	KHz	
	Δf1avg/Δf2avg	-	0.9	-	/	
Carrier Frequency Offset		-50	-	+50	KHz	
Frequency Drift		-25	-	+25	KHz	
Frequency Drift Rate		-5	-	+5	KHz/50us	

2M Data Rate **Table 2-10**

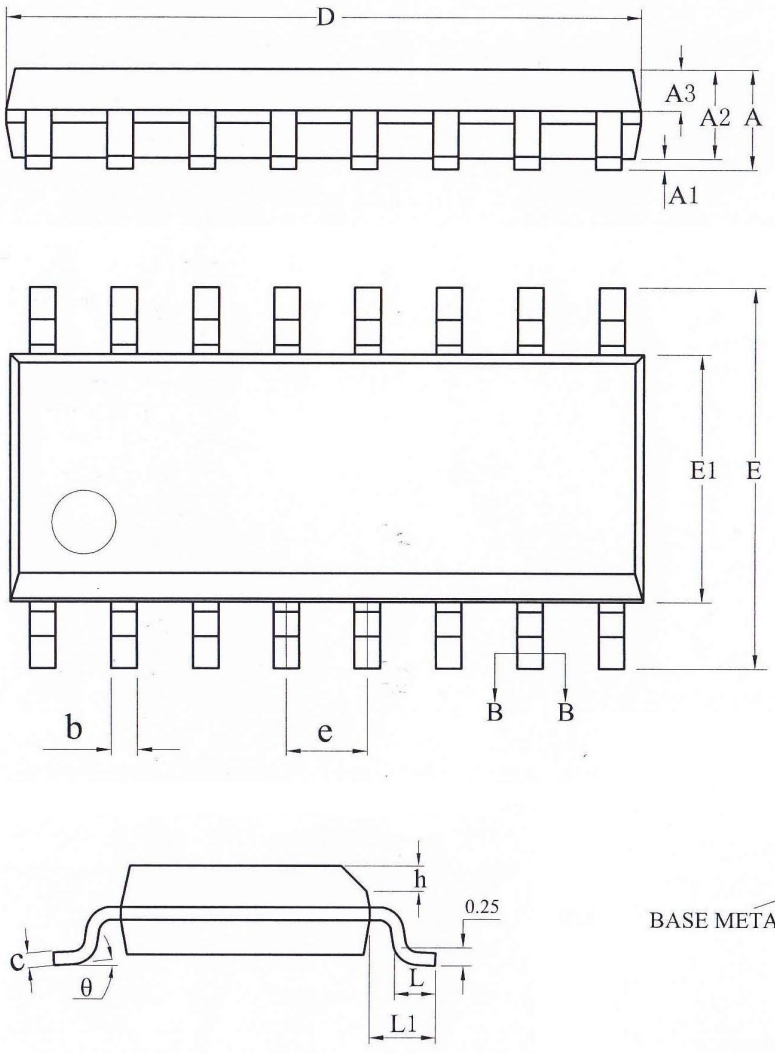
Parameter		Min	Typ	Max	Unit	Test Conditions
Sensitivity		-	-89	-	dBm	
RF Transmit Power		-	6	-	dBm	
In-band Spurious Emission	|M-N|=4MHz	-	-45	-	dBm	25℃ Power Supply VBAT=3.7V 2440MHz
	|M-N|=5MHz	-	-45	-	dBm	
	|M-N|≥6MHz	-	-45	-	dBm	
Modulation Characteristics	Δf1 avg	-	500	-	KHz	
	Δf2 99%	-	430	-	KHz	
	Δf1avg/Δf2avg	-	0.9	-	/	
Carrier Frequency Offset		-50	-	+50	KHz	
Frequency Drift		-25	-	+25	KHz	
Frequency Drift Rate		-5	-	+5	KHz/50us	

Long Range **Table 2-11**

Parameter	Min	Typ	Max	Unit	Test Conditions
Sensitivity LE 125K(S8)	-	-99	-	dBm	VBAT=3.7V,25℃ 2440MHz
Sensitivity LE 500K(S2)	-	-95	-	dBm	

3、Package Information

3.1 SOP16



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	—	—	1.75
A1	0.10	—	0.225
A2	1.30	1.40	1.50
A3	0.60	0.65	0.70
b	0.39	—	0.47
b1	0.38	0.41	0.44
c	0.20	—	0.24
c1	0.19	0.20	0.21
D	9.80	9.90	10.00
E	5.80	6.00	6.20
E1	3.80	3.90	4.00
e	1.27BSC		
h	0.25	—	0.50
L	0.50	—	0.80
L1	1.05REF		
θ	0	—	8°

Figure 3-1 AC6369F Package

4、Revision History

Date	Revision	Description
2020.07.20	V1.0	Initial Release
2022.07.19	V1.1	Update Bluetooth Feature
2024.03.06	V1.2	Update Bluetooth Feature, Add BLE Parameter