AC6373B Datasheet

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AC6373B 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 V5.1+BR+EDR+BLE specification
- Meet class1 class2 and class3 transmitting power requirement
- Support GFSK and π/4 DQPSK all packet types
- Provides amaximum+8dbm transmitting power
- receiver with -94dBm sensitivity
- Fast AGC for enhanced dynamic range
- Supports a2dp\avctp\avdtp\avrcp\hfp\spp\smp\att\gapgatt\rfcomm\sdp\l2cap profile

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, support DMA mode
- One hardware IIC interface supports host and device mode
- One Built-in low power Cap Sense Keys
- Built-in Cap Sense Key controller
- 10-bit ADC for analog sampling
- External wake up/interrupt on all GPIOs

PMU

- Low voltage LDO and DC-DC for internal digital and analog circuit supply
- 2uA current consumption in the soft-off mode
- Built-in LDO and DC-DC for the core, I/O, Bluetooth and flash
- VBAT is 2.2V to 4.5V
- VDDIO is 2.2V to 3.4V

Packages

- QFN20(3mm*3mm)

Temperature

- Operating temperature: -40℃to+85℃
- Storage temperature: -65℃ to +150℃

Applications

- Bluetooth IOT

1、Pin Definition

1.1 Pin Assignment

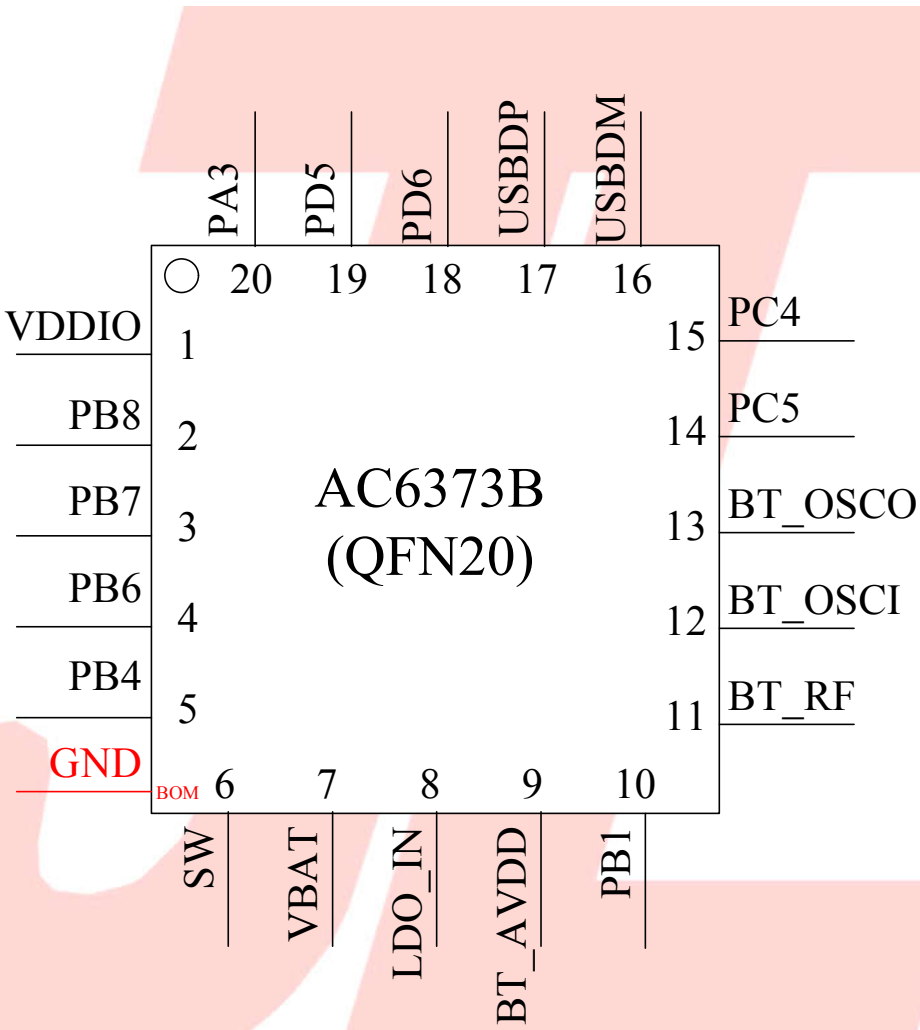


Figure 1-1 AC6373B Package Diagram

1.2 Pin Description

Table 1-1 AC6373B Pin Description

PIN NO.	Name	I/O Type	Drive (mA)	Function	Other Function
1	VDDIO	P	/		IO Power 3.3v
2	PB8	I/O	8/24	GPIO	UART0RXB：Uart0 Data Input(B)； CAP4：Timer4 Capture;
3	PB7	I/O	8/24	GPIO	UART0TXB：Uart0 Data Output(B)； SPI1DOA：SPI1 Data Out(A); Q-decoder1；
4	PB6	I/O	8/24	GPIO	UART1RXA：Uart1 Data Input(A)； SPI1CLKA：SPI1 Clk(A); PWM2：Timer2 PWM Output； ADC9：ADC Input Channel 9； Touch7：Touch Input Channel 7; Q-decoder0；
5	PB4	I/O	8/24	GPIO	ADC12：ADC Input Channel 12； TMR2：Timer2 Clock Input;
6	SW	P	/	DCDC output	DCDC switch output, connected to inductor
7	VBAT	P	/		connect to battery
8	LDO_IN	P	/		Charge Power Input; UART0TXC：Uart0 Data Output(C); UART0RXC：Uart0 Data Input(C); PWM3：Timer3 PWM Output； CAP1：Timer1 Capture;
9	BT_AVDD	P	/		BT Power
10	PB1	I/O	8/24	GPIO (pull up)	Long Press Reset； UART2TXC：Uart2 Data Output(C)； ADC6：ADC Input Channel 6； LP_TH0：Low Power Touch Channel 0；
11	BT_RF	/	/		BT Antenna
12	BT_OSCI	I	/		BTOSC In
13	BT_OSCO	O	/		BTOSC Out
14	PC5	I/O	8/24	GPIO	UART2RXD：Uart2 Data Input(D); SPI1DOB：SPI1 Data Out(B); IIC_SDA_B：IIC SDA(B)； ADC5：ADC Input Channel 5；

15	PC4	I/O	8/24	GPIO	UART2TXD：Uart2 Data Output(D); SPI1CLKB：SPI1 Clk(B); IIC_SCL_B：IIC SCL(B)； ADC4：ADC Input Channel 4； PWM4：Timer4 PWM Output；;
16	USBDM	I/O	4	USB Negative Data (pull down)	UART1RXD：Uart1 Data Input(D)； SPI2DOB：SPI2 Data Out(B); IIC_SDA_A：IIC SDA(A)； ADC11：ADC Input Channel 11；
17	USBDP	I/O	4	USB Positive Data (pull down)	UART1TXD：Uart1 Data Output(D)； SPI2CLKB：SPI2 Clk(B); IIC_SCL_A：IIC SCL(A)； ADC10：ADC Input Channel 10；
18	PD6	I/O	8/24	GPIO	
19	PD5	I/O	8/24	GPIO	
20	PA3	I/O	8/24	GPIO	UART2TXA：Uart2 Data Output(A)； ADC0：ADC Input Channel 0； PWM1：Timer1 PWM Output；; Touch0：Touch Input Channel 0;

2、Electrical Characteristics

2.1 Absolute Maximum Ratings

Table 2-1

Symbol	Parameter	Min	Max	Unit
Tamb	Ambient Temperature	-40	+85	℃
Tstg	Storage temperature	-65	+150	℃
VBAT	Supply Voltage	-0.3	4.5	V
LDO_IN	Charger Voltage	-0.3	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 Recommended Operating Conditions

Table 2-2

Symbol	Parameter	Min	Typ	Max	Unit	Test Conditions
VBAT	Voltage Input	2.2	3.7	4.5	V	
LDO_IN	Charger Voltage	4.5	5.0	5.5	V	
$V_{3.3}$	Voltage output	2.2	3.0	3.4	V	VBAT = 4.2V, 100mA loading
V_{BT_AVDD}	Voltage output	1.2	1.25	1.35	V	VBAT=4.2V, 100mA loading
$I_{L3.3}$	Loading current	_	_	150	mA	VBAT = 4.2V

2.3 Battery Charge

Table 2-3

Symbol	Parameter	Min	Typ	Max	Unit	Test Conditions
LDO_IN	Charge Input Voltage	4.5	5	5.5	V	_
V_{Charge}	Charge Voltage	4.15	4.2	4.25	V	_
I_{Charge}	Charge Current	20		200	mA	Charge current at fast charge mode
I_{Trikl}	Trickle Charge Current	20	45	70	mA	$V_{BAT}<V_{Trikl}$

2.4 IO Input/Output Electrical Logical Characteristics

Table 2-4

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

2.5 Internal Resistor Characteristics

Table 2-5

Port	**General Output**	**High Drive**	**Internal Pull-Up Resistor**	**Internal Pull-Down Resistor**	**Comment**
PA3, PB1,PB4, PB6~PB8, PC4,PC5, PD5,PD6,	8mA	24mA	10K	10K	1、PB1 default pull up 2、USBDM & USBDP default pull down 3、internal pull-up/pull-down resistance | accuracy ±20%
USBDP	4mA	_	1.5K	15K	
USBDM	4mA	_	180K	15K	

2.6 BT Characteristics

2.6.1 Transmitter

Basic Data Rate **Table 2-6**

Parameter		**Min**	**Typ**	**Max**	**Unit**	**Test Conditions**
RF Transmit Power			6	8	dBm	25℃, Power Supply VBAT=5V 2441MHz
RF Power Control Range			20		dB	
20dB Bandwidth			950		KHz	
Adjacent Channel Transmit Power	+2MHz		-40		dBm	
	-2MHz		-38		dBm	
	+3MHz		-44		dBm	
	-3MHz		-35		dBm	

Enhanced Data Rate **Table 2-7**

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

2.6.2 Receiver

Basic Data Rate **Table 2-8**

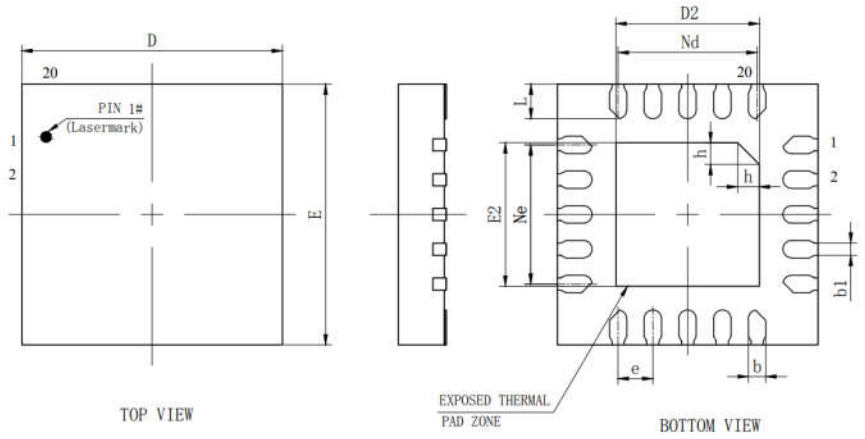
Parameter		Min	Typ	Max	Unit	Test Conditions
Sensitivity			-94		dBm	25℃, Power Supply VBAT=5V 2441MHz
Co-channel Interference Rejection			-13		dB	
Adjacent Channel Interference Rejection	+1MHz		+5		dB	
	-1MHz		+2		dB	
	+2MHz		+37		dB	
	-2MHz		+36		dB	
	+3MHz		+40		dB	
	-3MHz		+35		dB	

Enhanced Data Rate **Table 2-9**

Parameter		Min	Typ	Max	Unit	Test Conditions
Sensitivity			-94		dBm	25℃, Power Supply VBAT=5V 2441MHz
Co-channel Interference Rejection			-13		dB	
Adjacent Channel Interference Rejection	+1MHz		+5		dB	
	-1MHz		+2		dB	
	+2MHz		+37		dB	
	-2MHz		+36		dB	
	+3MHz		+40		dB	
	-3MHz		+35		dB	

3、 Package Information

3.1 QFN20_3.0x3.0



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	0.50	0.55	0.60
A1	0	0.02	0.05
b	0.15	0.20	0.25
b1		0.14REF	
c	0.10	0.15	0.20
D	2.90	3.00	3.10
D2	1.55	1.65	1.75
e		0.40BSC	
Ne		1.60BSC	
Nd		1.60BSC	
E	2.90	3.00	3.10
E2	1.55	1.65	1.75
L	0.35	0.40	0.45
h	0.20	0.25	0.30
[illegible]		1.95x1.95	

Figure 3-1 AC6373B Package

4、Revision History

Date	Revision	Description
2020.09.16	V1.0	Initial Release