

AB5617T3

Audio Player Microcontroller

Versions: 0.0.4
2022.11.15



Declaration

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Revision History

Date	Version	Comments	Revised by
2022-01-05	0.0.1	First draft	Leo
2022-01-22	0.0.2	Update QDID	Leo
2022-03-18	0.0.3	Modify the information of Product Features	Leo
2022-11-15	0.0.4	Update QDID	Leo

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1 Product Features

CPU and Flexible IO

- High performance 32bit RISC-V processor Core with DSP instruction
- RISC-V typical speed: 125MHz
- Program memory: internal 2K-BIT OTP
- Internal 96KB RAM for data and program
- Flexible GPIO pins with Programmable pull-up and pull-down resistors
- Support GPIO wakeup or interrupt

Bluetooth Radio

- Compliant to Bluetooth 5.3(QDID:194248);
- TX output power +8dBm in MAX;
- RX Sensitivity with -93dBm @EDR;

Audio Interface

- Audio codec with 16bit mono DAC and 16bit mono ADC;
- Support flexible audio EQ adjust;
- Support Sample rate 8, 11.025, 12, 16, 22.05, 32, 44.1 and 48KHz;
- Mono MIC amplifier input;
- High performance mono audio ADC with 91dB SNR;
- High performance mono audio DAC with 97dB SNR, with headphone amplifier output;

Peripheral and Interfaces

- Three 32-bit timers;
- One multi-function 32-bit timers, support Capture and PWM mode;
- WatchDog;
- Three full-duplex UART;
- Sixteen Channels 10-bit SARADC;
- Build in PMU, such as Charger/Buck/LDO;

Package

- SOP16;

Temperature

- Operating temperature: -40°C to +85°C;
- Storage temperature: -65°C to +150°C ;

Supports

- A2DP/AVDTP/AVRCP/RFCOMM/HFP/HSP/SPP/HID

2 Package Definition

2.1 Pin Assignment

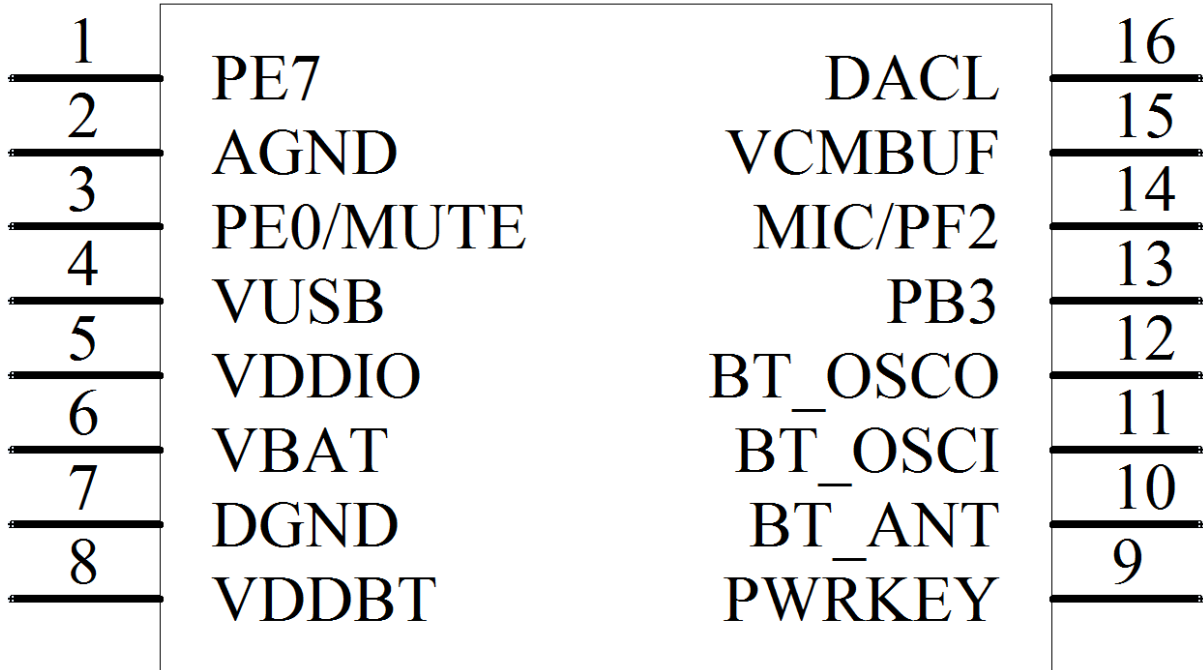


Figure 2-1 Pin assignment for SOP16

2.2 Pin Descriptions

Table 2-1 SOP16 pin description

Pin No.	Name	Type	Function
1	PE7	I/O	ADC9 AUXL2 TX0-G4 HSTRX-R4 PE7
2	AGND	GND	DAC Ground
3	PE0/MUTE	I/O	MUTE SPI0DI-G3 TX0-G6 PE0
4	VUSB	PWR	VUSB power input

5	VDDIO	PWR	VDDIO power output
6	VBAT	PWR	VBAT power input
7	DGND	GND	Digital Ground
8	VDDBT	PWR	BT power
9	PWRKEY	A	Power key input
10	BT_ANT	A	BT ANT
11	BT_OSCI	A	26M OSC input
12	BT_OSCO	A	26M OSC output
13	PB3	I/O	ADC5 AUXL1 SPI0DO-G3 TX0-G3 HSTRX-G3 PWM2-T3 PB3
14	MIC/PF2	I/O	ADC10 MIC TX0-G7 PF2
15	VCMBUF	A	VCM buffer output
16	DACL	A	DAC L

Note: I/O: Digital input/output; I : Digital input; A : Analog Pin; PWR: Power Pin; GND: Ground.

3 Characteristics

3.1 PMU Parameters

Table 3-1 PMU voltage input Parameters

Sym	Characteristics	Min	Typ	Max	Unit	Conditions
VUSB	Charger Voltage input	4.6	5.0	5.5	V	
VBAT	Voltage input	3.0	3.7	4.5	V	

Table 3-2 3.3V LDO Parameters

Sym	Characteristics	Min	Typ	Max	Unit	Conditions
VDDIO	3.3V LDO voltage output	-	3.3	-	V	Light Loading condition
Δ VDDIO	Output Mismatch 1-sigma	-	56	-	mV	VDDIO=3.3v
ILOAD	Maximum output current	-	-	150	mA	@VBAT=3.6v
ISC	Short Circuit Current Limit	-	-	300	mA	@VBAT=3.8v

Table 3-3 1.6V LDO Parameters

Sym	Characteristics	Min	Typ	Max	Unit	Conditions
VDDBT	1.6V LDO voltage output	-	1.6	-	V	Light Loading condition
Δ VDDBT	Output Mismatch 1-sigma	-	27	-	mV	VDDBT=1.6v
ILOAD	Maximum output current	-	-	100	mA	@VBAT=3.0v
ISC	Short Circuit Current Limit	-	-	200	mA	@VBAT=3.8v

Table 3-4 1.2V LDO Parameters

Sym	Characteristics	Min	Typ	Max	Unit	Conditions
VDDCORE	1.2V LDO voltage output	-	1.2	-	V	Light Loading condition
Δ VDDCORE	Output Mismatch 1-sigma	-	20	-	mV	VDDCORE=1.2v
ILOAD	Maximum output current	-	-	80	mA	@VBAT=3.6v
ISC	Short Circuit Current Limit	-	-	120	mA	@VBAT=3.8v

3.2 IO Parameters

Table 3-5 I/O Parameters

GPIO—Electrical Characteristics							
Symbol	Description	Related GPIO	Min	Typical	Max	Units	Conditions
V _{IL}	Low-level input voltage		-0.3		1.27	V	VDDIO=3.3V
V _{IH}	High-level input voltage		2.03		3.6	V	VDDIO=3.3V
Driver Ability 1	Output Driver Ability 1			32		mA	VDDIO=3.3V

GPIO—Electrical Characteristics							
Driver Ability 0	Output Driver Ability 0			8		mA	VDDIO=3.3V
R _{PUP0}	Internal pull-up resistor 0		8	10	12	KΩ	
R _{PUP1}	Internal pull-up resistor 1		0.24	0.3	0.36	KΩ	
R _{PUP2}	Internal pull-up resistor 2		160	200	240	KΩ	
R _{PDN0}	Internal pull-down resistor 0		8	10	12	KΩ	
R _{PDN1}	Internal pull-down resistor 1		0.24	0.3	0.36	KΩ	
R _{PDN2}	Internal pull-down resistor 2		160	200	240	KΩ	

3.3 Audio DAC Parameters

Table 3-6 Audio DAC Parameters

Sym	Characteristics	Min	Typ	Max	Unit	Conditions
SNR		-	97	-	dB	VCM cap=NC VDDDAC cap=1uF with A-wt filter Output -4dBV Fin=1KHz
THD+N		-	-75	-	dB	VCM cap=NC VDDDAC cap=1uF with A-wt filter Output -4dBV with 10K loading Fin=1KHz
Output Range	Maximum output voltage	-	2.5		V _{peak-peak}	32ohm Loading

3.4 Audio ADC Parameters

Table 3-7 Audio ADC Parameters

Sym	Characteristics	Min	Typ	Max	Unit	Conditions
SNR		-	91	-	dB	VCM cap=NC VDDDAC cap=1uF with A-wt filter Input sine amplitude, 850mV RMS Fin=1KHz
THD+N		-	-87	-	dB	VCM cap=1uF VDDDAC cap=1uF with A-wt filter Input sine amplitude, 850mV RMS Fin=1KHz.
Input Range	Input sine wave peak amplitude	0		VCM	V	From aux input, aux 0db gain, VCM represent VCM voltage.

3.5 BT Parameters

Table 3-8 BT Parameters

Characteristics	Min	Typical	Max	Unit	Conditions
Maximum Transmit Power	-	-	8	dBm	
RMS DEVM	-	5.5	-	%	Maximum TX power 2-DH5 packet
Peak DEVM	-	12.5		%	
EDR Relative Transmit Power		-0.2		dB	
Sensitivity @ Basic Rate		-91		dBm	BER=0.1%, using DH5 packet
Sensitivity @ EDR		-93		dBm	BER=0.01%, using 2-DH5 packet

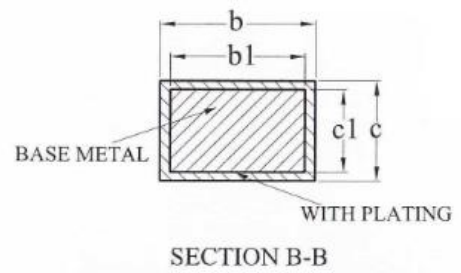
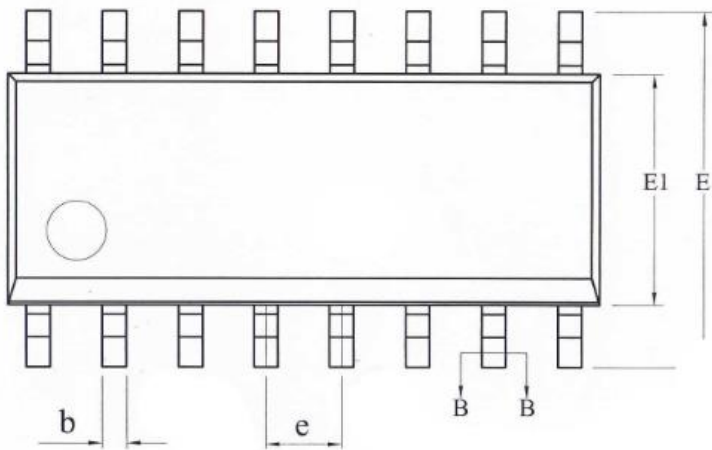
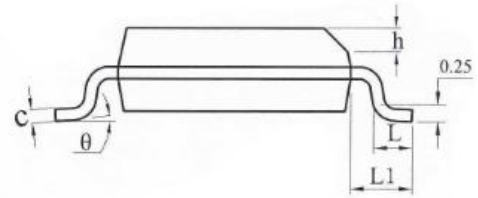
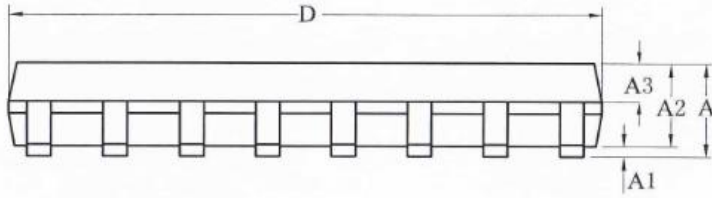
3.6 Current Parameters

Table 3-9 Current Parameters

Sym	Characteristics	Min	Typ	Max	Unit	Conditions
IRTC	RTC mode current	-	4	-	uA	4.2V input, room temp.
Sleep	Sleep current	-	500	2000	uA	3.3V input, room temp

4 Package Information

SOP16 9.90×3.90×1.40 e=1.27



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°



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