

AB136M

Audio Player Microcontroller

Versions: 0.0.2
2023.01.10



Declaration

Copyright © 2021, www.bluetrum.com.

All Rights Reserved. No Unauthorized Distribution.

Bluetrum reserves the right to make changes without further notice to any products herein to improve reliability, function or design.

For further information on the technology, product and business term, please contact Bluetrum Company.

For sales or technical support, please send email to the address:

Sales: sales@bluetrum.com

Technical: project@bluetrum.com

Revision History

Date	Version	Comments	Revised by
2021-08-16	0.0.1	First draft	Leo
2023-01-10	0.0.2	Update Product Features	Leo

Table of Contents

TABLE OF CONTENTS	2
1 PRODUCT FEATURES	3
2 PACKAGE DEFINITION	4
2.1 PIN ASSIGNMENT	4
2.2 PIN DESCRIPTIONS	5
3 CHARACTERISTICS	7
3.1 PMU PARAMETERS	7
3.2 IO PARAMETERS	7
3.3 AUDIO DAC PARAMETERS.....	7
3.4 AUDIO ADC PARAMETERS	8
3.5 CURRENT PARAMETERS.....	8
4 PACKAGE INFORMATION	9

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 2M bit flash
- Internal 60KB RAM for data and program
- Flexible GPIO pins with Programmable pull-up and pull-down resistors
- Support GPIO wakeup or interrupt

Audio Interface

- High performance stereo DAC with 95dB SNR;
- High performance mono ADC with 90dB SNR;
- MIC amplifier input;
- Support flexible audio EQ adjust;
- Support Sample rate 8, 11.025, 12, 16, 22.05, 32, 44.1, 48 and 96kHz;
- Four channels Stereo Analog MUX;
- VID and PID information can be configured;
- Audio head insertion and extraction detection;
- Earphone microphone detection;
- Automatic recognition of OMTP and CTIA headphones, and automatic adaptation;

Peripheral and Interfaces

- Support Touch Key;
- Two 32-bit timers;
- Two multi-function 32-bit timers, support Capture and PWM mode;
- WatchDog;
- Three full-duplex UART;
- Two SPI;
- IR controller;
- Integrate IRTC;
- SD Card Host controller;
- Sixteen Channels 10-bit SARADC;
- Build in PMU, such as LDO/LVD/POR;

Package

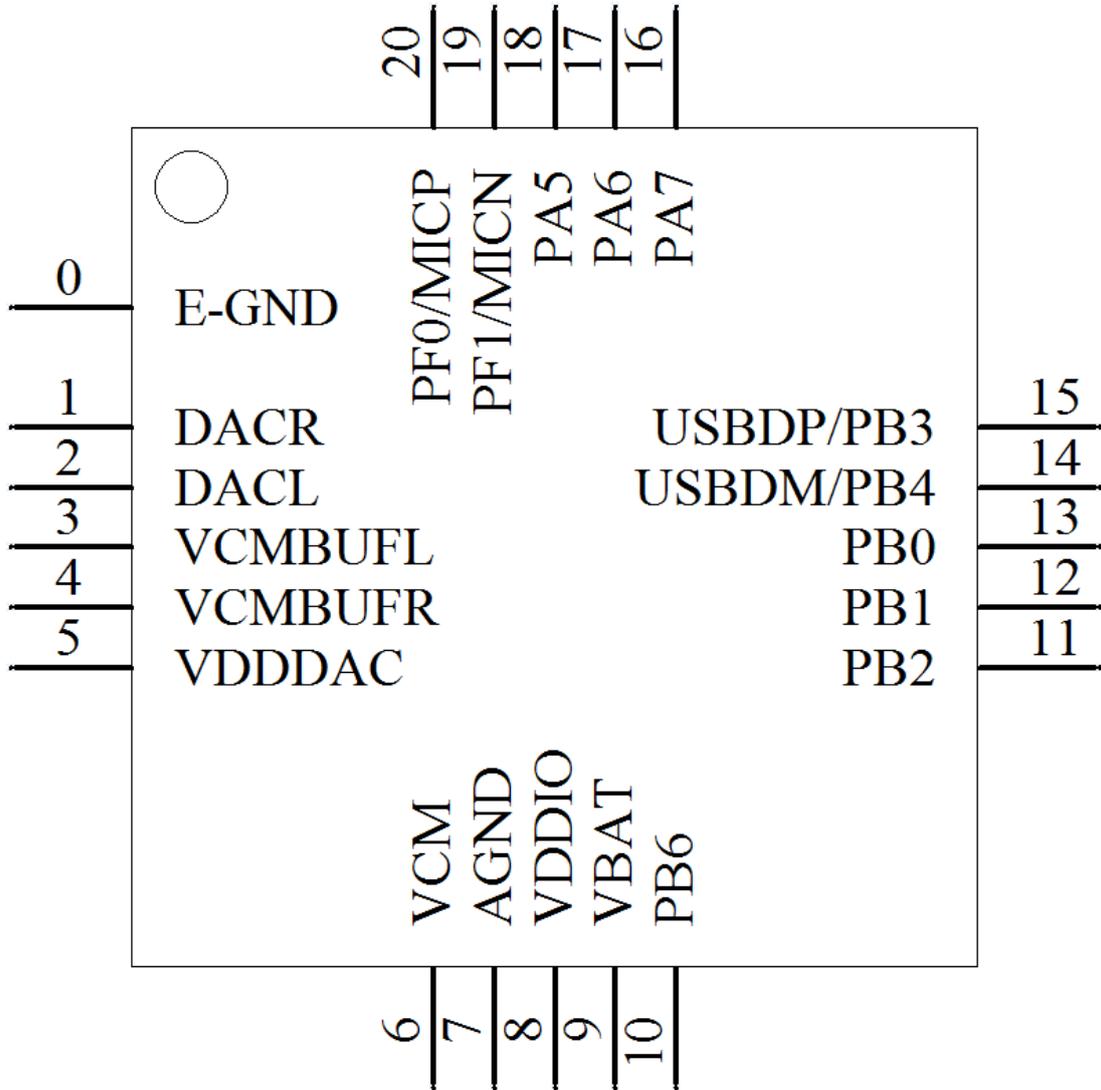
- QFN20 3x3

Temperature

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

2 Package Definition

2.1 Pin Assignment



2.2 Pin Descriptions

Table 2-1 QFN20 3x3 pin description

Pin No.	Name	Type	Function
0	E-GND	GND	E-Pad Ground
1	DACR	A	DAC R
2	DACL	A	DAC L
3	VCMBUFL	A	VCM buffer left output
4	VCMBUFR	A	VCM buffer right output
5	VDDDAC	PWR	DAC power
6	VCM	PWR	DAC VCM
7	AGND	GND	DAC Ground
8	VDDIO	PWR	VDDIO power output
9	VBAT	PWR	VBAT power input
10	PB6	I/O	ADC3 AUXR3 SPI1DO -G4 TX0-G5 FMOSC-G8 PWM1-T2-G3 TMR2CAP_G6/IR_G6 PB6
11	PB2	I/O	ADC2 AUXR2 SDDAT0-G1 SPI1DO-G1 SPI1DI-G4 TX0-G3 TX1-G2 HSTRX-G6 PWM2-T3-G2 TMR2CAP_G4/IR_G4 IISDO-G2 PB2
12	PB1	I/O	ADC1 AUXL2 SDCLK-G1/G2/G3/G4 SPI0DI-G3 SPI1CLK-G1 SPI1CLK-G2 RX0-G3 RX1-G2 HSTRX-G5 FMOSC-G6 PWM1-T3-G2 IISCLK-G2 PB1
13	PB0	I/O	SDCMD-G1/G2/G3 SPI1DI-G1 SPI1DI-G2 FMOSC-G5 PWM0-T3-G2 IISLRCLK-G2 PB0
14	USBDM/PB4	I/O	USBDM

			SDDAT0-G2 SDDAT0-G4 SPIOCLK-G3 SPI1DO-G2 RX0-G4 HSTRX-G8 PWM1-T3-G3 TMR1CAP PB4
15	USBDP/PB3	I/O	USBDP SDDAT0-G3 SDCMD-G4 SPI0DO-G3 TX0-G4 HSTRX-G7 PWM0-T3-G3 TMR0CAP PB3
16	PA7	I/O	ADC0 AUXR1 SDDAT0-G5 SPI1DO SPI1DATA-G3 TX0-G2 HSTRX-G4 FMOSC-G4 PWM1-T2-G2 TMR2CAP_G3/IR_G3 IISMCLK-G2 PA7
17	PA6	I/O	AUXL1 SDCLK-G5 SPI1CLK-G3 RX0-G2 HSTRX-G3 FMOSC-G3 PWM0-T2-G2 PA6
18	PA5	I/O	SDCMD-G5 SPI1DI-G3 PWM2-T3-G1 PA5
19	PF1/MICN	I/O	MICN PWM2-T3-G3 PF1
20	PF0/MICP	I/O	MICP ADC4 TX0-G7 PWM2-T2-G2 TMR3CAP_G1/IR_G8 PF0

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
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 VVDDIO	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

3.2 IO Parameters

Table 3-3 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
Driver Ability 0	Output Driver Ability 0			8		mA	VDDIO=3.3V
R _{PUP0}	Internal pull-up resistor 0		8	10	12	K Ω	
R _{PUP1}	Internal pull-up resistor 1		0.24	0.3	0.36	K Ω	
R _{PUP2}	Internal pull-up resistor 2		160	200	240	K Ω	
R _{PDN0}	Internal pull-down resistor 0		8	10	12	K Ω	
R _{PDN1}	Internal pull-down resistor 1		0.24	0.3	0.36	K Ω	
R _{PDN2}	Internal pull-down resistor 2		160	200	240	K Ω	

3.3 Audio DAC Parameters

Table 3-4 Audio DAC Parameters

Sym	Characteristics	Min	Typ	Max	Unit	Conditions
SNR		-	95	-	dB	VCM cap=NC VDDDAC cap=1uF with A-wt filter Output -3dBV Fin=1KHz
THD+N		-	-70	-	dB	VCM cap=NC VDDDAC cap=1uF with A-wt filter Output -3dBV with 10K loading Fin=1KHz

Sym	Characteristics	Min	Typ	Max	Unit	Conditions
Output Range	Maximum output voltage	-	2.6		V _{peak-peak}	32ohm Loading

3.4 Audio ADC Parameters

Table 3-5 Audio ADC Parameters

Sym	Characteristics	Min	Typ	Max	Unit	Conditions
SNR		-	90	-	dB	VCM cap=NC VDDDAC cap=1uF with A-wt filter Input sine amplitude, 850mV RMS Fin=1KHz
THD+N		-	-80	-	dB	VCM cap=NC 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.

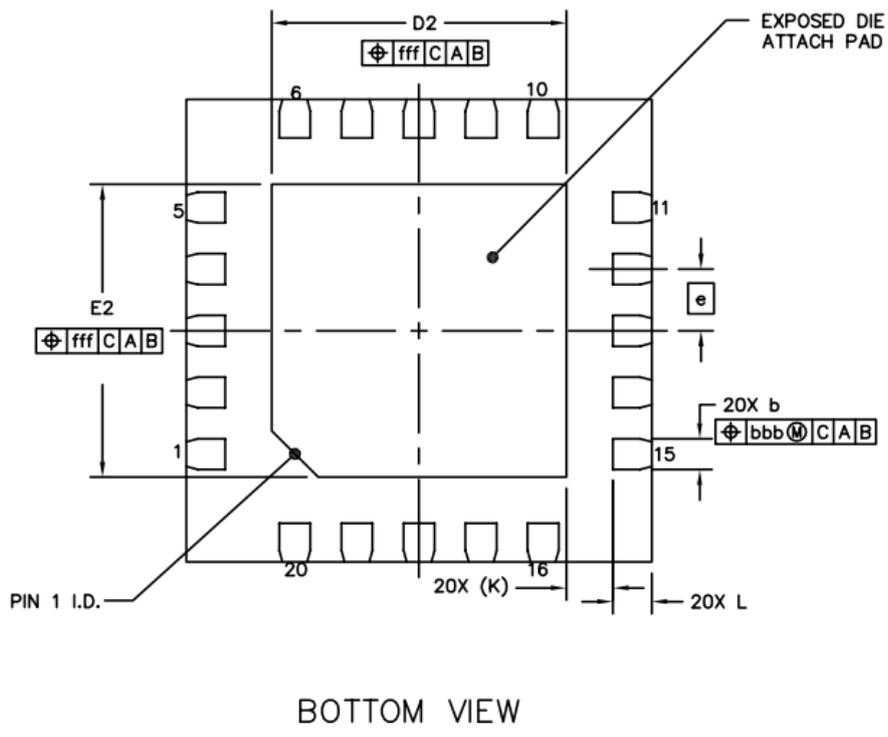
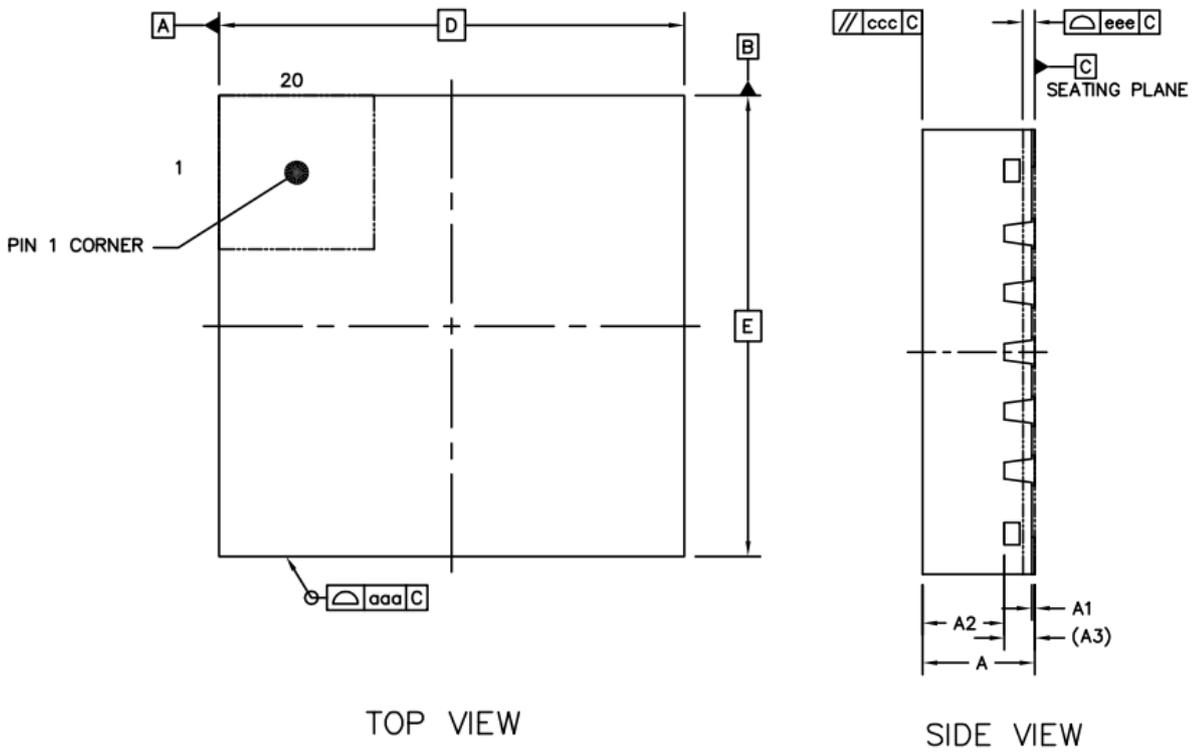
3.5 Current Parameters

Table 3-6 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

QFN20 3x3



		SYMBOL	MIN	NOM	MAX
TOTAL THICKNESS		A	0.7	0.75	0.8
STAND OFF		A1	0	0.02	0.05
MOLD THICKNESS		A2	---	0.55	---
L/F THICKNESS		A3	0.203 REF		
LEAD WIDTH		b	0.15	0.2	0.25
BODY SIZE	X	D	3 BSC		
	Y	E	3 BSC		
LEAD PITCH		e	0.4 BSC		
EP SIZE	X	D2	1.8	1.9	2
	Y	E2	1.8	1.9	2
LEAD LENGTH		L	0.15	0.25	0.35
LEAD TIP TO EXPOSED PAD EDGE		K	0.3 REF		
PACKAGE EDGE TOLERANCE		aaa	0.1		
MOLD FLATNESS		ccc	0.1		
COPLANARITY		eee	0.08		
LEAD OFFSET		bbb	0.07		
EXPOSED PAD OFFSET		fff	0.1		



Contact us

Address: 深圳市南山区沙河街道高发社区侨香路 4068 号智慧广场 A 栋 1301-1

E-mail: info@bluetrum.com

Website: www.bluetrum.com