AC6084A Datasheet

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AC6084A Features

CPU

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

DSP Audio Processing

- Supports MP2, MP3, WMA audio decoding
- 10-band EQ configuration for voice Effects
- Built-in microphone echo function

Audio Codec

- Two channels 16-bit DAC, SNR >= 92dB
- One channels 16-bit ADC , SNR >= 90dB
- Sampling rates of 8KHz/11.025KHz/16KHz/22.05KHz/24KHz/32KHz/44.1KHz/48KHz are supported
- One analog MIC amplifier, build-in MIC bias generator
- Two channels Mono analog MUX
- Supports cap-less, single-ended, and differential mode at the DAC path
- Supports 16ohm and 32ohm Speaker loading

Peripherals

- Full speed USB 2.0 OTG controller

- 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 and flash
- VBAT is 2.2V to 5.5V
- VDDIO is 2.2V to 3.6V

Packages

- QSOP24

Temperature

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

Applications

- Card MP3 player speaker

1、Pin Definition

1.1　Pin Assignment

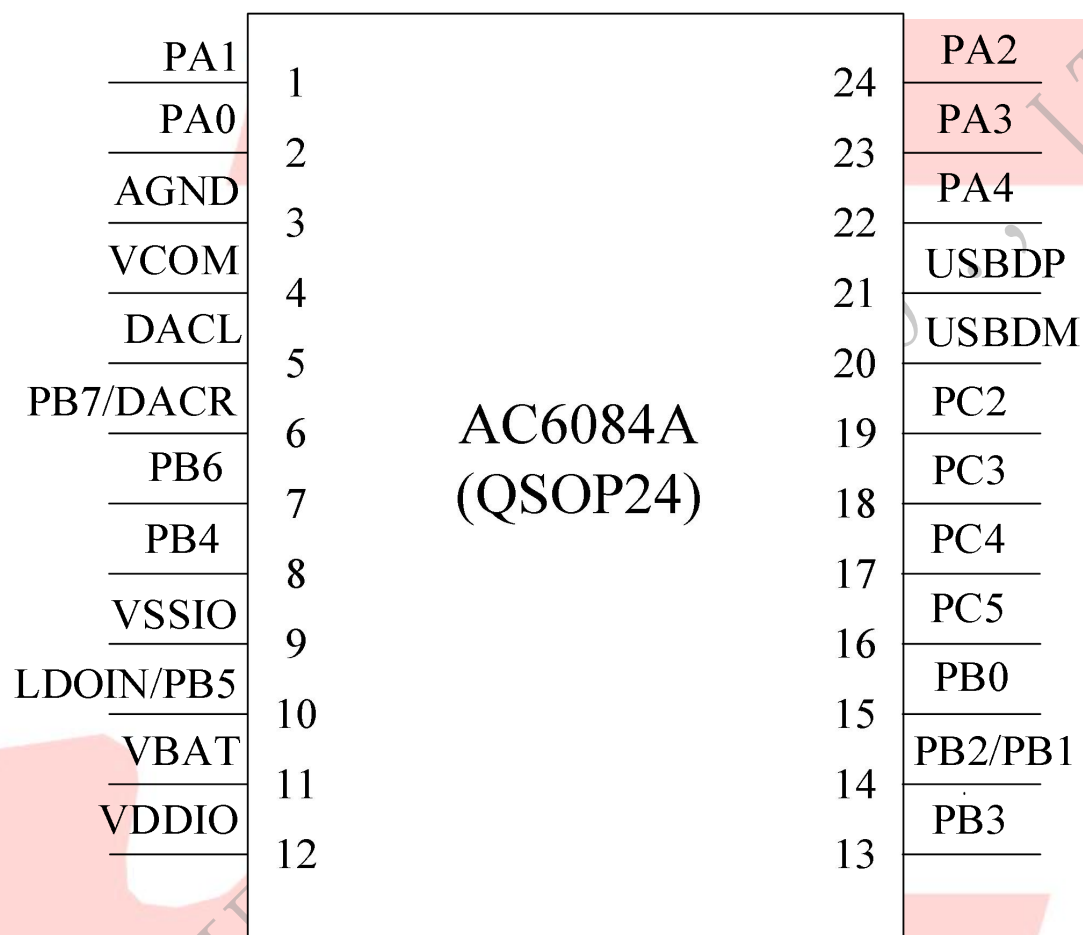|			
PA1	1	24	PA2
PA0	2	23	PA3
AGND	3	22	PA4
VCOM	4	21	USBDP
DACL	5	20	USBDM
PB7/DACR	6	19	PC2
PB6	7	18	PC3
PB4	8	17	PC4
VSSIO	9	16	PC5
LDOIN/PB5	10	15	PB0
VBAT	11	14	PB2/PB1
VDDIO	12	13	PB3

AC6084A (QSOP24)

Figure 1-1　AC6084A_QSOP24 Package Diagram

1.2　Pin Description

Table 1-1　AC6084A_QSOP24 Pin Description

PIN NO.	Name	I/O Type	Drive (mA)	Function	Other Function
1	PA1	I/O	24/8	GPIO	MIC：MIC Input Channel ; ADC1：ADC Input Channel 1; PWM4：Timer4 PWM Output； UART1RXC：Uart1 Data In(C);
2	PA0	I/O	24/8	GPIO	SDPG：SD Power Supply; ADC0：ADC Input Channel 0; CLKOUT0; UART1TXC：Uart1 Data Out(C)；
3	AGND	P	/		Analog Ground
4	VCOM	P	/		DAC Reference
5	DACL	O	/		DAC Left Channel
6	DACR	O	/		DAC Right Channel
	PB7	I/O	24/8	GPIO	SD0CLK_B：SD0 Clock(B); SD0CLK_F：SD0 Clock(F); SPI2DOA：SPI2 Data Out(A); AMUX1R：Analog Channel1Right; IIC_SDA_C：IIC DAT(C); ADC9：ADC Input Channel 9; PWM5：Timer5 PWM Output； UART1RXA：Uart1 Data In(A);
7	PB6	I/O	24/8	GPIO	SD0CMD_B：SD0 Command(B); SD0CMD_F：SD0 Command(F); SPI2CLKA：SPI2 Clock(A); AMUX1L：Analog Channel1 Left; IIC_SCL_C：IIC SCL(C); ADC8：ADC Input Channel 8; TMR3：Timer3 Clock Input; UART1TXA：Uart1 Data Out(A);
8	PB4	I/O	24/8	GPIO	SD0DAT_F：SD0 Data(F); ADC7：ADC Input Channel 7; LVD：Low Voltage Detect； UART2TXC：Uart2 Data Out(C)； UART2RXC：Uart2 Data In(C); CLKOUT1; Q-decoder2_0;

9	VSSIO	P	/		IO Ground
	LDOIN	P	/		Battery Charger In
10	PB5	I/O	8	GPIO (High Voltage Resistance)	SD0DAT_B：SD0 Data(B); SPI2DIA：SPI2 Data Input(A)； PWM3：Timer3 PWM Output； CAP1：Timer1 Capture; UART0TXC：Uart0 Data Out(C)； UART0RXC：Uart0 Data In(C)； Q-decoder2_1;
11	VBAT	P	/		Battery Power Supply
12	VDDIO	P	/		IO Power 3.3v
13	PB3	I/O	24/8	GPIO	SD0DAT_D：SD0 Data(D); ADC6：ADC Input Channel 6; PWM2：Timer2 PWM Output； UART2RXB：Uart2 Data In(B); Q-decoder1_1;
14	PB2	I/O	8	GPIO (High Voltage Resistance)	SD0CMD_D：SD0 Command(D); SPI1DIA：SPI1 Data In(A); UART2TXB：Uart2 Data Out(B)； CAP0：Timer0 Capture; Q-decoder1_0;
	PB1	I/O	24/8	GPIO	Long Press Reset; SPI1DOA：SPI1 Data Out(A); ADC5：ADC Input Channel 5; UART0RXB：Uart0 Data In(B); TMR2：Timer2 Clock Input;
15	PB0	I/O	8	GPIO (High Voltage Resistance)	SD0CLK_D：SD0 Clock(D); SPI1CLKA：SPI1 Clock(A); UART0TXB：Uart0 Data Out(B)； TMR5：Timer5 Clock Input;
16	PC5	I/O	24/8	GPIO	SD0CLK_A：SD0 Clock(A); SD0CLK_E：SD0 Clock(E); SPI1DOB：SPI1 Data Out(B); IIC_SDA_B：IIC SDA(B); ADC12：ADC Input Channel 12; TMR1：Timer1 Clock Input; UART2RXD：Uart2 Data In(D);

17	PC4	I/O	24/8	GPIO	SD0CMD_A：SD0 Command(A); SPI1CLKB：SPI1 Clock(B); IIC_SCL_B：IIC SCL(B); ADC11：ADC Input Channel 11; PWM1：Timer1 PWM Output； UART2TXD：Uart2 Data Out (D)；
18	PC3	I/O	24/8	GPIO	SD0DAT_A：SD0 Data(A); SPI1DIB：SPI1 Data In(B); CAP2：Timer2 Capture; UART0TXD：Uart0 Data Out (D)； UART0RXD：Uart0 Data In(D);
19	PC2	I/O	24/8	GPIO	ADC10：ADC Input Channel 10; CAP5：Timer5 Capture; UART1RXB：Uart1 Data In(B);
20	USBDM	I/O	4	USB Negative Data (pull down)	SD0DAT_E：SD0 Data(E); SPI2DOB：SPI2 Data Out(B); IIC_SDA_A：IIC SDA(A); ADC14：ADC Input Channel 14; UART1RXD：Uart1 Data In(D);
21	USBDP	I/O	4	USB Positive Data (pull down)	SPI2CLKB：SPI2 Clock(B); IIC_SCL_A：IIC SCL(A); ADC13：ADC Input Channel 13; UART1TXD：Uart1 Data Out(D);
22	PA4	I/O	24/8	GPIO	SD0CMD_C：SD0 Command(C); SD0CMD_E：SD0 Command(E); AMUX0R：Analog Channel0 Right; UART1_RTS：Uart1 Request to send; ADC3：ADC Input Channel 3; TMR4：Timer4 Clock Input; UART2RXA：Uart2 Data In(A); Q-decoder0_1;
23	PA3	I/O	24/8	GPIO	SD0DAT_C：SD0 Data(C); AMUX0L：Analog Channel0 Left; ADC2：ADC Input Channel 2; UART1_CTS：Uart1 Clear to send； UART2TXA：Uart2 Data Out(A); PWM5：Timer5 PWM Output; Q-decoder0_0;
24	PA2	I/O	24/8	GPIO	SD0CLK_C：SD0 Clock(C); MIC_BIAS：Microphone Bias Output; CAP3：Timer3 Capture;

2、 Electrical Characteristics

2.1 Absolute Maximum Ratings

Table 2-1

Symbol	Parameter	Min	Max	Unit
Tamb	Ambient Temperature	-40	+85	°C
Tstg	Storage temperature	-65	+150	°C
VBAT	Supply Voltage	-0.3	5.5	V
$V_{3.3IO}$	3.3V IO Input Voltage	-0.3	3.6	V
LDOIN	Charge Input Voltage	-0.3	6.0	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
LDOIN	Loading current	_	_	250	mA	VBAT = 4.2V
VBAT	Voltage Input	2.2	3.7	5.5	V	_
V_{VDDIO}	Voltage output	_	3.3	_	V	VBAT = 4.2V, 100mA loading

2.3 Battery Charge

Table 2-3

Symbol	Parameter	Min	Typ	Max	Unit	Test Conditions
LDOIN	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	_	250	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**
PA0~PA4 PB1,PB4 PB6,PB7 PC2~PC5		8mA	24mA	10K	10K	1、PB1 default pull up 2、USBDM & USBDP default pull down 3、internal pull-up/pull-down resistance｜accuracy ±20%
PA0 PB3	Output 0	8mA	24mA	10K	10K	
	Output 1	8mA	64mA			
PB0,PB2,PB5		8mA	_	10K	10K	
USBDP		4mA	_	1.5K	15K	
USBDM		4mA	_	180K	15K	

2.6　DAC Characteristics

Table 2-6

Parameter	Min	Typ	Max	Unit	Test Conditions
Frequency Response	20	_	20K	Hz	
THD+N	_	-72	_	dB	1KHz/0dB
S/N	_	92	_	dB	10Kohm loading
Crosstalk	_	-80	_	dB	With A-Weighted Filter
Output Swing	_	1	_	Vrms	
Dynamic Range	_	90	_	dB	1KHz/-60dB 10Kohm loading With A-Weighted Filter
DAC Output Power	11	_	_	mW	32ohm loading

2.7   ADC Characteristics

Table 2-7

Parameter	Min	Typ	Max	Unit	Test Conditions
Dynamic Range	_	80	_	dB	1KHz/-60dB
S/N	_	90	91	dB	1KHz/-60dB
THD+N	_	-70	_	dB	
Crosstalk	_	-90	_	dB	

3、 Package Information

3.1 QSOP24
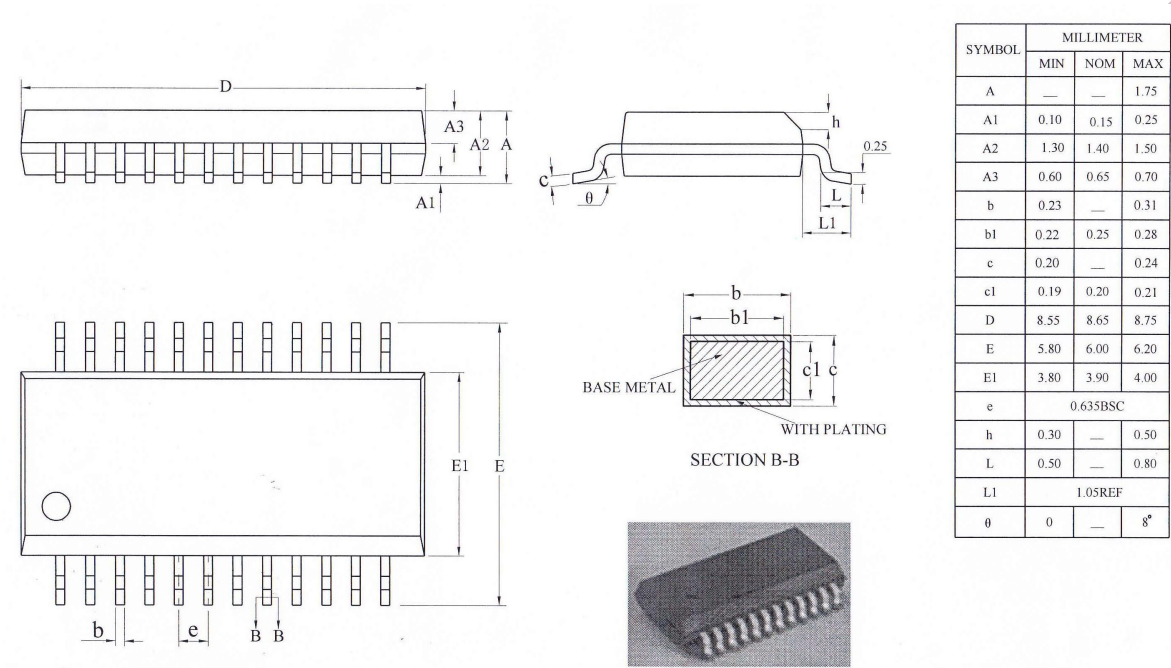
Figure 3-1. AC6084A_QSOP24 Package

SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	—	—	1.75
A1	0.10	0.15	0.25
A2	1.30	1.40	1.50
A3	0.60	0.65	0.70
b	0.23	—	0.31
b1	0.22	0.25	0.28
c	0.20	—	0.24
c1	0.19	0.20	0.21
D	8.55	8.65	8.75
E	5.80	6.00	6.20
E1	3.80	3.90	4.00
e	0.635BSC		
h	0.30	—	0.50
L	0.50	—	0.80
L1	1.05REF		
θ	0	—	8°

4、 Revision History

Date	Revision	Description
2020.10.13	V1.0	Initial Release