美恩微电子
Me Microelectronics

蓝牙模块芯片规格书

Me-AC4603

深圳市美恩微电子有限公司

版本：V1.0

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AC4603 Features

High performance 32-bit RISC CPU

- RISC CPU
- DC-160MHz operation
- Support DSP instructions
- 32 Vectored interrupts
- 4 Levels interrupt priority

Flexible I/O

- 9 GPIO pins
- All GPIO pins can be programmable as input or output individually
- All GPIO pins are internal pull-up/pull-down selectable individually
- CMOS/TTL level Schmitt triggered input
- External wake up/interrupt on all GPIOs

Digital Peripheral Feature

- Bluetooth V2.1+EDR baseband and modem
- FM receiver with stereo decoder and 50uS deemphasis
- Four multi-function 16-bit timers, support capture and PWM mode
- One 16-bit active parallel port
- One full-duplex basic UART
- Two full-duplex advanced UART
- Two SPI interface supports host and device mode
- Two SD Card Host controller
- One audio interface supports IIS, left adjusted, right adjusted and DSP mode
- One full speed USB 2.0 OTG controller
- Watchdog

Analog Peripheral Features

- Bluetooth RF with frequency synthesizer
- FM RF with frequency synthesizer，76-108MHz，100KHz step
- Three Crystal Oscillator
- Full speed USB 2.0 PHY
- 160MHz PLL-based clock generator
- 16-bit Stereo DAC, SNR > 93dB
- 2 channels Stereo ADC with 1 channel MIC amplifier, SNR>72dB
- Embedded headphone amplifier
- 1 channels analog MUX
- 5 channels 10-bit ADC
- 2 channels 4 levels Low Voltage Detector
- Built in Cap Sense Key controller

- Power-on reset
- Two LDO: 5V to 1.8V, 5V to 3.3V

Bluetooth Feature

- CMOS single-chip fully-integrated radio and baseband
- Compliant with Bluetooth 2.1 + EDR specification
- Bluetooth Piconet and Scatternet support
- Meet class2 and class3 transmitting power requirement
- Provides +4dbm transmitting power
- receiver with -85dBm sensitivity

FM Tuner

- Support worldwide frequency band 76-108MHz
- Digital low-IF tuner
- Fully integrated digital frequency synthesizer
- Autonomous search tuning
- Digital auto gain control (AGC)
- Digital adaptive noise cancellation
- Programmable de-emphasis (50/75 ms)
- Receive signal strength indicator (RSSI)
- Bass boost
- Volume control

Power Supply

- VDDLDO is 3.3V to 5.5V
- VDDIO is 3.0V to 3.6V

Packages

- SSOP24
- DIE form

Temperature

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

一、引脚定义

1.1 引脚分配

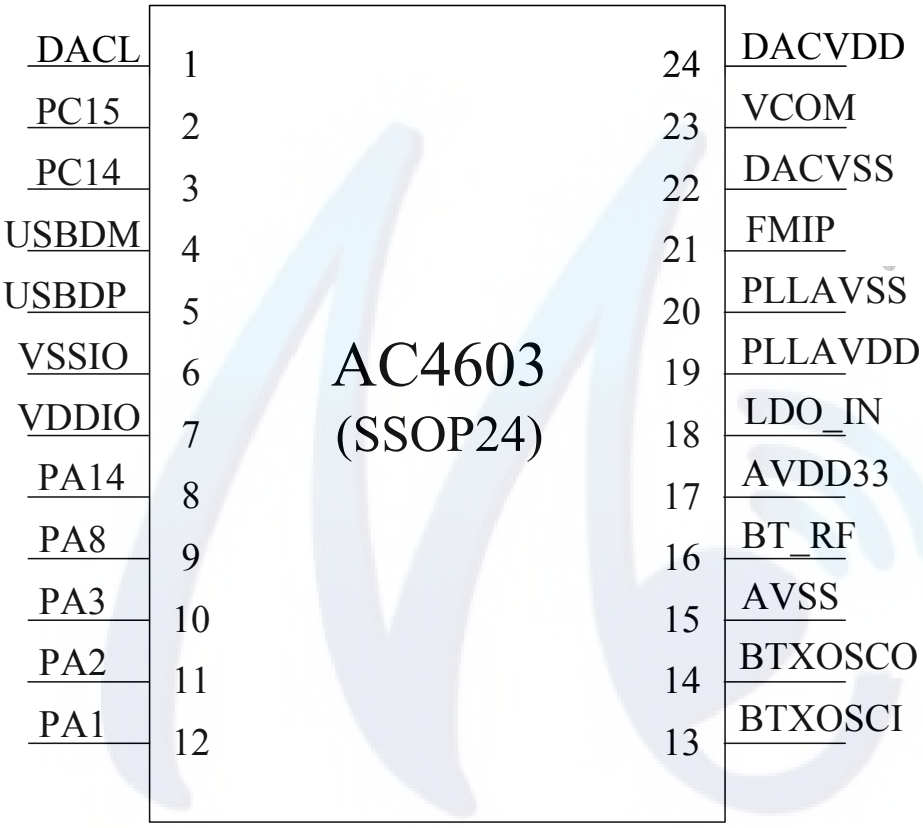

图 1-1 AC4603_SSOP24 引脚分配图

1.2 引脚描述

表 1-1　AC4603_SSOP24 引脚描述

PIN NO.	Name	I/O Type	Drive (mA)	Function	Other Function
1	DACL	O	/	DAC Left Channel	
2	PC15	I/O	16	GPIO	MIC; AMUX2R：Simulator Channel2 Right; 12BitADC;
3	PC14	I/O	16	GPIO	LVD：LVD Test; AMUX2L：Simulator Channel2 Left;
4	USBDM	I/O	4	USB Negative Data	
5	USBDP	I/O	4	USB Positive Data	
6	VSSIO	P	/	IO Ground	
7	VDDIO	P	/	IO Power 3.3v	
8	PA14	I/O	16	GPIO	Wakeup13：Port Interrupt /Wakeup 13; ADC7：ADC Input Channel 7; SPI1CLKA：SPI1 Clk(A); PAPD14：PAP Data(14); ALNK_MCLKA：Audio Link Master Clk(A); SEG14：LCD SEG Output14;
9	PA8	I/O	16	GPIO	Wakeup3：Port Interrupt /Wakeup 3; ADC5：ADC Input Channel 5; UART0TXA：Uart0 Data Out(A); PAPD8：PAP Data8; ALNK_DAT0A：Audio Link Data0(A); SEG8：LCD SEG Output8;
10	PA3	I/O	16	GPIO	ADC3：ADC Input Channel 3; SD0CLKB:SD0 Clk(B); PAPD3：PAP Data3; SEG3：LCD SEG Output3;
11	PA2	I/O	16	GPIO	ADC2：ADC Input Channel 2; SD0CMDB：SD0 Command(B); PAPD2：PAP Data1; SEG2：LCD SEG Output2;

12	PA1	I/O	16	GPIO	ADC1：ADC Input Channel 1; PWM3：Timer3 PWM Output; SD0DAT0B：SD0 Data0(B); PAPD1：PAP Data1; SEG1：LCD SEG Output1;
13	BTXOSCI			OSC In	
14	BTXOSCO			OSC Out	
15	AVSS	P	/	Analog Ground	
16	BT_RF	P	/		
17	AVDD	P	/	Analog Power 3.3v	
18	LDO_IN	P	/	LDO Power 5v	
19	PLLAVDD	P	/		
20	PLLAVSS	P	/		
21	FMIP	I	/		
22	DACVSS	P	/	DAC Ground	
23	VCOM	P	/	DAC Reference	
24	DACVDD	P	/	DAC Power	

二、电气特性

2.1 LDO 电压、电流特性

表 2-1

符号	参数	最小	典型	最大	单位	测试条件
LDO5V	Voltage Input	3.3	4.6	5.5	V	_
$V_{3.3}$	Voltage output	_	3.3	_	V	LDO5V = 5V, 100mA loading
$V_{1.8}$		_	1.8	_	V	LDO5V = 5V, 50mA loading
V_{DACVDD}	DAC Voltage	_	3.1	_	V	LDO5V = 5V, 10mA loading
$I_{L3.3}$	Loading current	_	_	150	mA	LDO5V = 5V

2.2 IO 输入、输出高低逻辑特性

表 2-2

IO 输入特性						
符号	参数	最小	典型	最大	单位	测试条件
V_{IL}	Low-Level Input Voltaget	-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 输出特性						
V_{OL}	Low-Level Output Voltaget	_	_	0.33	V	VDDIO = 3.3V
V_{OH}	High-Level Output Voltaget	2.7	_	_	V	VDDIO = 3.3V

2.3 IO 输出能力、上下拉电阻特性

表 2-3

Port 口	普通输出	强输出	上拉电阻	下拉电阻	备注
PA0~PA15	串接 250 欧电阻（寄存器可控制）	16mA	10K	60K	PA8 default pulldown
PC0~PC15	8mA	24mA	10K	60K	

DAC 特性

表 2-4

参数	最小	典型	最大	单位	测试条件
Frequency Response	20	_	200000	Hz	_
THD+N	_	0.014	_	%	1KHz out = 1V RMS
S/N	_	93	_	dB	1KHz out = 1V RMS
Channel Separation	_	80	_	dB	_
DAC Output Power	_	>15	_	mW	32ohm loading

BT 特性

表 2-5

参数	最小	典型	最大	单位	测试条件
Maximum Output Power	_	4	_	dBm	_
RMS DEVM	_	5.3	_	%	Maximum output power
PEAK DEVM	_	12	_	%	
99% DEVM	_	8	_	%	
EDR Relative Power	_	-1.4	_	dB	
BDR Sensitivity	_	-84	_	dBm	BER=0.001
EDR Sensitivity	_	-85	_	dBm	BER=0.0001

三、封装

3.1 AC4603_SSOP24

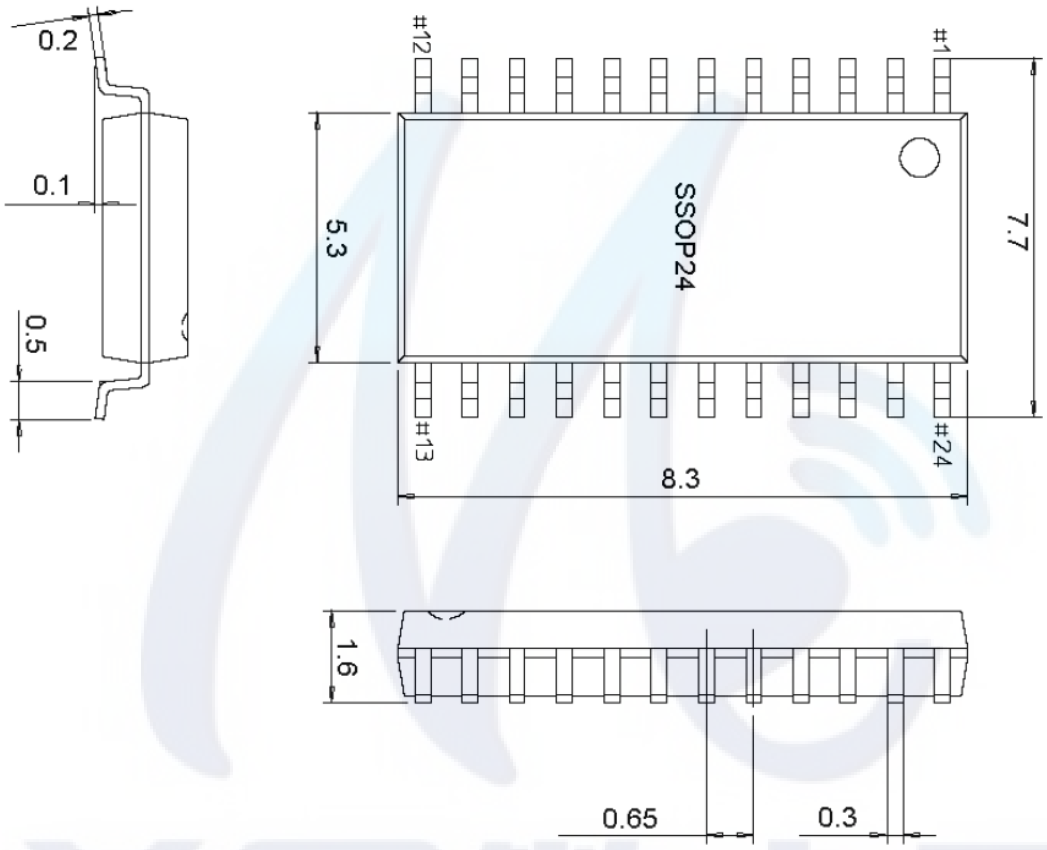

图 3-1 AC4603_SSOP24 封装图