LC6904C 芯片规格书

珠海市杰理科技有限公司

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LC6904C Features

High performance 32-bit RISC CPU

- RISC 32bit CPU
- DC-160MHz operation
- Support DSP instructions
- 64Vectored interrupts
- 4 Levels interrupt priority

Flexible I/O

- 15 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

Peripheral Feature

- One full speed USB 2.0 OTG controller
- Four multi-function 16-bit timers, support capture and PWM mode
- Four 16-bit PWM generator for motor driving
- One full-duplex basic UART
- Two full-duplex advanced UART
- Two SPI interface supports host and device mode
- Two SD Card Host controller
- One IIC interface supports host and device mode
- Watchdog
- 2 Crystal Oscillator
- Full speed USB 2.0 PHY
- 16-bit Stereo DAC, SNR > 90dB
- 3 channels Stereo ADC, SNR > 90Db
- 1 channel MIC amplifier
- Embedded headphone amplifier
- 2 channels Signal analog MUX
- 8 channels 10-bit ADC
- 1 channels 4 levels Low Voltage Detector
- Built in Cap Sense Key controller
- Power-on reset
- Embedded PMU

Bluetooth Feature

- CMOS single-chip fully-integrated radio and baseband
- Compliant with Bluetooth V4.2+BR+EDR+BLE specification
- Bluetooth Piconet and Scatternet support
- Meet class2 and class3 transmitting power requirement
- Provides +2dbm transmitting power
- receiver with -85dBm sensitivity
- Support a2dp\avctp\avdtp\avrcp\hfp\spp\smp\att\gap\gatt\rfcomm\sdp\l2cap profile

Power Supply

- LDO_IN is 4.5V to 5.5V
- VBAT is 3.3V to 5.5V
- VDDIO is 3.0V to 3.6V

Packages

- QFN32

Temperature

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

一、引脚定义

1.1 引脚分配

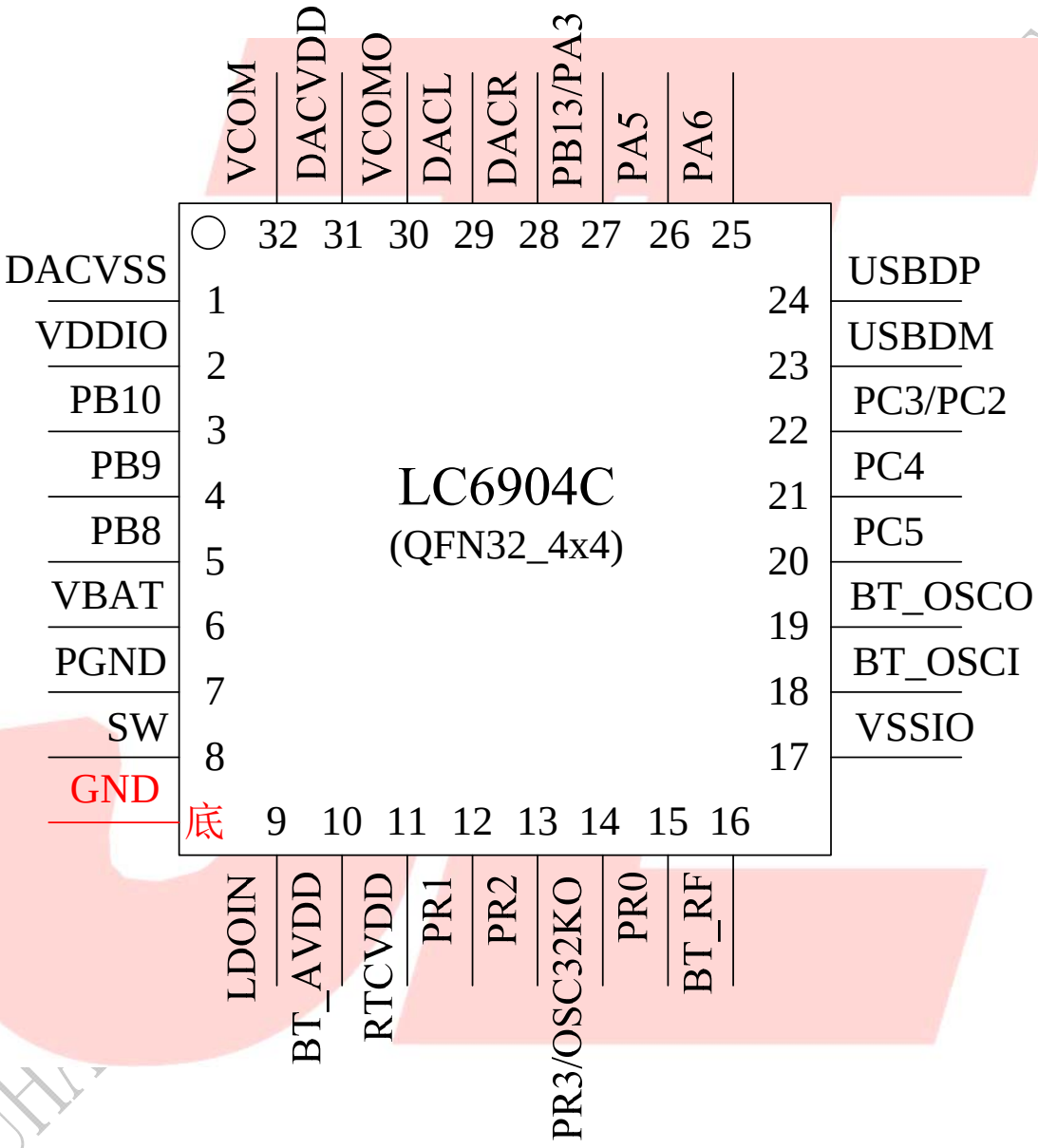


图 1-1 LC6904C_QFN32 引脚分配图

1.2 引脚描述

表 1-1 LC6904C_QFN32 引脚描述

PIN NO.	Name	I/O Type	Drive (mA)	Function	Other Function
1	DACVSS	P	/	DAC Ground	
2	VDDIO	P	/	IO Power 3.3v	
3	PB10	I/O	24	GPIO	UART2RXC：Uart2 Data In(C); Touch5：Touch Input Channel 5; ADC9：ADC Input Channel 9; SPI1_DIA：SPI1 Data In(A); SD0DAT0B：SD0 Data0(B); CAP0：Timer0 Capture;
4	PB9	I/O	24	GPIO	UART2TXC：Uart2 Data Out(C); ADC8：ADC Input Channel 8; CLKOUT1：Clk Out1; SD0DAT1B：SD0 Data1(B); Wakeup12：Port Interrupt /Wakeup 12;
5	PB8	I/O	24	GPIO	SFC_CLKB：SFC Clock(B); SPI0_CLKB：SPI0 Clock(B); ADC7：ADC Input Channel 7; SD0DAT2B：SD0 Data2(B);
6	VBAT	P	/	LDO Power	
7	PGND	P	/	Ground	
8	SW	P	/	DCDC Switch pin	
9	LDO_IN	P	/	Charge Power 5v	
10	BT_AVDD	P	/	BT Power	
11	RTCVDD	P	/	RTC Power 3.3v	
12	PR1	I/O	16	RTCIO1	ADC12：ADC Input Channel 12;
13	PR2	I/O	16	RTCIO2	ADC13：ADC Input Channel 13;
14	PR3	I/O	16	RTCIO3	
	OSCI	I	/	OSC32KI	
15	PR0	I/O	16	RTCIO0	OSC32KO
16	BT_RF	P	/		
17	VSSIO	P	/	Ground	
18	BT_OSCI	I	/	OSC In	
19	BT_OSCO	O	/	OSC Out	

20	PC5	I/O	16	GPIO	SD1CLKA：SD1 Clk(A); SPI1DOB：SPI1 Data Out(B); UART2RXD：Uart2 Data In(D) IIC_SDA_B：IIC SDA(B);
21	PC4	I/O	16	GPIO	SD1CMDA：SD1 Command(A); SPI1CLKB：SPI1 Clk(B); UART2TXD：Uart2 Data Out(D); IIC_SCL_B：IIC SCL(B);
22	PC3	I/O	16	GPIO	SD1DAT0A：SD1 Data0(A); SPI1DIB：SPI1 Data In(B); UART0RXC：Uart0 Data In(C)
	PC2	I/O	16	GPIO	SD1DAT1A：SD1 Data1(A); SPI2DIB：SPI2 Data In(B); UART0TXC：Uart0 Data Out(C); CAP1：Timer1 Capture;
23	USBDM	I/O	4	USB Negative Data	ISP_DI:
24	USBDP	I/O	4	USB Positive Data	ISP_DO:
25	PA6	I/O	16	GPIO	UART0RXA：Uart0 Data In(A); Touch13：Touch Input Channel 13; ADC3：ADC Input Channel 3; IIC_SDA_D：IIC SDA(D);
26	PA5	I/O	16	GPIO	UART0TXA：Uart0 Data Out(A); Touch12：Touch Input Channel 12; ADC2：ADC Input Channel 2; IIC_SCL_D：IIC SCL(D); Wakeup9：Port Interrupt /Wakeup 9;
27	PA3	I/O	16	GPIO	AMUX1L：Simulator Channel 1 Left; Touch10：Touch Input Channel 10; ADC0：ADC Input Channel 0; UART2TXA：Uart2 Data Out(A); ISP_CLK： Wakeup8：Port Interrupt /Wakeup 8;
	PB13	I/O	16	GPIO	MIC
28	DACR	O	/	DAC Right Channel	
29	DACL	O	/	DAC Left Channel	
30	VCOMO	O	/	DAC Reference out	
31	DACVDD	P	/	DAC Power	
32	VCOM	P	/	DAC Reference	

二、电气特性

2.1 PMU 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
LDO_IN	Voltage Input	4.5	5	5.5	V	_
VBAT	Voltage Input	3	3.7	5.5	V	
$V_{3.3}$	Voltage output	_	3.3	_	V	LDO5V = 5V, 100mA loading
$V_{1.2}$		_	1.2	_	V	LDO5V = 5V, 50mA loading
$V_{1.5}$	Voltage output		1.5		V	LDO5V=5V, 100mA 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
PA3~PA6 PB13 PC2~PC5 PR0-PR3	串接 200 欧电阻（寄存器可控制）	16mA	10K	60K	1、PA3 default pulldown 2、PB4、PB6、PD3 default pullup 3、PR0 output 0 4、内部上下拉阻抗因工艺波动差异，可能存在±20%的偏差
PB8~PB10	8mA	24mA	10K	60K	
USBDM USBDP	4mA	_	1.5K	15K	

2.4 DAC 特性

参数	最小	典型	最大	单位	测试条件
Frequency Response	20	_	20000	Hz	
THD+N	_	-70	_	dB	1KHz/0dB
S/N	_	90	_	dB	10Kohm loading
Crosstalk	_	-86	_	dB	With A-Weighted Filter
Output Swing		1.08		Vrms	
Dynamic Range		91		dB	1KHz/-60dB 10Kohm loading With A-Weighted Filter
DAC Output Power	_	>11	_	mW	32ohm loading

2.5 ADC 特性

参数	最小	典型	最大	单位	测试条件
Dynamic Range		91		dB	1KHz/-60dB 10Kohm loading With A-Weighted Filter
S/N	_	90	_	dB	1KHz/-60dB
THD+N	_	-70	_	dB	10Kohm loading
Crosstalk	_	-80	_	dB	With A-Weighted Filter

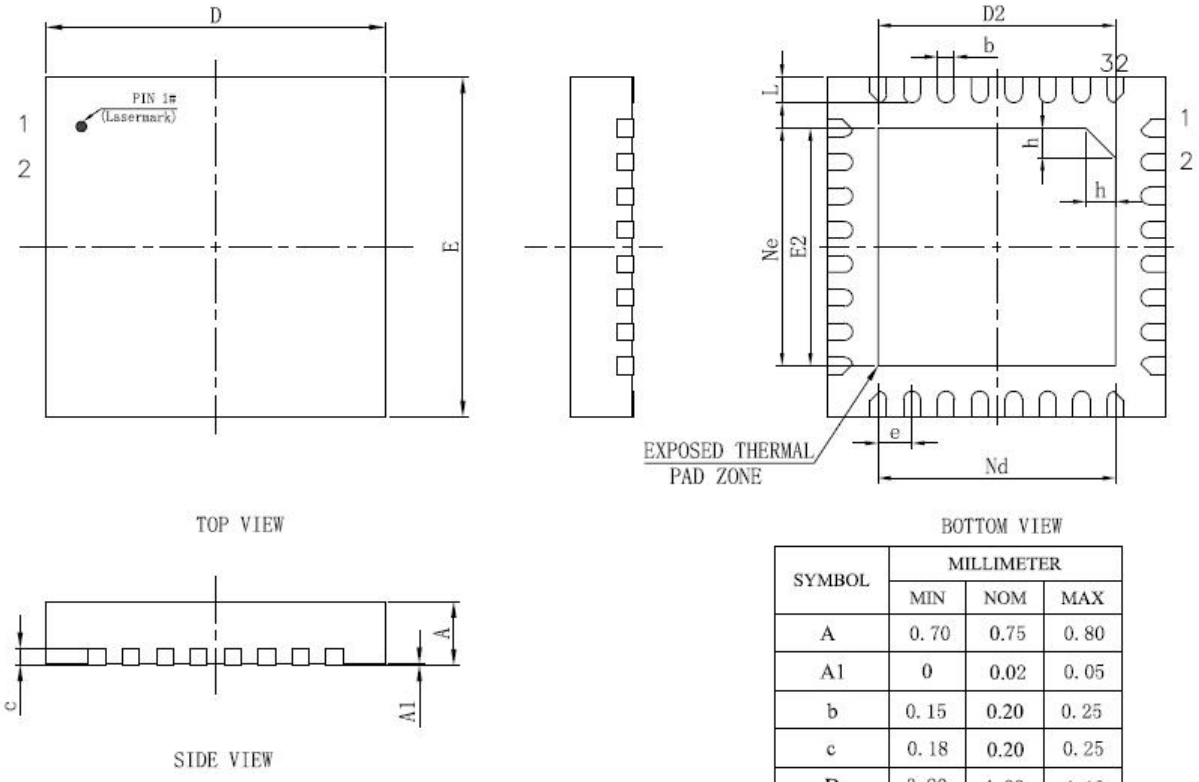
2.6 BT 特性

表 2-4

参数	最小	典型	最大	单位	测试条件
Maximum Output Power	_	2	_	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	_	-86	_	dBm	BER=0.0001

三、封装

3.1 QFN32_4X4



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	0.70	0.75	0.80
A1	0	0.02	0.05
b	0.15	0.20	0.25
c	0.18	0.20	0.25
D	3.90	4.00	4.10
D2	2.70	2.80	2.90
e	0.40BSC		
Ne	2.80BSC		
Nd	2.80BSC		
E	3.90	4.00	4.10
E2	2.70	2.80	2.90
L	0.25	0.30	0.35
h	0.30	0.35	0.40
L/F载体尺寸	122X122		

图 3-1 LC6904C_QFN32 封装图

四、版本信息

日期	版本号	描述
2016.12.22	V1.0	原始版本