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CW6676E

Bluetooth Audio Player Microcontroller

Product Spec

[CW6676E-PS-EN]

Versions: 1.1.0

Release Date: 2016/9/23

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1 Product Overview

1.1 Outline

CW6676E is an MCS-51™ Compatible high performance mixed signal microcontroller. It integrates advanced digital and analog peripherals to suit for BT audio playback and BT Communicate applications.

1.2 Features

- CPU Compatible with MCS-51TM instruction set;
- Compliant to Bluetooth 4.2 + EDR, backward-compatible with BT1.2, 2.0,2.1 and 3.0
- Support SCMS-T content protection method;
- Support HFP v1.6, HSP v1.2, A2DP 1.3, AVCTP 1.4, AVDTP 1.3 and AVRCP 1.5
- Class 2 power level, RF Performance: Tx:0dBm, Rx: -85dBm;
- Support simple pairing and auto reconnection function;
- Support MP3/SBC decoder;
- Support two pairs of AUX;
- Five Channels 10-bit SARADC;
- CW6676E support 16bit Stereo DAC with >90dB SNR, embedded with four class A/B headphone amplifier
- 16bit Mono ADC with >90dB DR
- Support Audio record function to MIC ADPCM;
- Support Audio playback from SD/USB
- Keypad tone mixer;
- Two 8-bit timers, support Capture and PWM mode;
- Two 16-bit timers, support Capture and PWM mode;
- Watchdog Timer with on-chip RC oscillator;
- Support full-duplex IIS, UART, SPI, SD interface;
- Support IIC interface for FM function;
- 2 channels 4 levels Low Voltage Detector;
- Power on Reset
- Support Full speed USB 2.0 PHY;
- Full speed USB 2.0 HOST/DEVICE controller;
- IR controller;
- Independent powered Real-Time Clock supporting 32.768kHz crystal
- Internal crystal oscillator support 26M crystal
- Internal LDO regulator:1.35V to 1.2V;4.2V to 3.3V
- Built-in buck converter,DC-DC:4.2V to 1.35V

2 Pin Definitions

2.1 CW6676E

2.1.1 Package

LQFP48

2.1.2 Pin Assignment

Figure 2-1 shows the pin assignment of CW6676E.

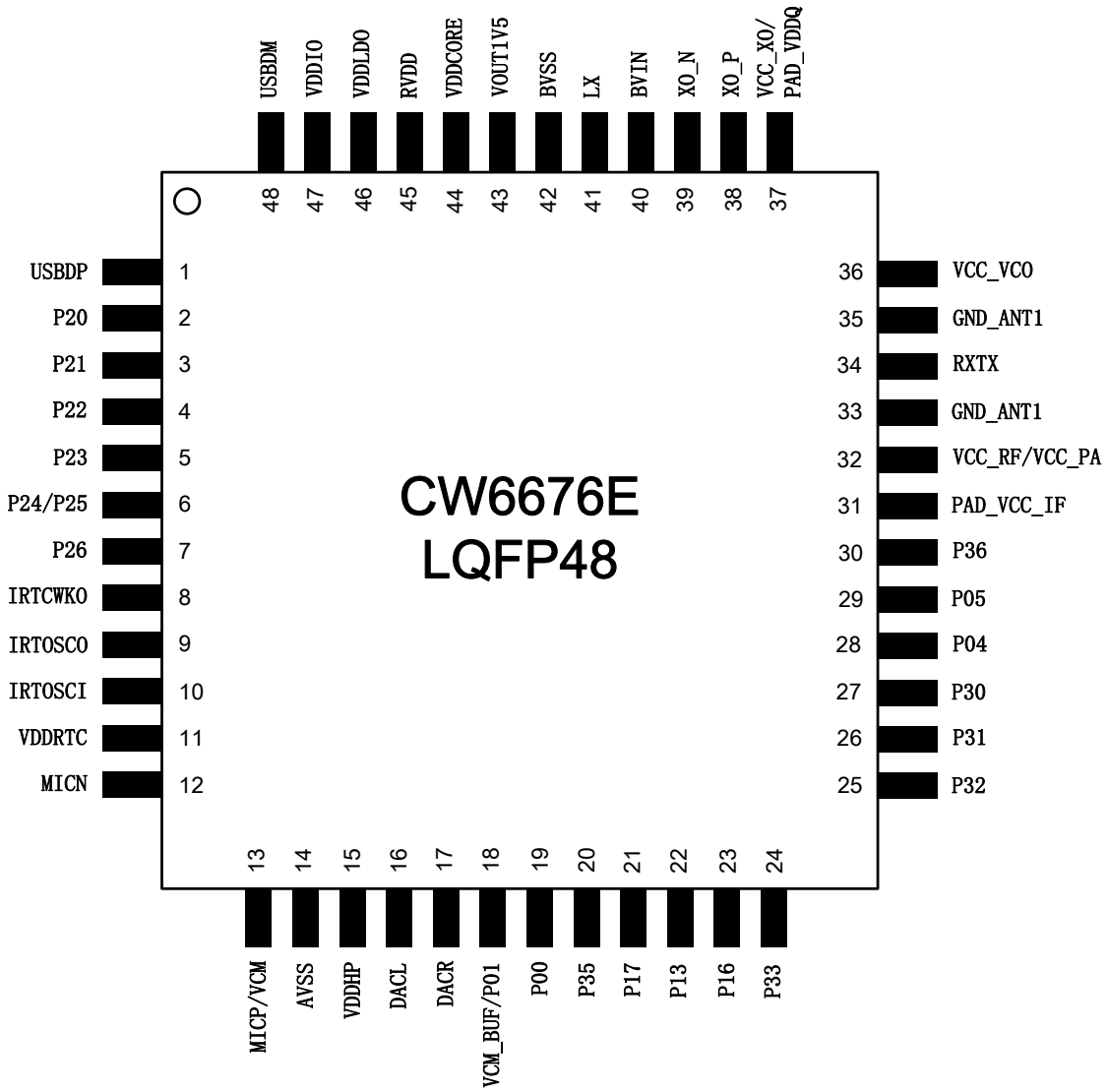


Figure 2-1 Pin Assignment of CW6676E

2.1.3 **Pin Description**

Table 2-1 shows the pin description of CW6676E.

Table 2-1 Pin Description of CW6676E

Pin No.LQFP48	Name	Type	Function
1	USBDP	I/O	USB Positive Input/output
2	P20	I/O	GPIO AUXL2 SDCMD EMIDAT0 LCD_D0
3	P21	I/O	GPIO AUXR2 ADC1 SDCLK EMIDAT1 LCD_D1
4	P22	I/O	GPIO ADC3 EMIDAT2 IISDO1 LCD_D2
5	P23	I/O	GPIO EMIDAT3 IISDI1 LCD_D3
6	P24/P25	I/O	P24 GPIO EMIDAT4 P25 GPIO EMIDAT5 SPI0DIN0/DOUT0 IISBCLK1
7	P26	I/O	GPIO BT UART1RX TMR2CKI IISWS0
8	IRTCWKO	I/O	RTC wakeup
9	IRTOSCO	A	RTC XOSC output
10	IRTOSCI	A	RTC XOSC input
11	VDDRTC	PWR	RTC power input
12	MICN	A	MIC Negative input
13	MICP/VCM	A	MIC Positive input

Pin No.LQFP48	Name	Type	Function
			DAC VCM output
14	AVSS	GND	Analog GND
15	VDDHP	PWR	Headphone power
16	DACL	A	DAC left output GPIO input
17	DACR	A	DAC right output GPIO input
18	P01/VCM_BUF	I/O	GPIO AUXR0 UARTTX1 PORT INT/WKUP0 SDDAT2 DAC VCM buffer
19	P00	I/O	GPIO AUXL0 UARTRX1 SDDAT1 SPI0DIN2
20	P35	I/O	GPIO MUTE
21	P17	I/O	GPIO BT UART1RX TMR2CKI IISWS0
22	P13	I/O	GPIO ADC5 IISBCLK0
23	P16	I/O	GPIO ir_input BT UART1TX UARTTX0 TMR2CAP/TMR2PWM IISREF
24	P33	I/O	GPIO ADC0/LVD dect ir_input 32K/xosc12m sys_clk_output TRM1CAP
25	P32	I/O	GPIO SDDAT0 SPI0DOUT3/DIN3

Pin No.LQFP48	Name	Type	Function
26	P31	I/O	GPIO SDCMD SPI0DIN3
27	P30	I/O	GPIO ADC4 SDCLK SPI0CLK3
28	P04	I/O	GPIO SPI1DOUT/DIN1
29	P05	I/O	GPIO SPI1CLK
30	P36	I/O	GPIO
31	PAD_VCC_IF	PWR	Power VCC
32	VCC_RF/VCC_PA	PWR	RF/PA Power VCC
33	GND_ANT1	GND	FR GND
34	RXTX	A	RF Rx and Tx pin
35	GND_ANT1	GND	RF GND
36	VCC_VCO	PWR	Power VCC
37	VCC_XO/ PAD_VDDQ	PWR	Power VCC/VDDQ
38	XO_P	A	BT 26MHz XOSC Positive Pin
39	XO_N	A	BT 26MHz XOSC Negative Pin
40	BVIN	PWR	PMU Power input Pin 4.2V(typ)
41	LX	A	Switch Node Connection to Inductor
42	BVSS	GND	GND
43	VOUT1V5	PWR	VOUT 1.5V
44	VDDCORE	PWR	Core power VDD 1.2V
45	RVDD	PWR	RF power VDD
46	VDDLDO	PWR	LDO power input 4.2V(typ)
47	VDDIO	PWR	Power output VDDIO 3.3V
48	USBDM	I/O	USB Negative Input/output

3 Characteristics

3.1 PMU Parameters

Table 3-1 PMU Parameters

Sym	Characteristics	Min	Typ	Max	Unit	Conditions
BVIN	Buck input voltage	2.8	4.2	4.6	V	
VDDLDO	VDDLDO input voltage	2.8	4.2	4.6	V	
VOUT1V5	Buck output voltage	1.15	1.35	1.6	V	
VDDCORE	1.2V output voltage	-	1.2	-	V	
VDDRTC	input voltage	2.2	4.2	4.6	V	
VDDHP	3.0V output voltage	2.8	3.0	3.3	V	
VCM	1.5V output voltage	-	1.35	-	V	
RVDD	output voltage	1.1	1.2	1.3	V	
VDDIO	3.3V output voltage	2.8	3.3	-	V	

3.2 CORE PLL Parameters

Table 3-2 PLL Parameters

Sym	Characteristics	Min	Typ	Max	Unit	Conditions
F_{I1}	Frequency input	-	32.768	-	KHz	Low frequency OSC
F_{I2}	Frequency input	1	12	15	MHz	High frequency OSC
F_{OUT1}	Frequency output	-	48	-	MHz	
T_{LOCK1}	PLL locked time	-	2	-	ms	Use low frequency OSC as input reference
T_{LOCK2}	PLL locked time	-	0.1	-	ms	Use high frequency OSC as input reference

3.3 General purpose I/O Parameters

Table 3-3 I/O Parameters

Symbol	Description	Min	Typ	Max	Units	Conditions
V_{IL}	Low-Level input voltage	-	-	30% * VDDIO	V	VDDIO = 3.3V
V_{IH}	High-level input voltage	70% * VDDIO	-	-	V	VDDIO = 3.3V
R_{PUP0}	Internal pull-up resister 0	-	10	-	KΩ	
R_{PUP1}	Internal pull-up resister 1	-	200	-	KΩ	
R_{PUP2}	Internal pull-up resister 2	-	0.5	-	KΩ	
R_{PDN0}	Internal pull-down resister 0	-	10	-	KΩ	
R_{PDN1}	Internal pull-down resister 1	-	0.33	-	KΩ	
R_{PDN2}	Internal pull-down resister 2	-	0.5	-	KΩ	
I_{LEVEL1}	Level1 current driving	8	-	-	mA	For PORT1

Symbol	Description	Min	Typ	Max	Units	Conditions
I_{LEVEL2}	Level2 current driving	24	-	-	mA	For Port1.1

3.4 Audio ADDA Parameters

Table 3-4 Audio DAC Parameters

Sym	Characteristics	Min	Typ	Max	Unit	Conditions
DAC SNR&DR		-	90	-	dB	48PIN
DAC SNR&DR		-	90	-	dB	28PIN & 20 PIN
DAC THD+N		-	-80	-	dB	10Kohm loading
PWR_{AB}	ClassAB AMP power output	-	-	16	mW	32ohm loading
V_{PP}	Maximum output voltage	-	-	2.6	V	10Kohm loading
ADC SNR/DR			93		dB	In Voice Band
ADC THD+N			89		dB	In Voice Band

3.5 USB PHY Parameters

Table 3-5 USB PHY Parameters

Sym	Characteristics	Min	Typ	Max	Unit	Conditions
RDM_{PUP}	DM pull-up resistor	-	120	-	KΩ	
RDP_{PUP}	DP pull-up resistor	-	1.5	-	KΩ	
RDM_{PDN}	DM pull-up resistor	-	15	-	KΩ	
RDP_{PDN}	DP pull-up resistor	-	15	-	KΩ	

3.6 RF Analog Blocks

Table 3-6 Frequency Synthesizer Parameters

Parameter	Condition		MIN	typ	max	Unit
Synthesizer						
Synthesizer settling time	Within +/- 25 KHz accuracy		-	70	-	us
Phase Noise	Fc=2.4GHz	ΔF=1 MHz	-	-110	-	dBc/Hz
		ΔF=2 MHz	-	-118	-	dBc/Hz
		ΔF≥3 MHz	-	-123	-	dBc/Hz
XTAL Oscillator						
Frequency range			-	26	-	MHz
Frequency Trimming Range	6 bits		-1	-	+1	kHz

Table 3-7 Receive path Parameters

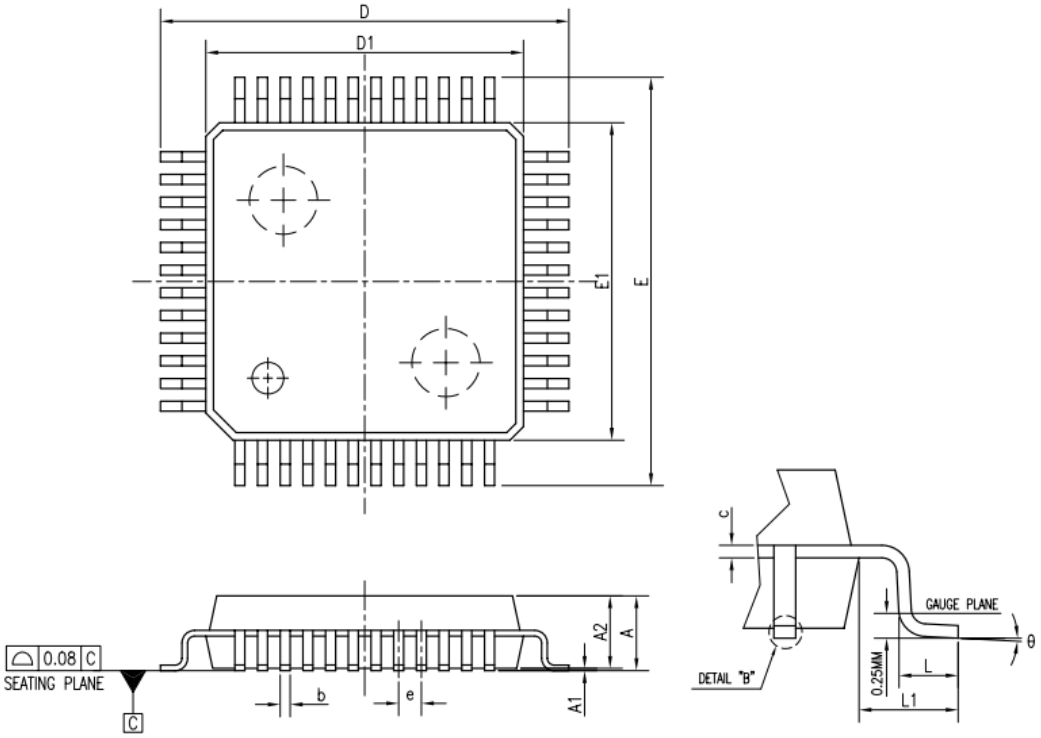
Parameter	Condition		MIN	typ	max	Unit
Receiver Channel						
Minimum Usable Signal	RX sensitivity		-	-80	-	dBm
LNA						
Gain		High Gain	-	25	-	dB
		Mid Gain	-	15	-	dB
		Low Gain	-	5	-	dB
Mixer						
Conversion Gain			-	0	-	dB
Ifamp						
Gain	5/9/12/15/18 dB		-	12	-	
Complex BPF						
Band pass -3 dB BW	Figure 1.		-	2	-	MHz
Image Rejection			-	30	-	dB
VGA						
Gain Range			-6	-	+68	dB
Gain Step			-	+1/+6	-	dB
ADMOD						
SNDR	Freq = +- BW		-	>50	-	dB

Table 3-8 Transmit path Parameters

Parameter	Condition		MIN	typ	max	Unit
Transmit Channel						
Available output power			-2	0	1.5	dBm
Side Band Suppression			-	-30	-	dBm
LPF						
Low pass -3 dB BW	Figure 2.		-	1	-	MHz
TXVGA						
Gain Step			-7	-	7	dB
PA						
Gain Range	Set paPWR[2:0] of Control Register #16	GFSK	-12	-	4	dBm
		DPSK	-15	-	1	dBm

4 Package Outline Dimensions

4.1 LQFP48



SYMBOL	DIMENSION IN MM			DIMENSION IN INCH		
	MIN.	NOM	MAX.	MIN.	NOM	MAX.
A			1.60			0.063
A1	0.05		0.15	0.002		0.006
A2	1.35	1.40	1.45	0.053	0.055	0.057
D	8.90	9.00	9.10	0.350	0.354	0.358
D1	6.90	7.00	7.10	0.272	0.276	0.280
E	8.90	9.00	9.10	0.350	0.354	0.358
E1	6.90	7.00	7.10	0.272	0.276	0.280
B c	0.09	–	0.20	0.004	–	0.008
c1	0.09	–	0.16	0.004	–	0.006
G L	0.45	–	0.75	0.018	–	0.030
L1	1.00 REF.			0.039 REF.		
θ	0	3.5	7	0	3.5	7
JEDEC						

	b (MM)			b1 (MM)			e (MM)			JEDEC
N	MIN.	NOM	MAX.	MIN.	NOM	MAX.	MIN.	NOM	MAX.	
48L	0.17	0.22	0.27	0.17	0.20	0.23		0.50 BSC.		MS-026 BBC
64L	0.13	0.18	0.23	0.13	0.16	0.19		0.40 BSC.		MS-026 BBD

Figure 4-1 LQFP48 Package Outline Dimension

Revision History

Date	Version	Comments	Revised by
2016/7/19	0.0.1	Initial version	YX
2016/7/22	0.0.2	Checked	GAO
2016/7/26	1.0.0	Released	YX
2016/9/23	1.0.1	Modify work voltage	YX
2016/9/23	1.1.0	Release	YX