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CW6689E

Bluetooth Audio Player Microcontroller

Product Spec

[CW6689E-PS-EN]

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Table of content

1 Product Overview

1.1 Outline

CW6689E is a highly integrated system on chip for Bluetooth v4.2 specification with Bluetooth Classic (BR/EDR) applications. This SOC is backward-compatible with Bluetooth 3.0, 2.1, 2.0 or 1.2 systems. This Bluetooth includes a data rate of 1M/2M/3Mbps for Bluetooth Classic (BR/EDR) and data rate of 8K for BLE. It has LQFP48 packaging, stereo audio output with three pairs of AUX input, and external flash. It integrates an abundant amount of peripherals (full-duplex UART, SPI, SD, IIC (FM function)), clock management and audio interface. In addition, this SOC supports audio playback from SD and USB.

1.2 Features

- Supports Bluetooth v4.2 specification with Bluetooth Classic (BR/EDR) ; backward-compatible with BT specification v 3.0, 2.1, 2.0 or 1.2;
- 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, GFSK typical: -85dBm;
- Build-in coexistence and prioritization handling for BE/EDR and LE;
- BLE support master / slave;
- BLE support multiple connection (up to 10);
- Support simple pairing and auto reconnection function;
- IO interrupt
- AES Module for BLE encryption
- Integrated random number generator
- High Performance 8051 at 48Mhz;
- Supports MP3/WMA/WAV decoder;
- Supports MP3 encoder;
- three pairs of AUX;
- 6 Channels 10-bit SARADC;
- support 16bit stereo DAC with >90dB SNR, embedded with one 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;
- 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 HOST/DEVICE controller/PHY;
- 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;
- Supports Software Power On/Off, Deep Sleep mode, and Sniff mode;
- Operating temperature: -25℃ to +85℃;
- Storage temperature: -65℃ to +150℃.

1.3 System Architecture

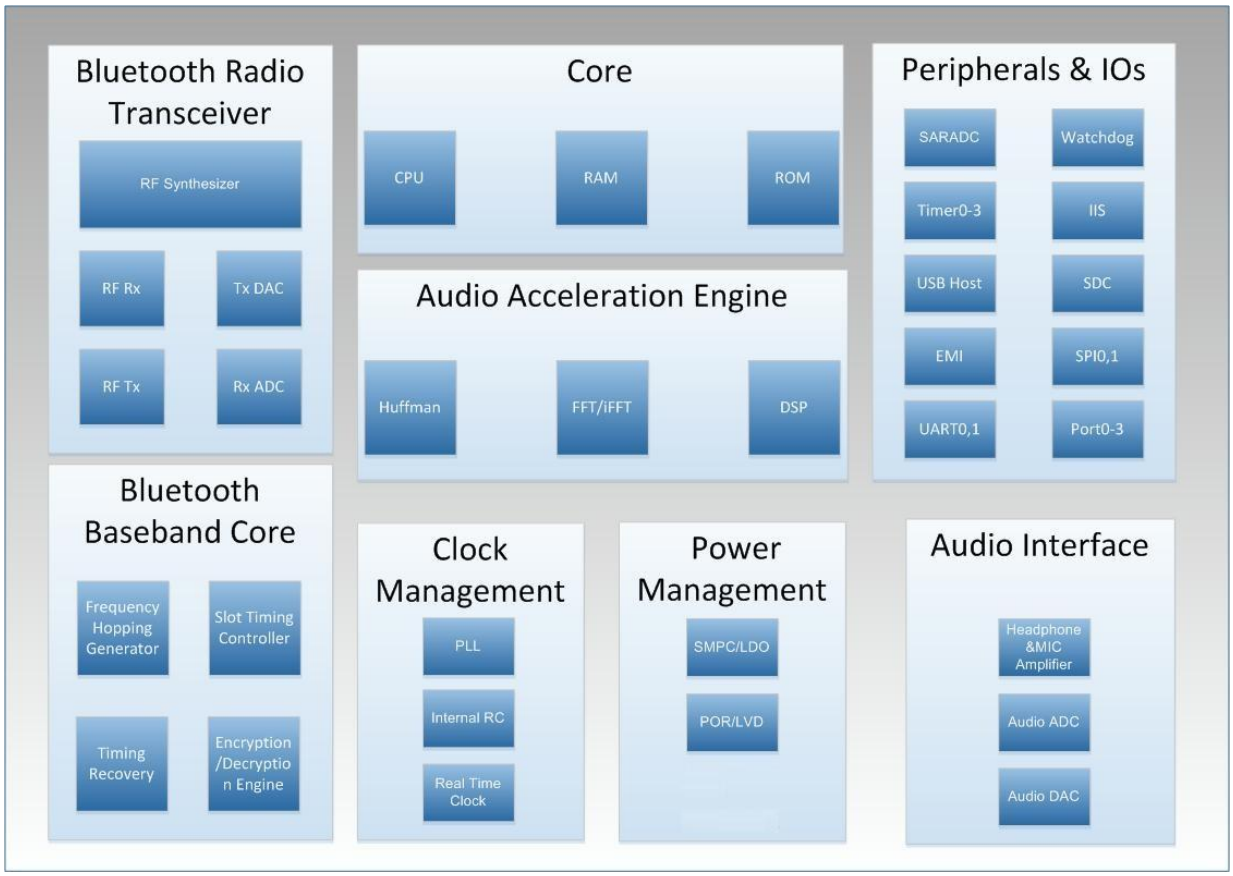


Figure 1-1 CW6689E system architecture

2 Pin Definitions

2.1 CW6689E

2.1.1 Packages

LQFP48

2.1.2 Pin Assignment

*Figure 2-*1 shows the pin assignments of LQFP48 package.

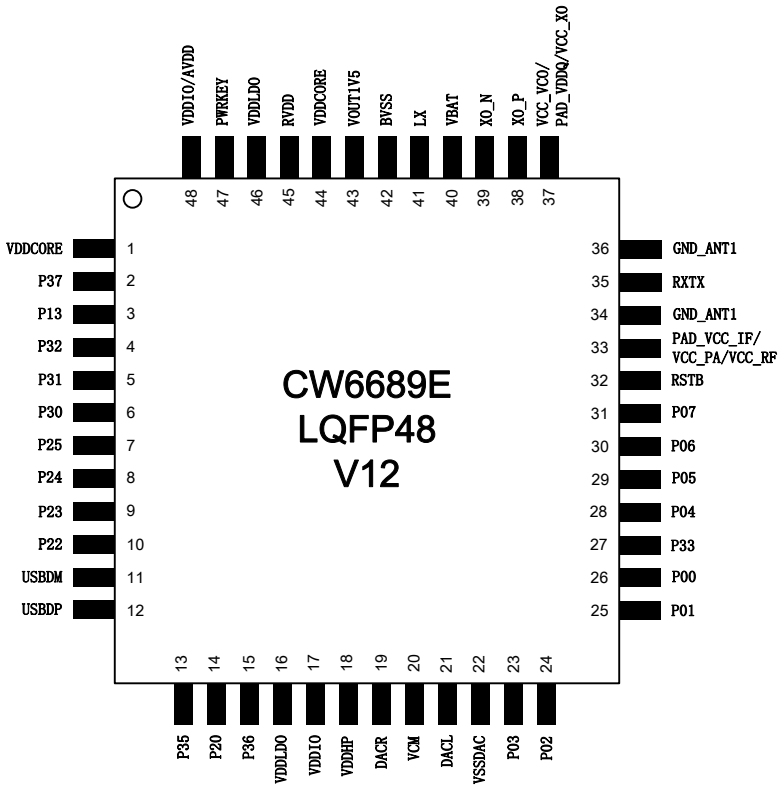


Figure 2-2 Pin assignment for LQFP48

2.1.3 Pin Descriptions

Table 2-1 shows the pin descriptions of LQFP48 package.

Table 2-1 LQFP48 pin description

Pin No.LQFP48	Name	Type	Function
1	VDDCORE	PWR	Digital 1.8V Power

2	P37	I/O	AUXL1, RA1, GPIO
3	P13	I/O	ADC5, GPIO
4	P32	I/O	SPI1DO0, SPI1DODI0, SDDAT01, GPIO
5	P31	I/O	SPI1DI0, SDCMD1, GPIO
6	P30	I/O	ADC4, SPI1CLK0, SDCLK1, GPIO
7	P25	I/O	EMID5, SPI0DO3, SPI0DI0, GPIO
8	P24	I/O	EMID4, IISDO1, GPIO
9	P23	I/O	EMID3, IISDI1, GPIO
10	P22	I/O	EMID2, IISDO0, GPIO
11	USBDM	I/O	USB Negative Input/output
12	USBDP	I/O	USB Positive Input/output
13	P35	I/O	UDSW, GPIO
14	P20	I/O	EMID0, IISBCLK, SDCMD0, GPIO
15	P36	I/O	VPG33, AUXR1, GPIO
16	VDDLDO	PWP	LDO 5V Power
17	VDDIO	PWR	IO 3.3V Power
18	VDDHP	PWR	HeadPhone 3.3V Power
19	DACR	AO	DAC Right Channel
20	VCM	AO	DAC Bandgap voltage reference
21	DACL	AO	DAC Left Channel
22	VSSDAC	GND	DAC Ground
23	P03	AI	MICIN1, VCMBUF, AUXL2
24	P02	AI	MICIN0, AUXR2
25	P01	I/O	AUXR0, SDDAT2, UART0TX1, GPIO
26	P00	I/O	AUXL0, SPI0DI2, SDDAT1, UART0RX1, GPIO
27	P33	I/O	ADC0, PWRWKUP, LVDDET, CLKO, GPIO
28	P04	I/O	ADC2, INT0, SPI1DO1, SPI1DODI1, PWM1, SPI0DODI1, SPI0DO1, GPIO
29	P05	I/O	ADC3, INT1, SPI1CLK1, CAP0, SPI0CLK1, GPIO
30	P06	I/O	ADC1, SPI1DI1, TMR1, TMR0, SPI0DI1, GPIO
31	P07	I/O	INT3, CAP1, GPIO
32	RSTB	I	Bluetooth system reset pin
33	PAD_VCC_IF/ VCC_PA/VCC_RF	PWR	RF/PA Power VCC
34	GND_ANT1	GND	FR GND
35	RXTX	A	RF Rx and Tx pin
36	GND_ANT1	GND	FR GND
37	VCC_VCO/ PAD_VDDQ/VCC_XO	PWR	Power VCC/VDDQ
38	XO_P	A	BT 26MHz XOSC Positive Pin

39	XO_N	A	BT 26MHz XOSC Negative Pin
40	VBAT	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
45	RVDD	PWR	RF power VDD
46	VDDLDO	PWR	LDO power input 4.2V(typ)
47	PWRKEY	I	Power on control pin
48	VDDIO/AVDD	PWR	Power output VDDIO

I: input; **O**: output; **PWR**: power; **GND**: ground; **AO**: Analog Output; **AI**: Analog Input; **NC**: not connect

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	4.8	V	
VDDLDO	VDDLDO input voltage	2.8	4.2	4.8	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	4.8	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	1.35	V	
VDDIO	3.3V output voltage	2.8	3.3	-	V	

3.2 General purpose I/O Parameters

Table 3-2 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
I_{LEVEL2}	Level2 current driving	24	-	-	mA	For Port1.1

3.3 Audio ADDA Parameters

Table 3-3 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

Sym	Characteristics	Min	Typ	Max	Unit	Conditions
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

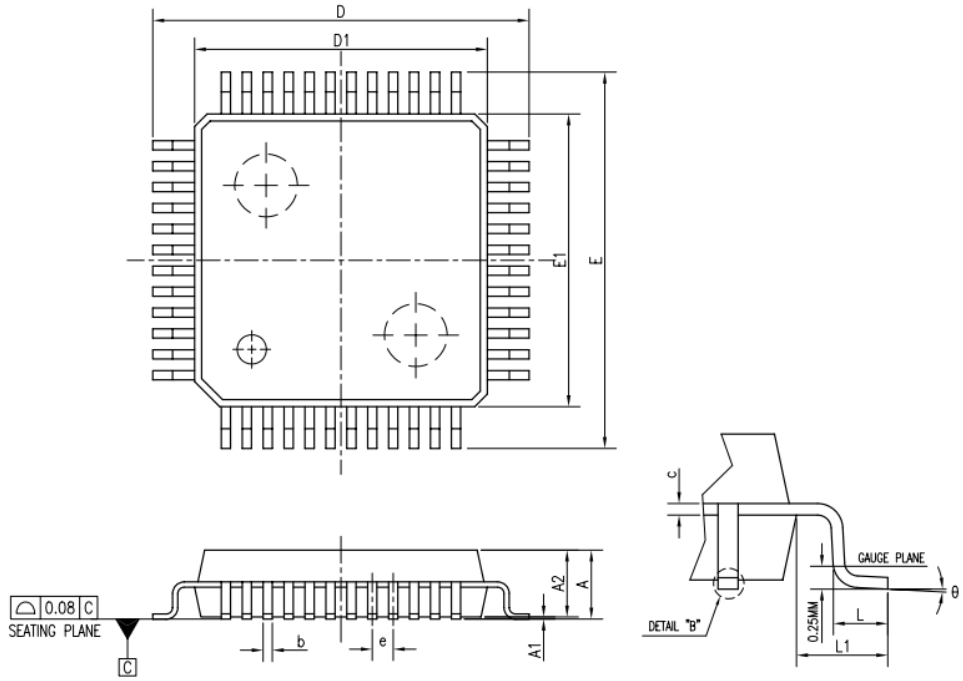
3.4 **RF Analog Blocks**

Table 3-4 RF characteristic

Parameter	Condition	MIN	typ	max	Unit
Operate Frequency	2402~2480	2402		2480	MHz
RX sensitivity 1Mbps	BER=0.1%	-	-80	-	dBm
RX sensitivity 2Mbps	BER=0.1%	-	-83	-	dBm
Transmit output power		-2	0	1.5	dBm
Transmit output power control range			30		dB

4 Package Dimensions

4.1 CW6689E 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 CW6689E LQFP48 package dimensions

Appendix I Revision History

Date	Version	Comments	Revised by
2015-10-12	0.0.1	Initial Version	YX
2015-10-15	1.0.0	Release	YX

In case of any questions or comments about this documentation, please feel free to contact AppoTech at documents@appotech.com .