DF1101S Datasheet

DFROBOT

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Content

1. Introduction

DF1101S is a voice recording and playing chip with 48kbs sampling rate, supporting multi-segment long-time voice recording. It features simple serial AT controlling function, and can be controlled by ADKAY. Besides that, the chip Flash can be simulated as a U-disk.

Power Supply

VBAT is 2.2V to 5.5V

VDDIO is 2.2V to 3.6V

RTCVDD is 2.2V to 3.6V

Packages

QSOP24

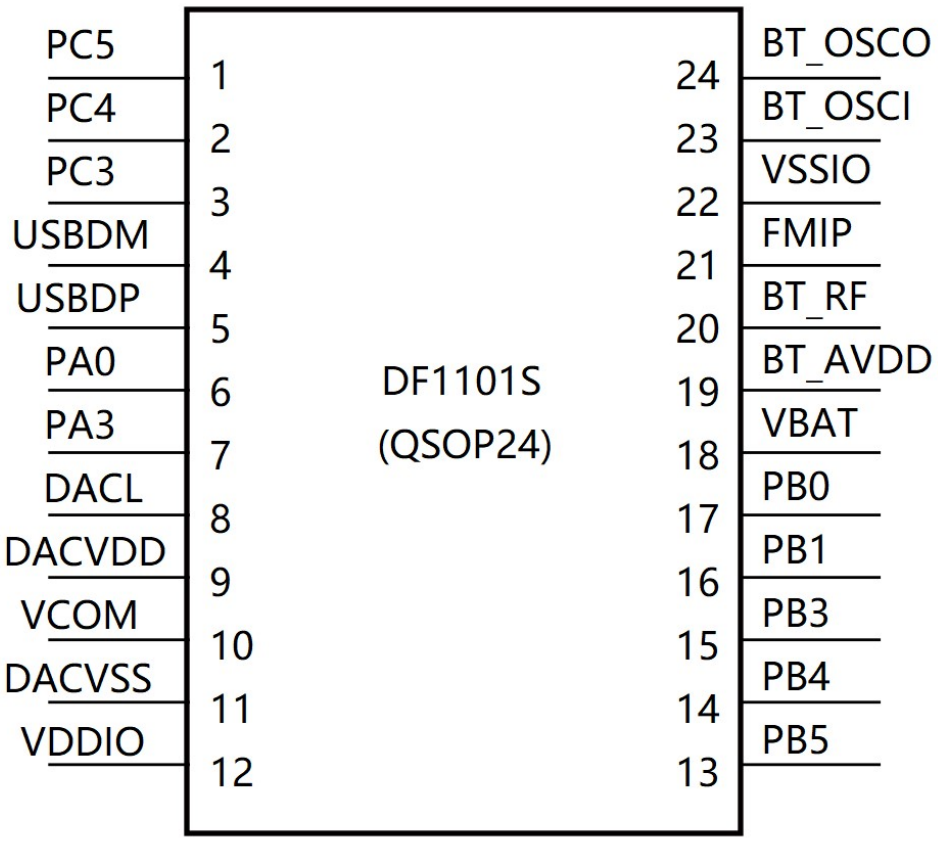
Temperature

Operating temperature: -20℃ to +70℃

Storage temperature: -65℃ to +150℃

2. Pin Description

2.1 Pin Assignment



2.2 Pin Description

PIN NO.	Name	I/O Type	High Drive	Function
1	PC5	I/O	24	SPI Data Out
2	PC4	I/O	24	SPI Clock
3	PC3	I/O	24	SPI Data In
4	USBDM	I/O	4	USB Negative Data (pull down)
5	USBDP	I/O	4	USB Positive Data (pull down)
6	PA0	I/O	24	MIC Input Channel
7	PA3	O	24	Playing Status Indicator
8	DACL	O	/	DAC Left Channel
9	DACVDD	P	/	DAC Power
10	VCOM	P	/	DAC Reference
11	DACVSS	P	/	Ground
12	VDDIO	P	/	IO Power 3.3v
13	PB5	I/O	8	Recording Status Indicator
14	PB4	I/O	8	ADKEY
15	PB3	I/O	8	Flash CS Pin
16	PB1	I/O	8	UART Data In
17	PB0	I/O	8	UART Data Out
18	VBAT	P	/	LDO Power
19	BT_AVDD	P	/	BT Power 1.3V
20	BT_RF	P	/	
21	FMIP	I	/	
22	VSSIO	P	/	Ground
23	BT_OSCI	I	/	BT OSC In
24	BT_OSCO	O	/	BT OSC Out

3. Electrical Characteristics

3.1 PMU Characteristics

Symbol	Parameter	Min	Typ	Max	Unit	Test Conditions
V_{BAT}	Voltage Input	2.2	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
$V_{1.3}$	Voltage output		1.3		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

3.2 IO Input/Output Electrical Logical Characteristics

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

3.3 Internal Resistor Characteristics

Port	**General Output**	**High Drive**	**Internal Pull-Up Resistor**	**Internal Pull-Down Resistor**	**Comment**
PA0 PA4 PC3~PC5	8mA	24mA	10K	10K	1:USBDM & USBDP default pull down 2:internal pull-up/pull-down resistance | accuracy ±20%
PB0 PB1 PB3~PB5	4mA	8mA	10K	10K	
USBDM USBDP	4mA	-	1.5K	1.5K	

3.4 DAC Characteristics

Parameter	**Min**	**Typ**	**Max**	**Unit**	**Test Conditions**
Frequency Response	20	-	20K	Hz	1KHz/0dB 10Kohm loading With A-Weighted Filter
THD+N	-	-69	-	dB	
S/N	-	95	-	dB	
Crosstalk	-	-80	-	dB	
Output Swing		1		Vrms	
Dynamic Range		90		dB	1KHz/-60dB 10Kohm loading With A-Weighted Filter
DAC Output Power	11		-	mW	32ohm loading

3.5 ADC Characteristics

Parameter	Min	Typ	Max	Unit	Test Conditions
Dynamic Range		85		dB	1KHz/-60dB 10Kohm loading With A-Weighted Filter
THD+N	-	90	-	dB	1KHz/-60dB 10Kohm loading With A-Weighted Filter
S/N	-	-72	-	dB	
Crosstalk	-	-80	-	dB	

4. Communication Command

4.1 Command Format

UART Communication Default Baud Rate: 115200bps（can be set by AT commands） Data bit: 8 Stop bit: 1 Parity bit: none Flow control: none	
Control command format: AT+<CMD>=[param]\r\n ---all the commands are chars instead of hexadecimal numbers.	
Data Feedback Format: [param]\r\n	
Data Features	**Description**
AT	Command Head
<CMD>	Command
[param]	Parameter
\r\n	\r\n End
eg: AT+VOL=5\r\n ---Designate volume to 5	

4.2 Command

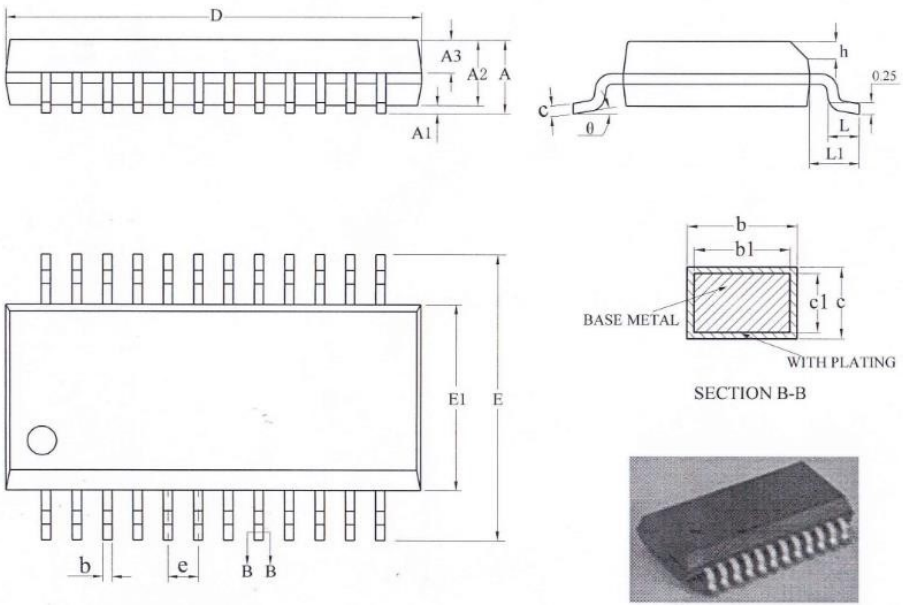
Command	Function	Description
AT\r\n	Test Connection	No command and parameter required
AT+VOL=5\r\n	Set/Query Volume (Volume: 0-30)	param -n: Volume-n +n: Volume+n N: Designate volume to n ?: Query volume
AT+FUNCTION=1\r\n	Function Switch	param 1: music mode 2: recording mode 3: slave mode
AT+PLAYMODE=1\r\n	Control playback mode	param 1: repeat one song 2: repeat all 3: play one song and pause ?: query the current playback mode
AT+PLAY=NEXT\r\n	Control playing	param PP: Play & Pause NEXT: next LAST: last
AT+PLAYFILE=5\r\n	Play the designated specific file	File number
AT+PLAYFILE=/DF_REC/test.MP3\r\n	Play the specific file	File path
AT+DEL\r\n	Delete currently-playing file	No parameter required
AT+REC=SAVE\r\n	Recording control	param RP: Record & Pause SAVE: Save the recorded voice
AT+BAUDRATE=115200\r\n	Set baud rate (power-down save, valid after re-powering on)	Param 9600,19200,38400,57600,115200
AT+PROMPT=ON\r\n	Prompt tone ON/OFF command (Power-down save)	param ON,OFF
AT+LED=ON\r\n	LED Prompt ON/OFF command (Power-down save)	param ON,OFF

5. ADKEY

Connect ADKEY to the chip's PB4, and add a 22k pull-up resistor whether it is used. The accuracy of 1% is best for the ADKEY, and the accuracy error is recommended to be no more than 5% . Please refer to the actual test when using.

Key	Resistance in Series	Function
K1	0R	Play & Pause
K2	3K	Hit：last Long-press：volume+
K3	6.2K	Hit：next Long-press：volume-
K4	9.1K	Playback mode switch
K5	15K	REC
K6	24K	PLAY
K7	33K	Volume-
K8	51K	Volume+
K9	100K	Switch working mode
K10	220K	Delete currently-playing file

6. 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°