2000-28SS Voice Chip

1. Feature

Fully compatible with MCS-51 instruction system

Maximum support 48MHz system clock

Support MP3, WMA, WAV decoding

Support MP3 code

Two multi-function 8 bit timer, support capture and PWM mode

Two multi-function 16 bit timer, support capture and PWM mode

Built-in RC oscillator and watchdog timer

One full duplex asynchronous serial interface

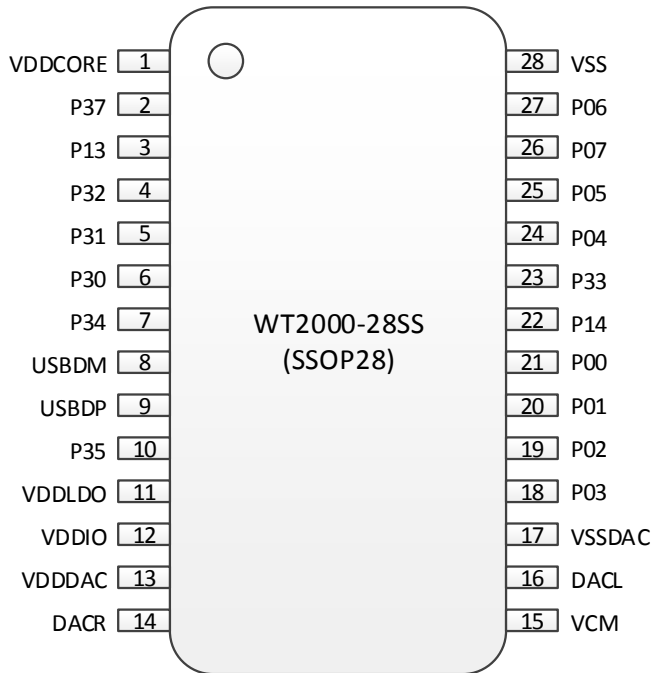Exactly two SPI interface

One full speed USB 2.0 transceiver

48MHz PLL clock generator

Nine-way Ten-bit ADC

Fully power on automatic reset

Built-in dual channel LDO 5V to1.2V; 5V to 3.3V

1. Pin Description

Pin NO.	Name	Type	Function Description
1	VDDCORE	PWR	Core 1.2V power supply terminal
2	P37	I/O	AUXL1 GPIO
3	P13	I/O	ADC5 GPIO
4	P32	I/O	SPI1DO0

			SPI1DODI0
			SDDDAT01
			GPIO
5	P31	I/O	SPI1DI0
			SDCMD1
			GPIO
6	P30	I/O	ADC4
			SPI1CLK0
			SDCLK1
			GPIO
7	P34	I/O	INT2
			PWM0
			SPI0CLK2
			UART0RX0
			GPIO
8	USBDM	I/O	USB data line DM
9	USBDP	I/O	USB data line DP
10	P35	I/O	UDSW
			GPIO
11	VDDLDO	PWP	Interior LDO 5V power supply input terminal
12	VDDIO	PWP	IO 3.3V power supply terminal
13	VDDDAC	PWP	DAC &HeadPhone 3.3V power supply terminal
14	DACR	AO	DAC right-channel output
15	VCM	AO	DAC voltage reference
16	DACL	AO	DAC left-channel output
17	VSSDAC	GND	DAC analog ground
18	P03	AI	MICIN1
			VCMBUF
			AUXL2
19	P02	AI	MICIN0
			AUXR2
20	P01	I/O	AUXR0
			SDDAT2
			UART0TX1
			GPIO
21	P00	I/O	AUXL0
			SPI0DI2
			SDDAT1
			UART0RX1
			GPIO
22	P14	I/O	PWM3
			CAP3
			SDDAT3
			SPI0DODI2

			SPI0DO2
			GPIO
23	P33	I/O	ADC0
			PWRWKUP
			LVDDET
			CLKO
			GPIO
24	P04	I/O	ADC2
			INT0
			SPI1DO1
			SPI1DODI1
			PWM1
			SPI0DODI1
			SPI0DO1
			GPIO
25	P05	I/O	ADC3
			INT1
			SPI1CLK1
			CAP0
			SPI0CLK1
			GPIO
26	P07	I/O	INT3
			CAP1
			GPIO
27	P06	I/O	ADC1
			SPI1DI1
			TMR1
			TMR0
			SPI0DI1
			GPIO
28	VSS	GND	Digital ground

I: Input terminal

O: Output terminal

PWR: Power supply terminal
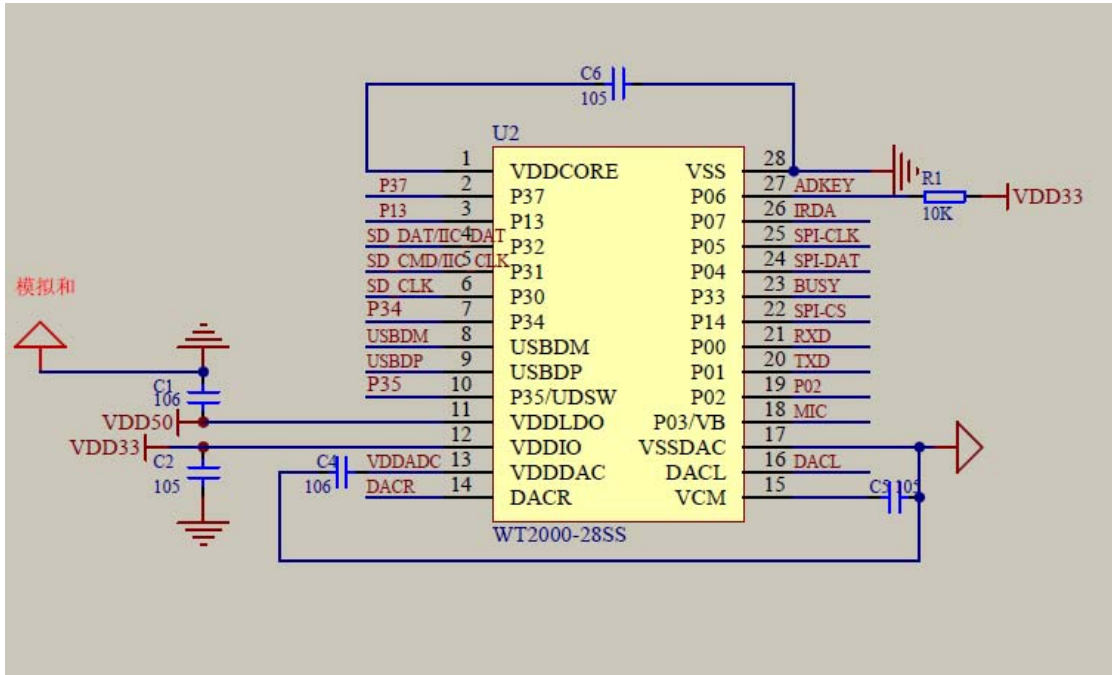
GND: Ground

AO: Analog signal output terminal
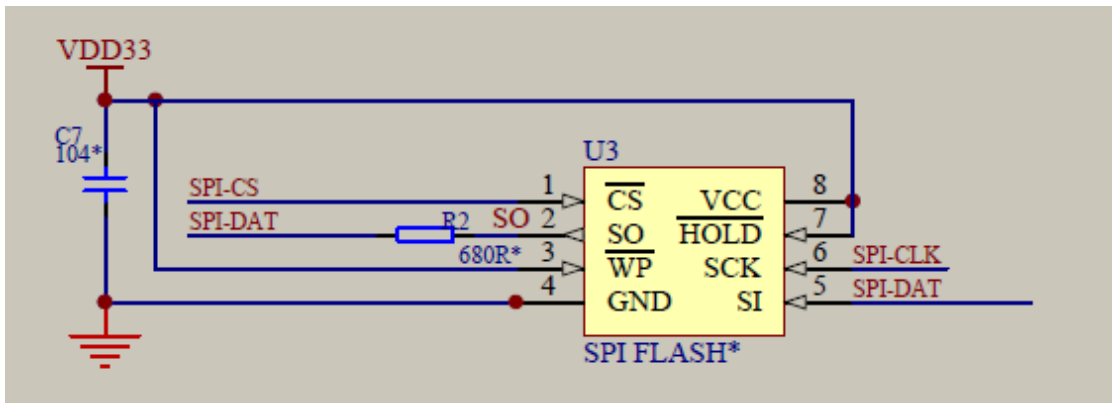
AI: Analog signal input terminal
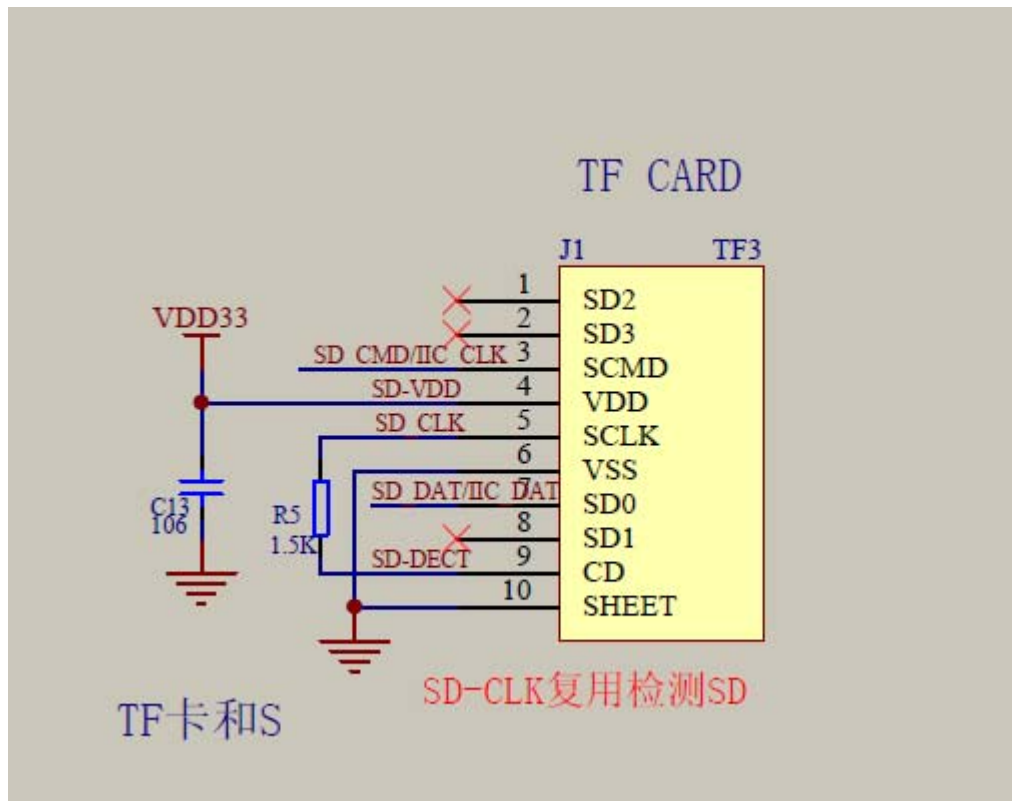
NC: No connection

2. Typical circuit

2.1 Minimum system circuit

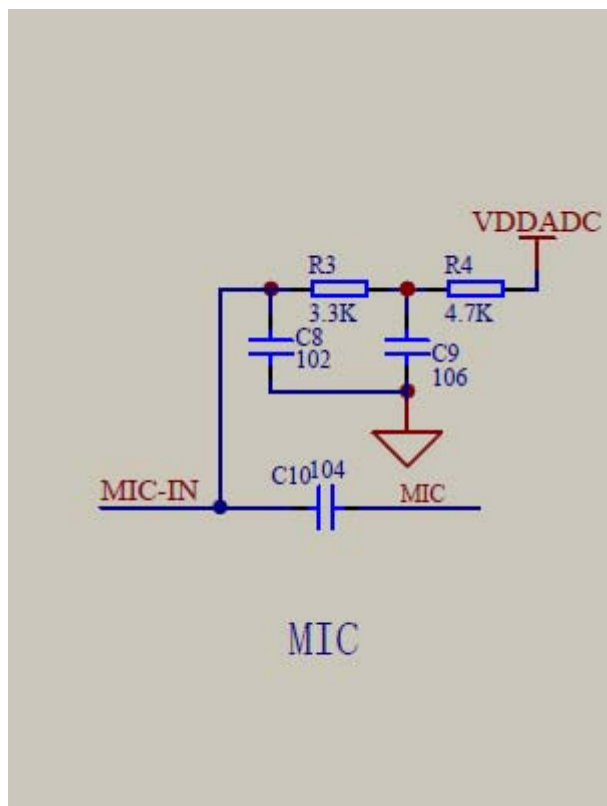## 2.2 SPI-FLASH connection circuit

2.3 Micro SD card/ SD card connection circuit

TF CARD

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SD-CLK复用检测SD

2.4   Microphone connection circuit

MIC

2.5   LM4890 amplifier typical circuit
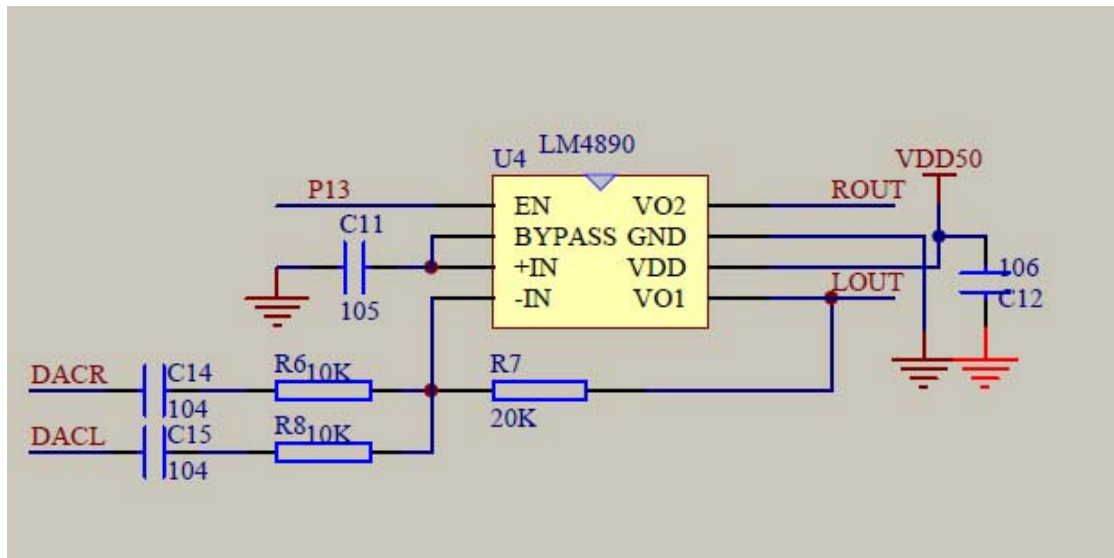
3. Electrical Parameters

3.1 LDO electrical parameters

Temperature : -40~85℃

Name	Function	Minimum value	Typical value	Maximum value	Unit	Condition
Vin	LDO input voltage	3.2	5.0	5.5	V	-
Vout1.2	LDO 1.2V output voltage	-	1.2	-	V	
Vout3.3	LDO 3.3V output voltage	-	3.3	-	V	
Iout1.2	LDO 1.2V output current	-	50	-	mA	
Iout3.3	LDO 3.3V output current	-	150	-	mA	

3.2 I/O electrical parameters

Temperature : 25℃

Name	Function	Minimum value	Typical value	Maximum value	Unit	Condition
VIL	Low level input voltage	-	-	30%*VDDIO	V	VDDIO=3.3V
VIH	High level input voltage	70%*VDDIO	-	-	V	VDDIO=3.3V
IIL	Low level drive current	8	-	-	mA	
IIH	High level drive current	24	-	-	mA	

3.3 Audio DAC Electrical Parameters

Temperature : 25℃

Name	Function	Minimum value	Typical value	Maximum value	Unit	Condition

SNR&DR	Signal to noise ratio	-	92	-	dB	QFP48
SNR&DR	Signal to noise ratio	-	82	-	dB	SSOP28&SOP16
THD+N	Total harmonic distortion	-	-70	-	dB	10K ohms load
PWRAB	DAC output power	-	-	16	mW	32 ohms load
VPP	DAC maximum output voltage amplitude	-	-	2.8	V	10K ohms load

3.4   The other parameters

Name	Function	Minimum value	Typical value	Maximum value	Unit	Condition
Working temperature	-	-40	-	85	℃	
Storage temperature	-	-40	-	85	℃	