AI8052U-144K256-LQFP48 核心板
2025-5-24

主控芯片使用AI8052U-LQFP48
可以直接仿真，不需外部晶振，不需外部复位，宽电压2.0～5.5V

X1
32.768kHz
P1.6
P1.7
C1
15pF
C2
15pF

U1
AI8052U-LQFP48

P5.3	1	P5.3/CAN2_TX_2/LIN_TX_2/CMP3+_2/TXD4_2	CAN2_RX_2/LIN_RX_2/CMP3-_2/RXD4_2/P5.2	48	P5.2
P0.5	2	P0.5/AD5/ADCB5/T3CLKO/SCLK2_2/PWMA_E2_2/OPA1-_1/OPA1+_2	OPA1+_1/OPA1-_2/PWMA_E1_2/MISO2_2/T3/ADCB4/AD4/P0.4	47	P0.4
P0.6	3	P0.6/AD6/ADCB6/T4/PWMB_ETR_2/LIN2_RX	CAN2_TX/LIN_TX/PWMB8_3/MOSI2_2/TXD4/T4CLKO_2/ADCB3/AD3/P0.3	46	P0.3
P0.7	4	P0.7/AD7/ADCB7/T4CLKO/PWMB_BRK_2/OPA1O_1/LIN2_TX	CAN2_RX/LIN_RX/PWMB7_3/SS2_2/RXD4/T4_2/ADCB2/ADC10/AD2/P0.2	45	P0.2
	5	Core_Vcc	CAN_TX/PWMB6_3/TXD3/T3CLKO_2/ADCB1/ADC9/AD1/P0.1	44	P0.1
P1.1	6	P1.1/ADC1/TXD2/PWMA1N/CMP2-_2/QSPI1_IO2	CAN_RX/OPA1O_2/OPA2O_2/PWMB5_3/RXD3/T3_2/ADCB0/ADC8/ADO/P0.0	43	P0.0
P4.7	7	P4.7/TXD2_2/PWMA_E2/CMP2O_1/LIN_TX_3/CAN2_TX_3/QSPI1_IO3_2	OSPI1_IO2_2/CAN2_RX_3/LIN_RX_3/CMP4O_2/PWMA_E1/RXD2_2/P4.6	42	P4.6
P1.4	8	P1.4/ADC4/MISO/I2CSDA/PWMA3P/OSPI1_IO1	CAN_TX_3/CMP3O_2/PWMA_BRK_2/ALE/P4.5	41	P4.5
P1.5	9	P1.5/ADC5/SCLK/I2CSCL/PWMA_E2_4/PWMA3N/QSPI1_CLK	LIN2_TX_2/OPA2-_1/CMP4+_1/PWMA4N_2/A15/P2.7	40	P2.7
P1.6	10	P1.6/ADC6/RXD_3/MCLKO_2/XTALO/PWMA4P/OPA4+_1/I2S_MCLK_4	LIN2_RX_2/OPA2+_1/CMP4-_1/PWMA4P_2/A14/P2.6	39	P2.6
P1.7	11	P1.7/ADC7/TXD_3/XTALI/PWMA4N/PWM/OPA4-_1/I2S_MCLK_4	I2S_CK_3/CMP40_1/PWMA3N_2/I2CSCL_2/SCLK_2/A13/P2.5	38	P2.5
		(P1.3/ADC3/T2CLKO/MOSI/PWMA_E1_4/PWMA2N/OPA4O_1/QSPI1_IO0)	I2S_MCLK_3/CMP3O_1/PWMA3P_2/I2CSDA_2/MISO_2/A12/P2.4	37	P2.4
GND	12	ADC_AGnd/ADC_AVRef-	I2S_SD_3/PWMB8/PWMA2N_2/MOSI_2/A11/P2.3	36	P2.3
UCAP	13	UCAP	I2S_WS_3/PWMB7/PWMA2P_2/SS_2/A10/P2.2	35	P2.2
P5.4	14	P5.4/RST/MCLKO/SS_3/PWMB6_2/QSPI1_NCS_2	OPA30_2/PWMB6/PWMA1N_2/A9/P2.1	34	P2.1
		(P1.2/ADC2/ADC_ETR/ADCB_ETR/T2/SS/PWMA2P/QSPI1_NCS)	0PA3+_2/PWMB5/PWMA1P_2/A8/P2.0	33	P2.0
	15	VCC/ADC_AVCC	CMP4-_2/TXD_4/RD/P4.4	32	P4.4
VREF	16	ADC_AVREF+	I2S_CK_4/QSPII_CLK_2/CMP4+_2/SCLK_3/RXD_4/ADCB_ETR_2/ADC_ETR_2/P4.3	31	P4.3
GND	17	GND	CAN_RX_3/OPA3-_2/OPA2O_1/WR/P4.2	30	P4.2
P4.0	18	P4.0/MOSI_3/CMP2O_2/0PA4O_2/QSPI1_IO0_2/I2S_SD_4	VCC	29	
P3.0_RXD_D-	19	P3.0/RXD/INT4/D-	CMP1+_1/INT3/TXD_2/P3.7	28	P3.7
P3.1_TXD_D+	20	P3.1/TXD/D+	CMP1-_1/INT2/RXD_2/P3.6	27	P3.6
P3.2	21	P3.2/INT0/SCLK_4/I2CSCL_4/PWMA_ETR/PWMB_ETR/OPA3O_1/I2S_CK	I2S_WS/OPA3+_1/PWMB_BRK/PWMA_BRK/SS_4/T0CLKO/T1/P3.5	26	P3.5
P3.3	22	P3.3/INT1/MISO_4/I2CSDA_4/PWMA4N_4/PWMB7_2/OPA4-_3/I2S_MCLK	CAN_TX_2/OPA3-_1/CMP1-_2/TXD3_2/P5.1	25	P5.1
P3.4	23	P3.4/T0/T1CLKO/MOSI_4/PWMA4P_4/PWMB8_2/CMP1O_1/I2S_SD			
P5.0	24	P5.0/RXD3_2/CMP1+_2/OPA3O_4/CAN_RX_2			

MCU-VCC
C12
100nF
C13
22uF

CORE_VCC
C3
22uF
C4
100nF
C5
100nF
MCU-VCC
C6
22uF
C7
100nF

USB1
SHELL GND VBUS SBU2 CC1 DN2 DP1 DN1 DP2 SBU1 CC2 VBUS SHELL GND
R1 5.1kΩ
R2 5.1kΩ
R3 33Ω
R4 33Ω
DN
DP
P3.0_RXD_D-
P3.1_TXD_D+
VUSB

VUSB
R5
200mA
LED1
C14
22uF
C15
100nF
R6
1kΩ
按下断电
S7
C27
470nF
R112
20kΩ
Q1
CJ3415
R113
20kΩ

5V
U2
1117M3-33
VIN GND VOUT
C16
22uF
C17
100nF
3.3V
D1
SMBJ5339B-TP
(5.6V/5W)
D2
SMBJ5338B
(5.1V/5W)
GND

J1
MCU-VCC
LED2
R7
1kΩ
R8
510Ω
GND

CN1
5V
GND
3.3V
GND

USB2
GND VBUS D- D+ GND GND
P3.0_RXD_D-
P3.1_TXD_D+
VUSB
USB-231-ARY
GND

MCU-VCC
C18
22uF
U6
VIN VSS CE VOUT NC
GND
CORE_VCC
附近有滤波电容
6211C15M5G-N
输出电压=1.5V

(RST)
P5.4
R9
300Ω
S2
P3.2
R10
300Ω
S3
P3.3
R11
300Ω
S4
P3.4
R12
300Ω
S5
P3.5
R13
300Ω
S6
GND

U4
输出电压=2.5V
GND_F GND_S ENABLE OUT_F OUT_S IN
REF3225AIDBVR
C20
10uF
MCU-VCC
不焊 NR2
0Ω
基准电压
VREF
C25
100nF
C21
10uF
U5
TL431A-MS
MCU-VCC
不焊 NR1
0Ω
R14
510Ω
C22
100nF
R15
0Ω
U4, U5 二选一，出厂时不焊 U4、NR2
用0欧姆电阻选择基准电压
出厂时焊R15，Vref=2.5V
出厂时不焊 NR1

MCU-VCC
R16
100kΩ
P6.7
(CMP2+_1)
W1
100kΩ
C23
100nF

使用SPI接口时只焊左边的R17、R18，不焊右边的R19、R20
使用I2C接口时只焊右边的R19、R20，不焊左边的R17、R18
出厂默认使用SPI接口，只焊左边的R17、R18
J2、J3、J4 共用一个7芯插座，因此在PCB板上没有 J3、J4

OLED显示屏
SPI 7 线接口
OLED显示屏
I2C 7 线接口
I2C 4 线接口

J2
GND
MCU-VCC
P2.5 SCLK
MOSI
RES
P2.2 DC
P2.6 CS
MCU-VCC BLK
R17
0Ω
P2.3
P2.4
R18
0Ω

J3
SCL
SDA
RES
DC
CS
BLK

J4
SCL
SDA

R19
0Ω
P2.4
P2.3
R20
0Ω

GND

MCU-VCC
LED3 R21 3.3kΩ P5.3
LED4 R22 3.3kΩ P0.5
LED5 R23 3.3kΩ P0.6
LED6 R24 3.3kΩ P0.7
LED7 R25 3.3kΩ P1.1
LED8 R26 3.3kΩ P4.7
LED9 R27 3.3kΩ P1.4
LED10 R28 3.3kΩ P1.5
LED11 R29 3.3kΩ P1.6
LED12 R30 3.3kΩ P1.7

MCU-VCC
LED13 R31 3.3kΩ P5.4
LED14 R32 3.3kΩ P4.0
LED15 R33 3.3kΩ P3.2
LED16 R34 3.3kΩ P3.3
LED17 R35 3.3kΩ P3.4
LED18 R36 3.3kΩ P5.0

MCU-VCC
LED29 R47 3.3kΩ P2.3
LED28 R46 3.3kΩ P2.2
LED27 R45 3.3kΩ P2.1
LED26 R44 3.3kΩ P2.0
LED25 R43 3.3kΩ P4.4
LED24 R42 3.3kΩ P4.3
LED23 R41 3.3kΩ P4.2
LED22 R40 3.3kΩ P3.7
LED21 R39 3.3kΩ P3.6
LED20 R38 3.3kΩ P3.5
LED19 R37 3.3kΩ P5.1

MCU-VCC
LED41 R59 3.3kΩ P5.2
LED40 R58 3.3kΩ P0.4
LED39 R57 3.3kΩ P0.3
LED38 R56 3.3kΩ P0.2
LED37 R55 3.3kΩ P0.1
LED36 R54 3.3kΩ P0.0
LED35 R53 3.3kΩ P4.6
LED34 R52 3.3kΩ P4.5
LED33 R51 3.3kΩ P2.7
LED32 R50 3.3kΩ P2.6
LED31 R49 3.3kΩ P2.5
LED30 R48 3.3kΩ P2.4

CN3
P5.3
P0.5
P0.6
P0.7
MCU-VCC
P1.1
P4.7
P1.4
P1.5
P1.6
P1.7
GND
排针

CN4
排母

CN5
P5.4
MCU-VCC
VREF
GND
P4.0
P3.0_RXD_D-
P3.1_TXD_D+
P3.2
P3.3
P3.4
P5.0
排针

CN6
排母

CN7
P2.3
P2.2
P2.1
P2.0
P4.4
P4.3
P4.2
MCU-VCC
P3.7
P3.6
P3.5
P5.1
排针

CN8
排母

CN9
P5.2
P0.4
P0.3
P0.2
P0.1
P0.0
P4.6
P4.5
P2.7
P2.6
P2.5
P2.4
排针

CN10
排母