

君正[®] Halley6 核心板

数据手册

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北京君正集成电路股份有限公司
Ingenic Semiconductor Co., Ltd.

君正® Halley6

数据手册

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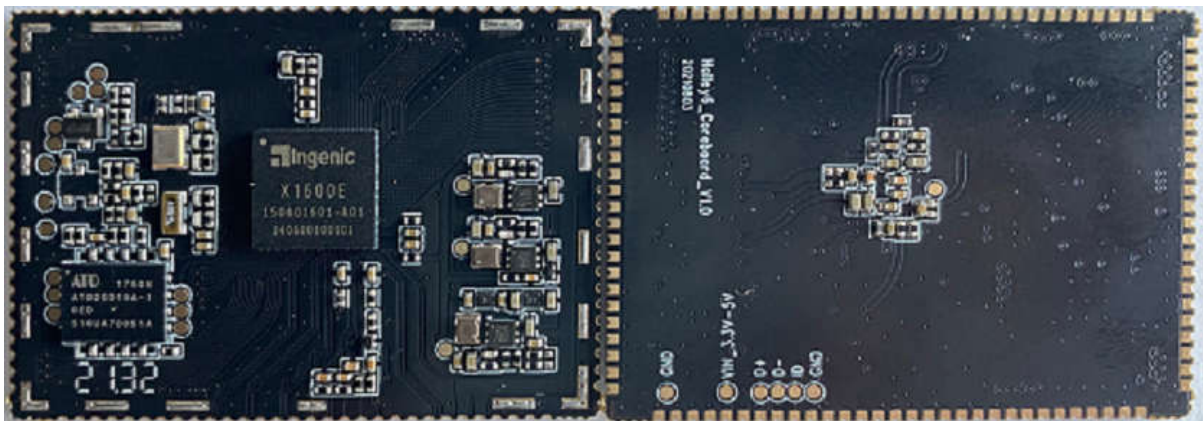
1 概述

1.1 简介

Halley6 核心板是一款基于 X1600/X1600E 设计的物联网设备设计的高性能、低成本的无线局域网模块, 最高 1GHz 主频、内部集成 32MB_LPDDR2/64MB_LPDDR2。核心板还包括一个 1Gbit SPI NAND Flash。它也为各种外设接口提供了一个引脚数为 104 的邮票孔接口, 可以外扩液晶显示 RGB/SLCD、Camera、RMII 以太网、SD 卡、USB OTG、SPI、I2C、UART、PWM、SADC 等。可广泛应用, 如图像识别、智能家电、智能家居, 智能办公等。

Halley6 核心板可以运行最新的 Linux 内核和 TCP / IP 堆栈。搭载高性能 XBurst CPU, 支持硬件浮点单元 (FPU), SIMD 加速指令, 支持图像识别算法

1.2 Halley6 结构



1.3 Halley6 功能参数

- 尺寸规格: 45mm x32mm X 1mm
- CPU 工作频率: 最高 1.0GHz
- 内存: 32MB_LPDDR2/64MB_LPDDR2
- 外部存储: 1Gbit SPI NAND Flash (兼容 SPI NOR FLASH、SDIO_Fash)
- 工作电压: DC 5V
- 物理接口
 - ☆Display: 24 bits RGB LCD & SLCD(6800/8080)
 - ☆I2S x1
 - ☆CAM(DVP_8bit)
 - ☆MIPI CSI(2_Lane)
 - ☆SPI Master x1
 - ☆SPI Slave x1
 - ☆UART x4

- ☆I2C x2
- ☆PWM x8
- ☆SADC x1(4ch)_12-bit
- ☆eMMC/SD2.0/ x1
- ☆Quad SPI x1
- ☆Ethernet MAC: (RMII)x1
- ☆CAN 2.0 x2
- ☆CDBUS x1
- ☆USB 2.0 OTG

2 外部接口

2.1 外部管脚

Halley6 核心板被设计成邮票孔接口。1 脚左下角逆时针方向放置, 孔距为 1.27mm。

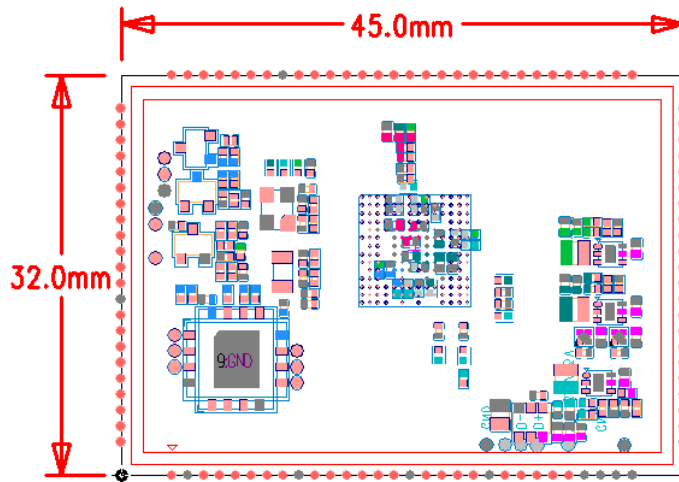


图 2-1 PCBA 顶部视图

引脚编号	引脚名称	引脚描述	类型
1	I2S_TX_MCLK/MAC_TXEN/PB26	FUN_0: I2S0_TX_MCLK FUN_1: MAC_TXEN PB26: GPIO group B bit 26	O O IO
2	GND	GND	P
3	MSC1_CLK/CDBUS_TX/PD00	FUN_0: MSC1_CLK_O FUN_1: CDBUS_TX_O PD00: GPIO group D bit 00	O O IO
4	MSC1_CMD/CDBUS_RX/PD01	FUN_0: MSC1_CMD FUN_1: CDBUS_RX PD01: GPIO group D bit 01	IO I IO
5	MSC1_D3/CAN1_RX/PD05	FUN_0: MSC1_D3 FUN_1: CAN1_RX FUN_3: UART3_RXD PD05: GPIO group D bit 05	IO I I IO
6	MSC1_D1/CAN0_RX/PD03	FUN_0: MSC1_D1 FUN_1: CDBUS_RX PD03: GPIO group D bit 03	IO I IO
7	MSC1_D2/CAN1_TX/PD04	FUN_0: MSC1_D2 FUN_1: CAN1_TX FUN_3: UART3_TXD PD04: GPIO group D bit 04	IO O O IO
8	MSC1_D0/CAN0_TX/PD02	FUN_0: MSC1_D0 FUN_1: CAN0_TX PD02: GPIO group D bit 02	IO O IO
9	GND	GND	P
10	MIPI_CSI_DP0	CSI_Lane0 positive end	AI
11	MIPI_CSI_DN0	CSI_Lane0 negative end	AI
12	MIPI_CSI_CLKP	CSI_CLK lane0 positive end	AI
13	MIPI_CSI_CLKN	CSI_CLK lane0 negative end	AI
14	MIPI_CSI_DP1	CSI_Lane1 positive end	AI
15	MIPI_CSI_DN1	CSI_Lane1 negative end	AI
16	GND	GND	P
17	SADC_IN0	Analog input 0	AI

18	SADC_IN1	Analog input 1	AI
19	SADC_IN3	Analog input 3	AI
20	SADC_IN2	Analog input 2	AI
21	GND	GND	P
22	USB_ID	USB_ID	I
23	OTG_DN	USB OTG data negative	AIO
24	OTG_DP	USB OTG data positive	AIO
25	VSYS	VSYS	PI
26	VSYS	VSYS	PI
27	GND	GND	P
28	GND	GND	P
29	GND	GND	P
30	GND	GND	P
31	GND	GND	P
32	UART0_RX/PB07	Func0: UART0_RXD PB07: GPIO group B bit 07	I IO
33	UART0_TX/PB08	Func0: UART0_TXD PB08: GPIO group B bit 08	O IO
34	UART0_RTS/PB10	Func0: UART0_RTS_ Func1: PWM7 Func2: TCU7_IN1 PB10: GPIO group B bit 10	O O I IO
35	UART0_CTS/PB09	Func0: UART0_CTS_ Func1: PWM6 Func2: TCU7_IN0 PB09: GPIO group B bit 09	I O I IO
36	UART1_CTS/UART3_RX/PB05	Func0: UART3_RXD Func1: UART1_CTS_ Func2: CDBUS_TX_EN PB05: GPIO group B bit 05	I I O IO
37	UART1_RTS/UART3_TX/PB04	Func0: UART3_TXD Func1: UART1_RTS_ Func2: SFC0_CE1_ PB04: GPIO group B bit 04	O O O IO

38	PWM3/TCU5_IN1/PC24	Func0: DRV_VBUS Func1: PWM3 Func2: TCU5_IN1 PC24: GPIO group C bit 24	O O IO IO
39	I2C0_SCK/PB30	Func0: I2C0_SCK Func1: CDBUS_TX_EN PB30: GPIO group B bit 30	IO O IO
40	I2C0_SDA/PB31	Func0: I2C0_SDA Func1: SFC0_CE1 PB31: GPIO group B bit 31	IO O IO
41	GND	GND	P
42	LCD_DE/SLCD_TE/PA27	Func0: LCD_DE Func1: SLCD_TE Func3: CS0_ PA27: GPIO group A bit 27	O I O IO
43	LCD_VSYNC/SLCD_DC/PA25	Func0: LCD_VSYNC Func1: SLCD_DC Func3: WE_ PA25: GPIO group A bit 25	O O O IO
44	LCD_PCLK/CIM_MCLK/PA24	Func0: LCD_PCLK Func1: CIM_MCLK Func3: RD_ PA24: GPIO group A bit 24	O O O IO
45	LCD_HSYNC/SLCD_WR/PA26	Func0: LCD_HSYNC Func1: SLCD_WR Func3: AVD_ PA26: GPIO group A bit 26	O O O IO
46	LCD_B0/SLCD_D0/PA00	Func0: LCD_D0 Func1: SLCD_D0 Func2: TCU0_IN0 PA00: GPIO group A bit 00	O O I IO
47	LCD_B2/SLCD_D2/PA02	Func0: LCD_D2 Func1: SLCD_D2 Func2: TCU1_IN0 PA02: GPIO group A bit 02	O O I IO
48	LCD_B1/SLCD_D1/PA01	Func0: LCD_D1 Func1: SLCD_D1 Func2: TCU0_IN1 PA01: GPIO group A bit 01	O O I IO

49	LCD_B3/SLCD_D3/PA03	Func0: LCD_D3 Func1: SLCD_D3 Func2: TCU1_IN1 PA03: GPIO group A bit 03	O O I IO
50	LCD_B4/SLCD_D4/PA04	Func0: LCD_D4 Func1: SLCD_D4 Func2: TCU2_IN0 PA04: GPIO group A bit 04	O O I IO
51	LCD_B5/SLCD_D5/PA05	Func0: LCD_D4 Func1: SLCD_D4 Func2: TCU2_IN1 PA05: GPIO group A bit 05	O O I IO
52	GND	GND	P
53	LCD_B7/SLCD_D7/PA07	Func0: LCD_D7 Func1: SLCD_D7 Func2: TCU3_IN1 PA07: GPIO group A bit 07	O O I IO
54	LCD_B6/SLCD_D6/PA06	Func0: LCD_D6 Func1: SLCD_D6 Func2: TCU3_IN0 PA06: GPIO group A bit 07	O O I IO
55	LCD_G0/CIM_D0/PA08	Func0: LCD_D8 Func1: SLCD_D8 Func2: CIM_D0 Func3: AD0 PA08: GPIO group A bit 08	O O I IO IO
56	LCD_G1/CIM_D1/PA09	Func0: LCD_D9 Func1: SLCD_D9 Func2: CIM_D1 Func3: AD1 PA09: GPIO group A bit 09	O O I IO IO
57	LCD_G2/CIM_D2/PA10	Func0: LCD_D10 Func1: SLCD_D10 Func2: CIM_D2 Func3: AD2 PA10: GPIO group A bit 10	O O I IO IO
58	LCD_G3/CIM_D3/PA11	Func0: LCD_D11 Func1: SLCD_D11 Func2: CIM_D3 Func3: AD3 PA11: GPIO group A bit 11	O O I IO IO

59	LCD_G4/CIM_D4/PA12	Func0: LCD_D12 Func1: SLCD_D12 Func2: CIM_D4 Func3: AD4 PA12: GPIO group A bit 12	O O I IO IO
60	LCD_R7/SLCD_CE/PA23	Func0: LCD_D23 Func1: SLCD_CE_ Func3: AD15 PA23: GPIO group A bit 23	O O IO IO
61	LCD_G5/CIM_D5/PA13	Func0: LCD_D13 Func1: SLCD_D13 Func2: CIM_D5 Func3: AD5 PA13: GPIO group A bit 13	O O I IO IO
62	LCD_G6/CIM_D6/PA14	Func0: LCD_D14 Func1: SLCD_D14 Func2: CIM_D6 Func3: AD6 PA14: GPIO group A bit 14	O O I IO IO
63	LCD_G7/CIM_D7/PA15	Func0: LCD_D15 Func1: SLCD_D15 Func2: CIM_D7 Func3: AD7 PA15: GPIO group A bit 15	O O I IO IO
64	LCD_R0/PA16	Func0: LCD_D16 Func3: AD8 PA16: GPIO group A bit 16	O IO IO
65	LCD_R1/PA17	Func0: LCD_D17 Func3: AD9 PA17: GPIO group A bit 17	O IO IO
66	LCD_R4/CIM_PCLK/PA20	Func0: LCD_D20 Func2: CIM_PCLK Func3: AD12 PA20: GPIO group A bit 20	O I IO IO
67	LCD_R3/PA19	Func0: LCD_D19 Func2: CIM_EXPOSURE Func3: AD11 PA19: GPIO group A bit 19	O O IO IO
68	LCD_R2/PA18	Func0: LCD_D18 Func3: AD10 PA18: GPIO group A bit 18	O IO IO

69	LCD_R6/CIM_HSYNC/PA22	Func0: LCD_D22 Func2: CIM_HSYNC Func3: AD14 PA22: GPIO group A bit 22	O I IO IO
70	LCD_R5/CIM_VSYNC/PA21	Func0: LCD_D21 Func2: CIM_VSYNC Func3: AD13 PA21: GPIO group A bit 21	O I IO IO
71	SPI_CE/I2C0_SCK/PA28	Func0: SSIO_CE0_ Func1: SSI1_SLV_CE0_ Func2: I2C0_SCK PA28: GPIO group A bit 28	O I IO IO
72	SPI_DT/UART2_TX/PA30	Func0: SSIO_DT Func1: SSI1_SLV_SLV_DT Func2: UART2_TXD PA30: GPIO group A bit 30	O O O IO
73	SPI_CLK/UART2_RX/PA31	Func0: SSIO_CLK Func1: SSI1_SLV_SLV_CLK Func2: UART2_RXD PA31: GPIO group A bit 31	O I I IO
74	SPI_DR/I2C0_SDA/PA29	Func0: SSIO_DR Func1: SSI1_SLV_SLV_DR Func2: IC20_SDA PA29: GPIO group A bit 29	I I IO IO
75	GND	GND	P
76	PWM0/TCU4_IN0/PC00	Func0: PWM0 Func1: TCU4_IN0 PC00: GPIO group C bit 00	O IO IO
77	PWM1/TCU4_IN1/PC01	Func0: PWM1 Func1: TCU4_IN1 PC01: GPIO group C bit 01	O IO IO
78	MPWM2/TCU5_IN0/PC02	Func0: PWM2 Func1: TCU5_IN0 PC02: GPIO group C bit 02	O IO IO
79	UART1_TX/PB02	Func0: TCK Func1: UART1_TXD Func2: SSIO_CE1 PB02: GPIO group B bit 02	I O O IO

80	UART1_RX/PB03	Func0: TMS Func1: UART1_RXD Func2: PWM_TCU_TRIG PB03: GPIO group B bit 03	I I I IO
81	CLK24M_O/PC25	Func0: EXCLK Func1: PWM4 Func2: TCU6_IN0 PB25: GPIO group B bit 25	O O IO IO
82	CLK32K_O/PC26	Func0: RTC32K Func1: PWM5 Func2: TCU6_IN1 PB26: GPIO group B bit 26	O O IO IO
83	MSC0_D1/I2C1_SCK/PB15	Func0: MSC0_D1 Func1: SSIO_GPC Func2: I2C1_SCK PB15: GPIO group B bit 15	O O IO IO
84	MSC0_D0/SPI_DR/PB14	Func0: MSC0_D0 Func1: SSIO_DR Func2: SSI_SLV_DR PB14: GPIO group B bit 14	IO I I IO
85	MSC0_CLK/SPI_CLK/PB12	Func0: MSC0_CLK Func1: SSIO_CLK Func2: SSI_SLV_CLK PB12: GPIO group B bit 12	O O I IO
86	MSC0_CMD/SPI_DT/PB13	Func0: MSC0_CMD Func1: SSIO_DT Func2: SSI_SLV_DT PB13: GPIO group B bit 13	IO O O IO
87	MSC0_D3/SPI_CE/PB17	Func0: MSC0_D3 Func1: SSIO_CE0_ Func2: SSI_SLV_CE0_ PB17: GPIO group B bit 17	IO O I IO
88	MSC0_D2/I2C1_SDA/PB16	Func0: MSC0_D2 Func1: SSIO_CE1_ Func2: SSI_SLV_CE1_ PB16: GPIO group B bit 16	IO O I IO
89	UART2_TX/PB00/DBG_TXD	Func0: TDO Func1: UART2_TXD PB00: GPIO group B bit 00	O O IO
90	UART2_RX/PB01/DBG_RXD	Func0: TDI Func1: UART2_RXD PB01: GPIO group B bit 01	I I IO

91	BOOT_KEY	BOOT_SEL1_KEY	I
92	AVDEFUSE	EFUSE programming power, 0V/2.5V	P
93	PPRST_KEY	RTC power on reset and RESET-KEY reset input	I
94	WKUP_KEY	WKUP_N: WAKE UP PC31: GPIO group C bit 31	I IO
95	GND	GND	P
96	I2S_TX_LRCK/MAC_MDIO/PB28	Func0: I2S0_TX_LRCK Func1: MAC_MDIO PB28: GPIO group B bit 28	IO IO IO
97	I2S_RX_DAT/MAC_TXD0/PB21	Func0: I2S0_RX_DATA Func1: MAC_TXD0 Func2: PWM7 Func3: TCU7_IN1 PA21: GPIO group B bit 21	I O O IO IO
98	I2S_RX_LRCK/MAC_RXDV/PB24	Func0: I2S0_RX_LRCK Func1: MAC_RX_DV PB24: GPIO group B bit 24	IO I IO
99	I2C1_SCK/MAC_RXD0/PB19	Func0: I2C1_SCK Func1: MAC_RXD0 Func2: PWM5 Func3: TCU6_IN1 PA19: GPIO group B bit 19	IO I O IO IO
100	I2C1_SDA/MAC_RXD1/PB20	Func0: I2C1_SDA Func1: MAC_RXD1 Func2: PWM6 Func3: TCU7_IN0 PA20: GPIO group B bit 20	IO I O IO IO
101	I2S_TX_BCLK/MAC_MDC/PB27	Func0: I2S0_TX_BCLK Func1: MAC_MDC PB27: GPIO group B bit 27	IO O IO
102	I2S_RX_MCLK/MAC_PHY_CLK/PB22	Func0: I2S0_RX_MCLK Func1: MAC_PHY_CLK PB22: GPIO group B bit 22	O O IO
103	I2S_RX_BCLK/MAC_REF_CLK/PB23	Func0: I2S0_RX_BCLK Func1: MAC_REF_CLK PB23: GPIO group B bit 23	IO I IO
104	I2S_TX_DAT/MAC_TXD1/PB25	Func0: I2S0_TX_DATA Func1: MAC_TXD1 PB25: GPIO group B bit 25	O O IO

2.2 引脚定义

注释:

1. I INPUT pin
2. O OUTPUT pin
3. IO INPUT&OUTPUT pin
4. AI Analog INPUT pin
5. AO Analog OUTPUT pin
6. AIO Analog INPUT &Analog OUTPUT pin
7. PI POWER input pin

3 电气参数

3.1 最大范围

Table 3-1

	Min	Max	Unit
Operation Temperature	-40	85	°C
Storage Temperature	-65	150	°C
VSYS	-0.3	7	V

3.2 工作条件

Table 3-2 Recommended operating conditions for power supplies

	Descriptions	Min	Typical	Max	Unit
VMEM	VDDMEM voltage for LPDDR2	1.14	1.2	1.3	V
VDDR1	DDR_VDD1 voltage	1.7	1.8	1.95	V
VDDRPLL	DDR_PLLVCCA voltage	3.0	3.3	3.6	V
VIO(3.3V)	VDDIO voltage, use as 3.3V	3.0	3.3	3.6	V
VIO(1.8V)	VDDIO voltage, use as 1.8V	1.62	1.8	1.98	V
VCORE	VDD core voltage	0.99	1.1	1.21	V
VPLLVD	PLL_VDD voltage	0.99	1.1	1.21	V
VPLLAVD D(3.3V)	PLL_AVDD voltage, use as 3.3V	3.0	3.3	3.6	V
VPLLAVD D(1.8V)	PLL_AVDD voltage, use as 1.8V	1.62	1.8	1.98	V
VEFUSE	AVDEFUSE voltage	2.97	3.3	3.63	V
VRTCIO(3 .3V)	PLL_AVDD voltage, use as 3.3V	3.0	3.3	3.6	V
VRTC	RTC_VDD voltage	1.0	1.1	1.21	V
VUSB33	USB_AVD33 voltage	3.0	3.3	3.6	V
VUSB11	USB_AVD11 voltage	0.99	1.1	1.21	V
VADC	SADC_AVDD voltage	2.97	3.3	3.63	V
SADC_VR EFP	SADC_VREFP and SADC_AGND are used as reference for SADC	-	3.3	VADC	V
VCSI33	CSI_VCCA33 voltage	2.97	3.3	3.63	V
VCSI11	CSI_VCCA11 voltage	0.99	1.1	1.21	V

3.3 GPIO 管脚直流特性

Table 3-3 DC characteristics for VDDIO/VDDIO_LCD/RTC_ VDDIO supplied pins for 3.3V

Symbol	Parameter	Min	Typical	Max	Unit	
V _{IL}	Input Low Voltage	-0.3		0.8	V	
V _{IH}	Input High Voltage	2		3.6	V	
V _T	Threshold point	1.34	1.45	1.59	V	
V _{T+}	Schmitt trig low to high threshold point	1.57	1.68	1.81	V	
V _{T-}	Schmitt trig high to low threshold point	1.21	1.32	1.45	V	
V _{TPU}	Threshold point with pull-up resistor enabled	1.31	1.42	1.55	V	
V _{TPD}	Threshold point with pull-down resistor enabled	1.37	1.49	1.63	V	
V _{TPU+}	Schmitt trig low to high threshold point with pull-up resistor enabled	1.54	1.65	1.77	V	
V _{TPU-}	Schmitt trig high to low threshold point with pull-down resistor enabled	1.18	1.29	1.41	V	
V _{TPD+}	Schmitt trig low to high threshold point with pull-down resistor enabled	1.61	1.72	1.86	V	
V _{TPD-}	Schmitt trig high to low threshold point with pull-up resistor enabled	1.23	1.35	1.49	V	
I _L	Input Leakage Current @ V _I =1.8V or 0V			±10	μA	
I _{OZ}	Tri-State output leakage current @ V _I =1.8V or 0V			±10	μA	
R _{PU}	Pull-up Resistor	58	86	133	kΩ	
R _{PD}	Pull-down Resistor	52	78	128	kΩ	
V _{OL}	Output low voltage			0.4	V	
V _{OH}	Output high voltage	2.4			V	
I _{OL}	Low level output current @ V _{OL} (max)	8mA	12.7	19.3	25.9	mA
		4mA	8.5	12.9	17.4	mA
I _{OH}	High level output current @ V _{OH} (min)	8mA	18.7	37	62.8	mA
		4mA	13.4	26.5	45	mA

Table 3-4 DC characteristics for VDDIO/VDDIO_LCD/RTC_ VDDIO supplied pins for 1.8V application

Symbol	Parameter		Min	Typical	Max	Unit
V _{IL}	Input Low Voltage		-0.3		0.63	V
V _{IH}	Input High Voltage		1.17		3.6	V
V _T	Threshold point		0.77	0.84	0.91	V
V _{T+}	Schmitt trig low to high threshold point		0.93	1.02	1.11	V
V _{T-}	Schmitt trig high to low threshold point		0.62	0.73	0.82	V
V _{TPU}	Threshold point with pull-up resistor enabled		0.75	0.83	0.9	V
V _{TPD}	Threshold point with pull-down resistor enabled		0.78	0.86	0.93	V
V _{TPU+}	Schmitt trig low to high threshold point with pull-up resistor enabled		0.92	1.01	1.1	V
V _{TPU-}	Schmitt trig high to low threshold point with pull-down resistor enabled		0.61	0.72	0.8	V
			0.95	1.1	1.388	V
V _{TPD-}	Schmitt trig high to low threshold point with pull-up resistor enabled		0.68	0.9	1.22	V
I _L	Input Leakage Current @ V _I =1.8V or 0V				±10	μA
I _{OZ}	Tri-State output leakage current @ V _I =1.8V or 0V				±10	μA
R _{PU}	Pull-up Resistor		117	194	331	kΩ
R _{PD}	Pull-down Resistor		91	159	291	kΩ
V _{OL}	Output low voltage				0.4	V
V _{OH}	Output high voltage		1.35			V
I _{OL}	Low level output current @ V _{OL} (max)	8mA	6.8	12.2	19.5	mA
		4mA	4.6	8.2	13	mA
I _{OH}	High level output current @ V _{OH} (min)	8mA	4.8	11.4	22.2	mA
		4mA	3.4	8.2	15.9	mA

Table 3-5 DC characteristics for VDDIO_CAN supplied pins for 3.3V application

Symbol	Parameter	Min	Typical	Max	Unit	
V _{IL}	Input Low Voltage	-0.3		0.8	V	
V _{IH}	Input High Voltage	2		5.5	V	
V _T	Threshold point	1.36	1.46	1.58	V	
V _{T+}	Schmitt trig low to high threshold point	1.71	1.84	1.94	V	
V _{T-}	Schmitt trig high to low threshold point	1.18	1.27	1.4	V	
V _{TPU}	Threshold point with pull-up resistor enabled	1.32	1.42	1.55	V	
V _{TPD}	Threshold point with pull-down resistor enabled	1.39	1.48	1.6	V	
V _{TPU+}	Schmitt trig low to high threshold point with pull-up resistor enabled	1.67	1.8	1.91	V	
V _{TPU-}	Schmitt trig high to low threshold point with pull-down resistor enabled	1.14	1.25	1.37	V	
V _{TPD+}	Schmitt trig low to high threshold point with pull-down resistor enabled	1.74	1.87	1.99	V	
V _{TPD-}	Schmitt trig high to low threshold point with pull-up resistor enabled	1.21	1.31	1.42	V	
I _L	Input Leakage Current @ V _I =1.8V or 0V			±10	μA	
I _{OZ}	Tri-State output leakage current @ V _I =1.8V or 0V			±10	μA	
R _{PU}	Pull-up Resistor	29	41	61	kΩ	
R _{PD}	Pull-down Resistor	31	45	74	kΩ	
V _{OL}	Output low voltage			0.4	V	
V _{OH}	Output high voltage	2.4			V	
I _{OL}	Low level output current @ V _{OL} (max)	8mA	8.9	14	19.1	mA
I _{OH}	High level output current @ V _{OH} (min)	8mA	15.7	31	52.3	mA

4 机械尺寸

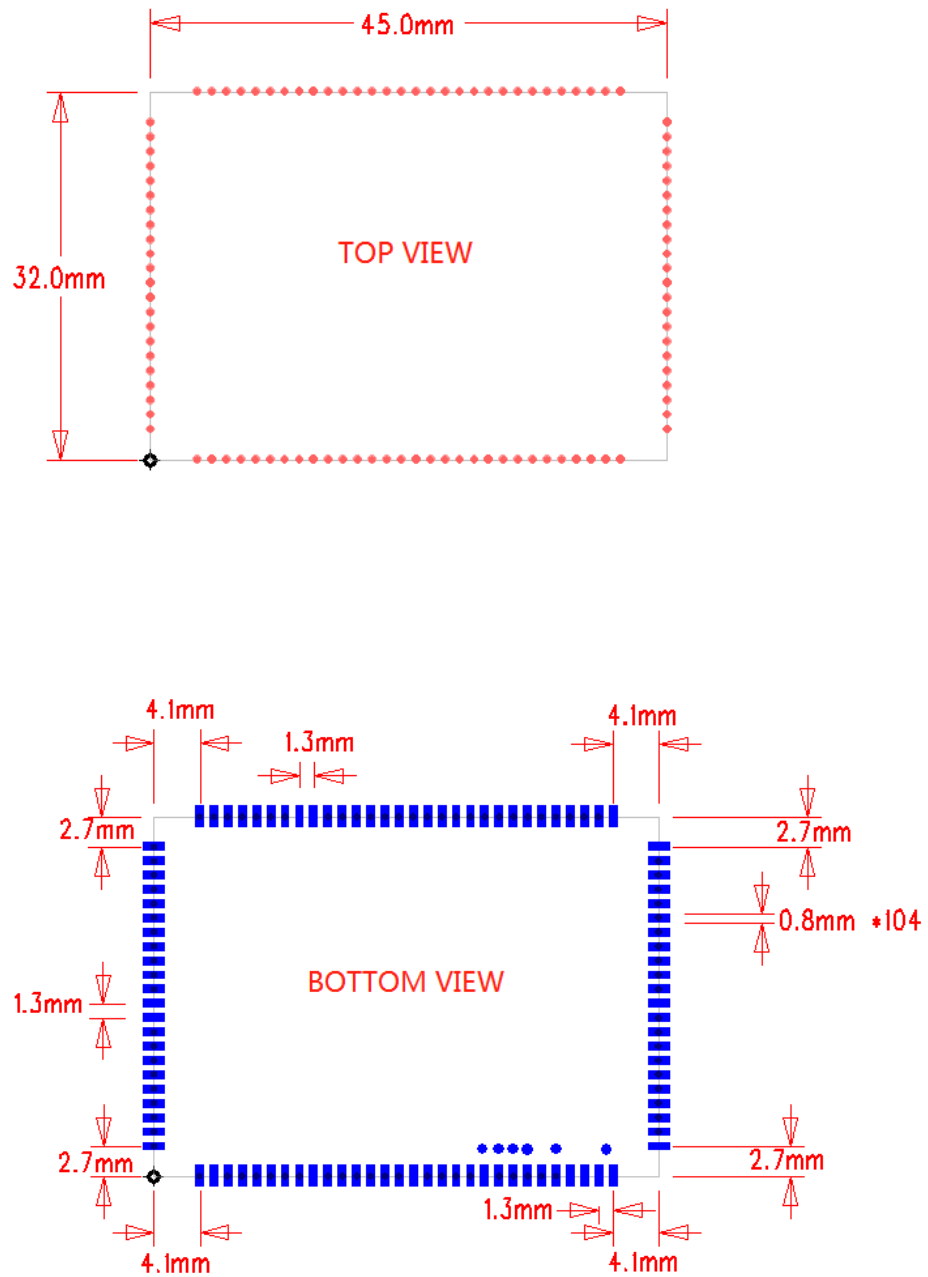


图 4-1 机械尺寸(单位 mm)

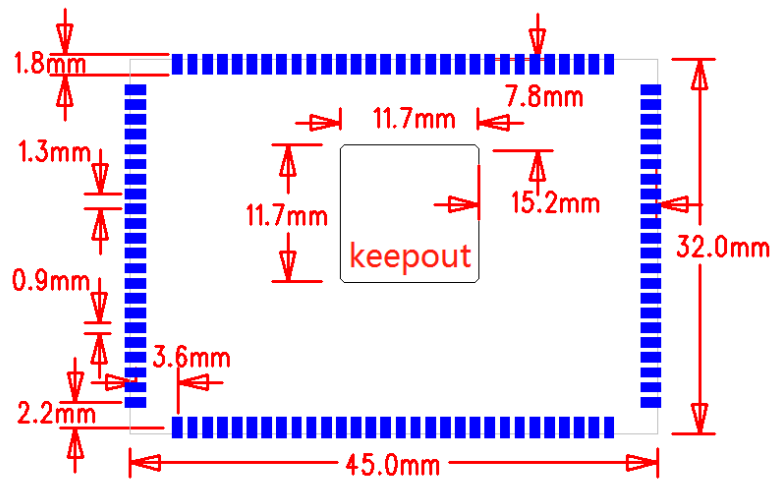


图 4-2 推荐的 PCB 封装焊盘尺寸(单位 mm)