Mini3568 Reference User Manual
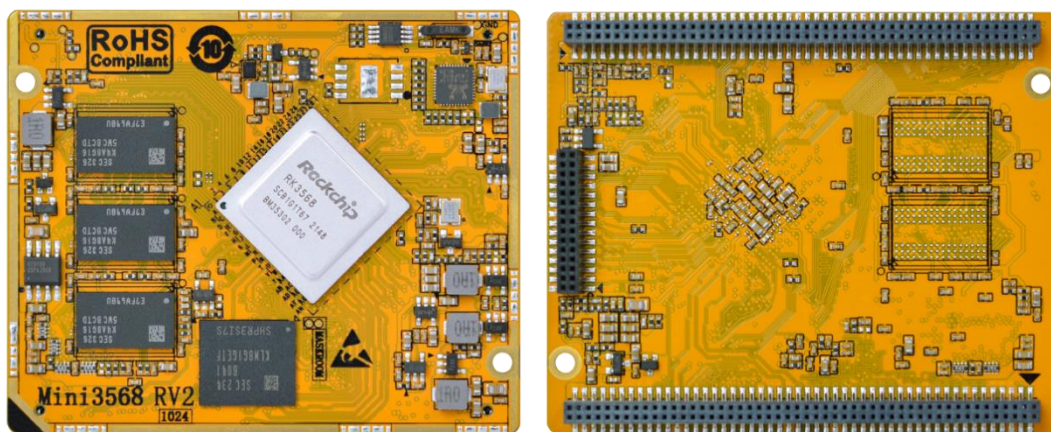
Boardcon Embedded Design

www. armdesigner. com

1. Introduction

1.1. About this Manual

This manual is intended to provide the user with an overview of the board and benefits, complete features specifications, and set up procedures. It contains important safety information as well.

1.2. Feedback and Update to this Manual

To help our customers make the most of our products, we are continually making additional and updated resources available on the Boardcon website (www.boardcon.com , www.armdesigner.com).

These include manuals, application notes, programming examples, and updated software and hardware. Check in periodically to see what's new!

When we are prioritizing work on these updated resources, feedback from customers is the number one influence, If you have questions, comments, or concerns about your product or project, please no hesitate to contact us at support@armdesigner.com.

1.3. Limited Warranty

Boardcon warrants this product to be free of defects in material and workmanship for a period of one year from date of buy. During this warranty period Boardcon will repair or replace the defective unit in accordance with the following process:

A copy of the original invoice must be included when returning the defective unit to Boardcon. This limited warranty does not cover damages resulting from lighting or other power surges, misuse, abuse, abnormal conditions of operation, or attempts to alter or modify the function of the product.

This warranty is limited to the repair or replacement of the defective unit. In no event shall Boardcon be liable or responsible for any loss or damages, including but not limited to any lost profits, incidental or consequential damages, loss of business, or anticipatory profits arising from the use or inability to use this product.

Repairs make after the expiration of the warranty period are subject to a repair charge and the cost of return shipping. Please contact Boardcon to arrange for any repair service and to obtain repair charge information.

Content

1 Mini3568 Introduction

1.1 Summary

The Mini3568 system-on-module is equipped with Rockchip's RK3568. It has quad-core Cortex-A55, Mali-G52 GPU, and 0.8TOPs NPU.

It is designed specifically for the AI devices such as industrial controller, IoT devices, intelligent interactive devices, personal computers and robots. The high performance and low power solution can help customers to introduce new technologies more quickly and enhance the overall solution efficiency.

In especial the Mini3568 use DDR4 with ECC for 7*24h work.

1.2 Features

- **Microprocessor**
    - Quad-core Cortex-A55 up to 1.8GHz
    - 32KB I-cache and 32KB D-cache for each core, 512KB L3 cache
    - Mali-G52 up to 0.8GHz
    - 1.0 TOPS Neural Process Unit

  Memory Organization
    - DDR4 RAM up to 8GB
    - EMMC up to 128GB
- **Boot ROM**
    - Supports system code download through USB OTG or SD
- **Trust Execution Environment system**
    - Supports secure OTP and multiple cipher engine
- **Video Decoder/Encoder**
    - Supports video decoding up to 4K@60fps
    - Supports H.264 encode
    - H.264 HP encoding up to 1080p@30fps
    - Picture size up to 8192x8192
- **Display Subsystem**
    - **Video Output**

    Supports HDMI 2.0 transmitter with HDCP 1.4/2.2, up to 4K@60fps

    Supports 8/4 lanes MIPI DSI up to 2560x1440@60fps

    Or Du-LVDS interface up to 1920x1080@60fps

    Supports ePD1.3 interface up to 2560x1600@30fps

    Supports BT-656 8bit output

    Supports BT-1120 16bit output

    Support 24bits RGB TTL output

    Support three displays with different source
    - **Image Input**

    Supports MIPI CSI 4lanes interface or 2ch MIPI CSI 2lanes interfaces

Supports 8~16bit DVP interface

Supports BT-656 8bit input

Supports BT-1120 8~16bit input

- **I2S/PCM**
  - Three I2S/PCM interfaces
  - Support Mic array Up to 8ch PDM/TDM interface
  - One SPDIF output

- **USB and PCIE**
  - Three 2.0 USB interfaces
  - Three SATA interfaces
    Or QSGMII + One USB3.0 host.
    Or Two USB3.0 hosts + One 1 lane PCIe 2.0.
  - One PCIe 3.0 interfaces

- **Ethernet**
  - RTL8211F on board
  - Support GMAC/EMAC and QSGMII
  - Support 10/100/1000Mbit/s data transfer rates
  - Support dual ethernet

- **I2C**
  - Up to Five I2Cs
  - Support standard mode and fast mode (up to 400kbit/s)

- **SDIO**
  - Support SDIO 3.0 protocol

- **SPI**
  - Up to four SPI controllers,
  - Full-duplex synchronous serial interface

- **UART**
  - Support up to 9 UARTs
  - UART2 with 2 wires for debug tools
  - Embedded two 64byte FIFO
  - Support auto flow control mode for UART1-5

- **SATA**
  - Three SATA host controller
  - Support SATA 1.5Gb/s, 3.0Gb/s and SATA 6.0Gb/s

- **ADC**
  - Up to two ADC channels
  - 10-bit resolution
  - Voltage input range between 0V to 1.8V
  - Support up to 1MS/s sampling rate

- **PWM**
  - 14 on-chip PWMs with interrupt-based operation
  - Support 32bit time/counter facility
  - IR option on PWM3/7/11/15

- **Power unit**

- Discrete Power on board
- Single 3.4-5V input
- Very low RTC consume current, less 5uA at 3V button Cell
- 3.3V output max 500mA

1.3 Mini3568 Block Diagram

1.3.1 RK3568 Block Diagram
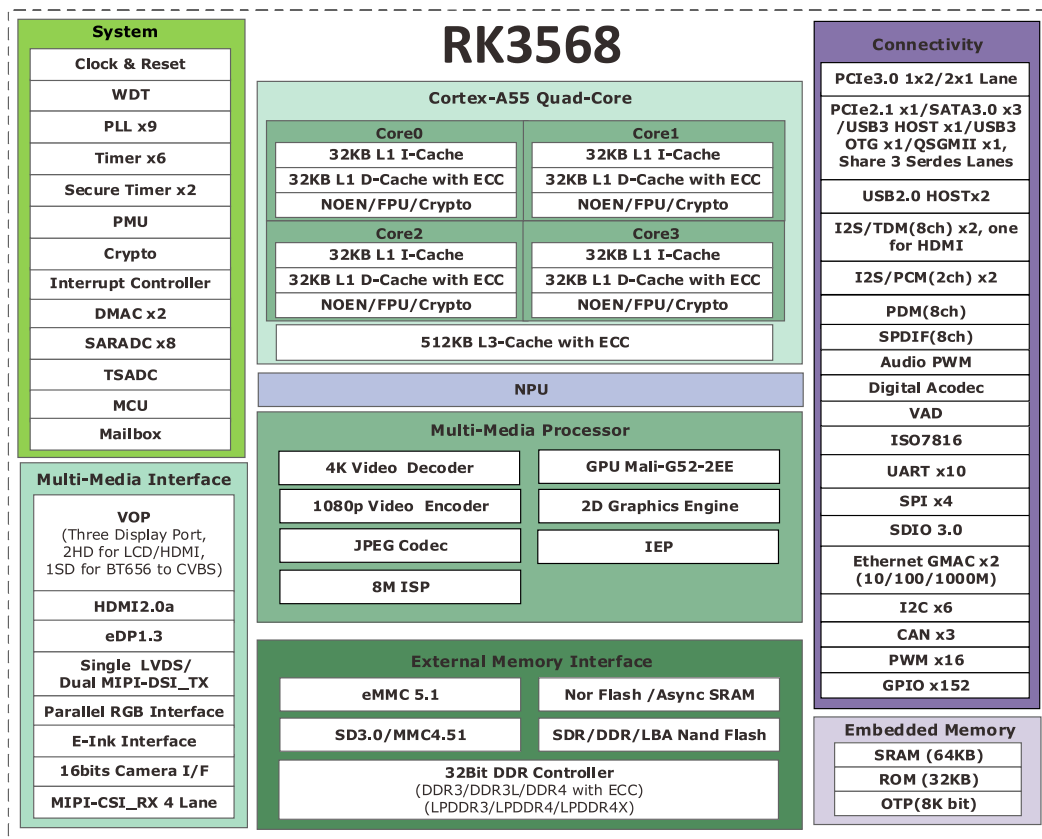
1.3.2 Development board Block Diagram
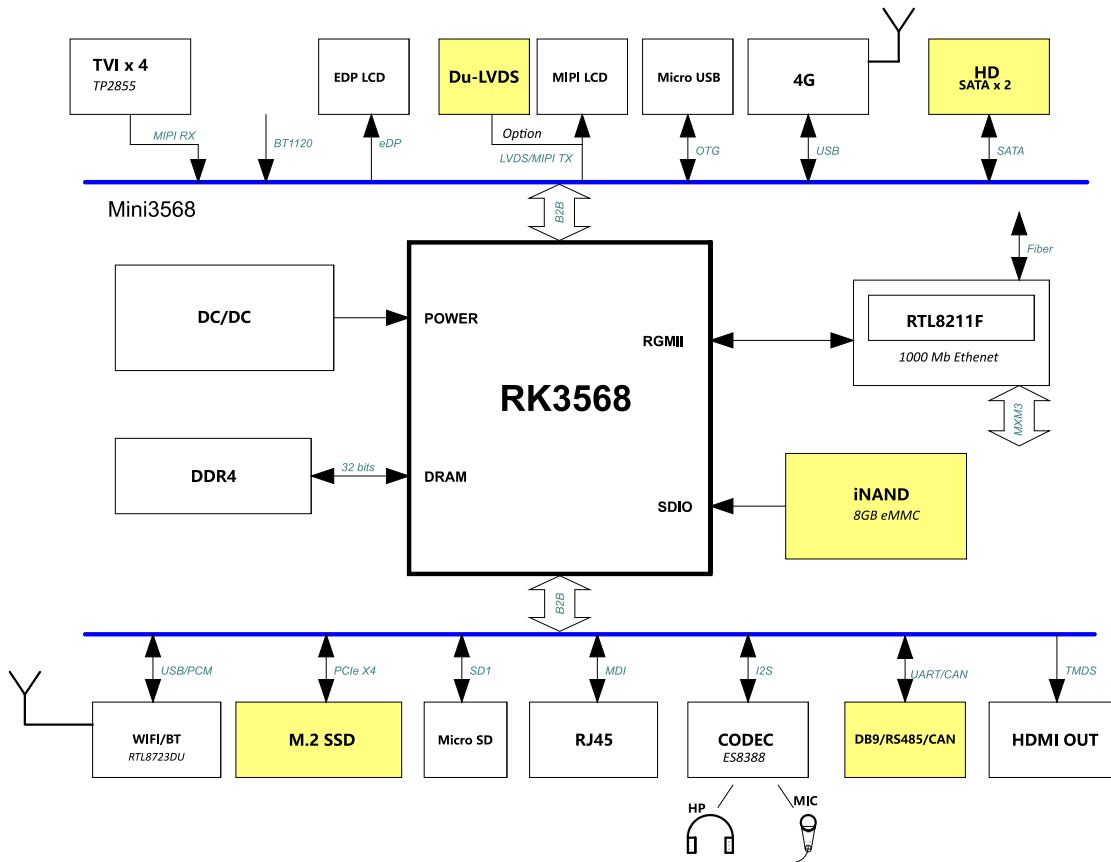
1.4 Mini3568 specifications

Feature	Specifications
CPU	Quad-core Cortex-A55
DDR	2GB DDR4 (up to 8GB)
eMMC FLASH	8GB (up to 128GB)
Power	DC 3.4~5V
LVDS/MIPI DSI	2-CH LVDS or Du-LVDS, 2-CH MIPI DSI
I2S	3-CH
MIPI CSI	1-CH DVP and 2-CH 2-Lane CSI or 1-CH 4-Lane CSI
SATA	3-CH
PCIe	1-CH PCIe 2.0 and 1-CH PCIe 3.0
HDMI out	1-CH
CAN	2-CH
USB	2-CH (USB HOST2.0), 1-CH(OTG 2.0) and 1-CH(USB 3.0)
Ethernet	2-ch GMAC: GMDI, GMII and QSGMII 1GB PHY (RTL8211F) on core board.

SDMMC/SDIO	2-CH
SPDIF TX	1-CH
I2C	5-CH
SPI	4-CH
UART	8-CH, 1-CH(DEBUG)
PWM	14-CH
ADC IN	2-CH
Board Dimension	70 x 58mm

1.5 Mini3568 PCB Dimension
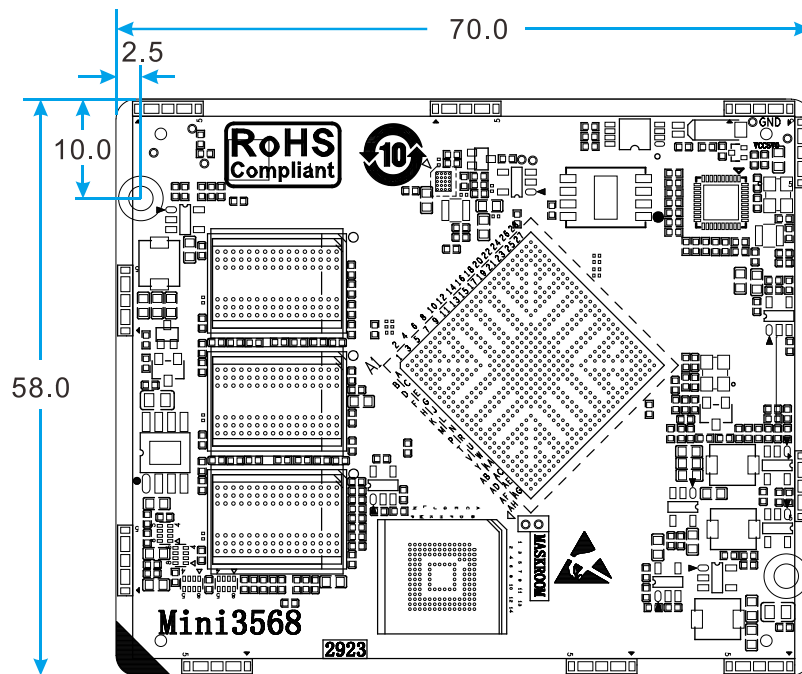
unit: mm

1.6 Mini3568 Pin Definition

J1	Signal	Description or functions	GPIO serial	IO Voltage
1	HDMI_TXCN			0.5V
2	HDMI_TX0N			0.5V
3	HDMI_TXCP			0.5V
4	HDMI_TX0P			0.5V
5	GND	Ground		0V
6	GND	Ground		0V
7	HDMI_TX1N			0.5V

J1	Signal	Description or functions	GPIO serial	IO Voltage
8	HDMI_TX2N			0.5V
9	HDMI_TX1P			0.5V
10	HDMI_TX2P			0.5V
11	HDMI_HPD	HDMI HPD input		3.3V
12	HDMI_CEC	HDMI_CEC/SPI3_CS1_M1	GPIO4_D1_u	3.3V
13	I2C_SDA_HDMI	I2C5_SDA_M1	GPIO4_D0_u	3.3V
14	I2C_SCL_HDMI	I2C5_SCL_M1	GPIO4_C7_u	3.3V
15	GND	Ground		0V
16	LCDC_VSYNC/ UART5_TX_M1	VOP_BT1120_D14/SPI1_MISO_M1/I2S1_SDO3_M2	GPIO3_C2_d	3.3V
17	LCDC_HSYNC/ PCIE20_PERSTn_M1	VOP_BT1120_D13/SPI1_MOSI_M1/I2S1_SDO2_M2	GPIO3_C1_d	3.3V
18	LCDC_CLK/ UART8_RX_M1	VOP_BT1120_CLK/SPI2_CLK_M1/I2S1_SDO1_M2	GPIO3_A0_d	3.3V
19	LCDC_DEN/ UART5_RX_M1	VOP_BT1120_D15/SPI1_CLK_M1/I2S1_SCLK_RX_M2	GPIO3_C3_d	3.3V
20	LVDS_MIPI_TX_D0P	LVDS0 or MIPI0 DSI D0P TX	Note(1)	0.5V
21	LVDS_MIPI_TX_D0N	LVDS0 or MIPI0 DSI D0N TX	Note(1)	0.5V
22	LVDS_MIPI_TX_D1P	LVDS0 or MIPI0 DSI D1P TX	Note(1)	0.5V
23	LVDS_MIPI_TX_D1N	LVDS0 or MIPI0 DSI D1N TX	Note(1)	0.5V
24	LVDS_MIPI_TX_D2P	LVDS0 or MIPI0 DSI D2P TX	Note(1)	0.5V
25	LVDS_MIPI_TX_D2N	LVDS0 or MIPI0 DSI D2N TX	Note(1)	0.5V
26	LVDS_MIPI_TX_D3P	LVDS0 or MIPI0 DSI D3P TX	Note(1)	0.5V
27	LVDS_MIPI_TX_D3N	LVDS0 or MIPI0 DSI D3N TX	Note(1)	0.5V
28	LCDC_D8/GPIO3_A1	VOP_BT1120_D0/SPI1_CS0_M1/PCIe30x1_PERSTn_M1	GPIO3_A1_d	3.3V
29	LCDC_D9/I2S3_MCLK_M0	VOP_BT1120_D1	GPIO3_A2_d	3.3V
30	LVDS_MIPI_TX_CLKP	LVDS0 or MIPI0 DSI CLKP TX	Note(1)	0.5V
31	LVDS_MIPI_TX_CLKN	LVDS0 or MIPI0 DSI CLKN TX	Note(1)	0.5V
32	LCDC_D10/I2S3_SCLK_M0	VOP_BT1120_D2	GPIO3_A3_d	3.3V
33	LCDC_D11/I2S3_LRCK_M0	VOP_BT1120_D3	GPIO3_A4_d	3.3V
34	LCDC_D12/I2S3_SDO_M0	VOP_BT1120_D4	GPIO3_A5_d	3.3V
35	LCDC_D13/I2S3_SDI_M0	VOP_BT1120_CLK	GPIO3_A6_d	3.3V
36	LCDC_D14/GPIO3_A7	VOP_BT1120_D5	GPIO3_A7_d	3.3V
37	LCDC_D15/GPIO3_B0	VOP_BT1120_D6	GPIO3_B0_d	3.3V

J1	Signal	Description or functions	GPIO serial	IO Voltage
38	LCDC_D16/UART4_RX_M1	VOP_BT1120_D7/PWM8_M0	GPIO3_B1_d	3.3V
39	LCDC_D17/UART4_TX_M1	VOP_BT1120_D8/PWM9_M0	GPIO3_B2_d	3.3V
40	LCDC_D18/I2C5_SCL_M0	VOP_BT1120_D9/PDM_SDI0_M2	GPIO3_B3_d	3.3V
41	LCDC_D19/I2C5_SDA_M0	VOP_BT1120_D10/PDM_SDI1_M2	GPIO3_B4_d	3.3V
42	LCDC_D20/GPIO3_B5	VOP_BT1120_D11/PWM10_M0/I2C3_SCL_M1	GPIO3_B5_d	3.3V
43	LCDC_D21/PWM11_IR_M0	VOP_BT1120_D12/I2C3_SDA_M1	GPIO3_B6_d	3.3V
44	GND	Ground		0V
45	MIPI_CSI_RX_CLK0N			0.5V
46	MIPI_CSI_RX_D0P			0.5V
47	MIPI_CSI_RX_CLK0P			0.5V
48	MIPI_CSI_RX_D0N			0.5V
49	MIPI_CSI_RX_D2N	MIPI_CSI_RX1_D0N		0.5V
50	MIPI_CSI_RX_D1N			0.5V
51	MIPI_CSI_RX_D2P	MIPI_CSI_RX1_D0P		0.5V
52	MIPI_CSI_RX_D1P			0.5V
53	MIPI_CSI_RX_D3P	MIPI_CSI_RX1_D1P		0.5V
54	GND	Ground		0V
55	MIPI_CSI_RX_D3N	MIPI_CSI_RX1_D1N		0.5V
56	MIPI_CSI_RX_CLK1N	MIPI_CSI_RX1_CLKN		0.5V
57	RTC_CLKO_WIFI	RTC 32.768KHz CLK output		1.8V
58	MIPI_CSI_RX_CLK1P	MIPI_CSI_RX1_CLKP		0.5V
59	GND	Ground		0V
60	CIF_D9_GMAC1_TXD3_M1_1V8	EBC_SDDO9/UART1_RX_M1/PDM_SDI0_M1	GPIO3_D7_d	1.8V
61	CIF_D8_GMAC1_TXD2_M1_1V8	EBC_SDDO8/UART1_TX_M1/PDM_CLK0_M1	GPIO3_D6_d	1.8V
62	CIF_D11_GMAC1_RXD2_M1_1V8	EBC_SDDO11/PDM_SDI1_M1	GPIO4_A1_d	1.8V
63	CIF_D10_GMAC1_TXCLK_M1_1V8	EBC_SDDO10/PDM_CLK1_M1	GPIO4_A0_d	1.8V
64	CIF_D13_GMAC1_RXCLK_M1_1V8	EBC_SDDO13/UART7_RX_M2/PDM_SDI3_M1	GPIO4_A3_d	1.8V
65	CIF_D12_GMAC1_RXD3_M1_1V8	EBC_SDDO12/UART7_TX_M2/PDM_SDI2_M1	GPIO4_A2_d	1.8V
66	CIF_D15_GMAC1_TXD1_M1_1V8	EBC_SDDO15/UART9_RX_M2/I2S2_LRCK_RX_M1	GPIO4_A5_d	1.8V

J1	Signal	Description or functions	GPIO serial	IO Voltage
67	CIF_D14_GMAC1_TXD0_M1_1V8	EBC_SDDO14/UART9_TX_M2/I2S2_LRCK_TX_M1	GPIO4_A4_d	1.8V
68	GMAC1_TXEN_M1_1V8	EBC_SDCE0/SPI3_CS0_M0/I2S1_SCK_RX_M1	GPIO4_A6_d	1.8V
69	GMAC1_RXD0_M1_1V8/CAM_CLKOUT0	EBC_SDCE1/SPI3_CS1_M0/I2S1_LRCK_RX_M1	GPIO4_A7_d	1.8V
70	GMAC1_RXD1_M1_1V8/CAM_CLKOUT1	EBC_SDCE2/SPI3_MISO_M0/I2S1_SDO1_M1	GPIO4_B0_d	1.8V
71	GMAC1_RXDV_CRS_M1_1V8	EBC_SDCE3/I2S1_SDO2_M1	GPIO4_B1_d	1.8V
72	CIF_HREF_GMAC1_MDC_M1_1V8	EBC_SDLE/UART1_RTS_M1/I2S2_MCLK_M1	GPIO4_B6_d	1.8V
73	CIF_VSYNC_GMAC1_MDIO_M1_1V8	EBC_SDOE/I2S2_SCK_TX_M1	GPIO4_B7_d	1.8V
74	CIF_CLKOUT/PWM11_IR_M1_1V8	EBC_GDCLK	GPIO4_C0_d	1.8V
75	CIF_CLKIN_GMAC1_MCLKINOUT_M1_1V8	EBC_SDCLK/UART1_CTS_M1/I2S2_SCK_RX_M1	GPIO4_C1_d	1.8V
76	I2C4_SCL_M0_1V8/ETH1_CLKO_25M_M1	EBC_GDOE/SPI3_CLK_M0/I2S2_SDO_M1	GPIO4_B3_d (Pull up 2.2K onboard)	1.8V
77	I2C4_SDA_M0_1V8/GMAC1_RXER_M1	EBC_VCOM/SPI3_MOSI_M0/I2S2_SDI_M1	GPIO4_B2_d (Pull up 2.2K onboard)	1.8V
78	GND	Ground		0V
79	EDP_TX_D1N			0.5V
80	EDP_TX_D0N			0.5V
81	EDP_TX_D1P			0.5V
82	EDP_TX_D0P			0.5V
83	PHY_LED2/CFG_LDO1	LINK LED+		3.3V
84	PHY_LED1/CFG_LDO0	SPEED LED-		3.3V
85	EDP_TX_AUXN			0.5V
86	EDP_TX_AUXP			0.5V
87	PCIE20_TXP	Or SATA2/QSGMII_TXP		0.5V
88	SARADC_VIN2_1V8			1.8V
89	PCIE20_TXN	Or SATA2/QSGMII_TXN		0.5V
90	SARADC_VIN0/RECOVERY_1V8	Recover Key input	(Pull up10K onboard)	1.8V
91	GPIO0_A0_d	REFCLK_OUT		3.3V
92	PCIE20_RXP	Or SATA2/QSGMII_RXP		0.5V
93	PCIE20_REFCLKP			0.5V
94	PCIE20_RXN	Or SATA2/QSGMII_RXN		0.5V

J1	Signal	Description or functions	GPIO serial	IO Voltage
95	PCIE20_REFCLKN			0.5V
96	VCC_RTC	VCC_RTC Power input		1.8-3.3V
97	VCC3V3_SYS	3V3 IO output for Carry board	Max 500mA	3.3V
98	GND	Ground		0V
99	VCC3V3_SYS	3V3 IO output for Carry board		3.3V
100	GND	Ground		0V

J2	Signal	Description or functions	GPIO serial	IO Voltage
1	VCC_SYS	3.3-5V Main Power input		3.4-5V
2	GND	Ground		0V
3	VCC_SYS	3.3-5V Main Power input		3.4-5V
4	GND	Ground		0V
5	PMIC_EN	Power On Control signal	Note(3)	3.4-5V
6	PHY_MDI0+			0.5V
7	PHY_MDI1+			0.5V
8	PHY_MDI0-			0.5V
9	PHY_MDI1-			0.5V
10	PWM3_IR	EPD_HPDIN_M1/PCIE30x1_WAKEn_M0	GPIO0_C2_d	3.3V
11	PHY_MDI2+			0.5V
12	PHY_MDI3+			0.5V
13	PHY_MDI2-			0.5V
14	PHY_MDI3-			0.5V
15	GND	Ground		0V
16	SPDIF_TX_M0	UART4_RX_M0/PDM_CLK1_M0/I2S1_SCLK_RX_M0	GPIO1_A4_d	3.3V
17	CIF_D4_SDMMC2_CMD_M0_1V8	EBC_SDDO4/I2S1_SDI0_M1/VOP_BT656_D4_M1	GPIO3_D2_d	1.8V
18	CIF_D0_SDMMC2_D0_M0_1V8	EBC_SDDO0/I2S1_MCK_M1/VOP_BT656_D0_M1	GPIO3_C6_d	1.8V
19	CIF_D1_SDMMC2_D1_M0_1V8	EBC_SDDO1/I2S1_SCK_TX_M1/VOP_BT656_D1_M1	GPIO3_C7_d	1.8V
20	CIF_D2_SDMMC2_D2_M0_1V8	EBC_SDDO2/I2S1_LRCK_TX_M1/VOP_BT656_D2_M1	GPIO3_D0_d	1.8V
21	CIF_D3_SDMMC2_D3_M0_1V8	EBC_SDDO3/I2S1_SDO0_M1/VOP_BT656_D3_M1	GPIO3_D1_d	1.8V
22	CIF_D5_SDMMC2_CLK_M0_1V8	EBC_SDDO5/I2S1_SDI1_M1/VOP_BT656_D5_M1	GPIO3_D3_d	1.8V
23	CIF_D6_1V8	EBC_SDDO6/I2S1_SDI2_M1/VOP_BT656_D6_M1	GPIO3_D4_d	1.8V
24	CIF_D7_1V8	EBC_SDDO7/I2S1_SDI2_M1/VOP_BT656_D7_M1	GPIO3_D5_d	1.8V

J2	Signal	Description or functions	GPIO serial	IO Voltage
25	CAN2_RX_M0_1V8	EBC_GDSP/I2C2_SDA_M1/VOP_BT656_CLK_M1	GPIO4_B4_d	1.8V
26	CAN2_TX_M0_1V8	EBC_SDSHR/I2C2_SCL_M1/I2S_SDO3_M1	GPIO4_B5_d	1.8V
27	GPIO2_C1_d_1V8		GPIO2_C1_d	1.8V
28	GPIO0_D6_d_1V8		GPIO0_D6_d	1.8V
29	SPI0_CLK_M0	PCIe20_WAKE_M0/PWM1_M1/I2C2_SCL_M0	GPIO0_B5_u	3.3V
30	SPI0_CS0_M0	PCIe30x2_PERST_M0/PWM7_IR_M1	GPIO0_C6_d	3.3V
31	SPI0_MISO_M0	PCIe30x2_WAKE_M0/PWM6_M1	GPIO0_C5_d	3.3V
32	SPI0_MOSI_M0	PCIe20_PERST_M0/PWM2_M1/I2C2_SDA_M0	GPIO0_B6_u	3.3V
33	UART7_RX_M1	SPDIF_TX_M1/I2S1_LRCK_RX_M2/PWM15_IR_M0	GPIO3_C5_d	3.3V
34	UART7_TX_M1	PDM_CLK1_M2/VOP_PWM_M1/PWM14_M0	GPIO3_C4_d	3.3V
35	UART8_RX_M0_1V8	CLK32K_OUT1	GPIO2_C6_d	1.8V
36	UART8_TX_M0_1V8		GPIO2_C5_d	1.8V
37	GND	Ground		0V
38	UART8_CTS_M0_1V8	CAN2_TX_M1/I2C4_SCL_M1	GPIO2_B2_u	1.8V
39	USB3_OTG0_DM	Or ADB/debug USB port		0.5V
40	UART8_RTS_M0_1V8	CAN2_RX_M1/I2C4_SDA_M1	GPIO2_B1_d	1.8V
41	USB3_OTG0_DP	Or ADB/debug USB port		0.5V
42	USB3_OTG0_ID			1.8V
43	USB3_HOST1_DM			0.5V
44	USB3_OTG0_VBUS	VBUS DET input		3.3V
45	USB3_HOST1_DP			0.5V
46	USB2_HOST3_DM			0.5V
47	SATA0_ACT_LED/UART9_RX_M1	SPI3_CS0_M1/I2S3_SDI_M1/PWM13_M1	GPIO4_C6_d	3.3V
48	USB2_HOST3_DP			0.5V
49	CAN1_RX_M1/PWM14_M1	SPI3_CLK_M1/I2S3_MCLK_M1/PCIe30x2_CLKREQ_M2	GPIO4_C2_d	3.3V
50	GND	Ground		0V
51	SATA1_ACT_LED/UART9_TX_M1	SPI3_MISO_M1/I2S3_SDO_M1/PWM12_M1	GPIO4_C5_d	3.3V
52	CAN1_TX_M1/PWM15_IR_M1D	SPI3_MOSI_M1/I2S3_SCLK_M1/PCIe30x2_WAKE_M2	GPIO4_C3_d	3.3V

J2	Signal	Description or functions	GPIO serial	IO Voltage
53	GND	Ground		0V
54	SPDIF_TX_M2/SATA2_ACT_LED	EDP_HPD_M0/I2S3_LRCK_M1/PCIe30x2_PERST_M2	GPIO4_C4_d	3.3V
55	USB3_OTG0_SSRXN	Or SATA0_RXN		0.5V
56	USB3_OTG0_SSTXN	Or SATA0_TXN		0.5V
57	USB3_OTG0_SSRXP	Or SATA0_RXP		0.5V
58	USB3_OTG0_SSTXP	Or SATA0_TXP		0.5V
59	USB3_HOST1_SSRXP	Or SATA1/QSGMII_RXP		0.5V
60	USB3_HOST1_SSTXP	Or SATA1/QSGMII_TXP		0.5V
61	USB3_HOST1_SSRXN	Or SATA1/QSGMII_RXN		0.5V
62	USB3_HOST1_SSTXN	Or SATA1/QSGMII_TXN		0.5V
63	SDMMC0_CLK	UART5_TX_M0/CAN0_RX_M1	GPIO2_A2_d	3.3V
64	GND	Ground		0V
65	SDMMC_D0	UART2_TX_M1/UART6_TX_M1/PWM8_M1	GPIO1_D5_u	3.3V
66	SDMMC_CMD	UART5_RX_M0/CAN0_TX_M1/PWM10_M1	GPIO2_A1_u	3.3V
67	SDMMC_D2	UART5_CTS_M0	GPIO1_D7_u	3.3V
68	SDMMC_D1	UART2_RX_M1/UART6_RX_M1/PWM9_M1	GPIO1_D6_u	3.3V
69	SDMMC_DET	PCIe30x1_CLKREQ_M0/SATA_CP_DET	GPIO0_A4_u	3.3V
70	SDMMC_D3	UART5_RTS_M0	GPIO1_A0_u	3.3V
71	PCIE20_CLKREQn_M0/GPIO0_A5	SATA_MP_SWITCH	GPIO0_A5_d	3.3V
72	LCD0_BL_PWM4	PCIe30x1_PERST_M0	GPIO0_C3_d	3.3V
73	LCD0_PWREN_H_GPIO0_C7	HDMITX_CEC_M1/PWM0_M1	GPIO0_C7_d	3.3V
74	LCD1_BL_PWM5	SPI0_CS1_M0	GPIO0_C4_d	3.3V
75	I2S1_SDI0_M0/PDM_SDI0_M0		GPIO1_B3_d	3.3V
76	I2S1_MCLK_M0	UART3_RTS_M0/SCR_CLK/PCIe30x1_PERST_M2	GPIO1_A2_d	3.3V
77	I2S1_SCLK_TX_M0	UART3_CTS_M0/SCR_IO/PCIe30x1_WAKE_M2	GPIO1_A3_d	3.3V
78	PDM_CLK0_M0	UART4_TX_M0/I2S1_LRCK_RX_M0/AU_PWM_ROUTP	GPIO1_A6_d	3.3V
79	I2S1_LRCK_TX_M0	UART4_RTS_M0/SCR_RST/PCIe30x1_CLKREQ_M2	GPIO1_A5_d	3.3V
80	I2S1_SDO0_M0	UART4_CTS_M0/SCR_DET/AU_PWM_ROUTN	GPIO1_A7_d	3.3V

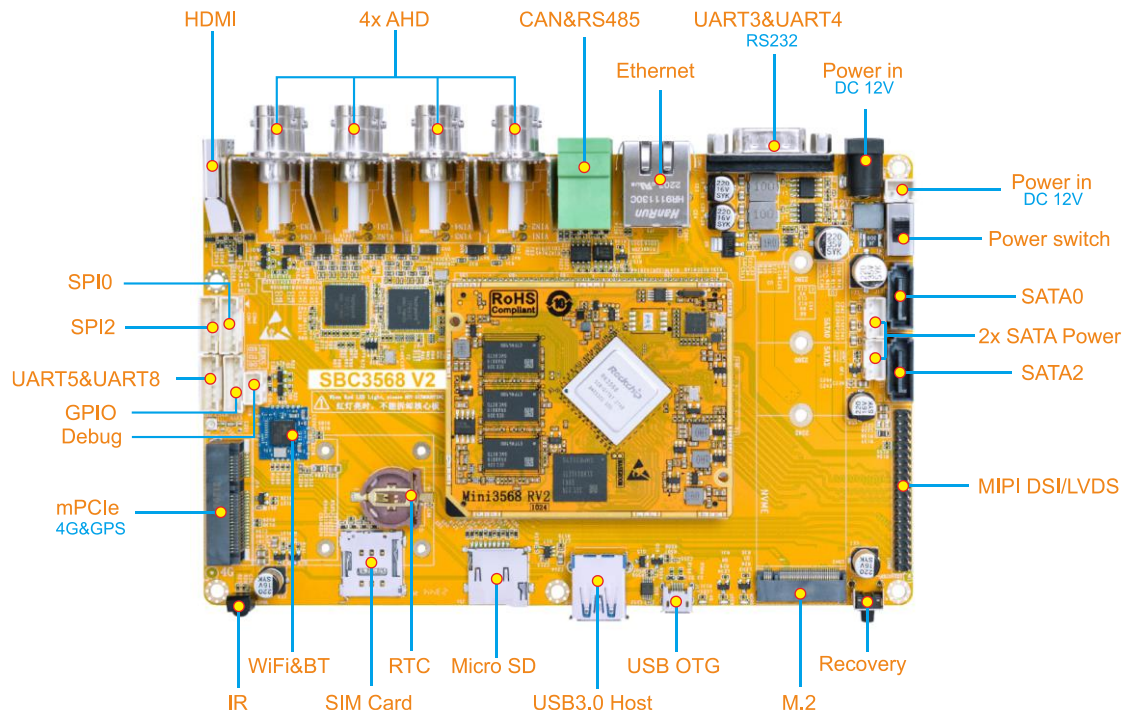| J2	Signal	Description or functions	GPIO serial	IO Voltage
81	PDM_SDI1_M0_ADC	I2S1_SDI1_SDO3_M0/PCIe20_PERST_M2	GPIO1_B2_d	3.3V
82	PDM_SDI2_M0_ADC	I2S1_SDI2_SDO2_M0/PCIe20_WAKE_M2	GPIO1_B1_d	3.3V
83	PDM_SDI3_M0_ADC	I2S1_SDI3_SDO1_M0/PCIe20_CLKREQ_M2	GPIO1_B0_d	3.3V
84	LCDC_D0/SPI0_MISO_M1/I2S1_MCLK_M2	PCIe20_CLKREQ_M1/VOP_BT656_D0_M0	GPIO2_D0_d	3.3V
85	I2C3_SDA_M0	UART3_RX_M0/CAN1_RX_M0/AU_PWM_LOUTP	GPIO1_A0_u	3.3V
86	GND	Ground		0V
87	LCDC_D1/SPI0_MOSI_M1/I2S1_SCK_Tx_M2	PCIe20_WAKE_M1/VOP_BT656_D1_M0	GPIO2_D1_d	3.3V
88	I2C3_SCL_M0	UART3_TX_M0/CAN1_TX_M0/AU_PWM_LOUTN	GPIO1_A1_u	3.3V
89	I2C1_SDA/CAN0_RX_M0	PCIe20_BUTTONRST/MCU_JTAG_TCK	GPIO0_B4_u(Pull up 2.2K)	3.3V
90	LCDC_D2/SPI0_CS0_M1/I2S1_LRCK_TX_M2	PCIe30x1_CLKREQ_M1/VOP_BT656_D2_M0	GPIO2_D2_d	3.3V
91	UART2_RX_M0_DEBUG		GPIO0_D0_u	3.3V
92	I2C1_SCL/CAN0_TX_M0	PCIe30x1_BUTTONRST/MCU_JTAG_TDO	GPIO0_B3_u(Pull up 2.2K)	3.3V
93	LCDC_D23/UART3_RX_M1	PDM_SDI3_M2/PWM13_M0	GPIO3_C0_d	3.3V
94	UART2_TX_M0_DEBUG		GPIO0_D1_u	3.3V
95	LCDC_D3/SPI0_CLK_M1/I2S1_SDI0_M2	PCIe30x1_WAKE_M1/VOP_BT656_D3_M0	GPIO2_D3_d	3.3V
96	LCDC_D22/UART3_TX_M1	PDM_SDI2_M2/PWM12_M0	GPIO3_B7_d	3.3V
97	LCDC_D4/SPI0_CS1_M1/I2S1_SDI1_M2	PCIe30x2_CLKREQ_M1/VOP_BT656_D4_M0	GPIO2_D4_d	3.3V
98	LCDC_D5/SPI2_CS0_M1/I2S1_SDI2_M2	PCIe30x2_WAKE_M1/VOP_BT656_D5_M0	GPIO2_D5_d	3.3V
99	LCDC_D6/SPI2_MOSI_M1/I2S1_SDI3_M2	PCIe30x2_PERST_M1/VOP_BT656_D6_M0	GPIO2_D6_d	3.3V
100	LCDC_D7/SPI2_MISO_M1/I2S1_SDO0_M2/UART8_TX_M1	VOP_BT656_D7_M0	GPIO2_D7_d	3.3V

J3	Signal	Description or functions	GPIO serial	IO Voltage
1	MIPI_DSI_TX1_D3P	LVDS1 or MIPI1 DSI D3P TX	Note(1)(2)	0.5V
2	GND	Ground		0V
3	MIPI_DSI_TX1_D3N	LVDS1 or MIPI1 DSI D3N TX	Note(1)(2)	0.5V
4	GPIO4_D2_d		GPIO4_D2_d	3.3V
5	MIPI_DSI_TX1_D2P	LVDS1 or MIPI1 DSI D2P TX	Note(1)(2)	0.5V
6	MIPI_DSI_TX1_CLKP	LVDS1 or MIPI1 DSI CKP TX	Note(1)(2)	0.5V
7	MIPI_DSI_TX1_D2N	LVDS1 or MIPI1 DSI D2N TX	Note(1)(2)	0.5V
8	MIPI_DSI_TX1_CLKN	LVDS1 or MIPI1 DSI CKN TX	Note(1)(2)	0.5V
9	MIPI_DSI_TX1_D1P	LVDS1 or MIPI1 DSI D1P TX	Note(1)(2)	0.5V
10	MIPI_DSI_TX1_D0P	LVDS1 or MIPI1 DSI D0P TX	Note(1)(2)	0.5V
11	MIPI_DSI_TX1_D1N	LVDS1 or MIPI1 DSI D1N TX	Note(1)(2)	0.5V
12	MIPI_DSI_TX1_D0N	LVDS1 or MIPI1 DSI D0N TX	Note(1)(2)	0.5V
13	GND	Ground		0V
14	PCIE30_RX1P			0.5V
15	PCIE30_RX0P			0.5V
16	PCIE30_RX1N			0.5V
17	PCIE30_RX0N			0.5V
18	GND	Ground		0V
19	PCIE30_TX1P			0.5V
20	PCIE30_TX0P			0.5V
21	PCIE30_TX1N			0.5V
22	PCIE30_TX0N			0.5V
23	GND	Ground		0V
24	PCIE30_REFCLKP_IN			0.5V
25	PCIE30X2_CLKREQN_M0	SATA_CP_POD	GPIO0_A6_d	3.3V
26	PCIE30_REFCLKN_IN			0.5V
27	VCC_SYS	3.3-5V Main Power input		3.4-5V
28	GND	Ground		0V
29	VCC_SYS	3.3-5V Main Power input		3.4-5V
30	GND	Ground		0V

Note:

1. Default MIPI DSI output. But can change to LVDS output by software.

2. Can set to Du-LVDS.

3. Pull up to VCC_SYS，Setting 0V can Power OFF。
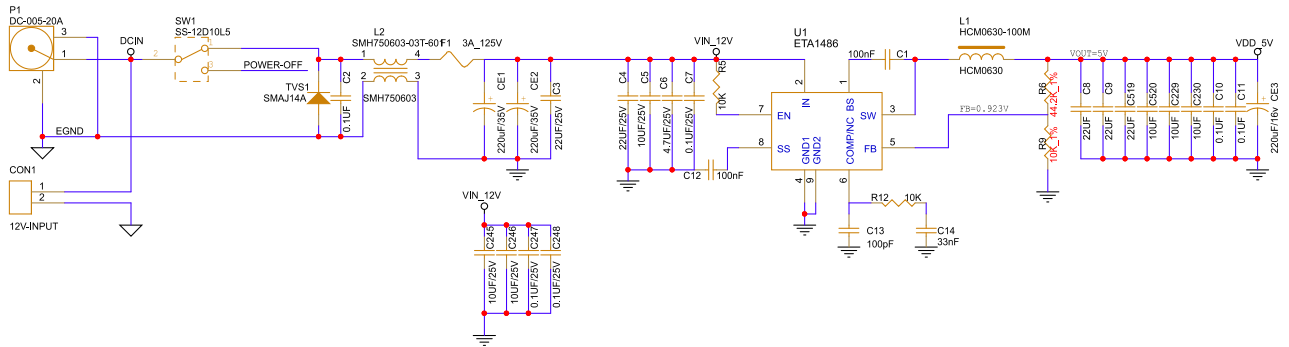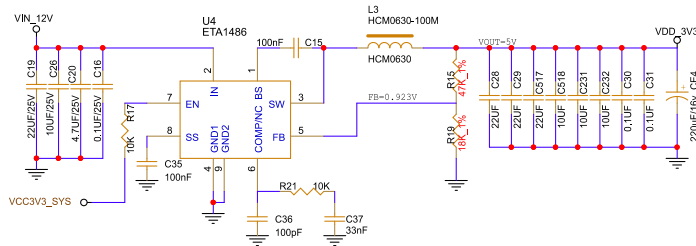
1.7 Development Kit (SBC3568)

HDMI
4x AHD
CAN&RS485
UART3&UART4
RS232
Ethernet
Power in
DC 12V
Power in
DC 12V
Power switch
SPI0
SPI2
SATA0
2x SATA Power
UART5&UART8
SATA2
GPIO
Debug
mPCIe
4G&GPS
MIPI DSI/LVDS
WiFi&BT
RTC
Micro SD
USB OTG
Recovery
IR
SIM Card
USB3.0 Host
M.2

2 Hardware Design Guide

2.1 Peripheral Circuit Reference

2.1.1 External Power

MAIN 5V
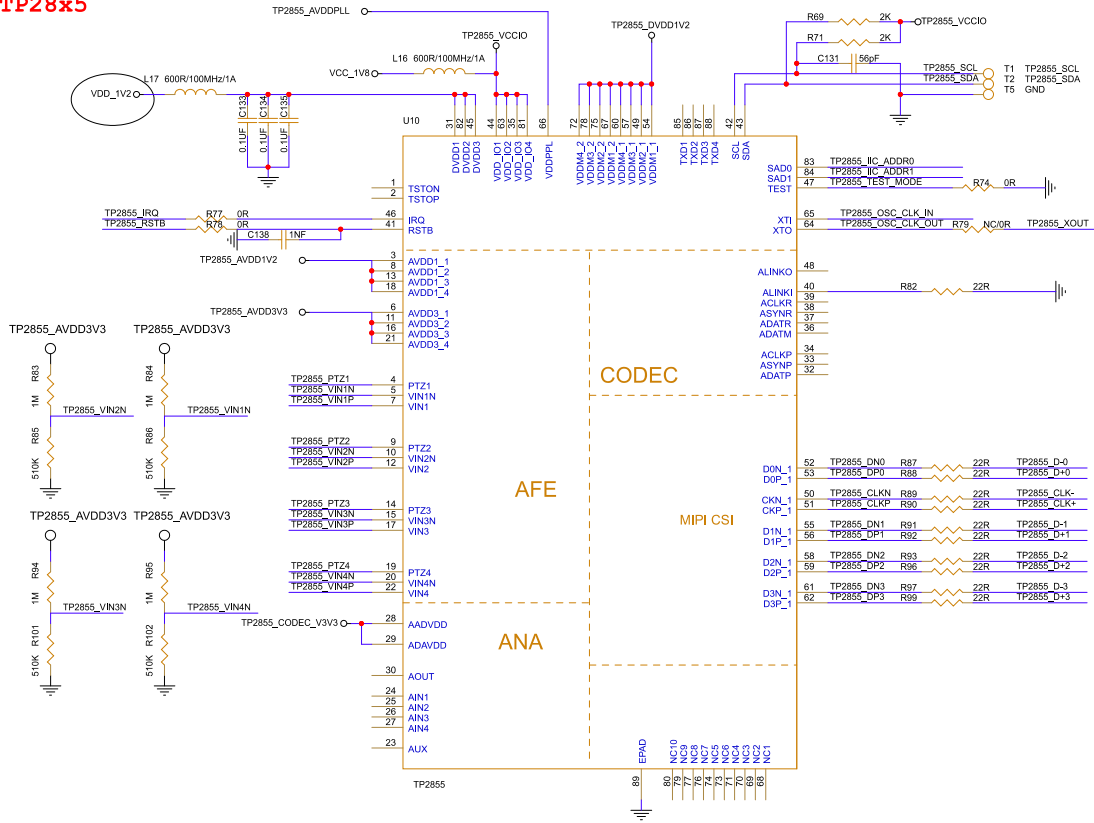

MAIN 3.3V

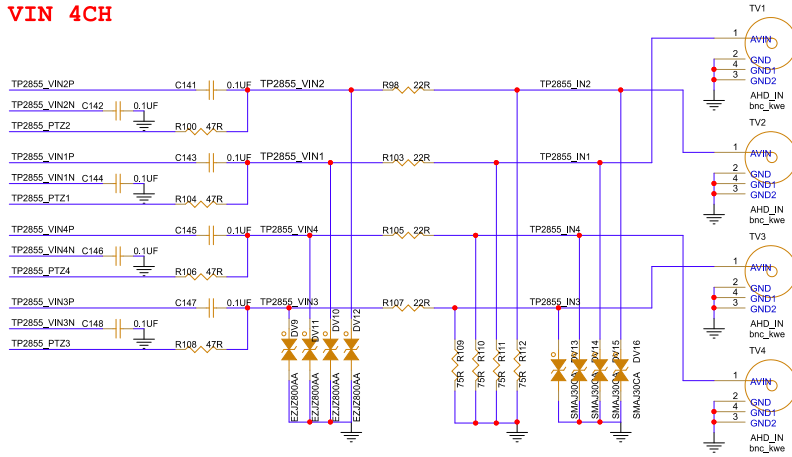### 2.1.2 Debug Circuit
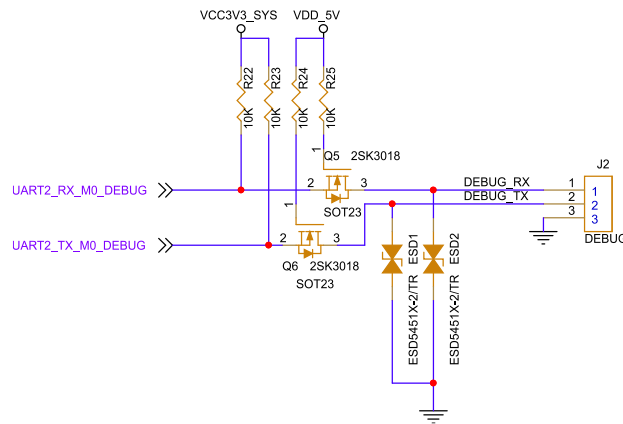
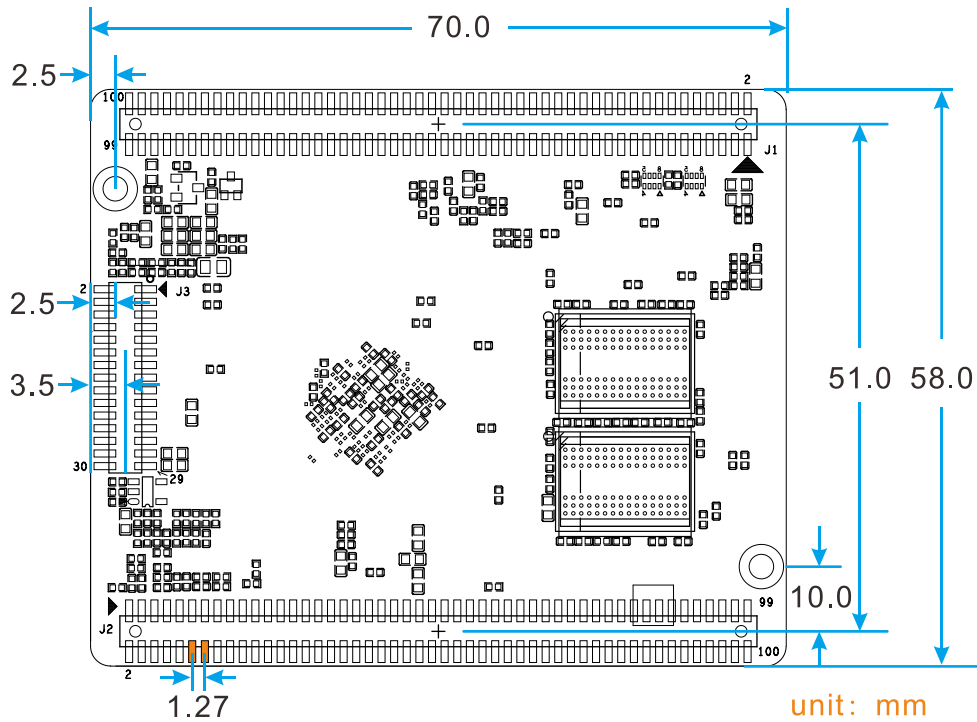## 2.1.3 TVI Interface Circuit

TP28x5

VIN 4CH

2.2 PCB Footprint

Top View

◆ *The picture of the carry board connectors (Pitch 1.27mm)*

3 Product Electrical Characteristics

3.1 Dissipation and Temperature

Symbol	Parameter	Min	Typ	Max	Unit
VCC_SYS	System IO Voltage	3.4V	5	5.5	V
Isys_in	VCC_SYS input Current		1400	2050	mA
VCC_RTC	RTC Voltage	1.8	3	3.4	V
Iirtc	RTC input Current		5	8	uA
VCC3V3_SYS	3V3 IO Voltage		3.3		V
I3v3_out	VCC_3V3 output Current			500	mA
Ta	Operating Temperature	-0		70	°C
Tstg	Storage Temperature	-40		85	°C

3.2 Reliability of Test

High Temperature Operating Test		
Contents	Operating 8h in high temperature	55°C±2°C
Result	Pass	

Operating Life Test		
Contents	Operating in room	120h
Result	Pass	