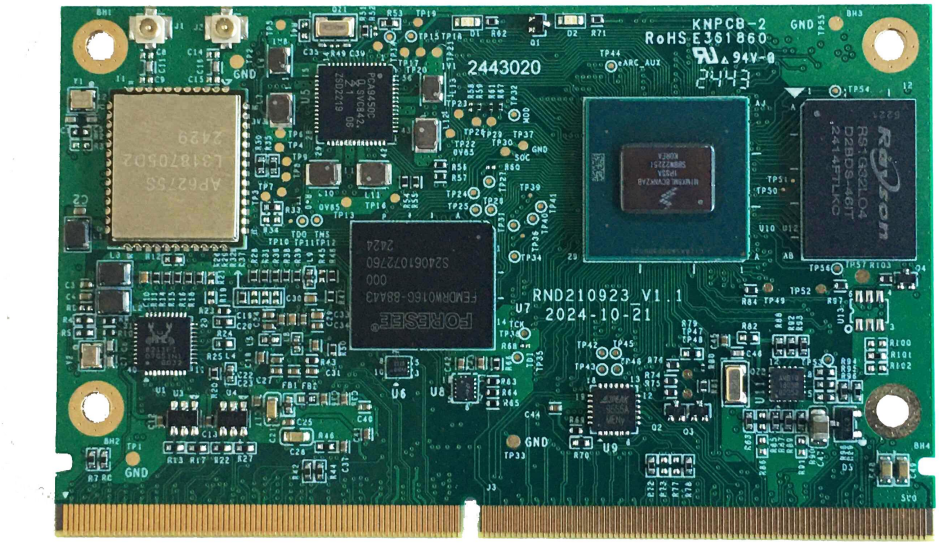
深 圳 金 亚 太 科 技 有 限 公 司

Shenzhen Geniatech Co.,Ltd.

NXP SMARC 核心板规格书

型号: SoM-MX8MP-SMARC



历史版本					
版本	**日期**	**板子 ID**	**页码**	**描述**	**作者**
V1.0	2022/5/6	RND210923_V1.0	9	Specification	
V1.1	2024/11/23	RND210923_V1.1	11	更换 WiFi 模组和 Pin 定义	

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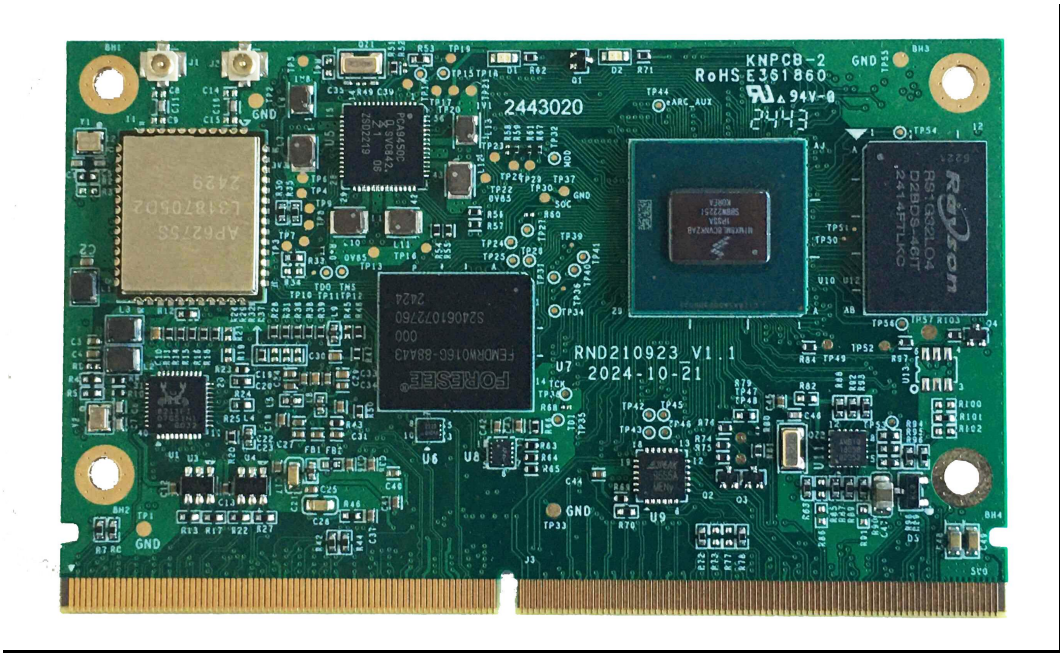
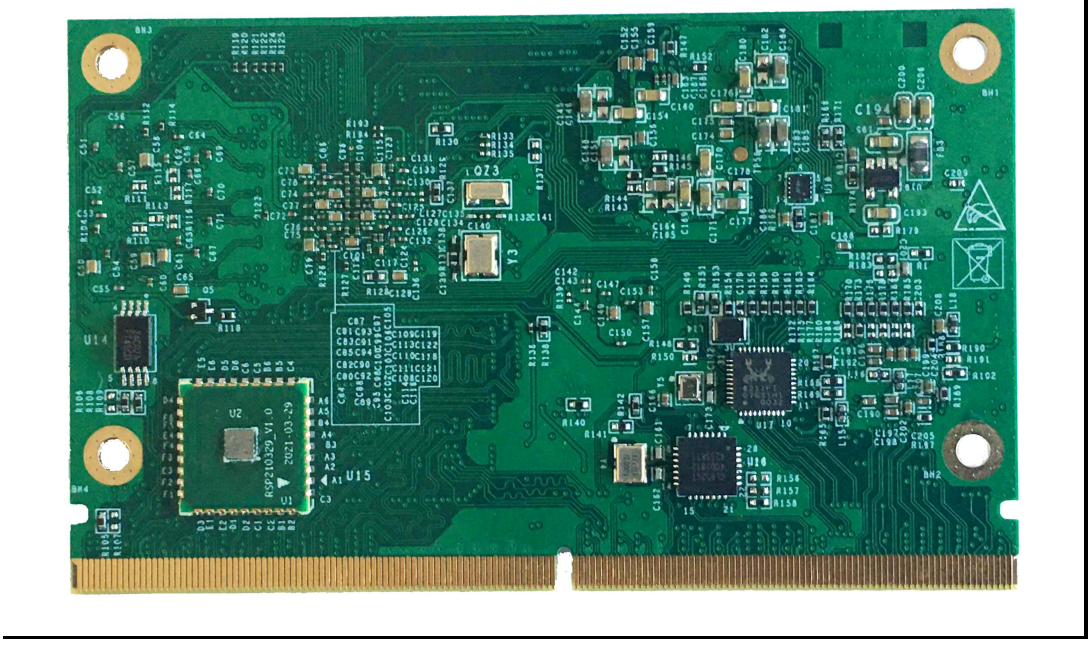
1. 产品描述

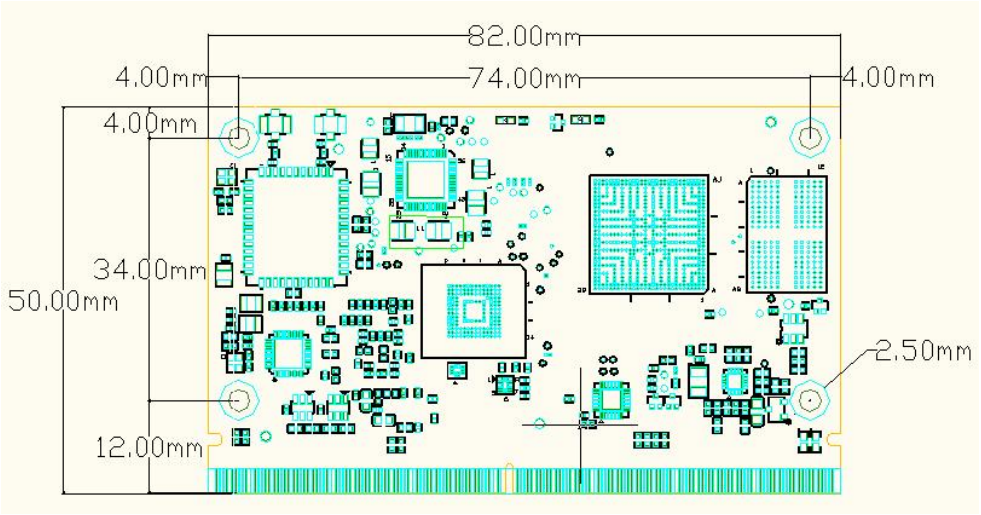
SoM-MX8MP-SMARC 采用 NXP i.MX8M Plus 处理器，基于 Quad Arm®Cortex®-A53 和 Cortex- m7 核，具有高达 2.3 TOPS 的神经处理单元(NPU)和双图像信号处理器(ISP)和两个摄像头输入，具有有效的高级视觉系统和行业领先的音频、语音和视频处理功能，集成 2.4G/5G 双频 WiFi 和蓝牙，适用于消费音频，广泛应用于机器学习和视觉、高级多媒体和高可靠性的工业自动化。Geniatech 开发的核心板和开发板基于 i.MX8M Plus 系列应用处理器设计，核心板基于 SMARC 硬件技术规范 2.1 进行兼容设计，适用于市场上所有具有相同接口的开发板。

2. 产品外观





尺寸图



3. 产品特性

芯片组	NXP i.MX8M Plus	
市场区域	全球	
语言	英语/汉语	
处理器	系统	安卓 10.0/Linux(Yocto)
	CPU	Quad ARM Cortex-A53 up to 1.8GHz& Cortex M7 up to 800MHz
	GPU	GC7000UL with OpenCL and Vulkan support
	NPU	2.3 TOP/s Neural Network performance
	内存	4GB(1-4G Optional)
	存储	16GB（16-128G Optional）
无线网络	WiFi	IEEE802.11 a/b/g/n/ac/ax
	蓝牙	BT5.0
SMARC 2.1	Ethernet	**2 x RGMII**
	PCIe	**1 x PCIe Gen3(single lane)**
	USB2.0	***4**
	USB 3.0	***2**
	MIPI CSI	***2(1*4 lane and 1*2 lane)**
	HDMI	***1(HDMI 2.0)**
	LVDS	***1(LVDS0 multiplex with MIPI DSI)**
	LVDS Backlight	***1**
	I2S	***2**
	MIPI DSI	***1(multiplex with LVDS0)**
	GPIO	***12**
	SDIO	***1**
	UART	***4**
	SPI	***2**
	I2C	***4**
	CAN	***2**

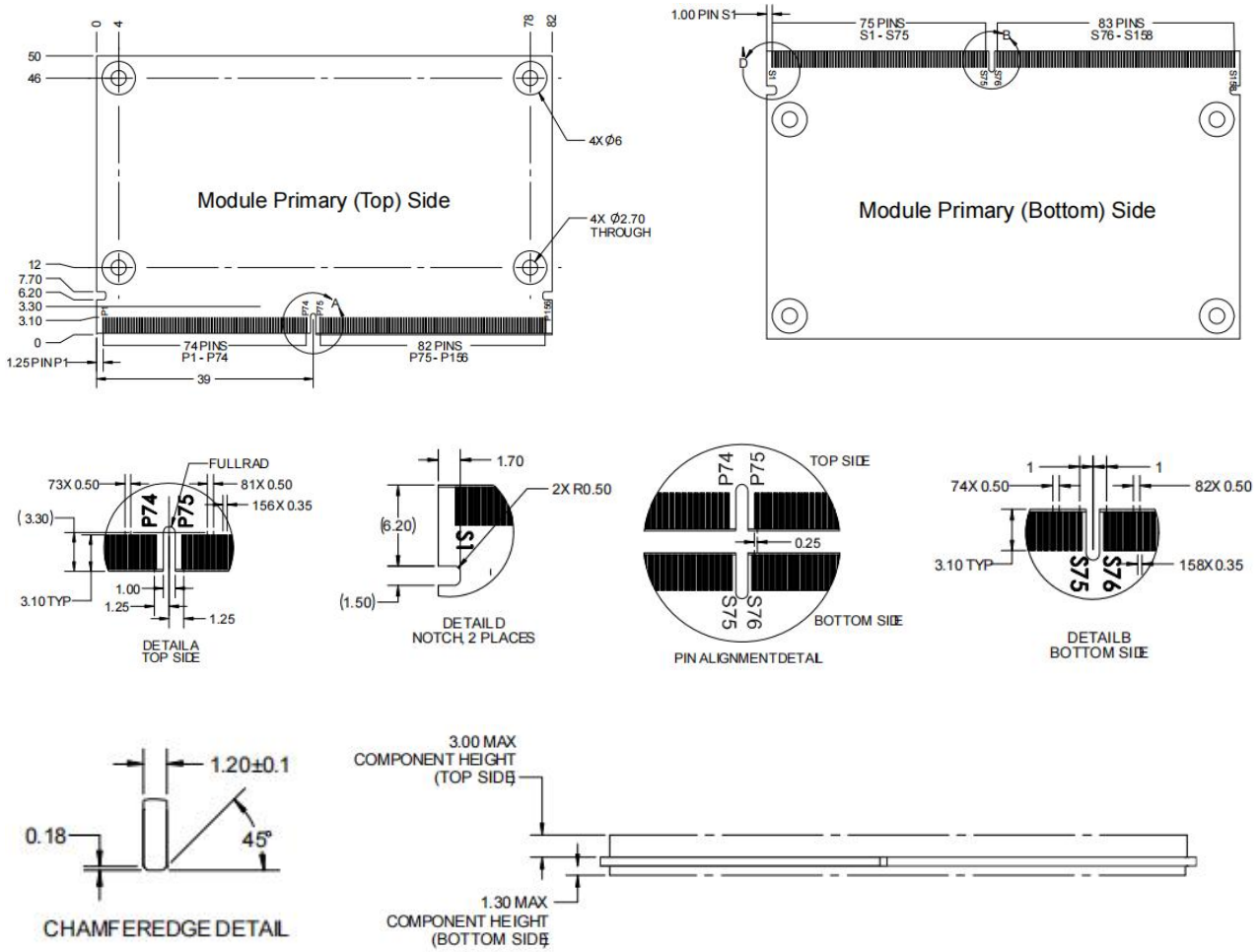
	Vin	**5V/3A**
尺寸	82 x 50 mm	

4. SOM 模块规格

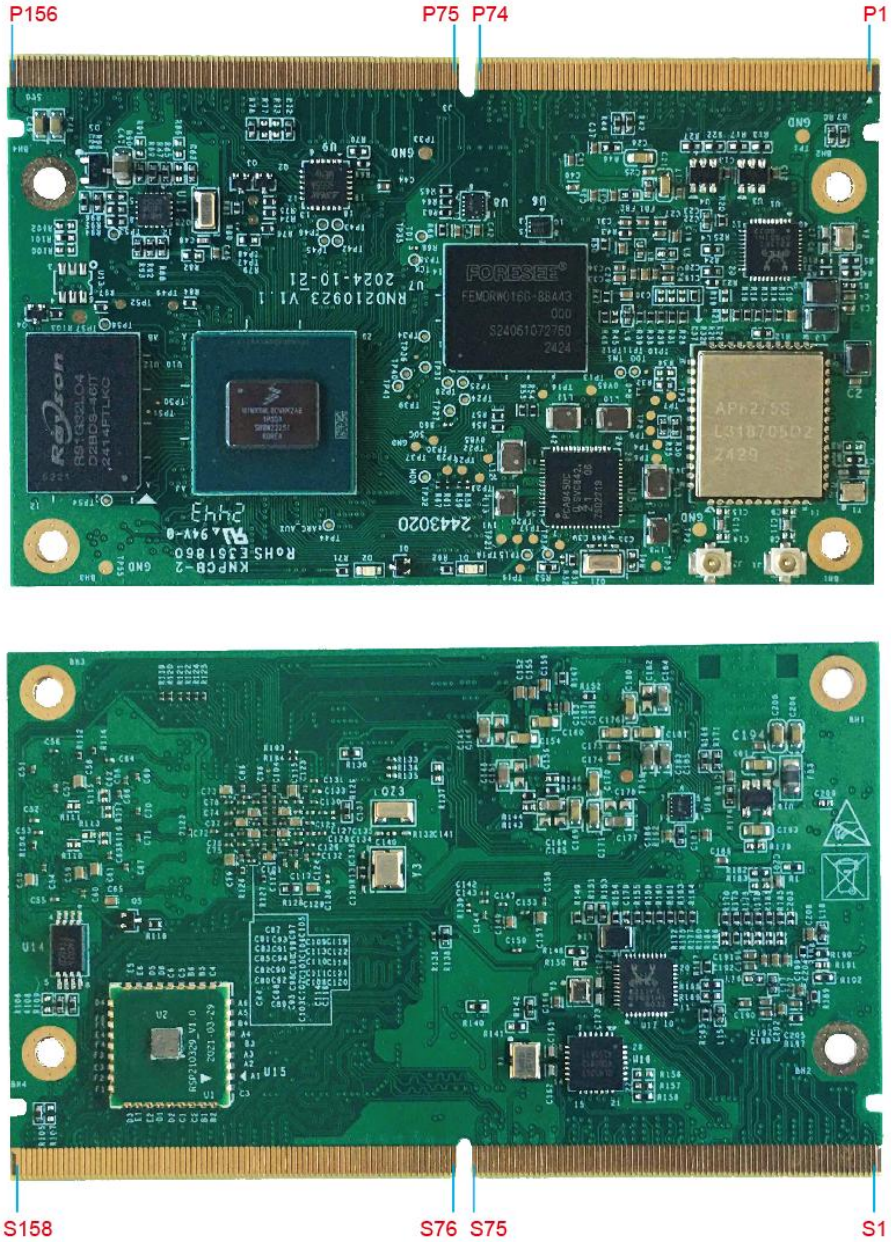
4.1 SMARC2.1 标准描述

SMARC(“智能移动架构”)是一种多功能的小尺寸计算机模块，旨在运行雨鞋要求低功耗、低成本和高性能的应用。这些模块通常使用 ARM soc，类似于平板电脑和智能手机等许多常见设备中使用的 soc。可选的低功耗 soc 和 cpu，如面向平板的 x86 设备和其他 RISC cpu 也可以使用。模块的功率包络通常在 6W 以下，尽管设计高达约 15W 是可能的。

模块有两种尺寸的定义:82 毫米 x 50 毫米和 82 毫米 x 80 毫米。模块 pcb 有 314 个金手指。这些模块被用作便携式和固定式嵌入式系统的构建模块。该模块集中了核心 CPU 和支持电路，包括 DRAM、引导闪存、电源排序、CPU 电源、千兆以太网和双通道 LVDS 显示发射机。该模块与应用特定的运营商板一起使用，实现其他功能，如音频编解码器，触摸控制器，无线设备等。模块化方法具有可扩展性、快速上市和可升级性，同时仍然保持低成本、低功耗和小的物理尺寸。



4.2 模块定义



No.	Functional Description	No.	Functional Description	No.	Functional Description
P1	NC	P53	GND	P105	HDMI_DDC_SCL
P2	GND	P54	QSPIA_nSS0	P106	HDMI_DDC_SDA
P3	CSI2_CKP	P55	GPIO1_nSS1	P107	HDMI_CEC
P4	CSI2_CKN	P56	QSPIA_SCLK	P108	CAM1_PWDN
P5	ETH1_CLK125_OUT	P57	QSPIA_DATA0	P109	CAM2_PWDN
P6	ETH_CLK125_OUT	P58	QSPIA_DATA1	P110	CAM1_nRST
P7	CSI2_DP0	P59	GND	P111	CAM2_nRST
P8	CSI2_DN0	P60	USB1_HUB_DP	P112	C_GPIO4

P9	GND	P61	USB1_HUB_DN	P113	C_GPIO5
P10	CSI2_DP1	P62	USB0_OVCUR	P114	C_GPIO6
P11	CSI2_DN1	P63	NC	P115	C_GPIO7
P12	GND	P64	NC	P116	C_GPIO8
P13	CSI2_DP2	P65	USB2_HUB_DP	P117	C_GPIO9
P14	CSI2_DN2	P66	USB2_HUB_DN	P118	C_GPIO10
P15	GND	P67	USB2_OVCUR	P119	C_GPIO11
P16	CSI2_DP3	P68	GND	P120	GND
P17	CSI2_DN3	P69	USB2_MUX_DP	P121	I2C1_SCL
P18	GND	P70	USB2_MUX_DN	P122	I2C1_SDA
P19	GBE2_MDI3-	P71	NC	P123	BOOT_MODE0_SEL
P20	GBE2_MDI3+	P72	NC	P124	BOOT_MODE1_SEL
P21	GBE2_LINK100	P73	NC	P125	BOOT_MODE2_SEL
P22	GBE2_LINK1000	P74	NC	P126	RTC_RESET_B
P23	GBE2_MDI2-	P75	PCIE_nRST_3V3	P127	RESET_IN
P24	GBE2_MDI2+	P76	USB4_OVCUR	P128	POWER_BTN
P25	GBE2_LINK_ACT	P77	NC	P129	UART3_TXD
P26	GBE2_MDI1-	P78	PCIE_nCLKREQ_3V3	P130	UART3_RXD
P27	GBE2_MDI1+	P79	GND	P131	UART3_RTS
P28	NC	P80	NC	P132	UART3_CTS
P29	GBE2_MDI0-	P81	NC	P133	GND
P30	GBE2_MDI0+	P82	GND	P134	UART2_TXD
P31	NC	P83	PCIE_CLKP	P135	UART2_RXD
P32	GND	P84	PCIE_CLKN	P136	NC
P33	SD2_WP	P85	GND	P137	NC
P34	SD2_CMD	P86	PCIE_RXP	P138	NC
P35	SD2_nCD	P87	PCIE_RXN	P139	NC
P36	SD2_CLK	P88	GND	P140	UART4_TXD
P37	SD2_PWR_EN	P89	PCIE_TXP	P141	UART4_RXD
P38	GND	P90	PCIE_TXN	P142	GND
P39	SD2_DATA0	P91	GND	P143	CAN1_TX
P40	SD2_DATA1	P92	HDMI_TXP2	P144	CAN1_RX
P41	SD2_DATA2	P93	HDMI_TXN2	P145	CAN2_TX
P42	SD2_DATA3	P94	GND	P146	CAN2_RX
P43	ECSPI2_SS0	P95	HDMI_TXP1	P147	VSYS_5V
P44	ECSPI2_SCLK	P96	HDMI_TXN1	P148	VSYS_5V
P45	ECSPI2_MISO	P97	GND	P149	VSYS_5V
P46	ECSPI2_MOSI	P98	HDMI_TXP0	P150	VSYS_5V
P47	GND	P99	HDMI_TXN0	P151	VSYS_5V
P48	NC	P100	GND	P152	VSYS_5V
P49	NC	P101	HDMI_TXCP	P153	VSYS_5V
P50	GND	P102	HDMI_TXCN	P154	VSYS_5V

P51	NC	P103	GND	P155	VSYS_5V
P52	NC	P104	HDMI_HPD	P156	VSYS_5V

No.	Functional Description	No.	Functional Description	No.	Functional Description
S1	I2C3_SCL	S54	NC	S107	LCD1_BL_EN
S2	I2C3_SDA	S55	USB3_OVCUR	S108	LVDS1_CLK_P
S3	GND	S56	QSPIA_DATA2	S109	LVDS1_CLK_N
S4	NC	S57	QSPIA_DATA3	S110	GND
S5	I2C5_SCL	S58	NC	S111	LVDS1_TX0_P
S6	CSI_MCLK	S59	USB3_HUB_DP	S112	LVDS1_TX0_N
S7	I2C5_SDA	S60	USB3_HUB_DN	S113	NC
S8	CSI1_CKP	S61	GND	S114	LVDS1_TX1_P
S9	CSI1_CKN	S62	USB1_TXP	S115	LVDS1_TX1_N
S10	GND	S63	USB1_TXN	S116	LCD1_VDD_EN
S11	CSI1_DP0	S64	GND	S117	LVDS1_TX2_P
S12	CSI1_DN0	S65	USB1_RXP	S118	LVDS1_TX2_N
S13	GND	S66	USB1_RXN	S119	GND
S14	CSI1_DP1	S67	GND	S120	LVDS1_TX3_P
S15	CSI1_DN1	S68	USB1_DP	S121	LVDS1_TX3_N
S16	GND	S69	USB1_DM	S122	LCD1_BL_PWM
S17	GBE1_MDI0+	S70	GND	S123	C_GPIO13
S18	GBE1_MDI0-	S71	USB2_TXP	S124	GND
S19	GBE1_LINK100	S72	USB2_TXN	S125	LVDS0_MIPI_D0_P
S20	GBE1_MDI1+	S73	GND	S126	LVDS0_MIPI_D0_N
S21	GBE1_MDI1-	S74	USB2_RXP	S127	LCD0_BL_EN
S22	GBE1_LINK1000	S75	USB2_RXN	S128	LVDS0_MIPI_D1_P
S23	GBE1_MDI2+	S76	NC	S129	LVDS0_MIPI_D1_N
S24	GBE2_MDI2-	S77	NC	S130	GND
S25	GND	S78	NC	S131	LVDS0_MIPI_D2_P
S26	GBE1_MDI3+	S79	NC	S132	LVDS0_MIPI_D2_N
S27	GBE2_MDI3-	S80	GND	S133	LCD0_VDD_EN
S28	NC	S81	NC	S134	LVDS0_MIPI_CLK_P
S29	NC	S82	NC	S135	LVDS0_MIPI_CLK_N
S30	NC	S83	GND	S136	GND
S31	GBE1_LINK_ACT#	S84	NC	S137	LVDS0_MIPI_D3_P
S32	NC	S85	NC	S138	LVDS0_MIPI_D3_N
S33	NC	S86	GND	S139	I2C2_SCL
S34	GND	S87	NC	S140	I2C2_SDA
S35	USB4_HUB_DP	S88	NC	S141	LCD0_BL_PWM
S36	USB4_HUB_DM	S89	GND	S142	C_GPIO12
S37	USB1_VBUS_3V3	S90	NC	S143	GND

S38	SAI3_MCLK	S91	NC	S144	SAI1_RXC
S39	SAI3_TXFS	S92	GND	S145	Wdt_time_out
S40	SAI3_TXD	S93	NC	S146	PCIe_Nwake__3V3
S41	SAI3_RXD	S94	NC	S147	VDD_RTC
S42	SAI3_TXC	S95	NC	S148	SAI3_RXC
S43	SAI1_RXFS	S96	NC	S149	SAI5_RXC
S44	NC	S97	NC	S150	NC
S45	NC	S98	NC	S151	NC
S46	NC	S99	NC	S152	NC
S47	GND	S100	NC	S153	SAI5_RXFS
S48	I2C3_SCL	S101	GND	S154	CARRIER_PWR_ON
S49	I2C3_SDA	S102	NC	S155	NC
S50	SAI2_TXFS	S103	NC	S156	NC
S51	SAI2_TXD	S104	NC	S157	BOOT_MODE3_SEL
S52	SAI2_RXD	S105	NC	S158	GND
S53	SAI2_TXC	S106	NC		

5. 多媒体

视频解码

- 1080p60 HEVC/H.265 Main, Main 10 (up to level 5.1)
- 1080p60 VP9 Profile 0, 2
- 1080p60 VP8
- 1080p60 AVC/H.264 Baseline, Main, High decoder

视频编码

- 1080p60 AVC/H.264 编码
- 1080p60 HEVC/H.265 编码

6. 显示输出

Graphic Processing Unit

- GC7000UL with OpenCL and Vulkan support
- 2 shaders
- 166 million triangles/sec
- 1.0 giga pixel/sec
- 16 GFLOPs 32-bit
- Supports OpenGL ES 1.1, 2.0, 3.0, OpenCL 1.2, Vulkan
- Core clock frequency of 1000 MHz
- Shader clock frequency of 1000 MHz
- GC520L for 2D acceleration
- Render target compatibility between 3D and 2D GPU (super tile status buffer)

HDMI 2.0a Tx

HDMI 2.0a Tx supporting one display

• Resolutions of: 720 x 480p60, 1280 x 720p60, 1920 x 1080p60, 1920 x 1080p120, 3840 x 2160p30
• Pixel clock up to 297 MHz

Audio support

• 32-channel audio output support
• 1 SPDIF audio eARC input support

LCDIF Display Controller

Support up to 1920x1200p60 display per LCDIF if no more than 2 instances used simultaneously, or 2x 1080p60 + 1x 4kp30 on HDMI if all 3 instances used simultaneously.

• One LCDIF drives MIPI DSI, up to UWHD and WUXGA
• One LCDIF drives LVDS Tx, up to 1920x1080p60
• One LCDIF drives HDMI Tx, up to 4kp3

MIPI Interface

Two instances of 4-lane MIPI CSI interface and HDR ISP

• For single Camera, MIPI CSI 1 can support up to 400/500 MHz pixel clock in the Nominal/Overdrive mode.
• For single Camera, MIPI CSI 2 can support up to 277 MHz pixel clock.
• For dual Camera, both MIPI CSI can support up to 266 MHz pixel clock.
• 2x ISP supporting 375 Mpixel/s aggregate performance and up to 3-exposure HDR processing.
•When one camera is used, support up to 12MP@30fps or 4kp45
•When two cameras are used, each supports up to 1080p80

4-lane MIPI DSI interface

• Maximum resolution limited to resolutions achievable with a 250 MHz pixel clock and active pixel rate of 200 Mpixel/s with 24-bit RGB. This includes resolutions such as:

•1080 p60
•WUXGA (1920x1200) at 60 Hz
•1920x1440 at 60 Hz
•UWHD (2560x1080) at 60 Hz
•MIPI DSI: WQHD (2560x1440) can be supported by reduced blanking mode

7. 产品订购信息

Part No.	CPU	Memory	Flash Memory	Temperature
SOM-iMX8MP-A1.1-2GD32GE-S-C	i.MX 8M Mini	2GB	32GB	0~70℃
SOM-iMX8MP-A1.1-2GD32GE-S-I	i.MX 8M Mini	2GB	32GB	-40~85℃
SOM-iMX8MP-A1.1-4GD32GE-S-C	i.MX 8M Mini	4GB	32GB	0~70℃
SOM-iMX8MP-A1.1-4GD32GE-S-I	i.MX 8M Mini	4GB	32GB	-40~85℃

Note:SOM-iMX8M-A1.1-4GD32GE-S-I is standard, for other models, please contact the relevant sales staff.

7.1 核心板型号参数说明

SOM-iMX8MP-A1.1-4GD16GE-S-I

SOM - ( ) ( ) - ( ) - ( ) ( ) - ( ) - ( )

Hardware Type

SOM: Core Board

DB: Development Board

APC: ARM PC

XPI: Raspberry Pi class

GTW: Gateway

ATV: Android Box

Product Model

Hardware Version No.

RAM Size

1GD: 1GByte DDR

2GD: 2GByte DDR

4GD: 4GByte DDR

8GD: 8GByte DDR

64MD: 64MByte DDR

128MD: 128MByte DDR

ROM Size

4GE: 4GByte eMMC

8GE: 8GByte eMMC

16GE: 16GByte eMMC

32GE: 32GByte eMMC

64GE: 64GByte eMMC

128GE: 128GByte eMMC

128MN: 128MByte Nand Flash

256MN: 256MByte Nand Flash

512MN: 512MByte Nand Flash

Core Board Interface Type

L：Little stamp hole

B：B2B Connector

O：OSM Package

S：SMARC

S1：SODIMM

Q：Q-seven

96：96Board

Temperature Grade

C：Commercial grade（0~85℃）

I：Industrial grade（-40~85℃）

8. 使用注意事项

- 相对湿度:5~ 95%。
- 操作温度:商业领域:0~ 85℃;工业领域:-40~85℃
- 请勿挤压、扭曲或拆卸 PC 机。
- 使电路板远离静电。
- 使板子远离水和其他液体。
- 不要使用长连接线，这可能会影响性能和图像质量。

更多帮助

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