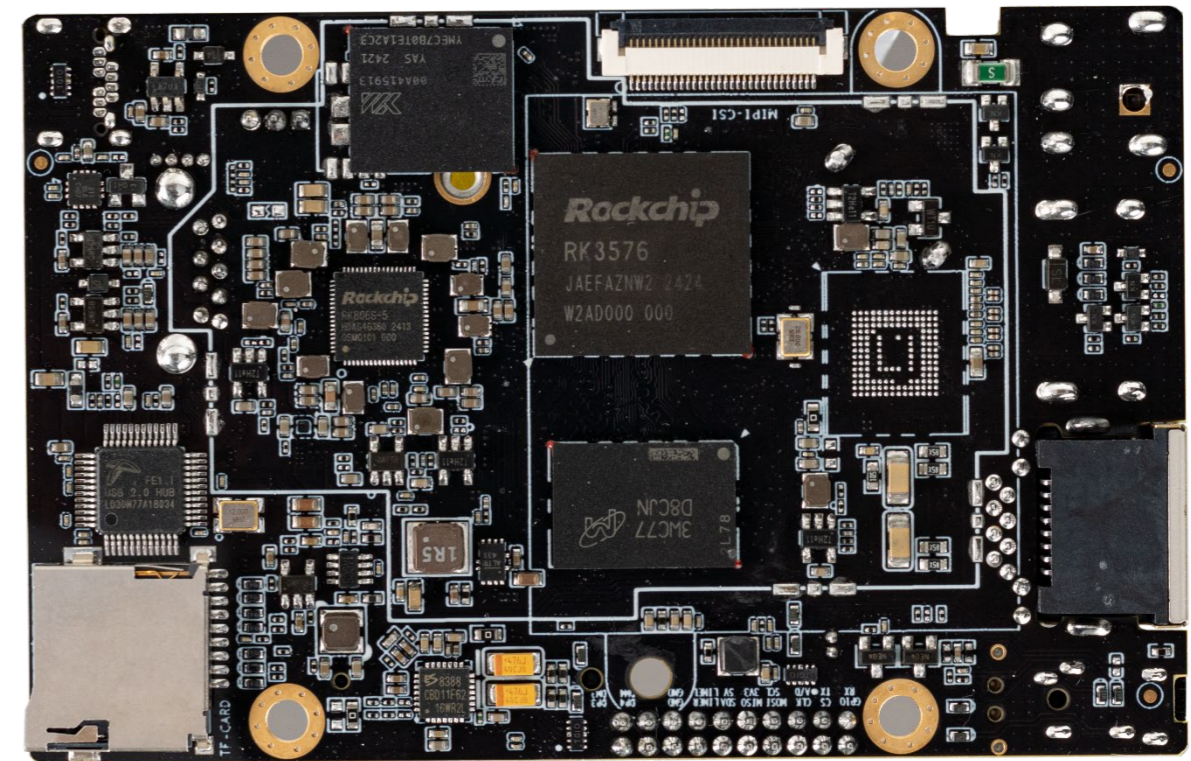




# ROC-RK3576-PC

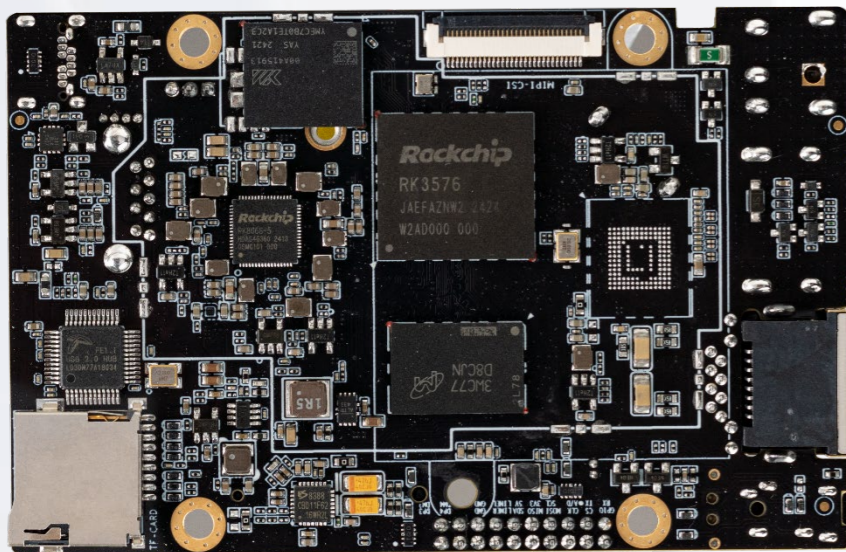
Low-power Large-model Mainboard



V1.1 2025-1-21

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# Product features



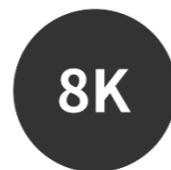
## Octa-core AIOT processor RK3576

RK3576, the new octa-core 64-bit AIOT processor, features a big little architecture (4xA72 +4xA53) and a frequency of up to 2.2 GHz.



## Built-in 6TOPS powerful computing NPU

It supports INT4/INT8/INT16/FP16/BF16/TF32 mixed operation and framework switching of TensorFlow/MXNet/PyTorch/Caffe. This enables enhanced data processing, speech recognition, and image analysis.



## 8K@30fps Decoding/4K@60fps Encoding

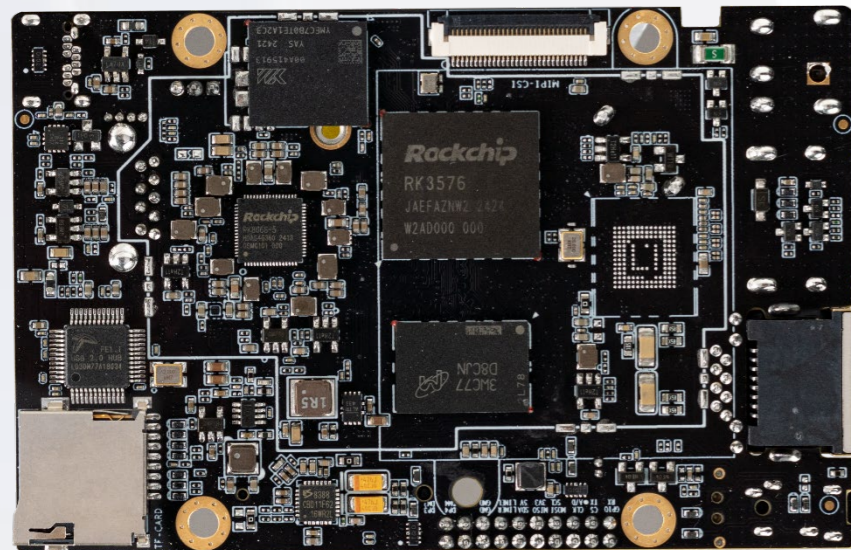
It supports 8K@30fps/4K@120fps decoding(H.265/HEVC, VP9, AVS2, AV1) , 4K@60fps decoding(H.264/AVC), 4K@60fps encoding(H.265/HEVC, H.264/AVC).



## HD high-frame-rate display capability at 4K@120fps

With HDMI2.1 (4K@120fps) / eDP1.3 (4K@60fps), DP1.4 (4K@120fps), and MIPI DSI (2560×1600@60fps) interfaces, the device enables three-display output.

# Product features



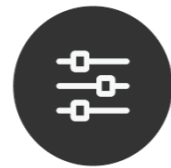
## UFS 2.0 with a data read speed of up to 12Gbps

With support for UFS 2.0/HS-G3 (12Gbps), this device ensures efficient data storage and access. With the PCIe NVMe/SATA SSD expansion, it delivers rapid data read and write speeds, enabling the device to be easily expanded to TB storage capacity.



## Support various operating systems

Support Android 14, Linux OS, and Buildroot+QT. These provide safe and stable systems for product research and production.



## Abundant interface options

Equipped with MIPI-CSI, MIPI-DSI, USB3.0, USB2.0, I2C, SPI, SARADC, UART expansion interfaces, and more, it meets the peripheral expansion needs of various scenarios.



## A wide range of applications

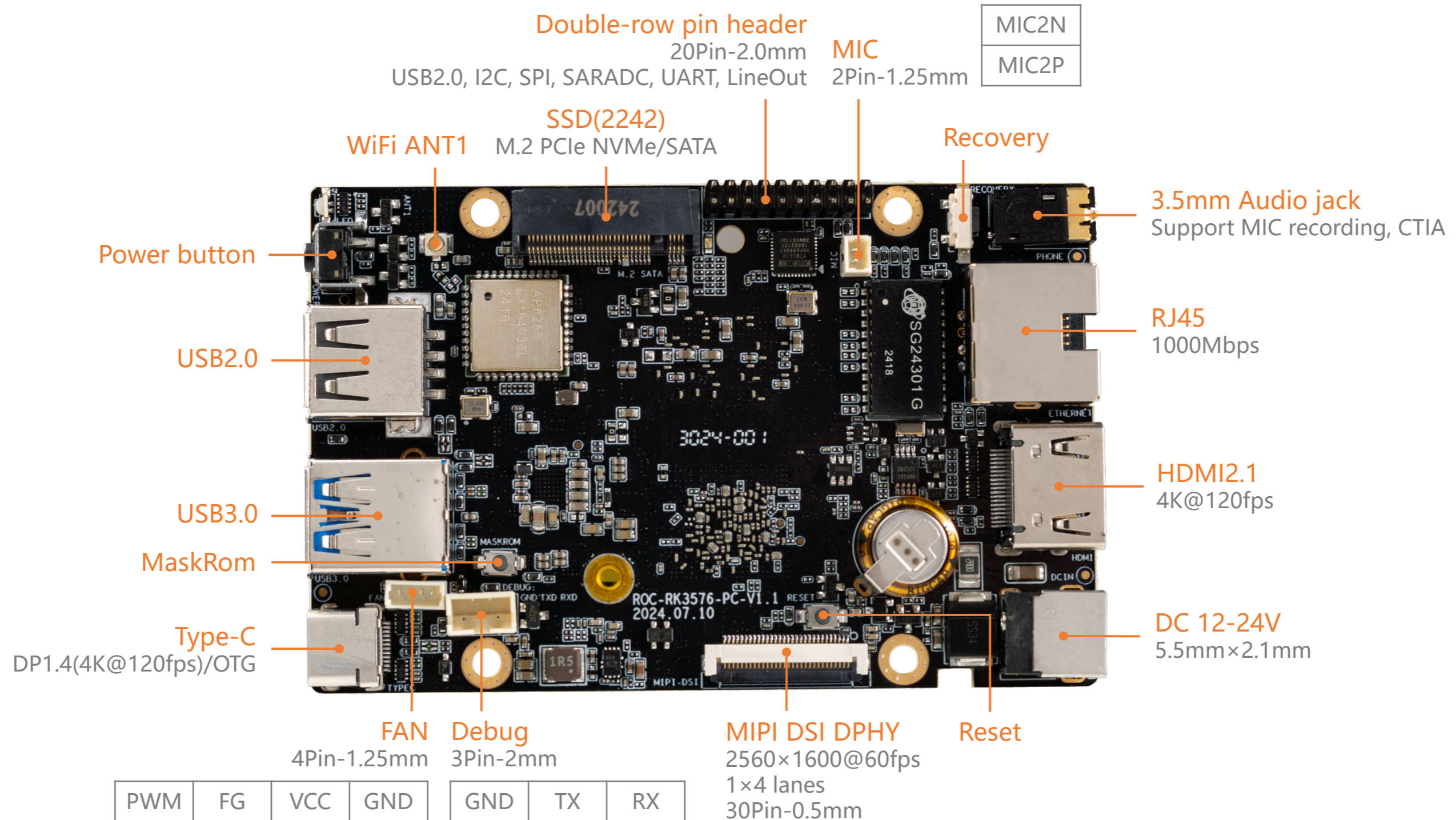
It is widely used in: edge computing, large model localization, smart commercial display, cloud terminal products, industrial control host, automotive electronics and other industries.

# Specifications



Specifications		
Basic Specifications	SOC	Rockchip RK3576
	CPU	Octa-core 64-bit processor (4xA72 + 4xA53), frequency is up to 2.2GHz
	GPU	G52 MC3@1GHz, support OpenGL ES 1.1/2.0/3.2, OpenCL 2.0, Vulkan 1.1, embedded high-performance 2D acceleration hardware
	NPU	6 TOPS NPU, support INT4/INT8/INT16/FP16/BF16/TF32 mixed operation
	Decoding/Encoding	Decoding: 8K@30fps/4K@120fps: H.265/HEVC, VP9, AVS2, AV1, 4K@60fps: H.264/AVC Encoding: 4K@60fps: H.265/HEVC, H.264/AVC
	RAM	LPDDR4/LPDDR4x (4GB/8GB/16GB optional)
	Storage	eMMC (16GB/32GB/64GB/128GB/256GB optional), UFS2.0 (Optional)
	Storage Expansion	1 × M.2 (Scalable 2242 PCIe NVMe/SATA SSD), 1 × TF Card
	Power	DC 12V (5.5mm × 2.1mm, support 12V~24V wide voltage input)
	Power consumption	Normal: 1.2W(12V/100mA), Max: 8.4W(12V/700mA), Min: 0.096W(12V/8mA)
	OS	Android14, Linux OS, Buildroot+QT
	Software support	<ul style="list-style-type: none"> <li>Support the privatization deployment of ultra-large-scale parametric models under the Transformer architecture, such as Gemma-2B, ChatGLM3-6B, Qwen-1.8B, Phi-3-3.8B and other large language models</li> <li>It supports traditional network architectures such as CNN, RNN, and LSTM, and supports the import and export of RKNN models; Support a variety of deep learning frameworks, including TensorFlow, TensorFlow Lite, PyTorch, Caffe, ONNX and Darknet. It also supports the development of custom operators</li> <li>Support Docker container management technology</li> </ul>
	Size	93.00mm × 60.15mm × 12.49mm
	Weight	≈50g
Environment	Operating Temperature: -20°C ~ 60°C, Storage Temperature: -20°C ~ 70°C, Storage Humidity: 10% ~ 90%RH (non-condensing)	
Interface Specifications	Internet	1 × Gigabit Ethernet (1000Mbps/RJ45), 2.4GHz/5GHz Dual-band WiFi (802.11a/b/g/n/ac), Bluetooth 5.0
	Video input	1 × MIPI CSI DPHY(30Pin-0.5mm, 1×4lanes/2×2lanes)
	Video output	1 × HDMI2.1(4K@120fps), 1 × DP1.4 (4K@120fps), 1 × MIPI DSI DPHY (2560×1600@60fps, 30Pin-0.5mm, 1×4lanes)
	Watchdogs	External watchdogs
	USB	1 × USB3.0, 1 × USB2.0
	Extension interface	1 × Type-C (OTG/DP1.4), 1 × FAN (4Pin-1.25mm), 1 × Debug(3Pin-2mm), 1 × 3.5mm Audio jack (Support MIC recording, American Standard CTIA), 1 × MIC (2Pin-1.25mm), 1 × Double-row pin headers (20Pin-2.0mm) Lead-out interfaces: USB2.0, I2C, SPI, SARADC, UART, LineOut

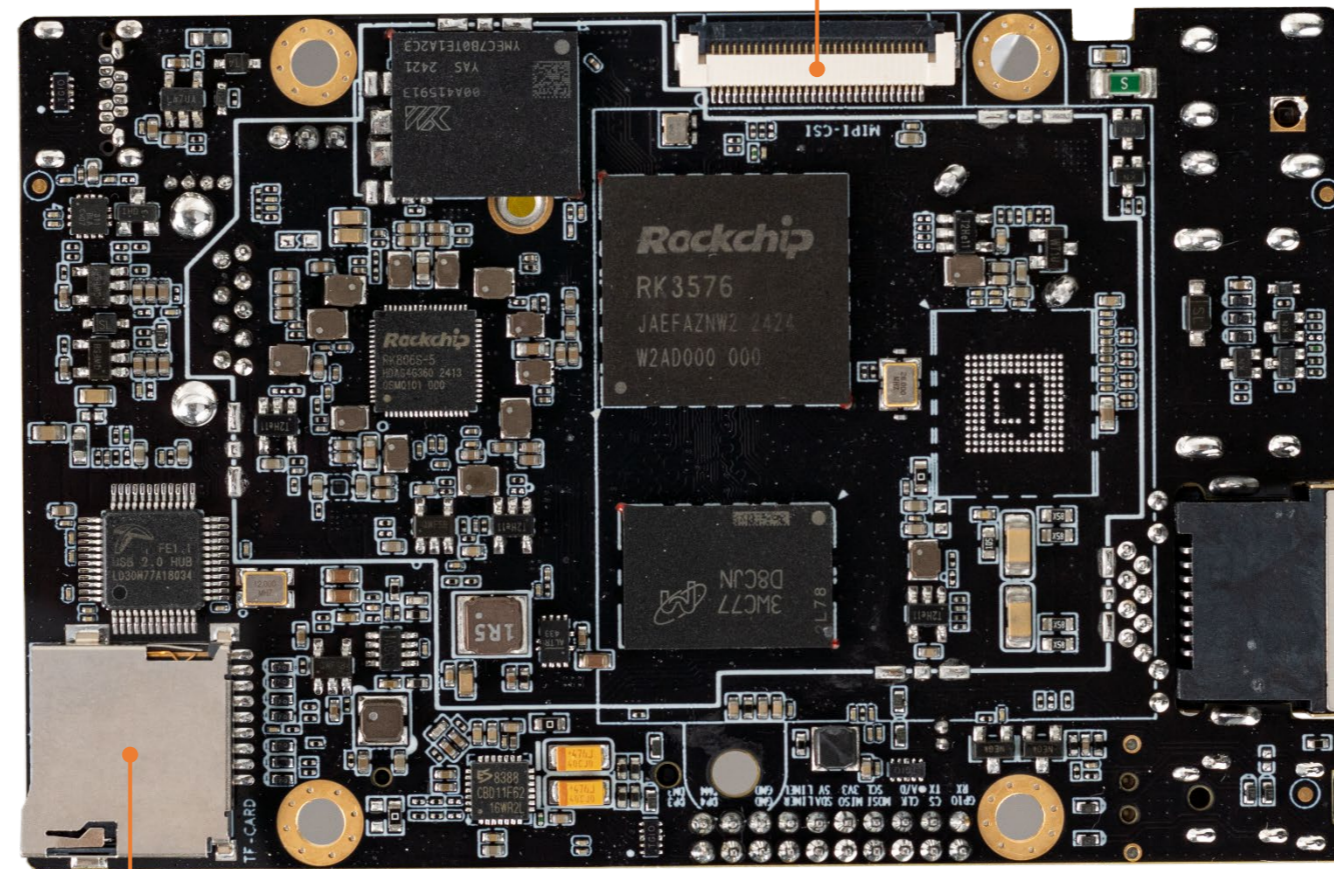
# Interface description



# Interface description

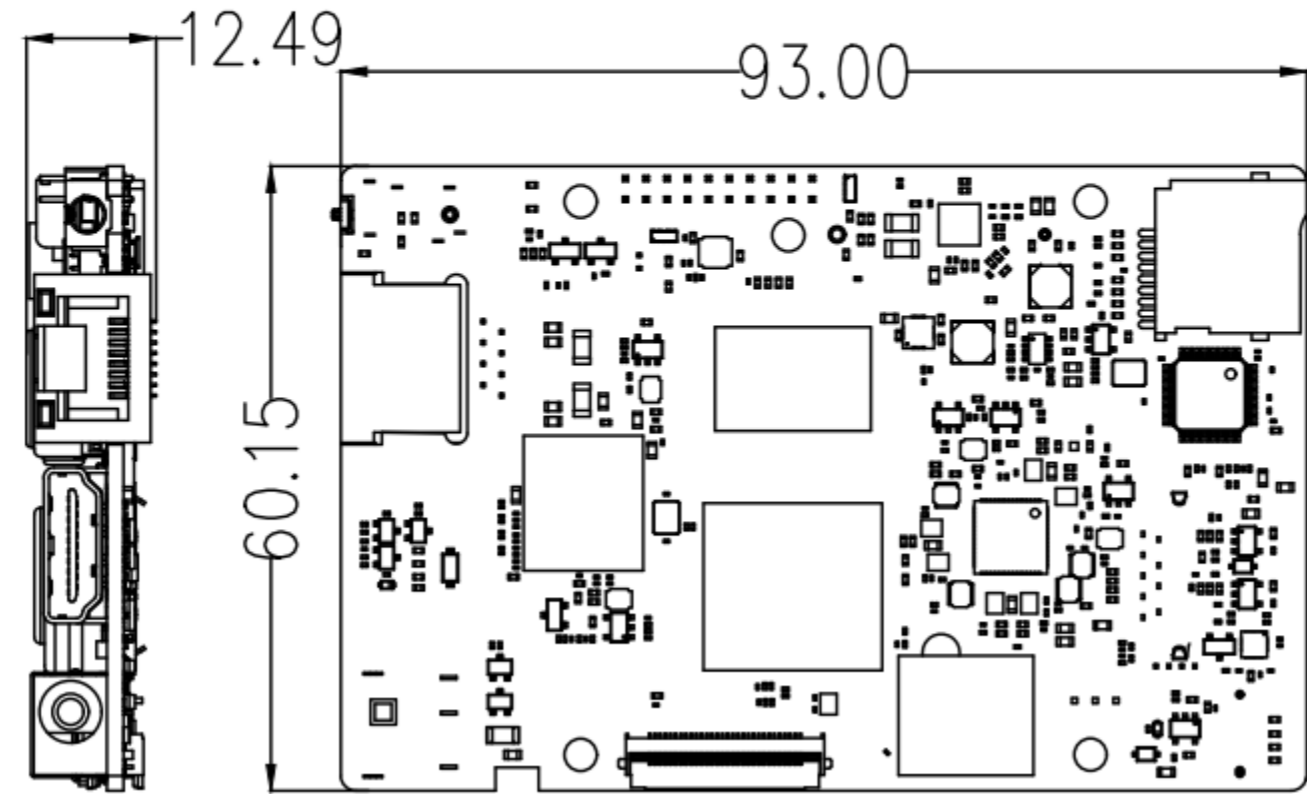
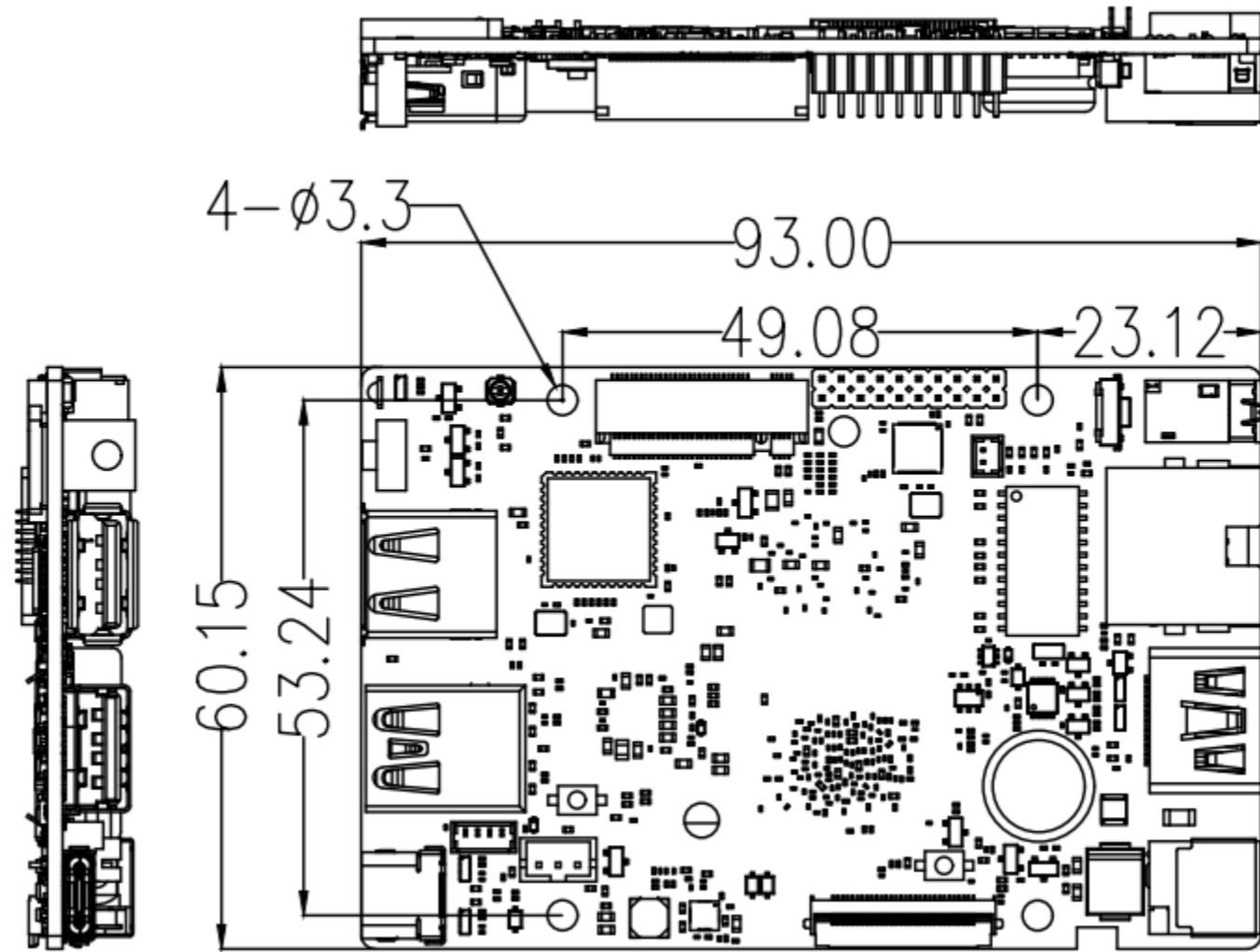


MIPI CSI DPHY  
1×4 lanes/2×2 lanes, 30Pin-0.5mm



TF Card

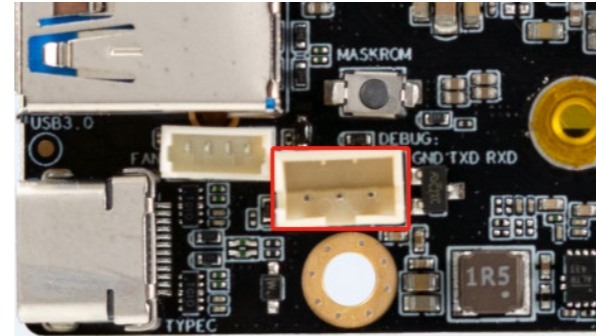
# Dimension





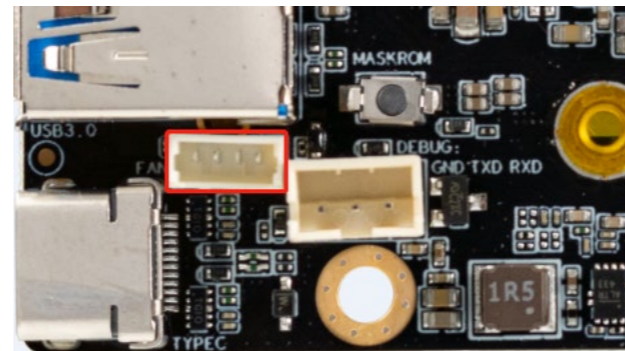
# Interface definition

## 1. DEBUG: 3PIN 2.0mm Pitch wafer (J27)



NO.	Definition	Power/V	NO.	Definition	Power/V
1	UART0_RXD	3.3	3	GND	
2	UART0_TXD	3.3			

## 2. FAN: 4PIN 1.25mm Pitch wafer (J3)

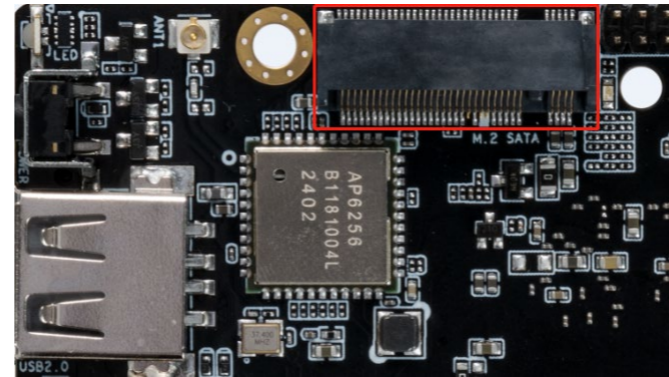


NO.	Definition	Power/V	NO.	Definition	Power/V
1	GND		2	VCC (5V Output)	5
3	FG Input	3.3	4	PWM Output	3.3

# Interface definition



## 3. M.2 PCIE/SATA M-KEY (J5405)



NO.	Definition	Power/V	NO.	Definition	Power/V
1	GND		2	VCC3V3_PCIE (3.3V Output)	3.3
3	GND		4	VCC3V3_PCIE (3.3V Output)	3.3
5	NC		6	NC	
7	NC		8	NC	
9	GND		10	DAS/DSS [pull up resistor10K]	3.3
11	NC		12	VCC3V3_PCIE (3.3V Output)	3.3
13	NC		14	VCC3V3_PCIE (3.3V Output)	3.3
15	NC		16	VCC3V3_PCIE (3.3V Output)	3.3
17	NC		18	VCC3V3_PCIE (3.3V Output)	3.3
19	NC		20	NC	
21	GND		22	NC	
23	NC		24	NC	
25	NC		26	NC	
27	GND		28	NC	

# Interface definition

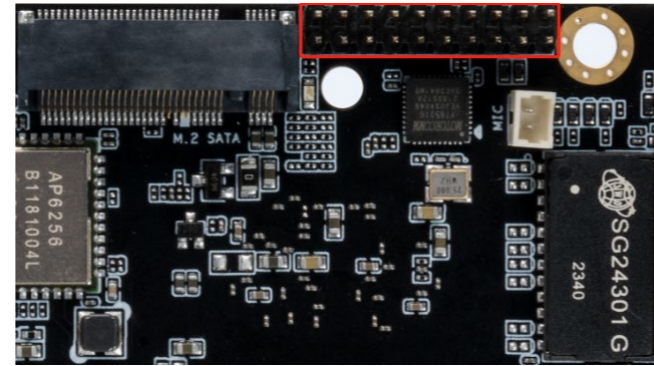


29	NC		30	NC	
31	NC		32	NC	
33	GND		34	NC	
35	NC		36	NC	
37	NC		38	DEVSLP [pull up resistor10K]	3.3
39	GND		40	NC	
41	PCIE0_RXN/SATA0_RXN	-	42	NC	
43	PCIE0_RXP/SATA0_RXP	-	44	NC	
45	GND		46	NC	
47	PCIE0_TXN/SATA0_TXN (Series capacitor 100nF)	-	48	NC	
49	PCIE0_TXP/SATA0_TXP (Series capacitor 100nF)	-	50	PCIE0_PERSTn (GPIO2_B4_d)	3.3
51	GND		52	PCIE0_CLKREQn_M0 (GPIO2_B2_d)	3.3
53	PCIE0_REFCLKN	-	54	PCIE0_WAKEn_M0 (GPIO0_D2_d)	3.3
55	PCIE0_REFCLKP	-	56	NC	
57	GND		58	NC	
59	NC		60	NC	
61	GND		62	VCC3V3_PCIE (3.3V Output)	3.3
63	GND		64	VCC3V3_PCIE (3.3V Output)	3.3
65	GND		66	VCC3V3_PCIE (3.3V Output)	3.3
67	GND				



# Interface definition

## 4. Double-row pin headers EXTENSION INTERFACE 2\*10PIN (J1)

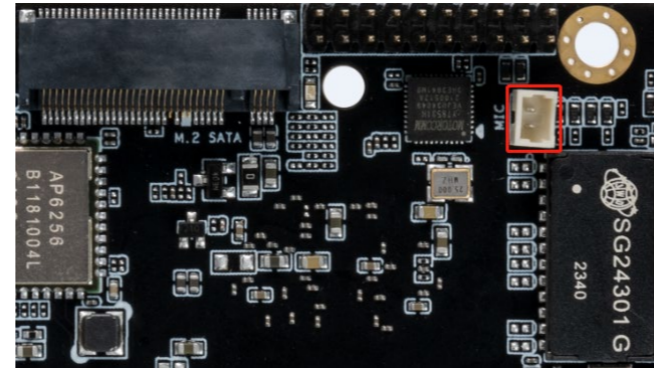


NO.	Definition	Power/V	NO.	Definition	Power/V
1	HUB_HOST_DM3	-	2	HUB_HOST_DP3	-
3	HUB_HOST_DM4	-	4	HUB_HOST_DP4	-
5	GND		6	GND	
7	LINEOUT_L (40m/32ΩW)	3.3	8	LINEOUT_R (40m/32ΩW)	3.3
9	VCC5V0_DEVICE_S0 (5.0V OUTPUT)	5.0V (MAX:500mA)	10	I2C3_SDA_M0 【GPIO4_B4_d】 Pull-up resistor 2.2K	3.3
11	VCC_3V3_S3 (3.3V OUTPUT)	3.3 (MAX:500mA)	12	SPI3_MISO_M1 【GPIO3_D5_d】	1.8
13	I2C3_SCL_M0 【GPIO4_B5_d】 Pull-up resistor 2.2K	3.3	14	SPI3_MOSI_M1 【GPIO3_D6_d】	1.8
15	ADC4 INPUT	1.8	16	SPI3_CLK_M1 【GPIO3_D4_d】	1.8
17	UART6_TX_M3 【GPIO4_C4_d】	3.3	18	SPI3_CSN1_M1 【GPIO3_D7_d】	1.8
19	UART6_RX_M3 【GPIO4_C5_d】	3.3	20	GPIO3_A4_d	1.8

# Interface definition



## 5. MIC 1.25mm Pitch (J44)

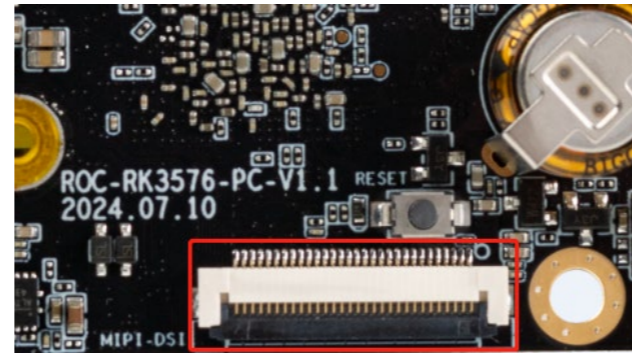


NO.	Definition	Power/V	NO.	Definition	Power/V
1	MIC2P	3.3	2	MIC2N	3.3

# Interface definition



## 6. MIPI Display 30PIN 0.5mm Pitch (J5400)



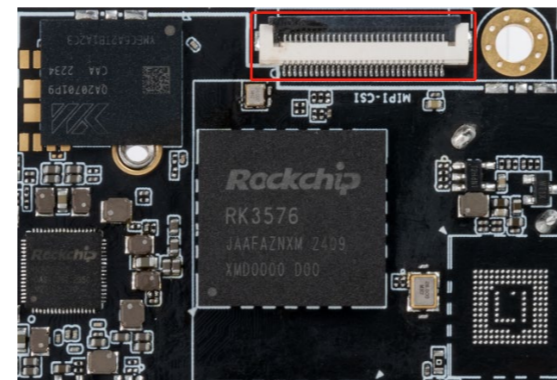
NO.	Definition	Power/V	NO.	Definition	Power/V
1	VCC5V0_DEVICE_S0 (5.0V OUTPUT)	5.0	16	MIPI_DPHY_DSI_TX_D0P	-
2	VCC5V0_DEVICE_S0 (5.0V OUTPUT)	5.0	17	MIPI_DPHY_DSI_TX_D0N	-
3	VCC5V0_DEVICE_S0 (5.0V OUTPUT)	5.0	18	GND	
4	GND		19	MIPI_DPHY_DSI_TX_D1P	-
5	NC		21	MIPI_DPHY_DSI_TX_D1N	-
6	VCC_3V3_S3 (3.3V OUTPUT)	3.3	21	GND	
7	I2C0_SDA_M1_TP 【GPIO0_C2_d】 Pull-up resistor 2.2K	3.3	22	MIPI_DPHY_DSI_TX_CLKP	-
8	I2C0_SCL_M1_TP 【GPIO0_C1_d】 Pull-up resistor 2.2K	3.3	23	MIPI_DPHY_DSI_TX_CLKN	-
9	LCD_PWREN_H 【GPIO0_C5_d】	3.3	24	GND	
10	TP_INT_L 【GPIO0_C6_d】	3.3	25	MIPI_DPHY_DSI_TX_D2P	-
11	MIPI_TE_M1 【GPIO3_A2_d】	3.3	26	MIPI_DPHY_DSI_TX_D2N	-
12	LCD_BL_PWM1_CH1_M0 【GPIO0_B5_d】	3.3	27	GND	
13	LCD_RESET_L 【GPIO0_B4_d】	3.3	28	MIPI_DPHY_DSI_TX_D3P	-
14	TP_RST_L 【GPIO0_D0_d】	3.3	29	MIPI_DPHY_DSI_TX_D3N	-

# Interface definition



15	GND		30	GND	
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## 7. MIPI CSI 30PIN 0.5mm Pitch (J4701)



NO.	Definition	Power/V	NO.	Definition	Power/V
1	I2C4_SDA_M3 【GPIO3_B7_d】 Pull-up resistor 2.2K	1.8	16	GND	
2	I2C4_SCL_M3 【GPIO3_C0_d】 Pull-up resistor 2.2K	1.8	17	MIPI_DPHY_CSI1_RX_CLKP	-
3	MIPI_DPHY_CSI1_PDN_H 【GPIO3_D0_d】	1.8	18	MIPI_DPHY_CSI1_RX_CLKN	-
4	MIPI_DPHY_CSI1_RESET 【GPIO3_C1_d】	1.8	19	GND	
5	GND		20	MIPI_DPHY_CSI1_RX_D2P/MIPI_DPHY_CSI2_RX_D0P	-
6	MIPI_DPHY_CSI1_CAM_CLKOUT 【GPIO4_A0_d】	1.8	21	MIPI_DPHY_CSI1_RX_D2N/MIPI_DPHY_CSI2_RX_D0N	-
7	MIPI_DPHY_CSI2_PDN_H 【GPIO3_C7_d】	1.8	22	GND	
8	MIPI_DPHY_CSI2_RESET 【GPIO3_C4_d】	1.8	23	MIPI_DPHY_CSI1_RX_D3P/MIPI_DPHY_CSI2_RX_D1P	-
9	MIPI_DPHY_CSI2_CAM_CLKOUT 【GPIO2_D7_d】	1.8	24	MIPI_DPHY_CSI1_RX_D3N/MIPI_DPHY_CSI2_RX_D1N	-
10	GND		25	GND	
11	MIPI_DPHY_CSI1_RX_D0P	-	26	MIPI_DPHY_CSI2_RX_CLKP	-

# Interface definition



12	MIPI_DPHY_CSI1_RX_D0N	-	27	MIPI_DPHY_CSI2_RX_CLKN	-
13	GND		28	GND	
14	MIPI_DPHY_CSI1_RX_D1P	-	29	VCC5V0_DEVICE_S0 (5.0V OUTPUT)	5.0
15	MIPI_DPHY_CSI1_RX_D1N	-	30	VCC5V0_DEVICE_S0 (5.0V OUTPUT)	5.0



## T-CHIP INTELLIGENCE TECHNOLOGY

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