



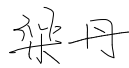
秋田微电子
AVDISPLAY

SPECIFICATION

MODULE NO. : EMB-R388000NN-A2-S

CUSTOMER NO. :

Rev No. : A

AVD	PREPARED BY	CHECKED BY	APPROVED BY
SIGNATURE			
DATE	2023.12.15	2023.12.15	2023.12.15

CUSTOMER APPROVAL	SIGNATURE	DATE

Notes:

- 1.Please contact AVD before assigning your product based on this module specification.
- 2.To improve the quality of product, this product specification is subject to change without any notice.

REVISION RECORD

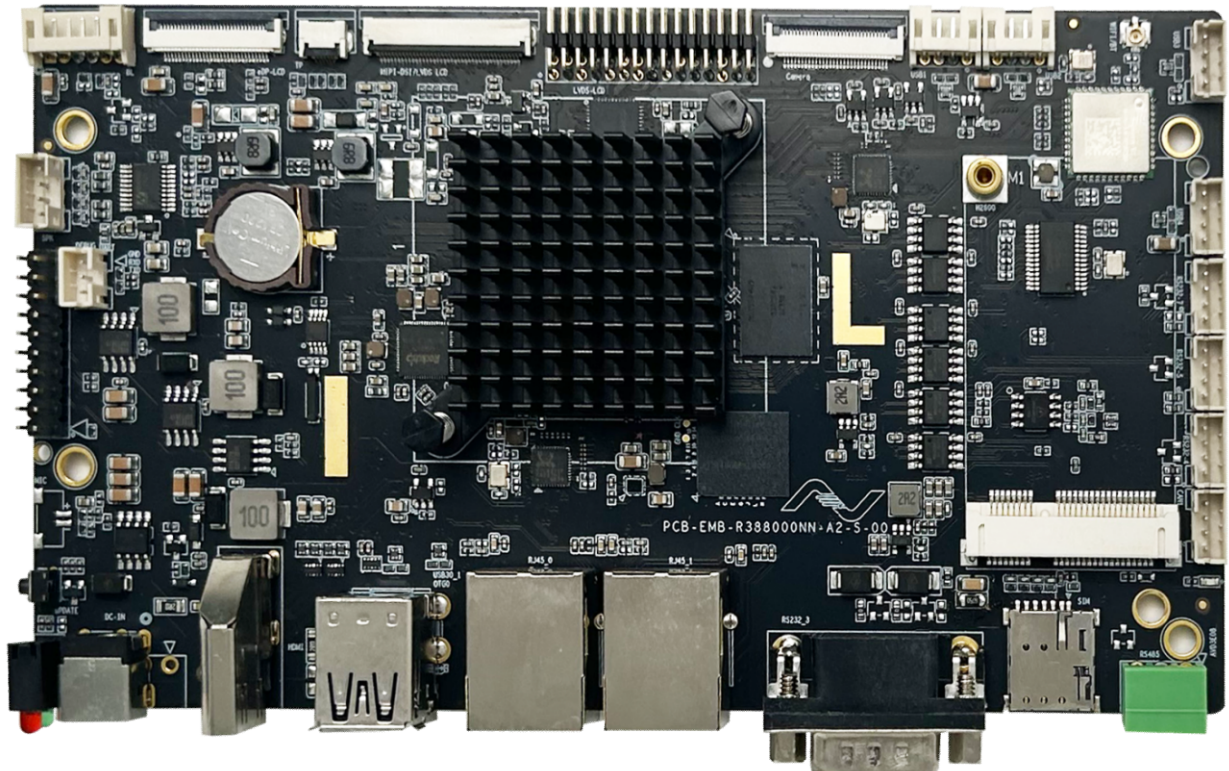
[illegible]

CONTENTS

1.MODULE DESCRIPTION.....	3
2.GENERAL INFORMATION.....	4
3.INTERFACE DESCRIPTION.....	5
4.MOUDLE EXTERNAL DIMENSIONS	12
5.ENVIRONMENTAL CONDITIONS.....	13
6.RELIABILITY TEST CONDITIONS.....	13
7.REMARK.....	14

1. MODULE DESCRIPTION

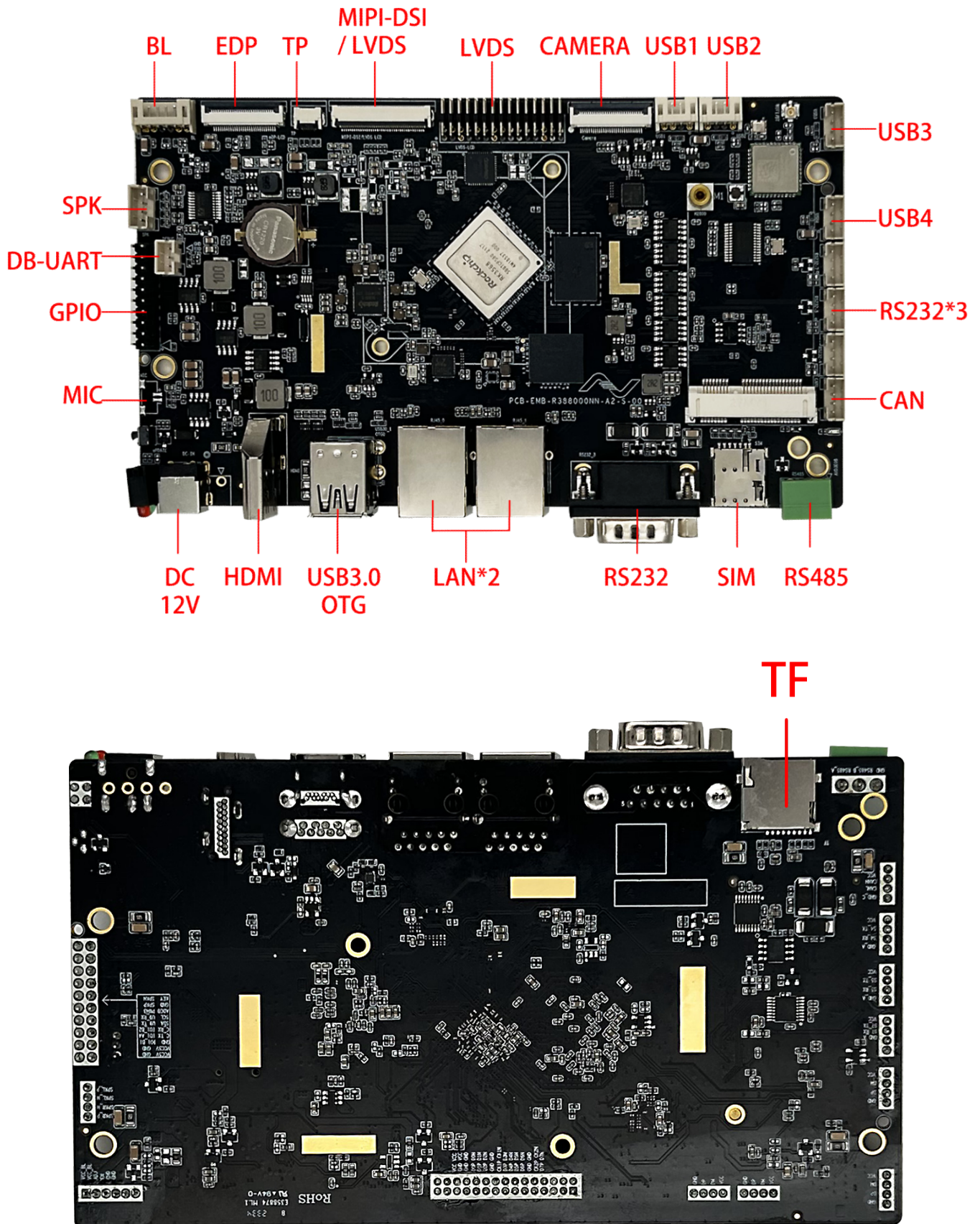
EMB-R388000NN-A2-S motherboard uses the RK3568 quad-core ARM Cortex-A55 architecture CPU, with a maximum dominant frequency of 2.0GHz. Integrated ARM Mali-G52 GPU. Support OpenGL ES 1.1/2.0/3.2, OpenCL 2.0, Vulkan 1.1. Embedded high-performance 2D acceleration hardware. NPU supports 1T computing power, 4K and 2K video playback, 4K 60fps H.265/H.264/VP9 video decoding, 1080P 60fps H.265/H.264, video encoding, and HDR. Support multiple screen show, show support MIPI/ LVDS, chip support USB2.0/USB3.0/PCIE3.0 / PCIE2.1 / QSGMII interface.



2.GENERAL INFORMATION

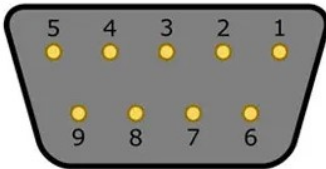
Product Introduce	
Operating System	Linux/Android
CPU	RK3568 ARM quad-core ARM Cortex-A55, Highest frequency is 2.0GHz, Arm Mali-G52 GPU is embedded with High-performance 2D acceleration hardware, 4K H.265 and other decoding methods
Memory	2GB LPDDR4+8GB EMMC
TYPE-C USB	OTG
Display interface	HDMI*1 support 1080P@120Hz OR 4K@60Hz LVDS*1, MIPI_DSI/LVDS*1, EDP*1
Camera interface	MIPI*1
Ethernet	LAN*2
I/O interface	WIFI, BT, SIM card (nano) , TF card, RS232(DB9)*1, RS485*1, USB 3.0*1, CAN*1, RS232 COM*3, USB*4
Power Supply	DC-in
	9-30V Typ. 12V
Power Consumption	4W(Static desktop with default brightness)
System upgrade	Support local USB upgrade
System Language	Multilingualism
Mechanical	170.00*96.60*22.10 mm
Weight	150g

3.INTERFACE DESCRIPTION

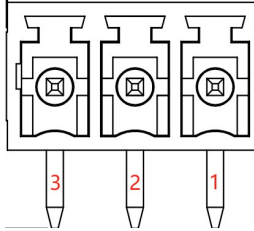


No.	Item	Symbol
1	DC	Power DC 12V
2	HDMI	HDMI 2.0
3	USB	USB3.0*1 TYPE-C OTG*1
4	LAN	LAN*2 10/100/1000M
5	SIM CARD	4G LTE
6	TF CARD	TF card slot

RS232: RS232 communication interface.

RS232	Pin No.	Symbol	Pin No.	Symbol
	1	GND	6	/
	2	RX	7	/
	3	TX	8	/
	4	/	9	/
	5	PE	/	/

RS485:

RS485	Pin No.	Symbol	Pin No.	Symbol
	1	GND	3	RS485_A0
	2	RS485_B0	/	/

CAN:

Pin No.	Symbol	Pin No.	Symbol
1	VCC	3	CANH
2	CANL	4	GND

RS232*3:

Pin No.	Symbol	Pin No.	Symbol
1	VCC	3	RX
2	TX	4	GND

USB*4:

Pin No.	Symbol	Pin No.	Symbol
1	VCC_5V	3	DP
2	DM	4	GND

CAMERA:

Pin No.	Symbol	Pin No.	Symbol
1	VCC_5V	16	MIPI_CSI_D3P
2	VCC_5V	17	MIPI_CSI_D3N
3	GND	18	GND
4	VCC_2.8V	19	MIPI_CSI_D2P
5	VCC_1.2V	20	MIPI_CSI_D2N
6	VCC_1.8V	21	GND
7	VCC_2.8V	22	MIPI_CSI_D1P
8	NC	23	MIPI_CSI_D1N
9	I ² C_SCL	24	GND
10	I ² C_SDA	25	MIPI_CSI_CLKP
11	MIPI_RST	26	MIPI_CSI_CLKN
12	CAMERA_PDN	27	GND
13	GND	28	MIPI_CSI_D0P
14	MIPI_CLK	29	MIPI_CSI_D0N
15	GND	30	GND

LVDS:

Pin No.	Symbol	Pin No.	Symbol
1	VDD	16	LVDS_CLK0P
2	VDD	17	LVDS_D3N
3	VDD	18	LVDS_D3P
4	GND	19	LVDS_D4N
5	GND	20	LVDS_D4P
6	GND	21	LVDS_D5N
7	LVDS_D0N	22	LVDS_D5P
8	LVDS_D0P	23	LVDS_D6N
9	LVDS_D1N	24	LVDS_D6P
10	LVDS_D1P	25	GND
11	LVDS_D2N	26	GND
12	LVDS_D2P	27	LVDS_CLK1N
13	GND	28	LVDS_CLK1P
14	GND	29	LVDS_D7N
15	LVDS_CLK0N	30	LVDS_D7P

MIPI_DSI/LVDS:

Pin No.	Symbol	Pin No.	Symbol
1	NC	21	D3P
2	VDD(3.3V)	22	GND
3	VDD(3.3V)	23	TP_RST
4	GND	24	TP_INT
5	RST	25	GND
6	NC	26	TP_I ² C_SCL
7	GND	27	TP_I ² C_SDA
8	D0N	28	TP_VDD
9	D0P	29	AVDD
10	GND	30	GND
11	D1N	31	LEDK

12	D1P	32	LEDK
13	GND	33	VCOM
14	CLKN	34	NC
15	CLKP	35	VGL
16	GND	36	NC
17	D2N	37	NC
18	D2P	38	VGH
19	GND	39	LEDA
20	D3N	40	LEDA

TP:

Pin No.	Symbol	Pin No.	Symbol
1	TP_RST	4	TP_I ² C_SDA
2	TP_INT	5	TP_I ² C_SCL
3	GND	6	TP_VDD

EDP:

Pin No.	Symbol	Pin No.	Symbol
1	NC	16	GND
2	GND	17	HPD
3	D1N	18	BL_GND
4	D1P	19	BL_GND
5	GND	20	BL_GND
6	D0N	21	BL_GND
7	D0P	22	BL_EN
8	GND	23	BL_PWM
9	CLKP/AUXP	24	NC
10	CLKN/AUXN	25	NC
11	GND	26	BL_PWR
12	LCD_VCC	27	BL_PWR
13	LCD_VCC	28	BL_PWR

14	NC	29	BL_PWR
15	GND	30	NC

BL:

Pin No.	Symbol	Pin No.	Symbol
1	VCC_BL	4	EN
2	VCC_BL	5	GND
3	PWM	6	GND

SPK:

Pin No.	Symbol	Pin No.	Symbol
1	OUTPL	3	OUTNR
2	OUTNL	4	OUTPR

GPIO:

Pin No.	Symbol	Pin No.	Symbol
1	KEY	11	CAN_RX
2	SPKN_OUT	12	GPIO1_A4
3	GND	13	CAN_TX
4	SPKP_OUT	14	GPIO1_B1
5	ADC0	15	GND
6	GND	16	GND
7	I ² C_SCL	17	VCC5V0
8	PWM3	18	VCC5V0
9	I ² C_SDA	19	VCC5V0
10	GPIO1_B2	20	VCC5V0

DB_UART:

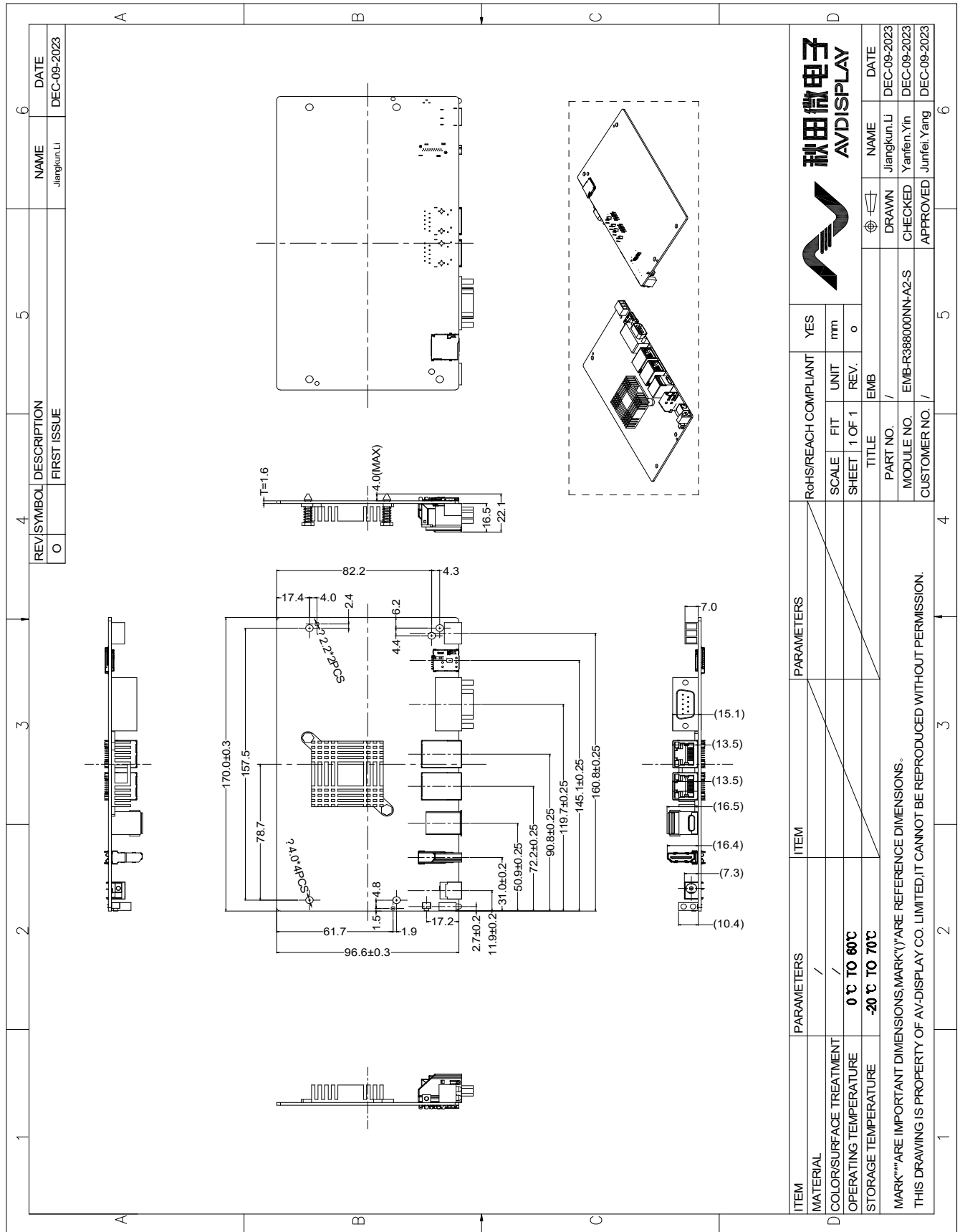
Pin No.	Symbol	Pin No.	Symbol
1	GND	3	UART_TX

2	UART_RX	/	/
---	---------	---	---

MIC:

Pin No.	Symbol	Pin No.	Symbol
1	MIC_IN	2	GND

4. MOUDLE EXTERNAL DIMENSIONS



5.ENVIRONMENTAL CONDITIONS

Item	Symbol	Min.	Max.	Unit
Operation Temperature	Top	0	+60	°C
Storage Temperature	Tst	-20	+70	°C
Humidity	RH	-	90%	%RH

6.RELIABILITY TEST CONDITIONS

No.	Test Item	Test condition		Inspection after test
1	High Temperature Storage Test	+70°C/72 hours		Inspection after 2~4 hours storage at room temperature, the sample shall be free from defects : 1.Current changing value before test and after test is 50% larger. 2. Function defect : Non-display, abnormal-display 3.Visual defect : Glass crack.
2	Low Temperature Storage Test	-20°C/120 hours		
3	High Temperature Operating Test	+60°C/48 hours		
4	Low Temperature Operating Test	0°C/120 hours		
5	Temperature Cycle Storage Test	-20°C ~ 25°C ~ +70°C/10 cycles (30 min.) (10 min.) (30 min.)		
6	High Temperature High Humidity Test	+50°C*90% RH/120 hours		
7	Vibration Test	Frequency : 250 r/min Amplitude : 1 inch Time: 45 min		
8	Drop Test	Drop direction: 1 corner/3 edges/6 sides ,10 times		
		Packing weight(kg)	Drop height(cm)	
		<11	80±1.6	
		11≦G<21	60±1.2	
		21≦G<31	50±1.0	
		31≦G<40	40±0.8	
9	ESD Test	Air discharge: ±8 KV, 10 times Contact discharge: ±4 KV, 10 times		

Remark :

- 1.The tested samples should be applied to only one test item.
- 2.Sample size for each test item is 3~5 pcs.
- 3.For High temperature high humidity test, Pure water(Resistance>10MΩ) should be used.
- 4.In case of malfunction defect caused by ESD damage, if it would be recovered to normal state after resetting, it would be judged as a good part.
- 5.Failure judgement criterion: Basic specification, Electrical characteristic, Mechanical characteristic, Optical characteristic.

7.REMARK:

- Avoid any inappropriate external force or strong vibration in the assembly process.
- High temperature, high humidity or rapid temperature changes may affect performance. Store and use the product in an appropriate environment.
- Avoid dust, oil mist, acid, alkali and chloride damage to the product.
- Wear wrist straps, antistatic gloves and clothes during assembly to prevent electrostatic discharge (ESD).
- When assembling, use ionic fan to prevent electrostatic discharge (ESD).
- Follow the correct time sequence when operating.
- Turn off the power when connecting or disconnecting the circuit.
- Ensure that the shell is connected to the ground (PE) in the operating environment.