Product specification

Product name：RK3328 Core board

Module name: DSOM-010

Revision History

Specification		Sect.	Update Description	By
Rev	Date			
1.0	2021-10-28		New version release	Li

Approvals

Organization	*Name*	*Title*	*Date*

Catalogue

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1 Product overview

1.1 Core board range of application

The RK3328 core board belongs to the Android intelligent motherboard, generally applicable to face recognition, intelligent display terminal products, video terminal products, industrial automation terminal products, such as: advertising machine, digital signage, intelligent self-service terminal, intelligent retail terminal, smart home, O2O intelligent equipment, industrial control host, robot equipment, etc.

1.2 product description

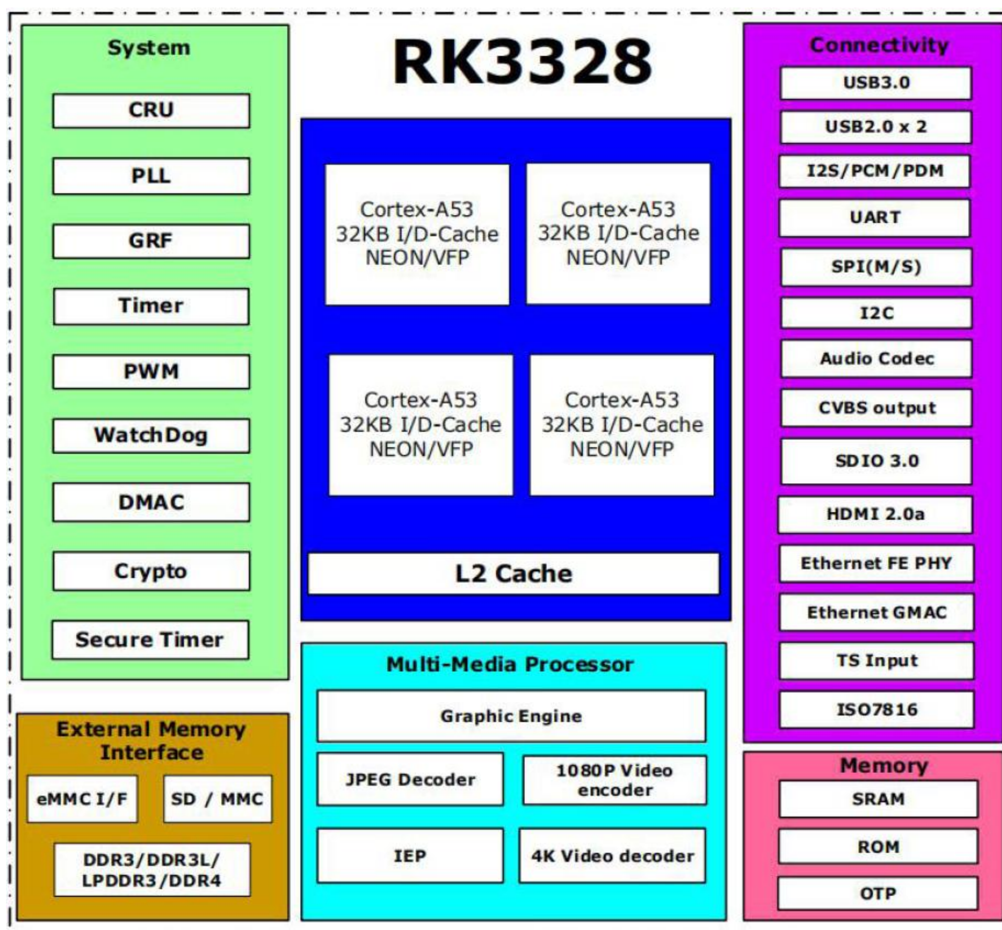
The RK3328 is powered by the ROCHCHIPRK3328 Cortex-A53 quad-core processor with Android/Linux+QT/Ubuntu and a high performance 1.5GHz main frequency. Adopt Mali-450MP2GPU, support 4K video encoding, H.264 hard decoding. Multiple video outputs, rich core board interfaces, pin out all functions, support a variety of peripheral expansion, is your best choice for human-computer interaction, industrial control projects.

1.3 Product features

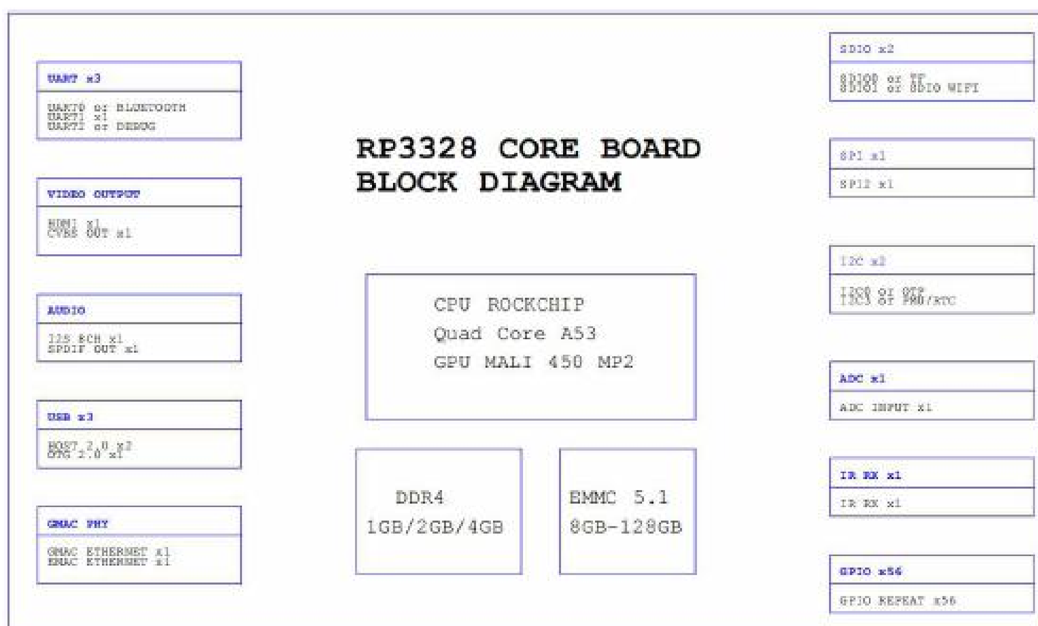
Stamp hole solder type core board, on board CVBS, HDMI display interface.

Support Android/Linux+QT system customization, provide system call interface API reference code, perfect support for customer upper layer application APP development and SDK.

2 Block diagram of the main chip



3 Block diagram of the core board



4 Basic parameters

Item	parameter	Remark
Mode	DSOM-010	Version V1.0
CPU	ROCKCHIPRK3328 Quad-coreA53	
GPU	Mali450MP2	
RAM	DDR4 1GBor2GB	
Storage	EMMC5.1 8GB 16GB/32G/64G	
Power management	RK805-1	
Lithium battery	Nc	
Lperating voltage	5V/2A	
Operating system	Andriod7.1/Ubuntu16.04/Linux+QT/debian	
Temperature	Working Temperature：-20℃~75℃	
	Storage Temperature：-30℃~85℃	
Humidity	10~95%(Non-condensing)	
Air pressure	76Kpa ~106Kpa	
Size	44mm×44mm×3mm	

5 interface

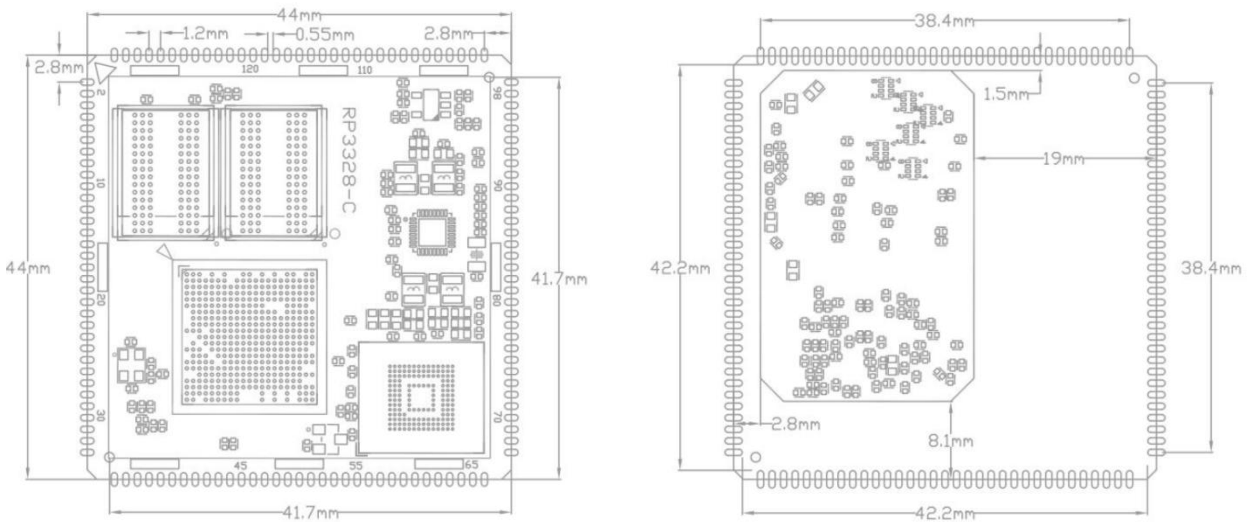
Interface	Interfaces by the factory default firmware
HDMI	HDMI HD output supports 4K / 1080P display
CVBS	Supports the CVBS output
UART	debug 3 Serport, debug
I2C	2*I2C
I2S	One 8-channel I2S interface
SDIO	1*SDIO*Wi-Fi AP6212

Interface	Interfaces by the factory default firmware
SPI	1*SPI
USB2.0	2*USB2.0 OTG
USB3.0	1*USB3.0
Ethernet	The main chip integrates 100M Ethernet chip
TF	1*TF
GPIO	Defined function
upgrade	Support for a local USB card upgrade

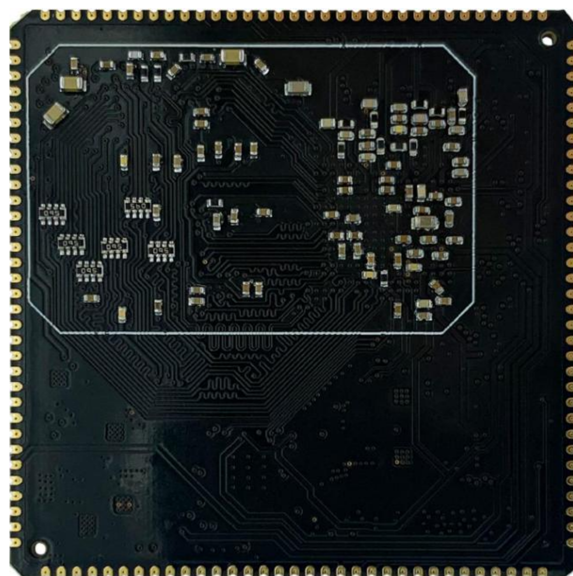
6 Mechanical structures

6.1 size

Module size: 44 ±0.35mm (W)×44±0.35mm (L) ×3±0.15mm (H)



6.2 The pin definition



The pin definition

Pin number	Name	I/O Type	Function
1	USB30_TXP	O	USB30_TXP
2	USB30_TXN	O	USB30_TXN
3	USB30_RXP	I	USB30_RXP
4	USB30_RXN	I	USB30_RXN
5	USB30_DP	I/O	USB30_DP
6	USB30_DM	I/O	USB30_DM
7	GND	P	GND
8	AOL	O	AOL
9	AOR	O	AOR
10	GND	P	Ground
11	VDAC_OUT	O	VDAC_OUT
12	GND	P	GND
13	GPIO0_A2	I/O	GPIO0_A2/CLKOUT_GMAC_M0/SPDIF_TX_M2_d
14	MUTE_CTL	O	GPIO_MUTE_d
15	GPIO0_A0	I/O	GPIO0_A0/CLKOUT_WIFI_M0_d
16	SDMMC0_PWREN	O	GPIO0_D6/FEPHY_LED_SPEED10/SDMMC0_PWREN_M1
17	SPDIF_TX_M0	O	GPIO0_D3/SPDIF_TX_M0_d
18	HDMI_HPD	I	GPIO0_A4/HDMI_HPD_d
19	HDMI_SDA	I/O	I2C3_SDA/HDMI_SDA_od
20	HDMI_SCL	O	I2C3_SCL/HDMI_SCL_od
21	HDMI_CEC	O	HDMI_CEC
22	GND	P	GND
23	HDMI_TX_C-	O	HDMI_TX_C-
24	HDMI_TX_C+	O	HDMI_TX_C+
25	GND	P	GND
26	HDMI_TX_D0-	O	HDMI_TX_D0-
27	HDMI_TX_D0+	O	HDMI_TX_D0+
28	GND	P	GND
29	HDMI_TX_D1-	O	HDMI_TX_D1-
30	HDMI_TX_D1+	O	HDMI_TX_D1+
31	GND	P	GND
32	HDMI_TX_D2-	O	HDMI_TX_D2-
33	HDMI_TX_D2+	O	HDMI_TX_D2+

Pin number	Name	I/O Type	Function
34	OTG20_DM	I/O	OTG20_DM
35	OTG20_DP	I/O	OTG20_DP
36	GND	P	GND
37	USB1_DM	I/O	USB1_DM
38	USB1_DP	I/O	USB1_DP
39	GND	P	GND
40	TD+	I/O	TD+
41	TD-	I/O	TD-
42	GND	P	GND
43	RD+	I/O	RD+
44	RD-	I/O	RD-
45	GND	P	GND
46	SDMMC0_DET	I	GPIO1_A5/SDMMC0_DETN_u
47	SDMMC0_D1	I/O	GPIO1_A1/SDMMC0_D1/UART2_RX_M0_u
48	SDMMC0_D0	I/O	GPIO1_A0/SDMMC0_D0/UART2_TX_M0_u
49	GND	P	GND
50	SDMMC0_CLK	O	GPIO1_A6/SDMMC0_CLK/TEST_CLK0_d
51	GND	P	GND
52	SDMMC0_CMD	O	GPIO1_A4/SDMMC0_CMD_u
53	SDMMC0_D3	I/O	GPIO1_A3/SDMMC0_D3/JTAG_TMS_u
54	SDMMC0_D2	I/O	GPIO1_A2/SDMMC0_D2/JTAG_TCK_u
55	UART0_RTSN	I	GPIO1_B2/UART0_RTSN/GMAC_RXD1_M1_d
56	UART0_TX	O	GPIO1_B1/UART0_TX/GMAC_TXD0_M1_u
57	UART0_RX	I	GPIO1_B0/UART0_RX/GMAC_TXD1_M1_u
58	UART0_CTSN	O	GPIO1_B3/UART0_CTSN/GMAC_RXD0_M1_d
59	GND	P	GND
60	PCM_SYNC	O	GPIO1_C7/I2S2_LRCK_TX_M0/GMAC_MDC_M1/PDM_SDI0_M1_d
61	PCM_TX	O	GPIO1_D1/I2S2_SDO_M0/GMAC_TXEN_M1/PDM_SDI2_M1_d
62	PCM_CLK	O	GPIO1_C6/I2S2_SCLK_M0/GMAC_RXDV_M1/PDM_CLK_M1_u
63	PCM_RX	I	GPIO1_D0/I2S2_SDI_M0/GMAC_RXER_M1/PDM_SDI1_M1_d
64	GND	P	GND
65	32K_OUT	O	GPIO1_D4/CLK32KOUT_M1_d
66	GND	P	GND
67	SDMMC1_D1	I/O	GPIO1_B7/SDMMC1_D1/GMAC_RXD2_M1_u

Pin number	Name	I/O Type	Function
68	SDMMC1_D0	I/O	GPIO1_B6/SDMMC1_D0/GMAC_RXD3_M1_u
69	GND	P	GND
70	SDMMC1_CLK	O	GPIO1_B4/SDMMC1_CLK/GMAC_TXCLK_M1_d
71	GND	P	GND
72	SDMMC1_CMD	O	GPIO1_B5/SDMMC1_CMD/GMAC_RXCLK_M1_u
73	SDMMC1_D3	I/O	GPIO1_C1/SDMMC1_D3/GMAC_TXD2_M1_u
74	SDMMC1_D2	I/O	GPIO1_C0/SDMMC1_D2/GMAC_TXD3_M1_u
75	GND	P	GND
76	WIFI_WAKE_HOST	I	GPIO1_C3/SDMMC1_DET/GMAC_MDIO_M1/PDM_FSYNC_M1_u
77	WIFI_REG_ON	O	GPIO1_C5/I2S2_MCLK/GMAC_CLK_M1_d
78	BT_WAKE_HOST	I	GPIO1_D2/I2S2_LRCK_RX_M0/CLKOUT_GMAC_M2/PDM_SDI3_M1_d
79	BT_REG_ON	O	GPIO1_C5/I2S2_MCLK/GMAC_CLK_M1_d
80	GND	P	GND
81	EMMC_KEY	I	UPDATA KEY
82	GND	P	GND
83	SARADC_IN1	I	SARADC_IN1
84	RECOVER		SARADC_IN0
85	GND	P	GND
86	RESET	I	RESET
87	GND	P	GND
88	UART2_TX	O	GPIO2_A0/UART2_TX_M1/POWERSTATE0_d
89	UART2_RX	I	GPIO2_A1/UART2_RX_M1/POWERSTATE1_u
90	IR_RX	I	GPIO2_A2/IR_RX/POWERSTATE2_u
91	GND	P	GND
92	I2C1_SCL_PMIC	O	GPIO2_A5/PWM1/I2C1_SCL_u
93	I2C1_SDA_PMIC	I/O	GPIO2_A4/PWM0/I2C1_SDA_u
94	PMIC_SLEEP	I	GPIO2_D2/USB20_DRV_d
95	GPIO2_A3	I/O	GPIO2_A3/EFUSE_PWREN/POWERSTATE3_u
96	PWR_KEY	I	PWR_KEY
97	RK805_32KOUT	O	RK805_32KOUT
98	GND	P	GND
99	GND	P	GND
100	VCC_SYS	P	Main power input 5V
101	VCC_SYS	P	Main power input 5V

Pin number	Name	I/O Type	Function
102	PMU_EN	I	Set up the power-on and self-start switch0=The power is not turned on1=Power boot
103	GND	P	GND
104	GND	P	GND
105	VCCIO_WL	I	Wi-Fi IO Voltage input1.8V/3.3V
106	GND	P	GND
107	VCC_18	P	POWER OUT 1V8 100mA
108	GND	P	GND
109	VCC_IO	O	POWER OUT 3V3 300mA
110	GND	P	GND
111	I2S1_SDI	I	GPIO2_C3/I2S1_SDI/PDM_SDI0_M0/CARD_CLK_M1_u
112	I2S1_SDIO3	I	GPIO2_C6/I2S1_SDIO3/PDM_SDI3_M0/CARD_IO_M1_u
113	I2S1_SDIO2	I	GPIO2_C5/I2S1_SDIO2/PDM_SDI2_M0/CARD_DET_M1_u
114	I2S1_SDIO1	I	GPIO2_C4/I2S1_SDIO1/PDM_SDI1_M0/CARD_RST_M1_u
115	I2S1_SDO	O	GPIO2_C7/I2S1_SDO/PDM_FSYNC_M0_u
116	I2S1_LRCK_RX	I	GPIO2_C0/I2S1_LRCK_RX/TSP_D5_M1/CIF_D5_M1_u
117	I2S1_LRCK_TX	O	GPIO2_C1/I2S1_LRCK_TX/SPDIF_TX_M1/TSP_D6_M1/CIF_D6_M1_u
118	I2S1_SCLK	O	GPIO2_C2/I2S1_SCLK/PDM_CLK_M0/TSP_D7_M1/CIF_D7_M1_d
119	I2S1_MCLK	O	GPIO2_B7/I2S1_MCLK/TSP_SYNC_M1/CIF_CLKOUT_M1_d
120	GND	P	GND
121	I2C0_SCL	O	GPIO2_D0/I2C0_SCL/FEPHY_LED_LINK_M1_u
122	I2C0_SDA	I/O	GPIO2_D1/I2C0_SDA/FEPHY_LED_DATA_M1_u
123	GND	P	GND
124	UART1_TX	O	GPIO3_A4/TSP_D0/CIF_D0/SDMMC0EXT_D0/UART1_TX/USB3PHY_DEBUG4_u
125	USB20_HOST_DRV	O	GPIO3_A5/TSP_D1/CIF_D1/SDMMC0EXT_D1/UART1_RTSN/USB3PHY_DEBUG5_u
126	UART1_RX	I	GPIO3_A6/TSP_D2/CIF_D2/SDMMC0EXT_D2/UART1_RX/USB3PHY_DEBUG6_u
127	USB30_HOST_DRV	O	GPIO3_A7/TSP_D3/CIF_D3/SDMMC0EXT_D3/UART1_CTSN/USB3PHY_DEBUG7_u
128	GND	P	GND
129	SPI2_CS0	O	GPIO3_B0/TSP_D4/CIF_D4/SPI_CSN0_M2/I2S2_LRCK_TX_M1/USB3PHY_DEBUG8/I2S2_LRCK_RX_M1_d
130	SPI2_TXD	O	GPIO3_A1/TSP_FAIL/CIF_HREF/SDMMC0EXT_DET/SPI_TXD_M2/USB3PHY_DEBUG2/I2S2_SDO_M1_u
131	SPI2_RXD	I	GPIO3_A2/TSP_CLK/CIF_CLKIN/SDMMC0EXT_CLK/SPI_RXD_M2/USB3PHY_DEBUG3/I2S2_SDI_M1_d

Pin number	Name	I/O Type	Function
132	SPI2_CLK	O	GPIO3_A0/TSP_VALID/CIF_VSYNC/SDMMC0EXT_CMD/SPI_CLK_M2/USB3PHY_DEBUG1/I2S2_SCLK_M1_u

Tips:

1. I-input; O-output; I/O-digital I/O; P-power supply.

7 Electric performance

7.1 Absolute parameters

Parameters	Description	Min	Typ.	Max	Unit
Ts	Store temperature	-30	-	85	℃
VBAT	Input voltage	4.5	5	5.5	V
Electrostatic discharge voltage (human body model)	TAMB-25℃	-	-	2	KV
Electrostatic discharge voltage (machine model)	TAMB-25℃	-	-	0.5	KV

Tips ：

Absolute parameter means that the index should not be exceeded at any time. If the parameter is exceeded, it may cause irreparable damage to the module.

7.2 Normal operation parameters

Parameters	Description	Min	Typ.	Max	Unit
Ta	Operating temperature	-20	25	75	°C
VDD		4.75	5	5.25	V
V_{IL}	Low-level input voltage	-0.3	-	VDD*0.25	V
V_{IH}	High-level input voltage	VDD*0.75	-	1.8/3.3	V
V_{OL}	Low-level output voltage		-	VDD*0.1	V
V_{OH}	High-level output voltage	VDD*0.8	-	-	V
I_{STD}	No-load running current	-	-	370	mA
I_{peak}	Peak current	-	580	-	mA

8 Operation instruction

8.1 SMT manufacture procedure

For modules that can be packaged in SMT or in-line, you can choose according to the customer's PCB design scheme. If the PCB design is for SMT packaging, use SMT packaged modules. If the PCB is designed for in-line packaging, please package the module in-line. The modules must be soldered within 24 hours after unpacking. Otherwise they need to be placed in a dry cabinet with a relative humidity of no more than 10%; alternatively they need to be vacuum packed again and the exposure time recorded (total exposure time must not exceed 168 hours).

Instruments or equipment required for SMT placement.

- Surface mounting machine
- SPI
- Reflow
- Furnace temperature tester
- AOI

Instruments or equipment required for baking:

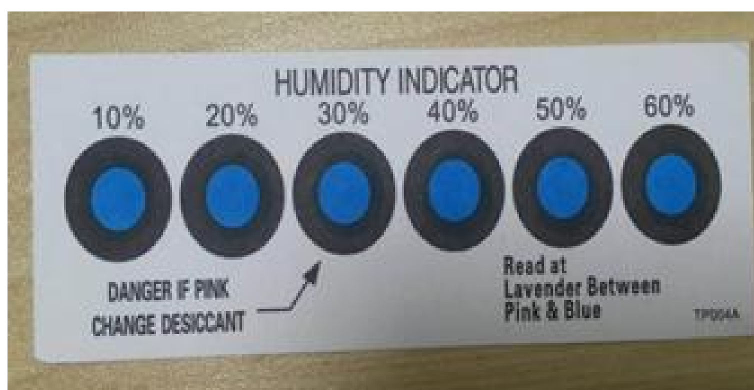
- Cabinet baking box
- Antistatic and high temperature resistant tray
- Anti-static and high-temperature resistant gloves

8.2 The module storage conditions are as follows:

The moisture-proof bag must be stored in a temperature <40℃ and humidity <90%RH

The shelf life is 12 months from the date when the package is sealed

A humidity indicator card is installed in the sealed package:



8.3 Baking is required when there is a risk of moisture.

The vacuum packaging bag is found to be damaged before unpacking

After unpacking, there is no humidity indication card in the packaging bag

If the humidity indicator card is read 10% and above, turn pink

The total exposure time exceeded 168 hours after unpacking

More than 12 months from the date of the first sealed packaging

8.4 The baking parameters are as follows:

Baking temperature: reel package 60℃, humidity less than 5%RH; tray package 125℃, humidity less than 5%RH (heat-resistant tray non-suction box drag tray)

Baking time: 48 hours; 12 hours

Alarm temperature setting: 65℃; 135℃

Production can be performed after cooling under 36℃ under natural conditions

If the exposure time is greater than 168 hours and it is not used up, please bake again

If the exposure time exceeds 168 hours and not baking, it is not recommended to weld this batch of modules by reflux welding process. Because the module of level 3 wet sensitive device exceeds the allowable exposure time, the product may be damp, which may lead to device failure or poor welding during high temperature welding

8.5 ESD

Electrostatic discharge (ESD) protects the module throughout production.

8.6 Qualification rate

To ensure qualified products, it is recommended to use SPI and AOI test equipment to monitor the quality of tin paste printing and mounting.

9 Recommended furnace temperature curve

SMT patch according to reflux weld graph, peak temperature 245℃. Taking SAC305 alloy welding paste as an example, the reflux welding temperature curve is shown in the figure below

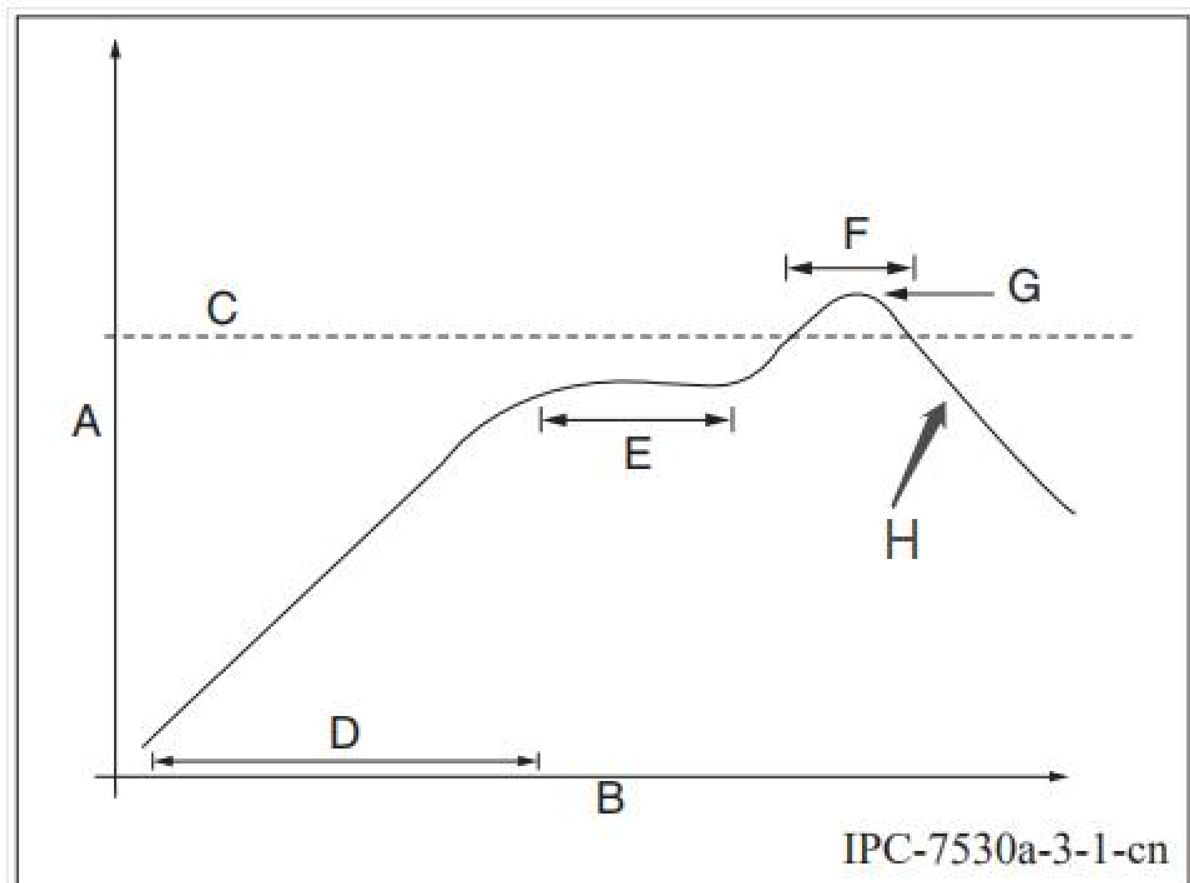


Illustration of the curve icon.

A：Temperature axis

B：time axis

C：217-220℃Alloy liquid phase line temperature: 217-220℃

D：Heating slope: 1-3℃ / s

E：Constant temperature time: 60-120s, constant temperature temperature: 150-200℃

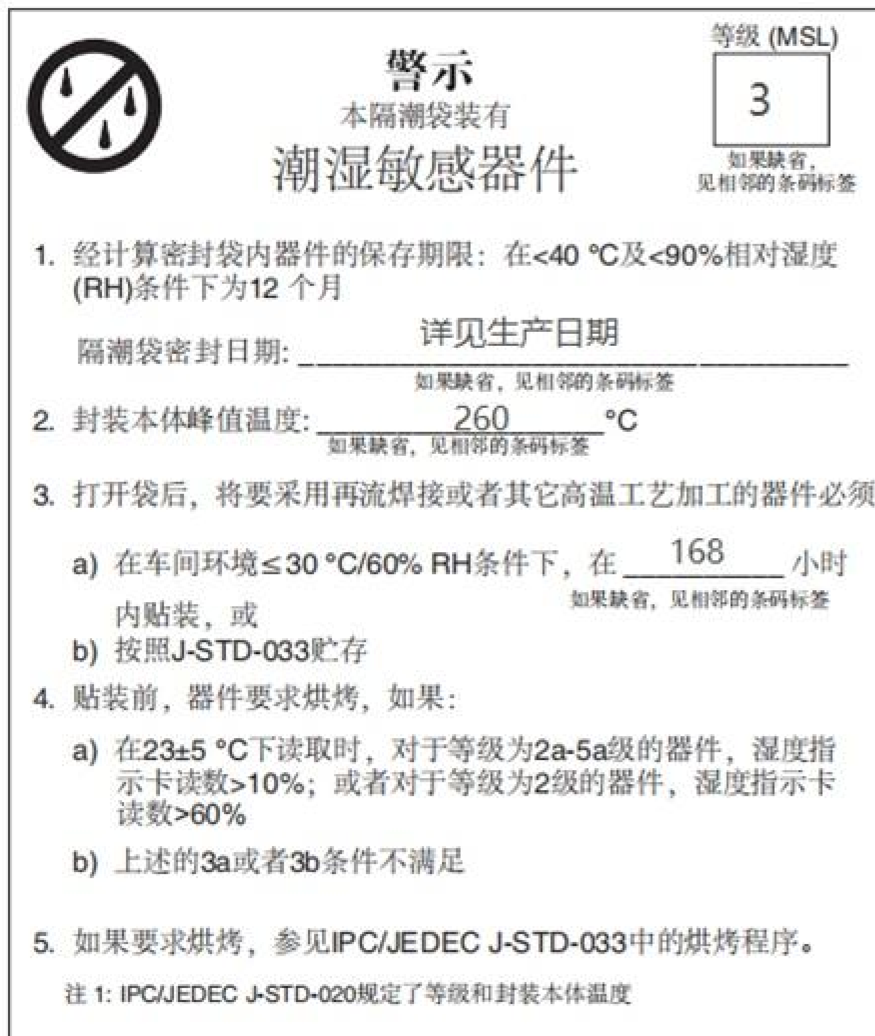
F： Time above the liquid phase line: 50-70s

G：Peak temperature: 235-245℃

H：Cooling slope: 1-4℃ / s

Instruction:The above recommended curve takes SAC305 alloy welding paste as an example. Other alloy welding paste should be set according to the recommended furnace temperature curve of the welding paste specifications

10 storage



警示

本隔潮袋装有

潮湿敏感器件

等级 (MSL)

3

如果缺省，见相邻的条码标签

1. 经计算密封袋内器件的保存期限：在<40 °C及<90%相对湿度(RH)条件下为12 个月

隔潮袋密封日期: 详见生产日期
如果缺省，见相邻的条码标签

2. 封装本体峰值温度: 260 °C
如果缺省，见相邻的条码标签

3. 打开袋后，将要采用再流焊接或者其它高温工艺加工的器件必须

a) 在车间环境≤30 °C/60% RH条件下，在 168 小时内贴装，或
如果缺省，见相邻的条码标签

b) 按照J-STD-033贮存

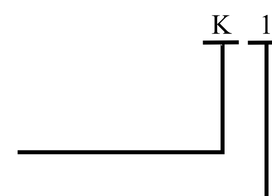
4. 贴装前，器件要求烘烤，如果：

a) 在23±5 °C下读取时，对于等级为2a-5a级的器件，湿度指示卡读数>10%；或者对于等级为2级的器件，湿度指示卡读数>60%

b) 上述的3a或者3b条件不满足

5. 如果要求烘烤，参见IPC/JEDEC J-STD-033中的烘烤程序。

注 1: IPC/JEDEC J-STD-020规定了等级和封装本体温度



11 Order information

DSM-010- K 1

Type
DDR Size（J=2Gb；K=1Gb）
EMMC size （1=8GB ；2=16GB；3=32GB）

12 package

TBD