Product Datasheet
ECK20-6Y2XA Core board



成都亿佰特电子科技有限公司
Chengdu Ebyte Electronic Technology Co.,Ltd.

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1. Product Overview

1.1.Product introduction

Ebyte ECK20-6Y2XA series core board is carefully designed based on NXP Cortex-A 7 core i.MX6ULL processor, and is a low-cost, low-power, cost-effective, and highly reliab le embedded core board connected by stamp holes. It can be widely used in industrial co ntrol, HMI, IoT and other fields.

NXP's i.MX6ULL processor uses a single ARM Cortex-A7 core with a maximum mai n frequency of 792MHz. It can provide rich I/O resources such as 1x LCD display, 1x di gital camera, 2x 100M Ethernet, 2x USB OTG, 8x UART, 2x SDIO, 2x CAN, multiple G PIO, etc.

The ECK20-6Y2XA series core board includes 3 specific product models.They mainly ha ve some differences in memory capacity,storage configuration,etc.Customers can choose the appropriate model according to their needs. For product selection,please refer to the p roduct s election section.

The physical picture of the ECK20-6Y2XA series core board (without components on the bottom of the product) is as follows:



Physical picture

1.2.Features

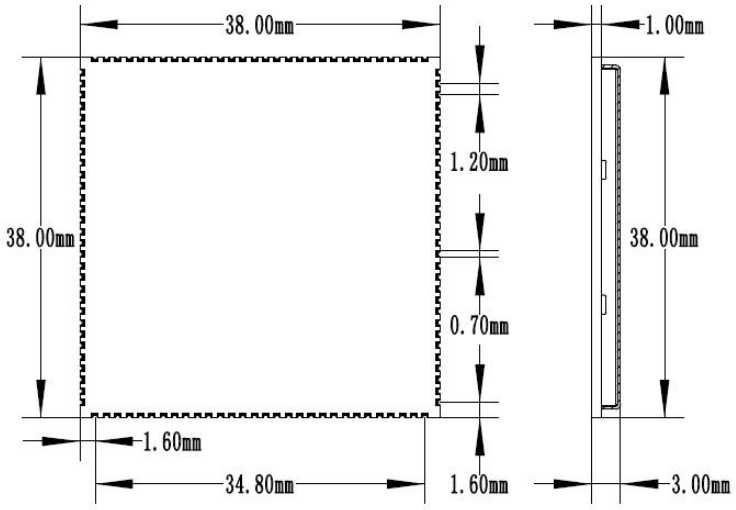
1. Processor: i.MX6ULL series industrial-grade processor, main frequency 792MHz;
2. Memory: On-board DDR3L SDRAM, 256MB/512MB capacity optional;
3. Storage: 8GB eMMC or 512MB parallel NAND FLASH optional;
4. Display: 1x parallel display interface,maximum resolution supports WXGA (1366

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×768@60fps）；

5. Network: 10/100 adaptive Ethernet MII/RMII interface;
6. USB: 2-way USB2.0 OTG interface;
7. SDIO: 2-way MMC/SD/SDIO card interface (eMMC configuration only supports 1-way SDIO lead-out);
8. Multiple extended I/O interfaces: including UART, CAN, I2C, SPI, SAI, ADC, GPIO, etc.
9. Supports on-chip watchdog function (timeout can cause processor reset)；
10. Support on-chip RTC function;
11. Interface type: 120-pin stamp hole;
12. Power supply: single-channel DC+5V±10%@0.3A power input;
13. Structural dimensions: 38×38×3mm, as shown in the following figure:



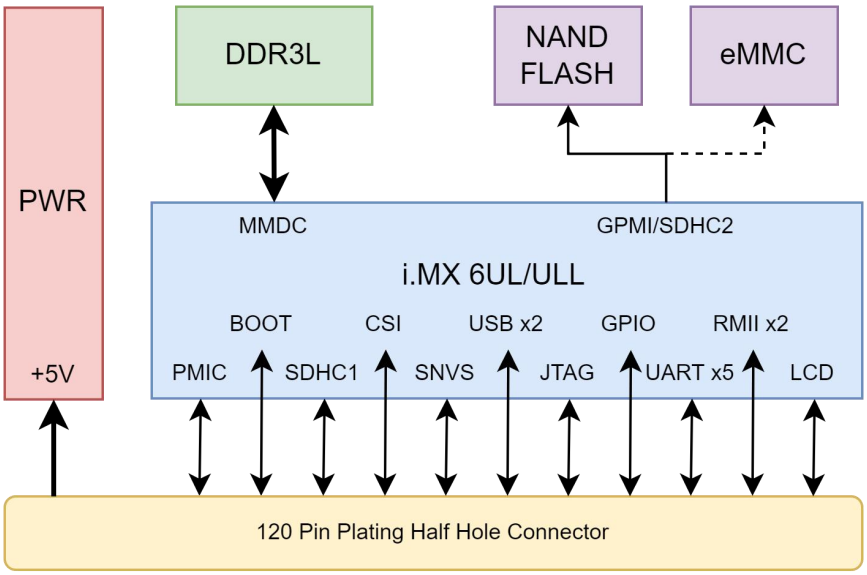
Dimensions

14. Working temperature:Commercial grade: 0℃-70℃, Industrial grade: -40℃-85℃;
15. PCB technology: 8-layer board design, immersion gold, lead-free technology;

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1.3.Core board functional block diagram



Functional Block Diagram

1.4.Typical applications

- Smart home;
- Smart toys;
- Smart cities;
- Tablet computer;
- IoT Gateway;
- Advertising all-in-one machine;
- Industrial all-in-one machine;
- Industrial control motherboard;
- Robots and drones.

1.5.Matching single-board computer

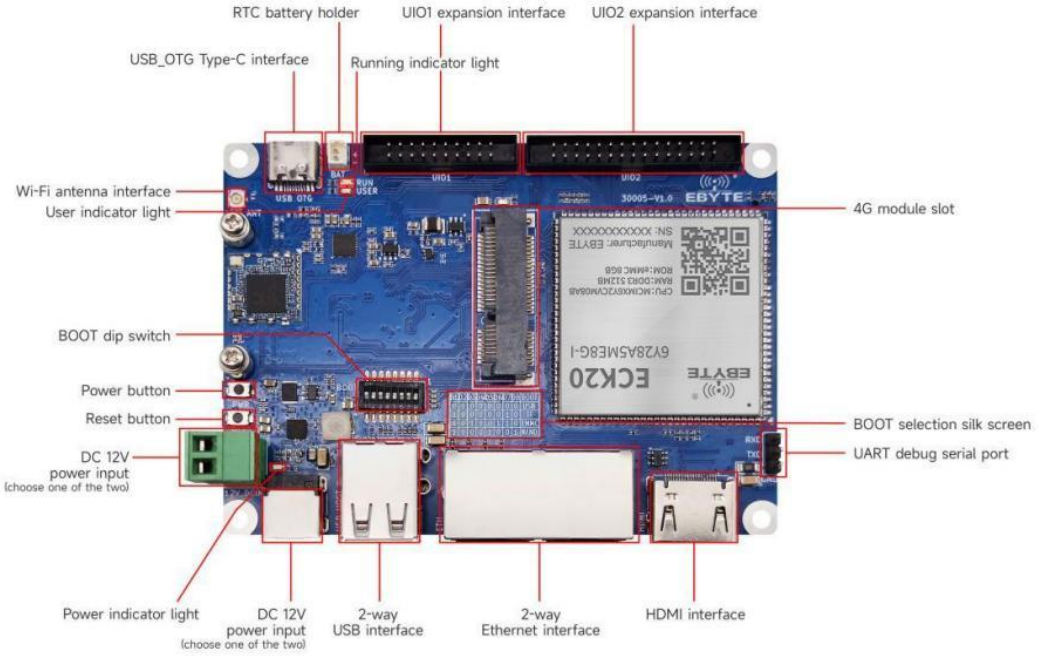
Based on the NXP i.MX 6ULL processor, Ebyte has launched a cost-effective 2.5-inc h single-board computer ECB20-6Y28A5ME8G-I. The single-board computer is composed of the core board ECK20-6Y28A5ME8G-I and the base plate by stamp hole welding. The single-board computer supports the Linux system and has a rich peripheral interface. The design level is higher than that of ordinary development boards and can be used in indu strial scenarios in batches.

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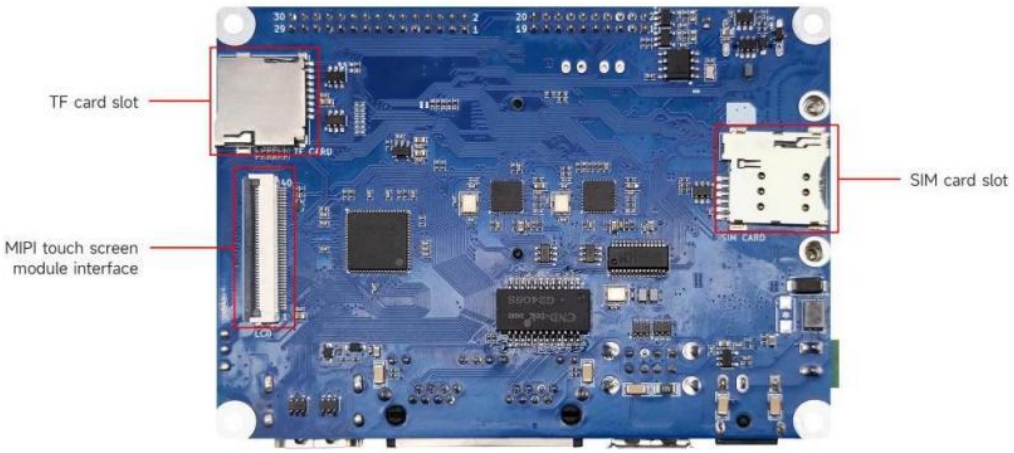
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Along with the single-board computer, Ebyte provides a stable reference design and a complete software development environment,which can effectively help users verify the co re board functions, improve development efficiency, shorten development cycle, optimize d esign quality, and accelerate product development and time to market.

The single board computer function diagram is as follows:



Functional description of the front side of the single board computer



Functional description diagram on the back of the single board computer

2. Product Selection

2.1.Model configuration

The ECK20-6Y2XA series core board selection and configuration table is as follows:

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Product Selection and Configuration Table

Serial number	Product Model	Processor model	Memory	storage	Operating temperature
1	ECK20-6Y28A2M N5M-I	MCIMX6Y2CV M08AB	256MB DDR3L	512MB NAND	Industrial Grade -40℃ ~85℃
2	ECK20-6Y28A5M E8G-C	MCIMX6Y2CV M08AB	512MB DDR3L	8GB eMMC	Commercial Grade 0℃ ~70℃
3	ECK20-6Y28A5M E8G-I	MCIMX6Y2CV M08AB	512MB DDR3L	8GB eMMC	Industrial Grade -40℃ ~85℃

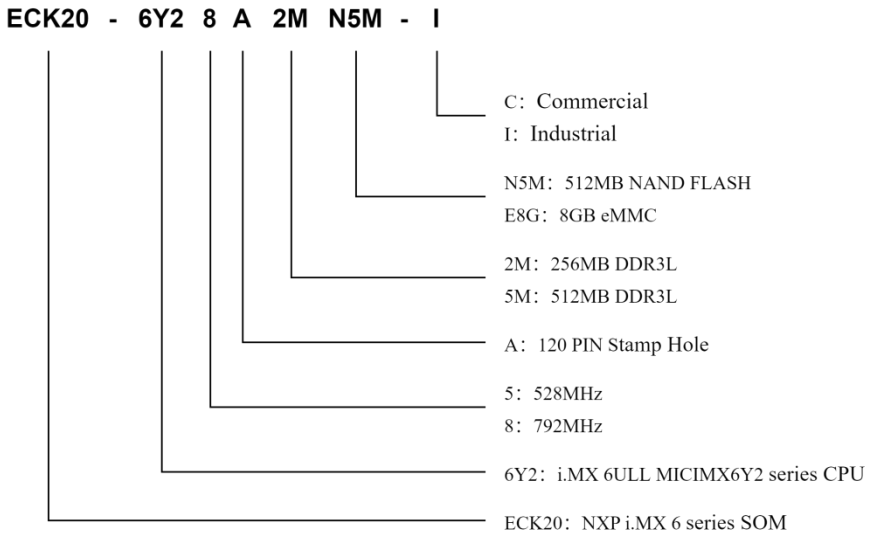
The selection and configuration table for the ECB20-6Y28A series single-board compu ters is as follows:

SBC Product Selection and Configuration Table

Serial number	Product Model	Processor model	Memory	storage	Operating temperature
1	ECB20-6Y28A5M E8G-I	ECK20-6Y28A5ME8 G-I	512MB DDR3L	8GB eMMC	Industrial Grade -40℃ ~85℃

2.2.Model code

The ECK20-6Y2XA series core board model coding is shown in the figure below:

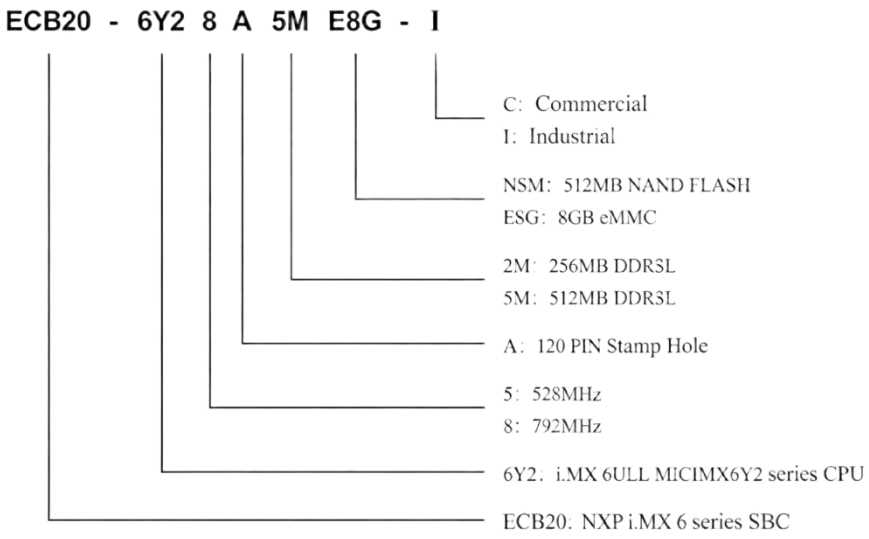


Model code description

The ECB20-6Y28A series single-board model coding is shown in the figure below:

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Model code description

3. Features and Parameters

3.1.Core board product functions

The ECK20-6Y2XA series core board mainly integrates the processor, memory, storag e and power system,and leads out all the I/O pins on the processor. Users can design the baseboard to apply the I/O resources on the core board according to their needs and reus e the I/O int o the functions they need.

The following table lists the main function parameters of the ECK20-6Y2XA series c ore board integrated on the board, and the function parameters of the reusable I/O resourc es. The description of each I/O function is the maximum indicator that the core board can use the I/O function without using other I/O functions (for example, after using 1x 24-bi t color LCD interface function and 2x network interface functions, 8-way UART function cannot be realized).

Core Board Product Function List

Functional	Functional Description	
processor	MCIMX6Y2CVM08AB; i.MX 6ULL Applications Processors for Industrial; Single Arm Cortex-A7 core, 792MHz;	
storage	Memory	On-board DDR3L SDRAM, 16-bit width, 256MB/512MB optional;
	FLASH	On-board 8GB eMMC / on-board 512MB parallel NAND FLASH optional;

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show	1 parallel display interface, maximum resolution supports WXGA (1366×768@60fps); Support 24bit, 18bit, 16bit, 8bit parallel display output;
Camera	1 parallel camera interface, supporting up to 24-bit data and 85MHz clock; Support 24bit, 16bit, 10bit, 8bit data input; Support BT.656 data format;
USDHC	2-way MMC/SD/SDIO card interface; 1-bit or 4-bit SD/SDIO card, up to UHS-I SDR-104 mode; 1bit, 4bit or 8bit mode MMC card, maximum support DDR mode; 4-bit or 8-bit mode eMMC, supporting up to HS200 mode;
USB	2-way USB 2.0 OTG;
Audio	3-way I2S/SAI/AC97, maximum 1.4Mbps per way; Support ESAI audio interface; Support SPDIF audio interface;
Serial Port	8-channel UART, maximum 5Mbps per channel;
SPI	4-channel eCSPI (Enhanced CSPI), maximum 52Mbps per channel;
Ethernet	2-way 10/100 Ethernet MAC, support IEEE1588, support RMII;
I2C	4-way I2C, maximum 400Kbps per channel;
CAN	2-way CAN interface, supporting CAN 2.0B protocol;
PWM	8-channel PWM, maximum clock frequency 66MHz;
ADC	2 12-bit ADCs, supporting up to 10 input channels;
EIM	Support EIM (External Interface Module), expandable NOR FLASH or PSRAM, etc.;
JTAG	Support System JTAG Controller;
TIMER	2 GPT (General Purpose Timer) timer functions;
WDT	3 Watchdog timer functions;
keyboard	1 8×8 matrix keyboard function;
GPIO	105 (maximum) GPIO, supporting interrupt function;

3.2.Single-board computer product functions

Single-board Computer Product Function List

Power Input	12V/1A DC input 1 DC round socket, parallel to one 3.81 Phoenix terminal;	
Processor	MCIMX6Y2CVM08AB; i.MX 6ULL Applications Processors for Industrial; Single Arm Cortex-A7 core, 792MHz;	
Storage	Memory	512MB, DDR3L;
	FLASH	8GB, eMMC;
Display	1-way 40Pin FPC RGB888 display interface, maximum resolution supports WXGA (1366×768@60fps), supports touch screen and backlight adjustment; 1x HDMI interface, maximum resolution supports WXGA (1366×768@60fps);	

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CSI	1-channel multiplexed CSI camera interface, extended interface lead-out;
USB HOST	2-way USB2.0 HOST;
USB OTG	1-way USB OTG, Type-C interface;
Network port	2x 10/100M adaptive RJ45 Ethernet ports;
4G	One mini-PCIe 4G module interface with USB signal is reserved, which can be used to connect the EC20/EC25 4G module of Quectel 1x micro-SIM card slot
Wi-Fi	1-channel 2.4GHz & 5.8GHz Wi-Fi ;
TF	1x TF card slot, supports plug-in detection ;
Audio	1x headphone output , extended interface lead out ; 1x microphone input , extended interface output ;
BOOT	1-way start mode dip switch;
Debug	1x UART debugging serial port ;
UART	2-way multiplexed UART communication interface, extended interface lead-out;
CAN	2-way multiplexed CAN FD interface, TTL level, extended interface lead-out ;
SPI	1-way multiplexed SPI interface, TTL level, extended interface lead-out ;
GPIO	34x multiplexed GPIOs, extended interface lead-out ;
I2C	2-way I2C, expansion interface lead out ;
Button	1x reset button; 1-way power button;
Indicator Lights	1x power indicator light ; 1x operation indicator light ; 1x user indicator light ;

3.3.Environmental characteristics

Environmental characteristics table

Operating temperature	Commercial Grade	0℃ ~ 70℃;
	Industrial Grade	-40℃ ~ 85℃;
Storage temperature	-40 ~ 85℃;	
Operating humidity	5~95% humidity, non-condensing;	
Storage humidity	60℃@95% humidity, non-condensing;	

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3.4.Power consumption

Note: The following parameters are measured on the ECK20-6Y28A5ME8G-I core board at room temperature. The measured power consumption does not include the baseboard power consumption. There is no display when measuring heavy-load power consumption, no baseboard SDIO access, and no network access.

Power Consumption Table

Power Status	Test environment	Supply voltage	Current	Power consumption
PWRUP	After the system starts, no application is running	5.0V	0.075A	0.375W
PWRUP	Software reload testing	5.0V	0.220A	1.1W
SLEEP	Freeze mode hibernation	5.0V	0.042A	0.21W
SLEEP	Standby mode sleep state	5.0V	0.011A	0.055W
SLEEP	Mem mode sleep state	5.0V	0.003A	0.015W
PWRDN	Power off state power consumption	5.0V	0.00A	0W

4. Software Resources

The ECB20-6Y28A5ME8G-I single-board computer is equipped with an operating system based on the Linux 5.10.9 kernel. The development board comes with a cross-compilation tool chain required for embedded Linux system development, U-boot source code, source code for the Linux kernel and various driver modules, as well as various development and debugging tools suitable for Windows desktop environment and Linux desktop environment.

Operating system: Ubuntu 20.04

System source code: u-boot 2020.04

Kernel 5.10.9

Configuration Tools: Configure Tools for i.MX V15

4.1.System resources

System Software Resource Table

Category	Name	Describe	Source code
BOOT	u-boot 2020.04	Bootloader	/source/u-boot_2020.04.tar.xz
Kernel	Kernel 5.10.9	Linux Kernel	/source/kernel_5.10.9.tar.xz
	MMC	e MMC/TF card driver	drivers/mmc/host/sdhci-esdhc-imx.c

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Device Driver	NAND	MTD Driver	drivers/mtd/nand/raw/gpmi-nand/gpmi-nand.c
	SPI	SPI Driver	drivers/spi/spi-imx.c
	I2C	I2C Driver	drivers/i2c/busses/i2c-imx.c
	USB Host	USB Drivers	drivers/usb/host/ohci-platform.c
	Ethernet	Network Drivers	drivers/net/ethernet/freescale/fec_main.c
	U ART	Serial port driver	drivers/tty/serial/imx.c
	Can bus	Can bus driver	drivers/net/can/flexcan.c
	GPIO keys	Key Driver	drivers/input/keyboard/gpio_keys.c
	RTC	RTC Driver	drivers/rtc/rtc-snvs.c
	GPIO LED	Led Driver	drivers/leds/leds-gpio.c
	LCD	L CDIF Driver	drivers/video/fbdev/mxsfb.c
	Resistive touch	ADC touch driver	drivers/input/touchscreen/imx6ul_tsc.c
Operating system	Rootfs	Ubuntu 20.04 system	/images/rootfs.tar.bz2
Development Tools	Gcc	Cross-compilation	/tools/gcc-linaro-7.5.0-2019.12-x86_64_arm-linu

5. Structural dimensions

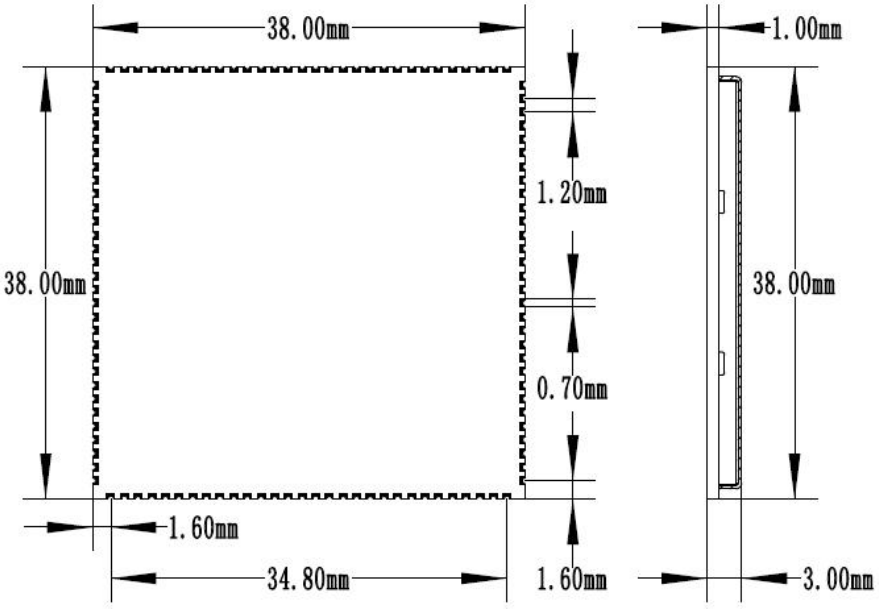
5.1.Core board structural dimensions

The ECK20-6Y2XA series core board adopts a 120 PIN, 1.2mm pitch stamp hole interface. It can be welded by SMT or manually. There are no components or exposed traces on the bottom layer of the core board, making the baseboard design simple.

The ECK20-6Y2XA series core board has a length of 38.0mm and a width of 38.0mm, with its structural dimensions shown in the following figure. The unit of the following dimensions is millimeters (mm), the structural dimension tolerance is ±0.1mm, and the PCB thickness tolerance is 10%.

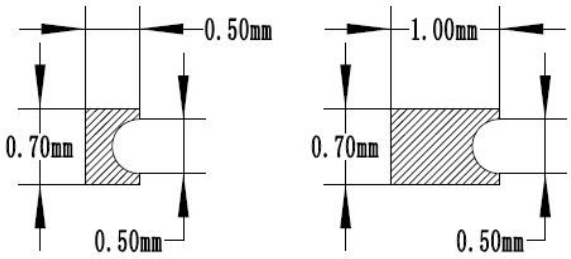
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Stamp hole core board structure size drawing

The size of the stamp hole pads on the bottom surface of the ECK20-6Y2XA series core board is shown in the following figure. The unit of the following dimensions is milli meters (mm).



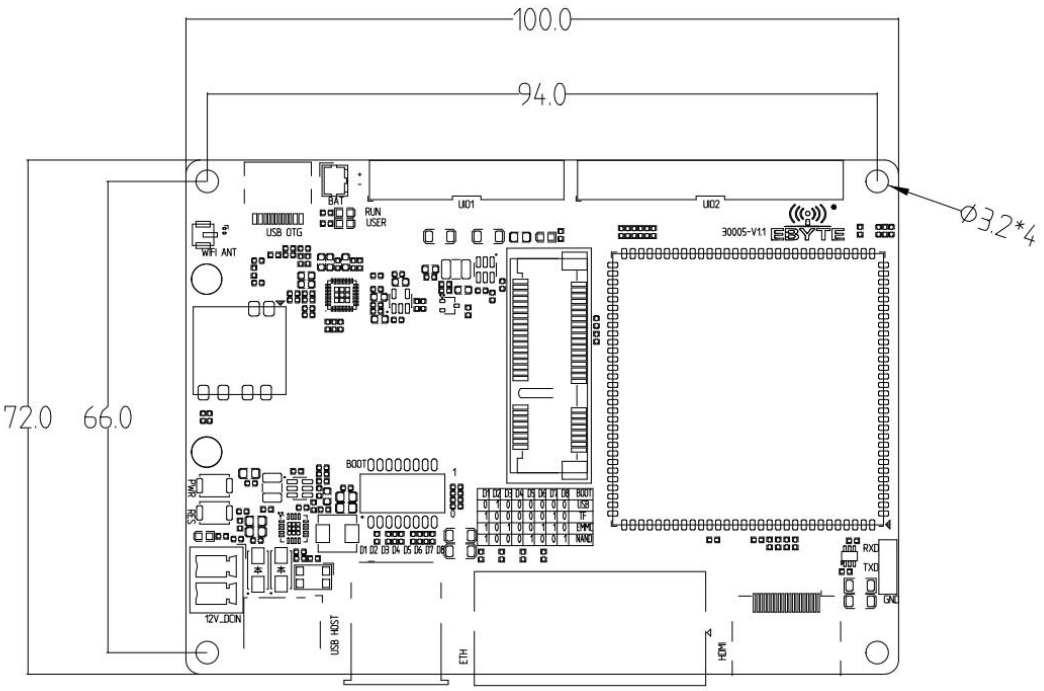
core board pad size drawing

5.2.Single-board computer structural dimensions

The ECK20-6Y28A single board computer has a length of 100.0mm and a width of 72.0mm, compatible with the 2.5-inch board size. The structural dimensions are shown in the following figure. The unit of the following dimensions is millimeters (mm), the structu ral dimension tolerance is ±0.1mm, and the PCB thickness tolerance is 10%.

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Structural dimension drawing of single-board computer

6. Welding Instructions

6.1.Reflow temperature

Reflow Temperature Table

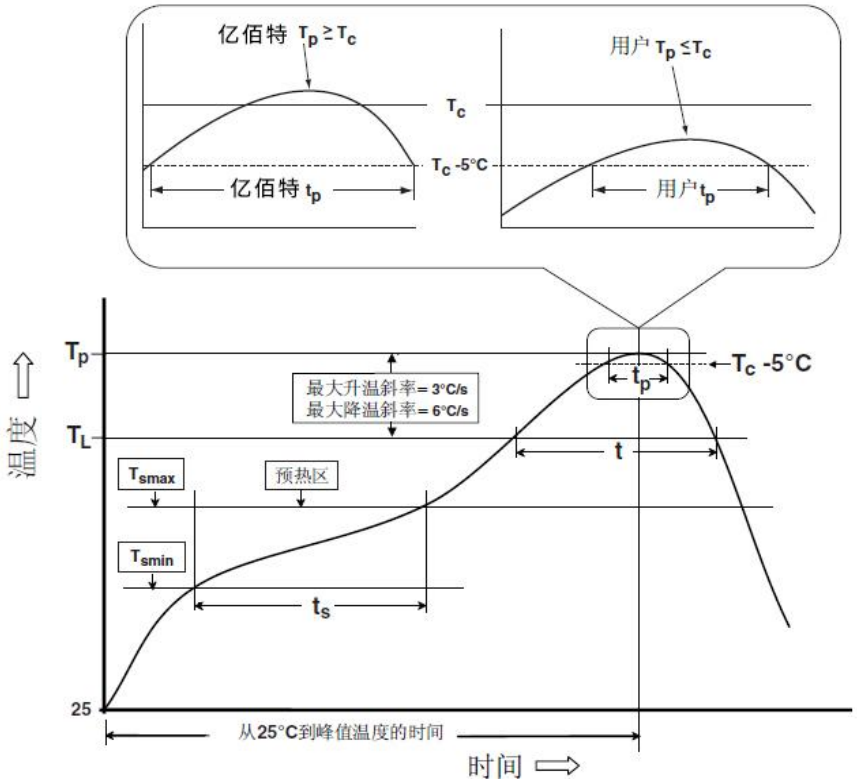
Reflow profile characteristics		Leaded process assembly	Lead-free assembly
Preheating/keeping	Minimum temperature (Tsmin)	100℃	150℃
	Maximum temperature (Tsmax)	150℃	200℃
	Time (Tsmin~Tsmax)	60-120 seconds	60-120 seconds
Heating slope (TL~Tp)		3℃/sec, max.	3℃/sec, max.
Liquidus temperature (TL)		183℃	217℃
Keep time above TL		60~ 90 seconds	60~ 90 seconds
Package peak temperature Tp		Users must not exceed the temperature stated on the product's "Moisture Sensitivity" label.	Users must not exceed the temperature stated on the product's "Moisture Sensitivity" label.
The time (Tp) within 5℃ of the specified classification temperature (Tc) is shown in the figure below.		20 seconds	30 seconds
Cooling slope (Tp~TL)		6℃/sec, max.	6℃/sec, max.
Time from room temperature to peak temperature		6 minutes, longest	8 minutes, longest

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※The peak temperature (Tp) tolerance of the temperature curve is defined as the upper limit of the user

6.2.Reflow oven profile



Reflow Oven Profile

7. Revision Notes

Revision Notes

Version	Modifications	Modification time	prepared by	Proofreading	Approval
V1.0	First Draft	2026-01-17	WFX	WYQ	WFX

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