Product Datasheet

ECK20-6Y2XA Core Board



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1.Product Overview

1.1.Product Introduction

The ECK20-6Y2XA series core board from EBYTE is a low-cost, low-power, high-performance, and highly reliable embedded core board based on the NXP Cortex-A7 core i.MX6ULL processor and featuring stamp hole connections. It can be widely used in industrial control, HMI, IoT, and other fields.

NXP's i.MX6ULL processor uses a single ARM Cortex-A7 core with a maximum clock speed of 792MHz, and provides rich I/O resources such as 1 LCD display, 1 digital camera, 2 100M Ethernet, 2 USB OTG, 8 UART, 2 SDIO, 2 CAN, and multiple GPIO.

The ECK20-6Y2XA series core boards include three specific product models. They differ mainly in memory capacity and storage configuration, allowing customers to choose the appropriate model based on their needs. For detailed product selection information, please refer to the product selection section.

The following is a physical image of the ECK20-6Y2XA series core board (without components on the bottom):



Core board physical image

1.2.Features

1、Processor: i.MX6ULL series industrial-grade processor, clock speed 792MHz;

2、Memory: Onboard DDR3L SDRAM, 256MB/512MB capacity optional;

3、Storage: 8GB eMMC or 512MB/1GB parallel NAND FLASH optional;

4、Display: 1 parallel display interface, maximum resolution supported is WXGA (1366×768@60fps).

5、Network: 10/100 adaptive Ethernet MII/RMII interface;

6、USB: 2 USB 2.0 OTG ports;

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7、SDIO: 2-way MMC/SD/SDIO card interface (eMMC configuration only supports 1-way SDIO output);

8、Multiple extended I/O interfaces: including UART, CAN, I2C, SPI, SAI, ADC, GPIO, etc.;

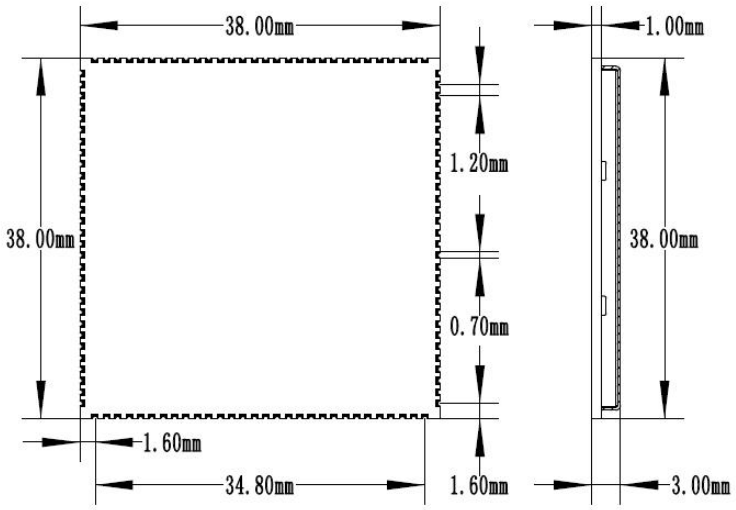
9、Supports on-chip watchdog functionality (timeout can trigger processor reset);

10、Supports on-chip RTC functionality;

11、Interface type: 120-pin stamp hole;

12、Power supply: Single-channel DC +5V±10%@0.3A power input;

13、Structural dimensions: 38×38× 3 mm, as shown in the figure below:



Dimensional diagram

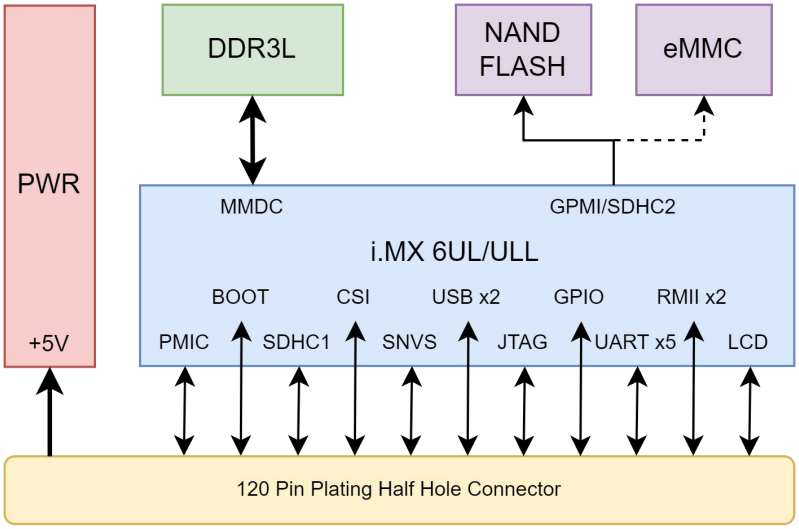
14、Operating temperature: Commercial grade: 0℃-70℃, Industrial grade: -40℃-85℃;

15、PCB process: 8-layer board design, immersion gold plating, lead-free process;

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1.3.Core board functional block diagram



Core board functional block diagram

1.4.Typical applications

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

1.5.Matching single-board computer

EBYTE has launched the ECB20-6Y28A5ME8G-I, a high-performance 2.5-inch single-board computer based on the NXP i.MX 6ULL processor. The computer consists of a core board (ECB20-6Y28A5ME8G-I) and a baseboard assembled using a stamp-hole soldering method. The computer supports Linux and features a rich array of peripheral interfaces. Its design level surpasses that of ordinary development boards, making it suitable for mass production and industrial applications.

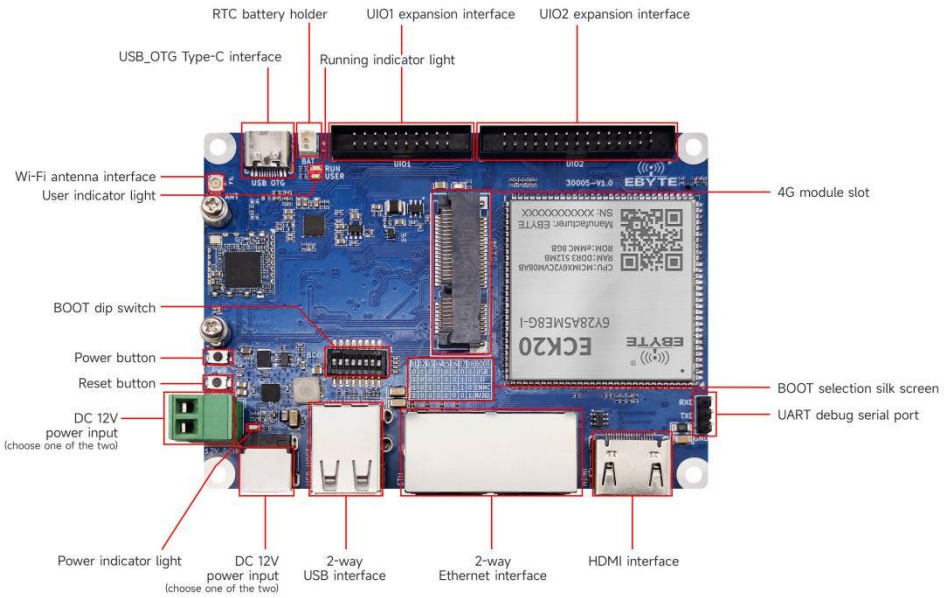
Along with the single-board computer, E-BIT provides a stable reference design and a complete software d

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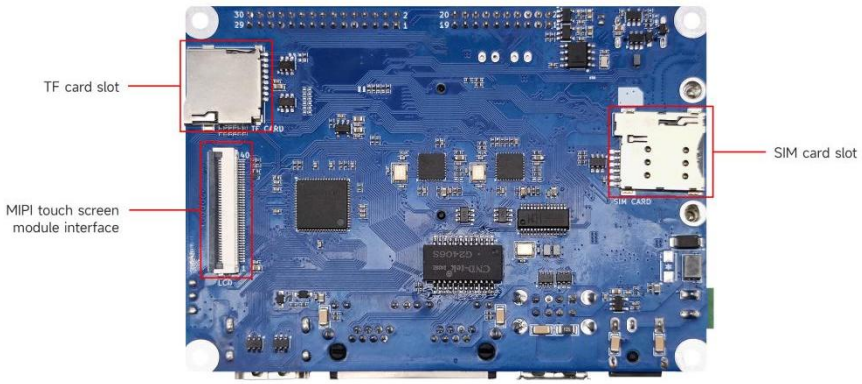
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evelopment environment, which can effectively help users verify the core board functions, improve development efficiency, shorten the development cycle, optimize design quality, and accelerate product development and tim e to market.

The functional diagram of the single-board computer is as follows:



Functional description diagram of the front of a single-board computer



Functional description diagram of the back of a single-board computer

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2.Product Selection

2.1.Model Configuration

The selection and configuration table for the ECK20-6Y2XA series core boards is as follows:

Core Board Product Selection and Configuration Table

Serial Number	Product Model	Processor Model	Memory	storage	Operating temperature
1	ECK20-6Y28A2MN5M-I	MCIMX6Y2CVM08AB	256MB DDR3L	512MB NAND	Industrial grade -40℃ ~ 85℃
2	ECK20-6Y28A5MN1G-I	MCIMX6Y2CVM08AB	512MB DDR3L	1GB NAND	Industrial grade -40℃ ~ 85℃
3	ECK20-6Y28A5ME8G-C	MCIMX6Y2CVM08AB	512MB DDR3L	8GB eMMC	Commercial 0℃ ~ 70℃
4	ECK20-6Y28A5ME8G-I	MCIMX6Y2CVM08AB	512MB DDR3L	8GB eMMC	Industrial grade -40℃ ~ 85℃

The selection and configuration table for the ECK20-6Y28A series single-board computer is as follows:

Single-board computer product selection and configuration table

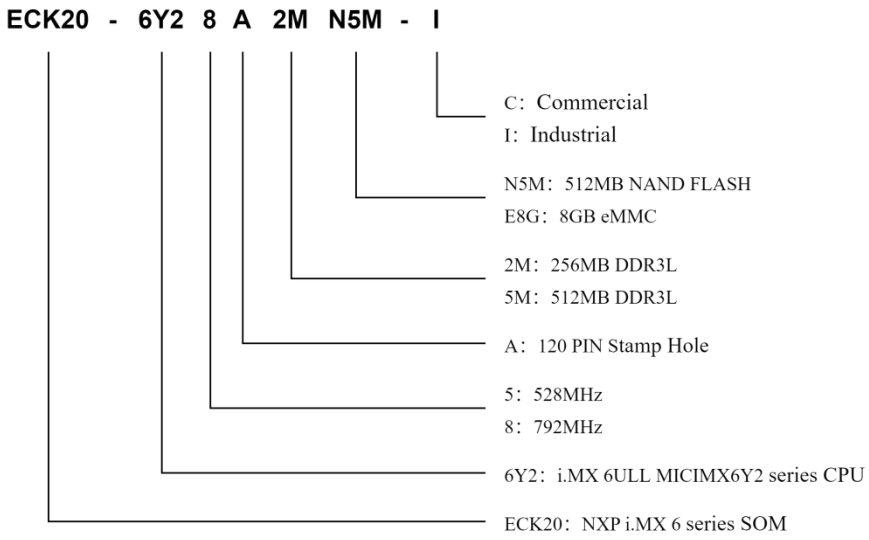
Serial Number	Product Model	Core board model	Memory	storage	Operating temperature
1	ECB20-6Y28A5ME8G-I	ECK20-6Y28A5ME8G-I	512MB DDR3L	8GB eMMC	Industrial grade -40℃ ~ 85℃

2.2.Model code

The core board product model code explanation is shown in the following figure:

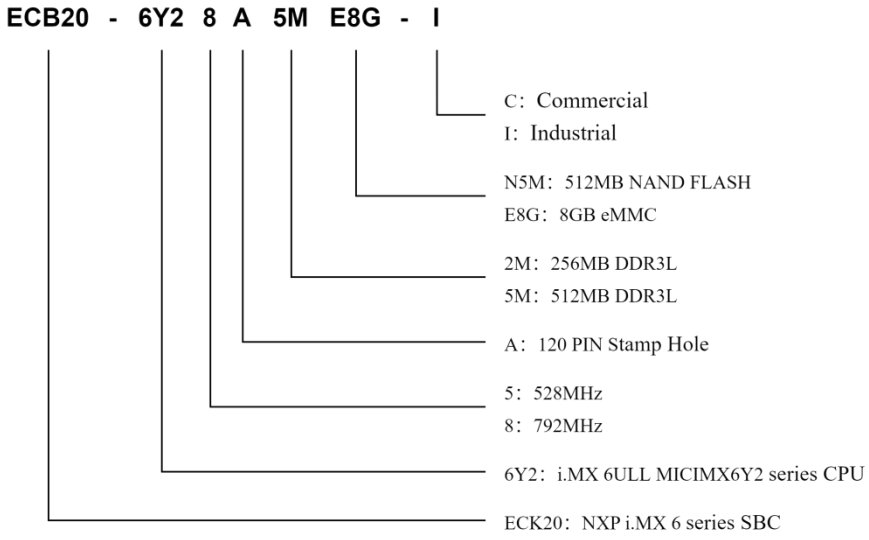
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Core board model code explanation

The product model coding explanation for single-board computers is shown in the following figure:



Single-board computer model coding explanation

3.Functions and parameters

3.1.Core board product functions

The ECK20-6Y2XA series core board integrates the processor, memory, storage, and power system, and ex poses all I/O pins on the processor. Users can design their own baseboards to utilize the I/O resources on the core board, multiplexing the I/O for their specific functions.

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The table below lists the main functional parameters integrated on the ECK20-6Y2XA series core board, a s well as the functional parameters of reusable I/O resources. Each I/O function is described as the maximum capacity the core board can utilize without using other I/O functions (for example, using one 24-bit color LCD interface and two network interfaces would prevent the implementation of eight UART channels).

Core Board Product Function Table

Function	Function Description	
processor	MCIMX6Y2CVM08AB; i.MX 6ULL Applications Processors for Industrial; Single Arm Cortex-A7 core, 792MHz;	
storage	Memory	Onboard DDR3L SDRAM, 16-bit width, 256MB/512MB optional;
	FLASH	Onboard 8GB eMMC / Onboard 512MB / 1GB parallel NAND FLASH optional;
show	One parallel display interface, supporting a maximum resolution of WXGA (1366×768@60fps). Supports 24-bit, 18-bit, 16-bit, and 8-bit parallel display output;	
Camera	One parallel camera interface, supporting up to 24-bit data and 85MHz clock; Supports 24-bit, 16-bit, 10-bit, and 8-bit data input; Supports BT.656 data format;	
USDHC	2-channel MMC/SD/SDIO card interface eMMC configuration only supports 1 SDIO port . 1-bit or 4-bit mode SD/SDIO card, with maximum support for UHS-I SDR-104 mode; MMC cards in 1-bit, 4-bit, or 8-bit mode, with maximum support for DDR mode; 4-bit or 8-bit eMMC mode, with maximum support for HS200 mode;	
USB	2-port USB 2.0 OTG;	
audio	3-channel I2S/SAI/AC97, maximum 1.4Mbps per channel; Supports ESAI audio interface; Supports SPDIF audio interface;	
serial port	8-channel UART, maximum 5Mbps per channel;	
SPI	4-channel eCSPI (Enhanced CSPI), maximum 52Mbps per channel;	
Ethernet	Two 10/100 Ethernet MAC ports, supporting IEEE 1588 and RMII;	
I2C	4-way I2C, maximum 400Kbps per channel;	
CAN	Two CAN interfaces, supporting the CAN 2.0B protocol;	
PWM	8-channel PWM, maximum clock frequency 66MHz;	
ADC	Two 12-bit ADCs, supporting up to 10 input channels;	
EIM	Supports EIM (External Interface Module) and can be expanded with NOR FLASH or PSRAM, etc.	
JTAG	Supports System JTAG Controller;	
TIMER	Two GPT (General Purpose Timer) timer functions;	
WDT	Three watchdog timer functions;	
keyboard	One 8x8 matrix keyboard function;	
GPIO	Up to 105 GPIOs, with interrupt functionality supported;	

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3.2.Single-board computer product functions

Single-board computer product function table

Power input	12V/1A DC input One DC round-head socket, connected in parallel to one 3.81mm Phoenix terminal;	
processor	MCIMX6Y2CVM08AB; i.MX 6ULL Applications Processors for Industrial; Single Arm Cortex-A7 core, 792MHz;	
storage	Memory	512MB, DDR3L;
	FLASH	8GB, eMMC;
show	One 40-pin FPC RGB888 display interface, supporting a maximum resolution of WXGA (1366×768@60fps), and supporting touch screen and backlight adjustment; One HDMI port, supporting a maximum resolution of WXGA (1366×768@60fps).	
CSI	One-channel multiplexed CSI camera interface with extended interface leads;	
USB HOST	2-port USB 2.0 host;	
USB OTG	1 USB OTG port, Type-C interface;	
network port	Two 10/100M adaptive RJ45 Ethernet ports;	
4G	A MINI-PCIE 4G module interface with one reserved USB signal can be used to connect Quectel EC20/EC25 4G modules. 1 micro-SIM card slot	
Wi-Fi	One 2.4GHz & 5.8GHz Wi-Fi cable;	
TF	One TF card slot, supporting insertion/removal detection;	
audio	One headphone output with an expansion interface; One microphone input, with an expansion interface leading out;	
BOOT	One-way start mode DIP switch;	
debug	1-channel UART debugging serial port;	
UART	2-way multiplexed UART communication interface, with extended interface leads out;	
CAN	2-channel multiplexed CAN port, TTL level, with expansion interface leads;	
SPI	One-way multiplexed SPI interface, TTL level, with expansion interface leads out;	
GPIO	34-channel multiplexed GPIO, with extended interface exposed;	
I2C	2-way I2C, with expansion interfaces brought out;	
button	One reset button; One power button;	
indicator lights	One power indicator light; One operating indicator light;	

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	1 user indicator light;
Watchdog	Supports in-chip watchdog functionality;
RTC	1-channel 1.25mm RTC battery holder;
Power output	Two 5V 1A power outputs with expansion interface leads; Two 3.3V 1A power outputs with expansion interface leads;

3.3.Environmental characteristics

Environmental Characteristics Table

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

3.4.Power consumption

Note: The following parameters were measured on the ECK20-6Y28A5ME8G-I core board under normal te mperature conditions. The power consumption measurement does not include the power consumption of the bas eboard. When measuring heavy load power consumption, there is no display screen, no baseboard TF card read /write access, and no Ethernet communication.

Power consumption meter

Power status	Test environment	power supply voltage	Current	Power consumption
PWRUP	No applications are running after system startup.	5.0V	0.075 A	0.375W
PWRUP	Software reload test calculation	5.0V	0.220 A	1.1 W
SLEEP	Freeze mode sleep state	5.0V	0.042 A	0.21W
SLEEP	standby mode in sleep mode	5.0V	0.011A	0.055W
SLEEP	mem mode sleep state	5.0V	0.00 3 A	0.01 5 W
PWRDN	Power consumption in power-off state	5.0V	0.00A	0W

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4.Software Resources

The ECK20-6Y2XA series core board is equipped with an operating system based on the Linux 5.10.9 kernel. The development board comes with a cross-compilation toolchain, U-boot source code, Linux kernel and driver module source code, and various development and debugging tools suitable for Windows and Linux desktop environments.

operating system:

Ubuntu 20.04 system

System source code:

u-boot 2020.04

Kernel 5.10.9

Development environment and tools:

Burning tool: uuu

Configuration Tools: Config 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
Device Driver	MMC	e MMC/TF Card Driver	drivers/mmc/host/sdhci-esdhc-imx.c
	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 driver	drivers/usb/host/ohci-platform.c
	Ethernet	Network Driver	drivers/net/ethernet/freescale/fec_main.c
	UART	Serial port driver	drivers/tty/serial/imx.c
	Can bus	CAN bus driver	drivers/net/can/flexcan.c
	GPIO key	Key driver	drivers/input/keyboard/gpio_keys.c
	RTC	RTC Drivers	drivers/rtc/rtc-snvs.c

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	GPIO LED	LED driver	drivers/leds/leds-gpio.c
	LCD	LCDIF 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	/tools/gcc-linaro-7.5.0-2019.12-x86_64_arm-linux-gnueabihf.tar.xz
	uuu	Burning tool	/tools/uuu
	Config Tools for i.MX	Resource configuration tools	/tools/Config_Tools_for_i.MX_v15_x64.exe
	balenaEtcher	SD boot card creation tool	/tools/balenaEtcher-Portable-1.18.11.exe

5.Structural dimensions

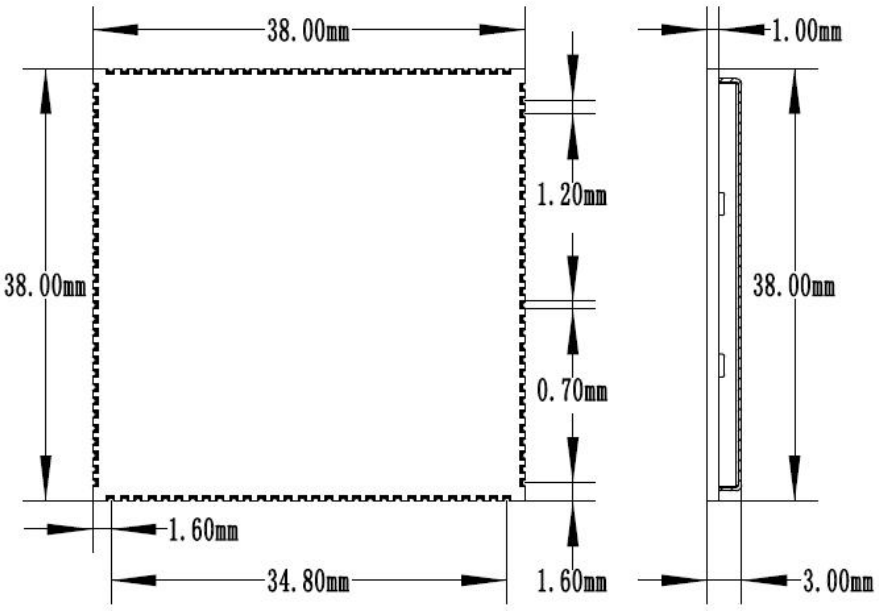
5.1.Core board structural dimensions

The ECK20-6Y2XA series core board uses a 120-pin, 1.2mm pitch stamp hole interface, which can be SMT soldered or hand-soldered. The bottom layer of the core board has no components and no exposed traces, resulting in a simple baseboard design.

The ECK20-6Y2XA series core board is 38.0mm long and 38.0mm wide. See the diagram below for structural dimensions. All dimensions are in millimeters (mm). Dimensional tolerance is ±0.1mm, and PCB thickness tolerance is 10%.

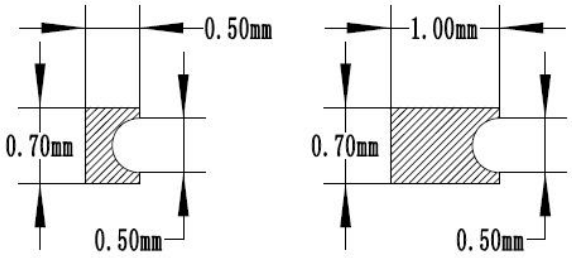
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Core board structural dimensions diagram

The dimensions of the stamp hole pads on the bottom surface of the ECK20-6Y2XA series core board are shown in the figure below. All dimensions are in millimeters (mm).



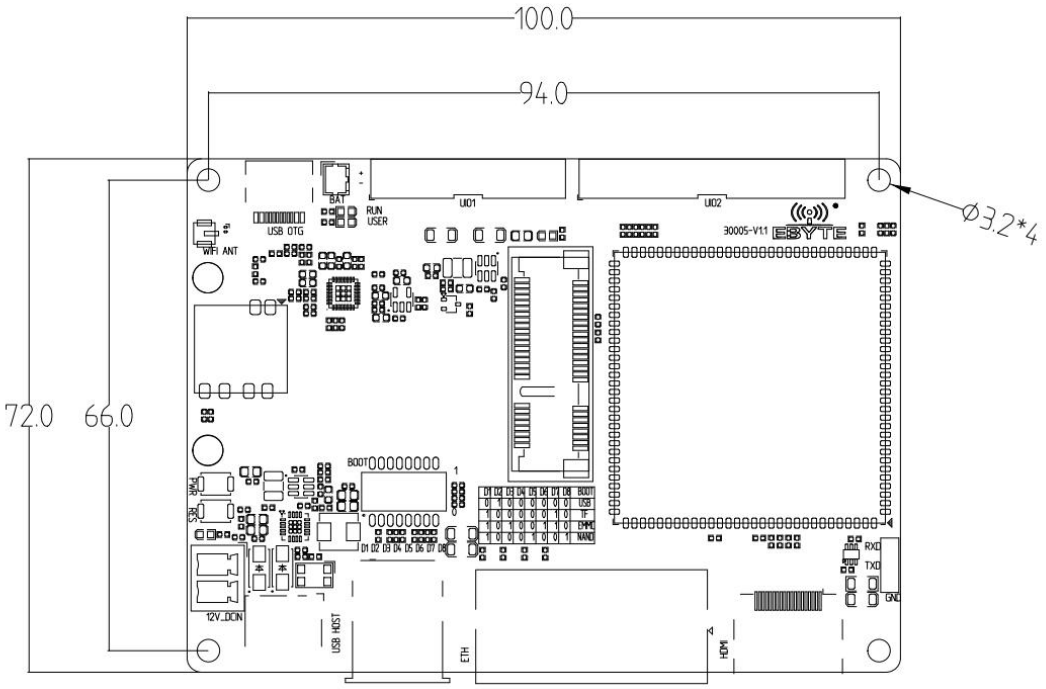
Core board pad dimension diagram

5.2.Single-board computer structural dimensions

The ECK20-6Y28A single-board unit is 100.0mm long and 72.0mm wide, compatible with 2.5-inch boards. See the diagram below for structural dimensions. All dimensions are in millimeters (mm). Dimensional toleran ce is ±0.1mm, and PCB thickness tolerance is 10%.

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Single-board computer structural dimension diagram

6.Core board welding instructions

6.1.Reflow soldering temperature

Reflow soldering temperature gauge

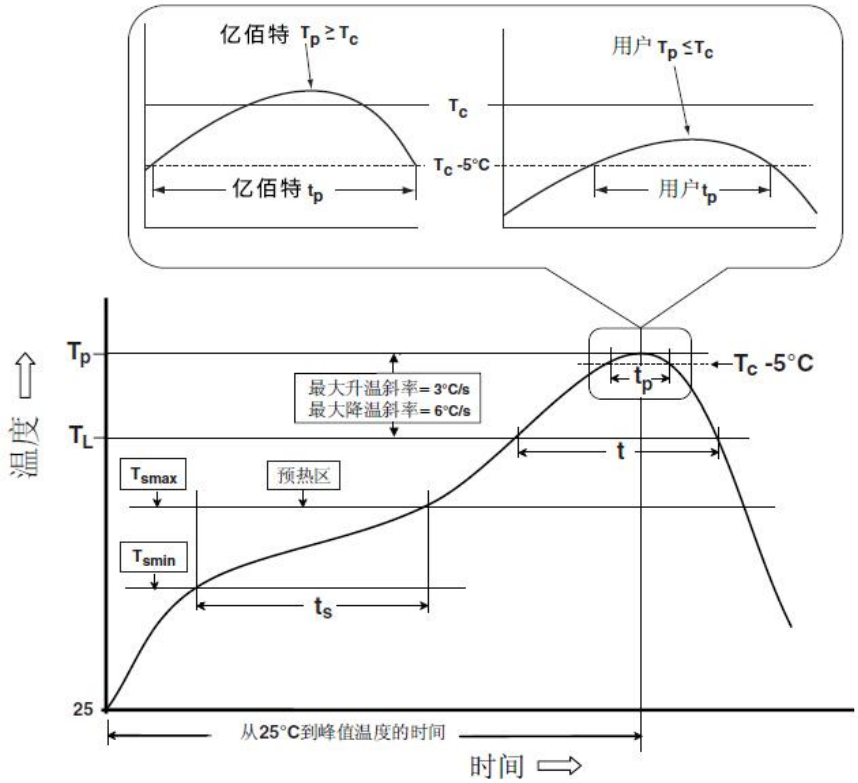
Reflow soldering profile characteristics		Lead-based assembly	Lead-free assembly
Preheating/Insulation	Minimum temperature (Tsmin)	100℃	150℃
	Maximum temperature (Tsmax)	150℃	200℃
	Time (Tsmin~Tsmin)	60-120 seconds	60-120 seconds
Temperature rise slope (TL~Tp)		3℃/second, maximum value	3℃/second, maximum value
Liquid phase temperature (TL)		183℃	217℃
Duration above TL		60~90 seconds	60~90 seconds
Package peak temperature Tp		Users must not exceed the temperature specified on the product's "humidity sensitivity" label.	Users must not exceed the temperature specified on the product's "humidity sensitivity" label.
The time (Tp) within 5°C of the specified grading temperature (Tc) is shown in the figure below.		20 seconds	30 seconds
Cooling slope (Tp~TL)		6℃/second, maximum value	6℃/second, maximum value

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Time from room temperature to peak temperature	6 minutes, the longest	8 minutes, the longest
* The peak temperature (Tp) tolerance of the temperature profile is defined as the user's upper limit.		

6.2.Reflow soldering curve



Reflow soldering curve

7.Revision Notes

Revision Notes

Version	Modifications	Modified time	prepared by	Proofreading	Approval
V1.0	First draft	2026-01-16	WFX	WJ	WFX
V1.1	Added ECK20-6Y28A5MN1G-I model number and related description, and optimized known issues.	2026-08-03	MY	LJQ	WFX

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