

Industrial PC

EPC/PPC-A9-101-C



PN: CS12800F101

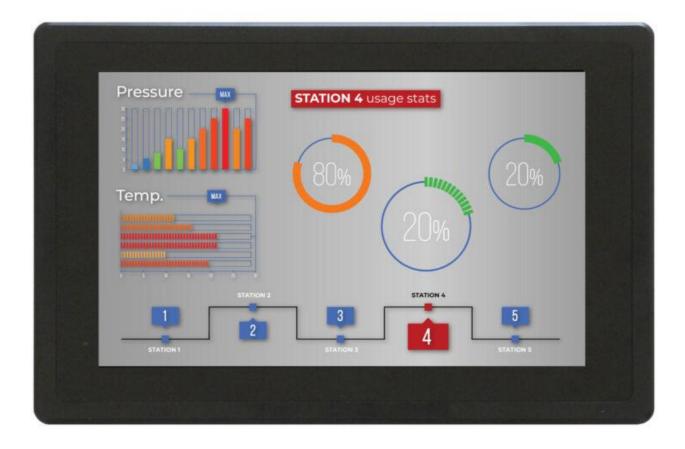
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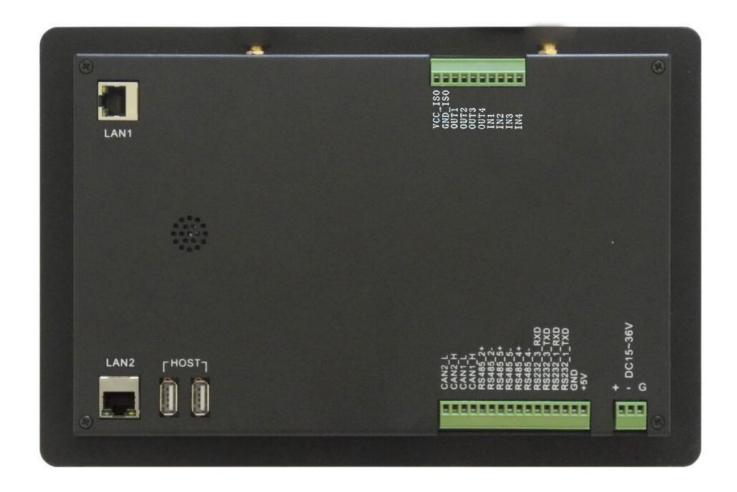
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EPC/PPC-A9-101-C

Front View



Rear View



Front View (Embedded Variant)



Rear View (Embedded Variant)



EPC/PPC-A9-101-C Product Overview

Product Overview

The Cortex[®]-A9 series EPC/PPC-A9-101-C (PN: CS12800F101) is a rugged, high-quality industrial panel PC. It features a 10.1" multi-point capacitive touch screen with a resolution of 1280 x 800 pixels.

Key Applications

- Human Machine Interface HMI
- Process Control
- Process Monitoring
- HMI
- Infotainment
- Predictive Maintenance
- Machine Learning
- Machine Vision
- Automotive applications
- ATM...

It is available both as an embedded solution and as a device hosed in an aluminum casing with bezels, thus facilitating different installation options:

- Installation on an industrial cabinet.
- Integration with the existing equipment

The EPC/PPC-A9-101-C Industrial Panel PC is based around the powerful CS-SOM-iMX6Q System on Module (SoM), powered by the i.MX6Q Arm[®] Cortex[®]-A9 quad-core Application Processor (APU). The i.MX6Q APU represents the latest achievement in integrated multimedia applications processors, delivering high-performance computing, an abundance of integrated peripherals, and high power efficiency.

This product also features a broad range of connectivity options, providing a high level of scalability for various use cases. It is the perfect solution for power-constrained applications on the Edge, acting as a robust control unit for collecting, processing, and aggregating field data. The i.MX6Q APU is part of NXP's EdgeVerse™ edge computing platform.

The NXP i.MX6UL APU does not generate extensive heat, so even the thin aluminum housing on PPC version delivers sufficient thermal dissipation. With its junction temperature from -40 to +125°C, the APU itself is well suited for extended temperature range in both automotive and factory environments.

EPC/PPC-A9-101-C Ordering Options

Ordering Options

Chipsee products can be customized during the ordering process. The product will be shipped with the pre-installed factory defaults if no extra requirements are specified. The table in the Hardware Features section provides information about the default options bundled with the product.



Note

You can order EPC/PPC-A9-101-C from the official Chipsee Store or from your nearest distributor.

Operating System

This product comes with a pre-installed OS of your choice. Please see the list below for the supported OSes, which can be also obtained from the Software Documentation section, along with the detailed installation instructions.

- Chipsee Linux*
- Android 4.3
- · Android 6.0
- Android 8.0
- Ubuntu 12.04
- Ubuntu 14.04
- Debian
- * Chipsee Linux is based on NXP Yocto framework that has been integrated with:
 - 1. Chipsee Hardware Test Application
 - 2. An initialization script for GPIO/Buzzer/Audio
 - 3. Multiple libraries, such as the libQt5Sql to develop Qt application with SQL
 - 4. Various packages, such as the ntfs-3g to use NTFS file system



Warning

The Software Documentation section provides a detailed instruction how to install different OS on your own. However, bear in mind that Chipsee can't take the responsibility of inadequate installation procedure. If you "brick" your device, please contact Chipsee Technical Support at support@chipsee.com for further assistance.

EPC/PPC-A9-101-C **Optional Features**

Optional Features

The EPC/PPC-A9-101-C Industrial Panel PC does not include 4G/LTE module by default. The module is optional and can be selected at the Chipsee store during the ordering process.



Warning

Installation, repair, and maintenance tasks should be performed by trained personnel only. Chipsee does not bear any responsibility for damage caused by inadequate handling of the product. EPC/PPC-A9-101-C Hardware Features

Hardware Features

The EPC/PPC-A9-101-C Industrial Panel PC offers a board range of performance and connectivity options for scalable integration, providing expandability according to future needs. Some of the key features are listed in the table below.

EPC/PPC-A9-101-C			
СРИ	iMX6Q, Arm [®] Cortex [®] -A9, 1GHz		
RAM	2GB DDR3		
еММС	8GB		
Storage	TF Card, Supports up to 32GB SDHC		
Display	10.1" LCD, 1280 x 800, High Brightness: 500cd/m ²		
Touch	Capacitive Multi-Point Touch Screen		
USB	2 x USB 2.0 HOST, 1 x USB OTG		
LAN	2 x RJ45: 1 x GbE, Optional PoE Support; 1 x 100Mbps, Optional		
Audio	3.5mm Audio In/Out Connector, Internal 2W Speaker		
Buzzer	Yes		
RTC	Yes, Powered by CR2032 Button Battery		
RS232	2 x RS232		
RS485	3 x RS4851		
CAN	2 x CAN		
GPIO	8 x General Purpose I/O (GPIO) channels		
WiFi/BT	Integrated WiFi/BT Module		
НОМІ	1 x HDMI		
SATA	1 x SATA II		
Expansion Port	N/A		
4G/LTE	Optional, Not mounted by default		
Power Input	From 12V to 36V		
Current at 15V	600mA Max (w/o 4G Module)		
Power Consumption	7W Typical		
Working Temperature	From -20°C to +70°C		
os	Multiple Choices (Operating System)		
Dimension	EPC-A9-101-C (PN: CS12800F101E): 245 x 155 x 11mm		
Dimensions	PPC-A9-101-C (PN: CS12800F101P): 280 x 185.5 x 27.5mm		

EPC/PPC-A9-101-C Hardware Features

EPC/PPC-A9-101-C			
Weight	EPC-A9-101-C (PN: CS12800F101E): 600g		
	PPC-A9-101-C (PN: CS12800F101P): 1410g		
Mounting	EPC-A9-101-C (PN: CS12800F101E): Embedded		
	PPC-A9-101-C (PN: CS12800F101P): Panel		

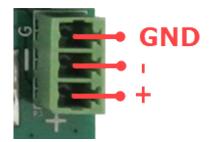
Table 11 Key Features

1 This product has 5 x UART channels in total. The default configuration is 2 x RS232, 2 x RS485, and 1 x UART for WiFi/BT module. UART can be swapped between RS232 and RS485 modes easily, so if you need different RS232/RS485 configuration, please get in touch with the Chipsee Technical Support at support@chipsee.com

EPC/PPC-A9-101-C Power Input

Power Input

The EPC/PPC-A9-101-C Industrial Panel PC can be powered by a wide range of input voltages: From 12V to 36V DC. The power input connector is a **3-pin**, **3.81mm terminal**. The polarity and the pinout is clearly marked on the housing of the PPC version, as well as on the PCB itself of the EPC version, as shown in the figure below.



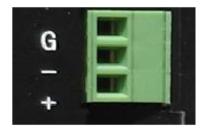


Figure 33: Power Input Section (embedded/enclosed version)

Note that the "+" sign represents the positive power input, and it is printed both at the casing and as a silk-screen on a PCB of the embedded version. The "-" terminal is shorted to the ground.

Power Input Definition			
Pin Number	Definition	Description	
Pin 1	Positive Input	DC Power Positive Terminal	
Pin 2	Negative Input	DC Power Negative Terminal	
Pin 3	Ground	Power System Ground	

Table 12 Power Connector



The system ground "**G**" is connected to power negative "-" on board.

EPC/PPC-A9-101-C Touch Screen

Touch Screen

The EPC/PPC-A9-101-C Industrial Panel PC uses a ten-point multitouch capacitive screen. *Figure 2* shows the capacitive screen connected to the motherboard via the **FPC connector**.



Figure 34: Figure 2: Capacitive Screen Connector



Attention

A capacitive touch screen is susceptible to power noise and Electromagnetic Radiation (EMR). It may cause LCD ripples or even capacitive touch malfunction. If using a capacitive multitouch test application, you might notice the touch points float erratically across the display. There are several solutions to this problem:

- 1. Use a high-quality Power Adapter Unit (PSU) with low EMR. You can also provide power from a battery.
- 2. Make sure that the EPC/PPC-A9-101-C Power Input connector (pin 3) is properly connected to the Power System Ground to provide sufficient EMI shielding and eliminate the problem entirely.
- 3. Bad GND problem can also be confirmed by touching pin 3 of the Power Input connector with one hand while operating the capacitive touch screen with the other hand. In this case, the operator's body acts as the Power System Ground.

EPC/PPC-A9-101-C Connectivity

Connectivity

There are many connectivity options available on the EPC/PPC-A9-101-C industrial PC. It has $2 \times HOST$ USB Type A connectors, $1 \times USB$ OTG Type Mini B, $2 \times HOST$ connector (RJ45) supporting up to 1 Gbps, and $5 \times UART$ terminals (RS232/485). This device also features two CAN interfaces.

RS232/RS485/CAN

The serial communication interfaces (RS485, RS232, and CAN) are routed to a **16-pin 3.81mm terminal**, as illustrated in the figure below. Serial communication on both RS485 and RS232 interfaces can reach up to 115200 kbps.

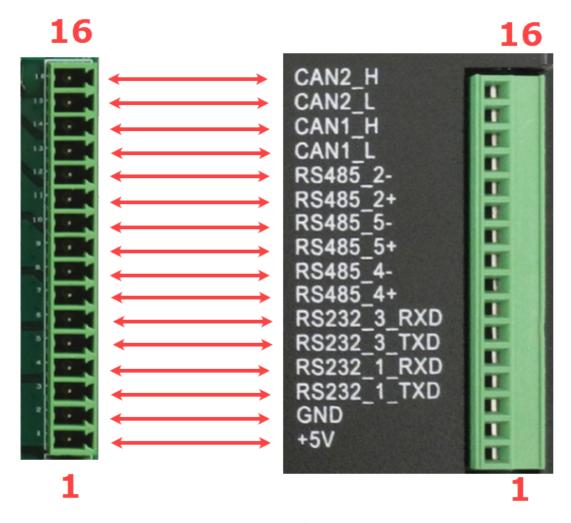


Figure 35: Serial pins connector

The table below offers more detailed description of every pin and its definition:

RS232 / RS485 / CAN Pin Definition:			
Pin Number	Definition	Description	
Pin 16 CAN2_H		CPU CAN Channel 2 H signal	

EPC/PPC-A9-101-C RS232/RS485/CAN

Pin 15	CAN2_L	CPU CAN Channel 2 L signal	
Pin 14 CAN1_H		CPU CAN Channel 1 H signal	
Pin 13	CAN1_L	CPU CAN Channel 1 L signal	
Pin 12	RS485_2-	CPU UART2, RS485 –(B) signal 2	
Pin 11	RS485_2+	CPU UART2, RS485 +(A) signal 2	
Pin 10 RS485_5-		CPU UART5, RS485 –(B) signal	
Pin 9	RS485_5+	CPU UART5, RS485 +(A) signal	
Pin 8 RS485_4-		CPU UART4, RS485 –(B) signal	
Pin 7	RS485_4+	CPU UART4, RS485 +(A) signal	
Pin 6 RS232_3_RXD		CPU UART3, RS232 RXD signal	
Pin 5 RS232_3_TXD		CPU UART3, RS232 TXD signal	
Pin 4 RS232_1_RXD		CPU UART1, RS232 RXD signal	
Pin 2 GND Syste		CPU UART1, RS232 TXD signal	
		System Ground	
		System 5V output, up to 1A	

Table 13 Connectivity Section

2(1,2)UART2 signal is used by the onboard WiFi/BT module, so the I/O port function is disabled by default. If you need the I/O port function instead, please contact Chipsee Technical Support at **support@chipsee.com** for assistance.



Note

 $120\Omega\,termination$ resistors are not mounted or included with the device.

EPC/PPC-A9-101-C USB Connectors

USB Connectors

There are 2 x Type A **USB HOST connectors** onboard, as shown on the figure below.





Figure 36: USB HOST Connectors (embedded/enclosed PC version)

There is also 1 x Type Mini B **USB OTG connector**, configured as slave by default.





Figure 37: USB OTG Connector (embedded/enclosed PC version)



Warning

Be careful not to touch surrounding electronic components accidentally while plugging in USB devices into the embedded IPC version.

EPC/PPC-A9-101-C LAN Connectors

LAN Connectors

LAN (RJ45) connector provides Ethernet connectivity over standardized Ethernet cables. The integrated Ethernet interface supports up to 1 Gbps data throughput. Power over Ethernet (PoE) is not supported.





Figure 38: RJ45 LAN Connectors (embedded/enclosed PC version)



Use CAT5 or better cables to achieve full data throughput over maximum distance defined by the 1000BASE-T standard (100m).

EPC/PPC-A9-101-C WiFi & BT Module

WiFi & BT Module

The EPC/PPC-A9-101-C Industrial Panel PC is equipped with the popular **Realtek RTL8723 WiFi/BT module** that supports BT/BLE 4.0 (with backward compatibility), as well as 802.11bgn 2.4 GHz Wireless LAN (WLAN).



Figure 39: RTL8273 WiFi/BT Module

The enclosed (PPC) variant of the product also includes an SMA connector for an external WiFi/BT antenna, as illustrated in the figure below.



Figure 40: WiFi+BT Antenna

EPC/PPC-A9-101-C 4G/LTE Module

4G/LTE Module

The EPC/PPC-A9-101-C Industrial Panel PC is equipped with a **mini-PCle connector** that can connect to a 4G/LTE module. The customer will also need a SIM Card Holder and a 4G/LTE Antenna Connector to ensure 4G/LTE works on the EPC/PPC-A9-101-C. SIM card does **NOT** support hot plug. **Power off** before inserting or removing SIM card.



Figure 41: 4G/LTE Module

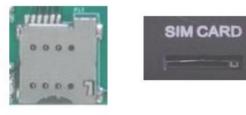




Figure 42: SIM Card Holder and 4G/LTE Antenna Connector

EPC/PPC-A9-101-C 4G/LTE Module



SIM Card Direction



Attention

The product does not come shipped with the 4G/LTE module by default.

EPC/PPC-A9-101-C GPIO Connector

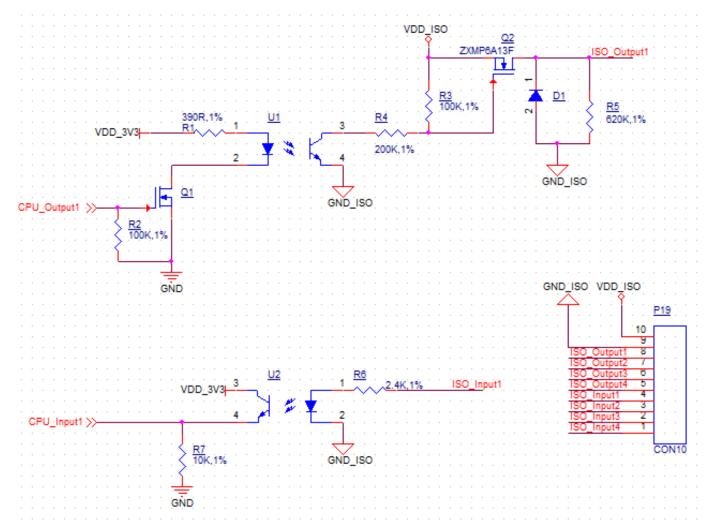
GPIO Connector

The EPC/PPC-A9-101-C Industrial Panel PC has a 10 Pin 3.81mm **GPIO Connector**, as shown in the figure below, that is labeled as P28 on the PCB. The table below gives details about the definition of every Pin.



GPIO Connector

EPC/PPC-A9-101-C GPIO Connector



Isolated GPIO reduced schematic

GPIO Connector Pin Definition:			
Pin Number	Definition	Description	
Pin 1	VCC_ISO	Isolated Power Input (+5V – +24V)	
Pin 2	GND_ISO	Isolated Ground	
Pin 3	OUT1	Isolated Output 1	
Pin 4	OUT2	Isolated Output 2	
Pin 5	OUT3	Isolated Output 3	
Pin 6	OUT4	Isolated Output 4	
Pin 7	IN1	Isolated Input 1	
Pin 8	IN2	Isolated Input 2	
Pin 9	IN3	Isolated Input 3	
Pin 10 IN4 Isolate		Isolated Input 4	

Table 14 GPIO Connector Pin-out

EPC/PPC-A9-101-C **GPIO** Connector

Attention

• The GPIO has been Opt-Isolated and it uses the 24V Logic by default. You can use an external isolated power input but the power input range should be from 5V to 24V DC.

• The 4 output channels can drive at most 500mA current on each channel.

EPC/PPC-A9-101-C Camera Connector

Camera Connector

The EPC/PPC-A9-101-C Industrial Panel PC supports a one channel CMOS camera, as shown on the figure below. The camera connector supports camera OV2659 and OV5640. It is labeled as P26 on the PCB.



Figure 43: Camera Connector



Attention

The camera is not mounted by default.

EPC/PPC-A9-101-C TF Card Slot

TF Card Slot

The EPC/PPC-A9-101-C Industrial Panel PC features 1 x **TF Card (micro SD) slot**. It can address up to 32GB of memory.

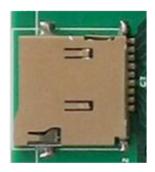




Figure 44: TF (micro SD) Card Slot



The product does not come shipped with the TF Card by default

EPC/PPC-A9-101-C Audio Connectors

Audio Connectors

The EPC/PPC-A9-101-C Industrial Panel PC features some audio peripherals, as well. It has 1 \times **3.5mm audio input jack** and 1 \times **3.5mm audio output jack**.

On the embedded panel PC version, the pink connector is the audio input jack (line-in) and the blue connector is the audio output jack (line-out, typically around -10 dBV). On the enclosed panel PC version, both audio input and audio output are clearly marked.





Figure 45: Audio I/O (embedded/enclosed PC version)

In addition, EPC/PPC-A9-101-C features a miniature 2W embedded speaker for audio reproduction, as well as a small buzzer for alarm/notification sounds.





Figure 46: 2W Micro Speaker and Buzzer

EPC/PPC-A9-101-C HDMI Connector

HDMI Connector

The EPC/PPC-A9-101-C Industrial Panel PC is equipped with 1 x **HDMI connector**. The HDMI connector allows connecting an additional (external) monitor. HDMI output resolution can be configured by the software.





Figure 47: HDMI Connector

EPC/PPC-A9-101-C Boot DIP Switch

Boot DIP Switch

The EPC/PPC-A9-101-C Industrial Panel PC supports boot from SD card. If you want to reflash the Operating System (OS), you can use the TF card for that purpose, combined with the **DIP switch** settings.

There is no need to alter the DIP switch settings during regular operation. However, if you need to reinstall the OS, please refer to the table below. Detailed information on how to reflash the OS can be found in the Software Documentation.

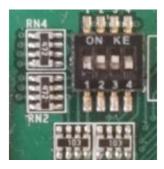


Figure 48: Boot DIP Switch

Boot Config Select				
DIP SW	1	2	3	4
SD	1	0	0	0
еММС	1	1	0	1
Download	0	1	1	0

Table 15 Boot Configuration Selection

EPC/PPC-A9-101-C Mounting Procedure

Mounting Procedure

The EPC/PPC-A9-101-C Industrial Panel PC can be mounted with 8 x M4 screws, enabling simplified installation onto any standard mounting fixture.

EPC-A9-101-C

You can mount EPC-A9-101-C with the Embedded mounting method, as shown on the figure below.

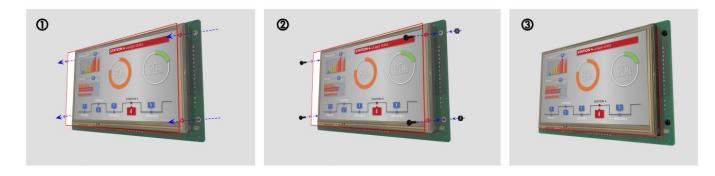


Figure 49: Embedded mounting

PPC-A9-101-C

You can mount PPC-A9-101-C with the Panel mounting method, as shown on the figure below. The grey area indicates your equipment or your machine that you want the Chipsee device to be panel mounted into. To learn more you can jump below to view the 3D viewer of this product, there are mounting screws provided by Chipsee to help you mount this device.

EPC/PPC-A9-101-C PPC-A9-101-C







Figure 50: Panel mounting



With the PPC-A9-101-C industrial PC, the operator can fix the PC into the panel by pushing it from the front inside the panel as described in the figure above. The recommended maximum thickness of the panel material is 8mm.

- 1. Make sure the Panel PC is configured correctly. The Boot Switch is sitting inside the housing. To use it, the Panel PC has to be unmounted from the panel.
- 2. Push the Panel PC straight into the Panel Hole until the unit sits flat on the panel as shown in the figure above.
- 3. Use the mounting fixtures to lock the Panel PC into it's place.



Attention

Please make sure the display is not exposed to high pressure when mounting into an enclosure.

You can find detailed information about mounting in the Mount IPC Guide.

EPC/PPC-A9-101-C Mechanical Specifications

Mechanical Specifications

EPC-A9-101-C

The outer mechanical dimensions of EPC-A9-101-C are $245 \times 155 \times 11$ mm (W x L x H). Please refer to the technical drawing in the figure below for details related to the specific product measurements.

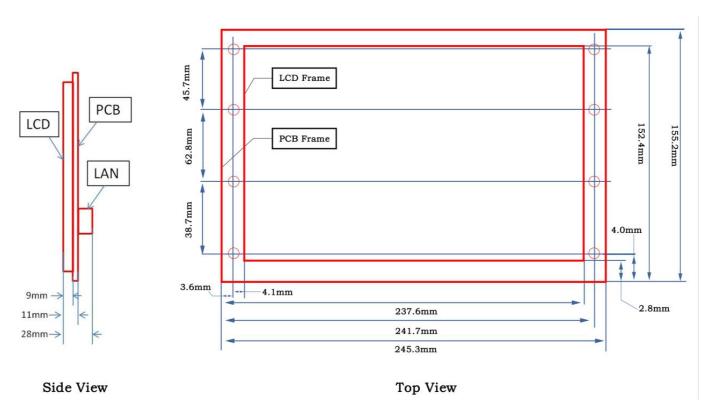


Figure 51: EPC-A9-101-C Technical Drawing

PPC-A9-101-C

For PPC-A9-101-C, the outer mechanical dimensions are $280 \times 185.5 \times 27.5$ mm (W x L x H). Please refer to the technical drawing in the figure below for details related to the specific product measurements.

EPC/PPC-A9-101-C PPC-A9-101-C

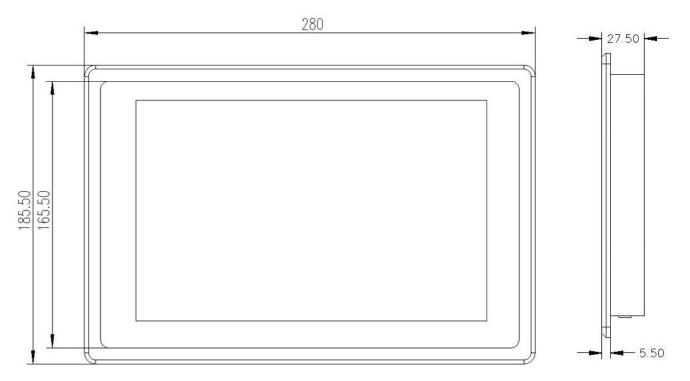


Figure 52: PPC-A9-101-C Technical Drawing



- When you use product EPC-A9-101-C, you should not touch the circuit board on the back of the product if the product is powered ON.
- Also, when the product is powered OFF, please take anti-static measures before touching the circuit board.

EPC/PPC-A9-101-C 3D Model

3D Model

EPC/PPC-A9-101-C 3D model can be viewed in the online doc in a web browser, **if you are reading from the PDF** version, please visit the online doc EPC/PPC-A9-101-C, select hardware documentation, drag the navigation bar to the 3D Model section.

EPC/PPC-A9-101-C Disclaimer

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