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## CH7213A USB Type-C Logic Controller

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### FEATURES

- Compliant with Type-C Specification Revision 1.2
- Compliant with the Power Delivery Specification Revision 2.0, Version 1.1
- Supports VESA DisplayPort Alt. Mode 1.0a
- Bi-directional conversion between the HPD signal and Power Delivery VDM
- Support DisplayPort AUX Channel DC voltage level detection
- Configurable USB Type-C Ports. Device can be designed with Type-C plug or Type-C receptacle connector. CC logic and Power Delivery protocol support one sink port and one charging port
- Rp and Rd resistors integrated
- Built-in Ra termination resistor
- USB Type-C SBU and DisplayPort AUX Channel switch integrated
- Support Type-C plug orientation detection
- Integrated USB Billboard Class, Version 1.21 for supporting USB Type-C Alt. Mode
- Support VCONN power. 5V to 3.3V and 3.3V to 1.2V Regulator integrated to save BOM cost
- Embedded MCU and flash
- IIC slave interface
- Firmware update capability
- Crystal free
- RoHS compliant and Halogen free package
- Offered in 16-Pin QFN (4x4 mm)

### APPLICATION

- USB Type-C to DisplayPort adapter
- DisplayPort to USB Type-C adapter
- Type-C docking
- USB Type-C to Multi-video adapter

### GENERAL DESCRIPTION

Chrontel's CH7213A is a low cost USB Type-C logic controller. The device is targeted for system designers implementing USB Type-C devices with DisplayPort capabilities and USB Power Delivery 2.0 support. The CH7213A integrates the USB Type-C plug orientation and attached detection mechanism on the CC (Channel Communication) pins. Its robust Power Delivery 2.0 module using the BMC protocol can enable USB Type-C devices operating in various power management roles including Consumer, Provider and Power Role Swap. The DisplayPort Alt. mode is another alternative interface supported in the CH7213A. A built-in Billboard Class can be automatically exposed to the USB 2.0 D+/- bus if a Type-C PD Source (DFP) does not equip USB Type-C Alt. Mode features that support DisplayPort signal transmission. The system with CH7213A's DisplayPort Alt. mode enabled can be programmed to support Type-C to DisplayPort display or DisplayPort to a Type-C DP Alt. mode monitor. The CH7213A's bi-directional signal converter for the DisplayPort HPD (hot plug detection) and VDM (Vendor Defined Message) is capable of translating the HPD to the appropriated VDM to Type-C DP device and vice versa. In addition to hardware support of PHY and Link layers, the CH7213A has an internal microprocessor to handle the cable logic communication and can be programmed for customization according to the application of USB Type-C platforms.

For reducing the BOM cost of final products, the CH7213A integrates all necessary components and circuits, such as LDO, clock generation isolation circuit,  $R_a$ ,  $R_d$  and  $R_p$  etc.

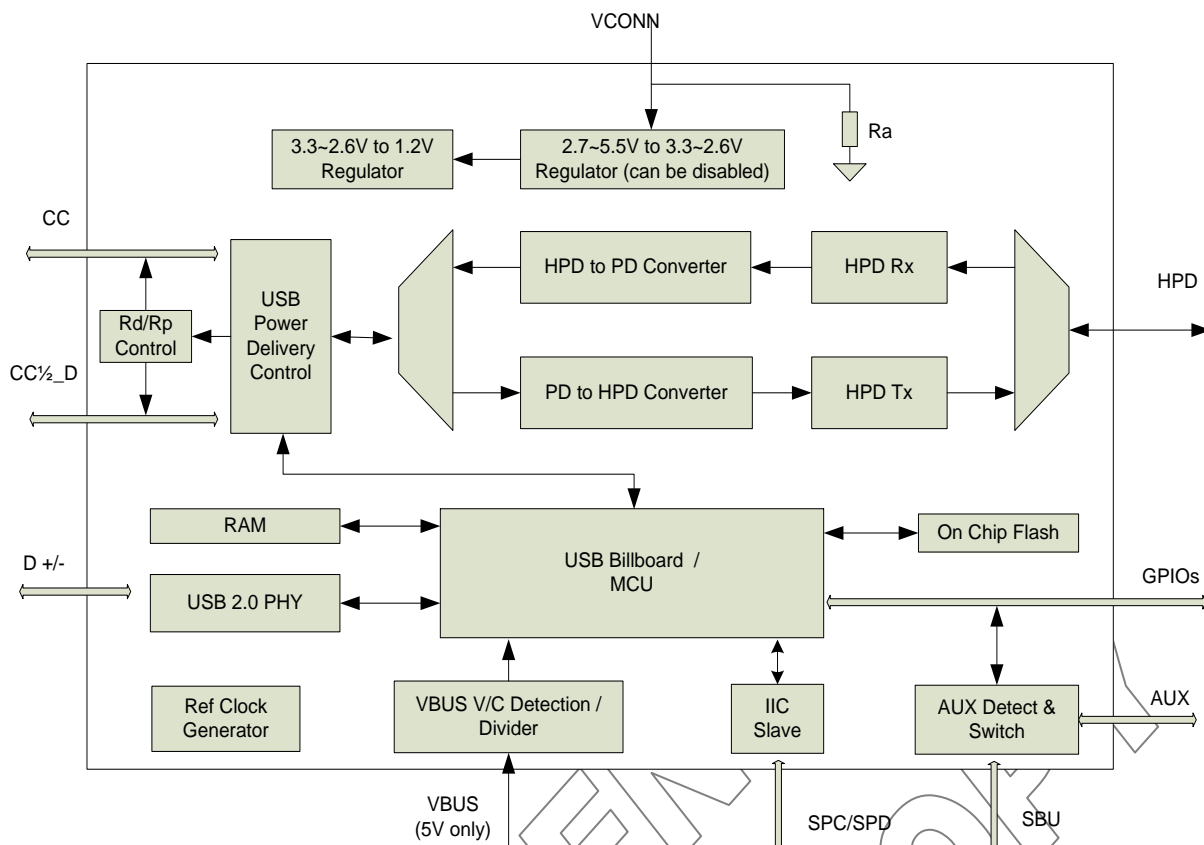


Figure 1: CH7213A Functional Block Diagram

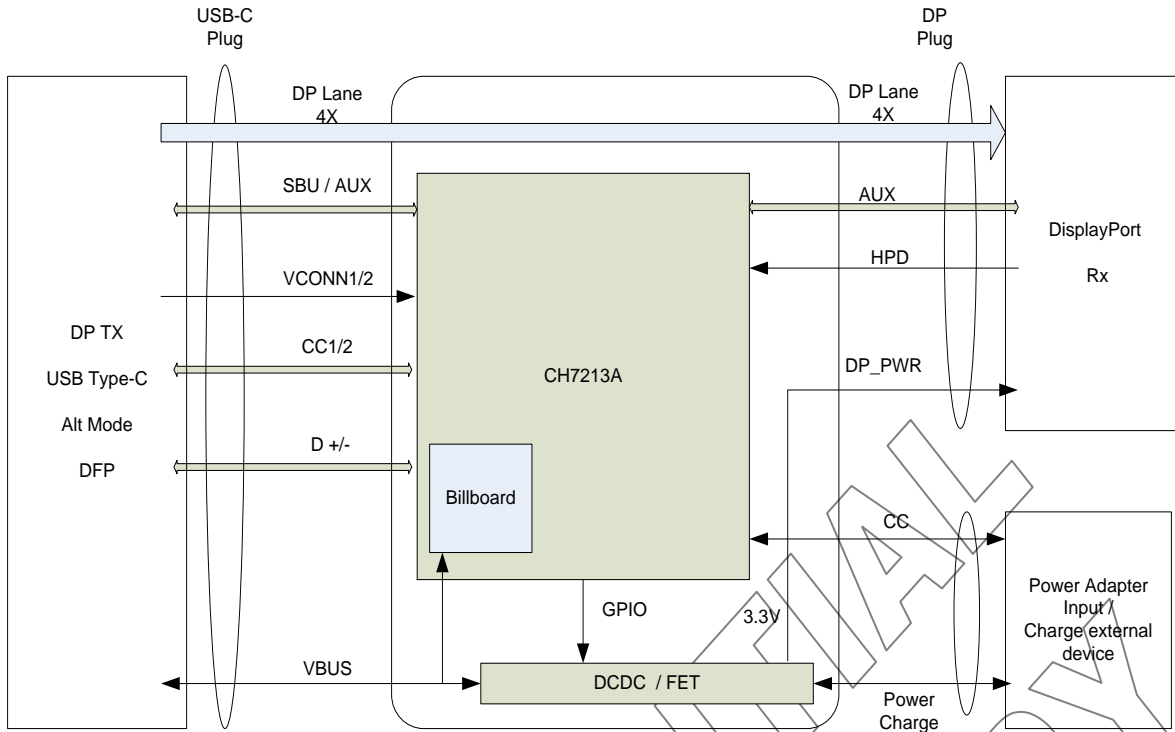


Figure 2: CH7213A USB-C to DisplayPort and USB-C DRP/DFP-D with Power Charging Block Diagram

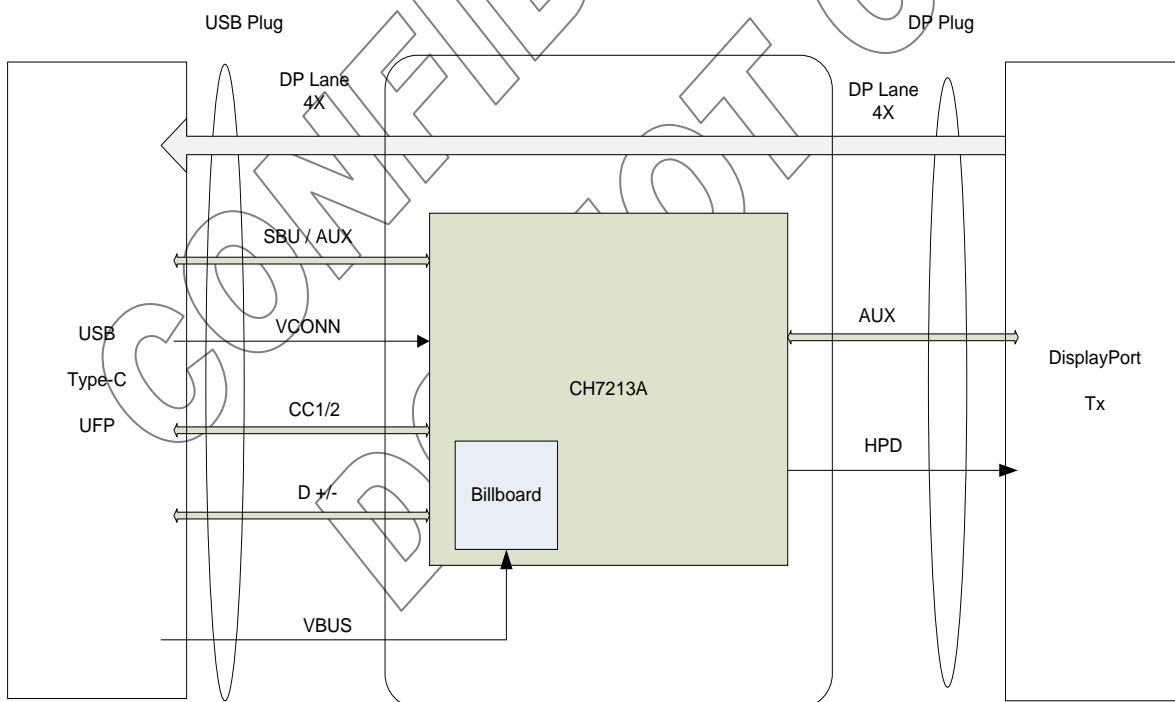


Figure 3: CH7213A DisplayPort to USB-C DFP-U/UFP-D Block Diagram

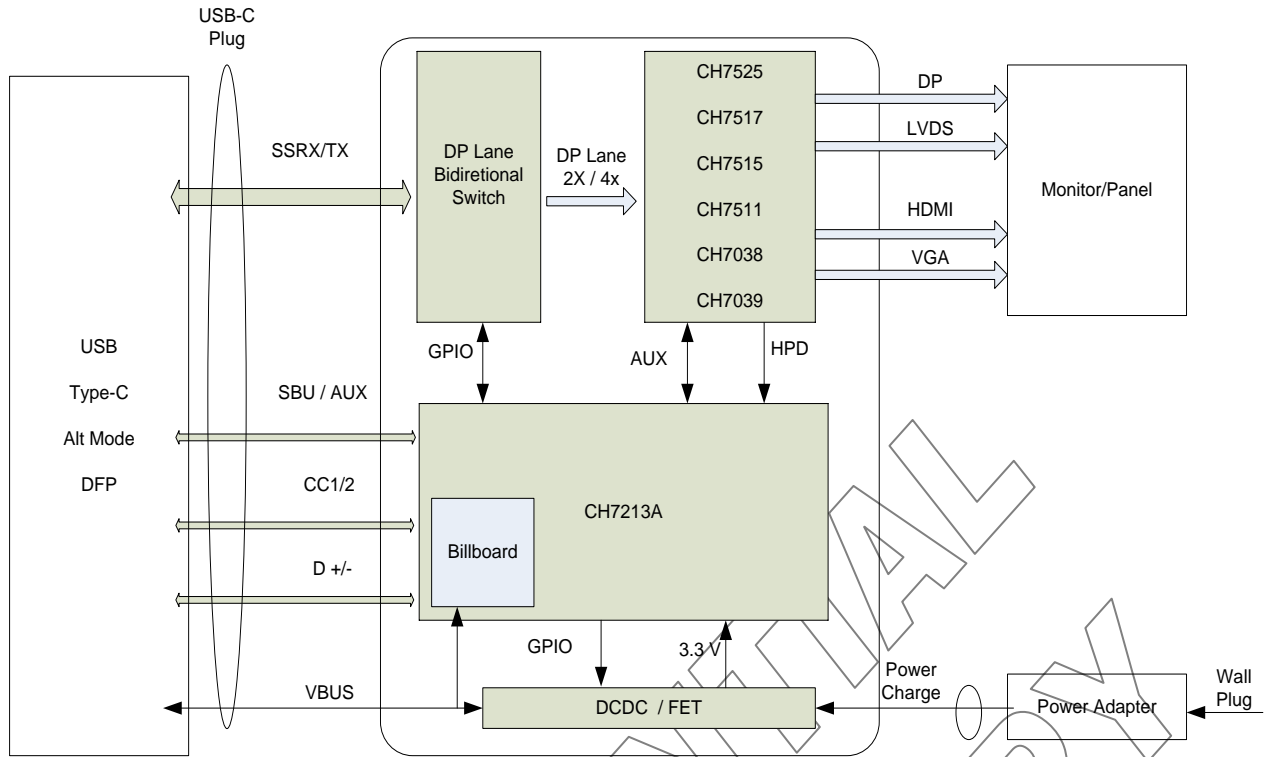


Figure 4: CH7213A USB-C to Multi-video interfaces with Power Charging Block Diagram

## 1.0 PIN-OUT

### 1.1 Package Diagram

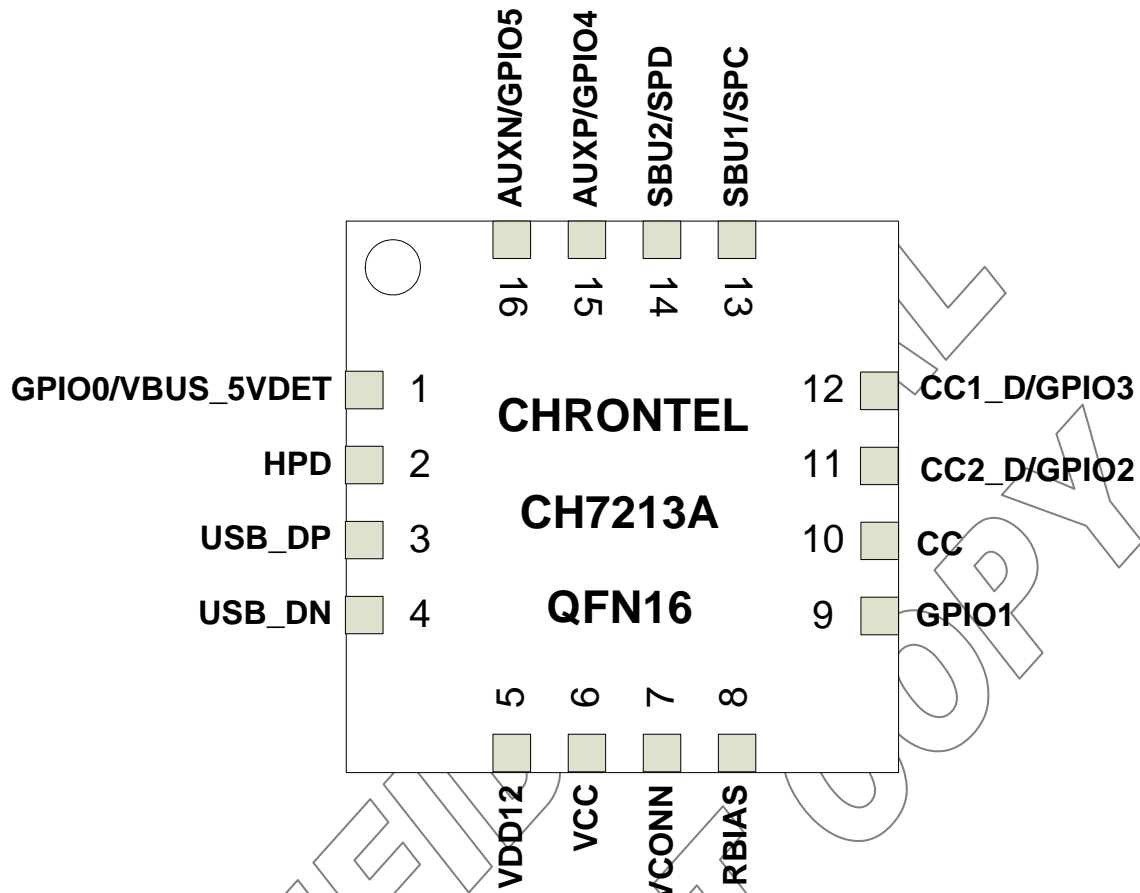


Figure 5: CH7213A 16 pin QFN Pin Out

## 1.2 Pin Description

Table 1: QFN 16 Pin Description

Pin #	Type	Symbol	Description
1	I/O	GPIO0	General Purpose Input/Output
	I	VBUS_5VDET	5V-only VBUS Detection
2	I/O	HPD	DisplayPort HPD
3	I/O	USB_DP	USB Billboard Positive Data Line
4	I/O	USB_DN	USB Billboard Negative Data Line
8	I	RBIAS	Analog reference resistor, external resistor is 10K with 1% accuracy
9	I/O	GPIO1	General Purpose Input/Output
10	I/O	CC	Upstream Type-C Port Configuration Channel
11	I/O	CC2_D	Downstream Type-C Port Configuration Channel 2
	I/O	GPIO2	General Purpose Input/Output
12	I/O	CC1_D	Downstream Type-C Port Configuration Channel 1
	I/O	GPIO3	General Purpose Input/Output
13	I/O	SBU1	USB Type-C Sideband Use 1
	I	SPC	I2C Slave Serial Port Clock Input External pull-up 6.8 k $\Omega$ Resistor is required.
14	I/O	SBU2	USB Type-C Sideband Use 2
	I/O	SPD	I2C Slave Serial Port Data Input / Output External pull-up 6.8 k $\Omega$ Resistor is required.
15	I/O	AUXP	DisplayPort Positive AUX CH
	I/O	GPIO4	General Purpose Input/Output
16	I/O	AUXN	DisplayPort Negative AUX CH
	I/O	GPIO5	General Purpose Input/Output
5	PWR	VDD12	Digital Power Supply(1.2V)
6	PWR	VCC	3.3V Power Supply
7	PWR	VCONN	Vconn Power Supply These pins connect to VCONN of the plug on the other side of the USB Type-C cable. (2.7 V to 5.5 V)
thermal pad	Power	AVSS	Ground

## 2.0 PACKAGE DIMENSION

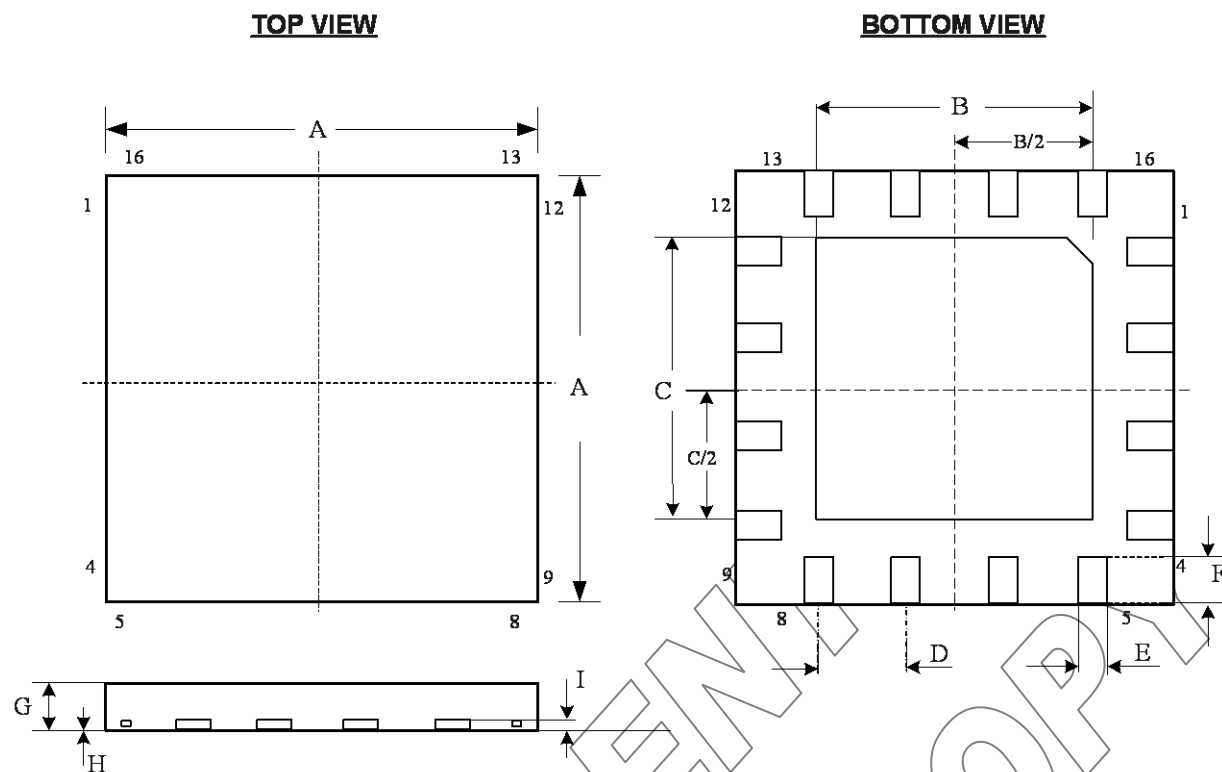


Figure 6: 16 Pin QFN Package

Table of Dimensions

No. of Leads		SYMBOL								
16 (4 X4 mm)		A	B	C	D	E	F	G	H	I
Milli-meters	MIN	3.90	2.40	2.40	0.65BSC	0.25	0.30	0.70	0	0.203
	NOM	4.00	2.50	2.50		0.30	0.40	0.75	0.02	
	MAX	4.10	2.60	2.60		0.35	0.50	0.80	0.05	

**Notes:**

1. Conforms to ASME Y14.5M-1994.

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ORDERING INFORMATION			
Part Number	Package Type	Operating Temperature Range	Minimum Order Quantity
CH7213A-BF	16 QFN, Lead-free	Commercial: 0 to 70°C	490/Tray

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