CH7213D USB Type−C Logic Controller

FEATURES

- Compliant with Type-C Specification Revision 1.4
- Compliant with the Power Delivery Specification Revision 3.0
- Supports VESA DisplayPort Alt. Mode 1.0a
- USB Type-C electronically marker component supported
- Bi-directional conversion between the HPD signal and Power Delivery VDM
- Support DisplayPort AUX Channel DC voltage level detection
- Rp and Rd resistors integrated
- Built-in Ra termination resistor
- USB Type-C SBU and DisplayPort AUX Channel switch integrated
- 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 ROM
- 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 CH7213D 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 3.0 support. CH7213D's robust Power Delivery 3.0 module using the BMC protocol can enable USB Type-C devices operating in various power management roles including Consumer and Provider. The DisplayPort Alt. mode is another alternative interface supported in the CH7213D. 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 CH7213D'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 CH7213D'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 CH7213D 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 CH7213D integrates all necessary components and circuits, such as LDO, clock generation isolation circuit, R_a, R_d and R_p etc.

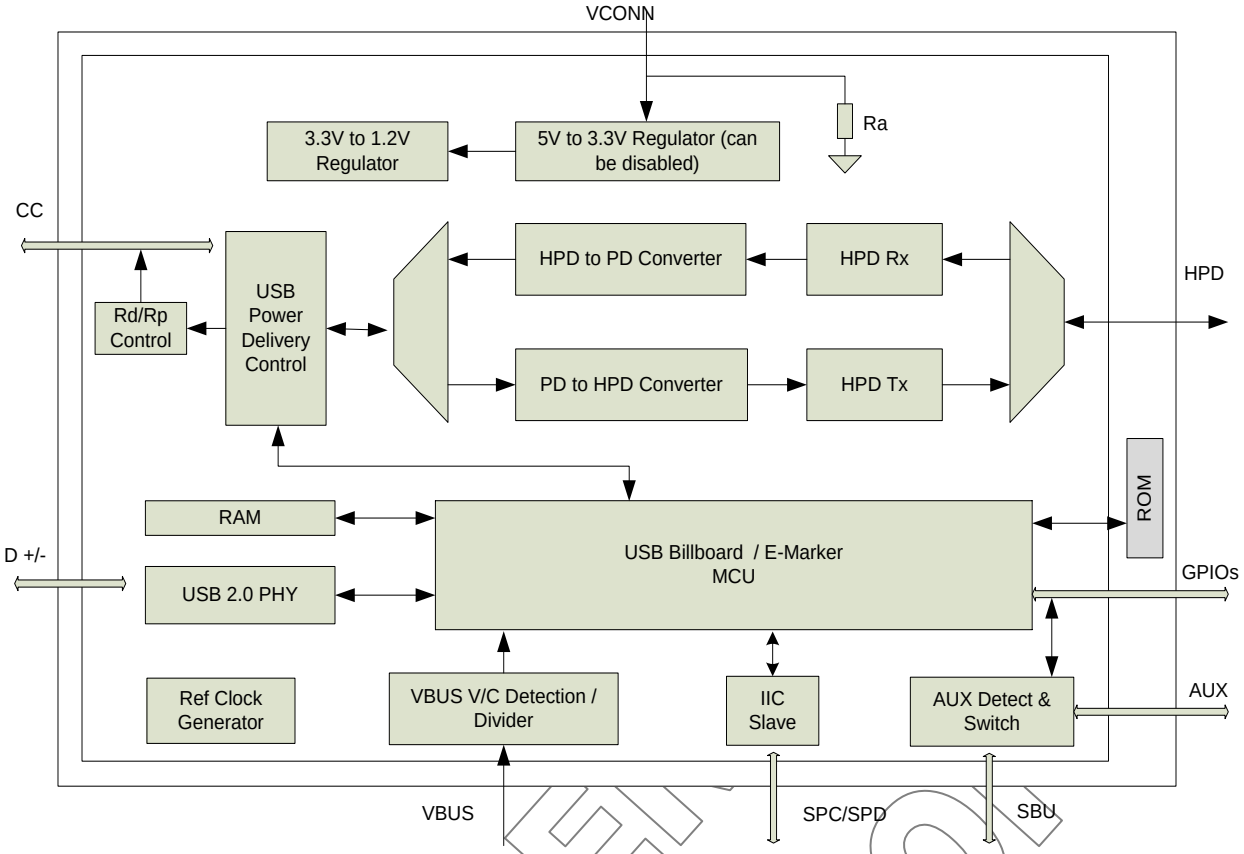

Figure 1: CH7213D Functional Block Diagram

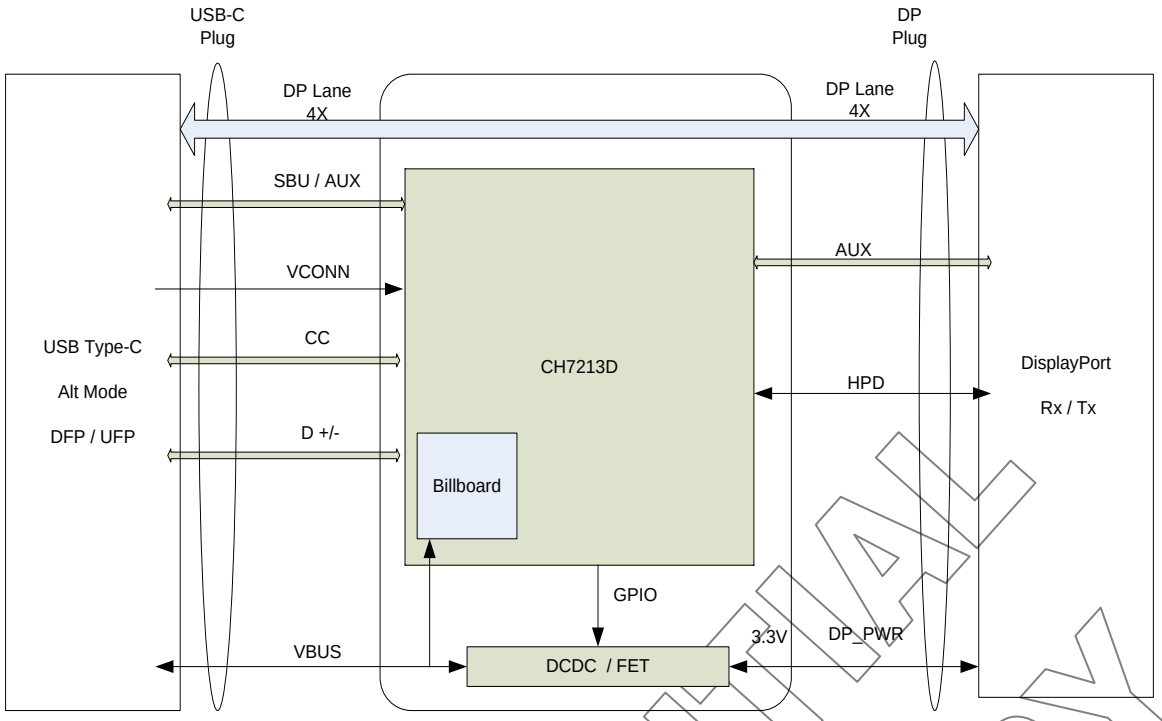

Figure 2: CH7213D USB-C to DisplayPort Bi-directional Converter

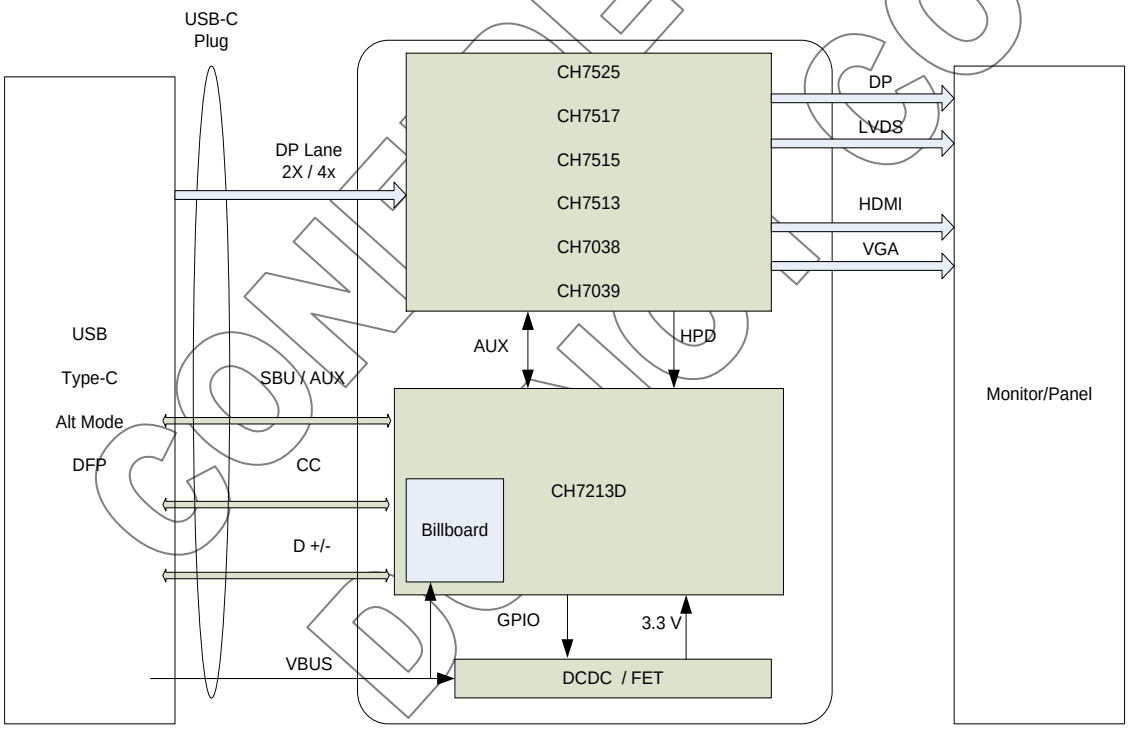

Figure 3: CH7213D USB-C to Multi-video Interfaces Converter Block Diagram

1.0 PIN-OUT

1.1 Package Diagram

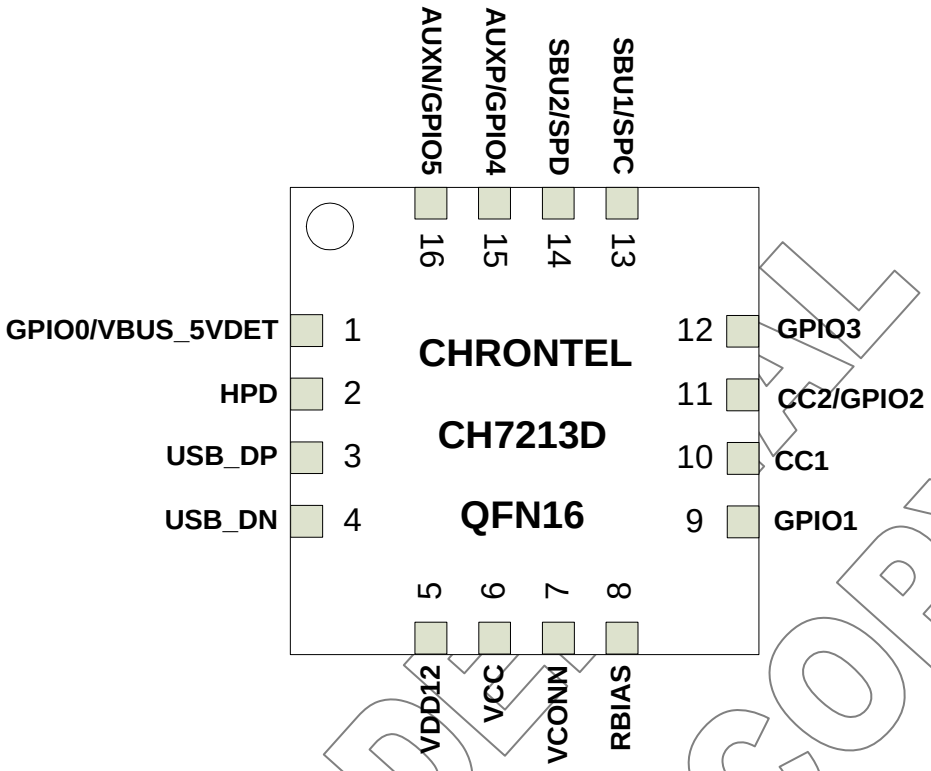

Figure 4: CH7213D 16 pin QFN Pin Out

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	CC1	**Type-C Port Configuration Channel**
11	I/O	CC2	**Type-C Port Configuration Channel**
	I/O	GPIO2	**General Purpose Input/Output**
12	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 kΩ Resistor is required.
	O	SPC	**I2C Master Serial Port Clock Output** External pull-up 6.8 kΩ 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 kΩ Resistor is required.
	I/O	SPD	**I2C Master Serial Port Data Input / Output** External pull-up 6.8 kΩ 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 (Connected to VCONN via internal LDO)**
7	PWR	VCONN	**Vconn Power Supply** These pins connect to VCONN of the plug on the other side of the USB Type-C cable.
thermal pad	Power	AVSS	**Ground**

2.0 PACKAGE DIMENSION

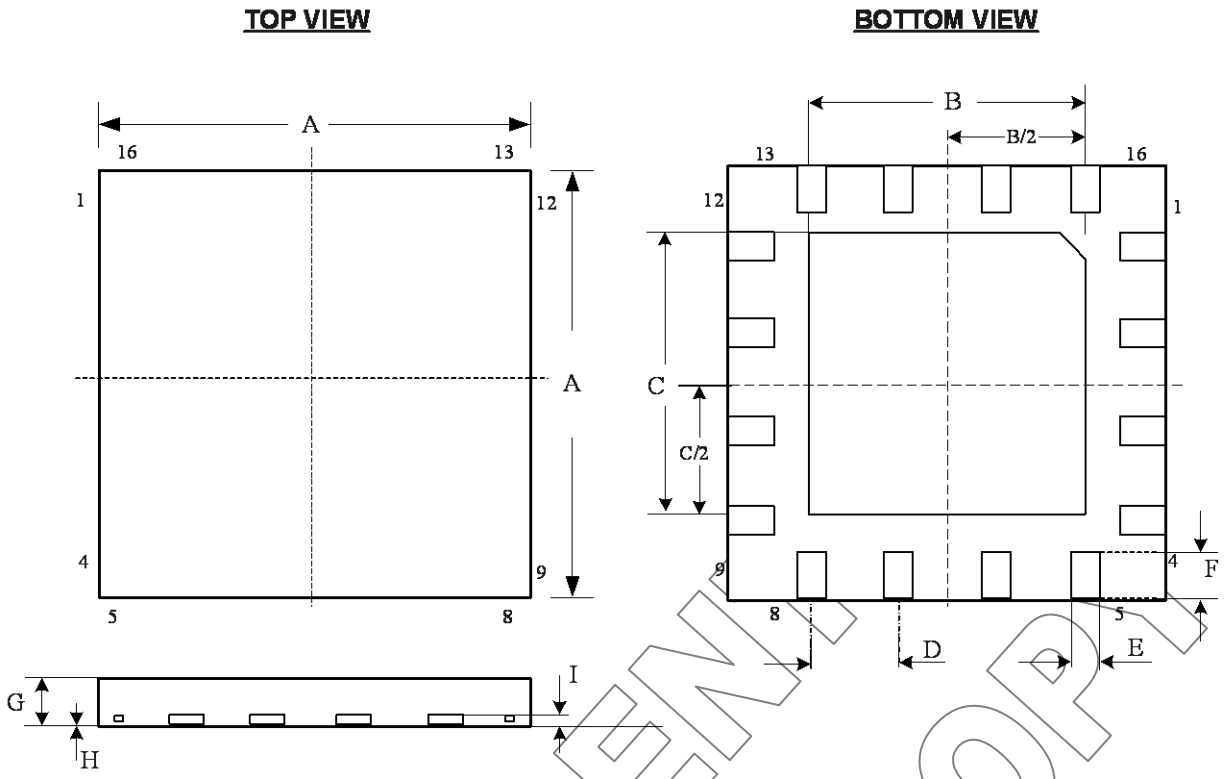

Figure 5: 16 Pin QFN Package

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**
CH7213D-BF	16 QFN, Lead-free	Commercial : 0 to 70°C	**490/Tray**

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