
Chrontel CH7251A for USB Type-C Charger

Features

- Component for USB Type-C Charger(USB Type-C Specification 1.2)
- On chip 3A switch.
- On chip over voltage, over current and over temperature detection and protection.
- On-chip embedded flash
- On-chip clock generation
- No external components required for lower BOM cost
- Offered in 16-pin QFN package

General Description

CH7251A is designed to go in the USB Type-C charger. It follows USB Type-C Specification 1.2. CH7251A integrates all necessary components and circuits, such as LDO, clock generation, isolation circuit, etc. on chip so that it does not require external components and provides a simple solution with low BOM cost. The on-chip 3A switch and over voltage, over current and over temperature features are included. It has embedded flash that allows ODM/OEM to use according to specification requirement.

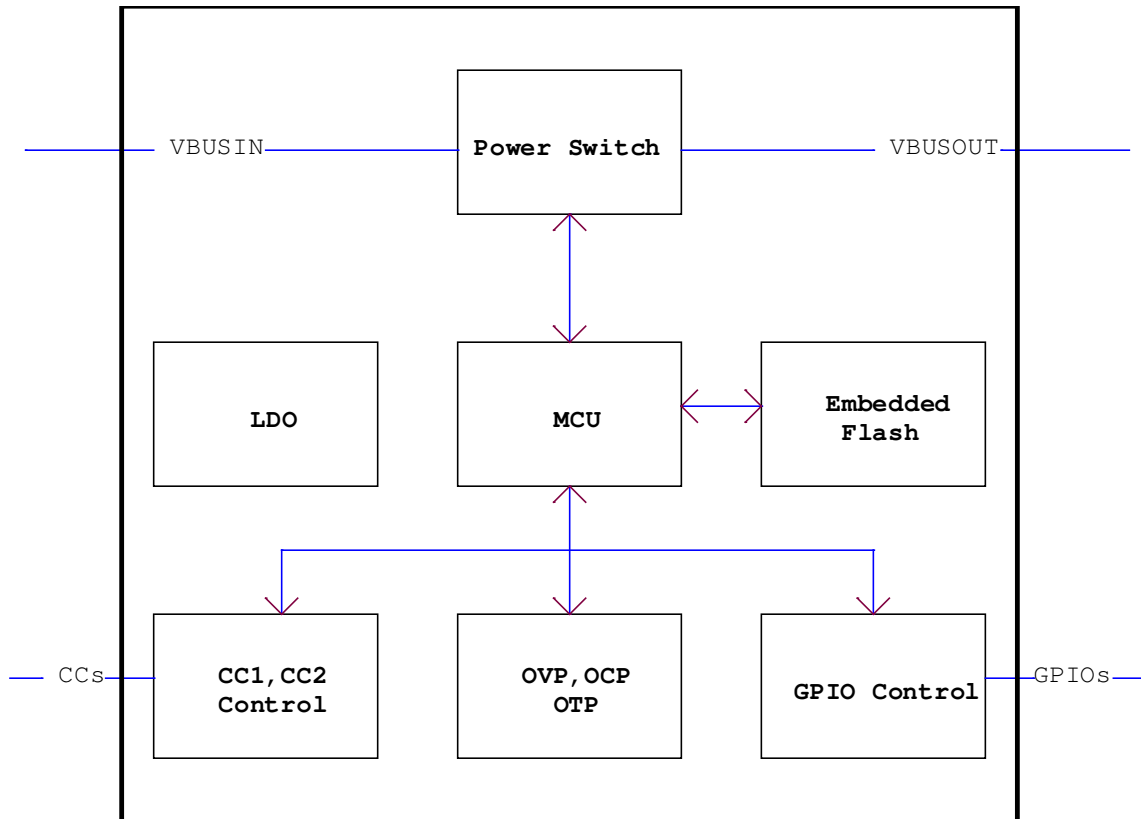


Figure 1: Functional Block Diagram

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1.0 Pin-Out

1.1 Package Diagram

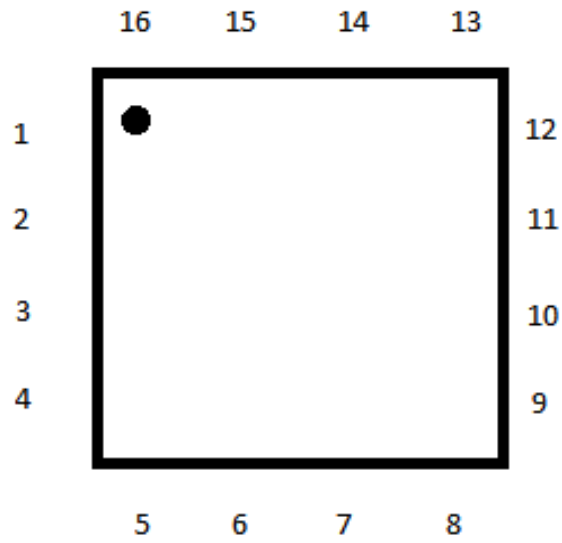


Figure 2: 16-Pin QFN Pin Out

1.2 Pin Description

Table 1: Pin Description of 16 PIN

Pin #	Type	Symbol	Description
1,2,3	Power	VBUS IN	VBUS IN These pins connect to the input side of the switch. They also provide the power to the IC. The nominal value is 5V.
10,11,12	Out	VBUS OUT	VBUS Out These pins connect to the output side of the switch. They should be connected to the USB Type-C connector.
6	Power	GND	Ground
4	In/Out	CC2	CC2 This pin connects to CC2 of the USB Type-C connector.
5	In/Out	CC1	CC1 This pin connects to CC1 of the USB Type-C connector.
7	In/Out	SPD	Serial Bus Data
8	In	SPC	Serial Bus Clock
9	In	Configure	Configuration Pin
13	In/Out	GPIO3	General Purpose IO
14	In/Out	GPIO2	General Purpose IO
15	In/Out	GPIO1	General Purpose IO
16	In/Out	GPIO0	General Purpose IO

2.0 Functional Description

2.1 Clock Generation

The clock for CH7251A is generated on chip and no external components are needed.

2.2 CC1, CC2 control

The configuration of CC1, CC2 and related resistors are done inside CH7251A. No outside components are needed.

2.3 MCU

CH7251A has an on-chip 8-bit MCU. It processes various operating condition signals and responses accordingly.

2.4 Embedded Flash

CH7251A has 2K-byte embedded flash on-chip. It holds the MCU program and other key parameters required for the chip to be functional. It needs to be initialized and programmed during the production test before shipping to customer.

2.5 On-chip Switch

CH7251A has an on-chip switch that allows the maximum current of 3A. The switch is on only when the proper resistors are detected on CC1/CC2 lines.

2.6 Over Voltage, Over Current and Over temperature protection

CH7251A has circuitry to detect over voltage and over current conditions. The large power switch is turned off in case of over voltage and over current situation. CH7251A also has circuitry to monitor temperature and shut down the switch in case of over temperature situation with built in hysteresis.

3.0 Electrical Specifications (Edits are needed)

3.1 Absolute Maximum Ratings

Symbol	Description	Min	Typ	Max	Units
T _{AMB}	Ambient operating temperature	0		70	°C
T _{STOR}	Storage temperature	-65		150	°C
T _J	Junction temperature			125	°C
T _{VPS}	Vapor phase soldering (1 minute)			220	°C

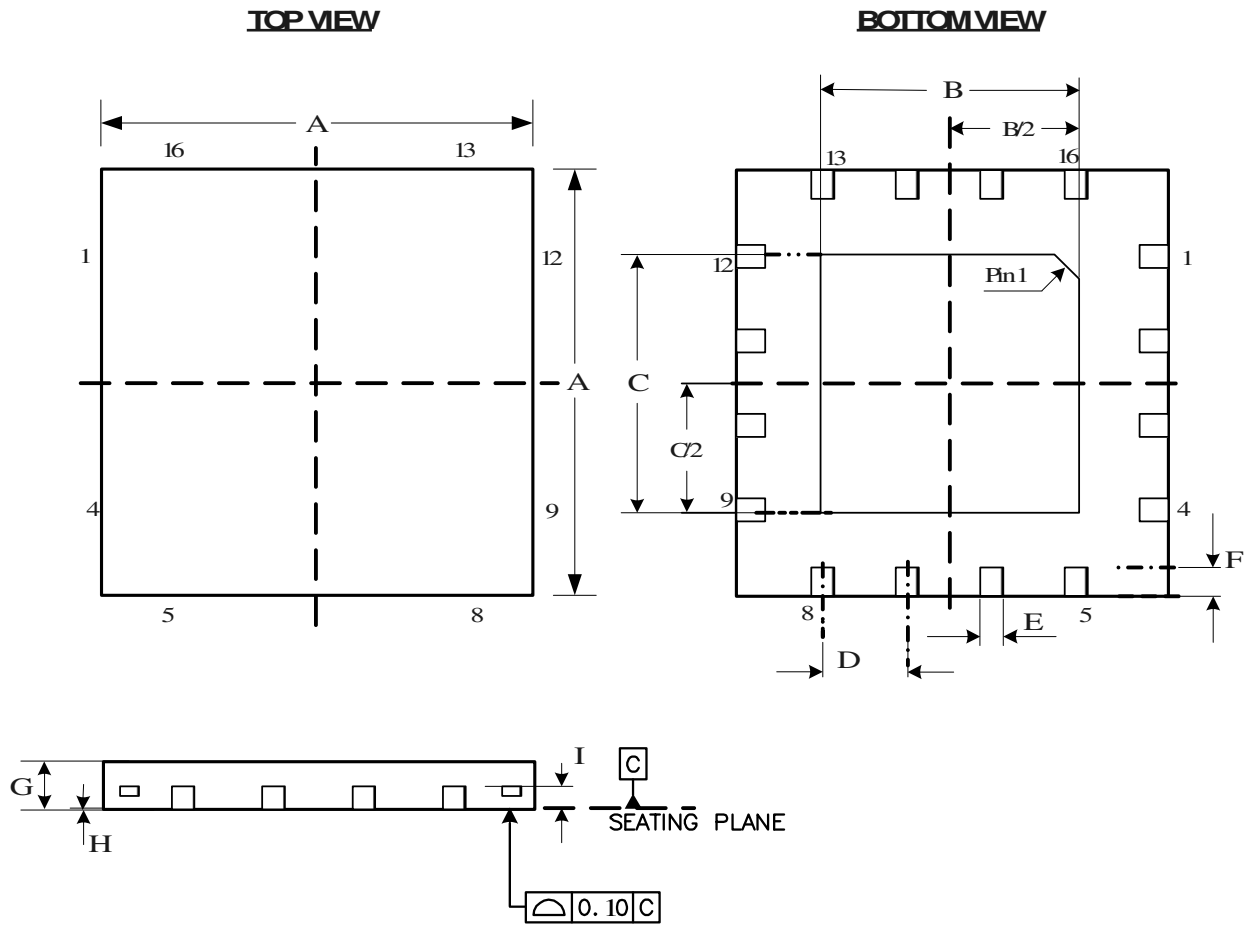
Note:

- 1) Stresses greater than those listed under absolute maximum ratings may cause permanent damage to the device. These are stress ratings only. Functional operation of the device at these or any other conditions above those indicated under the normal operating condition of this specification is not recommended. Exposure to absolute maximum rating conditions for extended periods may affect reliability.
- 2) The device is fabricated using high-performance CMOS technology. It should be handled as an ESD sensitive device. Voltage on any signal pin that exceeds the power supply voltages by more than $\pm 0.5V$ can induce destructive latchup.

3.2 Electrical Characteristics

Symbol	Description	Min	Typ	Max	Units
V _{BUS IN}	Input Voltage	4.75		5.5	Volt
R _{SWITCH ON}	Switch On Resistance			200	mOhm
I _{OFF}	OCP trigger current		3.3		A

4.0 Package Dimensions



16 Pin QFN Package (3 x 3 mm)

Table of Dimensions

No. of Leads		SYMBOL								
16 (3 X 3 mm)		A	B	C	D	E	F	G	H	I
Mili-meters	MIN	2.90	1.40	1.40	0.50	0.18	0.30	0.70	0	0.203
	MAX	3.10	1.60	1.60		0.30	0.50	0.80	0.05	

Notes:

1. Conforms to JEDEC standard JESD-30 MO-220.

5.0 Revision History

Table 2: Revisions

Rev. #	Date	Section	Description
0.01	01/20/17	All	Initial write-up
0.2	4/30/17	All	Updates
0.7	5/12/2017	All	External Engineering Specification release

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ORDERING INFORMATION					
Part Number	Package Type	Number of Pins	Voltage Supply	Quantity	Temperature Grade
CH7251A	QFN16	16			Commercial / Automotive Grade 4

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