

FEATURES

- USB Type-C 1.4 and USB PD3.0 compliant
- Support 5V, 9V and 12V FPDOS
- Support 5V Prog and 9V Prog APDOs
- Support BC1.2 DCP and HVDCP protocols
- BC 1.2 DCP mode
- Apple 5V 2.4A mode
- QC2.0/3.0 Class A, QC3+
- Samsung AFC
- Huawei FCP and SCP
- Support constant voltage loop (CV) and constant current loop (CC) operation
- Integrated N-MOSFET with softstart
- VBUS and VIN pins fast discharge
- Low operation current
- Integrated VIN OVP, VIN UVP, VIN UVLO, OCP, SCP and OTP protections
- DFNFC-9L package
- ±2kV HBM ESD Rating for USB IO pins

APPLICATIONS

- AC-DC power adapter
- Power bank
- Car charger
- USB-PD converter

GENERAL DESCRIPTION

The HUSB351 is designed for a low power Type-C product. The HUSB351 supports PD2.0, PD3.0, PPS, QC2.0/3.0, QC3+, BC1.2 DCP, AFC, FCP and SCP protocols. It supports 5V, 9V and 12V three FPDOS and 5V Prog, 9V Prog two APDOs which are fully compliant with PD3.0 PPS standard.

The HUSB351 integrates the VBUS power switch to save board space and BOM cost.

The HUSB351 integrates all required protections such as Over Voltage Protection (OVP), Under Voltage Protection (UVP), Under Voltage Lock Out (UVLO), Over Current Protection (OCP) and Over Temperature Protection (OTP).

It is available in a 3mm x 3mm, DFNFC-9L package.

TYPICAL APPLICATION CIRCUIT

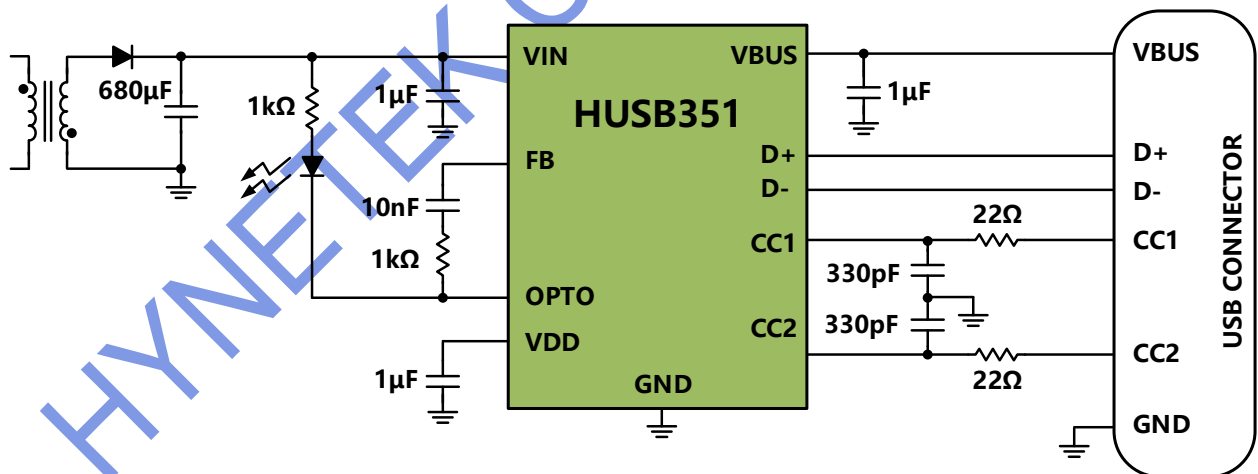


Figure 1. Typical Application Circuit

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REVISION HISTORY

Version	Date	Descriptions
Rev. 1.0	03/2021	Initial version

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PIN CONFIGURATION AND FUNCTION DESCRIPTIONS

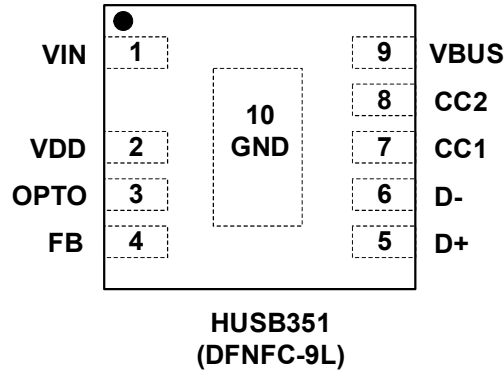


Figure 2. Pin Configuration (Top View)

Table 1. Pin Function Descriptions

Pin No.	Pin Name	Type ¹	Description
1	VIN	P	Input power pin for IC and internal VBUS power switch.
2	VDD	AO	Output of internal LDO. Connect 1µF ceramic capacitor at this pin to ground.
3	OPTO	AI	Connection of Opto-coupler feedback.
4	FB	AI	Feedback point for direct feedback connection.
5	D+	DIO	USB D+ line.
6	D-	DIO	USB D- line.
7	CC1	AIO	Type-C CC1 line.
8	CC2	AIO	Type-C CC2 line.
9	VBUS	P	Output of Type C connector.
10	GND	A	Exposed pad. Connect this pad to the ground of the system board.

¹ Legend:
A = Analog Pin
P = Power Pin
D = Digital Pin
I = Input Pin
O = Output Pin

ABSOLUTE MAXIMUM RATINGS

Table 2.

Parameter	Rating
VIN, VBUS, OPTO	-0.3V to +16V
CC1, CC2, D+, D-	-0.3V to +16V
VDD, FB	-0.3V to +7V
Operating Temperature Range (Junction)	-40°C to +125°C
Soldering Conditions	JEDEC J-STD-020
Electrostatic Discharge (ESD) Human Body Mode	2000V

Stresses at or above those listed under Absolute Maximum Ratings may cause permanent damage to the product. This is a stress rating only; functional operation of the product at these or any other conditions above those indicated in the operational section of this specification is not implied. Operation beyond the maximum operating conditions for extended periods may affect product reliability.

THERMAL RESISTANCE

Thermal performance is directly linked to printed circuit board (PCB) design and operating environment. Close attention to PCB thermal design is required.

θ_{JA} is the natural convection junction to ambient thermal resistance measured in a one cubic foot sealed enclosure.

θ_{JC} is the junction to case thermal resistance.

Table 3. Thermal Resistance

Package Type	θ_{JA}	θ_{JC}	Unit
DFNFC-9L	75	54	°C/W

ESD CAUTION



Electrostatic Discharge Sensitive Device.

Charged devices and circuit boards can discharge without detection. Although this product features patented or proprietary protection circuitry, damage may occur on devices subjected to high energy ESD. Therefore, proper ESD precautions should be taken to avoid performance degradation or loss of functionality.

TYPICAL APPLICATION CIRCUITS

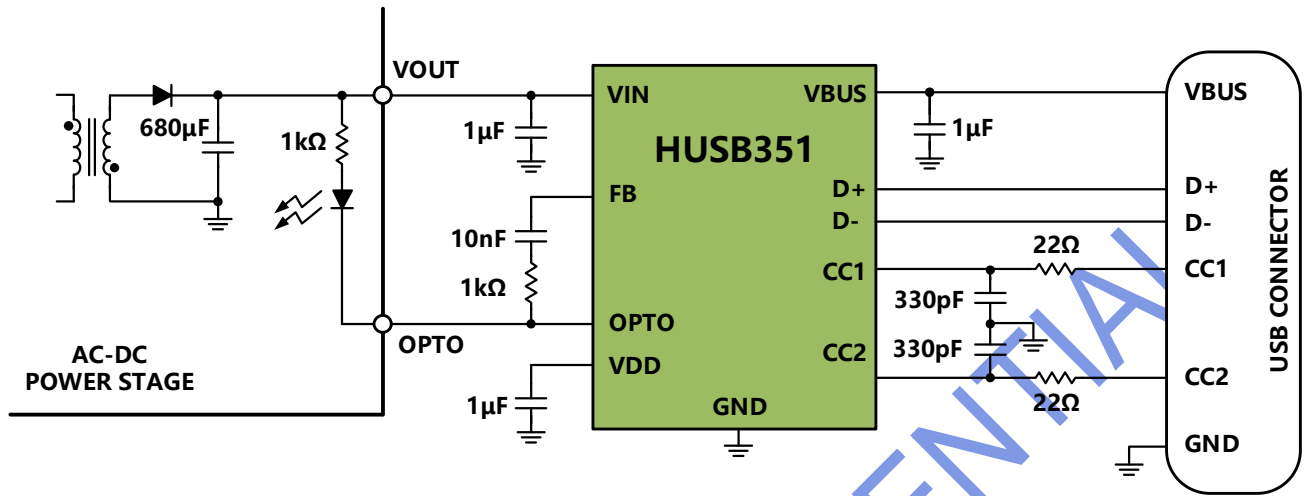


Figure 3. PD Adapter Application Circuit

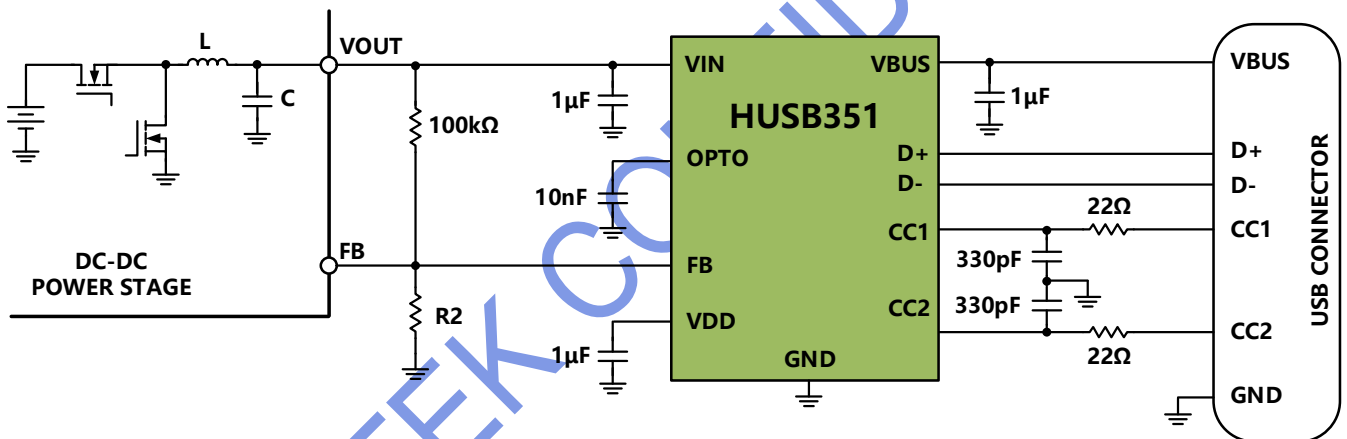
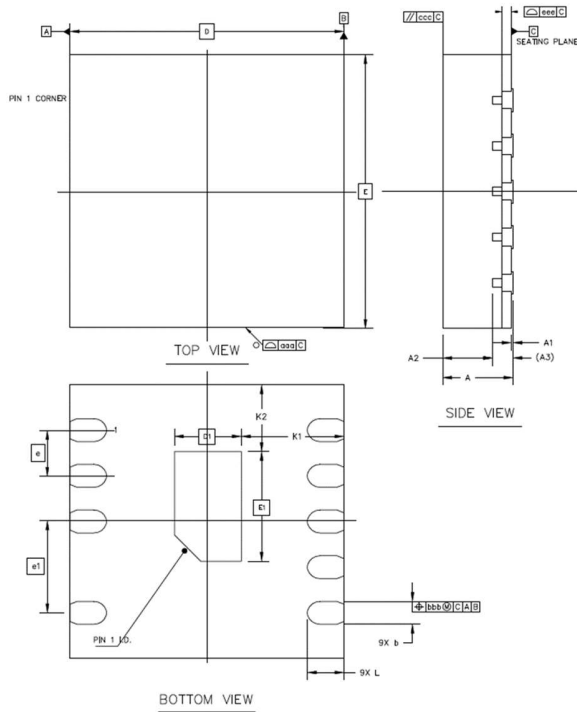


Figure 4. Car Charger Application Circuit

PACKAGE OUTLINE DIMENSIONS



	SYMBOL	MIN	NOM	MAX
TOTAL THICKNESS	A	0.7	0.75	0.8
STAND OFF	A1	0	0.02	0.05
MOLD THICKNESS	A2	---	0.55	---
L/F THICKNESS	A3	0.203 REF		
LEAD WIDTH	b	0.2	0.25	0.3
BODY SIZE	X	3.0 BSC		
	Y	3.0 BSC		
EP SIZE	X	0.63	0.73	0.83
	Y	1.1	1.2	1.3
LEAD PITCH	e	0.50 BSC		
	e1	1.00 BSC		
LEAD LENGTH	L	0.35	0.40	0.45
PACKAGE EDGE TO EP EDGE SIZE	X	1.12 REF		
	Y	0.73 REF		
PACKAGE EDGE TOLERANCE	aaa	0.1		
LEAD OFFSET	bbb	0.1		
	ddd	0.05		
MOLD FLATNESS	ccc	0.1		
COPLANARITY	eee	0.05		

Figure 5. DFNFC-9L Package, 3 mm x 3 mm

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