

D1542

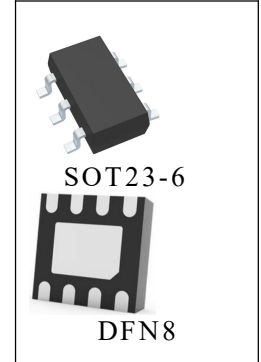
USB Dedicated Charging Port Controller For Charging protocol and QC2.0/3.0

General Description

The D1542 is a fast charge protocol controller for HiSilicon Fast Charging Protocol (FCP), Samsung Adaptive Fast Charge(AFC) and Qualcomm Quick Charge 2.0/3.0(QC2.0/3.0) USB interface. The device can fast charging FCP, AFC or QC 2.0/3.0 powered device (PD). The protocol feature monitors USB D+/D- data line voltage or D- data line transmission and automatically adjusts output voltage of power bank and wall adaptor to optimize charge time.

D1542 can support not only USB BC compliant devices, but also Apple /SAMSUNG devices and automatically detects whether a connected powered device is Quick Charge 2.0/3.0 or FCP capable before enabling output voltage adjustment. If a PD not compliant to Quick Charge 2.0/3.0 is detected the D1542 disables output voltage adjustment to ensure safe operation with legacy 5V only USB PDs.

The D1542 is available in SOT23-6 or DFN8 packages.



Features

- Support HiSilicon Fast Charging Protocol (FCP) for Output Voltage and Current Communication.
- Input Voltage Range from 3.2V to 6.4V
- Fully Supports Quick Charge 2.0/3.0 Specification: Class A: 5V/9V/12V Output Voltage
- Supports USB DCP Shorting D+ Line to D- Line per USB Battery Charging Specification, Revision 1.2
- Meets Chinese Telecommunication Industrial Standard YD/T 1591-2009
- Supports USB DCP Applying 2.7V on D+ line and 2.7V on D- line.
- Automatic Selection of D+/D- Mode for an Attached Device
- Complaint with Apple and Samsung Devices
- Automatic Selection FCP, AFC and QC2.0/3.0 Protocols.

Package Information

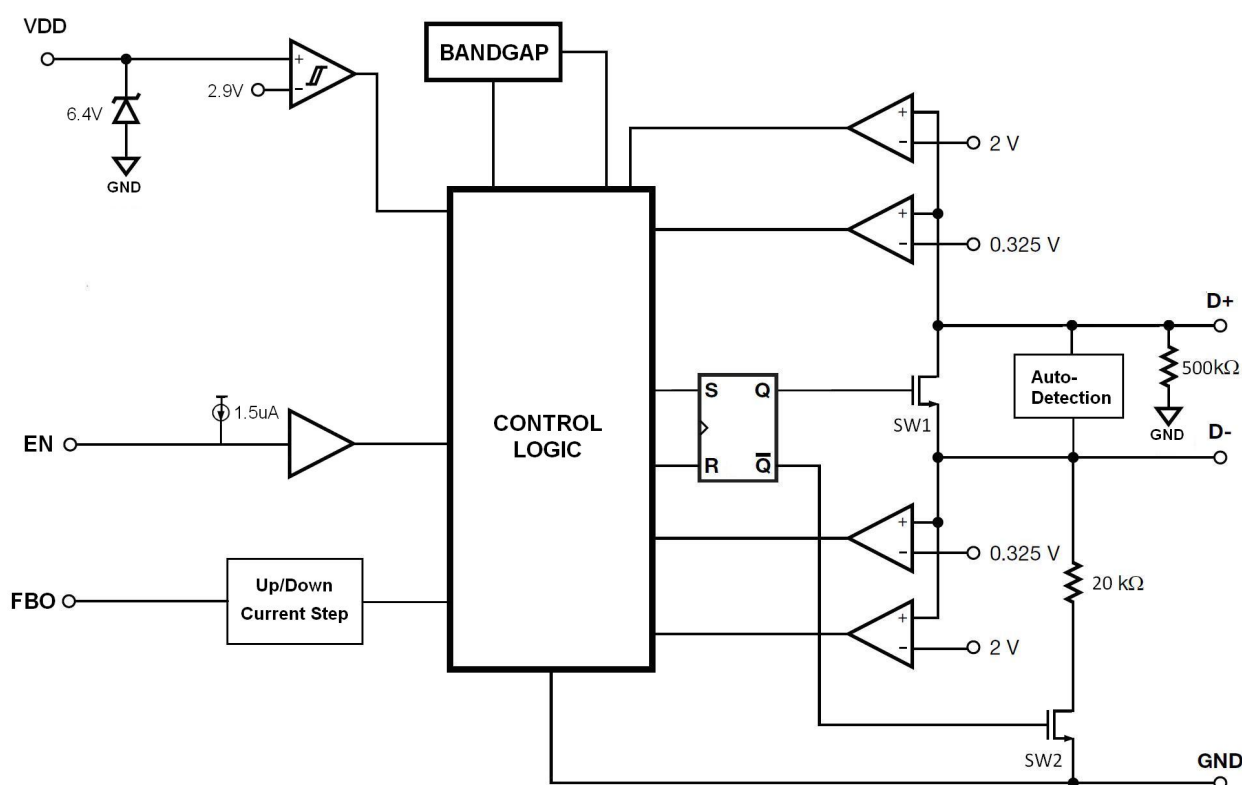
Part NO.	Order NO.	Package Description	Package Marking	Package Option
D1542	D1542	SOT23-6	L1XY	3000/Reel
D1542	D1542D	DFN8(3*3)	CHMC SXX D1542 .	3000/Reel

L1:D1542 X:Year Code Y: Date Code CHMC:Trademark D1542:Part NO. SXX:Lot NO.

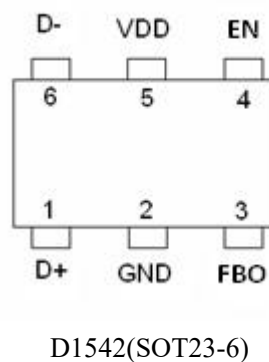
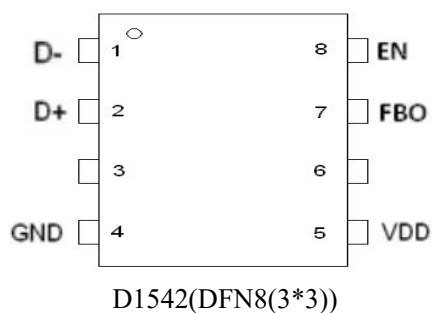
Applications

- Wall-Adapter/Power Plugs, Outlets
- Mobile/Tablet Power Bank
- Car Charger
- USB Power Output Ports

Functional Block Diagram



Pin Configuration



Pin Description

Pin Number	Pin Name	Type	Function Description
SOT-23-6			
1	D+	I/O	USB D+ Data Line Input.
2	GND	P	Ground Pin
3	FBO	O	Feedback Output. Current Sink/Source FB Node.
4	EN	I	High-Z with QC3.0 and FCP Function; Logic Low Disable QC3.0 and FCP Function.
5	VDD	P	Power Supply Input Pin.
6	D-	I/O	USB D- Data Line Input

Pin Number	Pin Name	Type	Function Description
DFN8			
2	D+	I/O	USB D+ Data Line Input.
4	GND	P	Ground Pin
7	FBO	O	Feedback Output. Current Sink/Source FB Node.
8	EN	I	High-Z with QC3.0 and FCP Function; Logic Low Disable QC3.0 and FCP Function.
5	VDD	P	Power Supply Input Pin.
1	D-	I/O	USB D- Data Line Input

(Note) I: CMOS Input O: Push-Pull CMOS Output

I/O: CMOS Input / Output P: Power / GND

Absolute Maximum Ratings

Parameter Name	Symbol	Value	Unit
Operating Voltage	V _{DD}	-0.3~+6.5	V
Input/Output Voltage	V _I /V _O	-0.3~+6.5	V
Operating Temperature	T _{OPR}	-40~+85	°C
Storage Temperature	T _{STG}	-65~+150	°C
ESD (Human Body Mode)	V _{ESD}	>4000	V

Electrical Characteristics

(VDD=5.0V, Ta=25°C and the recommended supply voltage range, unless otherwise specified.)

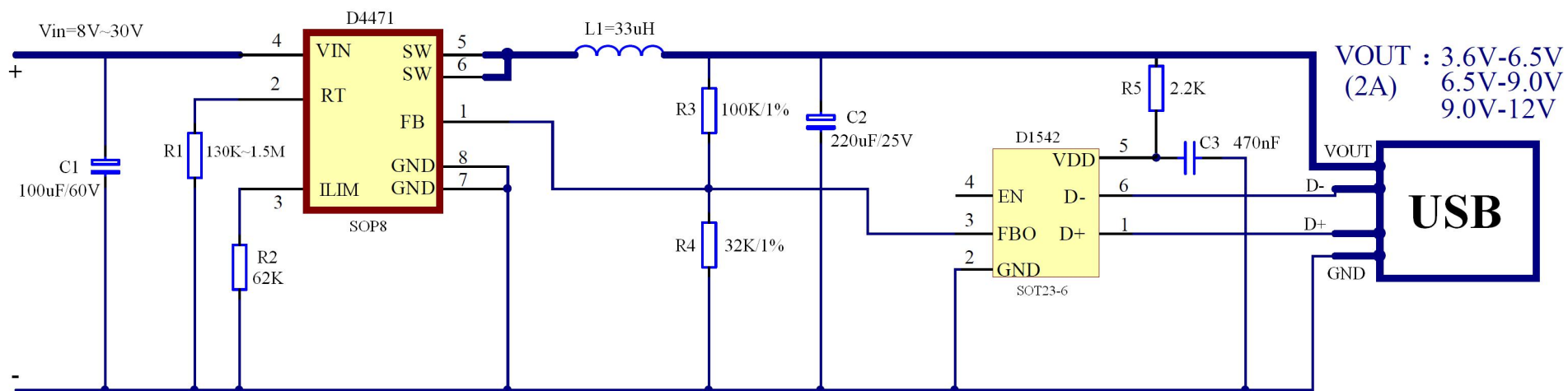
Parameter Name	Symbol	Conditions	Min	Typ	Max	Unit
VDD pin Voltage Range	V _{DD}		3.2	5.0	6.4	V
Operating Current	I _{DD}	V _{DD} =5.0V		400		μA
Power-Up Reset Threshold Voltage	V _{DD(RESET)}		2.5		2.9	V
VDD Shunt Voltage	V _{DD(SHUNT)}	I _{DD} =3mA	5.9	6.4	6.8	V
Data Detect Voltage	V _{DAT(REF)}		0.250	0.325	0.400	V
Output Voltage Selection Reference	V _{SEL(REF)}		1.8	2.0	2.2	V
Data Lines Short-Circuit Delay	T _{DAT(SHORT)}			1.0		ms
D+ High Glitch Filter Time	T _{GLITCH(BC) DONE}		1000	1150	1500	ms
Output Voltage Glitch Filter Time	T _{GLITCH(V) CHANGE}		20	40	60	ms
D- Pull-Down Resistance	R _{DM(DWN)}			20		kΩ
Continuous Mode Glitch Filter Time	T _{GLITCH(V)-CON T CHANGE}		100		200	μs
D+ Leakage Resistance	R _{DAT-LKG}		300	500	800	kΩ
Switch 1 On-Resistance	R _{D(S)ON} SW1	SW1=200μA VDD=5V		7	40	Ω
Up/Down Current Step	I _{UP, IDOWN}			2.0		μA
D+ _2.7V/D- _2.7V Line Output Voltage			2.57	2.70	2.84	V
D+ _2.7V/D- _2.7V Line Output Impedance				30		kΩ
D-FCP TX Valid Output H	V _{TX-VOH}		2.55		3.6	V
D-FCP TX Valid Output L	V _{TX-VOL}				0.3	V
D-FCP RX Valid Output H	V _{RX-VIH}		1.4		3.6	V
D-FCP RX Valid Output L	V _{RX-VIL}				1.0	V
D- Output Pull-Low Resistance (FCP)	R _{PD}		400	500	600	Ω
Unit interval For FCP PHY Communication	UI	f _{CLK} =125KHz	144	160	176	μs

Output Voltage

The Table Below Shows How D1542 Set Output Voltage

No.	USB Port D+	USB Port D-	Output V _{BUS} Voltage
1	0.6V	High-Z	5V (Default)
2	3.3V	0.6V	9V
3	0.6V	0.6V	12V
4	0.6V	3.3V	Continuous Mode

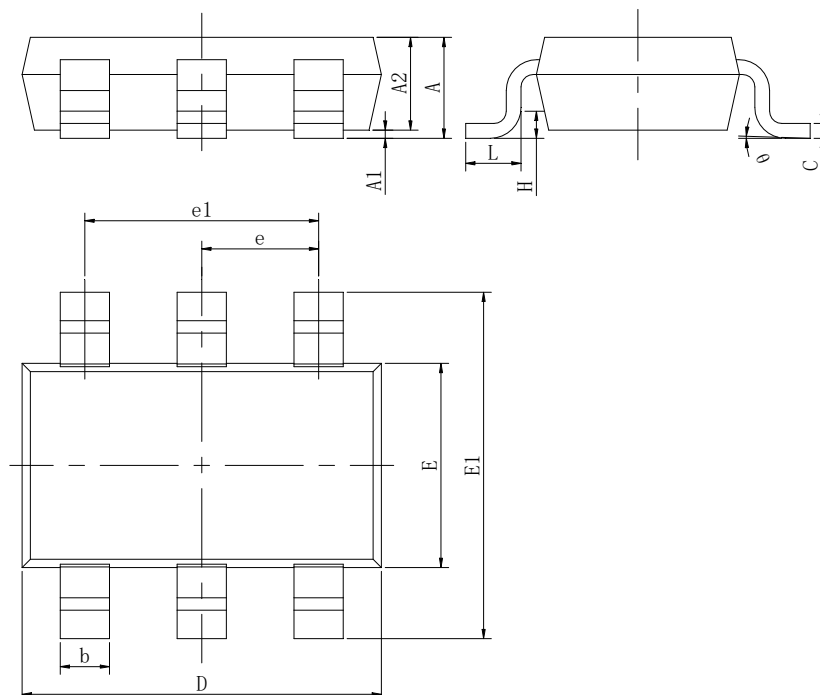
Typical Application (QC3.0)



Outline Dimensions

SOT23-6

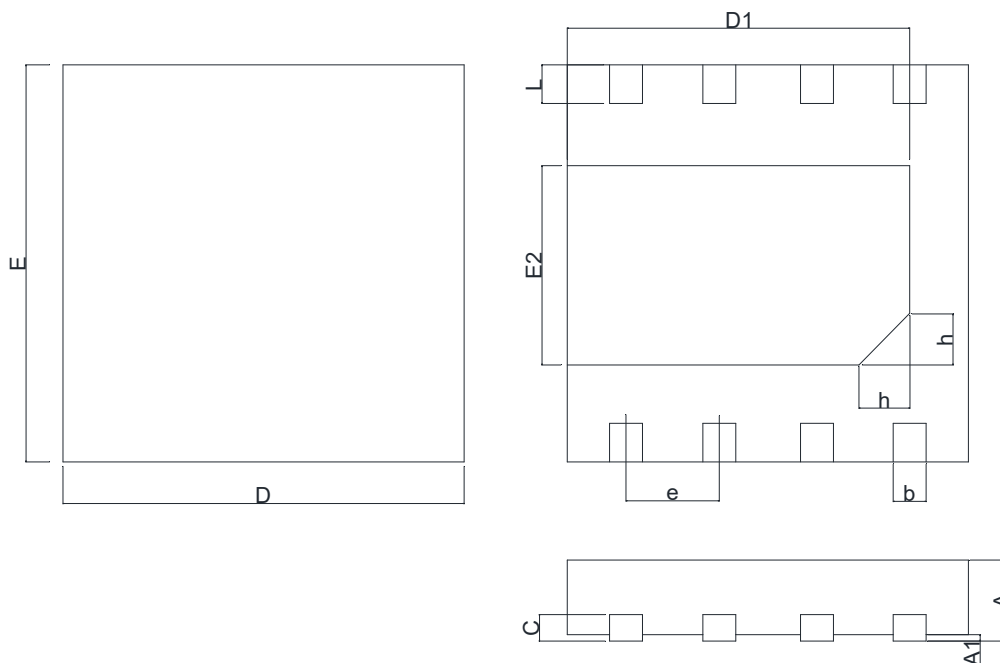
Unit: mm



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.130	0.000	0.005
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.95 (BSC)		0.037(BSC)	
e1	1.90 (BSC)		0.075(BSC)	
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°

DFN8

Unit: mm



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.700	0.900	0.027	0.035
A1	-	0.050	-	0.002
b	0.180	0.300	0.007	0.012
C	0.180	0.250	0.007	0.010
D	2.900	3.100	0.114	0.122
e	0.650 (BSC)		0.025 (BSC)	
E	2.900	3.100	0.114	0.122
D1	2.200	2.400	0.086	0.094
E2	1.400	1.600	0.055	0.063
h	0.300	0.400	0.012	0.015
L	0.200	0.300	0.007	0.012

Statements

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