

USB Charger Emulator with Adjustable Power Switch

FEATURES

- 25 mΩ High-Side MOSFET in SOT23-6
- 2.0~4.0 A Adjustable Current Limit
- Low Average Current in OUT shorted GND
- Support Apple @ 2.4A fast Charging
- Support Samsung @ 2.1A fast Charging
- Support BC1.2 & YD/T 1591-2009 Charging
- Built-in Soft-Start
- Available SOT23-6 package

APPLICATIONS

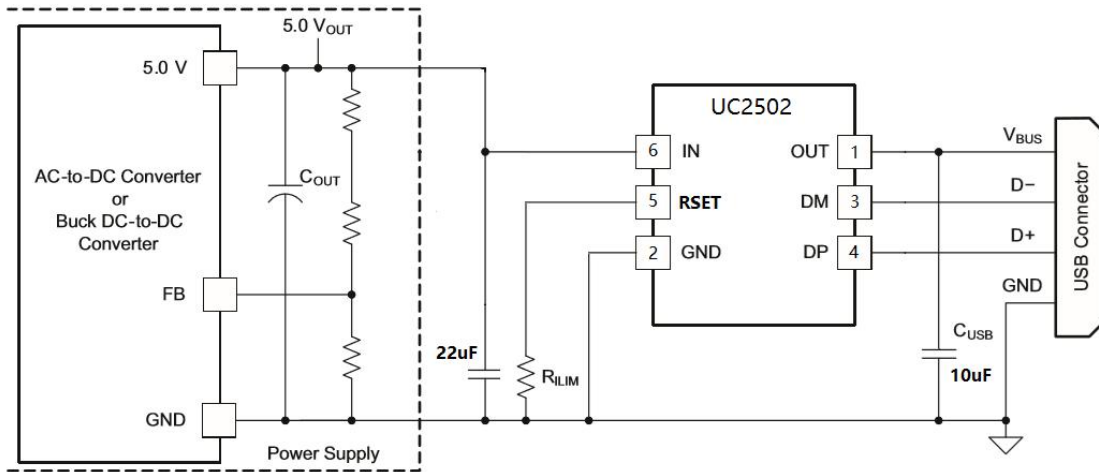
- USB Charger
- USB Wall Adapter
- Car Charger

DESCRIPTION

The UC2502 integrated USB charger emulators with automatic host charger identification circuitry and high performance adjustable current limiting power switch. An automatic USB charger identification circuit allows mobile power supply can automatically provides the correct modes on the data lines to charger compliant devices among the Apple, Samsung and BC1.2 modes.

The UC2502 is a 25 mΩ in SOT23-6 package power switch intended for applications where heavy capacitive loads and short-circuits are likely to be encountered. This also provides hiccup mode when OUT voltage is less than 3.0V or OTSD.

PACKAGE AND APPLICATION

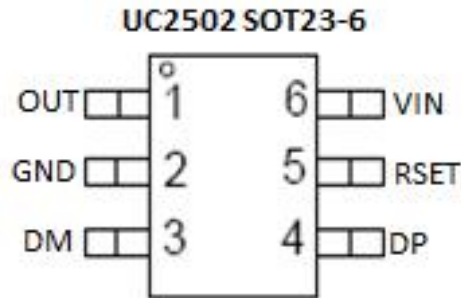


ORDERING INFORMATION

Part Number	Package Type	Package Qty	Op Temp(°C)	Mark
UC2502	SOT23-6	3000	-40~85	UC2502 XXX

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PINOUT



PIN FUNCTIONS

Pin Name	TYPE ⁽¹⁾		DESCRIPTION
	SOT23-6		
OUT	1	O	Power-switch output, connected to VBUS of USB; connect a 10μF or greater ceramic capacitor from OUT to GND as close to the IC as possible
GND	2	G	Ground connection
DM	3	I	DM data line to connector, input for hand-shake voltage from portable equipment high impedance while disabled
DP	4	I	DP data line to connector, input for hand-shake voltage from portable equipment high impedance while disabled
RSET	5	I	External resistor used to set current-limit threshold;
VIN	6	P/I	Power supply/Input voltage connected to Power Switch; connect a 10μF or greater ceramic capacitor from IN to GND as close to the IC as possible

(1) G = Ground, I = Input, O = Output, P = Power

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ABSOLUTE MAXIMUM RATINGS ⁽¹⁾

Over recommended operating free-air temperature range (unless otherwise noted)

PARAMETER		MIN	MAX	UNIT
Supply Voltage Range	IN	-0.3	7.0	V
Input voltage range	DP, DM	-0.3	5.8	
Continuous output sink current	DP input current, DM input current		35	mA
Continuous output source current	DP output current, DM output current		35	
ESD rating, Human Body Model (HBM)	IN, DP, DM		2	kV
Operating Junction Temperature	T _J	-40	125	°C
Storage Temperature Range	T _{stg}	-65	150	

(1) Stresses beyond those listed under Absolute Maximum Ratings may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under Recommended Operating Conditions is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

THERMAL CHARACTERISTICS

over operating free-air temperature range (unless otherwise noted)

THERMAL METRIC			UNIT
θ_{JA}	SOT23-6 Package thermal impedance ⁽¹⁾	165	°C/W

(1) The package thermal impedance is calculated in accordance with JESD 51-7.

RECOMMENDED OPERATING CONDITIONS

PARAMETER		MIN	MAX	UNIT
V _{IN}	Input voltage of IN	4.5	6.5	V
V _{DP/DM}	DP data line input voltage		5.5	
I _{DP/DM}	Continuous sink/source current		±10	mA
R _{SET}	Resistance of R _{SET}	13	100	kΩ
I _{OUT}	Continuous sink/source current	2000	4000	mA
T _J	Operating Junction Temperature	-40	125	°C

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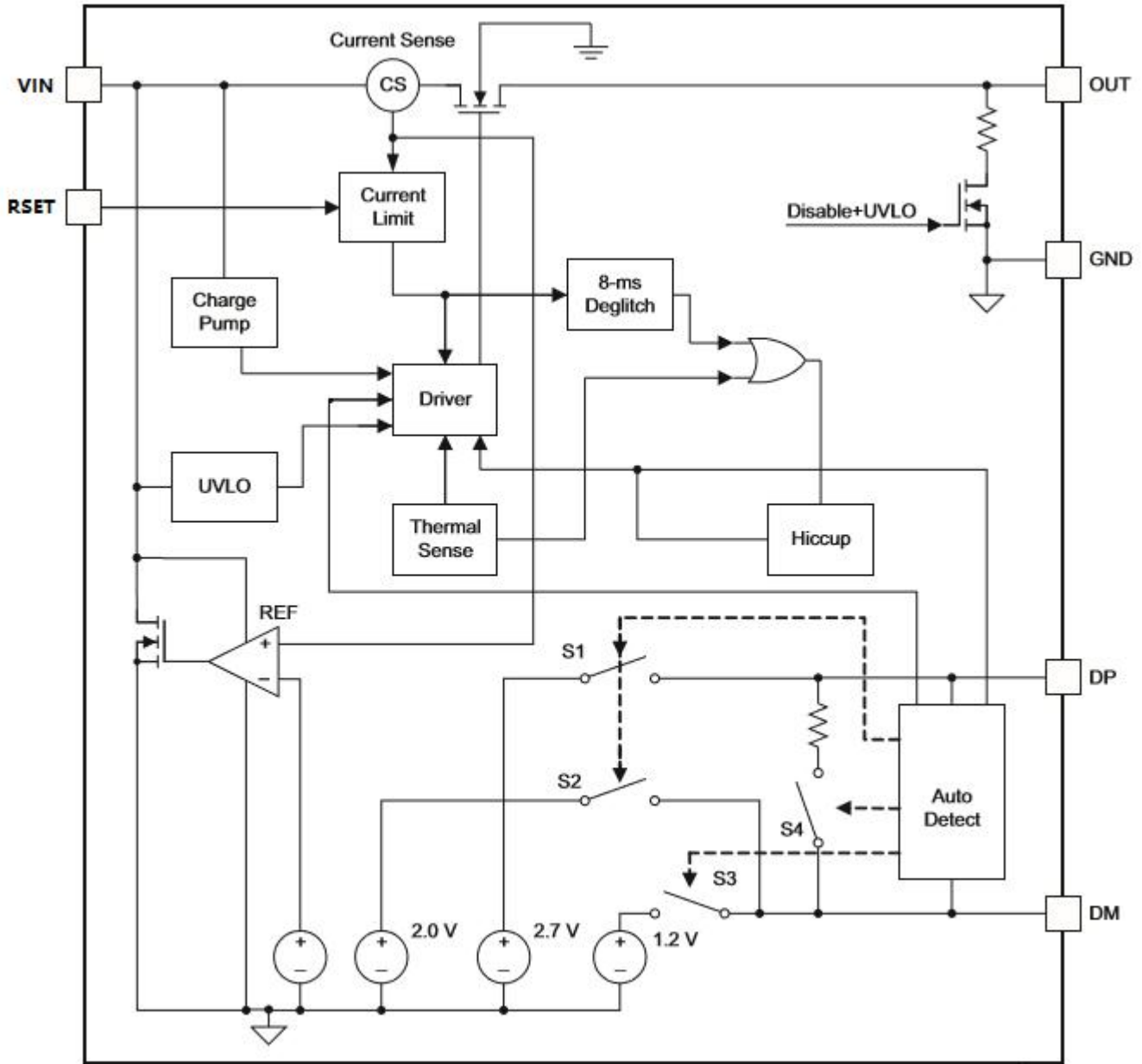
ELECTRICAL CHARACTERISTICS

Conditions are: TA = 25°C, IN = 5.0 V, Positive current are into pins. All voltages are with respect to GND (unless otherwise noted).

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT	
Power Switch						
R _{DS(on)}	SOT23-6	I _{OUT} =2.4A	25		mΩ	
Current Limit						
BIN1 I _{OS}	OUT current limited	RSET=19.1 k	2.50	2.75	3.00	A
BIN2 I _{OS}	OUT current limited	RSET= 21.5k	2.50	2.75	3.00	A
Hiccup Mode						
V _{OUT_SHORT}	OUT Threshold Voltage to enter Hiccup mode		2.85		V	
T _{ON_HICCUP}	ON Time of Hiccup mode		70	130	190	ms
T _{OFF_HICCUP}	OFF Time of Hiccup mode		0.7	1.3	1.9	s
Thermal Shutdown						
	Temperature Rising Threshold			150		°C
	Hysteresis			20		
UNDERVOLTAGE LOCKOUT						
V _{UVLO}	IN rising UVLO threshold voltage		3.75	3.95	4.15	V
	Hysteresis			100		mV
IPAD MODE 2.4A Mode						
V _{DP_IPAD}	DP output voltage		2.5	2.7	2.9	V
V _{DM_IPAD}	DM output voltage		2.5	2.7	2.9	
Galaxy Tab MODE						
V _{DP_GAL}	DP output voltage		1.1	1.2	1.3	V
V _{DM_GAL}	DM output voltage		1.1	1.2	1.3	
SUPPLY CURRENT						
I _{IN}	IN supply current	IN= 5.0V,		230	400	μA
I _{INL}	IN Disable Supply Current	IN= 5.0V		0	5	

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Function Block Diagram



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PCB LAYOUT NOTIFICATION

Input capacitance C_{IN} (red position) of the pin 6 of uc2502:

The voltage entering the pin 6 must pass through the input capacitor C_{IN} at a single point(单点过电容), the C_{IN} must be close to the pin6.

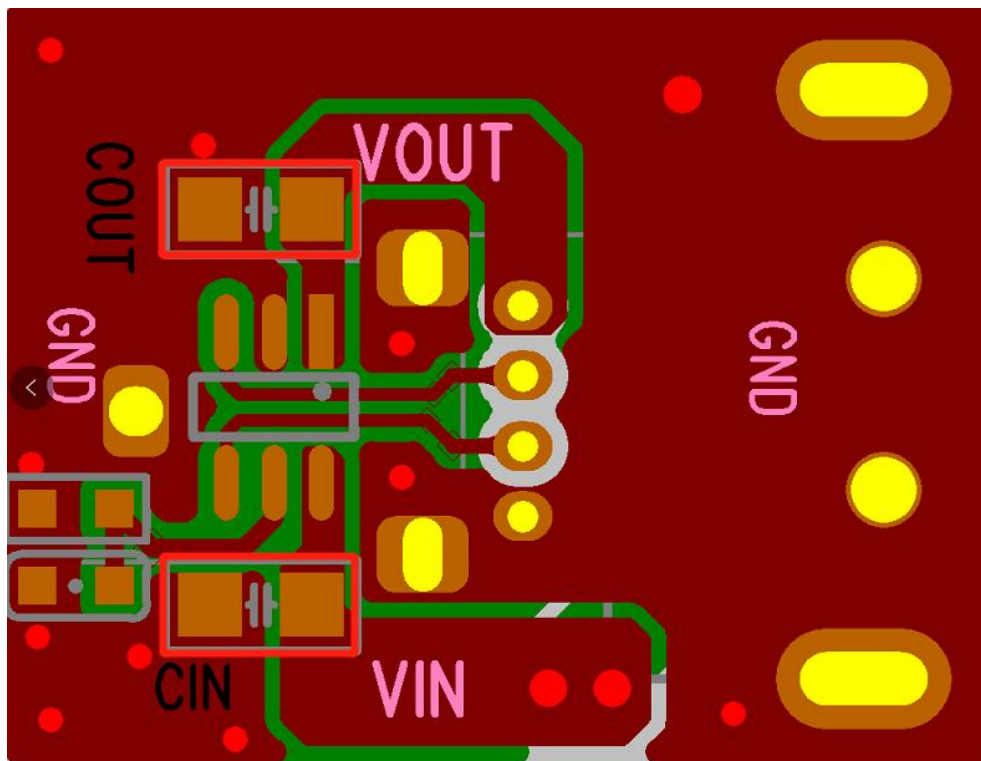
Output capacitance C_{OUT} (red position)of pin 1:

The pin1 to USB must pass through the output capacitor C_{OUT} and be close to pin 1.

Recommended capacitance C_{IN} is 0805 size, value is 22 μ F;

Recommended capacitance C_{OUT} is 0805 size, value is 10 μ F;

Based the difference of AC/DC or DC/DC, the C_{IN} and C_{OUT} can be bigger or smaller.



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Package information

SOT23-6

