

## USB Charger Emulator with Adjustable Power Switch

### FEATURES

- 16 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 1691-2009 Charging
- Built-in Soft-Start
- Available SOT23-6 package

### APPLICATIONS

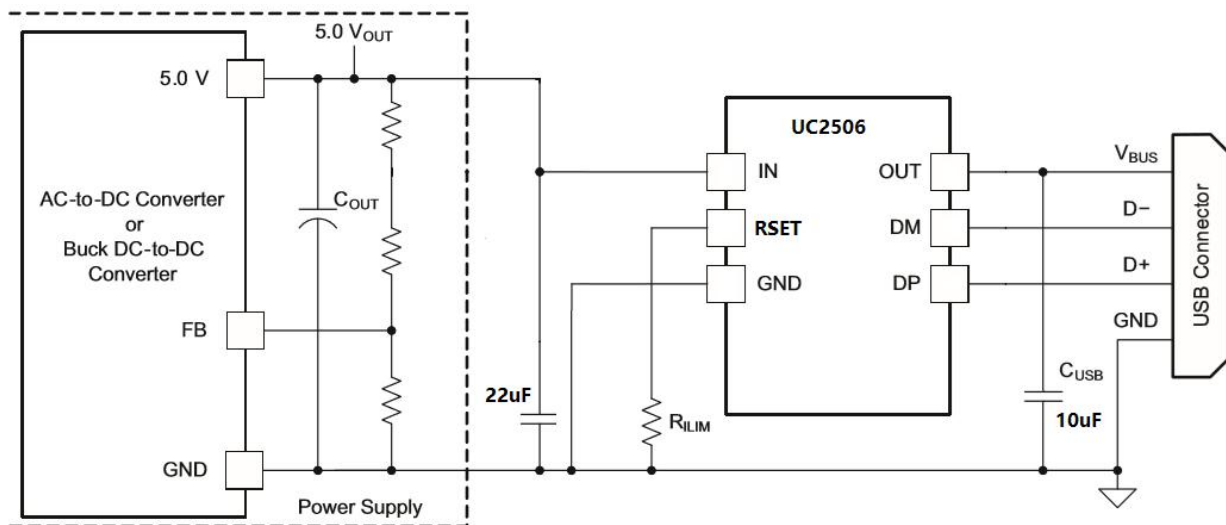
- USB Charger
- USB Wall Adapter
- Car Charger

### DESCRIPTION

The UC2506 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 UC2506 is a 16mΩ 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

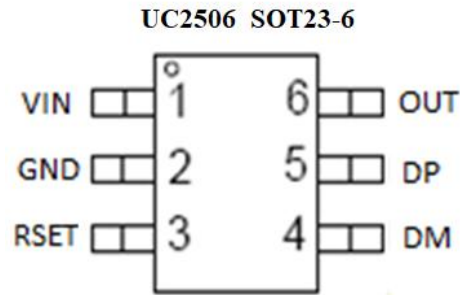


### ORDERING INFORMATION

Part Number	Package Type	Package Qty	Op Temp(°C)	Mark
UC2506	SOT23-6	3000	-40~85	UC2506 XXX

## USB Charger Emulator with Adjustable Power Switch

### PINOUT



### PIN FUNCTIONS

Pin Name	TYPE(1)		DESCRIPTION
	SOT23-6		
VIN	1	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
GND	2	G	Ground connection
RSET	3	I	External resistor used to set current-limit threshold;
DM	4	I	DM data line to connector, input for hand-shake voltage from portable equipment high impedance while disabled
DP	5	I	DP data line to connector, input for hand-shake voltage from portable equipment high impedance while disabled
OUT	6	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

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

## USB Charger Emulator with Adjustable Power Switch

### 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		6	kV
Operating Junction Temperature	T <sub>J</sub>	-40	125	°C
Storage Temperature Range	T <sub>stg</sub>	-65	160	

(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
$\theta_{JA}$	ESOP8 Package thermal impedance <sup>(1)</sup>	45	°C/W
$\theta_{JA}$	EMSOP8 Package thermal impedance <sup>(1)</sup>	65	
$\theta_{JA}$	SOT23-6 Package thermal impedance <sup>(1)</sup>	165	

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

### RECOMMENDED OPERATING CONDITIONS

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

## USB Charger Emulator with Adjustable Power Switch

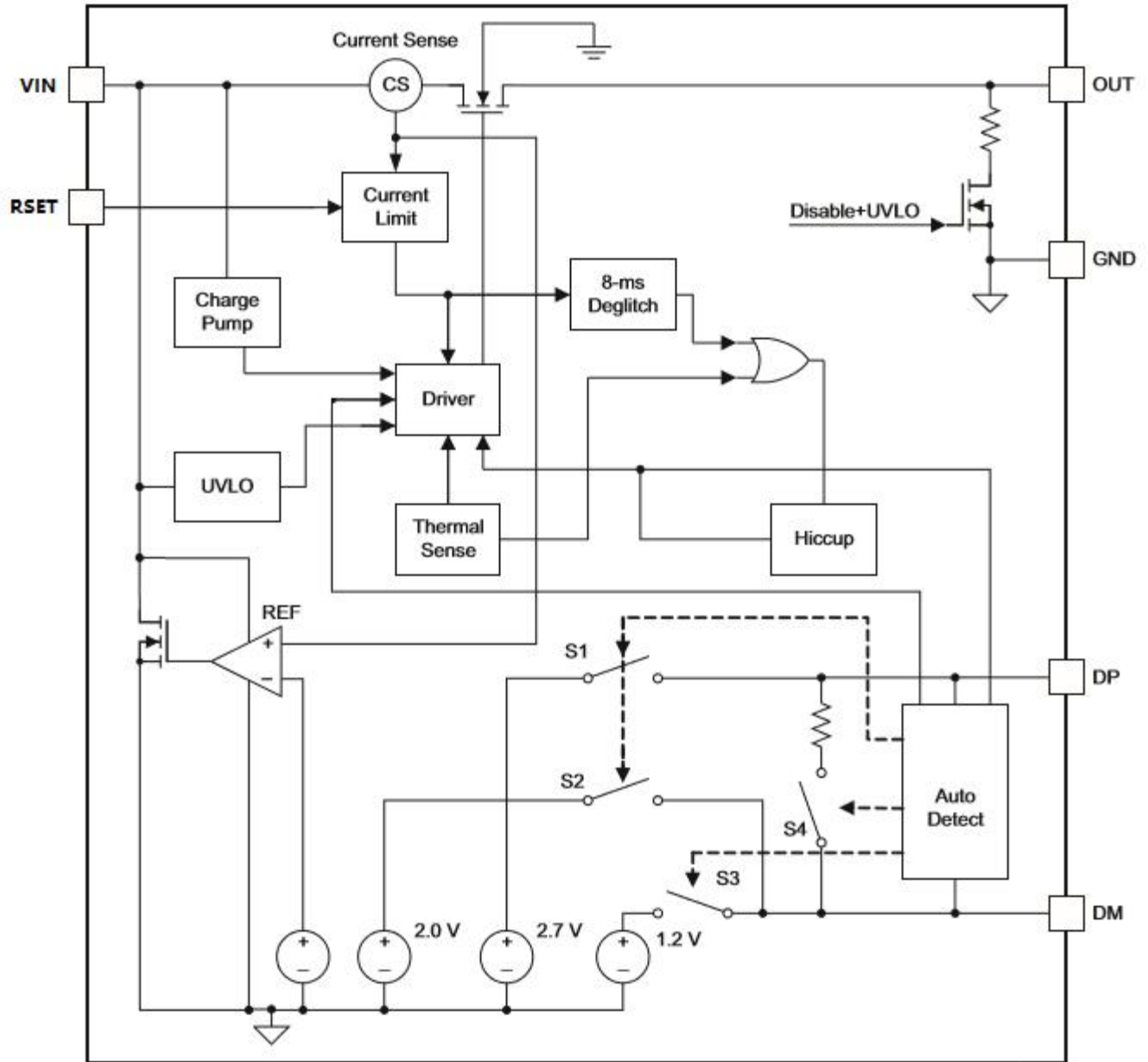
### ELECTRICAL CHARACTERISTICS

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	
<b>Power Switch</b>						
RDSON	SOT23-6	IOUT=2.4A		16	mΩ	
<b>Current Limit</b>						
IOUT	OUT current limited	BIN1:RSET=19.1k	2.5	2.75	3.0	A
<b>IPAD MODE 2.4A Mode</b>						
V <sub>DP_IPAD</sub>	DP output voltage		2.5	2.7	2.9	V
V <sub>DM_IPAD</sub>	DM output voltage		2.5	2.7	2.9	
<b>Galaxy Tab MODE</b>						
V <sub>DP_GAL</sub>	DP output voltage		1.1	1.2	1.3	V
V <sub>DM_GAL</sub>	DM output voltage		1.1	1.2	1.3	
<b>SUPPLY CURRENT</b>						
I <sub>IN</sub>	IN supply current	IN= 5.0V,		230	400	μA
I <sub>INL</sub>	IN Disable Supply Current	IN= 5.0V		0	5	
<b>Thermal Shutdown</b>						
T <sub>OTSD</sub>	Temperature Rising Threshold			160		°C
T <sub>HYS</sub>	Hysteresis			20		

USB Charger Emulator with Adjustable Power Switch

**FUNCTION BLOCK DIAGRAM**



## USB Charger Emulator with Adjustable Power Switch

### PCB LAYOUT NOTIFICATION

Input capacitance  $C_{IN}$ (red position) of the pin 1 of uc2506:

The voltage entering the pin 1 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 pin1.

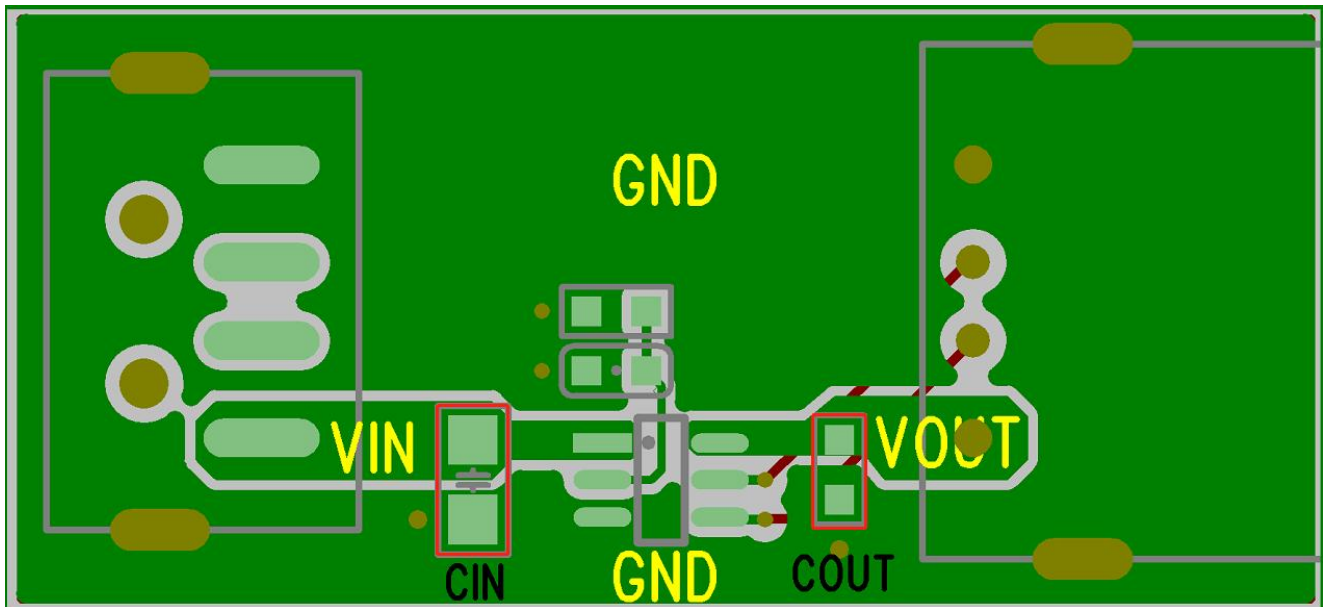
Output capacitance  $C_{OUT}$ (red position)of pin 6:

The pin6 to USB must pass through the output capacitor  $C_{OUT}$  and be close to pin 6.

Recommended capacitance  $C_{IN}$  is 0805 size, value is 22uF;

Recommended capacitance  $C_{OUT}$  is 0805 size, value is 10uF;

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



USB Charger Emulator with Adjustable Power Switch

**PACKAGE INFORMATION**

**SOT23-6**

