High Accuracy Adjustable Current-Limited Power Switch

FEATURES

- 45 mΩ High-Side MOSFET
- 3.1A continuous current capability in EMSOP8
- 1.0~4.0 A (typ.) Adjustable Current Limit
- Low Current under OUT shorted GND
- Support single layer PCB layout
- Built-in Soft-Start
- 4.5 ~ 6.5V Single Supply Operation
- Available EMSOP8 package.

APPLICATIONS

- USB Charger
- USB Ports/Hubs
- Set-Top Boxes

DESCRIPTION

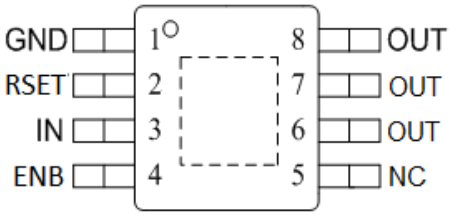
UC7441 is a 45mΩ adjustable current limited power switch intended for applications where heavy capacitive loads and short-circuits are likely to be encountered. These devices offer a programmable current-limit threshold between 1.0A and 4.0 A (typ) via an external resistor. The power-switch rise and fall times are controlled to minimize current surges during turn on/off.

UC7441 will enter hiccup mode when OUT voltage is less than 2.85V or OTSD. It can significant reduce the output current and reduce thermal effect to the system.

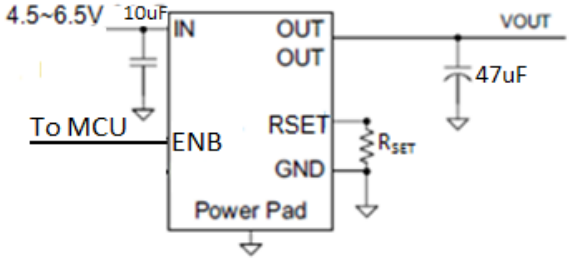
UC7441 devices limit the output current to a safe level by switching into a constant-current mode when the output load exceeds the current-limit threshold.

PACKAGE AND APPLICATION

UC7441
EMSOP8 Package



UC7441



ORDING INFORMATION

Part Number	Package Type	Package Qty	Op Temp(°C)	Mark
UC7441	EMSOP8	3000	-40~85	UC7441

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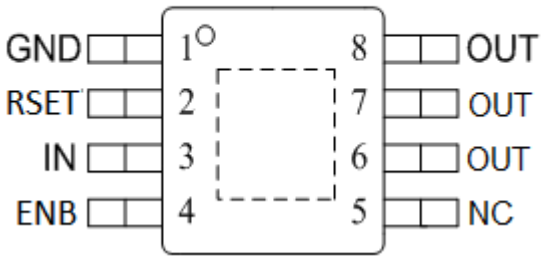
PINOUT

UC7441
EMSOP8 Package



PIN FUNCTIONS

NO.	NAME	TYPE(1)	DESCRIPTION
1	GND	G	Ground connection
2	RSET	I	External resistor used to set current-limit threshold;
3	IN	P/I	Power supply/Input voltage connected to Power Switch; connect a 1 µF or greater ceramic capacitor from IN to GND as close to the IC as possible
4	ENB	I	Enable input, logic low turns on UC7441
5	NC	NC	No Connected;
6,7,8	OUT	O	Power-switch output, connected to VBUS of USB; connect a 22µF or greater ceramic capacitor from OUT to GND as close to the IC as possible; These pins need to be shorted on PCB board;

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

ABSOLUTE MAXIMUM RATINGS (1)

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

PARAMETER		MIN	MAX	UNIT
Supply Voltage Range	IN, OUT, RSET, ENB	-0.3	7.0	V
ESD rating, Human Body Model (HBM)	IN, OUT, RSET, ENB		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}	EMSOP8 Package thermal impedance(1)	65	°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_{OUT}	Output voltage of OUT	4.5	6.5	
R_{SET}	Resistance of R_{SET}	18	100	kΩ
I_{OUT}	Continuous OUT current	1000	4000	mA
T_J	Operating Junction Temperature	-40	125	°C

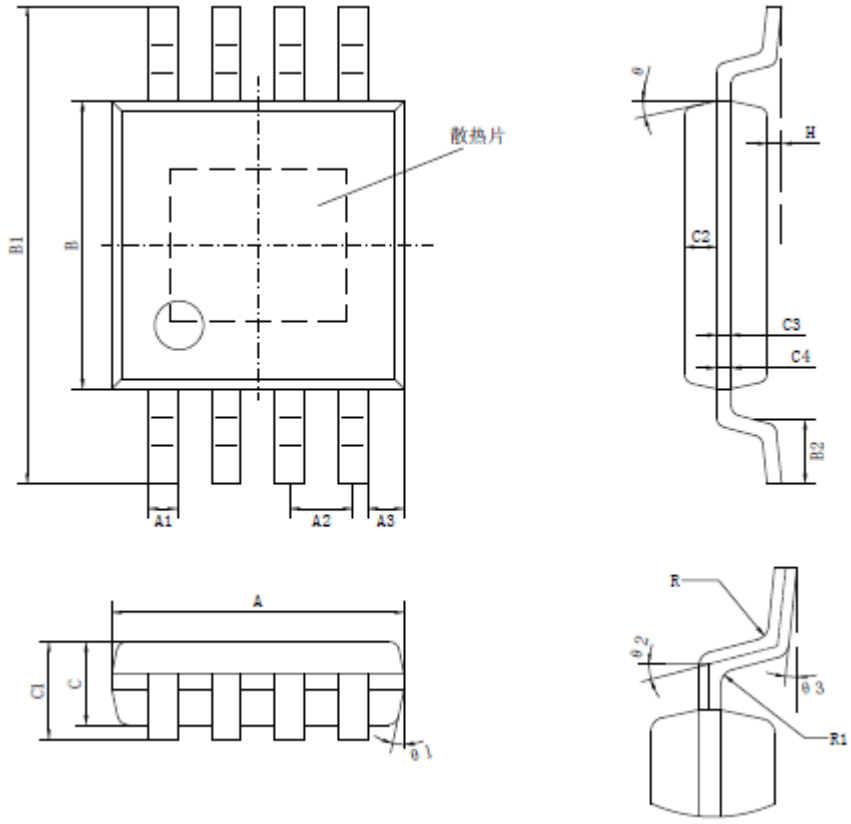
ELECTRICAL CHARACTERISTICS

Conditions are: TA = 25°C, VIN = 5.0 V, ENB = GND and RSET = 33.0 kΩ. 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_{DSON}	EMSOP8 Package	I_{OUT}=1A		45	68	mΩ
Tr	OUT voltage rise time	C_L = 1 μ F, R_L = 100 Ω,		1.73		ms
Tf	OUT voltage fall time			0.8		
Ton	OUT voltage turn-on time			2.48		
Toff	OUT voltage turn-off time			2.98		
Current Limit						
I_{OS}	OUT current limited	Rset=21.5k	2.40	2.70	3.00	A
		Rset=33.0k	1.56	1.76	1.96	
Enable Pin (ENB)						
V_{ENB}	ENB threshold voltage, falling		0.8	1.33	2.3	V
V_{ENB_HYS}	Hysteresis			150		mV
R_{PD}	Pull Down Resistor		200	290	380	kΩ
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			172		ºC
	Hysteresis			20		
UNDERVOLTAGE LOCKOUT						
V_{UVLO}	IN rising UVLO threshold voltage		3.75	3.95	4.15	V
	Hysteresis			100		mV
SUPPLY CURRENT						
I_{IN}	IN supply current	VIN=5.0V, ENB=0V		160	280	μA
I_{INL}	IN Disable Supply Current	VIN=ENB=5.0V		0	2	

PACKAGE INFORMATION

EMSOP8



尺寸 / 标注	最小(mm)	最大(mm)	尺寸 / 标注	最小(mm)	最大(mm)
A	2.90	3.10	C3	0.152	
A1	0.28	0.35	C4	0.15	0.23
A2	0.65TYP		H	0.02	0.15
A3	0.375TYP		θ	12° TYP4	
B	2.90	3.10	θ1	12° TYP4	
B1	4.70	5.10	θ2	14° TYP	
B2	0.45	0.75	θ3	0° ～ 6°	
C	0.75	0.95	R	0.15TYP	
C1	--	1.10	R1	0.15TYP	
C2	0.328TYP				
* 注：EMSOP8产品框架基岛尺寸为1.60X1.60，散热片尺寸为1.60X1.55（单位：mm）					