



ON Semiconductor

DN06043/D

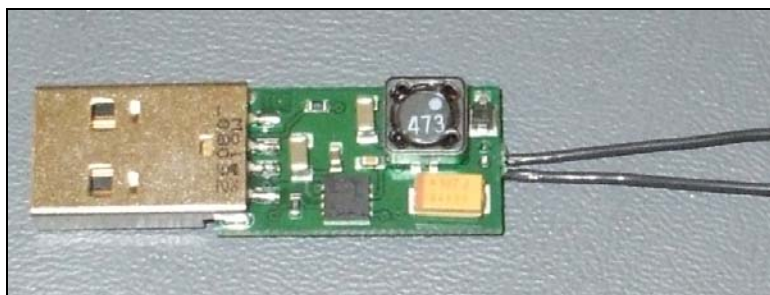
Design Note – DN06043/D USB to 6V 0.3A USB Charger

Device	Application	Input Voltage	Output Power	Topology	I/O Isolation
NCP3063	Consumer	4.5-5.5 V	1.8W	Zeta	Yes

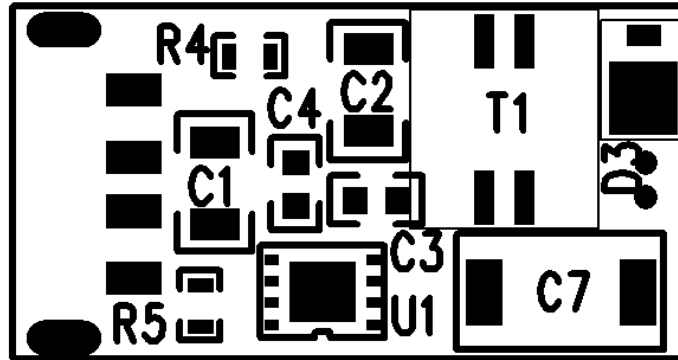
Characteristic	Min	Typ	Max	Unit
Output Voltage		6.0		V
Output Current		0.3	0.7	A
Oscillator Frequency		250		kHz
Output Voltage Ripple		100		mVpk-pk
Load Regulation ($V_{in} = 5V, I_{out} = 0.0 - 0.3A$)		0.7		%
PCB Dimensions	13mm X 25mm x 0.4mm			

Circuit Description

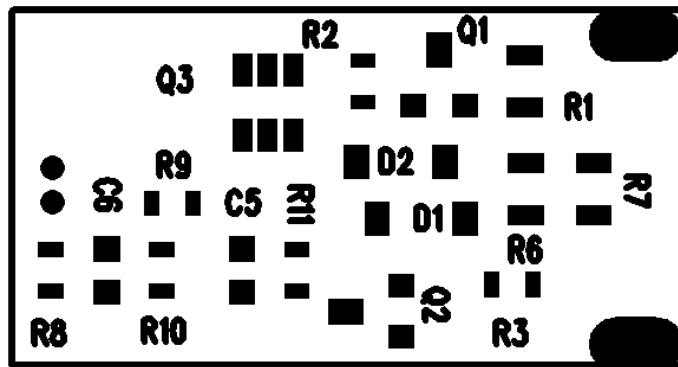
This circuit is design to operate as a non inverting Buck-Boost (Zeta Topology) producing a fixed voltage 6.0V output from a standard USB output. It provides a maximum of 0.3A. The current limit circuit operates at loads higher than 0.3A and is compliant with the USB 2.5W maximum power draw. All devices are less than 45degC at ambient temperature. This design utilizes the NCP3063 DFN Device with slope compensation to reduce burst mode ripple effects.



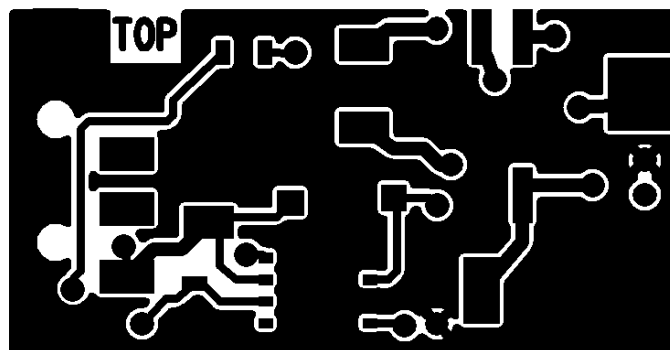
PCB Details



Top Device

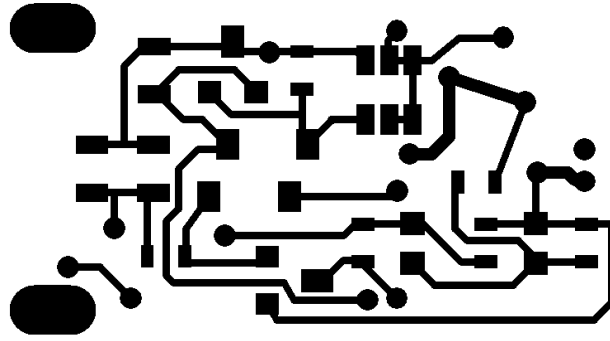


Bottom Device (Viewed from Back)



Top Metal

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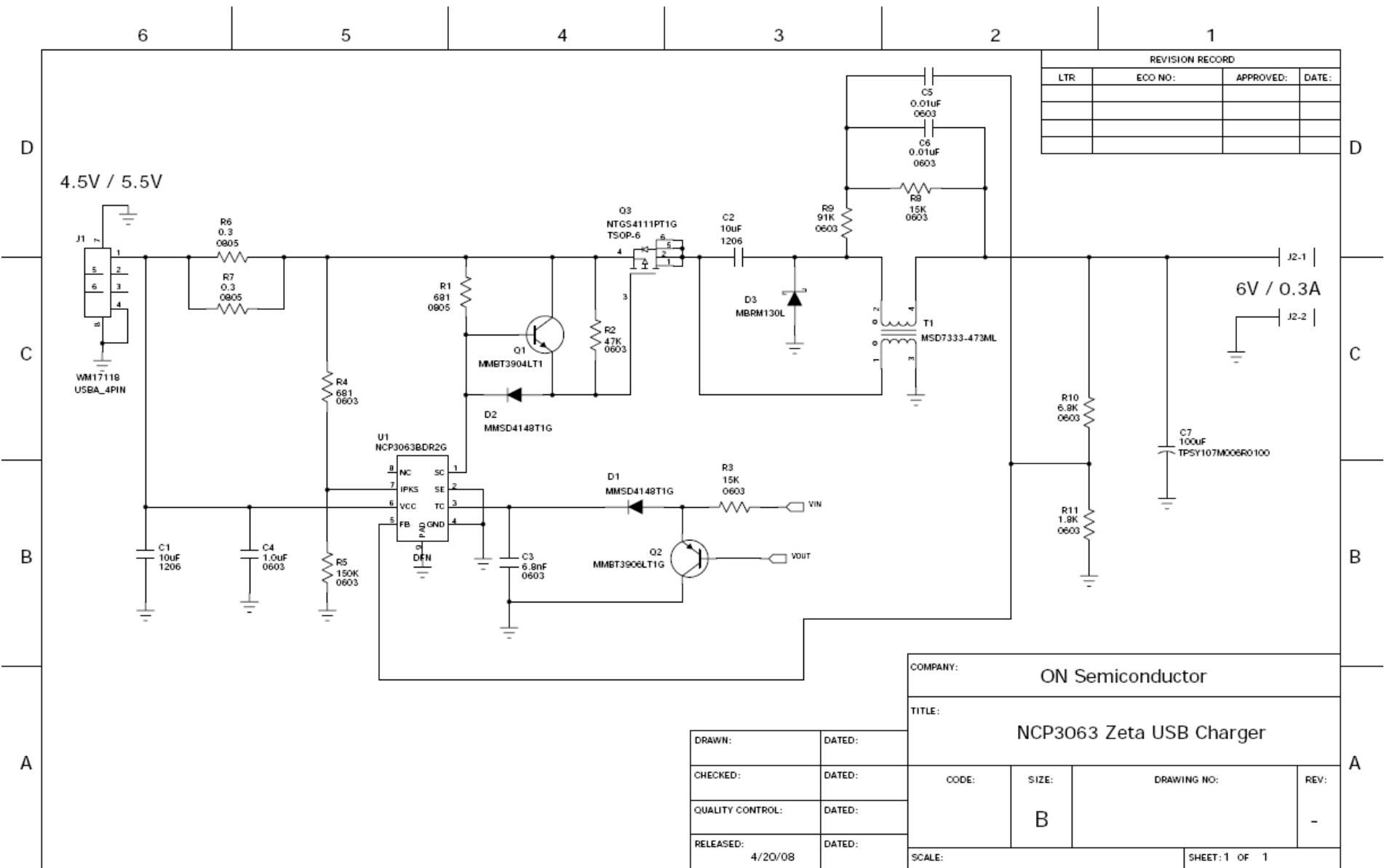


Bottom Metal

Gerber Files available upon request

Rev 0 - June, 2008

DN06043/D



REVISION RECORD			
LTR	ECO NO:	APPROVED:	DATE:

COMPANY:				ON Semiconductor			
TITLE:				NCP3063 Zeta USB Charger			
CODE:	SIZE:	DRAWING NO:		REV:	-		
	B						
SCALE:				SHEET: 1 OF 1			

DRAWN:	DATED:
CHECKED:	DATED:
QUALITY CONTROL:	DATED:
RELEASED:	DATED:
	4/20/08

Schematic

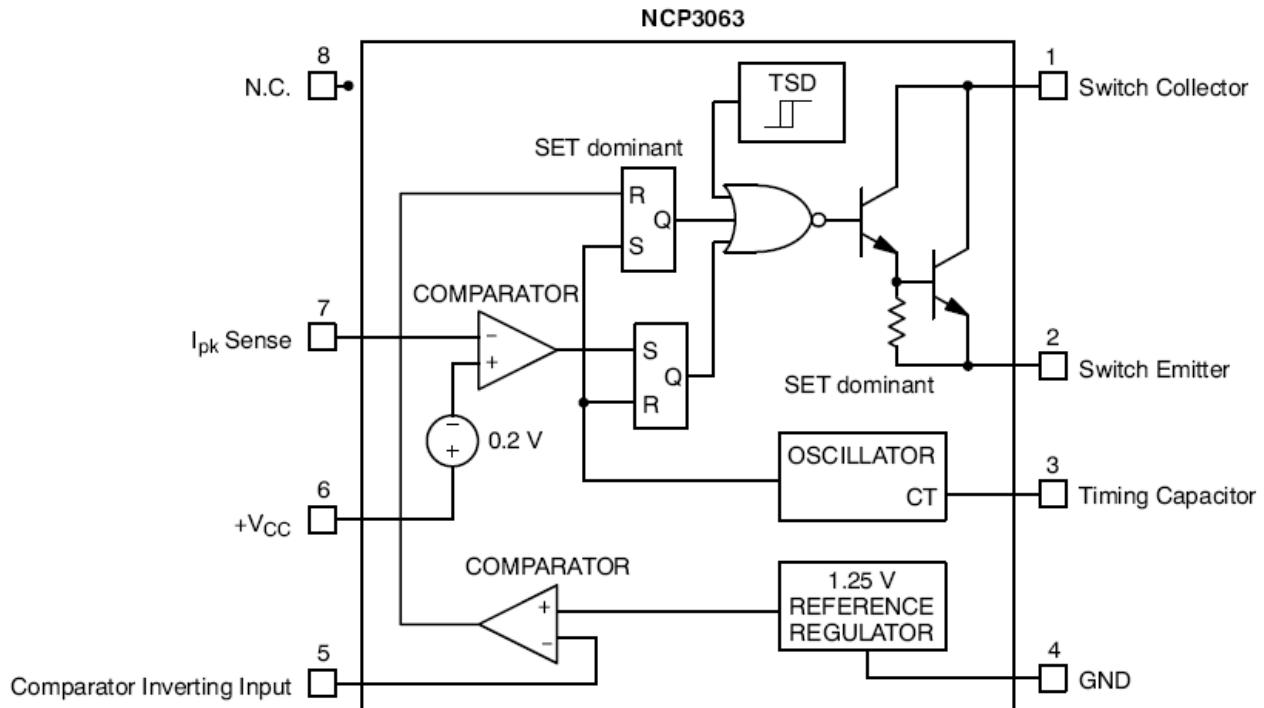
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QTY	REF	VALUE	DESCRIPTION	
2	C5-6	0.01uF	CAP_0603,0.01uF	Ceramic Chip Capacitor
1	C4	1.0uF	CAP_0603,0.1uF	Ceramic Chip Capacitor
1	C3	6.8nF	CAP_0603,6.8nF	Ceramic Chip Capacitor
2	C1-2	10uF	CAP_1206,10uF	Ceramic Chip Capacitor
1	D3	1A; 100V	MBRM130L,1A; 100V	Schottky Power Rectifier
1	Q2	PNP	MMBT3904,PNP	General Purpose NPN Transistor
1	Q1	PNP	MMBT3904LT1,PNP	General Purpose NPN Transistor
2	D1-2	100Vr	MMSD4148T1_SOD-123,100Vr,N/A	Switching Diode
1	T1	47uH	MSD7333-473ML	Coupled Inductor - Coilcraft
1	Q3		NTGS4111P	PFET
1	R11	1.8K	RES0603,1.8K	SURFACE MOUNT RESISTOR 0.031 X 0.061 INCHES, 1/10W
1	R8	15K	RES0603,15K	SURFACE MOUNT RESISTOR 0.031 X 0.061 INCHES, 1/10W
1	R10	6.8K	RES0603,6.8K	SURFACE MOUNT RESISTOR 0.031 X 0.061 INCHES, 1/10W
1	R9	91K	RES0603,91K	SURFACE MOUNT RESISTOR 0.031 X 0.061 INCHES, 1/10W
1	R5	150K	RES_0603,150K,±1.0%	Resistor
1	R3	15K	RES_0603,15K,±1.0%	Resistor
1	R2	47K	RES_0603,47K,±1.0%	Resistor
1	R4	681	RES_0603,680,±1.0%	Resistor
2	R6-7	0.3	RES_0805,0.3,±1.0%	Resistor
1	R1	681	RES_0805,680,±1.0%	Resistor
1	J2		SIP-2P-MICRO	GENERIC 2 PIN SIP HEADER .100 CENTERS
1	C7	100uF	TPSY107M006R0100,100uF	Tantalum Capacitor
1	J1	NA	WM17118	Molex USB Connector
1	U1	40 V 1.5A	NCP3063BDR2G	1.5 A, 150 kHz Switching Regulator

Bill of Materials

Block Diagram - NCP3063



PIN DESCRIPTION

Pin No.	Pin Name	Description
1	Switch Collector	Internal Darlington switch collector
2	Switch Emitter	Internal Darlington switch emitter
3	Timing Capacitor Oscillator Input	Timing Capacitor
4	GND	Ground pin for all internal circuits
5	Comparator Inverting Input	Inverting input pin of internal comparator
6	V _{CC}	Voltage Supply
7	I _{pk} Sense	Peak Current Sense Input to monitor the voltage drop across an external resistor to limit the peak current through the circuit
8	N.C.	Pin Not Connected
Exposed Pad	Exposed Pad	The exposed pad beneath the package must be connected to GND (Pin 4). Additionally, using proper layout techniques, the exposed pad can greatly enhance the power dissipation capabilities of the NCP3063.

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Performance Information

The following Figures show typical measured performance of the NCP3063 in this evaluation board

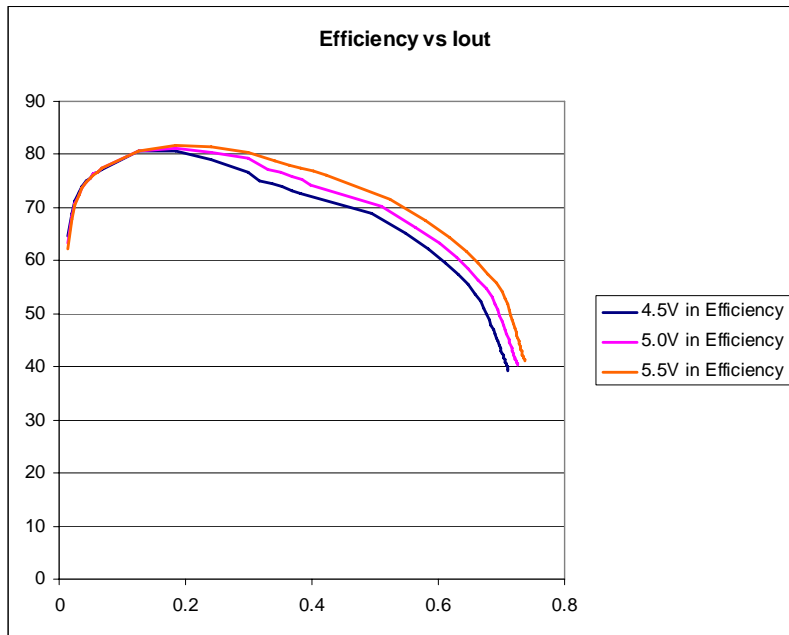


Figure 1 –Efficiency vs Load Current

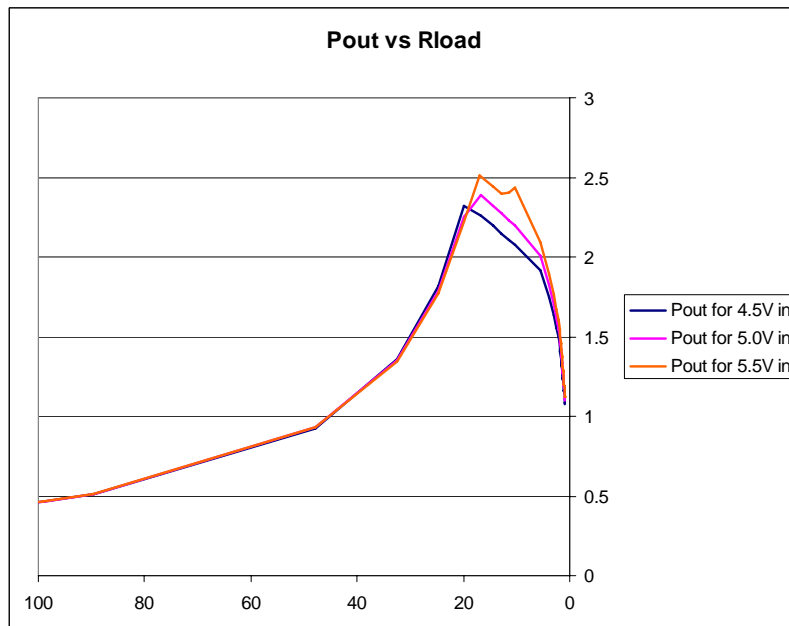


Figure 2 – Output Power vs Load Resistance

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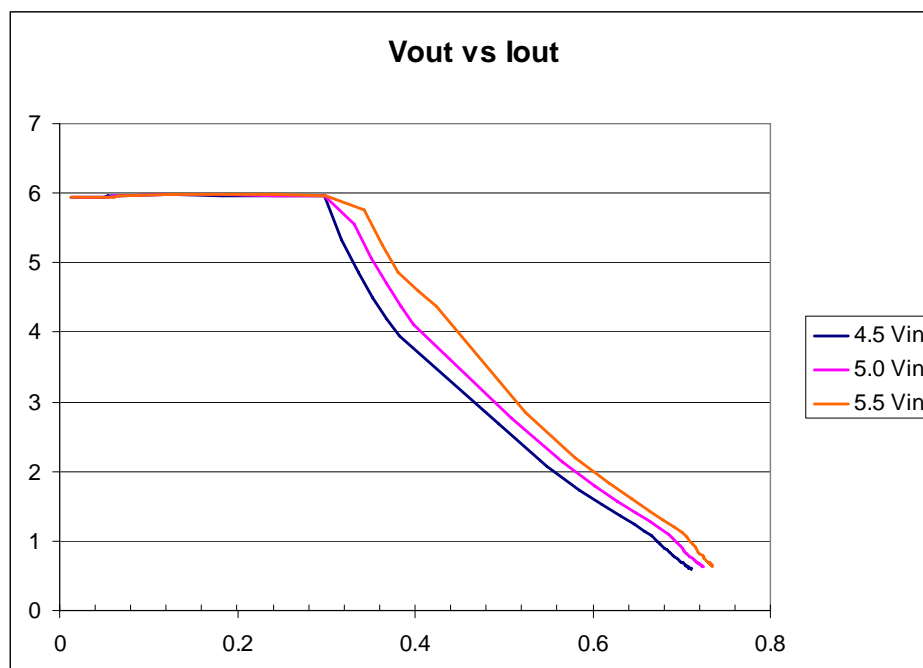


Figure 3 – Output Voltage vs Output Current

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