



1.0 Design Specifications

Inputs	Outputs #1
VinMin=4.0 V	Vout1=5.0 V
VinMax=9.0 V	Iout1=0.6 A

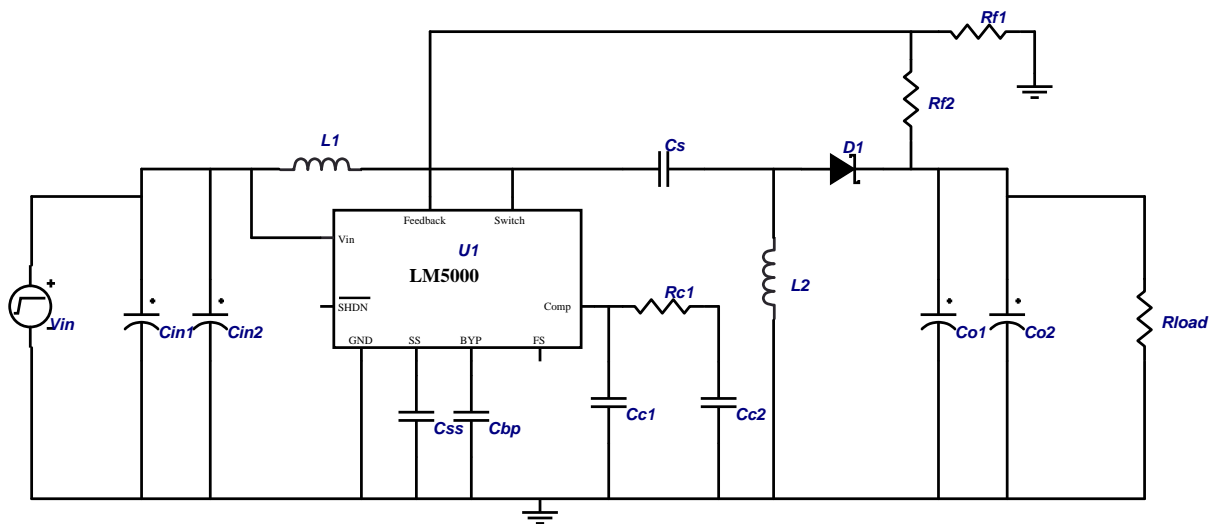
2.0 Design Description

The LM5000 is used to design a SEPIC power supply with a positive input voltage rail that can go above or below output voltage rail. The LM5000 is a PWM regulator with internal FET switch which minimizes parts count and simplifies design. Typically the SEPIC architecture is used in order to take advantage of easily available inductors rather than less available transformers used for similar applications with flyback architecture.

During the ON-time of the switch the input voltage charges the L1 inductor. The negative voltage, relative to ground,

across the SEPIC capacitor Cs charges the inductor L2. During the switch OFF-time both inductors discharge through D1 to the output. It is the average of this pulsed discharge current that forms the output load current and charges the output capacitors to the required voltage. Capacitor C_{SS} controls the softstart time and C_{bp} is used for bypassing purposes. Minimal ceramic capacitance, C_{in1} and C_{in2}, is required on the input, while output capacitance is typically larger (C_{o2} is 470uF) due to the pulsed nature of the output current waveform. Transient compensation for the power supply loop is accomplished via the resistor and capacitor combination at the COMP pin of the regulator.

3.0 Schematic



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FIGURE 1. Example Schematic Showing Connection for all Components.

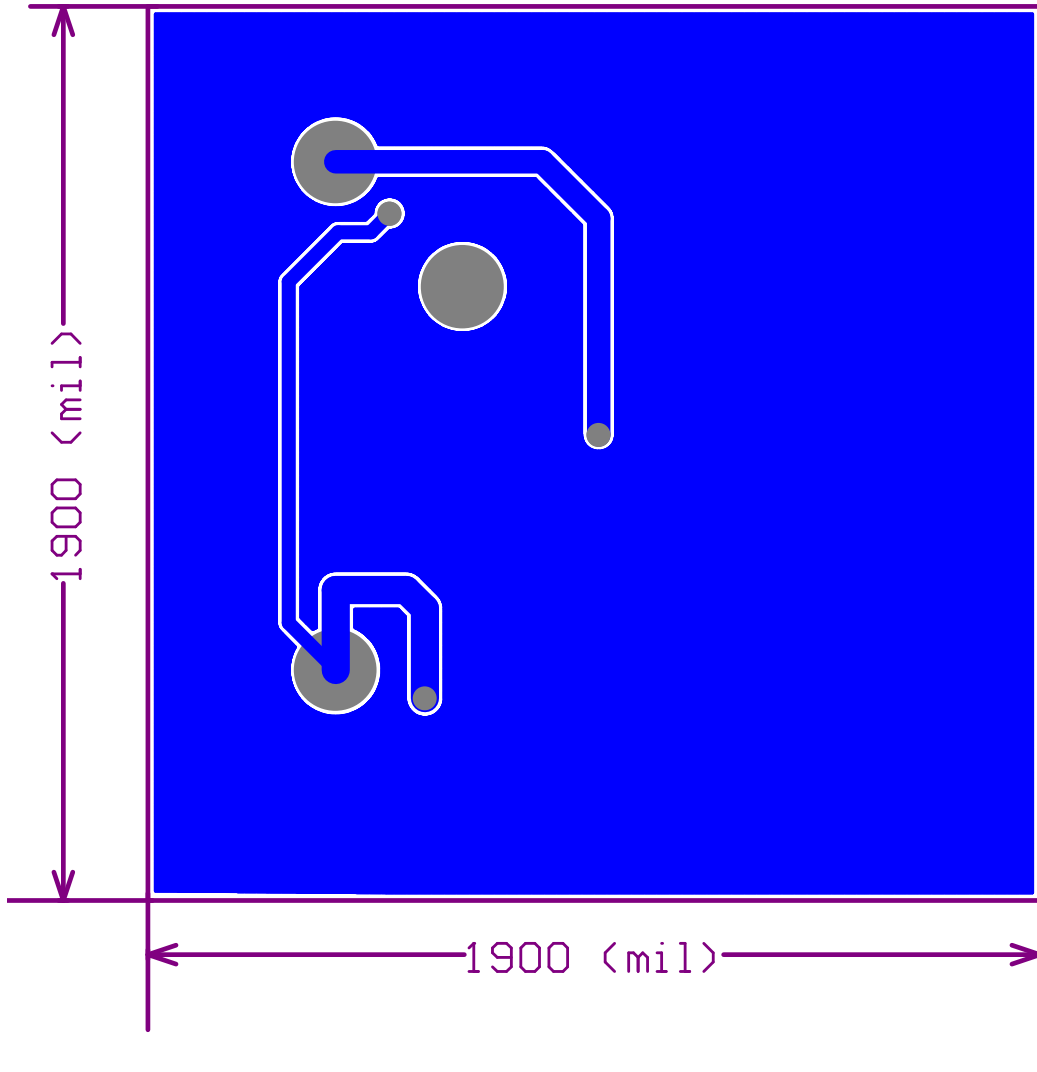
4.0 Bill Of Materials

Part	Manufacturer	Part#	Attributes
Cbp	Vishay	VJ0805Y104KXXAT	0.1u F
Cc1	Vishay	VJ0805A101KXXAT	100p F
Cc2	Vishay	VJ0805Y103KXXAT	0.01u F
Cin1	TDK	C3225X5R1C106	10u F, 1m Ohms
Cin2	Vishay	VJ0805Y104KXXAT	0.1u F

Part	Manufacturer	Part#	Attributes
Co1	TDK	C3216X5R0J106	10u F
Co2	Sanyo	16MV470WG	470u F, 0.11 Ohms
Cs	TDK	C3216X5R0J106	10u F
Css	Vishay	VJ0805Y104KXXAT	0.1u F
D1	ONSEMI	MBRA120	0.34 V
L1	Coilcraft	DO3316P-223	22.0u H, 0.05 Ohms
L2	Coilcraft	DO3316P-223	22.0u H, 0.05 Ohms
Rc1	Vishay	CRCW08051002FRT6	10k Ohms
Rf1	Vishay	CRCW08051002FRT6	10k Ohms
Rf2	Vishay	CRCW08053012FRT6	30.1k Ohms
U1	National Semiconductor	LM5000	

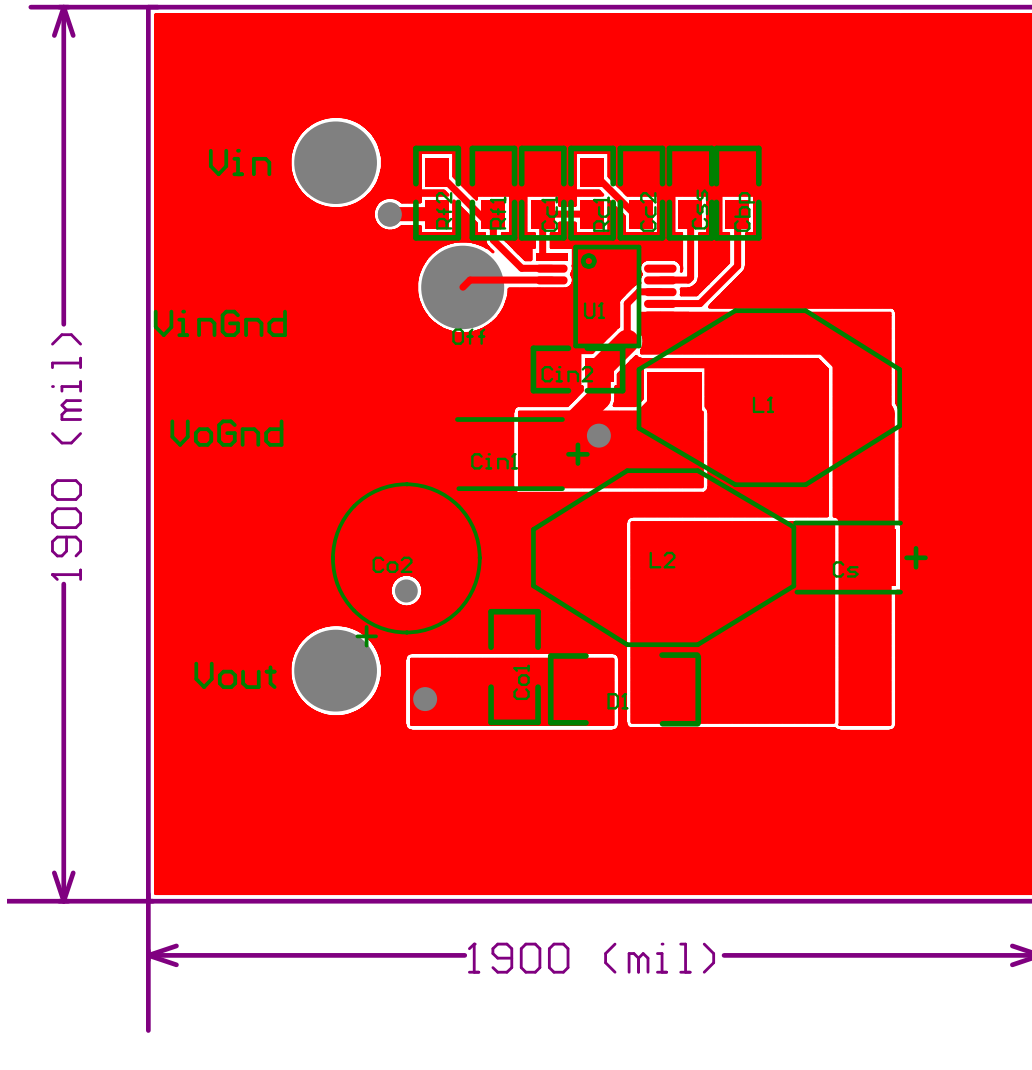
5.0 Layout

LM5000



PADC_NSC0228_lo_1

FIGURE 2. Board's Bottom View



PADC_NSC0228_1o_2

FIGURE 3. Board's Top View

Notes

Notes

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