

LMZ10504 5.5V Vin 4A Iout Simple Switcher Module Reference Design Package

National Semiconductor
RD-181
Performance Power Applications
February 4, 2010



1.0 Design Specifications

Inputs	Output #1
VinMin=2.95V	Vout1=2.5V
VinMax=5.5V	Iout1=4A

2.0 Design Description

The LMZ1050x SIMPLE SWITCHER power module is a complete, easy-to-use DC-DC solution capable of driving up to 3A, 4A, or 5A load with exceptional power conversion efficiency, output voltage accuracy, line and load regulation. The LMZ1050x is available in an innovative package that enhances thermal performance and allows for hand or machine soldering.

There are 2 designs presented in this Board Support Package. The Demonstration Board is configured in a low cost, high volume manufacturing design. The Evaluation Board design is designed for easy access to all of the circuits.

The Demonstration Design is in 2 layers, components on both side. The small signal components using 0603 footprints are located on the reverse side.

The Evaluation Board is designed to demonstrate low conducted noise on the input and output lines. Four input capacitors (Cin1 - Cin4) and three output capacitors (Co1 - Co3) are populated for this purpose. All the input and output filter capacitors are not necessary to comply with radiation standards. A circuit example that passes radiated emissions standards (EN55022, class B) is also presented. Additionally, a capacitor is present to reduce the resonance of the input line produced by the inductance and resistance in the cables connecting the bench power supply to the evaluation board design and the input capacitors.

The source files for both of these designs are included in the available design zip file, in Altium Designer format. The zip file also includes the BOMs in spreadsheet format, GERBER output, PDF schematic, PDF assembly drawing, and PDF view of the PCB itself.

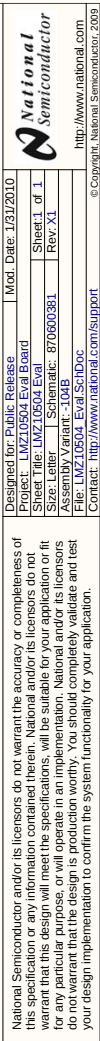
The LMZ10504 Evaluation Board App Note can be downloaded at <http://www.national.com/an/AN/AN-2022.pdf>

The Quick Start Guide for the LMZ10504 Demo Board can be downloaded at <http://www.national.com/an/AN/AN-2030.pdf>

3.0 Features

- Integrated on chip shielded inductor
- 2.5V output voltage (easy to change via 2 resistors)
- Flexible startup sequencing using external soft-start, tracking, and precision enable
- Protection against in-rush currents and faults such as input UVLO and output short-circuit
- -40°C to +125°C junction temperature operating range
- Single exposed pad and standard pinout for easy mounting and manufacturing
- Fully enabled for WEBENCH® Power Designer

FIGURE 1. LMZ10504 Eval Board Schematic



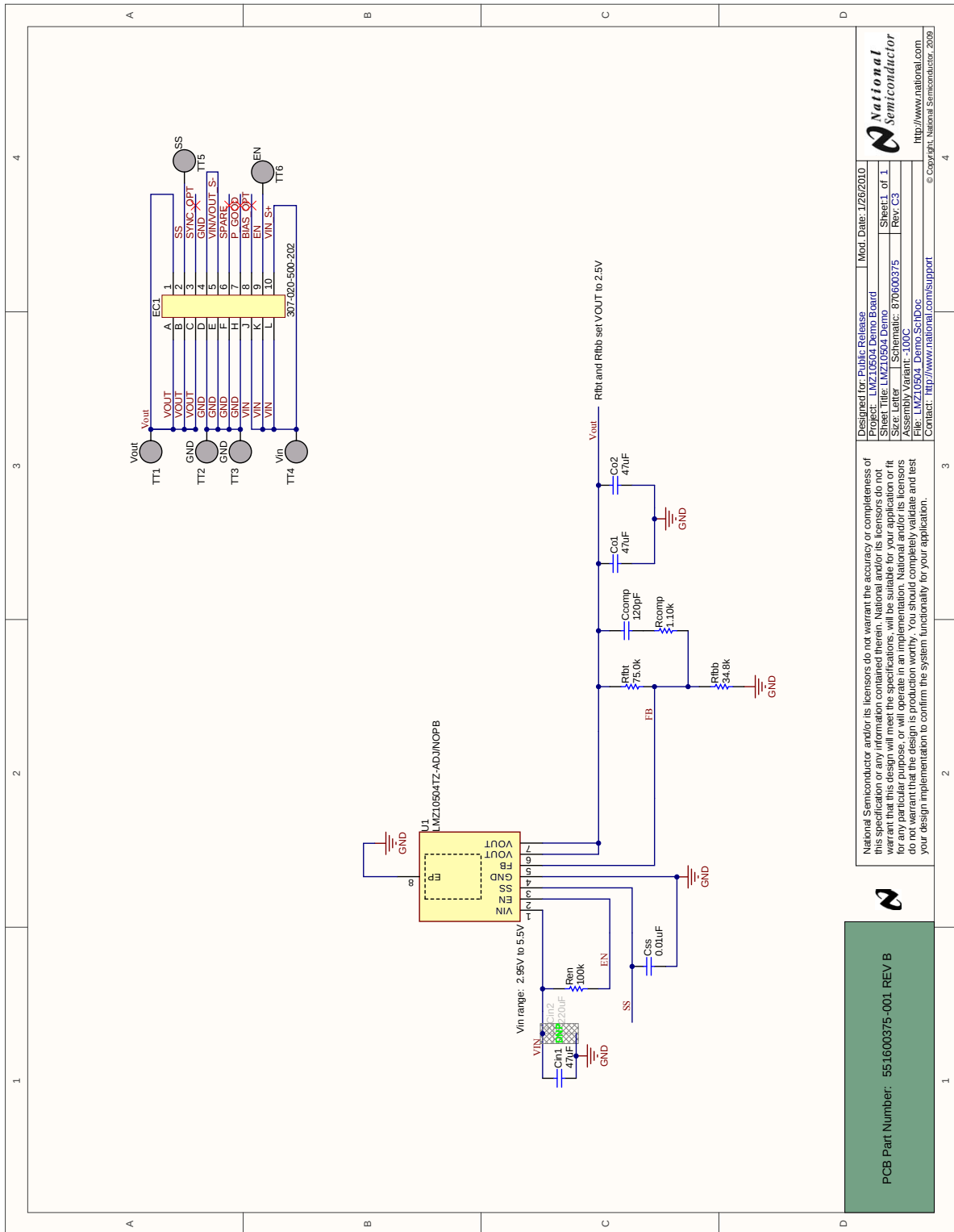


FIGURE 2. LMZ10504 Demo Board Schematic

5.0 Bill of Materials

Designator	Value	Package	Description	Manufacturer	Part Number	RoHS
AA		N/A	Printed Circuit Board	TBD		O
Ccomp	180pF	0603	Ceramic, C0G/NP0, 50V, 5%	TDK	C1608C0G1H181J	Y
Cin1	1uF	0805	Ceramic, X7R, 16V, 10%	TDK	C2012X7R1C105K	Y
Cin2, Co1	4.7uF	0805	Ceramic, X5R, 6.3V, 10%	TDK	C2012X5R0J475K	Y
Cin3, Co2	22uF	1210	Ceramic, X5R, 16V, 20%	TDK	C3225X5R1C226M	Y
Cin4	47uF	1210	Ceramic, X5R, 6.3V, 20%	TDK	C3225X5R0J476M	Y
Co3	100uF	1812	Ceramic, X5R, 6.3V, 20%	TDK	C4532X5R0J107M	Y
Css	0.01uF	0805	Ceramic, C0G/NP0, 50V, 5%	TDK	C2012C0G1H103J	Y
Rcomp	1.10k	0805	1%, 0.125W	Vishay-Dale	CRCW08051K10FKEA	Y
Rent	100k	0805	1%, 0.125W	Vishay-Dale	CRCW0805100KFKEA	Y
Rfbb	34.8k	0805	1%, 0.125W	Vishay-Dale	CRCW080534K8FKEA	Y
Rfbb	75.0k	0805	1%, 0.125W	Vishay-Dale	CRCW080575K0FKEA	Y
TT1, TT2, TT3, TT4	GND, Vin, Vout		Terminal, Turret, TH, Double	Keystone Electronics	1503-2	Y
TT5, TT6	EN, Vtrk		Terminal, Turret, TH, Double	Keystone Electronics	1593-2	Y
U1			4A, SIMPLE SWITCHER® Power Module with 5.5V Maximum Input	National Semiconductor	LMZ10504TZ/NOPB	Y

FIGURE 3. LMZ10504 Eval Board Bill of Materials - Non-populated parts are not listed.

Designator	Value	Package	Description	Manufacturer	Part Number	RoHS
AA		N/A	Printed Circuit Board	TBD		O
Ccomp	120pF	0603	Ceramic, C0G/NP0, 50V, 5%	TDK	C1608C0G1H121J	Y
Cin1, Co1, Co2	47uF	1210	Ceramic, X5R, 6.3V, 20%	TDK	C3225X5R0J476M	Y
Css	0.01uF	0603	Ceramic, C0G/NP0, 25V, 5%	TDK	C1608C0G1E103J	Y
Rcomp	1.10k	0603	1%, 0.1W	Vishay-Dale	CRCW06031K10FKEA	Y
Ren	100k	0603	1%, 0.1W	Vishay-Dale	CRCW0603100KFKEA	Y
Rfbb	34.8k	0603	1%, 0.1W	Vishay-Dale	CRCW060334K8FKEA	Y
Rfbt	75.0k	0603	1%, 0.1W	Vishay-Dale	CRCW060375K0FKEA	Y
TT1, TT2, TT3, TT4	GND, Vin, Vout		Terminal, Turret, TH, Double	Keystone Electronics	1503-2	Y
TT5, TT6	EN, SS		Terminal, Turret, TH, Double	Keystone Electronics	1593-2	Y
U1		TZA07A	4A, SIMPLE SWITCHER® Power Module with 5.5V Maximum Input	National Semiconductor	LMZ10504TZ-ADJ/NOPB	Y

bom1

FIGURE 4. LMZ10504 Demo Board Bill of Materials - Non-populated parts are not listed.

6.0 Board Photos



boardphoto

FIGURE 5. LMZ10504 Demo Board, Top View



boardphoto1

FIGURE 6. LMZ10504 Demo Board, Bottom View

Notes

National Semiconductor's design tools attempt to recreate the performance of a substantially equivalent physical implementation of the design. Reference designs are created using National's published specifications as well as the published specifications of other device manufacturers. While National does update this information periodically, this information may not be current at the time the reference design is built. National and/or its licensors do not warrant the accuracy or completeness of the specifications or any information contained therein. National and/or its licensors do not warrant that any designs or recommended parts will meet the specifications you entered, will be suitable for your application or fit for any particular purpose, or will operate as shown in the simulation in a physical implementation. National and/or its licensors do not warrant that the designs are production worthy. You should completely validate and test your design implementation to confirm the system functionality for your application.

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