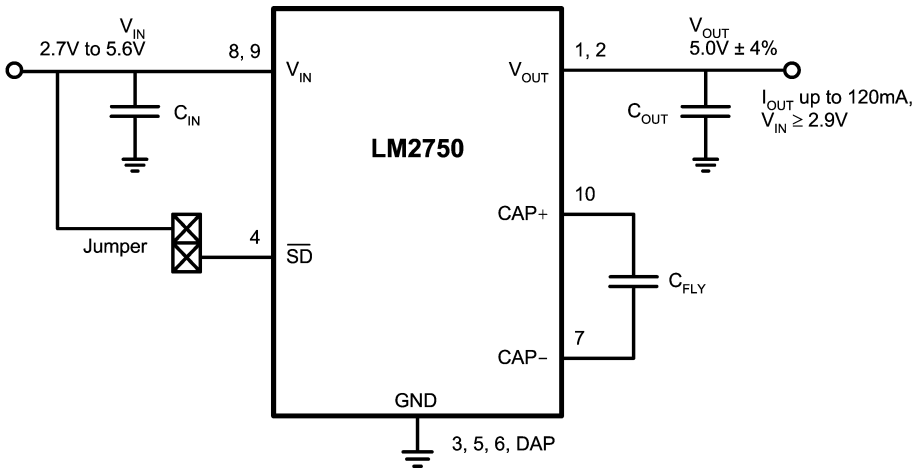
LM2750-5.0 Evaluation Board

National Semiconductor
Application Note 1269
October 2003

Evaluation Board Schematic



Components

I.C.

Part #	Package Mark I.D.	Package	Dimensions
LM2750-5.0	S002B	LLP10 (LDA10A)	3.0mm x 3.0mm x 0.8mm

CAPACITORS

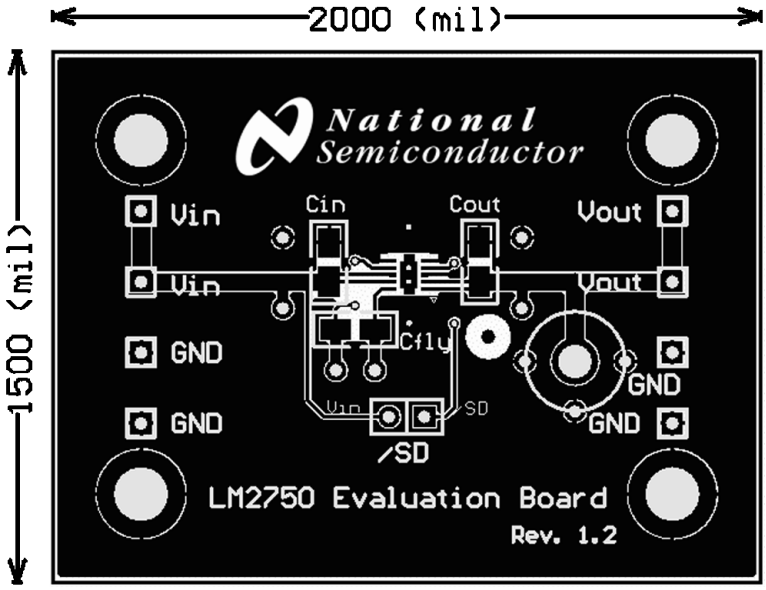
Capacitor Symbol	Value	Case Size U.S. (Metric)	Height	Temperature Characteristic	Mfr.	Part #
C_{IN}	2.2µF, 16V*	0805 (2012)	1.25mm	X5R	TDK	C2012X7R1C225K
C_{FLY}	1.0µF, 10V*	0603 (1608)	0.8mm	X5R	TDK	C1608X5R1A105K
C_{OUT}	2.2µF, 16V*	0805 (2012)	1.25mm	X5R	TDK	C2012X7R1C225K

* In order to meet LM2750 minimum capacitance requirements, 10V is the minimum recommended voltage rating for all capacitors. This elevated rating recommendation accounts for capacitace degradation due to DC bias, a common property of ceramic capacitors. For more information on capacitors, refer to the LM2750 datasheet.

MISCELLANEOUS

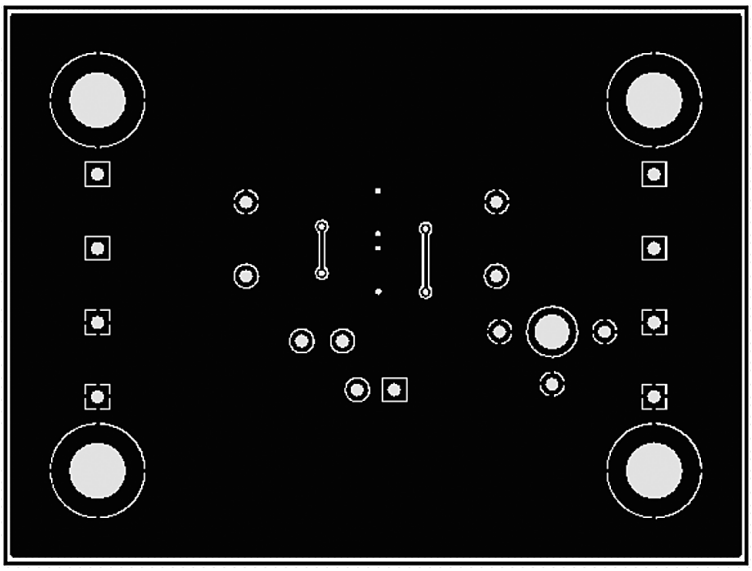
Item	Manufacturer	Part #
Oscilloscope Probe Tip Adapter	Tektronix	131-4353-00

Board Layers



20061801

Top Layer, Top View



20061802

Bottom Layer, Top View (unmirrored)

Ordering Information

Order #	Description
LM2750EVAL-5.0	LM2750LD-5.0 Evaluation Board

Part Description

The LM2750-5.0 is a switched-capacitor doubler that produces a low-noise, well regulated, 5.0V output. Regulation is guaranteed for output currents up to 120mA with a 2.9V to 5.6V input range, and also for output currents up to 40mA when the input voltage is as low as 2.7V. The LM2750 has been placed in National's 10-pin LLP, a package with excellent thermal properties that keeps the part from overheating under almost all rated operating conditions.

A perfect fit for space-constrained, battery-powered applications, the LM2750 requires only 3 external components: one input capacitor, one output capacitor, and one flying capacitor. Small, inexpensive ceramic capacitors are recommended for use. These capacitors, in conjunction with the 1.7MHz fixed switching frequency of the LM2750, yield low output voltage ripple, beneficial for systems requiring a low-noise 5V supply.

Pre-regulation minimizes input current ripple, reducing input noise to negligible levels. A tightly controlled soft-start feature limits inrush currents during part activation. Shutdown completely disconnects the load from the input. Output current limiting and thermal shutdown circuitry protect both the LM2750 and connected devices in the event of output shorts or excessive current loads.

Board Usage

INPUT

Connect the input and ground pins of the evaluation board to a power supply or battery with short, low-impedance, low-inductace wires or cables. The input voltage range of the LM2750-5.0 is 2.7V to 5.6V.

OUTPUT

The output voltage is guaranteed to be within 4% of 5.0V when the LM2750 is operated withing nominal operating ratings. Regulation is guaranteed for load currents as high as 120mA. The LM2750 is capable or driving load currents higher than 120mA. The LM2750 datasheet provides information on high load current usage, and datasheet curves illustrate the typical performance of the part with output currents as high as 175mA.

A scope probe tip adapter (Tektronix 131-4353-00) has been placed on the board to aid the measurement/observation of output voltage and output voltage ripple. Compatible with many different models of scope probes acorss several manufacturers, the adapter provides a very low-impedance connection to the evaluation board ground plane. This greatly reduces measurement noise spikes and associated ringing that are an artifact of the parasitic impedances of standard scope-probe alligator-clip grounding.

SHUTDOWN

A jumper is present on the evaluation board to bring the LM2750 in and out of shutdown. When the jumper is in place, the $\overline{SD}$ pin is connected to V_{IN}, and the part is operational.

Removing the jumper floats the $\overline{SD}$ pin. A 200kΩ resistor connected internally between the $\overline{SD}$ pin and GND pulls the voltage on the $\overline{SD}$ pin low. This places the LM2750 in shutdown.

References

LM2750 Product Folder and Datasheet:

http://www.national.com/pf/LM/LM2750.html

Application Note 1187 - Leadless Leadframe Package:

http://www.national.com/an/AN/AN-1187.html

Notes

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