*User's Guide*

# *LM2742 Buck Controller Evaluation Module User's Guide*

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## Trademarks

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# 1 Specifications of the Board

The LM2742 Evaluation board has been designed for a wide variety of components in order to show the flexibility of the LM2742 IC. The example design steps input voltages from 2.0 V to 13.2 V, down to 1.2 V, at 4 A, with a switching frequency of 500 kHz. This design can be modified by following the *Design Considerations* section of the *LM2742 N-Channel FET Synchronous Buck Regulator Controller for Low Output Voltages*d ata sheet. The board is four layers, consisting of signal/power traces on top and bottom, one internal ground plane, and an internal split power plane. All planes are 1-oz. copper, and the board is 62-mil FR4 laminate.

# 2 MOSFET Footprints

The LM2742 demo board has three footprints for single N-MOSFETs with SO-8 packages and standard pinouts. See Figure 2-1. Q1 is the high-side FET. Q2 and Q3 are connected in parallel for the low-side FET to accommodate higher currents when the circuit design uses low duty cycles. Q4 is a footprint for a dual N-MOSFET in SO-8 with a pinout shown in Figure 2-2.

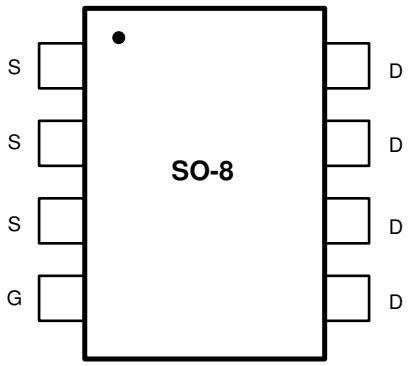



**Figure 2-1. Single N-MOSFETs with SO-8 Package**

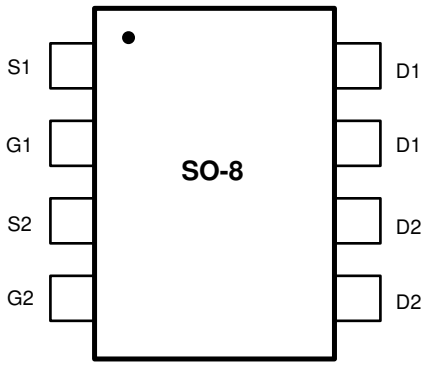



**Figure 2-2. Dual N-MOSFETs with SO-8 Package**

# 3 Low-Side Diode

A footprint D2 is available for a Schottky diode to be placed in parallel with the low-side FET. This can improve efficiency because a discrete Schottky will have a lower forward voltage than the low-side FET body diode. The footprint fits SMB size devices.

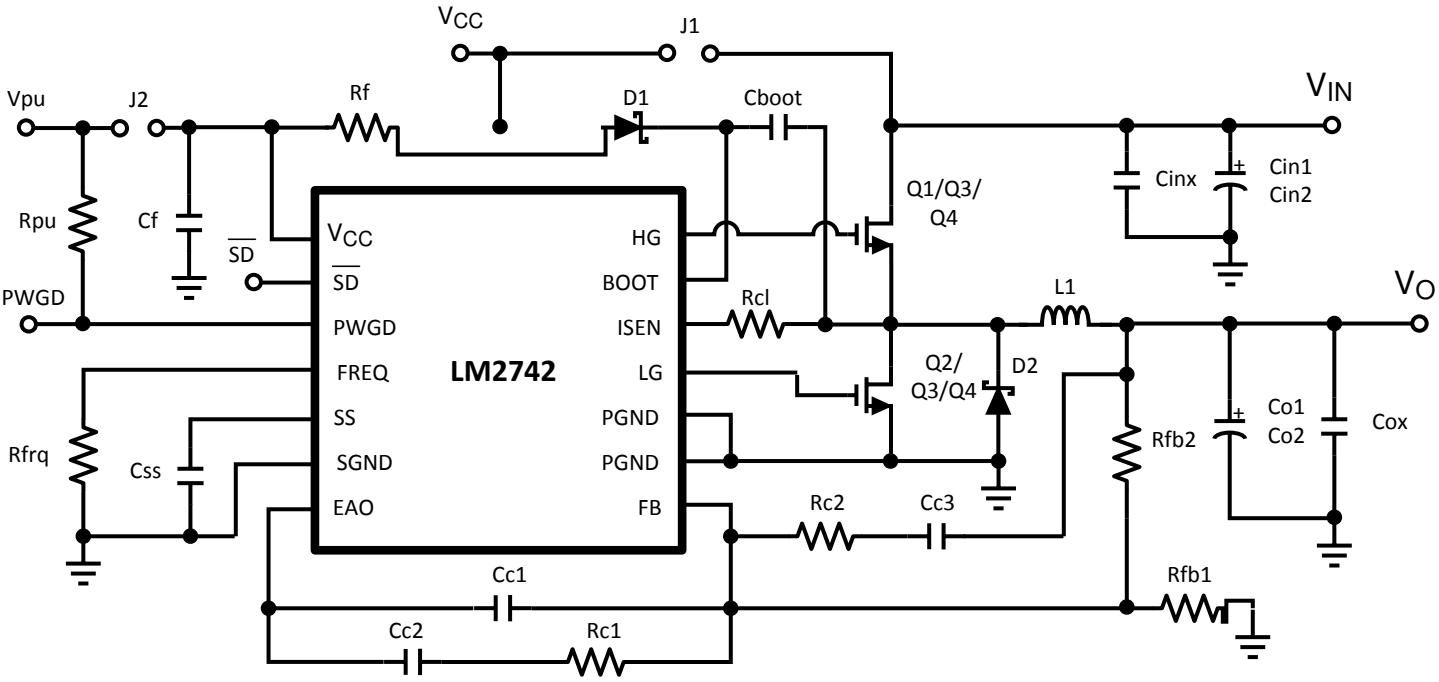
# 4 Additional Footprints

The 1206 footprints Rc2 and Cc3 are available for designs with more complex compensation needs. Jumper J1 can be stuffed with a 0-Ω resistor to connect the $V_{CC}$ pin of the LM2742 to the input voltage. This can only be done when the input voltage is 5 V ±10%. Jumper J2 connects the pullup resistor, Rpu, to $V_{CC}$. This is the recommended way to connect the power-good circuitry.

# 5 Use with Other ICs

The LM2742 IC shares the same pinout as the LM2727 and the LM2737. This evaluation board can also be used with those ICs.

## 6 Schematic




## 7 Bill of Materials

| ID | Part Number | Type | Size | Parameters | Qty | Vendor |
|---|---|---|---|---|---|---|
| U1 | LM2742 | Synchronous Controller | TSSOP-14 | | 1 | Texas Instruments |
| Q4 | Si4828DY | Dual Asymmetric N-MOSFET | SO-8 | 30 V<br>30-mΩ Top<br>18-mΩ Bottom | 1 | Vishay |
| Db | MBR0520 | Schottky Diode | SOD-123 | 20 V | 1 | ON |
| L1 | RLF7030T-2R2M5R4 | Inductor | 7.3 x 6.8 x 3.2mm | 2.2 µH, 5.4 A, 12 mΩ | 1 | TDK |
| Cin1 | C3225X5R1E106M | Capacitor | 1210 | 10 µF, 25 V, 3.3 Arms | 1 | TDK |
| Cinx,Cf | C3216X7R1E105K | Capacitor | 1206 | 1 µF, 25 V | 2 | TDK |
| Co1,Co2 | C3216X5R106M | Capacitor | 1206 | 10 µF, 6.3 V, 3 Arms | 2 | TDK |
| Css | VJ1206X123KXX | Capacitor | 1206 | 12 nF, 25 V | 1 | Vishay |
| Cc1 | VJ1206A221KXX | Capacitor | 1206 | 220 pF, 10% | 1 | Vishay |
| Cc2 | VJ1206X562KXX | Capacitor | 1206 | 5.6 nF, 10% | 1 | Vishay |
| Cc3 | VJ1206X122KXX | Capacitor | 1206 | 1.2 nF, 10% | 1 | Vishay |
| Rf | CRCW1206100J | Resistor | 1206 | 10 Ω, 5% | 1 | Vishay |
| Rfrq | CRCW12064992F | Resistor | 1206 | 49.9 kΩ, 1% | 1 | Vishay |
| Rc1, Rcl | CRCW12062431F | Resistor | 1206 | 2.43 kΩ, 1% | 1 | Vishay |
| Rc2, J1 | CRCW1206000Z | Resistor | 1206 | 0 Ω | 1 | Vishay |
| Rfb1,Rfb2 | CRCW12064871F | Resistor | 1206 | 10 kΩ, 1% | 2 | Vishay |

# 8 PCB Layout

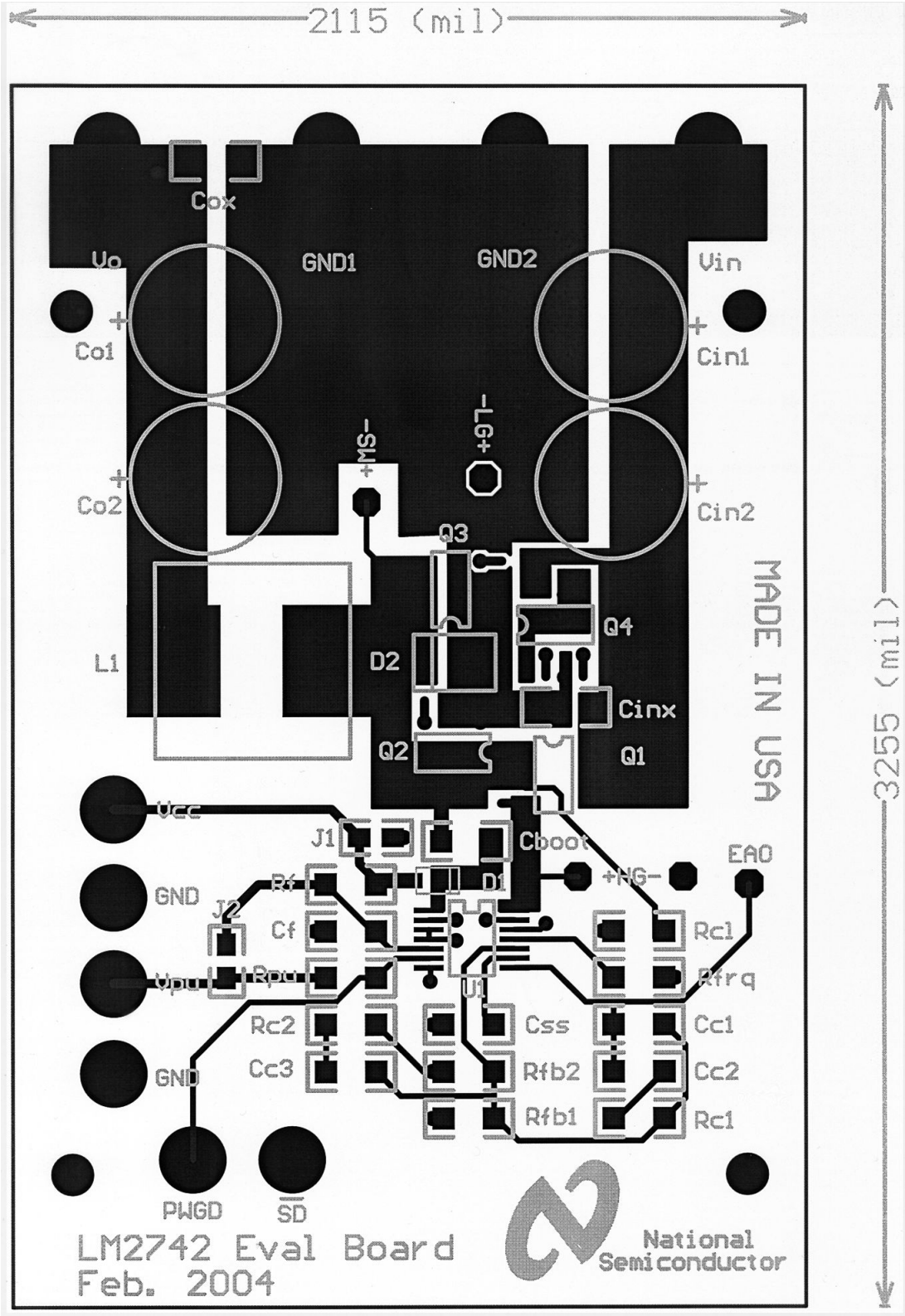



**Figure 8-1. Top Layer and Top Overlay**

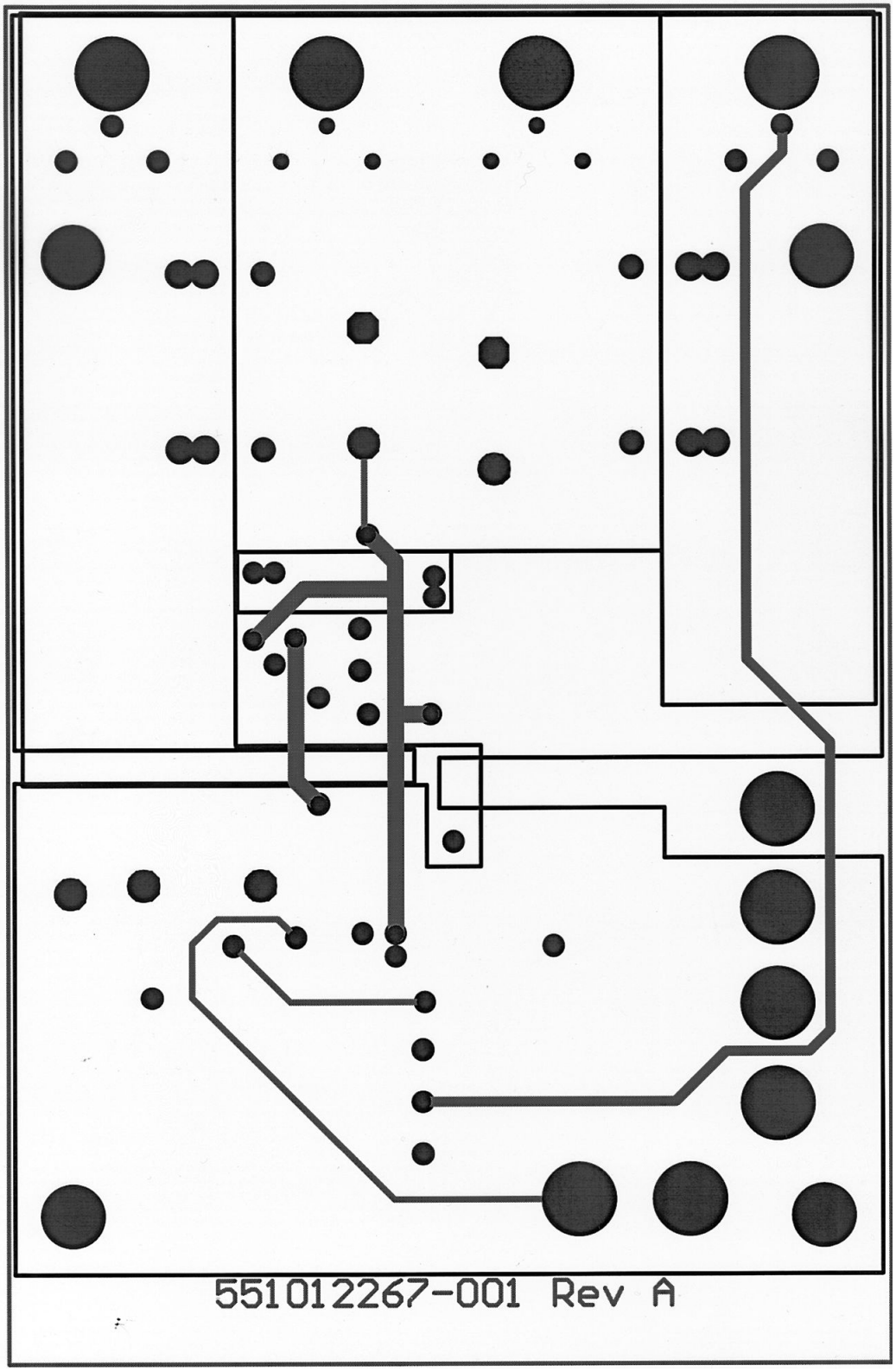



**Figure 8-2. Bottom Layer and Internal Power Plane**

# 9 Revision History

NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

| Changes from Revision A (May 2013) to Revision B (January 2022) | Page |
|---|---|
| • Updated the numbering format for tables, figures, and cross-references throughout the document. | 2 |
| • Updated the user's guide title | 2 |

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