LM3242 DSBGA Evaluation Board

1   Introduction

The LM3242 evaluation board is a working demonstration of an adjustable step down DC-DC converter optimized for powering RF power amplifiers (PAs) from a single Lithium-Ion cell. Output voltage is set using a VCON analog input for controlling power levels and efficiency of the RF PA.
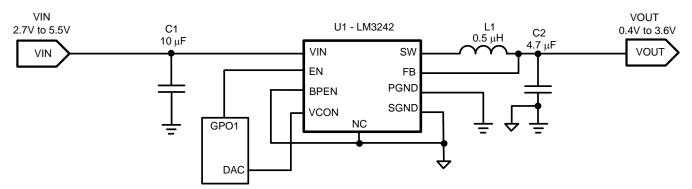
2   Operating Conditions

The device will operate under the following conditions:

- V_{IN} range: 2.7V to 5.5V
- V_{OUT} range: 0.4V to 3.6V
- VCON range: 0.16V to 1.44V
- V_{OUT} equation: $V_{OUT} = 2.5 \times VCON$
- I_{OUT} range: 0 mA to 750 mA

3   Package

The LM3242 is available in a 9-bump (0.4 mm pitch) lead-free DSBGA (1.355 mm x 1.48 mm x 0.6 mm) package. The total solution size of the LM3242 and external components is ≈ 7.1 mm^2.

4   Typical Application Circuit

5   Bill of Materials (BOM) For Typical Configurations

Table 1. Bill of Materials (BOM) [1]

Designator	Model	Description	Manufacturer
C1	CL05A106MQ5NUNC	10 µF, 6.3V, 0402	Samsung
C2	CL05A475MQ5NRNC	4.7 µF, 6.3V, 0402	Samsung
L1	MIPSZ2012D0R5M	0.5 µH, 2.0 x 1.2 x 1.0 mm	FDK
C4	GRM32ER60J107ME	100 µF, 6.3V, 1210	Murata
U1	LM3242	Buck DC/DC Converter	Texas Instruments

[1] If the battery voltage source is not on the same PC board as the LM3242, you should employ a 100 µF ceramic cap between VIN and GND terminals of the board to reduce effects of wire impedance. If considering use of the LM3242 in a system design, see the *PCB Board Layout Considerations* section of the *LM3242 6MHz, 750mA Miniature, Adjustable, Step-Down DC-DC Converter With Auto Bypass for RF Power Amplifiers Data Sheet* (SNOSB48). For a list of additional recommended external components, see the *LM3242 6MHz, 750mA Miniature, Adjustable, Step-Down DC-DC Converter With Auto Bypass for RF Power Amplifiers Data Sheet* (SNOSB48).
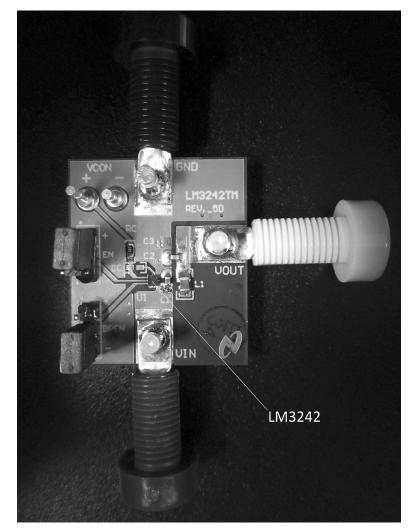
6   Evaluation Board Layout

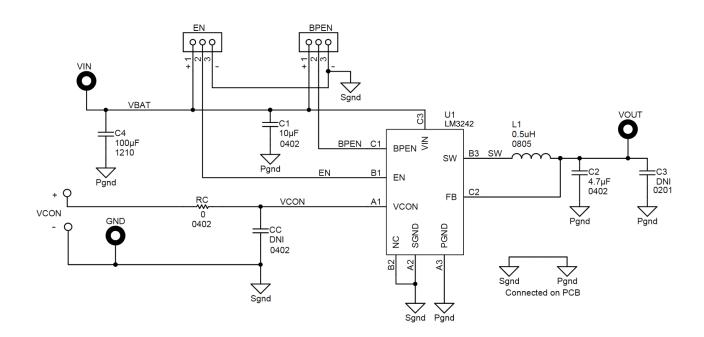**Figure 1. LM3242 Evaluation Board**

Figure 2. LM3242 Evaluation Board Schematic

7   Power Up Sequence

1. Ensure EN jumper at "EN/-" and BPEN jumper at "BPEN/-" positions prior to powering the evaluation board.
2. Power up VIN (within the range of 2.7V to 5.5V).
3. Set VCON for VOUT = 2.5 x VCON (within the specification of V_{OUT} = 0.4V to 3.6V)

    (a) Example: VCON = 1.0V will give the result of V_{OUT} = 2.5 x 1.0V = 2.5V.
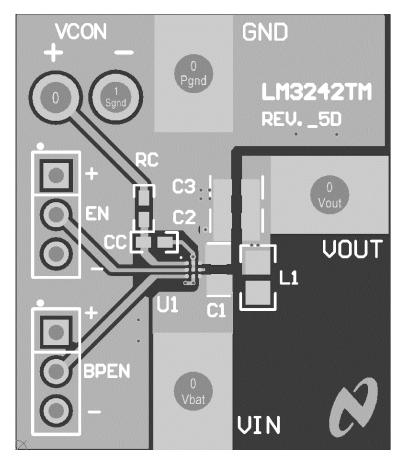4. Set EN jumper to "+/EN".
5. Measure V_{OUT}.

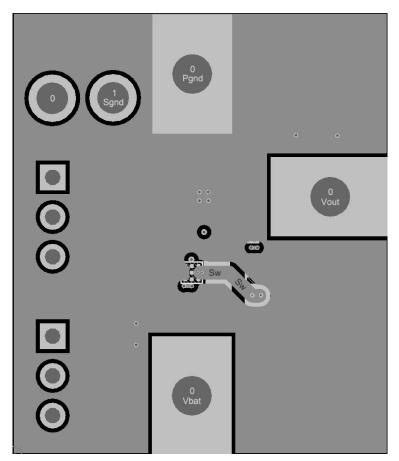**Figure 3. Top Layer: All Components on Top Layer**

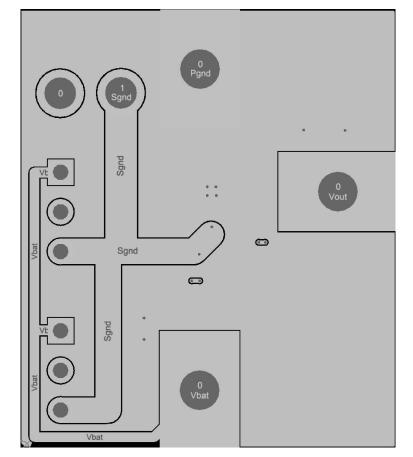**Figure 4. Mid Layer 1: Switching Path and Power Ground Plane**

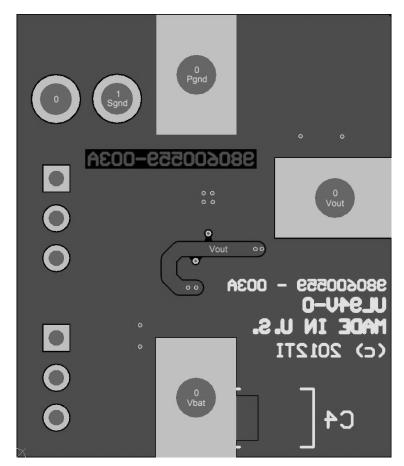**Figure 5. Mid Layer 2: Isolated Signal Ground and Power Ground Plane**

Figure 6. Bottom Layer: Feedback Path and Power Ground Plane

8   Connection Diagram and Package Mark Information

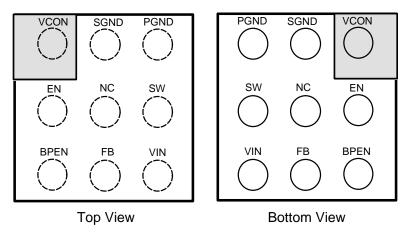Top View   Bottom View

Figure 7. Connection Diagram

9   Pin Descriptions

Pin No	Name	Description
A1	VCON	Voltage Control Analog input. VCON controls VOUT in PWM and ECO modes. VCON may also be used to force bypass condition by setting VCON > VIN/2.5.
A2	SGND	Signal Ground for analog and control circuitry.
A3	PGND	Power Ground for the Power MOSFETs and gate drive circuitry.
B1	EN	Enable Input. Set this digital input high for normal operation. For shutdown, set low. Do not leave EN pin floating.
B2	NC	Do not connect to PGND directly -- internally connected to SGND. Connect to SGND or leave floating.
B3	SW	Switching Node connection to the internal PFET switch and NFET synchronous rectifier. Connect to an inductor with a saturation current rating that exceeds the maximum Switch Peak Current Limit specification of the LM3242.
C1	BPEN	Bypass Enable input. Set this digital input high to force bypass operation. For normal operation with automatic bypass, set low or connect to ground. Do not leave this pin floating.
C2	FB	Feedback Analog Input and Bypass FET output. Connect to the output at the output filter capacitor.
C3	VIN	Voltage supply input for SMPS converter.

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