

## 3A High Performance Step-Up DC-DC Converter

### **General Description**

The RTQ9297-QT includes a high-performance step-up DC-DC converter that provides a regulated supply voltage for active-matrix thin-film transistor (TFT) liquid-crystal displays (LCDs).

The Boost Converter incorporates current mode, fixed-frequency, pulse-width modulation (PWM) circuitry with a built-in N-Channel power MOSFET to achieve high efficiency and fast transient response.

The RTQ9297-QT is available in a WDFN-10SL 3x3 package.

## Table of Contents

General Description .....	1
Performance Sepcification Summary .....	2
Power-up Procedure .....	2
Detailed Description of Hardware .....	3
Bill of Materials.....	4
Typical Applications .....	5
Evaluation Board Layout.....	8
More Information.....	9
Important Notice for Richtek Evaluation Board.....	9

## Performance Specification Summary

Summary of the RTQ9297GQW-QT Evaluation Board performance specification is provided in Table 1. The ambient temperature is 25°C.

Table 1. RTQ9297GQW-QT Evaluation Board Performance Specification Summary

Specification	Symbol	Test Conditions	Min	Typ	Max	Unit
Input Voltage Range	V <sub>DD</sub>	V <sub>AVDD</sub> < 18V	2.6	--	5.5	V
		18V < V <sub>AVDD</sub> < 24V	4	--	5.5	
Output Voltage Range	V <sub>AVDD</sub>		V <sub>DD</sub>	--	24	V
Undervoltage Lockout Threshold	V <sub>UVLO</sub>	V <sub>DD</sub> rising	2.17	2.4	2.55	V
		Hysteresis	--	50	240	mV
Shutdown Current	I <sub>SHDN</sub>	EN = GND, V <sub>IN</sub> = 5V	--	0.1	10	μA
Oscillator Frequency	f <sub>OSC</sub>	FREQ = GND	450	640	800	kHz
		FREQ = V <sub>IN</sub>	900	1240	1500	
Maximum Duty Cycle			87	90	95	%
Feedback Regulation Voltage	V <sub>FB</sub>		1.22	1.24	1.26	V
		T <sub>A</sub> = full range	-3	--	2	%

## Power-up Procedure

### Suggestion Required Equipments

- RTQ9297GQW-QT Evaluation Board
- DC power supply capable of at least 5V and 7A
- Electronic load capable of 3A
- Oscilloscope

### Quick Start Procedures

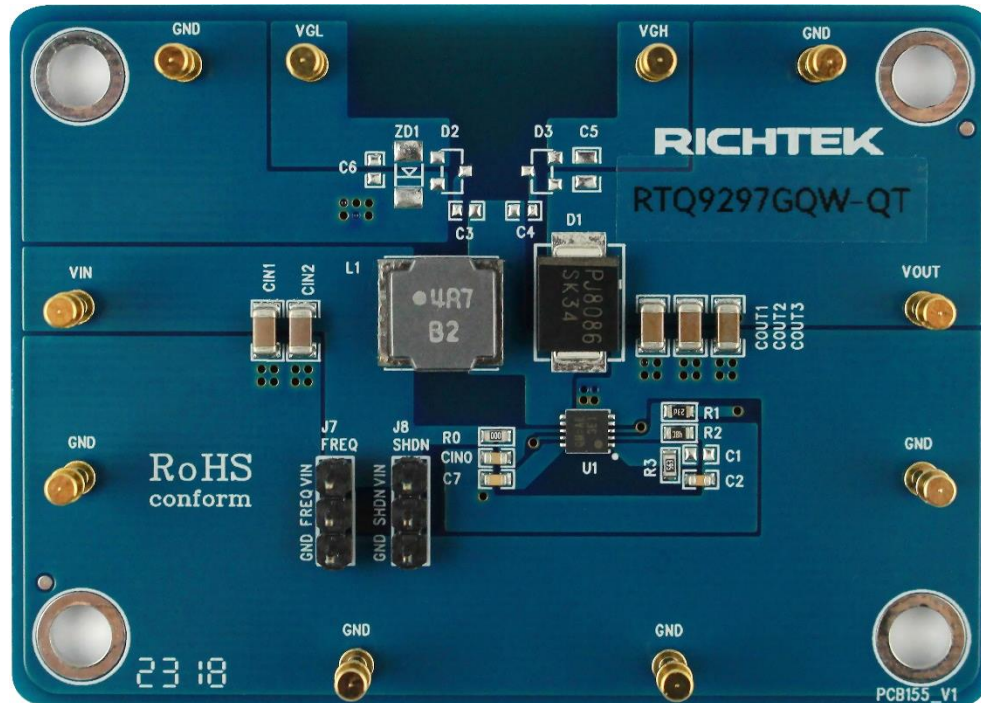
The Evaluation Board is fully assembled and tested. Follow the steps below to verify board operation. Do not turn on supplies until all connections are made. When measuring the output voltage ripple, care must be taken to avoid a long ground lead on the oscilloscope probe. Measure the output voltage ripple by touching the probe tip and ground ring directly across the last output capacitor.

### Proper measurement equipment setup and follow the procedure below.

- 1) With power off, connect the power supply for V<sub>IN</sub> and GND pins.
- 2) With power off, Use Jumper to pull high FREQ and SHDN pins.
- 3) With power off, connect the electronic load between the V<sub>OUT</sub> and nearest GND pins.
- 4) Turn on the power supply at the input. Make sure that the input voltage does not exceeds 5.5V on the Evaluation Board.
- 5) Check for the proper output voltage using a voltmeter.
- 6) Once the proper output voltage is established, adjust the load within the operating ranges and observe the output voltage regulation, ripple voltage, efficiency and other performance.

## Detailed Description of Hardware

### Headers Description and Placement



Carefully inspect all the components used in the EVB according to the following Bill of Materials table, and then make sure all the components are undamaged and correctly installed. If there is any missing or damaged component, which may occur during transportation, please contact our distributors or e-mail us at [evb\\_service@richtek.com](mailto:evb_service@richtek.com).

### Test Points

The EVB is provided with the test points and pin names listed in the table below.

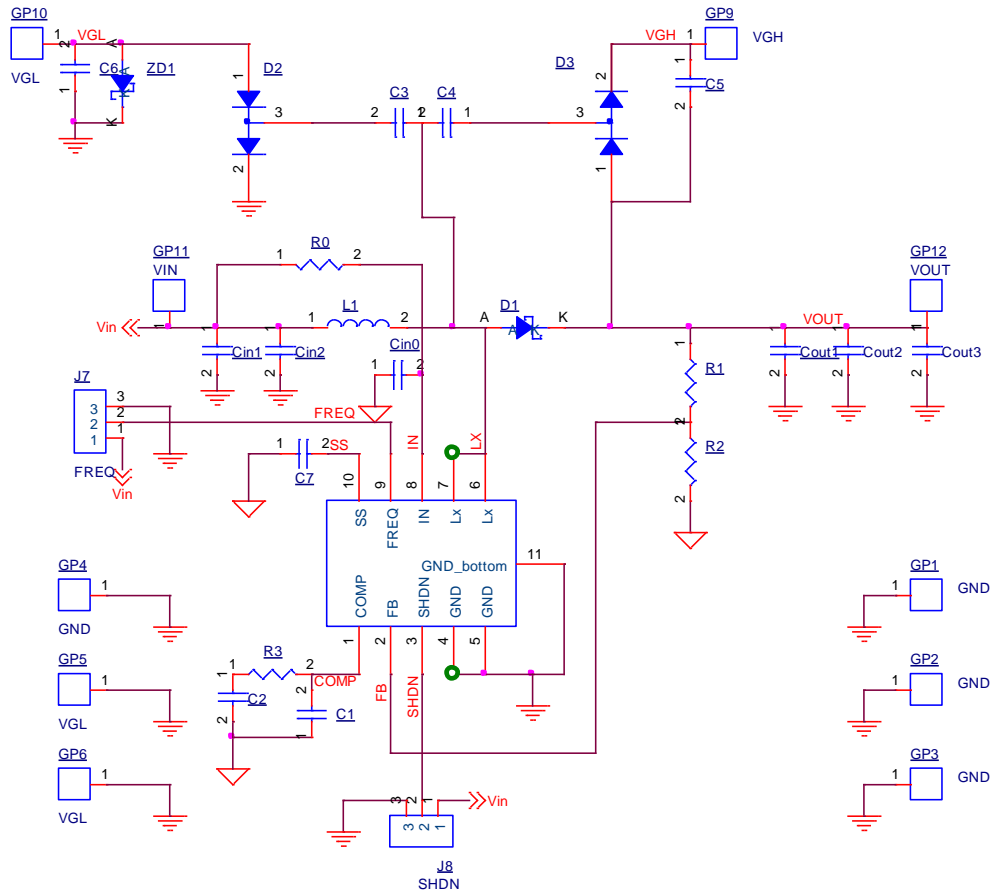
Test Point/ Pin Name	Function
<b>VOUT</b>	Output of boost converter.
<b>GND</b>	Power ground.
<b>FREQ</b>	Boost frequency selection.
<b>VIN</b>	Power supply input.
<b>SHDN</b>	Enable control input (active high).

**Bill of Materials**

Reference	Count	Part Number	Value	Description	Package	Manufacturer
U1	1	RTQ9297GQW-QT	RTQ9297GQW-QT	Step-Up DC-DC Converter	WDFN-10SL 3x3	RICHTEK
C2	1	0603B102K500CT	1nF	Capacitor, Ceramic 50V/X5R	0603	WALSIN
C7	1	0603B333K500CT	33nF	Capacitor, Ceramic 25V/X7R	0603	WALSIN
CIN0	1	0603X105K250CT	1 $\mu$ F	Capacitor, Ceramic 25V/X5R	0603	WALSIN
CIN1, CIN2	2	EMK316AB7106KL-T	10 $\mu$ F	Capacitor, Ceramic 16V/X7R	1206	TAIYO YUDEN
COU1, COU2, COU3	3	MSAST31LAB7106KTNA01	10 $\mu$ F	Capacitor, Ceramic 25V/X7R	1206	TAIYO YUDEN
D1	1	SK34	100V/3A	Schottky Diodes		PANJIT
L1	1	LSXNH8080YBL4R7NJG	4.7 $\mu$ H	Power Inductor	8x8mm	TAIYO YUDEN
R0	1	WR06X000 PTL	0	Resistor, Chip 0603	0603	WALSIN
R1	1	RTT031693FTP	169k	Resistor, Chip 0603	0603	RALEC
R2	1	RTT033092FTP	30.9k	Resistor, Chip 0603	0603	RALEC
R3	1	WR06X5602FTL	56	Resistor, Chip 0603	0603	WALSIN

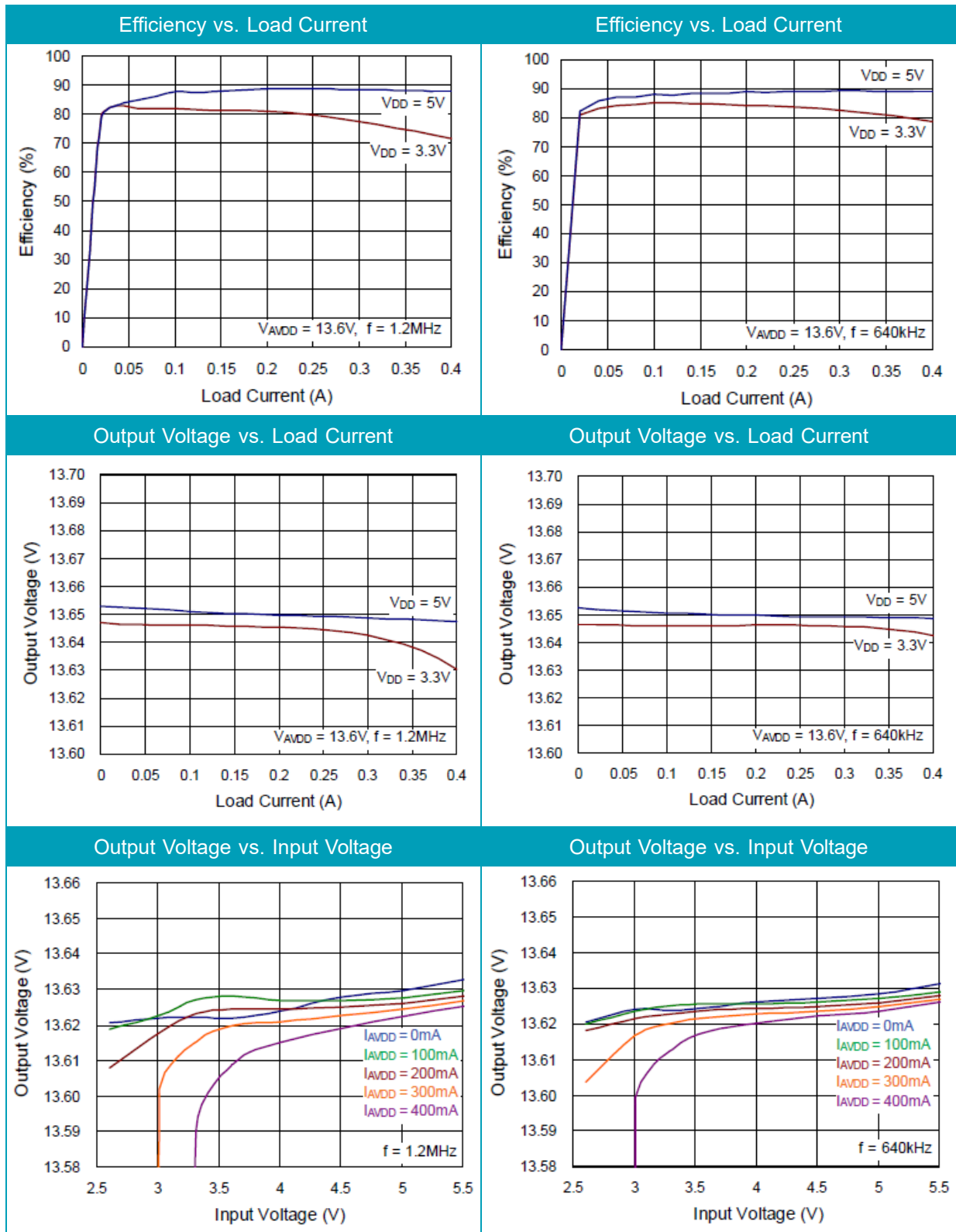
**Typical Applications**

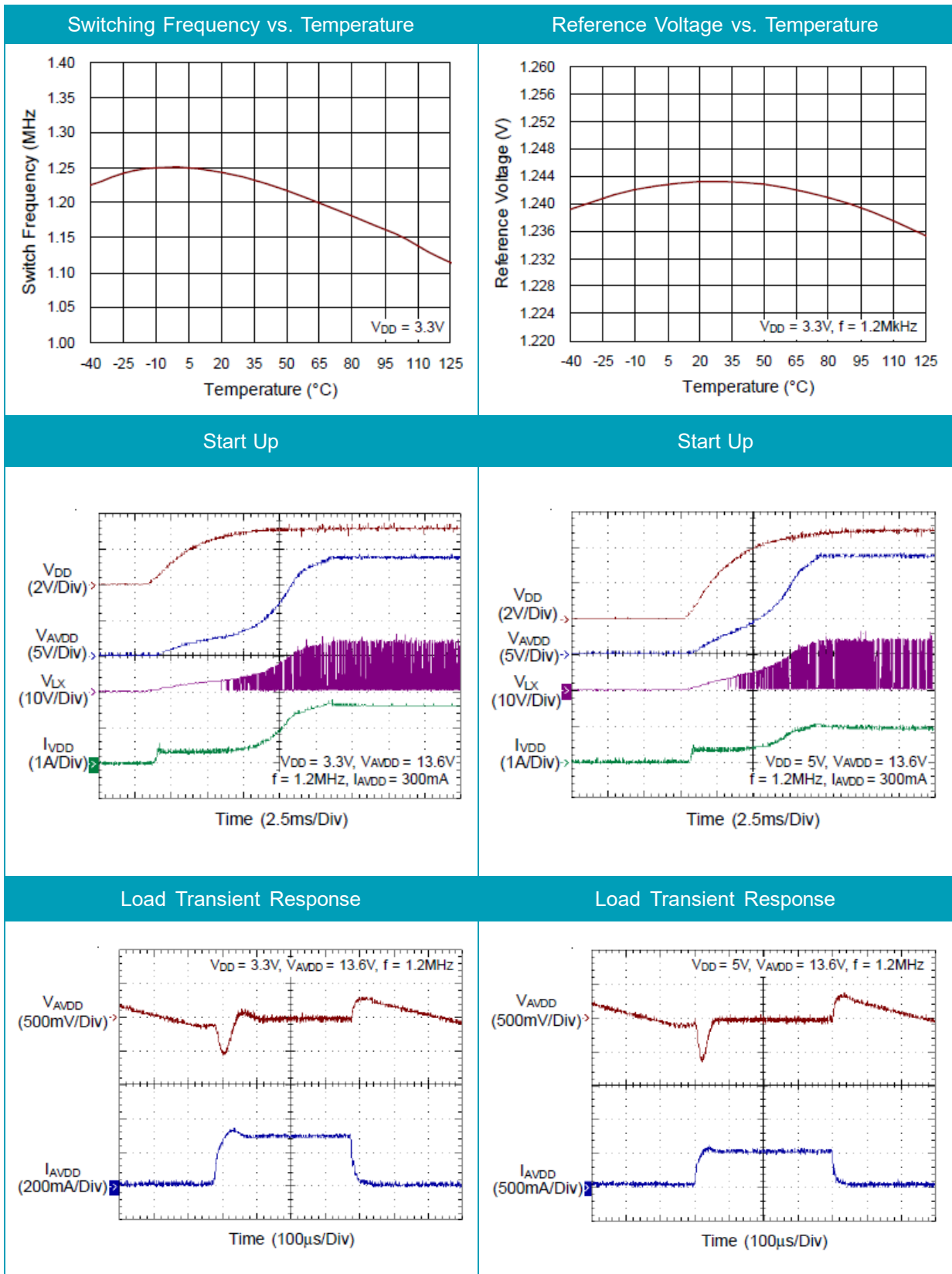
**EVB Schematic Diagram**



1. The capacitance values of the input and output capacitors will influence the input and output voltage ripple.
2. MLCC capacitors have degrading capacitance at DC bias voltage, and especially smaller size MLCC capacitors will have much lower capacitance.

Measure Result





**Evaluation Board Layout**

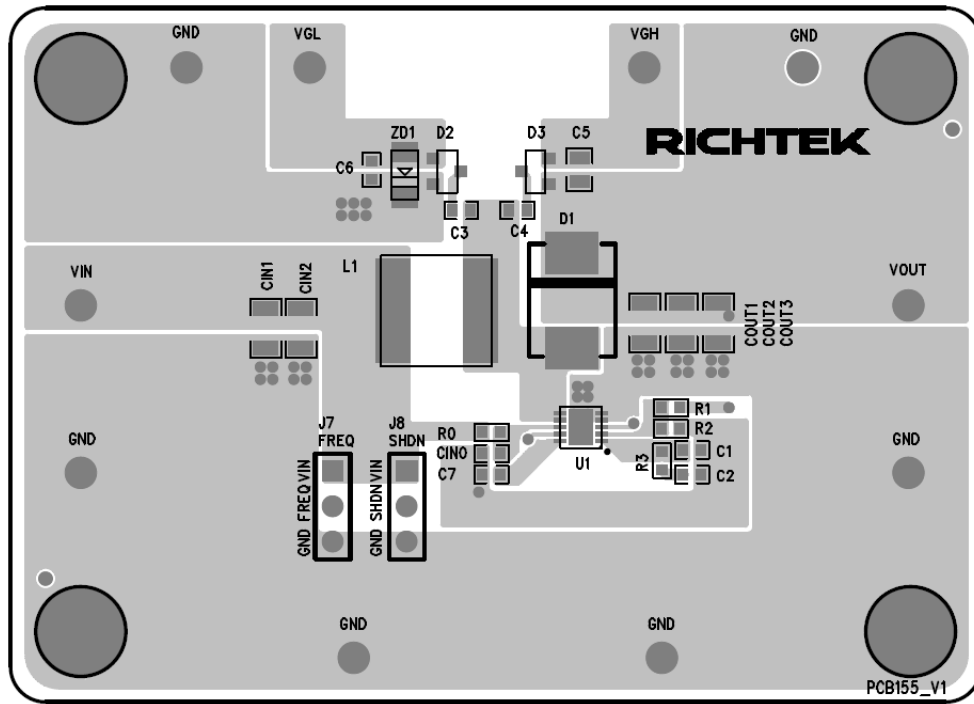


Figure 1. Top View

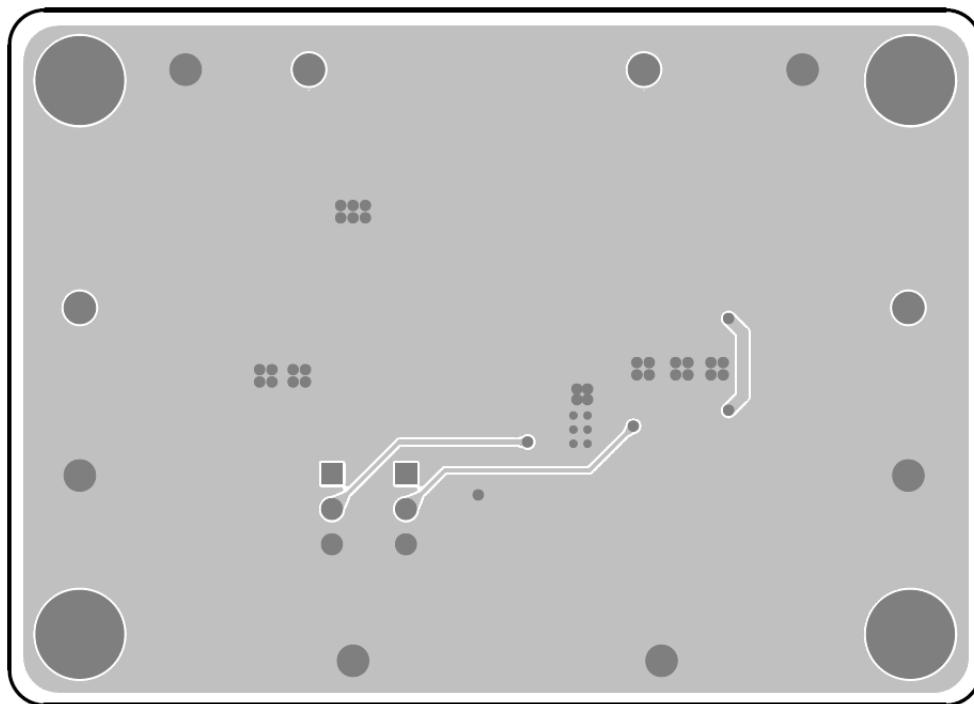


Figure 2. Bottom View



### ***More Information***

For more information, please find the related datasheet or application notes from Richtek website  
<http://www.richtek.com>.

### ***Important Notice for Richtek Evaluation Board***

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