

RT5707 Ultra-Low Quiescent Current HCOT Buck Converter Evaluation Board

General Description

The RT5707 is a high efficiency synchronous step-down converter featuring typ. 360nA quiescent current. This document explains the function and use of the RT5707 evaluation board (EVB), and provides information to related setting of the evaluation board.

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Performance Specification Summary

Summary of the RT5707 Evaluation Board performance specification is provided in Table 1. The ambient temperature is 25°C.

Table 1. RT5707 Evaluation Board Performance Specification Summary

Specification	Test Conditions	Min	Typ	Max	Unit
Input Voltage Range		2.2	--	5.5	V
Output Current		0	--	0.6	A
IQ_Non-SW	V _{OUT} = 1.8V, I _{OUT} = 0A, EN = V _{IN} , non-switching	--	360	800	nA
IQSW	V _{OUT} = 1.8V, I _{OUT} = 0A, EN = V _{IN} , switching	--	460	1200	nA
Operation Frequency	V _{OUT} = 1.8V, CCM mode	--	1.2	--	MHz
Line Regulation	V _{OUT} = 1.8V, I _{OUT} = 100mA, V _{IN} = 2.2V to 5.5V	--	0.1	--	%/V
Load Regulation (VOUT_LoadReg1)	V _{OUT} = 1.8V, including PFM operation	--	0.001	--	%mA
Load Regulation (VOUT_LoadReg2)	V _{OUT} = 1.8V, only CCM operation	--	0.0005	--	

Power-up Procedure

Suggestion Required Equipments

- RT5707 Evaluation Board
- DC power supply capable of at least 5.5V and 3A
- Electronic load capable of 2A
- Function Generator
- 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 input power supply to VIN and GND pins.
- 2) With power off, connect the electronic load between the VOUT and nearest GND pins.
- 3) Put jumper connectors on JP5 (VSEL1)/JP4 (VSEL2)/JP6 (VSEL3) to select VOUT value.

Table 2. Output Voltage Setting

Device	V _{OUT} (V)	VSEL3	VSEL2	VSEL1
RT5707	1.2	0	0	0
	1.5	0	0	1
	1.8	0	1	0
	2.1*	0	1	1
	2.5	1	0	0
	2.8	1	0	1
	3	1	1	0
	3.3*	1	1	1

- 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) Put jumper connectors on JP3 (EN Pull high).
- 6) Check for the proper output voltage using a voltmeter.
- 7) 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.

Test Points

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

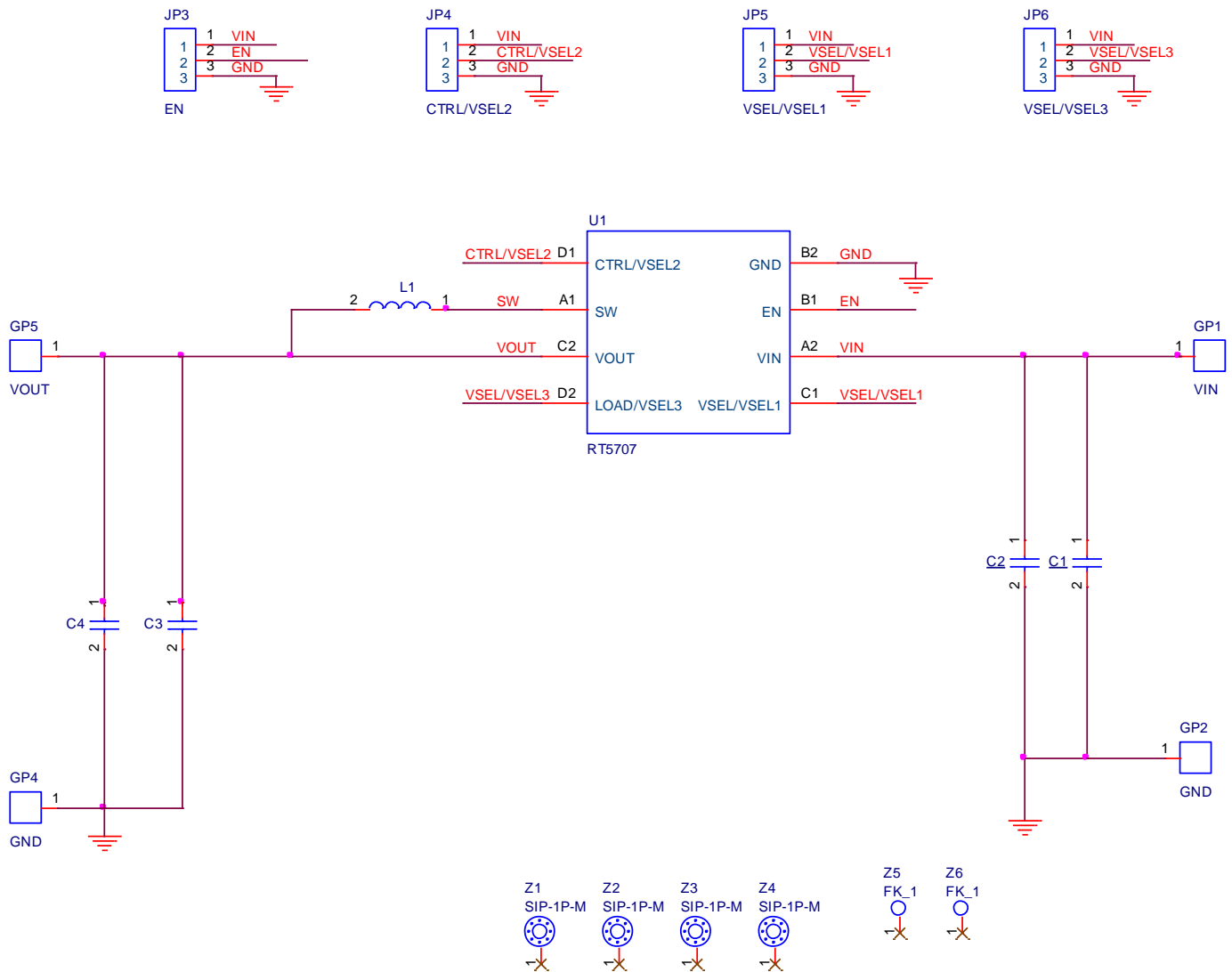
Test Point/ Pin Name	Function
VIN	Input voltage.
VOUT	Output voltage.
GND	Ground.
EN	Enable test point.
VSEL1	Output Voltage Select 1
VSEL2	Output Voltage Select 2
VSEL3	Output Voltage Select 3

Bill of Materials

Reference	Count	Part Number	Value	Description	Package	Manufacturer
U1	1	RT5707WSC	RT5707WSC	Step-Down Converter	WL-CSP-8B 0.9x1.6 (BSC)	RICHTEK
C1, C3	2	GRM155R60J106ME15	10 μ F	Capacitor, Ceramic 6.3V/X5R	0402	Murata
L1	1	1239AS-H-2R2M	2.2 μ H	Power Inductors	2520	Murata

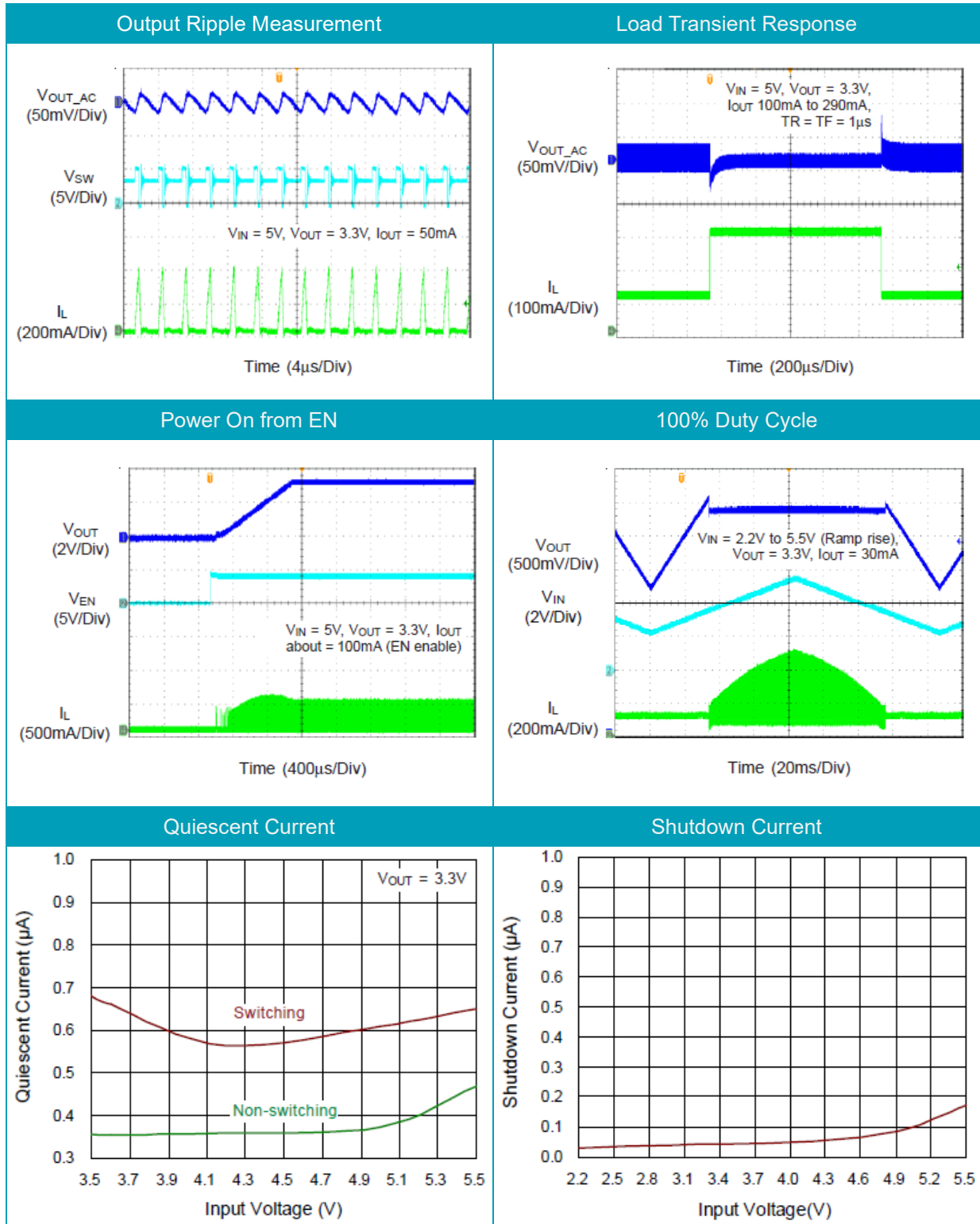
Typical Applications

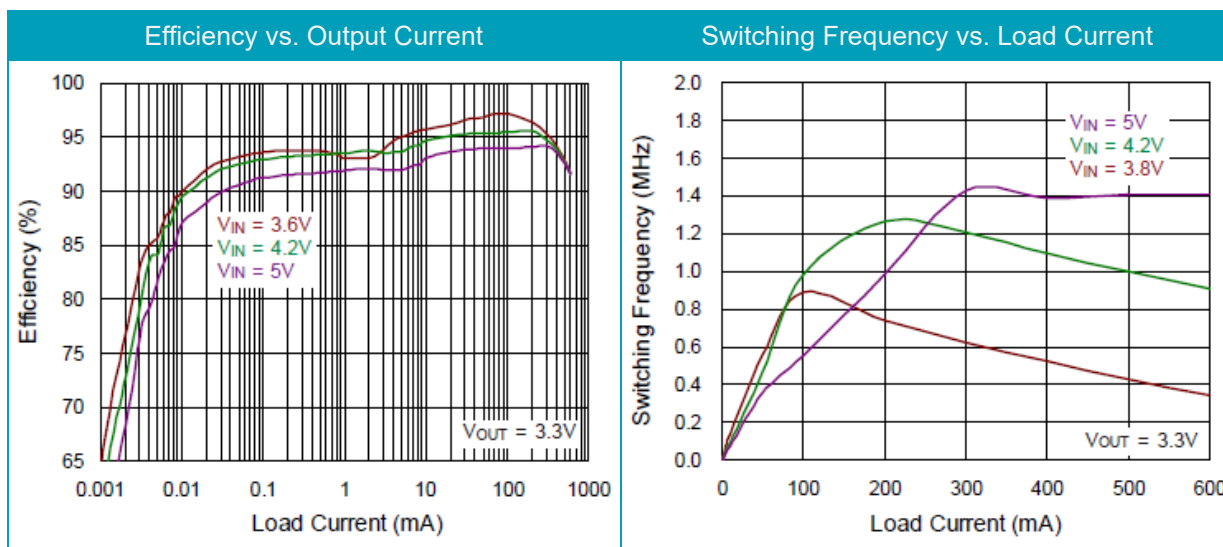
EVB Schematic Diagram



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





Note: When measuring the input or 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 directly across the output capacitor.

Evaluation Board Layout

Figure 1 to Figure 2 are RT5707 Evaluation Board layout. This board size is 35mm x 35mm and is constructed on two-layer PCB.

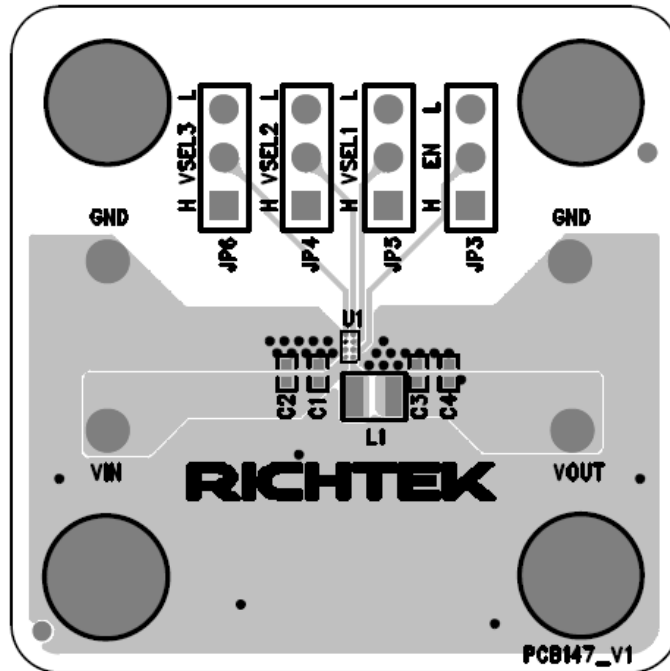


Figure 1. Top View (1st layer)

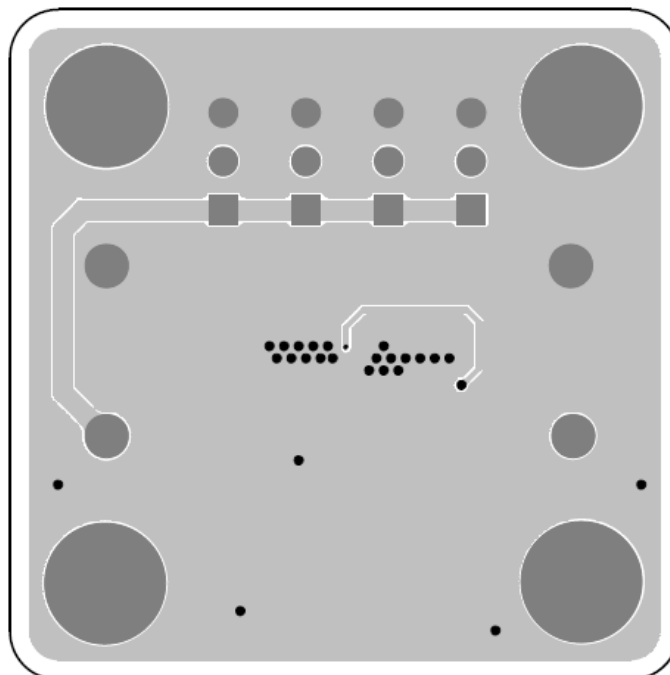


Figure 2. Bottom View (2nd Layer)

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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