

## 55mΩ, 3A High-Side Power Switches with Flag

### *Purpose*

The RT9742A is a cost-effective, low-voltage, single N-MOSFET high-side Power Switch IC for USB application. This document explains the function and use of the RT9742A evaluation board (EVB), and provides information to enable operation, modification of the evaluation board and circuit to suit individual requirements.

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## Introduction

### General Product Information

The RT9742A integrates an over-current protection circuit, a short fold back circuit, a thermal shutdown circuit and an under-voltage lockout circuit for overall protection. Besides, a flag output is available to indicate fault conditions to the local USB controller. Furthermore, the chip also integrates an embedded delay function to prevent miss-operation from happening due to inrush-current. The RT9742A is an ideal solution for USB power supply and can support flexible applications since it is available in TSOT-23-5 (FC) package.

### Product Feature

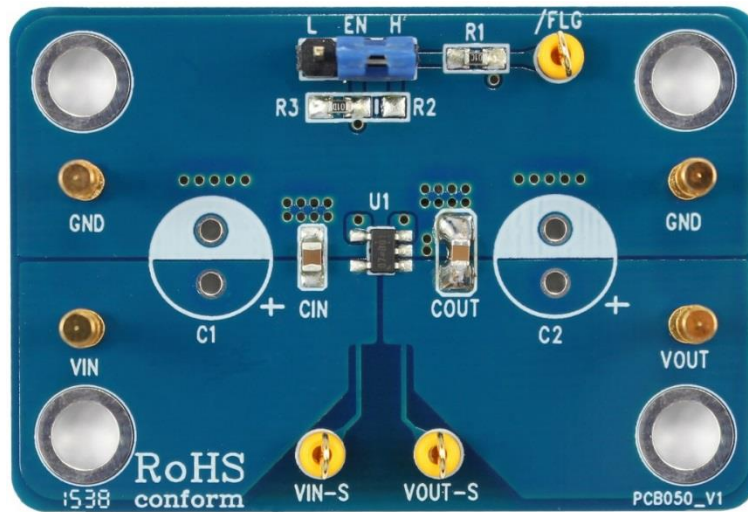
- 55mΩ (typ.) N-MOSFET Switch
- Operating Range : 2.7V to 6V
- Reverse Blocking Current
- Under Voltage Lockout
- Deglitched Fault Report (FLG)
- Thermal Protection with Fold-back
- Over Current Protection
- Short Circuit Protection
- UL Approved-E219878 
- Nemko Approved-NO87949

### Key Performance Summary Table

Key Features		Evaluation Board Number : PCB050_V1
Input Voltage Range	2.7V to 6V	
Max Output Current	3A	
Default Output Voltage	5V @ V <sub>IN</sub> = 5V	
Default Marking & Package Type	RT9742AGJ5F, TSOT-23-5 (FC)	

## Bench Test Setup Conditions

### Headers Description and Placement



Please carefully inspect the EVB IC and external components, comparing them to the following Bill of Materials, to ensure that all components are installed and undamaged. If any components are missing or damaged during transportation, please contact the distributor or send e-mail to [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.

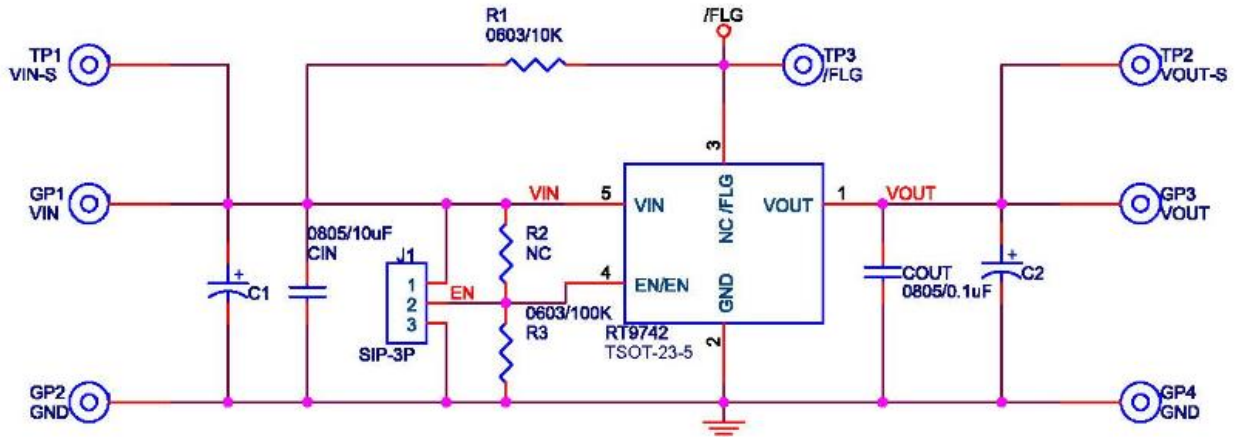
Test point/ Pin name	Signal	Comment (expected waveforms or voltage levels on test points)
<b>VIN</b>	Input voltage	Power input. Support 2.7V to 6V Input Voltage.
<b>EN</b>	Enable test point	High = Enable. Apply a voltage exceeds than enable logic high voltage (2V) for chip enable.
<b>GND</b>	Ground	Ground.
<b>VOUT</b>	Output voltage	Output voltage pin. Probe this pin to observe the output voltage waveform.
<b>/FLG</b>	Fault FLAG Output	$\overline{\text{FLAG}}$ output indicator pin. $\overline{\text{FLAG}}$ is a low active output. Once the over current, short circuit, and over temperature occurring, it will indicate "LOW" after 10ms delay time.

### Power-up & Measurement Procedure

1. Connecting input power ( $2.7V < V_{IN} < 6V$ ) and input ground to VIN and GND test pins respectively.
2. Connecting positive end and negative terminals of load to VOUT and GND test pins respectively.
3. There is a 3-pin header "EN" for enable control. To use a jumper at "HI" option to tie EN test pin to input power VIN for enabling the device. Inversely, to use a jumper at "LO" option to tie EN test pin and ground GND for disabling the device.
4. Connecting an external load up to 5A to the VOUT and GND terminals and verify the over current protection and  $\overline{\text{FLAG}}$  indication.

**Schematic, Bill of Materials & Board Layout**

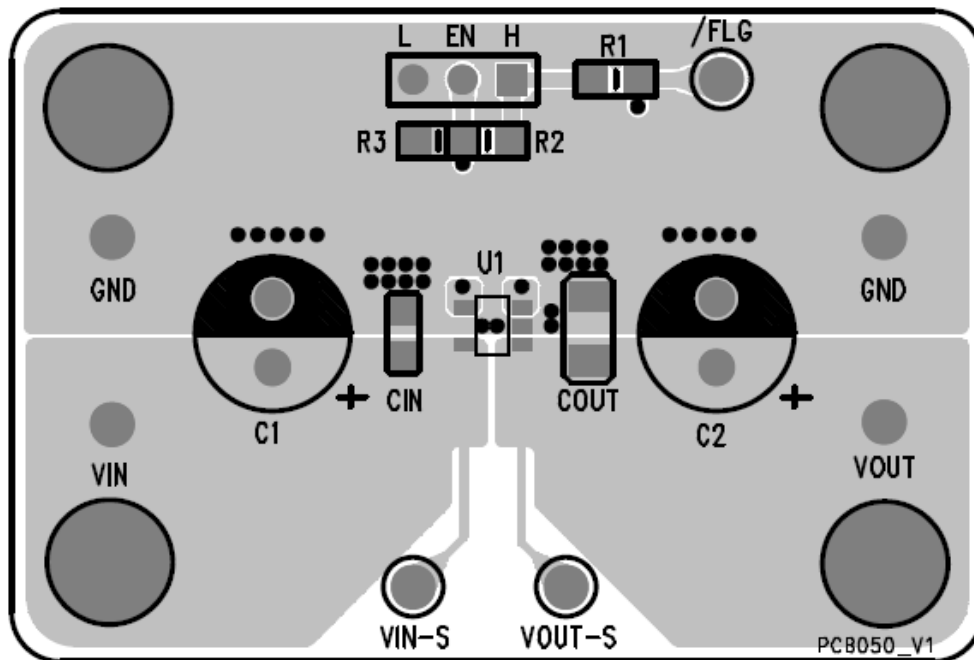
**EVB Schematic Diagram**



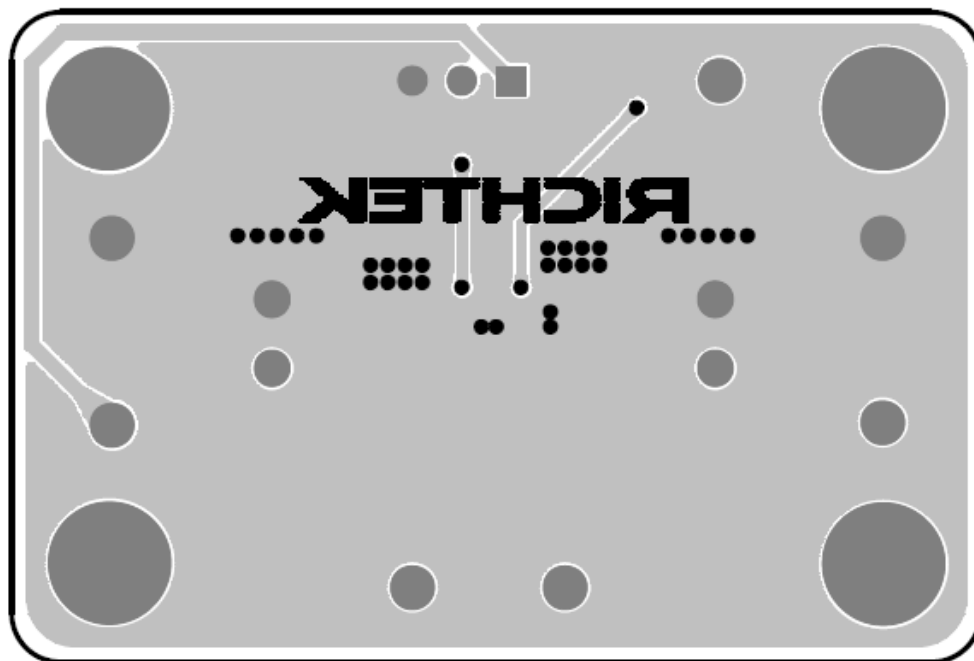
**Bill of Materials**

Reference	Qty	Part Number	Description	Package	Manufacture
U1	1	RT9742AGJ5F	Power Switch with Flag	TSOT-23-5 (FC)	RICHTEK
CIN	1		10μF/10V/X7R/0805	C-0805	
COUT	1		0.1μF/50V/X7R/0805	C-0805	
C1, C2	2		NC		
J1	1		SIP-3P	SIP-3P	
R1	1		10kΩ/0603	R-0603	
R3	1		100kΩ/0603	R-0603	
R2	1		NC		
GP1, GP2, GP3, GP4	4		VIN, GND, VOUT, GND (Gold Pin)	SIP-1P	
TP1, TP2, TP3	3		VIN-S, VOUT-S, /FLG (Test Pin)	SIP-1P	

**PCB Layout**



Top View



Bottom View