

RT4723P Dual Output AMOLED Bias Evaluation Board

Purpose

The RT4723P is a highly integrated Boost, LDO and inverting charge pump to generate positive and negative output voltage. The negative output voltages can be adjusted from -0.6V to -2.4V with 100mV steps by SWIRE interface protocol. With its input voltage range of 2.5V to 4.6V, RT4723P is optimized for products powered by single-cell battery and the output current up to 30mA.

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Introduction

General Product Information

The RT4723P is a highly integrated Boost, LDO and inverting charge pump to generate positive and negative output voltage. The negative output voltages can be adjusted from -0.6V to -2.4V with 100mV steps by SWIRE interface protocol. The part maintains the highest efficiency by utilizing a -0.33x/-0.5x mode fractional charge pump with automatic mode transition. With its input voltage range of 2.5V to 4.6V, RT4723P is optimized for products powered by single-cell battery and the output current up to 30mA. The RT4723P is available in WL-CSP-15B 1.39x2.07 (BSC) package to achieve optimized solution for PCB space.

Product Feature

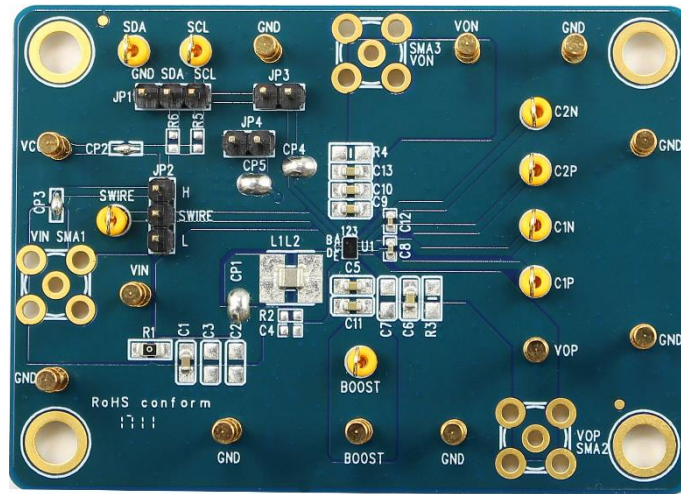
- 2.5V to 4.6V Supply Voltage Range
- Single Wire Protocol
- Fixed 4.6V Positive Voltage Output
- Negative Voltage Output from -0.6V to -2.4V per 0.1V by SWIRE Pin
- Auto-Mode Transition of -0.33x/-0.5x Charge Pump
- Built-in Soft-Start
- 30mA Maximum Output Current
- Programmable Output Fast Discharge Function
- High Impedance Output when IC Shutdown
- UVLO, OCP, SCP, OTP Protection
- Shutdown Current < 1 μ A
- Available in 15-Ball WL-CSP Package

Key Performance Summary Table

Key Features	Evaluation Board Number: PCB088_V1
Default Input Voltage	3.7V
Max Output Current	30mA
Default Output Voltage	V _{OP} = 4.6V, V _{ON} = -2.4V
Default Marking & Package Type	RT4723PWSC, WL-CSP-15B 1.39x2.07 (BSC)

Bench Test Setup Conditions

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	Signal	Comment (expected waveforms or voltage levels on test points)
VIN	Input voltage	Power input. Support 2.5V to 4.6V input coltage. Must bypass with a suitable large ceramic capacitor at this pin.
SWIRE	Single Wire Protocal	Enable and VON voltage setting.
GND	Ground	Ground.
BOOST	Boost Voltage	Output voltage of boost converter. It's typically 5V.
VOP	Positive Terminal Output	The output of a LDO. It is set at a typical value of 4.6V.
VON	Negative Terminal Output	The output of an inverting charge pump. It is set at a typical value of -2.4V and can be programmed through SWIRE.
C1P, C1N	Flying Capacitor 1 Positive and Negative Connection	Connect 1 μ F between C1P and C1N for inverting charge pump operation.
C2P, C2N	Flying Capacitor 2 Positive and Negative Connection	Connect 1 μ F between C2P and C2N for inverting charge pump operation.

Power-up & Measurement Procedure

1. Connect input power ($2.5V < V_{IN} < 4.6V$) and input ground to VIN and GND test pins respectively.
2. Connect positive end and negative terminals of load to VOP and VON test pins respectively.
3. There is a 3-pin header "SWIRE" for enable control. To use a jumper at "H" option (upper side) to tie SWIRE test pin to input power VIN for enabling the device. Inversely, to use a jumper at "L" option to tie SWIRE test pin and ground GND for disabling the device.
4. Verify the output voltage (typically 7.0V) between VOP and VON.
5. Connect an external load up to 30mA to the VOP and VON terminals and verify the output voltage and current.

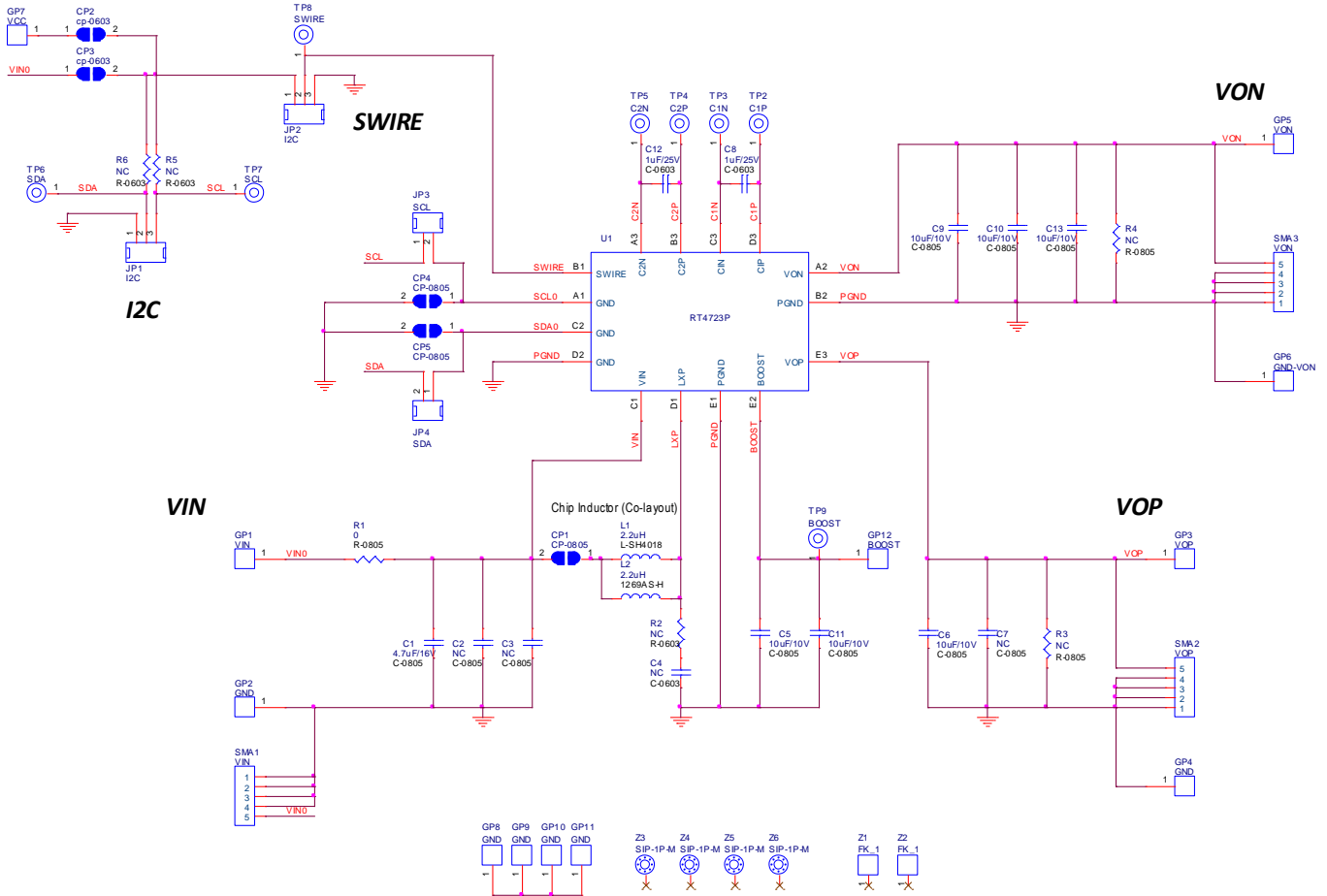
VON Output Voltage Setting

Set the negative output voltage with the Single Wire Protocol (SWIRE). Send the specified pulses to the header of SWIRE to program the VON voltage. The negative output voltage is set by the following table:

Pulse	VON (V)
0	-2.4 (default)
1	-2.4
2	-2.3
3	-2.2
4	-2.1
5	-2.0
6	-1.9
7	-1.8
8	-1.7
9	-1.6
10	-1.5
11	-1.4
12	-1.3
13	-1.2
14	-1.1
15	-1.0
16	-0.9
17	-0.8
18	-0.7
19	-0.6
20	0

Schematic, Bill of Materials & Board Layout

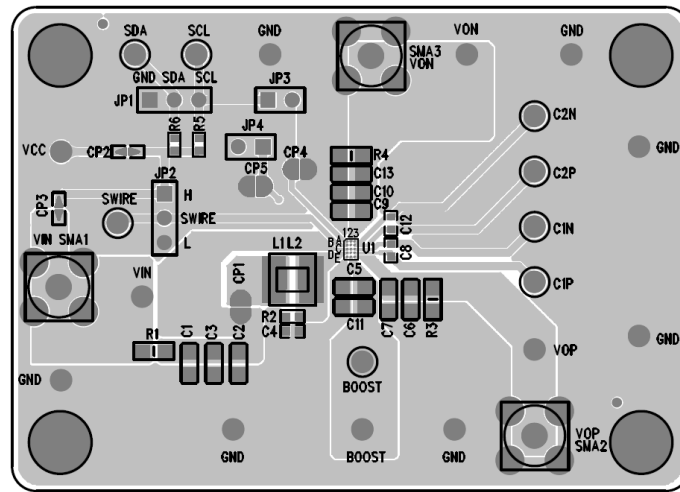
EVB Schematic Diagram



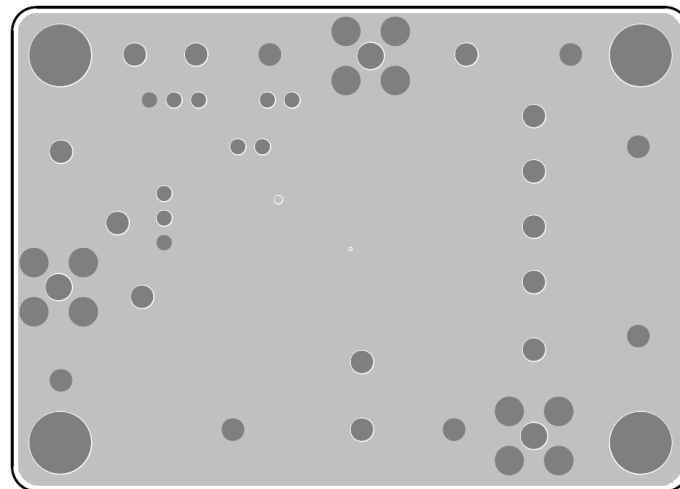
Bill of Materials

Reference	Qty	Part number	Description	Package	Manufacturer
U1	1	RT4723PWSC	DC-DC Converter	WL-CSP-15B 1.39x2.07 (BSC)	RICHTEK
C1	1	GRM188R61C475KAAJ	4.7µF/16V/0603	C-0805	muRata
C2, C3, C4, C7, C11, R2, R3, R4, R5, R6	10		NC		
C5, C6, C9, C10, C11, C13	6	GRM188R61A106KE69	10µF/10V/0603	C-0805	muRata
C8, C12	2	GRM155R61C105KE01	1µF/16V/0402	C-0603	muRata
L1	1	GLCLK2R201A	L1 or L2	L-SH4018	ALPS
L2	1	1269AS-H-2R2M=P2	(擇一即可)	1269AS-H	muRata
R1	1		0 ohm	R-0805	

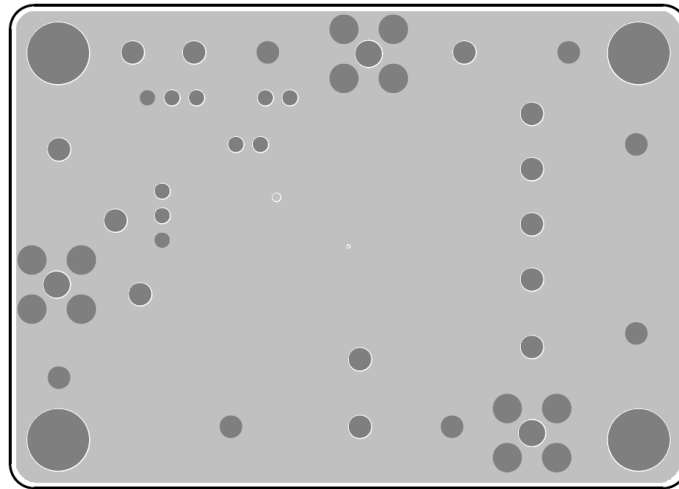
PCB Layout



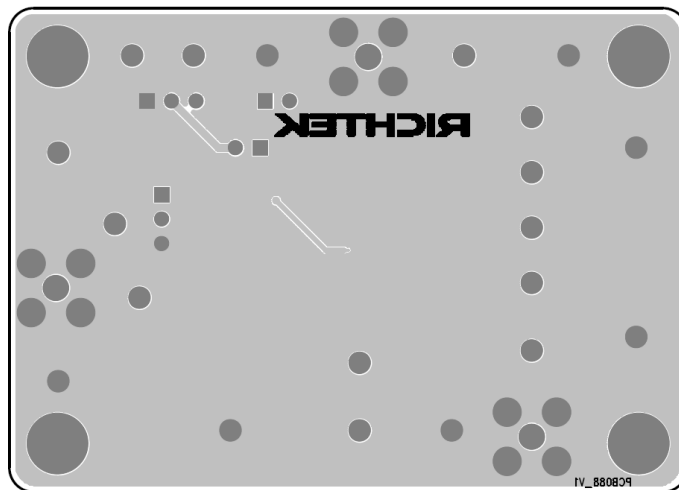
Top View (1st layer)



PCB Layout—Inner Side (2nd Layer)



PCB Layout—Inner Side (3rd Layer)



Bottom View (4th 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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