RTKA214405DE0020BU

5V Fixed Output Voltage Low Iq Current LDO Regulator Evaluation Board

The RTKA214405DE0020BU evaluation board is a simple platform for evaluating the RAA214405 low-dropout regulator (LDO). It provides a view of the SOT23 5-lead and SOT89 packages. To use the board, place jumpers on the input and output associated with the IC. The board contains all the necessary circuitry for characterizing critical performance parameters.

RAA214405 is an LDO featuring a low-quiescent current and a fixed output voltage of 5V. It can efficiently deliver up to 150mA to a load and has a wide input voltage range of 5.3V to 40V with up to 45V line transient tolerance.

Features

- Typical low-quiescent current: 3.8µA at no load
- Typical shutdown current: <1µA
- Wide input voltage range: 5.3V to 40V with 45V line transient tolerance
- Max output current: 150mA
- Output voltage accuracy: ±3% over line, load, and temperature
- Typical dropout voltage: 0.8V at 150mA
- Fixed output voltage of 5V
- Stable with 2.2µF minimum ceramic output capacitor
- Overcurrent and over-temperature protection
- Junction temperature range: -40°C to 125°C

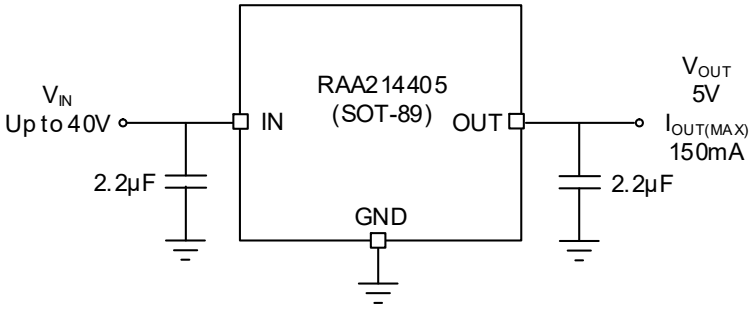

Figure 1. Block Diagram

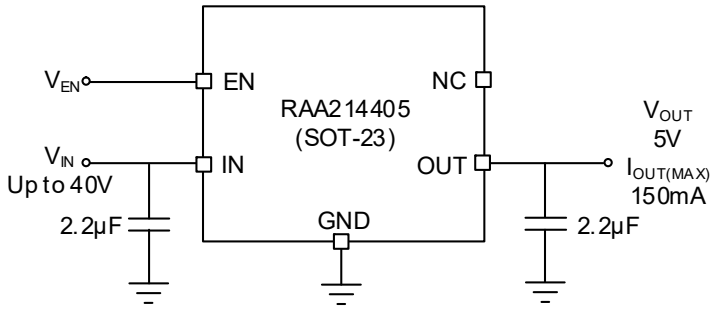

Figure 2. Block Diagram

Contents

1. Functional Description

The RTKA214405DE0020BU evaluation board provides a simple platform to evaluate the RAA214405 LDO in the SOT-89 3-lead or SOT-23 5-lead packages. The ordering information for the specific voltage option is shown in the Ordering Information table. Jumpers on VIN_J2 and VOUT_J2 are required to connect the SOT-89 3-lead package, and jumpers on VIN_J1 and VOUT_J1 are required to connect the SOT-23 5-lead package.

1.1 Quick Start Guide

1.1.1 SOT-89 3-Lead Package Evaluation

1. Verify Jumper VIN_J2 and Jumper VOUT_J2 are in the circuit and that VIN_J1 and Jumper VOUT_J1 are not in the circuit.
2. Connect the input supply to VIN and GND_IN (banana jack) to an external power supply.
3. Connect a voltmeter across VOUT_TP1 and GND_TP2 (mini test point).
4. If required, connect a load to VOUT and GND_OUT (banana jack).
5. Observe the output voltage.
6. The following test points are provided for easy connection to the input and output voltages: VIN_TP2, GND_TP4, VOUT_TP2, GND_TP3.

1.1.2 SOT-23 5-lead Package Evaluation

1. Verify Jumper VIN_J1 and Jumper VOUT_J1 are in the circuit and that VIN_J2 and Jumper VOUT_J2 are not in the circuit.
2. Verify Jumper EN1_J1 is in the circuit and connected to the left. This applies the VIN voltage to the Enable pin; the part will be on. To disable the part, move the jumper EN1_J1 to the right position.
3. Connect the input supply to VIN and GND_IN (banana jack) to an external power supply.
4. Connect a voltmeter across VOUT_TP1 and GND_TP2 (mini test point).
5. If required, connect a load to VOUT and GND_OUT (banana jack).
6. Observe the output voltage.
7. The following test points are provided for easy connection to the input and output voltages: VIN_TP1, GND_TP1, VOUT_TP1, GND_TP2.

2. Board Design

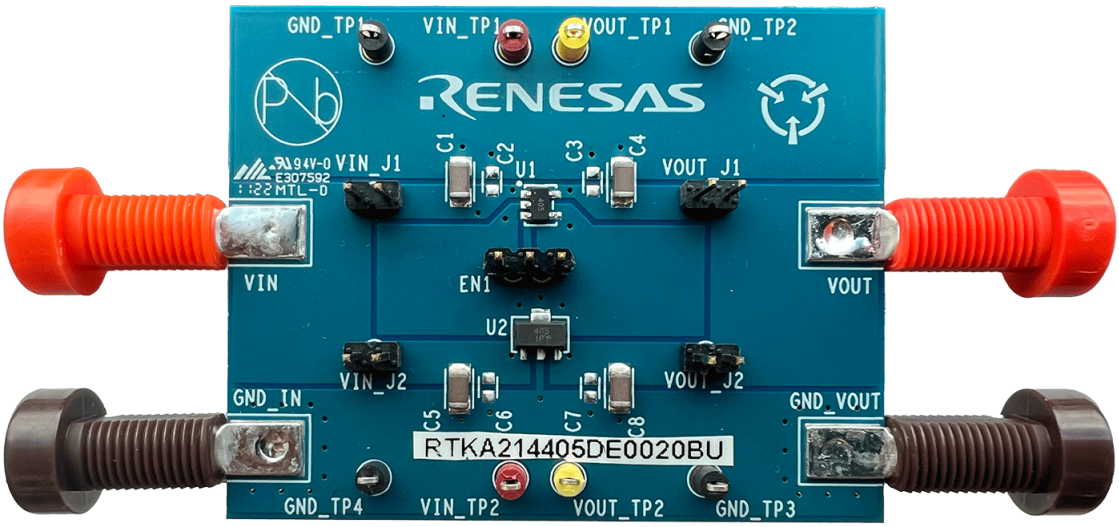

Figure 3. RTKA214405DE0020BU Board

2.1 Layout Guidelines

A good PCB layout is important to achieve expected performance. Consideration should be taken when placing the components, routing the trace to minimize the ground impedance, and keeping the parasitic inductance low. The input and output capacitors should have a good ground connection and be placed as close to the IC as possible.

The ground pad of the IC is connected to a large ground copper plane on the bottom layer for effective thermal dissipation.

2.2 Schematic Drawing

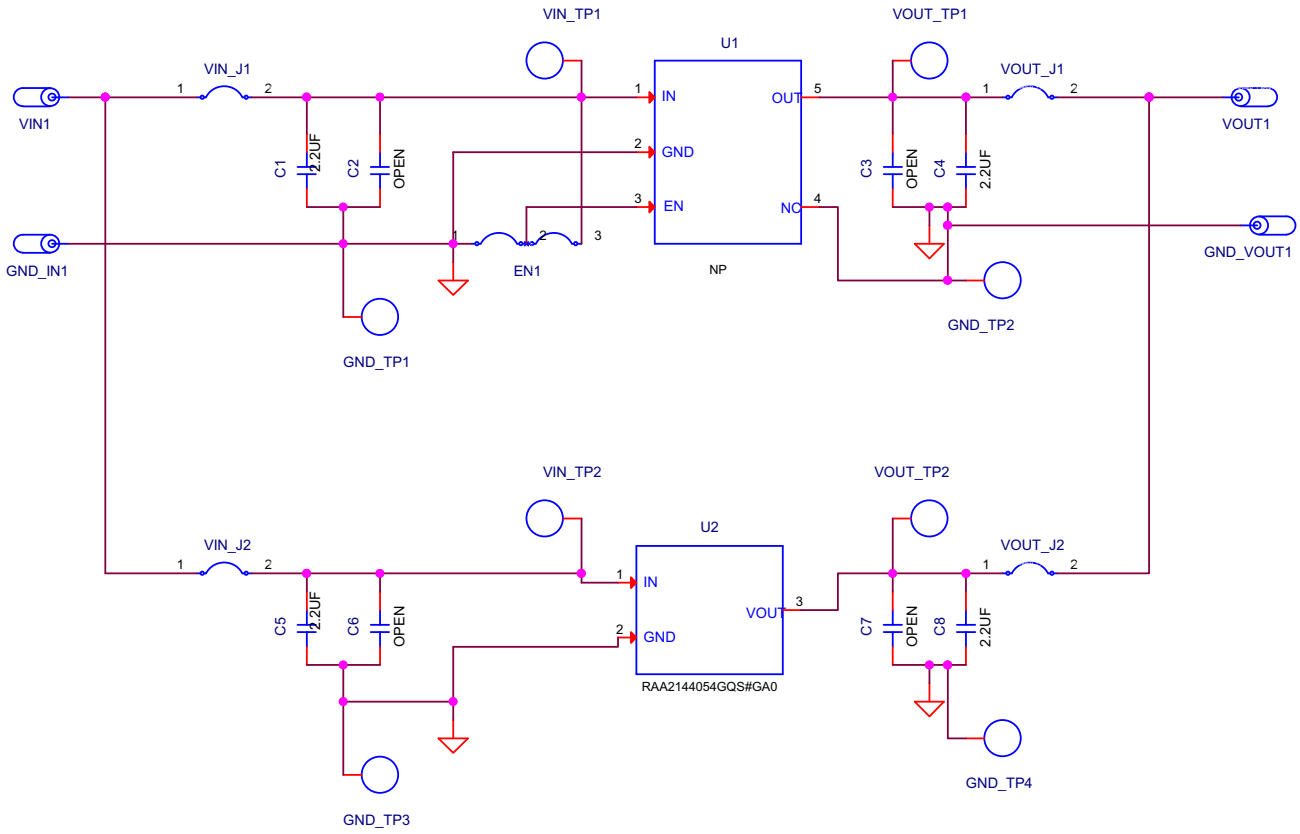

Figure 4. RTKA214405DE0010BU Schematic

2.3 Bill of Materials

Qty	Reference Designator	Description	Manufacturer	Manufacturer Part
1	-	PWB-PCB, RTKA21440XDE0000BU, REVA, ROHS	MTL (Multilayer PCB International (HK) CO.LTD)	RTKA21440XDE0000BU RVAPCB
0	C2, C3, C6, C7	CAP, SMD, 0603, DNP-PLACE HOLDER, ROHS	-	-
4	C1, C4, C5, C8	CAP, SMD, 1206, 2.2µF, 100V, 10%, X7R, ROHS	Yageo	CC1206KKX7R0BB225
2	VIN, VOUT	CONN-BANANA JACK, INSULATED, ORANGE, NYLON, ROHS	Johnson Components	108-0906-001
2	GND_IN, GND_VOUT	CONN-BANANA JACK, FEMALE, TH, W/SOLDER TABS, BROWN, ROHS	Cinch	108-0908-001
2	VIN_TP1, VIN_TP2	CONN-MINI TEST PT, VERTICAL, RED, ROHS	Keystone	5000
4	GND_TP1-GND_TP4	CONN-MINI TEST PT, VERTICAL, BLK, ROHS	Keystone	5001
2	VOUT_TP1, VOUT_TP2	CONN-MINI TEST POINT, VERTICAL, YEL, ROHS	Keystone	5004
1	EN1	CONN-HEADER, 1×3, BREAKAWY 1×36, 2.54mm, ROHS	Berg/FCI	68000-236HLF
4	VIN_J1, VIN_J2, VOUT_J1, VOUT_J2	CONN-HEADER, 1×2, RETENTIVE, 2.54mm, 0.230 × 0.120, ROHS	Berg/FCI	69190-202HLF
1	U1	IC-5V, 150mA, LDO REGULATOR, 5P, TSOT-23, ROHS	Renesas Electronics	RAA2144054GP3#JA0
1	U2	IC-5V, 150mA, LDO REGULATOR, 3P, TSOT-89, ROHS	Renesas Electronics	RAA2144054GQS#GA0

2.4 Board Layout

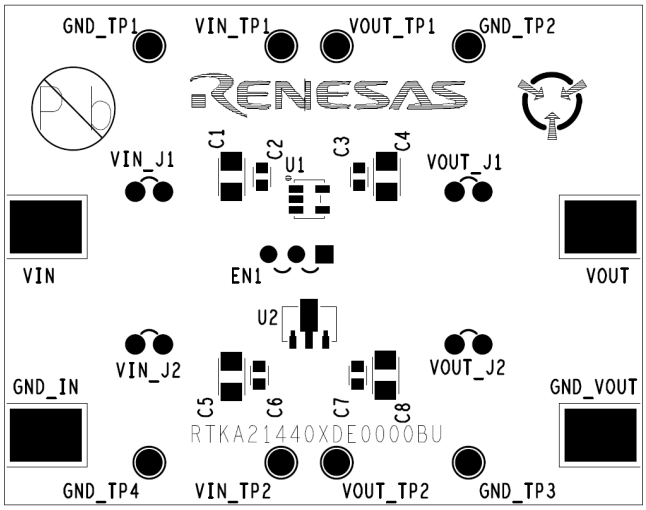

Figure 5. Top Layer Silk Screen

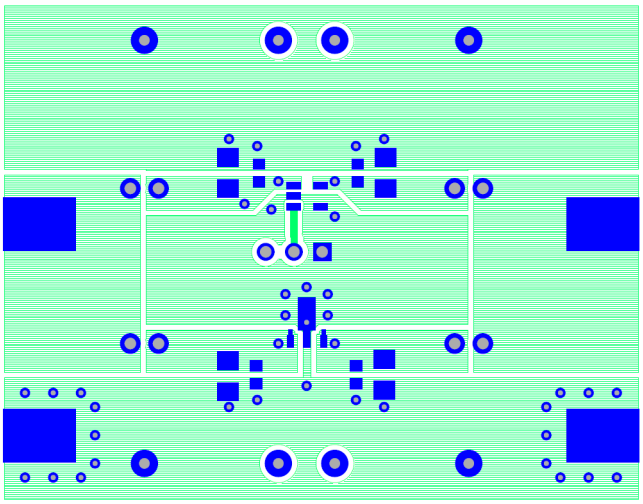

Figure 6. Top Layer

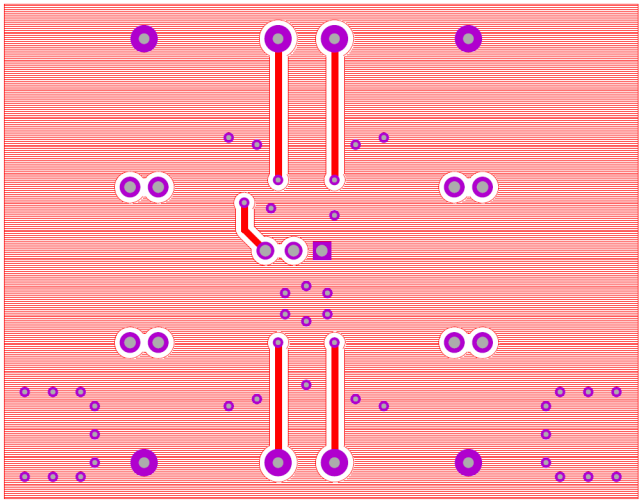

Figure 7. Bottom Layer

3. Ordering Information

Part Number	Description
RTKA214405DE0020BU	RAA214405 5V board option

4. Revision History

Rev.	Date	Description
1.00	Oct 25, 2023	Initial release

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