

## RTKA214220DR0000BU

Demonstration Board

The RTKA214220DR0000BU demonstration board provides a simple platform for demonstrating the RAA214220 20V 150mA LDO linear regulator. The board features convenient connection points for input, output, in addition to Enable. With a small form factor, the board can be integrated into another system as a daughter card or a module.

The RAA214220 is offered in a 5Ld TSOT23 package. The RTKA214220DR0000BU evaluation board operates from a supply voltage of 2.5V to 20V DC with the flexibility of regulating different output voltages from 1.2266V to 18V at a load up to 150mA.

### Key Features

- Wide input voltage range 2.5V to 20V
- Adjustable and accurate output voltage from 1.2266V to 18V
- Excellent line and load regulation
- Stable with as low as 1 $\mu$ F MLCC output capacitor
- Integrated fault protections including over-temperature shutdown and current limit

### Specifications

This board is specified for the following operating conditions:

- $V_{IN}$  supply: 2.5V to 20V
- $V_{OUT}$ : adjustable between 1.2266V and 18V by changing output resistor divider
- Load step: up to 150mA
- Short-circuit current limit: 220mA

### Ordering Information

Part Number	Description
RTKA214220DR0000BU	RAA214220 demonstration board

### Related Literature

For a full list of related documents, visit our website:

- [RAA214220](#) device page

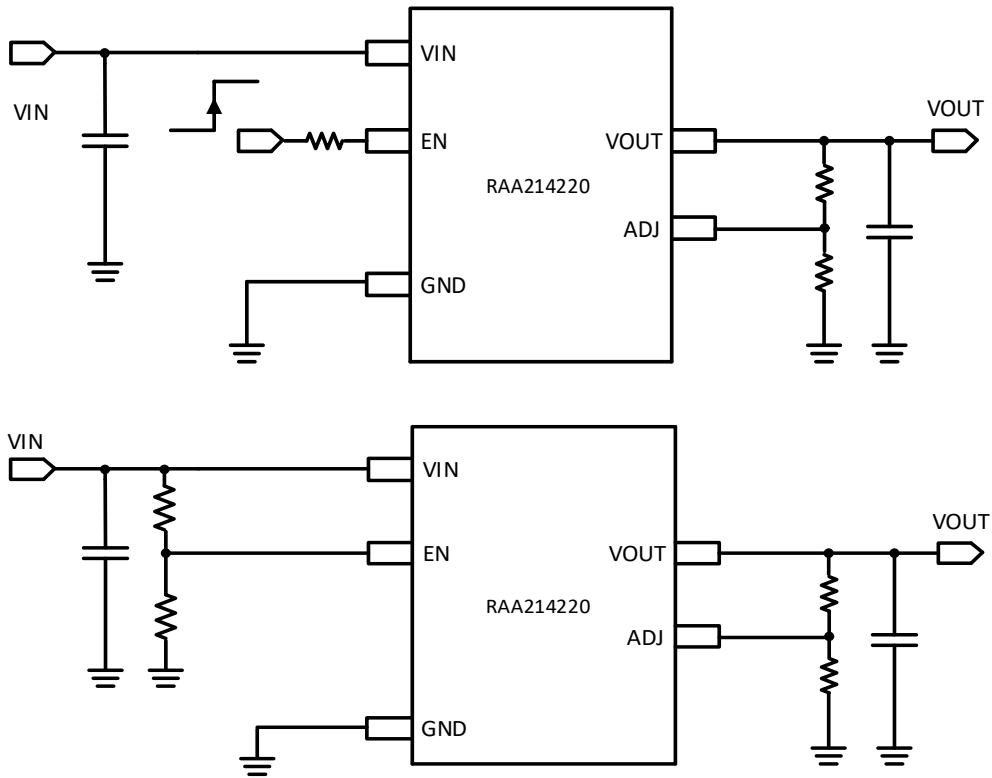


Figure 1. RAA214220 Typical Application Block Diagrams

# 1. Functional Description

The RTKA214220DR0000BU provides you with an easy setup to demonstrate the functionality of the RAA214220 LDO linear regulator. This demonstration board includes an input capacitor, output capacitor, and a resistor divider to set the output voltage. Connectors for input, output, and the Enable signal are populated on the board to allow for simple connections. Also, the pads for these connectors can be used to solder or connect the small demonstration board to other systems.

## 1.1 Setting the Output Voltage

The demonstration board is designed for a 2.5V to 20V input voltage range. The output voltage can be set to any user required level by adjusting the resistor divider on the output. R1 is the top of the resistor divider and set to 100k. R2 can be adjusted to set your required output voltage using [Equation 1](#). By default, the output voltage on this boards is set to 3.3V. If R2 is removed and R1 is replaced with a 0Ω resistor, the output voltage equals the 1.2266V reference voltage.

$$\text{(EQ. 1)} \quad V_{\text{OUT}} = \left(1 + \frac{R1}{R2}\right) \times 1.2266\text{V}$$

## 1.2 Recommended Equipment

- Power supply that delivers up to 20V with at least 0.5A source current capability
- Second power supply that delivers up to 20V (Optional)
- DC electronic load to draw current out of the LDO output
- Oscilloscope to monitor input voltage, output voltage, and load current

## 1.3 Quick Start Guide

1. Connect a power supply to the VIN terminals on board TP1 and GND.
2. If an external EN signal is needed, connect a second power supply to the EN terminals TP5 and GND.
3. Alternatively, connect TP5 and TP1 so that the IC is enabled by the input voltage.
4. Set the output voltage by adjusting the resistor divider on the output. See [RTKA214220DR0000BU Evaluation Board](#) for details.
5. Connect the DC load to the output terminals TP2 and GND.
6. Turn on the VIN supply at the required voltage, up to 20V.
7. If applicable, turn on the EN power supply at the required voltage, up to 20V.
8. Verify output voltage and load current on the oscilloscope.

## 2. Board Design

### 2.1 PCB Layout Guidelines

For best thermal performance, use as many vias as possible to connect the top layer PCB thermal land to ground planes on other PCB layers.

Place the components connected to the ADJ pin as close to the pin as possible to allow shortest possible routing; with this method, the parasitic capacitance on the pin is minimized.

### 2.2 RTKA214220DR0000BU Evaluation Board

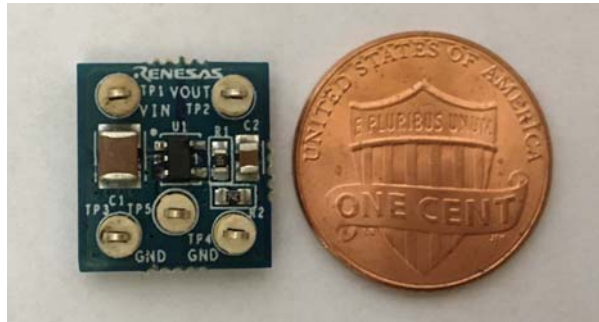


Figure 2. RTKA214220DR0000BU Evaluation Board (Top)

### 2.3 RTKA214220DR0000BU Circuit Schematic

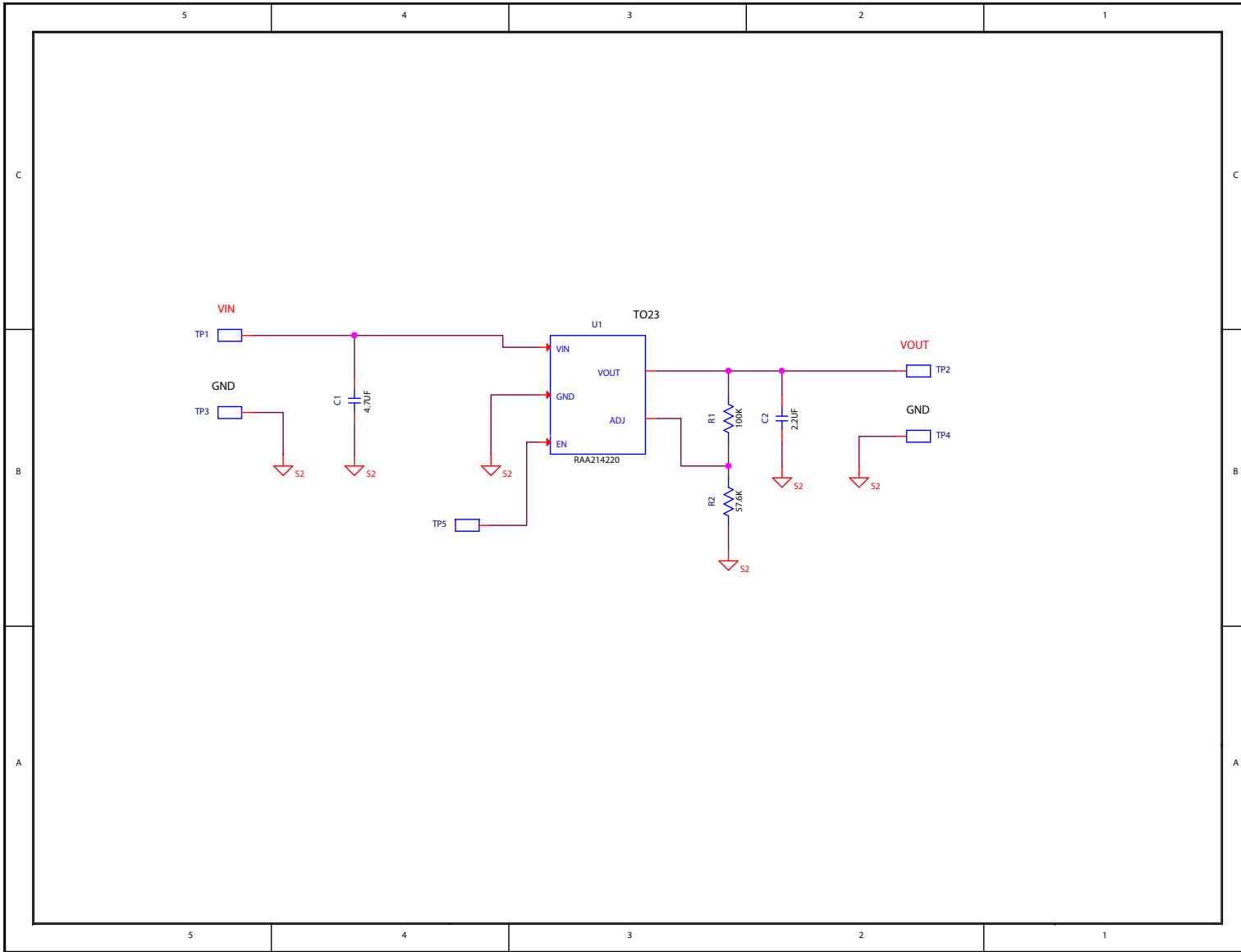


Figure 3. Schematic

## 2.4 Bill of Materials

Reference Designator	Qty	Description	Manufacturer	Manufacturer Part Number
TP1-TP5	5	Miniature White Test Point	Keystone	5002
C1	1	Ceramic Chip Cap, 4.7 $\mu$ F	TDK	CGA6M3X7S2A475K200AB
C2	1	Ceramic Cap, 2.2 $\mu$ F	Murata	GRM21BR71E225KA73L
R1	1	Thick Film Chip Resistor, 100k $\Omega$	Generic	Various
R2	1	Thick Film Chip Resistor, 57.6 $\Omega$	Generic	Various
U1	1	150mA 20V LDO Linear Regulator	Renesas	RAA214220

## 2.5 Board Layout

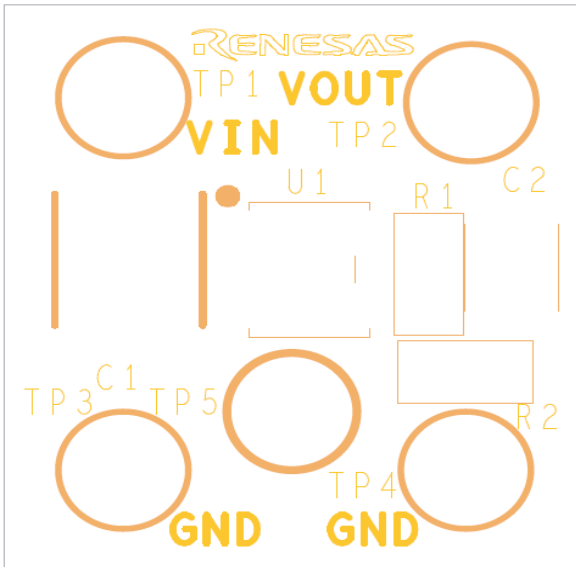


Figure 4. Silkscreen Top Layer



Figure 5. Layer 1

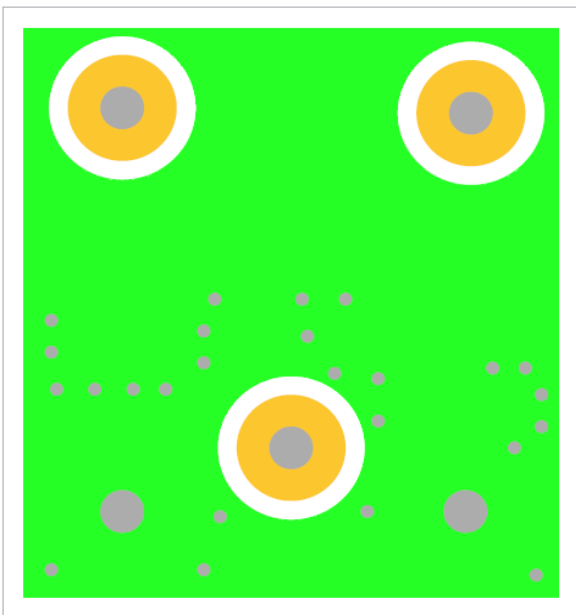


Figure 6. Layer 2

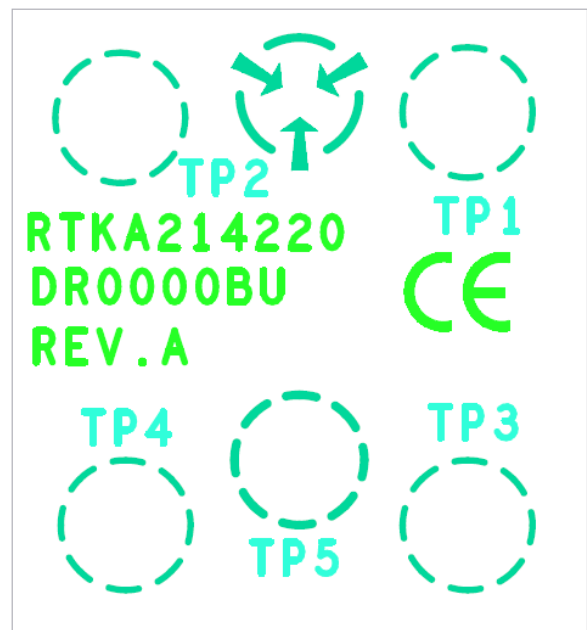


Figure 7. Silkscreen Bottom Layer

### 3. Revision History

Revision	Date	Description
1.0	Jun.16.21	Initial release



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### Corporate Headquarters

TOYOSU FORESIA, 3-2-24 Toyosu,  
Koto-ku, Tokyo 135-0061, Japan  
[www.renesas.com](http://www.renesas.com)

### Contact Information

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