

# Simple DC/DC

## Power supply circuit for RZ/A Series

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### Introduction

This application note indicates the example of power supply circuit used Simple DC/DC for RZ/A series.

### Description

The simple DC/DC provides the best power supply system for Renesas MCU and SoC having the following features.

- Multi channel DC/DC built-in the main circuit for power supply are ready to market, and simple DCDC minimizes a PCB area and components. The devices are the most suitable for RZ/A series which need 2 power supply.
- Simple DC/DC has the discharge circuit and this function helps customers to reduce a time frame of power down, and it is easy for customers to reduce a design time without adding external components.
- Auto PFM mode keeps the high efficiency even though light load and reduces the standby power, and then this mode helps to be long life battery.
- Simple DCDC and RZ/A1H are mounted on GR-Peach (ARM® mbed™ board, on sale). Customers can reduce the development time by the circuit diagrams and pattern diagrams.

### Target device

Simple DC/DC : RAA230231GSB

RZ/A1 series : RZ/A1H, RZ/A1M, RZ/A1L, RZ/A1LU

### Related documents

RAA23022x RAA23023x Datasheet (R18DS0017EJ0100)

RZ/A1H Group, RZ/A1M Group User's Manual: Hardware (R01CP0031EJ0100)

RZ/A1L Group User's Manual: Hardware (R01UH0437EJ0200)

SH7262/SH7264 Guidelines for Hi-Speed USB 2.0 Board Design (REJ05B1216-0100)

### 1. Circuit example

Fig 1 shows the circuit example of power supply system for RZ/A by Simple DC/DC.

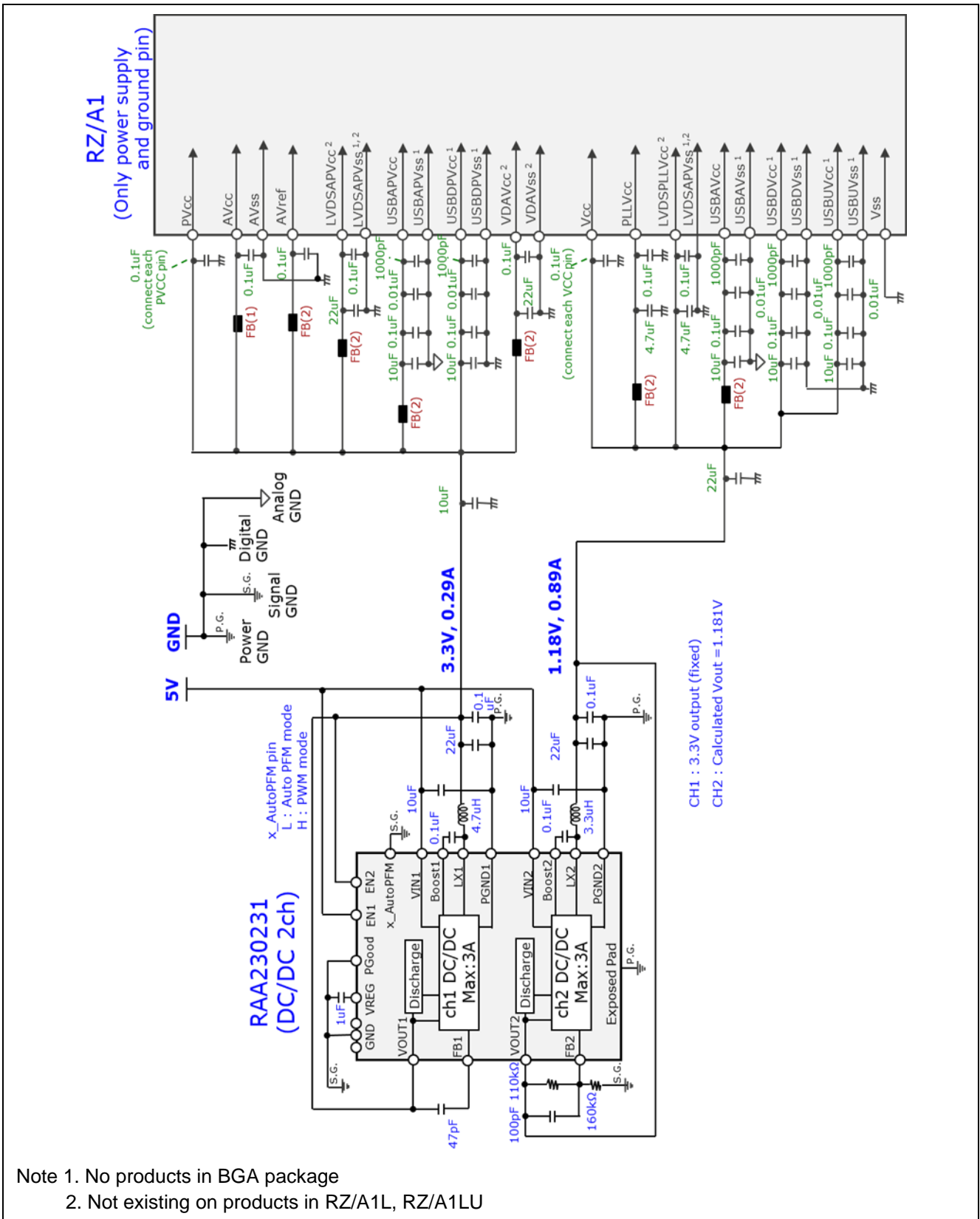


Fig.1 Circuit example of power supply system for RZ/A by Simple DC/DC

## 2. External components example

Table 1 shows example of external components.

Table 1 External components example

Part	Part number / Maker	Value and Size
Inductor RAA230231 CH1	NRS5040T4R7NMGK / Taiyo Yuden	4.7uH, 4.1A, 4.9x4.9x2.4mm
Inductor RAA230231 CH2	NRS5030T3R3MMGJ / Taiyo Yuden	3.3uH, 3.6A, 4.9x4.9x2.4mm
Ferrite bead (1) RZ/A AVcc filter	BK1005HS121 / Taiyo Yuden	Z=120Ω (100MHz), 500mA, 1x0.5x0.5mm
Ferrite bead (2) RZ/A other filter	BK1005HS241 / Taiyo Yuden	Z=240Ω (100MHz), 400mA, 1x0.5x0.5mm

【Note】 Please contact each maker for the detail information.

### 3. Remark

Maximum output current of CH1 and CH2 in RAA230231 are 3A.

Maximum consumption current of RZ/A Series are 1.18V:0.89A、3.3V:0.29A.

Fig.2 shows input and output voltage waveform of GR-Peach (ARM® mbed™ board) when starting and shutdown. The discharge circuits in Simple DC/DC turn off the output voltage quickly and avoid system malfunction caused by residual charge in the capacitors.

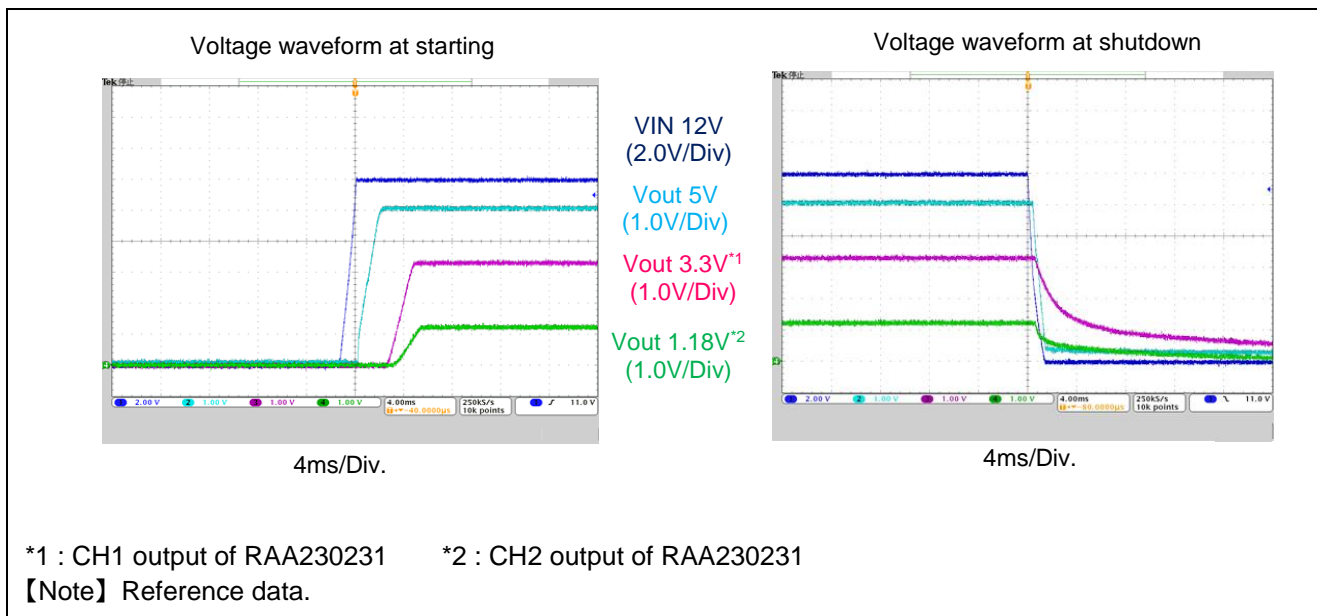


Fig2 Voltage waveform at starting and shutdown on GR-Peach

Fig.3 shows the power conversion efficiency of GR-Peach. High efficiency over all road condition is achieved during Auto PFM mode, and it reduces the power consumption in the system and helps a long life battery.

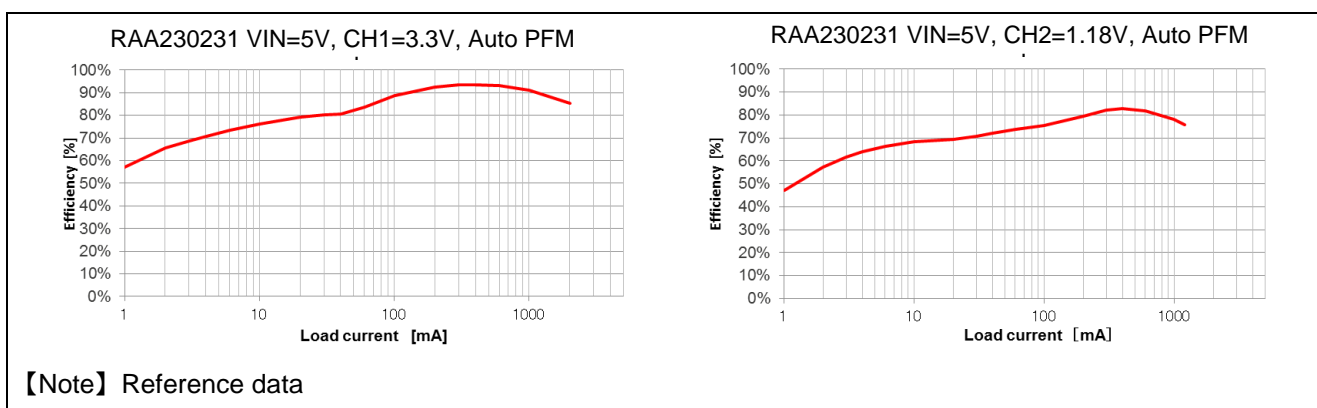


Fig.3 Efficiency at GR-Peach

When customers make actual pattern, separate a ground of control signal from a ground of a power line like the circuit diagram on page 2, so that these grounds do not have a common impedance as much as possible.

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## Revision history

Rev.	Date	Description	
		Page	Summary
1.00	Mar 30, 2016	-	First edition.
1.01	Jul 17, 2019	1-4	Revised Target device(Simple DC/DC)

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