

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.

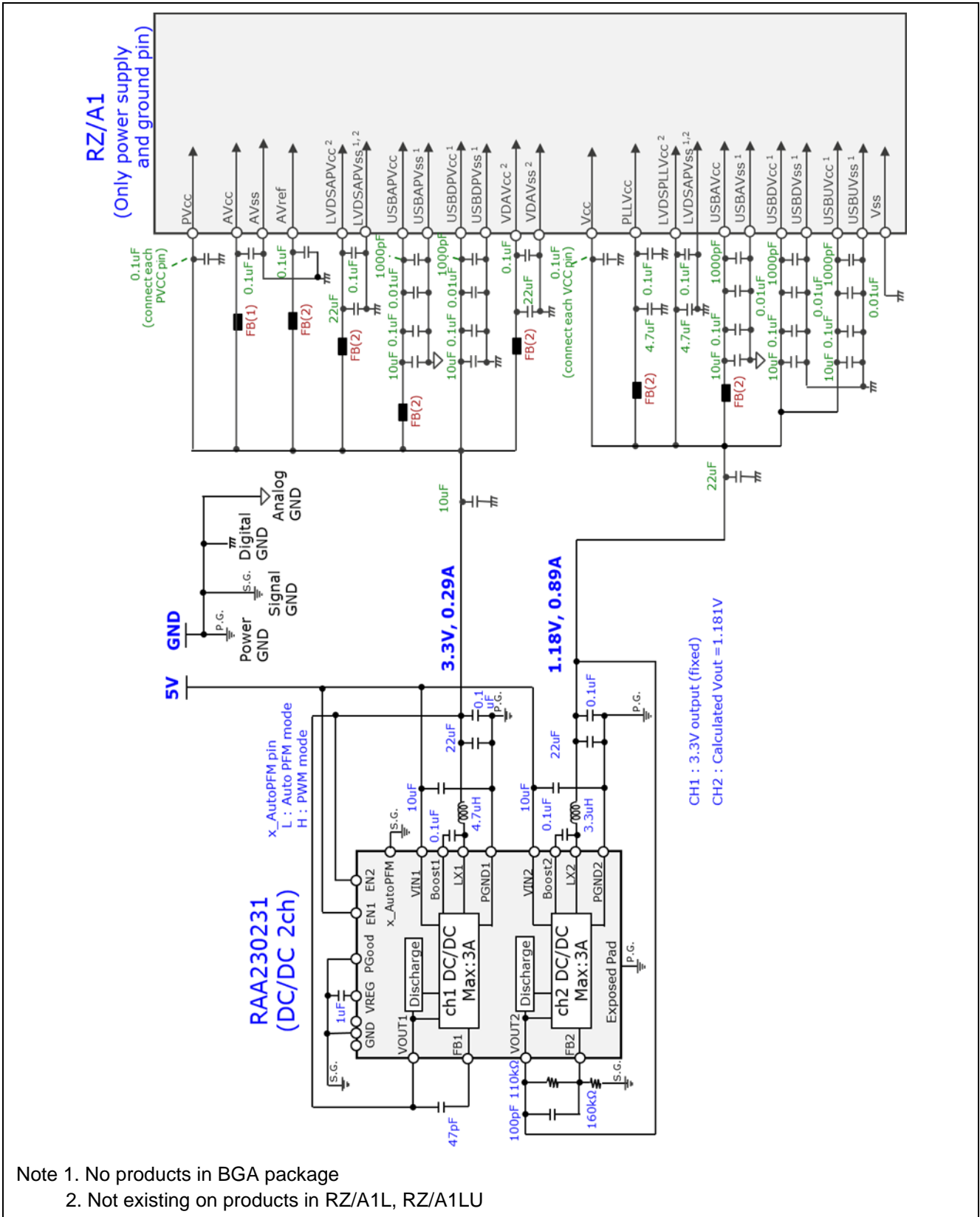


Fig.1 Circuit example of power supply system for RZ/A by Simple DC/DC

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.

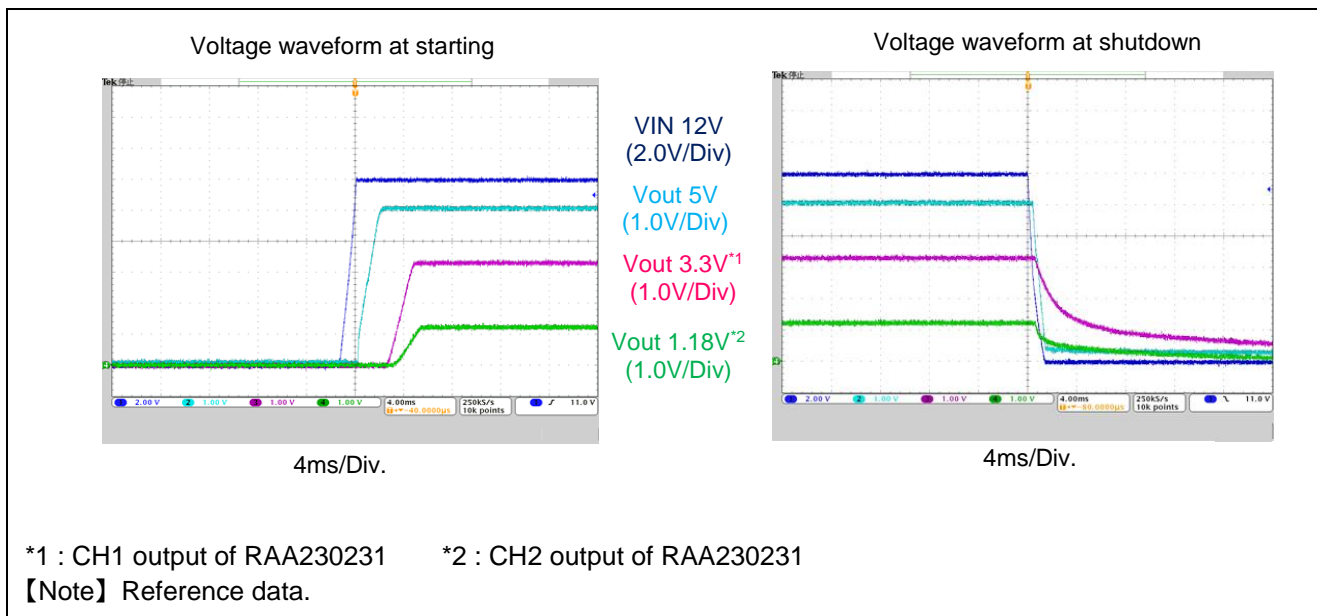


Fig2 Voltage waveform at starting and shutdown on GR-Peach

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.

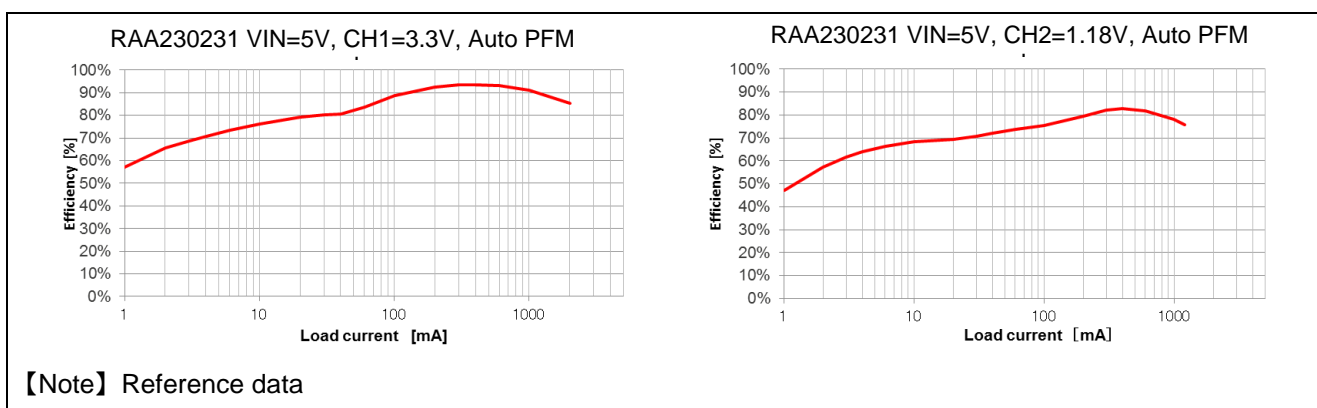


Fig.3 Efficiency at GR-Peach

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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