R2A30445NP

R19DS0066EJ0090
Rev.0.90
May 10, 2012

2-Channel Motor Driver IC for DSC, DVC and Surveillance Cameras

Overview

The R2A30445NP is a semiconductor integrated circuit that incorporates driver circuits suitable for motor of digital cameras.

Features

- An ultra-fine CMOS process has been adopted for low power consumption in a design.
- 5.0mmx5.0mm QFN (0.5mm pitch)
- Built-in of 2CH H-bridge (with a FS/BTL selectable function).
- BTL has a selectable built-in DAC control capable of 10bit accuracy.
- Hall device drive, built-in Hall output computation circuit.
- 8bitDAC built-in for various offset adjustments.
- Selection of 2 line serial communication (I2C) and 3 line serial communication (SPI) is possible.
- For I2C, the input interface control voltage is compatible with 1.8V system.
- Built-in power-on reset circuit, reference voltage, prevention from low-voltage malfunction and thermal shutdown circuit.

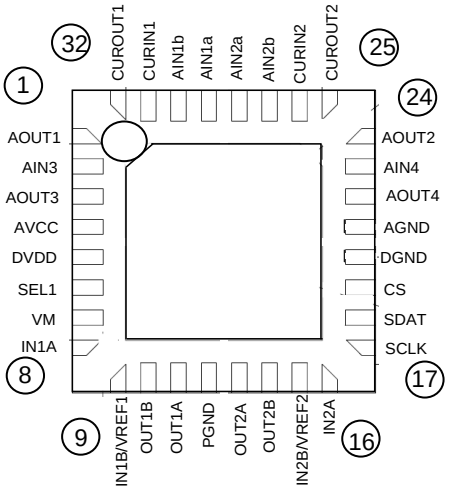
Application

Motor driver for digital still cameras

Recommended operating conditions

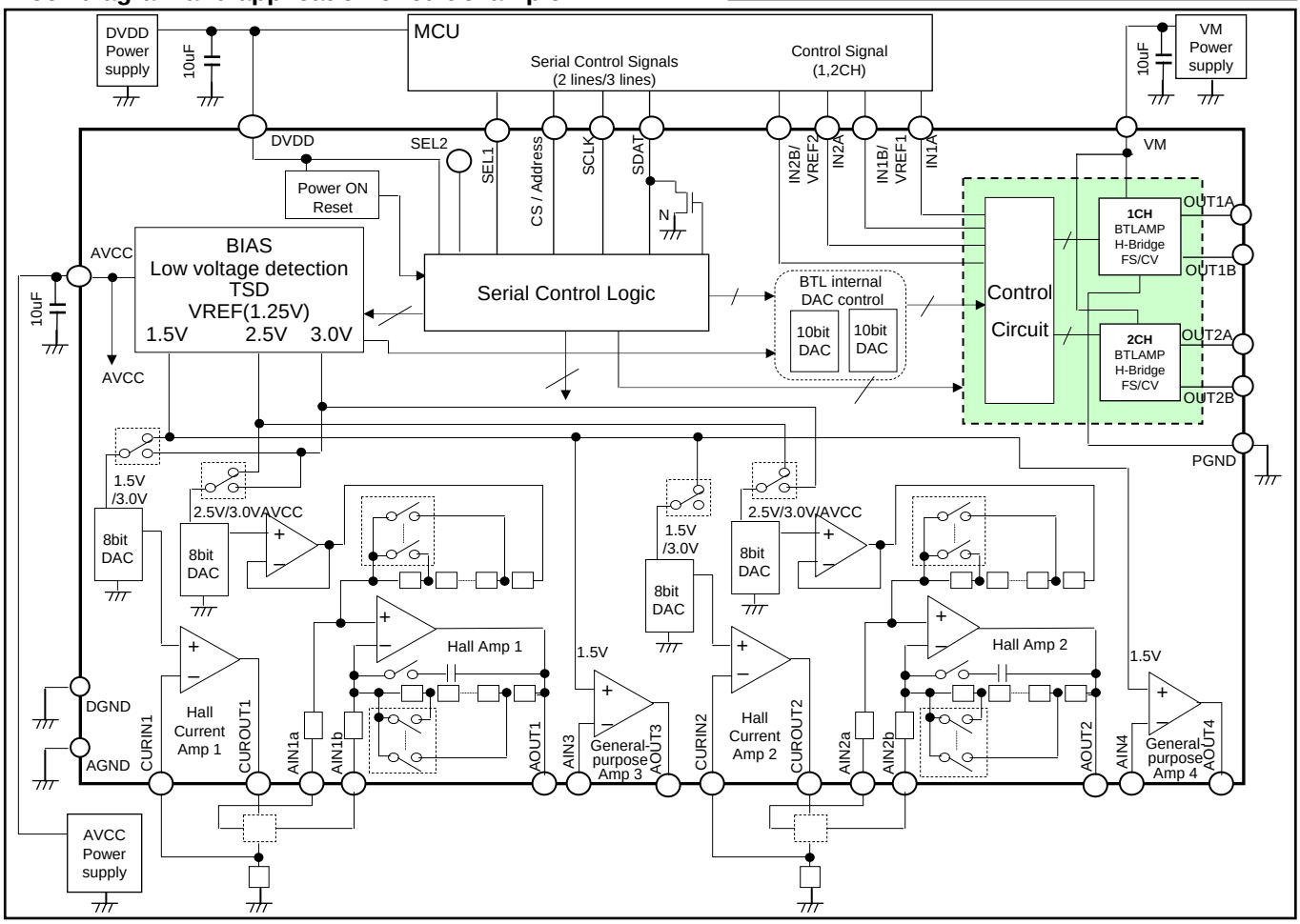
Power-supply voltage range · · · · · · · · · · · · · VM/AVCC: 2.7V~5.5V
DVDD: 2.7V~3.6V
Rated power-supply voltage · · · · · · · · · · · · · VM: 5.0V
AVCC/DVDD: 3.25V

Pin Configuration (top view)
Outline: 32QFN (5.0x5.0mm t=1.0mm(Max))



Note)
- The terminals (lead) is located on the package underside.
- There is heat dissipation PAD at the center underside of the package.
- SEL2 terminal is connected with DGND with a wire.

Block diagram and application circuit example

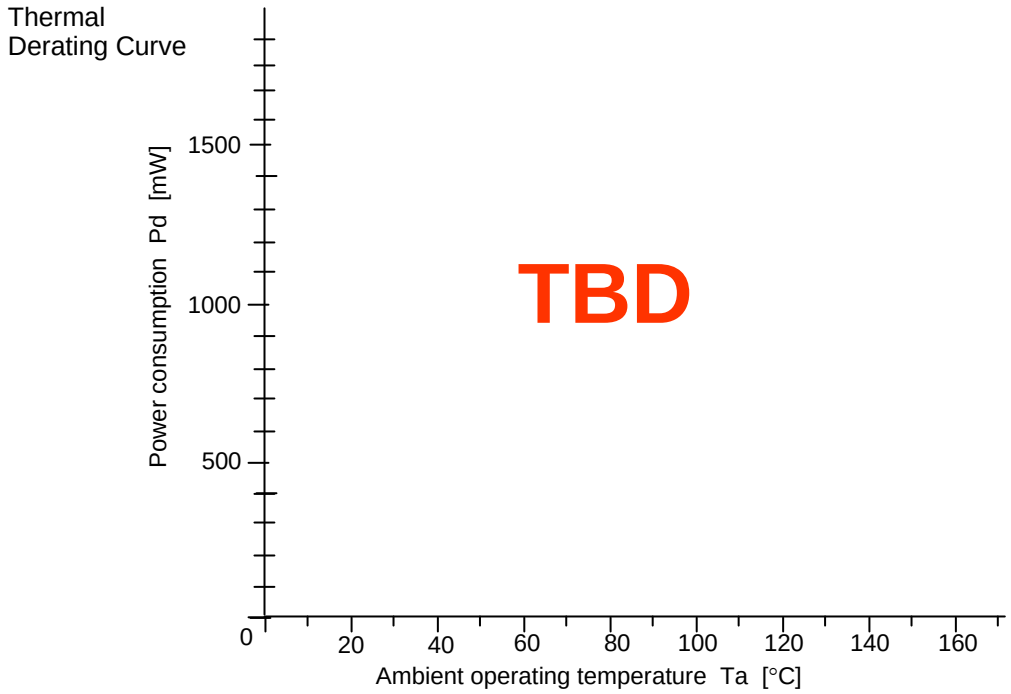


The specifications are subject to change without notice.
When it is examined for use, please confirm that this is the latest version.

Absolute Maximum Ratings (Unless specified, the ambient temperature is 25°C)

Item	Symbol	Rated Value	Unit	Remarks
Power-supply voltage 1	VM	6.5	V	Note1
Power-supply voltage 2	AVCC	6.5	V	Note1
Power-supply voltage 3	DVDD	6.5	V	Note1
Direct current (1ch~2ch)	Iod	±400	mA/ch	Note4 Note5 DC
Instant output current (1ch~2ch)	Iop	±1000	mA/ch	Note4 PW < 10ms, Duty ≤ 20%
Allowable power consumption	Pd	TBD	mW	Note2 (Ta = 25°C)
Thermal derating ratio	Kθ	TBD	mW/°C	Note2 (Ta ≥ 25°C)
Max. junction temperature	Tj	150	°C	
Applied input voltages	Vin	–0.3~DVDD+0.3 –0.3~VM+0.3	V	Note3 /DVDD system input
Ambient operating temperature	Topr	–30~85	°C	
Storage temperature	Tstg	–40~125	°C	

Notes: 1. As a rule, do not apply reverse power-supply voltages.
2. Glass epoxy board: 76.2mm x 114.5mm x 1.6mm,
copper-occupancy ratio in a 4-layer board: 20% in layers 1 and 4, 100% in layers 2 and 3.
Note that the allowable power consumption changes according to the conditions imposed on the board.
3. As a rule, do not apply voltages above the power-supply voltage or below the GND voltage.
4. The total output current does not exceed the rated value in usage with multiple channels simultaneously turned on.



[Remarks]

The electric power which the power consumption of this IC with the output transistor of 1ch - 2ch becomes dominant.

Output transistor power consumption formula

<Full Swing>: (output current)^2 x ON resistance E.g. (500mA)^2 x 2.0ohm=500mW

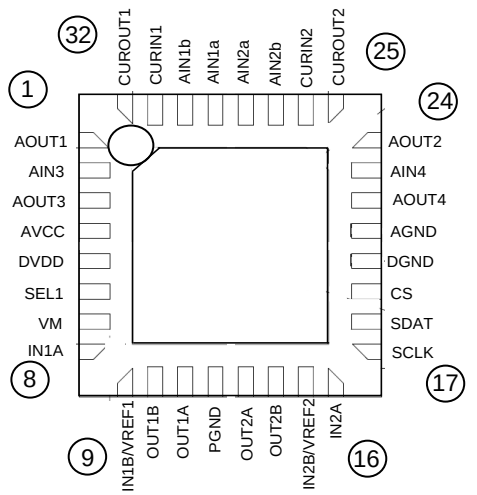
<Constant Voltage>: (VM-Voltage between terminals) x Voltage between terminals /RL

Note: In constant voltage control, the on resistance is not included in the calculation

When the ambient temperature is 25°C or more, refer to the above figure in selecting the required heat sink.

Terminal Function Explanation

Pin Configuration (top view)
Outline: 32QFN (5.0x5.0mm t=1.0mm(Max))



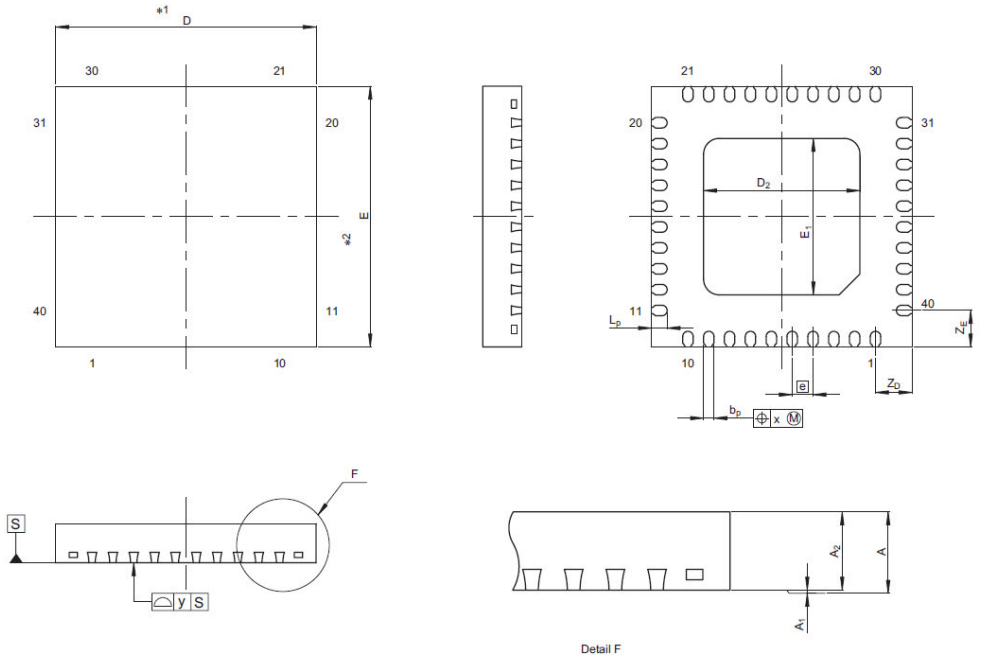
Note)
- The terminals (lead) is located on the package underside.
- There is heat dissipation PAD at the center underside of the package.
- SEL2 terminal is connected with DGND with a wire.

Pin No	Pin Name	I/O	Pin Function
1	AOUT1	O	Hall amplifier 1 output
2	AIN3	I	General-purpose Amplifier 3 input
3	AOUT3	O	General-purpose Amplifier 3 output
4	AVCC	Supply	Analog circuitry power supply
5	DVDD	Supply	Digital circuit power supply
6	SEL1	I	Communication mode selection
7	VM	Supply	1/2CH motor power supply
8	IN1A	I	1CH control signal
9	IN1B /VREF1	I	1CH control signal
10	OUT1B	O	1CH B output
11	OUT1A	O	1CH A output
12	PGND	GND	12CH power GND
13	OUT2A	O	2CH A output
14	OUT2B	O	2CH B output
15	IN2B /VREF2	I	2CH control signal
16	IN2A	I	2CH control signal

Pin No	Pin Name	I/O	Pin Function
17	SCLK	I	Serial control signal
18	SDAT	I/O	Serial control signal
19	Address /CS	I	I2C address setup /serial control signal
20	DGND	GND	Digital GND
21	AGND	GND	Analog GND
22	AOUT4	O	General-purpose Amplifier 4 output
23	AIN4	I	General-purpose Amplifier 4 input
24	AOUT2	O	Hall amplifier 2 output
25	CUROUT2	O	Hall current amplifier 2 output
26	CURIN2	I	Hall current amplifier 2 input
27	AIN2b	I	Hall amplifier 2 input
28	AIN2a	I	Hall amplifier 2 input
29	AIN1a	I	Hall amplifier 1 input
30	AIN1b	I	Hall amplifier 1 input
31	CURIN1	I	Hall current amplifier 1 input
32	CUROUT1	O	Hall current amplifier 1 output

Package Dimensions

JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
P-HWQFN40-5x5-0.40	PWQN0040LD-A	40PJR-A	0.05g



Reference Symbol	Dimension in Millimeters		
	Min	Nom	Max
D	4.9	5.0	5.1
E	4.9	5.0	5.1
A_2	—	0.75	—
A	—	—	0.8
A_1	0	0	0.05
b_p	0.15	0.2	0.25
e	—	0.4	—
L_p	0.2	0.3	0.4
x	—	—	0.05
y	—	—	0.05
Z_D	—	0.7	—
Z_E	—	0.7	—
D_2	—	3.0	—
E_1	—	3.0	—

Ordering Information

Orderable Part No.	Package Code	Quantity
R2A30445NP#W0	PWQN0040LD-A	5000 pcs

Notice

1. Descriptions of circuits, software and other related information in this document are provided only to illustrate the operation of semiconductor products and application examples. You are fully responsible for the incorporation of these circuits, software, and information in the design of your equipment. Renesas Electronics assumes no responsibility for any losses incurred by you or third parties arising from the use of these circuits, software, or information.
2. Renesas Electronics has used reasonable care in preparing the information included in this document, but Renesas Electronics does not warrant that such information is error free. Renesas Electronics assumes no liability whatsoever for any damages incurred by you resulting from errors in or omissions from the information included herein.
3. Renesas Electronics does not assume any liability for infringement of patents, copyrights, or other intellectual property rights of third parties by or arising from the use of Renesas Electronics products or technical information described in this document. No license, express, implied or otherwise, is granted hereby under any patents, copyrights or other intellectual property rights of Renesas Electronics or others.
4. You should not alter, modify, copy, or otherwise misappropriate any Renesas Electronics product, whether in whole or in part. Renesas Electronics assumes no responsibility for any losses incurred by you or third parties arising from such alteration, modification, copy or otherwise misappropriation of Renesas Electronics product.
5. Renesas Electronics products are classified according to the following two quality grades: "Standard" and "High Quality". The recommended applications for each Renesas Electronics product depends on the product's quality grade, as indicated below.
   "Standard": Computers; office equipment; communications equipment; test and measurement equipment; audio and visual equipment; home electronic appliances; machine tools; personal electronic equipment; and industrial robots etc.
   "High Quality": Transportation equipment (automobiles, trains, ships, etc.); traffic control systems; anti-disaster systems; anti-crime systems; and safety equipment etc.
   Renesas Electronics products are neither intended nor authorized for use in products or systems that may pose a direct threat to human life or bodily injury (artificial life support devices or systems, surgical implantations etc.), or may cause serious property damages (nuclear reactor control systems, military equipment etc.). You must check the quality grade of each Renesas Electronics product before using it in a particular application. You may not use any Renesas Electronics product for any application for which it is not intended. Renesas Electronics shall not be in any way liable for any damages or losses incurred by you or third parties arising from the use of any Renesas Electronics product for which the product is not intended by Renesas Electronics.
6. You should use the Renesas Electronics products described in this document within the range specified by Renesas Electronics, especially with respect to the maximum rating, operating supply voltage range, movement power voltage range, heat radiation characteristics, installation and other product characteristics. Renesas Electronics shall have no liability for malfunctions or damages arising out of the use of Renesas Electronics products beyond such specified ranges.
7. Although Renesas Electronics endeavors to improve the quality and reliability of its products, semiconductor products have specific characteristics such as the occurrence of failure at a certain rate and malfunctions under certain use conditions. Further, Renesas Electronics products are not subject to radiation resistance design. Please be sure to implement safety measures to guard them against the possibility of physical injury, and injury or damage caused by fire in the event of the failure of a Renesas Electronics product, such as safety design for hardware and software including but not limited to redundancy, fire control and malfunction prevention, appropriate treatment for aging degradation or any other appropriate measures. Because the evaluation of microcomputer software alone is very difficult, please evaluate the safety of the final products or systems manufactured by you.
8. Please contact a Renesas Electronics sales office for details as to environmental matters such as the environmental compatibility of each Renesas Electronics product. Please use Renesas Electronics products in compliance with all applicable laws and regulations that regulate the inclusion or use of controlled substances, including without limitation, the EU RoHS Directive. Renesas Electronics assumes no liability for damages or losses occurring as a result of your noncompliance with applicable laws and regulations.
9. Renesas Electronics products and technology may not be used for or incorporated into any products or systems whose manufacture, use, or sale is prohibited under any applicable domestic or foreign laws or regulations. You should not use Renesas Electronics products or technology described in this document for any purpose relating to military applications or use by the military, including but not limited to the development of weapons of mass destruction. When exporting the Renesas Electronics products or technology described in this document, you should comply with the applicable export control laws and regulations and follow the procedures required by such laws and regulations.
10. It is the responsibility of the buyer or distributor of Renesas Electronics products, who distributes, disposes of, or otherwise places the product with a third party, to notify such third party in advance of the contents and conditions set forth in this document, Renesas Electronics assumes no responsibility for any losses incurred by you or third parties as a result of unauthorized use of Renesas Electronics products.
11. This document may not be reproduced or duplicated in any form, in whole or in part, without prior written consent of Renesas Electronics.
12. Please contact a Renesas Electronics sales office if you have any questions regarding the information contained in this document or Renesas Electronics products, or if you have any other inquiries.

(Note 1) "Renesas Electronics" as used in this document means Renesas Electronics Corporation and also includes its majority-owned subsidiaries.

(Note 2) "Renesas Electronics product(s)" means any product developed or manufactured by or for Renesas Electronics.

RENESAS

SALES OFFICES Renesas Electronics Corporation http://www.renesas.com

Refer to "http://www.renesas.com/" for the latest and detailed information.

Renesas Electronics America Inc.
2880 Scott Boulevard Santa Clara, CA 95050-2554, U.S.A.
Tel: +1-408-588-6000, Fax: +1-408-588-6130

Renesas Electronics Canada Limited
1101 Nicholson Road, Newmarket, Ontario L3Y 9C3, Canada
Tel: +1-905-898-5441, Fax: +1-905-898-3220

Renesas Electronics Europe Limited
Dukes Meadow, Millboard Road, Bourne End, Buckinghamshire, SL8 5FH, U.K
Tel: +44-1628-651-700, Fax: +44-1628-651-804

Renesas Electronics Europe GmbH
Arcadiastrasse 10, 40472 Düsseldorf, Germany
Tel: +49-211-65030, Fax: +49-211-6503-1327

Renesas Electronics (China) Co., Ltd.
7th Floor, Quantum Plaza, No.27 ZhiChunLu Haidian District, Beijing 100083, P.R.China
Tel: +86-10-8235-1155, Fax: +86-10-8235-7679

Renesas Electronics (Shanghai) Co., Ltd.
Unit 204, 205, AZIA Center, No.1233 Lujiazui Ring Rd., Pudong District, Shanghai 200120, China
Tel: +86-21-5877-1818, Fax: +86-21-6887-7858 / -7898

Renesas Electronics Hong Kong Limited
Unit 1601-1613, 16/F., Tower 2, Grand Century Place, 193 Prince Edward Road West, Mongkok, Kowloon, Hong Kong
Tel: +852-2886-9318, Fax: +852 2886-9022/9044

Renesas Electronics Taiwan Co., Ltd.
13F, No. 363, Fu Shing North Road, Taipei, Taiwan
Tel: +886-2-8175-9600, Fax: +886 2-8175-9670

Renesas Electronics Singapore Pte. Ltd.
80 Bendemeer Road, Unit #06-02 Hyflux Innovation Centre Singapore 339949
Tel: +65-6213-0200, Fax: +65-6213-0300

Renesas Electronics Malaysia Sdn.Bhd.
Unit 906, Block B, Menara Amcorp, Amcorp Trade Centre, No. 18, Jln Persiaran Barat, 46050 Petaling Jaya, Selangor Darul Ehsan, Malaysia
Tel: +60-3-7955-9390, Fax: +60-3-7955-9510

Renesas Electronics Korea Co., Ltd.
11F., Samik Lavied' or Bldg., 720-2 Yeoksam-Dong, Kangnam-Ku, Seoul 135-080, Korea
Tel: +82-2-558-3737, Fax: +82-2-558-5141

Colophon 2.2