R2A30444BX

R19DS0064EJ0800
Rev.8.00
May 10, 2012

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

Overview

The R2A30444BX 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 with no charge-pump.
- A small 32-pin WLBGA package (ball pitch of 0.4mm/t=0.64mm) has been adopted.
- 1ch/2ch and 3ch/4ch are capable 1-2 phase (100%) stepper drive, 16, 256 and 512 resolution micro-steps.
- 3ch/4ch is capable of constant voltage drive.
- 5ch/6ch is capable of constant current drive.
- By using exclusive control mode on 5ch and 6ch, it resembles 7ch drive.
- The input terminal is compatible with 1.8V system.
- Built-in 2 PI driver channels
- Built-in 2 Comparator channels
- Built-in low-voltage malfunction prevention and thermal shutdown circuit.

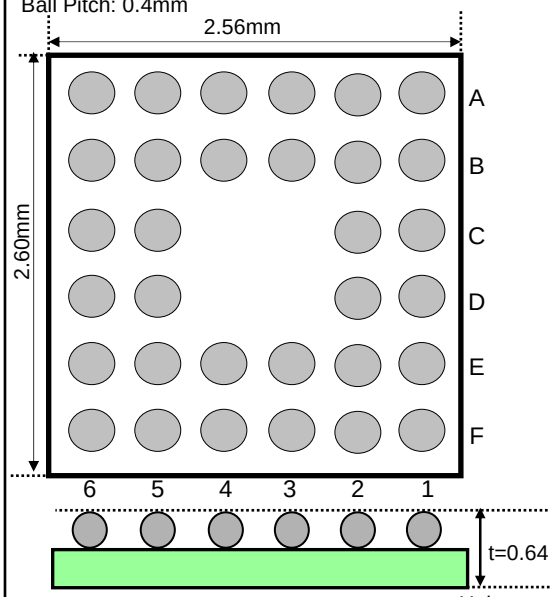
Application

Motor driver for digital still cameras

Recommended operating conditions

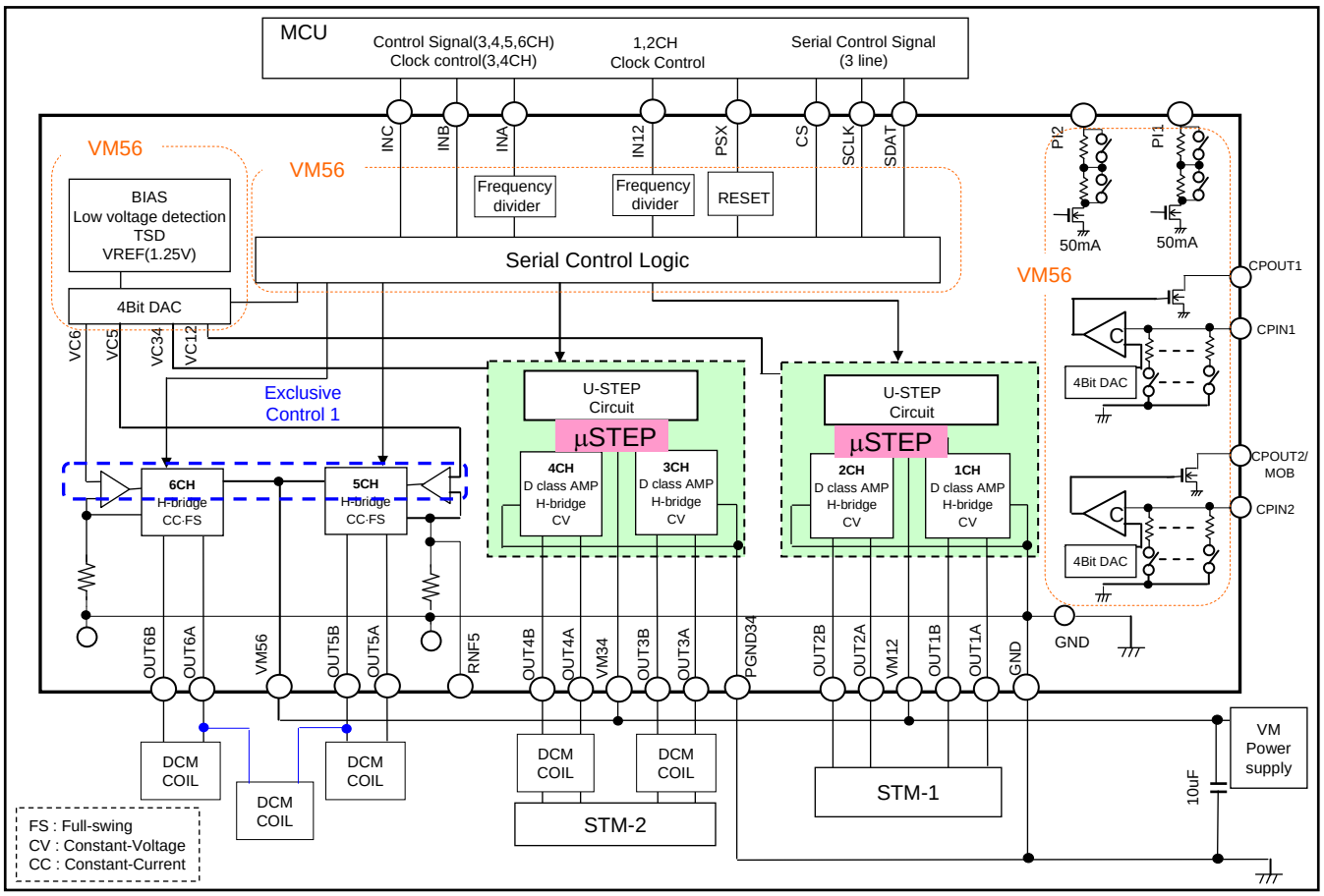
Power-supply voltage range · · · · · · · · · · · · · VM: 2.65V~5.5V
Rated power-supply voltage · · · · · · · · · · · · · VM: 5.0V

Pin Layout (Ball side) Outline/Package: WLBGA
Body: 2.56mm x 2.60mm t=0.64mm
Ball Pitch: 0.4mm



Note: Unit: mm
• Each VM pins respectively are not connected to each other internally. Please connect them externally.

Block diagram and application circuit example

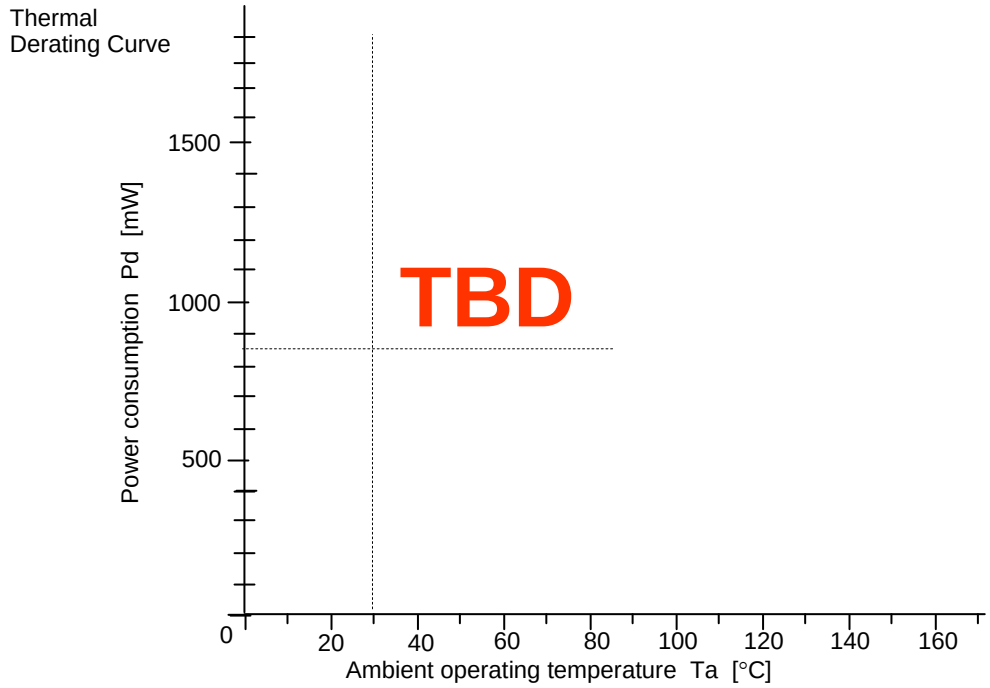


The specifications are subject to change without notice.
When it is examined for use, please confirm that this is the latest version.

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

Item	Symbol	Rated Value	Unit	Remarks
Power-supply voltage 2	VM	6.5	V	Note1
Direct current (1ch~5ch)	Iod	±800	mA/ch	Note4 Note5 DC
Instantaneous output current (1ch~5ch)	Iop	±1000	mA/ch	Note4 PW < 10ms, Duty ≤ 20%
Direct current (6ch)	Iod	±400	mA/ch	Note4 Note5 DC
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	–0.3~5.5	V	Note3
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.
5. When FS is used for CH5, RNF5 needs to be connected to GND.



[Remarks]

The electric power which the power consumption of this IC with the output transistor of 1ch - 6ch becomes dominant.

Output transistor power consumption formula

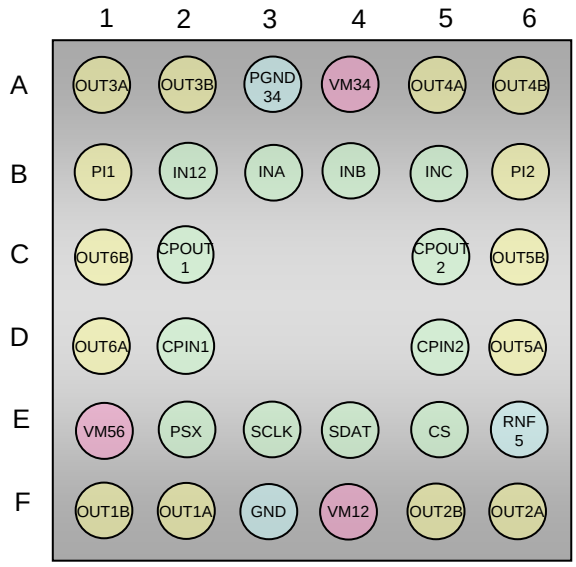
<Full Swing/Constant Voltage>: (output current)^2 x ON resistance E.g. (500mA)^2 x 2.0ohm=500mW

<Constant current>: output current x {VM – RNF5 – output current x RM}
Note: In constant current control, the on resistance is not included in the calculation

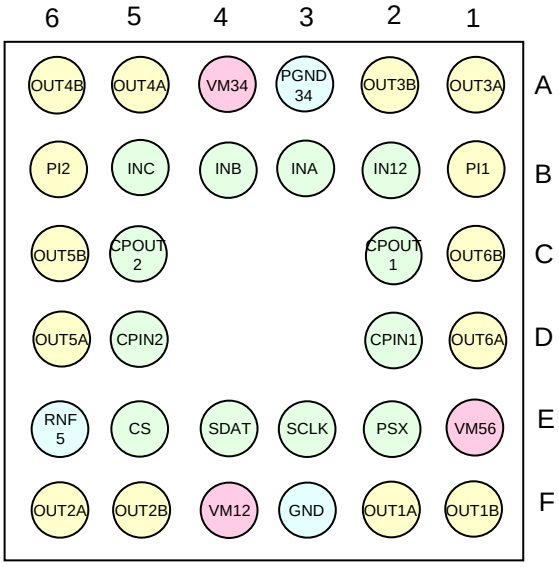
When the ambient temperature is 25°C or more, refer to the above figure in selecting the required heat sink.

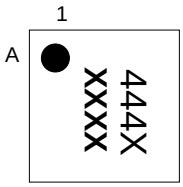
Terminal Function Explanation

Top VIEW (Marking Side)



Bottom VIEW (Pin side)



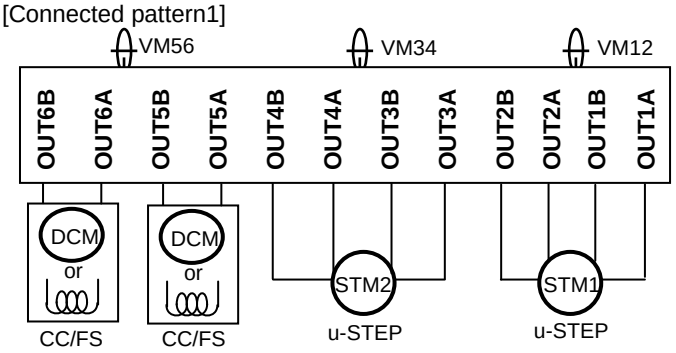


Pin No	Pin Name	I/O	Pin Function
A1	OUT3A	O	3CH A Output
A2	OUT3B	O	3CH B Output
A3	PGND34	GND	3/4CH power GND
A4	VM34	Power Supply	3/4CH Motor Power Supply
A5	OUT4A	O	4CH A Output
A6	OUT4B	O	4CH B Output
B1	PI1	O	PI1 Output
B2	IN12	I	12CH Control
B3	INA	I	3/4/5CH Control
B4	INB	I	4/5/6CH Control
B5	INC	I	Serial Control Signal
B6	PI2	O	PI2 Output MOB/EXT Output
C1	OUT6B	O	6CH B Output
C2	CPOUT1	O	Comparator 1 output
—			
—			
C5	CPOUT2	O	Comparator 2 output
C6	OUT5B	O	5CH B Output

Pin No	Pin Name	I/O	Pin Function
D1	OUT6A	O	6CH A Output
D2	CPIN2	I	Comparator 1 input
—			
—			
D5	CPIN2	I	Comparator 2 input
D6	OUT5A	O	5CH A Output
E1	VM56	Power Supply	5/6CH Motor Power Supply & Analog/Control power supply
E2	PSX	I	PS control signal
E3	SCLK	I	Serial Control Signal
E4	SDAT	I	Serial Control Signal
E5	CS	I	Serial Control Signal
E6	RNF5	GND	5CH power GND
F1	OUT1B	O	1CH B Output
F2	OUT1A	O	1CH A Output
F3	GND	GND	1/2CH power GND /analog control GND
F4	VM12	Power Supply	1/2CH Motor Power Supply
F5	OUT2B	O	2CH B Output
F6	OUT2A	O	2CH A Output

Actuator connection pattern(1)

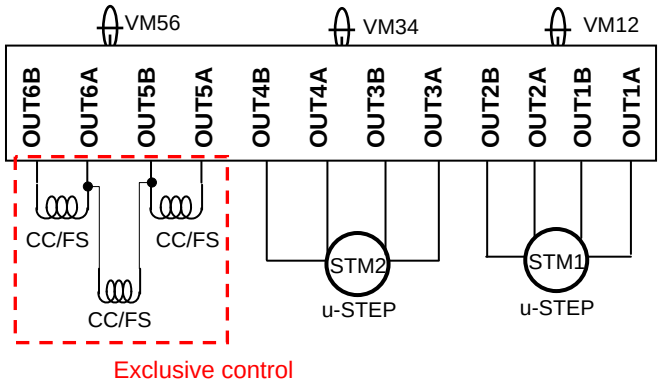
[Connected pattern1]



1ch	2ch	3ch	4ch	5ch	6ch
STM1		STM2		CC/FS	CC/FS
1line (IN12)		1line control (INA)		1line control (INC) or 2line control (INB/INC) or serial	1line control (INB) or serial

The control method of each channel is set through serial

[Connected pattern2]



1ch	2ch	3ch	4ch	5ch	6ch	7ch
STM1		STM2		CC/FS	CC/FS	CC/FS
1line (IN12)		1line control (INA)		1line control (INC) or 2line control (INB/INC) or serial	1line control (INB) or serial	1line control or Serial

The control method of each channel is set through serial

Exclusive Control

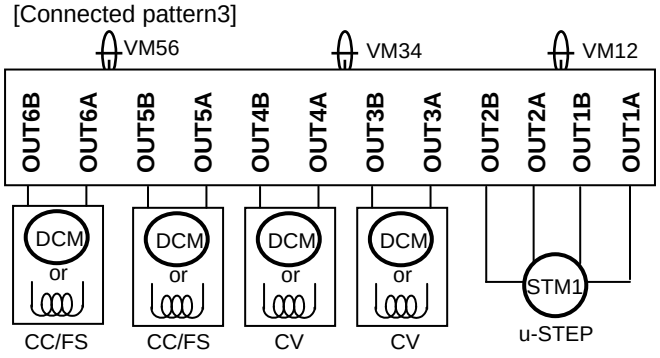
5ch,6ch,7ch cannot be simultaneously operated. Only one channel is operated at a time.

3~7CH Control Input Terminal Setting

3~7CH Input Terminal Control Bit Setting					3/4ch (STM2)	3ch(DC motor/coil)	4ch(DC motor/coil)	5ch	6ch	7ch
b4	b3	b2	b1	b0						
0	0	0	0	0		—	—	—	—	—
0	0	0	0	1		—	—	INB/INC	—	—
0	0	0	1	0		INA	—	INB/INC	—	—
0	0	0	1	1		—	INA	INB/INC	—	—
0	0	1	0	0		—	—	INB/INC	INA	—
0	0	1	0	1		—	—	INC	—	—
0	0	1	1	0		INA	—	INC	—	—
0	0	1	1	1		INA	INB	INC	—	—
0	1	0	0	0		INA	—	INC	INB	—
0	1	0	0	1		INA	—	INC	—	INB
0	1	0	1	0		—	INA	INC	—	—
0	1	0	1	1		—	INA	INC	INB	—
0	1	1	0	0		—	INA	INC	—	INB
0	1	1	0	1		—	—	INC	INB	—
0	1	1	1	0		—	—	INC	—	INB
1	0	0	0	0	INA			—	—	—
1	0	0	0	1	INA			INC	—	—
1	0	0	1	0	INA			—	INC	—
1	0	0	1	1	INA			INB/INC	—	—
1	0	1	0	0	INA			INC	INB	—
1	0	1	0	1	INA			INC	—	INB

Actuator connection pattern(2)

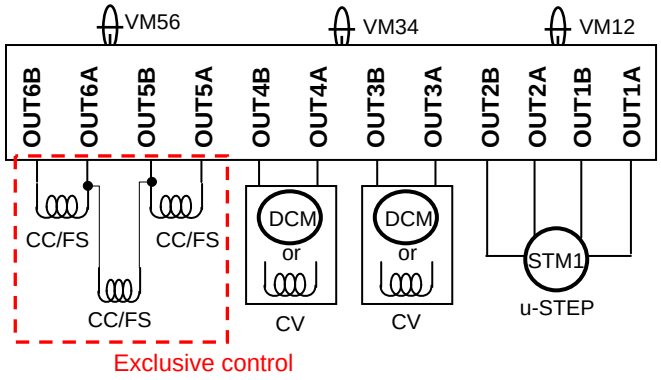
[Connected pattern3]



1ch	2ch	3ch	4ch	5ch	6ch
STM1		CV	CV	CC/FS	CC/FS
1line (IN12)		1line control (INA) or serial	1line control (INA or INB) or serial	1line control (INC) or 2line control (INB/INC) or serial	1line control (INB) or serial

The control method of each channel is set through serial

[Connected pattern4]



1ch	2ch	3ch	4ch	5ch	6ch	7ch
STM1		CV	CV	CC/FS	CC/FS	CC/FS
1line (IN12)		1line control (INA) or serial	1line control (INA or INB) or serial	1line control (INC) or 2line control (INB/INC) or serial	1line control (INB) or serial	1line control or Serial

The control method of each channel is set through serial

Exclusive Control

5ch,6ch,7ch cannot be simultaneously operated. Only one channel is operated at a time.

3~7CH Control Input Terminal Setting

3~7CH Input Terminal Control Bit Setting					3/4ch (STM2)	3ch(DC motor/coil)	4ch(DC motor/coil)	5ch	6ch	7ch
b4	b3	b2	b1	b0						
0	0	0	0	0		—	—	—	—	—
0	0	0	0	1		—	—	INB/INC	—	—
0	0	0	1	0		INA	—	INB/INC	—	—
0	0	0	1	1		—	INA	INB/INC	—	—
0	0	1	0	0		—	—	INB/INC	INA	—
0	0	1	0	1		—	—	INC	—	—
0	0	1	1	0		INA	—	INC	—	—
0	0	1	1	1		INA	INB	INC	—	—
0	1	0	0	0		INA	—	INC	INB	—
0	1	0	0	1		INA	—	INC	—	INB
0	1	0	1	0		—	INA	INC	—	—
0	1	0	1	1		—	INA	INC	INB	—
0	1	1	0	0		—	INA	INC	—	INB
0	1	1	0	1		—	—	INC	INB	—
0	1	1	1	0		—	—	INC	—	INB
1	0	0	0	0	INA			—	—	—
1	0	0	0	1	INA			INC	—	—
1	0	0	1	0	INA			—	INC	—
1	0	0	1	1	INA			INB/INC	—	—
1	0	1	0	0	INA			INC	INB	—
1	0	1	0	1	INA			INC	—	INB

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Orderable Part No.	Package Code	Quantity
R2A30444BX#W0	SWBG0032LA-A	3000 pcs

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