

R2A30428BM/R2A30428BX

R19DS0061EJ0100

Rev.1.00

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

Overview

The R2A30428BM is a semiconductor integrated circuit that incorporates driver circuits suitable for motor of digital cameras

Features

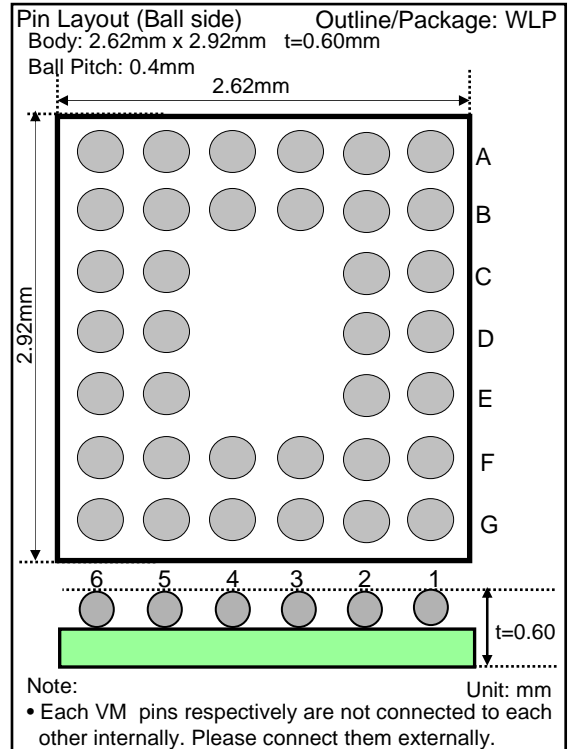
- An ultra-fine CMOS process has been adopted for low power consumption in a design with no charge-pump.
- A small 36-pin WLP package (ball pitch of 0.4mm/t=0.60mm) has been adopted.
- 1ch/2ch and 3ch/4ch are capable of 2-2 phase stepper drive, 1-2 phase (100%) stepper drive, 128, 256 and 512 resolution 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.
- Built-in 3 PI drivers channels.
- Built-in 3 Schmitt buffers channels.
- Built-in low-voltage malfunction prevention and thermal shutdown circuit.
- Power supplies VCC and VM are internally isolated and include a function to prevent reverse current between the power supplies.

Application

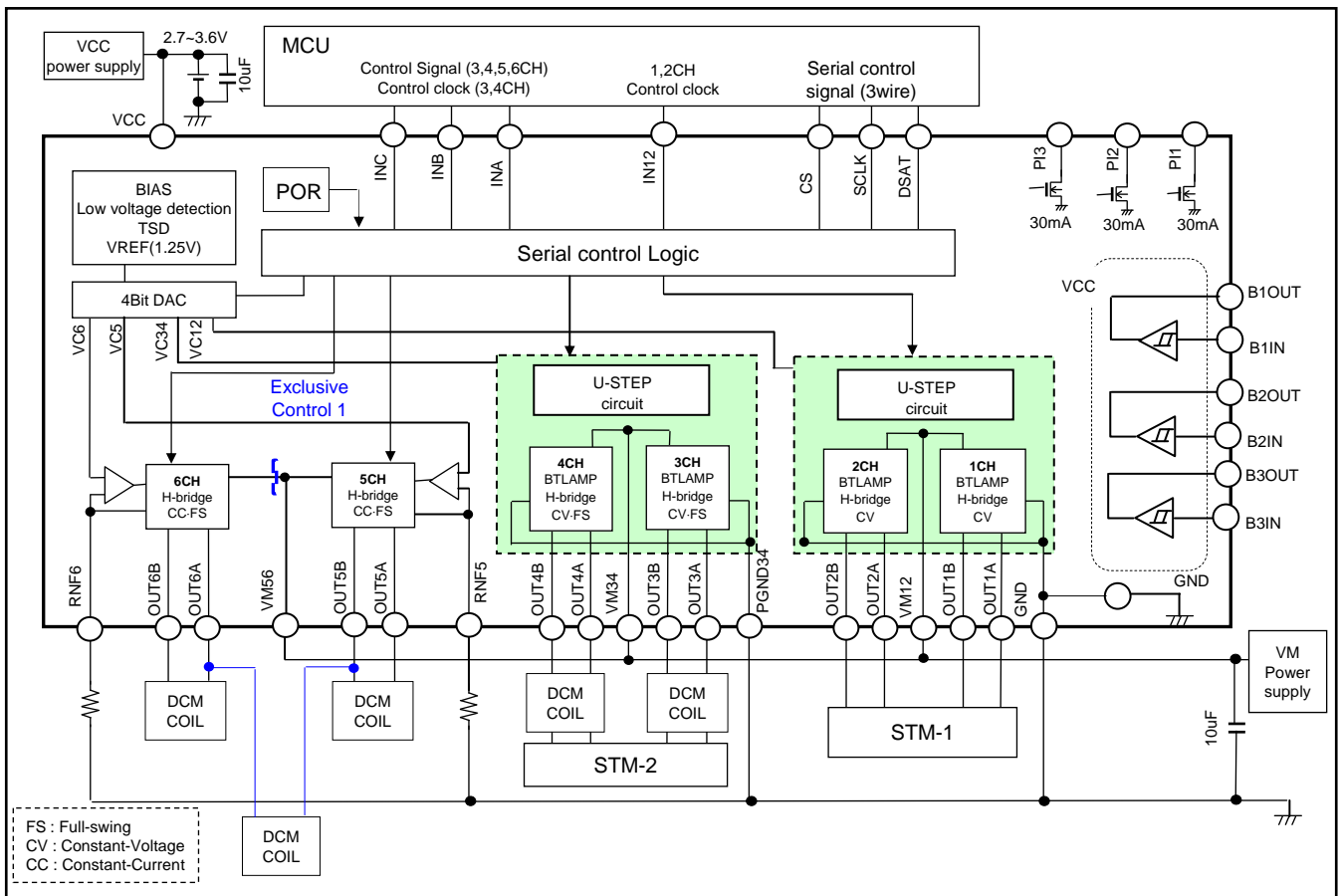
Motor driver for digital still cameras

Recommended operating conditions

Power-supply voltage range VCC: 2.7V~3.6V
 VM: 2.7V~5.5V
 Rated power-supply voltage VCC: 3.3V
 VM: 5.0V



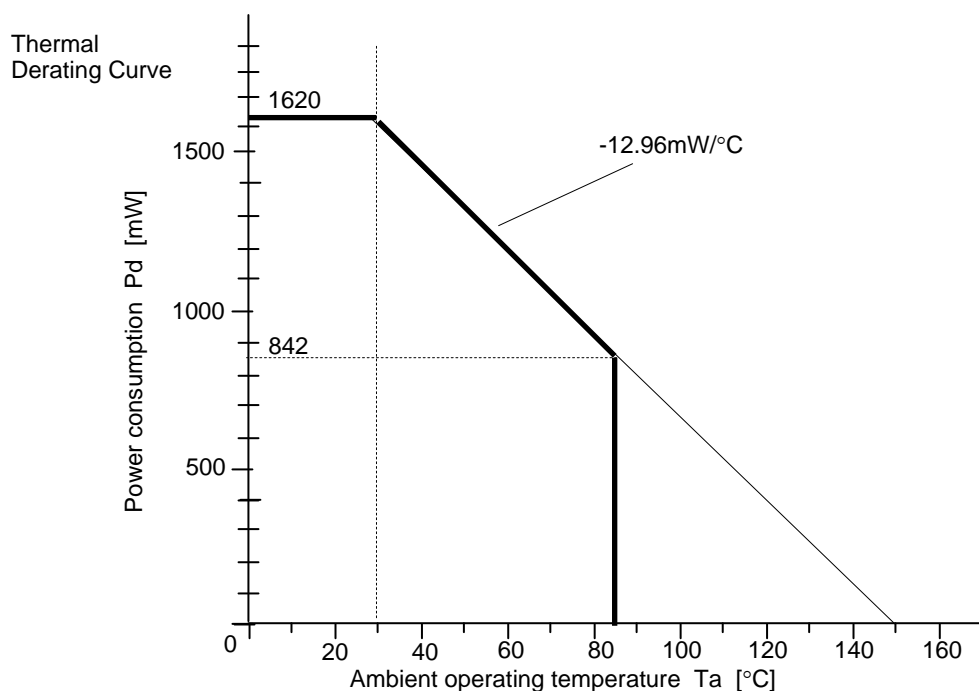
Block diagram and application circuit example



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

Item	Symbol	Rated Value	Unit	Remarks
Power-supply voltage 1	VCC	6.5	V	Note1
Power-supply voltage 2	VM	6.5	V	Note1
Direct current (1ch~6ch)	Iod	±600	mA/ch	Note4 DC
Instantaneous output current(1ch~6ch)	Iop	±800	mA/ch	Note4 PW < 10ms, Duty ≤ 20%
Allowable power consumption	Pd	1620	mW	Note2 (Ta = 25°C)
Thermal derating ratio	Kθ	-12.96	mW/°C	Note2 (Ta ≥ 25°C)
Max. junction temperature	Tj	150	°C	
Applied input voltages	Vin	-0.3~VCC+0.3	V	Note3
Ambient operating temperature	Topr	-30~85	°C	
Storage temperature	Tstg	-40~150	°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 20-100-100-20%.
 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 - 6ch becomes dominant.

Output transistor power consumption formula

<Full Swing>: (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}

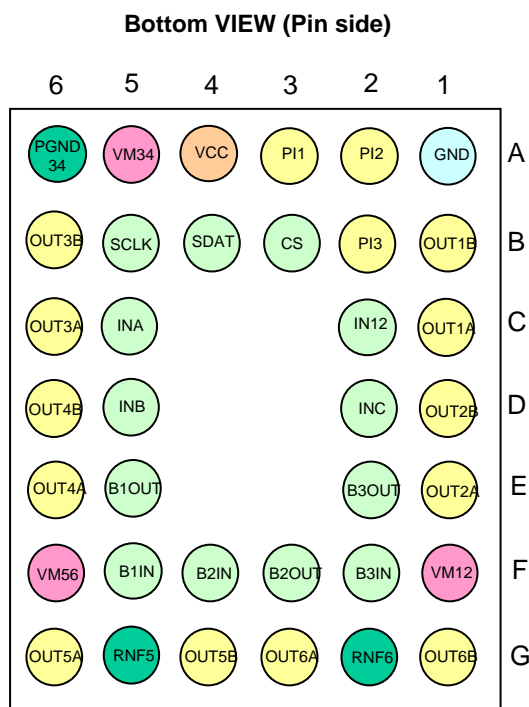
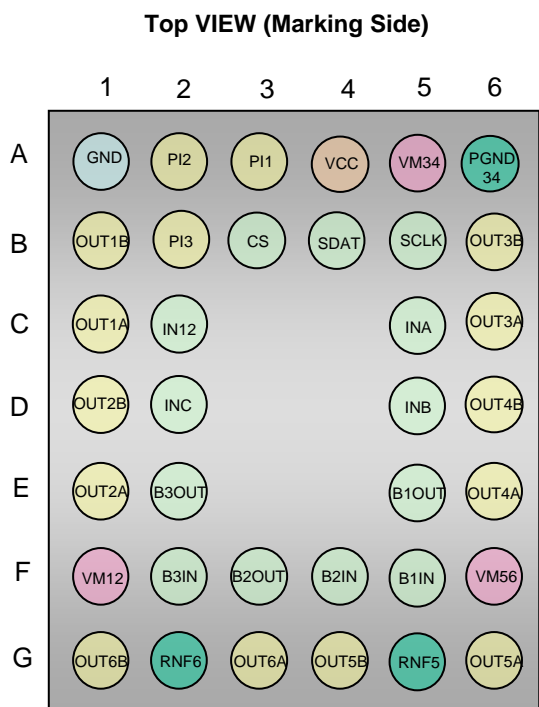
Note: In constant current control, the on resistance is not included in the calculation

<Constant voltage>: (VM - voltage between terminal) x voltage between terminal / RL

Note: In constant voltage control, the on resistance is not included in the calculation formula for RL at a resistance fixed voltage regulation of the actuator.

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

Terminal Function Explanation

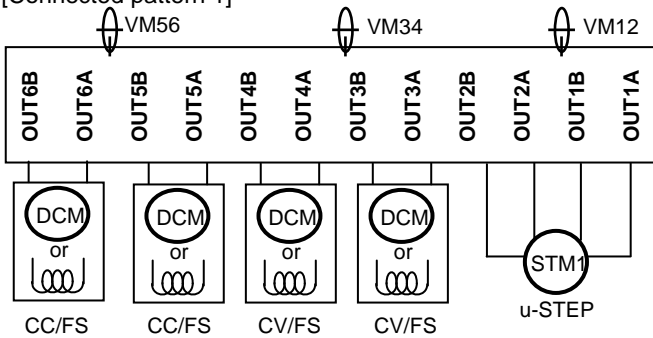


Pin No	Pin Name	I/O	Pin Function
A1	GND	GND	1/2CH Power GND /Analog Control GND
A2	PI2	O	PI2 Output
A3	PI1	O	PI1 Output
A4	VCC	Power Supply	Analog/Control Power Supply
A5	VM34	Power Supply	3/4CH Motor Power Supply
A6	PGND34	GND	34CH Power GND
B1	OUT1B	O	1CH B Output
B2	PI3	O	PI3 Output or MOB/EXT Output
B3	CS	I	Serial Control Signal
B4	SDAT	I	Serial Control Signal
B5	SCLK	I	Serial Control Signal
B6	OUT3B	O	3CH B Output
C1	OUT1A	O	1CH A Output
C2	IN12	I	12CH Control
—	—	—	—
—	—	—	—
C5	INA	I	3/4/5CH Control
C6	OUT3A	O	3CH A Output
D1	OUT2B	O	2CH B Output
D2	INC	I	6CH Control
—	—	—	—
—	—	—	—
D5	INB	I	4/5/6CH Control
D6	OUT4B	O	4CH B Output

Pin No	Pin Name	I/O	Pin Function
E1	OUT2A	O	2CH A Output
E2	B3OUT	O	Schmitt Buffer 3 Output
—	—	—	—
—	—	—	—
E5	B1OUT	O	Schmitt Buffer 1 Output
E6	OUT4A	O	4CH A Output
F1	VM12	Power Supply	1/2CH Motor Power Supply
F2	B3IN	I	Schmitt Buffer 3 Input
F3	B2OUT	O	Schmitt Buffer 2 Output
F4	B2IN	I	Schmitt Buffer 2 Input
F5	B1IN	I	Schmitt Buffer 1 Input
F6	VM56	Power Supply	5/6CH Motor Power Supply
G1	OUT6B	O	6CH B Output
G2	RNF6	GND	Current feedback resistor connection
G3	OUT6A	O	6CH A Output
G4	OUT5B	O	5CH B Output
G5	RNF5	GND	Current feedback resistor connection
G6	OUT5A	O	5CH A Output

Actuator connection pattern(1)

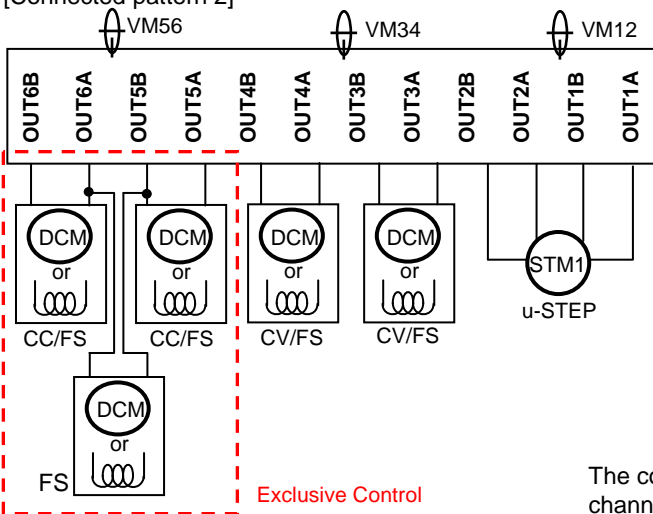
[Connected pattern 1]



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

The control method of each channel is set through serial

[Connected pattern 2]



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

The control method of each channel is set through serial

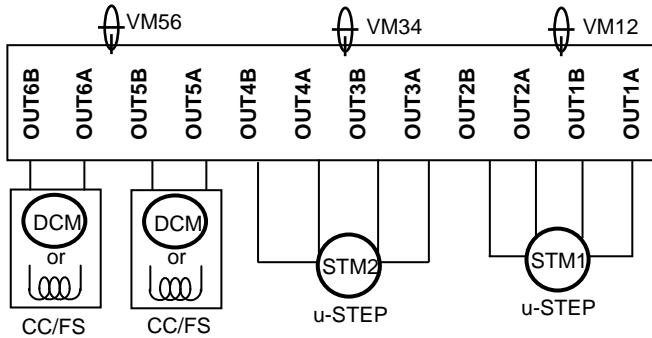
Exclusive Control
5ch,6ch,7ch cannot be simultaneously operated. Only one channel is operated at a time.

3-6CH Control input terminal setting

3-6CH Control Bit of Input terminal setting					3/4ch (STM2)	3ch (DC motor /coil)	4ch (DC motor /coil)	5ch	6ch		
b4	b3	b2	b1	b0					INB	INC	
0	0	0	0	0	X	—	—	—	INB	INC	
0	0	0	1	0		INA	—	—	—	INB	INC
0	0	1	0	0		—	INA	—	—	INB	INC
0	0	1	1	0		—	—	—	INA	INB	INC
0	0	0	0	1		—	—	—	—	—	INC
0	0	0	1	1		INA	—	—	—	—	INC
0	0	1	0	1		INA	INB	—	—	—	INC
0	0	1	1	1		INA	—	—	INB	—	INC
0	1	0	0	1		—	INA	—	—	—	INC
0	1	0	1	1		—	—	INA	INB	—	INC
0	1	1	0	1	—	—	—	INB	—	INC	
1	0	0	0	0	INA	—	—	—	INB	INC	
1	0	0	1	1	INA	—	—	INB	—	INC	
1	0	1	0	1	INA	—	—	—	—	INC	

Actuator connection pattern(2)

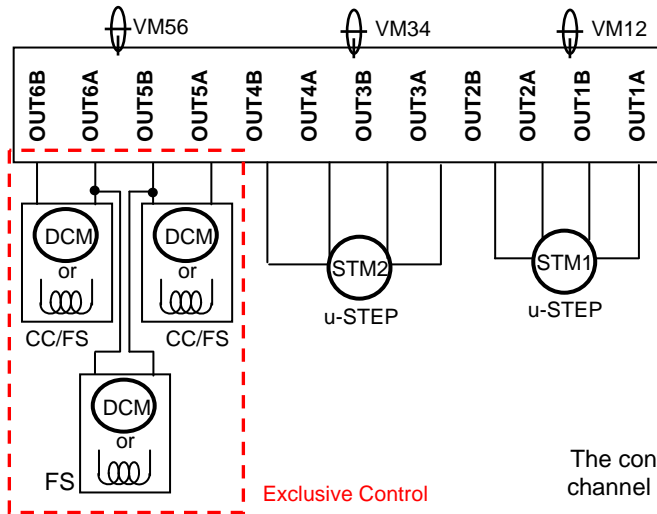
[Connected pattern3]



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

The control method of each channel is set through serial

[Connected pattern4]



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

3~6CH Control input terminal setting

3~6CH Control Bit of Input terminal setting					3/4ch (STM2)	3ch (DC motor /coil)	4ch (DC motor /coil)	5ch	6ch	
b4	b3	b2	b1	b0					INB	INC
0	0	0	0	0		---	---	---	INB	INC
0	0	0	1	0		INA	---	---	INB	INC
0	0	1	0	0		---	INA	---	INB	INC
0	0	1	1	0		---	---	INA	INB	INC
0	0	0	0	1		---	---	---	---	INC
0	0	0	1	1		INA	---	---	---	INC
0	0	1	0	1		INA	INB	---	---	INC
0	0	1	1	1		INA	---	INB	---	INC
0	1	0	0	1		---	INA	---	---	INC
0	1	0	1	1		---	INA	INB	---	INC
0	1	1	0	1		---	---	INB	---	INC
1	0	0	0	0	INA			---	INB	INC
1	0	0	1	1	INA			INB	---	INC
1	0	1	0	1	INA			---	---	INC

Ordering Information

Orderable Part No.	Package Code	Quantity
R2A30428BM#W0	SWBG0036LA-A	2500 pcs
R2A30428BX#W0	SWBG0036LB-A	2500 pcs

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