

# DCM8054/8027 Stepper Motor Drive

Pulse/Direction or CW/CCW Control Mode, 20-80VDC, 5.5A/2.8A

- Anti-Resonance provides optimal torque and nulls mid-range instability
- Micro Stepping allows a low resolution step input to produce a higher micro step output, thus offers smoother motor movement
- Soft-start with no “jump” when powered on
- TTL compatible and optically isolated input
- Support PUL/DIR and Double Pulse modes
- 14 selectable resolutions in decimal and binary, up to 51,200 steps/rev
- Supply voltage up to +80VDC
- Output current up to 5.5A (DCM8054), 2.8A (DCM8027)
- Automatic idle-current reduction
- Over-voltage, over-current, Short-circuit



## Descriptions

The DCM8054/8027 is a fully digital stepper drive developed with advanced DSP control algorithm based on the latest motion control technology. It has achieved a unique level of system smoothness, providing optimal torque and nulls mid-range instability. Compared with traditional analog drives, DCM8054/8027 can drive a stepper motor at much lower noise, lower heating, and smoother movement. Its unique features make DCM8054/8027 an ideal choice for high performance applications.

## Applications

Suitable for a wide range of stepper motors, from NEMA size 17 to 34. It can be used in various applications such as laser cutters, laser markers, high precision X-Y tables, labeling machines, CNC router, etc. Its unique features make the DCM8054/8027 an ideal choice for applications that require both low-speed smoothness and high speed performances.

## Specifications

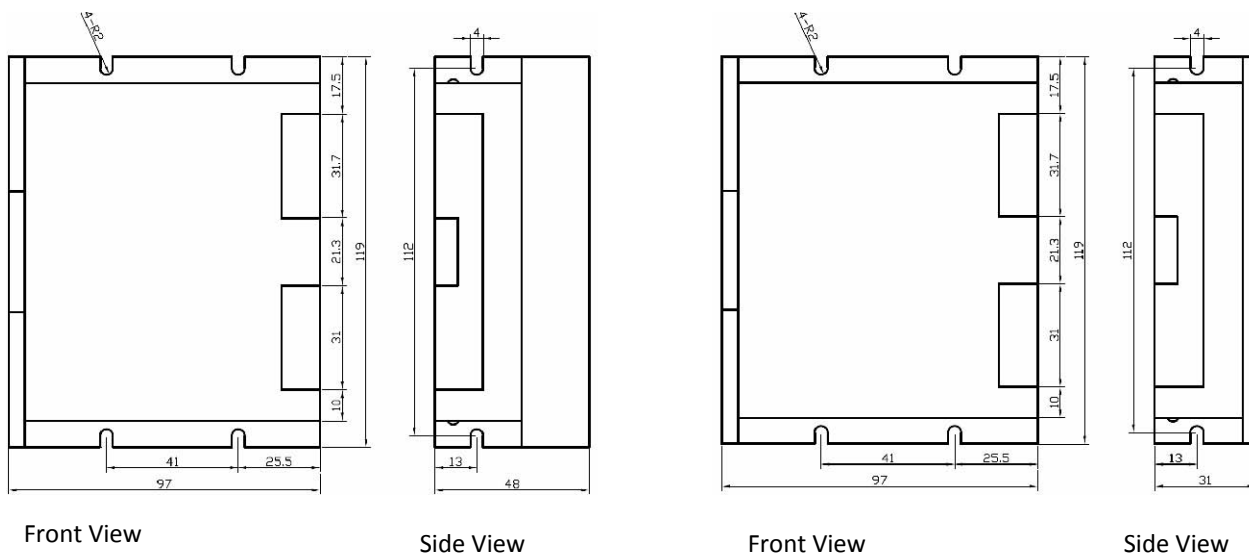
### Electrical Specifications

Parameter	Min	Typical	Max	Unit
Inupt Voltage	20	48	80	VDC
Output Current	0	-	5.5(8054) 2.8 (8027)	A
Pulse Input Frequency	0	-	200	kHz
Pulse Voltage	0	-	5	V
Logic Signal Current	7	10	16	mA
Isolation Resistance	100	0	0	M Ω

### Operating Environment

Cooling	Natural Cooling or Forced Cooling	
Operating Environment	Environment	Avoid dust, oil fog and corrosive gases
	Ambient Temperature	0°C – 40°C (32°F – 104°F)
	Humidity	40%RH – 90%RH
	Operating Temperature (Heat Sink)	70°C (158°F) Max
Storage Temperature	-20°C – 125°C (-4°F – 257°F)	
Weight	DCM8054: 460g (15.5oz), DCM8027: 350g (12.34oz)	

### Mechanical Specifications





(a) DCM8054

(b) DCM8027

## Protection Indications

The green indicator turns on when power-up. When the drive protection is activated, the red LED blinks periodically (3S) to indicate the error type. For each fault cycle, the red LED turns on for 0.2 second then turns off for 0.3 second.

Priority	Time(s) of Blink	Sequence wave of red LED	Description
1st	1		Over-current protection activated when motor coil current exceeds the limit.
2nd	2		Over-voltage protection activated when input voltage is greater than 91VDC.

## Connectors and Pin Assignment

The DCM8054/DCM8027 has two connectors, connector for control signals connections and connector for power connections. All of them are screw terminals and can be plug/unplug easily.

Control Signal Connector			
Pin	Name	I/O	Description
1	PUL+(+5V)	I	<i>Pulse Signal:</i> In single pulse (pulse/direction) mode, this input represents pulse signal, active each rising or falling edge; In double pulse mode (set by inside jumper J2), this input represents clockwise (CW) pulse, active both at high level and low level. 4.5-5V when PUL-HIGH, 0-0.5V when PUL-LOW. For reliable response, pulse width should be longer than 2.5 $\mu$ s.
2	PUL-(PUL)	I	
3	DIR+(+5V)	I	<i>Direction Signal:</i> In single-pulse mode, this signal has low/high voltage levels, representing two directions of motor rotation. In double-pulse mode (set by inside jumper J2), this signal is counter-clock (CCW) pulse, active both at high level and low level. For reliable motion response, DIR signal should be ahead of PUL signal by 5 $\mu$ s at least. 4.5-5V when DIR-HIGH, 0-0.5V when DIR-LOW. The motor direction can also be changed by inside jumper J3. The rotation direction is also related to motor-driver wiring match. Exchanging the connection of two wires for a coil to the driver will reverse motion direction.
4	DIR-(DIR)	I	
5	ENA(+5V)	I	<i>Enable Signal:</i> This signal is used for enabling/disabling the driver. In default, high level for enabling the driver and low level for disabling the driver. Usually left UNCONNECTED (ENABLED).
6	ENA-(ENA)	I	

Power Connector			
Pin	Name	I/O	Description
1	GND	GND	Power Ground (Negative)
2	+V	I	Power Supply Input (Positive) 20-80 VDC (recommend leaving room for voltage fluctuation and back-EMF)
3	A+	O	Motor Phase A+
4	A-	O	Motor Phase A-
5	B+	O	Motor Phase B+
6	B-	O	Motor Phase B-

### DIP Switch Settings

#### Output Current (SW1-SW3)

The output RMS current is set by the DIP switches SW1-SW3 as shown in the following table. Note the actual current is also related to motor velocity.

DCM8054	DCM8027	SW1	SW2	SW3
2.0A	1.0A	ON	ON	ON
2.5A	1.3A	OFF	ON	ON
3.0A	1.5A	ON	OFF	ON
3.5A	1.8A	OFF	OFF	ON
4.0A	2.0A	ON	ON	OFF
4.5A	2.3A	OFF	ON	OFF
5.0A	2.5A	ON	OFF	OFF
5.5A	2.8A	OFF	OFF	OFF

#### Idle Current Reduction (SW4)

The DIP switch SW4 is used to switch on/off auto-current current reduction. The auto reduction level is 50% of the run current setting.

	ON	OFF
SW4	Auto idle current reduction is OFF.	Auto idle current reduction is ON.

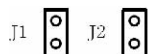
### Micro Step Resolution (SW5-SW8)

The micro step resolution is set by the DIP switches SW5-SW8 as show in the following table:

Micro step	Steps/rev.(for 1.8°motor)	SW5	SW6	SW7	SW8
2	400	ON	ON	ON	ON
4	800	ON	OFF	ON	ON
8	1600	ON	ON	OFF	ON
16	3200	ON	OFF	OFF	ON
32	6400	ON	ON	ON	OFF
64	12800	ON	OFF	ON	OFF
128	25600	ON	ON	OFF	OFF
256	51200	ON	OFF	OFF	OFF
5	1000	OFF	ON	ON	ON
10	2000	OFF	OFF	ON	ON
25	5000	OFF	ON	OFF	ON
50	10000	OFF	OFF	OFF	ON
125	25000	OFF	ON	ON	OFF
250	50000	OFF	OFF	ON	OFF

### Selecting Pulse Active Edge and Control Mode (J1-J2)

There are two jumpers J1 and J2 inside the DCM8027 and DCM8028 specifically for selecting effective pulse edge and control signal mode, as shown in the following figure. Default setting is PUL/DIR mode and upward-rising edge effective.



(a) J1, J2 open circuit  
PUL/DIR mode and effective at upward-rising edge



(b) J1 short circuit, J2 open circuit  
PUL/DIR mode and effective at downward-falling edge



(c) J1 open circuit, J2 short circuit  
CW/CCW mode and effective at upward-rising edge



(d) J1 short circuit, J2 short circuit  
CW/CCW mode and effective at downward-falling edge

Please note that there is also an internal Jumper J3 which can be used to change the motor direction in PUL/DIR mode.

