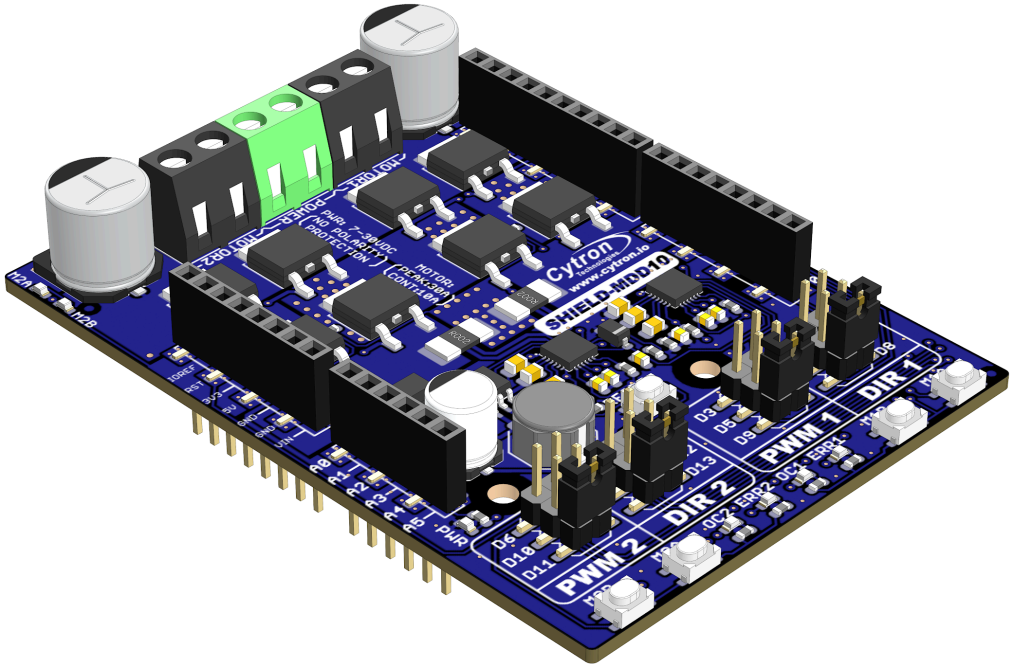
SHIELD-MDD10
10Amp 7V-30V DC Motor Driver Shield for Arduino (2 Channels)



Datasheet

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1. BOARD LAYOUT & FUNCTION

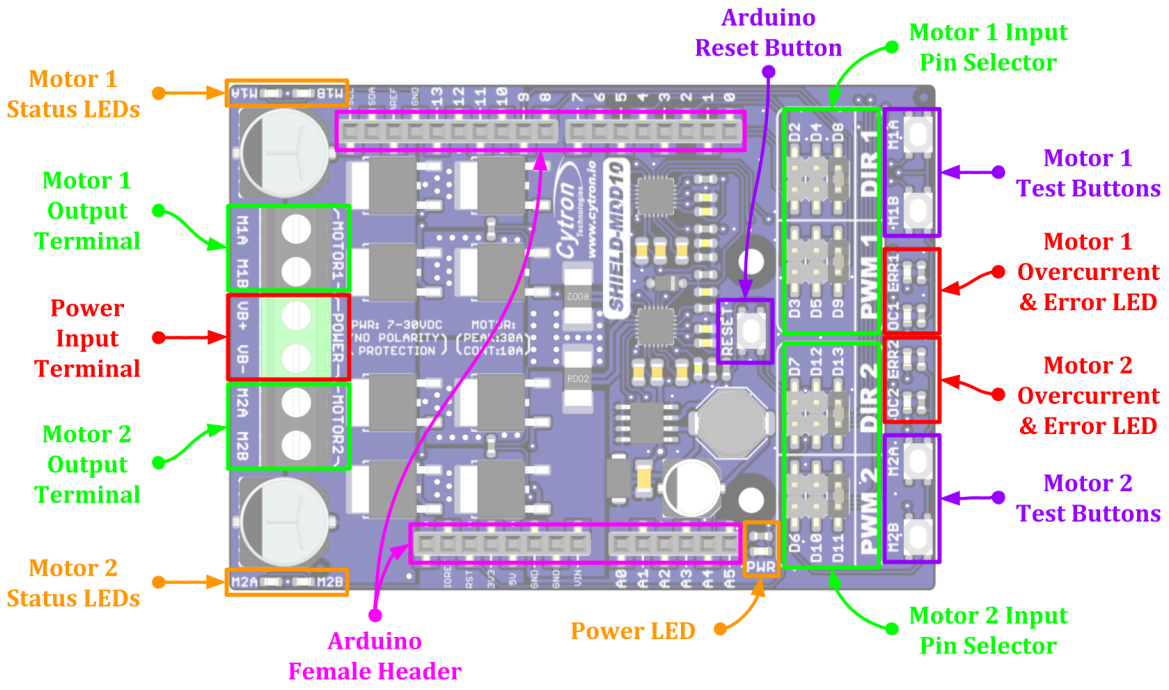

Figure 1: SHIELD-MDD10 Board Functions (Top)

Function	Description
Power Input Terminal	Connect to battery. ● VB+ : Positive ● VB- : Negative *Warning : Connecting in reverse polarity will damage the motor driver instantaneously.*
Motor Output Terminal	Connect to motor terminal. Motor direction is depending on the polarity.
Power LED	Turn on when power up.
Motor Status LEDs	Turn on when the motor is running. ● MA : Forward* ● MB : Backward*
Error LED	Turn on during undervoltage shutdown or hardware fault. Please contact support@cytron.io for more information.
OC (Overcurrent) LED	Turn on when current limiting is in action. Current limit threshold is depending on the board temperature.
Arduino Reset Button	Press to reset the Arduino.
Test Buttons	Press to test the functionality of the motor driver. Motor will run at full speed. ● MA : Forward* ● MB : Backward*

Function	Description
PWM/DIR Input Pin Selector	Select the Arduino pin for PWM & DIR signal. ● DIR : Direction input. ● PWM : PWM input for motor speed control.
Arduino Female Header	Connect to other shield.

Table 1: SHIELD-MDD10 Board Functions (Top)

* *Actual motor direction is depending on the motor connection.*
Swapping the connection (MA & MB) will reverse the direction.

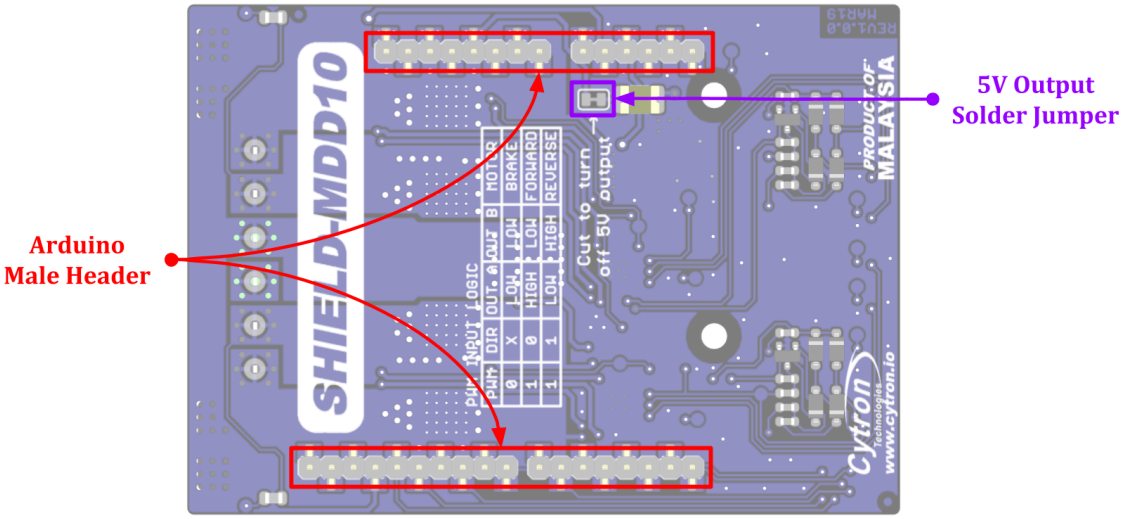

Figure 2: SHIELD-MDD10 Board Functions (Bottom)

Function	Description
5V Output Solder Jumper	SHIELD-MDD10 has a built-in 5V buck regulator to power the Arduino by default. If you want to power the Arduino from the other source, cut the track to disconnect the regulator from the Arduino 5V pin.
Arduino Male Header	Connect to Arduino or on top of other shield.

Table 2: SHIELD-MDD10 Board Functions (Bottom)

2. SPECIFICATIONS

No	Parameters		Min	Max	Unit
1	Power Input Voltage		7	30	V
2	Maximum Motor Current (Per Channel)	Continuous	-	10	A
		Peak *1	-	30	A
3	Logic Input Voltage (PWM & DIR)	Low Level	0	0.8	V
		High Level	1.5	5.5	V
4	PWM Frequency *(Output frequency is same as input frequency)*	Standard	DC	20	KHz
		Extended *2	20	40	KHz
5	DC +5V Output Maximum Current		-	500	mA

Table 3: SHIELD-MDD10 Absolute Maximum Ratings

*1 *Peak current is limited by the overcurrent protection circuit. Actual current limit is depending on board temperature. Value shown is at room temperature (25 - 30 degree Celsius).*

*2 When the PWM operates in extended frequency range, continuous motor current will be reduced.

3. DIMENSION

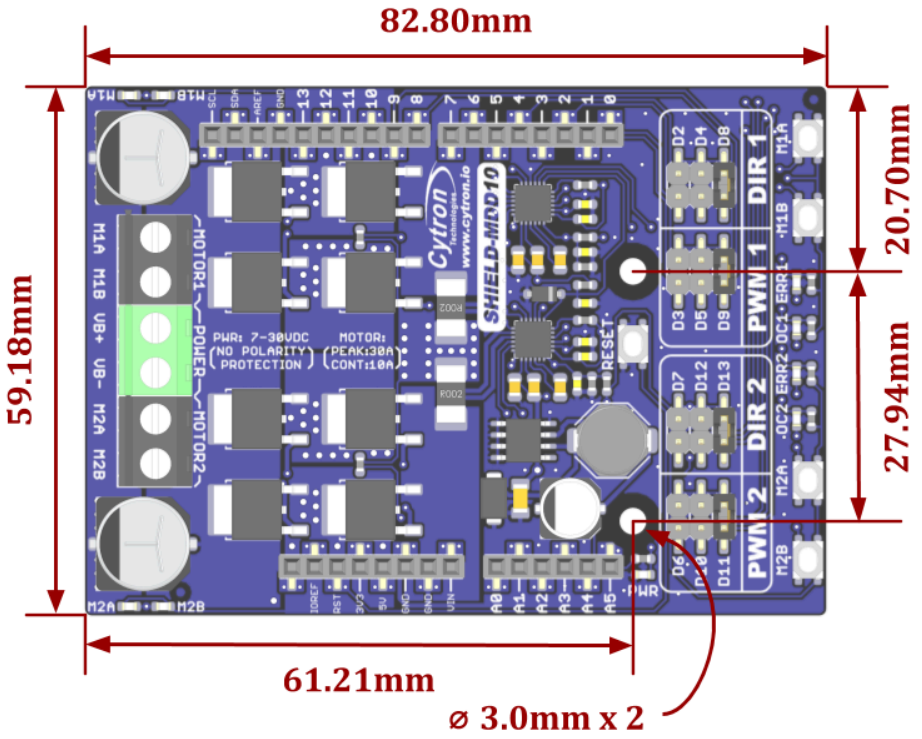

Figure 3: SHIELD-MDD10 Dimension

4. INTERFACE

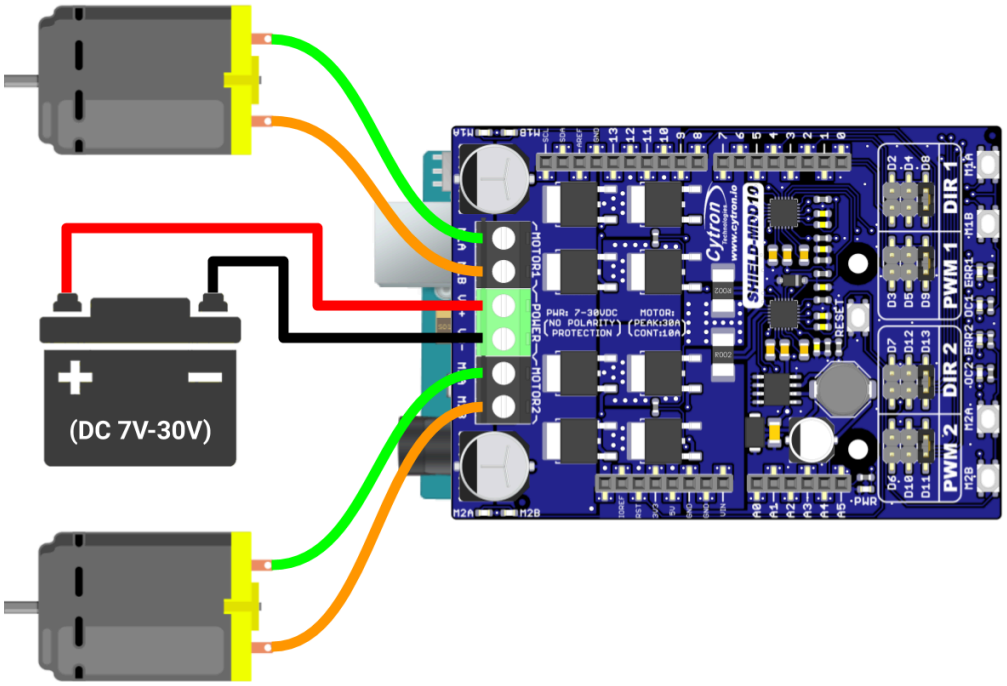

Figure 4: Battery and Motors Connection Diagram

PWMx	DIRx	Output A (MxA)	Output B (MxB)	Motor x
Low	**X (Don't Care)**	Low	Low	Brake
High	**Low**	High	Low	Forward*
High	**High**	Low	High	Backward*

Table 4: PWM/DIR Input Truth Table

* *Actual motor direction is depending on the motor connection.*
Swapping the connection (MA & MB) will reverse the direction.

5. PROTECTION FEATURES

- **Overcurrent Protection with Active Current Limiting**

  When the motor is trying to draw more current than what the motor driver can supply, the PWM to the motor will be chopped off and the motor current will be maintained at maximum current limit. This prevents the motor driver from damage when the motor stalls or an oversized motor is hooked up. OC LED will turn on when current limiting is in action.

- **Temperature Protection**

  The maximum current limiting threshold is determined by the board temperature. The higher the board temperature, the lower the current limiting threshold. This way, SHIELD-MDD10 is able to deliver its full potential depending on the actual condition without damaging the MOSFETs.

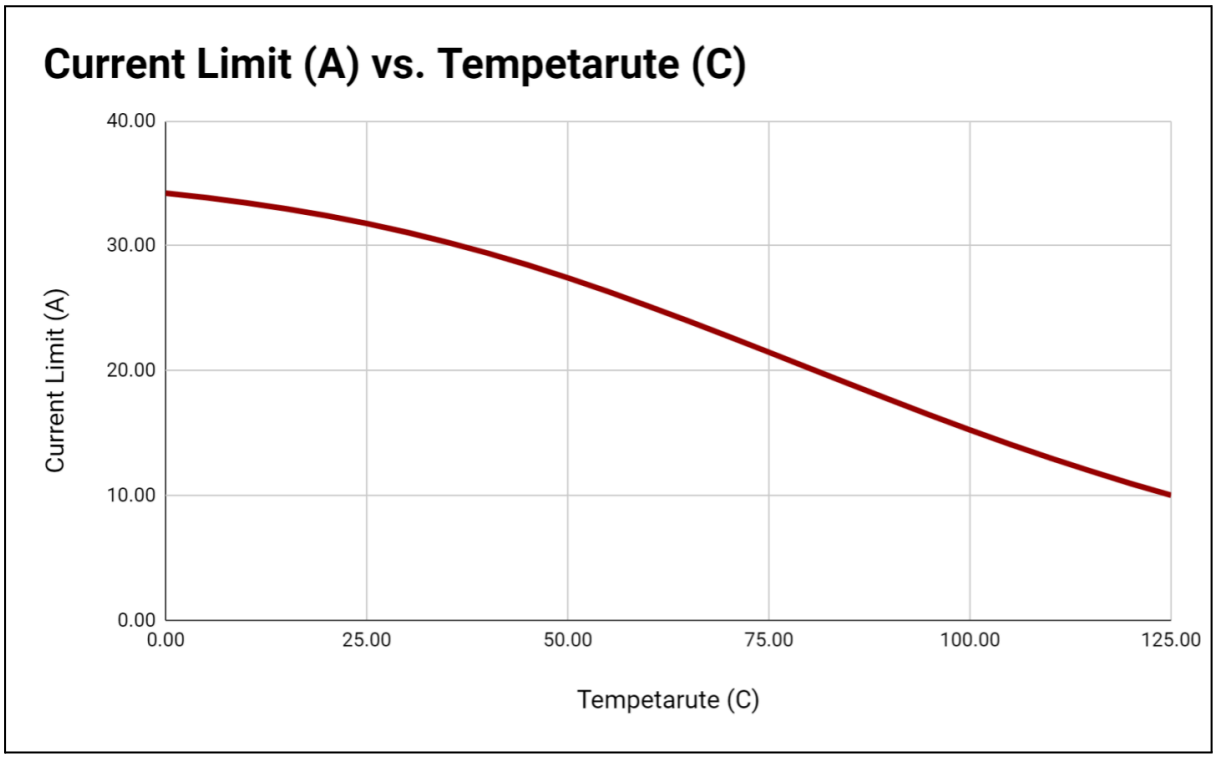

Figure 5: Maximum Current Limit vs Temperature Graph

- **Undervoltage Shutdown**

  The motor driver output will be shut down when the power input voltage drops below the lower limit. This is to make sure the MOSFETs have sufficient voltage to fully turn on and do not overheat. ERR LED will turn on during undervoltage shutdown.

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