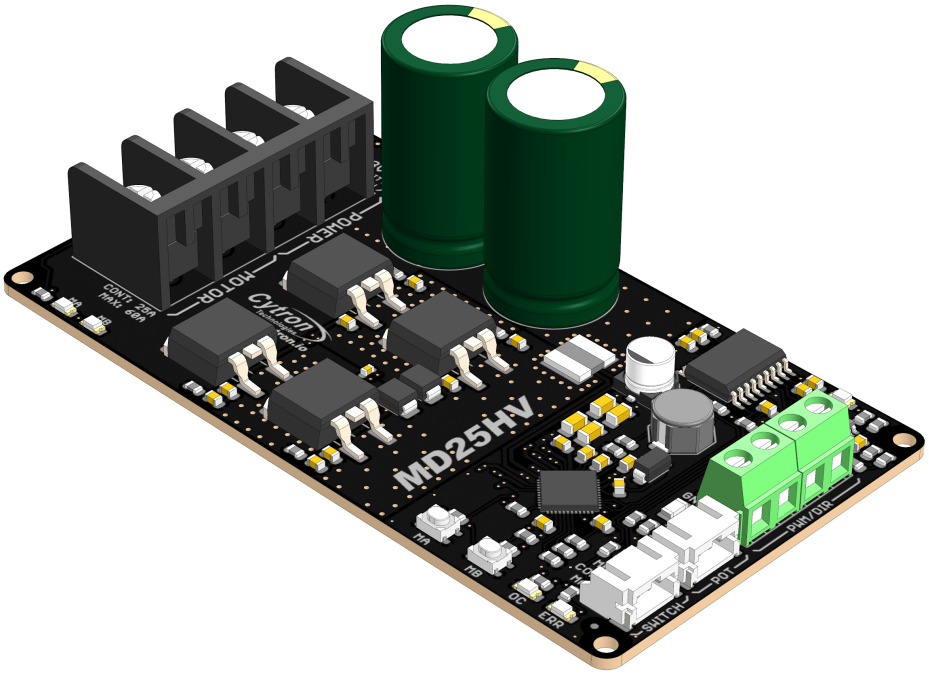
MD25HV
High Voltage 7V-58V
25Amp DC Motor Driver



Datasheet

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1. BOARD LAYOUT & FUNCTION

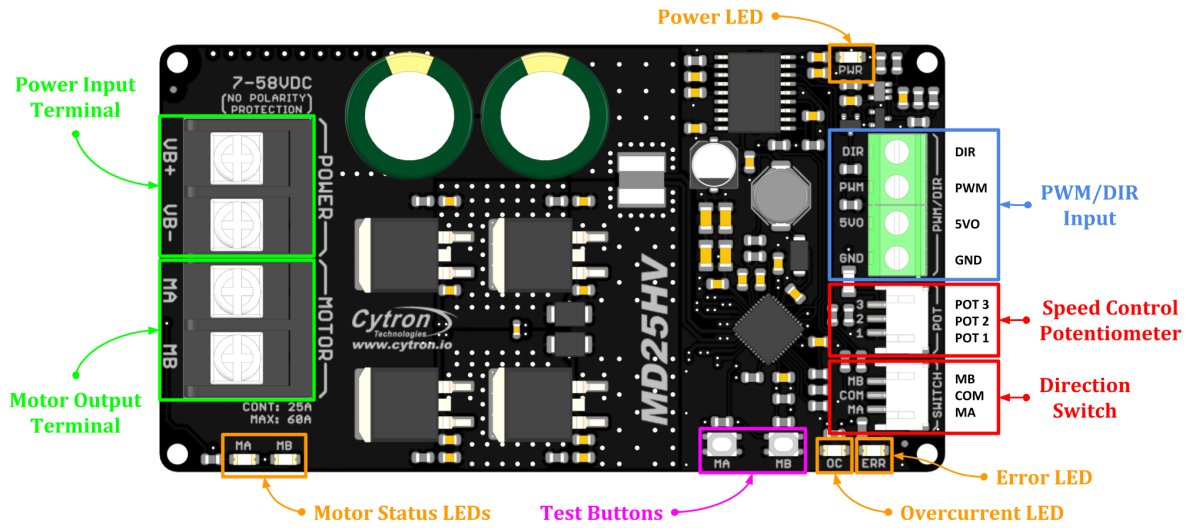

Figure 1: MD25HV Board Functions

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.
Error LED	Blink when there is error.
OC (Overcurrent) LED	Turn on when current limiting is in action. Current limit threshold is depending on the board temperature.
Motor Status LEDs	Turn on when the motor is running. ● MA : Forward* ● MB : Backward*
Test Buttons	Press to test the functionality of the motor driver. Motor will run at 78% of full speed. ● MA : Forward* ● MB : Backward*

Function	Description
PWM/DIR Input	Control the motor with PWM/DIR signal. ● PWM : PWM input for motor speed control. ● DIR : Direction input. ● 5VO : 5V Output. Can be used to power Arduino and other MCU. ● GND : Signal ground.
Speed Control Potentiometer	Connect to 10KΩ potentiometer for motor speed control. ● POT 1 (GND) : Connect to pin 1 of the pot (Lowest speed). ● POT 2 (Analog In) : Connect to pin 2 of the pot (Middle pin). ● POT 3 (5V) : Connect to pin 3 of the pot (Highest speed).
Direction Switch	Connect to SPDT Switch for motor direction control. MA and MB are internally pulled high. ● MA : Short to GND to run forward*. ● COM : Common pin. Connected to GND internally. ● MB : Short to GND to run backward*.

Table 1: MD25HV Board Functions

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

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2. SPECIFICATIONS

No	Parameters	Min	Max	Unit
1	Power Input Voltage	7	58	V
2	Maximum Motor Current (Continuous)	-	25	A
3	Maximum Motor Current (Peak)	-	60	A
4	5V Output Voltage	4.9	5.1	V
5	5V Output Maximum Current	-	250	mA
6	Potentiometer Analog Input Voltage (POT 2)	0	5	V
7	Direction Switch Input Voltage - Low Level (MA, MB)	0	0.8	V
8	Direction Switch Input Voltage - High Level (MA, MB)	3	5	V
9	Logic Input Voltage - Low Level (PWM, DIR)	0	0.8	V
10	Logic Input Voltage - High Level (PWM, DIR)	3	30	V
11	PWM Input Frequency*	DC	40	KHz
12	Motor Driver Output PWM Frequency *(Output frequency is independent of input frequency)*	16		KHz

Table 2: MD25HV Absolute Maximum Ratings

* *Lock-Antiphase PWM is not supported.*

3. DIMENSION

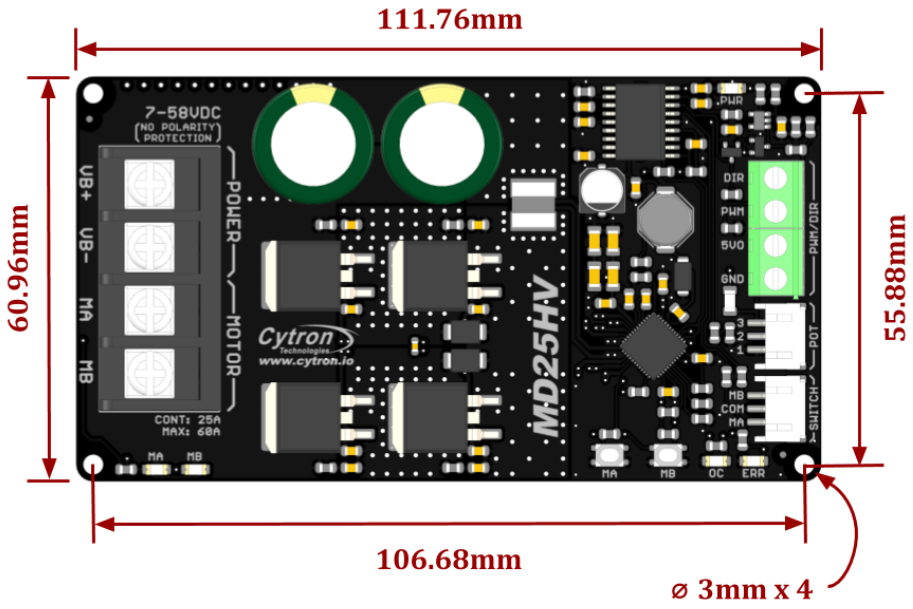

Figure 2: MD25HV Dimension

4. INPUT MODE 1: PWM/DIR INPUT

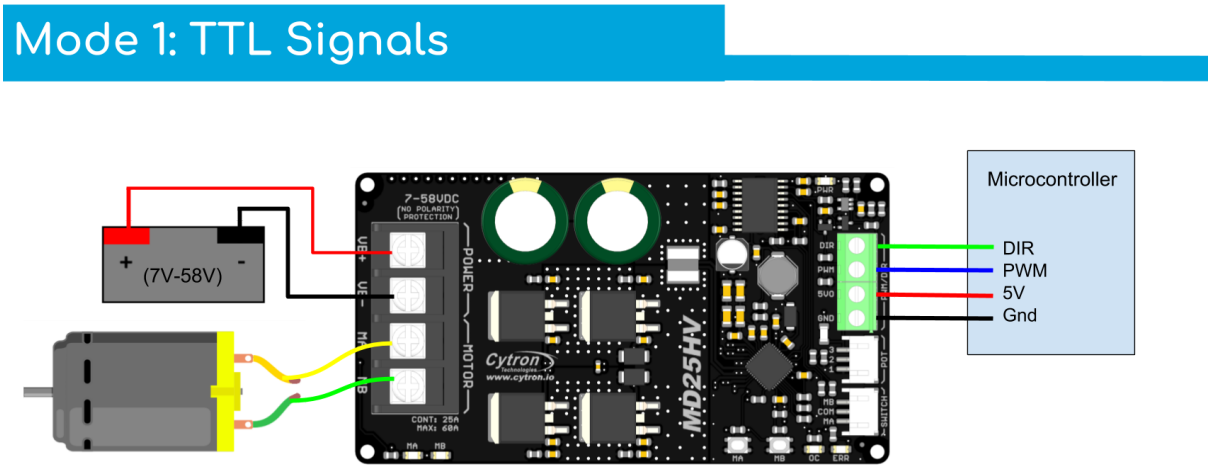

Figure 3: PWM/DIR Input Connection Diagram

PWM	DIR	Output A (MA)	Output B (MB)	Motor
Low	**X (Don't Care)**	Low	Low	Brake
High	**Low**	High	Low	Forward*
High	**High**	Low	High	Backward*

Table 3: PWM/DIR Input Truth Table

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

5. INPUT MODE 2: POTENTIOMETER/SWITCH INPUT

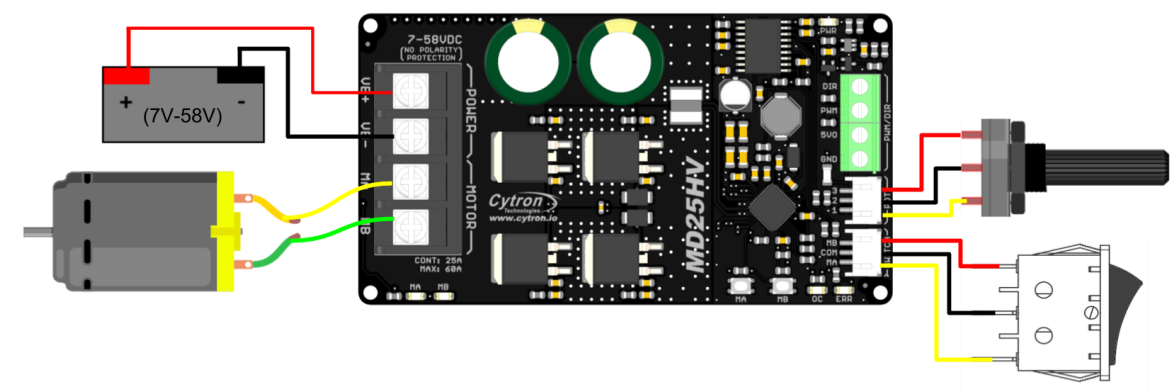

Figure 4: Potentiometer/Switch Input Connection Diagram

6. 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, MD25HV is able to deliver its full potential depending on the actual condition without damaging the MOSFETs.

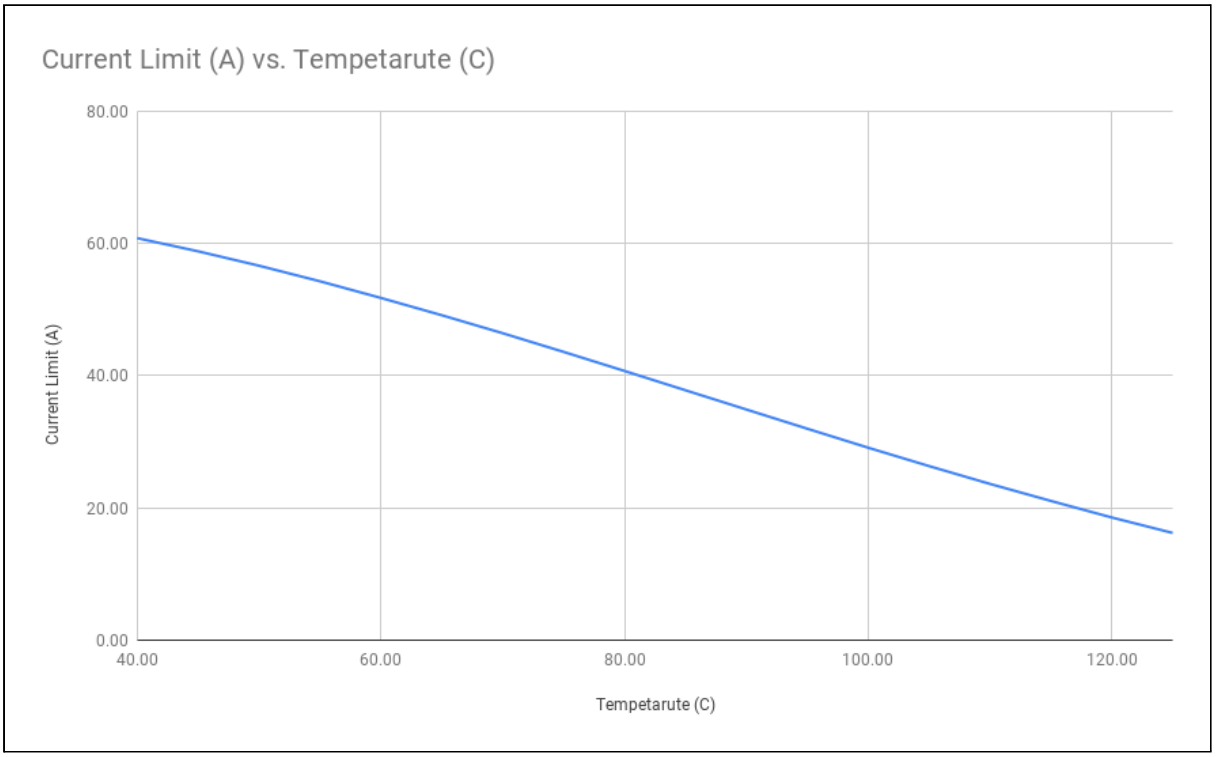

Figure 5: Maximum Current Limit vs Temperature Graph

- **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.

7. ERROR LED INDICATOR

ERR LED Blinking	DESCRIPTION
2	**MOSFET Driver Error** This happens when there is undervoltage error or hardware failure. Please contact support@cytron.io for more details.
3	**Overvoltage Error** Power input voltage has exceeded the maximum rating. If switching power supply is being used, connect a motor shunt regulator or rechargeable battery with same voltage in parallel with the power supply. This is to absorb the regenerative energy from the motor during deceleration.
4	**Overheat Error** Board temperature is over 80℃ (176℉). This is just served as a warning. The motor driver can still be safely operated.

Table 4: Error LED Indicator

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