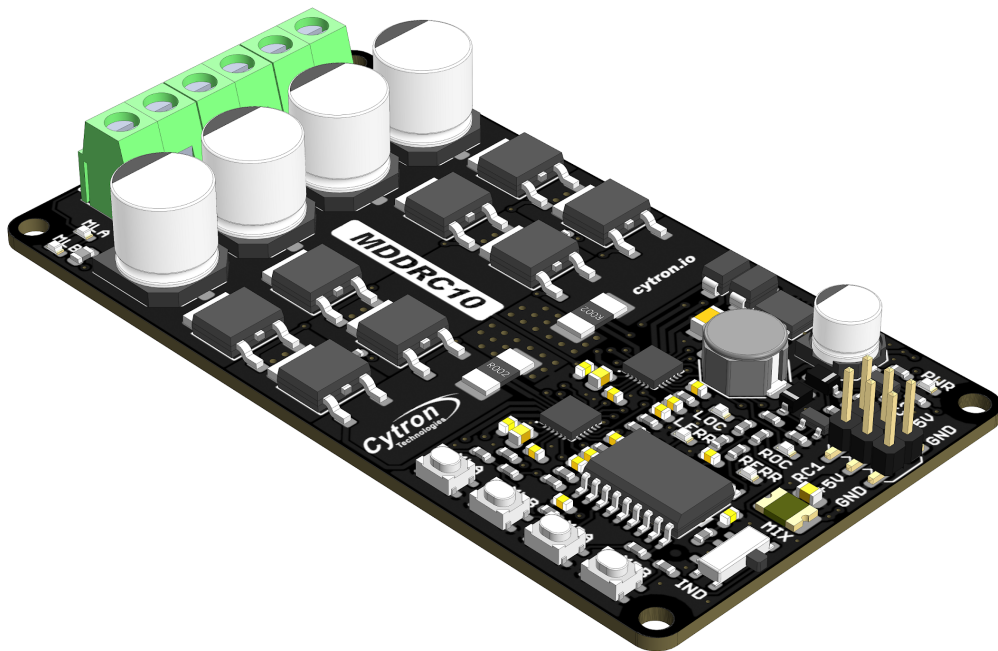




MDDRC10

10Amp 7V-30V DC Motor Driver for R/C (2 Channels)



Datasheet

Rev 1.0
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1. BOARD LAYOUT & FUNCTION

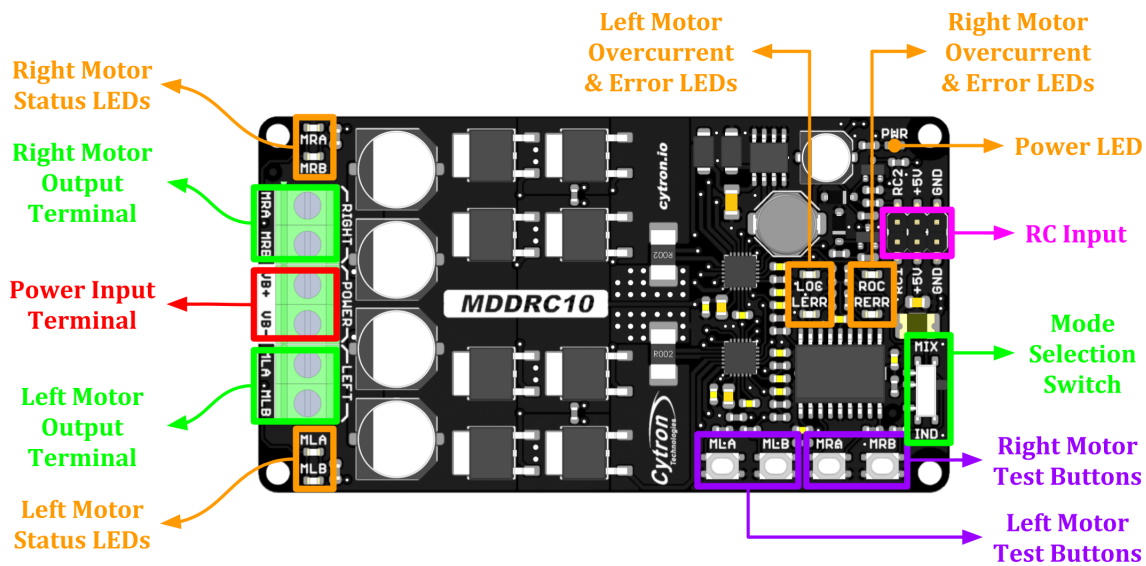


Figure 1: MDDRC10 Board Functions

Function	Description
Power Input Terminal	Connect to battery. <ul style="list-style-type: none"> VB+ : Positive VB- : Negative <i>Warning : Connecting in reverse polarity will damage the motor driver instantaneously.</i>
Motor Output Terminal	Connect to the motor terminal. Motor direction is depending on the polarity.
Motor Status LEDs	Turn on when the motor is running. <ul style="list-style-type: none"> MxA : Forward* MxB : Backward*
Power LED	Turn on when powered up.
Error LED	Blink when there is error. Refer to Chapter 7 for more details.
OC (Overcurrent) LED	Turn on when current limiting is in action. Current limit threshold is depending on the board temperature.
Test Buttons	Press to test the functionality of the motor driver. Motor will run at full speed. <ul style="list-style-type: none"> MxA : Forward* MxB : Backward*
Mode Selection Switch	Select the RC input mode (Independent or Mixed Mode)

Function	Description
RC Input	<p>Connect to RC receiver.</p> <ul style="list-style-type: none"> • RC1/RC2 : Signal • +5V : 5V output for RC receiver (500mA max, do not use this to power the servo motor). • GND : Ground. <p><u>Independent mode:</u></p> <ul style="list-style-type: none"> • Channel 1 : Left motor • Channel 2 : Right motor <p><u>Mixed mode:</u></p> <ul style="list-style-type: none"> • Channel 1 : Forward/Backward • Channel 2 : Turn Left/Right

Table 1: MDDRC10 Board Functions

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

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	Motor Output PWM Frequency		20		KHz
4	RC Input Voltage (RC1 & RC2)	Low Level	0	0.7	V
		High Level	1.5	15	V
5	RC Signal Timing	Frequency	10	100	Hz
		Deadband	±35		us
		Fullscale	±435		us
6	5V Output Maximum Current		-	500	mA

Table 2: MDDRC10 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).

3. DIMENSION

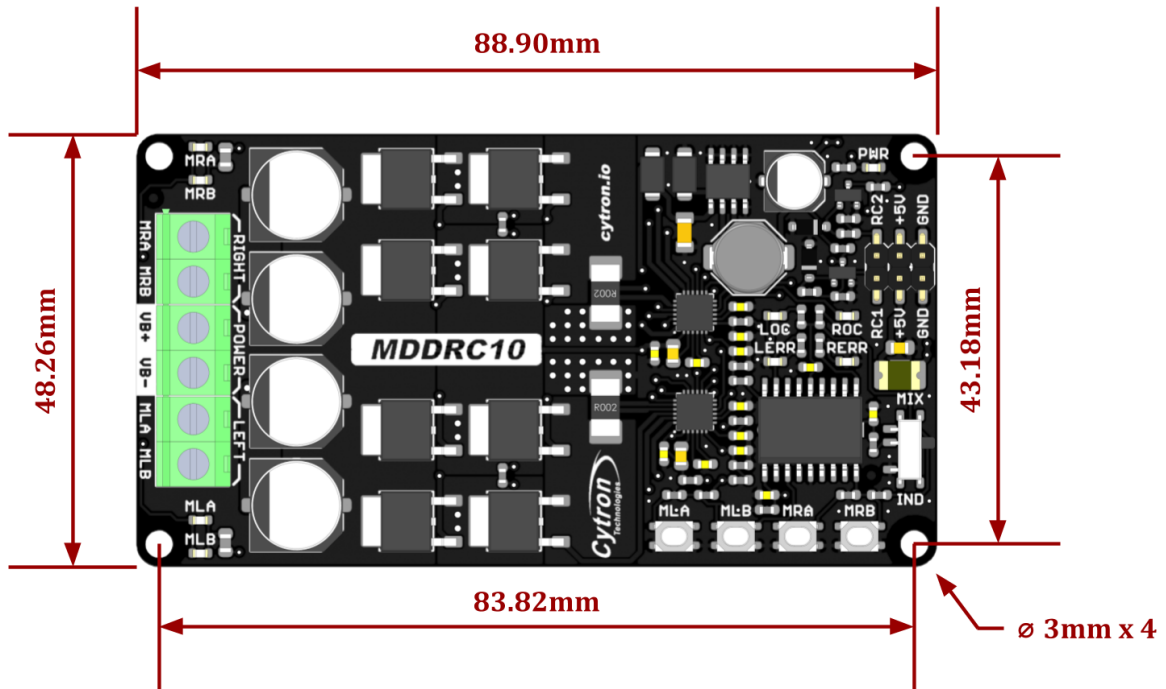


Figure 2: MDDRC10 Dimension

4. INPUT MODE

MDDRC10 can operate in Independent Mode or Mixed Mode selectable by the mode selection switch. Mixed Mode is the preferred mode when MDDRC10 is used for differential drive motors in mobile robots.

- Mixed Mode**

RC1 and RC2 are mixed together to control the left and right motors resulting in forward, backward, turning left and right movement of the differential drive robot. RC1 controls the forward/backward speed while RC2 controls the left and right movement.

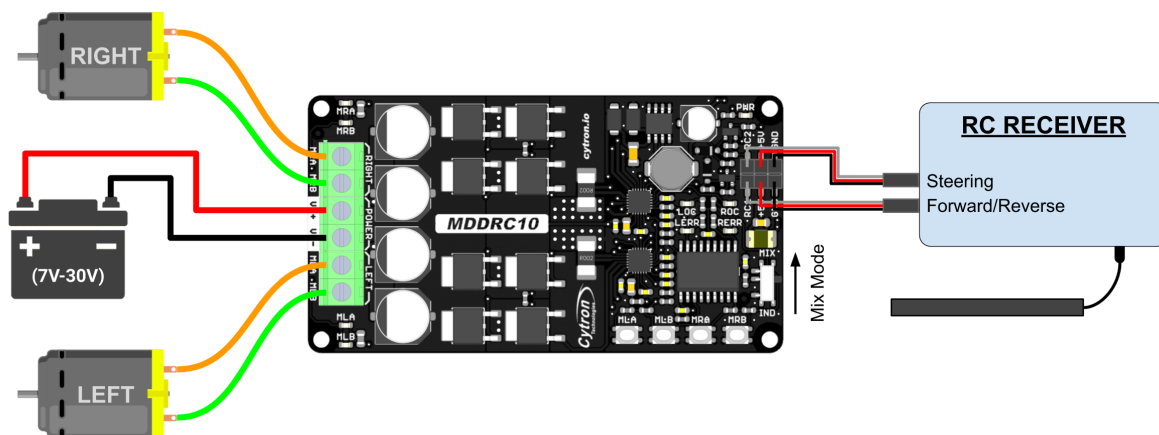


Figure 3: Connection Diagram for Mixed Mode

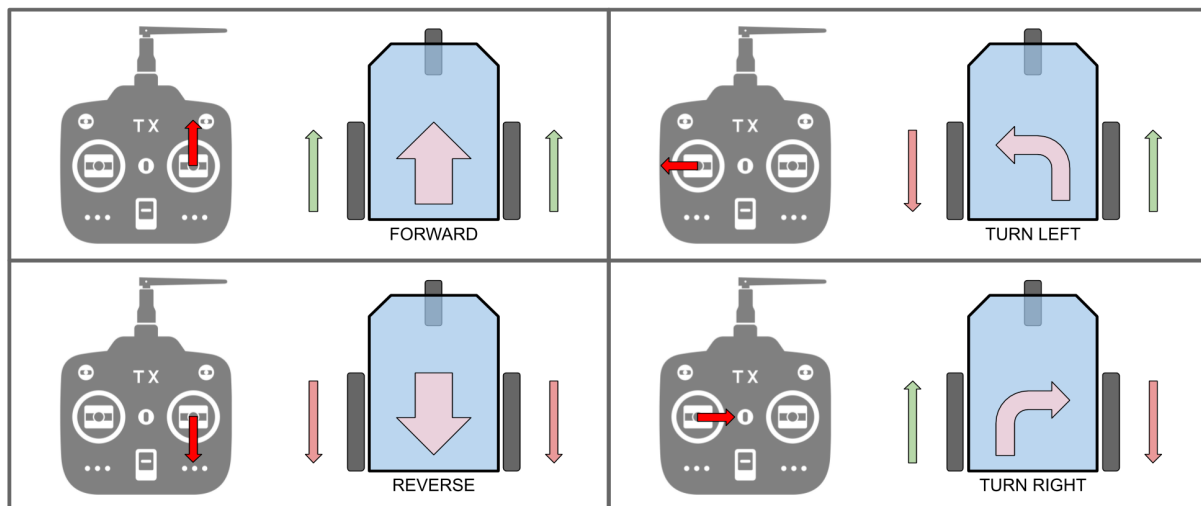


Figure 4: RC Tx Control Input vs Robot Movement

- Independent Mode**

RC1 and RC2 are independent with each other. RC1 controls the speed and direction of the left motor while RC2 controls the speed and direction of the right motor. This mode is usually used for non-wheeled motors or when you want to control the motor independently.

5. RC INPUT AUTO-CALIBRATION

The neutral points and offsets of the input signals are calibrated automatically each time the motor driver is turned on.

Upon powered up, it waits for a valid RC signal and captures it as the neutral point. Thus, it's recommended to turn on the RC transmitter first and make sure the control sticks are at the neutral position before switching on the motor driver.

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, MDDRC10 is able to deliver its full potential depending on the actual condition without damaging the MOSFETs.

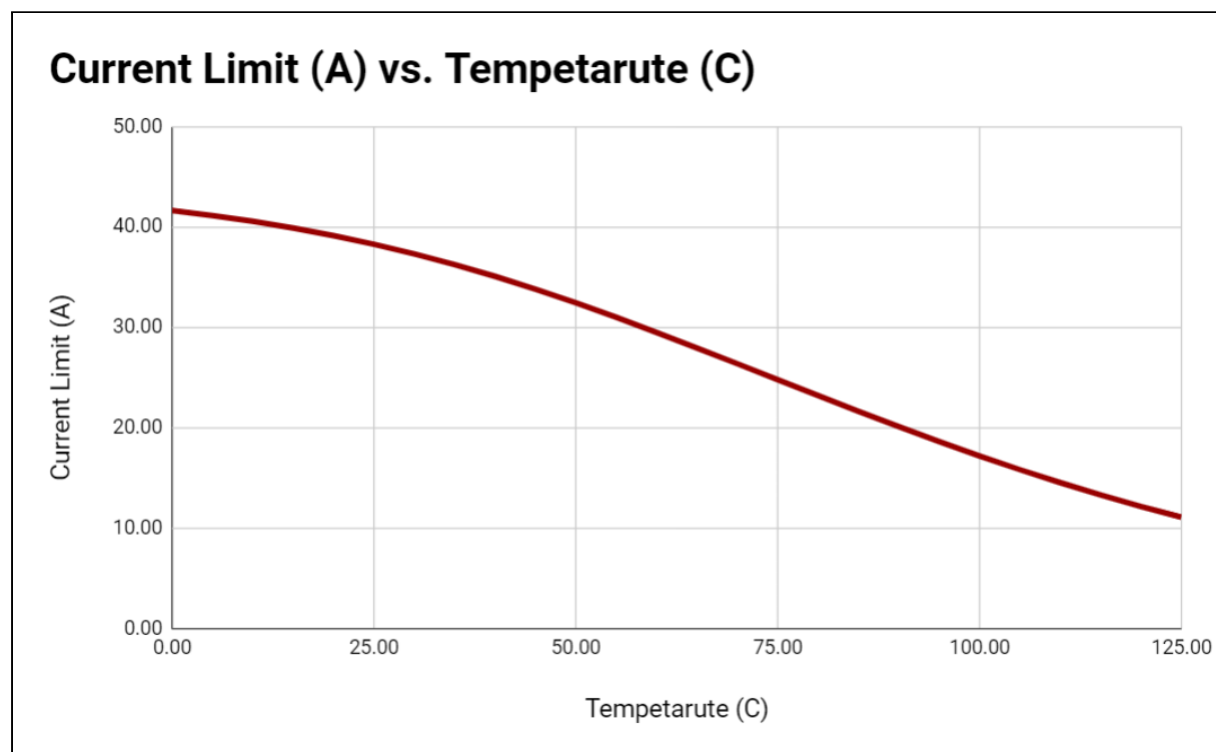


Figure 5: Maximum Current Limit vs Temperature Graph (Per channel)

- **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 blink during undervoltage shutdown.

7. ERROR LED INDICATOR

ERR LED Blinking	DESCRIPTION
2	RC Input Error No RC signal is detected or the pulse width is out of acceptable range.
3	Undervoltage / MOSFET Driver Error This happens when there is undervoltage error or hardware failure. Please contact support@cytron.io for more details.
4	Overvoltage Error Power input voltage has exceeded the maximum rating. If a switching power supply is being used, connect a motor shunt regulator or rechargeable battery with the same voltage in parallel with the power supply. This is to absorb the regenerative energy from the motor during deceleration.

Table 4: Error LED Indicator

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