

# **H BRIDGE MODULE (MC33926) – BM001**

## OPEN SOURCE HARDWARE MODULE



hardware made easy

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## Pin Functions and Notes

#	Name	Maximum Voltage	Notes
1	VIN	28V	Motor power supply. Any voltages above 24V should have some external protections to keep transient spikes below 28VDC.
2	GND	0V	Ground return for the motor power supply.
3	IN2	5V	Logic input. One of the two motor control inputs. This pin may be pulse-width modulated (PWM) for proportional control of motor speed.
4	IN1	5V	Logic input. One of the two motor control inputs. This pin may be pulse-width modulated (PWM) for proportional control of motor speed.
5	FB	5V	Analog output. This pin outputs an analog value proportional to the motor current. It is 0.24% of the motor current passed through a 270Ω resistor (R2). A 1A motor current would output something close to $1A * 0.0024 * 270\Omega = 0.65V$ . The output voltage is accurate to 20% when motor current is in the range of 0.5-6.0A. If higher voltage output is needed an external amplifier should be used.
6	EN	5V	Logic input. A logic high (>2.0V) enables the H-bridge.
7	SF	5V	Logic output. This is an open collector output pulled to the voltage of the EN pin with a 33KΩ resistor. When the motor is in a fault condition (under-voltage, over-temperature, short-circuit) the pin will be pulled to ground. To reset a fault condition the EN pin should be toggled. This pin cannot sink more than 0.5mA. It should not be connected to output pins or pulled up with smaller resistors.
8	OUT1	28V	Positive motor lead. This lead will be high (motor voltage) when the motor is running forward, and low (grounded) when running in reverse.
9	OUT2	28V	Negative motor lead. This lead will be low (grounded) when the motor is running forward, and high (motor voltage) when running in reverse.

## Truth Table

Operating Mode	EN	IN1	IN2	OUT1	OUT2
Forward	H	H	L	H	L
Reverse	H	L	H	L	H
Proportional forward	H	PWM	L	PWM	L
Proportional reverse	H	L	PWM	L	PWM
Brake motor grounded	H	L	L	L	L
Brake motor tied high	H	H	H	H	H
Sleep Mode	L	X	X	Z	Z

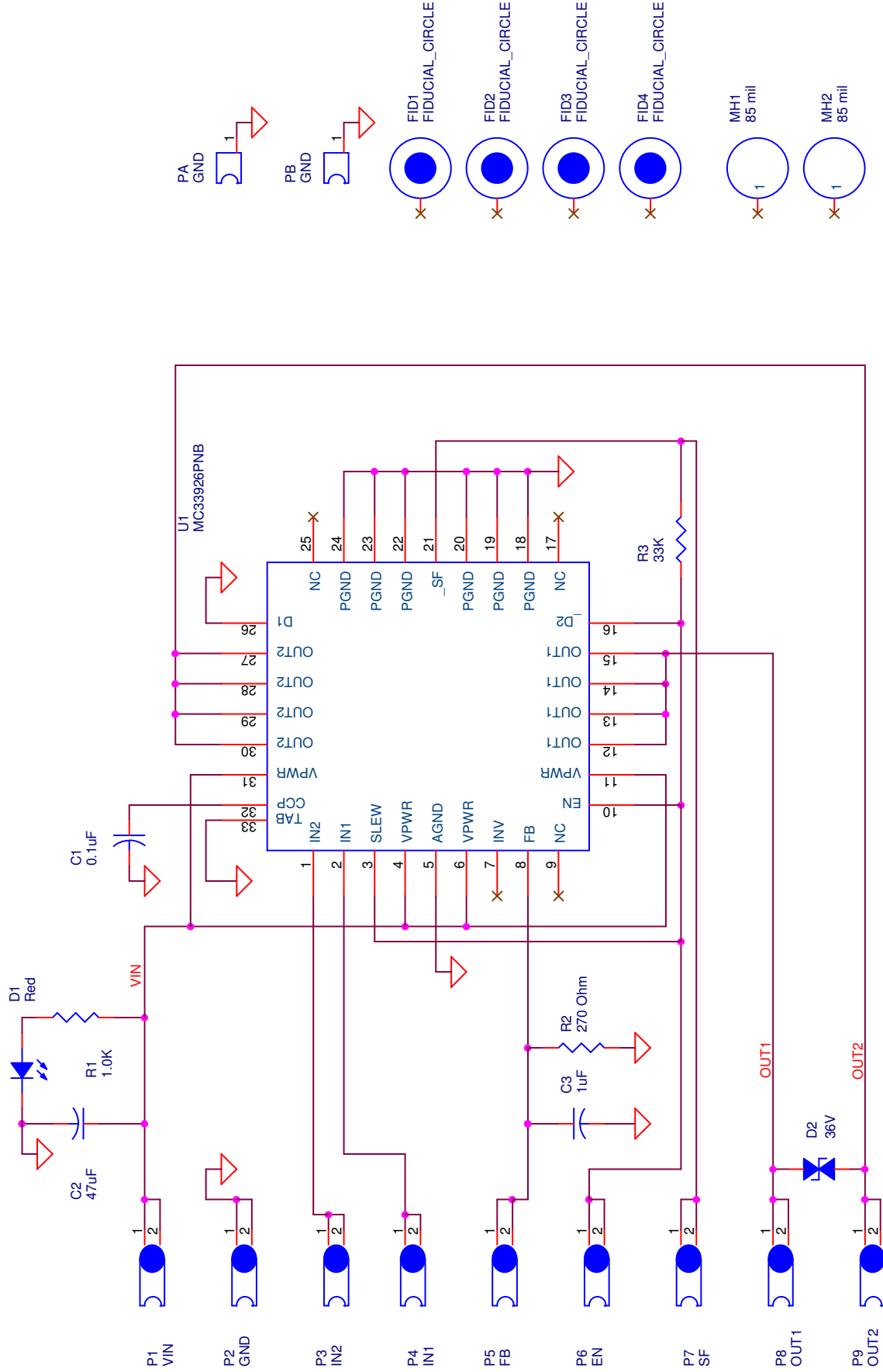
## User Notes/Tips

- For additional information on the MC33926 H-bridge driver visit Freescale's web site and review the datasheet.
- Visit [www.solutions-cubed.com](http://www.solutions-cubed.com) for application notes associated with this module.
- When operating at higher voltages (greater than 20V) you should explore adding protection in the form of transient voltage suppressors, RC snubbers, and other circuits appropriate for limiting voltage spikes.
- Although this device is rated for 5A continuous current it has a small thermal sink capacity. Actual current handling will be much lower unless significant attempts are made to cool the IC.

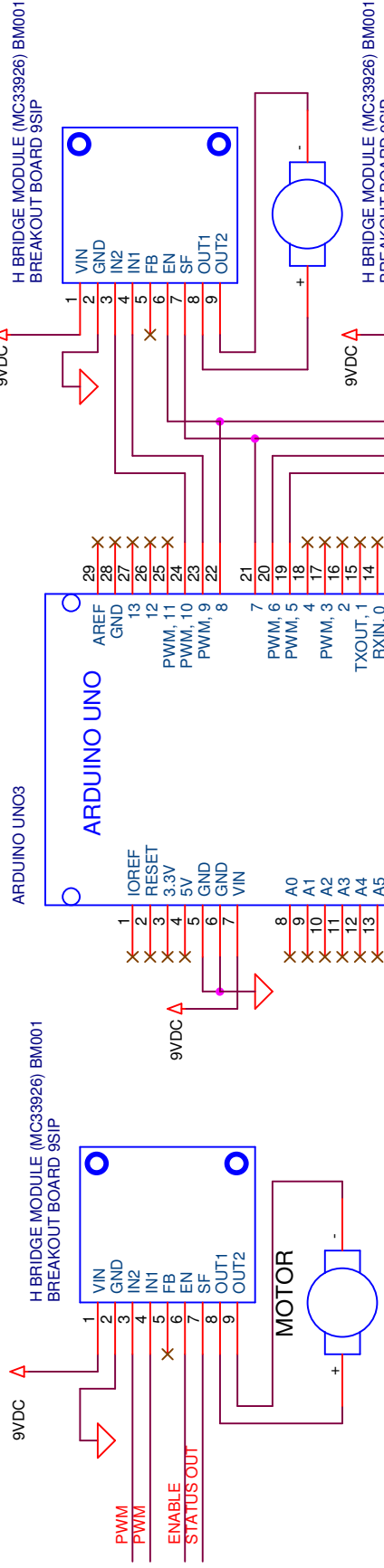
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## User Datasheet

October 2012

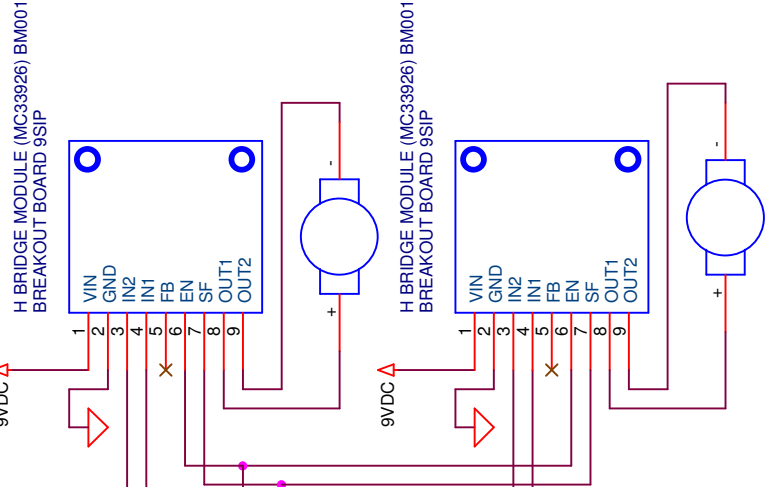


**BASIC CONNECTIONS**

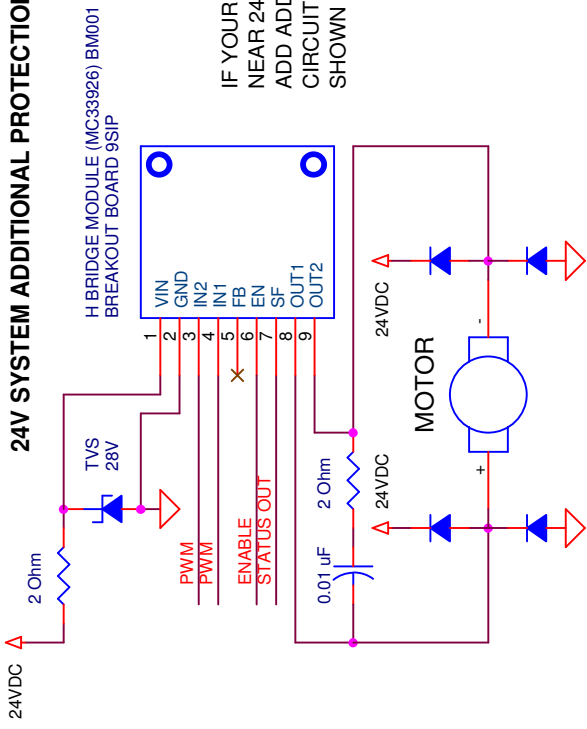


IN1 = PWM IN2 = 0V => FORWARD  
 IN1 = 0V IN2 = PWM => REVERSE  
 IN1 = 0V IN2 = 0V => BRAKE

**ARDUINO BASED SKID STEERING ROBOT**



**24V SYSTEM ADDITIONAL PROTECTION**



IF YOUR VOLTAGE SYSTEM IS NEAR 24V YOU MAY NEED TO ADD ADDITIONAL PROTECTION CIRCUITS. SOME OPTIONS ARE SHOWN HERE.