

# PROJECT MOTOR DRIVING FAQs

- Q: Why does the magic smoke come out of my (Hbridge/MOSFET) when I try to run my motor?
- A: The chip got too hot.

- Q: But I checked the Amps on the (Hbridge/MOSFET) data sheet and it should be ok.
- A: You need to check the power on the data sheet as well:

Continuous output current,  $I_O$  .....  $\pm 1.1$  A  
Continuous total power dissipation at (or below) 25°C free-air temperature (see Note 2) ..... 2075 mW

2 W gives you very little voltage if you are running at 12V.

- Q: My driver chip doesn't have that kind of power number on it. It has stuff like

Continuous output current, I <sub>O</sub> : L293 .....	±1 A
Continuous output current, I <sub>O</sub> : L293D .....	±600 mA
Package thermal impedance, θ <sub>JA</sub> (see Notes 2 and 3): DWP package .....	TBD°C/W
N package .....	67°C/W
NE package .....	TBD°C/W
Maximum junction temperature, T <sub>J</sub> .....	150°C

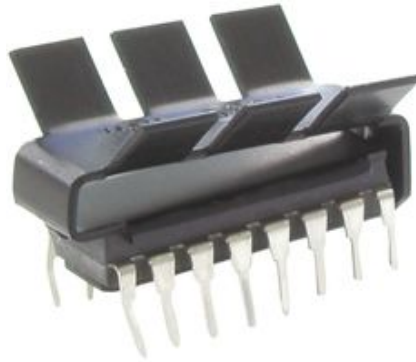
- NOTES:
1. All voltage values are with respect to the network ground terminal.
  2. Maximum power dissipation is a function of T<sub>J(max)</sub>, θ<sub>JA</sub>, and T<sub>A</sub>. The maximum allowable power dissipation at any allowable ambient temperature is P<sub>D</sub> = (T<sub>J(max)</sub> - T<sub>A</sub>)/θ<sub>JA</sub>. Operating at the absolute maximum T<sub>J</sub> of 150°C can affect reliability.
  3. The package thermal impedance is calculated in accordance with JESD 51-7.

- A: Make the calculation described in note 2. There is a book excerpt posted on ANGEL (lessons) that explains this in more detail.

- Q: Ok, my chip can't handle the power. Now what do I do?
- A: You have two choices:
  - Get the chip cooler, so it can dissipate more power
  - Get a new motor driver circuit

# Get the Chip Cooler (Choices)

1. Buy a heat sink and attach it to the chip.



2. Put the entire circuit in non-conductive oil, like canola oil. (Rumored to work, we haven't tried this personally.)

# Get a New Motor Driver Circuit (Choices)

1. Buy a chip with a larger power rating on the data sheet.
2. Buy a motor driver circuit with a heat sink from your instructor. \$20. Can do bi-directional, but only one line.  
(Steppers need 4 lines.)
3. Use several MOSFETs in parallel.  
(Unidirectional only, of course.)