How to read a FET datasheet:

The three most important things to look for when selecting a FET to use as a switch are the maximum drain source voltage (breakdown voltage), the maximum drain current, and the on resistance. The breakdown voltage needs to be higher than the voltage you plan to switch. The max drain current should be well above the current you plan to switch. And the on resistance should be low compared to the resistance of the load you are controlling. Note: The listed max continuous drain current assumes an infinite heat sink (i.e. like a chilled water supply).

Continuous Drain Current: The maximum continuous drain current the FET can handle

Pulsed Drain Current: The maximum pulsed drain current the FET can handle

Power Dissipation: The maximum power the FET can dissipate with and infinite (cool) heat sink

Derating Factor: The max power dissipation is decreased by this amount if the case temperature is more than the reference temperature, in this case 25C. Ex: if the case temperature is at 50C instead of 25C then the max power dissipation would be (50C-25C)*1.3W/C = 32.5W less, 200W - 32.5W = 166.5W.

V_{GS}: Max gate to source voltage without damaging the part

Operating Junction Temperature: Max temperature for the semiconductor junction. Note: the junction temperature can be substantially higher than the case temperature. Another words the semiconductor die inside the chip could be much hotter than case (i.e. the metal tab where the heatsink is attached).

Thermal Resistance: Explained previously (basically how easily the part transfers heat from the die to the case)

$V_{(BR)DSS}$: Max drain to source voltage before damaging the FET

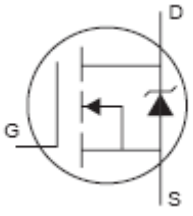
$R_{DS(ON)}$: Max on resistance for different gate voltages

I_{DSS}: Drain-to-Source Leakage Current (i.e. the current that flows when the switch is off)

Rise/Fall Time: Best case performance for how long it will take to turn on or off

Delay Time: Best case performance for the time lag between driving the gate and the FET switching

Ciss: The input capacitance of the gate



Note: Many FETs have an internal (body diode). This diode helps protect the FET from reverse voltages spikes which can occur when an inductive load is switched off quickly. Recall that the energy stored in an inductor is $0.5LI^2$. When the current is switched off the stored energy has to go somewhere. The voltage on the inductor increases to try and keep the current going in the same direction. We'll cover this when we use transistors and FETs to turn on relays.