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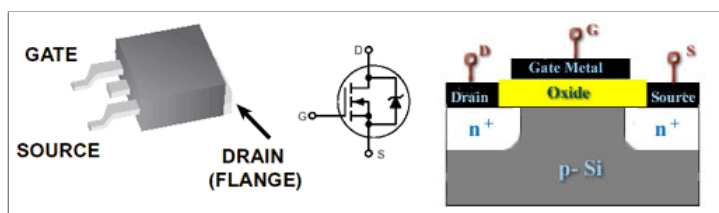
What is a MOSFET, what does it look like, and how does it work?

Author: **Wizzard** Date: 2004-05-24 03:11:14

Pronounced MAWS-feht. Acronym for metal-oxide semiconductor field-effect transistor. These are used in many scenarios where you want to convert voltages. On your motherboard for example to generate CPU Voltage, Memory Voltage, AGP Voltage etc. Mosfets are usually used in pairs. If you see six mosfets around your CPU socket you have three-phase power.

Technical Info

MOSFETs come in four different types. They may be enhancement or depletion mode, and they may be n-channel or p-channel. For this application we are only interested in n-channel enhancement mode MOSFETs, and these will be the only ones talked about from now on. There are also logic-level MOSFETs and normal MOSFETs. The only difference between these is the voltage level required on the gate.



Unlike bipolar transistors that are basically current-driven devices, MOSFETs are voltage-controlled power devices. If no positive voltage is applied between gate and source the MOSFET is always non-conducting. If we apply a positive voltage UGS to the gate we'll set up an electrostatic field between it and the rest of the transistor. The positive gate voltage will push away the 'holes' inside the p-type substrate and attracts the moveable electrons in the n-type regions under the source and drain electrodes. This produces a layer just under the gate's insulator through which electrons can get into and move along from source to drain. The positive gate voltage therefore 'creates' a channel in the top layer of material between oxide and p-Si. Increasing the value of the positive gate voltage pushes the p-type holes further away and enlarges the thickness of the created channel. As a result we find that the size of the channel we've made increases with the size of the gate voltage and enhances or increases the amount of current which can go from source to drain- this is why this kind of transistor is called an enhancement mode device.

More info here: <http://homepages.which.net/~paul.hills/SpeedControl/Mosfets.html>

MOSFET testing

Get a multimeter with a diode test range.

Connect the meter negative to the MOSFET's source.

Hold the MOSFET by the case or the tab if you wish, it doesn't matter if you touch the metal body but be careful not to touch the leads until you need to. Do NOT allow a MOSFET to come in contact with your clothes, plastic or plastic products, etc. because of the high static voltages it can generate.

First touch the meter positive on to the gate.

Now move the positive meter probe to the drain. You should get a low reading. The MOSFET's gate capacitance has been charged up by the meter and the device is turned on.

With the meter positive still connected to the drain, touch a finger between source and gate (and drain if you wish, it doesn't matter). The gate will be discharged through your finger and the meter reading should go high, indicating a non-conducting device.

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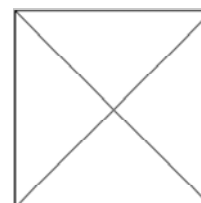
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