

Re: PMOS in parallel with NMOS

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- *From:* rickman <gnuarm@xxxxxxxxxx>
 - *Date:* Wed, 7 May 2008 05:27:47 -0700 (PDT)
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On May 7, 12:31 am, Tomás Ó hÉilidhe <t...@xxxxxxxxxx> wrote:

On May 7, 5:14 am, "robertwess...@xxxxxxxxxx" <robertwess...@xxxxxxxxxx> wrote:

That won't work. There will be some voltage leaking from the high impedance device, and exactly what that is, and how much current there is, will dictate exactly what the two drive transistors are going to do.

With the PIC microcontroller, if you put a volt meter across a high impedance pin, I think you measure about 3 V. Of course, it's behind a massive resistance, but I think that 3 V might be enough to turn on an NMOS transistor.

What are you trying to do? Build a high output tristate device? Are you trying to drive a multi-color LED or something?

I have a bi-colour LED that has 3 pins. Within the LED package there are two LED's, and they have a common cathode. Their anodes are separate.

When my microcontroller pin is high, I want it to be green. When low, red. When high impedance, off.

To do this, I want to use a p-type and a n-type transistor that have a common gate/base. When the microcontroller pin is high, the n-type transistor will be turned on and it will put five volts onto the red anode. When the microcontroller pin is low, the p-type transistor will be turned on and it will put five volts onto the green anode.

I might end up doing it with bi-polars instead of mosfets...

Your idea won't work with bi-polar transistors. They turn on at 0.7

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volts on the base. There is no voltage you can use that will turn them both off. You **can** however turn them both ON!

I don't think you will get this to work well with 5 volt drive, but you might. It depends on the characteristic of the MOSFETs. You need parts that have a threshold voltage that is **much** higher than 2.5 volts. All you need to do is use two resistors to bias the gates to 2.5 volts when the MCU is not driving the circuit. By leaving it tristated, you are not controlling the voltage at all and the gates will float which can be up or down or somewhere in the middle.

There is an easier way. Use an LED that has 4 pins and a 3.3 volt supply. You can put the two LEDs in series, across the power with neither of them turning on. Use a current limiting resistor from the middle connection to the MCU pin. The MCU can pull up to turn one on, down to turn the other on or tristate to let the voltage float with both LEDs off. To make this work with 5 volts, you need LEDs that have a forward voltage much higher than 2.5 volts.