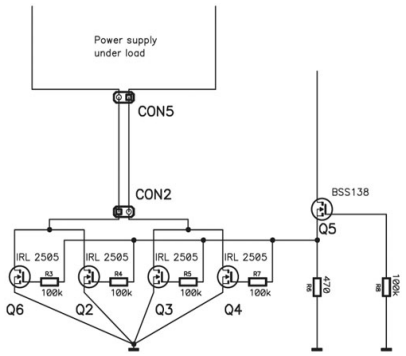
Not long ago, I was testing a PWM power supply and its characteristics. For basic tests, an ordinary 100W ceramic power resistor – a souvenir from my student days, was enough. Finding a similar resistor nowadays would be nearly impossible task. Probably one can find it at radio amateur “flea markets”. Even if we found a suitable resistor, this is not a good solution if we want to perform measurements over wide range power supply voltages/currents. For that purpose one would need to buy either a powerful rheostat or a programmable electronic load.



Neither of the choices mentioned above is too cost-effective for an electronic hobbyist, so we need a different approach. While testing the PWM power supply, I tested my first prototype of a PWM electronic load, consisting of a MegaPin board and one MOSFET power transistor. That prototype proved the concept very well. Using a selection of different output transistors I could select a resistance in the range of a couple of Ohms down to milliOhms.

When testing the PWM power supply, I needed resistance values ranging from 1,500 Ohms down to about 7.5 Ohms. Using these, and some intermediate resistances, we could check the performance of our power supply.

As mentioned, MOSFET transistors worked very well in our first prototype. With our next circuit we wanted to go one step further. We used an ATtiny85 in our circuit (one can also use an ATtiny 25, but we had ATtiny85s on-hand). The ATtiny85 has enough output pins to drive the PWM electronic load, but not enough left for driving an LCD display. So we decided to drive the LCD via the SPI bus, as described elsewhere in this book. That minimized the part count, yet made our PWM electronic load fully functional with a LCD display and two buttons to set the load value. Perfect for a “bare-bones” electronic load!

The Circuit

The device was split to two parts: the drive electronics and the power control. The drive electronics consists of ATtiny85 that scans two buttons SW1 & SW2, drives the LCD and MOSFET Q5, which drives the high-power MOSFETs. The ATtiny85 also has one available pin (PORTB.5 = RST) which could drive the LCD’s backlight. However, once you program that pin to be a regular I/O pin (and not the -RESET pin), you can no longer program the ATtiny85 with an ISP programmer- you then have to use a parallel programmer.

“Bare-bones” programmable electronic load

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