

More MOSFET Follies: A Soft Current Clamp

- for making your power on and standby switching
easier on your caps and rectifiers

The circuit shown is a simple instantaneous current limiter. It floats on the high voltage going into the first filter cap, and normally conducts with a loss of maybe 3-5V. When the current through it raises the voltage on R2 above the conduction threshold of Q2, Q2 steals enough current from R1 to prevent Q1 from conducting any more. The current is clamped by Q1 refusing to allow any more through.

Typical values are:

R1: 10K to 100K, not critical

R2: 0.47 Ω - this value directly sets the current level

D1, D2: 1N4007

Z1: 12V 1/2W zener diode

Q1: this is where all the fun is! It needs to be rated for more than about 800V, more than 5A instantaneous drain current, and more than 20W power dissipation.

Q1 dissipates almost nothing at standby, but at a guessed-at full power, it has about 8-10W in it for a nominal 100W amp.

As such, it needs a heat sink that will keep it cool enough not to overheat in the hot environment of the inside of a tube amp. This is not a huge heat sink, but it is not trivial, either.

Several suitable MOSFETs are: IRFBE20, FQP2N80, FQP2N90, SPP4N80, SPP4N90, STP2NK80, STP2NK90, and many others. These cost under \$1.25 at the time of this writing. The heat sink will cost about the same. Suitable sinks will have 5-8 C/W, and can be bought new for \$1.00 - \$1.50.

The heat sink will be floating up at full B+ so it's a safety hazard!! Package this where you will not touch it!

