



Category: FET

**CIRCUIT IDEAS FOR DESIGNERS**

Schematic no. fet\_11136.0

**Basic P-Channel Current Source****Description**

The reference resistance  $R_{SET}$  determines the  $I_{SET}$  value, which is mirrored across the matched pair P-Channel MOSFET and produces an output  $I_{SOURCE}$  that is equal to  $I_{SET}$ . The p-channel MOSFETs have their respective gates and drains diode-connected. The gates of M1 and M2 are matched and connected to the same gate voltage, and with careful device matching on-chip,  $I_{SOURCE}$  error variation from  $I_{SET}$  is minimized. The total error for this circuit is typically  $>1\%$ , when  $V_{SET}$  and  $V_{OUT}$  are at about the same voltage levels, with matching errors such as those from  $R_{SET}$  and  $R_{LOAD}$ . For better matching and less output voltage and loading errors, consider using cascode current sources instead. As the matched pair p-channel devices are physically situated adjacent to each other on the same silicon chip, their temperatures are closely matched so that any power dissipated differences between the devices would heat its neighbor equally and almost instantly so that the other device output would operate at the same temperature with temperature effects minimized.

For full schematic diagram and notes, please register and login at [aldinc.com](http://aldinc.com)