



Category: MOSFET

**CIRCUIT IDEAS FOR DESIGNERS**

Schematic no. fet\_11101.0

**Basic MOSFET / EPAD® MOSFET Diode-Connected Circuit****Description**

This circuit shows a basic diode-connected MOSFET connection. The drain terminal is shorted to the gate terminal. This circuit produces an output voltage  $V_O$  with the drain current  $I_{ds}$  that flows through the MOSFET increasing exponentially with increases of  $V_O$ , with  $I_{ds}$  versus  $V_O$  characteristics similar to that of a forward biased diode. Hence the term "diode-connected" configuration. This type of circuit is very useful to clamp or control the output to a certain voltage level and not allowing  $V_O$  to increase without limit. It is also useful as a compression circuit where the voltage range of  $V_{IN}$  (input information presented at  $V_+$ ) is compressed into a small voltage range at  $V_O$ . At low voltage levels, the  $I_{ds}$  current reduces to a very low level so that a  $V_O$  is free to change in value within the circuit with little or no impedance loading. Using different low voltage EPAD MOSFET devices, different  $V_O$  ranges can be set to different operating or input voltage ranges. At a voltage about 55mV above threshold voltage of the EPAD MOSFET, or at 68 $\mu$ A  $I_{ds}$ , the  $V_O$  tends to be temperature stable. At other voltage or current levels, the tempco changes from positive to negative with temperature. A small signal voltage centered at that voltage would have minimal temperature variations.

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