**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