



Category: FET

CIRCUIT IDEAS FOR DESIGNERS

Schematic no. fet\_11133.0

**Current Source/Current Sink/Current Limiter****Description**

This circuit, when  $V_{AB} > V_{GS(th)}$ , will pass a fixed current independent of  $V_{AB}$ . When node A is connected to the positive supply the circuit will act as a current source with node B as the output. When node B is connected to ground, the circuit will act as a current sink with node A as the input. The current is set by the resistor R. If the current has a tendency to rise, the drop across R increases which biases the FET to a lower current, which counteracts the rise.

For currents much lower than  $I_D$  ( $V_{GS} = 0$ ), the resistor value is  $R = |V_{th}|/I_{LIMIT}$ . For other currents a graphical method is used. First, select the operating point on the graph of drain current vs. drain source voltage. Identify the value of  $V_{GS}$  by interpolating the  $V_{GS}$  curves. Then calculate the resistor value from  $R = (|V_{th}| - |V_{GS}|)/I_{LIMIT}$ . Alternative to a graphical solution, decide on a current limit,  $I_{LIMIT}$ . Select the resistor using the equation  $R = [(I_{LIMIT}/K)0.5 - |V_{th}|]/I_{LIMIT}$ , where  $K = 0.5*(kn')*(W/L)$ .

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