



Category: FET

CIRCUIT IDEAS FOR DESIGNERS

Schematic no. fet\_11135.0

## **Current Source/Current Sink/Current Limiter**

## Description

This circuit, when  $V_{AB} > 2|V_{th}|$ , 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<sub>D</sub> (V<sub>GS</sub>=0), the resistor value is R=|V<sub>th</sub>|/I<sub>LIMIT</sub>. 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<sub>GS</sub> by interpolating the V<sub>GS</sub> curves. Then calculate the resistor value from R=(|V<sub>th</sub>|-|V<sub>GS</sub>|)/I<sub>LIMIT</sub>. Alternative to a graphical solution, decide on a current limit, I<sub>LIMIT</sub>. Select the resistor using the equation R = [(I<sub>LIMIT</sub>/K)0.5 - |V<sub>th</sub>]/I<sub>LIMIT</sub>, where K = 0.5\*(kn')\*(W/L).

For full schematic diagram and notes, please register and login at aldinc.com

©2016 Advanced Linear Devices, Inc. Information furnished by Advanced Linear Devices, Inc. (ALD) is believed to be accurate and reliable. However, ALD assumes no responsibility for the use of such information nor for any infringement of patent or rights of third parties that may result from its use. No license is granted implication or otherwise under any patent rights of ALD.