

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 ID (VGS = 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 VGS by interpolating the VGS 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

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