Category: FET   **CIRCUIT IDEAS FOR DESIGNERS**   Schematic no. fet_11137.0

P-Channel Current Mirrors & Current Multipliers

Description

When M1, M2, M3 and M4 are matched devices, the current across all the transistors have exactly the same gate bias voltage and remain constant. The drain and the gate of the M1 transistor are diode-connected and the current is set with $V_{SET} = I_{SET} \times R_{SET}$. The gate of M1 is connected to the gate of transistors M2, M3, and M4, which produces currents that mirror I_{SET}. With equal resistance loads R1, R2 and R3, the voltages V1, V2 and V3 mirror V_{SET}. This circuit has a range of current values from 100µA to 0.1µA. A 100µA current is achieved using R_{SET} = 1.5KΩ and a 0.1µA current is achieved using R_{SET} = 2MΩ. For current multiplier applications, connecting V1 and V2 together produces 2 X I_{SET} current, and connecting V1, V2 and V3 together produces 3 x I_{SET} current. Alternatively, V1, V2 and V3 are three separate independent current sources, each at I_{SET}.

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