



Category: FET

CIRCUIT IDEAS FOR DESIGNERS

Schematic no. fet_11118.0

Ultra Low Voltage RC Oscillator**Description**

This circuit is an ultra low supply voltage EPAD MOSFET RC oscillator operating at less than 1V. In this circuit U1A, U1B and U1C form the basic three-stage oscillator with feedback resistor and capacitor network R4, C_{osc} and R5. The oscillator operates in low frequency ranging from a few hertz to kilohertz. The output is tapped and buffered with U1D as an output buffer stage. Power to the output stage is supplied by V_L. V_L can be either at V₊ or at a different value, depending on the desired output high level. If V_L is at a different voltage level, then the output buffer also acts as a level shifter.

Using a low threshold enhancement mode EPAD MOSFET such as the ALD110802 (quad with V_{GS(TH)}= 0.20V), an example of this oscillator operates on 0.16V supply voltage and at 33nW of power, at a frequency of 10 Hz. Generally capacitor C_{osc} and Resistor R5 determine oscillating frequency of the RC oscillator, given by $f_{osc} = 1 / (2 \pi * R5 * C_{osc})$. However, the EPAD MOSFET is operating partially or entirely in the sub-threshold region of the MOSFET device. The charging of C_{osc} is limited by R3+R4 and the discharging of C_{osc} is limited by the current drive of U1C. These factors tend to decrease the actual oscillating frequency significantly. The remaining resistors R1 to R6 determine help determine the power dissipation as well as the oscillating frequency.

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