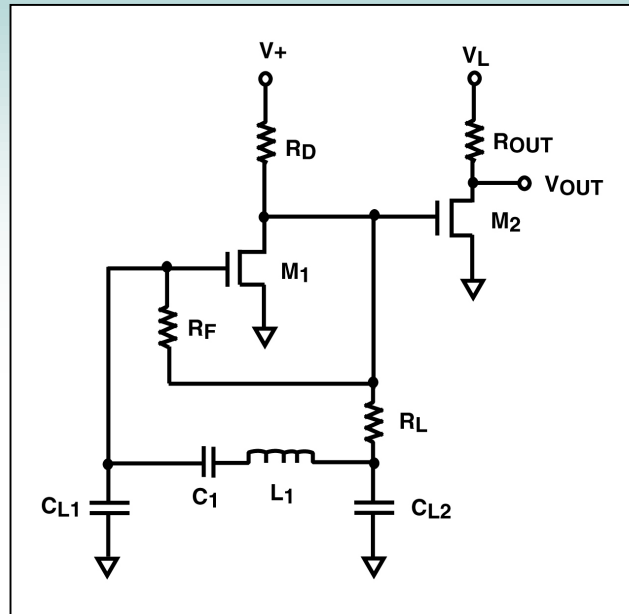




Ultra Low Voltage Nanopower LC (Colpitts) Oscillator Circuit



Description

This is an ultra-low supply voltage LC (Colpitts) oscillator circuit using EPAD MOSFETs with passive resistor load and output buffer. This circuit is similar to a classic LC oscillator circuit used to power 5V circuits. However, at low operating voltages, the values of the resistors and the impedance of the inverter MOSFET are selected to optimize oscillation stability and at the same time minimize power consumption. Using the appropriate component values, a LC circuit can be configured to operate in the range of supply voltages of $V+ = 5V$ to $0.2V$, with oscillating frequency ranges of 1 MHz to 4 MHz. The active-load reduces the minimum operating voltage to $0.17V$, and produces a figure of merit of 1MHz operation at $800nW$ of power consumption. At higher frequencies in excess of 1 MHz, at frequencies of up to 10 MHz, a dual EPAD MOSFET can be connected in parallel to provide more low voltage drive current necessary.

Recommended Components

EPAD MOSFET: M1, M2 **ALD110900** (either single or dual MOSFET connected in parallel)
 $CL1=10pF$; $CL2 = 39pF$; $RF= 5.6M\Omega$; $RL= 6 \Omega$; $RD= 20K\Omega$; $ROUT = 2.4K\Omega$; $L1 = 1mH$;

Other Related Circuit Ideas

[Schematic no. fet_11123.0](#) Low Voltage Micropower LC (Colpitts) Oscillator Circuit with Active Load