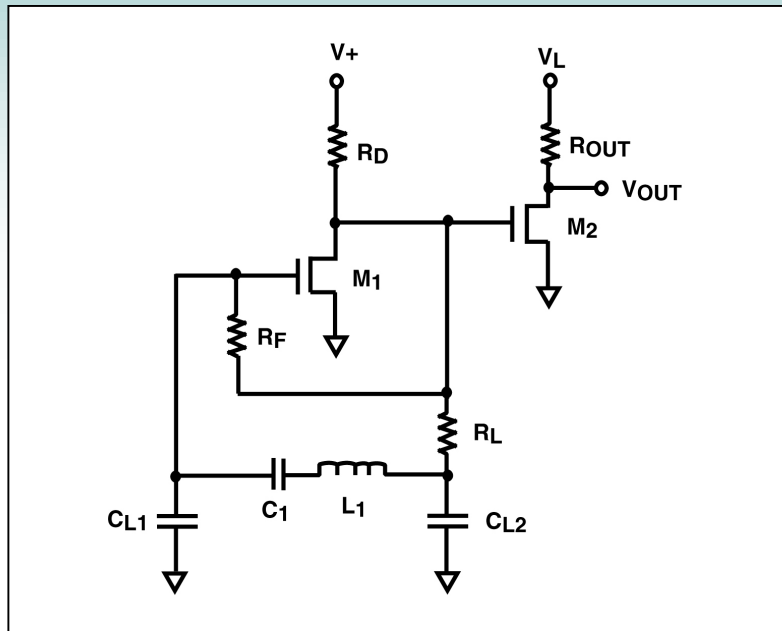




LC (Colpitts) Oscillator operates on 0.5V to 5 V Single Supply



Description

This is a low-voltage LC (Colpitts) oscillator circuit using EPAD MOSFETs that operates on a single supply ranging from 0.5V to 5V. A dual EPAD MOSFET is connected in parallel to provide more low voltage drive current at lower supply voltages.

Oscillator Circuit Performance Data: $V_+ = 0.5V$, $I_+ = 25\mu A$, $P_D = 12.5\mu W$, Crystal frequency = 1 MHz.
 $V_+ = 5.0V$, $I_+ = 250\mu A$, $P_D = 1250\mu W$, Crystal frequency = 1 MHz.

The output buffer is powered by V_L with pull up resistor R_{OUT} , which can be selected to optimize the output voltage swing levels as well as providing adequate output drive currents. V_L is an output voltage level that can be equal to, higher than or lower than V_+ , depending on desired output voltage swing levels. R_{out} must be selected for a selected V_L and at the same time minimize current drain.

Output Buffer performance Data: $V_L = 0.5V$, $I_L = 62\mu A$, $P_D = 31\mu W$, $V_{OH} = 350mV$, $V_{OL} = 226mV$.
 $V_L = 5.0V$, $I_L = 69\mu A$, $P_D = 347\mu W$, $V_{OH} = 4.78V$, $V_{OL} = 1.47V$

Recommended Components

EPAD MOSFETs: M1 [ALD110800](#) (dual MOSFET connected in parallel); M2 1/2 [ALD114904](#)
 $C_{L1} = 10pF$; $C_{L2} = 39pF$; $L_1 = 1mH$; $R_F = 5.6M\Omega$; $R_L = 6\Omega$; $R_D = 20K\Omega$; $R_{OUT} = 2.4K\Omega$

Other Related Circuit Ideas

[Schematic no. osc_42008.0 Nanopower LC \(Colpitts\) Oscillator Circuit](#)