

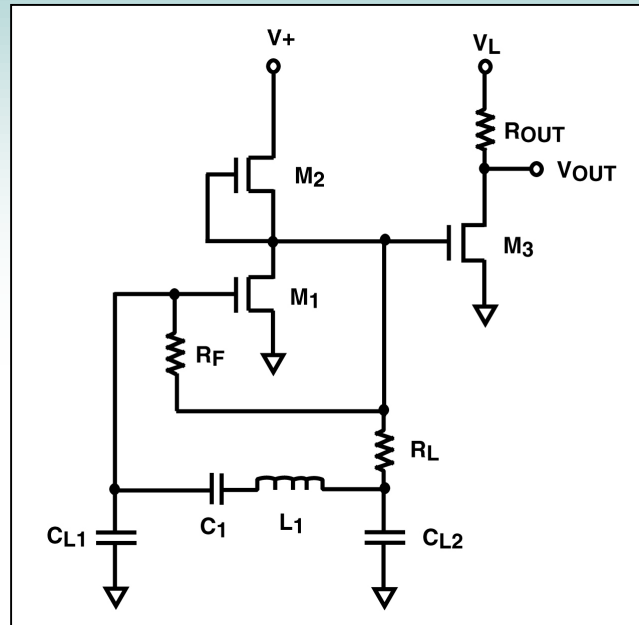


Category: FET

CIRCUIT IDEAS FOR DESIGNERS

Schematic no. fet\_11123.0

### Low Voltage Micropower LC (Colpitts) Oscillator Circuit with Active Load



#### Description

This is an ultra low-voltage LC (Colpitts) oscillator circuit using EPAD MOSFETs with active load and output buffer. This circuit is similar to a standard 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. An active load device using, for example, an ALD114804 replaces a passive load at the inverter. Using the appropriate component values, an oscillator circuit can be configured to operate in the range of supply voltages of  $V+ = 5V$  to  $0.2V$ , with oscillating frequency ranges of  $1\text{ MHz}$  to  $4\text{ MHz}$ . The active-load reduces the minimum operating voltage to  $0.2V$ , and produces a figure of merit of  $1\text{ MHz}$  oscillating frequency at  $3\text{ }\mu\text{W}$  of power consumption. At higher frequencies in excess of  $1\text{ MHz}$ , a dual EPAD MOSFET can be connected in parallel to provide more low voltage drive current necessary.

#### Recommended Components

EPAD MOSFETs: M1, M3 [ALD110800](#) (either single or dual MOSFET connected in parallel);

Active Load: M2  $\frac{1}{2}$  [ALD114904](#)

$CL1=10\text{pF}$ ;  $CL2 = 39\text{pF}$ ;  $L1 = 1\text{mH}$ ;  $R_F= 5.6\text{MOhm}$ ;  $R_L= 6\text{ Ohm}$ ;  $R_{OUT} = 2.4\text{KOhm}$

#### Other Related Circuit Ideas

[Schematic no. fet\\_11122.0](#) Ultra Low Voltage Nanopower LC (Colpitts) Oscillator Circuit