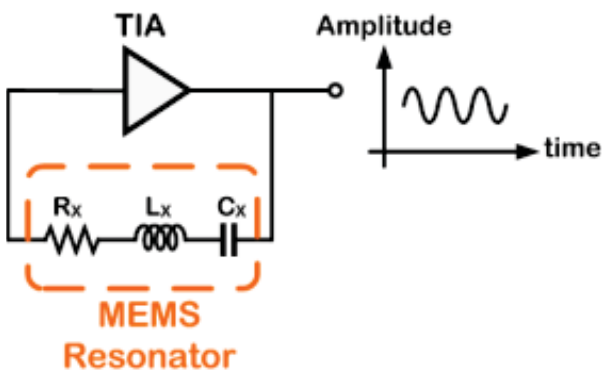
CMOS Phase-Locked Loop with Integrated MEMS Resonator



PFD , Charge Pump

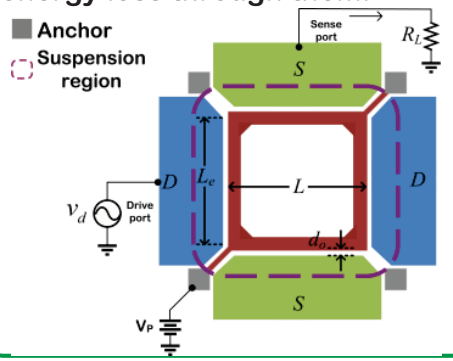
The type-Ⅳ PFD, we chosen that because of its detecting range covers ±2π. Our CP has high linearity. The dead zone, PFD+Charge Pump, had eliminated.

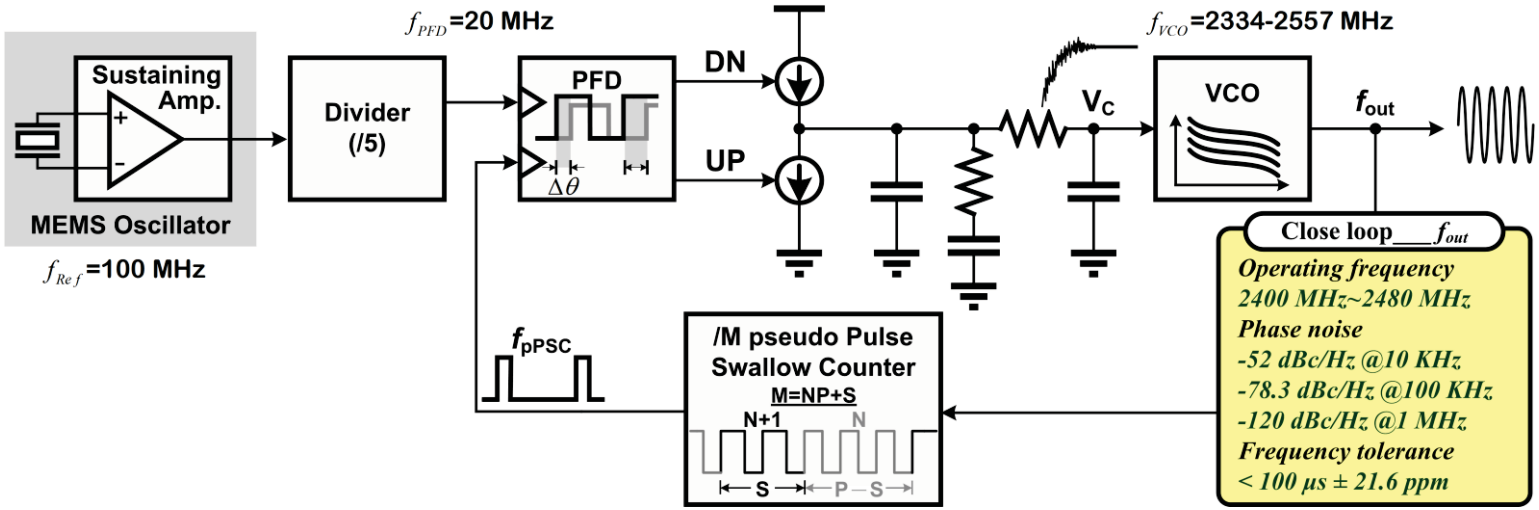
VCO

The loss of inductor was compensated by cross-couple pairs, the wide tune and the fine tune were controlled through V_b and V_c, respectively.

Lamé mode resonator

The anchors of Lamé mode resonator move away from main structure, different from C-C Beam, that suppresses energy loss through them.





Ring oscillator topology

The oscillator uses MEMS resonator as its frequency selective tank, there will be oscillate if the loop gain $L(j\omega)$ at ω_o matched the Barkhausen's Criteria.

pseudo Pulse Swallow Counter

We applied a adjustable pulse width unit to replace S-counter, that has the same performance and more simple than the traditional PSC.