1S-13

CMOS-on-Quartz Pulse Generator for Low Power Applications

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VDEC

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1S-13

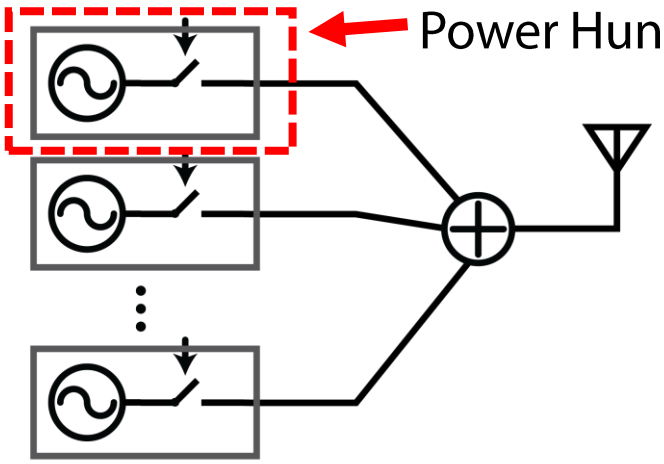
CMOS-on-Quartz Pulse Generator for Low Power Applications

Ultra-Wideband Impulse-Radio

Applications
- Radar Range Finder
- Chemical/biological spectroscopy

Low Power	Low Duty Cycle	High Frequency
High Efficiency	Zero stand by power Quick Start	CMOS limitation

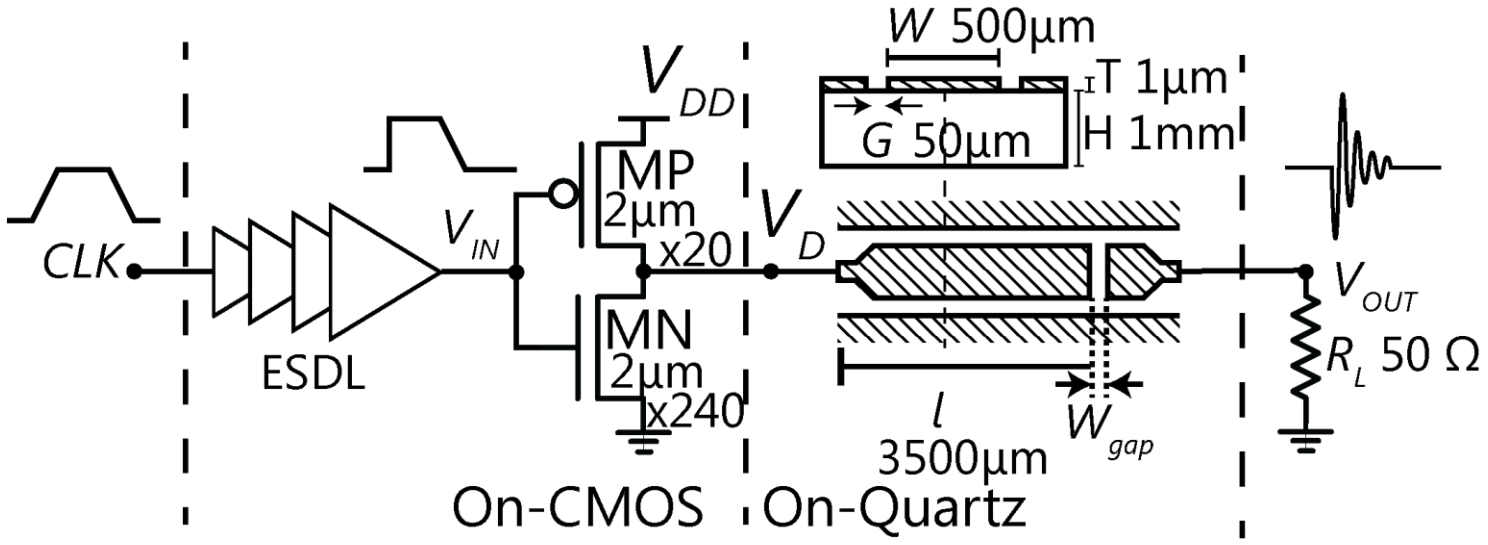
Pulse Generator



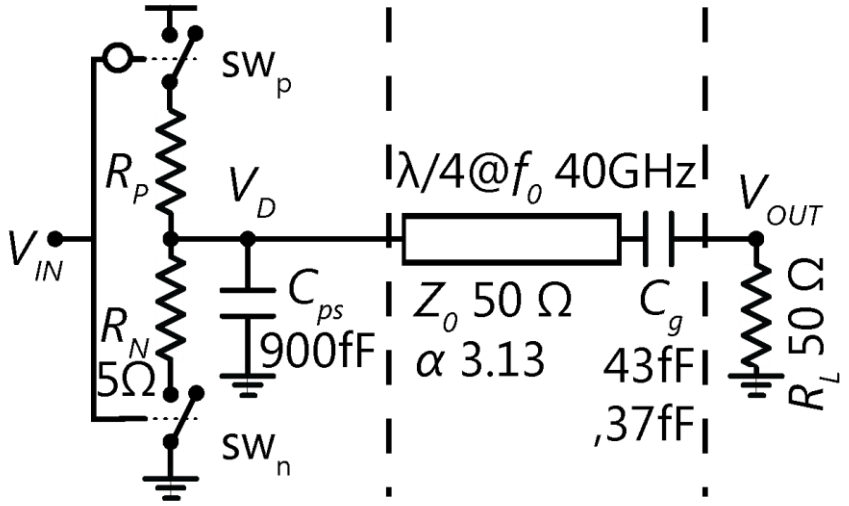
Conventional Methods fails
- Pulsed Oscillator
- Edge Combiner
- Lump Charge-Discharge

1S-13

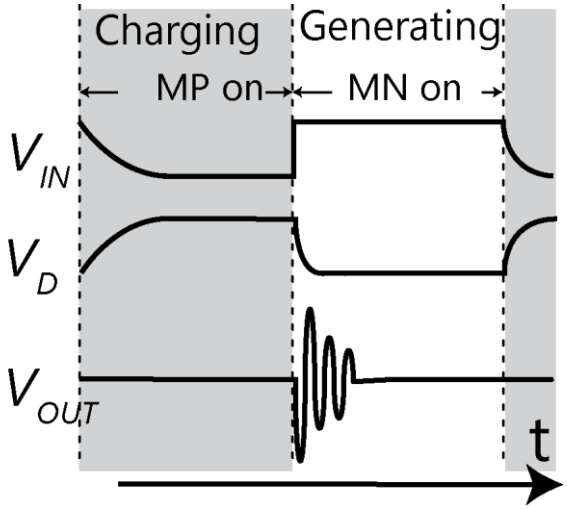
Proposed Circuit



Simplified Circuit

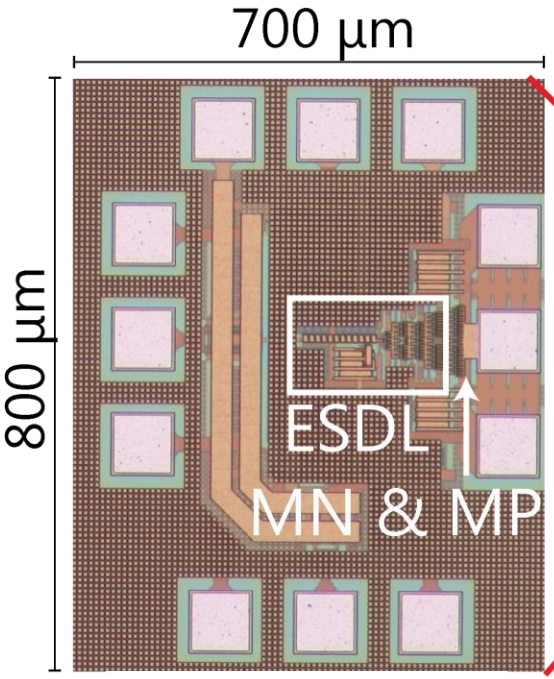


Timing Diagram

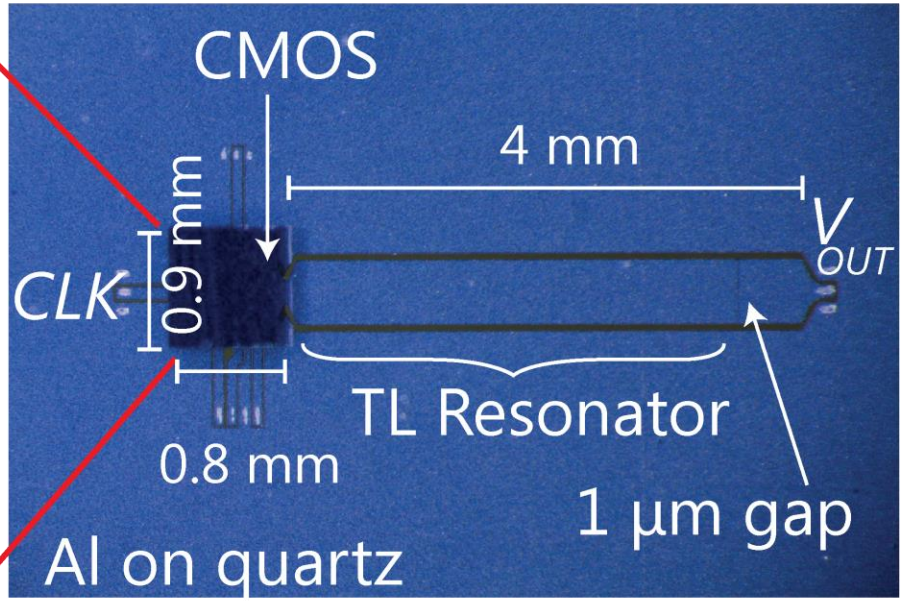


1S-13

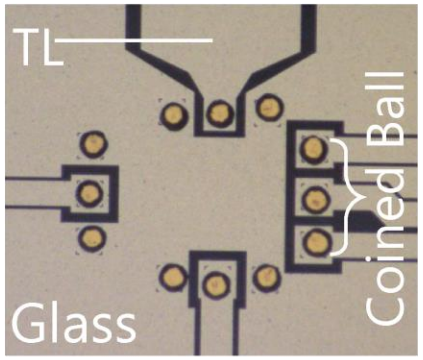
Integration

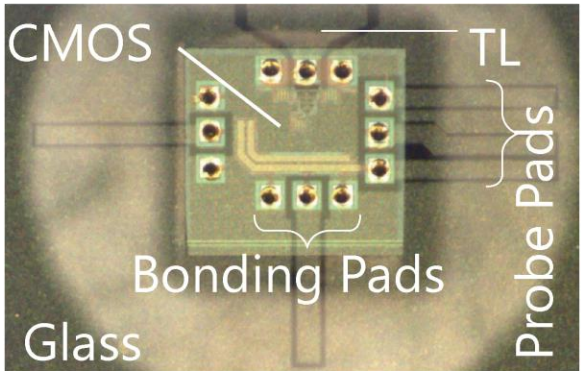


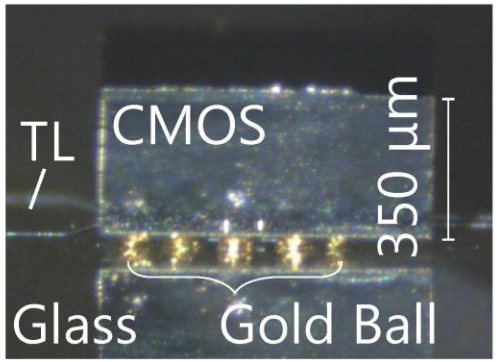
CMOS Chip



Integrated Pulse Generator



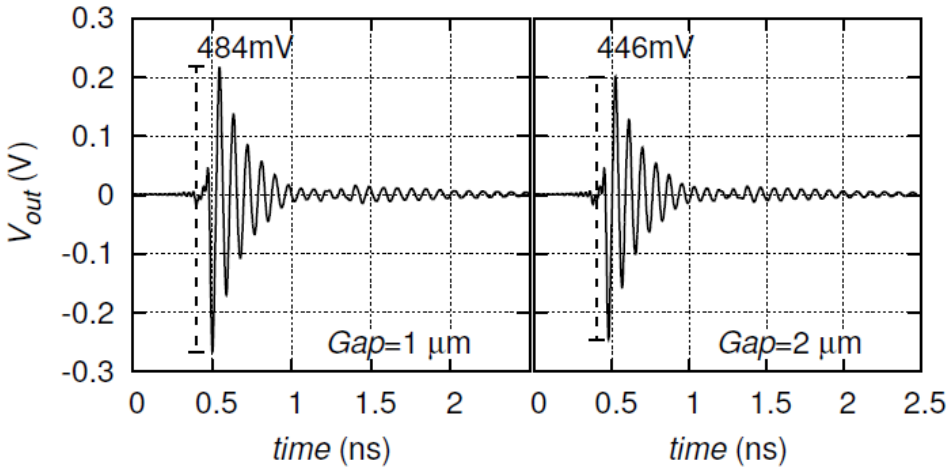




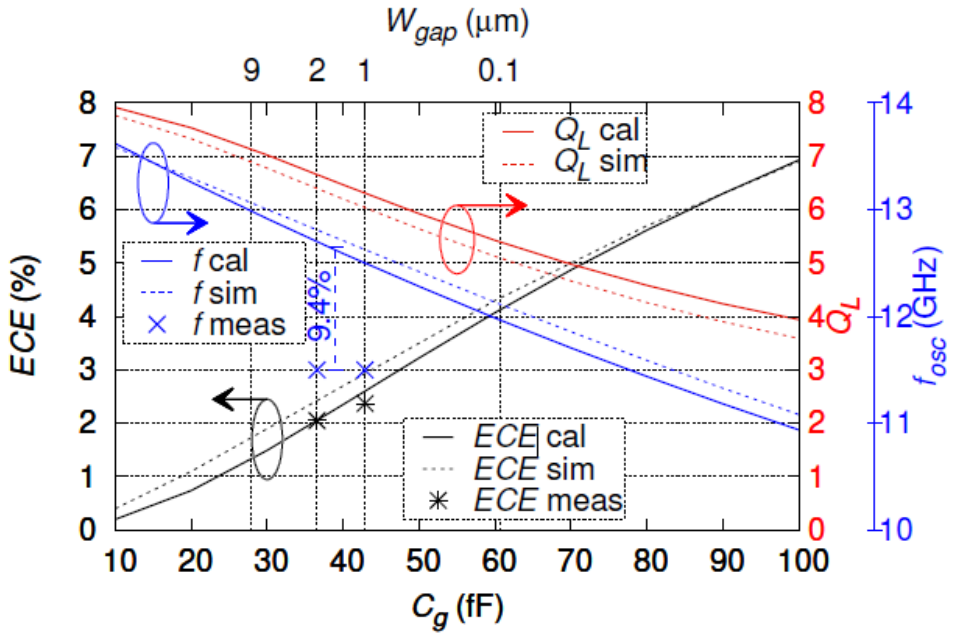
Flipped chip integration

Measurement Results

Time Domain Waveform



Output Characteristics



Performance Summary

Frequency	11.5 GHz
Efficiency	2.37 %
Output Energy	128 fJ/pulse
Input Energy	5.4 pJ/pulse
Repetition Rate	200 Mb/s