Energy Harvesting IC for Fuzing Applications

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Mixed Signal Integration

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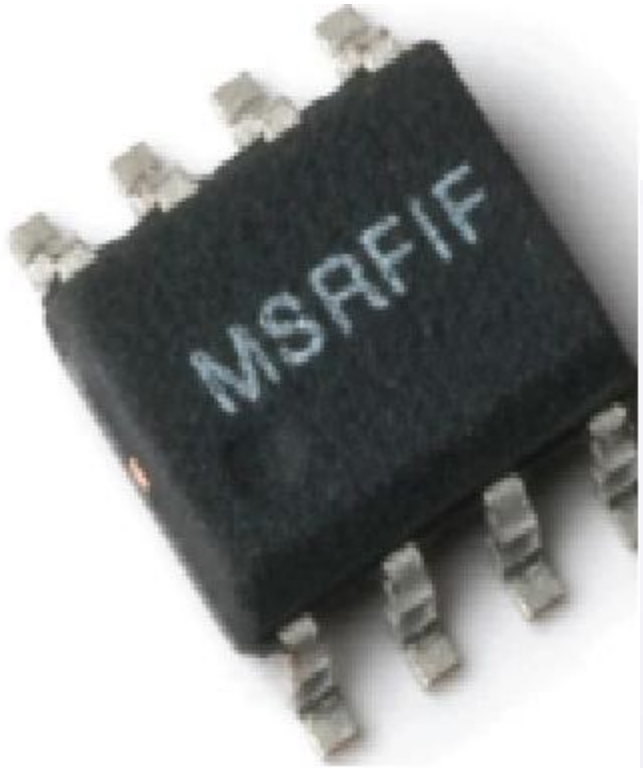
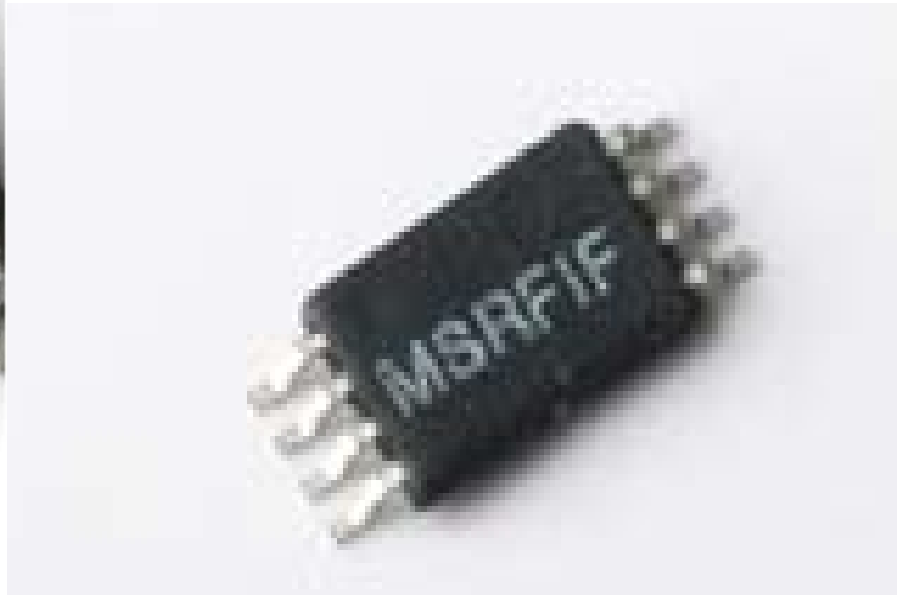
What is Energy Harvesting?

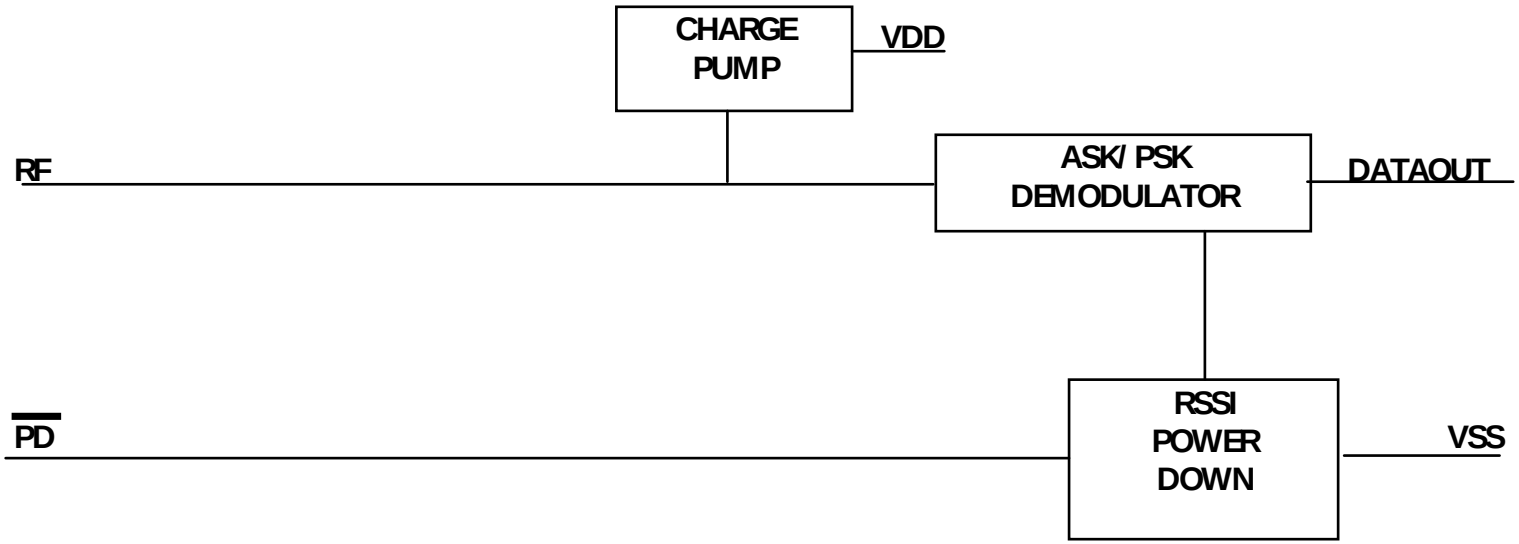
- Vibration detection
  - Using transducer
  - or Piezoelectric device
- Applications
  - Sensors for remote equipment
    - motors (bearing failure detection).

MSRFIF

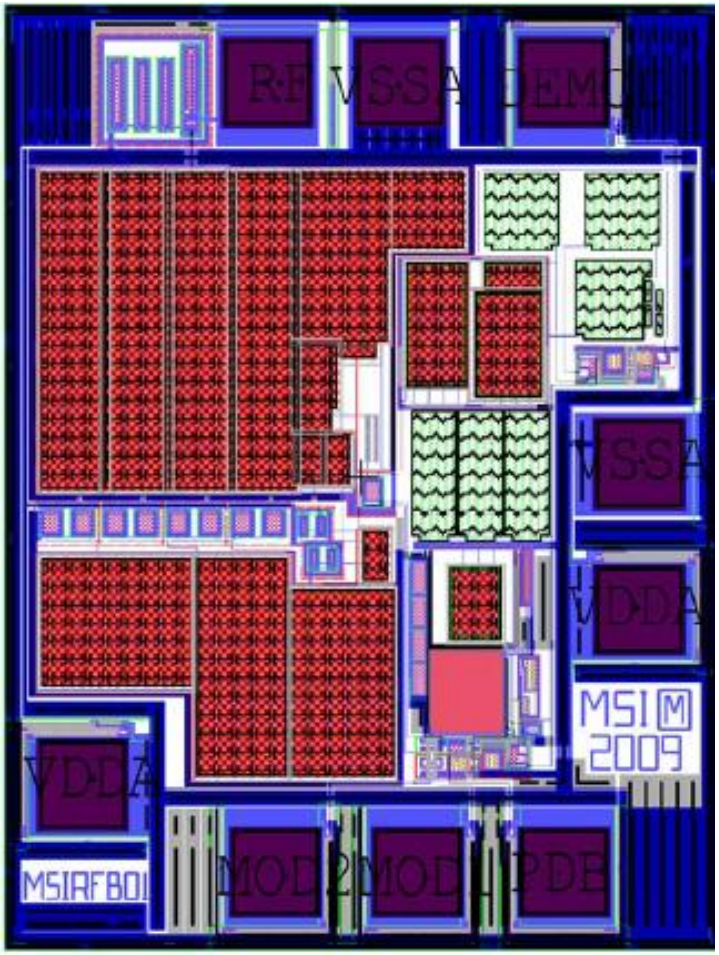




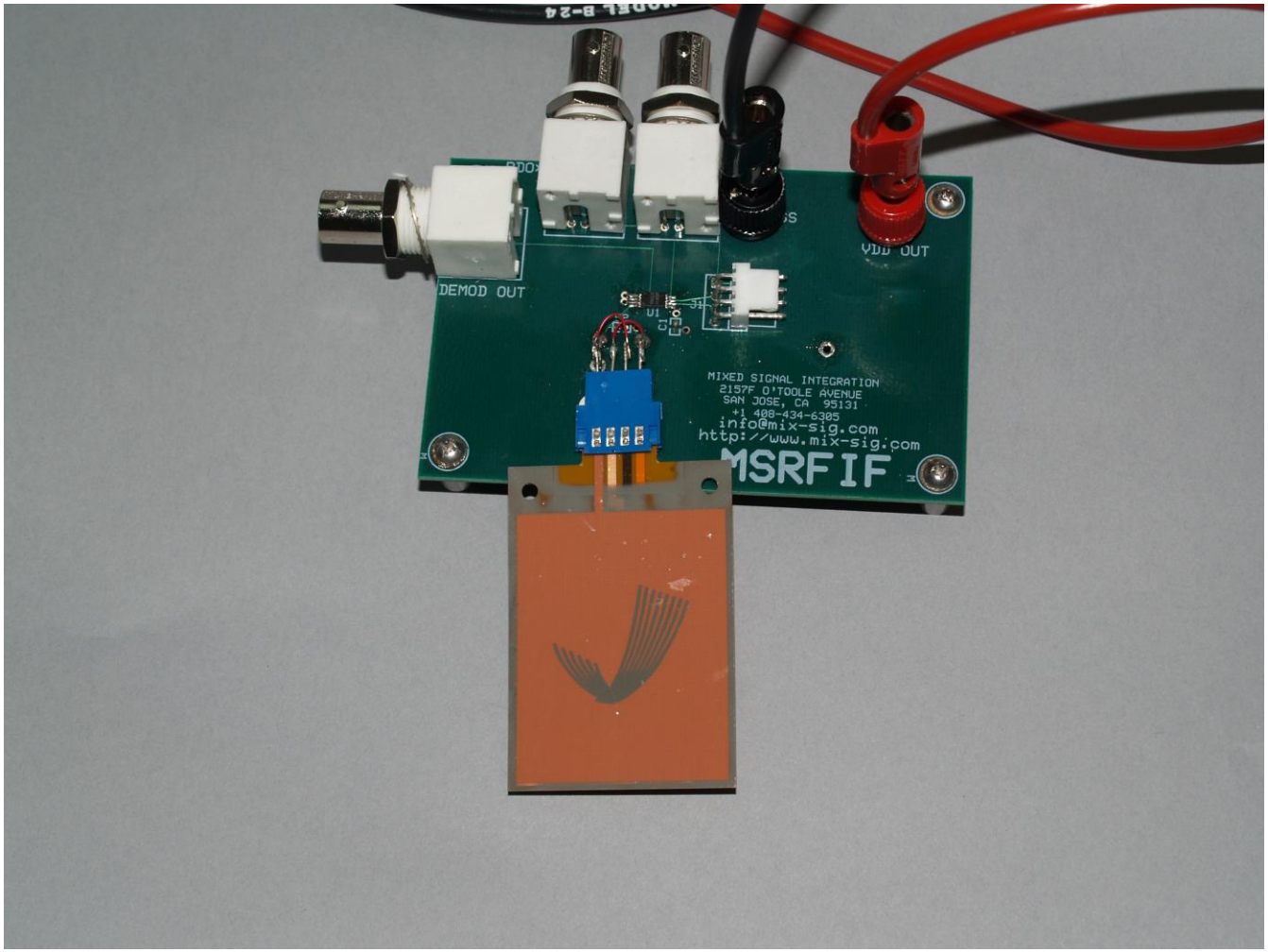
MSRFIF Block Diagram



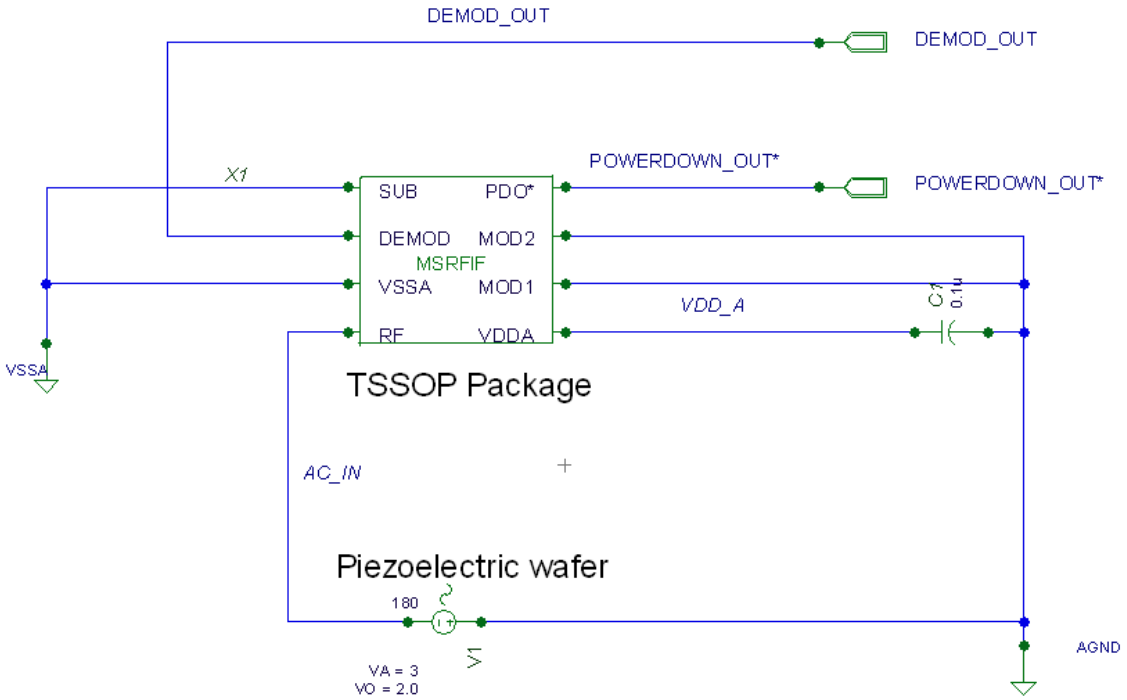
MSRFIF Die Plot



MSRFIF Evaluation Board



Simplified Schematic



Bench Data

- Piezoelectric wafer is tuned
- Voltage generated by Motion fed to charge pump of MSRFIF.
- VDD out is 2.5V at 100 μA

Technical Issues

- Piezo efficiency
  - Amount of motion limited for application
- Piezo size
  - Need larger size for voltage/current needs
- Charge pump efficiency
  - Optimized for RF

Summary

MSRFIF provides a charge pump to power Fuzing technology

- Piezoelectric wafer for energy harvesting.
- Perfect for micropower microcontrollers
- Possible to achieve more current in future designs