

# Piezoelectric Energy Harvesting Interface Circuit

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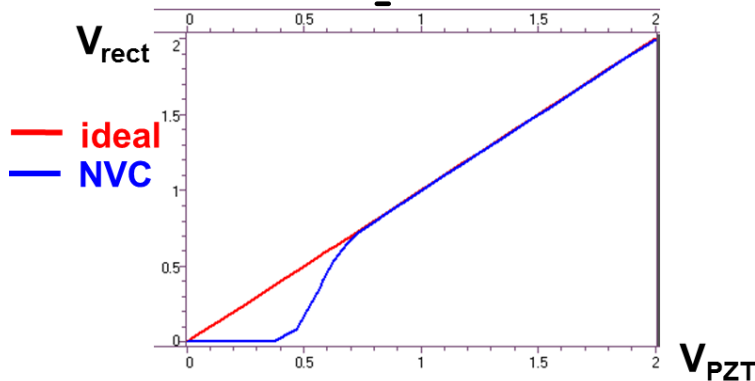
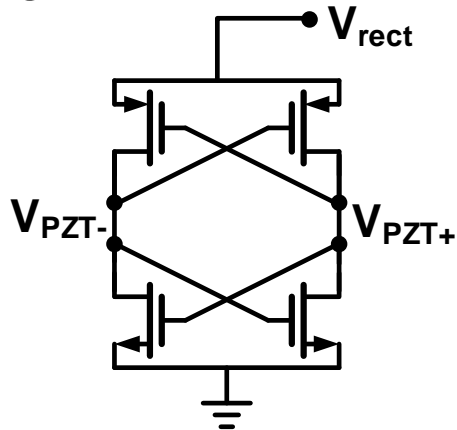
學生: 陳家賢



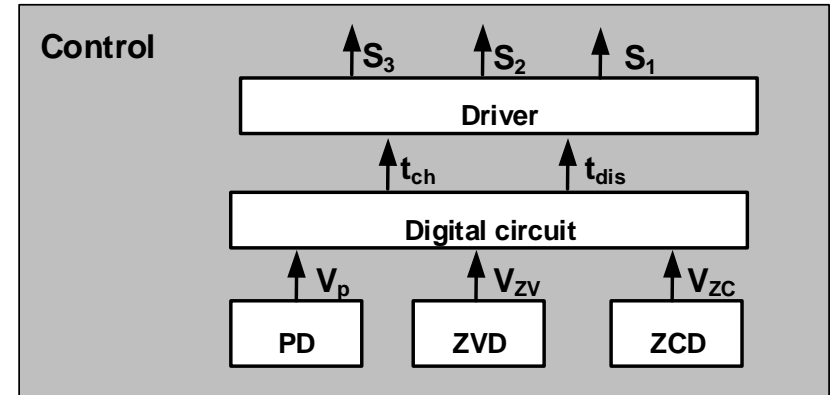
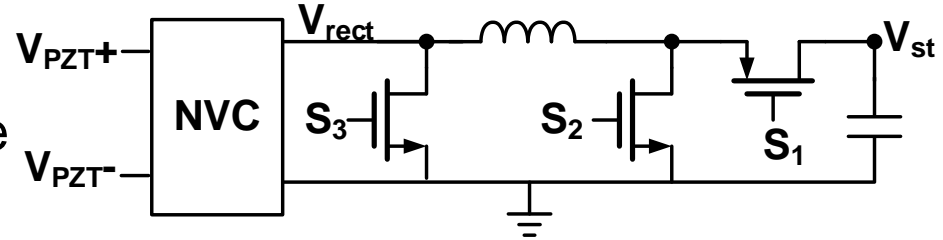
# Interface Circuit

- Interface circuit
  - ◆ Harvest piezo. power
  - ◆ Switch inductor technique

➤ NVC

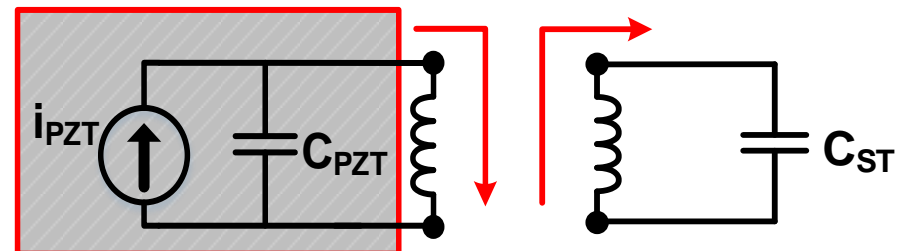


➤ System



➤ Power flow

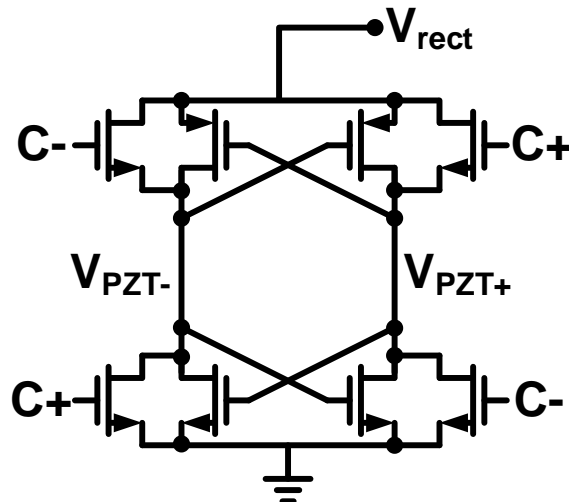
PZT model



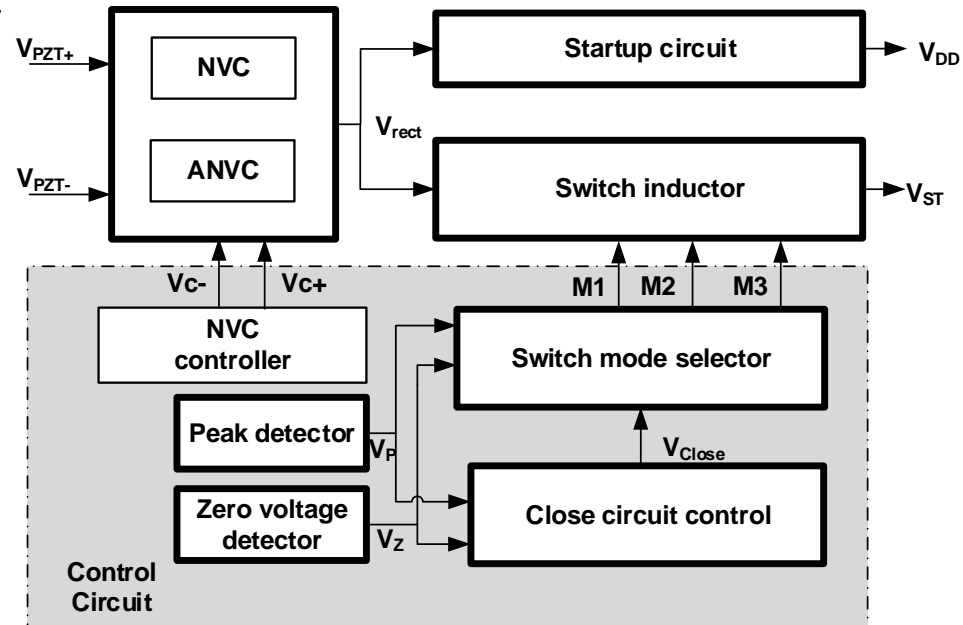
# Tri-mode Switch inductor

- Interface circuit
  - ◆ Tri-mode Switch inductor
  - ◆ Self startup
  - ◆ Active NVC

## Active NVC



## System

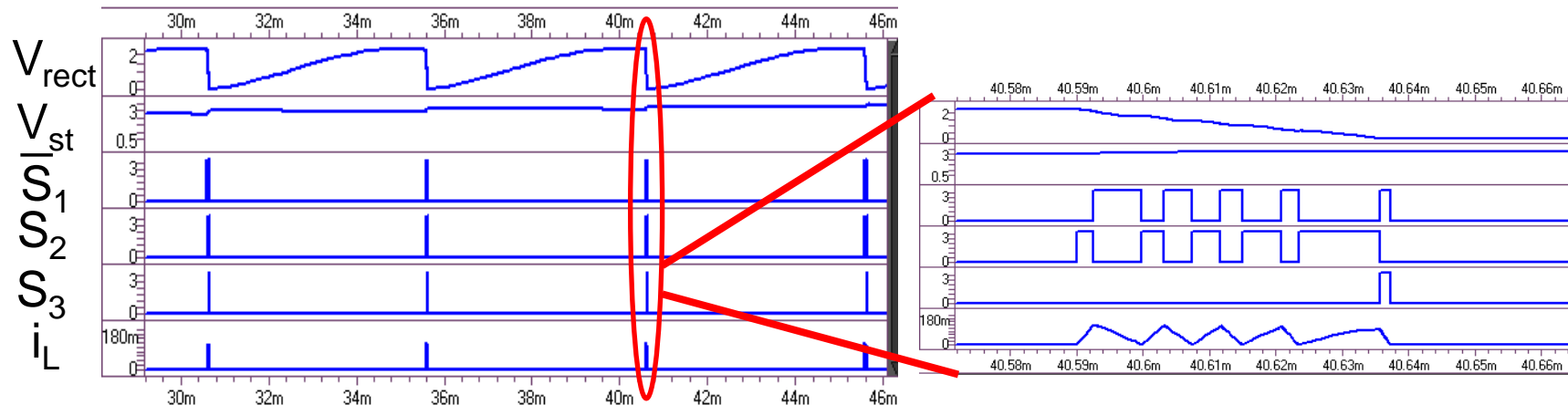


## Tri-mode

- Direct mode
- Multiple switches mode
- Hybrid mode

# Tri-mode Switch inductor

## ● Simulation waveform



## ● Comparison table

	JSSC2010	JSSC2012	ASSCC2013	ISSCC2013	ISSCC2013	This work
Process	0.18 $\mu\text{m}$	0.35 $\mu\text{m}$	65 nm	0.25 $\mu\text{m}$	0.35 $\mu\text{m}$	0.18 $\mu\text{m}$
Input power	70 $\mu\text{W}$	30-523 $\mu\text{W}$	28 $\mu\text{W}$	25-1600 $\mu\text{W}$	50 $\mu\text{W}$	600 $\mu\text{W}$
Eff.	87% *	85%	70%	88.9%*	69.2 %	<b>90.7%</b>
Startup	NO	YES	YES	NO	NO	<b>YES</b>

\*Only buck

