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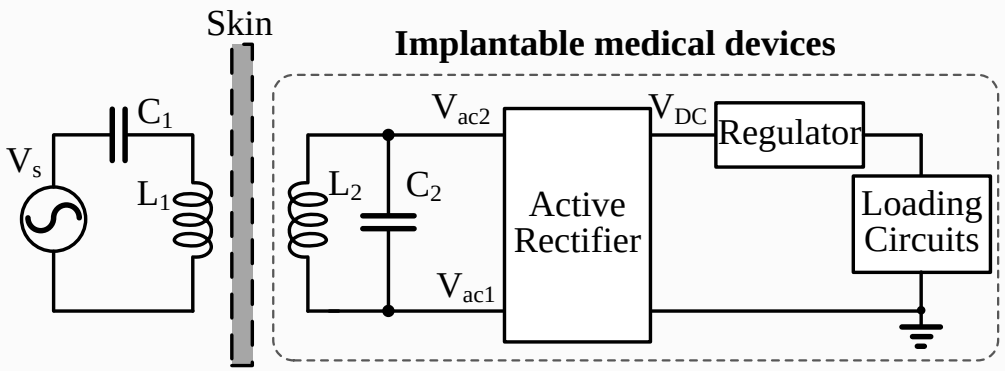
香港科技大學
THE HONG KONG UNIVERSITY OF SCIENCE AND TECHNOLOGY

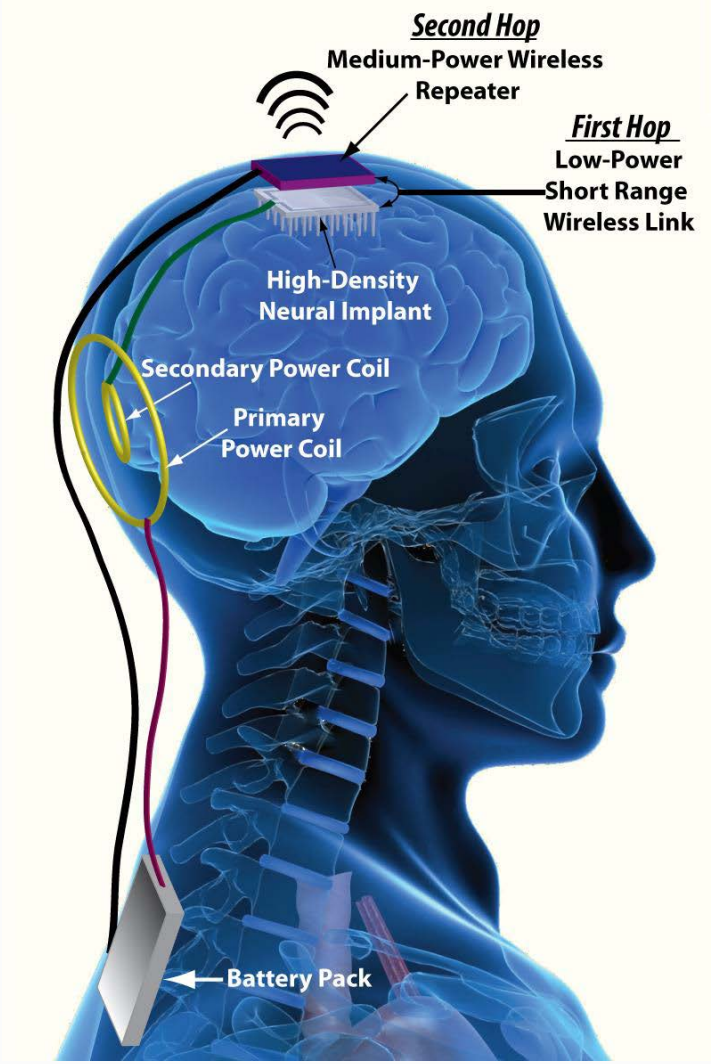
A 13.56 MHz On/Off Delay-Compensated Fully-Integrated Active Rectifier for Biomedical Wireless Power Transfer Systems

Lin Cheng, Wing-Hung Ki, Tak-Sang Yim

Department of ECE,
The Hong Kong University of Science and Technology

Wireless Charging for Implants

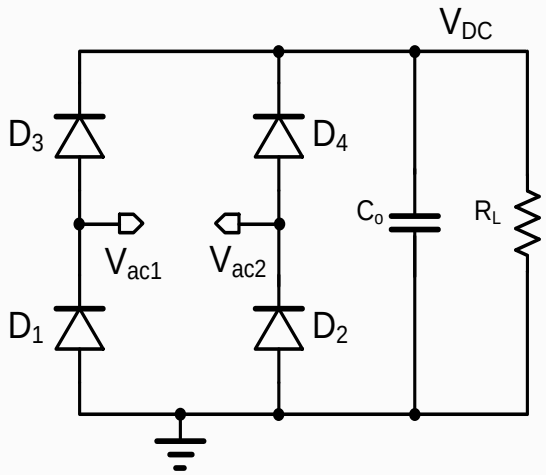




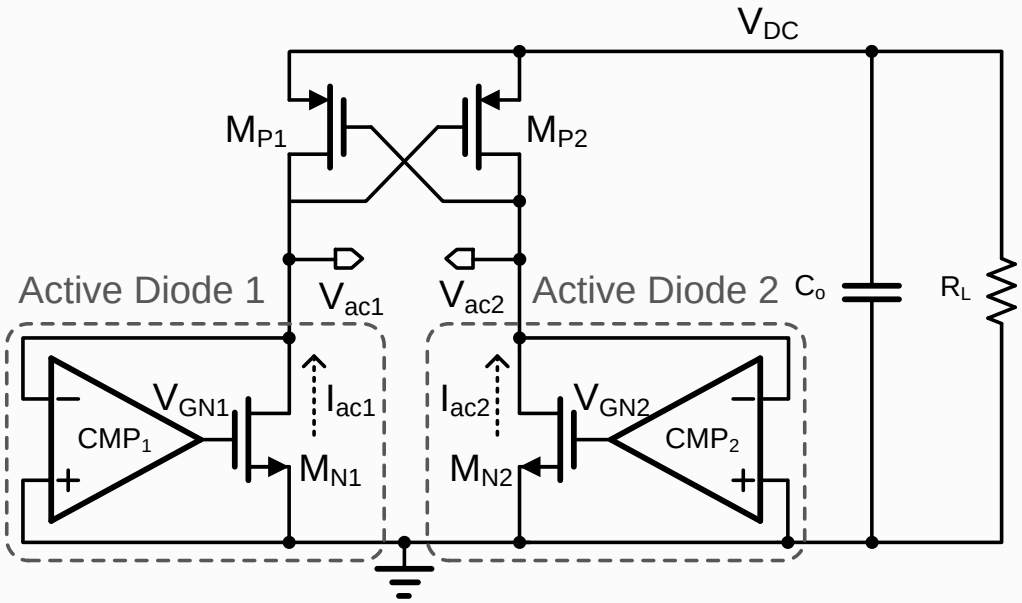
- A viable solution to provide power for implants

Source: http://mimetic.ece.ucsb.edu/research/

Active Rectifier/Diode



Passive rectifier

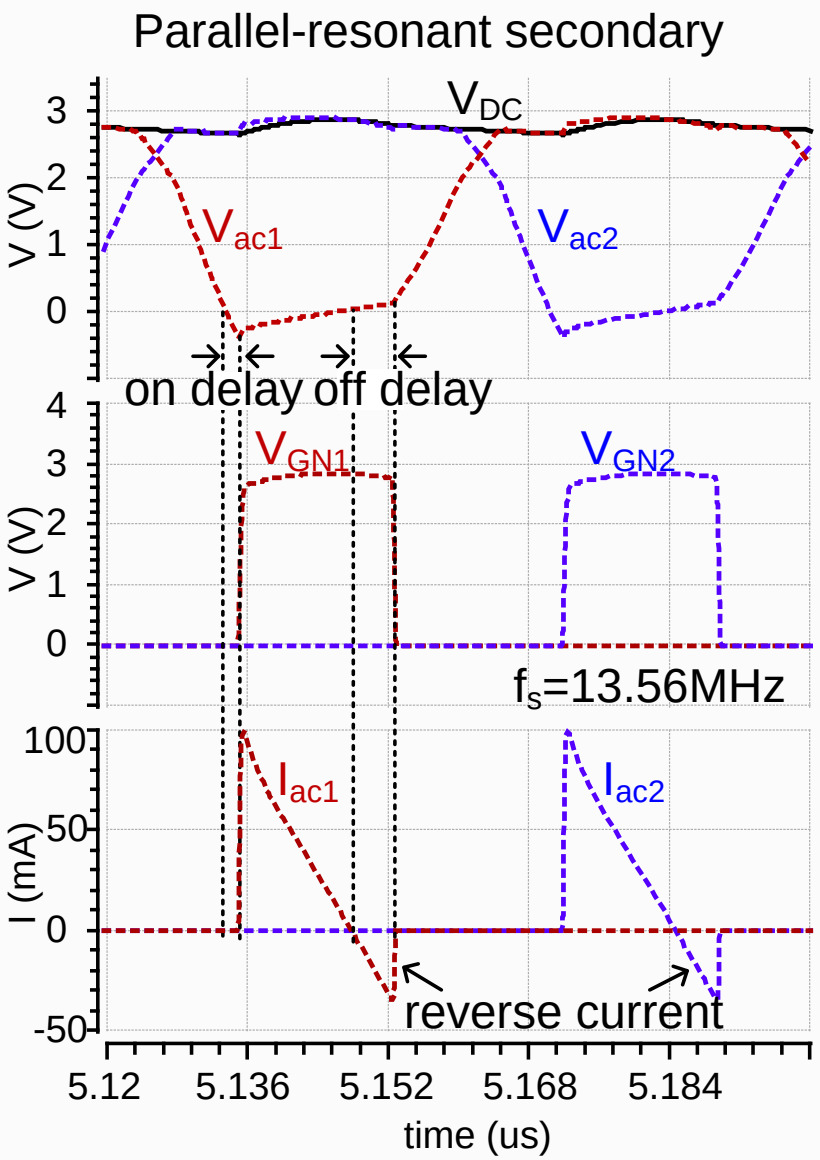


Active rectifier

Effects of On/Off Delays

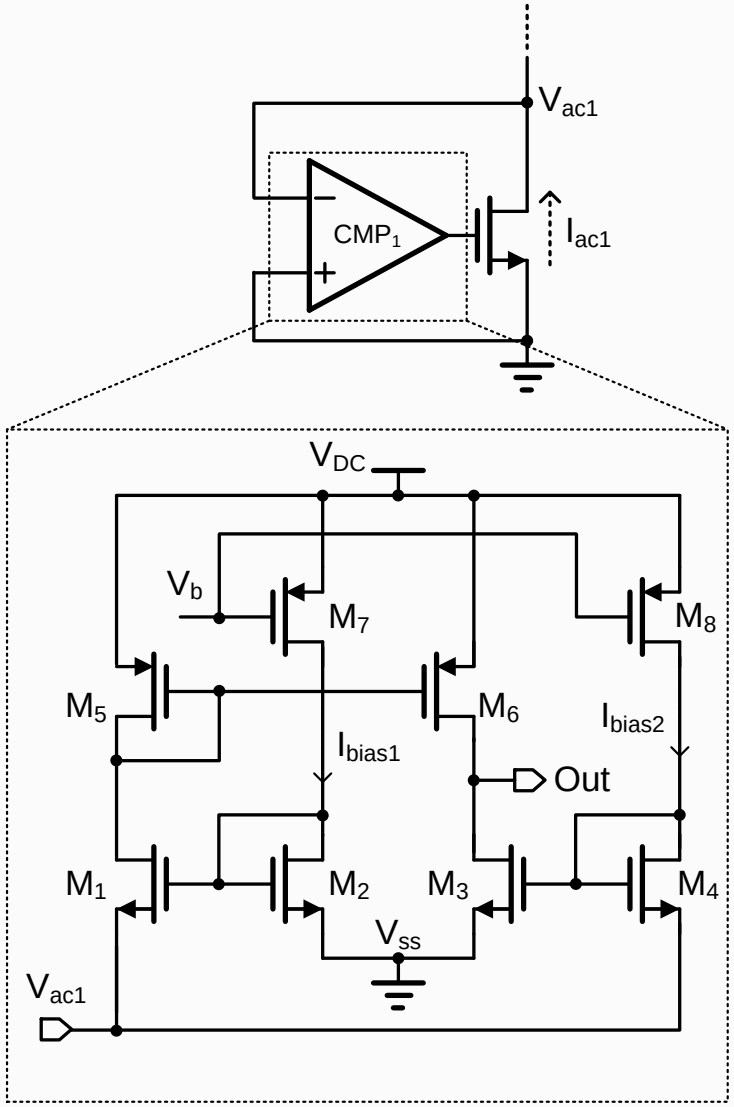
- Power conversion efficiency (PCE)
- Voltage conversion ratio (VCR)
- Output voltage ripples
- di/dt noise

The main challenge in designing active diodes



Existing Delay-Compensation Schemes

- Inject a fixed offset by
  - Unbalanced bias currents
    [Guo, JSSC 2009], [Lee, TCAS-I 2011]
    [Lu, TBCAS 2014], [Wu, JSSC 2014]
  - Asymmetrical input transistors
    [Lam , TCAS-II 2006],[Cha, TCAS-II 2012]
  - Off-chip calibration
    [Lee, TCAS-I 2011]
- Sensitive to PVT variations and mismatches



Proposed Delay-Compensation Scheme