Ultra-Fast High-Energy Capacitor Designs

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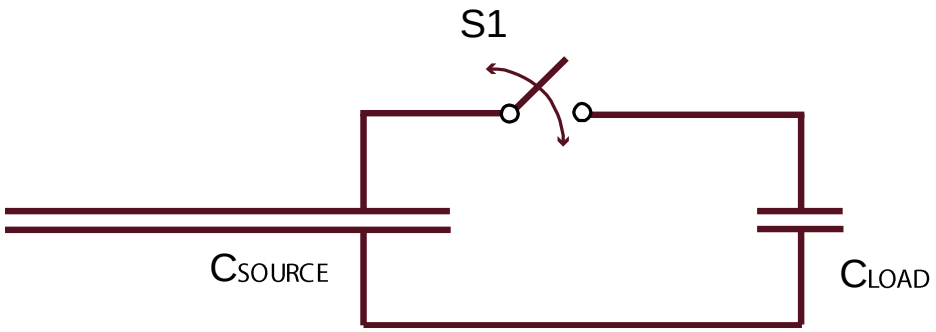
Applications requiring faster, high-energy capacitors

- Energy harvesting
- Regenerative braking
- Transient protection
- Load balancing
- Power decoupling

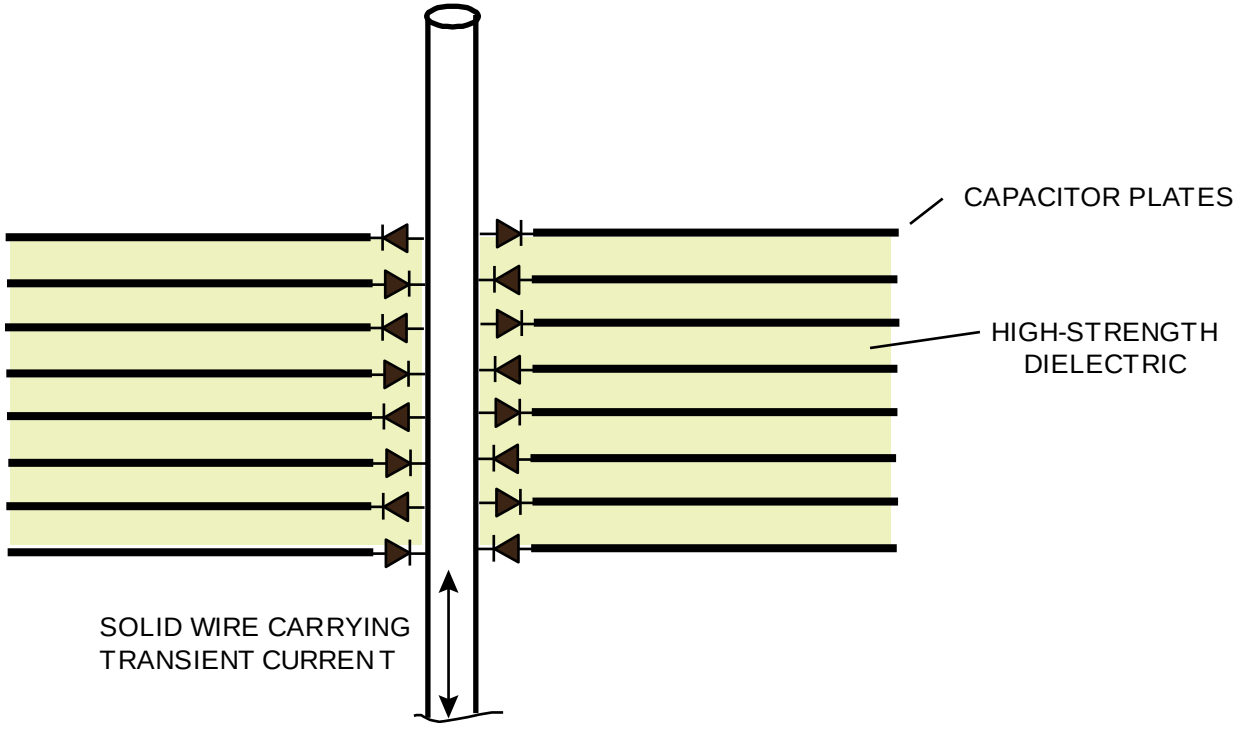
Factors that limit charge/discharge rate

- Inductance
- High ESR
- Low ESR
- Non-linear junction speeds/losses
- Non-linear dielectric materials

Problem Illustration



Passive Example



Project Proposal 1

- Develop an ultra-fast high-energy capacitor for regenerative braking applications.
  - Characterize regenerative braking sources
  - Work with a Tier 1 electronics supplier to determine design constraints
  - Design capacitor and build a prototype
  - Evaluate prototype
  - Patent and/or publish results

Project Proposal 2

- Develop an “impedance matching” circuit for a capacitor to maximize energy capture from time varying sources.
  - Define the target source characteristics
  - Design capacitor and build a prototype
  - Evaluate prototype
  - Patent and/or publish results