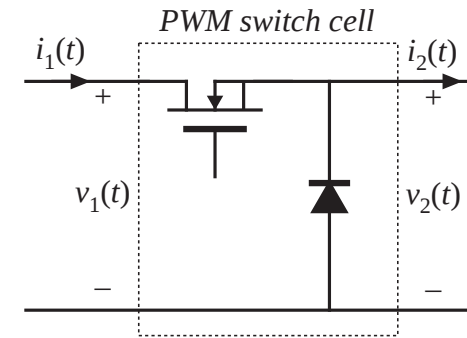
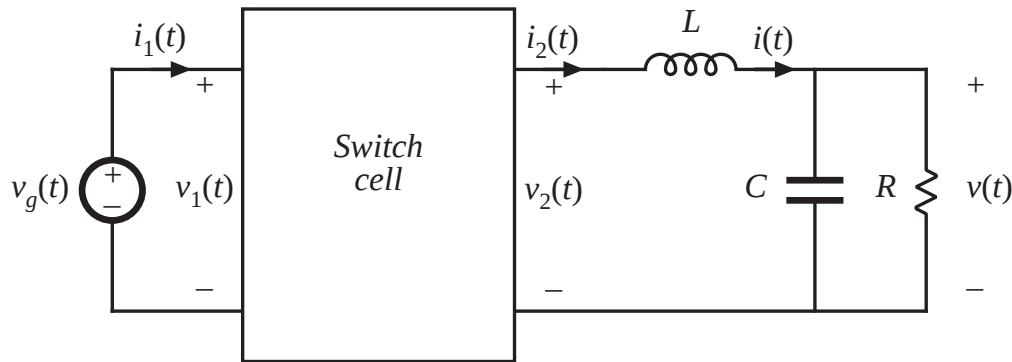


The resonant switch concept

General idea:

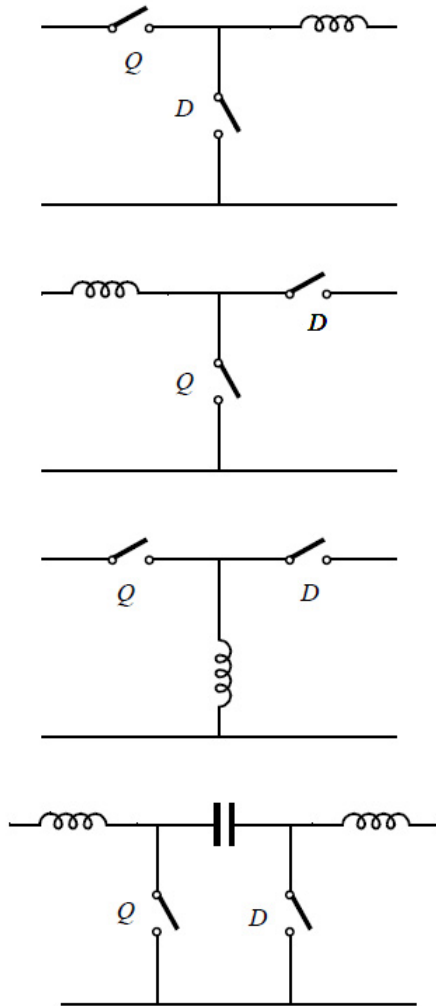
- PWM switch network is replaced by a resonant switch network
- This leads to a quasi-resonant or quasi-squarewave version of the original PWM converter



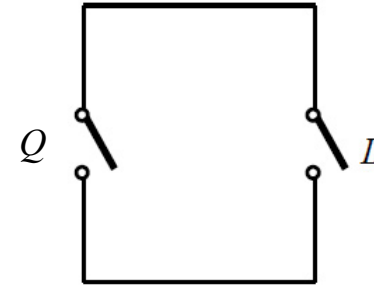
Example: realization of the switch cell in the buck converter

High Frequency Switch Network

Converter examples



High-frequency view of the switch network



Basic switch implementation options

Q : single-quadrant (transistor)

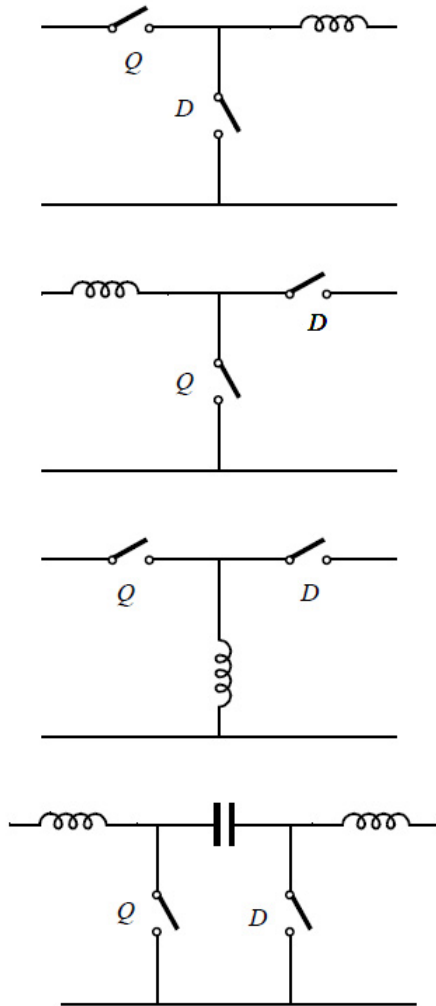
D : single-quadrant (diode)

Q : current-bidirectional (e.g. MOSFET)

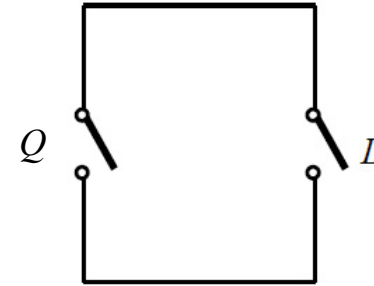
D : current-bidirectional synchronous rectifier
(e.g. MOSFET)

ZVS-QSW: Review

Converter examples



High-frequency view of the switch network



Basic switch implementation options

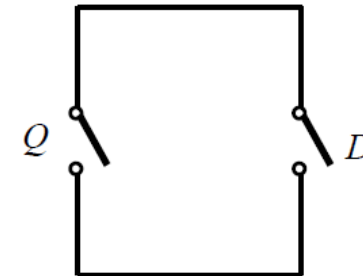
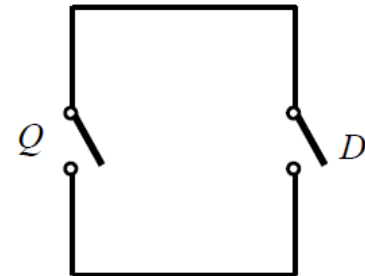
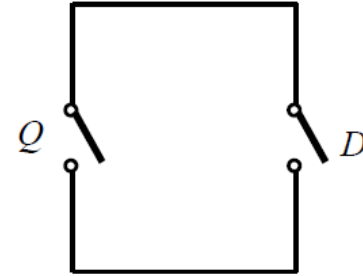
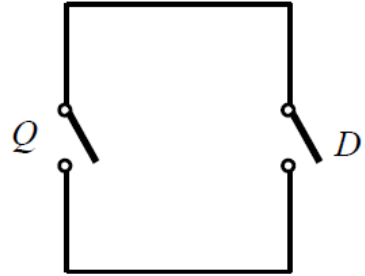
Q : single-quadrant (transistor)

D : single-quadrant (diode)

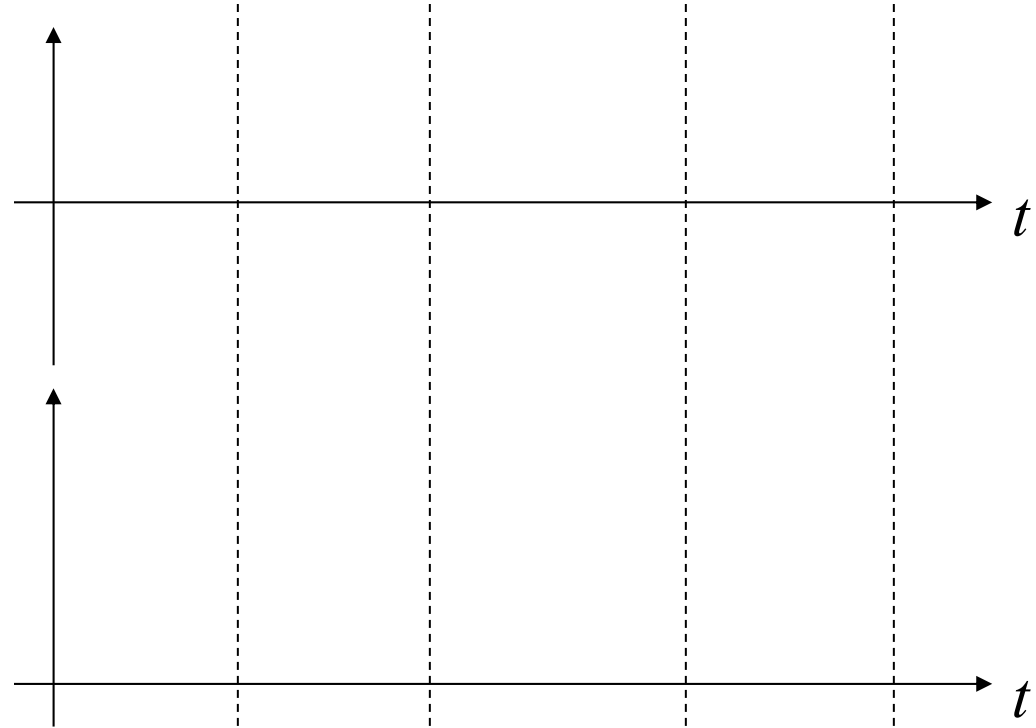
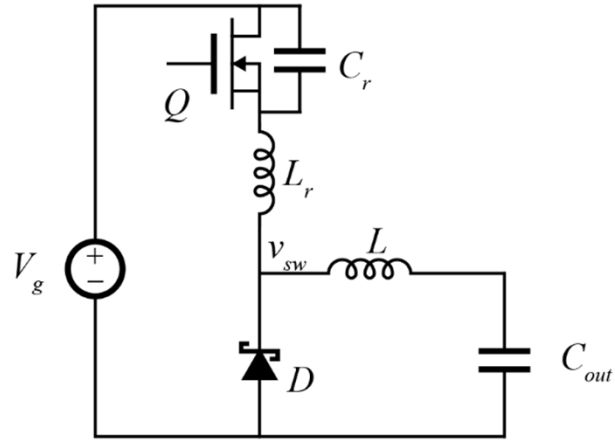
Q : current-bidirectional (e.g. MOSFET)

D : current-bidirectional synchronous rectifier (e.g. MOSFET)

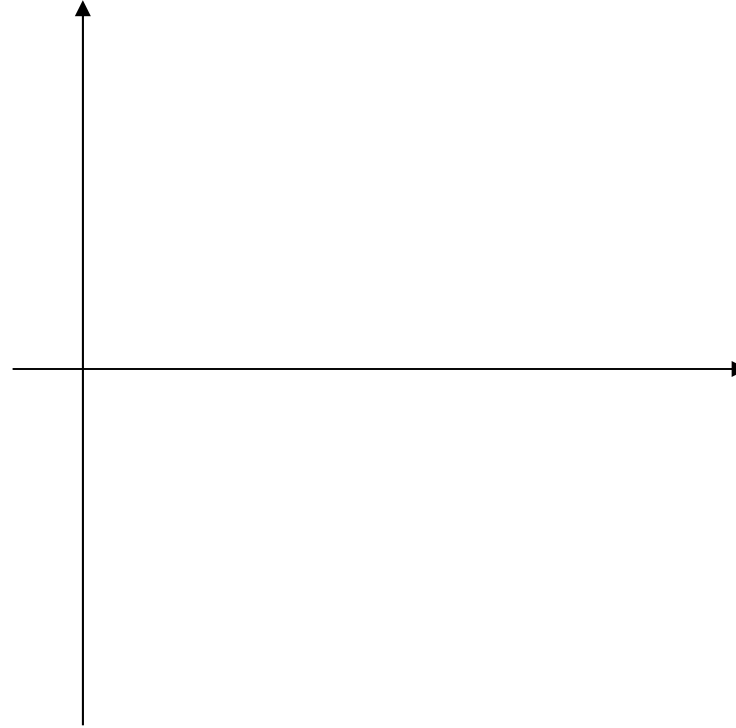
Classification of Resonant-Switch Converters



ZVS-QR Buck



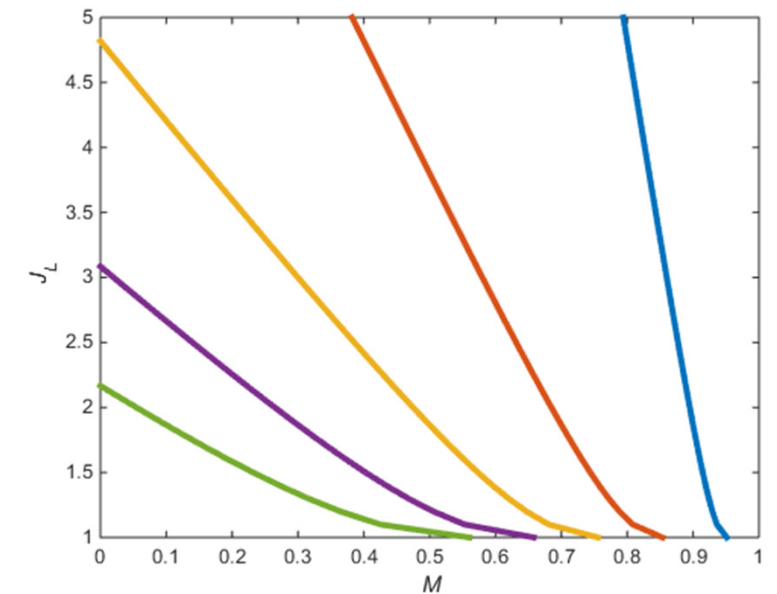
ZVS-QR State Plane



Averaging



Complete Solution



MOSFET Voltage Stresses

Test Circuit

