

Single-Inductor-Dual-Output DC-DC Buck converter Design with ZVS-PWM Control



Nobukazu Tsukiji, Yasunori Kobori, Nobukazu Takai, Haruo Kobayashi

Division of Electronics and Informatics, Gunma University, Kiryu 376-8515 Japan

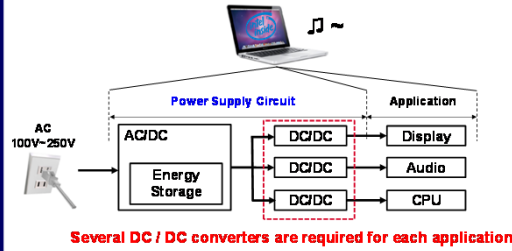
email: tsukiji@el.gunma-u.ac.jp k_haruo@el.gunma-u.ac.jp



Introduction

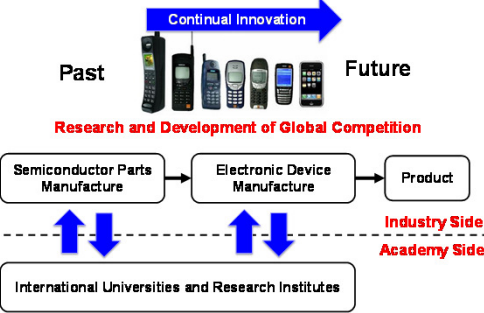
Research Background(1)

- Power supply circuit is required for all electronic devices



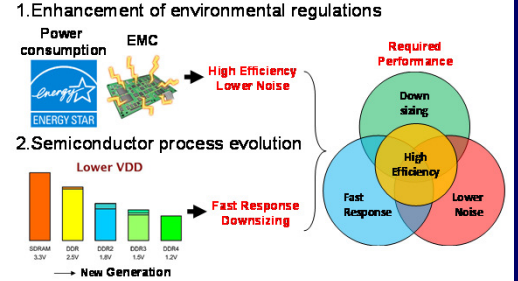
Research Background(2)

- Background of electronics evolution



Research Background(3)

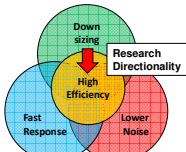
- Background of power supply performance requirements



Research Objective and Key-Technology

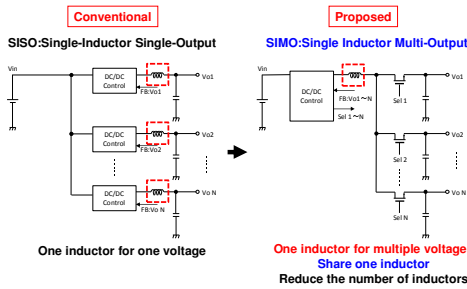
Research Objective

- Performance improvement of DC/DC converter power supply

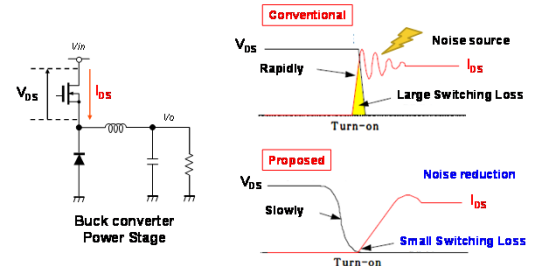


Target	Key technology
Downsizing	Single-Inductor-Multi-Output
High Efficiency Lower Noise	ZVS-PWM Control

SIMO:Single-Inductor Multi-Output for Downsizing

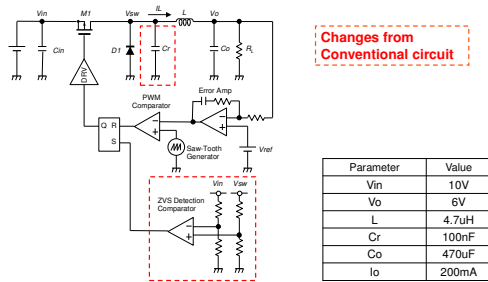


ZVS:Zero-Voltage-Switching for High Efficiency & Lower Noise

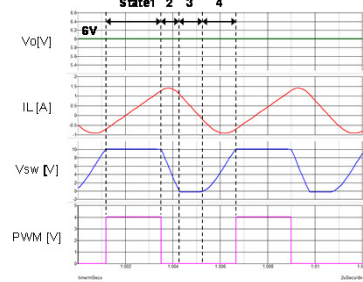


Simulation Result

SISO Buck Converter Circuit with ZVS-PWM Control



Basic ZVS-PWM operation in SISO buck converter



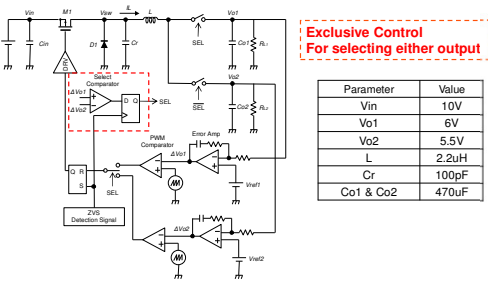
Summary

- We have described ZVS configuration and operation for SISO buck and boost converters.
- We have extended this ZVS method to SISO converters, and shown only their simulation results in the steady and transient states.

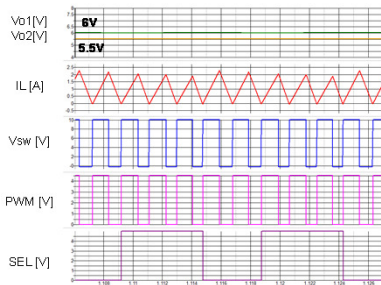
Future Research

- We consider that ZVS improves efficiency of these converters, which we will investigate in theory, simulations and experiments.

SIDO Buck Converter Circuit with ZVS-PWM Control



Steady-State operation with ZVS-PWM in SIDO buck converter



Transient operation with ZVS-PWM in SIDO buck converter

