

A system to operate boost converter in a discontinuous conduction mode and a method thereof

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ABSTRACT

The present disclosure provides a system and method for operating boost converter in a discontinuous conduction mode. The system comprising a boost converter comprising a first switch (SL) and a second switch (SH); a control circuit connected to the boost converter via the first switch (SL) and the second switch (SH). The control circuit comprises a first comparator (202) configured to compare a first input value (V_p) received from a first sawtooth wave generator (V_{sw1}) with a second input value ($V_c[n]$) received from a digital controller; and generate a first activation signal (V_{act_first}) to control the first switch of the boost converter, based on said comparison. The control circuit further comprises a second comparator (204) configured to compare a first control signal (V_{c1}) and a second control signal (V_{c2}); and generate a second activation signal (V_{act_second}) to control the second switch of the boost converter, based on said comparison.

KEY APPLICATION AREAS

1. Power Electronics & DC-DC Boost Converters.
2. Gallium Nitride (GaN) Power Devices.
3. Digital Power Control Systems.
4. Electric Vehicle (EV) Power Electronics.
5. Renewable Energy Power Conversion.
6. Industrial & High-Efficiency Power Supplies.

POTENTIAL USE

- 1.High-efficiency GaN-based boost converters operating in discontinuous conduction mode (DCM).
- 2.EV onboard chargers and DC-DC converters with reduced switching and driver losses.
- 3.Solar PV and renewable energy converters requiring efficient voltage boosting.
- 4.Telecom, server, and industrial power supplies with improved efficiency under light-load conditions.
- 5.Power converters without external current sensing circuitry, reducing system cost and complexity.
- 6.Digital control of half-bridge/full-bridge converters and inverters using GaN switches.
- 7.Battery-powered and energy-efficient electronic systems requiring low-loss, high-frequency power conversion.