

Switched Tank Converter (STC) Controllers with Integrated Drivers

General Description

The MAX16610/MAX16610A family of ICs consists of highly integrated, scalable, controllers for a switched tank converter (STC) topology. The STC provides highly efficient zero-current-switching (ZCS) voltage conversion from a 60V–40V input bus to an intermediate bus voltage. The intermediate bus voltage is unregulated and is approximately a quarter of the input voltage.

The 4:1 STC topology has 10 FETs that need to be driven, with only three of the FETs connected to ground. The MAX16610/MAX16610A family provides an extremely dense solution with integrated drivers and generation of floating supplies.

An adaptation algorithm tunes the STC on-times to maintain ZCS, regardless of variations in and tolerances of the STC components (e.g., temperature coefficient, aging, and voltage derating). With the adaptation algorithm, an STC controlled by a MAX16610/MAX16610A can use Class II capacitors in the resonant tanks to save on cost and improve efficiency compared to Class I capacitor designs.

Multiple fault protection features prevent damage to the STC converter and downstream components.

Applications

Intermediate Bus Voltage Generation for Datacenter and Communications Systems Using 48V Architecture to Supply Voltage Regulators Powering:

- High-Power VR13.HC CPUs
- Machine Learning ASICs and Accelerator Cards
- Networking ASICs
- DDR Memory

Benefits and Features

- High Density and Simplified Design
 - Integrated Drivers for 10 FETs
 - Integrated Floating Domains Generation
- Efficiency Optimization Regardless of Component Variation
 - Adaptive On-Time Algorithm Ensures ZCS
 - Support for Wide Range of Baseline Resonant Frequencies
- Higher Reliability
 - Adaptive Algorithm Enforces a Minimum Off-Time
 - Prevents Component Over-Stress and Excessive Peak Currents
- Protection Features
 - Input Overcurrent Protection (Latching)
 - Output Overvoltage Protection
 - Soar Mitigation and OVP
 - Bias-Supply Undervoltage Protection
 - Component Failure Protection
 - Fault/Output Voltage Indicators
 - Critical Fault-Flag Output Pin
 - Power-Good Indicator

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