

Brief Description

The ZSPM9000 DrMOS is a fully optimized, ultra-compact, integrated MOSFET plus driver power-stage solution for high-current, high-frequency, synchronous buck DC-DC applications. The device incorporates a driver IC, two power MOSFETs, and a bootstrap Schottky diode in a thermally enhanced, ultra-compact 6mmx6mm PQFN40 package.

With an integrated approach, the ZSPM9000's complete switching power stage is optimized for driver and MOSFET dynamic performance, system inductance, and power MOSFET $R_{DS(ON)}$. It uses innovative high-performance MOSFET technology, which dramatically reduces switch ringing, eliminating the snubber circuit in most buck converter applications.

An innovative driver IC with reduced dead times and propagation delays further enhances performance. An internal 12V to 5V linear regulator enables the ZSPM9000 to operate from a single 12V supply. A thermal warning function (THWN) warns of potential over-temperature situations. The ZSPM9000 also incorporates features such as Skip Mode (SMOD) for improved light-load efficiency and a tri-state 3.3V pulse-width modulation (PWM) input for compatibility with a wide range of PWM controllers.

The ZSPM9000 DrMOS is ideally compatible with IDT's ZSPM1000, a leading-edge configurable digital power-management system controller for non-isolated point-of-load (POL) supplies.

Benefits

- Fully optimized system efficiency: >93% peak
- Clean switching waveforms with minimal ringing
- 72% space-saving compared to conventional discrete solutions
- Ideally compatible with IDT's ZSPM1000 true digital PWM controller

Features

- Based on the Intel® 4.0 DrMOS standard
- Internal 12V to 5V linear regulator (LDO)
- High-current handling: up to 50A
- High-performance copper-clip package
- Tri-state 3.3V PWM input driver
- Skip Mode (low-side gate turn off) input (SMOD#)
- Warning flag for over-temperature conditions
- Driver output disable function (DISB# pin)
- Internal pull-up and pull-down for SMOD# and DISB# inputs, respectively
- Integrated Schottky diode technology in the low-side MOSFET
- Integrated bootstrap Schottky diode
- Adaptive gate drive timing for shoot-through protection
- Under-voltage lockout (UVLO)
- Optimized for switching frequencies up to 1MHz

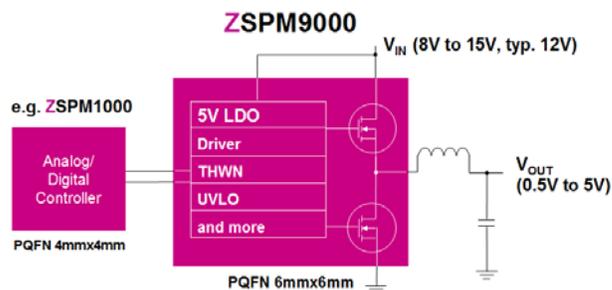
Available Support

- ZSPM8000-KIT: Closed Loop Evaluation Kit combined for the ZSPM9000 and ZSPM1000

Physical Characteristics

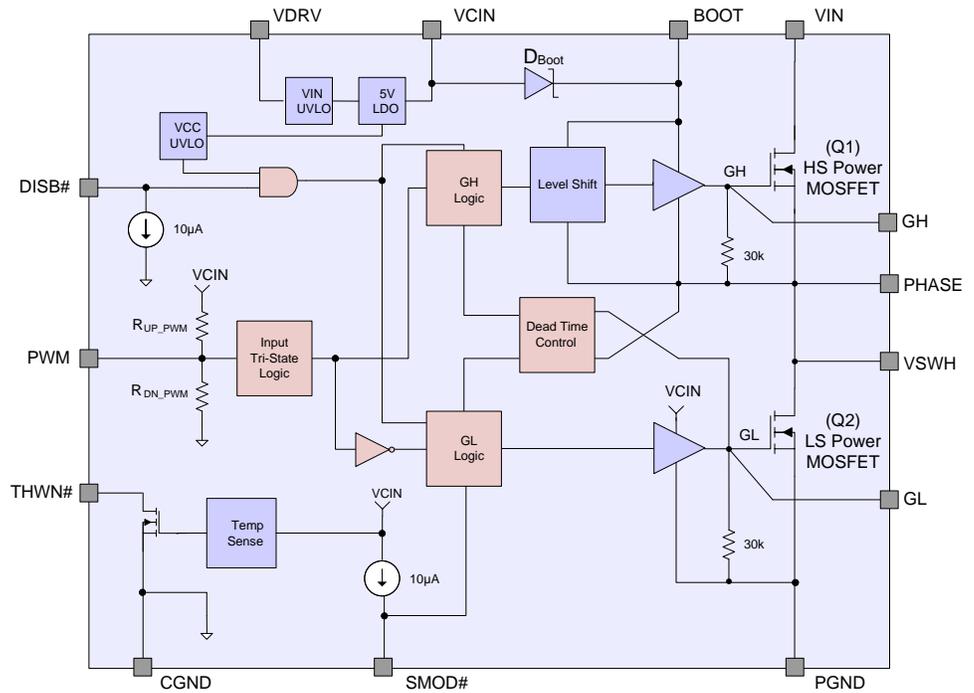
- Operation temperature: -40°C to +125°C
- V_{IN} : 8V to 15V (typical 12V)
- I_{OUT} : 40A (average), 50A (maximum)
- Low-profile SMD package: 6mmx6mm PQFN40
- IDT green packaging and RoHS compliant

Typical Application



ZSPM9000 Block Diagram

- Typical Applications**
- Telecom switches
 - Servers and storage
 - Desktop computers
 - Workstations
 - High-performance gaming motherboards
 - Base stations
 - Network routers
 - Industrial applications



Ordering Information

Product Sales Code	Description	Package
ZSPM9000A11R	ZSPM9000 Lead-free PQFN40 — Temperature range: -40°C to +125°C	Reel
ZSPM8000-KIT	Integrated Evaluation Kit for ZSPM9000 and ZSPM1000	Kit

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