

Brief Description

The ZSPM9060 is IDT's next-generation, fully optimized, ultra-compact, integrated MOSFET plus driver power stage solution for high-current, high-frequency, synchronous buck DC-DC applications. The ZSPM9060 integrates a driver IC, two power MOSFETs, and a bootstrap Schottky diode into a thermally enhanced, ultra-compact 6x6mm package.

With an integrated approach, the complete switching power stage is optimized with regard to driver and MOSFET dynamic performance, system inductance, and power MOSFET $R_{DS(ON)}$. The ZSPM9060 uses innovative high-performance MOSFET technology, which dramatically reduces switch ringing, eliminating the need for a snubber circuit in most buck converter applications.

A driver IC with reduced dead times and propagation delays further enhances the performance. A thermal warning function warns of a potential over-temperature situation. The ZSPM9060 also provides a Skip Mode (SMOD#) for improved light-load efficiency. It also provides a tri-state 3.3V PWM input for compatibility with a wide range of PWM controllers.

The ZSPM9060 DrMOS is compatible with IDT's ZSPM1000, a leading-edge configurable digital power-management system controller for non-isolated point-of-load (POL) supplies.

Features

- Based on the Intel® 4.0 DrMOS standard
- High-current handling: up to 60A
- High-performance PQFN 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 ≤ 1 MHz

Benefits

- Fully optimized system efficiency: $>93\%$ peak
- Clean switching waveforms with minimal ringing
- 72% space-saving compared to conventional discrete solutions
- High current handling
- Optimized for use with IDT's ZSPM1000 true digital PWM controller

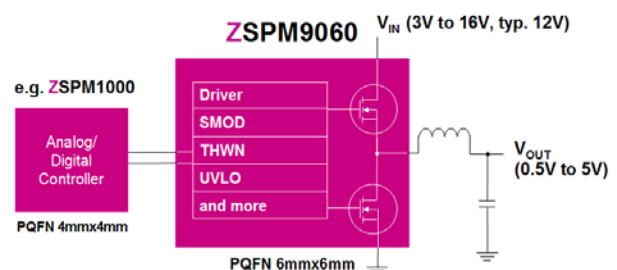
Available Support

- ZSPM8060-KIT: Open-Loop Evaluation Board for ZSPM9060

Physical Characteristics

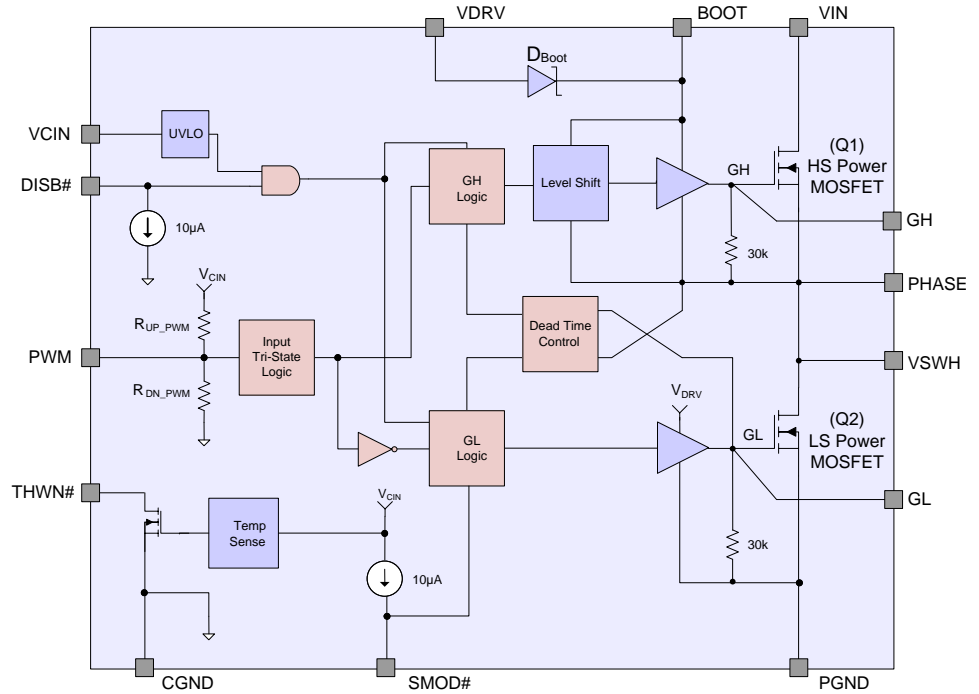
- Operation temperature: -40°C to $+125^{\circ}\text{C}$
- V_{IN} : 3V to 16V (typical 12V)
- I_{OUT} : up to 60A
- Low-profile SMD package: 6mmx6mm PQFN40
- IDT green packaging and RoHS compliant

Typical Application



ZSPM9060 Block Diagram

- Typical Applications**
- High-performance gaming motherboards
 - Compact blade servers, Vcore and non-Vcore DC-DC converters
 - Desktop computers, Vcore and Non-Vcore DC-DC converters
 - Workstations
 - High-current DC-DC point-of-load converters
 - Networking and telecom microprocessor voltage regulators
 - Small form-factor voltage regulator modules



Ordering Information

Sales Code	Description	Package
ZSPM9060ZA1R	ZSPM9060 RoHS-Compliant Clip-Bond PQFN40 - Temperature range: -40 to +125 °C	Reel
ZSPM8060-KIT	Open-Loop Evaluation Board for ZSPM9060	Circuit Board

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