

Brief Description

The ZSPM401xB is a family of DC/DC synchronous switching regulators with fully integrated power switches, internal compensation, and full fault protection. The ZSPM401xB family consists of the ZPSM4011B (1A DC/DC), the ZSPM4012B (2A DC/DC), and the ZSPM4013B (3A DC/DC). The 1MHz switching frequency enables using small filter components, resulting in reduced board space and reduced bill-of-materials costs.

The ZSPM401xB utilizes current mode feedback in normal regulation pulse-width modulation (PWM) mode. When the regulator is disabled (EN pin is low), the ZSPM401xB draws less than 10 μ A quiescent current.

The ZSPM401xB integrates a wide range of protection circuitry, including input supply under-voltage lockout, output voltage soft start, current limit, V_{OUT} over-voltage, and thermal shutdown. The ZSPM401xB includes supervisory reporting through the PG (Power Good) open drain output to interface other components in the system.

Features

- Output voltage options (depends on order code):
 - Fixed output voltages: 1.5V, 1.8V, 2.5V, 3.3V, or 5V with +/- 2% output tolerance
 - Adjustable output voltage range: 0.9V to 5.5V with +/- 1.5% reference
- Wide input voltage range: 4.5V to 24V for ZSPM4011B and ZSPM4012B; 4.5V to 18V for ZSPM4013B
- 1MHz +/- 10% fixed switching frequency
- 1A, 2A, or 3A continuous output current
- High efficiency – up to 95%
- Current mode PWM control with pulse-frequency modulation (PFM) mode for improved light load efficiency
- Voltage supervisor for V_{OUT} reported at the PG pin
- Input supply under-voltage lockout
- Soft start for controlled startup with no overshoot
- Full protection for over-current, over-temperature, and V_{OUT} over-voltage
- Less than 10 μ A in Disabled Mode
- Low external component count

Benefits

- Increased battery life
- Minimal external component count (3 capacitors, 1 inductor)
- Inherent fault protection and reporting

Available Support

- Evaluation Kit
- Documentation

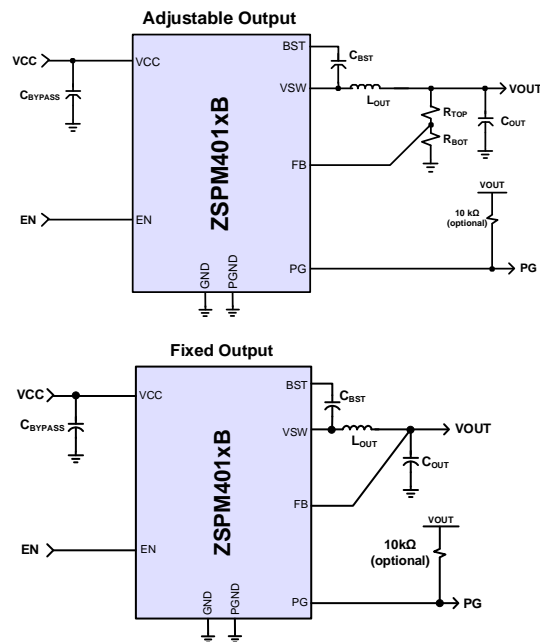
Physical Characteristics

- Junction operating temperature -40°C to 125°C
- Packaged in a 16pin QFN (3x3mm)

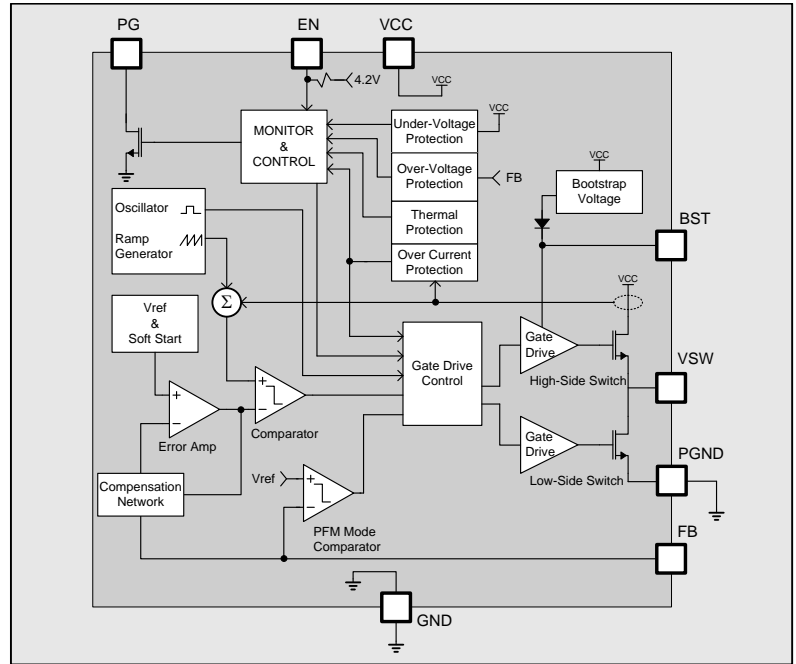
Related IDT Products

- ZSPM4023/ZSPM4022: 6A/9A/12A synchronous buck regulator (28-pin 5x6mm QFN)
- ZSPM1000: >5A single-phase, single-rail, true digital PWM controller (24-lead 4x4mm QFN)

ZSPM401xB Application Circuits



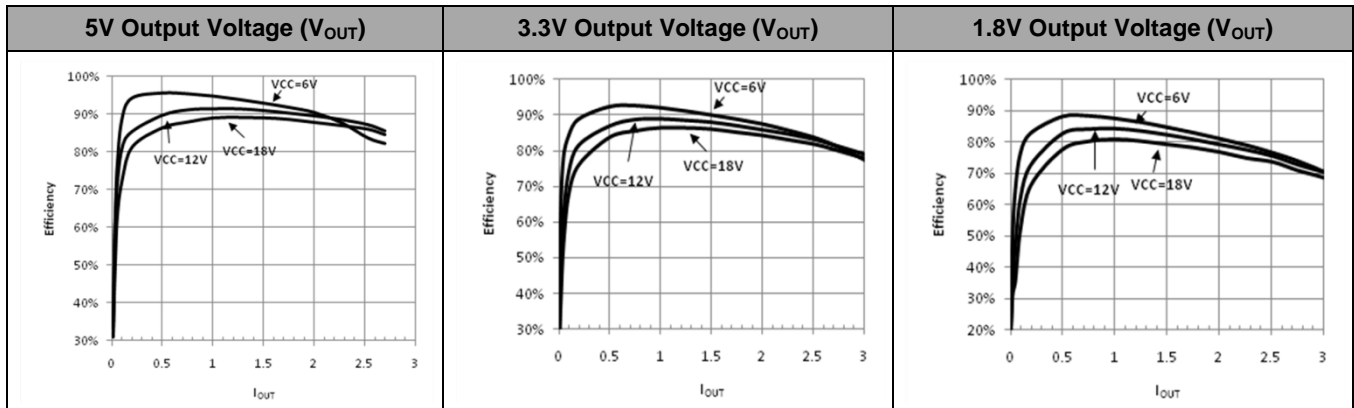
ZSPM401xB Block Diagram



Typical Applications

- Wireless access points, cable modems
- Set-top boxes
- DVD, LCD, LED supplies
- Portable products, including GPS, smart phones, and tablet PCs
- Printers

Efficiency Graphs



Ordering Information

Ordering Code	Description	Package
ZSPM4011BA1W00	1A Synchronous Buck Converter: adjustable output, 0.9V to 5.5V, 16-pin 3x3mm QFN	7" reel with 1000 ICs
ZSPM4011BA1W15	1A Synchronous Buck Converter: fixed output, 1.5V, 16-pin 3x3mm QFN	7" reel with 1000 ICs
ZSPM4011BA1W18	1A Synchronous Buck Converter: fixed output, 1.8V, 16-pin 3x3mm QFN	7" reel with 1000 ICs
ZSPM4011BA1W25	1A Synchronous Buck Converter: fixed output, 2.5V, 16-pin 3x3mm QFN	7" reel with 1000 ICs
ZSPM4011BA1W33	1A Synchronous Buck Converter: fixed output, 3.3V, 16-pin 3x3mm QFN	7" reel with 1000 ICs
ZSPM4011BA1W50	1A Synchronous Buck Converter: fixed output, 5.0V, 16-pin 3x3mm QFN	7" reel with 1000 ICs
ZSPM4011BKIT	ZSPM4011BKIT, Evaluation Kit for 1A Synchronous Buck Converter	Kit
ZSPM4012BA1W00	2A Synchronous Buck Converter: adjustable output, 0.9V to 5.5V, 16-pin 3x3mm QFN	7" reel with 1000 ICs
ZSPM4012BA1W15	2A Synchronous Buck Converter: fixed output, 1.5V, 16-pin 3x3mm QFN	7" reel with 1000 ICs
ZSPM4012BA1W18	2A Synchronous Buck Converter: fixed output, 1.8V, 16-pin 3x3mm QFN	7" reel with 1000 ICs
ZSPM4012BA1W25	2A Synchronous Buck Converter: fixed output, 2.5V, 16-pin 3x3mm QFN	7" reel with 1000 ICs
ZSPM4012BA1W33	2A Synchronous Buck Converter: fixed output, 3.3V, 16-pin 3x3mm QFN	7" reel with 1000 ICs
ZSPM4012BA1W50	2A Synchronous Buck Converter: fixed output, 5.0V, 16-pin 3x3mm QFN	7" reel with 1000 ICs
ZSPM4012BKIT	ZSPM4012B Evaluation Kit for 2A Synchronous Buck Converter	Kit
ZSPM4013BA1W00	3A Synchronous Buck Converter: adjustable output, 0.9V to 5V, 16-pin 3x3mm QFN	7" reel with 1000 ICs
ZSPM4013BA1W15	3A Synchronous Buck Converter: fixed output, 1.5V, 16-pin 3x3mm QFN	7" reel with 1000 ICs
ZSPM4013BA1W18	3A Synchronous Buck Converter: fixed output, 1.8V, 16-pin 3x3mm QFN	7" reel with 1000 ICs
ZSPM4013BA1W25	3A Synchronous Buck Converter: fixed output, 2.5V, 16-pin 3x3mm QFN	7" reel with 1000 ICs
ZSPM4013BA1W33	3A Synchronous Buck Converter: fixed output, 3.3V, 16-pin 3x3mm QFN	7" reel with 1000 ICs
ZSPM4013BA1W50	3A Synchronous Buck Converter: fixed output, 5.0V, 16-pin 3x3mm QFN	7" reel with 1000 ICs
ZSPM4013BKIT	ZSPM4013B Evaluation Kit for 3A Synchronous Buck Converter	Kit

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