

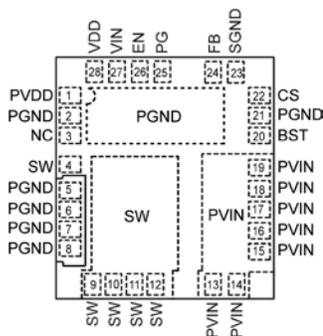
**Brief Description**

The ZSPM4023 and ZSPM4022 product families are constant-frequency, synchronous DC/DC buck regulators featuring adaptive on-time control architecture. The output voltage is adjustable down to 0.8V. The ZSPM4023 family operates over a supply range of 4.5V to 28V (24V typical). The supply range for the ZSPM4022 family is 4.5V to 19V (12V typical). Both families have an internal linear regulator that provides a regulated 5V to power the internal control circuitry. They operate at a constant 600kHz switching frequency in continuous-conduction mode. Each IC family includes three product versions that support different maximum load capabilities: 6A, 9A, and 12A.

Under medium to heavy loads, the ZSPM4023 and ZSPM4022 provide high efficiency and ultra-fast transient response via their rapid-control architecture. Under light load conditions, they maintain high efficiency and a superior transient response by transitioning to variable-frequency, discontinuous mode operation with their ultra-light-load architecture.

Both families offer a full suite of protection features to ensure protection of the IC during fault conditions. These include under-voltage lockout to ensure proper operation under power-sag conditions; thermal shutdown; internal soft-start to reduce inrush current; foldback current limiting; and “hiccup” mode short-circuit protection. A power good (PG) output pin is provided to allow simple sequencing.

**Pin Configuration**



**Benefits**

- Ultra-light load efficiency – up to 80% at 10mA
- Up to 95% efficiency
- Feedback reference accuracy as high as ±1%

**Features**

- Rapid-control architecture enables operation with a high input/output voltage ratio (e.g., for the ZSPM4023,  $V_{IN} = 28V$  and  $V_{OUT} = 0.8V$ ) and a small output capacitance
- Adjustable output voltage from 0.8V to 5.5V
- Universally compatible with most output capacitors – stable with zero to high ESR
- Power good (PG) output
- Foldback current limiting and “hiccup” mode short-circuit protection
- Safe start-up into pre-biased loads

**Available Support**

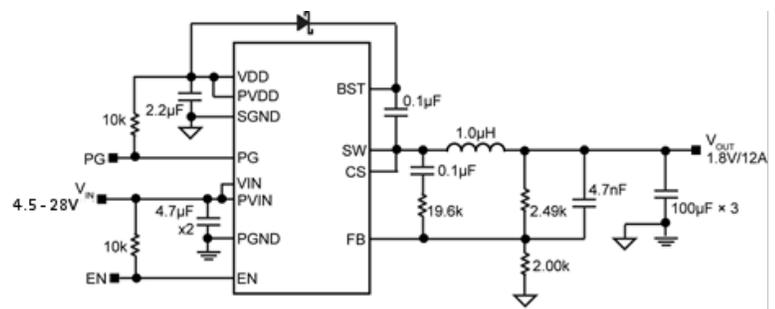
- Evaluation Kit
- Support documentation

**Physical Characteristics**

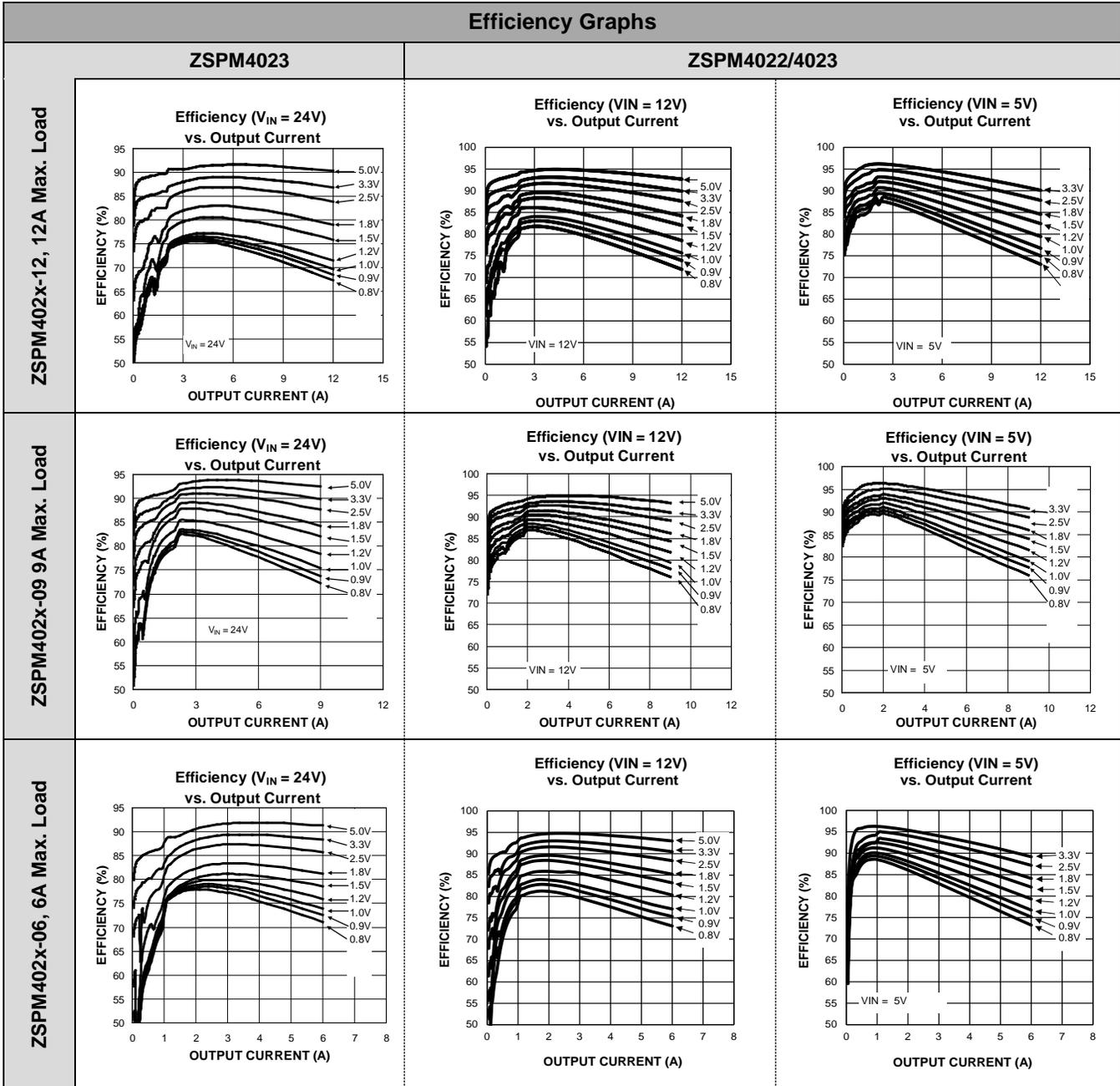
- Switching frequency: 600kHz
- Junction temperature:  $-40^{\circ}C$  to  $+125^{\circ}C$
- 28-pin QFN package (5mm × 6mm)

$V_{IN}$	12A	9A	6A
4.5V to 19V	ZSPM4022-12	ZSPM4022-09	ZSPM4022-06
4.5V to 28V	ZSPM4023-12	ZSPM4023-09	ZSPM4023-06

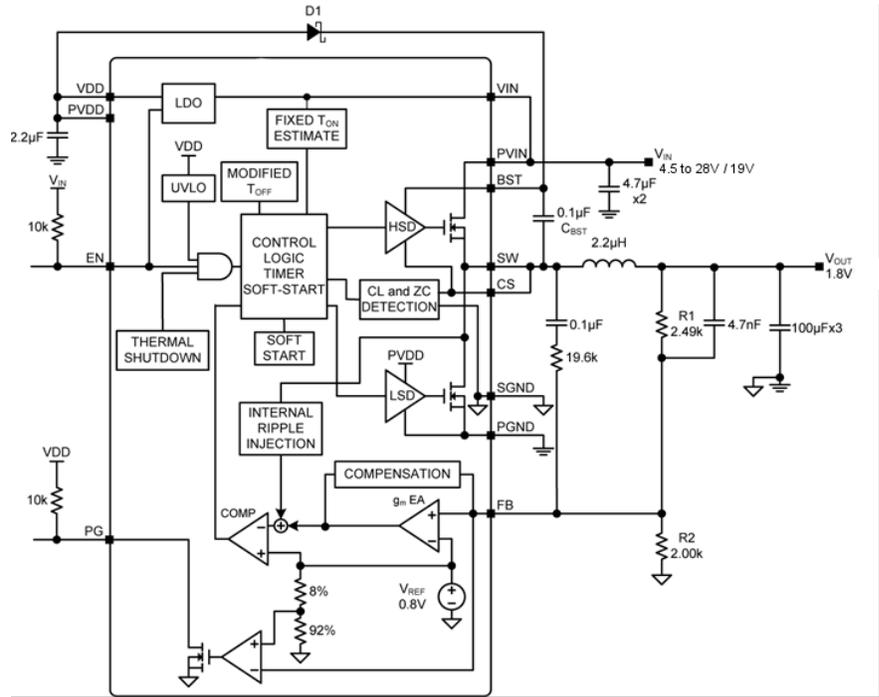
**Example Application Circuit: ZSPM4023-12**



Efficiency Graphs



**ZSPM4023/ZSPM4022  
Functional Diagram**



**Typical Applications**

- ❖ Servers, workstations
- ❖ Routers, switches, and telecommunication equipment
- ❖ Base stations
- ❖ STB, high-end consumer electronics
- ❖ Distributed point-of-load

**Ordering Information**

Sales Code	Description	Package
ZSPM4022AA1W06	ZSPM4022-06, QFN28 5mmx6mm, 6A max. — Temperature range: -40°C to +125°C	7" Reel with 1000 ICs
ZSPM4022AA1W09	ZSPM4022-09, QFN28 5mmx6mm, 9A max. — Temperature range: -40°C to +125°C	7" Reel with 1000 ICs
ZSPM4022AA1W12	ZSPM4022-12, QFN28 5mmx6mm, 12A max. — Temperature range: -40°C to +125°C	7" Reel with 1000 ICs
ZSPM4023AA1W06	ZSPM4023-06, QFN28 5mmx6mm, 6A max. — Temperature range: -40°C to +125°C	7" Reel with 1000 ICs
ZSPM4023AA1W09	ZSPM4023-09, QFN28 5mmx6mm, 9A max. — Temperature range: -40°C to +125°C	7" Reel with 1000 ICs
ZSPM4023AA1W12	ZSPM4023-12, QFN28 5mmx6mm, 12A max.— Temperature range: -40°C to +125°C	7" Reel with 1000 ICs
ZSPM402x-yy-KIT	Evaluation Kit, including ZSPM402x-yy Evaluation Board (substitute product number for ZSPM402x-yy when ordering; e.g., ZSPM4022-06-KIT)	Kit

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