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SB0800 Octal Valves and Pump Controller System on Chip

The octal valves and pump controller system on chip (VAPS) consists of four regulated low-side drivers and four low-side drivers digital, plus a high-side to control a DC motor.

TARGET APPLICATIONS

Medical

- ▶ Oxygen concentrators
- ▶ Medical test equipment
- ▶ Dialysis machines
- ▶ Blood pressure

Commercial

- ▶ 3D printers
- ▶ Soda dispensers

Industrial

- ▶ Heavy equipment and construction machinery
- ▶ Fork lifters
- ▶ Water control system for irrigation (connected to farm tractor)
- ▶ Food control in animal farm

This simple solution is suitable for loads with high inrush current and allows driving to high frequency (up to 5 kHz). To use the chip, a simple serial peripheral interface (SPI) communication is needed. With this communication, users can perform control and diagnostic functions directly on the chip.

The device is designed for harsh environments, and it includes self-recovery features thanks to the embedded supervision that allows extensive safety monitoring. Furthermore, a predriver-safe MOSFET increases safety by turning off all valves in the event of any issue. This system on chip is the perfect solution to drive hydraulic or pneumatic valves without "smart electronics."



DOCUMENTATION

Document Number	Title	Description
MC345B0800	Octal Valve and Pump Controller System on Chip	Data sheet
SG1002	Analog Product Selector Guide	Selector guide
SG200	Industrial Product Selector Guide	Selector guide

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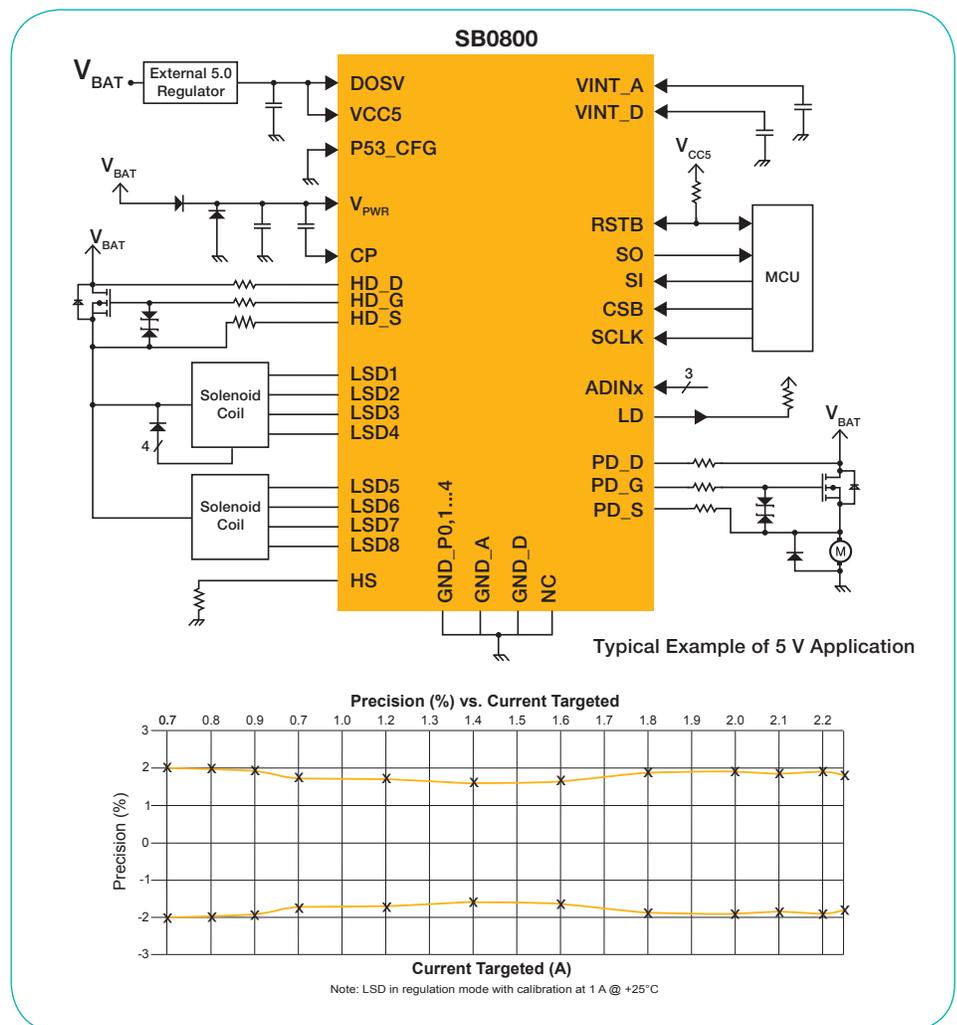
Expanding on more than 30 years of innovation, NXP is a leading provider of high-performance products that use SMARTMOS technology combining digital, power and standard analog functions. NXP supplies analog and power management ICs that are advancing the automotive, consumer, industrial and networking markets. Analog solutions interface with real world signals to control and drive for complete embedded systems.



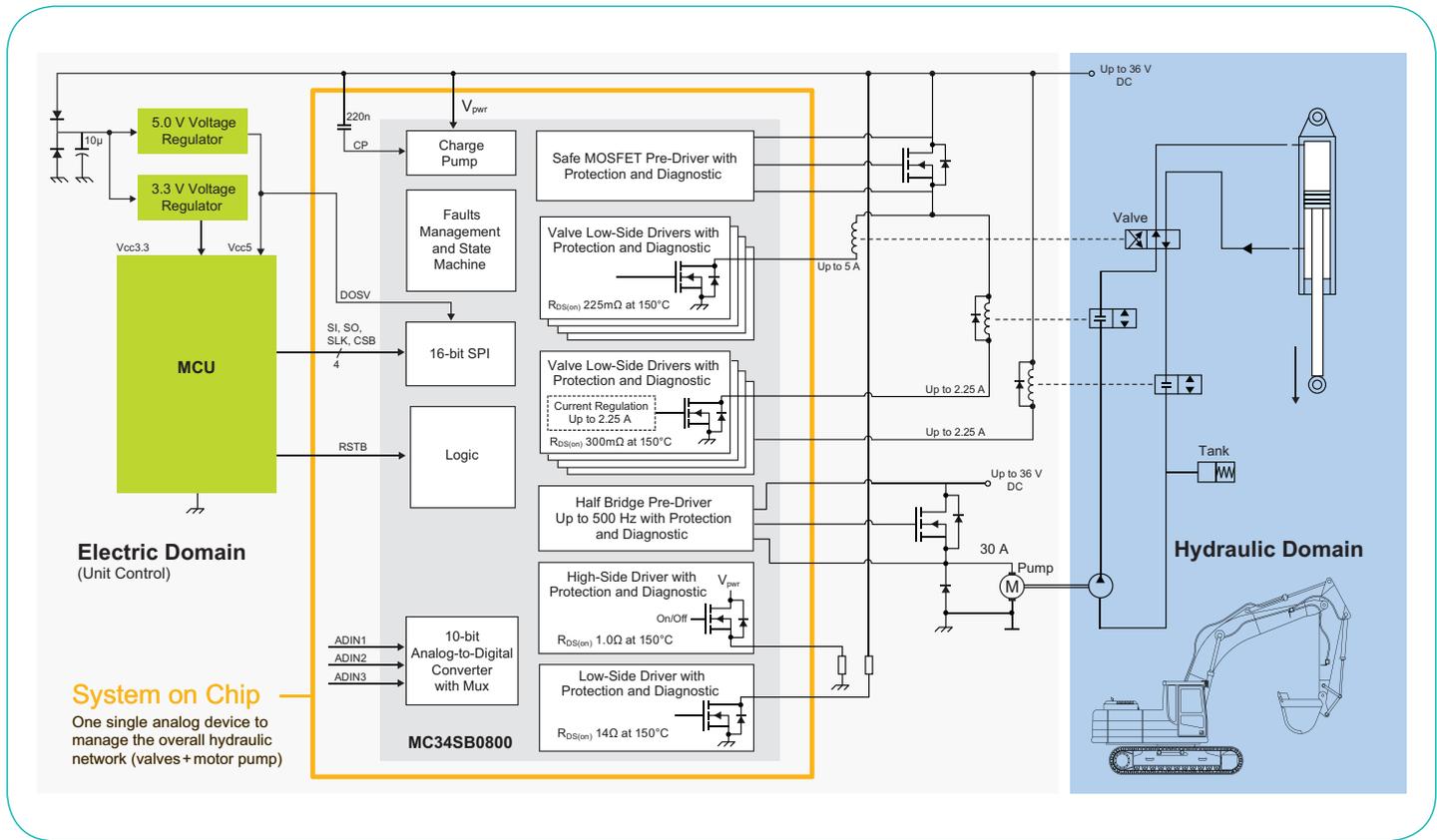
SB0800 DIFFERENTIATION

Features	Benefits
Industry/Voltage	Supports the industrial industry with voltage ranges from 6 to 36 V
Low $R_{DS(on)}$ for valve drivers in thermally enhanced package	Best thermal efficiency
Up to 8 LSD integrated into a LQFP 10 x10 64-pin package	Best PCB space saving
Switch-off energy drained by digital valves driver	No freewheeling diode needed
Built-in close loop control for regulated valves	Only targeted value needs to be sent by SPI; error is reported when regulated current cannot be reached
Accurate current regulated valves driver	+/- 2.0% precision reachable without external discrete components and with calibration
Safe MOSFET turned off all the valves in case of issues	No external circuitry needed to achieve full safe valve operation
All actuators controllable through SPI	MCU does not need to generate PWM signals at high frequency; MCU only sends targeted duty cycle through SPI
10-bit analog-to-digital converter	ADC can monitor external or internal signals to enhance the control unit safety level
Digital diagnostics by SPI	Full control for system
Integrated DC pump motor predriver controller	Up to 500 Hz

SB0800 SIMPLIFIED BLOCK DIAGRAM



TYPICAL USE CASE



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