Analog, Mixed-Signal and Power Management

MC16XSD200

Dual 16 mOhm High-Side Switch

Target Applications

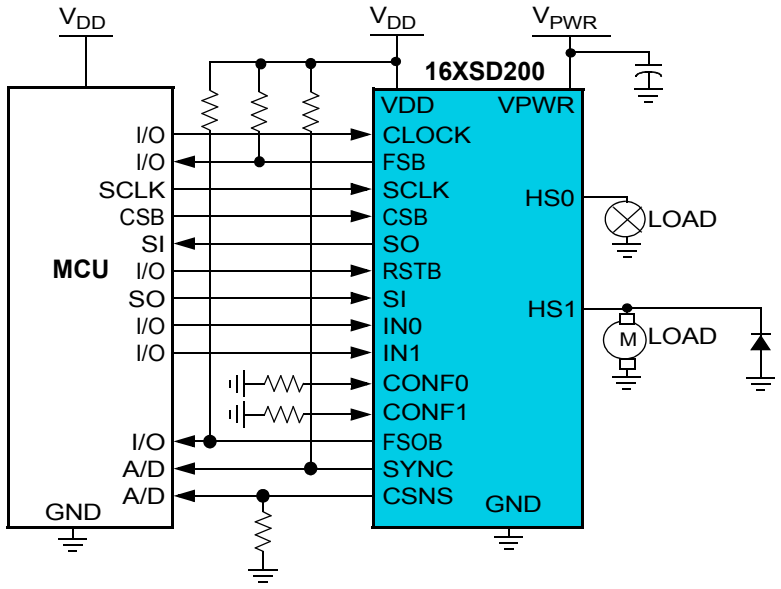
- Industrial (12 V and 24 V systems)
- Halogen bulbs
- Light-emitting diodes (LEDs)
- Low-voltage industrial lighting
- DC motors

Overview

The MC16XSD200 device is part of a 36 V high-side switch product family with integrated control and a high number of protective and diagnostic functions. It is designed for industrial applications. The low $R_{DS(on)}$ channels (< 16 mΩ) can control different load types, including bulb lamps, solenoids or DC motors.

Control, device configuration and diagnostics are performed through a 16-bit serial peripheral interface (SPI), allowing easy integration into existing applications. Both channels can be controlled individually by external or internal clock signals, or by direct inputs. Using the internal clock allows fully autonomous device operation. Programmable output voltage slew rates (individually programmable) help improve electromagnetic compatibility (EMC) performance.

Simplified Application Drawing



A dynamic overcurrent threshold profile is utilized to avoid shutting off the device due to inrush current while still being able to closely track the load current. Switching current of each channel can be sensed with a programmable sensing ratio. Whenever communication with the external MCU is lost, the device enters a fail-safe operation mode—but remains operational, controllable and protected.

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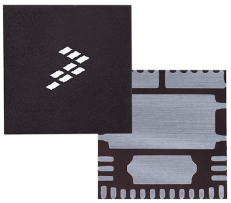

24-pin PQFN (12 x 12 mm)
98ASA00428D

Product Features and Benefits

Features	Benefits
Two fully protected 16 mΩ (@ 25 °C) high-side switches	Offers an intelligent high-side switch for 24 V industrial applications
Up to 3.0 A steady state current per channel	Allows decentralized lighting management (autonomous operation)
Separate bulb and DC motor latched overcurrent handling	Provides a high number of protective and diagnostic functions
Individually programmable internal/external PWM clock signals	Allows to drive bulb lamps (tungsten filament), LED lights and DC motors
Overcurrent, short-circuit and overtemperature protection with programmable auto-retry functions	Guarantees full functional and electrical compatibility between family members
Accurate temperature and current sensing	Offers a 16-bit SPI interface for daisy chaining multiple devices
Open-load detection (channel IN, OFF and ON states) and LED applications (7.0 mA typical)	Allows multiple channel and device current sensing with only one precision resistor
Normal operating range: 8–36 V, extended range: 6–58 V	
3.3 and 5.0 V compatible 16-bit SPI port for device control, configuration and diagnostics at rates up to 8.0 MHz	

Performance

Performance	Typical values
Outputs	2
$R_{DS(on)}$ at 25 °C	Dual 16 mΩ
Operating voltage	8 to 36 V
Extended operating range	6 to 58 V
Peak current	38.5 A
ESD	± 8.0 kV power I/Os ± 2.0 kV digital I/Os

Development Tools

Part Number	Typical values
KIT20XS4200EVBE	Evaluation board featuring the MC20XS4200

Documentation

Freescale Document Number	Title	Description
MC16XSD200	Dual 16 mΩ High-Side Switch	Data sheet
SG1002	Analog Product Selector Guide	Selector guide
SG200	Analog and Power Management Industrial Selector Guide	Selector guide
AN2467	Power Quad Flat No-lead Package	Application note
AN4473	Compact Thermal Model Application Note	Application note
AN4474	EMC and Fast Transient Pulses Performances Application Note	Application note
AN4516	IBIS Model Application Note	Application note

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