Fact Sheet

NXP XS48100

dFuse: Smart eFuse for SDV and AI systems

Four-channel, digitally configurable eFuse for 12 V, 24 V and 48 V automotive power distribution

The XS48100 is a self-protected, four-channel high-side eFuse designed for modern automotive power distribution. It combines fast analog protection with a digital core that enables configurable monitoring, autonomous fault management and flexible control through a 32-bit SPI interface with CRC. The device supports resistive, inductive and capacitive loads and helps simplify zonal and software-defined vehicle architectures.



Key benefits

- **Efficient low-power operation:** Typically 40 µA with all four channels on, while maintaining diagnostics
- **Flexible load distribution:** Four channels operate independently or in parallel
- **Reduced MCU and I/O demand:** Integrated ADC, SPI and daisy chaining reduce external requirements
- **Autonomous protection:** Configurable protection reduces software interaction
- **Support for capacitive loads:** Intelligent current limiting and retry support reliable charging
- **Functional safety support**: Supports ASIL B integrity in key operating modes

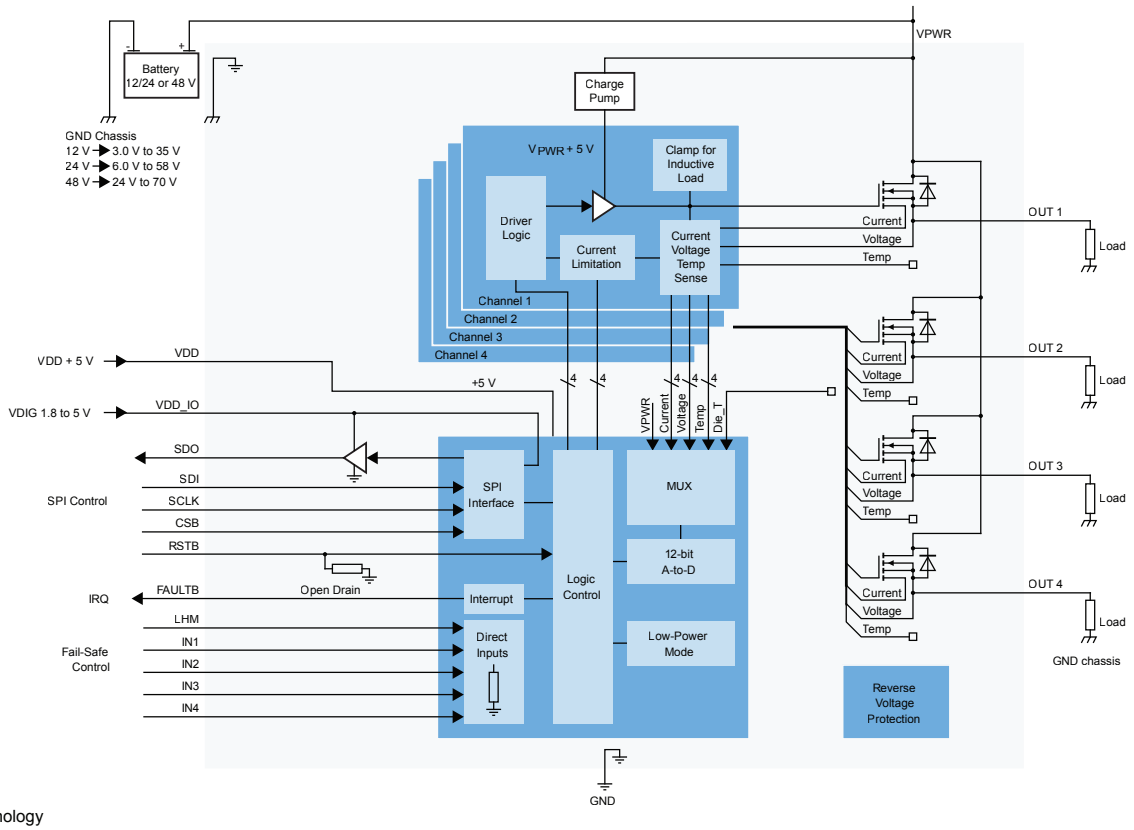
Target applications

- Automotive 12 V, 24 V and 48 V power distribution
- Fuse and relay replacement
- Zonal and domain control units
- ECU power supplies with large input bypass capacitors
- Resistive, inductive and capacitive loads
- Lighting, door, seat, roof, wiper and other body-control loads

Key features

- eFuse
  - I^2t implementation with high accuracy, based on 3% current sense
  - Smart low power mode with 40 µA for 4 channel, providing full diagnosis and high current
  - Fast turn off <10 µs
- Load driving capability
  - 2 A per channel (at 85 °C), more than 5 A all channels parallel
  - 4-channel device
  - Virtual channels by paralleling with synchronization
  - Superior and intrinsic cap charging
- Diagnosis
  - Configurable thresholds for under/over of current, voltage and temperature
  - Open Load @ ON & OFF with integrated current source
  - 3% accurate current, 3% relative-error current/ voltage sense and 5°C accurate temp sense
  - 12-bit ADC
- Functional Safety
- ISO 26262 compliant ASIL B

XS48100 eFuse block diagram



NXP Technology



Power stage: Designed for ultimate load-driving capability

Safe and secure: Reliable and ASIL B compliant

The bridge: Converting all analog values to digital data

Digital core: Enabling smart low power mode, intrinsic cap charging and offloading of the MCU core with high autonomy

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