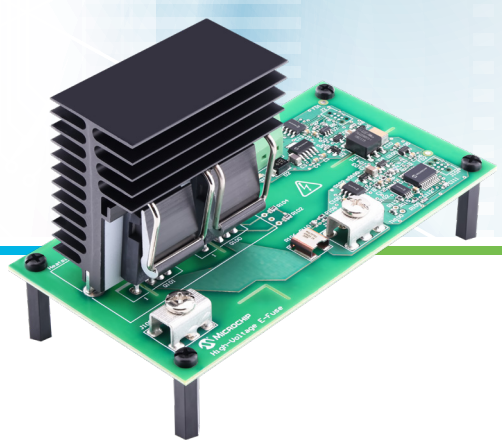


High-Voltage Auxiliary

E-Fuse Reference Design

The "electrification of everything" is driving the widespread adoption of Silicon Carbide (SiC) technology in high-voltage applications.

A high-voltage E-Fuse combines mSiC™ MOSFETs with on-board fault detection, producing a superior method of protecting the high-voltage electrical system.

The E-Fuse provides increased reliability over relays, contactors and traditional fuses; its fast response time limits peak short-circuit currents of tens of kAs to hundreds of amps and can prevent a fault event from becoming a catastrophic failure.

The E-Fuse demonstrator can detect and interrupt fault currents in microseconds, 100–500 times faster than traditional mechanical approaches because of its high-voltage, solid-state design. The E-Fuse can be reset, eliminating the design-for-serviceability constraints and simplifying system packaging and design.

Key Messages

Lower system cost

- Maximized system uptime and reliability

Faster time to market

- Fewer system components

Lower risk

- Maximized system performance and safety

Advantages

- No arcing
- Resettable
- No degradation from mechanical shock and vibration
- No contact bouncing
- No mechanical wear-out
- Faster than mechanical (<2 µs versus >1 ms)

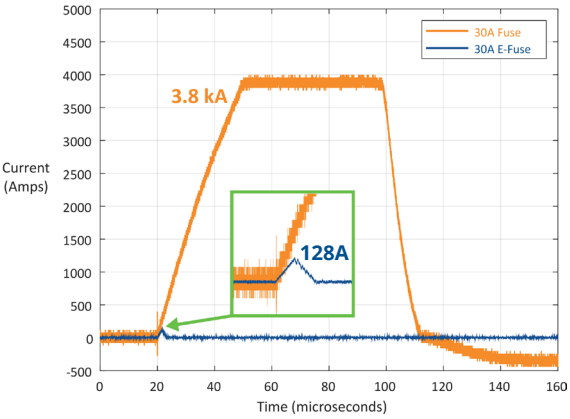
Applications

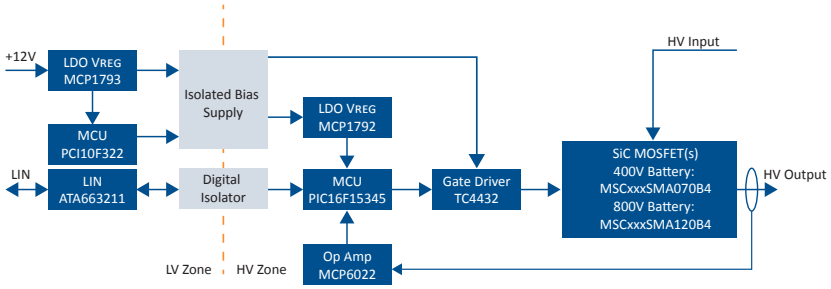
Electric Vehicles | Solar | Wind | Data Center | eVTOL | Microgrid

Key Features and Specifications

- Configurable time-current characteristics curve
- Two modes of short-current detection: edge-triggered and ride-through
- Diagnostic status of current, temperature and bias supply measurements
- LIN communication interface for control, configurability and diagnostics
- Resettable through LIN interface or cycling of +12V supply
- Short-circuit withstand time up to 10 µs
- Up to 30A continuous output load current
- Low-voltage operating voltage range: 9V to 16V
- High-voltage operating voltage range: 200V to 900V
- Operating temperature range: −40°C to 85°C

Comparison: E-Fuse Versus Traditional Fuse





E-Fuse Demonstrator Boards

Demonstration Application Board	Description	Voltage (V)	Current (A)
MSCDR-EFUSE-001	400V/10A SiC E-Fuse Demonstrator; 1 MSC035SMA070B4	400	10
MSCDR-EFUSE-002	400V/20A SiC E-Fuse Demonstrator; 2 MSC035SMA070B4	400	20
MSCDR-EFUSE-003	400V/30A SiC E-Fuse Demonstrator; 2 MSC015SMA070B4	400	30
MSCDR-EFUSE-004	800V/10A SiC E-Fuse Demonstrator; 1 MSC040SMA120B4	800	10
MSCDR-EFUSE-005	800V/20A SiC E-Fuse Demonstrator; 2 MSC040SMA120B4	800	20
MSCDR-EFUSE-006	800V/30A SiC E-Fuse Demonstrator; 2 MSC025SMA120B4	800	30

microchip.com/e-fuse

Schedule a call with our team

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