PRODUCT BRIEF

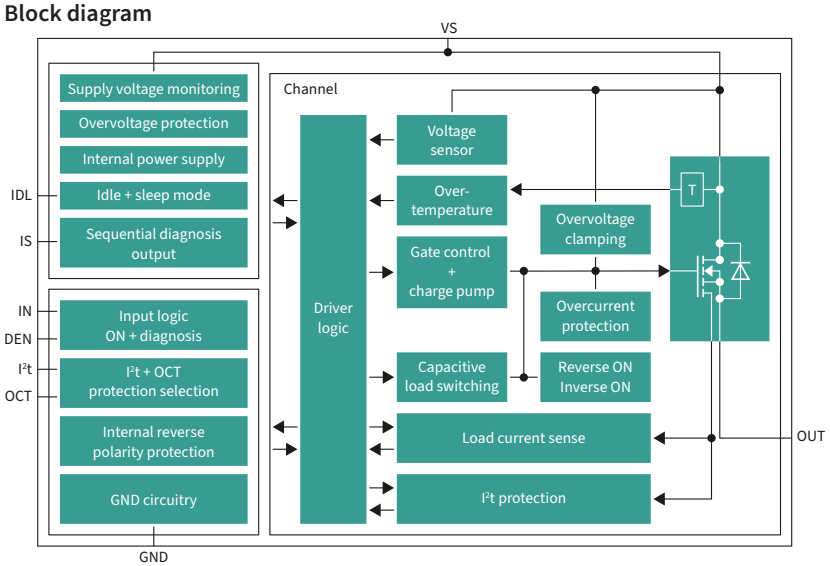
PROFET™ Wire Guard 12V

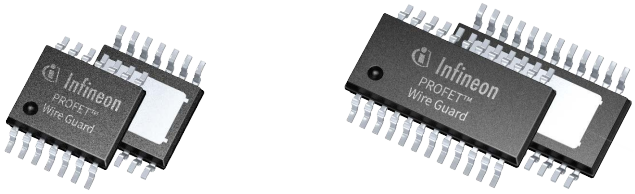
12 V PROFET™ high-side power switch with patented I^2t wire protection, adjustable overcurrent threshold for fast failure isolation and less than 60 µA current consumption during parking.

Modern, decentralized and zonal power distribution architectures demand for dependable solutions to protect the in-vehicle network. Say goodbye to melting fuses and upgrade to PROFET™ Wire Guard – the sophisticated and dependable choice for wire protection in modern, power distribution. In comparison to melting fuses, the devices are capable of emulating the wire stress characteristics to a hardware-based, precise I^2t protection curve, selectable out of six implemented curves, according to load requirements. The accuracy, reliability and reset-ability enable to optimize the wire harness in accordance to cost and weight. Furthermore, the adjustable overcurrent detection threshold enables fast failure isolation within microseconds and prevents power supplies from overload events, resulting in a dependable power supply for safety-relevant applications. The automatic idle mode reduces the current consumption below 60 µA during parking, while supporting full load control and self-protection functionality. In addition, the sequential diagnosis provides detailed application information via one single pin, forming the enabler for predictive maintenance and module optimization.

With full pin-to-pin compatibility of the TSDSO-14 and TSDSO-24 packages and the unique family approach, exchanging devices within the PROFET™ Wire Guard family is easy and can always follow load requirements. Developed PRO-SIL™ ISO 26262-compliant, the safety manual simplifies the use in functional safety applications. Software tools, available in the Infineon Developer Center, in combination with evaluation boards simplify the design-in process.

Block diagram



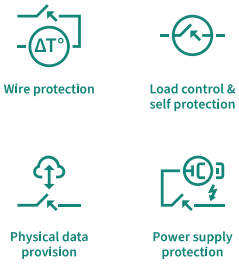


Key features

- Selectable I^2t wire protection
- Adjustable overcurrent protection
- Low operating current in Idle mode (< 60 µA)
- Sequential diagnosis for detailed feedback via one single pin
- Capacitive load switching mode to switch loads with big capacitive share in the safe operating area, extending system robustness
- Overtemperature, overvoltage, load dump, reverse polarity and short-circuit protection
- AEC-Q100 Grade1 qualification

Key benefits

- Precise wire protection via emulated I^2t curve, enabling wire harness optimization
- Fast failure isolation by adjustable overcurrent threshold
- Active load supply during parking via Idle mode
- Status readout via sequential diagnosis
- Switching of big capacitive loads within safe operating area
- PRO-SIL™ ISO 26262-compliant development to address safety requirements up to ASIL B(D)



www.infineon.com/profetwireguard

PROFET™ Wire Guard provides six accurate integrated I^2t wire protection profiles combined with fast failure isolation

The PROFET™ Wire Guard actively monitors the wire stress and reports the wire condition to the microcontroller. It will switch off automatically when a predefined critical threshold is reached, using one of six selectable I^2t protection curves. These curves emulate the wire characteristic and therefore enable precise wire protection. Further, PROFET™ Wire Guard provides the wire protection status even beyond a protective switch off and can be re-activated once the wire temperature has decreased.

The PROFET™ Wire Guard simplifies fuse replacement and enables wire harness optimization in terms of cost and weight. In addition, the devices offer fast failure isolation towards power supplies with their adjustable overcurrent protection. Both hardware-based features are adjustable to system requirements via an external resistor.

Maximizing cost and weight efficiency with Infineon's PROFET™ Wire Guard and advanced diagnostics

Central computing with zone architecture becomes the new standard in the automotive industry, which increases software complexity and requires accurate physical data for software updates. The Infineon PROFET™ Wire Guard supports this need by providing advanced sequential diagnosis through five different addresses via a single pin. The current sense address gathers data on current consumption and reports failure conditions. The I^2t address shows the selected I^2t protection curve, and the I^2t status address detects the I^2t margin currently in use. The OCT setting address displays the selected OCT setting, and the digital current sense address provides feedback measured via an independent current path. This function offers valuable information to identify cost and weight reduction potential for module facelifts. Further, the sequential diagnosis enables to verify the application integrity with sense pin, I^2t and OCT setting verification.

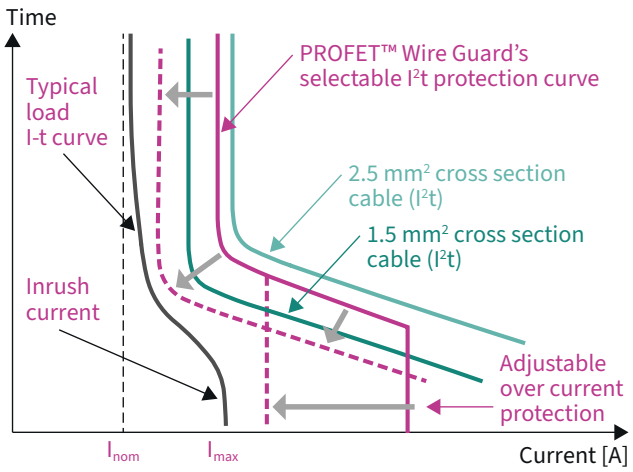
Key benefits of PROFET™ Wire Guard for wire and power supply protection

- Standalone, precise and integrated wire protection, in normal and Idle mode
- Wire harness optimization in terms of cost and weight
- Permanent wire stress monitoring, even after protective switch off
- Resettable protection behavior
- Protection of power supplies against overload
- Stabilized, dependable power supply for loads in normal operation

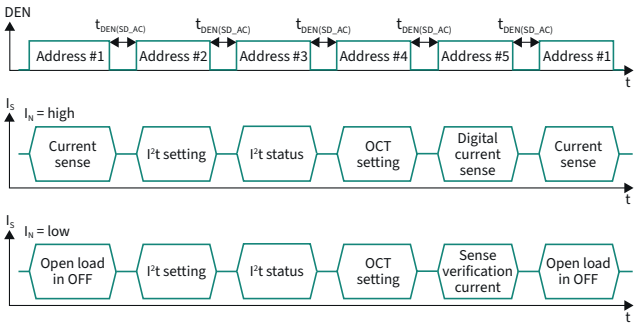
Key benefits of PROFET™ Wire Guard's sequential diagnosis

- Evaluation of wire size reduction for face lift projects
- Precise and advanced diagnostic data
- Independent monitoring of current, I^2t status feedback and current sense
- Application integrity check to fulfill safety requirements in fail operational systems

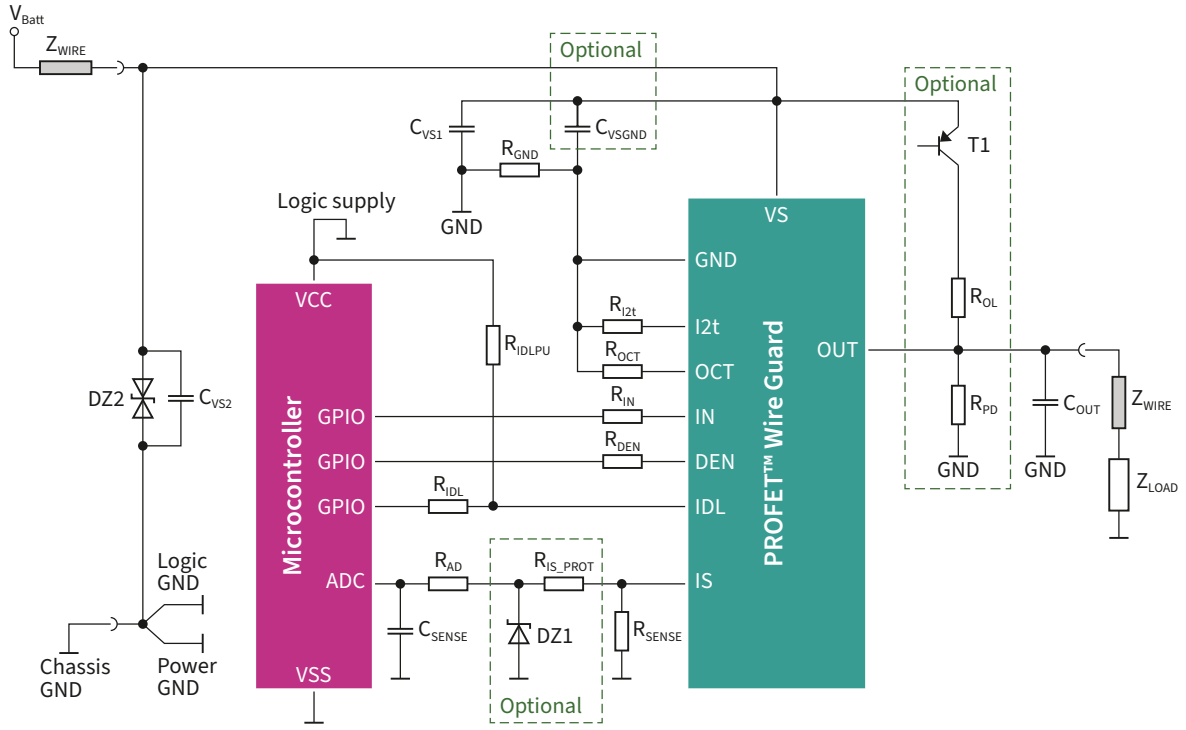
The integrated I^2t wire protection enables wire harness protection and optimization during normal operation



The sequential diagnosis provides advanced application data and enables application integrity checks



Application diagram



PROFET™ Wire Guard product family

Product name	$R_{DS(on)}$ (typ) [mΩ]	$R_{DS(on)}$ (max) @ T_j = 150°C [mΩ]	Nominal load current [A]	Typical adjustable overcurrent protection range @ T_j = -40°C [A]	Typical I^2t wire protection current range [A]	EAS [mJ]	Nominal operating voltage range [V]	Extended operating voltage range [V]	No. of channels	Package
BTG70008A-1ESW[1)]	0.9	1.6	36.5	43...240	24.0...40.6	557	5…20	2.75...28	1	PG-TSDSO-24
BTG70013A-1ESW	1.5	2.8	26.6	35...211	17.4...29.5	415	5…20	2.75...28	1	PG-TSDSO-24
BTG70020A-1ESW	2.2	4.1	21.5	27.5...168	14.1...23.9	270	5…20	2.75...28	1	PG-TSDSO-24
BTG7003A-1EPW	3.6	6.6	15.7	24...137.5	10.3...17.4	150	5…20	2.75...28	1	PG-TSDSO-14
BTG7007A-1EPW	8.0	14.7	10.3	12.8...77.5	6.7...11.4	60	5…20	2.75...28	1	PG-TSDSO-14
BTG7016A-1EPW	18	33	6.8	9...43	4.4...7.5	26	5…20	2.75...28	1	PG-TSDSO-14

1) Additional feature: commanded fast switch-off

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