PRODUCT BRIEF

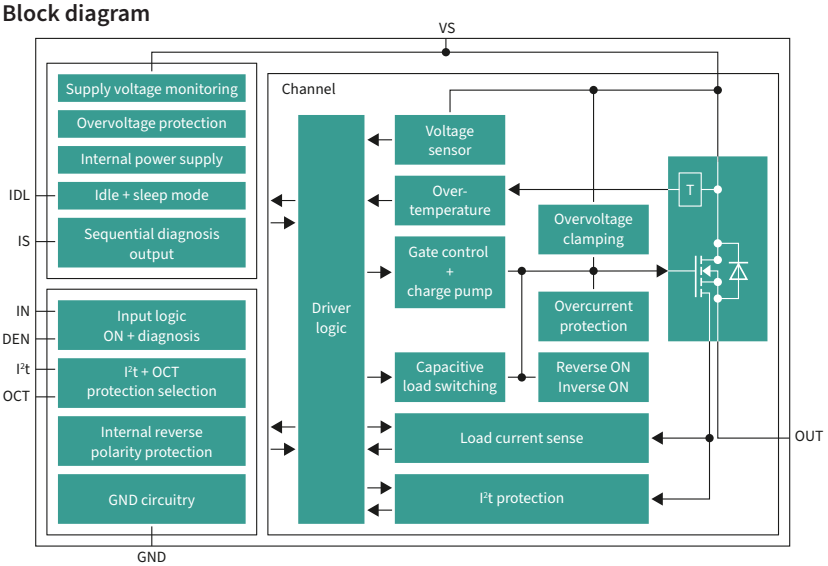
PROFET™ Wire Guard 12V

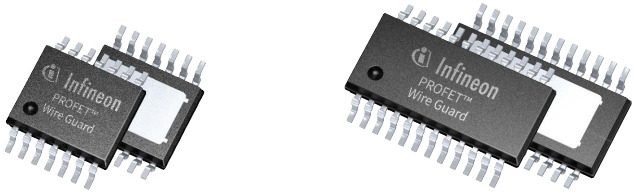
12 V PROFET™ high-side power switch with patented I^2t wire protection, adjustable overcurrent threshold for fast failure isolation and less than 60 µA current consumption during parking.

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, dependable 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™ ISO26262-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





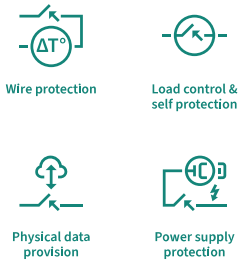
www.infineon.com/profetwireguard

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™ ISO26262-compliant development to address safety requirements up to ASIL B(D)



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 its 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

Decentral 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 current I^2t margin 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.

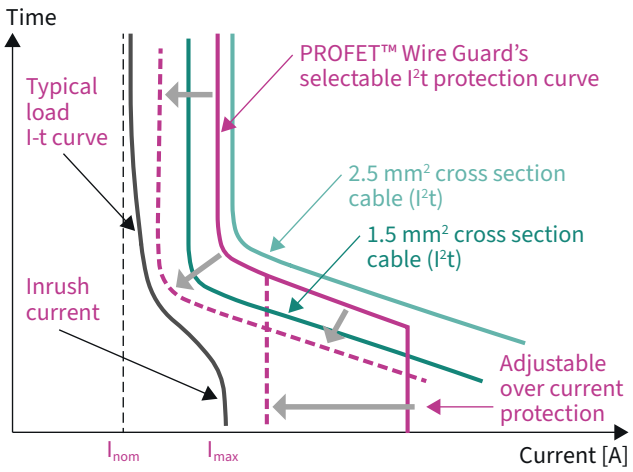
Key benefits of PROFET™ Wire Guard for wire and power supply protection

- 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

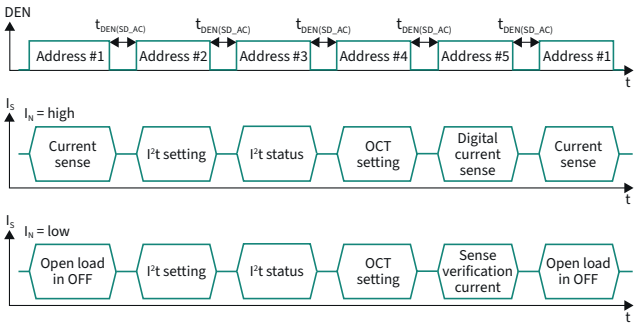
Key benefits of PROFET™ Wire Guard's sequential diagnosis

- 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

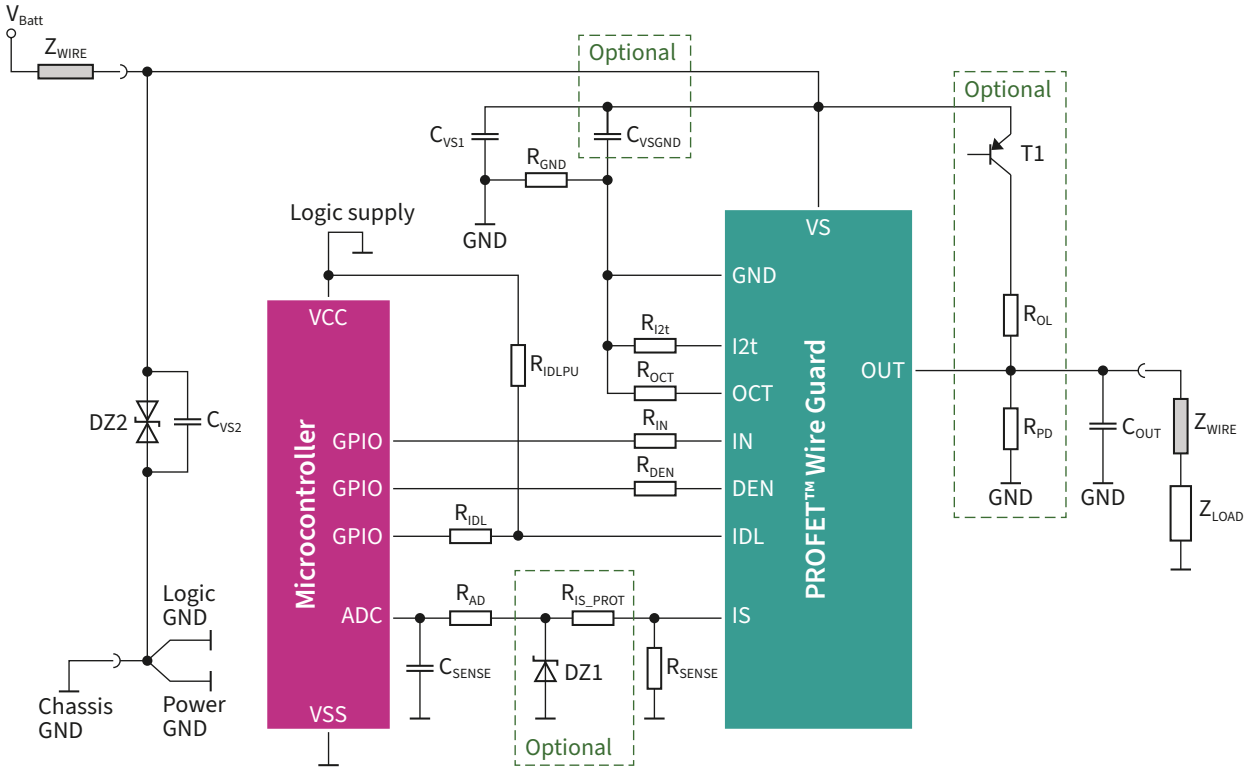
The integrated I^2t wire protection enables wire harness protection and optimization during normal operation



The sequential diagnosis provides advances 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
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

Published by
Infineon Technologies AG
Am Campeon 1-15, 85579 Neubiberg
Germany

Public

Date: 01/2024

Please note!
This Document is for information purposes only and any information given herein shall in no event be regarded as a warranty, guarantee or description of any functionality, conditions and/or quality of our products or any suitability for a particular purpose. With regard to the technical specifications of our products, we kindly ask you to refer to the relevant product data sheets provided by us. Our customers and their technical departments are required to evaluate the suitability of our products for the intended application.

We reserve the right to change this document and/or the information given herein at any time.

Additional information
For further information on technologies, our products, the application of our products, delivery terms and conditions and/or prices, please contact your nearest Infineon Technologies office (www.infineon.com).

Warnings
Due to technical requirements, our products may contain dangerous substances. For information on the types in question, please contact your nearest Infineon Technologies office.

Except as otherwise explicitly approved by us in a written document signed by authorized representatives of Infineon Technologies, our products may not be used in any life-endangering applications, including but not limited to medical, nuclear, military, life-critical or any other applications where a failure of the product or any consequences of the use thereof can result in personal injury.

Scan QR code and explore offering
www.infineon.com