PHOENIX

TECHNICAL MARKETING

Chassis & Safety Automotive Catalog

nexperia 5 YEARS

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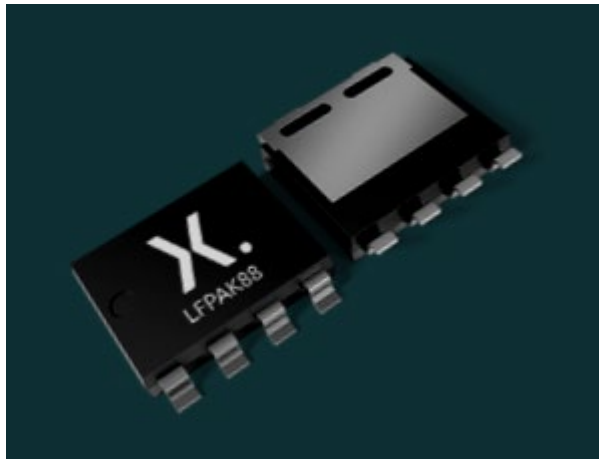
Chassis & Safety

One of the biggest improvements that electronic systems have brought is an improvement in automotive chassis and safety systems. Whether it is replacing heavy mechanical systems with lightweight electronics – with the additional benefit of reducing CO2 emissions – to dedicated systems to enhance driver and passenger safety, today's vehicles are radically different. To further enhance safety many of these systems need to offer system level redundancy, significantly increasing the silicon content.



Chassis & Safety Applications

- **Electronic Power Steering**
- By magnifying driving wheel movement, electric power steering (EPS) systems make steering easier. Additional torque is pr...
- Read more
- **Anti-locking braking systems**
- Anti-locking braking systems help vehicles maintain contact with the road surface and prevent skidding in conditions such...
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- **Airbag controller with Safing MOSFET**
- Airbags have been a standard feature in passenger cars for over 20 years. Naturally these systems need to be extremely ro...
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- **In-Vehicle Network (CAN FD / LIN / FlexRay / Ethernet) protection**
- The car is an extremely interconnected system, with over 100 ECUs all attempting to communicate with other systems in the...
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Chassis & Safety Focus Products

- Automotive ASFETs for Airbag Applications
- Automotive ASFETs for Repetitive Avalanche
- Schottky diodes and rectifiers IF >= 1 A
- CAN-FD ESD protection
- LFPAK88 MOSFETs

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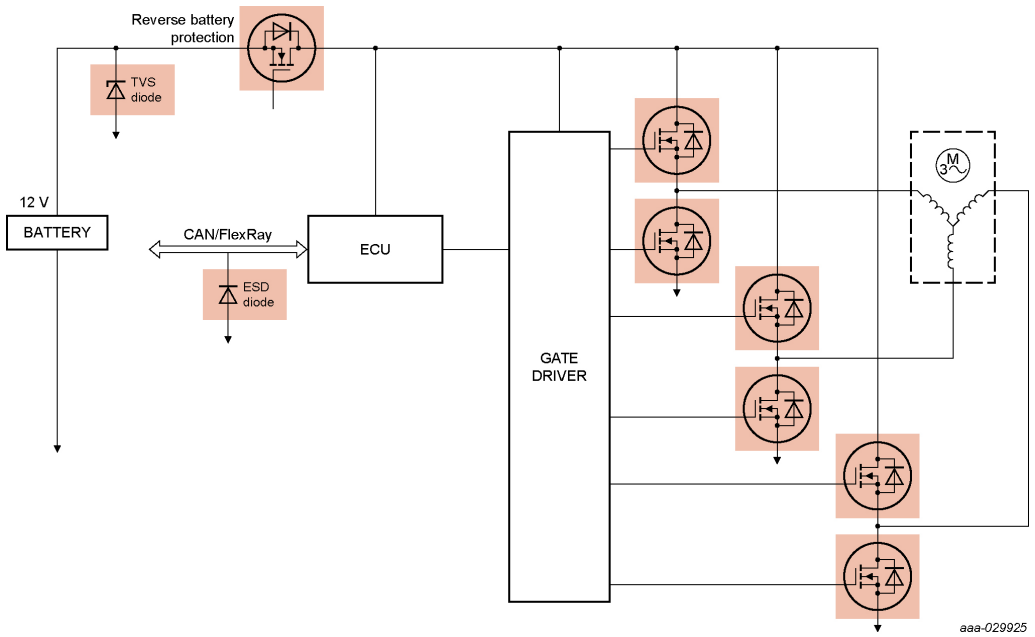
Electronic Power Steering

By magnifying driving wheel movement, electric power steering (EPS) systems make steering easier. Additional torque is provided by brushless DC motors due to their compact size and relatively low system cost, with increasing safety requirements driving the introduction of dual-redundancy systems. Brushless DC motors also provide improved performance, longer lifetimes, reduced noise, increased reliability and ease of installation.



Products

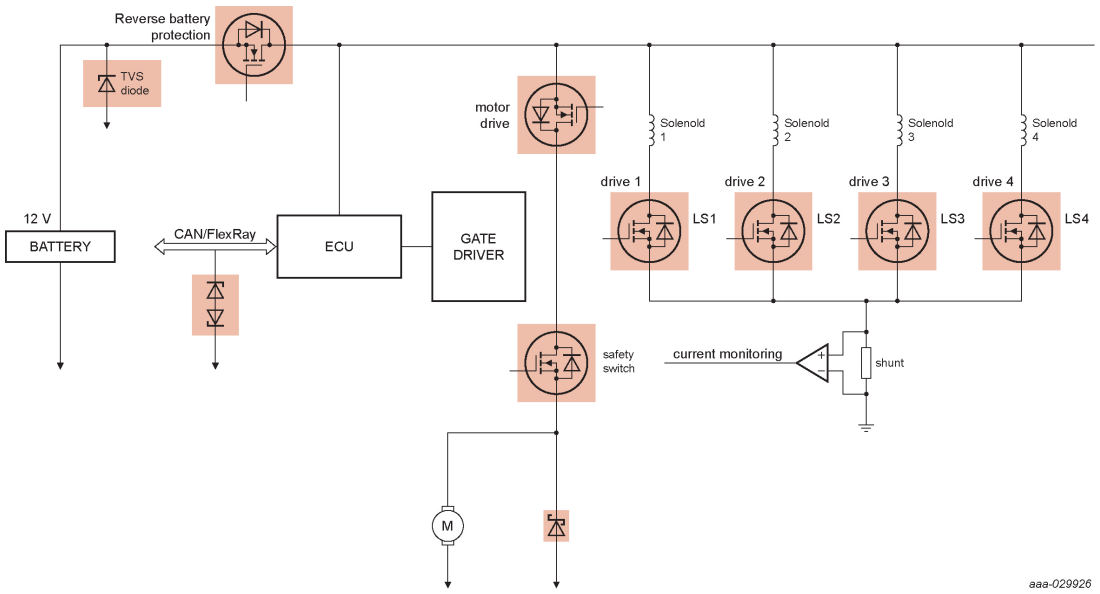
- Motor drive MOSFETs: 40 V, LFPAK88
- Schottky rectifiers: 100 V
- ESD: CAN / Flexray bus protection
- ESD: TVS, 24 / 40 W
- Reverse battery: 40 V, LFPAK88

Design considerations

- Dual-redundancy designs require greater power densities and space saving, enabled by LFPAK88
- System must be able to handle worst-case current and thermal surges caused by torque assistant pulses
- Protect against EMI noise by ensuring sufficient suppression and filtering

Anti-locking braking systems

Anti-locking braking systems help vehicles maintain contact with the road surface and prevent skidding in conditions such as icy or wet roads. When the driver applies braking the ABS responds, many times every second, to changes in the rotational speed of each wheel. Reducing or increasing brake pressure as necessary to maintain control. From a safety perspective, critical systems are increasingly moving to dual-redundancy designs.



Products

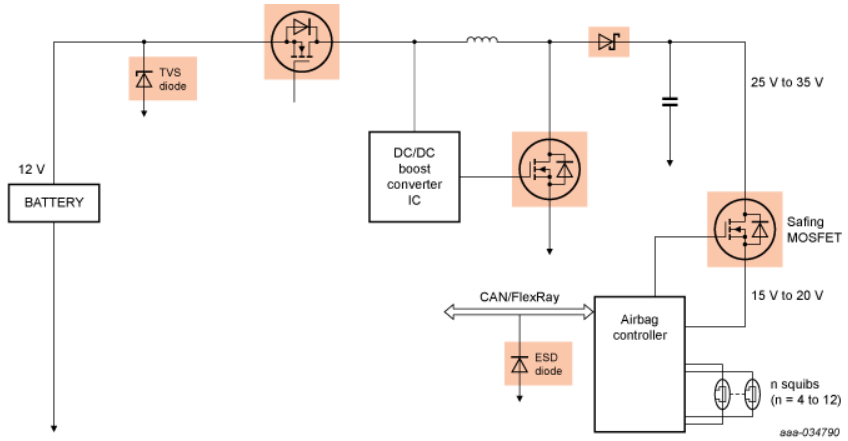
- Motor drive MOSFET: 40 V, LFPAK88
- Safety switch MOSFET: 40 V, LFPAK88
- Solenoid drive MOSFET: 40 V, LFPAK56
- Solenoid drive MOSFET: 60 V, Automotive ASFETs for Repetitive Avalanche
- Schottky rectifiers: 100 V
- ESD: CAN / Flexray bus protection
- ESD: TVS, 24 / 40 W
- Reverse battery: 40 V, LFPAK88

Design considerations

- To improve solenoid drop out time the body diode is avalanched, hence the MOSFET must be avalanche rugged
- The safety switch MOSFET is normally continuously ON
- Protect against EMI noise by ensuring sufficient suppression and filtering

Airbag controller with Safing MOSFET

Airbags have been a standard feature in passenger cars for over 20 years. Naturally these systems need to be extremely robust and reliable, regardless of whether it is just a single airbag for the driver and front passenger or a complete multi-stage airbag system offering a range of protection options (front, side, head, rollover and even pedestrian protection). A Safing MOSFET in series with firing circuit transistors provides cost-effective operational reliability, enabling breakage of the current circuit in case of incorrect operation due to malfunction or electrical noise.



Products

- Safing MOSFET: ASFETs for Airbags, LFPAK33 / 56
- DC-DC boost low side switch: MOSFET, 60 V, LFPAK33
- DC-DC freewheeling: Schottky rectifier, 60 – 100 V, CFP
- ESD: CAN / LIN bus protection
- ESD: TVS, 400 W / 600 W
- Reverse battery protection: MOSFET, 40 V, LFPAK33/56

Design considerations

- Traditional solutions to Airbag applications are being withdrawn from the market due to unsustainability
- Enhanced SOA technology provides similar linear mode performance in a sustainable silicon technology
- For pulsed linear mode applications, such as the Safing MOSFET in airbags, Nexperia's ASFETs provide the required robustness while delivering significant board space savings (up to 84% with an LFPAK33 device) compared to traditional DPAK solutions
- Airbag firing circuits need a stable voltage of 15 to 20 V, requiring a boost converter to step up the standard 12 V battery voltage to 25–35 V

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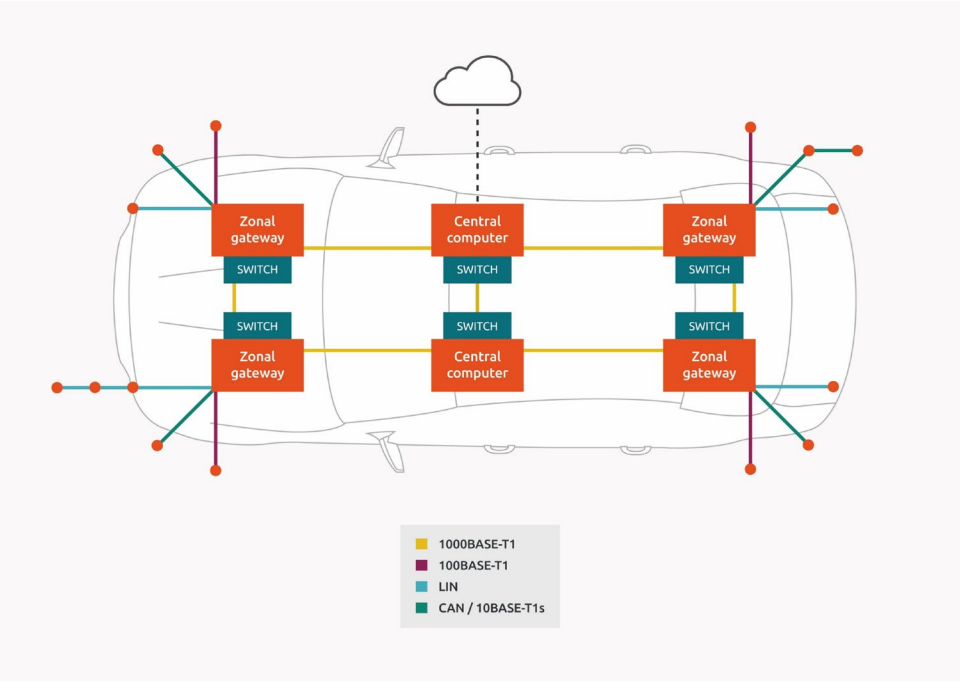
In-Vehicle Network (CAN FD / LIN / FlexRay / Ethernet) protection

The car is an extremely interconnected system, with over 100 ECUs all attempting to communicate with other systems in the car. To manage increased complexity and higher data rates as new versions of existing protocols find their way into vehicle networks (CAN FD, Ethernet), the classic flat wiring harness architecture is changing to a domain and zonal architecture with Automotive Ethernet as the backbone. Offering increased system robustness, our IVN bus line protection solutions are well suited to automotive bus protection without impeding signal integrity in this electrically noisy environment.



Products

- LIN / CAN(FD) / FlexRay
- Automotive ESD Ethernet

Design considerations

- High ESD robustness up to 30 kV and high surge currents up to 3.5 A (8/20µs)
- Excellent ESD clamping behavior
- Operate at a low capacitance avoiding any unwanted circuit disturbances
- Asymmetrical internal diode configuration, ensures optimized electromagnetic immunity