OPTIREG™ application compass

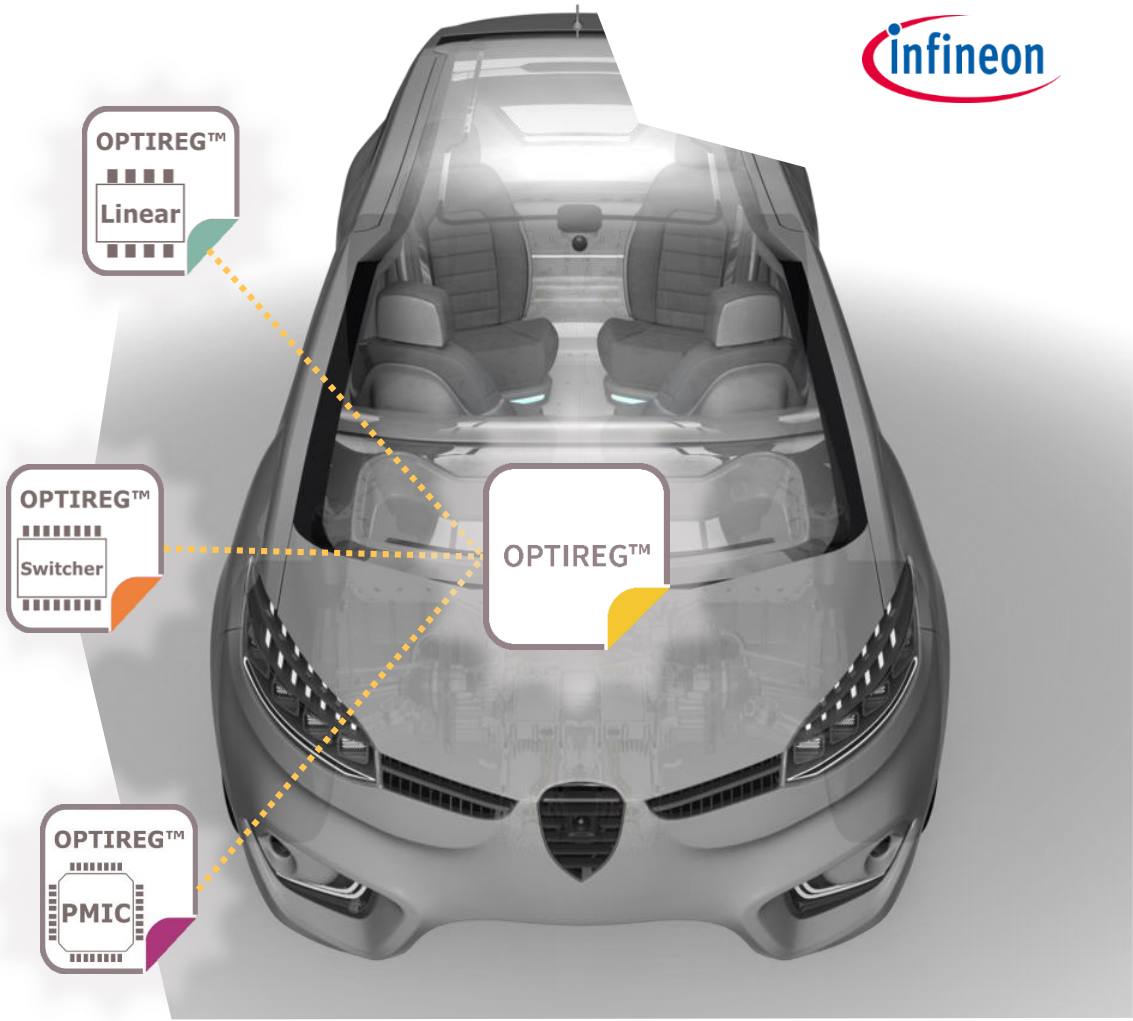
Please activate your speakers or headphones

Learning objectives

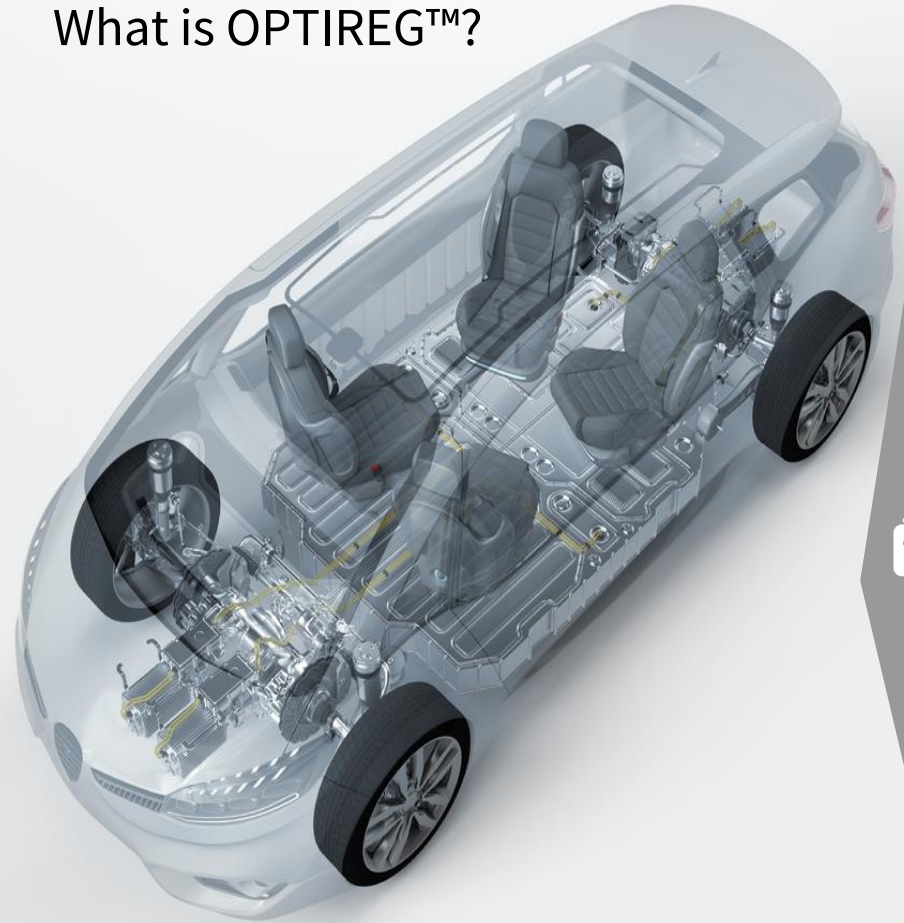
Know Infineon's OPTIREG™ power supply solutions

How OPTIREG™ can be used in almost all automotive applications

Why OPTIREG™ products stand out from other solutions in the market



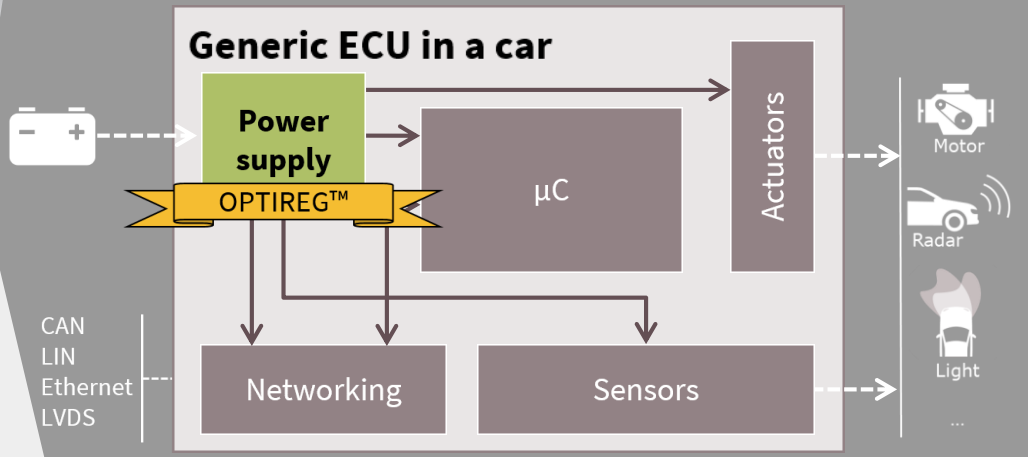
What is OPTIREG™?



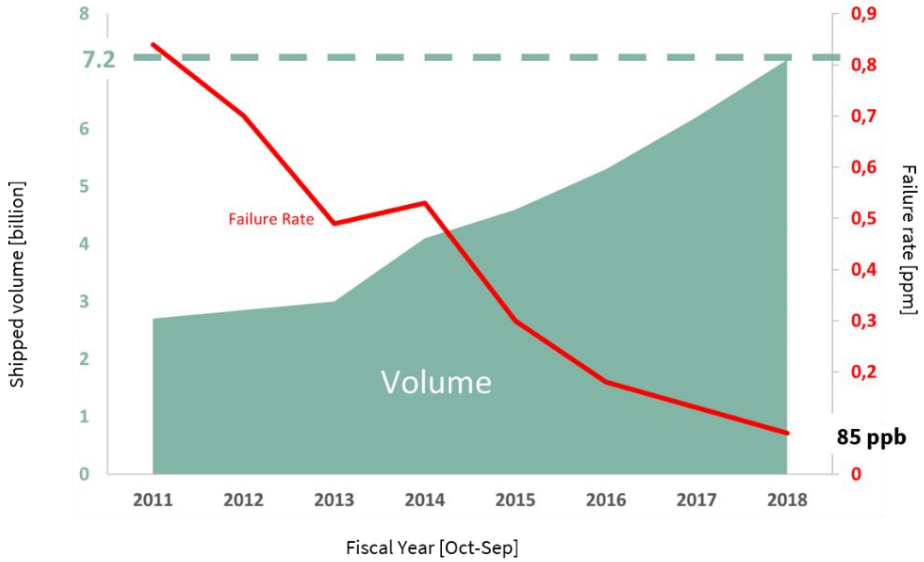
OPTIREG™ Linear

OPTIREG™ Switcher

OPTIREG™ PMIC



Infineon’s benchmark automotive quality



Near-zero defect rate

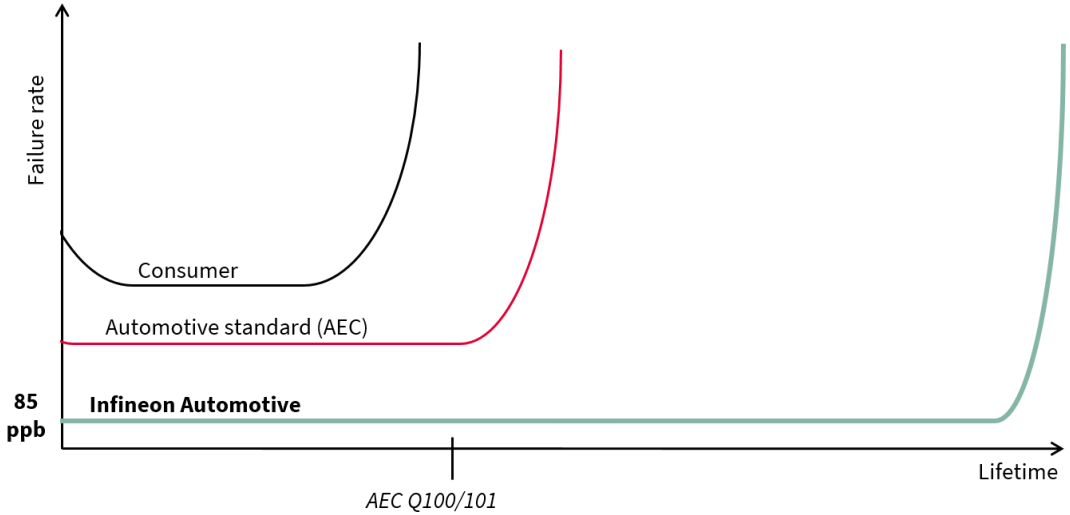
Growing volume capability

0.35 ppm
Microcontrollers

0.02 ppm
IVN transceivers

0.03 ppm
OPTIREG™ voltage regulators

Infineon’s benchmark automotive quality



Highly engineered products to target zero defects

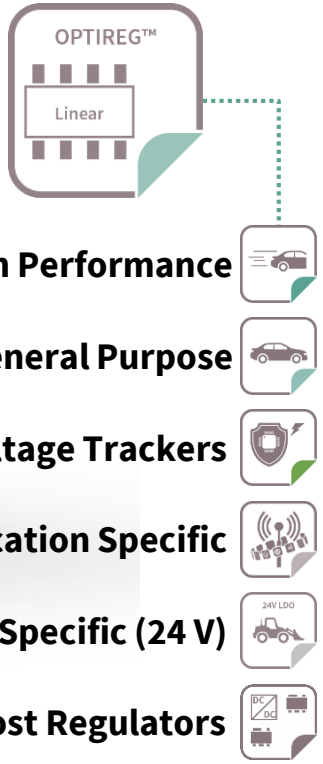
15+ years of product lifetime

Top regional customer services

Expert quality analysis and support close to the customer

OPTIREG™ Linear

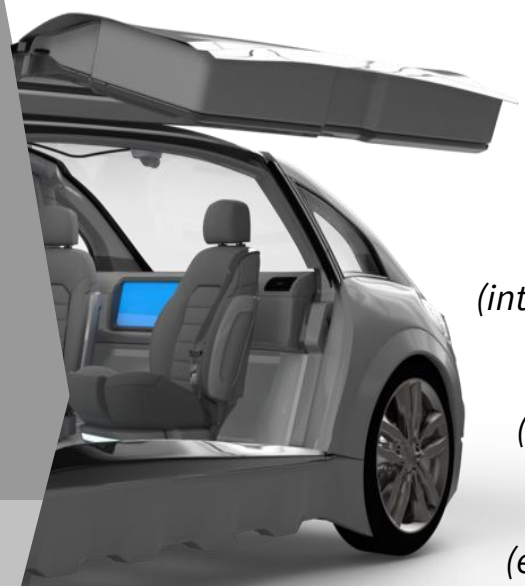
- Low quiescent current
- Integrated protection features
- High power supply rejection ratio
- Very small packaging

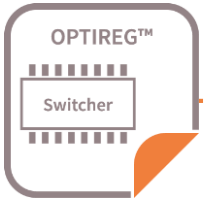


Body power operated | Power distribution | Car lighting | Connected Car | Power Seat

OPTIREG™ Switcher

- Wide input voltage range (12 V, 24 V, 48 V)
- Spread spectrum features
- Monitoring features
- Wide junction temperature (150°C)





Buck converter
(integrated power stage)

Buck converter
(external power stage)

Boost controller
(external power stage)

Body power operated

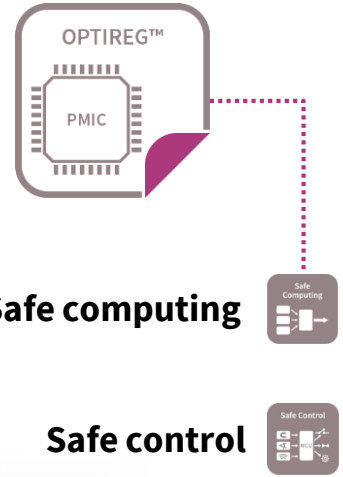
Power distribution

Car security

48V

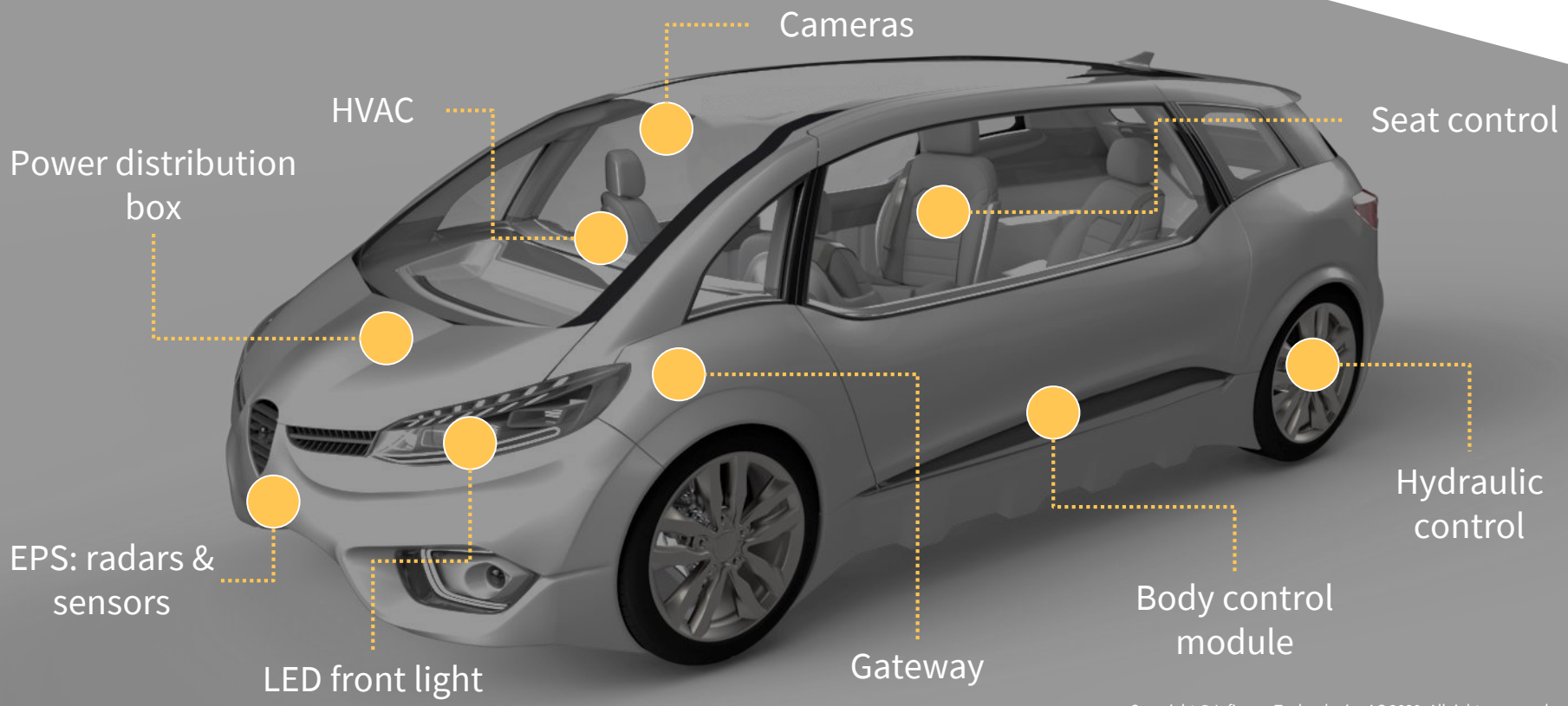
OPTIREG™ PMIC

- ISO 26262-compliant (from QM to ASIL D)
- AURIX™ and multi-rail voltage supply
- Highly integrated architectures
- System safety functions



Connected Car | Car security | Radar | Lidar | Camera

Select an application to know how OPTIREG™ can address different needs



Multi-purpose camera

ADAS

Advanced Driver-Assistance System

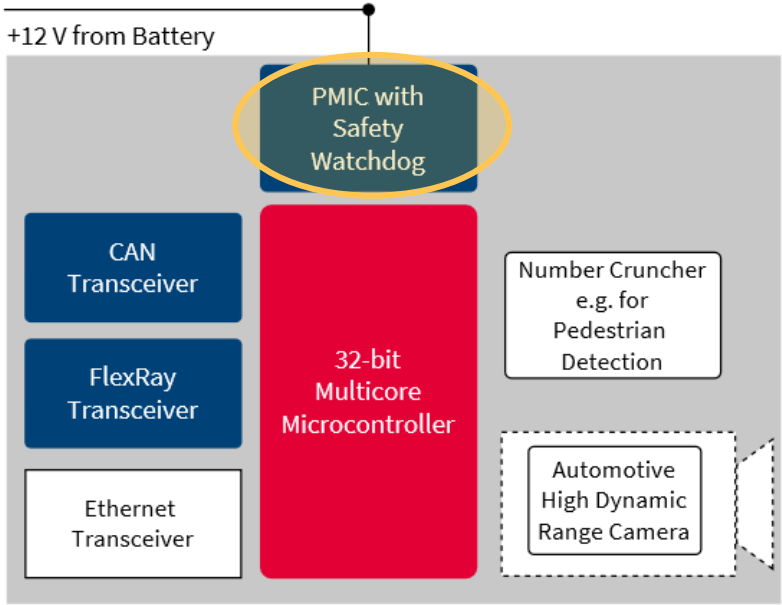
Monitoring

Warning

Braking

Steering

Small and effective thermal management solution required



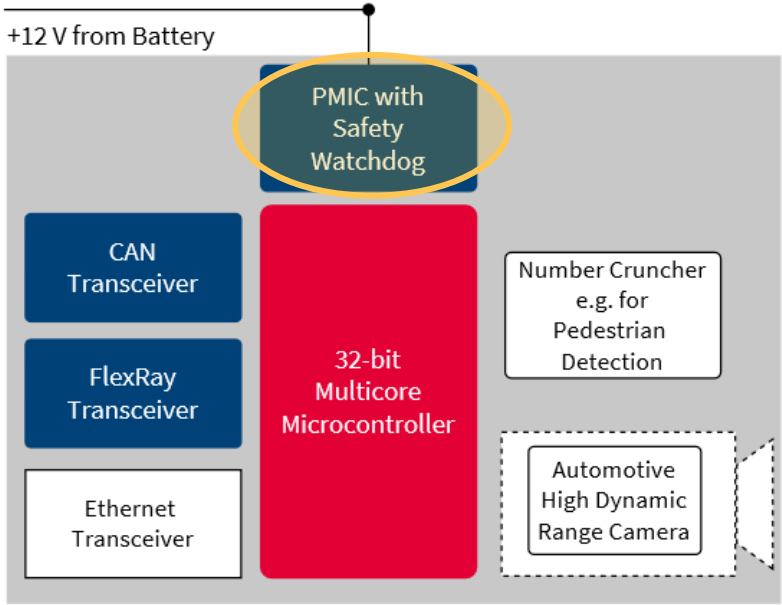
Multi-purpose camera

TLS4120

TLS4125

Multiple power rails

- 2 – 2.5 A output current capability
- Integrated power stages
- Fully synchronous
- Minimum external components required
- Highly efficient



Multi-purpose camera

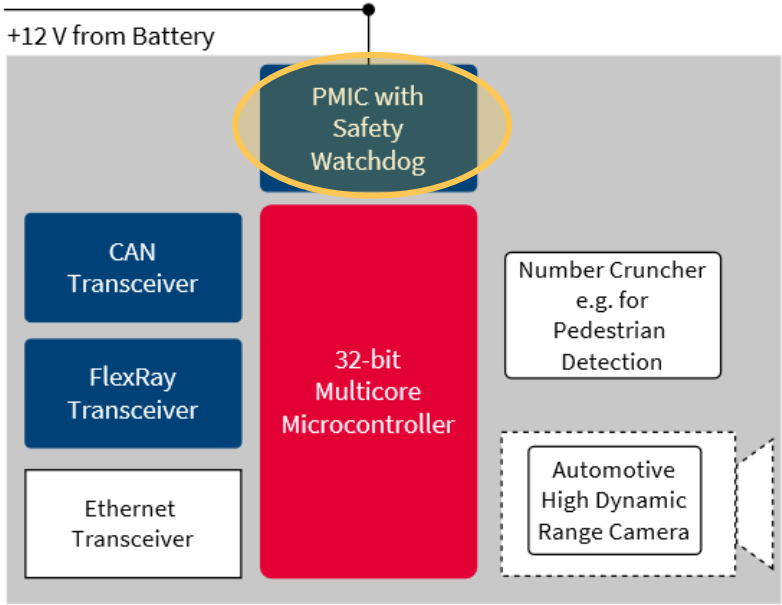
Functional safety (FuSa)

ASIL D required

AURIX™ + OPTIREG™ PMIC

FuSa master | TLF35584

AURIX™ can only reach its full FuSa potential if its safety integrity is externally checked and monitored

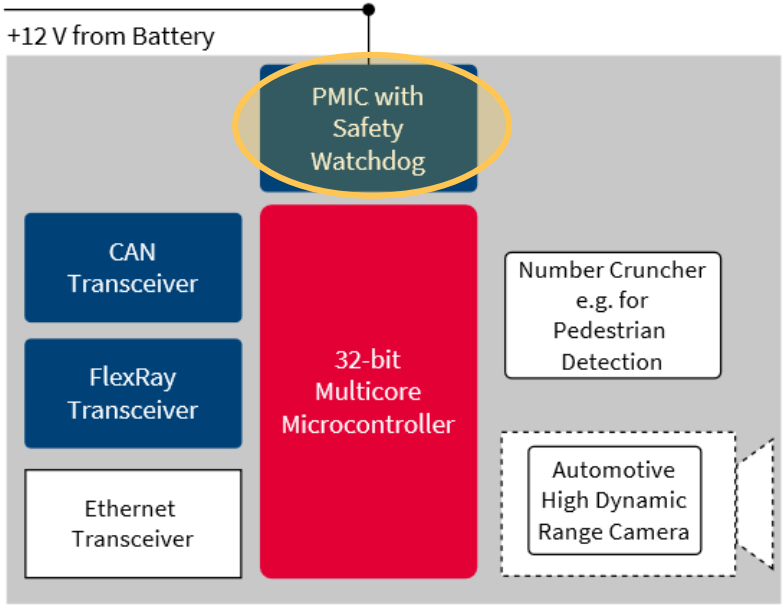


Multi-purpose camera

TLF35584

FuSa features and capabilities

- Under and overvoltage monitoring
- Software execution supervision and clock error monitoring
- Safe state controller
- Built-In Self-Test (BIST)
- Adjustable to different system requirements

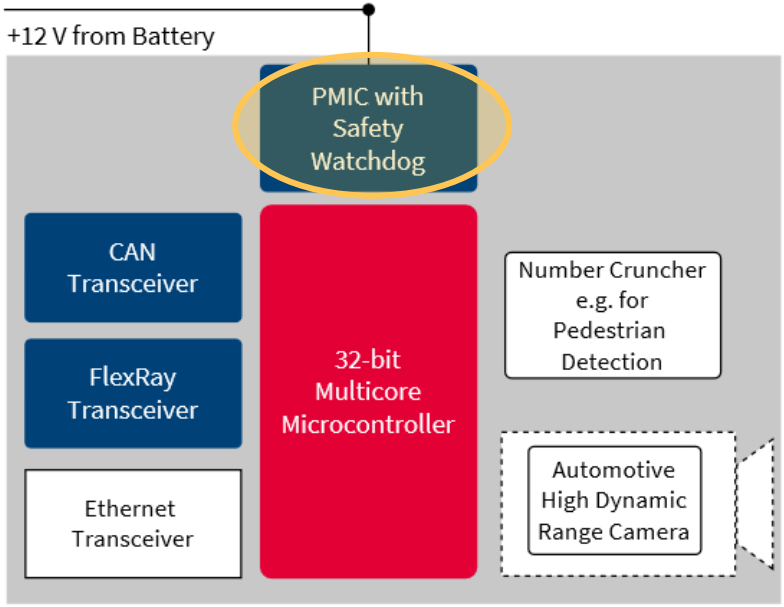


Multi-purpose camera

TLF35584

FuSa features and capabilities

- Small leadless package with lead-tip inspection capability
- Reduced number of external components
- High switching frequency
- ISO 26262-compliant
- FuSa documentation available



More info on:

Infineon's multi-purpose camera webpage

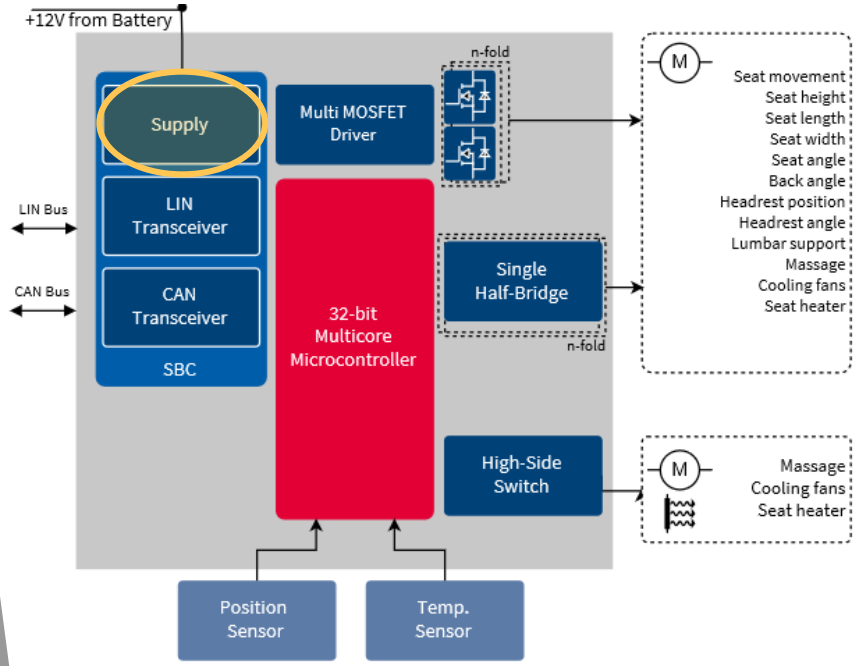
Click to RETURN

Seat control

Important role in user experience and car brand differentiation

Comparable complexity and challenges to body control modules

Low quiescent current, small size and very low power dissipation required



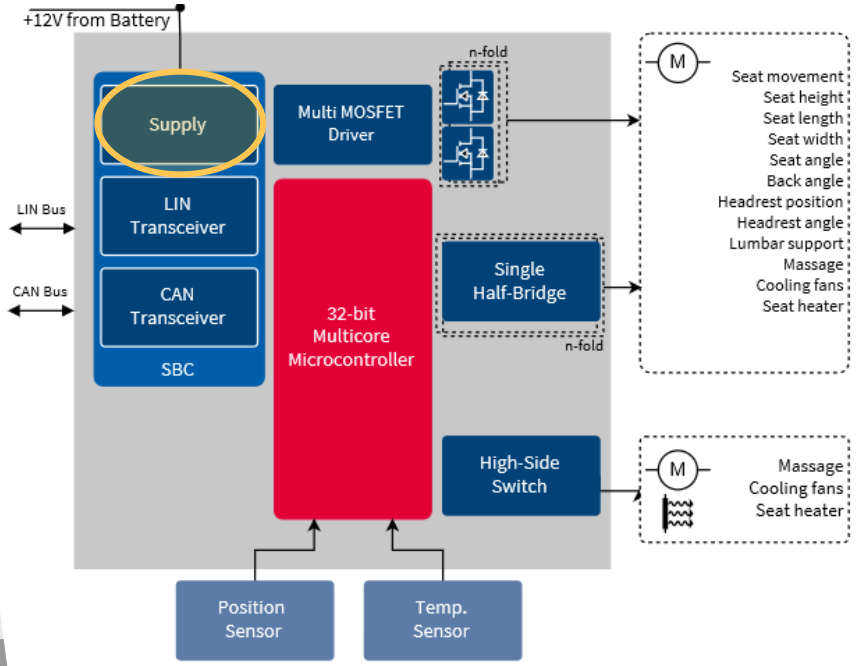
Seat control

TLS8xx
TLS71x
TLF502x1
...

Low quiescent current

TLS71xx
TLS8xx
TLF502x1
TLS4120x
TLS4125x
...

High efficiency and various voltage/current ranges



More info on:

Infineon's seat control webpage

Click to RETURN

Automatic transmission
Hydraulic control

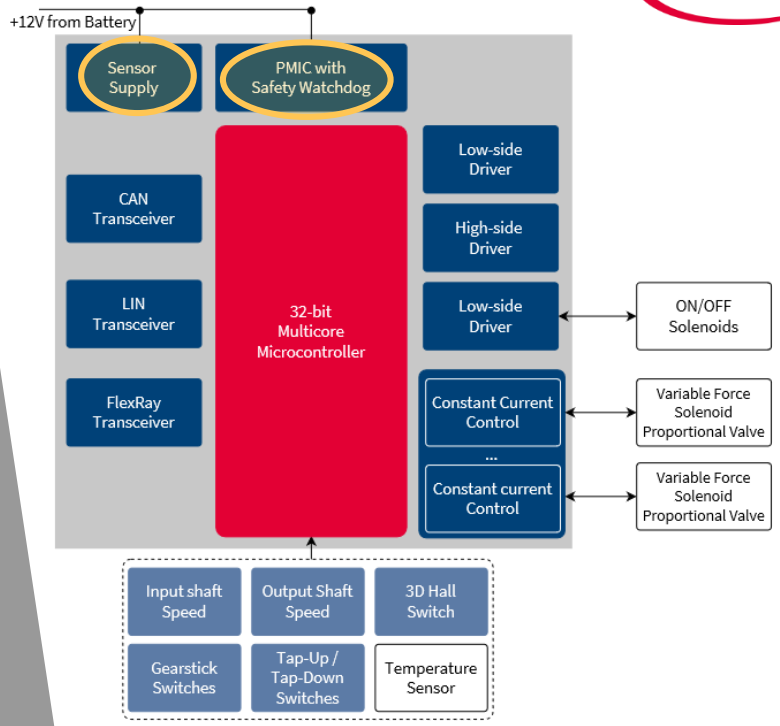
Automatic transmission

ASIL D required

Accurate sensor data is critical

Risks of sensors connected to ECU by cable:

- Short to battery ➤ Tracker overvoltage
- Short to ground ➤ Tracker overload
- Reverse polarity ➤ Tracker negative voltage



Automatic transmission
Hydraulic control

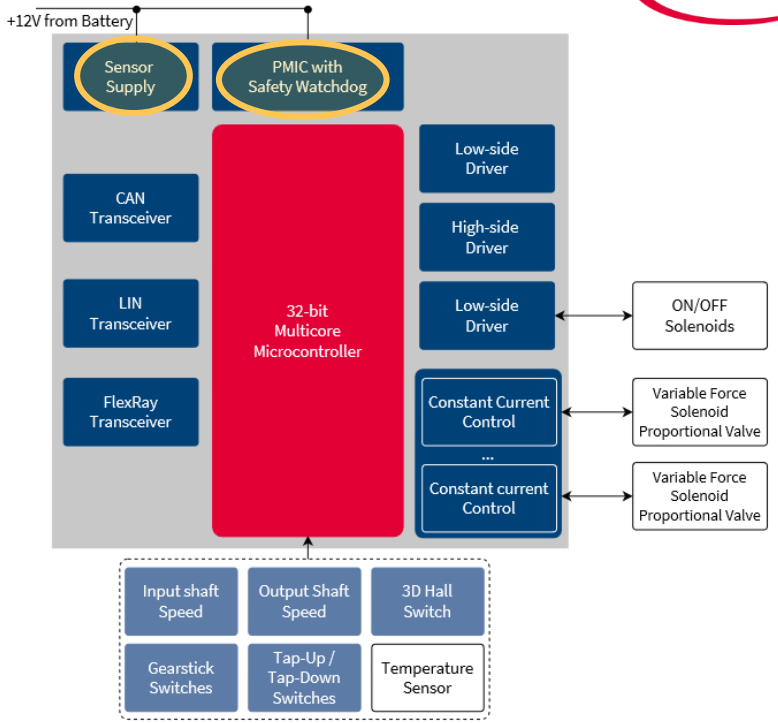
TLS105
TLS115
TLE425x

Protection against shorts and reverse polarity events

TLF35584

Power management features for AURIX™ microcontroller

- Small leadless package with lead-tip inspection capability
- Reduced number of external components
- High switching frequency



More info on:

Infineon's automatic transmission webpage

Click to RETURN

Body control module

Car lighting

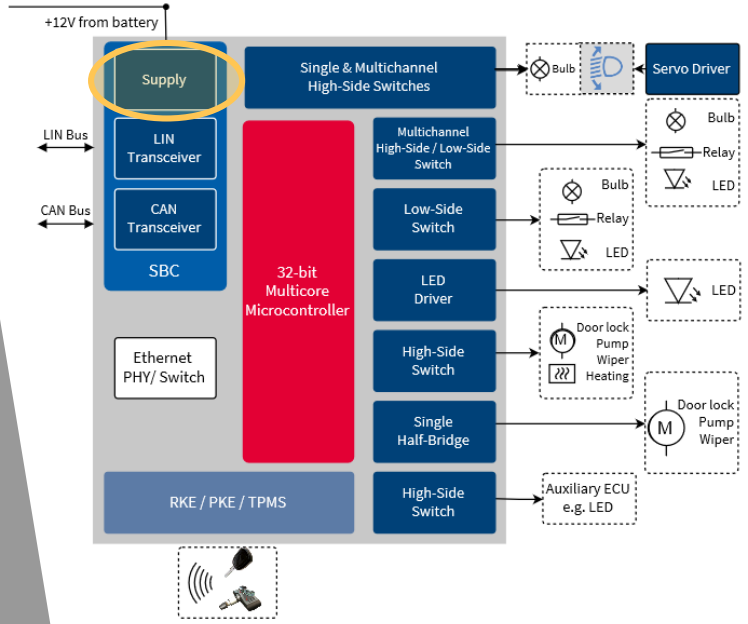
Car security

Window lift

Power Seat

HVAC blower

...



Body control module

TLS810x
TLS820x
TLS850x
…

Low quiescent current

…

TLS412x
…

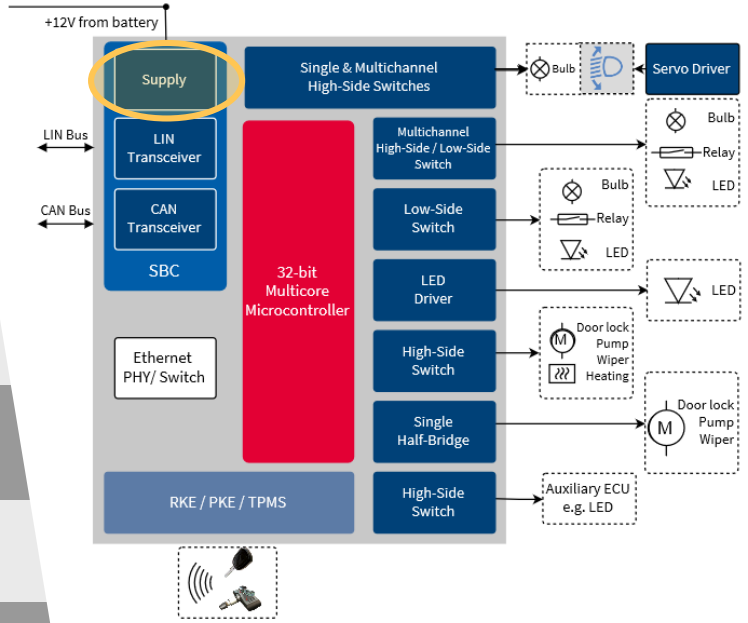
High current, integration and efficiency

TLS820x
TLS850x
TLS50281x
…

Complex Watchdog (optional)

TLF35584
…

High safety level



More info on:

Infineon's BCM webpage

Click to RETURN

Gateway

- *Processing power*
- *Data throughput*
- *Safety and security requirements*
- *Space constraints limit form factor*

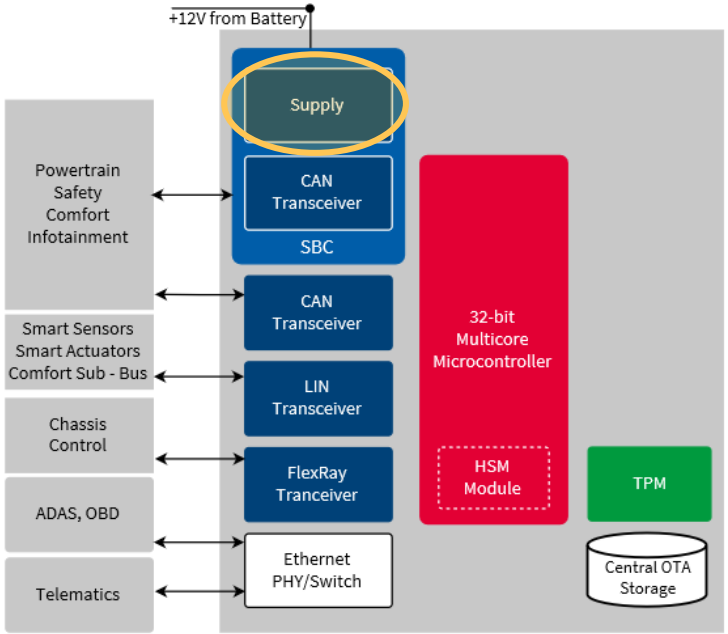
Performance

+

PCB size

=

Flexible power supply solution required



Gateway

TLS8xx
TLS71x
TLS412x
...

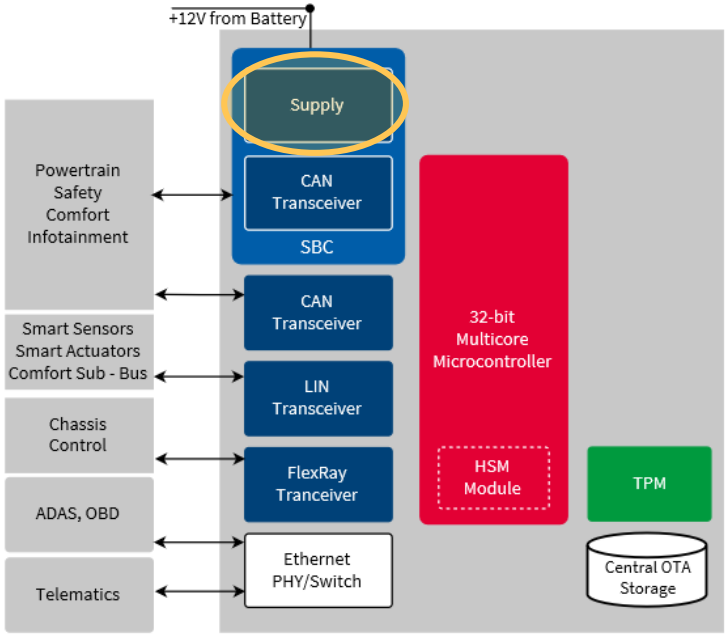
Low quiescent current

TLF50281
...

Complex Watchdog (optional)

TLF35584
TLF30682
...

High integration



More info on:

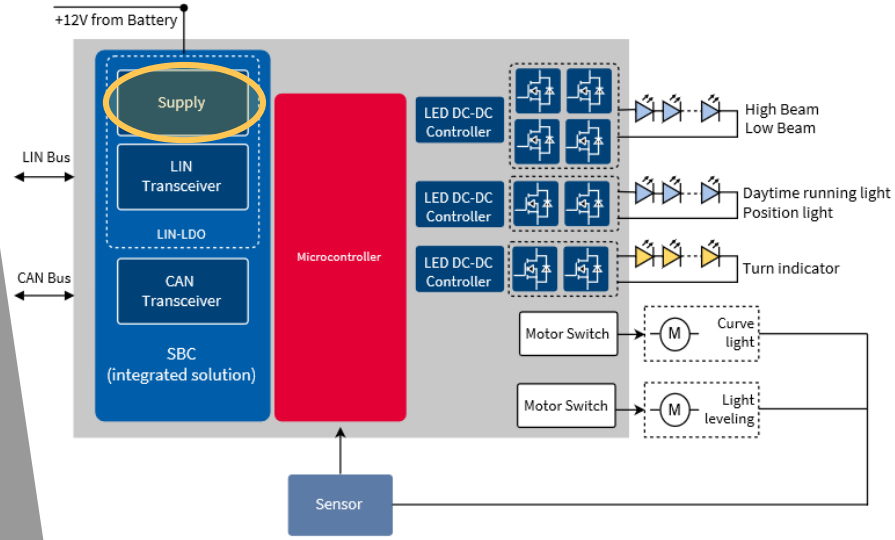
Infineon's gateway webpage

Click to RETURN

LED front light

- *Differentiating car brand factor*
- *Important in safety, reliability, energy efficiency and user experience*
- *Increasing complexity with additional features*

Flexible and efficient power supply solution required



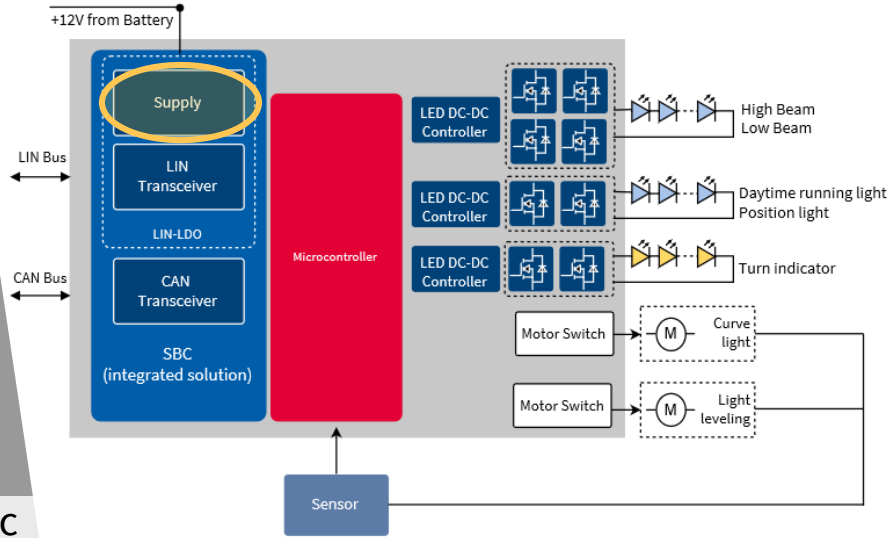
LED front light

TLS8xx
TLF502x1
TLS4120x
TLS4125x
…

Low quiescent current

TLF502x1
TLF35584
TLF30682
…

High safety and diagnostic features



More info on:

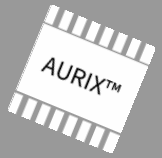
Infineon's LED front lighting webpage

Click to RETURN

Electric Power Steering

Functional safety (FuSa)

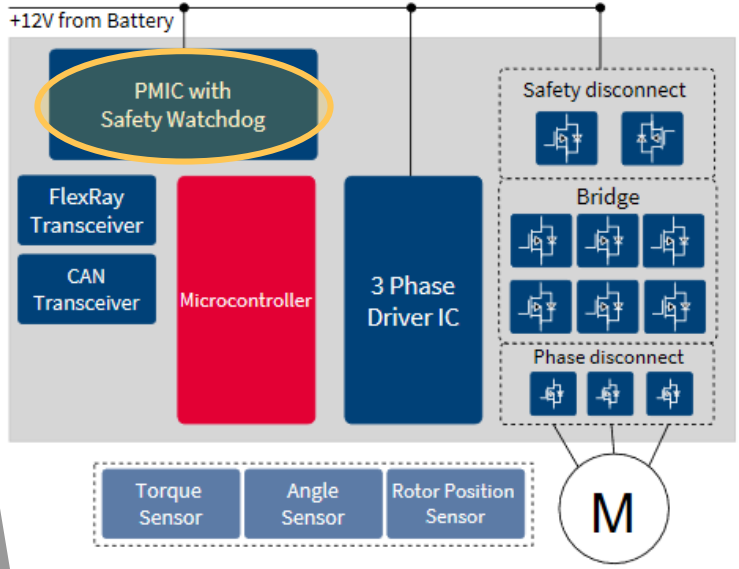
ASIL D required



FuSa master

Optimal solution to power AURIX™

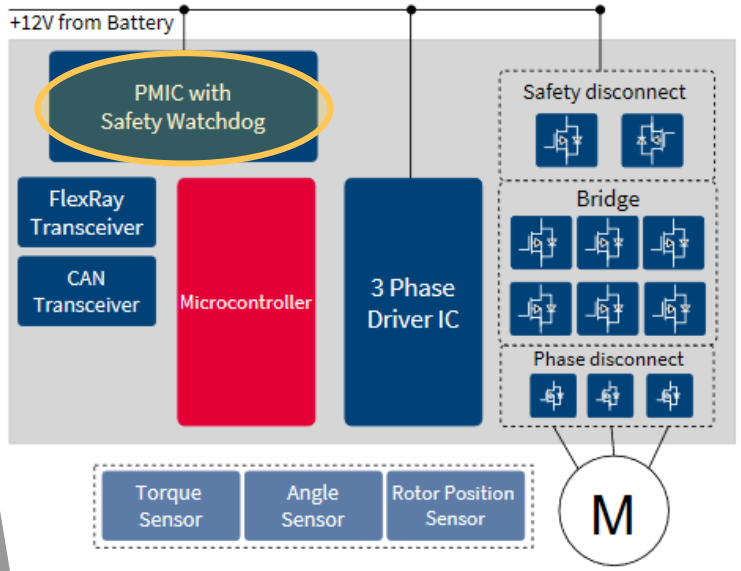
AURIX™ can only reach its full FuSa potential if its safety integrity is externally checked and monitored



Electric Power Steering

TLF35584 FuSa features and capabilities

- Under and overvoltage monitoring
- Software execution supervision and clock error monitoring
- Safe state controller
- Built-In Self-Test (BIST)
- Adjustable to different system requirements

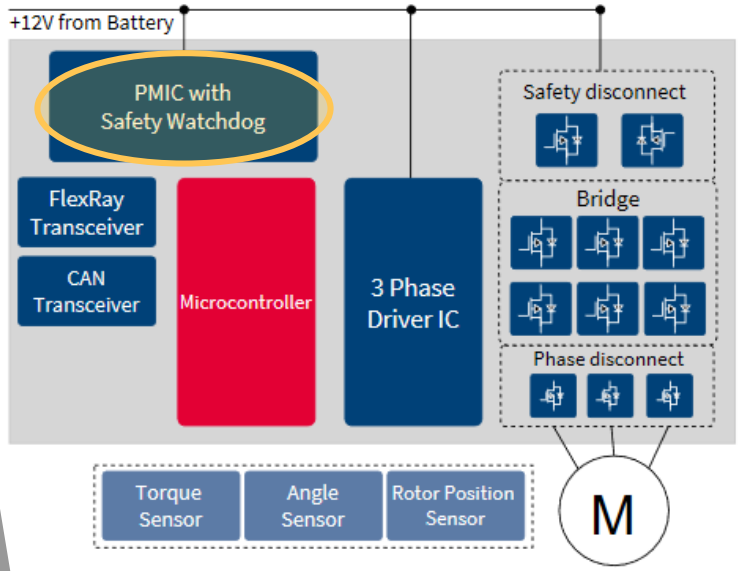


Electric Power Steering

TLF35584 FuSa features and capabilities

✓ Power supply to the entire system

- **Microcontroller**
  Standby domain, microcontroller main supply and ADC supply through the reference LDO
- **Transceivers**
  Communication LDO for CAN and FlexRay™
- **Sensors**
  Redundant sensors can be supplied by two independent trackers that are protected against short to battery

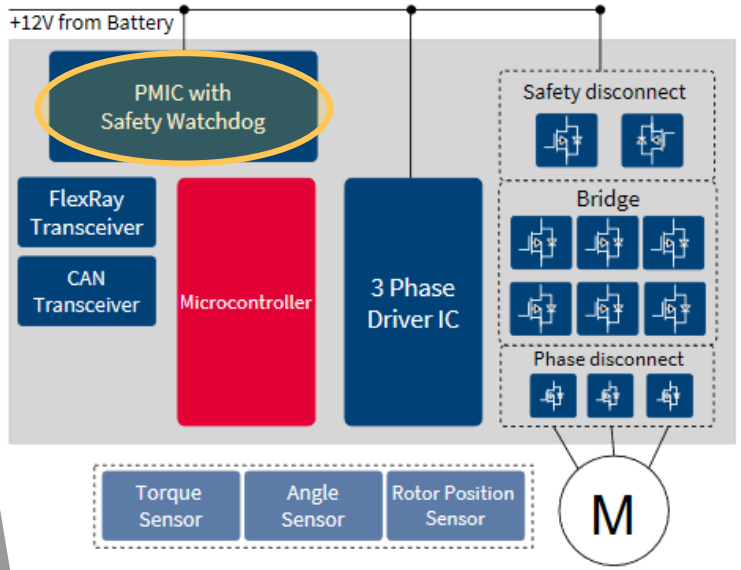


Electric Power Steering

TLF35584

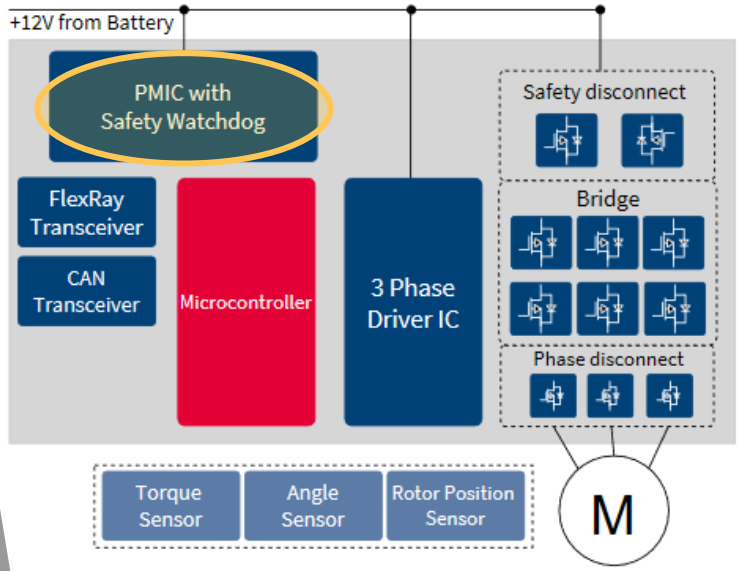
FuSa features and capabilities

- Small leadless package with lead-tip inspection capability
- Reduced number of external components
- High switching frequency
- ISO 26262-compliant
- FuSa documentation available
- Easy implementation



Electric Power Steering

TLF35584 FuSa features and capabilities



The same use concept applies to other applications

- Fail operational EPS
- Electric brake booster
- Electric parking brake

More info on:

Infineon's EPS webpage

Click to RETURN

Electric Power Steering

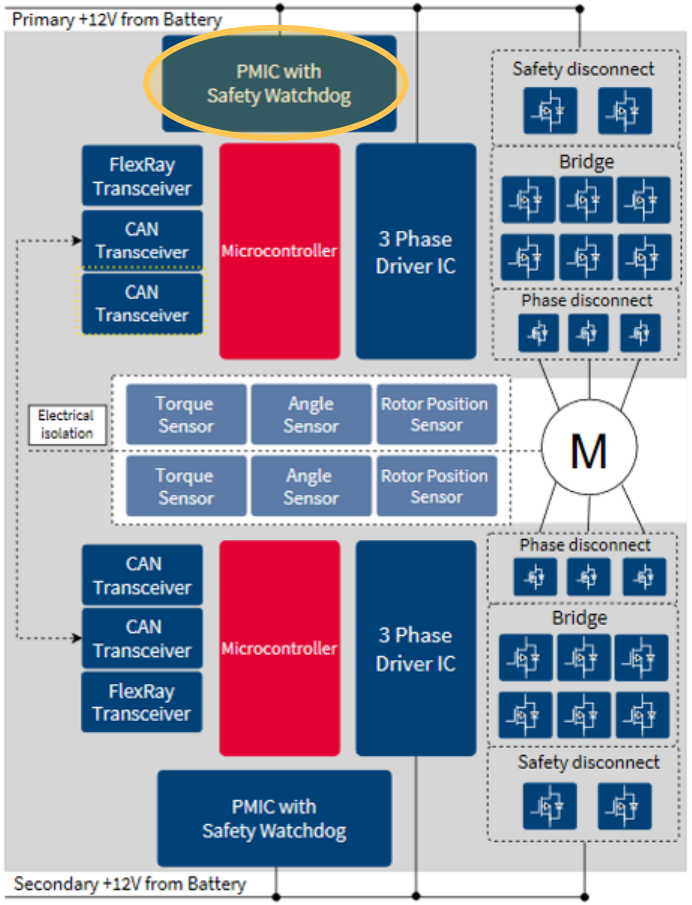
TLF35584

FuSa features and capabilities

Fail operational EPS

More info on:

Infineon's fail-operational EPS webpage

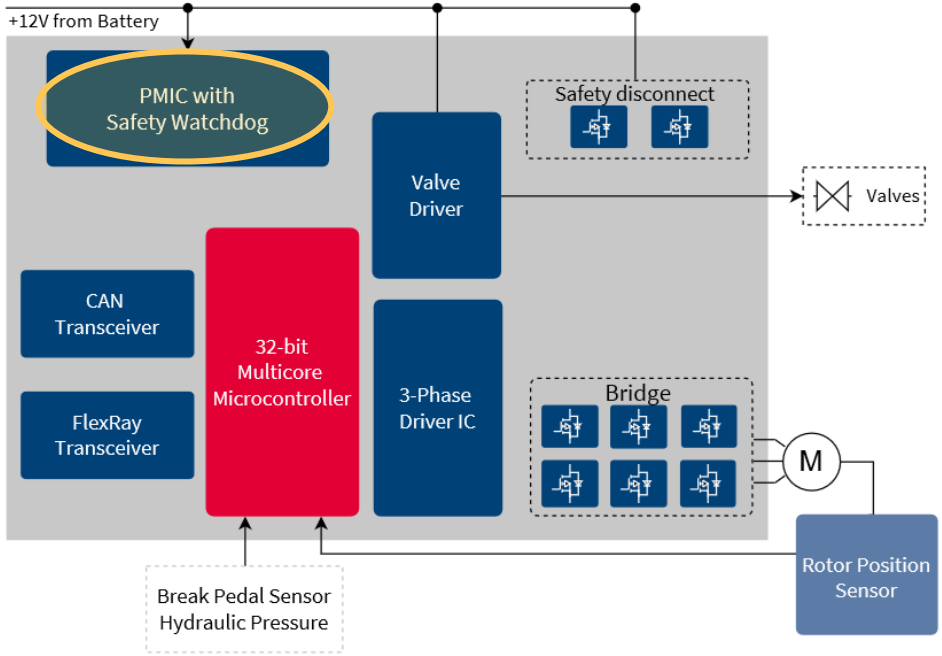


Electric Power Steering

TLF35584

FuSa features and capabilities

Electric brake booster



More info on:

Infineon's electric brake booster webpage

Electric Power Steering

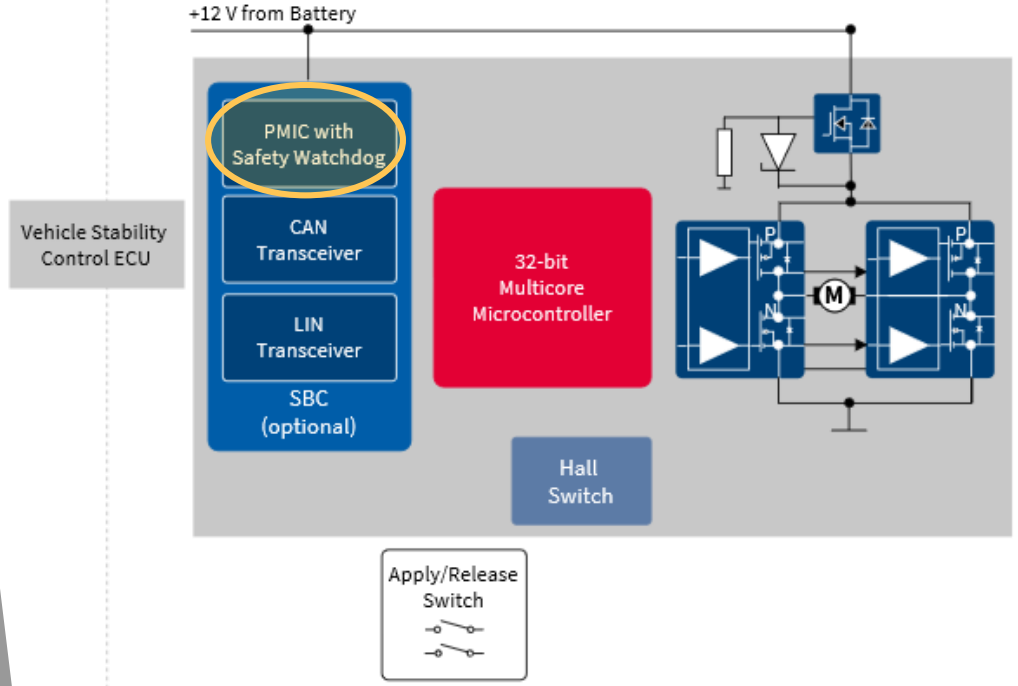
TLF35584

FuSa features and capabilities

Electric parking brake

More info on:

Infineon’s electric parking brake webpage

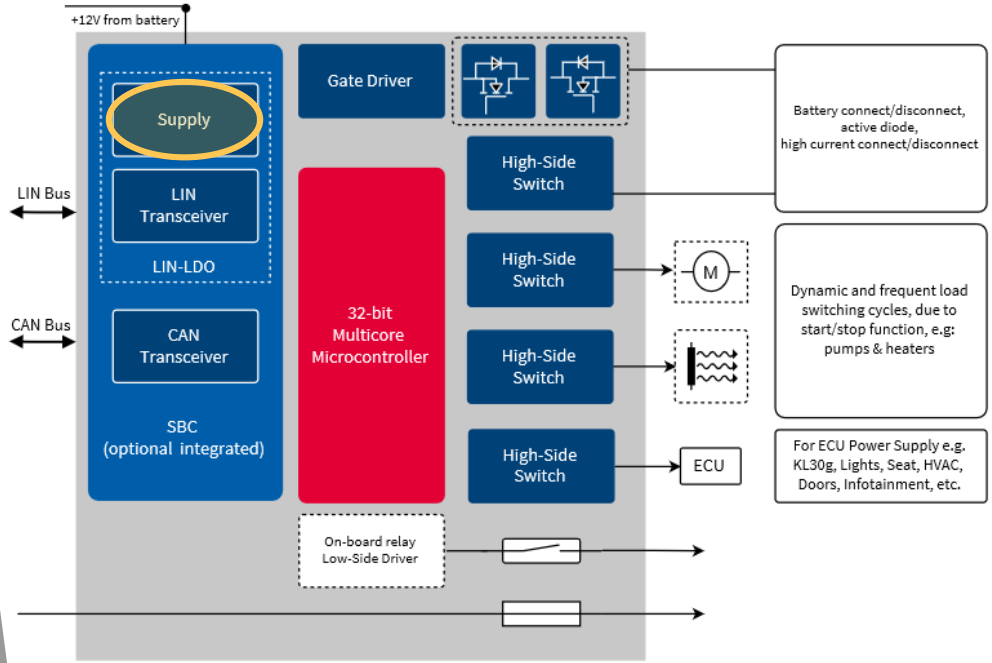


Power distribution box

Power distribution box evolving to a body control module or ECU

Relays and fuses replaced with semiconductors

New functions integrated (power supply included)



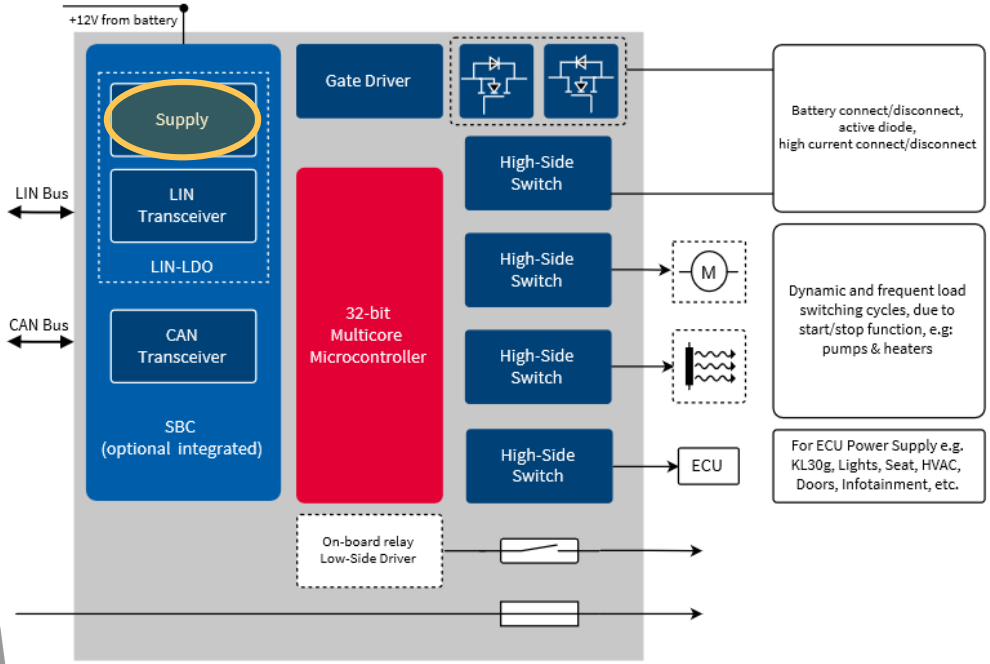
Power distribution box

TLS8xx
TLS71x
TLF502x1
…

Low quiescent current

TLF50281
TLF35584
TLF30682
…

High safety and diagnostic features



More info on:

Infineon's power distribution box webpage

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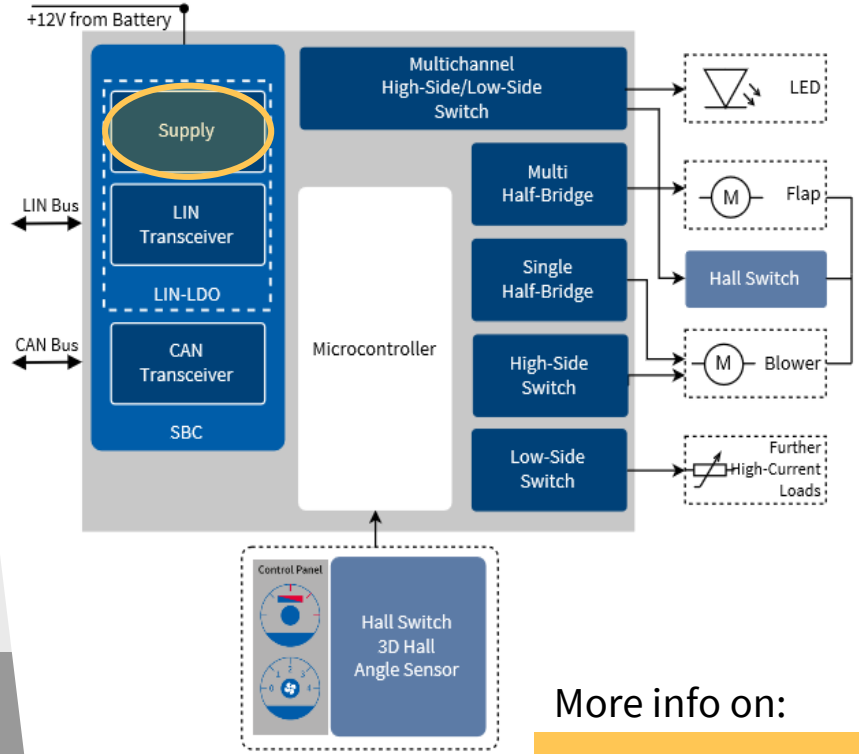
HVAC control module

TLS810x
TLS820x
TLS850x
…

Low quiescent current

TLS412x
…

High current, efficiency and integration

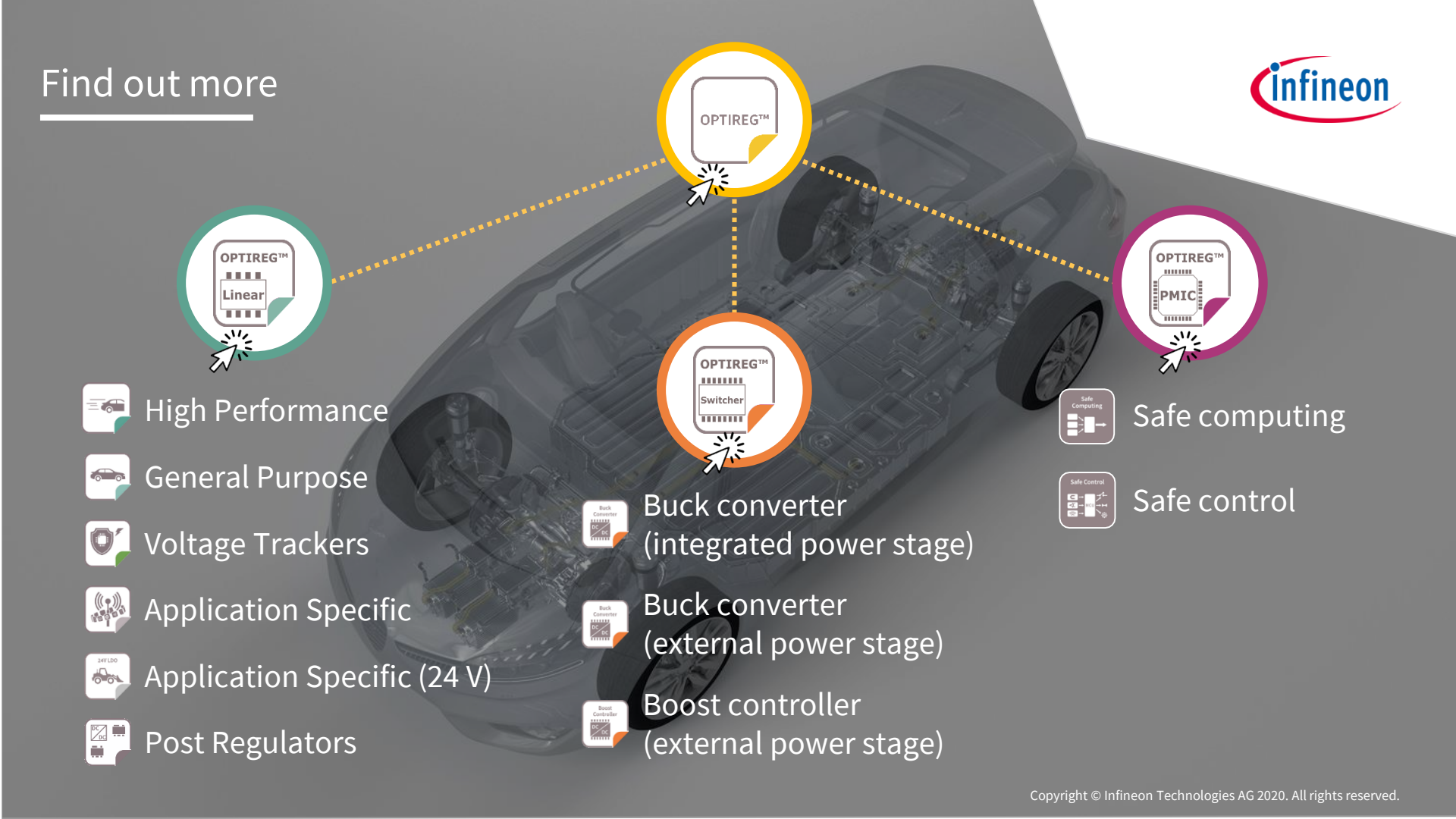


More info on:

Infineon's HVAC webpage

Click to RETURN

Find out more



- High Performance
- General Purpose
- Voltage Trackers
- Application Specific
- Application Specific (24 V)
- Post Regulators

- Buck converter (integrated power stage)
- Buck converter (external power stage)
- Boost controller (external power stage)

- Safe computing
- Safe control

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