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™?

Generic ECU in a car

- Power supply
- OPTIREG™
- μC
- Actuators
- Networking
- Sensors

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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

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

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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)
OPTIREG™ PMIC

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

Safe computing
Safe control

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

- Cameras
- HVAC
- Power distribution box
- EPS: radars & sensors
- LED front light
- Gateway
- Seat control
- Hydraulic control
- Body control module
Multi-purpose camera

**ADAS**
*Advanced Driver-Assistance System*

- Monitoring
- Warning
- Braking
- Steering

Small and effective thermal management solution required
Multi-purpose camera

- 2 – 2.5 A output current capability
- Integrated power stages
- Fully synchronous
- Minimum external components required
- Highly efficient
Functional safety (FuSa)
ASIL D required

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

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

FuSa features and capabilities

More info on:

Infineon’s multi-purpose camera webpage
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

Low quiescent current

High efficiency and various voltage/current ranges

More info on:

Infineon’s seat control webpage
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
Small leadless package with lead-tip inspection capability

Reduced number of external components

High switching frequency

Protection against shorts and reverse polarity events

Power management features for AURIX™ microcontroller

More info on:

Infineon’s automatic transmission webpage
Body control module
Body control module

- **TLS810x**
  - Low quiescent current

- **TLS820x**
  - High current, integration and efficiency

- **TLS850x**
  - Complex Watchdog (optional)

- **TLS50281x**

- **TLF35584**
  - High safety level

More info on:

Infineon’s BCM webpage

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Gateway

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

**Performance**

- Flexible power supply solution required

**PCB size**
Gateway

Low quiescent current

Complex Watchdog (optional)

High integration

More info on:

Infineon’s gateway webpage

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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**

- **TLF502x1**
- **TLF35584**
- **TLF30682**

**Low quiescent current**

**High safety and diagnostic features**

More info on:

Infineon’s LED front lighting webpage

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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

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Electric Power Steering

Infineon’s fail-operational EPS webpage

FuSa features and capabilities
Electric Power Steering

TLF35584

FuSa features and capabilities

Electric brake booster

More info on:

Infineon’s electric brake booster webpage

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Electric Power Steering

TLF35584

FuSa features and capabilities

Electric parking brake

More info on:

Infineon’s electric parking brake webpage
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

Low quiescent current

TLS8xx
TLS71x
TLF502x1
... OPTIGA®

High safety and diagnostic features

TLF50281
TLF35584
TLF30682
... OPTIGA®

More info on:

Infineon’s power distribution box webpage

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HVAC control module

- TLS810x
- TLS820x
- TLS850x
- TLS412x

More info on:

Infineon’s HVAC webpage
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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