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# Automotive Smart Power – Product Selector Guide 2023

Q1

# Automotive smart-power product catalogue **by functions**

| Motor control | Generic drivers | System power supply | Battery management ICs |
|---|---|---|---|
| H-bridge DC motor driver | Multi-output generic driver IC | LDO voltage regulator | Battery management system |
| BLDC motor control | Multi-channel HS/LS driver | Power Management IC and System Basis Chip | Battery cut-off |
| Stepper motor control | Valve drivers | | |

| Door zone ICs | Engine management systems | Electronic Parking Brake | Airbag Systems |
|---|---|---|---|
| Door zone | Engine management system | H-bridge DC motor pre-driver ICs for EPB | Automotive ICs for Airbag |
| Door lock | Alternator voltage regulator | | |

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# Motor control

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# Line card
# H-bridge DC motor driver

| L99H02 | L9960/T | L9959/T |
| --- | --- | --- |
| H-Bridge DC motor pre-driver designed to control 4 external N-channel MOS transistors in bridge configuration | Integrated H-bridge for resistive and inductive loads in Single and Dual output (one or two motors per device) with flexible driving control | Single and Dual integrated H-bridge for resistive and inductive loads with current feedback output |

| L99UDL01 |
| --- |
| Smart driver IC for multiple motor control, suitable for a wide range of applications including the centralized car lock with a single IC |

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# L99H02
# Automotive H-Bridge driver

## H-Bridge DC motor pre-driver designed to control 4 external N-channel MOS transistors in bridge configuration

### Features

#### Electrical parameters

- Operating supply voltage 6V to 28V
- PWM operation up to 30kHz
- Driving stage capability 0.5 A (source), 4 Ω (sink)
- 2-stages Charge Pump for optimum MOSFET drive down to 6V

#### Protections

- Control of reverse battery protection MOSFETs with embedded thermal sensors
- Programmable thermal, undervoltage, overvoltage protections

#### Outputs

- 1x Half Bridge or Full Bridge Gate Driver
- Current sensing amplifier

#### Diagnostics

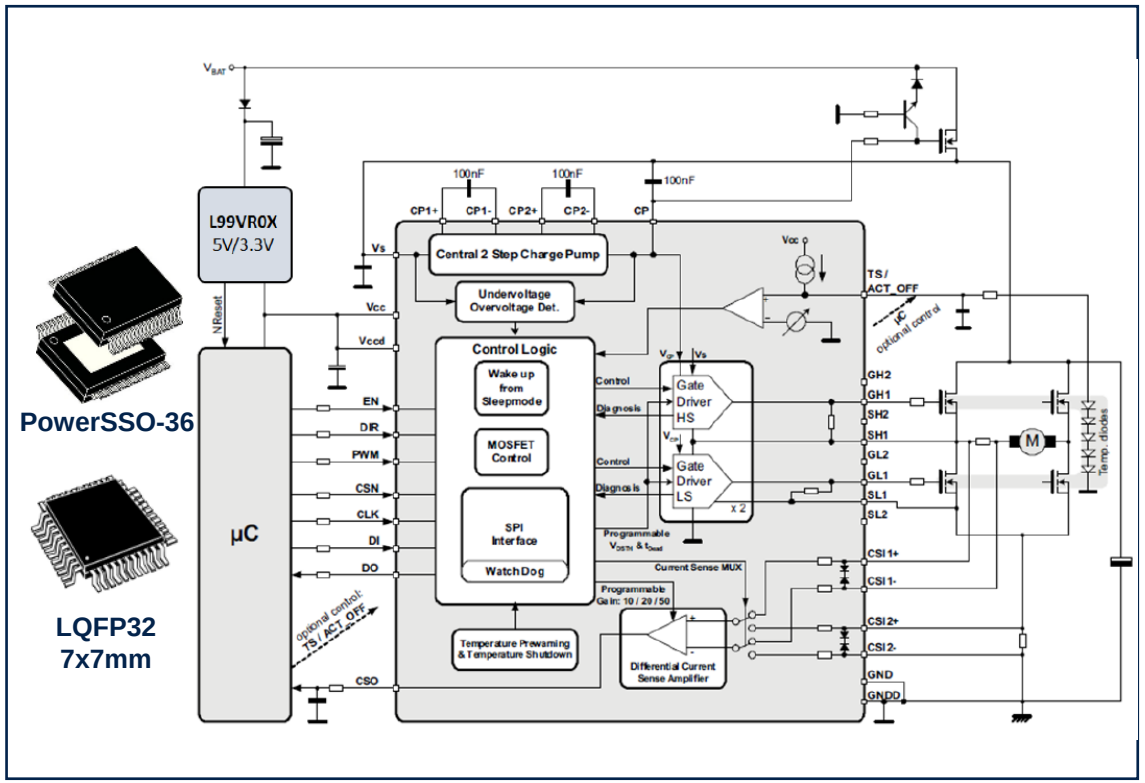
- Diagnostic information via SPI for all the outputs



PowerSSO-36



LQFP32
7x7mm



# L99H02
# Automotive H-Bridge driver

## A glance at possible applications:

| | | |
|---|---|---|
| Generic DC motor driving | Windscreen Wiper | Seat positioning |
| Power Doors | Park break | trailer brake controller |
| Window lift | Steering wheel | Seat Belt Pre-Tensioner |

## Key values

Flexible solution for DC motor driving adapting external power stage to different needs

- Free configurable current sense amplifier designed for current shunt
- Programmable cross current protection
- Four different free wheeling modes (2 active and 2 passive)

## Collaterals & Tools

Product page
Datasheet,
Application Note,
Evaluation Boards,
Eval-Boards UM & GUI,
Software GUI (for EVAL-L99H02QF)
Software GUI (for EVAL-L99H02XP)

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Find out more about L99H02 **H-bridge for brushed DC motor control** applications

# L9960/T
# Automotive H-bridge motor control

## Integrated H-bridge for resistive and inductive loads in Single and Dual output (one or two motors per device) with flexible driving control

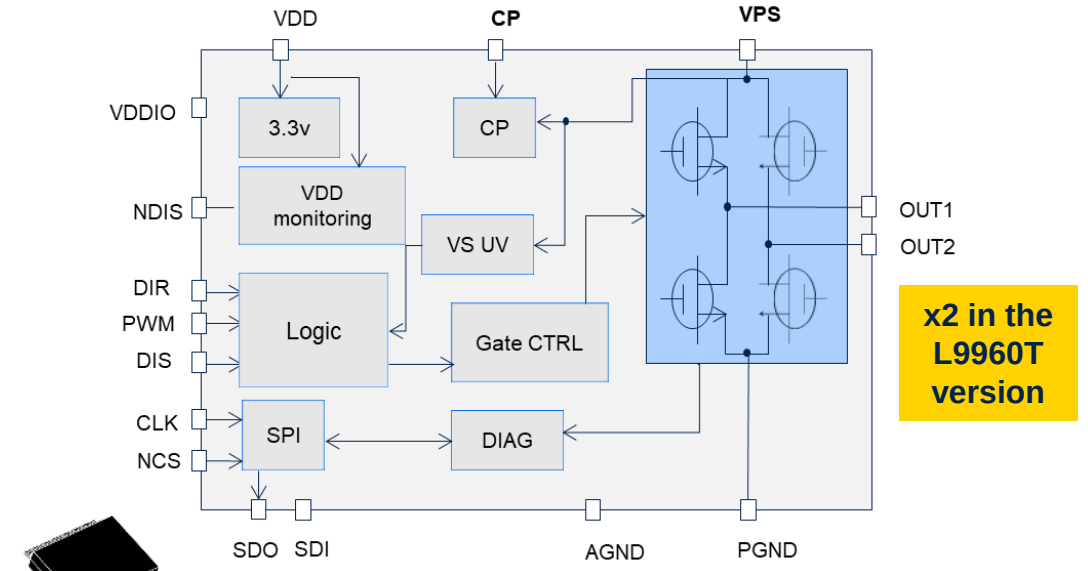
### Features

#### Electrical parameters
- Operating battery supply voltage from 4.5V up to 28V
- Operating VDD5 supply voltage from 4.5V to 5.5V
- Logic levels compatible to 3.3V and 5V
- PWM operation up to 20kHz

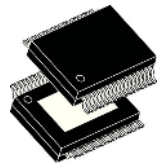
#### Protections
- Programmable current limitation and overcurrent thresholds
- Programmable thermal warning and shutdown thresholds
- Supply monitoring

#### Outputs
- 1x integrated H-bridge **(400mΩ full path)**
- Programmable current and voltage slew rates

#### Diagnostics
- Open load in ON state
- Off-state diag (OL, SCG, SCB)
- 16-bit serial peripheral interface for control and diagnosis




**x2 in the L9960T version**



**PowerSSO-36**

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# L9960/T
# Automotive H-bridge motor control

## A glance at possible applications:

| | | |
|---|---|---|
| Inductive/resistive loads (throttle control, valve control, etc.) | Seat positioning | Trunk lift |
| Wipers | Washer pump | Window lift |

Suitable for every **DC motor control** application taking benefit of state-of-the art automotive quality

## Key values

- Flexible driving strategy via configurable pins
- Selectable current/voltage slew rates for improved EMC performance
- ASIL-B solution compliant with ISO26262

## Collaterals & Tools

### L9960/T

- Product page: L9960, L9960T
- Datasheet
- Application note
- Selection guide: powertrain & safety, smart power for body
- Brochure

### EVAL-L9960/T

- Product page: EVAL-L9960, EVAL-L9960T
- Data brief
- User manual
- Board manufacturing specification
- Bill of material
- Schematics

### STSW-L9960/T

- Product page: STSW-L9960, STSW-L9960T
- Data brief
- User manual
- License agreement

Find out more about L9960/T **H-bridge for brushed DC motor control** applications

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# L9959/T
# Automotive H-bridge motor control

## Single and Dual integrated H-bridge for resistive and inductive loads with current feedback output

### Features

#### Electrical parameters
- Operating battery supply voltage from 5V up to 28V
- Operating VDD5 supply voltage from 4.5V to 5.5V
- Logic level 5V compatible
- PWM operation up to 11kHz

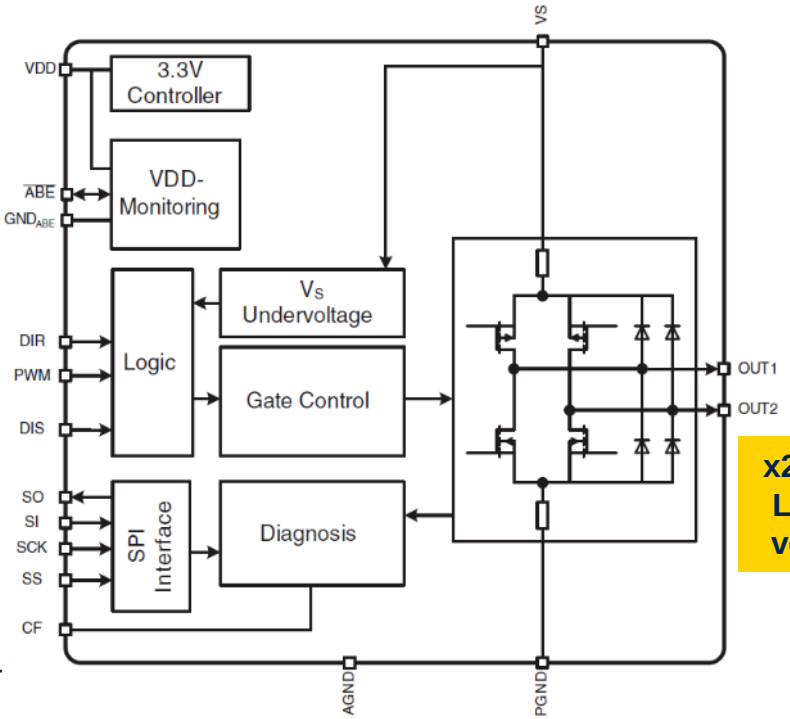
#### Protections
- Programmable current limitation and overcurrent thresholds
- Programmable thermal warning and shutdown thresholds
- Supply monitoring

#### Outputs
- 1x integrated H-bridge **(540mΩ full path)**
- Programmable current and voltage slew rates

#### Diagnostics
- Current feedback
- Open load in ON state
- Off-state diag (OL, SCG, SCB)
- 16-bit serial peripheral interface for control and diagnosis

**PowerSSO-36**

**PowerSSO-24**




**x2 in the L9959T version**



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# L9959/T
# Automotive motor H-bridge driver

## A glance at possible applications:

| | | |
|---|---|---|
| Inductive/resistive loads (throttle control, valve control, etc.) | Seat positioning | Trunk lift |
| Wipers | Washer pump | Window lift |

Suitable for every **DC motor control** application taking benefit of state-of-the art automotive quality

## Key values

| | | |
|---|---|---|
| Flexible driving strategy via configurable pins | Current sensing monitoring and feedback on analog output | Improved PCB footprint design vs different target application |

## Collaterals & Tools

Product page: L9959, L9959T
datasheet,
application note,
selection guidelines,
brochure

Find out more about L9959/T **H-bridge for brushed DC motor control** applications

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# L99UDL01
# Automotive multichannel motor control – universal door lock

**Smart driver IC for multiple motor control, suitable for a wide range of applications including the centralized car lock with a single IC**

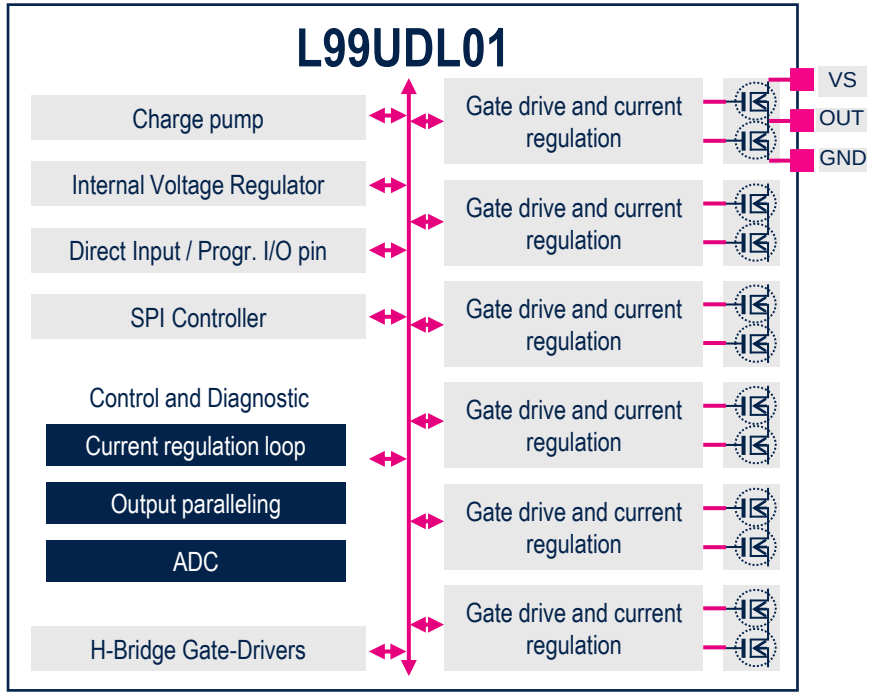
## Features

### Electrical parameters
- Extended Operating Range 5V to 26V
- Junction Temperature from -40ºC to 150ºC

### Protections
- Overload for all outputs
- Shorted and open load detection, also in off state
- Drain-source voltage monitoring for external FETs

### Outputs
- 6x Half Bridge Driver **(90mΩ)**
- 2x External Half Bridge Drivers
- Current regulation loops for each HS/LS switch
- Mechanism for paralleling up to 2x3 outputs

### Diagnostics
- Open load detection for all the outputs
- Digital current monitor 10-bit resolution via SPI
- Emergency mode overriding built-in protections

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# L99UDL01
# Automotive multichannel motor control – universal door lock

## A glance at possible applications:

Every kind of application requiring multiple smart motor control as well as:

Centralized door lock

Vending machines

## Key values

### Integration concept

Provide an IC that can control all door lock configurations using a minimum of external components

### Reduce peak currents

Reduces the power requirements in wiring, circuit board and silicon, improving system reliability level

### Multiple Motor Smart Control

Closed loop current control, output paralleling mechanism, serial control, full set of protection and diagnostics makes the device ideal also in multiple motor control applications

## Collaterals & Tools

### L99UDL01

- Product page
- Datasheet
- Selection guide: smartpower for body
- Brochure
- Flyer

### EVAL-L99UDL01

- Product page
- Data brief

### STSW-L99UDL01

- Product page
- Data brief
- User manual
- License

# Line card
# BLDC motor control

| L9908 | L9907 | L99ASC03 |
| --- | --- | --- |
| 3-phase gate driver unit (GDU) for controlling 6 N-channel FETs for brushless motors | 3 phase gate driver for 6 steps or FOC controlled brushless motors compatible with 48V NET | BLDC 3-phase motor pre-driver featuring a voltage regulator for MCU power supply and an operation amplifier for motor current sensing |

# L9908

# Automotive 3-phase motor gate driver unit

## 3-phase gate driver unit (GDU) for controlling 6 N-channel FETs for brushless motors

## Features

### Electrical parameters

- VDH motor supply voltage range from 4.5 V to 75 V for working in single (12 V systems), double (24 V systems) and 48 V battery applications
- 3.3 V internal supply voltage generated from 5 V on VDD pin
- Digital I/O compatible to 3.3 V/5 V logics

### Protections

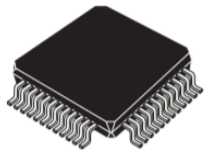
- Open load, short to GND and short to battery diagnostic in off-state
- VDD, VDH, VBP (over-voltage and under-voltage diagnostic)
- FET driver supply VPRE and VCP( under-voltage and over-voltag) diagnostic
- Full ISO26262 compliant, ASIL-D systems ready

### Outputs

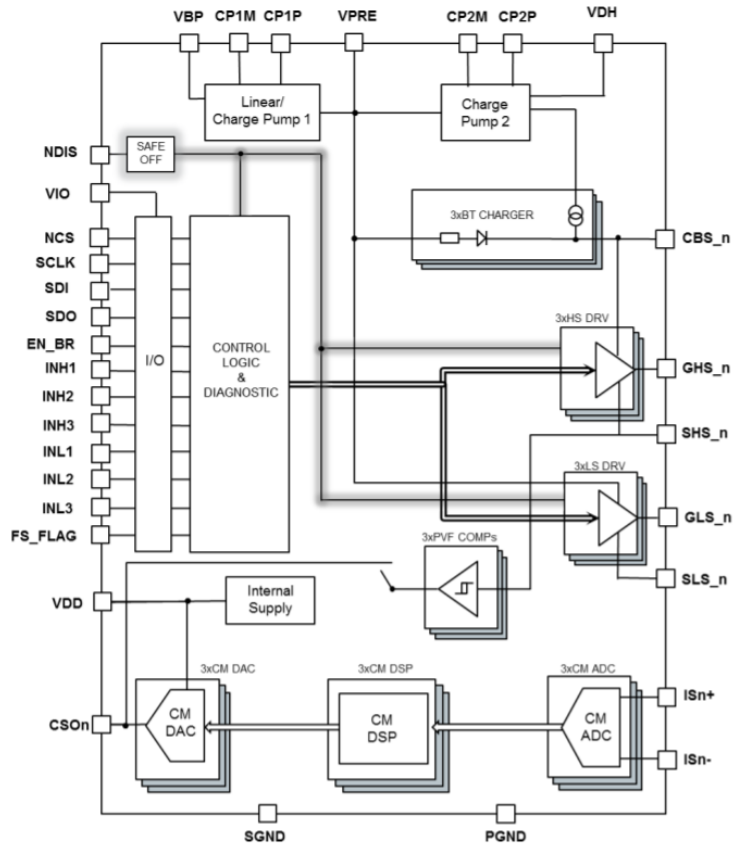
- 6 separate N-channel FET pre-drivers (0% to 100% duty cycle operation support, dedicated PWM input pin for each gate driver)
- 3 differential high accuracy current monitors for ground referred current measurements
- 3 real time phase voltage monitor channels

### Diagnostics

- 32-bit - 10 MHz SPI interface with 5-bit CRC
- SPI programmable: VDS diagnostic and protection in on-state, Dead Time protection, Shoot-through diagnostic and protection
- Over-temperature diagnostic and protection with SPI programmable warning flag
- SPI Window Watchdog
- Fault status flag output



**TQFP48**
**(exposed pad down)**



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# L9908
# Automotive 3-phase motor gate driver unit

## A glance at possible applications:

Suitable for every **BLDC motor control** application leveraging outstanding high quality and robust solutions

| | | |
|---|---|---|
| Generic BLDC motor driving | Electric blower/ snowblower | E-scooter traction |
| Electric motorbike | 48V start and stop system | Electric forklift |
| Electric brake booster | 48V Electric super charger | Electric power steering |

## Key values

**Flexible and programmable**

SPI parameter setting and full diagnostic availability

**Supporting electrification requirement**

Of high-efficient BLDC driven applications

**ASIL-D solution**

Full compliant with ISO26262

## Collaterals & Tools

### L9908

- Product page
- Datasheet
- Application note

### EVAL-L9908

- Product page
- Data brief
- User manual
- Bill of material
- Schematics

### STSW-L9908

- Product page
- Data brief
- License agreement
- User manual

Find out more about L9908 **motor driver IC for BLDC motor driving** applications

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# L9907
# Automotive gate driver for 3 phase BLDC motors

## 3 phase gate driver for 6 steps or FOC controlled brushless motors compatible with 48V NET

## Features

### Electrical parameters

- Supply voltage from 4.2V to 54V (60V 1hr)
- For 12V, 24V, 48V battery applications
- PWM operation up to 20 kHz
- Adjustable gate driver current via SPI (max 600 mA)

### Protections

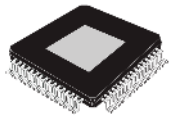
- Floating current sense amplifiers with SPI selectable amplifier gain and output offset voltage level
- Power MOSFET drain to source voltage drop measurement for overcurrent protection

### Outputs

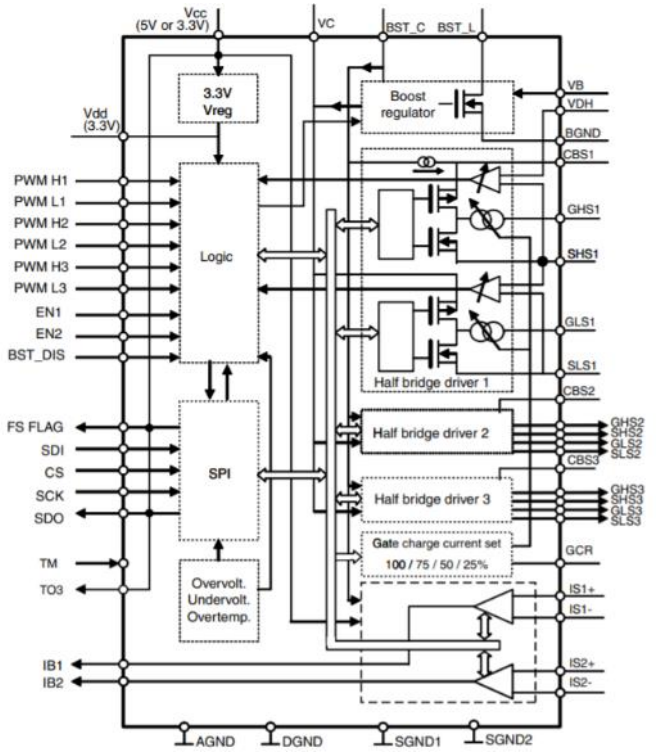
- 3 Low-Side & High-Side drivers
- Withstand -7V to 90V at the FET high-side driver pins
- 2x current sense 3.3/5V compatible

### Diagnostics

- Full diagnostic through 8MHz 32-bit SPI
- Over-temperature diagnostic and shut-down, programmable deadtime, drain-source monitoring
- Status flag



**LQFP64**
**(exposed pad up)**



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# L9907
# Automotive gate driver for 3 phase BLDC motors

## A glance at possible applications:

Suitable for every **BLDC motor control** application leveraging outstanding high quality and robust solutions

| | | |
|---|---|---|
| Generic BLDC motor driving | Electric blower/ snowblower | E-scooter traction |
| Electric motorbike | 48V start and stop system | Electric forklift |
| Electric brake booster | 48V Electric super charger | Electric power steering |

## Key values

**Flexible and programmable**

SPI parameter setting and full diagnostic availability

**Supporting electrification requirement**

Of high-efficient BLDC driven applications

**ASIL-D solution**

Full compliant with ISO26262

## Collaterals & Tools

### L9907

- Product page
- Datasheet
- Application note: supply voltage configuration
- Brochure

### EVAL-L9907

- Product page
- Data brief
- Application note: supply voltage configuration
- User manual
- Bill of material
- Schematics

### STSW-L9907

- Product page
- Data brief
- License agreement
- User manual

SPC5 motor control tool kit **FOC LIBRARY**

Find out more about L9907 **motor driver IC for BLDC motor driving** applications

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# L99ASC03G

## Automotive multifunctional system IC for 3-phase motor control

**BLDC 3-phase motor pre-driver featuring a voltage regulator for MCU power supply and an operation amplifier for motor current sensing**

## Features

### Electrical parameters

- Operating voltage range: 6V to 28V
- Very low current consumption in standby mode (<15 µA)
- PWM operation up to 80 kHz

### Protections

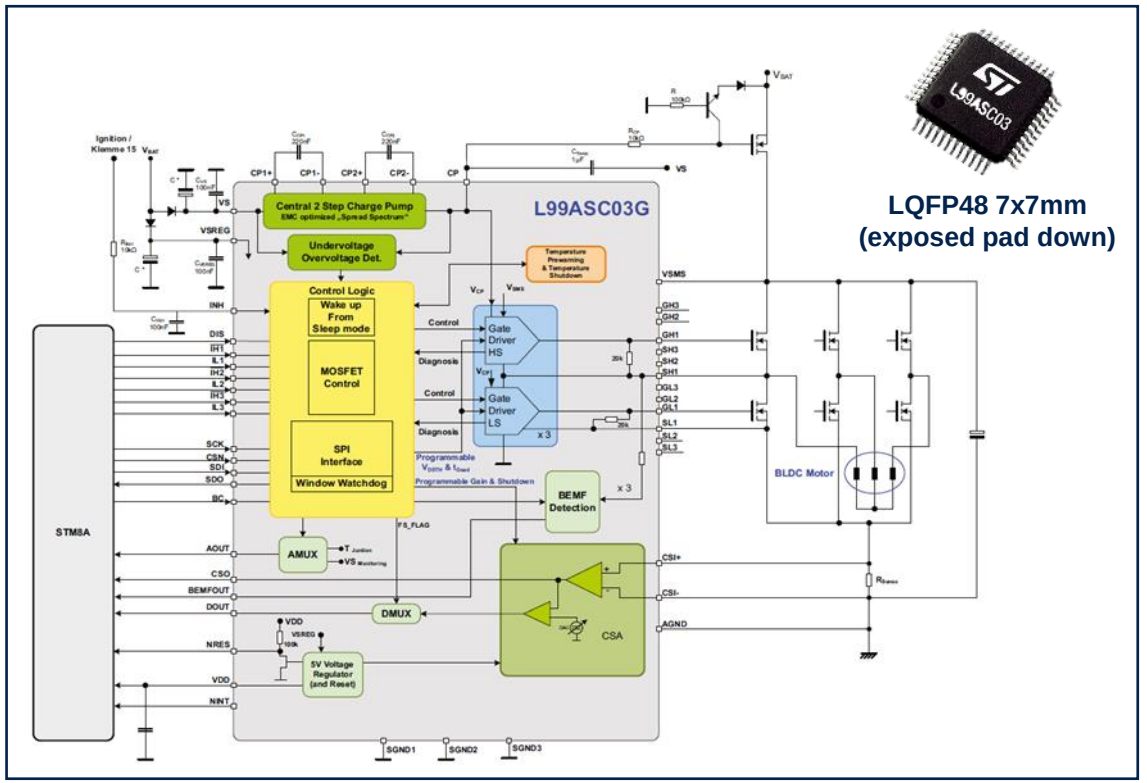
- Fail-safe functionality
- Analog multiplexer output to monitor external power supply voltages and junction temperature
- Programmable overcurrent protection
- Open load detection

### Outputs

- 3x Half Bridge configurable Drivers
- 1x LDO Regulator 5V (200mA continuous mode)

### Diagnostics

- SPI interface for control and diagnostics
- Back-EMF diagnostic
- Drain-source monitoring
- Open-load detection

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# L99ASC03G

# Automotive multifunctional system IC for 3-phase motor control

## A glance at possible applications:

Suitable for every **BLDC motor control** application leveraging outstanding high quality and robust solutions

| | | |
|---|---|---|
| Generic BLDC motor driving | HVAC blower fans | Water pumps |
| Oil pumps | Fuel pumps | Window lift |
| Twin Clutch Control | Engine cooling fans | |

## Key values

- Advanced BEMF diagnostic for sensor-less applications
- Full drive of external MOSFETs down to 6 V input voltage
- Window watchdog and fail-safe functionality

## Collaterals & Tools

### L99ASC03

- Product page
- Datasheet
- Application note: current sense amplifier offset, PMBLDC sensorless
- Selection Guide: powertrain&safety, smartpower for body
- Brochure

### EVAL-L99ASC03

- Product page
- Data brief

### STSW-L99ASC03

- Product page
- Data brief
- License agreement
- User manual

Find out more about L99ASC03 **motor driver IC for BLDC motor driving** applications

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# Line card
# **Stepper motor control**

| L99SM81 | L99MD01 | L9942 |
| --- | --- | --- |
| Programmable 2-phase stepper motor with micro-stepping and stall detection | Octal Half Bridge driver with SPI control for brushed DC and stepper motors | Bipolar stepper motor control with micro-stepping and programmable current profile |

# L99SM81
# Automotive Stepper motor driver

## Programmable 2-phase stepper motor with micro-stepping and stall detection

### Features

#### Electrical parameters

- Operating voltage: 6V to 28V
- Motor current capability up to 1.35 A
- Rdson = 0.7Ω typ @ 25°C (1.3Ω max @150°C)
- Very low current consumption in standby (typ. 10µA) mode (typ. 10µA)

#### Protections

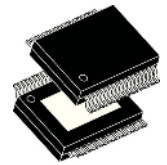
- Open load, short to battery, short to ground
- 1x programmable analog output for Tj measurement or band-gap reference
- Thermal warning and shutdown

#### Outputs

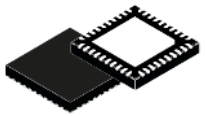
- 1x programmable analog output for Tj measurement or band-gap reference
- 2x programmable digital outputs for PWM ON duty cycles, error signals, coils voltage measurement

#### Diagnostics

- Integrated ADC for coil voltage measurement and stall detection
- ST SPI 4.1 interface for control and
- diagnostics



PowerSSO-36



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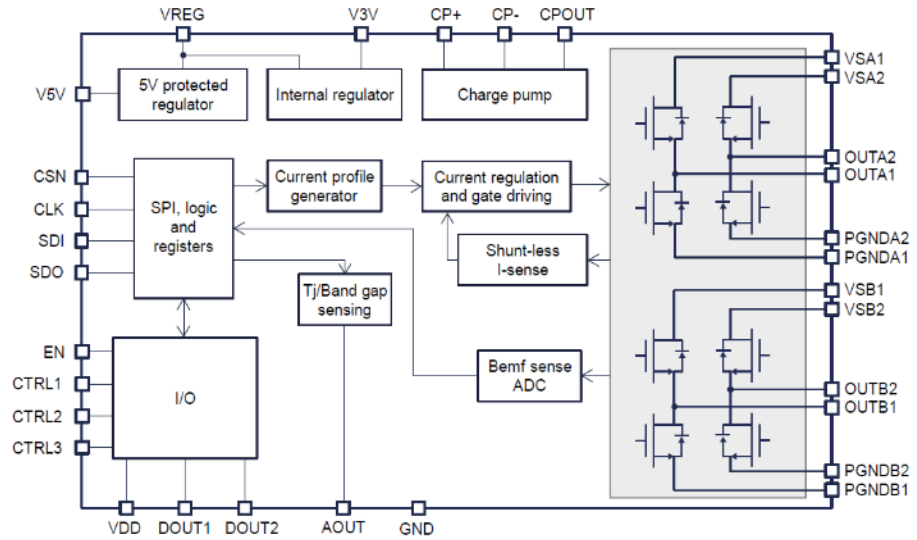




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# L99SM81
# Automotive Stepper motor driver

## A glance at possible applications:

| | | |
|---|---|---|
| Generic stepper motor driving | Head-up display | Control valves |
| Active suspension | HVAC | Idle speed control |
| Rotating antenna | Front lighting control | |

## Key values

- Programmable step modes: full-step, half-step, mini-step, 1/8 micro step, 1/16 micro step
- Programmable decay modes: slow-mode, mixed-mode, 2x automatically selected modes
- Back electromotive force (BEMF) approach for motor speed readout

## Collaterals & Tools

### L99SM81

- Product page
- Datasheet
- Application note
- Selection guide
- Flyer
- Brochure

### EVAL-L99SM81xx

- EVAL-L99SM81VQ product page
- EVAL-L99SM81VQ: Datasheet
- EVALIL99SM81VY product page
- EVAL-L99SM81VY: Datasheet

### STSW-L99SM81

- Product page
- Data brief
- License agreement
- User manual

Find out more about L99SM81 **stepper motor driver for motor control** applications

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# L99MD01
# Automotive octal Half Bridge motor control

## Octal Half Bridge driver with SPI control for brushed DC and stepper motors

### Features

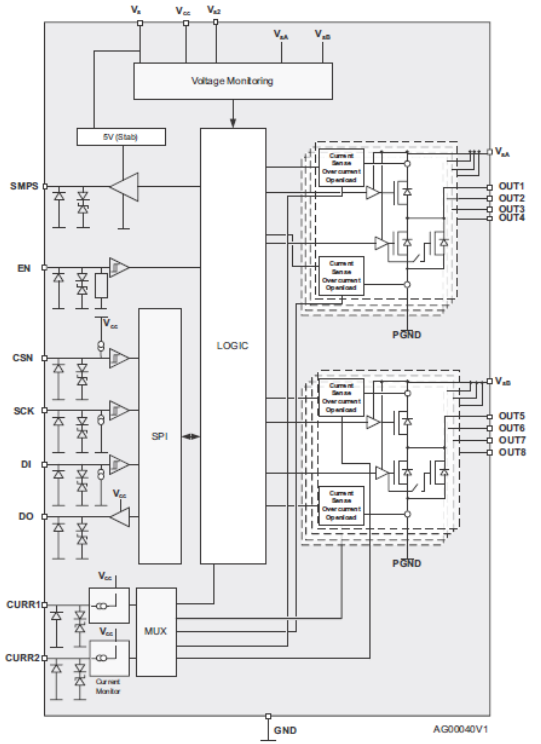
#### Electrical parameters
- Operating voltage range 6V to 18V
- Compatible with 5V and 3.3V logic
- Very low current consumption in standby mode typ. 5uA

#### Protections
- Over-current, short-circuit protection for all outputs
- Over-temperature shutdown
- Thermal pre-warning
- Cross-current protection for all outputs

#### Outputs
- 8x Half Bridges (**HS: 0.9Ω, LS 0.64Ω,** typ. @Tj=25°C)
- Current limit of each output at min 0.8A

#### Diagnostics
- Open load and overload detection
- Control and diagnostic through SPI

**PowerSSO-36**



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# L99MD01
# Automotive octal Half Bridge motor control

## A glance at possible applications:

- Generic brushed DC and stepper motor driving
- HVAC applications
- Flaps control

## Key values

- Driver for DC motors and stepper motors control, also, in mixed combination
- Monitoring system of the instantaneous current flowing in the selected half-bridge
- Internal switched mode power supply (SMPS) driver implementing spread spectrum technique

## Collaterals & Tools

Product page
Datasheet,
Technical note: SPI protocol,
Selection guide,
Brochure

Find out more about L99MD01 **stepper motor driver for motor control** applications

# L9942
# Integrated stepper motor control

## Bipolar stepper motor control with micro-stepping and programmable current profile

### Features

#### Electrical parameters

- Operating battery supply from 7V up to 20V
- Operating VCC supply from 3V to 5.3V
- Very low current consumption in standby mode IS < 3 µA, typ. Tj < 85 °C
- Current regulation via PWM integrated controller and waveform programmable with look-up table

#### Protections

- All outputs short circuit protected with open load, overload current, temperature warning and thermal shutdown

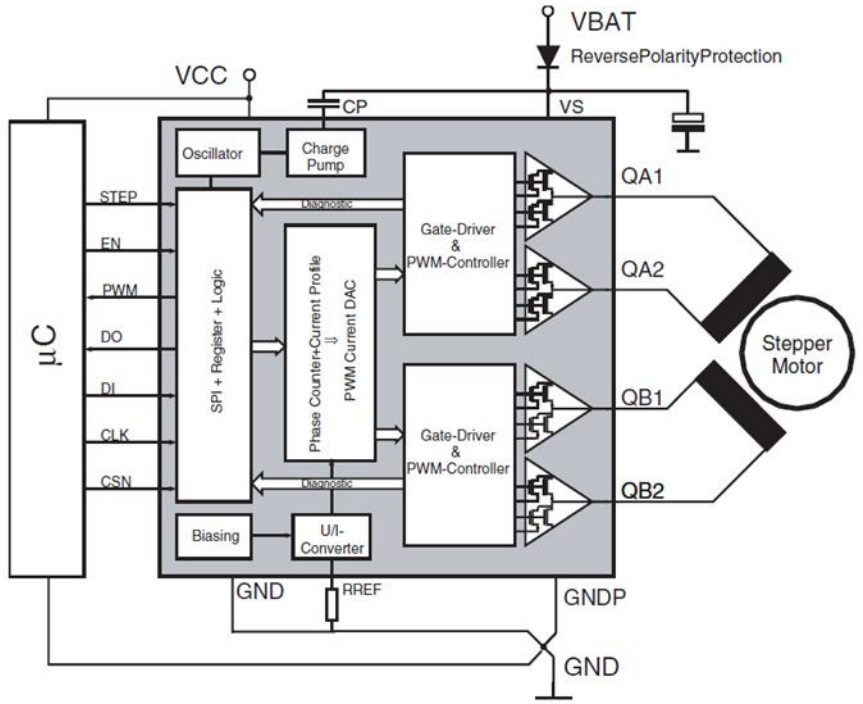
#### Outputs

- 2x Full bridges (**500 mΩ max. 1.3A**)

#### Diagnostics

- 16-bit SPI for parameter settings and diagnosis

**PowerSSO-24**



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# L9942
# Integrated stepper motor control

## A glance at possible applications:

- Mirror adjustment
- Adaptive front Lighting
- Sunroof
- Tachometer
- Air conditioning flaps
- Gym bike

## Key values

Current profile **slew rate programmability** for best trade-off EMC and power dissipation

**Optimized BOM** with embedded functionalities reducing MCU workload

**Stall detection** programmable threshold, minimizing the noise during alignment process

## Collaterals & Tools

### L9942

- Product page
- Datasheet
- Application note: back EFM stall detection algorithm, stepper motor driver for bipolar motor
- Technical article: thermal design calculations
- Brochure

### EVAL-L9942

- Product page
- Data brief
- User manual, graphical interface
- Board manufacturing specification
- Bill of material
- Schematics

### STSW-L9942

- Product page
- Data brief
- License agreement

Find out more about L9942 **stepper motor driver for motor control** applications

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# “If only

**I could find out more about motor control**

**This is where we come in**

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# Generic drivers

# Line card
# Multi-output generic driver ICs

| L99MOD50XP | L99MOD51XP | L99MOD53XP |
|---|---|---|
| Microcontroller-driven multifunctional actuator IC with embedded 6 Half-Bridge & 5 High-Side drivers | Microcontroller-driven multifunctional actuator IC with embedded 3 Half-Bridges & 2 High-Side drivers | Microcontroller-driven multifunctional actuator IC with embedded 5 Half-Bridge & 3 High-Sides drivers |

| L99MOD54XP | L99UDL01 |
|---|---|
| Microcontroller-driven multifunctional actuator IC with embedded 3 Half-Bridge & 3 High-Side drivers | Smart driver IC for multiple motor control, suitable for a wide range of applications including the centralized car lock with a single IC |

# L99MOD50XP
# Multi-purpose/multi-output IC for automotive

## Microcontroller-driven multifunctional actuator IC with embedded 6 Half-Bridge & 5 High-Side drivers

### Features

#### Electrical parameters

- Max operating voltage 28V
- Very low consumption in stand-by mode $I_S$ < 6 µA typ; Tj ≤ 85 °C

#### Protections

- Over-current protection for all outputs
- Over- and Under-Voltage shutdown
- Thermal Shutdown
- Cross Current protection for half bridges
- Charge Pump output for reverse polarity protection

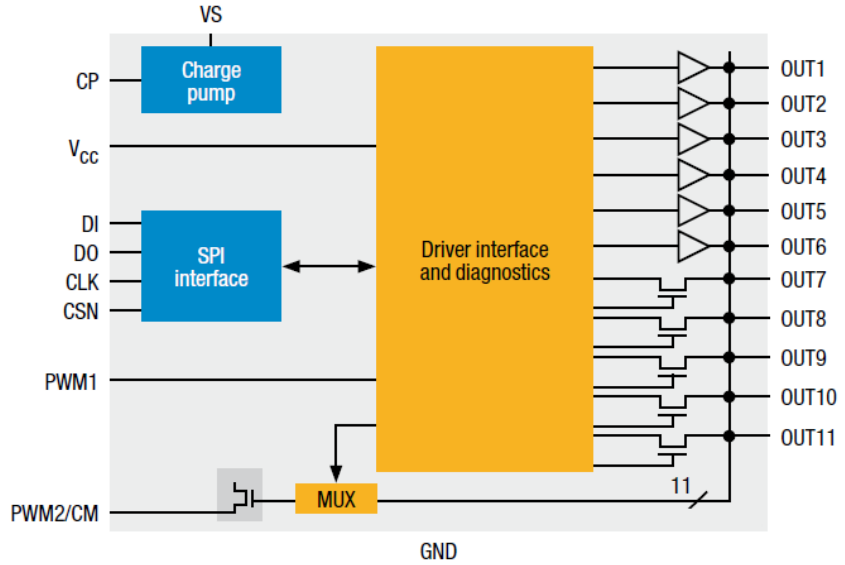
#### Outputs

- 2x Half-Bridge for 6A load (**150mΩ**);
- 2x Half-Bridge for 3A load (**300mΩ**);
- 2x Half-Bridge for 0.75A load (**1.6Ω**);
- 1x High-Side for 6A (**90mΩ**);
- 2x High-Side for up to 1.5A (**500mΩ**);
- 2x High-Side for 0.5A (**1.6Ω**);
- Programmable soft-start for all outputs

#### Diagnostics

- Open-load detection via SPI for all outputs
- Temperature Warning
- Multiplexed current monitor for all High-Side Drivers and selected Half-Bridge
- PWM control of all outputs

**PowerSSO-36**



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# L99MOD51XP
# Multi-purpose/multi-output IC for automotive

## Microcontroller-driven multifunctional actuator IC with embedded 3 Half-Bridges & 2 High-Side drivers

### Features

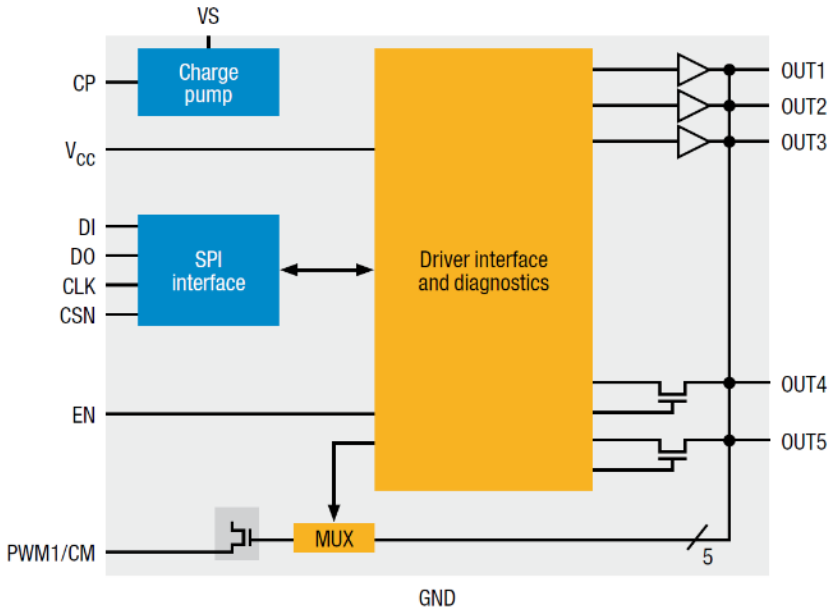
#### Electrical parameters
- Max operating voltage 28V
- Very low consumption in stand-by mode $I_S$ < 3 µA typ Tj ≤ 85 °C

#### Protections
- Overload for all outputs
- Over- and Under-Voltage shutdown
- Thermal Shutdown
- Cross-current protection for half-bridges
- Charge Pump output for reverse polarity protection

#### Outputs
- 1x Half-Bridge for 7.4A load (**150mΩ**);
- 2x Half-Bridge for 5A load (**200mΩ**);
- 2x High-Side  for 1.25A (**800mΩ**);
- Programmable soft-start for all outputs
- PWM control of all the outputs

#### Diagnostics
- Open-load detection via SPI for all the outputs
- Temperature Warning
- Multiplexed current monitor for all outputs

**PowerSSO-36**



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# L99MOD53XP
# Multi-purpose/multi-output IC for automotive

## Microcontroller-driven multifunctional actuator IC with embedded 5 Half-Bridge & 3 High-Sides drivers

### Features

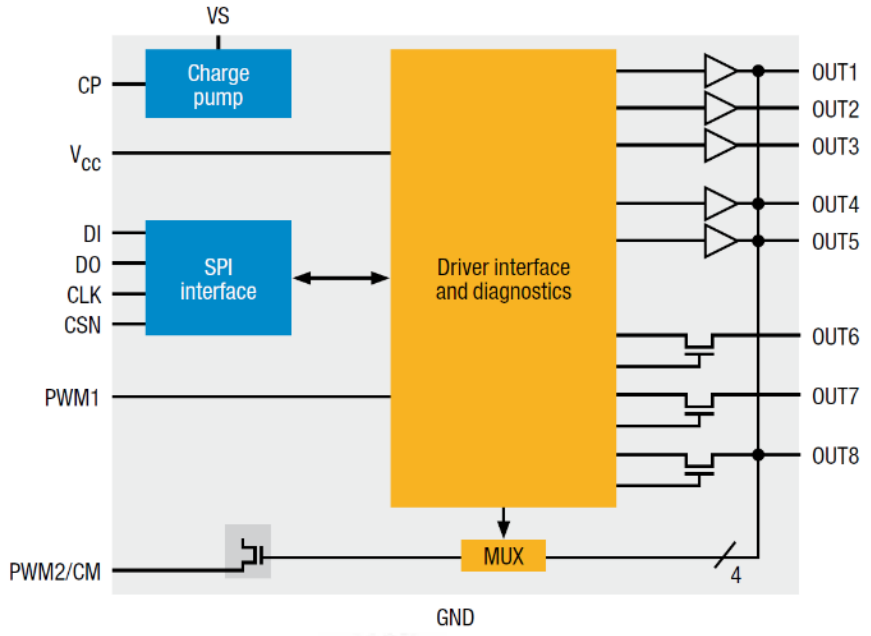
#### Electrical parameters
- Max operating voltage 28V
- Very low consumption in stand-by mode $I_S$ < 6 µA typ Tj ≤ 85 °C

#### Protections
- Overload for all outputs
- Over- and Under-Voltage shutdown
- Thermal Shutdown
- Cross-current protection for half-bridges
- Charge Pump output for reverse polarity protection

#### Outputs
- 2x Half-Bridge for 6A loads (**150mΩ**)
- 3x Half-Bridge for 0.75A loads (**1.6Ω**)
- 2x High-Side for 1.5A load (**500mΩ**)
- 1x High-Side for 6A load (**100mΩ**)
- Programmable soft-start for all outputs
- PWM control of all the outputs

#### Diagnostics
- Open-load detection via SPI for all outputs
- Temperature Warning
- Multiplexed current monitor for selected outputs

PowerSSO-36



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# L99MOD54XP
# Multi-purpose/multi-output IC for automotive

## Microcontroller-driven multifunctional actuator IC with embedded 3 Half-Bridge & 3 High-Side drivers

### Features

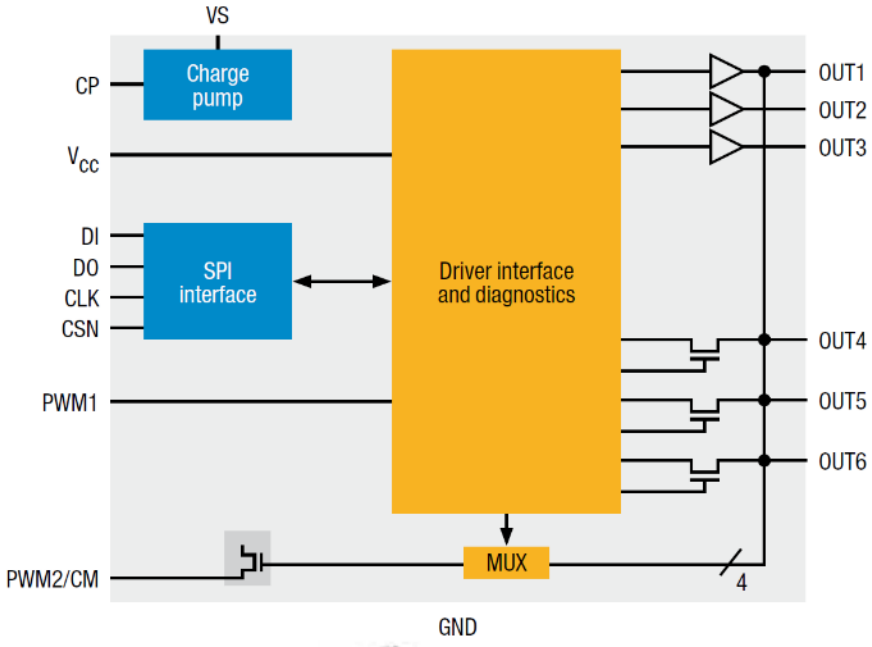
#### Electrical parameters
- Max operating voltage 28V
- Very low consumption in stand-by mode $I_S$ < 6 µA typ Tj ≤ 85 °C

#### Protections
- Overload for all outputs
- Over- and Under-Voltage shutdown
- Thermal Shutdown
- Cross-current protection for half-bridges
- Charge Pump output for reverse polarity protection

#### Outputs
- 3x Half-Bridge for 0.75A loads (**1.6Ω**)
- 2x High-Side for up to 1.5A load (**0.5Ω)**
- 1x High-Side for 6A load (**100mΩ**)
- Programmable soft-start for all outputs
- PWM control of all the outputs

#### Diagnostics
- Open-load detection via SPI for all outputs
- Temperature Warning
- Multiplexed current monitor for all High-Side Drivers and selected Half-Bridge

**PowerSSO-36**



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# L99MOD5xXP
# Multi-purpose/multi-output driver for automotive

## A glance at possible applications:

Every kind of mix of load such as DC motor, bulbs, LED strings, relay drivers…

Bulbs/LEDs
Sensors/cameras

Breakthrough solution suitable for new E/E architecture requirements

## Key values

**Integration concept**

Enables minimization of module current consumption and I/O pins reduction

**Multiple target applications**

Housing on a single IC multiple half bridges, high-side and bridge drivers for external FET targeting a wide range of body applications

**Flexible and programmable**

SPI parameter setting and full diagnostic availability

## Collaterals & Tools

### L99MOD5xXP

- L99MOD50XP – Product page, Datasheet
- L99MOD51XP – Product page, Datasheet
- L99MOD54XP – Product page, Datasheet
- L99MOD53XP – Product page, Datasheet

### EVAL-L99MOD50XP

- Product page
- Data brief
- User manual

### STSW-L99MOD5xXP

- Product page
- Data brief
- User manual
- License

# L99UDL01
# Automotive multichannel motor control – universal door lock

**Smart driver IC for multiple motor control, suitable for a wide range of applications including the centralized car lock with a single IC**

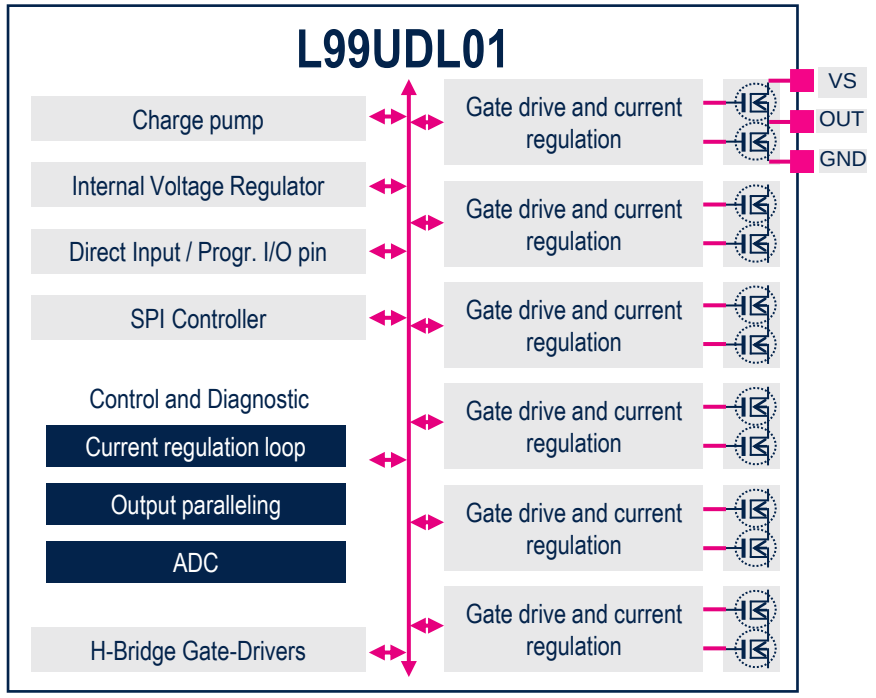
## Features

### Electrical parameters
- Extended Operating Range 5V to 26V
- Junction Temperature from -40ºC to 150ºC

### Protections
- Overload for all outputs
- Shorted and open load detection, also in off state
- Drain-source voltage monitoring for external FETs

### Outputs
- 6x Half Bridge Driver **(90mΩ)**
- 2x External Half Bridge Drivers
- Current regulation loops for each HS/LS switch
- Mechanism for paralleling up to 2x3 outputs

### Diagnostics
- Open load detection for all the outputs
- Digital current monitor 10-bit resolution via SPI
- Emergency mode overriding built-in protections

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# L99UDL01
# Automotive multichannel motor control – universal door lock

## A glance at possible applications:

Every kind of application requiring multiple smart motor control as well as:

Centralized door lock

Vending machines

## Key values

### Integration concept

Provide an IC that can control all door lock configurations using a minimum of external components

### Reduce peak currents

Reduces the power requirements in wiring, circuit board and silicon, improving system reliability level

### Multiple motor smart control

Closed loop current control, output paralleling mechanism, serial control, full set of protection and diagnostics makes the device ideal also in multiple motor control applications

## Collaterals & Tools

### L99UDL01

- Product page
- Datasheet
- Selection guide: smartpower for body
- Brochure
- Flyer

### EVAL-L99UDL01

- Product page
- Data brief

### STSW-L99UDL01

- Product page
- Data brief
- User manual
- License

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# Line card
# Multichannel high/low side drivers

| L9826 | L9651 | L9301 |
|---|---|---|
| 8-channel Low-Side driver IC compatible with resistive and inductive loads | Low ohmic 4-channels Low-Side driver with serial diagnostic interface | Configurable 8 Low-Side driver or 4 Low-Side & 4 High-Side driver with independent control and diagnostics |

| L9026 | L9945 | L99MC6GJ |
|---|---|---|
| 8-channel IC with 2 fixed HS drivers and 6 configurable HS/LS drivers compatible with resistive, inductive and capacitive loads | 8-channel fully configurable MOSFET pre-driver complying with 12V up to 24V battery systems | Automotive configurable 6-channel driver |

# L9826
# Automotive Octal Low-Side driver

## 8-channel Low-Side driver IC compatible with resistive and inductive loads

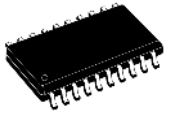
### Features

#### Electrical parameters
- Digital supply voltage compatible with 5V microcontroller
- 50V clamping for inductive loads

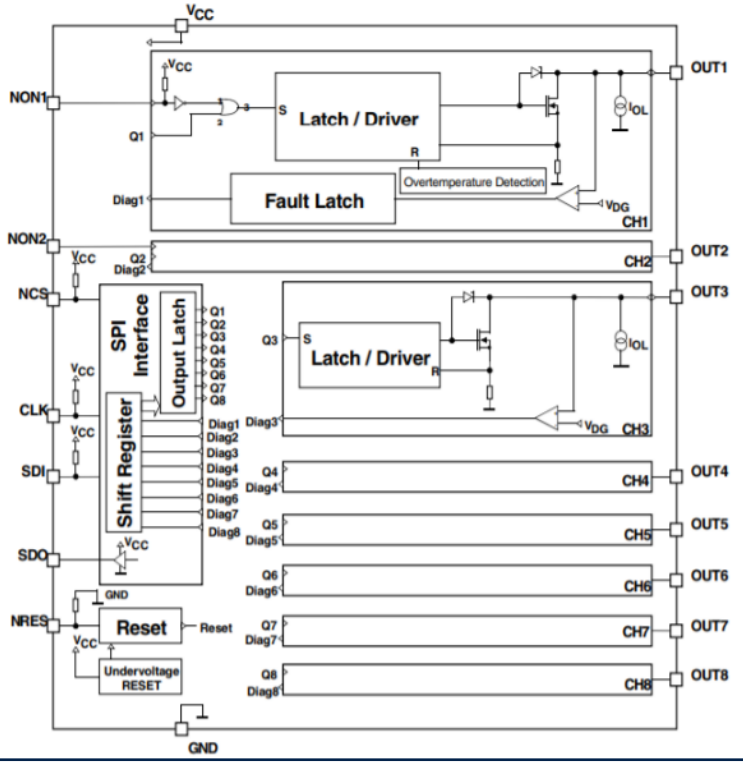
#### Protections
- Overcurrent and short circuit shutdown for Out 3 to 8
- Short circuit current limitation and thermal shutdown on Out1 & 2
- Out 1 & 2 Bulb inrush mode (BIM)

#### Output
- 8x Low-Side Driver (**1.5Ω, max 450mA**)
- SPI control on all outputs, Out1 and Out2 controlled through parallel inputs

#### Diagnostics
- 8-bit serial peripheral interface for control and diagnosis



SO-20



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# L9826
# Automotive Octal Low Side driver

## A glance at possible applications:

- Bulbs
- Small motors
- Resistive loads
- Capacitive loads
- Relays

## Key values

- Embedding a set of features perfectly sized for small loads driving in low side configuration
- Achieving design optimization with a Solution securing minimized BOM
- Versatile device using in harsh environment using inside and outside transportation applications

## Collaterals & Tools

Product page
Datasheet
Selection guides: powertrain & safety, smartpower for body

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# L9651
# Automotive Quad solenoid driver

## Low ohmic 4-channels Low-Side driver with serial diagnostic interface

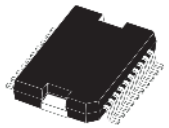
### Features

#### Electrical parameters
- Supply voltage from 6.5V to 25V
- Clamping Voltage 70V (typ) for fast inductive loads switching

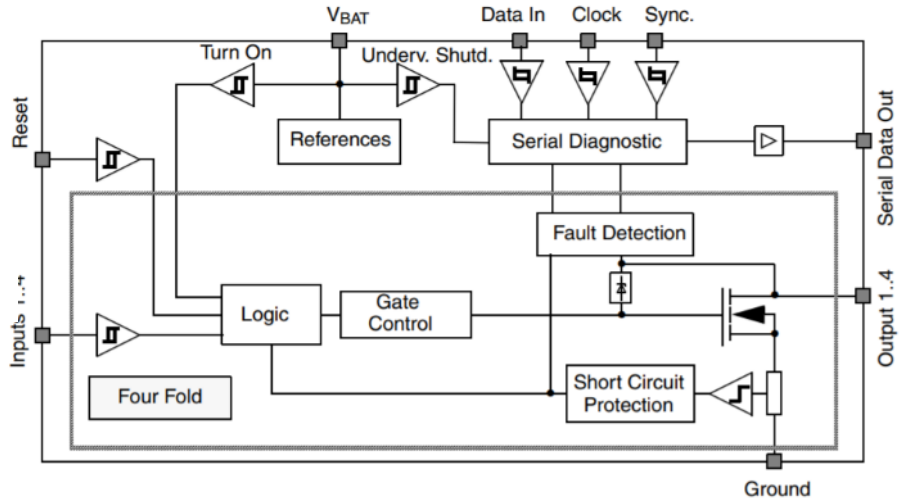
#### Protections
- Short Circuit Protection
- Over temperature Protection

#### Outputs
- 4x Low-Side drivers (**500mΩ**)
- Output controlled by paralleled inputs

#### Diagnostics
- Serial diagnostic interface
- Open load detection
- Over temperature detection
- Short-to-ground and battery detection



**PowerSO-20**



# L9651
# Automotive Quad solenoid driver

## A glance at possible applications:

- Generic solenoid driver/valve application
- Injector drivers for EMS system
- Solenoid driver for powertrain system
- Electric vehicle solenoids switch (HV High Current Contactors..)

## Key values

Embedding a set of features perfectly sized for small loads driving in low side configuration

Achieving design optimization with a Solution securing minimized BOM

Versatile device using in harsh environment using inside and outside transportation applications

## Collaterals & Tools

Product page
Datasheet
Selection guides: powertrain & safety,

# L9301
# Automotive 8-channel configurable driver

## Configurable 8 Low-Side driver or 4 Low-Side & 4 High-Side driver with independent control and diagnostics

### Features

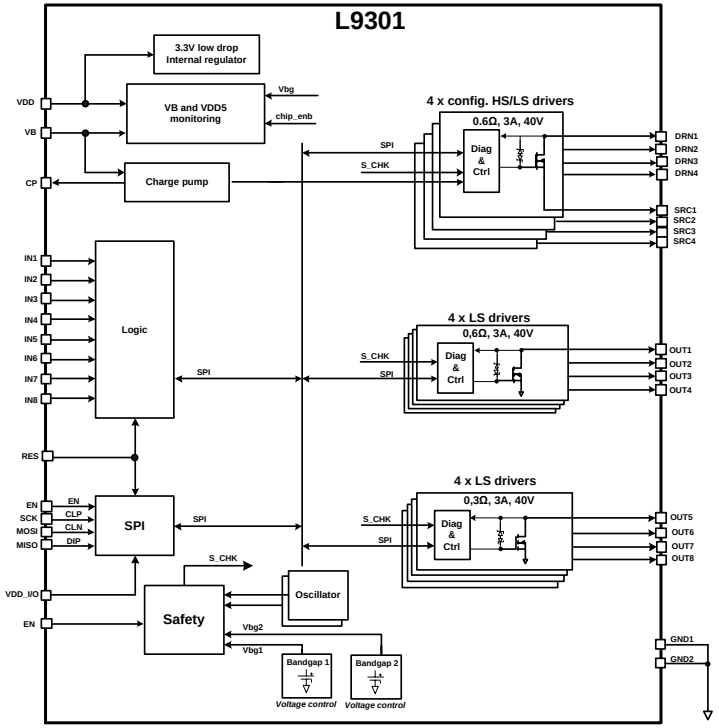
#### Electrical parameters
- Operating supply voltage 5V to 18V
- Operating VDD supply voltage 4.75V to 5.25V

#### Protections
- Overtemperature, overcurrent and shutdown protection

#### Outputs
- 8x configurable High-Side/Low-Side drivers (**0.6Ω, max 3A**)
- 4x Low-Side drivers (**0.6Ω, max 3A**)
- 4x Low-Side drivers (**0.3Ω, max 3A**)
- Possibility to parallel DRN/SRC1-4 and OUT1-4 in order to get 4
- x Low-Side drivers for a total 8x Low-Side drivers (**0.3Ω**)

#### Diagnostics
- SPI interface for outputs control and for diagnosis data communication

**PowerSSO-36**



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# L9301
# Automotive 8-channel configurable driver

## A glance at possible applications:

- Generic resistive and inductive loads driver
- Automotive ABS
- Vehicle transmission
- Vehicle control unit
- Active suspensions

## Key values

### High flexibility

Possibility to configure HS/LS drivers and to parallelize realizing a total 8x LS drivers

### Full configurability

Device parameters configuration (e.g., slew-rate, overcurrent threshold) and diagnosis via SPI

### Design optimization

Low ohmic PowerMOS and improved EMC performances

## Collaterals & Tools

### L9301

- Product page
- Datasheet

### EVAL-L9301

- Product page
- Data brief
- User manual
- Board manufacturing specification
- Bill of material
- Schematics

### STSW-L9301

- Product page
- Data brief
- User manual
- License agreement

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# L9026
# Automotive configurable multi-channel relay driver

## 8-channel IC with 2 fixed HS drivers and 6 configurable HS/LS drivers compatible with resistive, inductive and capacitive loads

### Features

#### Electrical parameters
- Cranking compatibility down to VBATT=3V
- Digital supply voltage compatible with 3.3 and 5V microcontroller
- Very lo quiescent current

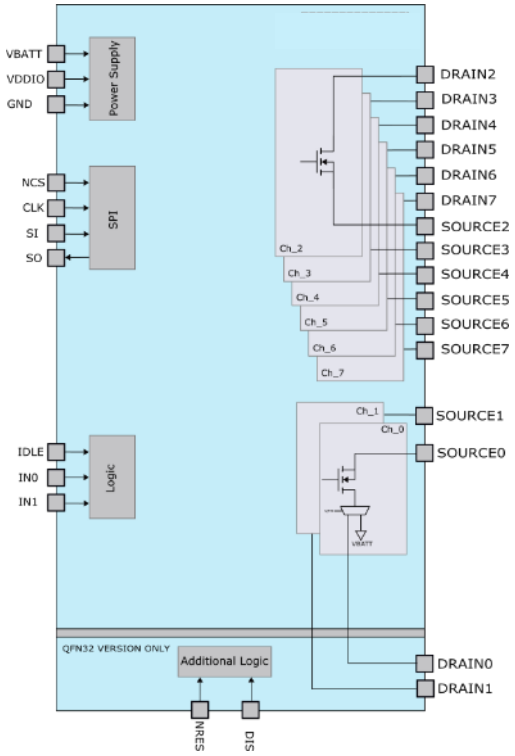
#### Protections
- Reverse battery protection on VBATT and on drain pins without external components
- Bulb inrush mode (BIM)
- Temperature sensor and monitoring

#### Outputs
- 6x configurable High-Side/Low-Side drivers
- 2x High Side Drivers
- 2x additional internal PWM generator
- Daisy Chain capability SPI, also compatible with 8-bit SPI devices

#### Diagnostics
- 16-bit serial peripheral interface for control and diagnosis

**VFQFPN32 5x5x1mm (exposed pad down)**

**HTSSOP24 7.8x6.4x1mm (exposed pad down)**



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# L9026
# Automotive configurable multi-channel relay driver

## A glance at possible applications:

| | |
|---|---|
| Bulbs | LEDs |
| Relays | Small motors |
| Resistive loads | Capacitive loads |

## Key values

**Embedding a set of features**

Reverse battery, LED mode, bulb inrush, PWM generator, limp home

**Achieving efficiency**

Extreme low quiescent current solution

**ASIL-B solution**

Solution compliant with ISO26262

## Collaterals & Tools

### L9926

- Product page
- Datasheet

### EVAL-L9026-YO

- Product page
- Data brief
- User manual
- Bill of material
- Schematics

### STSW-L9026-Y0

- Product Page
- Data brief
- User manual
- License agreement

# L9945
# Configurable multichannel pre-driver

## 8-channel fully configurable MOSFET pre-driver complying with 12V up to 24V battery systems

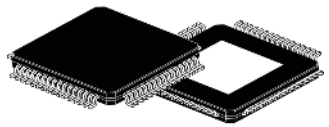
### Features

#### Electrical parameters
- Operating battery supply voltage 3.8V to 36V
- Operating VDD supply voltage 4.5V to 5.5V

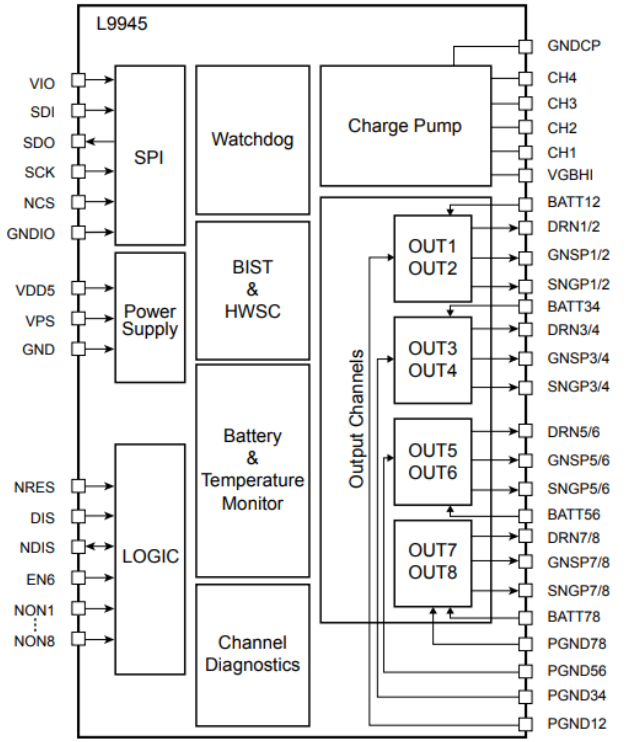
#### Protections
- Overcurrent monitoring
- Current limitation for H-bridge

#### Outputs
- Up to 8x High Side Drivers
- Up to 8x Low Side Drivers
- Up to 2x Peak & Hold
- Up to 2x H-Bridge Drivers
- All output controlled through parallel PWM inputs.

#### Diagnostics
- Full diagnostic for short circuit to battery, open load, short circuit to ground for each individual output
- Each output status can be constantly monitored through dedicated SPI registers



**TQFP64**
**(exposed pad down)**



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# L9945
# Configurable multichannel pre-driver

## A glance at possible applications:

| | | |
|---|---|---|
| High current inductive loads | 12V applications | Automotive (EMS, VCU..) |
| High Current inductive loads | 24V applications | Commercial Vehicle, Trucks (EMS,VCU..) |
| High Current inductive loads | 24V applications | Industrial (DC motors, Valves..) |

## Key values

### Configurability

All channels can be configured either as Low and High Side Drivers

### Flexibility

Different kind of loads can be driven: linear or Peak and Hold solenoids, motors…

### Application Coverage

From 12V up to 24V application (e.g., commercial vehicles, industrial..)

## Collaterals & Tools

### L9945

- Product page
- Datasheet
- Application note: charge pump stress estimation, configuring diagnostics, improving EMI, h-bridge direction switching recommendation, h-bridge configuration

### EVAL-L9945

- Product page
- Data brief
- User manual
- Board manufacturing specification
- Bill of material
- Schematics

### STSW-L9945

- Product page
- Data brief
- User manual
- License agreement



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# L99MC6GJ
# Automotive configurable 6-channel driver

## Monolithic medium current output driver including 3 Low-Side & 3 independently self configuring Low-Side or High-Side drivers

### Features

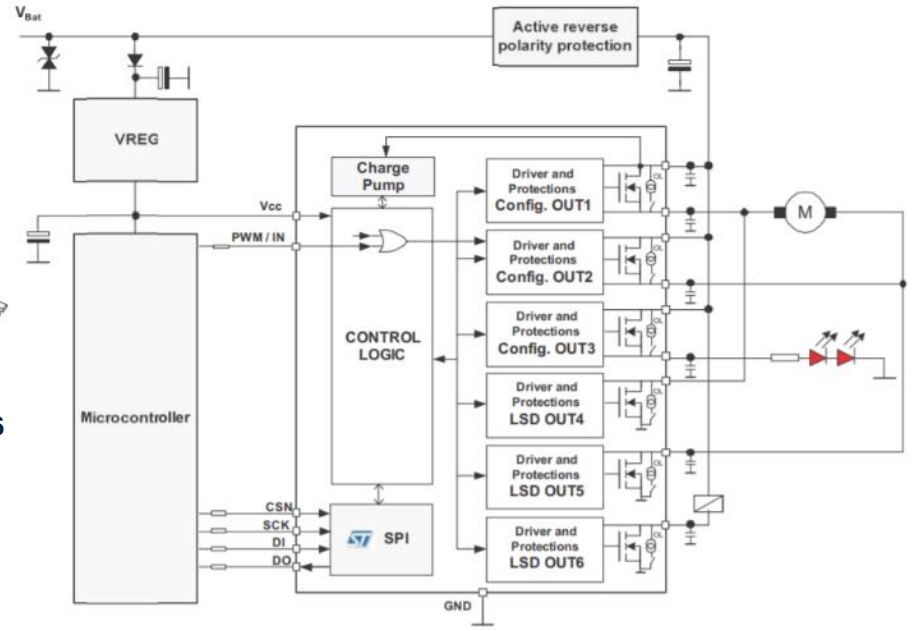
#### Electrical parameters
- VCC supply voltage 3V to 5.25V
- Very low current consumption in standby mode 5µA (typ)

#### Protections
- All outputs short-circuit protected
- All outputs overtemperature protected
- Bridge mode with crosscurrent protection
- Temperature warning

#### Outputs
- 3x independently self configuring High/Low-Side channels (**0.7Ω**)
- 3x Low-Side drivers (**0.7Ω**)
- Current limit of each output min 0.6A

#### Diagnostics
- The integrated 16-bit standard serial peripheral interface (SPI) controls all outputs and provides diagnostic information
- Configurable open-load detection in off mode

PowerSSO-16



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# L99MC6GJ
# Automotive configurable 6-channel driver

## A glance at possible applications:

| | |
|---|---|
| Wiper control | Mirror Adjustment |
| Under hood Switching Module | Body control module |
| Relay Driver | LED driver |

## Key values

| | | |
|---|---|---|
| High flexibility in driving different loads with 3 low-side and 3 outputs that can be used as either low-side or high-side drivers | Very low current consumption in standby mode | Internal Zener clamp for fast turn-off of inductive loads |

## Collaterals & Tools

Product page
Datasheet
Technical note

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# Line card
# **Valve driver**

| L9945 | L9301 | L9305 |
| --- | --- | --- |
| 8-channel fully configurable MOSFET pre-driver complying with 12V up to 24V battery systems | Configurable 8 Low-Side driver or 4 Low-Side & 4 High-Side driver with independent control and diagnostics | 4-channel configurable and independent Low-Side and High-Side current controlled drivers |

# L9945
# Configurable multichannel pre-driver

## 8-channel fully configurable MOSFET pre-driver complying with 12V up to 24V battery systems

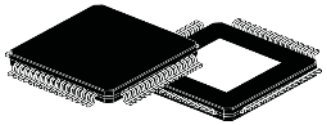
### Features

#### Electrical parameters
- Operating battery supply voltage 3.8V to 36V
- Operating VDD supply voltage 4.5V to 5.5V

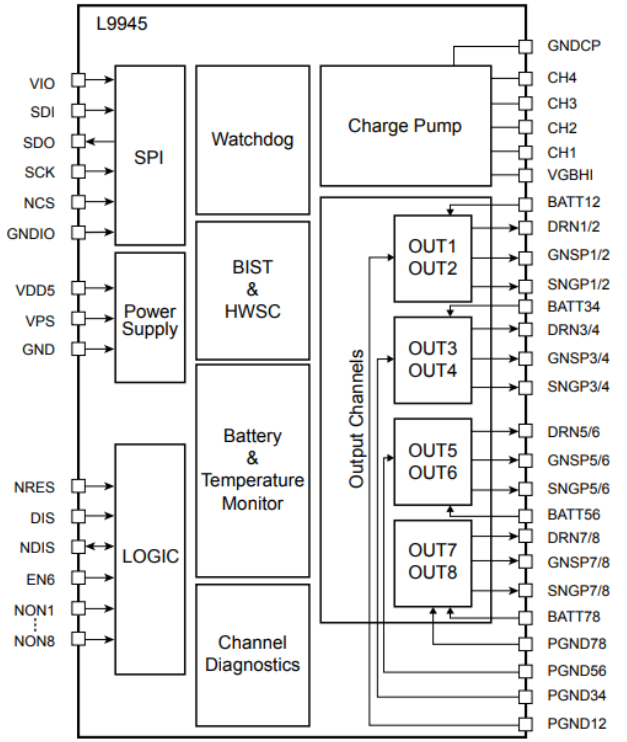
#### Protections
- Overcurrent monitoring
- Current limitation for H-bridge

#### Outputs
- Up to 8x High Side Drivers
- Up to 8x Low Side Drivers
- Up to 2x Peak & Hold
- Up to 2x H-Bridge Drivers
- All output controlled through parallel PWM inputs.

#### Diagnostics
- Full diagnostic for short circuit to battery, open load, short circuit to ground for each individual output
- Each output status can be constantly monitored through dedicated SPI registers



**TQFP64**
**(exposed pad down)**



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# L9945
# Configurable multichannel pre-driver

## A glance at possible applications:

| | | |
|---|---|---|
| High current inductive loads | 12V applications | Automotive (EMS, VCU..) |
| High Current inductive loads | 24V applications | Commercial Vehicle, Trucks (EMS,VCU..) |
| High Current inductive loads | 24V applications | Industrial (DC motors, Valves..) |

## Key values

### Configurability

All channels can be configured either as Low and High Side Drivers

### Flexibility

Different kind of loads can be driven: linear or Peak and Hold solenoids, motors…

### Application Coverage

From 12V up to 24V application (e.g., commercial vehicles, industrial..)

## Collaterals & Marketing Package

### L9945

- Product page
- Datasheet
- Application note: charge pump stress estimation, configuring diagnostics, improving EMI, h-bridge direction switching recommendation, h-bridge configuration

### EVAL-L9945

- Product page
- Data brief
- User manual
- Board manufacturing specification
- Bill of material
- Schematics

### STSW-L9945

- Product page
- Data brief
- User manual
- License agreement

# L9301
# Automotive 8-channel configurable driver

## Configurable 8 Low-Side driver or 4 Low-Side & 4 High-Side driver with independent control and diagnostics

### Features

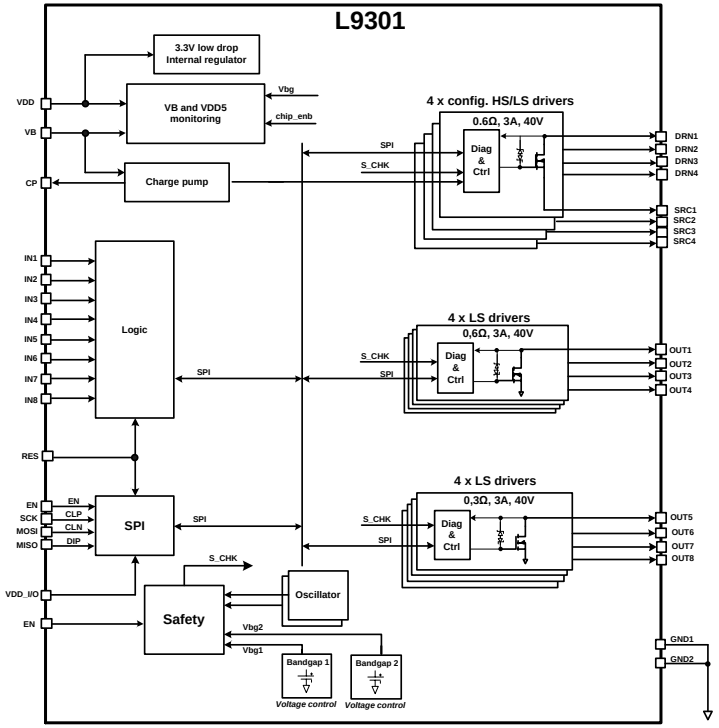
#### Electrical parameters
- Operating supply voltage 5V to 18V
- Operating VDD supply voltage 4.75V to 5.25V

#### Protections
- Overtemperature, overcurrent and shutdown protection

#### Outputs
- 8x configurable High-Side/Low-Side drivers (**0.6Ω, max 3A**)
- 4x Low-Side drivers (**0.6Ω, max 3A**)
- 4x Low-Side drivers (**0.3Ω, max 3A**)
- Possibility to parallel DRN/SRC1-4 and OUT1-4 in order to get 4
- x Low-Side drivers for a total 8x Low-Side drivers (**0.3Ω**)

#### Diagnostics
- SPI interface for outputs control and for diagnosis data communication

**PowerSSO-36**



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# L9301
# Automotive 8-channel configurable driver

## A glance at possible applications:

Generic resistive and inductive loads driver

Automotive ABS

Vehicle transmission

Vehicle control unit

Active suspensions

## Key values

### High flexibility

Possibility to configure HS/LS drivers and to parallelize realizing a total 8x LS drivers

### Configurability

Device parameters configuration (e.g., slew-rate, overcurrent threshold) and diagnosis via SPI

### Design optimization

Low ohmic PowerMOS and improved EMC performances

## Collaterals & Marketing Package

### L9301

- Product page
- Datasheet

### EVAL-L9301

- Product page
- Data brief
- User manual
- Board manufacturing specification
- Bill of material
- Schematics

### STSW-L9301

- Product page
- Data brief
- User manual
- License agreement

# L9305
# Automotive 4-channel valve driver

## 4-channel configurable and independent Low-Side and High-Side current controlled drivers

### Features

#### Electrical parameters

- Operating battery supply voltage 5.5V to 9V
- Operating VDD supply voltage 4.75V to 5.5V
- Max precision accuracy 1mA (normal range 0.5-15A)

#### Protections

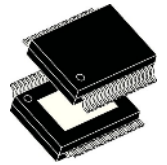
- 1-4 high side fail safe ENABLE switch pre-driver with VDS monitoring
- Redundant safe enable path
- Temperature sensor and monitoring
- Redundant current sensing for all channels

#### Outputs

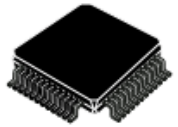
- 4x configurable High-Side/Low-Side Drivers (**375mΩ**)
- 2 operating driving modes:
  1. PWM through parallel input
  2. PWM internally generated

#### Diagnostics

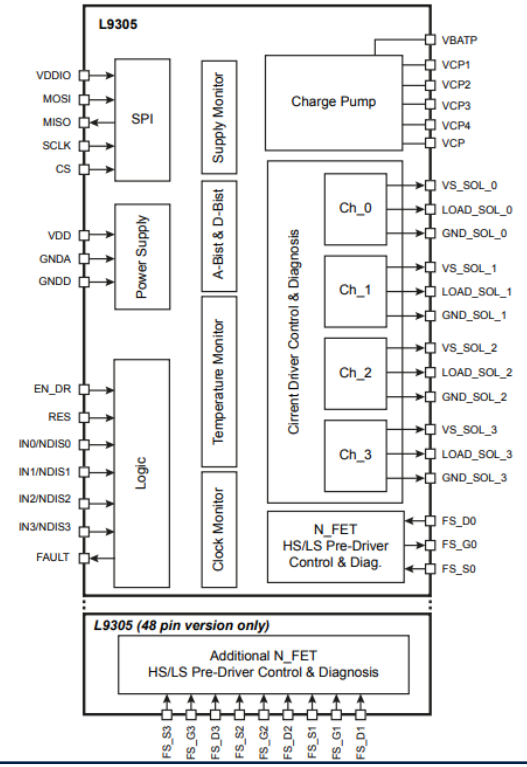
- Advanced diagnosis and monitoring using BIST



**PowerSSO-36**



**TQFP48 exposed pad down**



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# L9305
# Automotive 4-channel valve driver

## A glance at possible applications:

| | | |
|---|---|---|
| High current inductive loads | 12V applications | Automotive (EMS, VCU..) |
| High Current inductive loads | 24V applications | Commercial Vehicle, Trucks (EMS,VCU..) |
| High Current inductive loads | 24V applications | Industrial (DC motors, Valves..) |

## Key values

### Configurability

Several parameters programmable via SPI (current set point, switching frequency

### Flexibility

Two operating modes
**HW:** PWM signal internally generated relieving MCU tasks
**SW:** MCU is generating the PWM signals

### Performance

High precision current control level allowing an accurate valve control

## Collaterals & Marketing Package

Product page
Datasheet
Application note: charge pump stress estimation, how to improve EMI

# System power supply

# Line card
# LDO voltage regulators

| L5050 | L5150 | L5300 |
|---|---|---|
| 5V low drop-output linear voltage regulator in Single and Dual fully electrical isolated version for low load applications | 5V low drop-output linear voltage regulator with 150 mA of output current capability | 5V low drop-output linear voltage regulator with 300 mA of output current capability |

| L4995 | L99VR01S/J | L99VR02J |
|---|---|---|
| 5V low drop-output linear voltage regulator voltage regulator with 500mA of output current capability | Low drop-output linear voltage regulator with configurable output voltage and 200mA of current capability | Low drop-output linear voltage regulator with configurable output voltage and 500mA of current capability |

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# L5050
# Automotive Single and Dual 5V LDO

## 5V low drop-output linear voltage regulator in Single and Dual fully electrical isolated version for low load applications

### Features

#### Electrical parameters

- Operating DC supply voltage range 5.6V to 40V
- Very low current consumption in standby mode typ. 5uA

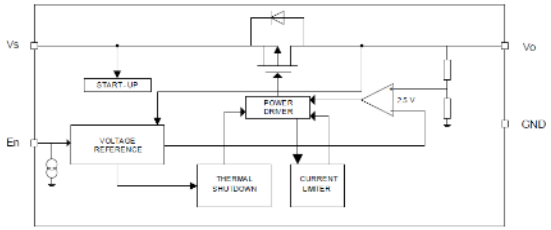
#### Protections

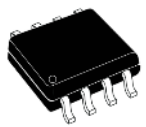
- Thermal shutdown and short circuit protection

#### Outputs

- Output voltage: **5V**
- Output current: **50 mA**
- Output voltage precision ±2 %

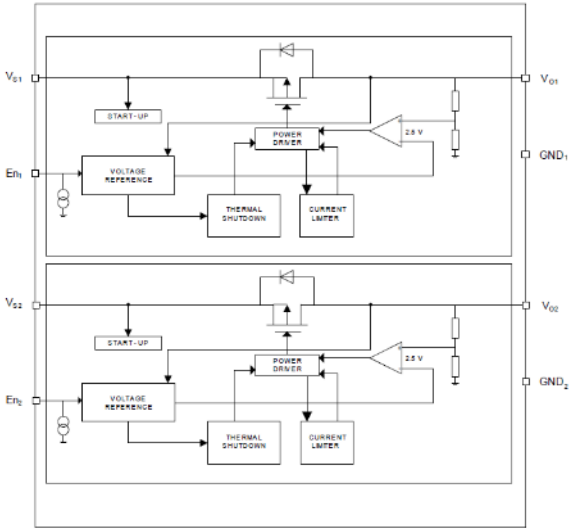
### Single 5V LDO

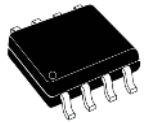


SO-8

### Dual 5V LDO



SO-8



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# L5150
# Automotive 5V LDO

## 5V low drop-output linear voltage regulator with 150 mA of output current capability

### Features

#### Electrical parameters

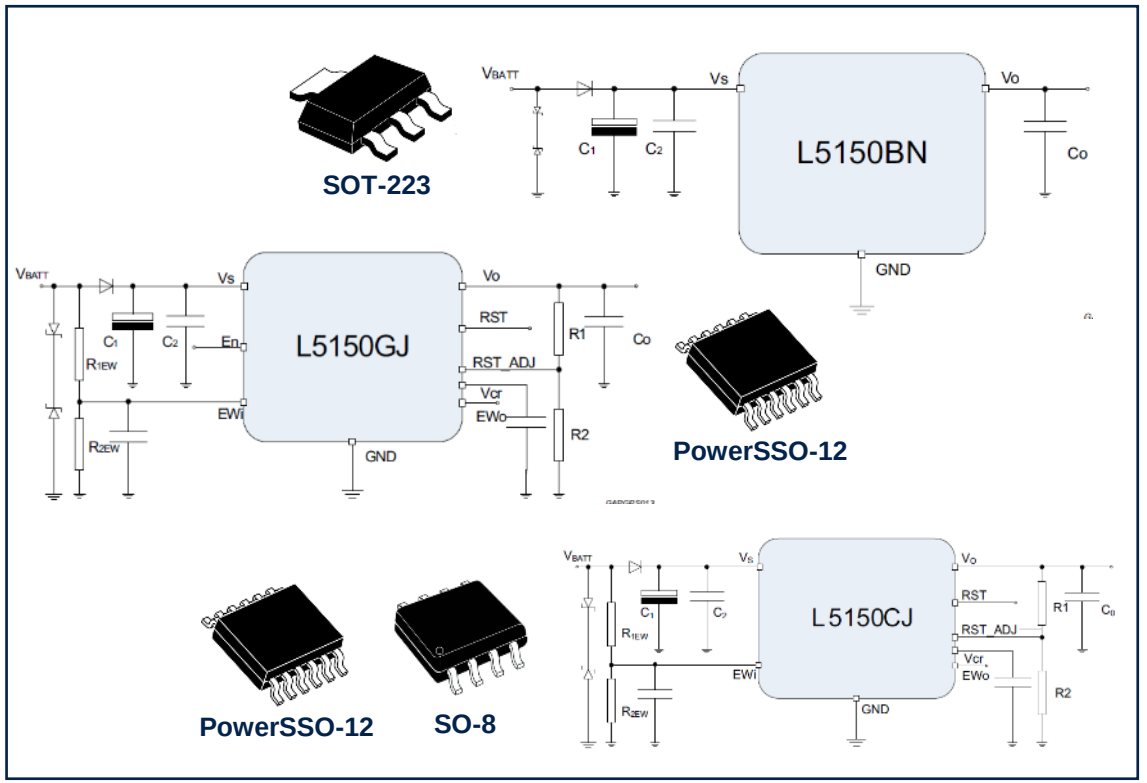
- Operating DC supply voltage range 5.6V to 40V
- Very low current consumption

#### Protections

- Thermal shutdown and short circuit protection

#### Outputs

- Output voltage: **5V**
- Output current: **150 mA**
- Output voltage precision ±2 %



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# L5300
# Automotive 5V LDO

## 5V low drop-output linear voltage regulator with 300 mA of output current capability

### Features

#### Electrical parameters

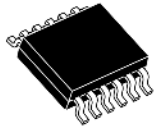
- Operating DC supply voltage range 5.6V to 40V
- Very low current consumption

#### Protections

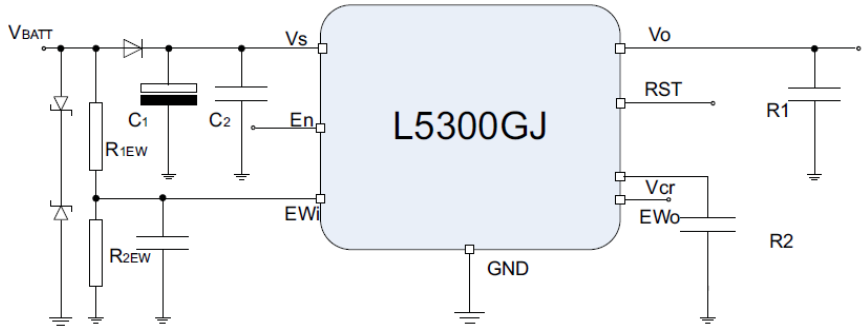
- Thermal shutdown and short circuit protection

#### Outputs

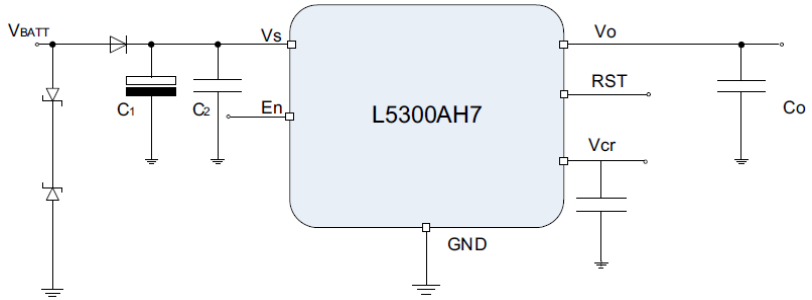
- Output voltage: **5V**
- Output current: **300 mA**
- Output voltage precision ±2 %



PowerSSO-12




HPAK



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# L5xxx
# Automotive 5V LDO

## A glance at possible applications:

| | | |
|---|---|---|
| Suitable for any kind of electrical module requiring 5V power supply up to 300mA | | |
| Keyless module | Seat heater | Sensors supply |
| Parking Assistance System | HVAC | Two wheelers applications |
| LED module | TMPS | On board charger |

## Key values

| | | |
|---|---|---|
| Proposed in packages solution differentiated by body size and thermal performance | Internal protection system according to the Automotive requirements | Different electrical characteristics and features versions are available |

## Collaterals & Tools

L5050S: product page, datasheet
L5050D: product page, datasheet
L5150BN: product page, datasheet
L5150CJ: product page, datasheet
L5150CS: product page, datasheet
L5150CJ: product page, datasheet
L5300AH7: product page, datasheet
L5300GJ: product page, datasheet

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# L4995
# Automotive 5V LDO

## 5V low drop-output linear voltage regulator voltage regulator with 500mA of output current capability

### Features

#### Electrical parameters

- Operating DC supply voltage range 5.6V to 31V
- Very low current consumption (typical 3µA in standby mode)

#### Protections

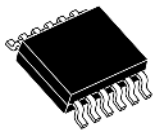
- Thermal shutdown and short circuit protection

#### Outputs

- Output voltage: **5V**
- Output current: **500 mA**
- Output voltage precision ±2 %

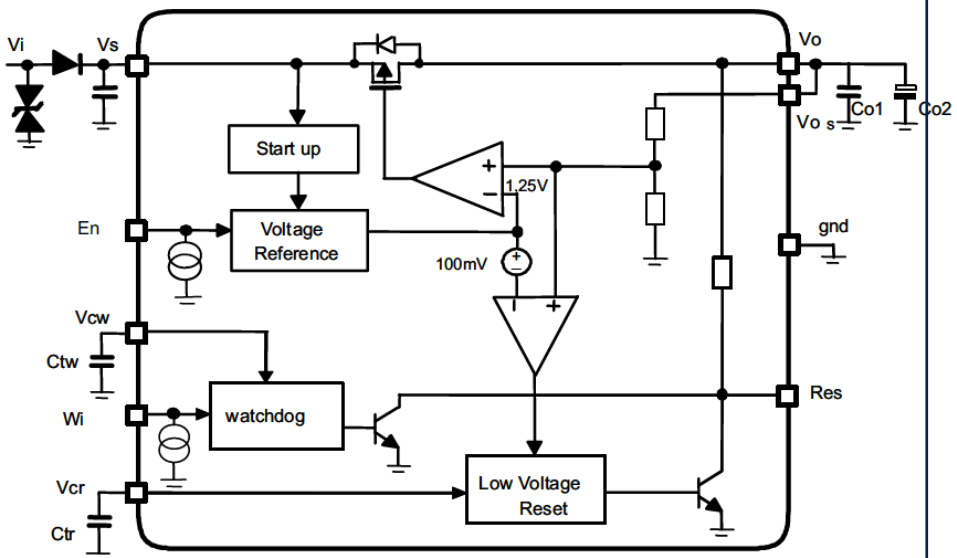
#### Diagnostics

- Watchdog function



PowerSSO-12

PowerSSO-24



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# L4995
# Automotive 5V LDO

## A glance at possible applications:

| | | |
|---|---|---|
| Suitable for any kind of electrical module requiring 5V power supply up to 500mA | | |
| Ignition Control Module | Transmission Control Unit | Identification Authentication Unit |
| Power Seat Module | Active Pedal Module | Electric Power Steering |
| LED driver Module | Sunroof | Battery management system |

## Key values

| | | |
|---|---|---|
| Packages solution differentiated by body size and thermal performance | Internal protection system according to the Automotive requirements | Devices of that series are differentiated for features (Enable, Watchdog) |

## Collaterals & Tools

Product page
Datasheet

# L99VR01S/J
# Automotive LDO linear voltage regulator

## Low drop-output linear voltage regulator with configurable output voltage and 200mA of current capability

### Features

#### Electrical parameters
- Operating DC power supply voltage from 2.15V to 28V
- Very low quiescent current Iq <1µA with regulator disabled

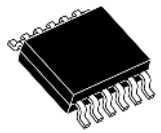
#### Protections
- Thermal shutdown and short-circuit current limitation
- Programmable short-circuit output current
- Undervoltage-lockout UVLO
- Programmable autonomous watchdog

#### Outputs
- User-selectable output voltage: **0.8V; 1.2V; 1.5V; 1.8V; 2.5V; 2.8V; 3.3V or 5V**
- Output voltage precision ±2%
- Output current: Io **200mA**

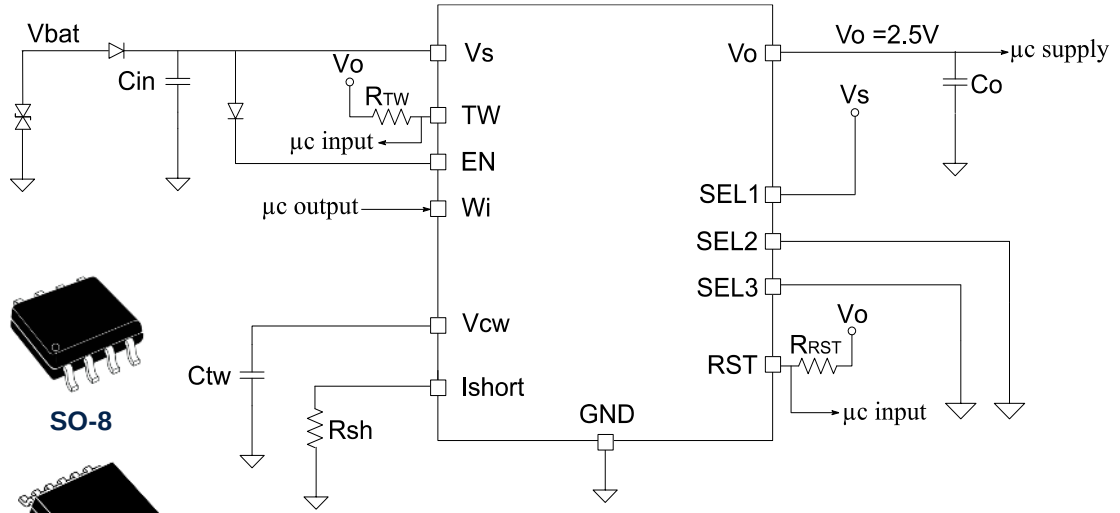
#### Diagnostics
- Advanced thermal warning and output overvoltage diagnostic (L99VR01J only)



**SO-8**



**PowerSSO-12**



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# L99VR01x
# Automotive LDO linear voltage regulator

## A glance at possible applications:

| | |
|---|---|
| 8/16/32-bit MCU | FPGA |
| Infotainment & audio system | Powertrain system |
| Camera / sensors | Display driver |

## Key values

### Design standardization

One configurable device from 0.8V to 5V serving multiple application needs with single part number

### Family approach

Simplifying supply chain and taking benefit of cumulated higher volume on single part number

### Safety requirement

Protection and safety mechanisms to reach safety requirements

## Collaterals & Tools

L99VR01: product page, datasheet, flyer

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# L99VR02J
# Automotive LDO linear voltage regulator

## Low drop-output linear voltage regulator with configurable output voltage and 500mA of current capability

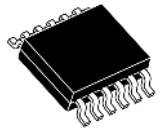
### Features

#### Electrical parameters
- Operating DC power supply voltage from 2.15V to 28V
- Very low quiescent current Iq <1µA with regulator disabled

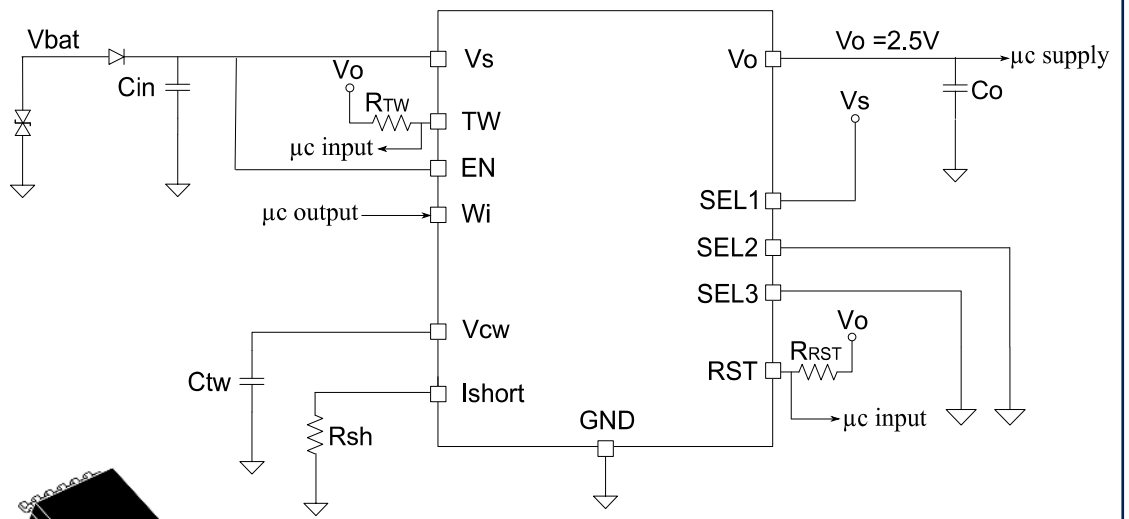
#### Protections
- Thermal shutdown and short-circuit current limitation
- Programmable short-circuit output current
- Undervoltage-lockout UVLO
- Programmable autonomous watchdog

#### Outputs
- User-selectable output voltage: **0.8V; 1.2V; 1.5V; 1.8V; 2.5V; 2.8V; 3.3V or 5V**
- Output voltage precision ±2%
- Output current: Io **500mA**

#### Diagnostics
- Advanced thermal warning and output overvoltage diagnostic



**PowerSSO-12**



# L99VR02x
# Automotive LDO linear voltage regulator

## A glance at possible applications:

| | |
|---|---|
| 8/16/32-bit MCU | FPGA |
| Infotainment & audio system | Powertrain system |
| Camera / sensors | Display driver |

## Key values

### Design standardization

One configurable device from 0.8V to 5V serving multiple application needs with single part number

### Family approach

Simplifying supply chain and taking benefit of cumulated higher volume on single part number

### Safety requirement

Protection and safety mechanisms to reach safety requirements

## Collaterals & Tools

L99VR02J: product page, datasheet
L99VR02XP: product page, data-brief

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# Line card
# Power Management IC and System Basis Chip

| L5963 | L5965 | L9001 |
|---|---|---|
| Multiple voltage regulator integrating two switching DC-DC converters and one linear voltage regulator | Multiple voltage regulator integrating two Buck pre-regulators, two buck post-regulators, one boost, one LDO and voltage reference | Configurable voltage regulator with 1 buck regulator, 1 buck / linear voltage regulator and 1 linear voltage regulator |
| **L9396** | **SPSB081** | **STPM066S** |
| Configurable 6 rail & 4-channel sensor interface PMIC with Pre-Boost, Pre-Buck, LDOs, Vref and Tracking regulators. | System Basis Chip with 2 configurable output voltage rails, 4 high side drivers with CAN FD and LIN transceivers | Multiple voltage regulator integrating one Buck pre-regulator, one boost, one LDO and one voltage reference |
| **STPM801** | **L9758** | |
| Configurable integrated Soft-Start, Hot-Swap and O-Ring with reverse input protection | PMIC with Pre-Buck, Pre-Boost, LDOs programmable and Tracking regulators | |

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# L5963
# Automotive multichannel power management

## Multiple voltage regulator integrating two switching DC-DC converters and one linear voltage regulator

### Features

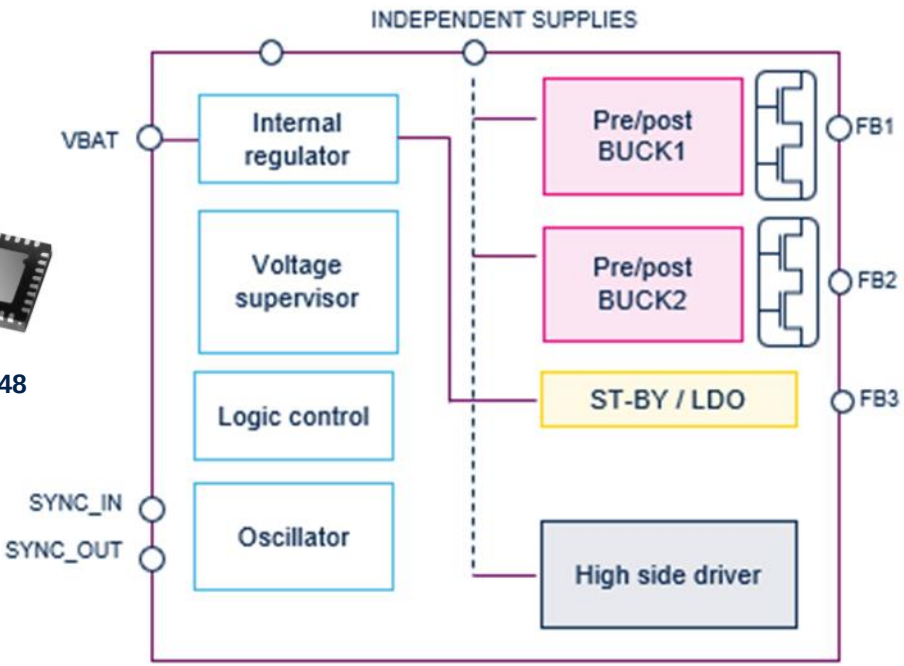
#### Electrical parameters
- Car passenger battery compatibility
- Extremely low quiescent current in standby conditions

#### Protections
- Load dump protection
- Independent thermal protection on all regulators
- Independent current limit on all regulators

#### Outputs
- 2x buck pre/post-regulators, min 1V, 2.5/3A max current capability, 250kHz free run, up to 2MHz with sync in
- 1x linear LDO post-regulator,250mA max current capability
- 1x high side driver, 0.5A max current capability

#### Diagnostics
- Power good
- Programmable under voltage battery detector

VFQFPN-48
7x7mm



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# L5963

# Automotive multichannel power management

## A glance at possible applications:

| | | |
|---|---|---|
| ECU | Microcontroller power supply | Infotainment module |
| USB hub | Automotive sound system | Instrument cluster |
| Car radio | | |

## Key values

### Low interference

High operating frequency allowed by the synchronization input helps to reduce AM and FM interferences

### BOM optimization

High level of integration reduces the total number of external components needed

### Application Coverage

Suitable for applications when battery compatibility, load dump protection and wide input voltage range are mandatory

## Collaterals & Tools

### L5963

- Product page
- Datasheet
- Selection Guide: smart power solutions for car body applications
- Brochure: power management., Electric vehicle (EV) ecosystem
- Flyer: automotive multichannel power management ICs

### EVAL-L5963/Q

- Product page: EVAL-L5963, EVAL-L5963Q
- Databrief
- User manual
- Evaluation board terms of use

# L5965
# Automotive multichannel power management

## Multiple voltage regulator integrating two Buck pre-regulators, two buck post-regulators, one boost, one LDO and voltage reference

### Features

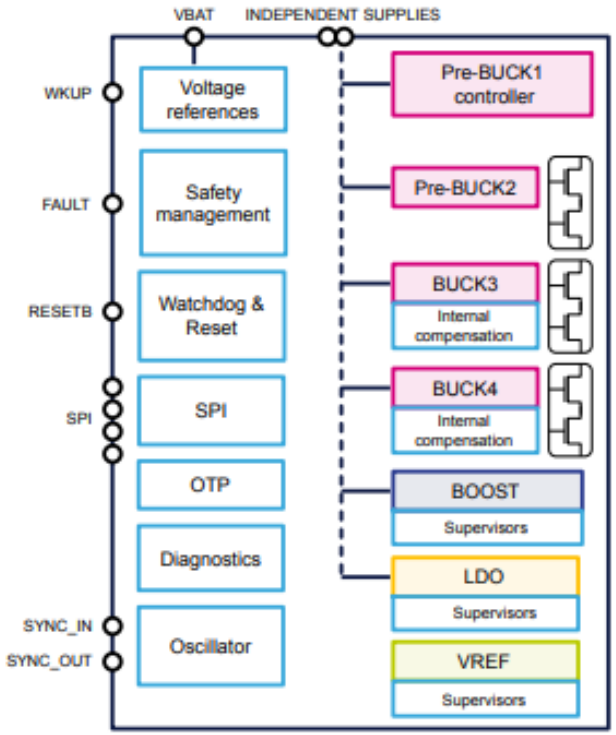
#### Electrical parameters
- Car passenger battery compatibility
- Power up sequence, output voltages and currents, switching frequencies programmable via OTP
- High switching frequency (>2MHz)
- Window watchdog and reset

#### Protections
- Undervoltage / Overvoltage / Overcurrent protections
- Over temperature detection by local thermal sensors
- Short circuit protected outputs and short to ground protection

#### Outputs
- 2x Buck pre-regulator (one of which is a controller)
- 2x Buck post-regulator
- 1x Boost post-regulator
- 1x linear LDO post-regulator
- 1x post precise voltage reference

#### Diagnostics
- ABIST, DBIST
- Fault detection pin to MCU
- Programmable diagnostic via SPI (e.g., over current limitation in case of over-load or short to ground, output voltage threshold…)

**VFQFPN-48**
**7x7mm**



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# L5965
# Automotive multichannel power management

## A glance at possible applications:

- Processor power supply
- Microcontroller power supply
- Infotainment
- ECU
- Automotive radar system
- Automotive lidar system
- Automotive vision system

## Key values

**High level of integration**

Up to 7 regulators embedded completing power path from the battery

**Independent management**

Independent regulators suppling and output voltage monitoring

**Safety requirement**

Offering a set of features to support applications that need to fulfill functional safety requirements

## Collaterals & Tools

### L5965

- Product page
- Datasheet
- Selection Guide: smart power solutions for car body applications
- Brochure: power management., Electric vehicle (EV) ecosystem
- Flyer: automotive multichannel power management ICs

### EVAL-L5965

- Product page
- Data brief
- User manual
- Evaluation board terms of use

# L9001
# Automotive power supply IC with multiple voltage regulators

## Configurable voltage regulator with 1 buck regulator, 1 buck / linear voltage regulator and 1 linear voltage regulator

### Features

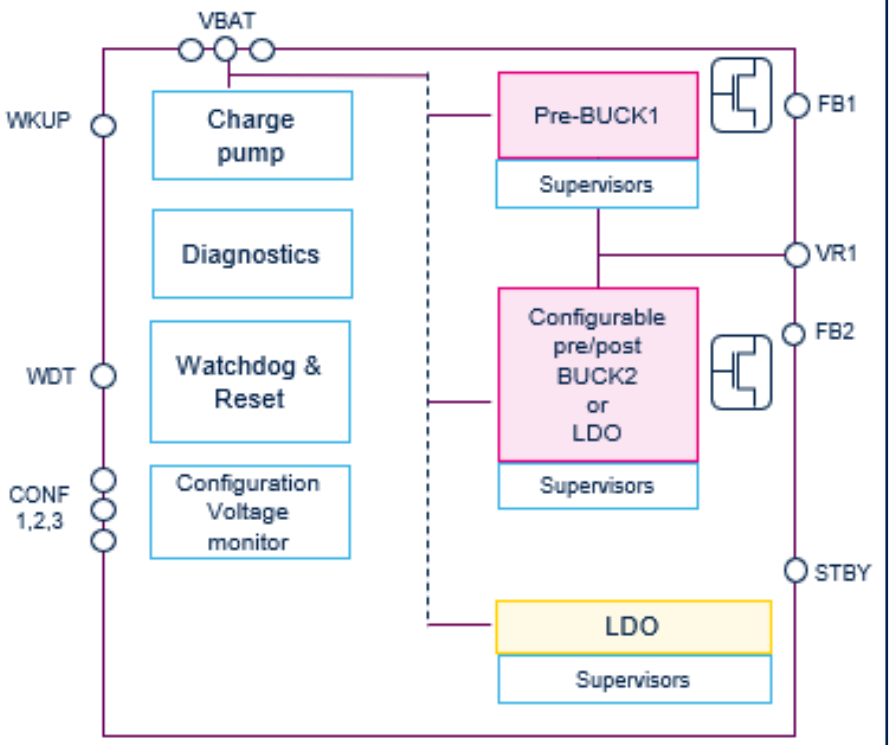
#### Electrical parameters
- Low power operation mode with main regulators still active and reduced power consumption from battery

#### Protections
- Configurable watchdog
- Over temperature shutdown
- Output under or over voltage reset generation

#### Outputs
- 1x Buck regulator (**3.3/5/6V, 1A**)
- 1x configurable Buck/LDO regulator (**0.8V to 5.0 V, 1A as Buck and 300 mA as LDO**)
- 1 x LDO (**3.3/5V, 100mA**)

#### Diagnostics
- Over-temperature, Overcurrent and undercurrent diagnosis
- 2x Voltage Monitor for overvoltage & undervoltage diagnosis on the regulators

**PowerSSO-24**



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# L9001
# Automotive power supply IC with multiple voltage regulators

## A glance at possible applications:

Any kind of microcontroller power supply inside and outside transportation applications

## Key values

### Fully configurable

Flexible and configurable for multiple power supply schemes and applications

### Integrated supervision & diagnosis

Full diagnosis functional box integration

### Fail-safe functionality

Output supply supervision, overcurrent and overtemperature protection

## Collaterals & Tools

### L9001

- Product page
- Datasheet
- Application note: integration and performance eval
- Selection Guide: smart power solutions for car body applications
- Brochure: power management., Electric vehicle (EV) ecosystem

### EVAL-L9001

- Product page
- Data brief
- User manual
- Board manufacturing specification
- Bill of material
- Schematics

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# L9396
# Automotive multiple power supply IC

## Configurable 6 rail & 4-channel sensor interface PMIC with Pre-Boost, Pre-Buck, LDOs, Vref and Tracking regulators

### Features

#### Electrical parameters

- Operating voltage: VBATP: 4.5 V to 19 V with boost; 6 V to 19 V without boost

#### Protections

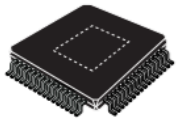
- Temperature monitoring and thermal shutdown
- Configurable and programmable double watchdog

#### Outputs

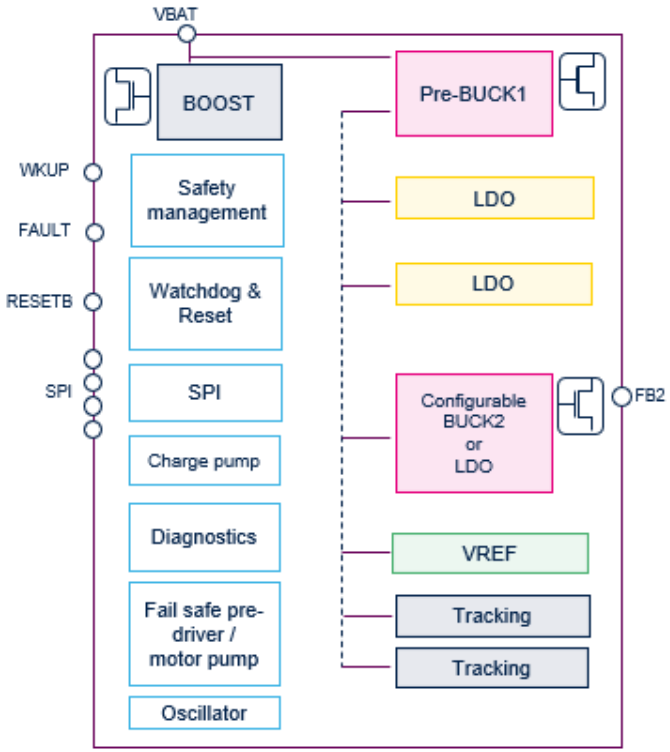
- 1x boost converter (**9V, max 0.3A, 2MHz**)
- 1x buck converter (**6.5/7.2V, max 1A, 465KHz**)
- 1x LDO VCC5 (**5V** +/-2%, **250mA**)
- 1x LDO VCC (**3.3/5V** +/-2%, **100mA**)
- 1x VCORE (0.8V to 5.0V +/-2% **max 1A switching, max 750mA linear mode**)
- 2x tracking regulators (120mA)

#### Diagnostics

- Voltage monitoring UV/OV on all regulated rails
- 32bit SPI with 3-bit CRC for configuration and diagnosis



**TQFP64**
**(exposed pad down)**



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# L9396
# Automotive multiple power supply IC

## A glance at possible applications:

- Any kind of microcontroller power supply
- Braking
- Electric power steering
- Transmission
- Active suspensions
- On-board charger
- Vehicle control unit

## Key values:

### Flexibility

Different combinations to supply the MCU, external peripheral and sensors with wide adjustable voltage/current ranges

### ASIL-D solution

Full compliant with ISO26262

## Collaterals & Tools

Product page
Datasheet
Application note: L9396 configuration and layout

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# SPSB081
# Automotive Power Management IC with CAN FD and LIN

## System Basis Chip with 2 configurable output voltage rails, 4 high side drivers with CAN FD and LIN transceivers

### Features

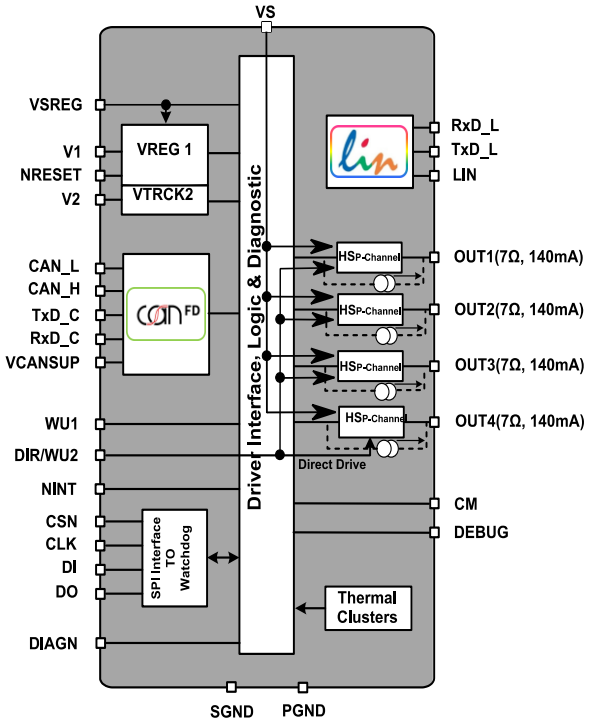
#### Electrical parameters
- Operating voltage: 6V < VS < 28V
- Transient Load Dump up to 40V

#### Protections
- Overcurrent protection for all outputs
- V1 overvoltage detection and protection
- Device contains temperature warning and protection

#### Outputs
- One 5 V (or 3.3 V for SPSB0813 and SPSB081C3) low-drop voltage regulator (V1) for microcontroller and peripheral supply
- One configurable 5 V or 3.3 V low-drop voltage regulator V2 selectable via SPI, tracker for peripheral supply
- Minimum current limitation of 450 mA for V1 and 400 mA for V2

#### Diagnostics
- DIAGN output pin for fail-safe signalization
- Current monitor output for all internal high-side drivers
- Open-load diagnosis for all outputs

QFN32 5x5 WF



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SPSB081

# Automotive Power Management IC with CAN FD & LIN

## A glance at possible applications:

- Any kind of microcontroller power supply
- Body Control Modules (BCM)
- Passive keyless entry and start modules
- Heating, Ventilation and Air Conditioning (HVAC)
- Seat control modules
- Gear shifters
- Fuel pump

## Key values:

### Flexibility

Different combinations to supply the MCU, external peripheral and sensors with configurable output voltage and embedded CAN FD & LIN transceivers

### ASIL-B solution

Limited documentation available for customers that need support when dealing with ASIL requirements as per ISO 26262

## Collaterals & Tools

Product page
Databrief
Datasheet

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# STPM066S

## 4 Rail power management for automotive vision and radar systems

**Power management IC for OBC MCUs, ECUs, vision and radar systems**

## Features

### Electrical parameters

- Car passenger compatibility
- Power-up sequence, output voltages, current and switching frequencies programmable via OTP
- High switching frequency (2MHz)
- Window watchdog and reset

### Protections

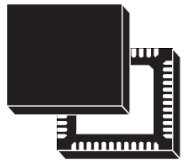
- Undervoltage / Overvoltage / Overcurrent protections
- Over temperature detection by local thermal sensors
- Short circuit protected outputs and short to ground protection
- Thermal shutdown junction temperature 175 °C

### Outputs

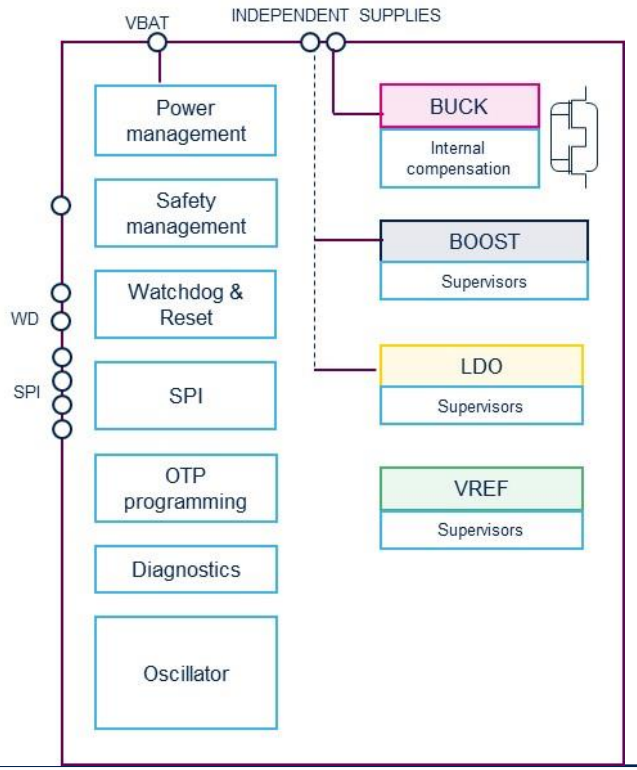
- Pre SMPS BUCK regulator, adjustable via OTP to 1.0 V, 1.1 V, 1.2 V, 1.35 V, 1.5 V, 3.3 V, 3.6 V, 5.0 V @ 1.35/2.6 A min peak current limit, 0.4/2.4 MHz
- Post SMPS BOOST regulator, adjustable via OTP to 5.0 V @ 0.3 A max load current, 7.0 V @ 0.2 A max load current, 2.4 MHz
- Post Linear regulator LDO, adjustable via OTP to 1.2 V, 1.25 V, 1.3 V, 1.8 V, 2.5 V, 2.8 V, 3.3 V, 5.0 V @ 300/600 mA max load current

### Diagnostics

- Voltage monitoring, UV/OV on all regulated rails
- Digital BIST on internal logic
- Analog BIST
- Fault pin to Microcontroller
- Ground loss monitors
- SPI interface with CRC
- Adjustable window watchdog supervisors



**VFQFPN-48 (7x7)**



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# STPM066S
## Automotive multichannel power management

### A glance at possible applications:

Power management of systems with single / double supply microcontrollers and CAN transceiver: OBC, ADAS, Infotainment

### Key values

**Fully configurable**

Flexible and configurable for multiple power supply schemes and applications

**Integrated supervision & diagnosis**

Full diagnosis functional box integration

**Fail-safe functionality**

Output supply supervision, overcurrent and overtemperature protection

### Collaterals & Tools

- Product page
- Data-brief
- Datasheet
- Brochure

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# STPM801

# Hot swap & oring IC for high redundancy power architectures

## IC with integrated Hot-Swap, Soft-Start and O-Ring and reverse input protections

## Features

### Electrical parameters

- Wide input voltage, from 4V to 65V, with -65V reverse protection
- Full function operating input voltage from 4V to 40V

### Protections

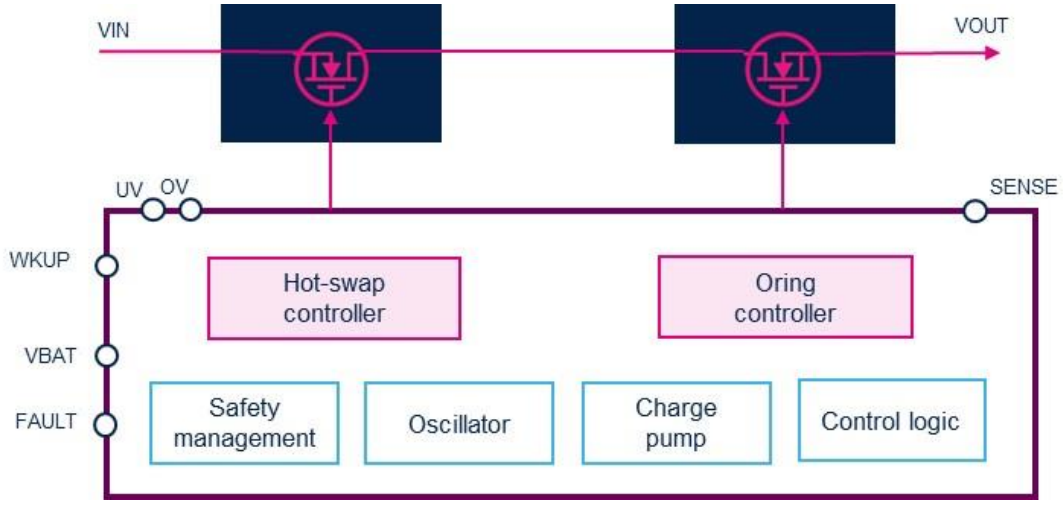
- Input overvoltage and undervoltage protections (threshold with ext divider)
- Output overcurrent protection
- Short to GND detection on Vout

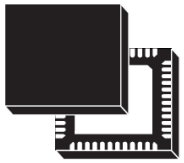
### Outputs

- 2x external N-channel MOSFET pre-drivers: 1x hot-swap + 1x o-ring
- Soft start: control of hot-swap, adjustable by external capacitor
- Stand-by mode with reduced power consumption, disabling accuracy and some diagnostics
- Complies with the 16750 AC ripple test requirements (50-25kHz)

### Diagnostics

- Fault pin: LOW whenever a fault condition is detected (i.e. OV, UV, OVC). Fault Table in the datasheet



**Package: VFQFPN-32 (5x5mm)**



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# STPM801
# hot swap & oring IC for high redundancy power architectures

## A glance at possible applications:

- ADAS
- Redundancy applications where enhanced system reliability and uninterrupted operation is important

## Key values

**Wide input voltage, from 4V to 65V**
Compatible with car and truck batteries

**Reverse input protection**
Avoid permanent damage of the load

**Hot swap and Oring in the same products**
High integration to protect loads from high voltage transients, furthermore it allows double battery / PCB

## Collaterals & Tools

- Product page
- Datasheet

# L9758
# Automotive multiple power supply IC

## PMIC with Pre-Buck, Pre-Boost, LDOs programmable and Tracking regulators

### Features

#### Electrical parameters

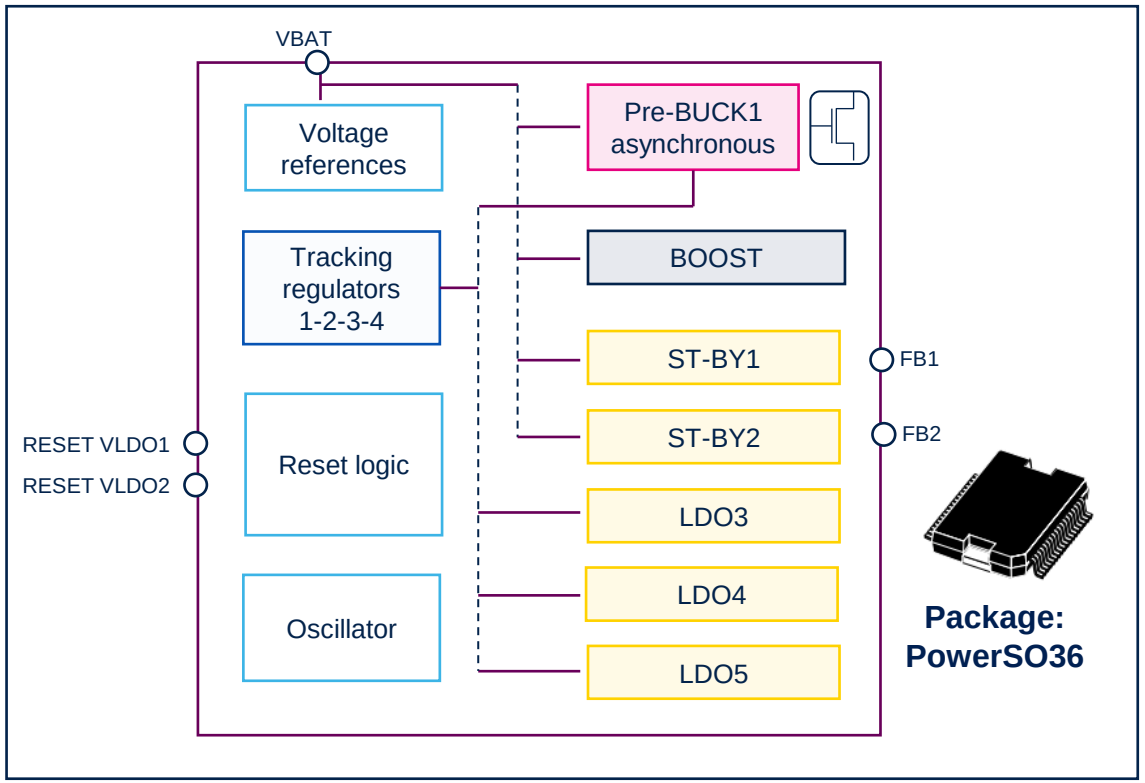
- Input voltage range compatible with car battery: -0.3 to 40 V
- Operating voltage: 4 to 26.5 V

#### Protections / Diagnostics

- Temperature monitoring and thermal shutdown
- Independent reset signals
- Independent st-by voltage monitor
- STANDBY_OK
- Two power supply enable signals
- Battery voltage thresholding
- Logic level thresholding

#### Outputs

- 1x BUCK pre-regulator, 5.5Vmin.
- 1x BOOST pre-regulator, 10V max.
- 1x LDO, 5V output, 2% accuracy @ 1A
- 1x LDO programmable 3.3V or 2.6V @ 1A
- 1x LDO programmable with external partitioning 1.5V @ 1A
- 1x LDO st-by 1V or 1.5V @ 10mA
- 1x LDO st-by 3.3V or 2.6V @ 10mA
- 4x LDO protected tracking 5V +/- 7mV @ 50mA




**Package: PowerSO36**



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# L9758
# Automotive multiple power supply IC

## A glance at possible applications:

High end automotive microcontrollers used in powertrain applications.

## Key values:

### Flexibility
Different combinations to supply the MCU

### Programmability
Programmable regulator with external pass transistor
Programmable microcontroller core voltage LDO regulator
Programmable standby memory regulator

## Collaterals & Tools

Product page
Datasheet

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# Battery management ICs

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# Line card
# Battery management system

| L9963E | L9963T | L9961 |
| --- | --- | --- |
| Li-ion battery monitoring and protection chip, up to 14 stacked cells and daisy chain up to 31 ICs: modular approach from 48V to 800V battery | General purpose SPI to isolated SPI transceiver for communication bridge between different voltages domains | Chip for consumer battery management applications up to 5 cells |

# L9963E
# Automotive chip for battery management applications

**Li-ion battery monitoring and protection chip, up to 14 stacked cells and daisy chain up to 31 ICs: modular approach from 48V to 800V battery**

## Features

### Electrical parameters

- Measures 4 to 14 cells in series, no desynchronization delay between samples
- 16-bit voltage measurement with maximum error of ±2 mV in the 1.7-4.7V range, in whole operating temp range
- 18-bit current measurement with +/-0.5% sense error accuracy

### Protections

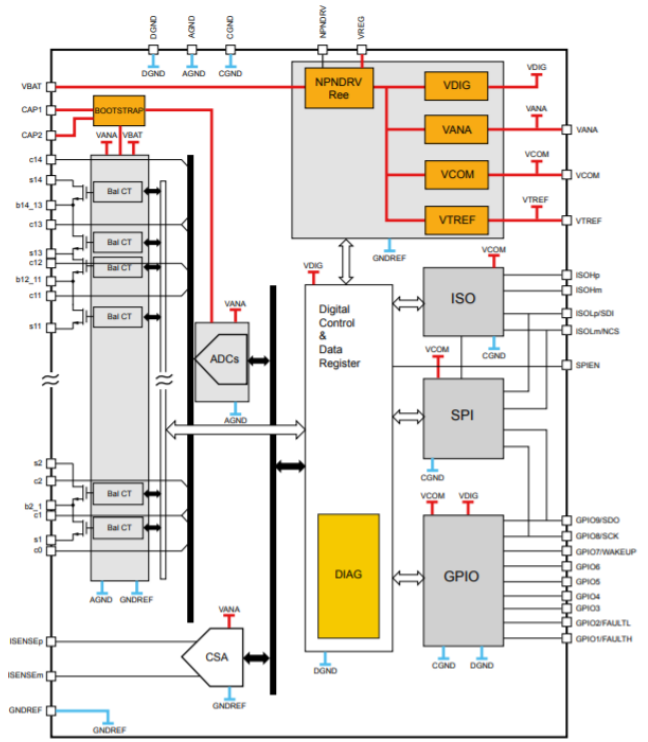
- Fully redundant cell measurement path, with ADC Swap, for enhanced safety and limp home functionality
- The device can monitor up to 7 NTCs

### Outputs

- 2.66 Mbps isolated serial communication with regenerative buffer, supporting dual access ring
- Cells voltage conversion and Synchronized current measurement with coulomb counter
- Single or multiple channel cell balancing simultaneously

### Diagnostics

- Intelligent diagnostic routine providing automatic failure validation.
- Redundant fault notification through both SPI Global Status Word (GSW) and dedicated FAULT line

# L9963E
# Automotive chip for battery management applications

## A glance at possible applications:

- Electrified vehicle
- Electric motorbike
- Forklift & industrial eqpt.
- Lawnmower & blower
- Electric forklift
- E-scooter/bike

## Key values

**Supporting accuracy**

Best-in-class cell voltage accuracy
total conversion error 2mV

**High speed data transmission**

Supporting fully synchronous cell voltage acquisition with 2us max desync on 800V battery pack

**ASIL-D solution**

Full compliant with ISO26262

## Collaterals & Tools

**L9963E**
- Product page
- Datasheet

**EVAL-L9963E-MCU**
- Product page
- Data brief
- User manual

**EVAL-L9963E-NDS**
- Product page
- Data brief

**STSW-L9963E**
- Product page
- Data brief
- User manual

Find out more about L9963E for **battery management** applications

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# L9963T
# Isolated transceiver

## General purpose SPI to isolated SPI transceiver for communication bridge between different voltages domains

### Features

#### Electrical parameters

- Compatible both with 3.3V and 5V logics
- Low standby current consumption (VDD<64uA)

#### Protections & safety

- Redundant reference voltage and dual oscillator are used to guarantee independency between monitor functions

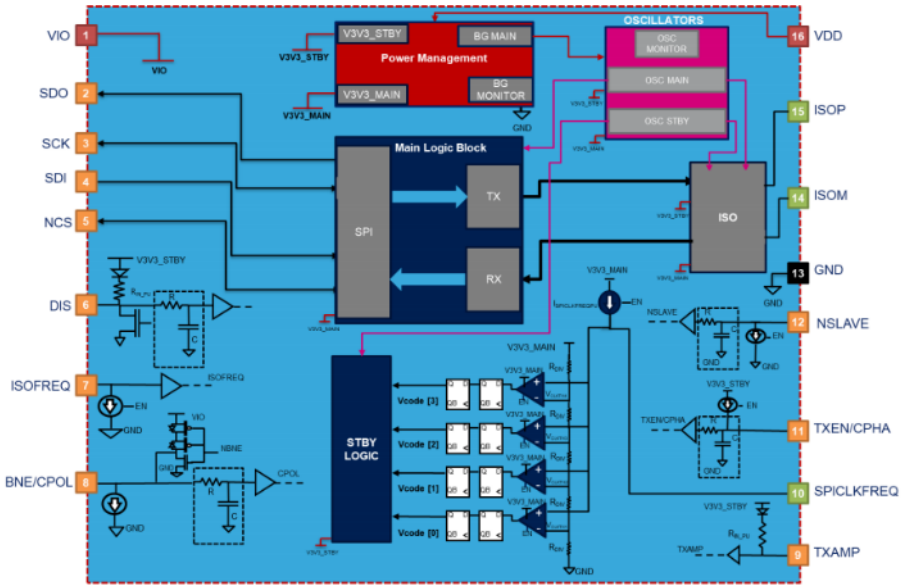
#### Outputs

- Supports both XFMR and Capacitive isolation
- 10 MHz SPI peripheral for SPI Slave operation. Configurable SPI frequency (250 kHz to 8MHz) for SPI Master operation
- 333kbps and 2.66 Mbps Vertical InterFace (VIF) for isolated SPI communication

#### Diagnostics

- Short to battery detection and balance undervoltage protection


SO16



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# L9963T
# Isolated transceiver

## A glance at possible applications:

- Electrified vehicle
- Electric motorbike
- Forklift & industrial eqpt.
- Lawnmower & blower
- Electric forklift
- E-scooter/bike

## Key values:

### Flexibility

General purpose isolated transceiver compatible to any communication protocol up to 64bit

### ASIL-D ready

Full compliant with ISO26262

## Collaterals & Tools

**L9963T**

- Datasheet
- Application note: L9963 14 Cells BMC IC Evaluation Board Quick Guide

Find out more about L9963T for **battery management** applications

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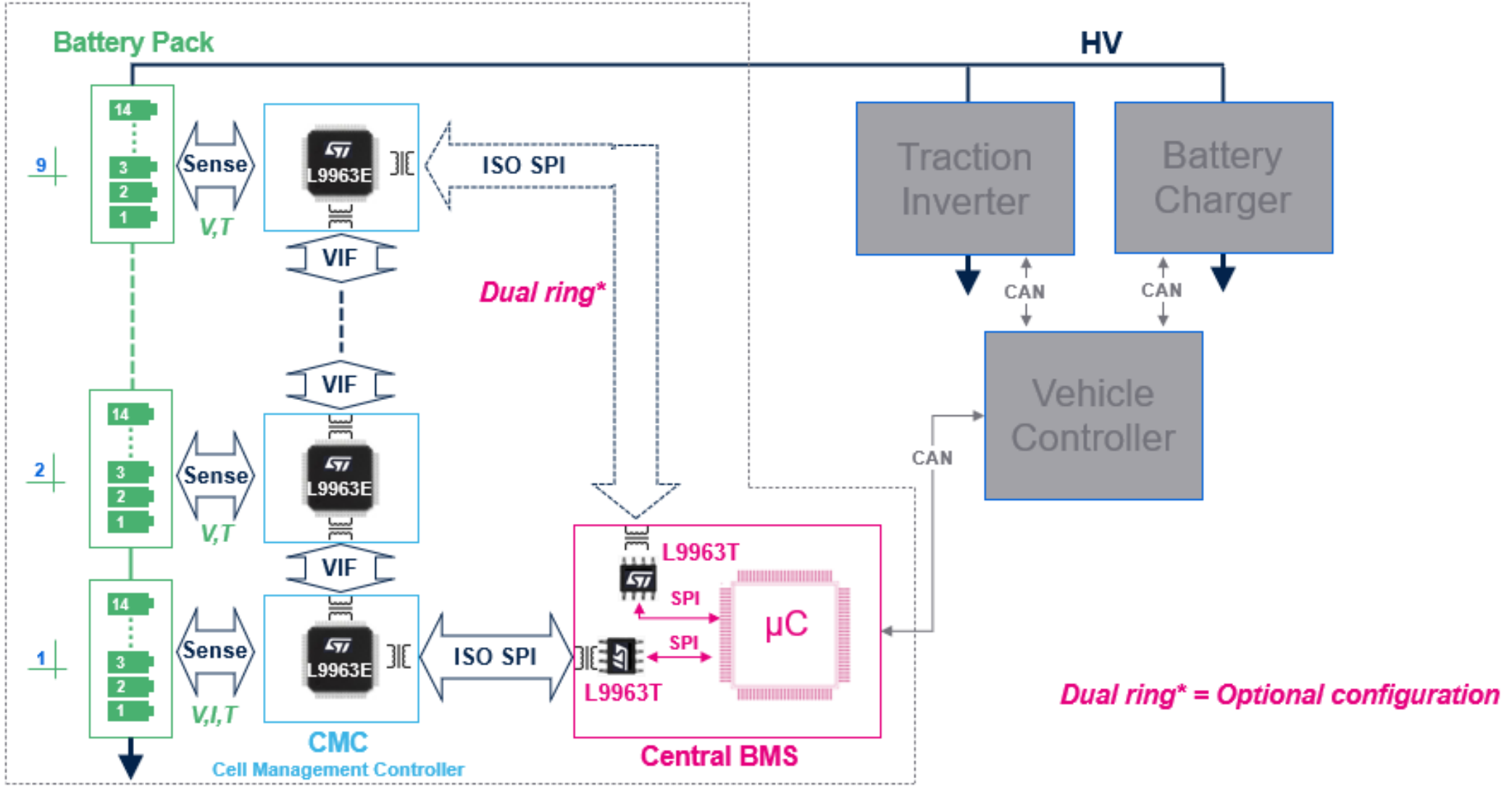
# Application example of HV battery BMS based on L9963x




V,I,T = Voltage, Current and Temperature sense

# L9961
# INDUSTRIAL Solution for Power Tools and portable devices (18V)

**3-5 cells industrial solution for power tools: capability to support the expansion of li-ion battery adoption for LV applications such as battery-operated tools, e-mobility, UPS and medical portable equipment up to 20 V**

## Features

### Electrical parameters

- Measures series cell voltages for 3, 4, or 5 cell configurations
- 16-bit signed current measurement with 0.2% maximum error after end of line calibration
- 12-bit voltage measurement with maximum error of ±15mV
- 2uA SHIP mode & 5uA STANDBY mode current consumption
- Integrated VREG system regulator 3.3V±3% @ 30mA

### Protections

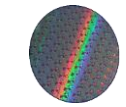
- Failsafe fuse driver
- NTC ratiometric temperature measurement, ±0.8% max. gain error

### Outputs

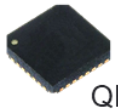
- I2C peripheral for device programming and data transfers
- Dual configurable HS/LS gate drivers for charge & discharge control
- Stack voltage measurement
- Cell balancing, 70mA per cell

### Diagnostics

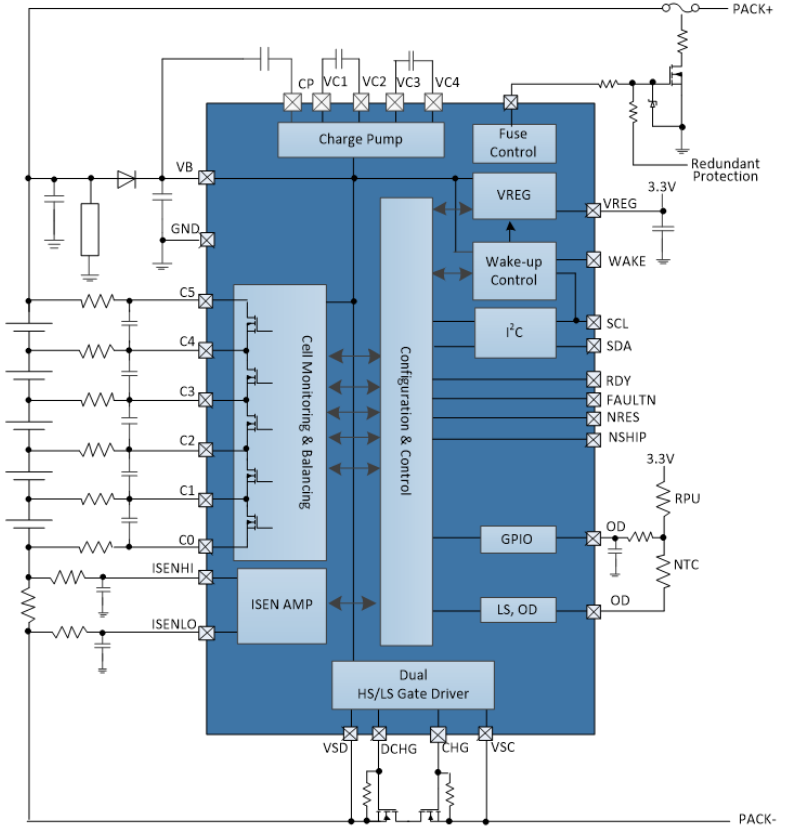
- Battery current measurement with coulomb counting & overcurrent detection
- Cell over/under voltage detection and balance undervoltage protection



BCD9sL



QFN32



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# INDUSTRIAL Solution for Power Tools and portable devices (18V)

## A glance at possible applications:

- Cordless power tools
- E-Bikes, Scooters, etc
- UPS Systems
- Medical & Portable Test Equipment

## Key values

### Accuracy

Industrial BMS best in class in terms of configurability:

-High accuracy in battery current measurements (i.e. maximum error of 0.25%);
-High accuracy in cell voltage measurements (i.e. maximum error of ± 15 mV

### Configurability

Industrial BMS best in class in terms of configurability:

-I2C peripheral for device programming and data transfers over I2C bus;

-Embedded NVM for configuration parameters storage

### Minimum Consumption of the Battery Pack

Very low current consumption in both deep-sleep mode (i.e. 2 µA) and standby mode (i.e. 5 µA)

## Collaterals & Tools

**L9961**
- Product page
- Data-brief
- Datasheet
- Flyer

**STEVAL-L99615C**
- Product page
- Data brief
- User manual

**STEVAL-L99615CX**
- Product page
- Data brief
- User manual

**STSW-L9961**
- Product page
- Data brief
- User manual

Find out more about L9961 for **battery management** applications

# “If only

I could find out more about battery management

This is where we come in

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# Line card
# **Battery cut-off**

| L9678 | L9679 |
| --- | --- |
| System Basis Chip integrating 4-channel squib drivers for emerging market solutions like battery cut-off | System Basis Chip integrating 8-channel squib drivers for emerging market solutions like battery cut-off |

# L9678P/-S
# Automotive low end System Basis Chip

**System Basis Chip integrating 4-channel squib drivers for emerging market solutions like battery cut-off**

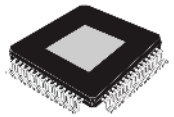
## Features

### Electrical parameters
- Energy reserve voltage power supply (high frequency boost regulator, 1.882 MHz, selectable output voltage, 23V or 33V ±5%
- Configurable linear power supplies (5V and 7.2V ±4%)

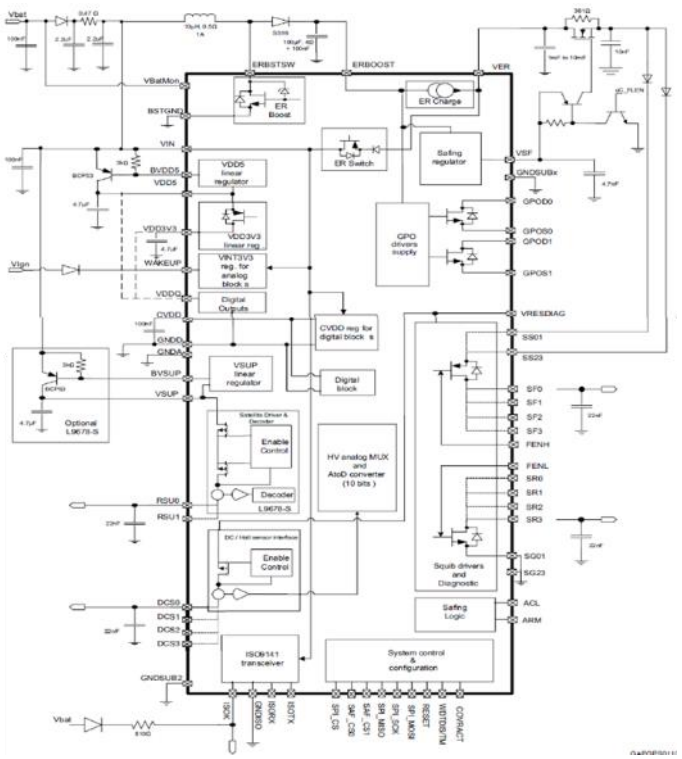
### Protections
- Battery voltage monitor and shutdown control with wake-up control
- Current monitoring

### Outputs
- 4-channel High-Side/Low-Side Squib drivers (max 25V)
- 2-channel PSI-5 remote sensor interface (L9678P-S version only)

### Diagnostics
- Battery voltage monitor and shutdown control with wake-up
- 32bit SPI for parameter setting and diagnosis
- System voltage diagnosis through internal ADC



**LQFP64**
**(exposed pad up)**





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# L9679E
# Automotive mid/high end System Basis Chip

## System Basis Chip integrating 8-channel squib drivers for emerging market solutions like battery cut-off

### Features

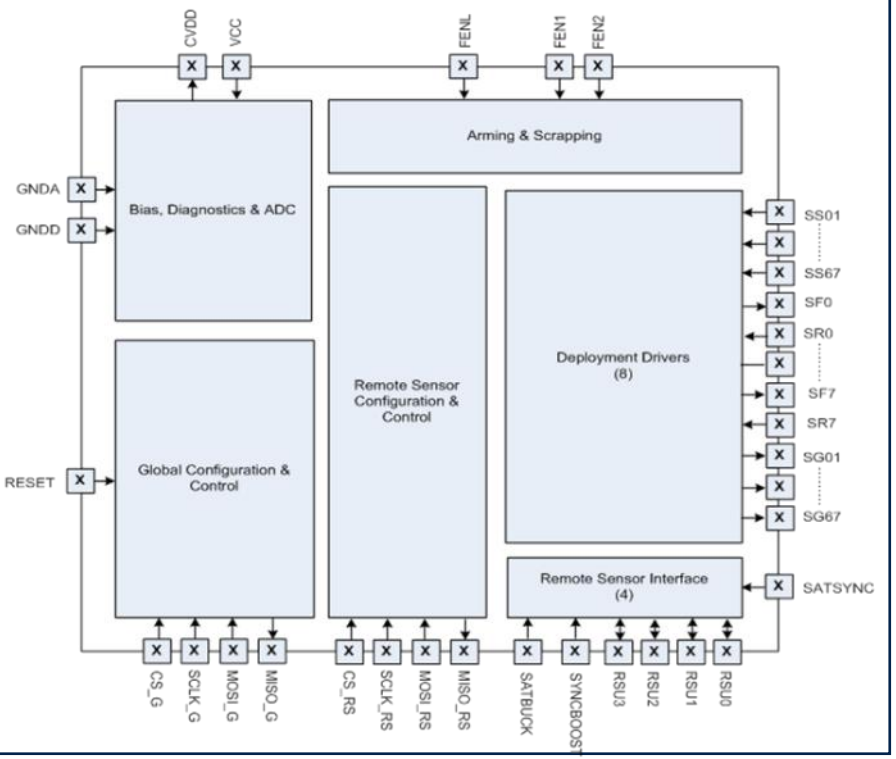
#### Electrical parameters
- Energy reserve voltage power supply (high frequency boost regulator, 1.882 MHz, selectable output voltage, 23V or 33V ±5%
- Configurable linear power supplies (5V and 7.2V ±4%)

#### Protections
- Battery voltage monitor and shutdown control with wake-up control
- Current monitoring

#### Outputs
- 8-channel High-Side/Low-Side Squib drivers (max 25V)
- 4-channel PSI-5 remote sensor interface

#### Diagnostics
- Battery voltage monitor and shutdown control with wake-up
- 32bit SPI for parameter setting and diagnosis
- System voltage diagnosis through internal ADC


TQFP48EP



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# L967xx
# Automotive low end System Basis Chip

## A glance at possible applications:

Hazard management (battery cut-off)

Airbag


## Key values

### Embedded full set of feature

Integrating solution with all key functions for power supply, management block and squib deployment

### Family approach

Belonging to U-chip set of devices compliant with ISO26262

## Collaterals & Tools

L9678P: product page, datasheet
L9678P-S: product page, datasheet
L9679E: product page, datasheet
Application note: user configurable airbag

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# Door zone ICs

# Line card
# **Door zone**

## L99DZ100G/GP

Microcontroller-driven multifunctional actuator driver with embedded 6 half-bridge, 10 high-side actuator and H-bridge driver

## L99DZ120

Microcontroller-driven multifunctional actuator driver with embedded 4 half-bridge, 10 high-side actuator and H-bridge driver

## L99DZ200G

Microcontroller-driven multifunctional actuator driver with embedded 4 half-bridge, 7 high-side actuator and Dual H-bridge driver

## L99DZ300G

Microcontroller-driven multifunctional actuator driver with embedded 6 half-bridges, 10 high-side actuator, H-bridge driver, LIN and CAN FD transceivers

# L99DZ100G/GP
# Automotive Front Door device with LIN and HS-CAN

## Microcontroller-driven multifunctional actuator driver with embedded 6 half-bridge, 10 high-side actuator and H-bridge driver

## Features

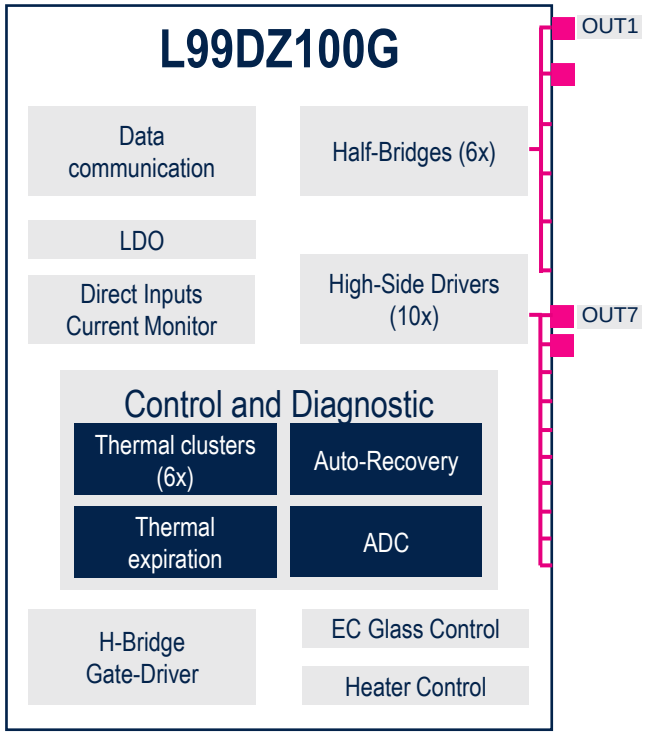
### Electrical parameters
- Max operating voltage 28V
- Very low consumption in stand-by mode Is = 21 µA Typ.
- Programmable soft-start for all the outputs

### Protections
- Over current for all the outputs
- Over- and Under-Voltage shutdown
- Thermal Clusters Shutdown & Thermal Expiration
- Charge pump output for reverse polarity protection
- Configurable Window Watchdog
- Isolated fail-safe block with 2 LS to pull down the gates of the external HS MOSFETs

### Outputs
- 6x Half-Bridge
- 10x High-Side Drivers with duty cycle adjustment
- H-Bridge driver
- High-Side CAN and LIN communication
- 2x LDOs for MCU and sensor supply (max 250mA)

### Diagnostics
- Open-load detection via SPI for all outputs
- Temperature warning
- Multiplexed current monitor for all High-Side Drivers and selected Half-Bridge
- Runtime Thermal Cluster and battery monitoring via internal ADC


**LQFP64**
**10x10mm**

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# L99DZ120
# Automotive Rear Door device with embedded LIN

## Microcontroller-driven multifunctional actuator driver with embedded 4 half-bridge, 10 high-side actuator and H-bridge driver

## Features

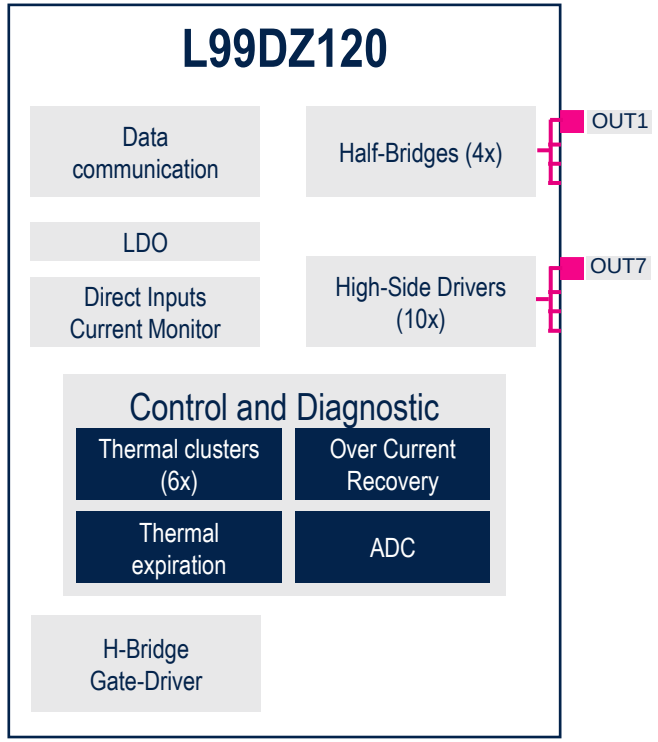
### Electrical parameters
- Max operating voltage: 28V
- Very low consumption in stand-by mode $I_S$ = 21 µA Typ.
- Programmable soft-start for all output

### Protections
- Overcurrent for all the outputs
- Over- and Under-Voltage shutdown
- Thermal clusters shutdown & thermal expiration
- Charge pump output for reverse polarity protection
- Configurable Window Watchdog
- Isolated fail-safe block with 2 LS to pull down the gates of the external HS MOSFETs

### Outputs
- 4x Half-Bridge
- 10x High-Side drivers
- H-bridge driver
- 2x LDOs for MCU and sensor supply (max 250mA)
- LIN communication

### Diagnostics
- Open-load detection via SPI for all outputs
- Temperature warning
- Multiplexed current monitor for all High-Side Drivers and selected Half-Bridge
- Runtime Thermal Cluster and battery monitoring via internal ADC


**LQFP64**
**10x10mm**



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# L99DZ100G(P) /L99DZ120
# Automotive ICs for Front and Rear doors

## A glance at possible applications:

Full Front & Rear Door functionalities addressed by:

L99DZ100G(P)
L99DZ120

## Key values

**provide highly integrated IC embedding almost all the door functionalities using a minimum set of external components**

**L99DZ100G(P)**


**L99DZ120**


## Collaterals & Tools

### L99DZ100G

- Product page
- Datasheet
- Selection guide: smartpower for body
- Technical note: TN1243, TN1245
- Flyer
- Brochure

### L99DZ120

- Product page
- Datasheet
- Flyer: rear door system IC, L99DZ8x family
- Selection guide: smartpower for body
- Brochure

### EVAL-L99DZ120

- Product page
- Data brief

Find out more about **door module drivers for door zone** applications

# L99DZ200G

# Automotive Front Door device with LIN and CAN providing Dual H-bridge driving

## Microcontroller-driven multifunctional actuator driver with embedded 4 half-bridge, 7 high-side actuator and Dual H-bridge driver

### Features

#### Electrical parameters

- Max operating voltage: 28V
- Very low consumption in stand-by mode $I_S$ = 21 µA Typ.
- Programmable soft-start for all the output

#### Protections

- Short circuit protection for integrated half bridges
- Overcurrent for all the outputs
- Over- and Under-Voltage shutdown
- Thermal clusters shutdown & thermal expiration
- Generator Mode for H-bridge drivers
- Charge pump output for reverse polarity protection

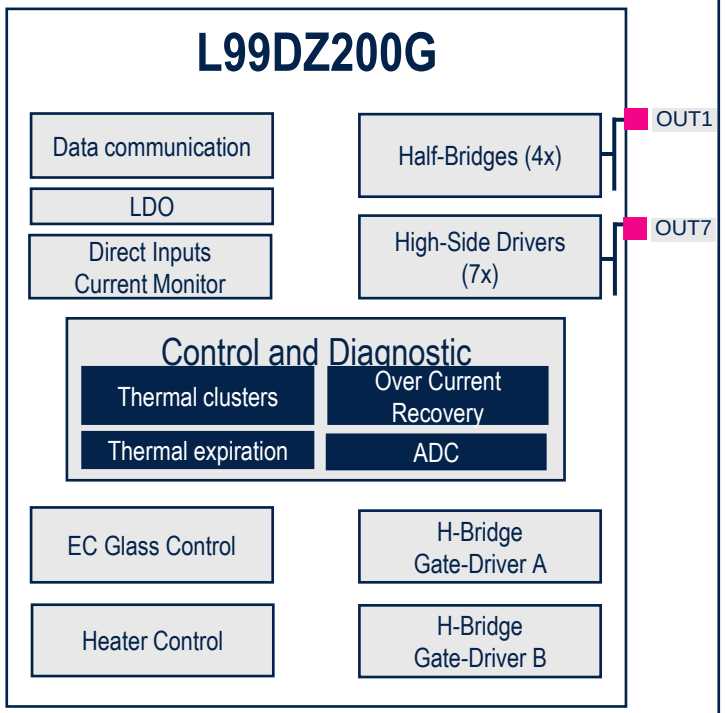
#### Outputs

- 4x Half-Bridge
- 7x High-Side Drivers with Duty Cycle Adjustment and Constant Current Mode
- 1x Dual H-bridge drivers
- High-Side CAN and LIN communication
- 2x voltage regulators for MCU and sensor supply (max 250mA)

#### Diagnostics

- Open-load detection via SPI for all outputs
- Temperature warning
- Multiplexed current monitor for all High-Side Drivers and selected Half-Bridge
- Runtime Thermal Cluster and battery monitoring via internal ADC


**LQFP64**
**10x10mm**



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# L99DZ200G

# Automotive Front Door device with LIN and CAN providing Dual H-bridge driving

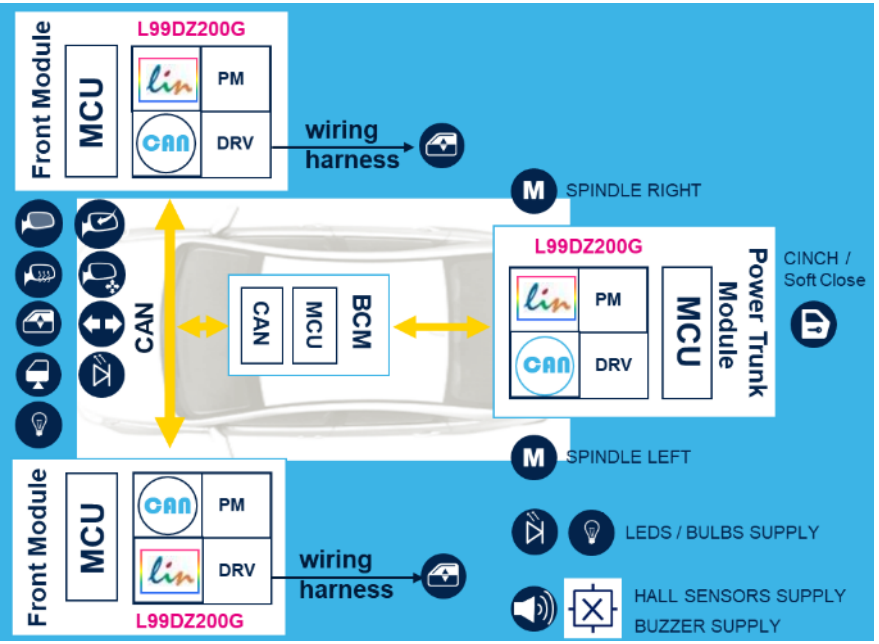
## A glance at possible applications:

Power Trunk / Tailgate applications

Front drives Rear Door

## Key values

**A single device managing several door & trunk applications**




## Collaterals & Tools

Product page
Datasheet
Selection guide: smartpower for body
Brochure

Find out more about **door module drivers for door zone** applications

# L99DZ300G

## Microcontroller-driven multifunctional actuator driver with embedded 6 half-bridges, 10 high-side actuator, H-bridge driver, LIN and CAN FD transceivers

## Features

### Electrical parameters

- Max operating voltage: 28V
- Very low consumption in stand-by mode: $I_S$ = 21 µA Typ.
- VREG1 Output current Max. value 250 mA

### Protections

- Short Circuit protection for integrated half bridges
- Overcurrent for all the outputs
- Over- and Under-Voltage shutdown
- Thermal Clusters Shutdown
- Charge pump output for reverse polarity protection

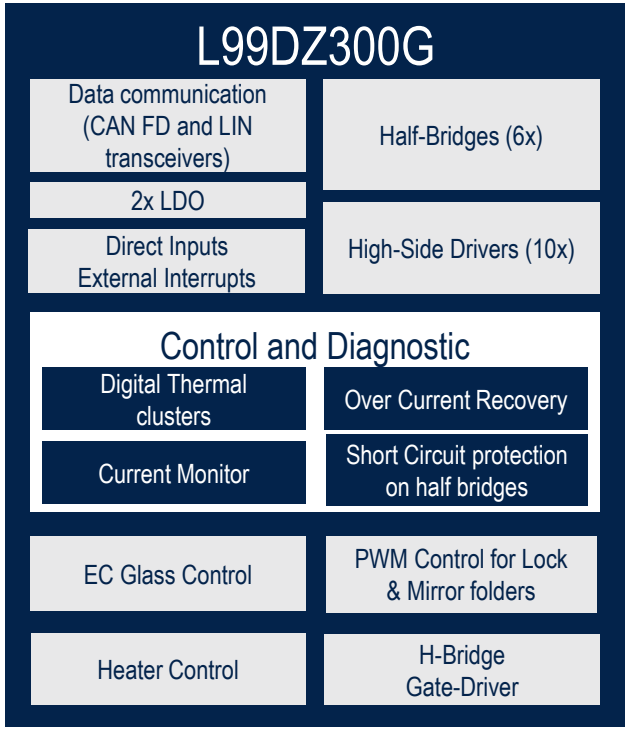
### Outputs

- 6x Half-Bridge and 10x HS drivers with Constant Current Mode
- H-bridge driver
- CAN FD and LIN communication
- 2x VREGs for micro controller and sensor supply
- EC and heater control
- Programmable soft-start for all the output
- PWM input pins for controlling half bridges

### Diagnostics

- Open-load detection via SPI for all outputs
- Temperature warning
- Multiplexed current monitor for all High-Side Drivers and selected Half-Bridge
- Runtime Thermal Cluster


LQFP64
10x10



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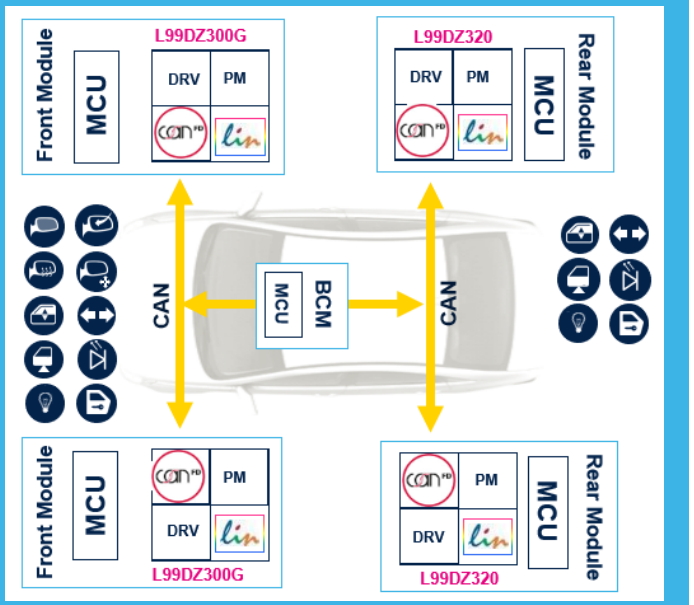
# L99DZ300G
# Automotive Front Door device with CAN FD and LIN

## Front Door Application

## Key values

**A single device managing all the electronic in the front door**




## Collaterals & Marketing Package

L99DZ300G – Datasheet

# “If only

**I could find out more about door zone**

**This is where we come in**

# Line card
# **Door lock**

## L99UDL01

Smart driver IC for multiple motor control, suitable for a wide range of applications included the centralized car lock with a single IC

# L99UDL01
# Automotive multichannel motor control – universal door lock

**Smart driver IC for multiple motor control, suitable for a wide range of applications including the centralized car lock with a single IC**

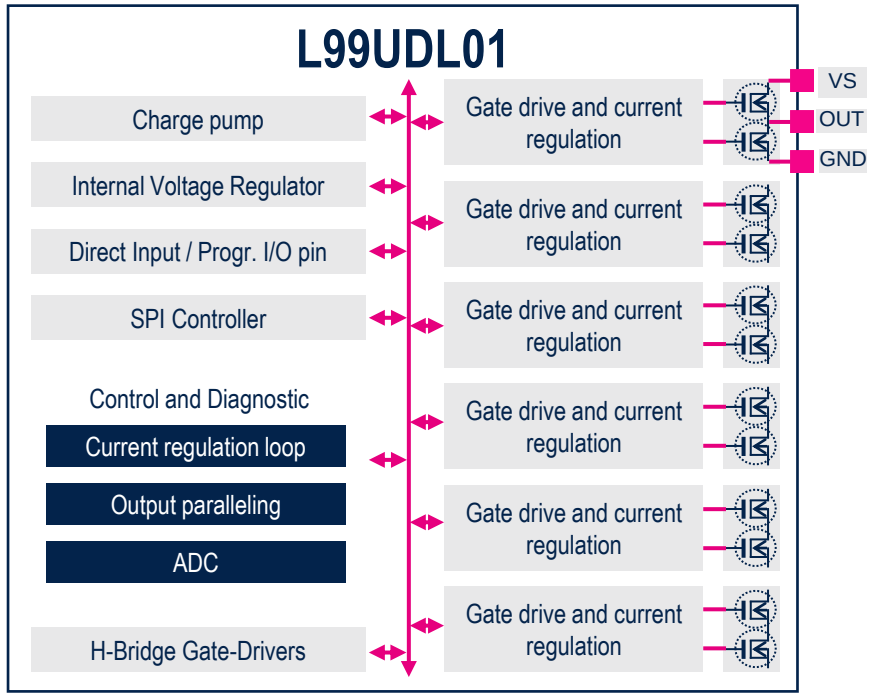
## Features

### Electrical parameters
- Extended Operating Range 5V to 26V
- Junction Temperature from -40ºC to 150ºC

### Protections
- Overload for all outputs
- Shorted and open load detection, also in off state
- Drain-source voltage monitoring for external FETs

### Outputs
- 6x Half Bridge Driver **(90mΩ)**
- 2x External Half Bridge Drivers
- Current regulation loops for each HS/LS switch
- Mechanism for paralleling up to 2x3 outputs

### Diagnostics
- Open load detection for all the outputs
- Digital current monitor 10-bit resolution via SPI
- Emergency mode overriding built-in protections

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# L99UDL01
# Automotive multichannel motor control – universal door lock

## A glance at possible applications:

Every kind of application requiring multiple smart motor control as well as:

Centralized door lock

Vending machines

## Key values

### Integration concept

Provide an IC that can control all door lock configurations using a minimum of external components

### Reduce peak currents

Reduces the power requirements in wiring, circuit board and silicon, improving system reliability level

### Multiple Motor Smart Control

Closed loop current control, output paralleling mechanism, serial control, full set of protection and diagnostics makes the device ideal also in multiple motor control applications

## Collaterals & Tools

### L99UDL01

- Product page
- Datasheet
- Selection guide: smartpower for body
- Brochure
- Flyer

### EVAL-L99UDL01

- Product page
- Data brief

### STSW-L99UDL01

- Product page
- Data brief
- User manual
- License

# Engine management systems

# Line card
# Engine management systems for 1/4-cylinders

| L9177A | L9779WD | L9788 |
|---|---|---|
| U-chip integrating all key functions for an Electronic Fuel Injection (EFI) ECU up to 2 cylinders | U-chip integrating all key functions for an Electronic Fuel Injection (EFI) ECU up to 4 cylinders | Multi-output integrated circuit embedding a full set of power supplies and signal processing peripherals for 4-cylinder engine management |

| L9780 | L9966 |
|---|---|
| Sensor control device with voltage controlled current source compatible with a wide range of air fuel sensors | Programmable sensor interface with up-to 15-channels used for a broad variety of analog/digital sensing and resistance measurement |

# L9177A
# Small Engine EFI (Electronic Fuel Injection) U-chip

**U-chip integrating all key functions for an Electronic Fuel Injection (EFI) ECU up to 2 cylinders**

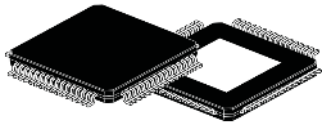
## Features

### Electrical parameters
- Voltage supply operation: 6V-18V (basic functionalities down to 3.9V)

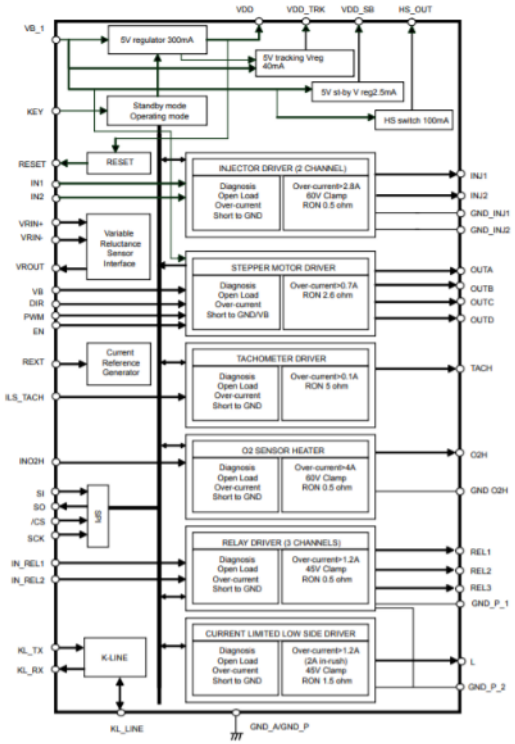
### Protections
- Short to battery protection
- Short to ground protection
- Thermal shutdown protection

### Inputs/Outputs
- 2-channel solenoids drivers
- 3x relay drivers
- 1x stepper motor driver
- 1x O2 sensor heater
- 2x 5V regulator (300/400mA)
- 1x 5V tracking regulator
- 1x High-Side driver min 100mA

### Diagnostics
- 16-bit serial peripheral interface for control and diagnosis
- Full diagnosis via SPI (injector driver, relay and lamp driver, O2 sensor heater, tachometer, stepper motor driver, general)



**TQFP64**
**(exposed pad down)**



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# L9177A
# Small Engine EFI (Electronic Fuel Injection) U-chip

## A glance at possible applications:

- Two wheelers
- Microcar
- Lawnmowers
- UPS / generators

## Key values

### Embedding a set of features

All key functions for an EFI ECU are included

### Achieving Optimization

Solution with optimized BOM and form factor

### EMS family

L9177A is the smallest member of a family of U-chip specifically conceived for EFI ECU

## Collaterals & Tools

### L9177/A

- L9177: product page, datasheet
- L9177A: product page, datasheet
- Application note: lamp switch mgmt., white paper

### EVAL-L9177A

- Product page
- Data brief
- User manual
- Board manufacturing specification
- Bill of material
- Schematics

### STSW-L9177A

- Product page
- Data brief
- User manual
- License agreement

Find out more about L9177/A **engine management SBC for engine management** applications

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# L9779WD
# EFI (Electronic Fuel Injection) U-chip

## U-chip integrating all key functions for an Electronic Fuel Injection (EFI) ECU up to 4 cylinders

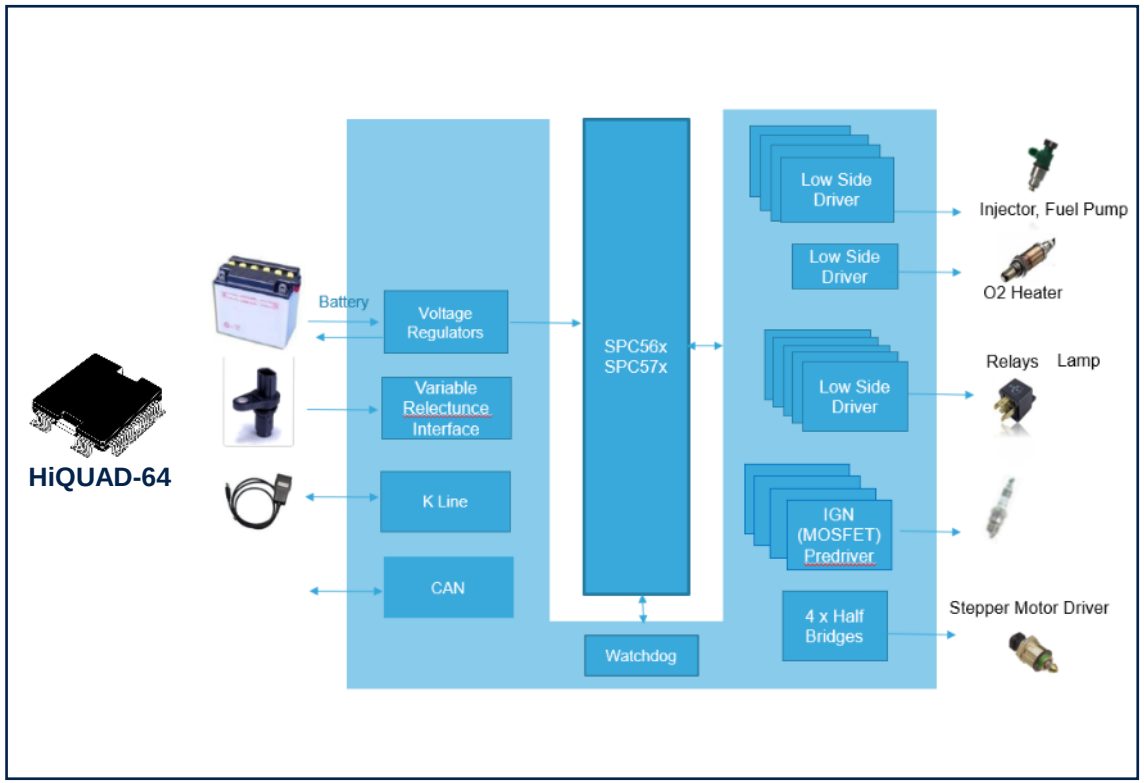
### Features

#### Electrical parameters
- Voltage supply operation 6V-18V (basic functionalities down to 4.15V)

#### Protections
- Short to battery protection
- Short to ground protection
- Thermal shutdown protection

#### Inputs/Outputs
- 14x Low-Side Drivers
- 4x MOSFET pre-drivers
- 4x Independent Half-Bridge drivers
- 1x O2 sensor heater
- 3/5V  regulator (100mA)
- 1x 5V tracking regulator

#### Diagnostics
- 16-bit serial peripheral interface for control and diagnosis



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# L9779WD
# EFI (Electronic Fuel Injection) U-chip

## A glance at possible applications:

- Up to 4 cylinder 2 and 4 wheelers
- Vehicle Control Unit
- UPS/ generators
- ICE forklift

## Key values

### Embedding a set of features

All key functions for an EFI ECU are included. High Speed CAN also on board

### Achieving Optimization

Solution with optimized BOM & form factor. High performance power dissipation package

### EMS family

L9779WD is the mid end member of a family of U-chip specifically conceived for EFI ECU

## Collaterals & Tools

### L9779WD/-SPI

- L9779WD: product page, datasheet
- L9779WD/-SPI: product page, datasheet
- Application note: lamp switch mgmt., white paper

### EVAL-L9779WD-SPI

- Product page
- Data brief
- User manual
- Board manufacturing specification
- Bill of material
- Schematics

### STSW-L9779WD-SPI

- Product page
- User manual
- License agreement

Find out more about L9779WD **engine management SBC for engine management** applications

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# L9788
# Automotive 4-cylinder ICE management IC

**Multi-output integrated circuit embedding a full set of power supplies and signal processing peripherals for 4-cylinder engine management**

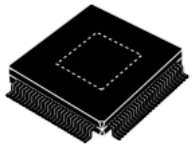
## Features

### Electrical parameters
- Voltage supply operation: 6V-18V (basic functionalities down to 3.9V)

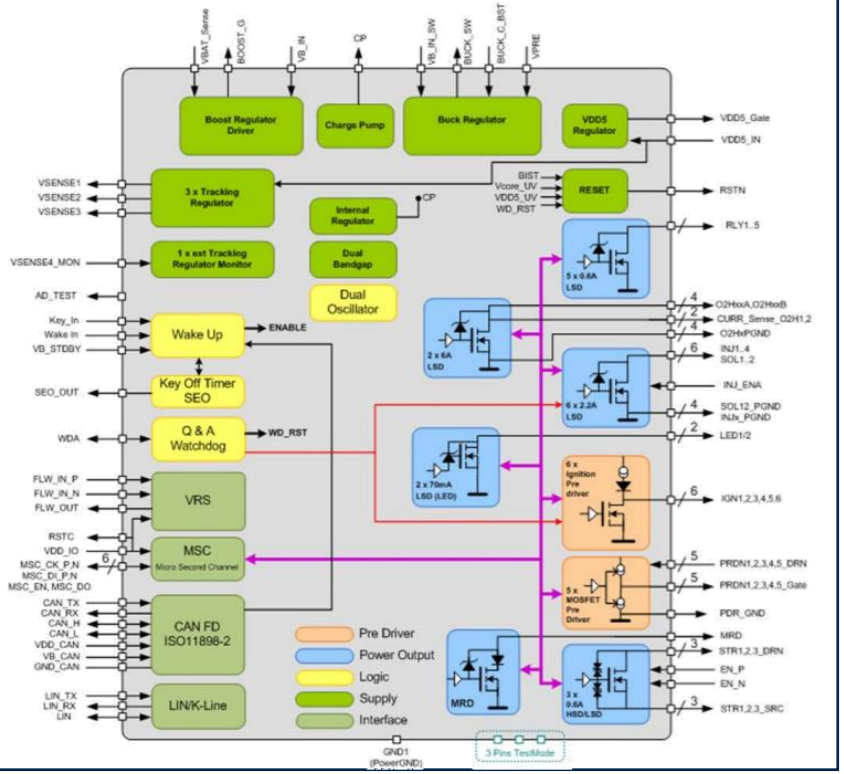
### Protections
- Soft start-up of all regulators
- Battery protection
- Thermal protection

### Inputs/Outputs
- 1x pre-boost & 1x pre-buck regulator
- 1x LDO 5V, 1 A
- 3x tracking regulator 5V, 150 mA
- Multiple-channels LS/HS drivers for O2H load, camshaft or solenoid, LED, injector, relay, internal or external igniter drivers including functionalities of reverse battery protection, low battery function for smart start

### Diagnostics
- Temperature sensor and monitoring
- Full diagnostics via CAN-FD with wake up by CAN function



**LQFP100 14x14x1.4 (exposed pad down)**




- ISO26262 ready for ASIL D systems



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# L9788
# Automotive 4-cylinder ICE management IC

## A glance at possible applications:

- Up to 4 cylinder 2 and 4 wheelers
- Vehicle Control Unit
- UPS/ generators
- ICE forklift

## Key values

**Flexible and programmable**

Multiple-outputs with extensive programmability and with full diagnostics managed via CAN-FD

**BOM Optimization**

Solution with optimized BOM & form factor integrating a full set of power supplies and signal preprocessing peripherals

**Functional Safety**

ISO26262 ready for ASIL-D systems

**Embedding a set of features**

All key functions needed to control a 4 cylinders internal combustion engine are included. CAN also on board

## Collaterals & Tools

### L9788

- Product page
- Data brief
- Application note
- White paper

### EVAL-L9788

- Product page
- Data brief
- User manual
- Board manufacturing specification
- Bill of material
- Schematics

### STSW-L9788

- Product page
- Data brief
- License agreement

# L9780
# Automotive air sensor interface

**Sensor control device with voltage controlled current source compatible with a wide range of air fuel sensors embedding also external FET drivers to control sensor heater**

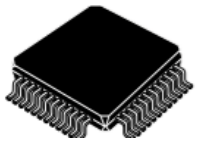
## Features

### Electrical parameters
- 5 V internal operating voltage supply

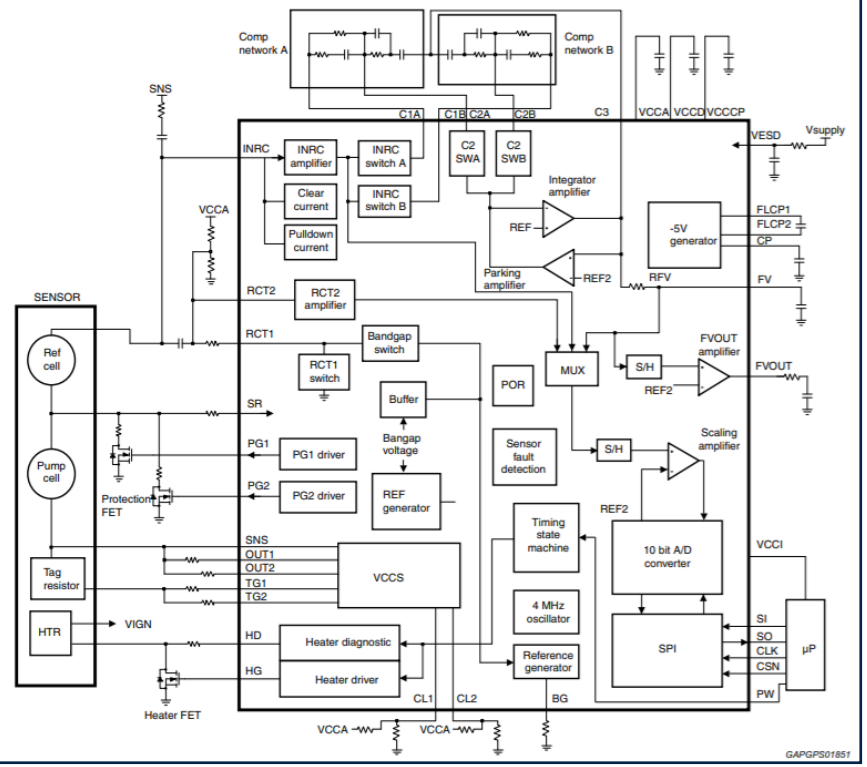
### Protections
- Sensor and all I/O protection against shorts

### Inputs/Outputs
- Digital input and outputs compatible with 5 V or 3.3 V voltage supply
- 2x channels available to connect compensation networks

### Diagnostics
- Fault communication via SPI
- Short to battery diagnostic on functional ground (pin SR) and on voltage from reference cell (pin INRC)



LQFP48



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# L9780
# Automotive air sensor interface

## A glance at possible applications:

- Up to 4 cylinder 2 and 4 wheelers
- Body and chassis modules
- UPS/ generators
- ICE forklift

## Key values

**Flexible and programmable**

All the main time values for a right sequencing of the measurement process an be configured by SPI

**Features integration**

L9780 drives also an external FET used to control the sensor heater

**Extensive compatibility**

Compatible with most sensors on the market

## Collaterals & Tools

**L9780**

Product page
Datasheet
Selection guide: Smart power solutions for car body applications

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# L9966
# Automotive programmable sensor interface

**Programmable sensor interface with up-to 15-channels used for a broad variety of analog/digital sensing and resistance measurement**

## Features

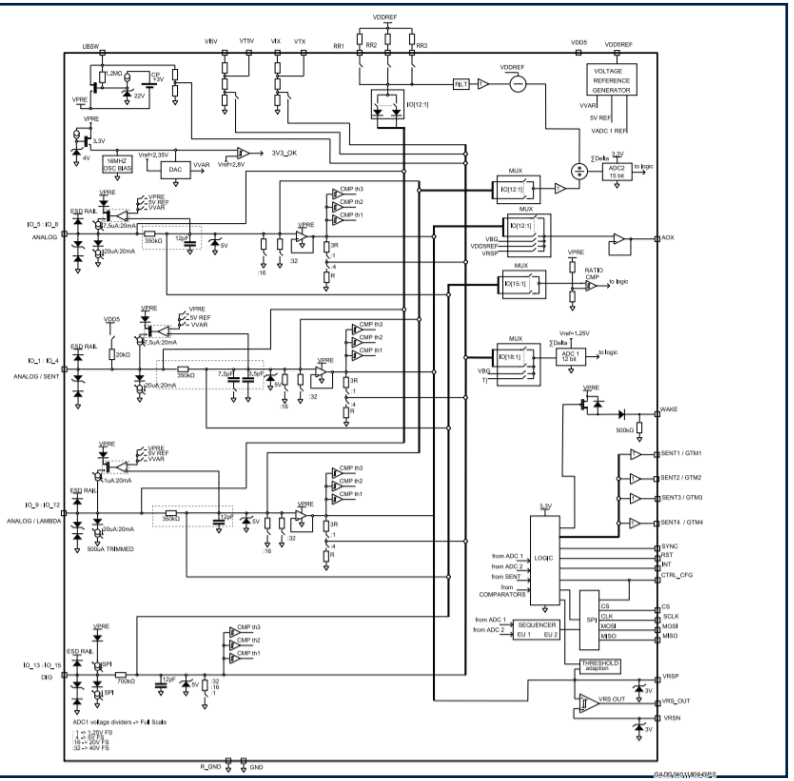
### Electrical parameters
- 12 V and 24 V systems compatible
- Operating voltage supply: 5.5-36V

### Protections
- Overtemperature protection

### Inputs/Outputs
- 12x input channels for connection to external analog loads (4 with also λ sensor functionality, 4 with also SENT functionality)
- 3x inputs channels for connection to external digital switches
- 1x analog output channel
- 4x digital output channels

### Diagnostics
- SPI interface for device configuration, diagnostics and data communication

TQFP48 7x7 mm





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# L9966
# Automotive programmable sensor interface

## A glance at possible applications:

- Up to 4 cylinder 2 and 4 wheelers
- Body and chassis modules
- UPS/ generators
- ICE forklift

## Key values

**Flexible and programmable**

Several inputs options and programmability for analog/digital and resistance measurement

**BOM Optimization**

Replacing a broad number of discrete components

**Extensive compatibility**

Possibility to change the sensors across different applications without modifying the PCB hardware

## Collaterals & Tools

**L9966**

Product page
Data brief
Application note: evaluation on L9966 fitting requirements of some automotive applications, main supply power up using L9966

# Line card
# Alternator voltage regulator

| L9918 | L9916 | L9911 |
| --- | --- | --- |
| Alternator voltage regulator, suited for 12 V automotive systems, able to communicate with ECU through LIN communication protocol | Smart alternator voltage regulator conceived to be used in automotive application for both 12 V and 24 V systems | Monolithic multifunction alternator voltage regulator for 12V automotive applications |

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# L9918

# Alternator voltage regulator with LIN interface

**Alternator voltage regulator, suited for 12 V automotive systems, able to communicate with ECU through LIN communication protocol. NVM cells, for device parameters programmability, makes it suitable for a wide range of charging applications**

## Features

### Electrical parameters

- Operating voltage: 12 V automotive battery voltage range

### Protections

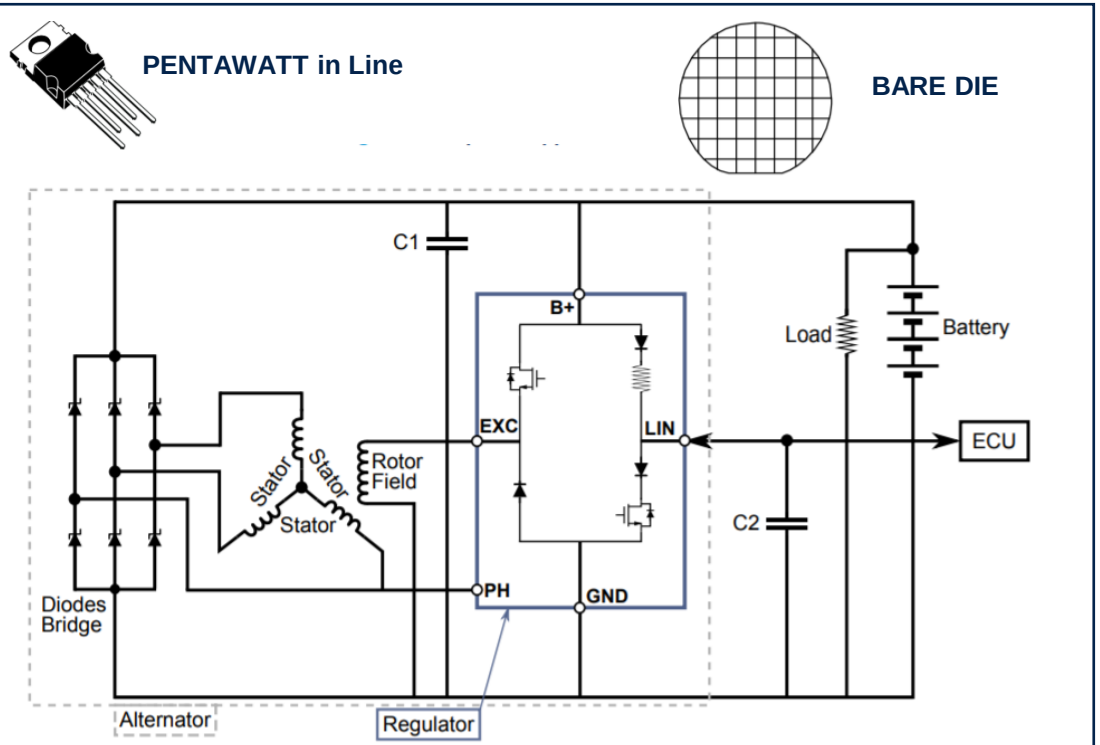
- Current limitation and overcurrent protection
- Thermal protection
- Full ISO26262 compliant, ASIL-B systems ready

### Inputs/Outputs

- Closed loop voltage control
- Regulated voltage with thermal compensation function
- High side excitation driver with internal freewheeling circuit
- Load response control (LRC) and Return LRC
- Self-start activation by phase signal

### Diagnostics

- Physical Layer compliant with LIN 2.2A spec.
- Data Link Layer compliant with LIN 1.3, 2.1, 2.2 and 2.2A specification
- Compliant to VDA LIN-Generator-Regulator specification



# L9918

# Alternator voltage regulator with LIN interface

## A glance at possible applications:

- 12V automotive alternators
- 12V truck alternators

## Key values

### Steady Voltage on Car Loads

The device modulates the rotor current in order to keep the voltage on car loads steady to a target value whatever the vehicle demand

### Flexible and programmable

NVM cells, for device parameters programmability, makes it suitable for a wide range of charging applications

### Extensive compatibility

The device is suitable for alternators with different poles pair number (configurable for 5, 6, 7, 8 or 9 pole pair alternator)

## Collaterals & Tools

**L9918**

Product page
Data-brief

# L9916

# Multifunction alternator voltage regulator for 12 V / 24 V on board networks

**Smart alternator voltage regulator conceived to be used in automotive application for both 12 V and 24 V systems. The presence of OTP cells for parameters programmability makes it suitable for a wide range of charging application.**

## Features

### Electrical parameters

- Operating voltage: 12 V automotive battery voltage range
- Operating voltage: 24 V automotive battery voltage range

### Protections

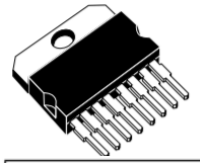
- Thermal shutdown
- Field short circuit protection
- Protected high side relay driver

### Inputs/Outputs

- High side field driver
- Self-start function
- Regulated voltage thermally compensated
- Configurable parameters through OTP cells
- Lamp driver
- Load response control (LRC)

### Diagnostics

- Continuous feedback to the ECU is provided through the Field Monitor output.



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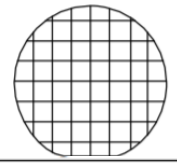

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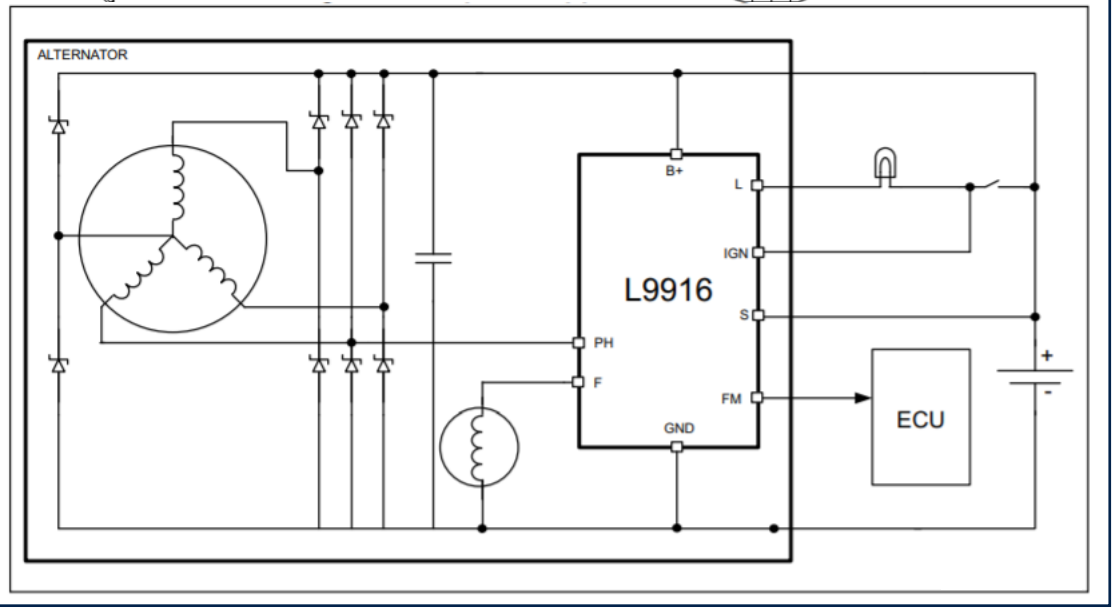




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# L9916

# Multifunction alternator voltage regulator for 12 V / 24 V on board networks

## A glance at possible applications:

- 12V automotive alternators
- 12V truck alternators
- 24V automotive alternators
- 24V truck alternators

## Key values

### Steady Voltage on Car Loads

The device is able to keep the battery at its nominal value whatever the vehicle demand

### Flexible and programmable

The presence of OTP cells for parameters programmability makes it suitable for a wide range of charging application

### Extensive compatibility

The device is suitable for multi-phase-current alternators at 12V and 24 V systems

## Collaterals & Tools

**L9916**

Product page
Datasheet

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# L9911

# Multifunction smart regulator with lamp/relay diagnostic driver

**Monolithic multifunction alternator voltage regulator for 12V automotive applications. It includes the control section, the field power stage, fault diagnostic circuit which drives a warning lamp, and the protection against short circuits**

## Features

### Electrical parameters

- Operating voltage: 12 V automotive battery voltage range

### Protections

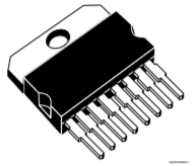
- Thermal protection
- Field short circuit protection
- Protected diagnostic lamp driver
- Protected high side relay driver

### Inputs/Outputs

- High side field driver
- Load response control
- Self start function

### Diagnostics

- Continuous feedback to the ECU is provided through the DFM (Field Monitor) output



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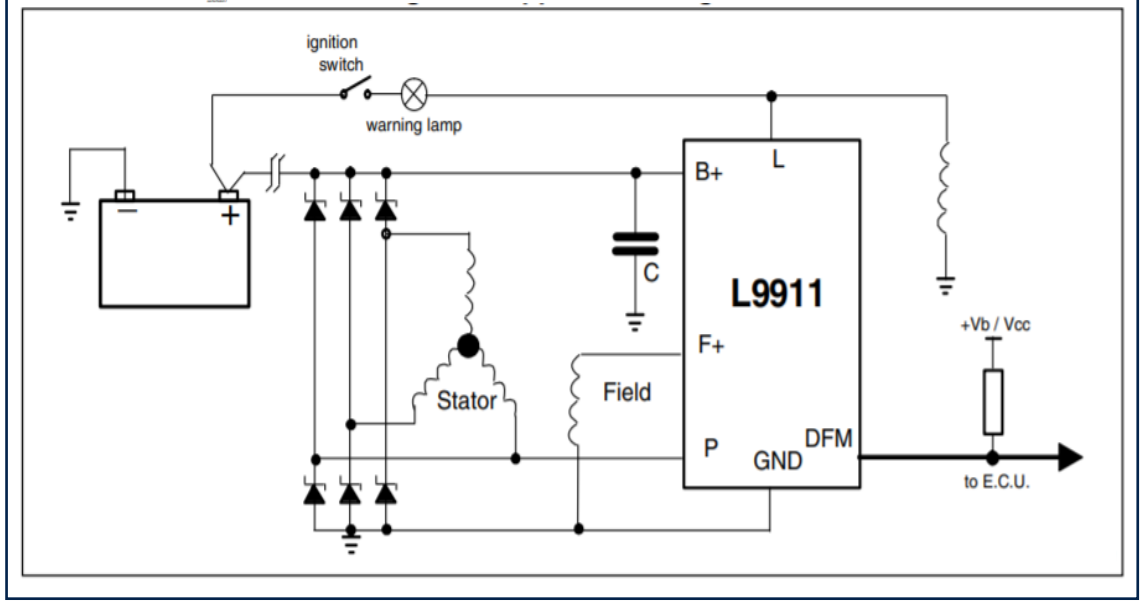




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# L9911

# Multifunction smart regulator with lamp/relay diagnostic driver

## A glance at possible applications:

- 12V automotive alternators
- 12V truck alternators

## Key values

### Flexible

The internal circuit regulates the soft start characteristics (activated always at engine start) and the soft attack characteristics

### Features integration

The device doesn't need, in the standard application, any external component

### Fault Diagnosis

The device detects fault conditions related to the three alternator phases. Fault warnings are not displayed immediately but are delayed by a fixed time

## Collaterals & Tools

**L9911**

Product page
Datasheet

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# “If only

**I could find out more about engine management**

**This is where we come in**

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# Electronic Parking Brake

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# Line card
# H-bridge DC motor pre-driver ICs for Electronic Parking Brake

| L9369 | L9370 |
| --- | --- |
| Dual H-Bridge DC motor pre-driver IC for EPB application: SPI controlled and designed for VDA 2.0 compliance | Dual H-Bridge DC motor pre-driver IC for EPB application: SPI controlled and designed for VDA 3.0 compliance |

# L9369

# Automotive Dual H-Bridge pre-driver for EPB

**Designed for compliance with VDA 2.0, equipped with integrated button interface for diagnostics and system wake-up, with independent integrated current and voltage measurement paths**

## Features

### Electrical parameters

- Operating supply voltage 5.5V to 32V
- Synchronized motor current/voltage acquisition with 10 integrated fully differential channels (with VDA 2.0 compliance for accuracy)

### Protections

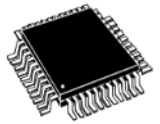
- reverse battery protection FET
- Programmable thermal, undervoltage, overvoltage , drain-source protections
- Redundant safety low-side switch-off path
- Configurable OVC detection

### Outputs

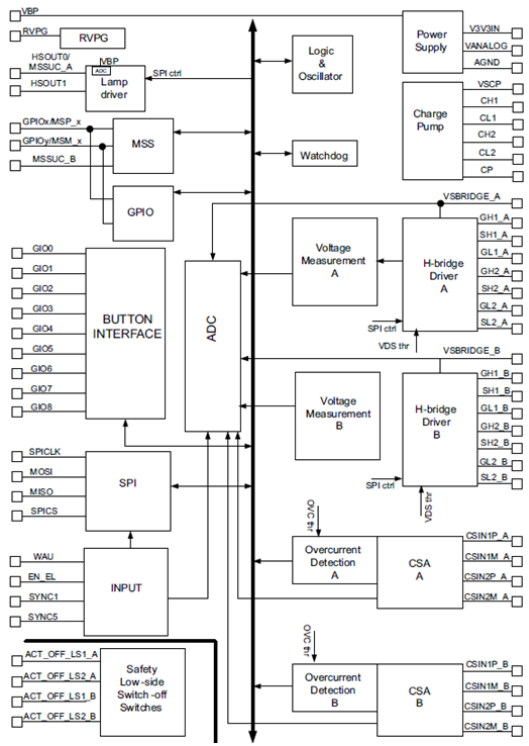
- 2x H-bridge pre-driver stages fully controlled and configured by SPI (with PWM mode option)
- 2x configurable HS / LS lamp drivers
- 4x GPIOs , also for SYS wake up in Sleep Mode (Button I/F)

### Diagnostics

- Programmable and independent Motors diagnostics in Off state
- Integrated button interface for monitoring in Normal and system wake up in Sleep mode
- SPI current and voltage readouts



LQFP64



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# L9369
# Automotive Dual H-Bridge pre-driver for EPB

## A glance at possible applications:

- Electronic Parking Brake
- Generic DC motor driving

## Key values

- 4x integrated measurement paths for synchronized digital motor current acquisition (13bit resolution), Configurable LP Filter, OVC protection
- 8xGIOs for integrated Button IF diagnostics in Normal and Sleep mode with System wake pulse generation
- 2 independent, SPI controlled H-bridge pre-drivers, with redundant safety switch-off path in isolated area
- 6x integrated measurement paths for synchronized digital motor voltage acquisition (12bit), configurable LP filter Motor diagnostics in Off state
- SPI 10MHz WD and CRC
- ISO26262 compliance for ASIL-D systems
- 2x Motor Speed Sensor I/Fs
- 2x configurable HS / LS lamp drivers

## Collaterals & Tools

Product page
Databrief
Application Note

Find out more about L9369 and ST solutions for **Electronic Parking Brake (EPB) application**

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# L9370

# Automotive Dual H-Bridge pre-driver for EPB

**Designed for compliance with VDA 3.0, equipped with integrated button interface for diagnostics and system wake-up, with independent integrated current and voltage measurement paths**

## Features

### Electrical parameters

- Operating supply voltage 5.5V to 32V
- Synchronized motor current/voltage acquisition with 10 integrated fully differential channels (with VDA 3.0 compliance for accuracy)

### Protections

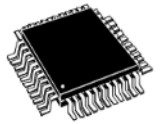
- reverse battery protection FET
- Programmable thermal, undervoltage, overvoltage , drain-source protections
- Redundant safety low-side switch-off path
- Configurable OVC detection

### Outputs

- 2x H-bridge pre-driver stages fully controlled and configured by SPI (with PWM mode option)
- 2x configurable HS / LS lamp drivers
- 4x GPIOs , also for SYS wake up in Sleep Mode (Button I/F)

### Diagnostics

- Programmable and independent Motors diagnostics in Off state
- Integrated button interface for monitoring in Normal and system wake up in Sleep mode
- SPI current and voltage readouts



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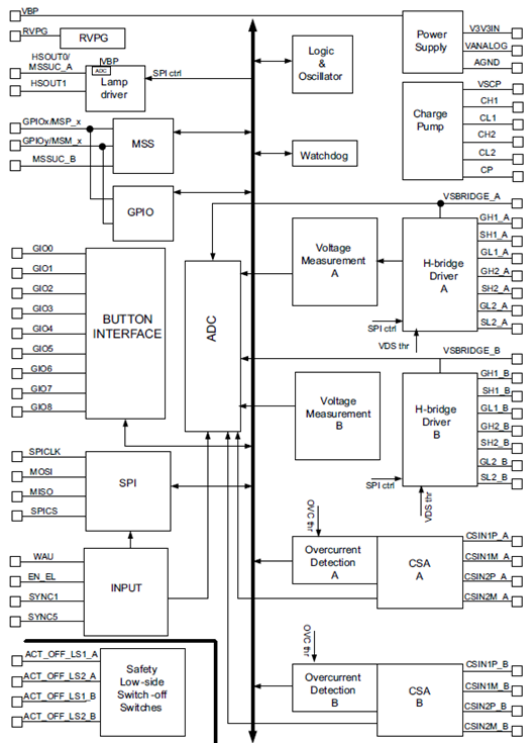




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# L9370
# Automotive Dual H-Bridge pre-driver for EPB

## A glance at possible applications:

- Electronic Parking Brake
- Generic DC motor driving

## Key values

- 4x integrated measurement paths for synchronized digital motor current acquisition (13bit resolution), Configurable LP Filter, OVC protection
- 8xGIOs for integrated Button IF diagnostics in Normal and Sleep mode with System wake pulse generation
- 2 independent, SPI controlled H-bridge pre-drivers, with redundant safety switch-off path in isolated area
- 6x integrated measurement paths for synchronized digital motor voltage acquisition (12bit), configurable LP filter Motor diagnostics in Off state
- SPI 10MHz WD and CRC
- ISO26262 compliance for ASIL-D systems
- 2x Motor Speed Sensor I/Fs
- 2x configurable HS / LS lamp drivers

## Collaterals & Tools

Product page
Databrief
Application Note

Find out more about L9370 and ST solutions for **Electronic Parking Brake (EPB) application**

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# Airbag Systems

# Line card
# Automotive ICs for Airbag

| L9691 | L9690 | L9689E |
| --- | --- | --- |
| Advanced and complete system chip solution including power supply stage, 16-ch squib drivers, 8-ch remote sensor IF, 12-ch DC sensor IF; full ISO262622 compliance for target systems rated ASIL-D. | Advanced and complete system chip solution including power supply stage, 12-ch squib drivers, 6-ch remote sensor IF, 9-ch DC sensor IF; full ISO262622 compliance for target systems rated ASIL-D. | Airbag Product family Expansion IC including 8-ch squib drivers, 2-ch remote sensor IF, 7-ch DC sensor IF; full ISO262622 compliance for target systems rated ASIL-D. |

# L9691
# Automotive 16ch IC for advanced Airbag application

**Full ISO26262 compliance design, with flexible configuration as single IC and master/slave, integrating a high frequency power supply stage, squib drivers, PSI5 and DC sensor interfaces**

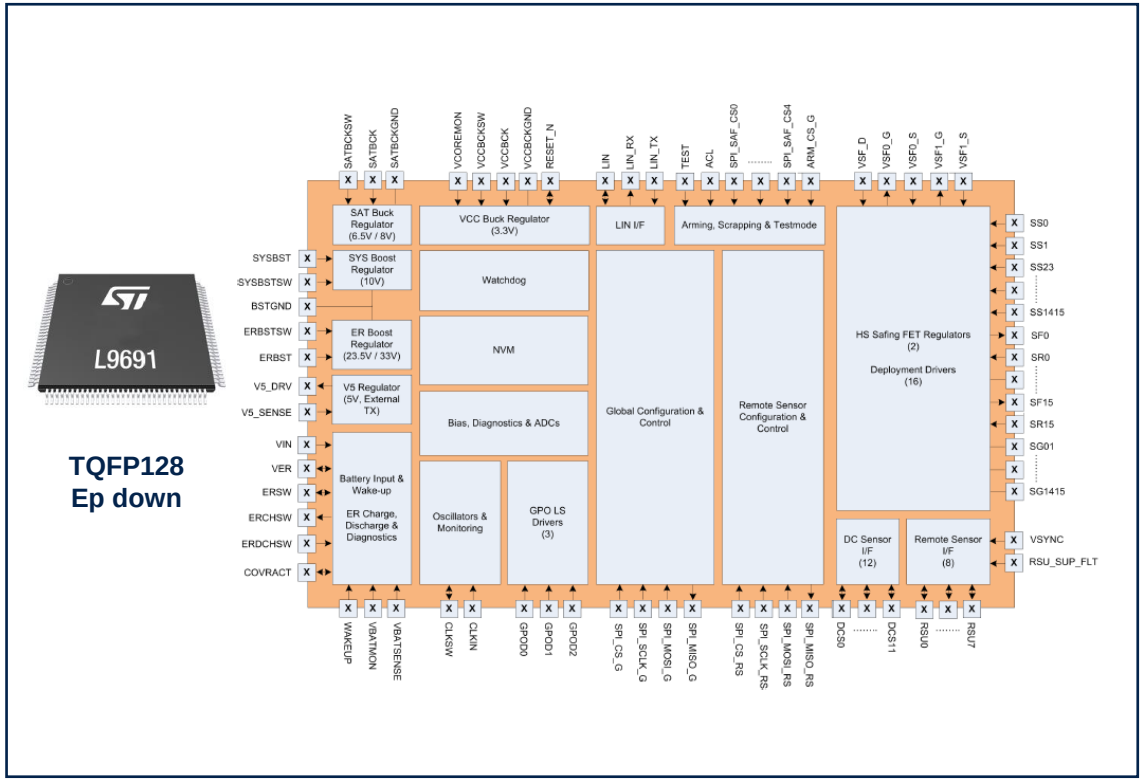
## Features

### Electrical parameters
- Integrated Energy reserve boost regulator 24V/33V with peak inductor regulation
- Buck for remote sensors 2MHz, 6.5V / 8V, 700mA max
- Buck Core, 2MHz, 3.3V, 450mA
- LDO 5V 135mA

### Protections
- OV / UV detection on power supply, GND loss detection and shutdown on regulators
- Open and shot on squib drivers
- Current limitation on DC sensor outputs
- Short and open load on GPIOs

### Outputs
- 16 ch squib drivers with user programmable deploy option, with 2 supporting LEA load
- 3 GPIOs with ON/OFF and PWM ctrl
- 1 global SPI, 1 for remote sensor SPI (SafeSPI v1.0 compatibility)

### Diagnostics
- R measure on Squib driver
- 1 ADC for power supply stage
- 1 ADCs for leakage current of deployment stage
- 2 ADCs for ER cap
- 8 ADCs for remote sensor interface
- 2 ADCs for DC sensor



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# L9691
# Automotive 16-ch IC for Airbag application

## A glance at possible applications:

Airbag

## Key values

Complete System Power supply stage including Boost regulator for ER cap, microcontroller and sensor IF

12x DC sensor IF

Arming logic with independent user configuration

ADC converters for diagnostics on power supply stage, squib drivers, remote sensor and DC sensor IF

16 channels squib driver, with LEA support on 2 channels – independent HS/LS control, user programmable deployment profile

2 SPI (global+remote sensor IF)

ISO26262 compliance for ASIL-D systems

8-ch PSI5 v2.3 w SYNC pulse

3x GPIOs : ON/OFF,PWM ctrl

LIN w OCS capability

## Collaterals & Tools

Databrief

Find out more about L9691 and ST solutions for **Airbag application**

# L9690
# Automotive 12ch IC for advanced Airbag application

**Full ISO26262 compliance design, with flexible configuration as single IC and master/slave, integrating a high frequency power supply stage, squib drivers, PSI5 and DC sensor interfaces**

## Features

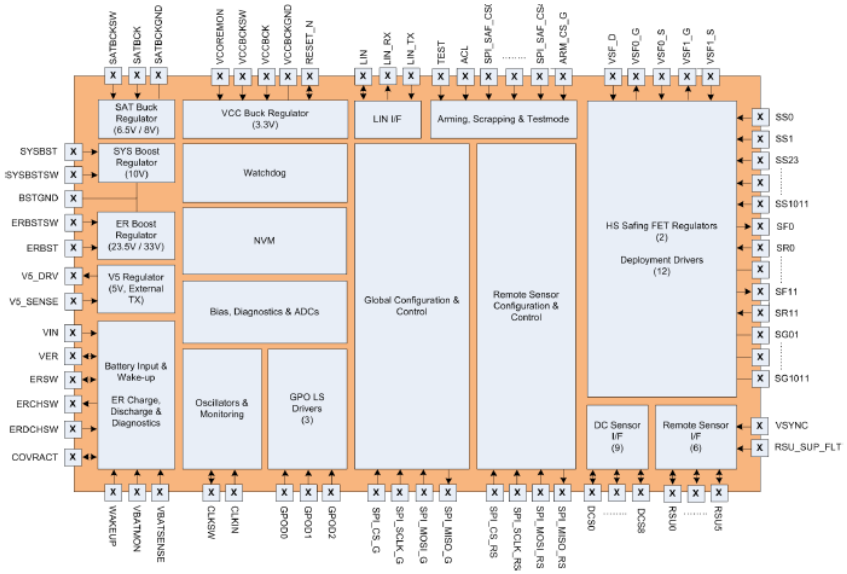
### Electrical parameters
- Integrated Energy reserve boost regulator 24V/33V with peak inductor regulation
- Buck for remote sensors 2MHz, 6.5V / 8V, 700mA max
- Buck Core, 2MHz, 3.3V, 450mA
- LDO 5V 135mA

### Protections
- OV / UV detection on power supply, GND loss detection and shutdown on regulators
- Open and shot on squib drivers
- Current limitation on DC sensor outputs
- Short and open load on GPIOs

### Outputs
- 12 ch squib drivers with user programmable deploy option, with 2 supporting LEA load
- 3 GPIOs with ON/OFF and PWM ctrl
- 1 global SPI, 1 for remote sensor SPI (SafeSPI v1.0 compatibility)

### Diagnostics
- R measure on Squib driver
- 1 ADC for power supply stage
- 1 ADCs for leakage current of deployment stage
- 2 ADCs for ER cap
- 6 ADCs for remote sensor interface
- 2 ADCs for DC sensor


**TQFP128**
**Ep down**



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# L9690
# Automotive 12-ch IC for Airbag application

## A glance at possible applications:

Airbag

## Key values

Complete System Power supply stage including Boost regulator for ER cap, microcontroller and sensor IF

9x DC sensor IF

Arming logic with independent user configuration

ADC converters for diagnostics on power supply stage, squib drivers, remote sensor and DC sensor IF

12 channels squib driver, with LEA support on 2 channels – independent HS/LS control, user programmable deployment profile

2 SPI (global+remote sensor IF)

ISO26262 compliance for ASIL-D systems

6-ch PSI5 v2.3 w SYNC pulse

3x GPIOs : ON/OFF,PWM ctrl

LIN w OCS capability

## Collaterals & Tools

Databrief

Find out more about L9690 and ST solutions for **Airbag application**

# L9689E
# Expansion IC for Airbag application

**Completing product family with L9691 and L9690, granting the highest rate of flexibility at system configuration level**

## Features

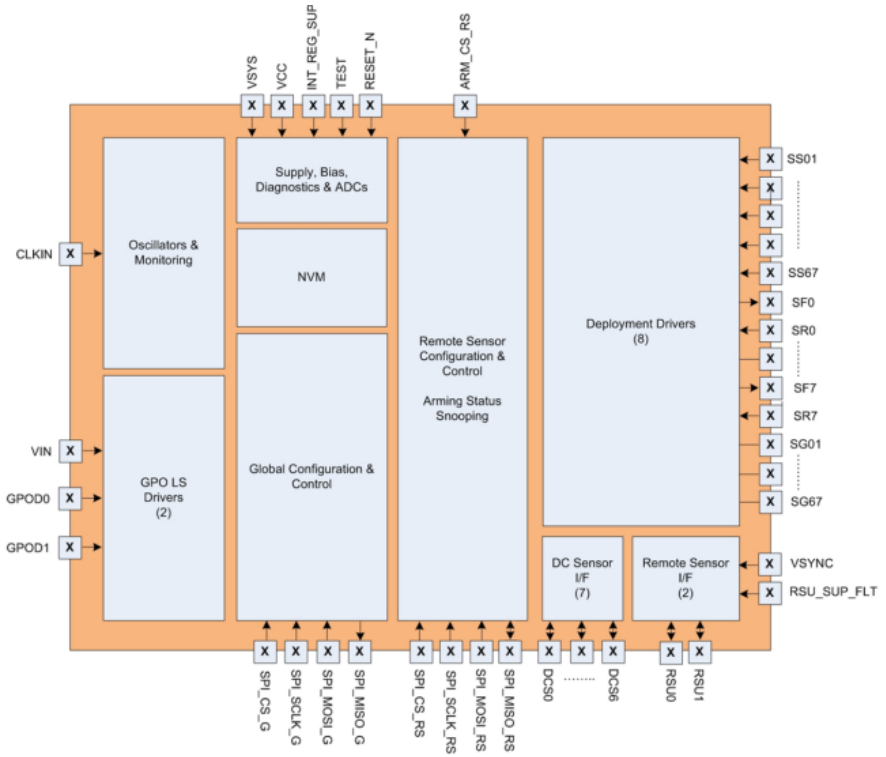
### Electrical parameters
- VSYS min 4.3V (for DC sensors)
- INT_REG_SUP min 4.3V
- Satellite data with parity and CRC, 10bit, 16bit and 20bit messages, 125k or 189kbps

### Protections
- OV / UV detection on power supply, GND loss detection and shutdown on regulators
- Open and shot on squib drivers
- Current limitation on DC sensor outputs
- Short and open load on GPIOs

### Outputs
- 8 ch squib drivers with user programmable deploy option, with 2 supporting LEA load
- 2 GPIOs with ON/OFF and PWM ctrl
- 1 global SPI, 1 for remote sensor SPI (SafeSPI v1.0 compatibility)

### Diagnostics
- R measure on Squib driver
- 1 ADC for power supply stage
- 1 ADCs for leakage current of deployment stage
- 2 ADCs for ER cap
- 6 ADCs for remote sensor interface
- 2 ADCs for DC sensor


**TQFP64 Ep down**



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# L9689E
# Expansion IC for Airbag application

## A glance at possible applications:

Airbag

## Key values

8 channels squib driver, with LEA support on 2 channels – independent HS/LS control, user programmable deployment profile

7x DC sensor IF

Arming logic with independent user configuration

ADC converters for diagnostics on power supply stage, squib drivers, remote sensor and DC sensor IF

2 SPI (global+remote sensor IF)

ISO26262 compliance for ASIL-D systems

2-ch PSI5 v2.3 w SYNC pulse

2x GPIOs : ON/OFF,PWM ctrl

## Collaterals & Tools

Databrief

Find out more about L9689E and ST solutions for **Airbag application**

# Thank you



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