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Automotive Smart Power – Product Selector Guide 2022

Q3

Automotive smartpower product catalogue by functions

<u>Motor control</u>	<u>Generic drivers</u>	<u>System power supply</u>	<u>Battery management ICs</u>
<u>H-bridge DC motor driver</u>	<u>Multi-output generic driver IC</u>	<u>LDO voltage regulator</u>	<u>Battery management system</u>
<u>BLDC motor control</u>	<u>Multi-channel HS/LS driver</u>	<u>Power management IC and System Basis Chip</u>	<u>Battery cut-off</u>
<u>Stepper motor control</u>	<u>Valve drivers</u>		
<u>Door zone ICs</u>	<u>Engine management systems</u>	<u>Electronic Parking Brake</u>	<u>Airbag Systems</u>
<u>Door zone</u>	<u>Engine management system</u>	<u>H-bridge DC motor pre-driver ICs for EPB</u>	<u>Automotive ICs for Airbag</u>
<u>Door lock</u>	<u>Alternator voltage regulator</u>		

Motor control



Line card H-bridge DC motor driver

L99H02

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

L9960/T

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

L9959/T

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

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

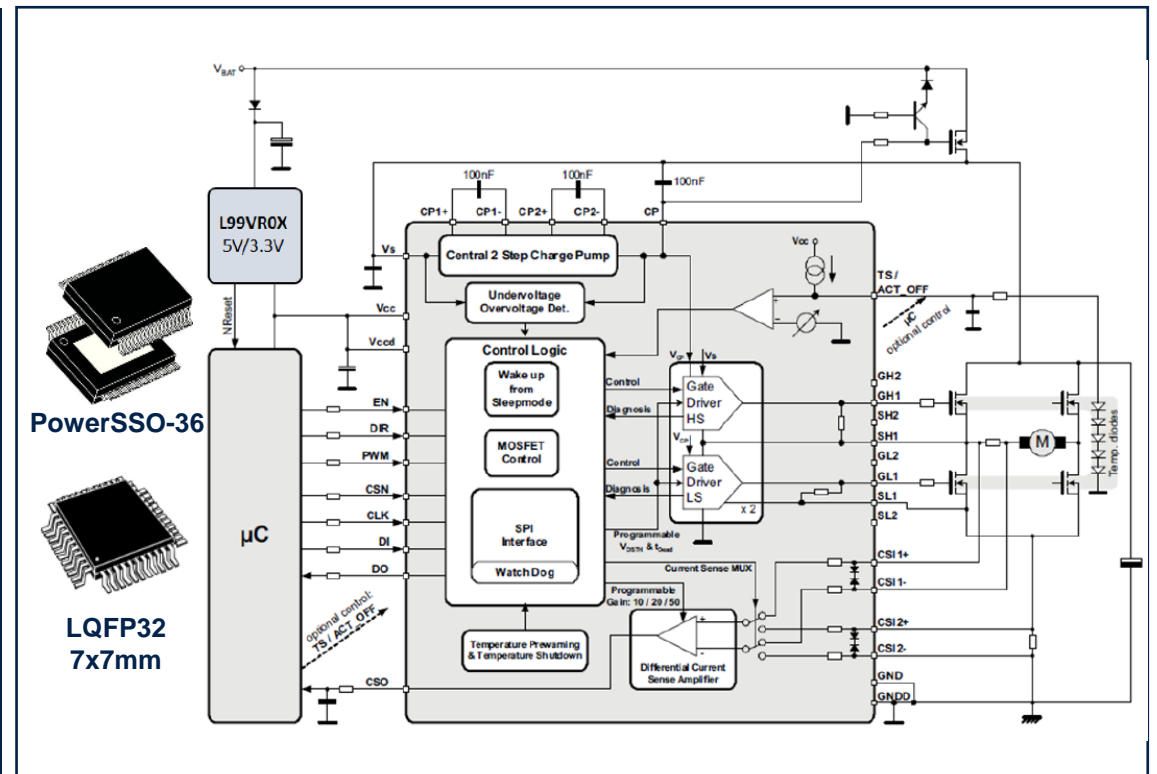
- Control of reverse battery protection MOSFETs with embedded thermal sensors
- Programmable thermal, undervoltage, overvoltage protections

Outputs

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

Diagnostics

- Diagnostic information via SPI for all the outputs



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](#)

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

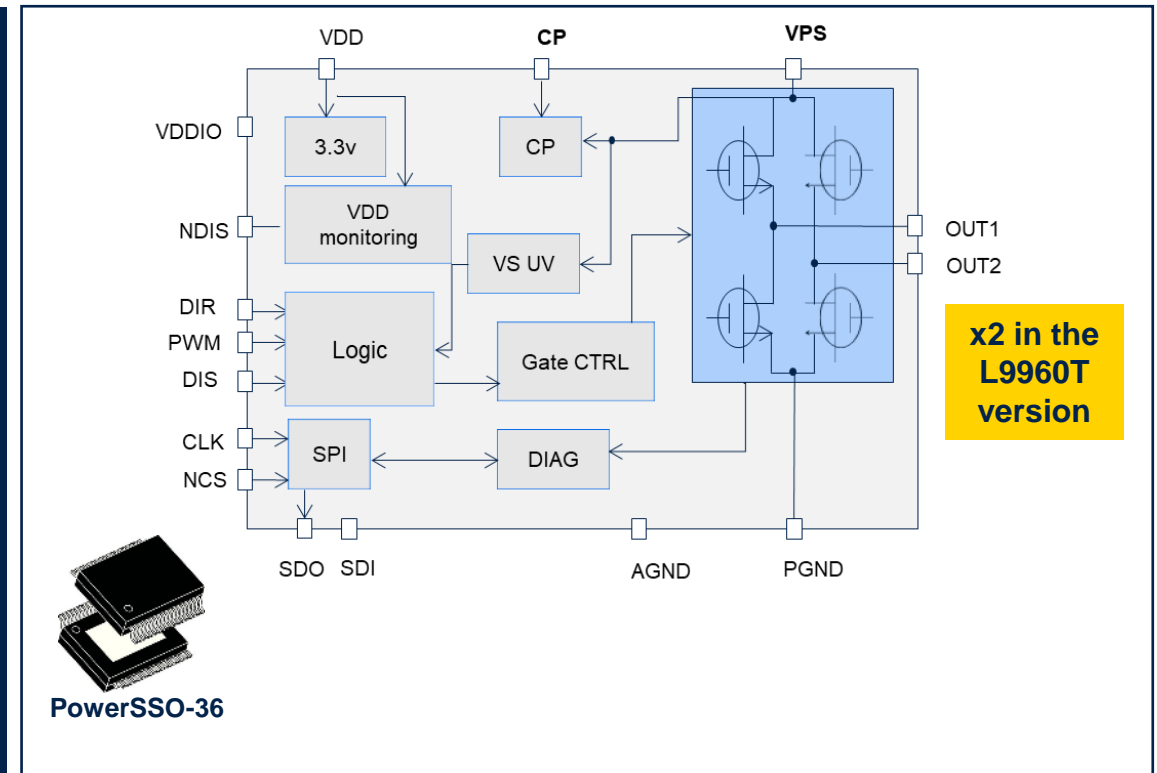
- Programmable current limitation and overcurrent thresholds
- Programmable thermal warning and shutdown thresholds
- Supply monitoring

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



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

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

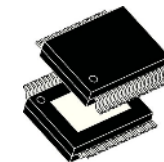
- Programmable current limitation and overcurrent thresholds
- Programmable thermal warning and shutdown thresholds
- Supply monitoring

Outputs

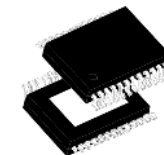
- 1x integrated H-bridge (**540mΩ full path**)
- Programmable current and voltage slew rates

Diagnostics

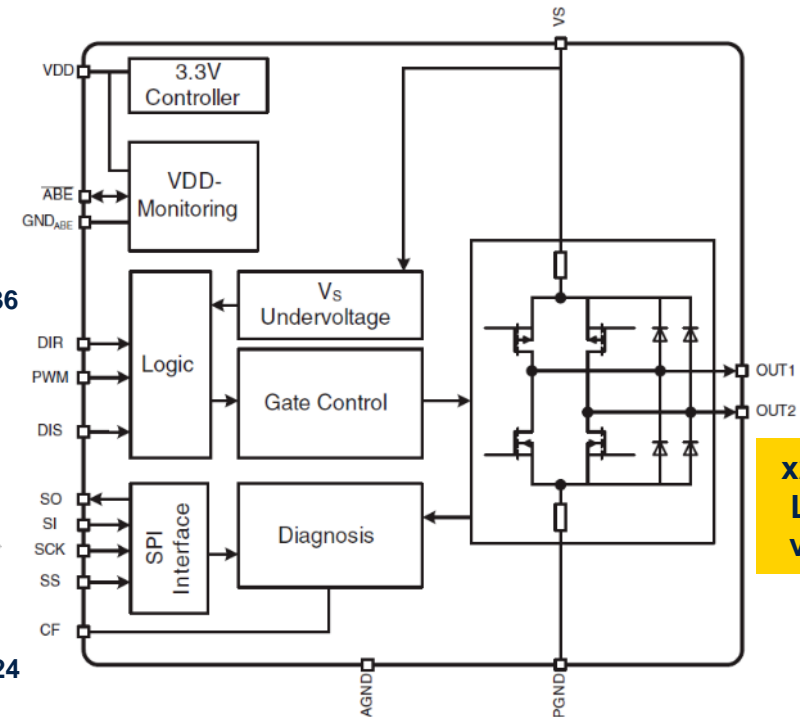
- Current feedback
- Open load in ON state
- Off-state diag (OL, SCG, SCB)
- 16-bit serial peripheral interface for control and diagnosis



PowerSSO-36



PowerSSO-24



x2 in the
L9959T
version

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

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 -40°C to 150°C

Protections

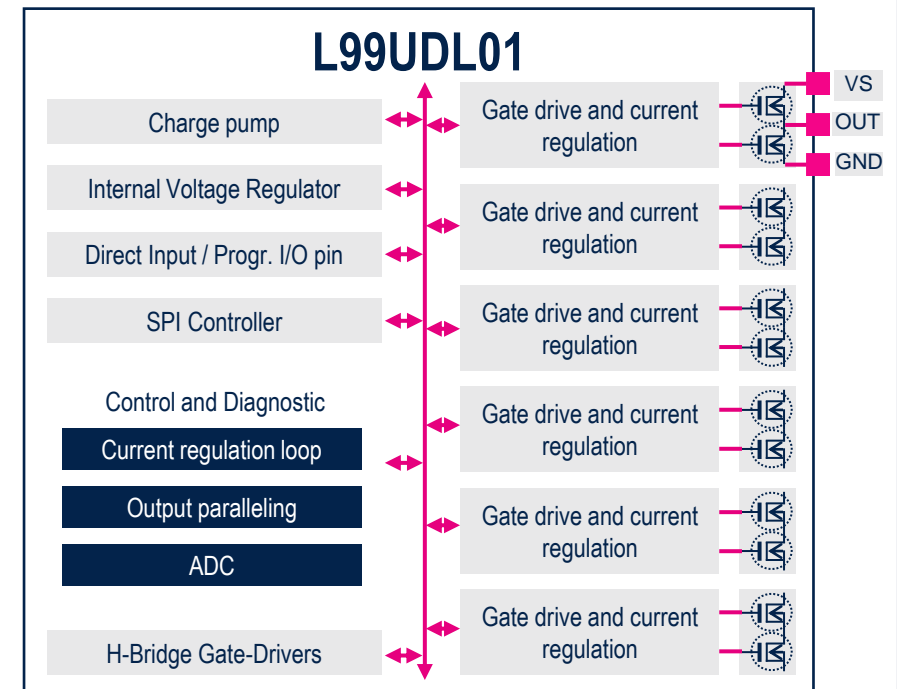
- Overload for all outputs
- Shorted and open load detection, also in off state
- Drain-source voltage monitoring for external FETs

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



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

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

L9907

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

L99ASC03

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

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

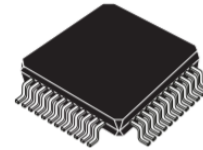
- Open load, short to GND and short to battery diagnostic in off-state
- VDD, VDH, VBP (over-voltage and under-voltage diagnostic)
- FET driver supply VPRE and VCP(under-voltage and over-voltage) diagnostic
- Full ISO26262 compliant, ASIL-D systems ready

Outputs

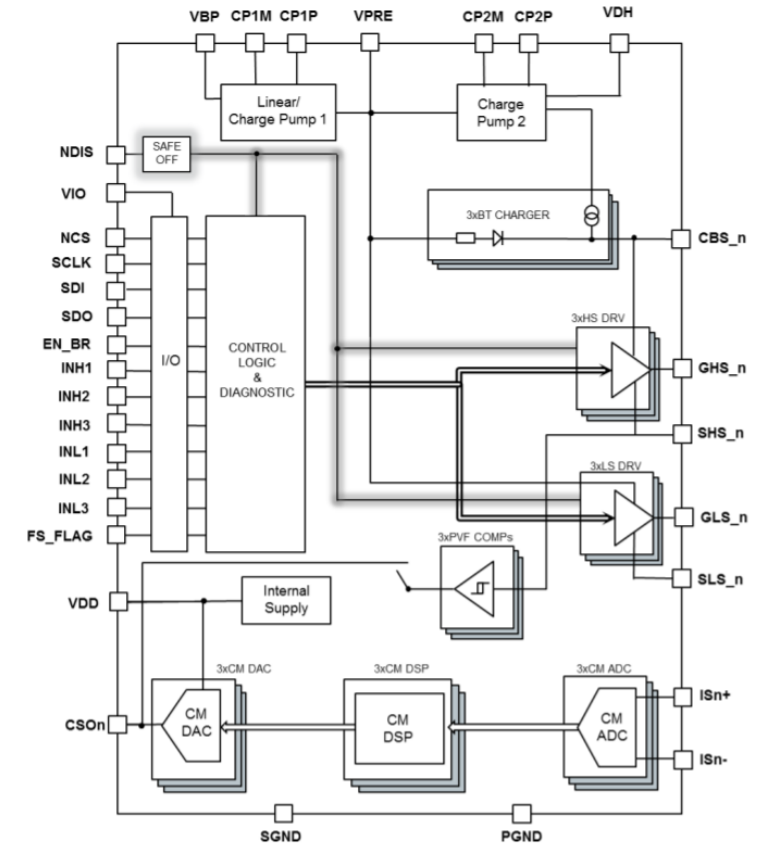
- 6 separate N-channel FET pre-drivers (0% to 100% duty cycle operation support, dedicated PWM input pin for each gate driver)
- 3 differential high accuracy current monitors for ground referred current measurements
- 3 real time phase voltage monitor channels

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)



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

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

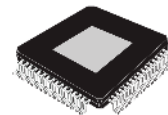
- Floating current sense amplifiers with SPI selectable amplifier gain and output offset voltage level
- Power MOSFET drain to source voltage drop measurement for overcurrent protection

Outputs

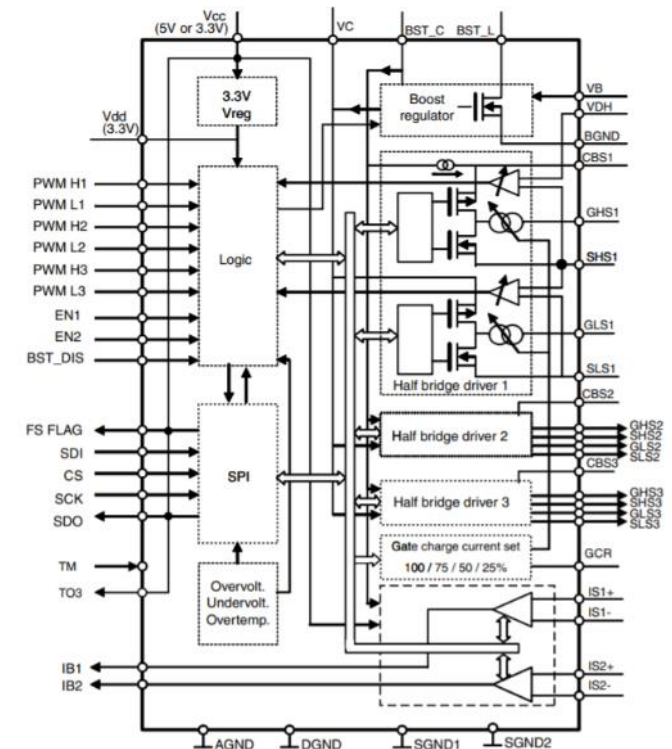
- 3 Low-Side & High-Side drivers
- Withstand -7V to 90V at the FET high-side driver pins
- 2x current sense 3.3/5V compatible

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)



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](#)



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 μ A)
- PWM operation up to 80 kHz

Protections

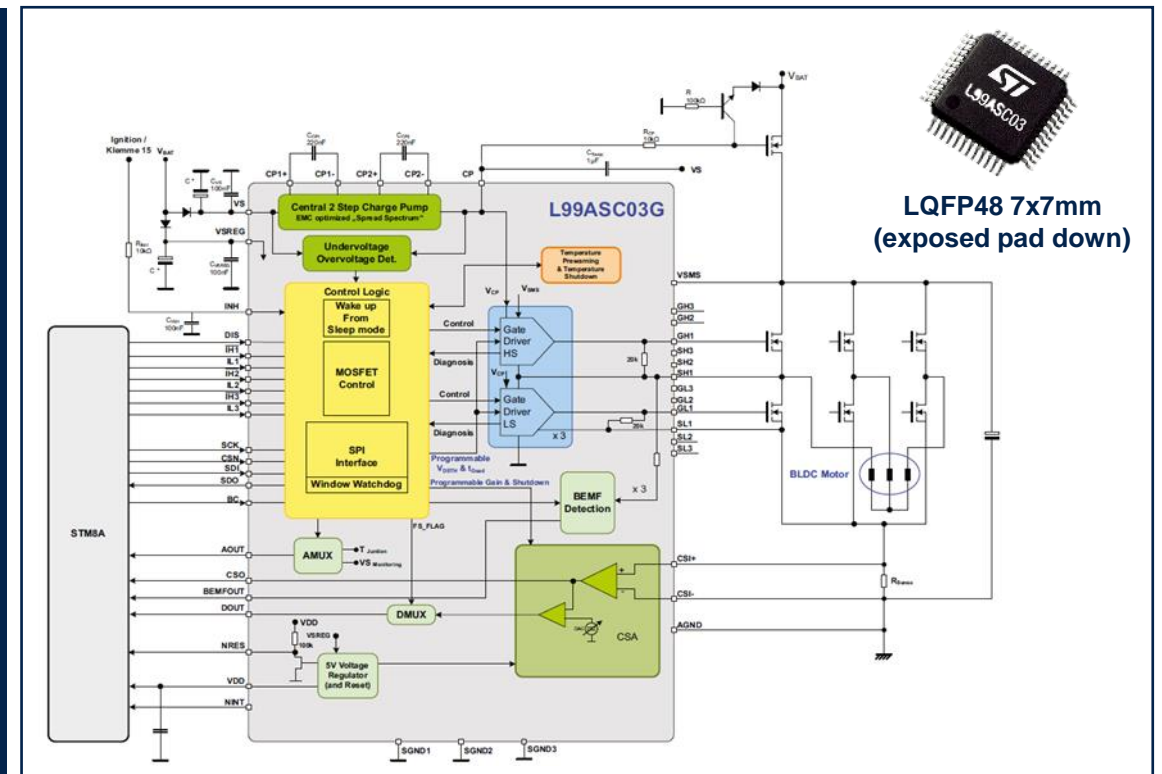
- Fail-safe functionality
- Analog multiplexer output to monitor external power supply voltages and junction temperature
- Programmable overcurrent protection
- Open load detection

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



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

Line card Stepper motor control

L99SM81

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

L99MD01

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

L9942

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
- $R_{ds(on)} = 0.7\Omega$ 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

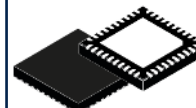
- 1x programmable analog output for Tj measurement or band-gap reference
- 2x programmable digital outputs for PWM ON duty cycles, error signals, coils voltage measurement

Diagnostics

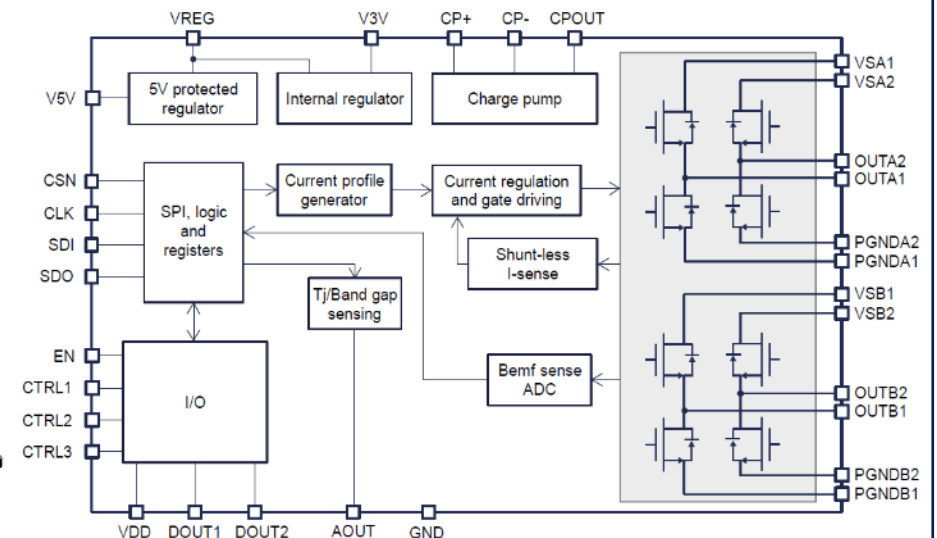
- Integrated ADC for coil voltage measurement and stall detection
- ST SPI 4.1 interface for control and diagnostics



PowerSSO-36



QFN40L



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

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

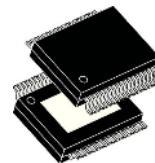
- Over-current, short-circuit protection for all outputs
- Over-temperature shutdown
- Thermal pre-warning
- Cross-current protection for all outputs

Outputs

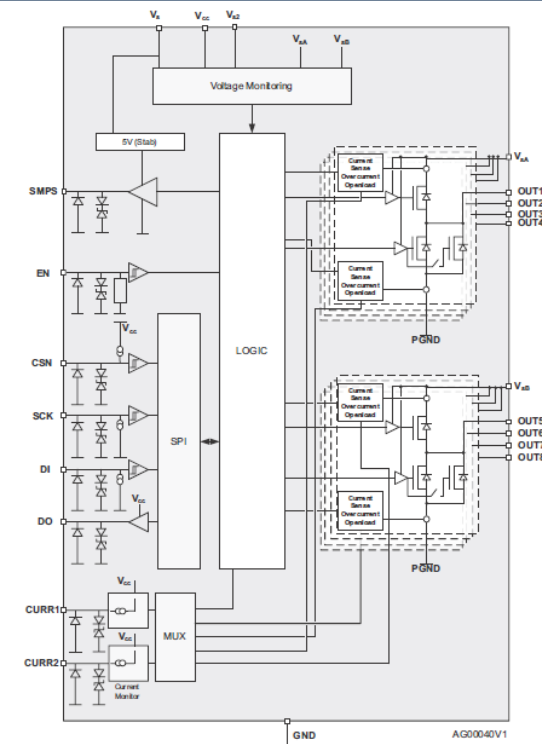
- 8x Half Bridges (**HS: 0.9Ω, LS 0.64Ω**, typ. @T_j=25°C)
- Current limit of each output at min 0.8A

Diagnostics

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



PowerSSO-36



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

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 $I_S < 3 \mu\text{A}$, typ. $T_j < 85 \text{ }^\circ\text{C}$
- Current regulation via PWM integrated controller and waveform programmable with look-up table

Protections

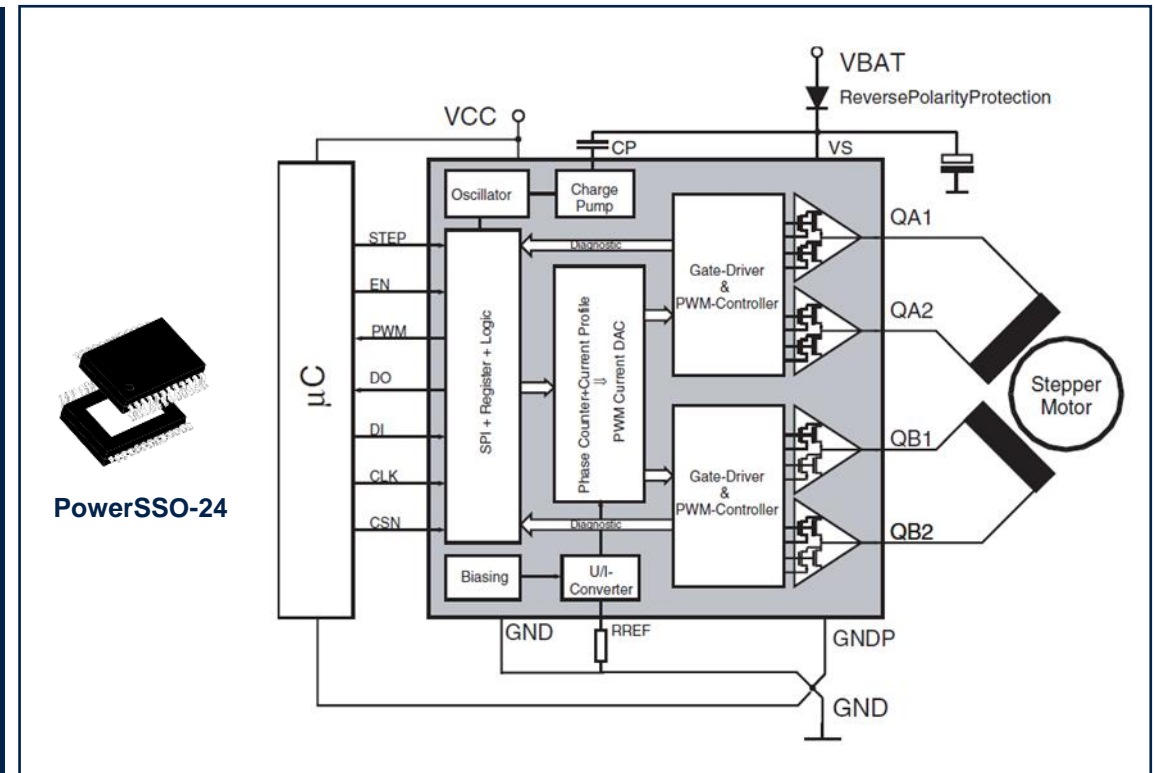
- All outputs short circuit protected with open load, overload current, temperature warning and thermal shutdown

Outputs

- 2x Full bridges (500 m Ω max. 1.3A)

Diagnostics

- 16-bit SPI for parameter settings and diagnosis



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

“
If only



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

This is where we come in

Generic drivers



Line card

Multi-output generic driver ICs

L99MOD50XP

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

L99MOD51XP

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

L99MOD53XP

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

L99MOD54XP

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

L99UDL01

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 $I_S < 6 \mu A$ typ; $T_j \leq 85 \text{ }^\circ C$

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

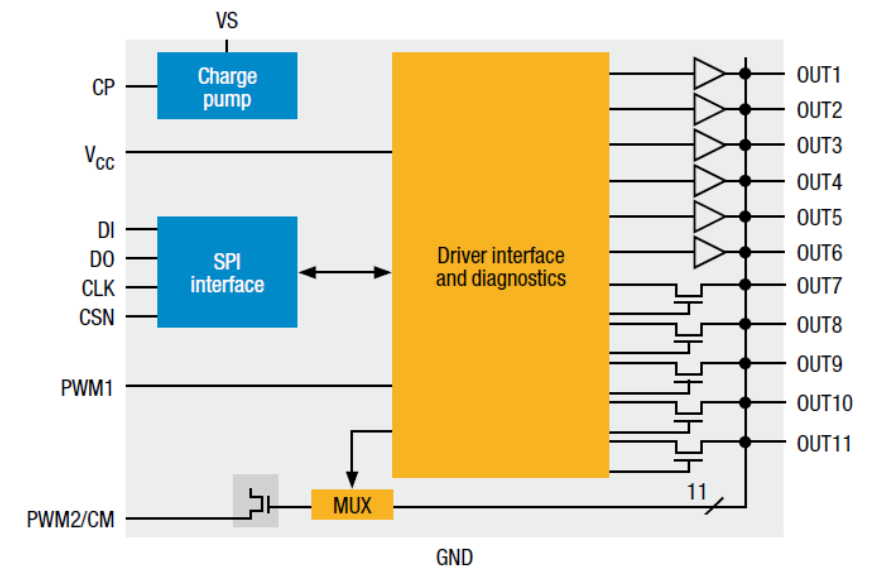
- 2x Half-Bridge for 6A load (**150m Ω**);
- 2x Half-Bridge for 3A load (**300m Ω**);
- 2x Half-Bridge for 0.75A load (**1.6 Ω**);
- 1x High-Side for 6A (**90m Ω**);
- 2x High-Side for up to 1.5A (**500m Ω**);
- 2x High-Side for 0.5A (**1.6 Ω**);
- Programmable soft-start for all outputs

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



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 $I_S < 3 \mu A$ typ $T_j \leq 85 \text{ }^\circ C$

Protections

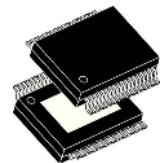
- Overload for all outputs
- Over- and Under-Voltage shutdown
- Thermal Shutdown
- Cross-current protection for half-bridges
- Charge Pump output for reverse polarity protection

Outputs

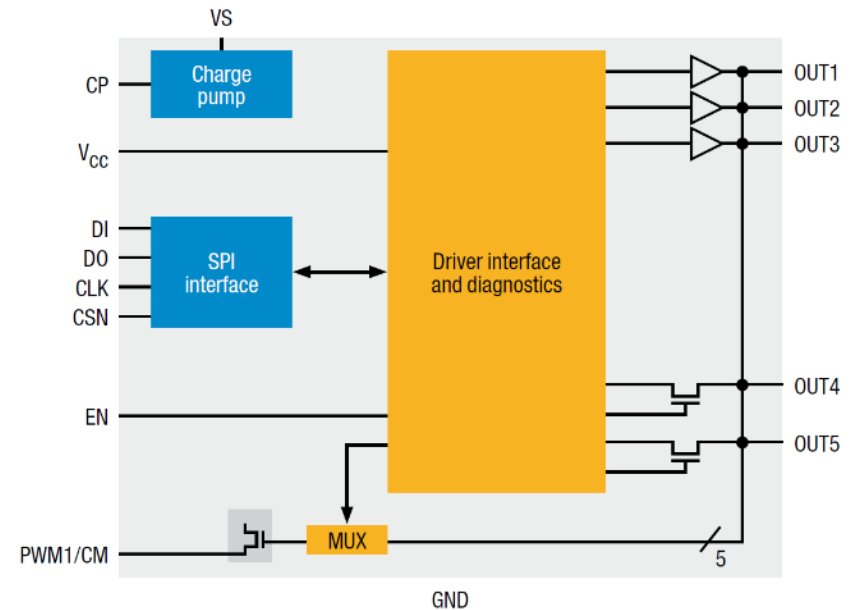
- 1x Half-Bridge for 7.4A load (**150m Ω**);
- 2x Half-Bridge for 5A load (**200m Ω**);
- 2x High-Side for 1.25A (**800m Ω**);
- Programmable soft-start for all outputs
- PWM control of all the outputs

Diagnostics

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



PowerSSO-36



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 $I_S < 6 \mu\text{A}$ typ $T_j \leq 85 \text{ }^\circ\text{C}$

Protections

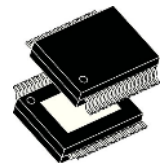
- Overload for all outputs
- Over- and Under-Voltage shutdown
- Thermal Shutdown
- Cross-current protection for half-bridges
- Charge Pump output for reverse polarity protection

Outputs

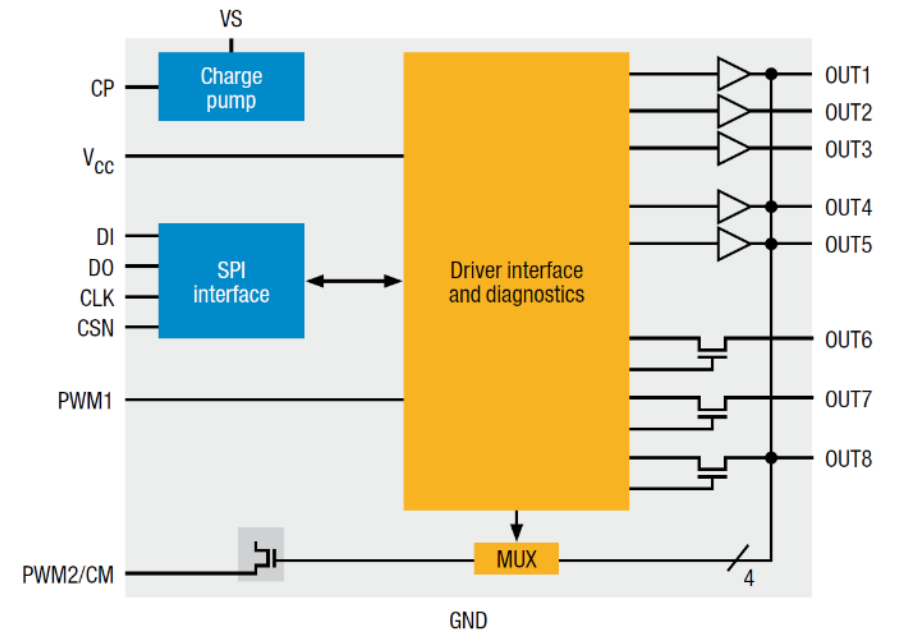
- 2x Half-Bridge for 6A loads (**150m Ω**)
- 3x Half-Bridge for 0.75A loads (**1.6 Ω**)
- 2x High-Side for 1.5A load (**500m Ω**)
- 1x High-Side for 6A load (**100m Ω**)
- Programmable soft-start for all outputs
- PWM control of all the outputs

Diagnostics

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



PowerSSO-36



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 $I_S < 6 \mu\text{A typ } T_j \leq 85 \text{ }^\circ\text{C}$

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

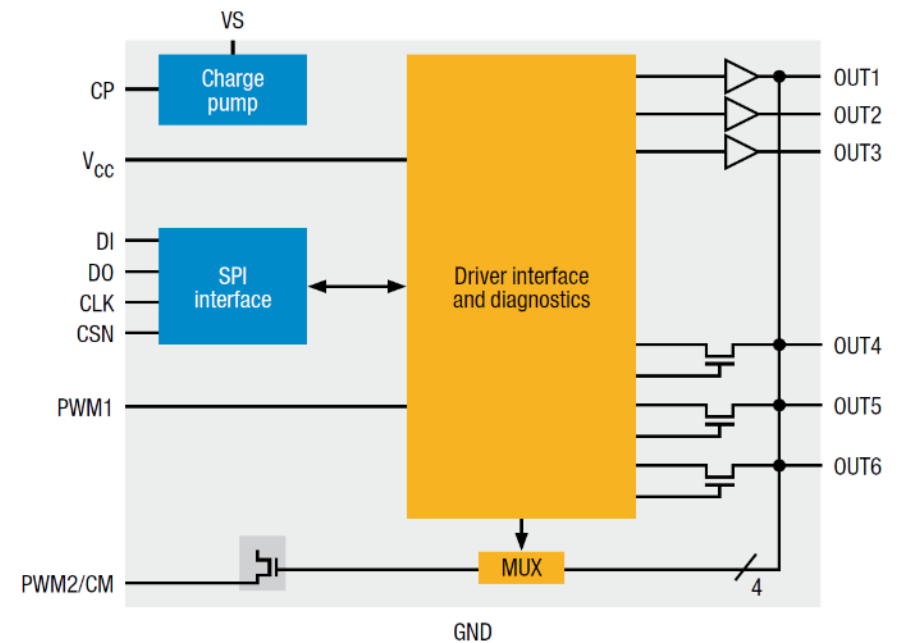
- 3x Half-Bridge for 0.75A loads (**1.6 Ω**)
- 2x High-Side for up to 1.5A load (**0.5 Ω**)
- 1x High-Side for 6A load (**100m Ω**)
- Programmable soft-start for all outputs
- PWM control of all the outputs

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



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](#)

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 -40°C to 150°C

Protections

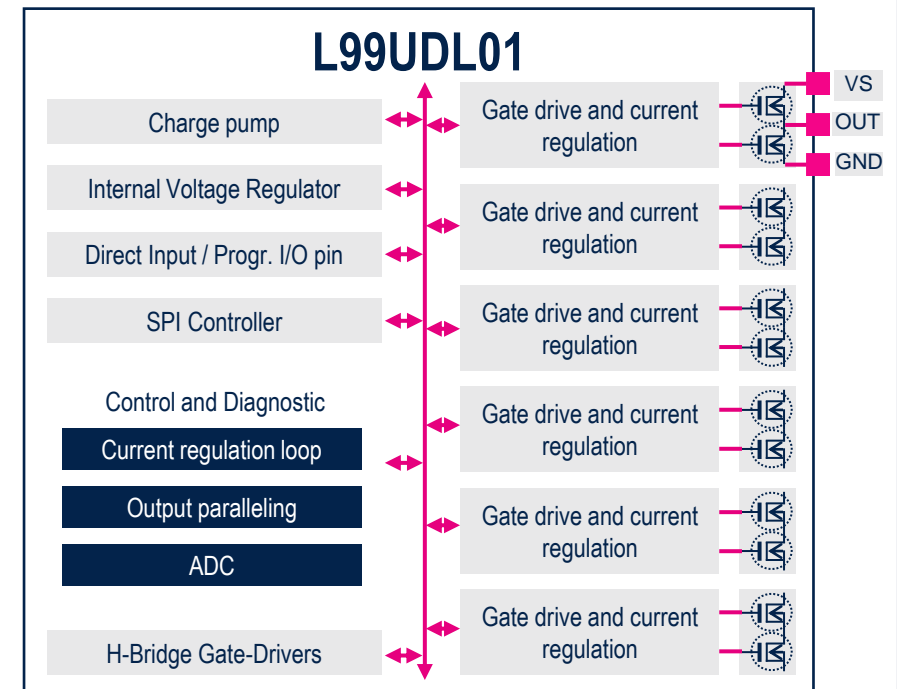
- Overload for all outputs
- Shorted and open load detection, also in off state
- Drain-source voltage monitoring for external FETs

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



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

Multichannel high/low side drivers

L9826

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

L9651

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

L9301

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

L9026

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

L9945

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

L99MC6GJ

Automotive configurable 6-channel driver

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

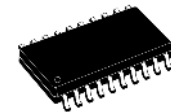
- Overcurrent and short circuit shutdown for Out 3 to 8
- Short circuit current limitation and thermal shutdown on Out1 & 2
- Out 1 & 2 Bulb inrush mode (BIM)

Output

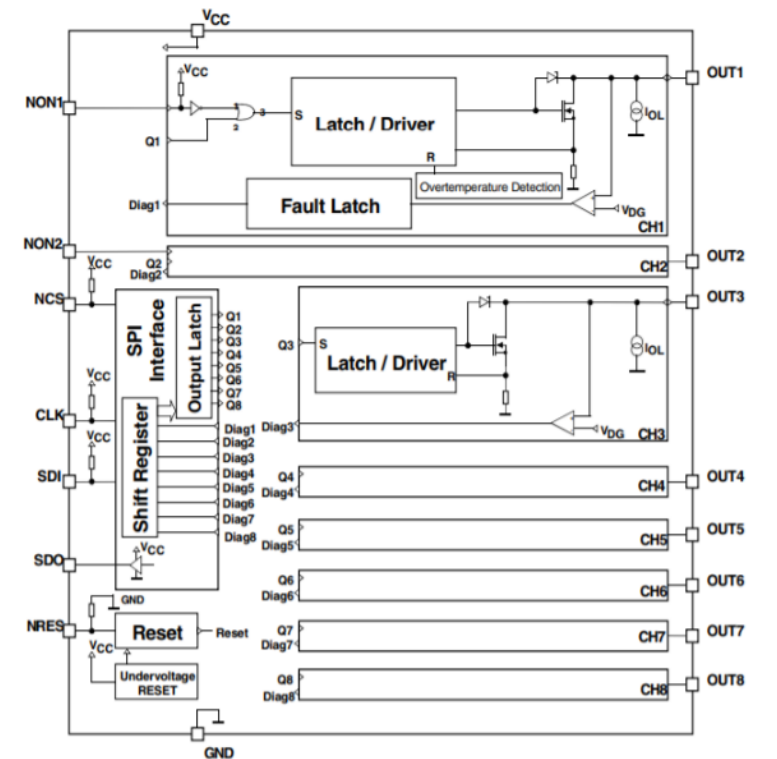
- 8x Low-Side Driver (1.5Ω, max 450mA)
- SPI control on all outputs, Out1 and Out2 controlled through parallel inputs

Diagnostics

- 8-bit serial peripheral interface for control and diagnosis



SO-20



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](#)

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

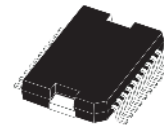
- Short Circuit Protection
- Over temperature Protection

Outputs

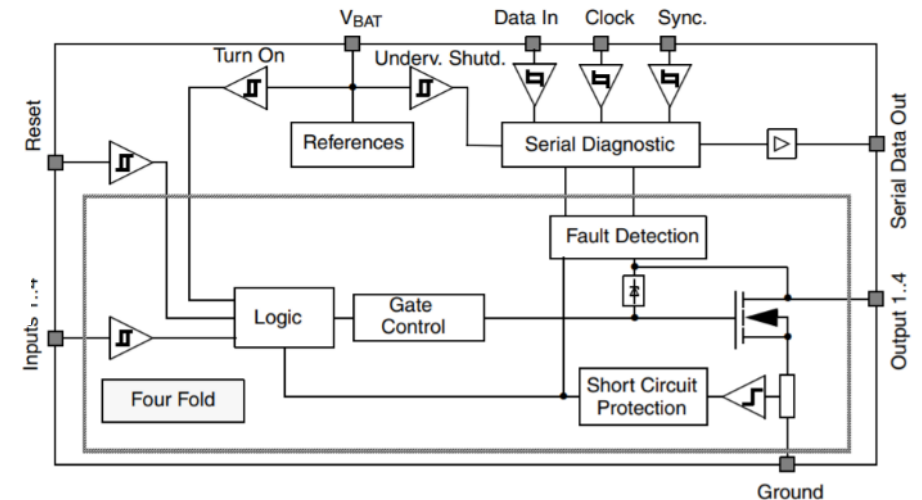
- 4x Low-Side drivers (500mΩ)
- Output controlled by paralleled inputs

Diagnostics

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



PowerSO-20



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](#),

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

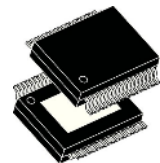
- Overtemperature, overcurrent and shutdown protection

Outputs

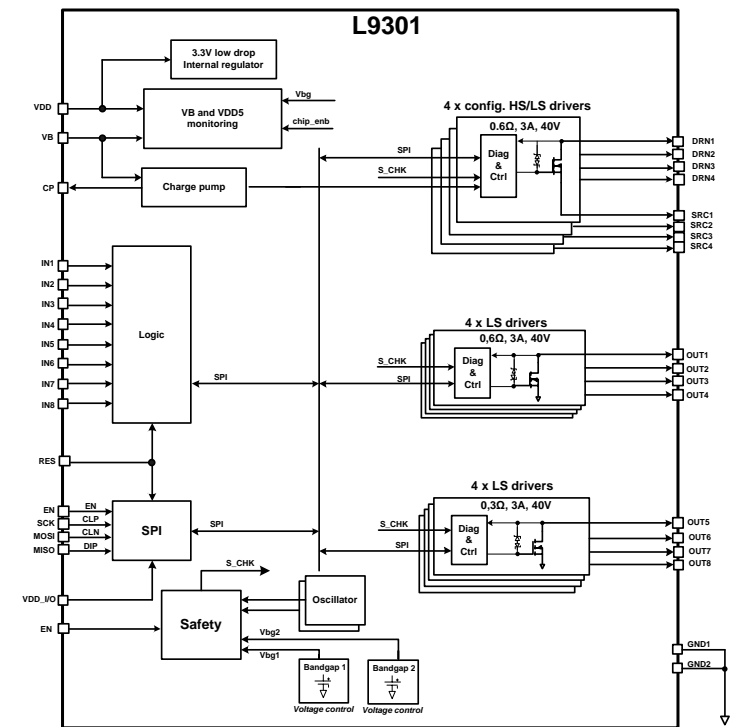
- 8x configurable High-Side/Low-Side drivers (**0.6Ω, max 3A**)
- 4x Low-Side drivers (**0.6Ω, max 3A**)
- 4x Low-Side drivers (**0.3Ω, max 3A**)
- Possibility to parallel DRN/SRC1-4 and OUT1-4 in order to get 4
- x Low-Side drivers for a total 8x Low-Side drivers (**0.3Ω**)

Diagnostics

- SPI interface for outputs control and for diagnosis data communication



PowerSSO-36



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](#)

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 low 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

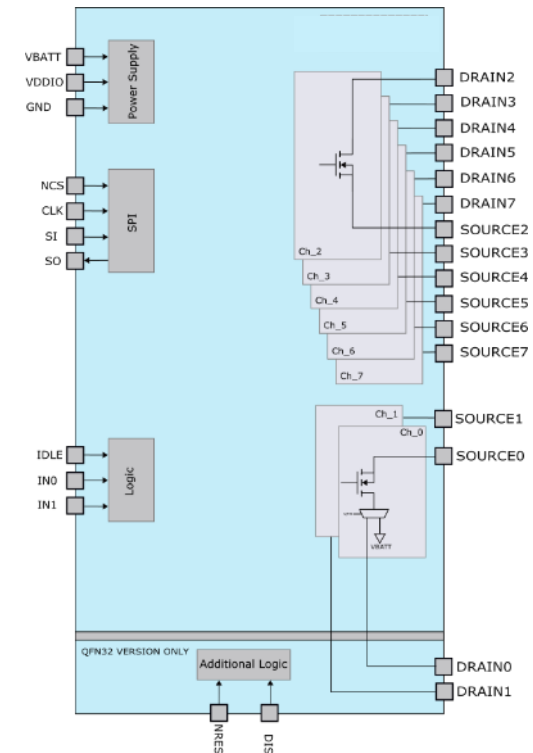
- 16-bit serial peripheral interface for control and diagnosis



VFQFPN32 5x5x1mm
(exposed pad down)



HTSSOP24 7.8x6.4x1mm
(exposed pad down)



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](#)

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

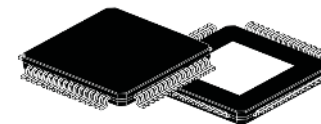
- Overcurrent monitoring
- Current limitation for H-bridge

Outputs

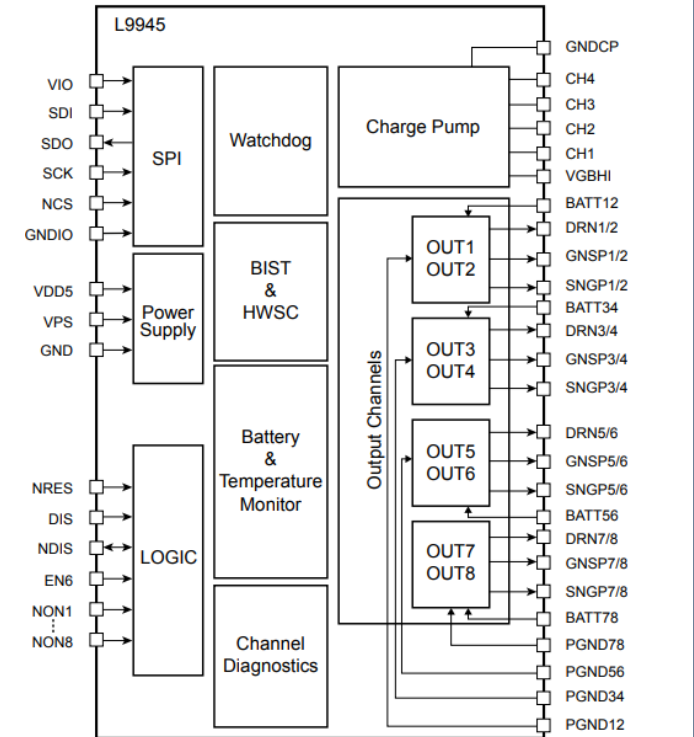
- Up to 8x High Side Drivers
- Up to 8x Low Side Drivers
- Up to 2x Peak & Hold
- Up to 2x H-Bridge Drivers
- All output controlled through parallel PWM inputs.

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

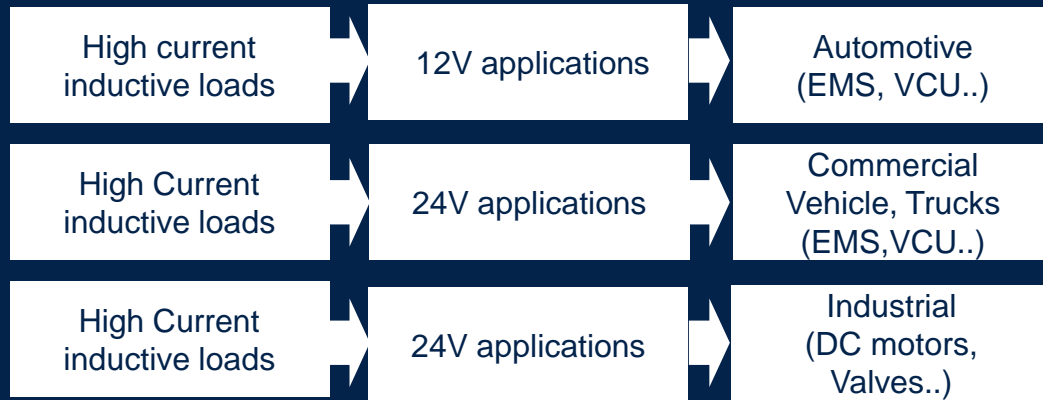


TQFP64
(exposed pad down)



Configurable multichannel pre-driver

A glance at possible applications:



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](#)

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

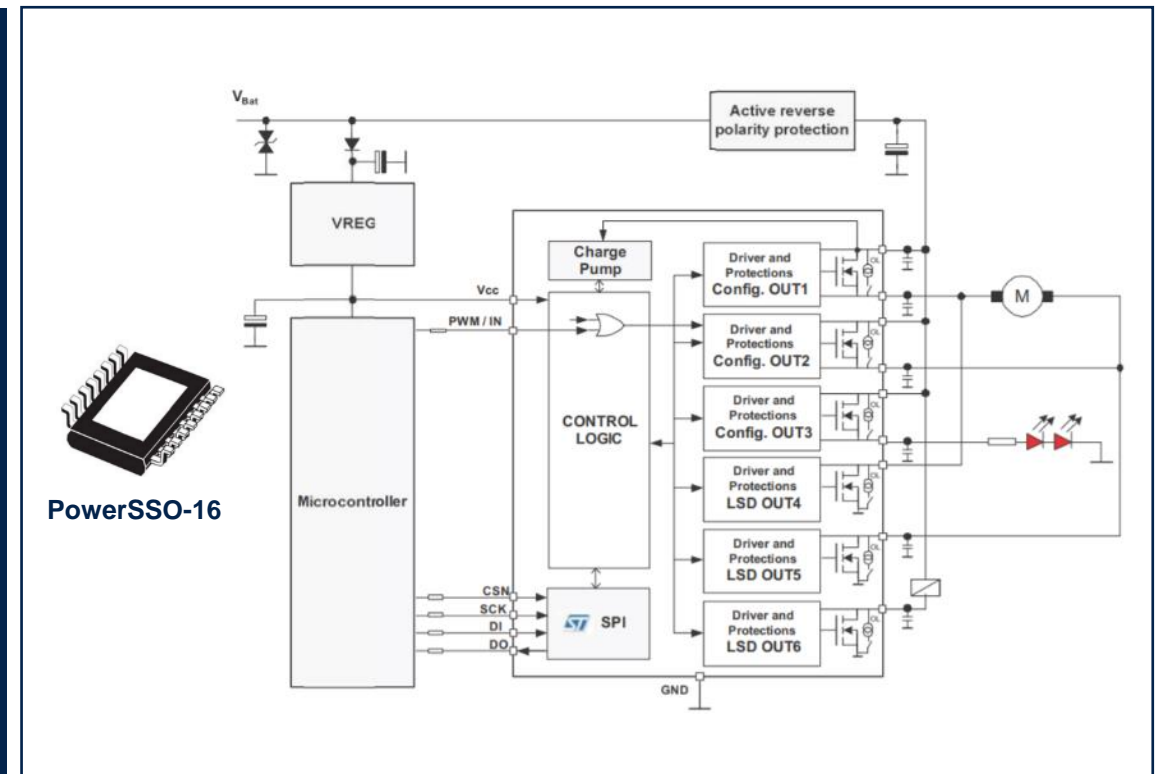
- All outputs short-circuit protected
- All outputs overtemperature protected
- Bridge mode with crosscurrent protection
- Temperature warning

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



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](#)

Line card Valve driver

L9945

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

L9301

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

L9305

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

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

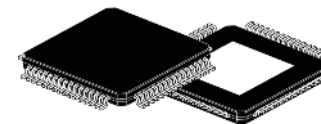
- Overcurrent monitoring
- Current limitation for H-bridge

Outputs

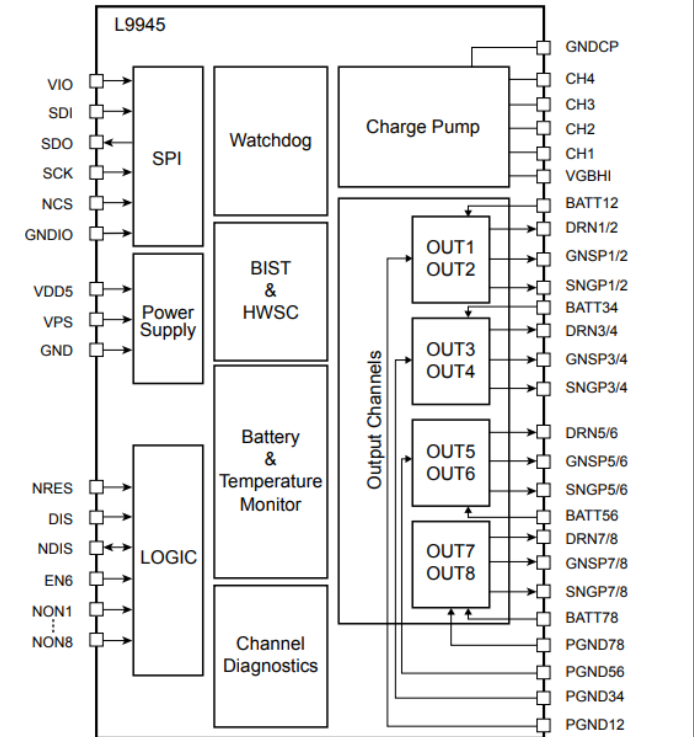
- Up to 8x High Side Drivers
- Up to 8x Low Side Drivers
- Up to 2x Peak & Hold
- Up to 2x H-Bridge Drivers
- All output controlled through parallel PWM inputs.

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

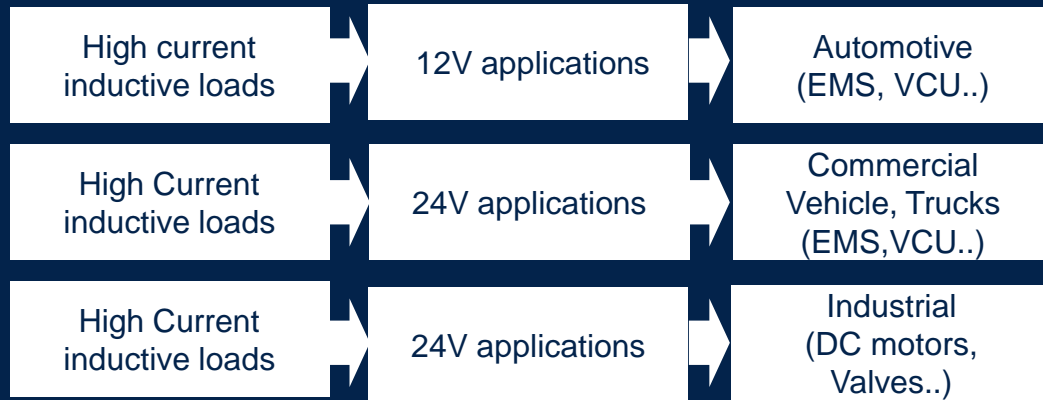


TQFP64
(exposed pad down)



Configurable multichannel pre-driver

A glance at possible applications:



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](#)

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

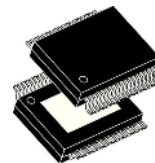
- Overtemperature, overcurrent and shutdown protection

Outputs

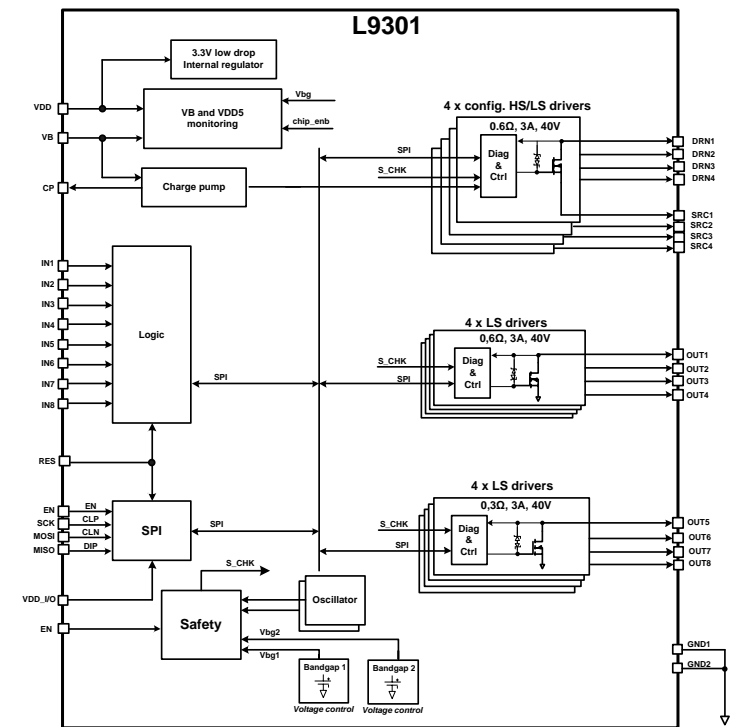
- 8x configurable High-Side/Low-Side drivers (**0.6Ω, max 3A**)
- 4x Low-Side drivers (**0.6Ω, max 3A**)
- 4x Low-Side drivers (**0.3Ω, max 3A**)
- Possibility to parallel DRN/SRC1-4 and OUT1-4 in order to get 4
- x Low-Side drivers for a total 8x Low-Side drivers (**0.3Ω**)

Diagnostics

- SPI interface for outputs control and for diagnosis data communication



PowerSSO-36



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](#)

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

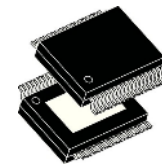
- 1-4 high side fail safe ENABLE switch pre-driver with VDS monitoring
- Redundant safe enable path
- Temperature sensor and monitoring
- Redundant current sensing for all channels

Outputs

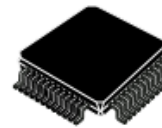
- 4x configurable High-Side/Low-Side Drivers (**375mΩ**)
- 2 operating driving modes:
 1. PWM through parallel input
 2. PWM internally generated

Diagnostics

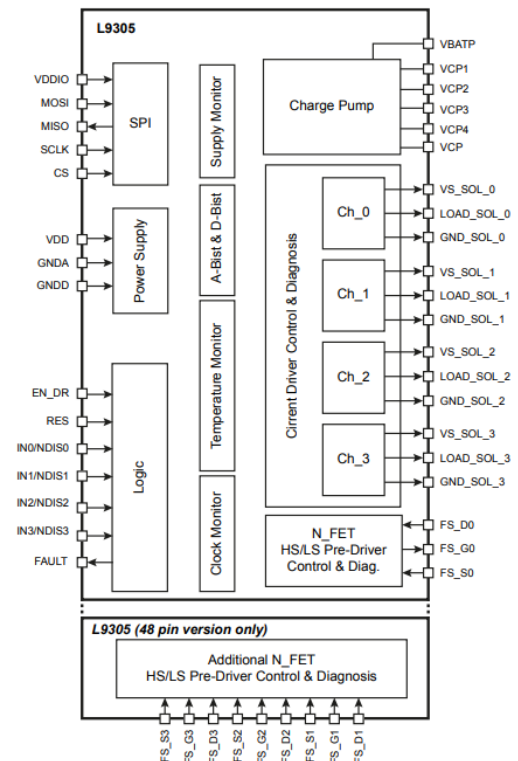
- Advanced diagnosis and monitoring using BIST



PowerSSO-36

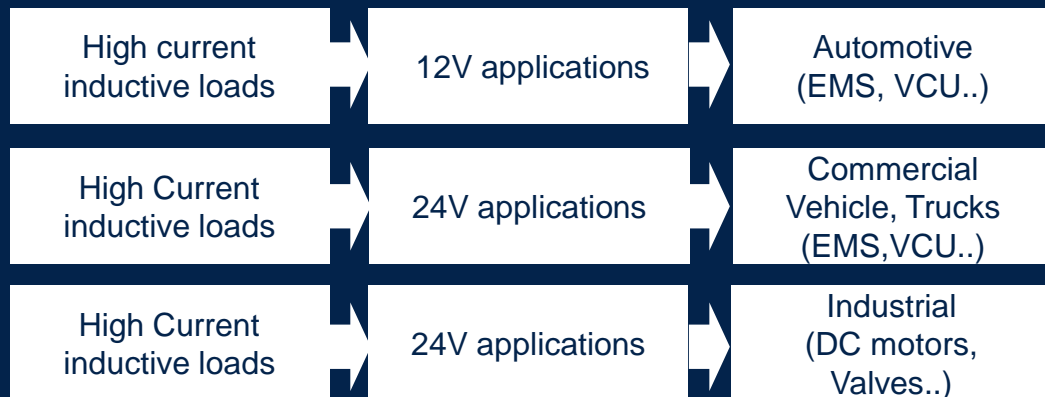


TQFP48
exposed pad
down



Automotive 4-channel valve driver

A glance at possible applications:



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

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

L5150

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

L5300

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

L4995

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

L99VR01S/J

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

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

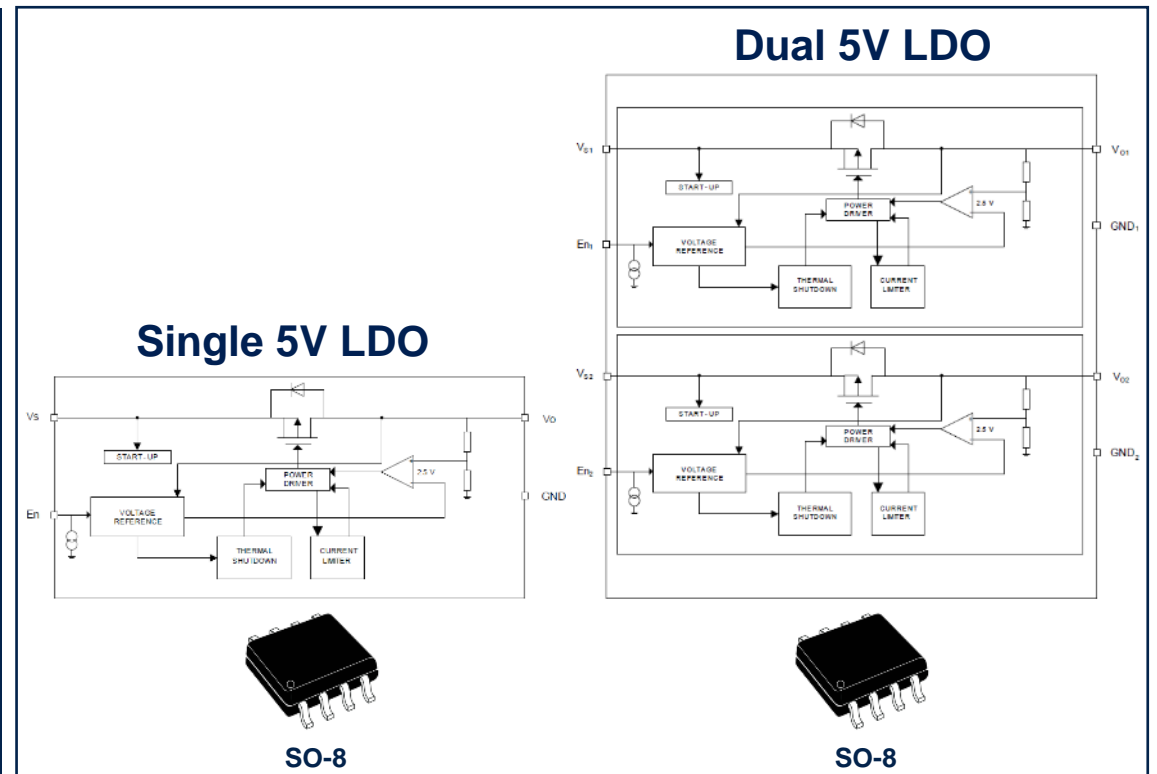
- Operating DC supply voltage range 5.6V to 40V
- Very low current consumption in standby mode typ. 5uA

Protections

- Thermal shutdown and short circuit protection

Outputs

- Output voltage: **5V**
- Output current: **50 mA**
- Output voltage precision $\pm 2\%$



L5150 Automotive 5V LDO

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

Features

Electrical parameters

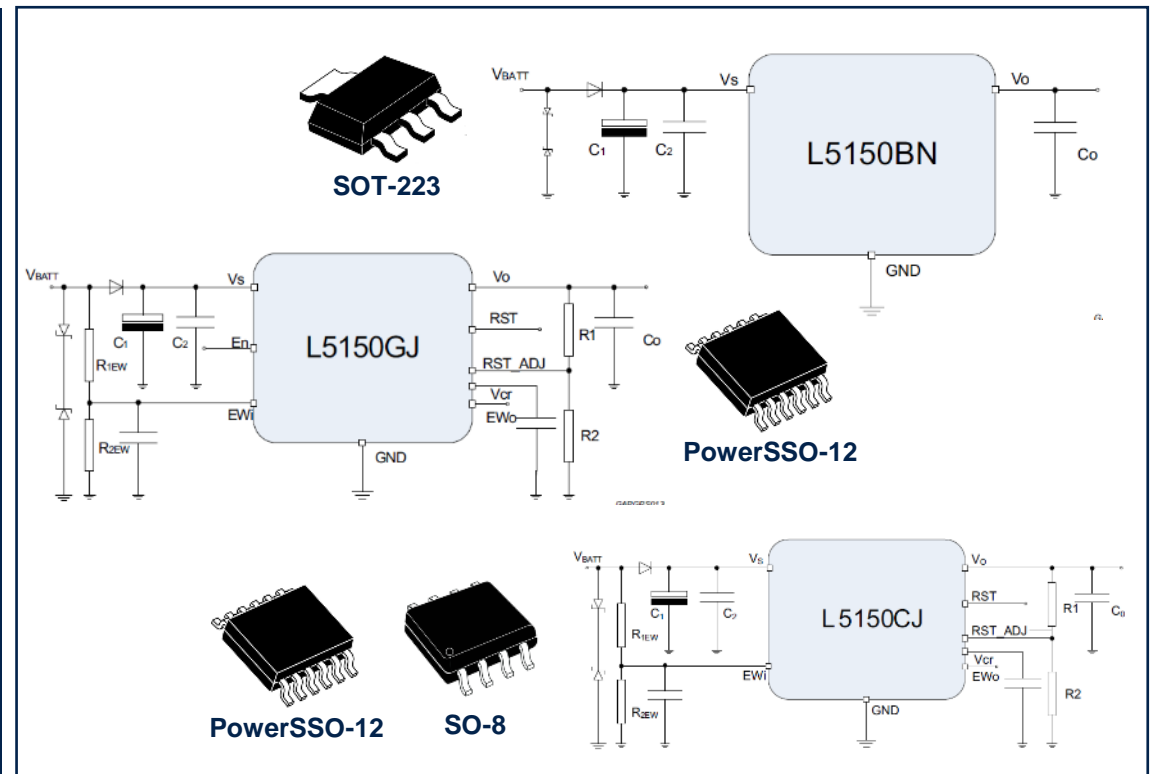
- Operating DC supply voltage range 5.6V to 40V
- Very low current consumption

Protections

- Thermal shutdown and short circuit protection

Outputs

- Output voltage: **5V**
- Output current: **150 mA**
- Output voltage precision $\pm 2\%$



L5300

Automotive 5V LDO

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

Features

Electrical parameters

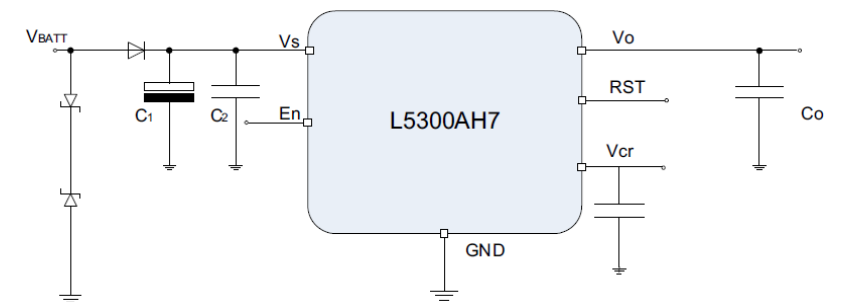
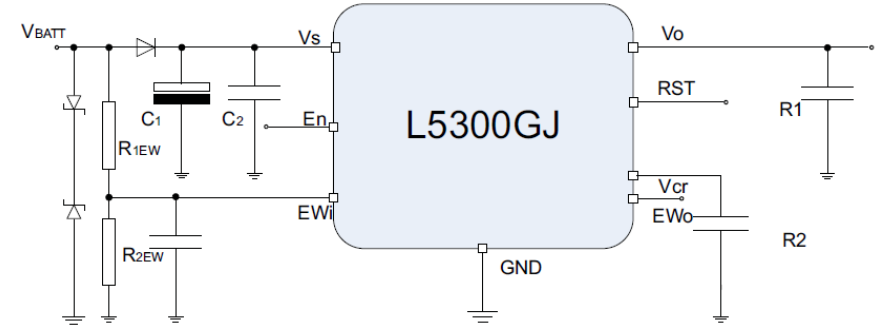
- Operating DC supply voltage range 5.6V to 40V
- Very low current consumption

Protections

- Thermal shutdown and short circuit protection

Outputs

- Output voltage: **5V**
- Output current: **300 mA**
- Output voltage precision $\pm 2\%$



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](#)

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 3 μ A in standby mode)

Protections

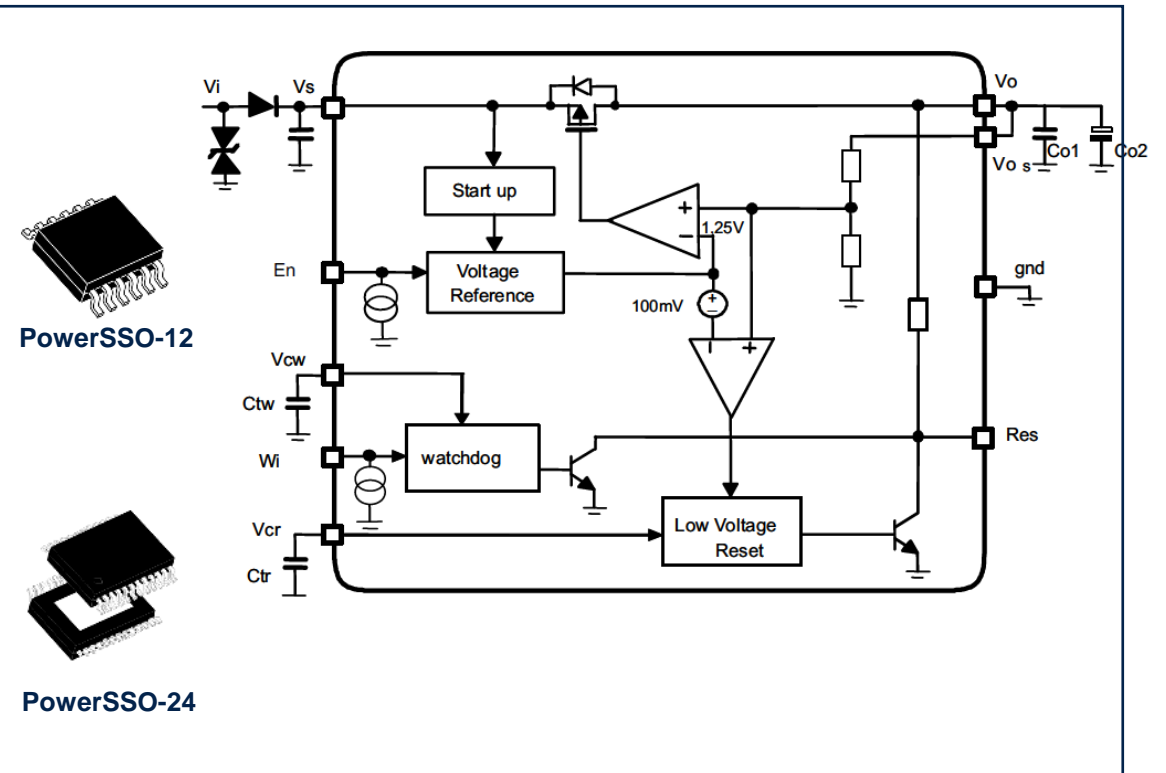
- Thermal shutdown and short circuit protection

Outputs

- Output voltage: **5V**
- Output current: **500 mA**
- Output voltage precision $\pm 2\%$

Diagnostics

- Watchdog function



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)
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Collaterals & Tools

[Product page](#)
[Datasheet](#)

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 $I_q < 1\mu\text{A}$ with regulator disabled

Protections

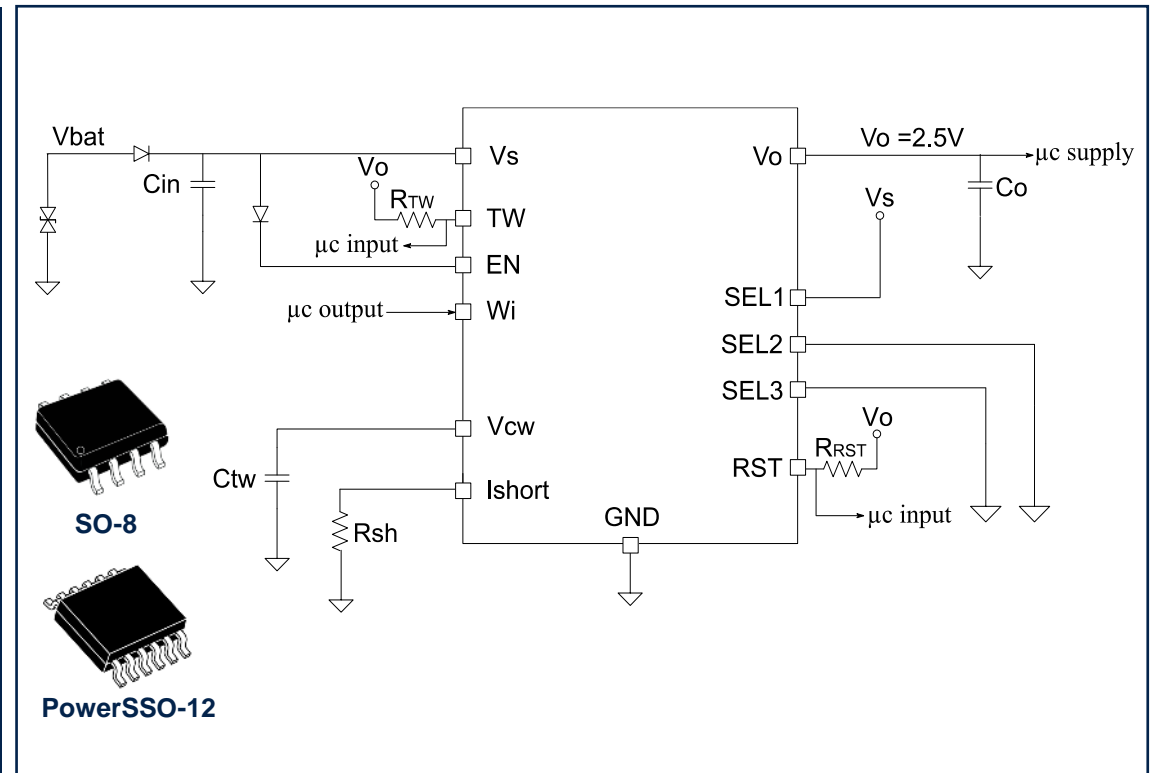
- Thermal shutdown and short-circuit current limitation
- Programmable short-circuit output current
- Undervoltage-lockout UVLO
- Programmable autonomous watchdog

Outputs

- User-selectable output voltage: **0.8V; 1.2V; 1.5V; 1.8V; 2.5V; 2.8V; 3.3V or 5V**
- Output voltage precision $\pm 2\%$
- Output current: I_o **200mA**

Diagnostics

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



Automotive LDO linear voltage regulator

A glance at possible applications:

8/16/32-bit MCU

FPGA

Infotainment &
audio systemPowertrain
systemCamera
/ 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](#)

L99VR02J: [product page](#), [data-brief](#)

L99VR02XP: [product page](#), [data-brief](#)

Line card Power management IC

L5963

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

L5965

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

L9001

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

L9396

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

SPSB081

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

STPM066S

Multiple voltage regulator integrating one Buck pre-regulator, one boost, one LDO and one voltage reference

STPM801

Configurable integrated Soft-Start, Hot-Swap and O-Ring with reverse input protection

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

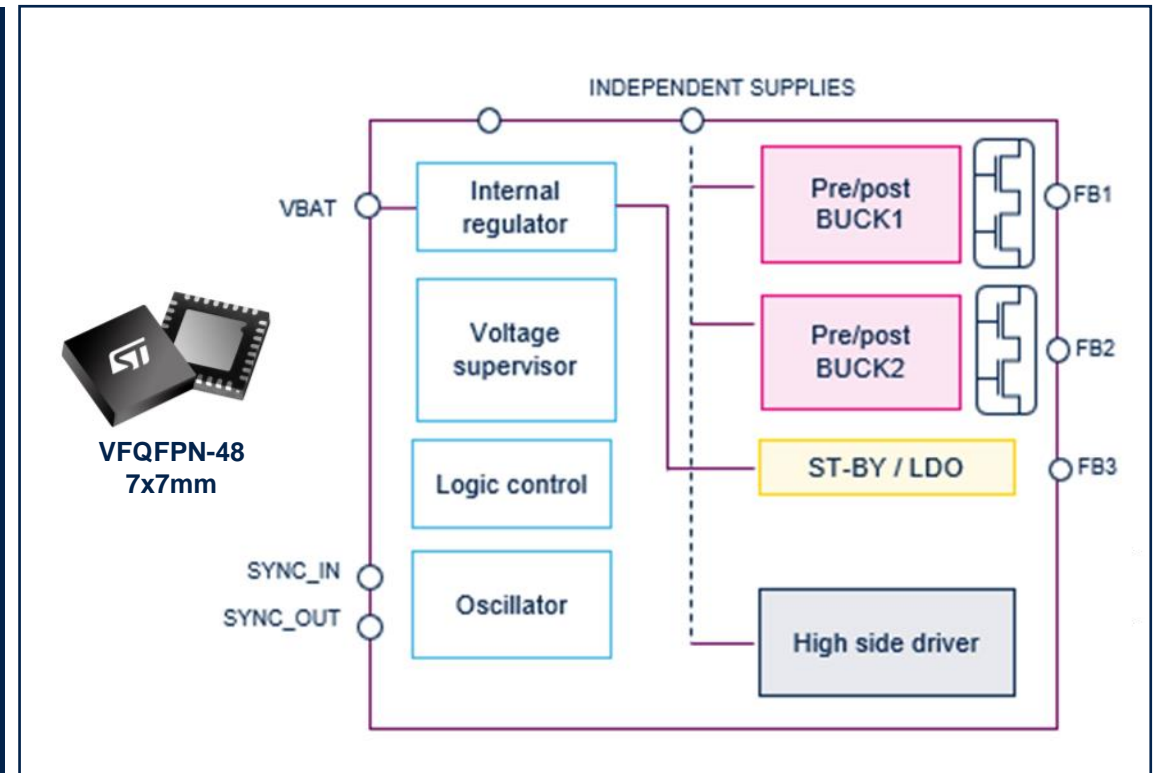
- Load dump protection
- Independent thermal protection on all regulators
- Independent current limit on all regulators

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



Automotive multichannel power management

A glance at possible applications:

ECU

Microcontroller
power supplyInfotainment
module

USB hub

Automotive
sound systemInstrument
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](#)

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

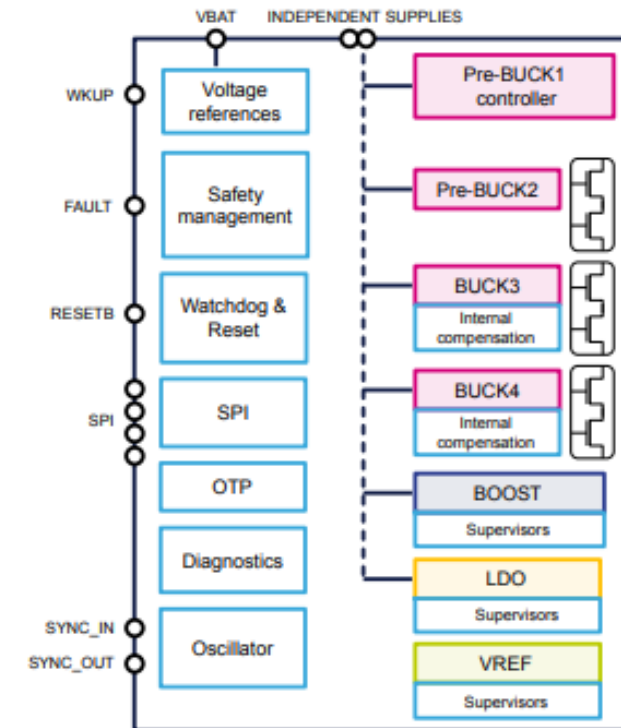
- 2x Buck pre-regulator (one of which is a controller)
- 2x Buck post-regulator
- 1x Boost post-regulator
- 1x linear LDO post-regulator
- 1x post precise voltage reference

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



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 supplying
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](#)

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

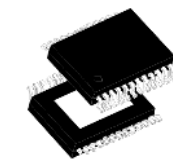
- Configurable watchdog
- Over temperature shutdown
- Output under or over voltage reset generation

Outputs

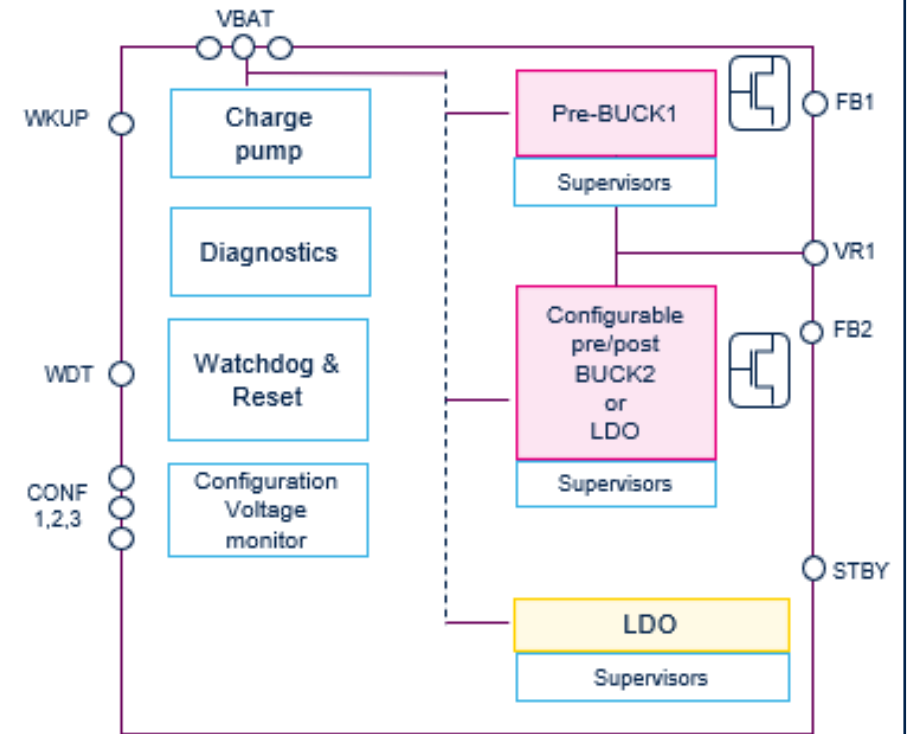
- 1x Buck regulator (3.3/5/6V, 1A)
- 1x configurable Buck/LDO regulator (0.8V to 5.0 V, 1A as Buck and 300 mA as LDO)
- 1 x LDO (3.3/5V, 100mA)

Diagnostics

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



PowerSSO-24



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](#)

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

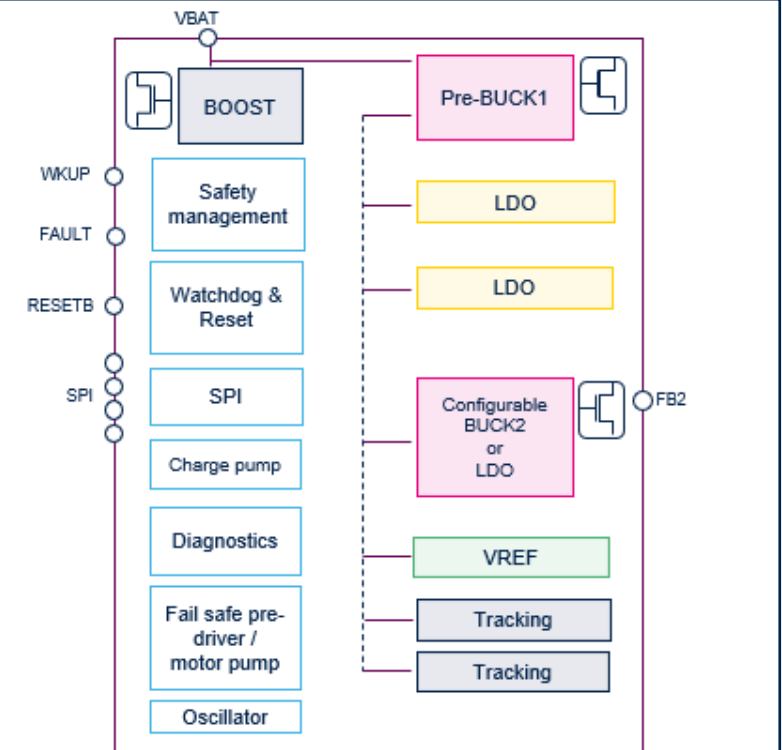
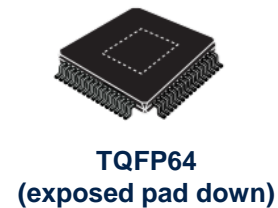
- Temperature monitoring and thermal shutdown
- Configurable and programmable double watchdog

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



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](#)

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

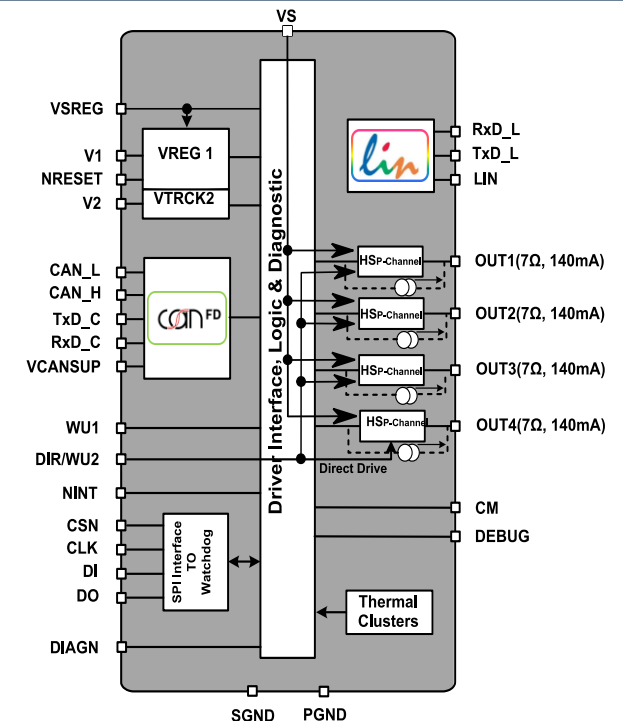
- One 5 V (or 3.3 V for SPSB0813 and SPSB081C3) low-drop voltage regulator (V1) for microcontroller and peripheral supply
- One configurable 5 V or 3.3 V low-drop voltage regulator V2 selectable via SPI, tracker for peripheral supply
- Minimum current limitation of 450 mA for V1 and 400 mA for V2

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



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](#)

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

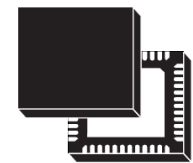
- Undervoltage / Overvoltage / Overcurrent protections
- Over temperature detection by local thermal sensors
- Short circuit protected outputs and short to ground protection
- Thermal shutdown junction temperature 175 °C

Outputs

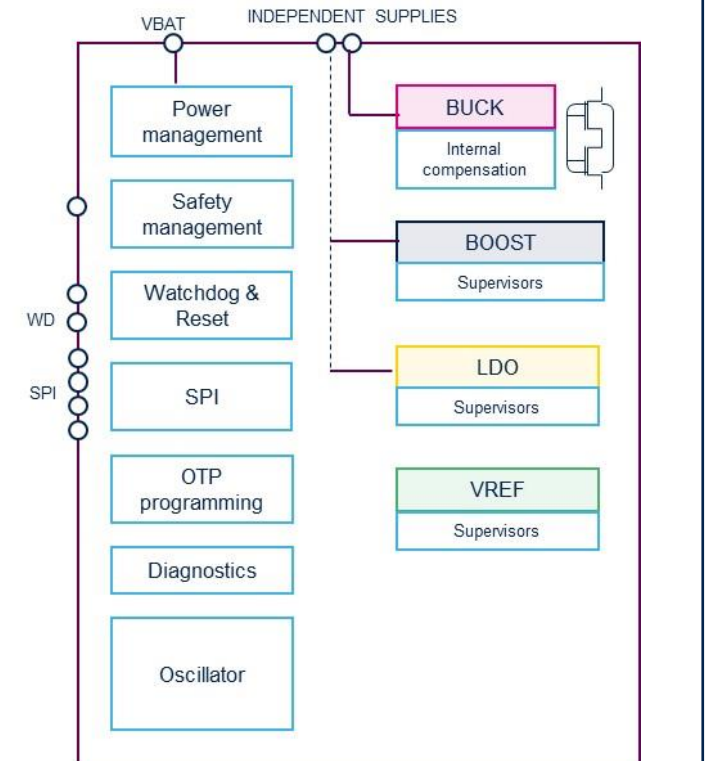
- Pre SMPS BUCK regulator, adjustable via OTP to 1.0 V, 1.1 V, 1.2 V, 1.35 V, 1.5 V, 3.3 V, 3.6 V, 5.0 V @ 1.35/2.6 A min peak current limit, 0.4/2.4 MHz
- Post SMPS BOOST regulator, adjustable via OTP to 5.0 V @ 0.3 A max load current, 7.0 V @ 0.2 A max load current, 2.4 MHz
- Post Linear regulator 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)



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](#)

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

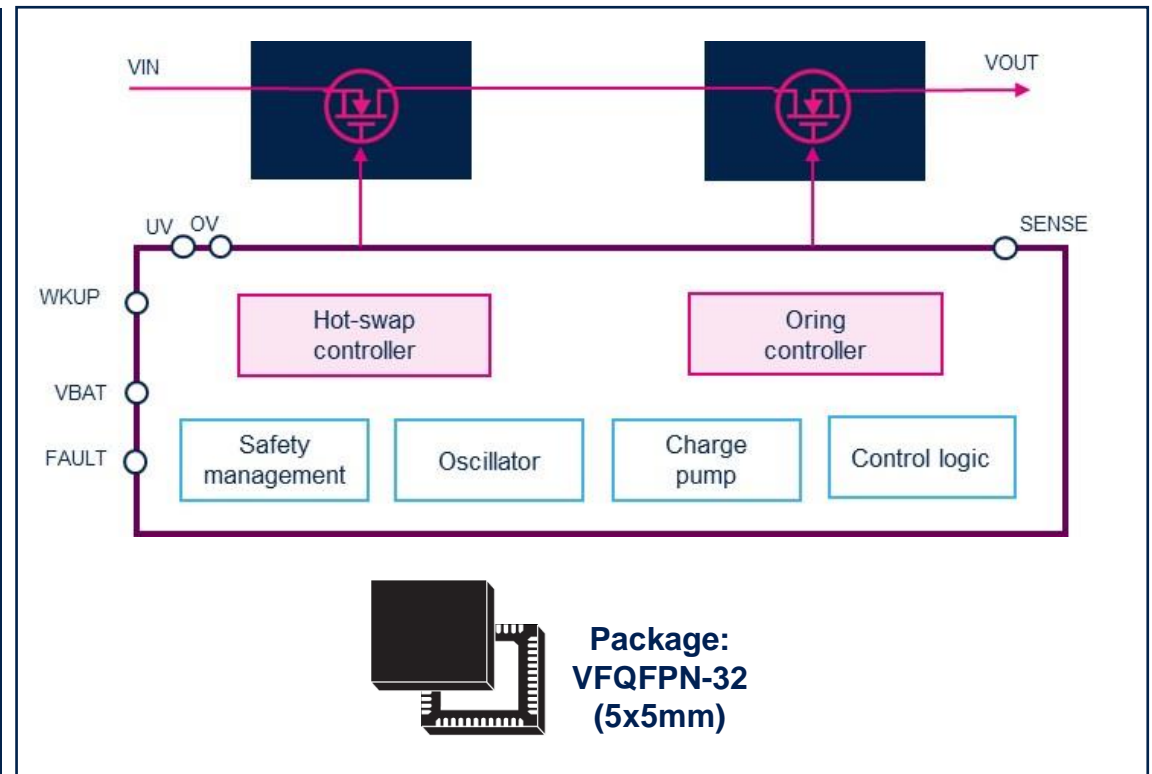
- Input overvoltage and undervoltage protections (threshold with ext divider)
- Output overcurrent protection
- Short to GND detection on Vout

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



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
- Data-brief
- Datasheet

Battery management ICs



Line card Battery management system

L9963E

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

L9963T

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

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 $\pm 0.5\%$ sense error accuracy

Outputs

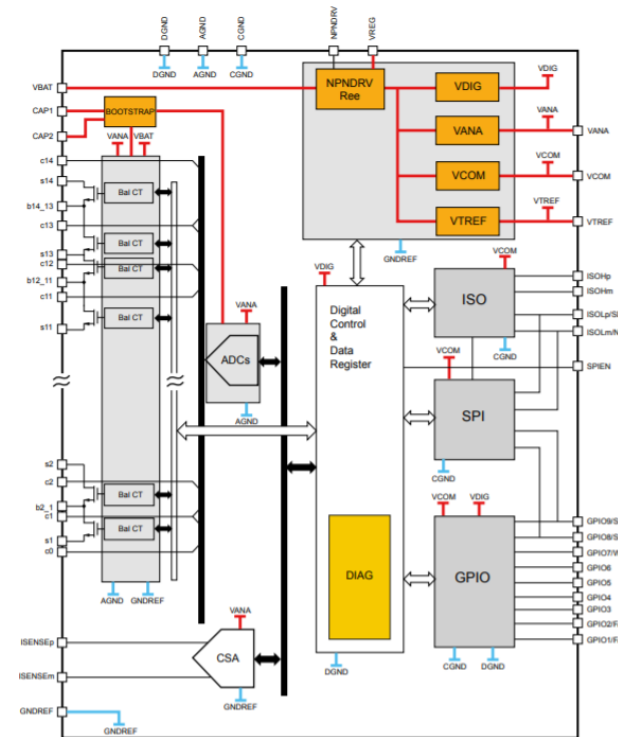
- 2.66 Mbps isolated serial communication with regenerative buffer, supporting dual access ring
- Cells voltage conversion and Synchronized current measurement with coulomb counter
- Single or multiple channel cell balancing simultaneously

Protections

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

Diagnostics

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



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

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

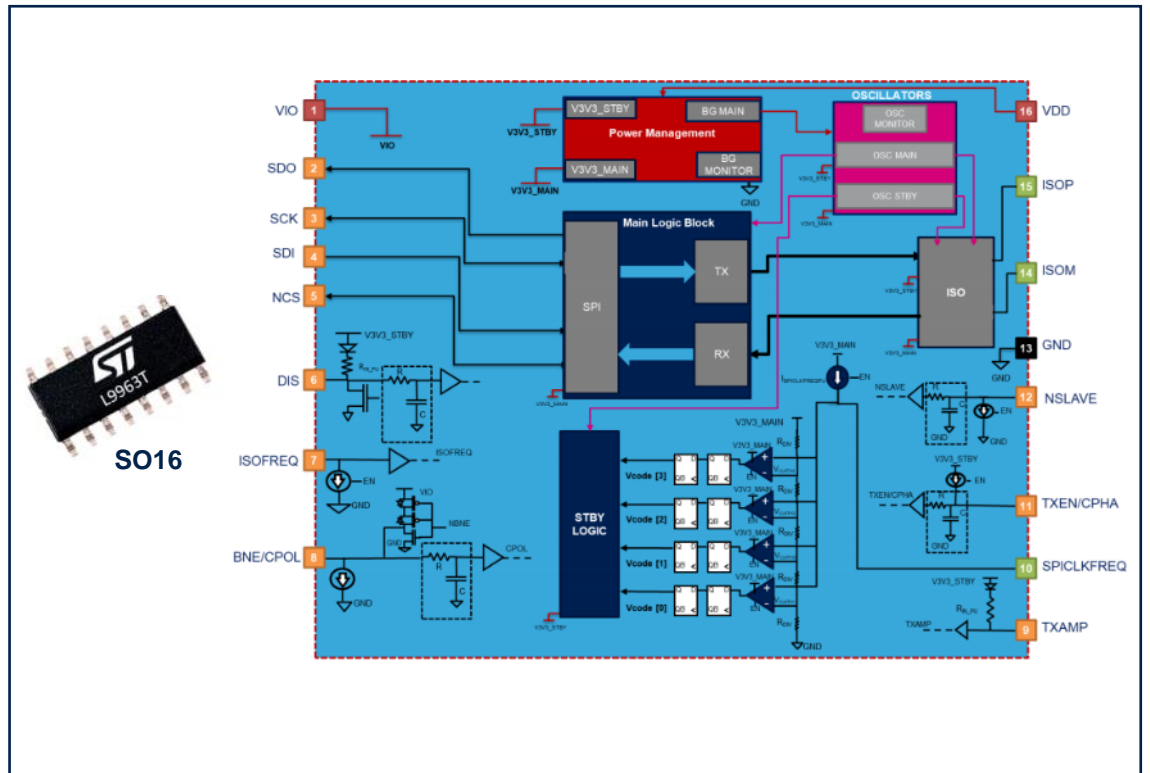
- Redundant reference voltage and dual oscillator are used to guarantee independency between monitor functions

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



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

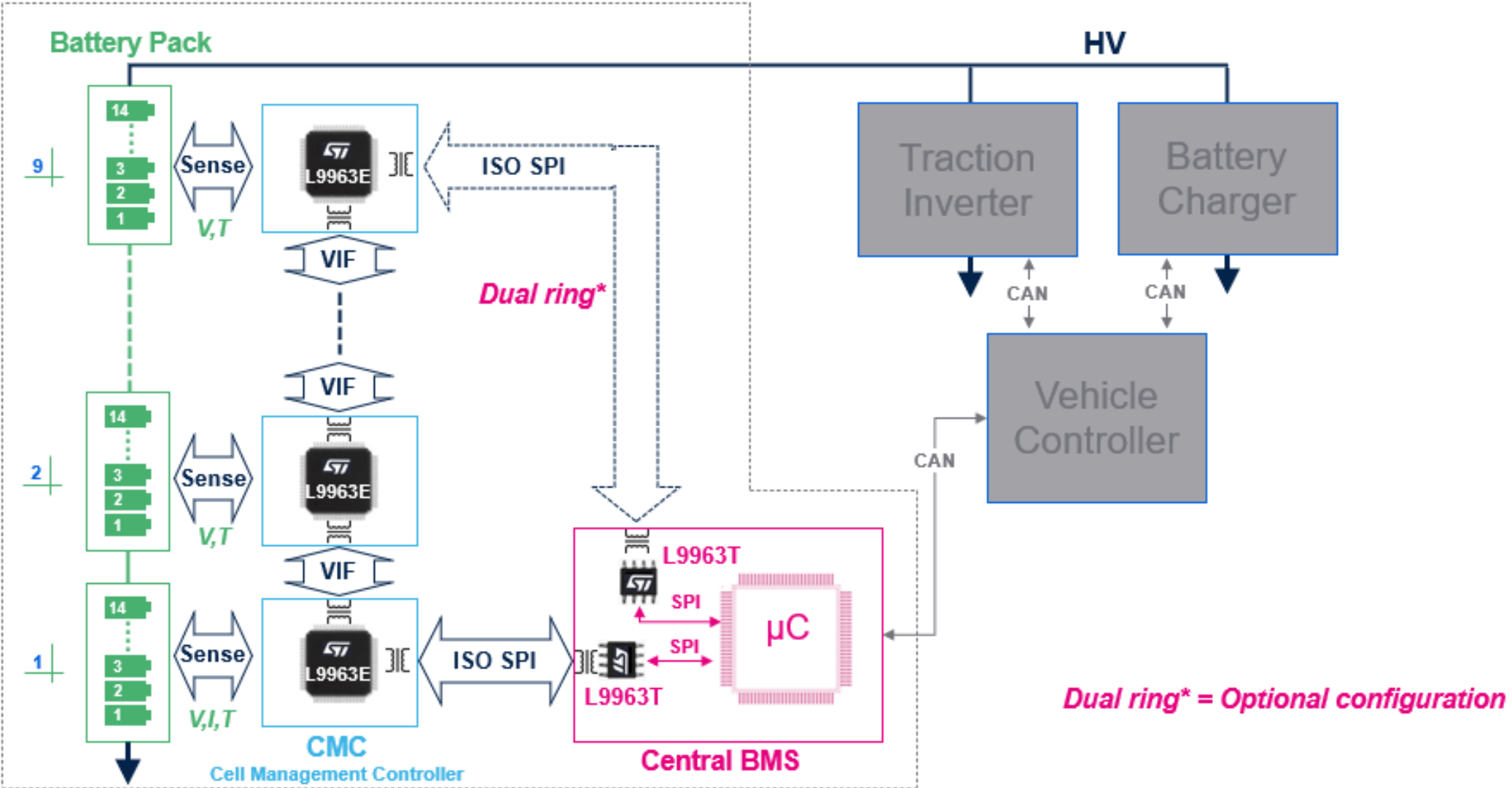
Full compliant with ISO26262

Collaterals & Tools

L9963T

- [Datasheet](#)
- Application note: [L9963 14 Cells BMC IC Evaluation Board Quick Guide](#)

Application example of HV battery BMS based on L9963x



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

Dual ring* = Optional configuration

“
If only

I could find out more about
battery management

This is where we come in

Line card

Battery cut-off

L9678

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

L9679

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 $\pm 5\%$)
- Configurable linear power supplies (5V and 7.2V $\pm 4\%$)

Protections

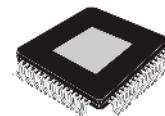
- Battery voltage monitor and shutdown control with wake-up control
- Current monitoring

Outputs

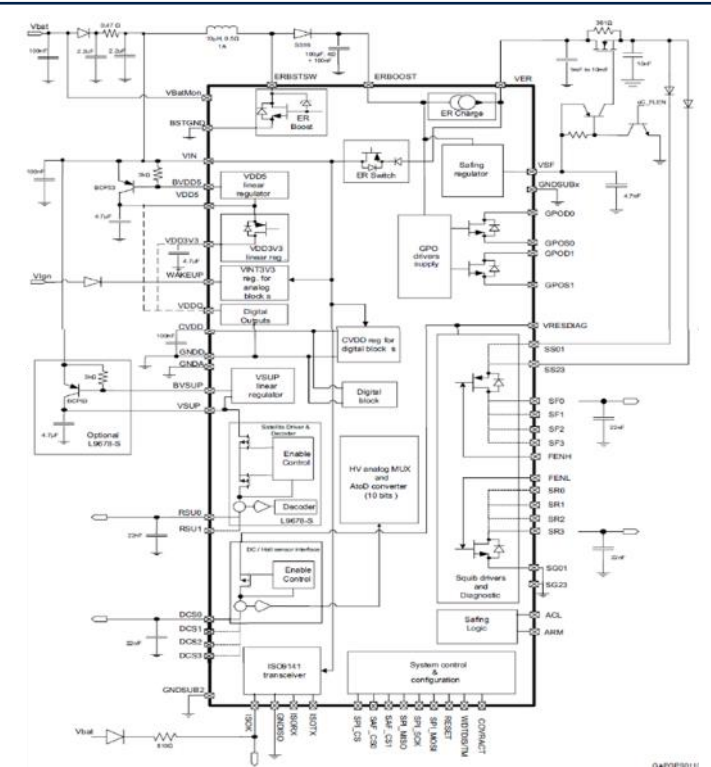
- 4-channel High-Side/Low-Side Squib drivers (max 25V)
- 2-channel PSI-5 remote sensor interface (L9678P-S version only)

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)



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 $\pm 5\%$)
- Configurable linear power supplies (5V and 7.2V $\pm 4\%$)

Protections

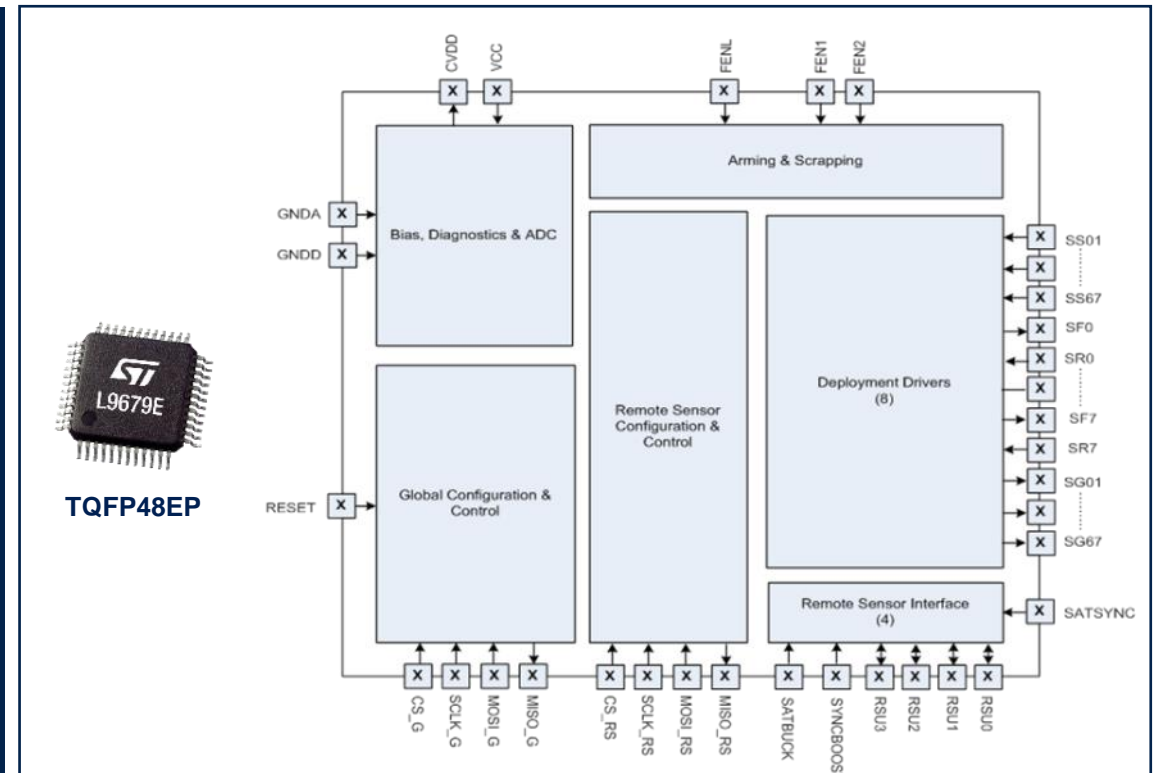
- Battery voltage monitor and shutdown control with wake-up control
- Current monitoring

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



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](#)

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

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 $I_s = 21 \mu A$ 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

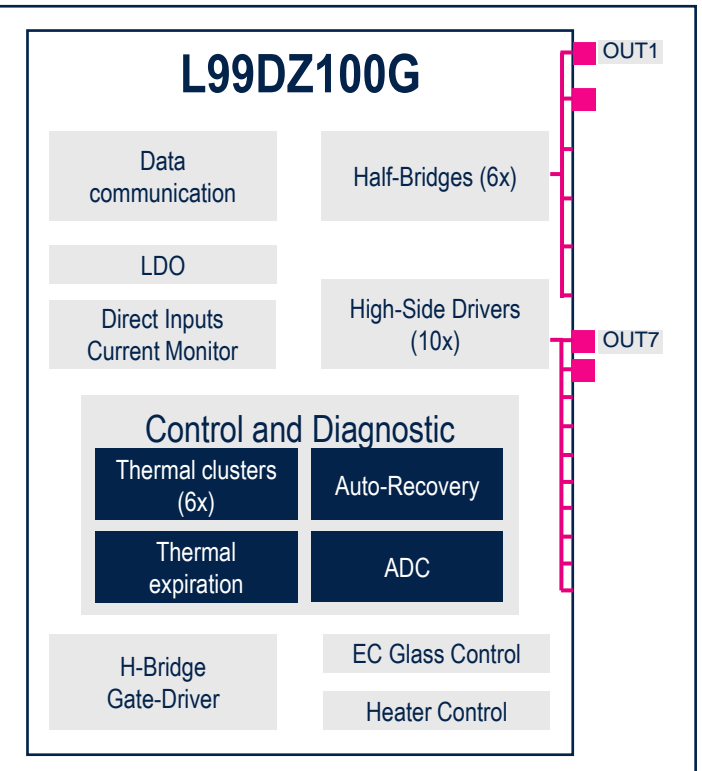
- 6x Half-Bridge
- 10x High-Side Drivers with duty cycle adjustment
- H-Bridge driver
- High-Side CAN and LIN communication
- 2x LDOs for MCU and sensor supply (max 250mA)

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



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 $I_S = 21 \mu A$ 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

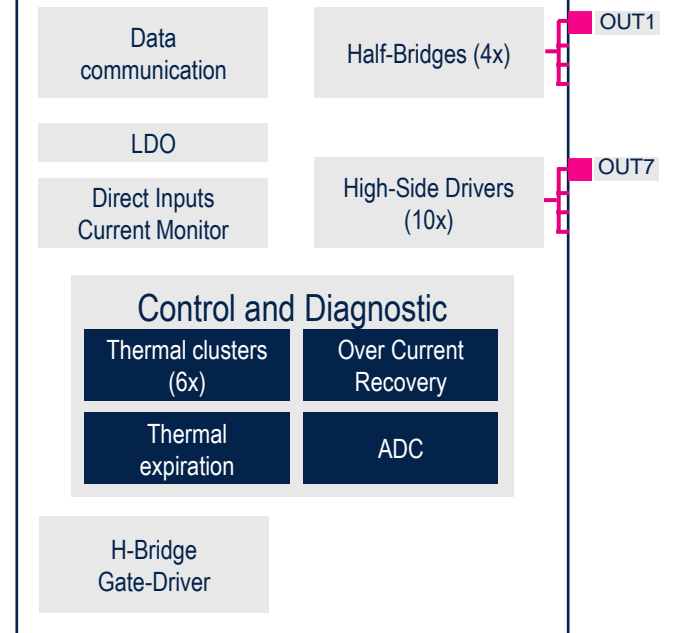
Diagnostics

- 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

L99DZ120



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 $I_S = 21 \mu A$ Typ.
- Programmable soft-start for all the output

Protections

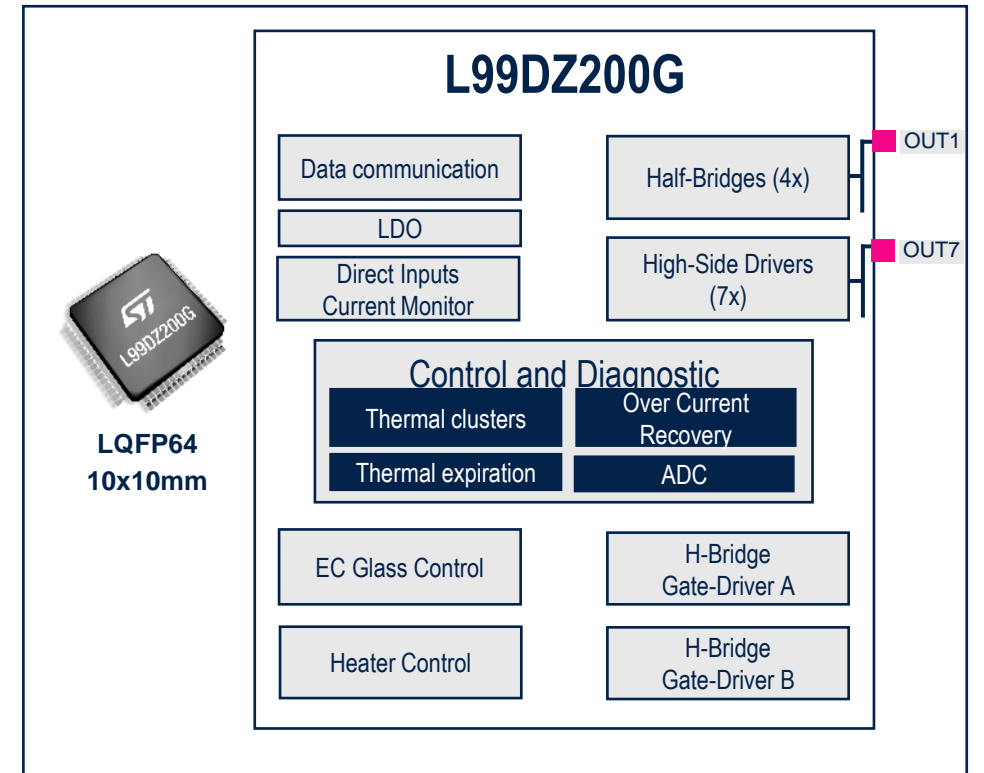
- Short circuit protection for integrated half bridges
- Overcurrent for all the outputs
- Over- and Under-Voltage shutdown
- Thermal clusters shutdown & thermal expiration
- Generator Mode for H-bridge drivers
- Charge pump output for reverse polarity protection

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



L99DZ200G

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

A glance at possible applications:



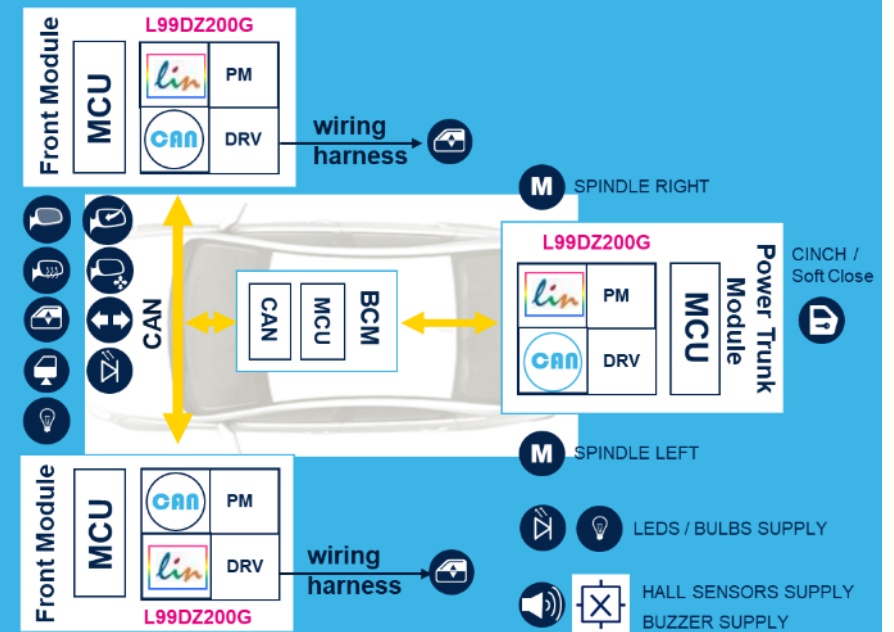
Power Trunk /
Tailgate applications



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](#)

“
If only



I could find out more
about door zone

This is where we come in

L99UDL01

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

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 -40°C to 150°C

Protections

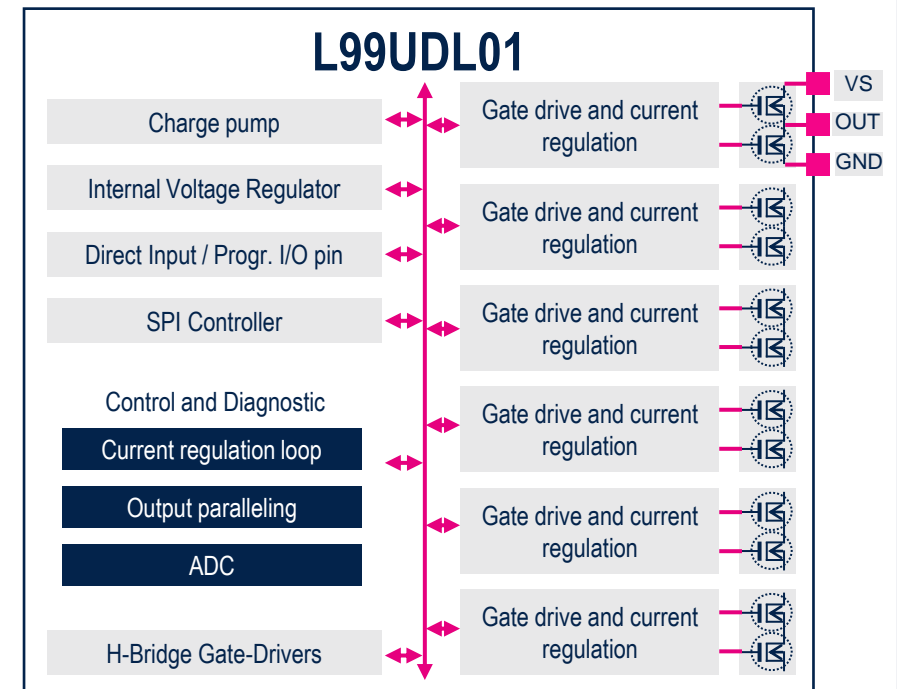
- Overload for all outputs
- Shorted and open load detection, also in off state
- Drain-source voltage monitoring for external FETs

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



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

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

L9779WD

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

L9788

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

L9780

Sensor control device with voltage controlled current source compatible with a wide range of air fuel sensors

L9966

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

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

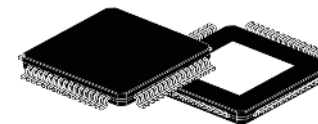
- Short to battery protection
- Short to ground protection
- Thermal shutdown protection

Inputs/Outputs

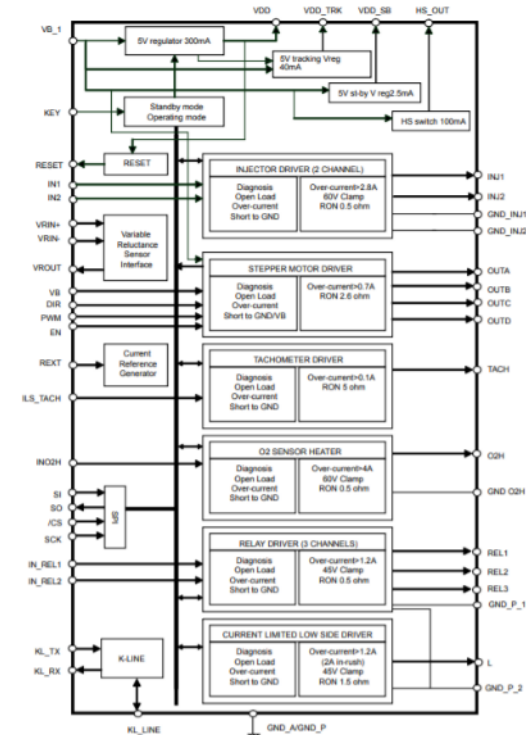
- 2-channel solenoids drivers
- 3x relay drivers
- 1x stepper motor driver
- 1x O2 sensor heater
- 2x 5V regulator (300/400mA)
- 1x 5V tracking regulator
- 1x High-Side driver min 100mA

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)



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](#)

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

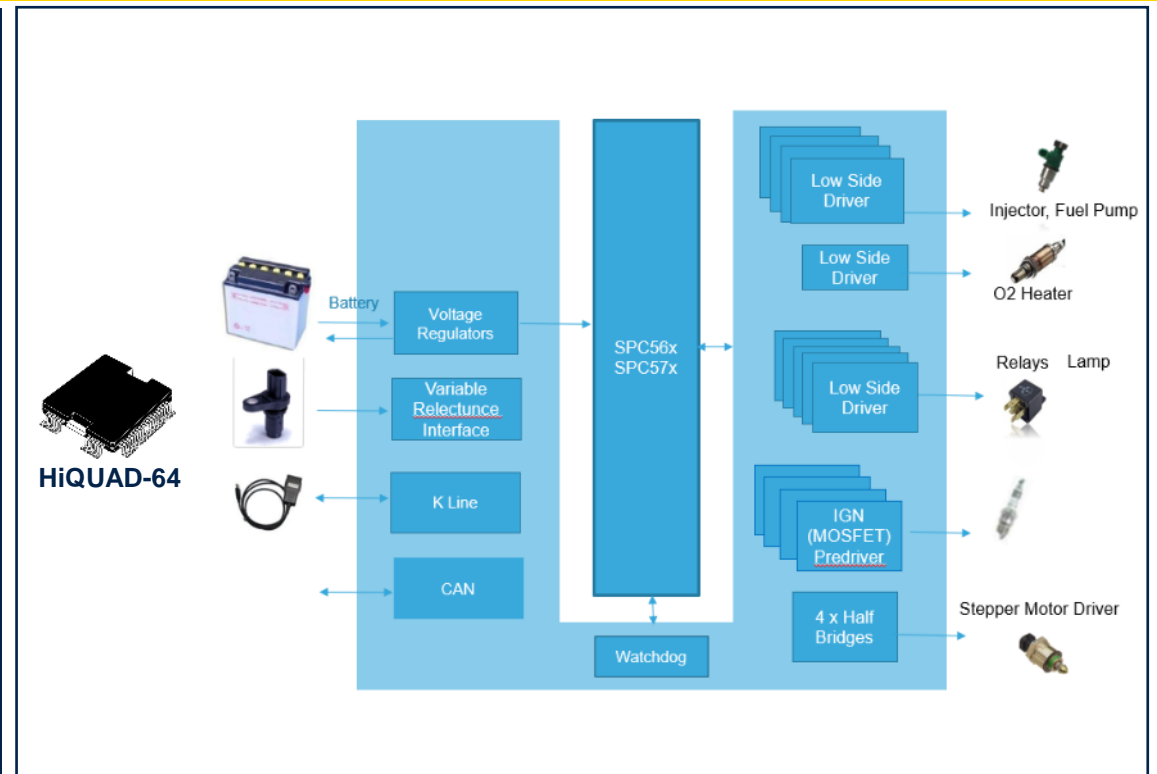
- Short to battery protection
- Short to ground protection
- Thermal shutdown protection

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



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](#)

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

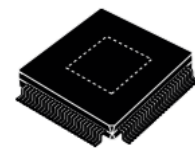
- Soft start-up of all regulators
- Battery protection
- Thermal protection

Inputs/Outputs

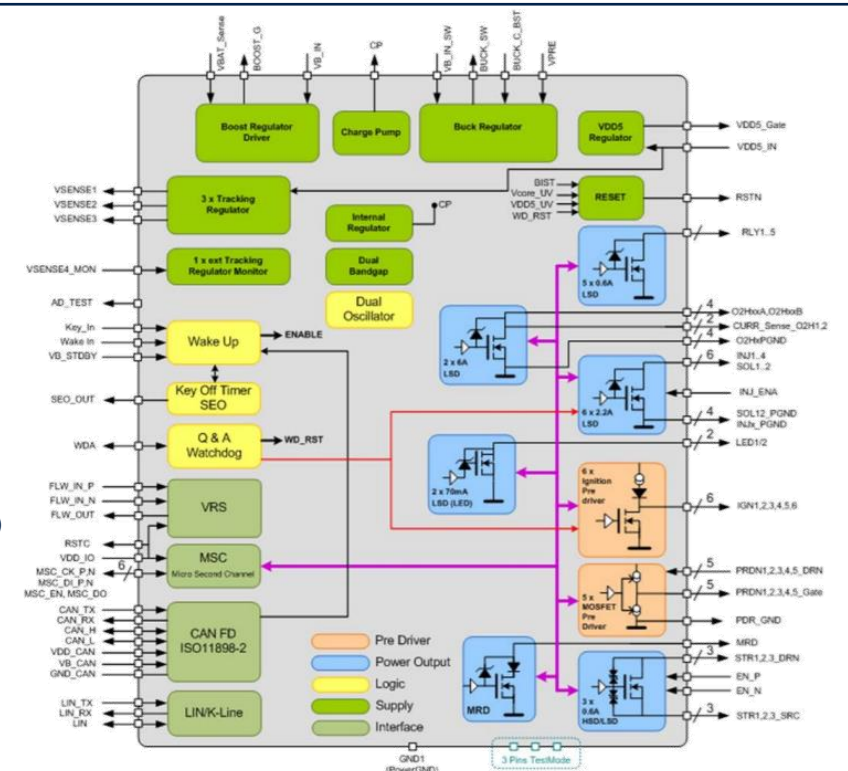
- 1x pre-boost & 1x pre-buck regulator
- 1x LDO 5V, 1 A
- 3x tracking regulator 5V, 150 mA
- Multiple-channels LS/HS drivers for O2H load, camshaft or solenoid, LED, injector, relay, internal or external igniter drivers including functionalities of reverse battery protection, low battery function for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

Diagnostics

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



LQFP100 14x14x1.4 (exposed pad down)



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

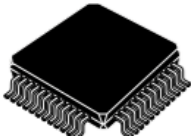
- Sensor and all I/O protection against shorts

Inputs/Outputs

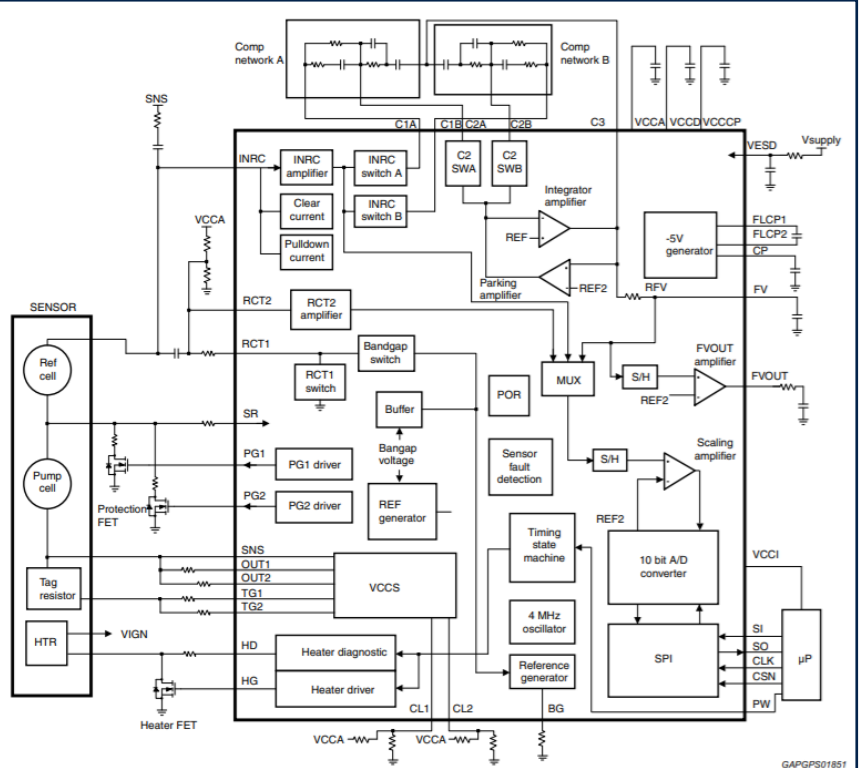
- Digital input and outputs compatible with 5 V or 3.3 V voltage supply
- 2x channels available to connect compensation networks

Diagnostics

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



LQFP48



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 can 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](#)

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

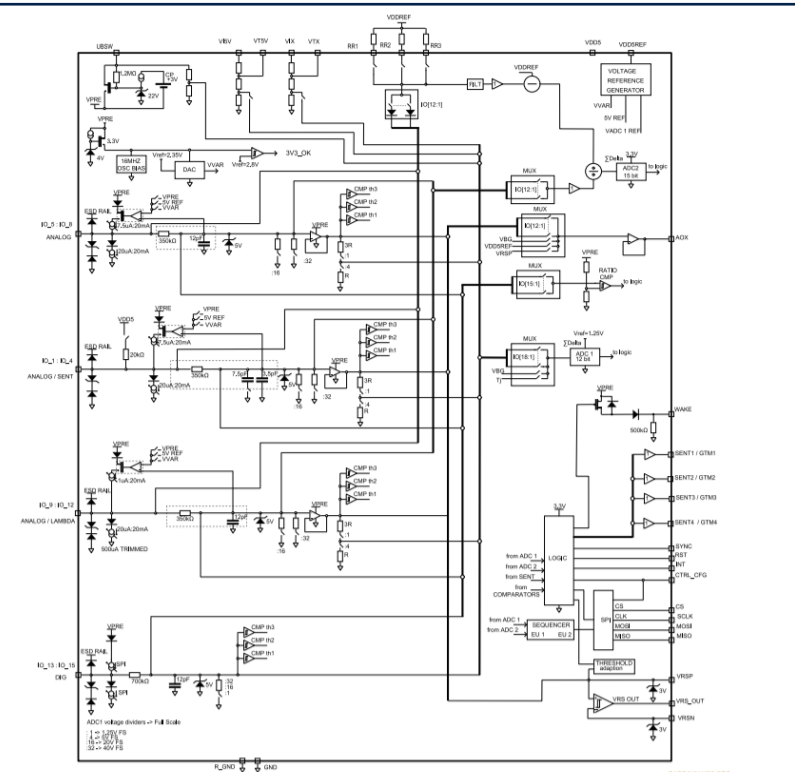
- 12x input channels for connection to external analog loads (4 with also λ sensor functionality, 4 with also SENT functionality)
- 3x inputs channels for connection to external digital switches
- 1x analog output channel
- 4x digital output channels

Diagnostics

- SPI interface for device configuration, diagnostics and data communication



TQFP48 7x7 mm



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

Alternator voltage regulator, suited for 12 V automotive systems, able to communicate with ECU through LIN communication protocol

L9916

Smart alternator voltage regulator conceived to be used in automotive application for both 12 V and 24 V systems

L9911

Monolithic multifunction alternator voltage regulator for 12V automotive applications

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

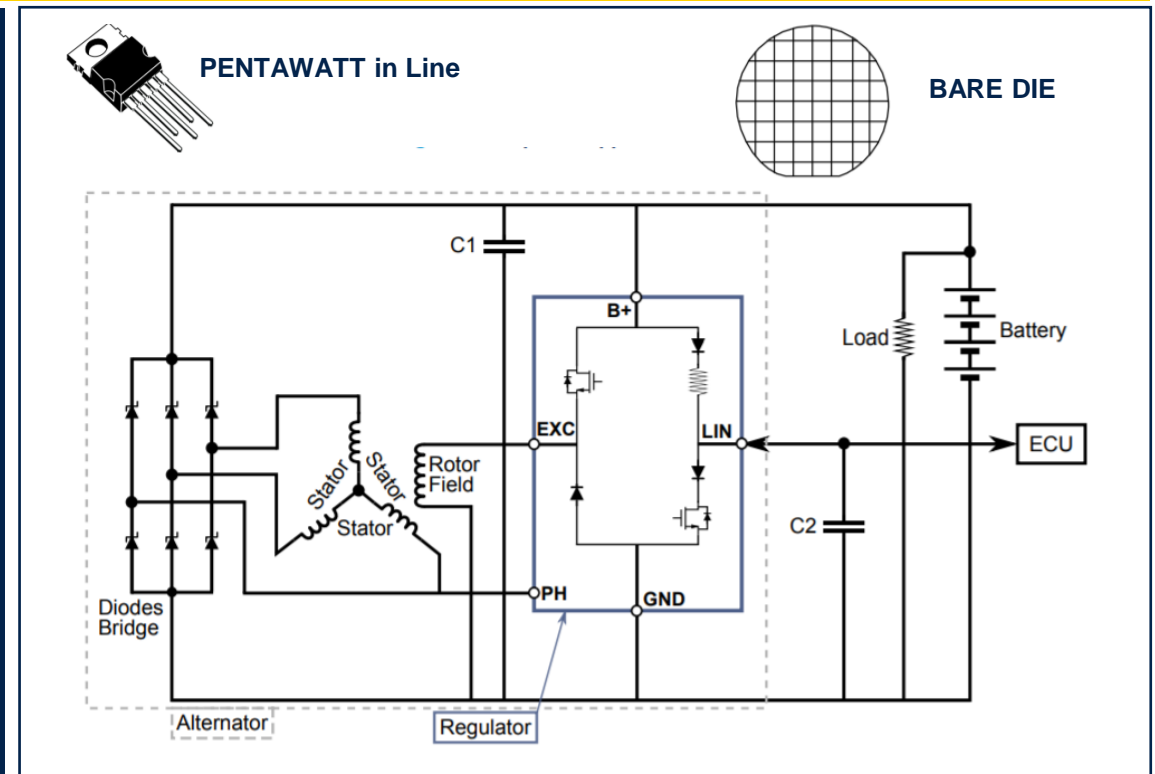
- Current limitation and overcurrent protection
- Thermal protection
- Full ISO26262 compliant, ASIL-B systems ready

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



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](#)

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

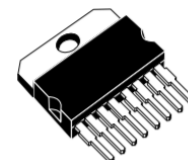
- Thermal shutdown
- Field short circuit protection
- Protected high side relay driver

Inputs/Outputs

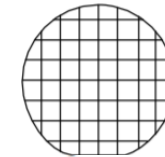
- High side field driver
- Self-start function
- Regulated voltage thermally compensated
- Configurable parameters through OTP cells
- Lamp driver
- Load response control (LRC)

Diagnostics

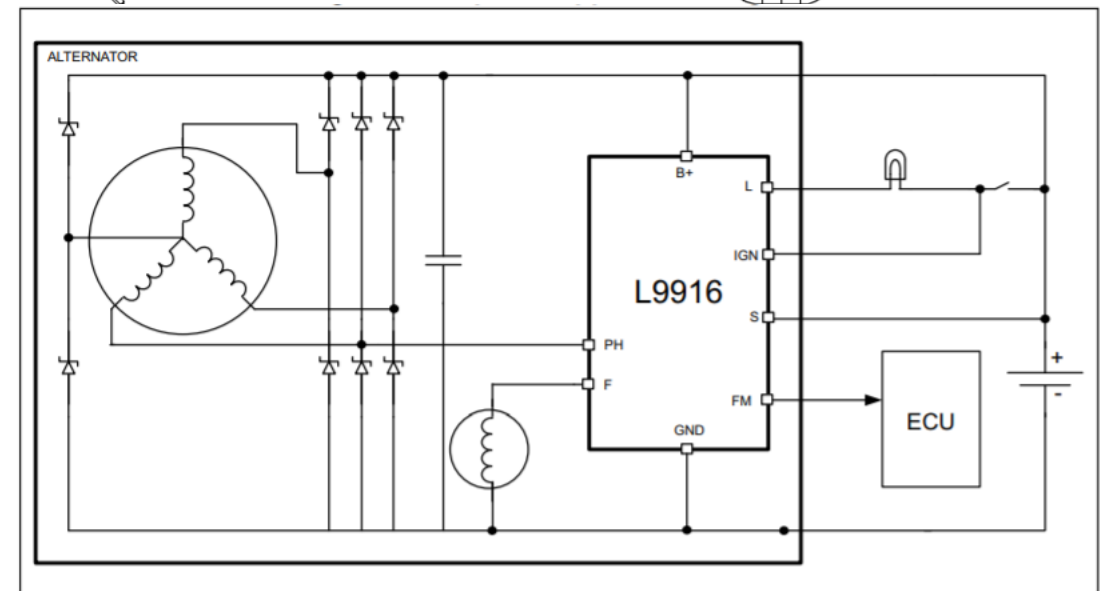
- Continuous feedback to the ECU is provided through the Field Monitor output.



MULTIWATT8



BARE DIE



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](#)

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

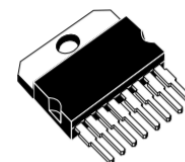
- Thermal protection
- Field short circuit protection
- Protected diagnostic lamp driver
- Protected high side relay driver

Inputs/Outputs

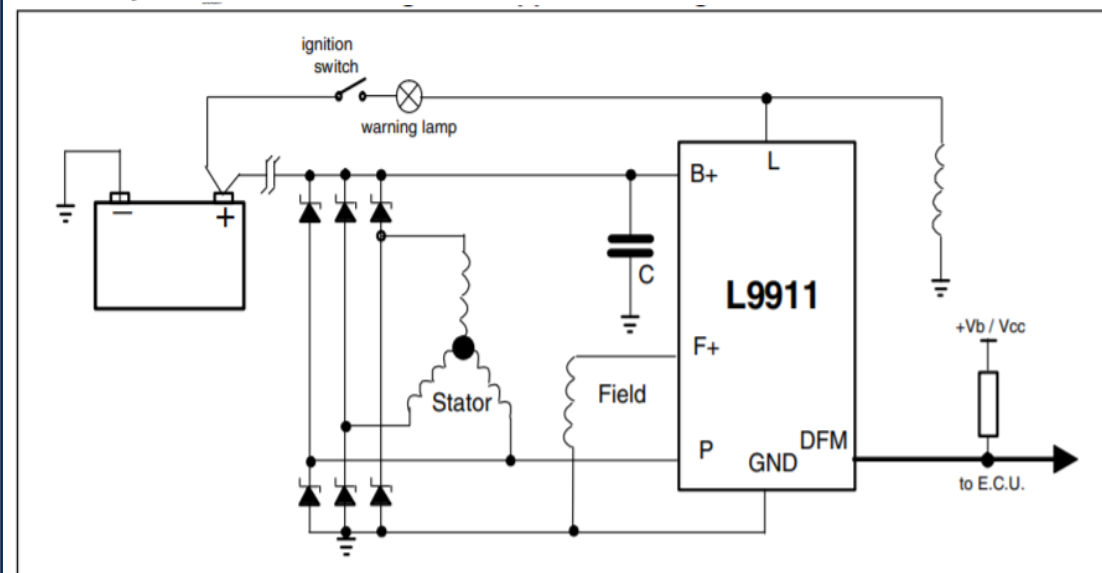
- High side field driver
- Load response control
- Self start function

Diagnostics

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



MULTIWATT8



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](#)

“
If only



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

This is where we come in

Electronic Parking Brake



Line card

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

L9369

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

L9370

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

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

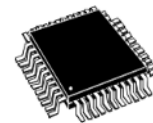
- reverse battery protection FET
- Programmable thermal, undervoltage, overvoltage, drain-source protections
- Redundant safety low-side switch-off path
- Configurable OVC detection

Outputs

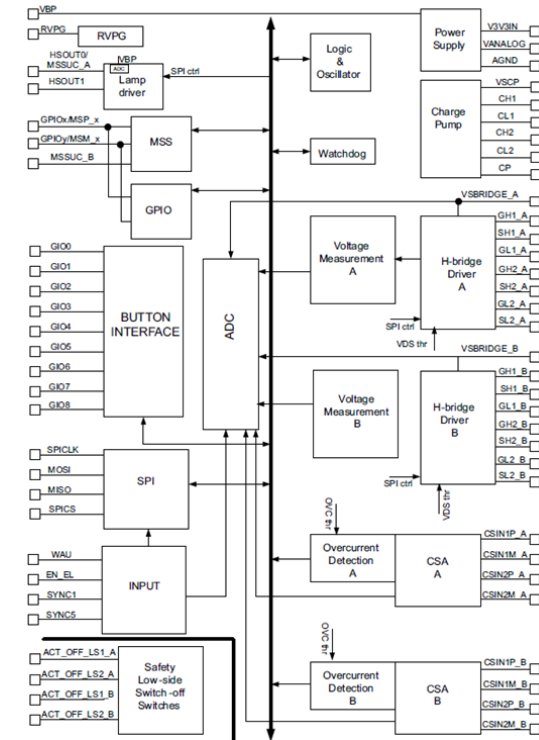
- 2x H-bridge pre-driver stages fully controlled and configured by SPI (with PWM mode option)
- 2x configurable HS / LS lamp drivers
- 4x GPIOs, also for SYS wake up in Sleep Mode (Button I/F)

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



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

6x integrated measurement paths for synchronized digital motor voltage acquisition (12bit), configurable LP filter
Motor diagnostics in Off state

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

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](#)

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

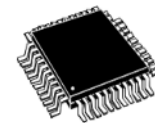
- reverse battery protection FET
- Programmable thermal, undervoltage, overvoltage, drain-source protections
- Redundant safety low-side switch-off path
- Configurable OVC detection

Outputs

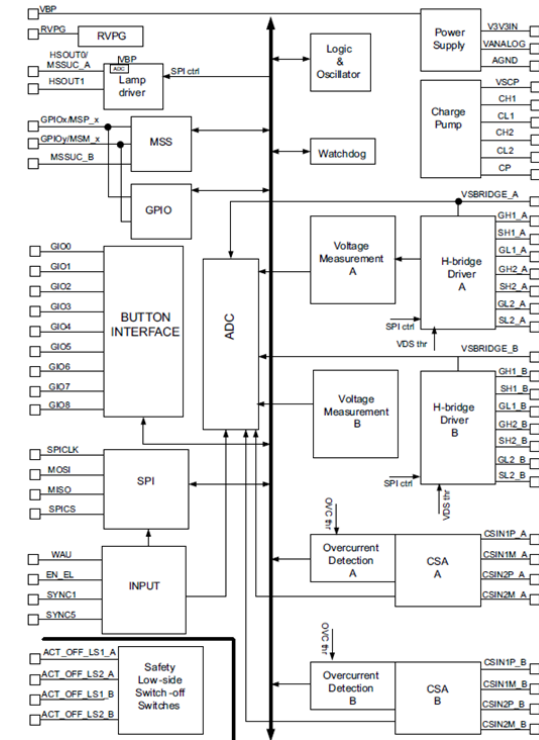
- 2x H-bridge pre-driver stages fully controlled and configured by SPI (with PWM mode option)
- 2x configurable HS / LS lamp drivers
- 4x GPIOs, also for SYS wake up in Sleep Mode (Button I/F)

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



LQFP64



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

6x integrated measurement paths for synchronized digital motor voltage acquisition (12bit), configurable LP filter
Motor diagnostics in Off state

8xGPIOs 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

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](#)

Airbag Systems



Line card

Automotive ICs for Airbag

L9691

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.

L9690

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.

L9689E

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.

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

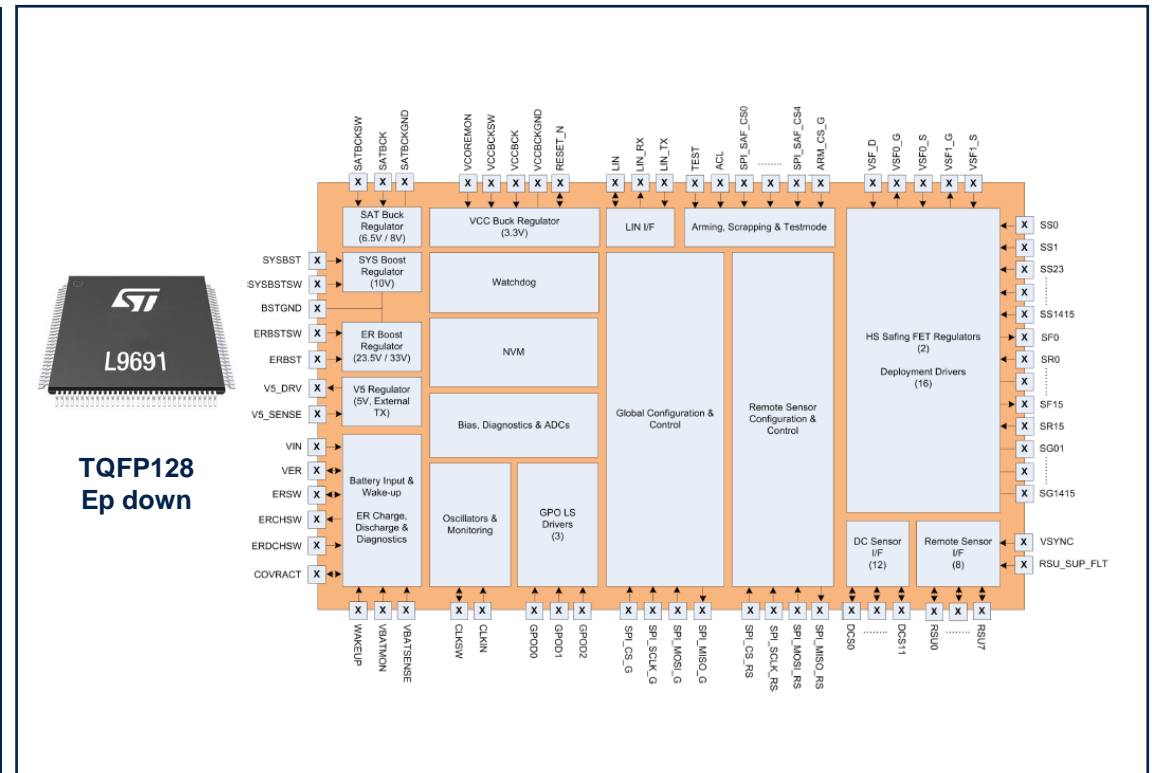
- OV / UV detection on power supply, GND loss detection and shutdown on regulators
- Open and shot on squib drivers
- Current limitation on DC sensor outputs
- Short and open load on GPIOs

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



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](#)

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

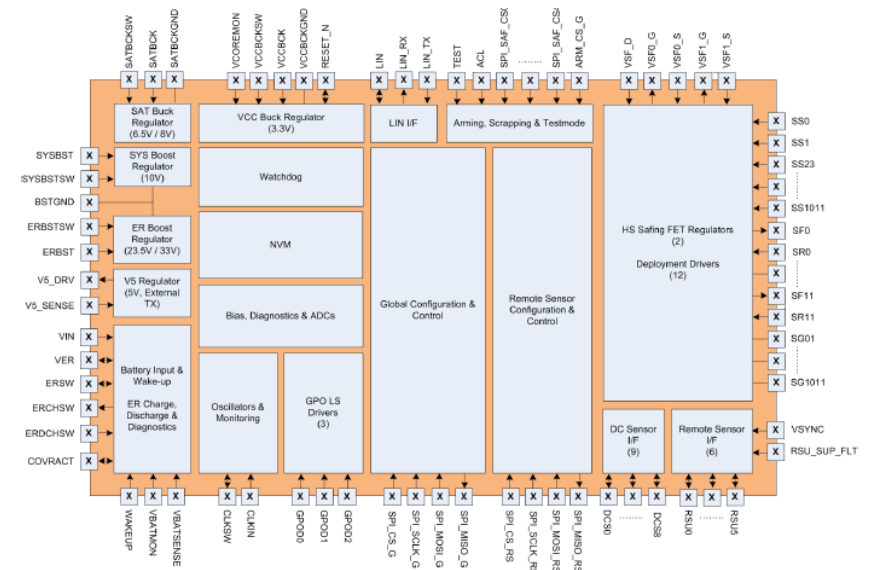
- 12 ch squib drivers with user programmable deploy option, with 2 supporting LEA load
- 3 GPIOs with ON/OFF and PWM ctrl
- 1 global SPI, 1 for remote sensor SPI (SafeSPI v1.0 compatibility)

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



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](#)

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

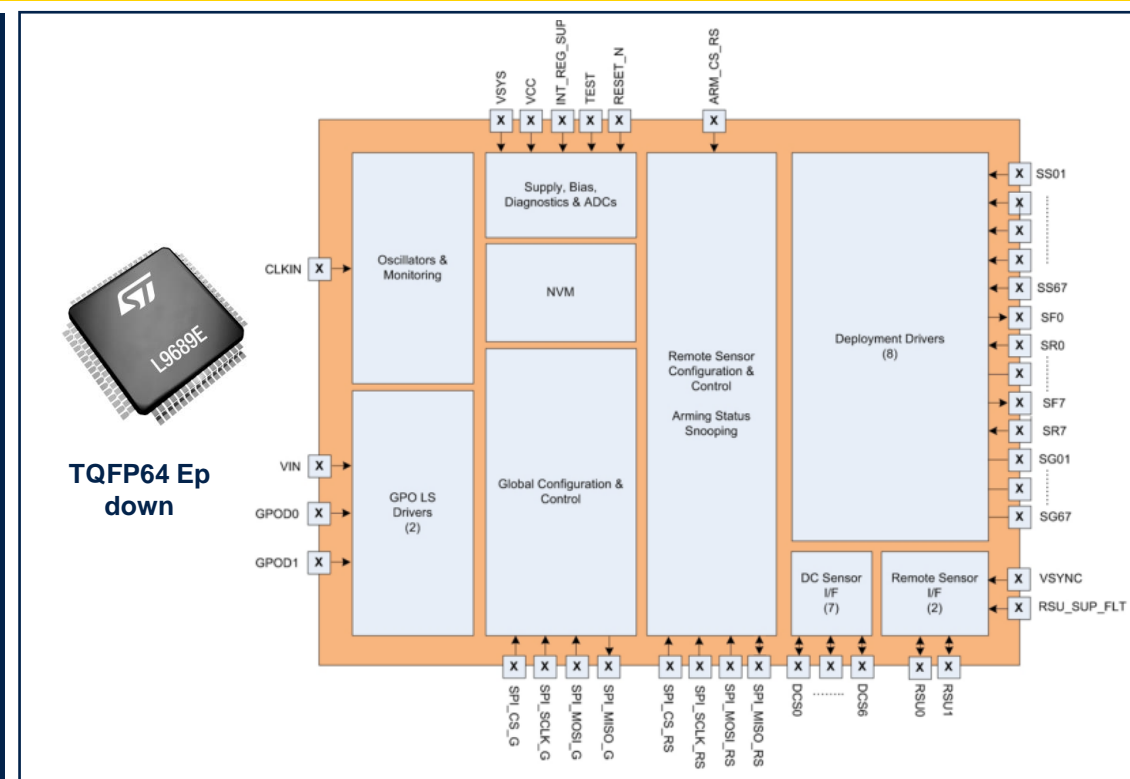
- OV / UV detection on power supply, GND loss detection and shutdown on regulators
- Open and short on squib drivers
- Current limitation on DC sensor outputs
- Short and open load on GPIOs

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



Expansion IC for Airbag application

A glance
at possible
applications:

Airbag

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

Key values

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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