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Automotive Smart Power – Product Selector Guide 2021

Q1

Automotive smartpower product catalogue **by functions**

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

Door zone electronics	Engine management system for 1/4 cylinders	Valve drivers
Door zone	Engine management system	Valve drivers
Door lock		

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Motor control

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Line card
H-bridge DC motor driver

L99H01	L9960/T	L9959/T
DC motor driver designed to control 4 external N-channel MOS transistors in bridge configuration	Integrated H-bridge for resistive and inductive loads in Single and Dual output (one or two motors per device) with flexible driving control	Single and Dual integrated H-bridge for resistive and inductive loads with current feedback output

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

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L99H01
Automotive motor bridge driver

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

Features

Electrical parameters

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

Protections

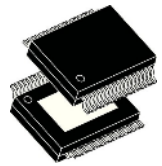
- Control of reverse battery protection MOSFETs with embedded thermal sensors
- Programmable thermal, undervoltage, overvoltage protections

Outputs

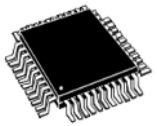
- 1x Half Bridge or Full Bridge Gate Driver
- Current sensing amplifier

Diagnostics

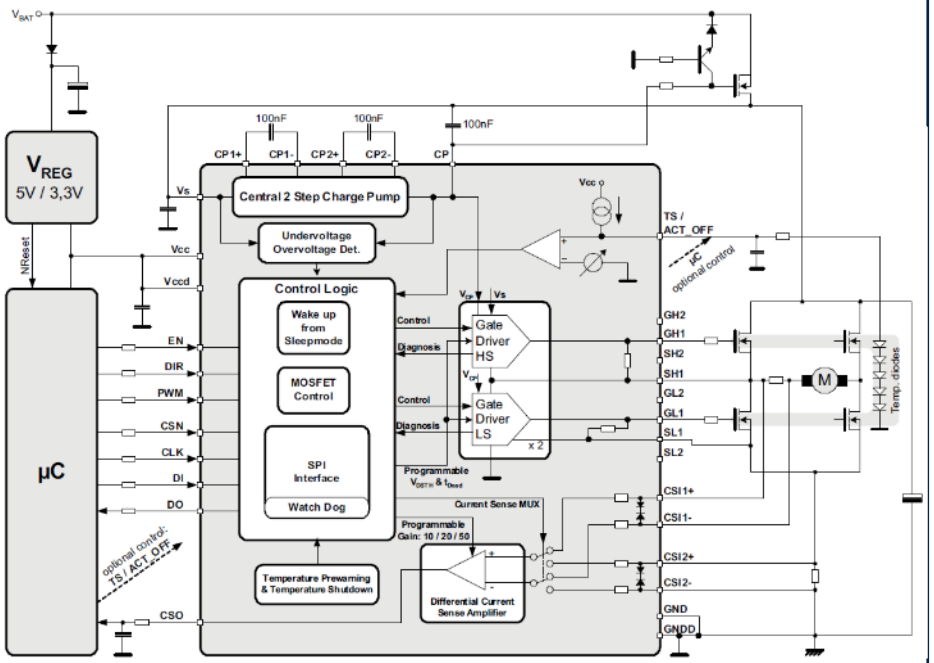
- Diagnostic information via SPI for all the outputs



PowerSSO-36



LQFP32
7x7mm



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L99H01
Automotive motor 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 & Marketing Package

Product page
Datasheet,
Selection guide: smartpower for body,
Brochure

Find out more about L99H01 **H-bridge for brushed DC motor control** applications

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L9960/T
Automotive H-bridge motor control

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

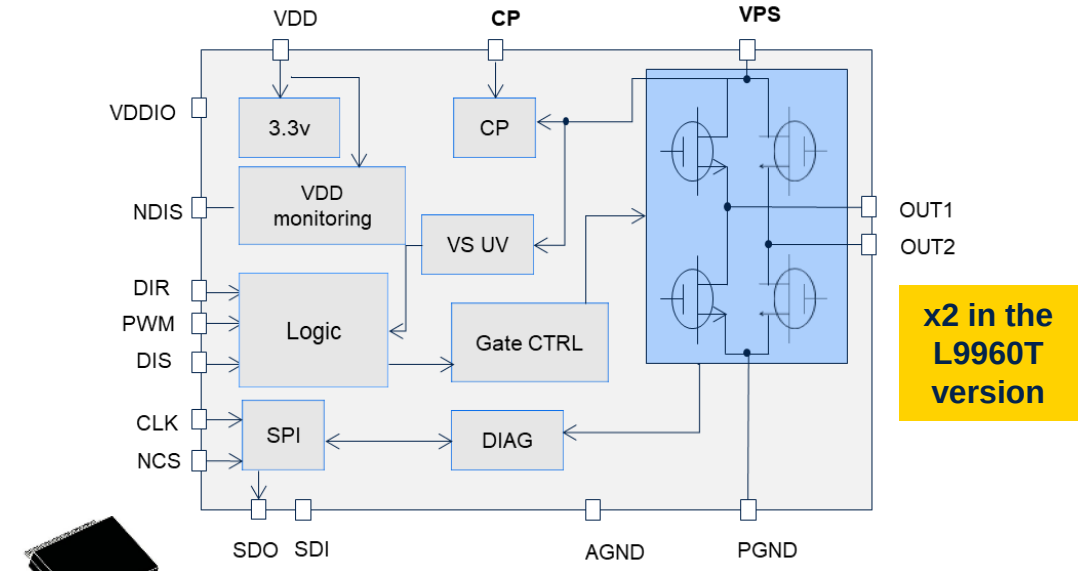
Features

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

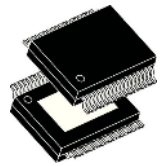
Protections
- Programmable current limitation and overcurrent thresholds
- Programmable thermal warning and shutdown thresholds
- Supply monitoring

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

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



x2 in the L9960T version



PowerSSO-36

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L9960/T
Automotive H-bridge motor control

A glance at possible applications:

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

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

Key values

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

Collaterals & Marketing Package

L9960/T

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

EVAL-L9960/T

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

STSW-L9960/T

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

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

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L9959/T
Automotive H-bridge motor control

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

Features

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

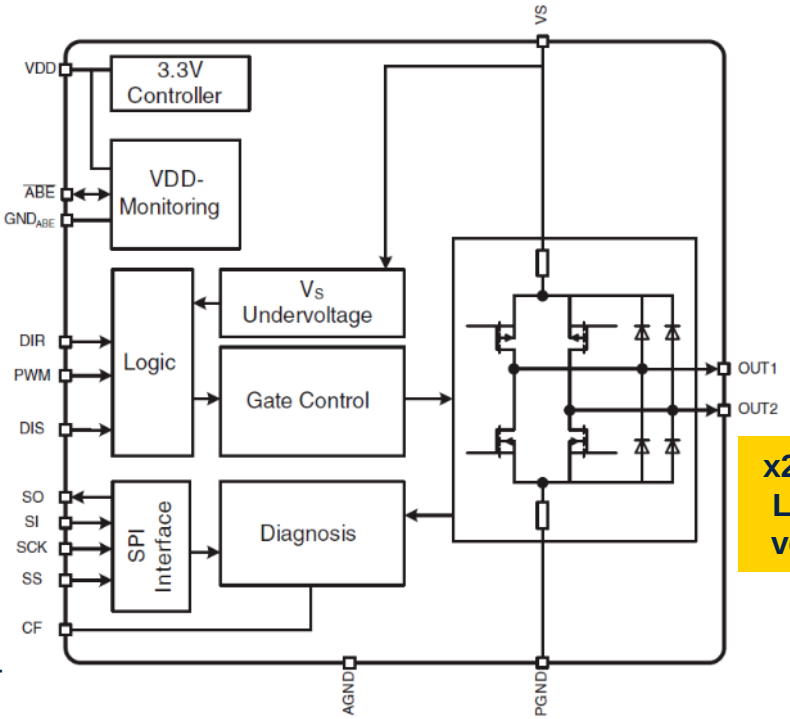
Protections
- Programmable current limitation and overcurrent thresholds
- Programmable thermal warning and shutdown thresholds
- Supply monitoring

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

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

PowerSSO-36

PowerSSO-24



x2 in the L9960T version

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L9959/T
Automotive motor H-bridge driver

A glance at possible applications:

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

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

Key values

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

Collaterals & Marketing Package

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

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

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L99UDL01
Automotive multichannel motor control – universal door lock

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

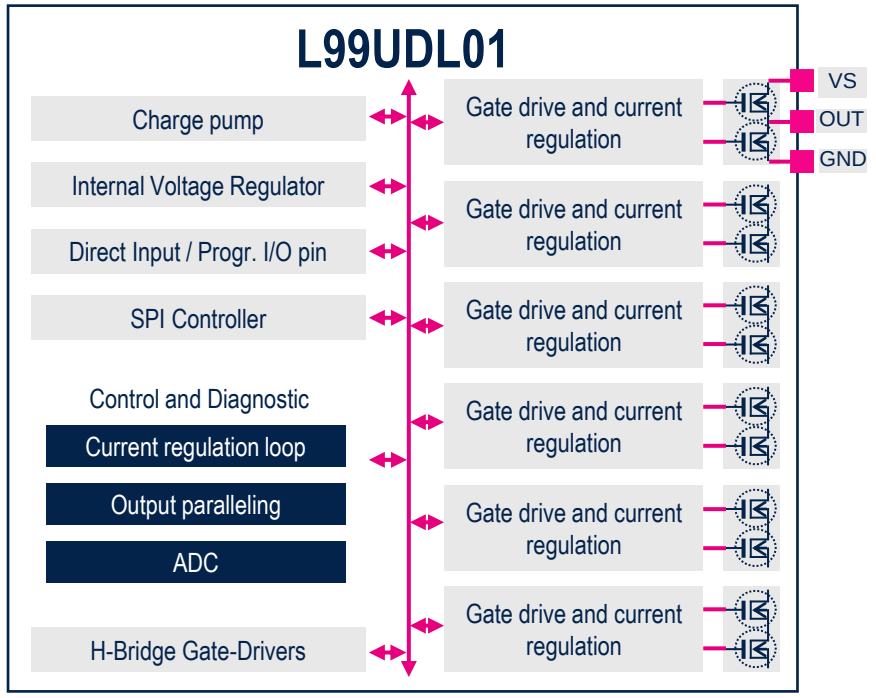
Features

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

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

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

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



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L99UDL01
Automotive multichannel motor control – universal door lock

A glance at possible applications:

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

Centralized door lock

Vending machines

Key values

Integration concept

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

Reduce peak currents

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

Multiple Motor Smart Control

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

Collaterals & Marketing Package

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

L9907	**L99ASC03**
3 phase gate driver for 6 steps or FOC controlled brushless motors compatible with 48V NET	BLDC 3-phase motor pre-driver featuring a voltage regulator for MCU power supply and an operation amplifier for motor current sensing

L9907
Automotive gate driver for 3 phase BLDC motors

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

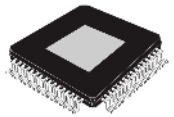
Features

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

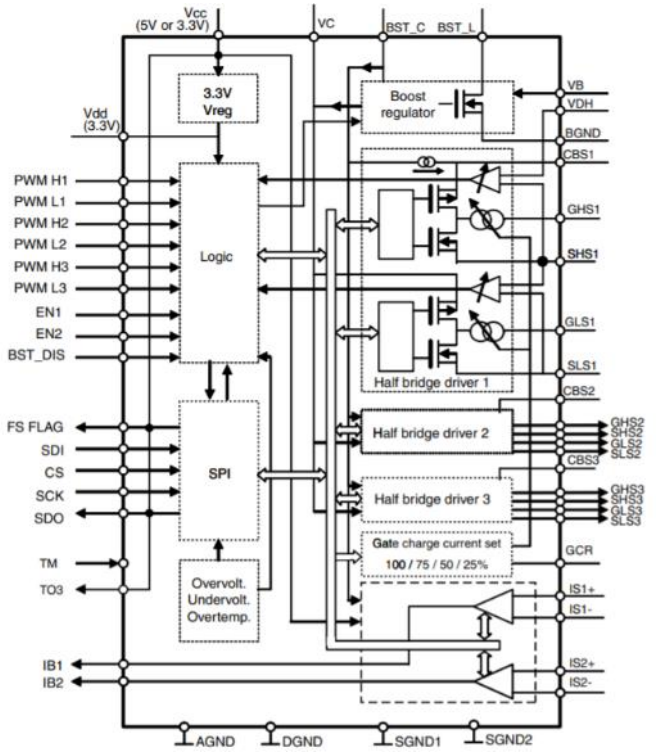
Protections
- Floating current sense amplifiers with SPI selectable amplifier gain and output offset voltage level
- Power MOSFET drain to source voltage drop measurement for overcurrent protection

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

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



LQFP64
(exposed pad up)



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L9907
Automotive gate driver for 3 phase BLDC motors

A glance at possible applications:

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

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

Key values

Flexible and programmable

SPI parameter setting and full diagnostic availability

Supporting electrification requirement

Of high-efficient BLDC driven applications

ASIL-D solution

Full compliant with ISO26262

Collaterals & Marketing Package

L9907

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

EVAL-L9907

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

STSW-L9907

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

SPC5 motor control tool kit **FOC LIBRARY**

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

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L99ASC03

Automotive multifunctional system IC for 3-phase motor control

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

Features

Electrical parameters

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

Protections

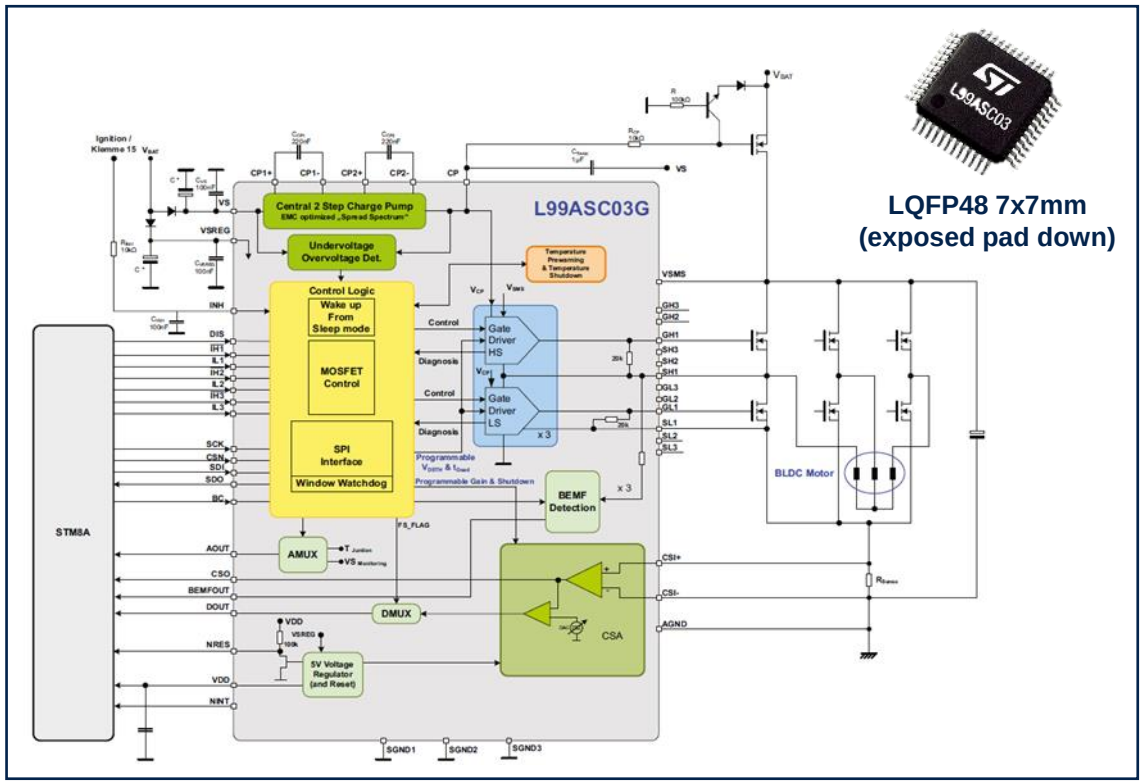
- Fail-safe functionality
- Analog multiplexer output to monitor external power supply voltages and junction temperature
- Programmable overcurrent protection
- Open load detection

Outputs

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

Diagnostics

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



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L99ASC03
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 & Marketing Package

L99ASC03

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

EVAL-L99ASC03

- Product page
- Data brief

STSW-L99ASC03

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

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

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Line card
stepper motor control

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

L99SM81
Automotive Stepper motor driver

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

Features

Electrical parameters

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

Protections

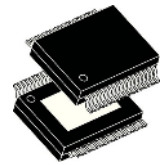
- Open load, short to battery, short to ground
- 1x programmable analog output for Tj measurement or band-gap reference
- Thermal warning and shutdown

Outputs

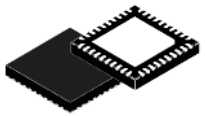
- 1x programmable analog output for Tj measurement or band-gap reference
- 2x programmable digital outputs for PWM ON duty cycles, error signals, coils voltage measurement

Diagnostics

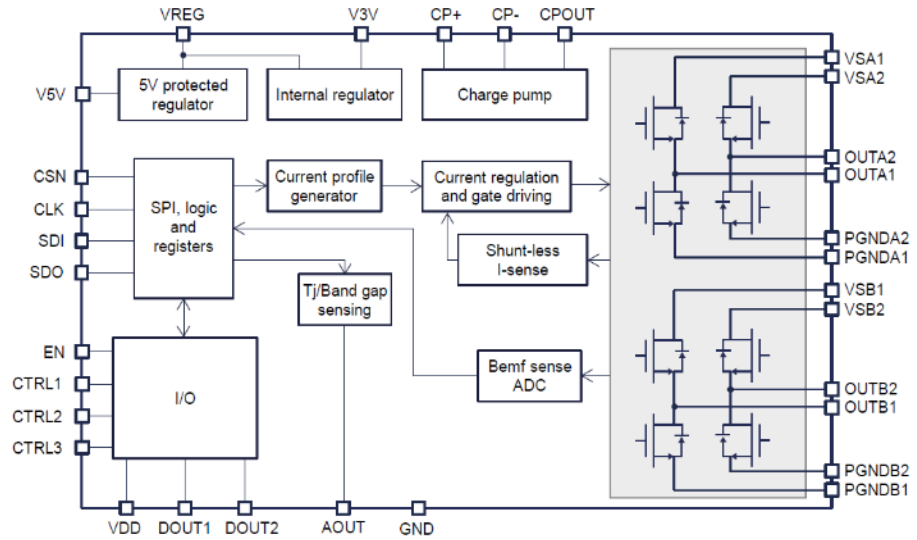
- Integrated ADC for coil voltage measurement and stall detection
- ST SPI 4.1 interface for control and
- diagnostics



PowerSSO-36



QFN40L



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L99SM81
Automotive Stepper motor driver

A glance at possible applications:

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

Key values

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

Collaterals & Marketing Package

L99SM81
- Product page
- Datasheet
- Application note
- Selection guide
- Flyer
- Brochure

EVAL-L99SM81xx
- EVAL-L99SM81VQ product page
- EVAL-L99SM81VQ: Datasheet
- EVALIL99SM81VY product page
- EVAL-L99SM81VY: Datasheet

STSW-L99SM81
- Product page
- Data brief
- License agreement
- User manual

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

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L99MD01
Automotive octal Half Bridge motor control

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

Features

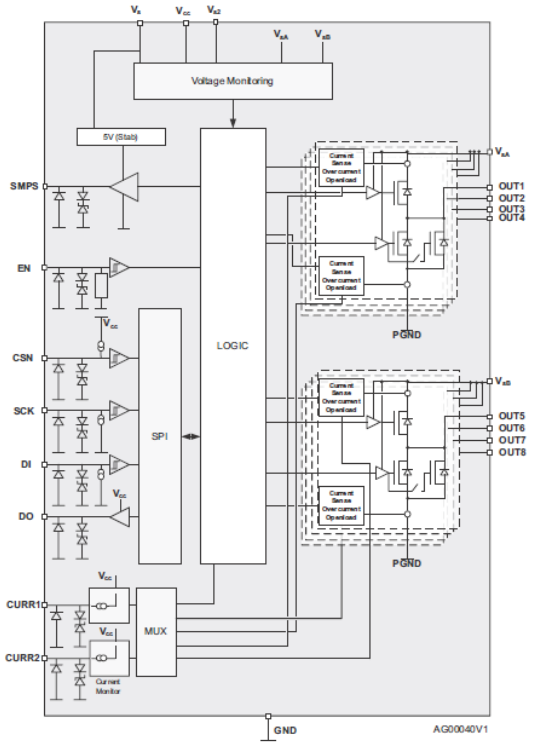
Electrical parameters
- Operating voltage range 6V to 18V
- Compatible with 5V and 3.3V logic
- Very low current consumption in standby mode typ. 5uA

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

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

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

PowerSSO-36



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L99MD01
Automotive octal Half Bridge motor control

A glance at possible applications:

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

Key values

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

Collaterals & Marketing Package

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

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

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L9942
Integrated stepper motor control

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

Features

Electrical parameters

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

Protections

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

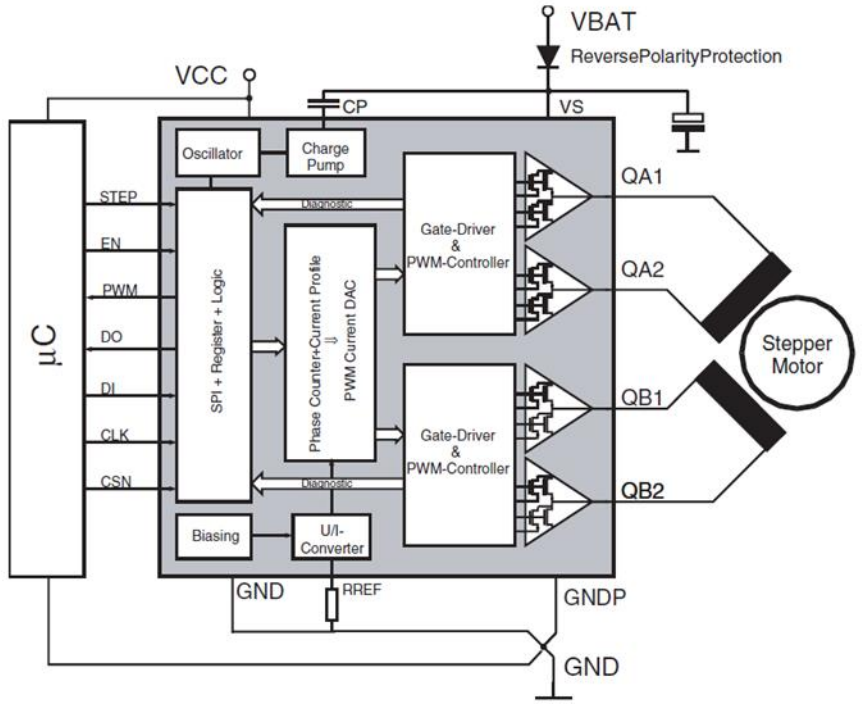
Outputs

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

Diagnostics

- 16-bit SPI for parameter settings and diagnosis

PowerSSO-24



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L9942
Integrated stepper motor control

A glance at possible applications:

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

Key values

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

Optimized BOM with embedded functionalities reducing MCU workload

Stall detection programmable threshold, minimizing the noise during alignment process

Collaterals & Marketing Package

L9942

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

EVAL-L9942

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

STSW-L9942

- Product page
- Data brief
- License agreement

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

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“If only

I could find out more about motor control

This is where we come in

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Generic drivers

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Line card
multi-output generic driver ICs

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

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

L99MOD50XP
Multi-purpose/multi-output IC for automotive

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

Features

Electrical parameters

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

Protections

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

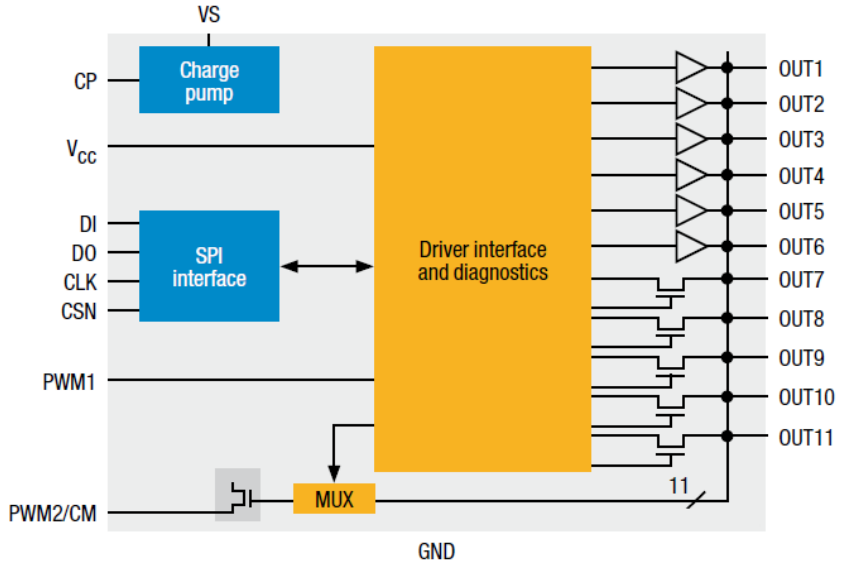
Outputs

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

Diagnostics

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

PowerSSO-36



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L99MOD51XP
Multi-purpose/multi-output IC for automotive

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

Features

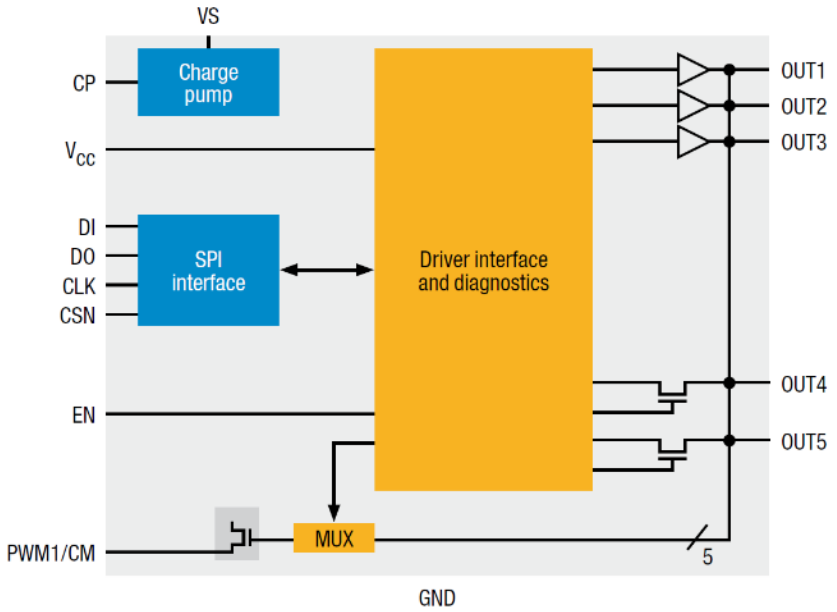
Electrical parameters
- Max operating voltage 28V
- Very low consumption in stand-by mode I_S < 3 µA typ Tj ≤ 85 °C

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

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

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

PowerSSO-36



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L99MOD53XP
Multi-purpose/multi-output IC for automotive

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

Features

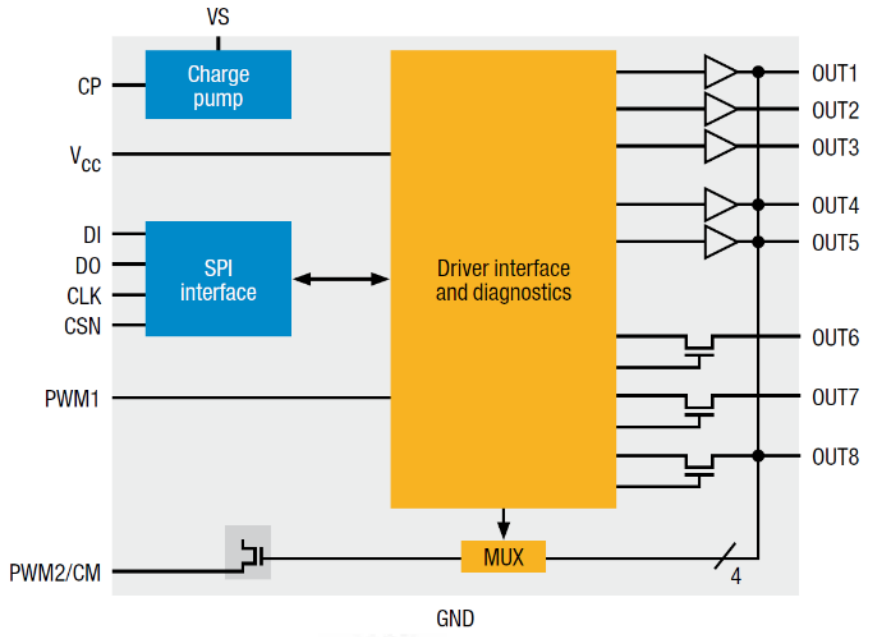
Electrical parameters
- Max operating voltage 28V
- Very low consumption in stand-by mode I_S < 6 µA typ Tj ≤ 85 °C

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

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

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

PowerSSO-36



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L99MOD54XP
Multi-purpose/multi-output IC for automotive

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

Features

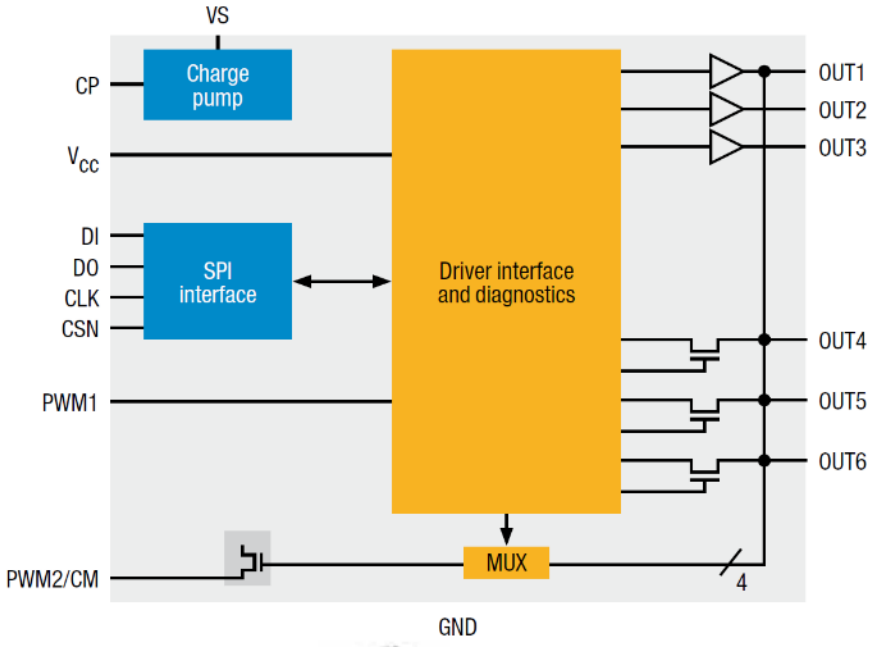
Electrical parameters
- Max operating voltage 28V
- Very low consumption in stand-by mode I_S < 6 µA typ Tj ≤ 85 °C

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

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

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

PowerSSO-36



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L99MOD5xXP
Multi-purpose/multi-output driver for automotive

A glance at possible applications:

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

Bulbs/LEDs
Sensors/cameras

Breakthrough solution suitable for new E/E architecture requirements

Key values

Integration concept

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

Multiple target applications

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

Flexible and programmable

SPI parameter setting and full diagnostic availability

Collaterals & Marketing Package

L99MOD5xXP

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

EVAL-L99MOD50XP

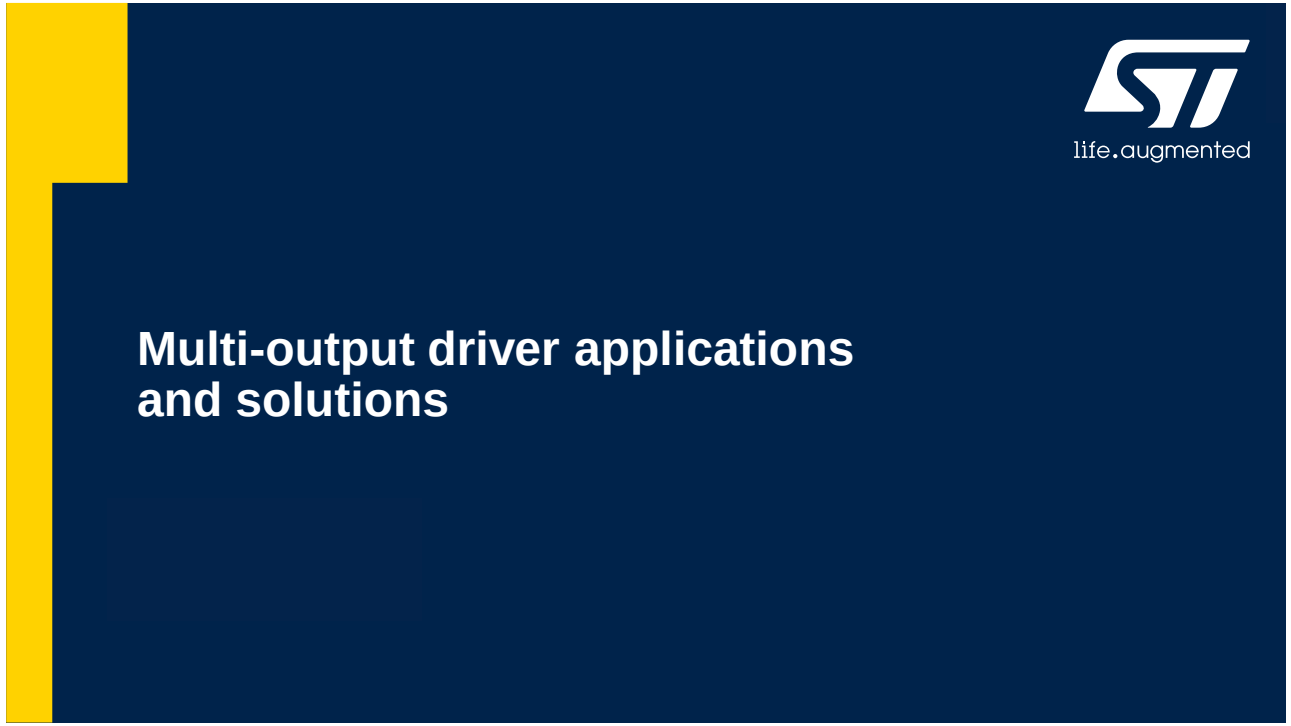
- Product page
- Data brief
- User manual

STSW-L99MOD5xXP

- Product page
- Data brief
- User manual
- License

L99MOD5xXP – marketing package

Contact us to get more information



L99UDL01
Automotive multichannel motor control – universal door lock

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

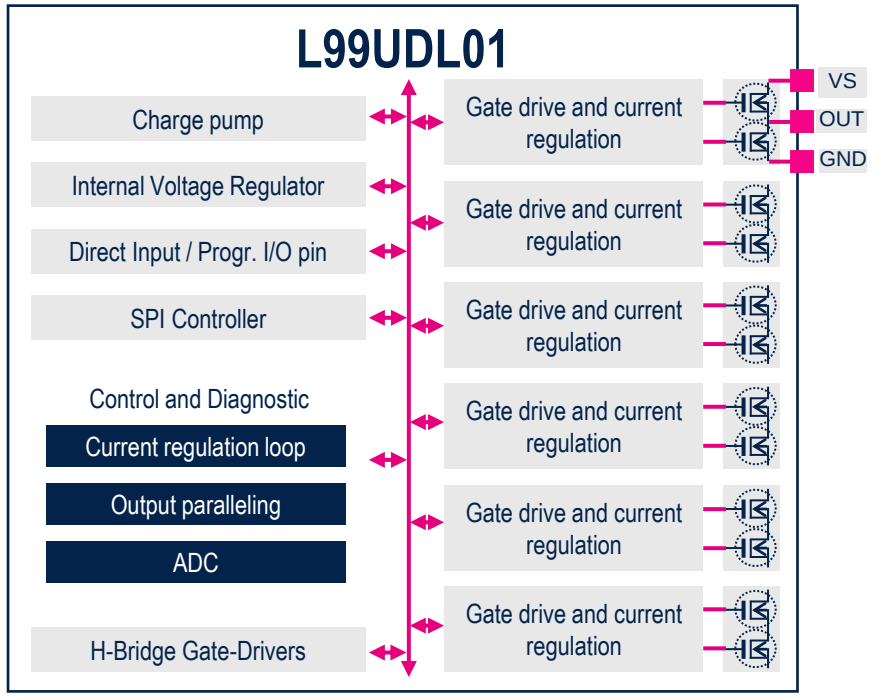
Features

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

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

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

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



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L99UDL01
Automotive multichannel motor control – universal door lock

A glance at possible applications:

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

Centralized door lock

Vending machines

Key values

Integration concept

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

Reduce peak currents

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

Multiple motor smart control

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

Collaterals & Marketing Package

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

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

L9826
Automotive Octal Low-Side driver

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

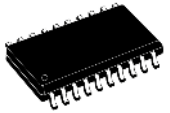
Features

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

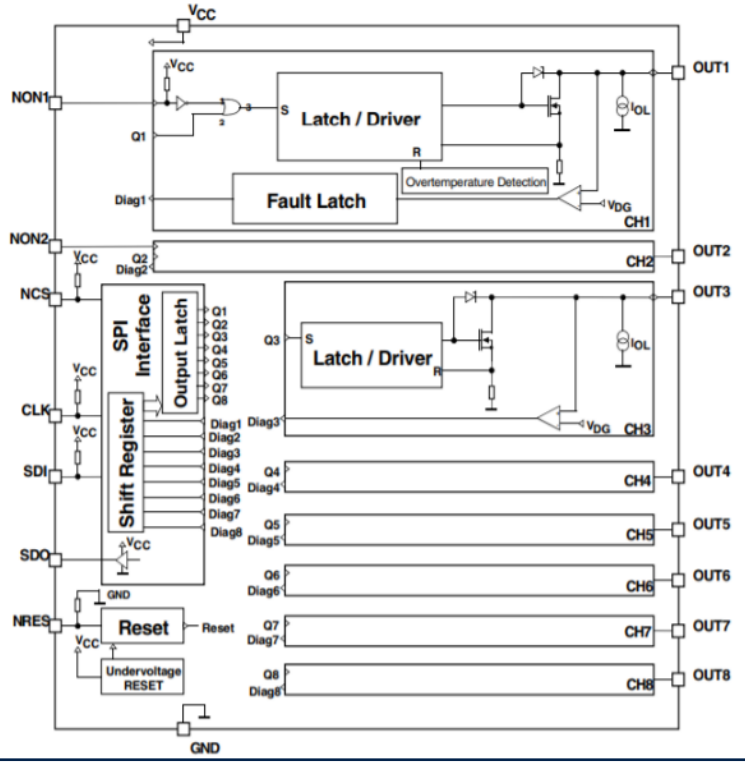
Protections
- Overcurrent and short circuit shutdown for Out 3 to 8
- Short circuit current limitation and thermal shutdown on Out1 & 2
- Out 1 & 2 Bulb inrush mode (BIM)

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

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



SO-20



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L9826
Automotive Octal Low Side driver

A glance at possible applications:

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

Key values

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

Collaterals & Marketing Package

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

L9651
Automotive Quad solenoid driver

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

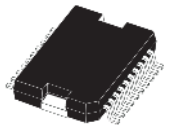
Features

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

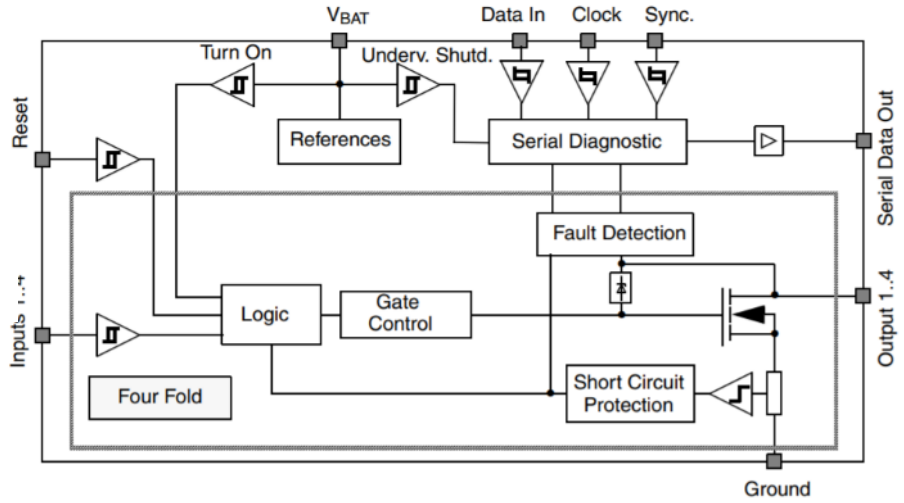
Protections
- Short Circuit Protection
- Over temperature Protection

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

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



PowerSO-20



L9651
Automotive Quad solenoid driver

A glance at possible applications:

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

Key values

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

Achieving design optimization with a Solution securing minimized BOM

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

Collaterals & Marketing Package

Product page
Datasheet
Selection guides: powertrain & safety,

L9301
Automotive 8-channel configurable driver

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

Features

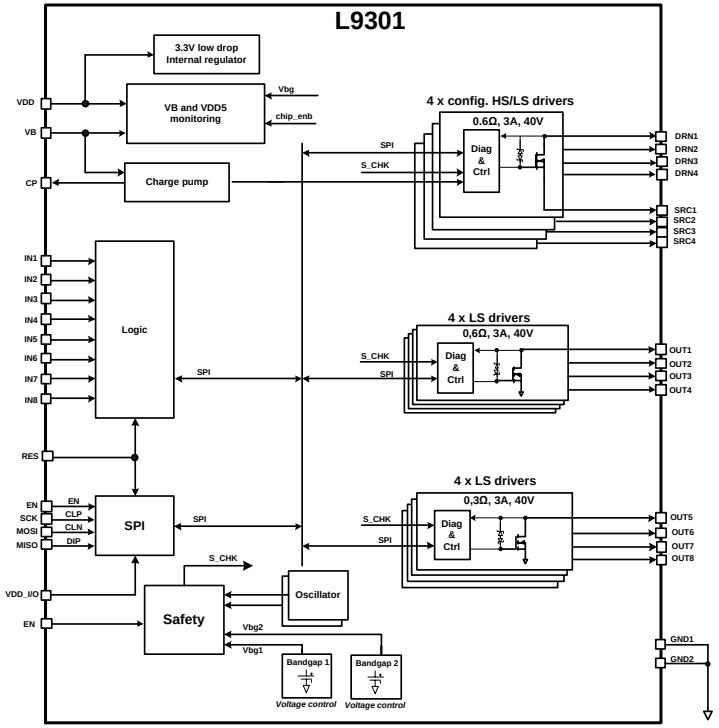
Electrical parameters
- Operating supply voltage 5V to 18V
- Operating VDD supply voltage 4.75V to 5.25V

Protections
- Overtemperature, overcurrent and shutdown protection

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

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

PowerSSO-36



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L9301
Automotive 8-channel configurable driver

A glance at possible applications:

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

Key values

High flexibility

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

Full configurability

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

Design optimization

Low ohmic PowerMOS and improved EMC performances

Collaterals & 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

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L9026
Automotive configurable multi-channel relay driver

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

Features

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

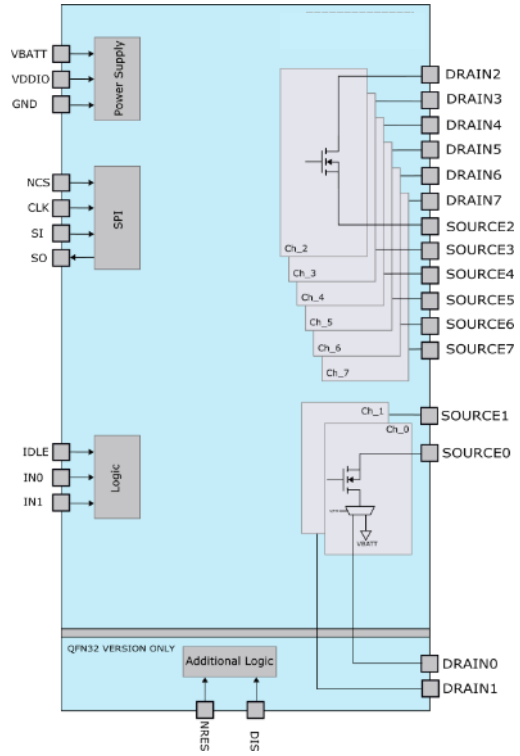
Protections
- Reverse battery protection on VBATT and on drain pins without external components
- Bulb inrush mode (BIM)
- Temperature sensor and monitoring

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

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

VFQFPN32 5x5x1mm (exposed pad down)

HTSSOP24 7.8x6.4x1mm (exposed pad down)



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L9026
Automotive configurable multi-channel relay driver

A glance at possible applications:

Bulbs	LEDs
Relays	Small motors
Resistive loads	Capacitive loads

Key values

Embedding a set of features

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

Achieving efficiency

Extreme low quiescent current solution

ASIL-B solution

Solution compliant with ISO26262

Collaterals & Marketing Package

Product page
datasheet

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L9945
Configurable multichannel pre-driver

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

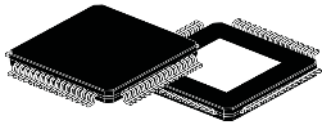
Features

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

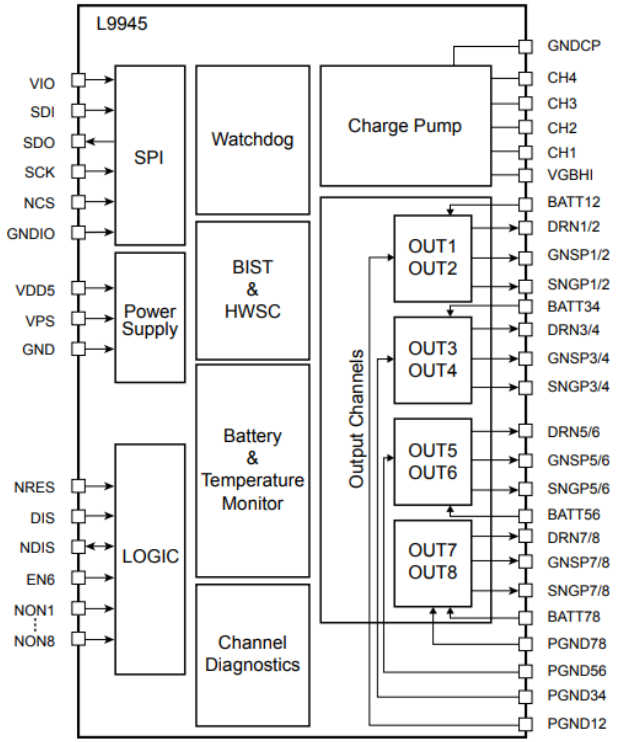
Protections
- Overcurrent monitoring
- Current limitation for H-bridge

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

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



TQFP64
(exposed pad down)



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L9945
Configurable multichannel pre-driver

A glance at possible applications:

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

Key values

Configurability

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

Flexibility

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

Application Coverage

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

Collaterals & Marketing Package

L9945

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

EVAL-L9945

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

STSW-L9945

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

L99MC6GJ
Automotive configurable 6-channel driver

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

Features

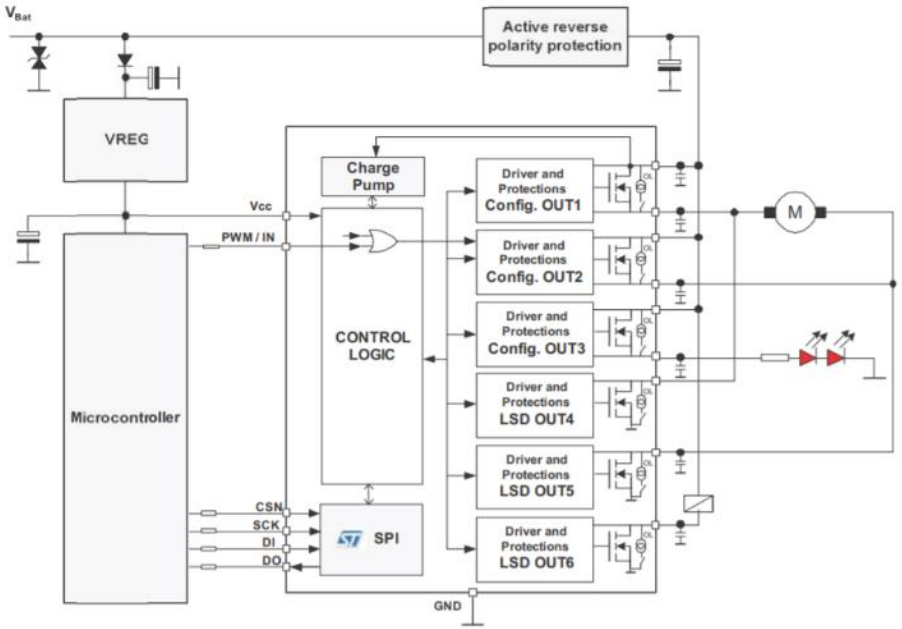
Electrical parameters
- VCC supply voltage 3V to 5.25V
- Very low current consumption in standby mode 5µA (typ)

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

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

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

PowerSSO-16



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L99MC6GJ
Automotive configurable 6-channel driver

A glance at possible applications:

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

Key values

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

Collaterals & Marketing Package

Product page
Datasheet
Technical note

System power supply

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Line card
LDO voltage regulators

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

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

L99VR02XP
Low drop-output dual linear voltage regulator with configurable output voltage and 2x250mA of current capability

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L5050
Automotive Single and Dual 5V LDO

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

Features

Electrical parameters

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

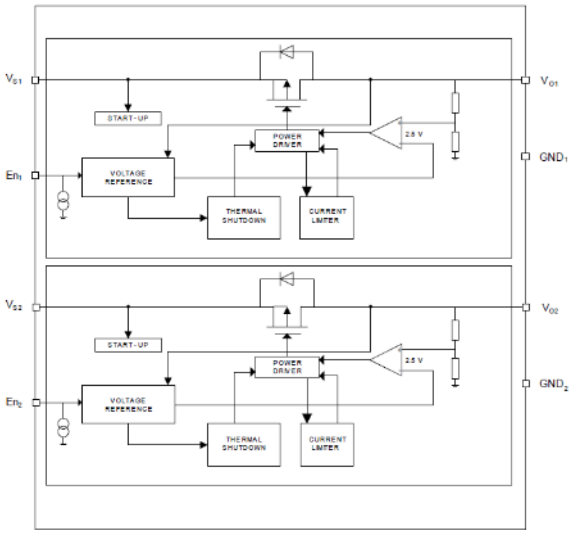
Protections

- Thermal shutdown and short circuit protection

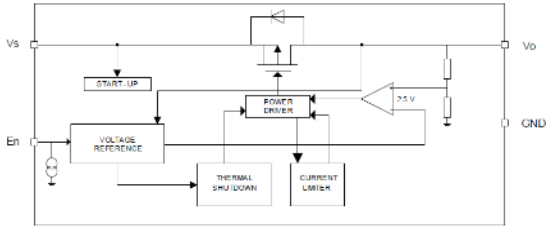
Outputs

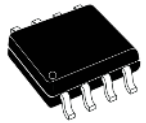
- Output voltage: **5V**
- Output current: **50 mA**
- Output voltage precision ±2 %

Dual 5V LDO

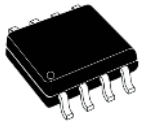


Single 5V LDO





SO-8



SO-8

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L5150
Automotive 5V LDO

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

Features

Electrical parameters

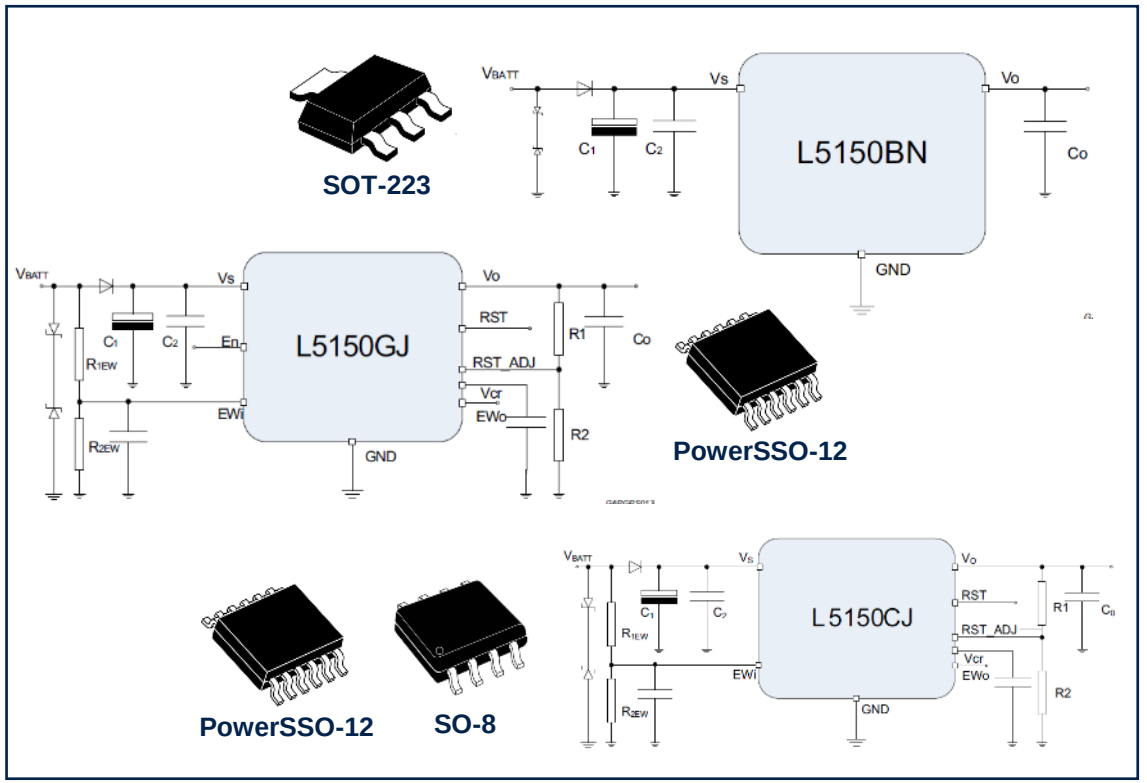
- Operating DC supply voltage range 5.6V to 40V
- Very low current consumption

Protections

- Thermal shutdown and short circuit protection

Outputs

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



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L5300
Automotive 5V LDO

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

Features

Electrical parameters

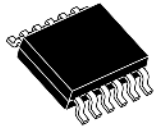
- Operating DC supply voltage range 5.6V to 40V
- Very low current consumption

Protections

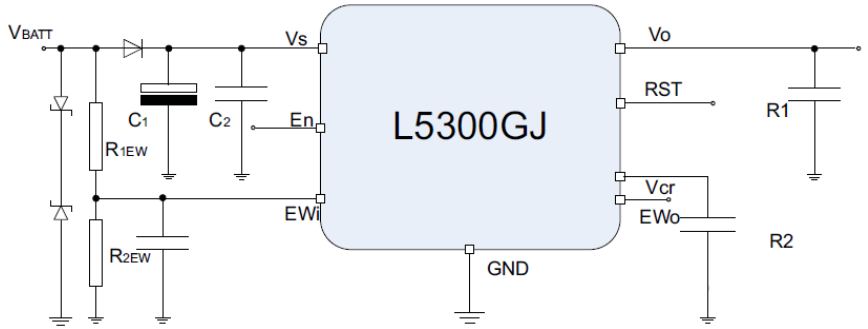
- Thermal shutdown and short circuit protection

Outputs

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



PowerSSO-12



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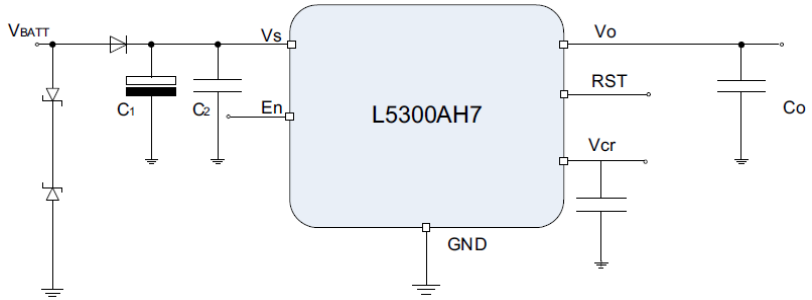

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L5xxx
Automotive 5V LDO

A glance at possible applications:

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

Key values

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

Collaterals & Marketing Package

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 3µA in standby mode)

Protections

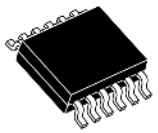
- Thermal shutdown and short circuit protection

Outputs

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

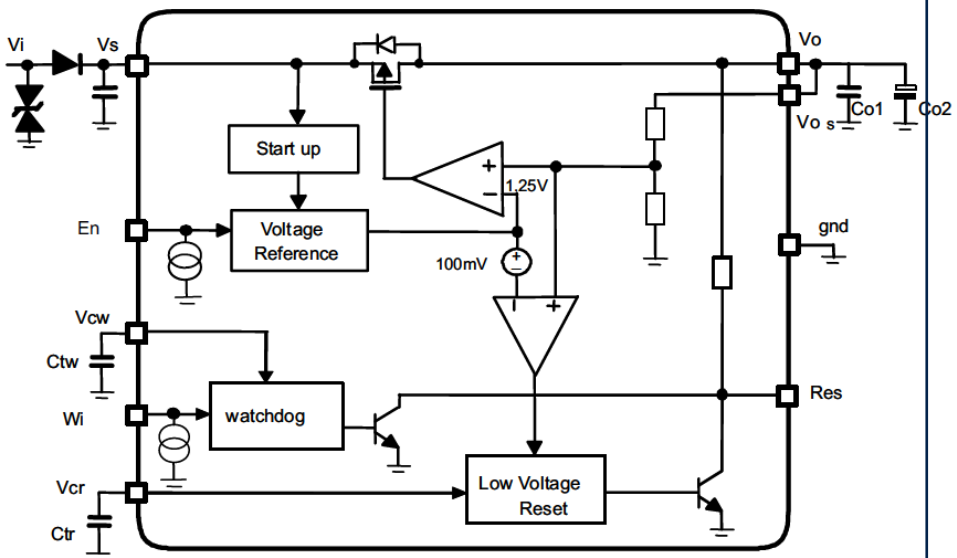
Diagnostics

- Watchdog function



PowerSSO-12

PowerSSO-24



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L4995
Automotive 5V LDO

A glance at possible applications:

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

Key values

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

Collaterals & Marketing Package

Product page
Datasheet

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L99VR01S/J
Automotive LDO linear voltage regulator

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

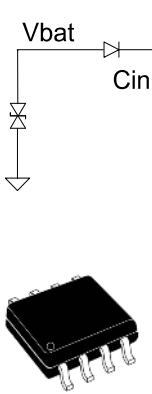
Features

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

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

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

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



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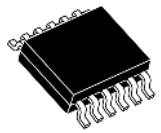

PowerSSO-12

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L99VR02J
Automotive LDO linear voltage regulator

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

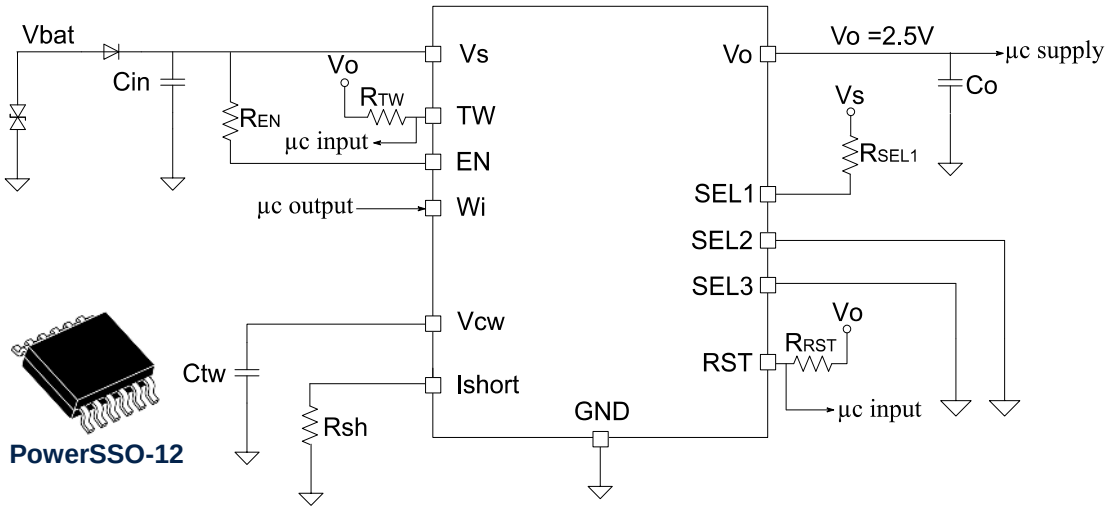
Features

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

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

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

Diagnostics
- Advanced thermal warning and output overvoltage diagnostic



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L99VR02XP
Automotive LDO linear voltage regulator

Low drop-output dual linear voltage regulator with configurable output voltage and 2x250mA of current capability

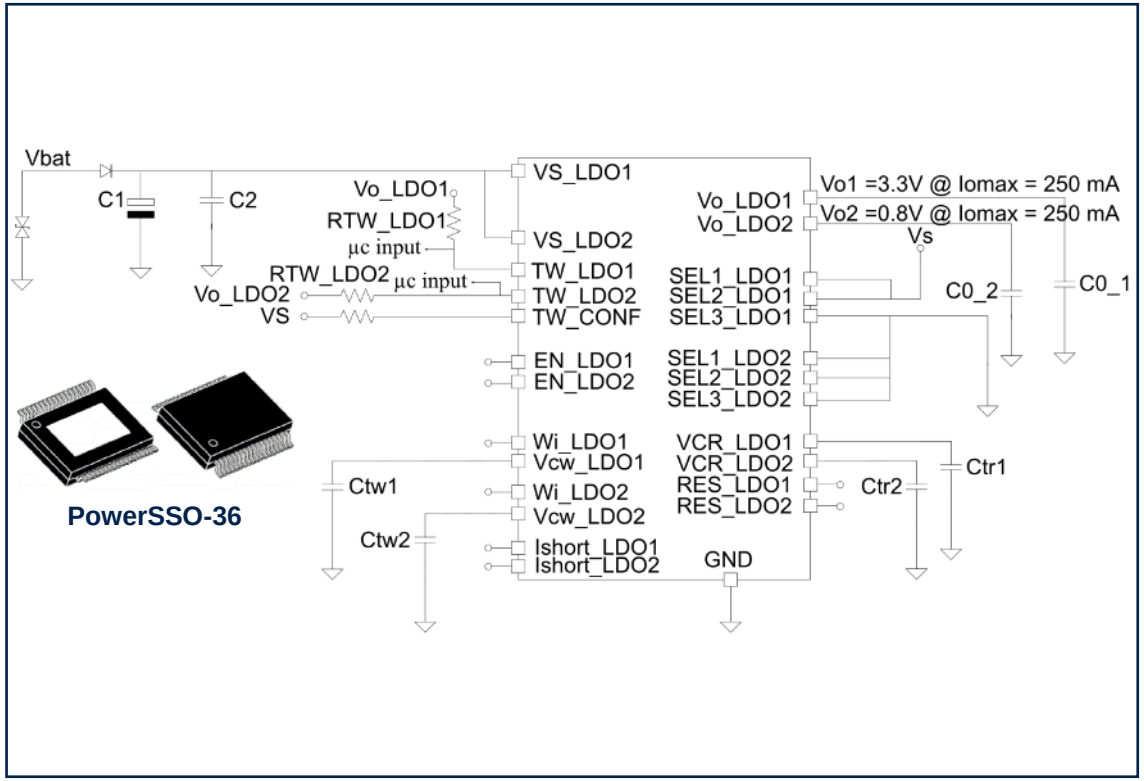
Features

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

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

Outputs
- User-selectable output voltage: **0.8V; 1.2V; 1.5V; 1.8V; 2.5V; 2.8V; 3.3V or 5V**
- Output voltage precision ±2%
- Output current: Io **2 x 250mA**

Diagnostics
- Advanced thermal warning and output overvoltage diagnostic



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L99VR0x
Automotive LDO linear voltage regulator

A glance at possible applications:

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

Key values

Design standardization

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

Family approach

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

Safety requirement

Upon customer request ISO26262 available

Collaterals & Marketing Package

L99VR01: product page, datasheet
L99VR02J: product page, datasheet
L99VR02XP: product page, datasheet

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Line card
Power Management IC & System Basis Chip

L5964

Dual 3.5 A step-down switching regulator with internal power switches and low drop-out linear/standby 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

Integrated power management System Basis Chip with a switched mode power supply for pre-regulation, 3 LDOs, 1 buck/LDO

L99PM60J

Power management with 5V low drop-out linear voltage regulator and LIN transceiver

L99PM62GXP

Power management with 5V low drop-out linear voltage regulators, LIN and High-Speed CAN transceivers

L99PM72GXP

Power Management with 5V low drop-out linear voltage regulators, LIN and High-Speed CAN transceivers supporting Selective Wake-Up

L5964
Automotive monolithic switching regulator with LDO

Dual 3.5 A step-down switching regulator with internal power switches and low drop-out linear/standby voltage regulator

Features

Electrical parameters

- Wide operating input voltage range (from 3.3V to 26V)
- Total quiescent current with both DC-DCs and LDO are disabled <10uA

Protections

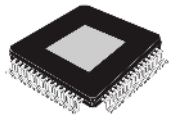
- Switching regulators programmable current limits at 2A and 4A
- Standby-linear regulator 250mA maximum current capability
- Short circuit protected outputs
- One integrated window watchdog

Outputs

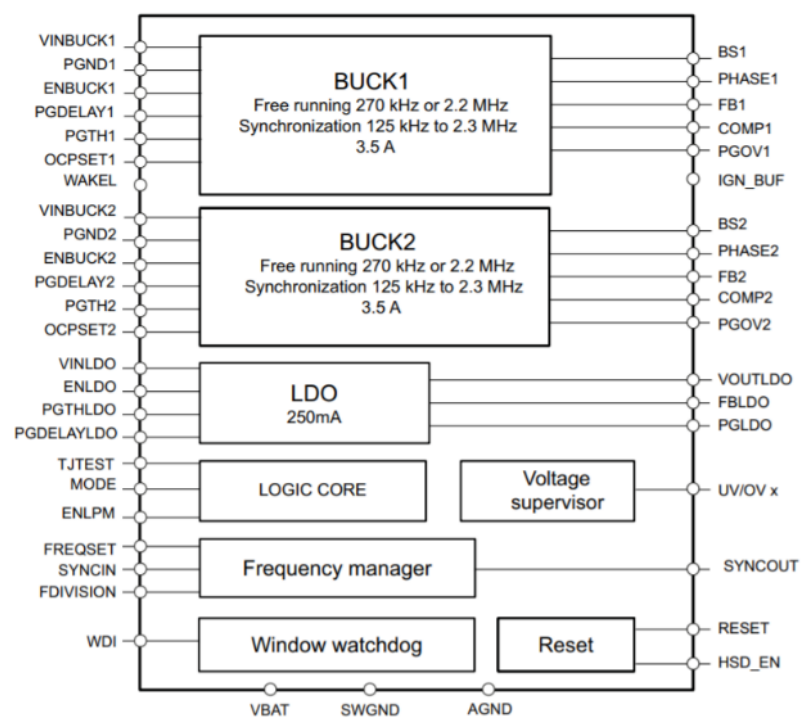
- 2x buck regulator (selectable frequency 270 kHz or 2.2 MHz) min 0.9V, max 7A when paralleled
- 1x LDO max 250mA

Diagnostics

- Over/under voltage detection and balance undervoltage protection



LQFP64
(exposed pad up)



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L5964
Automotive monolithic switching regulator with LDO

A glance at possible applications:

- Camera supply
- Display
- Instrument Cluster
- USB Type-C
- Gateway
- Radar

Key values

Two converter parallelization

Two DC-DC converters can be paralleled duplicating the current capability up to (3.5A + 3.5A)

Four converter synchronization

Two L5964 can be connected each other and synchronized generating a power tree with 4 DC-DC converters

Safety requirements

Protection and diagnostic systems (selectable voltage supervisors; power goods; selectable current limits)

Collaterals & Marketing Package

L5964

- Product page
- Datasheet
- Application note
- Selection Guide: smartpower for body, audio ampl. & Vreg
- Brochure: Smartpower, Evs
- Flyers

AEK-POW-100W4V1

- Product page
- Data brief
- Gerber file
- BOM
- Schematics

AEK-POW-L5964V1

- Product page
- Data brief
- Gerber file
- BOM
- Schematics
- Application note

STSW-AUTODEVKIT

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

L5965
Automotive multichannel power management

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

Features

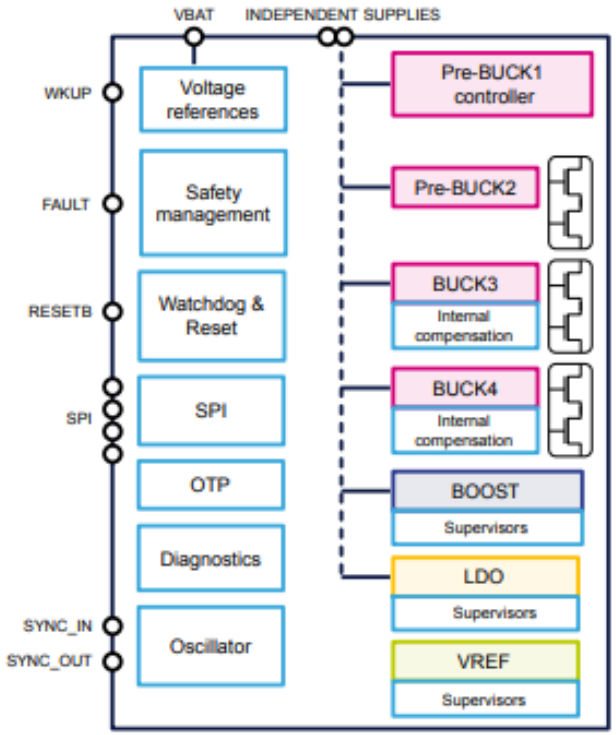
Electrical parameters
- Car passenger battery compatibility
- Power up sequence, output voltages and currents, switching frequencies programmable via OTP
- High switching frequency (>2MHz)
- Window watchdog and reset

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

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

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

VFQFPN-48
7x7mm



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L5965
Automotive multichannel power management

A glance at possible applications:

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

Key values

High level of integration

Up to 7 regulators embedded completing power path from the battery

Independent management

Independent regulators suppling and output voltage monitoring

Safety requirement

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

Collaterals & Marketing Package

L5965

- Product page
- Datasheet
- Selection Guide: audio ampl. & Vreg, smartpower for body
- Brochure: power mgmt., EVs
- Flyer

EVAL-L5965

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

L9001
Automotive power supply IC with multiple voltage regulators

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

Features

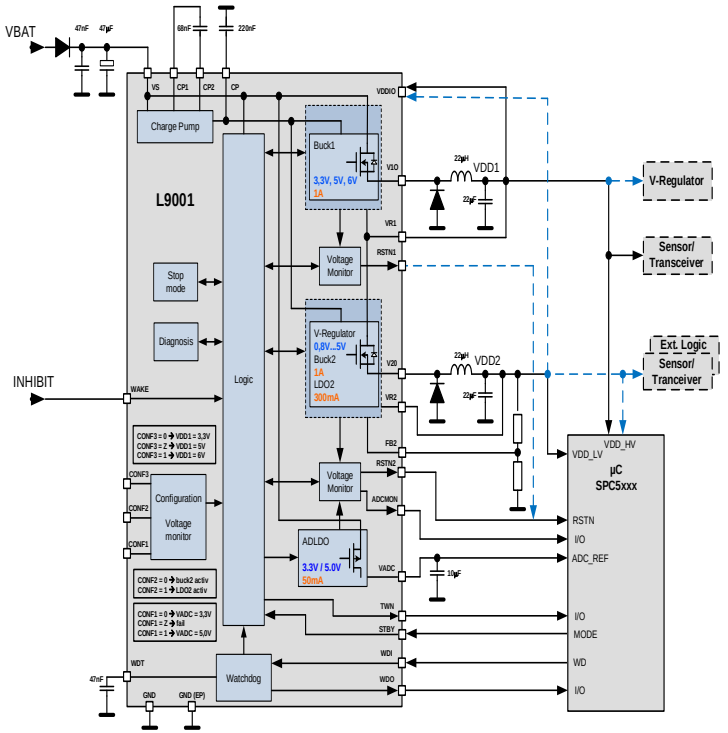
Electrical parameters
- Low power operation mode with main regulators still active and reduced power consumption from battery

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

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

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

PowerSSO-24



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L9001
Automotive power supply IC with multiple voltage regulators

A glance at possible applications:

Any kind of microcontroller power supply inside and outside transportation applications

Key values

Fully configurable

Flexible and configurable for multiple power supply schemes and applications

Integrated supervision & diagnosis

Full diagnosis functional box integration

Fail-safe functionality

Output supply supervision, overcurrent and overtemperature protection

Collaterals & Marketing Package

L9001

- Product page
- Datasheet
- Application note: integration and performance eval
- Selection guide: power amp & Vreg, smartpower for body
- Brochure: power mgmt., EVs

EVAL-L9001

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

L9396
Automotive multiple power supply IC

Integrated power management System Basis Chip with a switched mode power supply for pre-regulation, 3 LDOs, 1 buck/LDO

Features

Electrical parameters

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

Protections

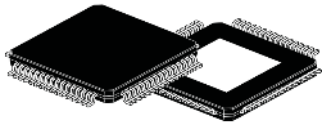
- Temperature monitoring and thermal shutdown
- Configurable and programmable double watchdog

Outputs

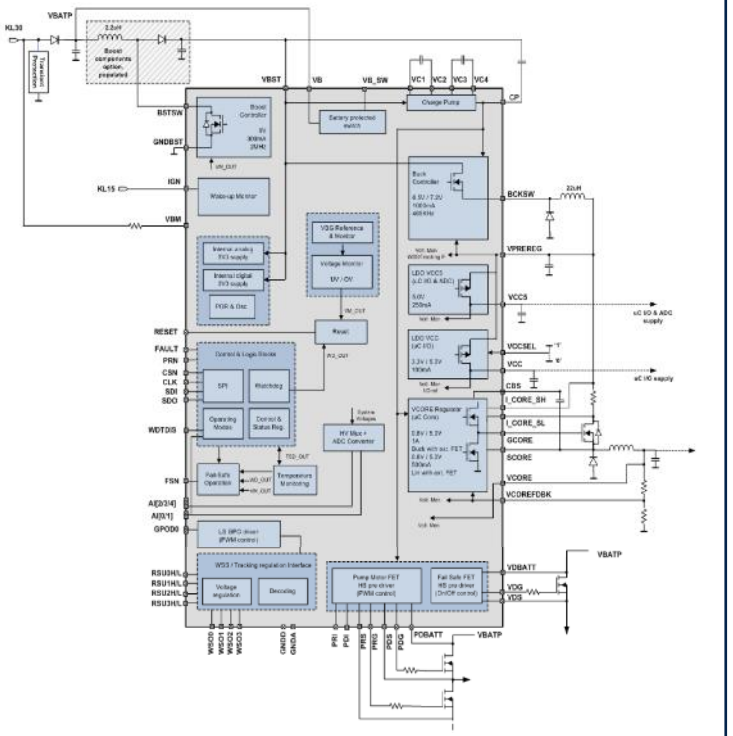
- 1x boost converter (**9V, max 0.3A, 2MHz**)
- 1x buck converter (**6.5/7.2V, max 1A, 465KHz**)
- 1x LDO VCC5 (**5V** +/-2%, **250mA**)
- 1x LDO VCC (**3.3/5V** +/-2%, **100mA**)
- 1x VCORE (0.8V to 5.0V +/-2% **max 1A switching, max 750mA linear mode**)
- 2x tracking regulators (120mA)

Diagnostics

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



TQFP64
(exposed pad down)



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L9396
Automotive multiple power supply IC

A glance at possible applications:

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

Key values:

Flexibility

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

ASIL-D solution

Full compliant with ISO26262

Collaterals & Marketing Package

Product page
Datasheet

L99PM60J
Power Management IC with transceiver

Power management with 5V low drop-out linear voltage regulator and LIN transceiver

Features

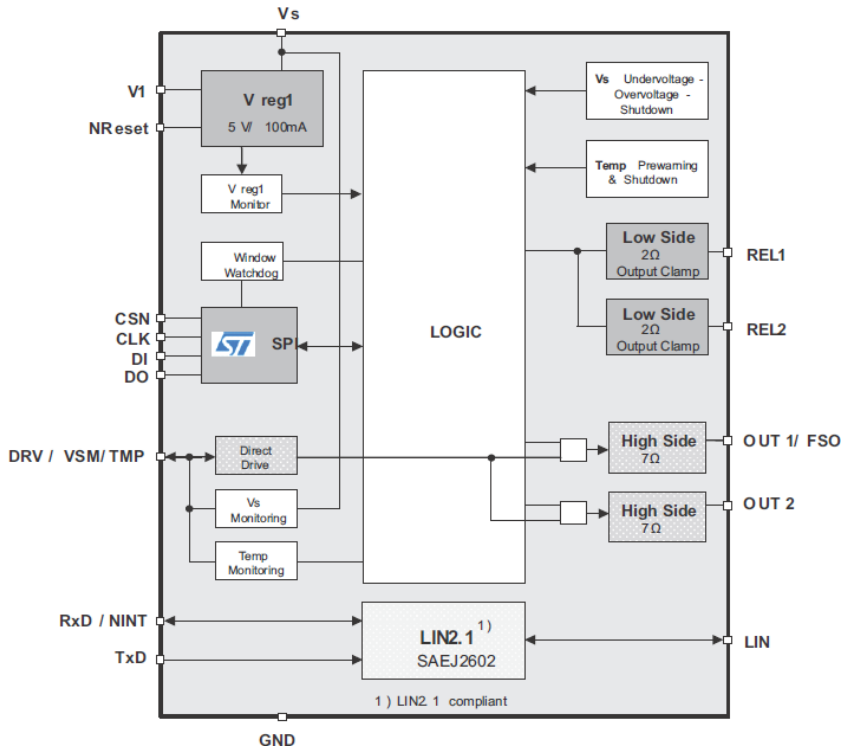
Electrical parameters
- Ultra-low quiescent current in VBAT-standby (7µA)
- Programmable reset threshold (4.6V; 3.5V)

Protections
- All Outputs Short Circuit protected
- Under- and Over-Voltage Shutdown
- Temperature Warning and Thermal Shutdown

Outputs
- 1x LDO **5V / 100mA**
- 2x High-Side Drivers (**7 Ω**)
- 2x Low-Side Drivers (**2 Ω**)

Diagnostics
- ST SPI interface for mode control and diagnostics
- VS monitoring & temperature measurement
- Watchdog for MCU monitoring

PowerSSO-16



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L99PM62GXP
Power Management IC transceiver

Power management with 5V low drop-out linear voltage regulators, LIN and High-Speed CAN transceivers

Features

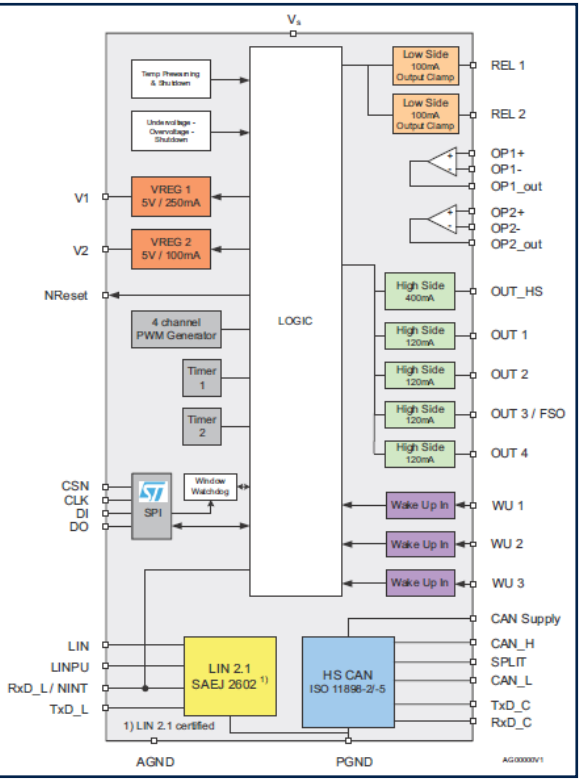
Electrical parameters
- Very low Stand-By Current: VBAT stand-by: 7µA

Protections
- All Outputs Short Circuit protected
- Under- and Over-Voltage Shutdown
- Temperature Warning and Thermal Shutdown

Outputs
- 1x LDO1 5**V / 250 mA**
- 1x LDO2 **5V / 100 mA**
- 5x High-Side Drivers
- 2x Relay Driver
- 2x Operational Amplifiers

Diagnostics
- 16-bit ST Standard SPI for Mode Control and Diagnosis

PowerSSO-36



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L99PM72GXP
Power Management IC with LIN and High-Speed CAN

Power Management with 5V low drop-out linear voltage regulators, LIN and High-Speed CAN transceivers supporting Selective Wake-Up

Features

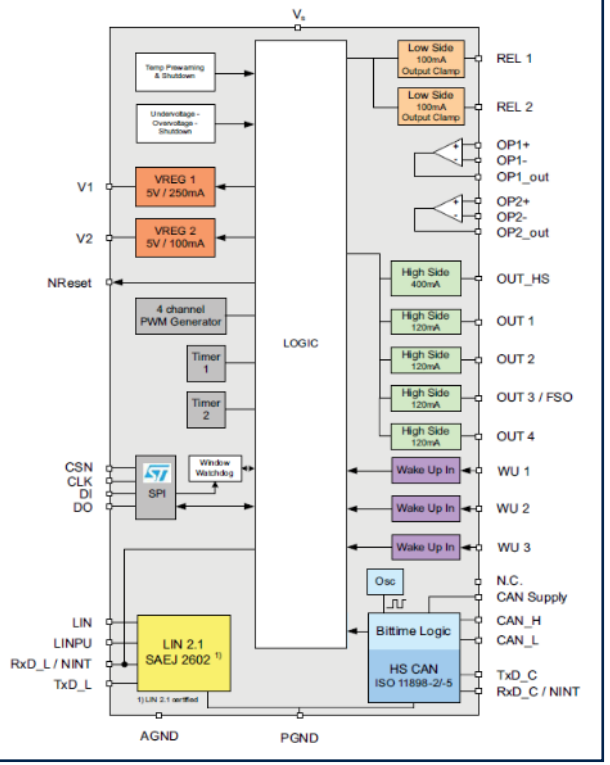
Electrical parameters
- Very low Stand-By Current: VBAT stand-by: 7µA

Protections
- All Outputs Short Circuit protected
- Under- and Over-Voltage Shutdown
- Temperature Warning and Thermal Shutdown

Outputs
- 1x LDO1 **5V / 250 mA**
- 1x LDO2 **5V / 100 mA**
- 5x High-Side Drivers
- 2x Relay Driver
- 2x Operational Amplifiers

Diagnostics
- 16 Bit ST Standard SPI for Mode Control and Diagnosis

PowerSSO-36



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L99PMxx
Power Management IC with transceiver

A glance at possible applications:

Cooling water pump	Pneumatic Lumbar control	Battery mgmt. system
Windows lift	Seat Module	Trunk Module
Trailer Module	Sunroof Module	HVAC

Key values

- Programmable reset generator for power-on and undervoltage
- LIN and High-Speed CAN (optional with selective wake-up) transceiver
- Drivers for motor control, LED, sensors and contact monitoring for wake-up system

Collaterals & Marketing Package

L99PMxx

- Product page: L99PM60J, L99PM62GXP, L99PM72GXP
- Datasheet: L99PM60J, L99PM62GXP, L99PM72GXP
- Application note: HW design PS & voltage regulation, external voltage regulation
- Technical note: SPI protocol
- Selection guide: power amp.&Vreg, smartpower for body
- Brochure: power mgmt., EVs

EVAL-L99PM62-72

- Product page
- Data brief
- User manual
- Terms of use

STSW-L99PM62-72

- Product page
- Data brief
- License agreement

Battery management ICs

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Line card
battery management system

L9963E	L9963T	L9961
Li-ion battery monitoring and protection chip, up to 14 stacked cells and daisy chain up to 31 ICs: modular approach from 48V to 800V battery	General purpose SPI to isolated SPI transceiver for communication bridge between different voltages domains	Up to 20V Li-ion battery monitoring and protection chip for 3, 4 or 5 cells configuration

L9963E
Automotive chip for battery management applications

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

Features

Electrical parameters

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

Protections

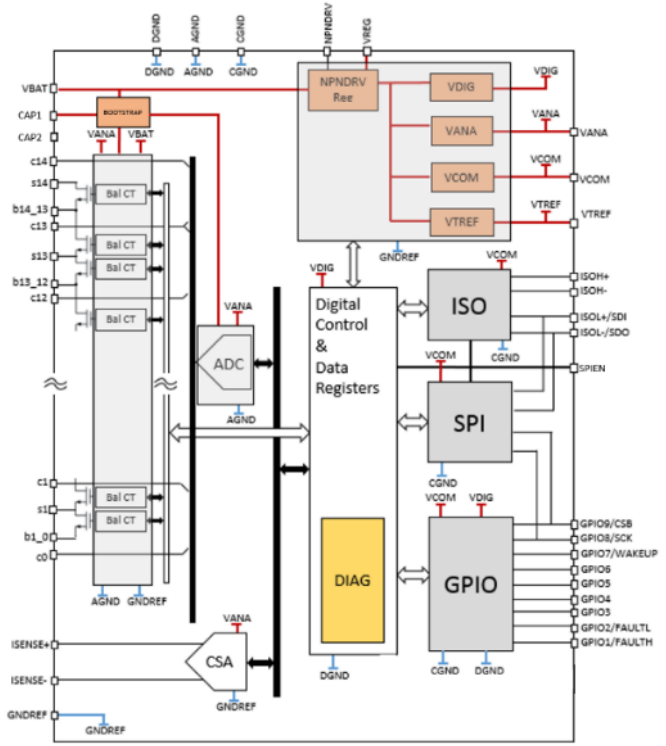
- Fully redundant cell measurement path, with ADC Swap, for enhanced safety and limp home functionality
- The device can monitor up to 7 NTCs

Outputs

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

Diagnostics

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



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L9963E
Automotive chip for battery management applications

A glance at possible applications:

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

Key values

Supporting accuracy

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

High speed data transmission

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

ASIL-D solution

Full compliant with ISO26262

Collaterals & Marketing Package

Product page
Datasheet

Find out more about L9963 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

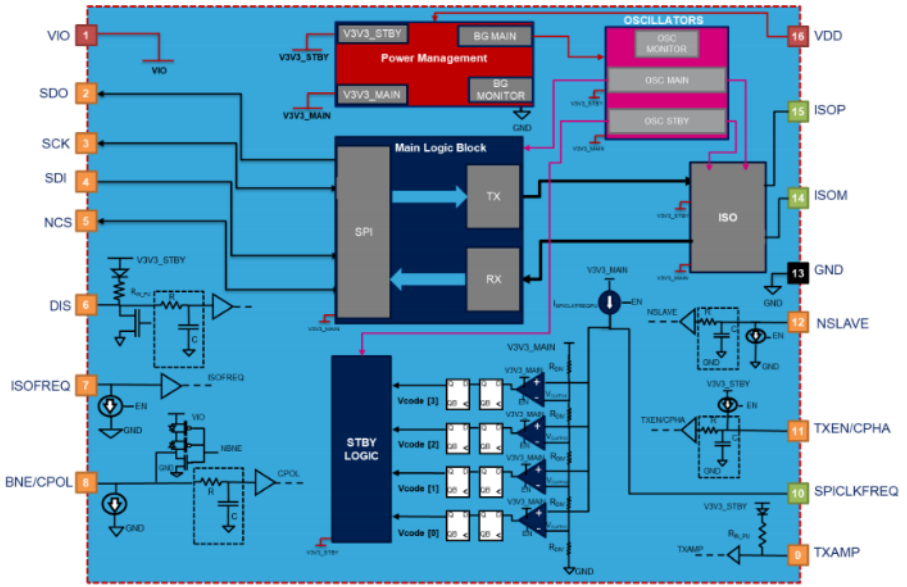
Outputs

- 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

SO16



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L9963T
Isolated transceiver

A glance at possible applications:

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

Key values:

Flexibility

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

ASIL-D ready

Full compliant with ISO26262

Collaterals & Marketing Package

EVAL-L9963-MCU

- Product page
- Data brief
- Application note
- User manual
- Board manufacturing specs: ASSY, layout
- BOM
- Schematics

EVAL-L9963-NDS

- Product page
- Data brief
- Application note
- Board manufacturing specs: ASSY, layout
- BOM
- Schematics

STSW-L9963

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

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

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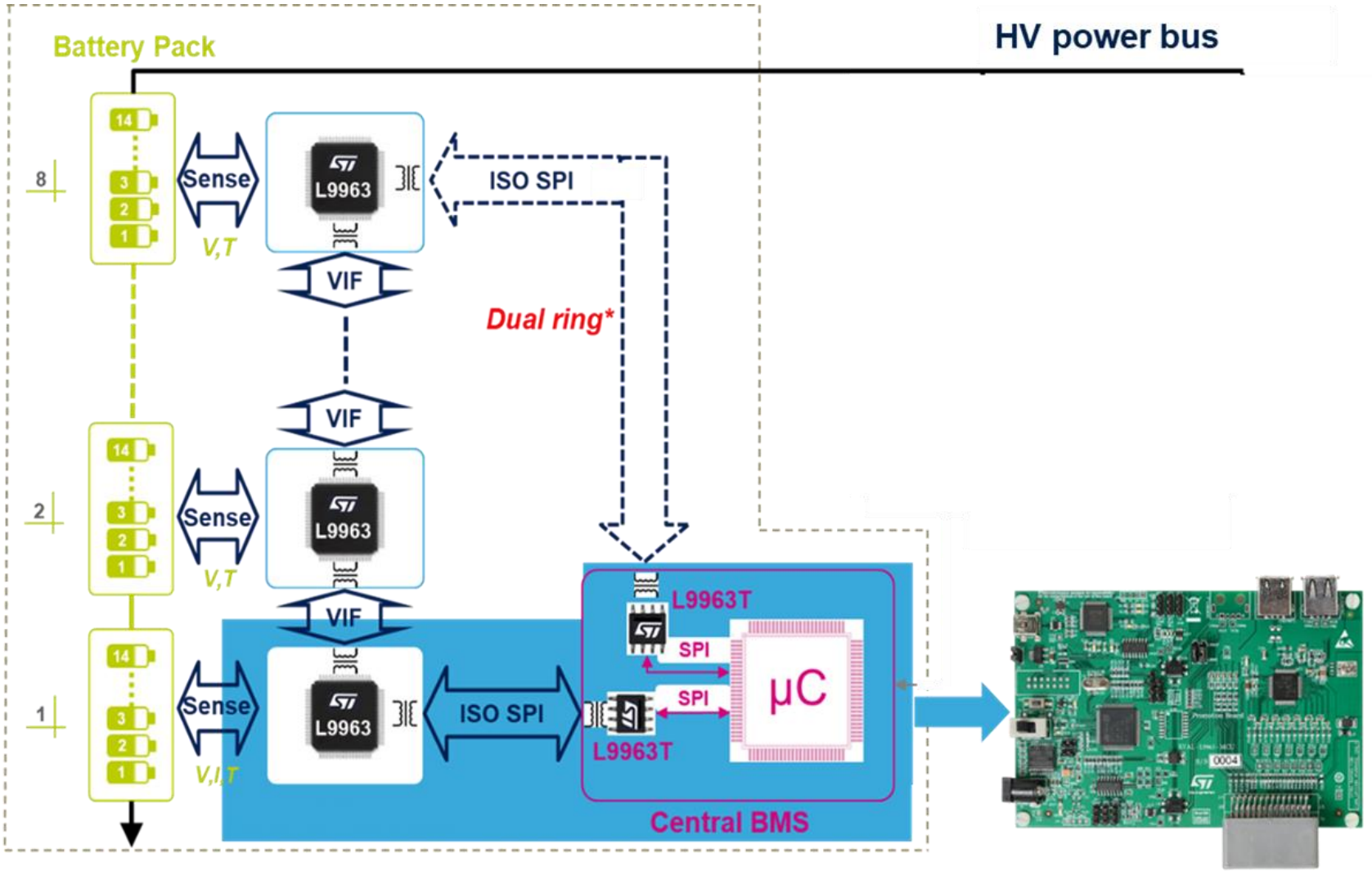
Application example of HV battery BMS based on L9963x



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

Dual ring* = Optional configuration

Under development

Automotive chip for battery management applications

Up to 20V Li-ion battery monitoring and protection chip for 3, 4 or 5 cells configuration

Features

Electrical parameters

- Integrated VREG system regulator 3.3V±3% @ 30mA
- 2uA SHIP mode & 5uA STANDBY mode current consumption

Protections

- Failsafe fuse driver
- NTC ratiometric temperature measurement, ±0.8% max. gain error
- Dual configurable HS/LS gate drivers for charge & discharge control

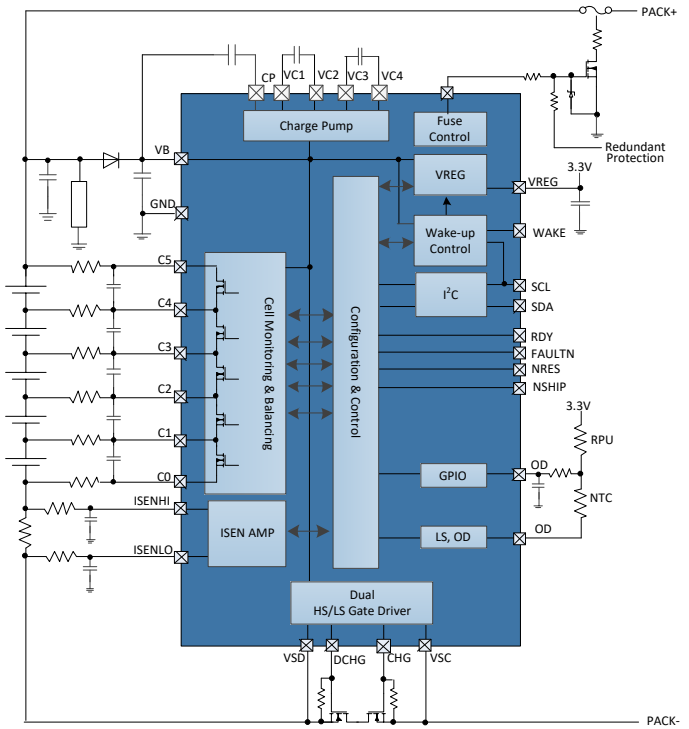
Outputs

- 0.2% maximum current measurement error
- Maximum voltage measurement error of ±15mV
- Cell balancing, 70mA per cell

Diagnostics

- Cell over/under voltage detection and balance undervoltage protection

QFN32



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Under development

Automotive chip for battery management applications

A glance at possible applications:

Cordless power tools	Vacuum cleaners
Medical portable eqpt.	Drones
UPS systems	E-bike / e-skateboard

Key values

High level of integration

- Cell & current monitoring
- MCU power supply
- Dual pre-driver
- Fuse pre-driver

Low energy consumption

2uA SHIP mode & 5uA STANDBY mode current consumption

Very high flexibility

Dual configurable HS/LS gate drivers for charge & discharge control

Collaterals & Marketing Package

BMS – marketing package

Contact us to get more information

“If only

I could find out more about battery management

This is where we come in

Line card
battery cut-off

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

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L9678P/-S
Automotive low end System Basis Chip

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

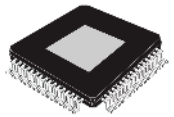
Features

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

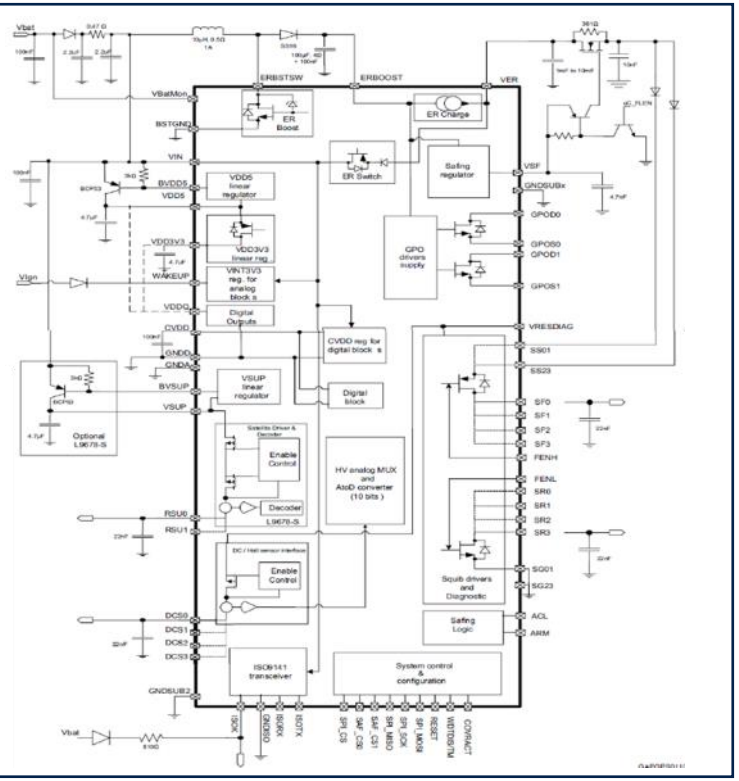
Protections
- Battery voltage monitor and shutdown control with wake-up control
- Current monitoring

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

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



LQFP64
(exposed pad up)



L9679E
Automotive mid/high end System Basis Chip

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

Features

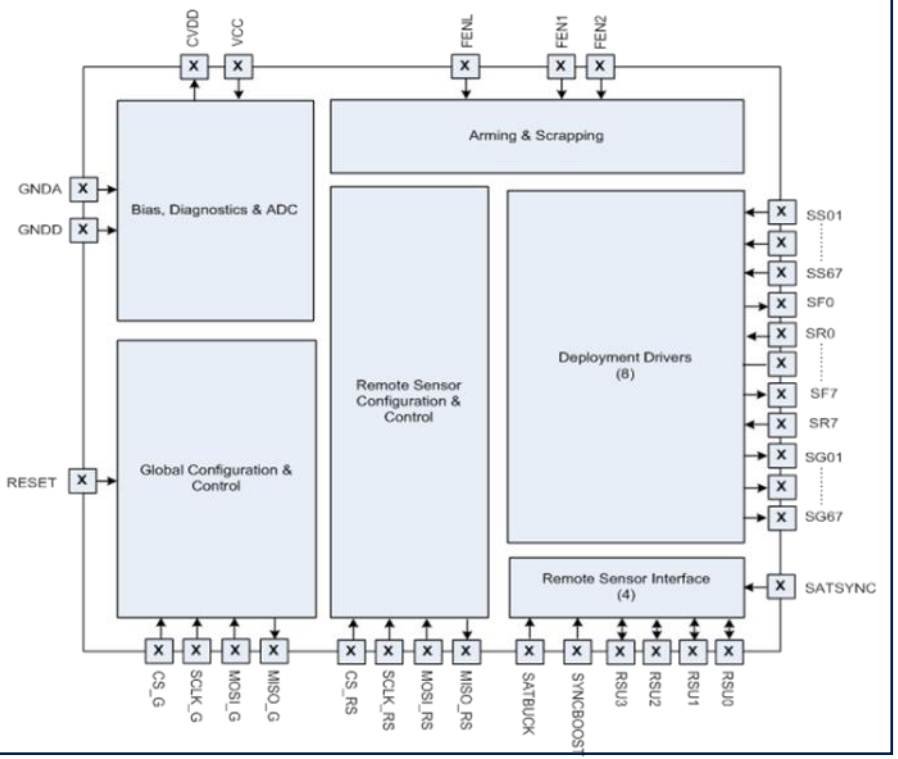
Electrical parameters
- Energy reserve voltage power supply (high frequency boost regulator, 1.882 MHz, selectable output voltage, 23V or 33V ±5%
- Configurable linear power supplies (5V and 7.2V ±4%)

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

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

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

TQFP48EP



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L967xx
Automotive low end System Basis Chip

A glance at possible applications:

Hazard management (battery cut-off)

Airbag

Key values

Embedded full set of feature

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

Family approach

Belonging to U-chip set of devices compliant with ISO26262

Collaterals & Marketing Package

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

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Door zone Electronics

life.augmented

Line card **door zone**

L99DZ100G/GP	L99DZ120	L99DZ200G
Microcontroller-driven multifunctional actuator driver with embedded 6 half-bridge, 10 high-side actuator and H-bridge driver	Microcontroller-driven multifunctional actuator driver with embedded 4 half-bridge, 10 high-side actuator and H-bridge driver	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

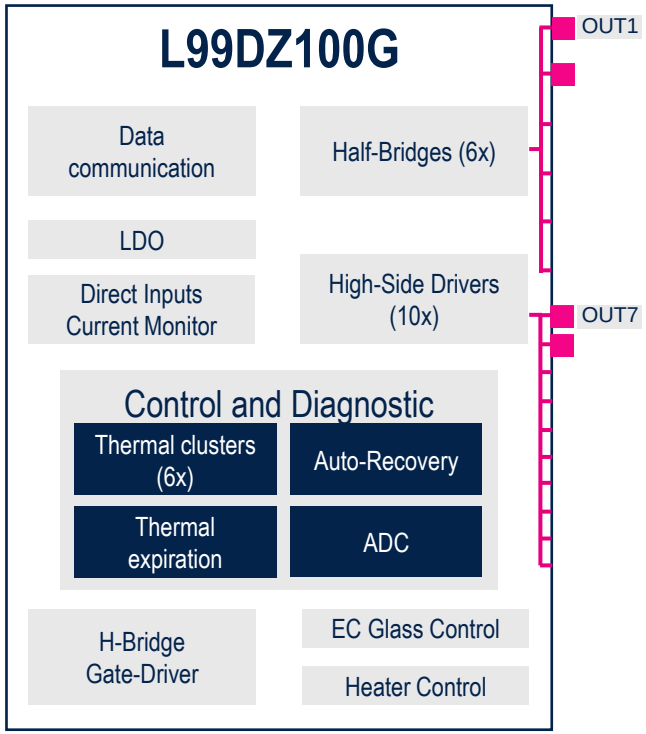
Electrical parameters
- Max operating voltage 28V
- Very low consumption in stand-by mode Is = 21 µA Typ.
- Programmable soft-start for all the outputs

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

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

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

LQFP64
10x10mm



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L99DZ120
Automotive Rear Door device with embedded LIN

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

Features

Electrical parameters

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

Protections

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

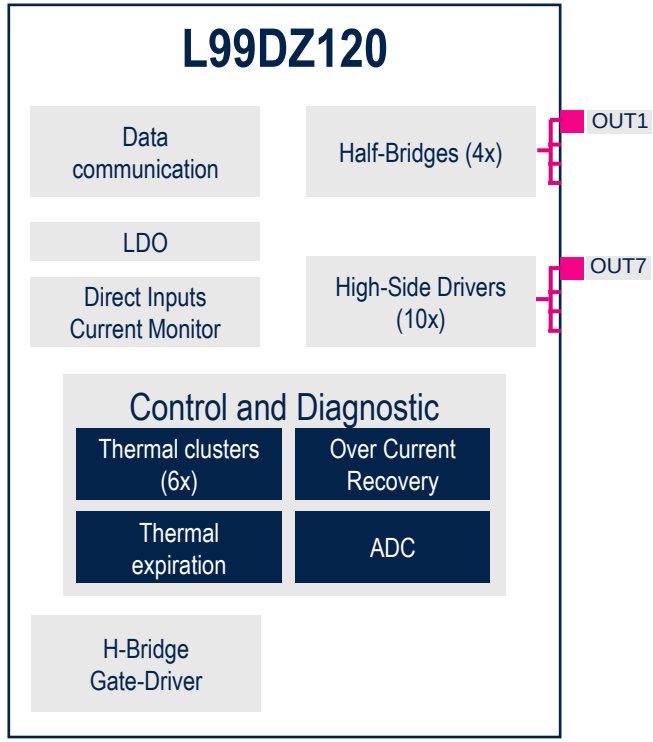
Outputs

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

Diagnostics

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

LQFP64
10x10mm



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

A glance at possible applications:

Full Front & Rear Door functionalities addressed by:

L99DZ100G(P)
L99DZ120

Key values

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

L99DZ100G(P)

L99DZ120

Collaterals & Marketing Package

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

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L99DZ200G

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

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

Features

Electrical parameters

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

Protections

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

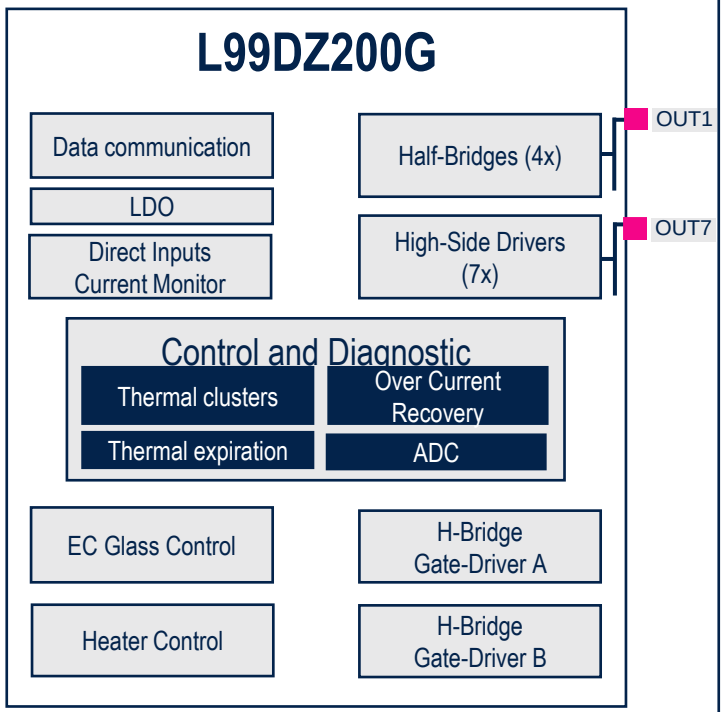
Outputs

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

Diagnostics

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

LQFP64
10x10mm



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L99DZ200G

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

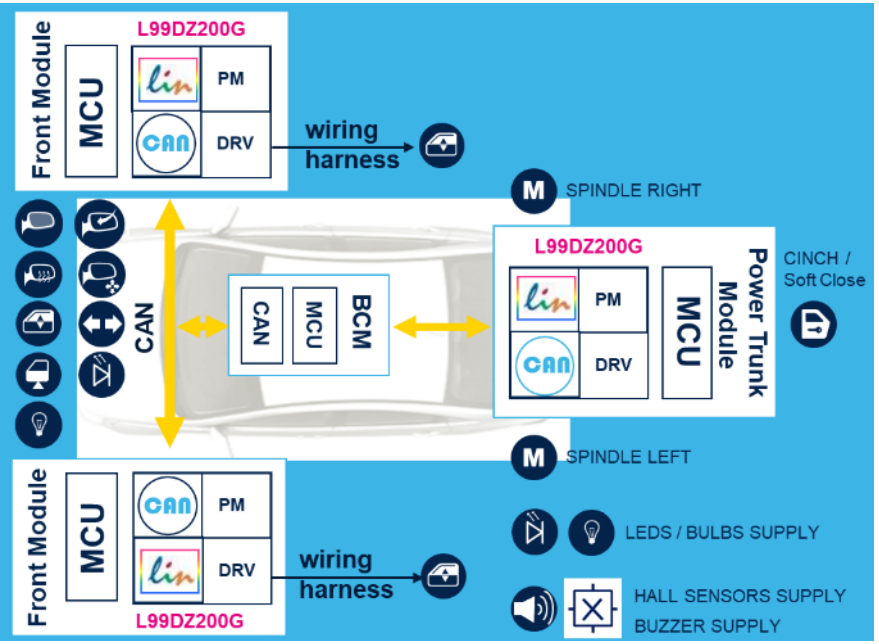
A glance at possible applications:

Power Trunk / Tailgate applications

Front drives Rear Door

Key values

A single device managing several door & trunk applications



Collaterals & Marketing Package

Product page
Datasheet
Selection guide: smartpower for body
Brochure

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

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“If only

I could find out more about door zone

This is where we come in

Line card **door lock**

L99UDL01

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

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L99UDL01
Automotive multichannel motor control – universal door lock

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

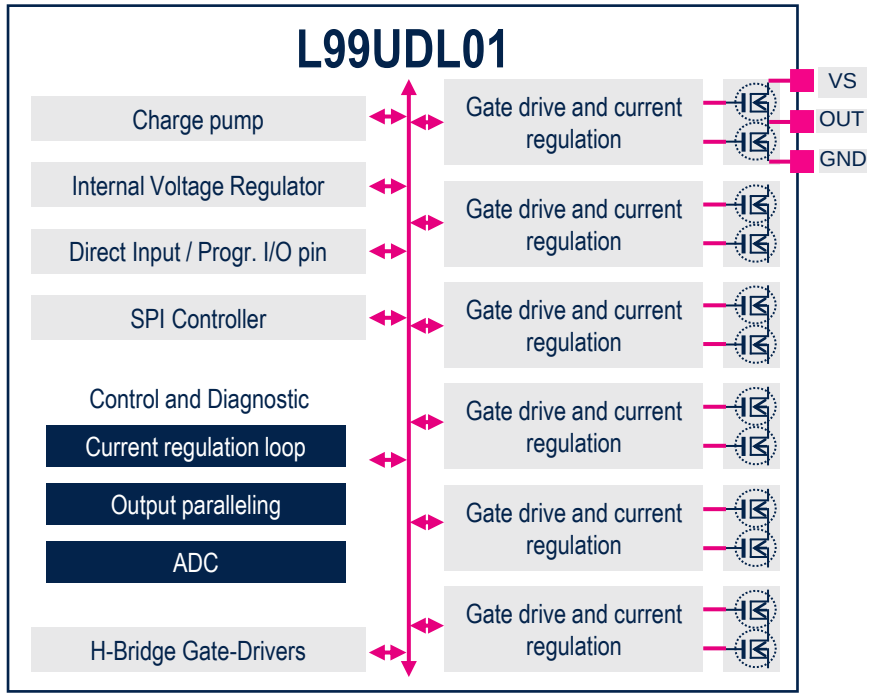
Features

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

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

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

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



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L99UDL01
Automotive multichannel motor control – universal door lock

A glance at possible applications:

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

Centralized door lock

Vending machines

Key values

Integration concept

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

Reduce peak currents

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

Multiple Motor Smart Control

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

Collaterals & Marketing Package

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 system for 1/4-cylinders

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Line card
Engine management systems for 2/4-cylinders

L9177A	L9779WD
U-chip integrating all key functions for an Electronic Fuel Injection (EFI) ECU up to 2 cylinders	U-chip integrating all key functions for an Electronic Fuel Injection (EFI) ECU up to 4 cylinders

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

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

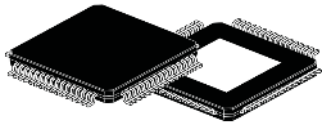
Features

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

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

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

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



TQFP64
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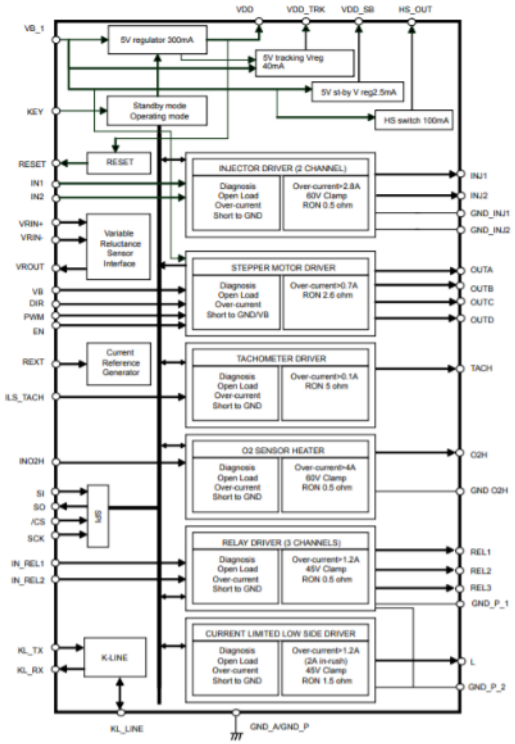

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L9177A
Small Engine EFI (Electronic Fuel Injection) U-chip

A glance at possible applications:

- Two wheelers
- Microcar
- Lawnmowers
- UPS / generators

Key values

Embedding a set of features

All key functions for an EFI ECU are included

Achieving Optimization

Solution with optimized BOM and form factor

EMS family

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

Collaterals & Marketing Package

L9177/A

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

EVAL-L9177A

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

STSW-L9177A

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

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

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L9779WD
EFI (Electronic Fuel Injection) U-chip

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

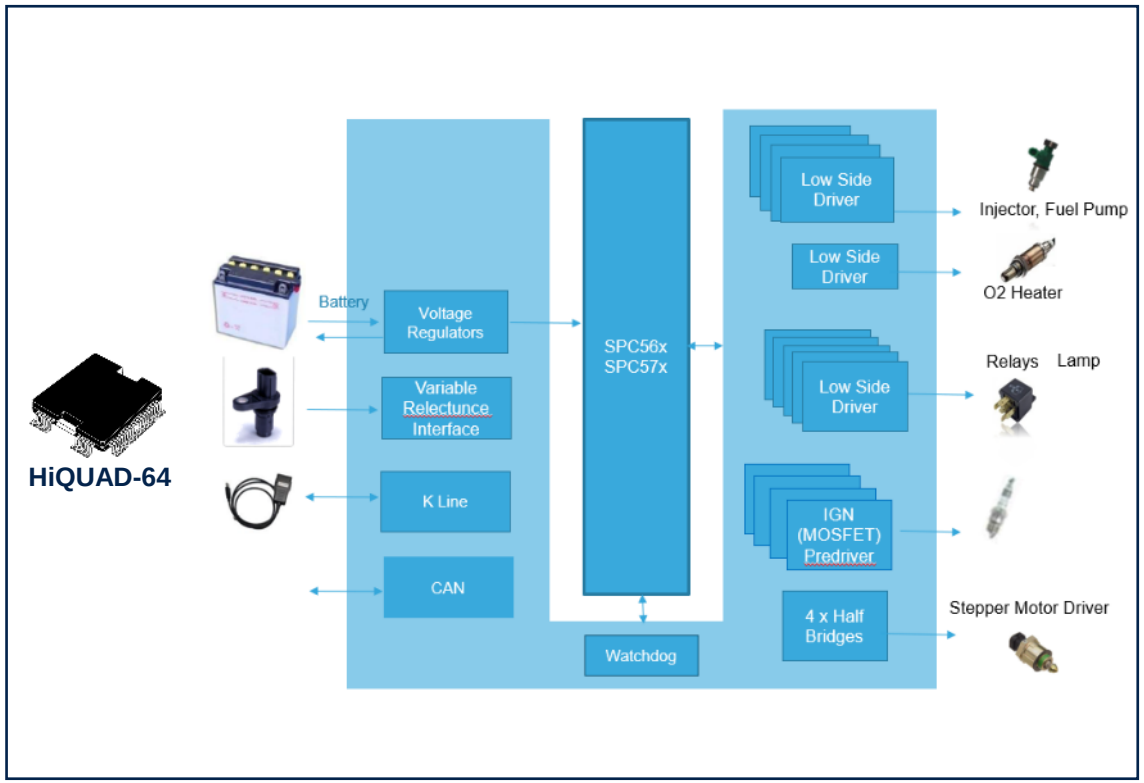
Features

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

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

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

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



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L9779WD
EFI (Electronic Fuel Injection) U-chip

A glance at possible applications:

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

Key values

Embedding a set of features

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

Achieving Optimization

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

EMS family

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

Collaterals & Marketing Package

L9779WD/-SPI

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

EVAL-L9779WD-SPI

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

STSW-L9779WD-SPI

- Product page
- User manual
- License agreement

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

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“If only

I could find out more about engine management

This is where we come in

Valve drivers

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Line card **valve driver**

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

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L9945
Configurable multichannel pre-driver

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

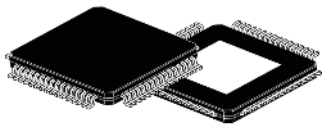
Features

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

Protections
- Overcurrent monitoring
- Current limitation for H-bridge

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

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



TQFP64
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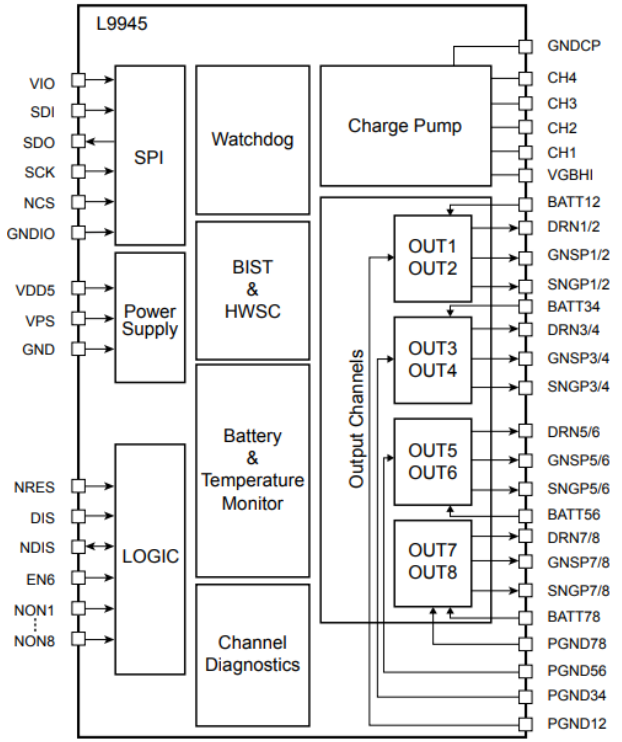

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L9945
Configurable multichannel pre-driver

A glance at possible applications:

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

Key values

Configurability

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

Flexibility

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

Application Coverage

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

Collaterals & Marketing Package

L9945

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

EVAL-L9945

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

STSW-L9945

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

L9301
Automotive 8-channel configurable driver

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

Features

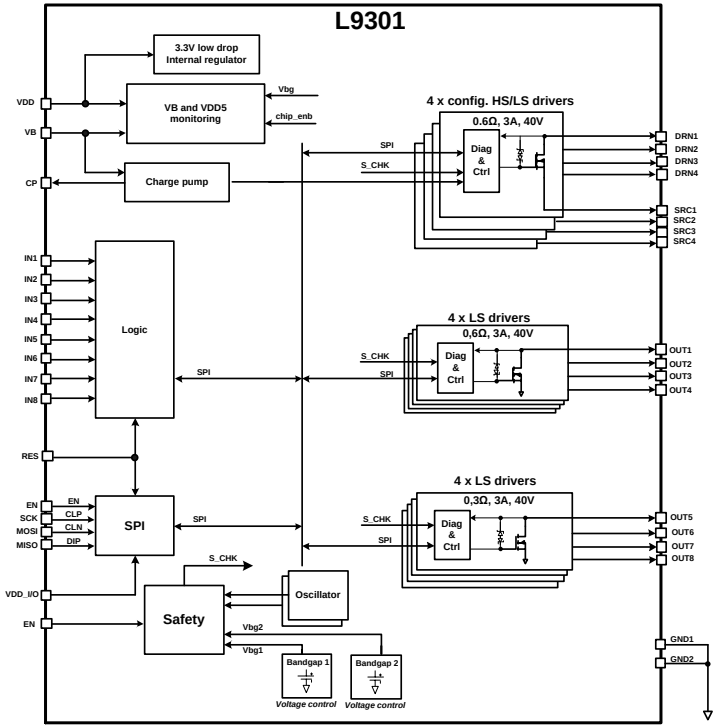
Electrical parameters
- Operating supply voltage 5V to 18V
- Operating VDD supply voltage 4.75V to 5.25V

Protections
- Overtemperature, overcurrent and shutdown protection

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

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

PowerSSO-36



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L9301
Automotive 8-channel configurable driver

A glance at possible applications:

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

Key values

High flexibility

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

Configurability

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

Design optimization

Low ohmic PowerMOS and improved EMC performances

Collaterals & Marketing Package

L9301

- Product page
- Datasheet

EVAL-L9301

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

STSW-L9301

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

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L9305
Automotive 4-channel valve driver

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

Features

Electrical parameters

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

Protections

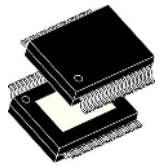
- High side fail safe ENABLE switch pre-driver with VDS monitoring
- Redundant safe enable path
- Temperature sensor and monitoring
- Redundant current sensing for all channels

Outputs

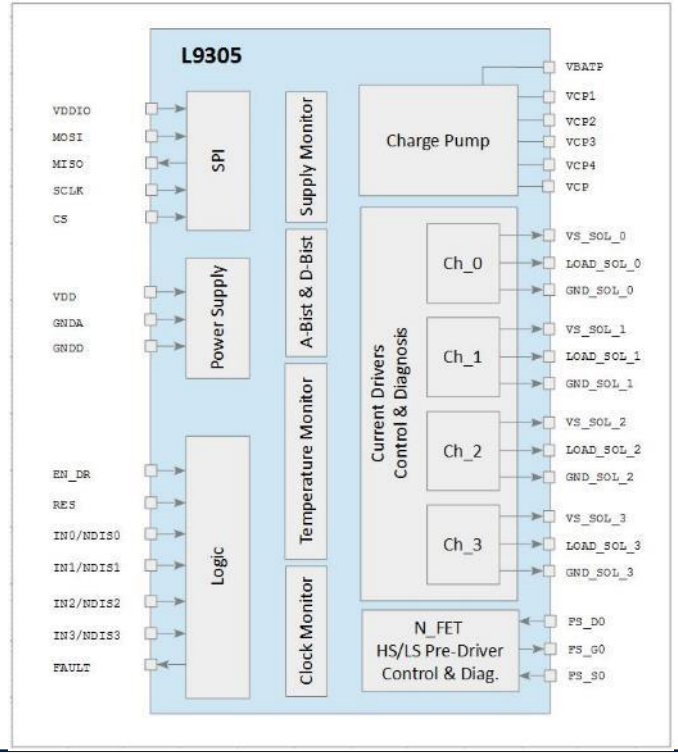
- 4x configurable High-Side/Low-Side Drivers (**375mΩ**)
- 2 operating driving modes:
  1. PWM through parallel input
  2. PWM internally generated

Diagnostics

- Advanced diagnosis and monitoring using BIST



PowerSSO-36



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L9305
Automotive 4-channel valve driver

A glance at possible applications:

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

Key values

Configurability

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

Flexibility

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

Performance

High precision current control level allowing an accurate valve control

Collaterals & Marketing Package

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

Thank you

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