

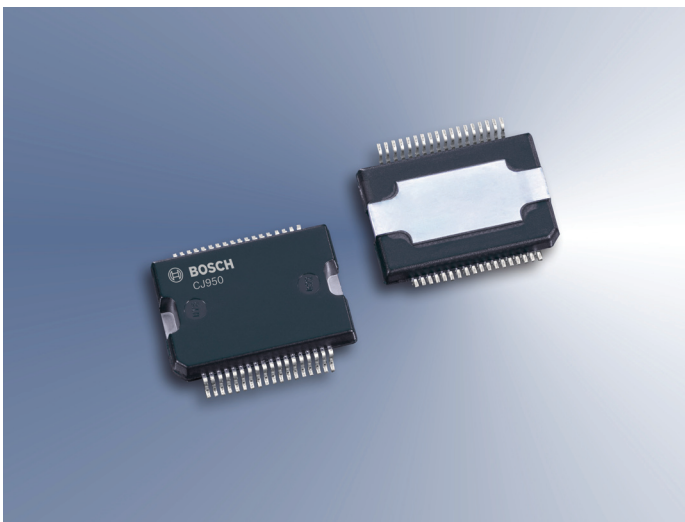
# Automotive Electronics

## Product Information

### CJ950P – 18fold Low Side Power Switch



**BOSCH**  
Invented for life



#### Customer benefits:

- ▶ Cost and space saving design
- ▶ Enhanced thermal management allows small SO36 package
- ▶ Enhanced diagnosis concept
- ▶ Long-term availability of manufacturing processes and products

#### Features

- ▶ Micro Second Channel
- ▶ Fault diagnostic functions of all power stages
- ▶ Withstand voltage of 36V
- ▶ Enhanced self protection
- ▶ Parallel connection of power stages
- ▶ Two power stages with extended current capability
- ▶ VDD Monitoring
- ▶ Power SO36 package

#### Diagnostic Features

All PS have fault diagnostic functions:

- ▶ Short circuit to battery (SCB) can be detected if stages are turned on.
- ▶ Short circuit to ground (SCG) can be detected if stages are turned off.
- ▶ Open load (OL) can be detected if stages are turned off.
- ▶ Overtemperature warning (OTW) can be detected if stages are on or forced off by OTSD.

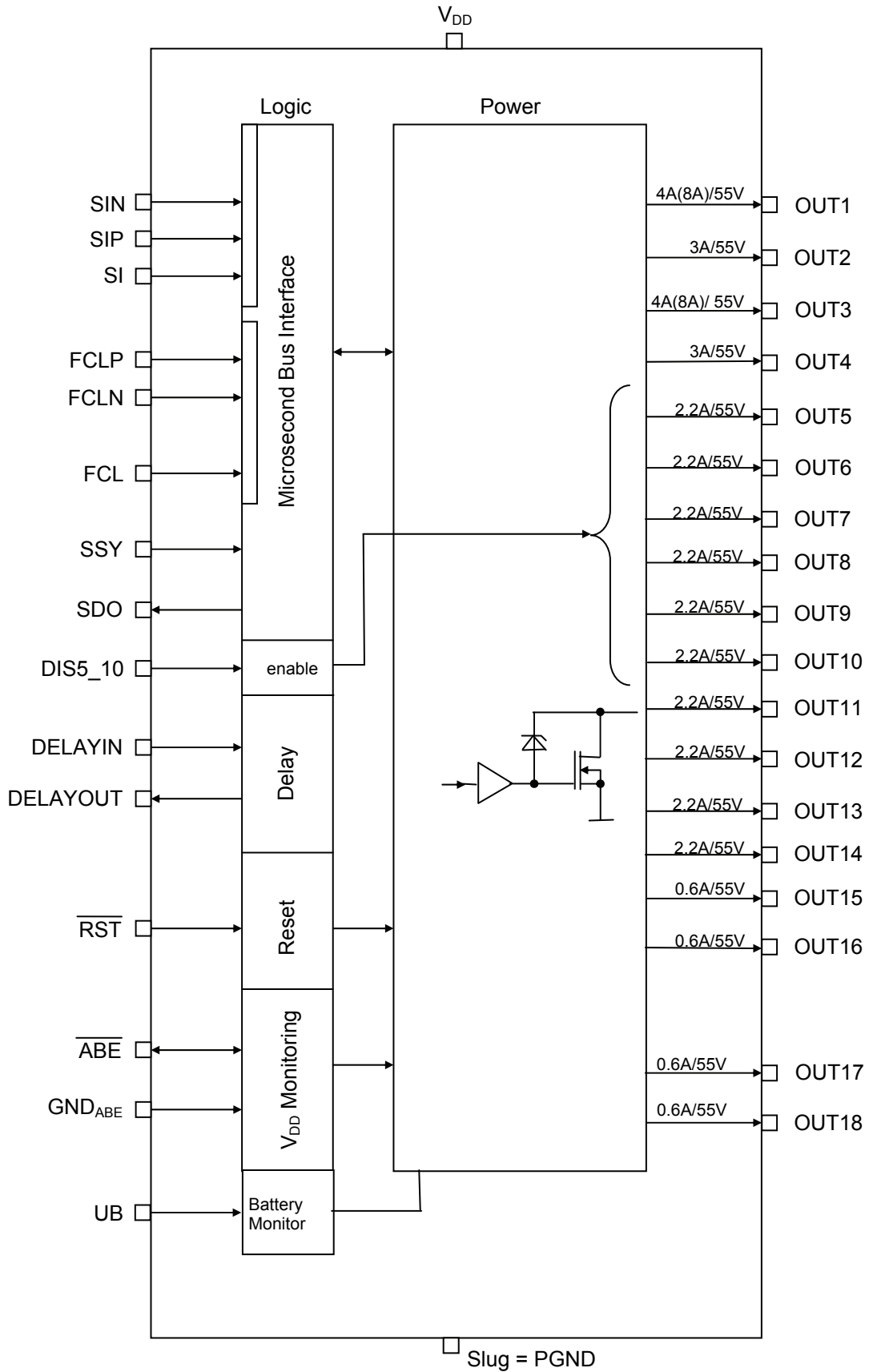
#### Functional Description

Output	Stage Type	Nominal Load current	R <sub>ON_typ</sub> (T <sub>J</sub> = 25°C)
OUT1, OUT3	PS	4.0A / 8.0A	150mΩ
OUT2, OUT4	PS	3.0A	260mΩ
OUT5...OUT10	PS	2.2A	500mΩ
OUT11...OUT14	PS	2.2A	500mΩ
OUT15, OUT16	PS	0.6A	1800mΩ
OUT17, OUT18	PS	0.6A	1800mΩ

#### Electrical Maximum Ratings

Parameter Condition/Comment	Symbol	Values		
		min	max	unit
Supply Voltage Range pin VDD, static	V <sub>DD_MR</sub>	-0.3	36	V
Battery Voltage stages output pins via load	V <sub>BAT_MR</sub>	-1.0	40	V
Total Ground Current total current over heat slug	I <sub>GND_MR</sub>	-38		A
Output Stages static voltage OUTn (n=1...18)	V <sub>OUTn_MR</sub>		50	V

Block Diagram



Name	Number	Description
OUT1	1	Power stages. Short circuit proof, individually protected against overtemperature, diagnostic functions, control via MSC. Limitation of the output voltage by clamping diodes.
OUT2	36	
OUT3	18	
OUT4	19	
OUT5	3	
OUT6	35	
OUT7	16	
OUT8	20	
OUT9	4	
OUT10	34	
OUT11	15	
OUT12	21	
OUT13	5	
OUT14	33	
OUT15	14	
OUT16	22	
OUT17	6	
OUT18	32	
$\overline{\text{DIS5\_10}}$	9	Disable pin for OUT5...OUT10 (low level on this pin disables OUT5...OUT10 after filtering time (tDIS5_10) has expired).
$\overline{\text{DELAYIN}}$	7	Switch on and off pin DELAYOUT with programmable delay time.
$\overline{\text{DELAYOUT}}$	8	Open drain output generating active low level if disabling input DELAYIN is low level, input ABE disables stages or VDD monitoring has detected a supply voltage failure.
$\overline{\text{ABE}}$	11	Bidirectional reset pin (active low) output. Shuts down all stages regardless of their input signals.
GND <sub>ABE</sub>	12	Sense ground. Reference ground for VDD monitoring only.
V <sub>DD</sub>	13	Supply voltage 5V.
SDO	24	MSC interface. Upstream data, open drain output.
SSY	25	MSC interface. Chip select and synchronisation strobe.
SIP	26	MSC interface. Downstream data positive for differential interface.

Name	Number	Description
$\overline{\text{SIN}}$	27	MSC interface. Downstream data negative for differential interface.
SI	28	MSC interface. Optional downstream data input for single ended interface.
FCLP	29	MSC interface. Clock positive for differential interface.
$\overline{\text{FCLN}}$	30	MSC interface. Clock negative for differential interface.
FCL	31	MSC interface. Optional clock input for single ended interface.
$\overline{\text{RST}}$	23	Reset input (active low) Shuts down all stages regardless of their input signals.
UB	10	Battery voltage.
n.c.	2,17	Pin 2 and 17 are not connected. It is recommended to connect pin 2 (nc) to pin1 (OUT1) and pin 17 (nc) to pin 18 (OUT3).
PGND	slug	Ground connection for powerstages and logic.

#### Micro Second Channel

The MSC is a high speed serial interface which is especially optimized to connect peripheral devices via serial link to the microcontroller.

#### Whithstand voltage

All input pins can handle static overvoltage up to 36V without destruction.

#### Parallel connection of power stages

In case the application requires a higher load current than a single power stage can deliver, parallel connection of up to four stages is possible.

### Enhanced device self protection

All PS are short circuit protected. If critical overtemperature is detected in one stage the stage is switched off.

Operating temperature:  $-40^{\circ}\text{C} \dots +150^{\circ}\text{C}$

Storage temperature:  $-55^{\circ}\text{C} \dots +150^{\circ}\text{C}$

### Two power stages with extended current capability

Especially for lambda sensor heating, two power stages with extended current up to 8A (800h over lifetime) have been implemented.

### VDD Monitoring

$V_{DD}$  is measured with reference to pin  $\text{GND}_{\text{ABE}}$ .

$V_{DD}$  monitoring detects faulty supply voltage. If  $V_{DD}$  is out of limit, all power stages are disabled.

### General functions of VDD Monitoring

#### $V_{DD}$ Undervoltage

If the  $V_{DD}$  voltage is lower than the supply voltage lower threshold ( $V_{DD\_THL}$ ), all output stages are shut off.

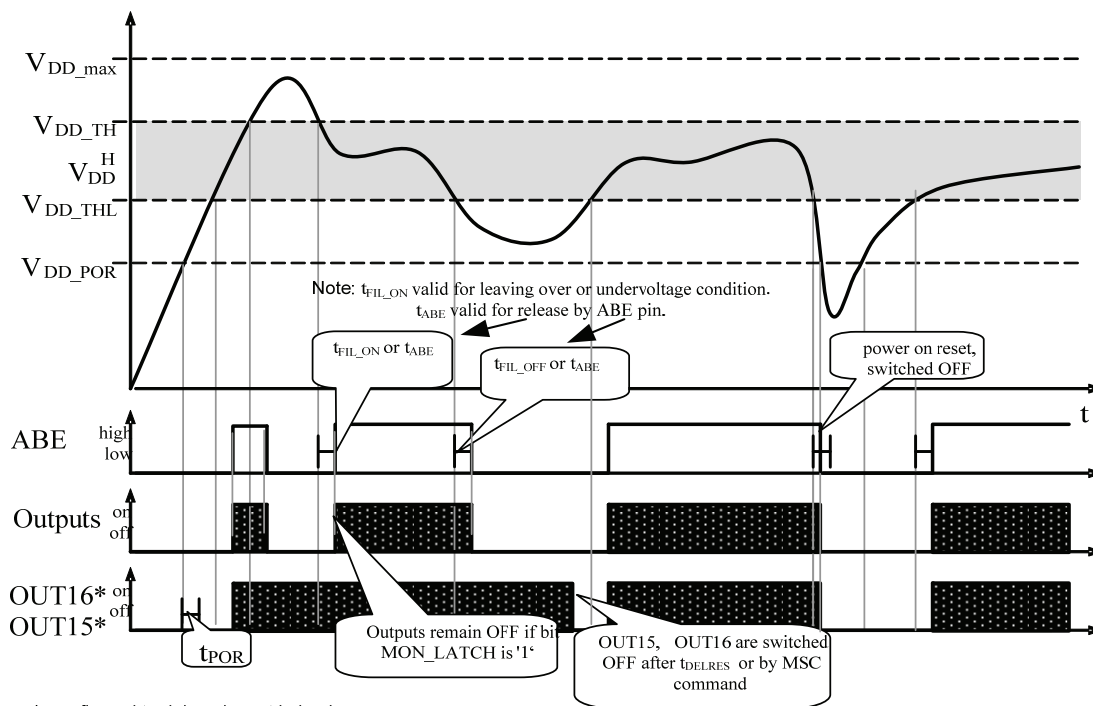
#### $V_{DD}$ Overvoltage

If the  $V_{DD}$  voltage is higher than the supply voltage upper threshold ( $V_{DD\_THH}$ ), all output stages are shut off.

#### ESD Capability

The IC pins are protected against electrostatic discharge (ESD) through integrated protection structures.

External Pin-Connections	Pin Combination	Values		
		min	max	unit
Electro Static Discharge Voltage (HBM).	All Pins	-2	2	kV
Electro Static Discharge Voltage (HBM).	OUT1...OUT18 vs. GND	-4	4	kV



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