FS65 AND FS45 FAIL-SILENT POWER SYSTEM BASIS CHIP PRODUCT FAMILIES

The standardization of critical power management and safety behavior is driving innovation and a set of standard system basic chip (SBC) products. Industry trends are for green powertrain, electrification and secured solutions that integrate functional safety.

The FS45 and FS65 product families combine power management with its own monitoring in conjunction with the microcontroller system's monitoring. This arrangement helps the system to achieve high-safety, integrity-level performance. The need for a higher CAN bandwidth improves intersystem communications and reduces software download times.

TARGET APPLICATIONS

- Electric vehicle, hybrid electric vehicle and battery management systems
- Safety-critical motor control
- Drive train applications
- ADAS
- Onboard charger
- Functional safety integration

Importance of functional safety and system availability

- System use in harsh environments needing functional safety requirements
- Q&A watchdog and FCCU monitoring for external monitoring of microcontroller operation (ASIL D)
- Provides multiple diagnostics such as overcurrent, undervoltage and overtemperature for safe operation
- Allows configurable safety behavior to manage system goals

Electric drivetrain transportation systems

- Allow voltage range from 2.7 V to 28 V for automotive applications
- Robust to harsh ePowertrain and EV/HEV mission profile with grade 1 pass up to 4200h HTOL (Ta=125 °C/ Tj=150 °C) and grade 0 pass up to 1300h HTOL (Ta=150 °C/ Tj=175 °C)
- Integrated advanced system functions to manage drive cycles such as long-duration timer (LDT), fail-safe pin (FS1)

Applications that require thermal efficiency and low PCB size

- Efficient and robust DC-DC solutions that supply the microcontroller from 1.2 V to 5 V, up to 2.2 A
- Solution uses LQFP48eP, a 7 x 7 mm package

Innovative and cost-effective system solutions

- Compared to a similar solution in discrete, the safety assessment required and the external component needs, the FS45 and FS65 families offer a significant price and size advantage

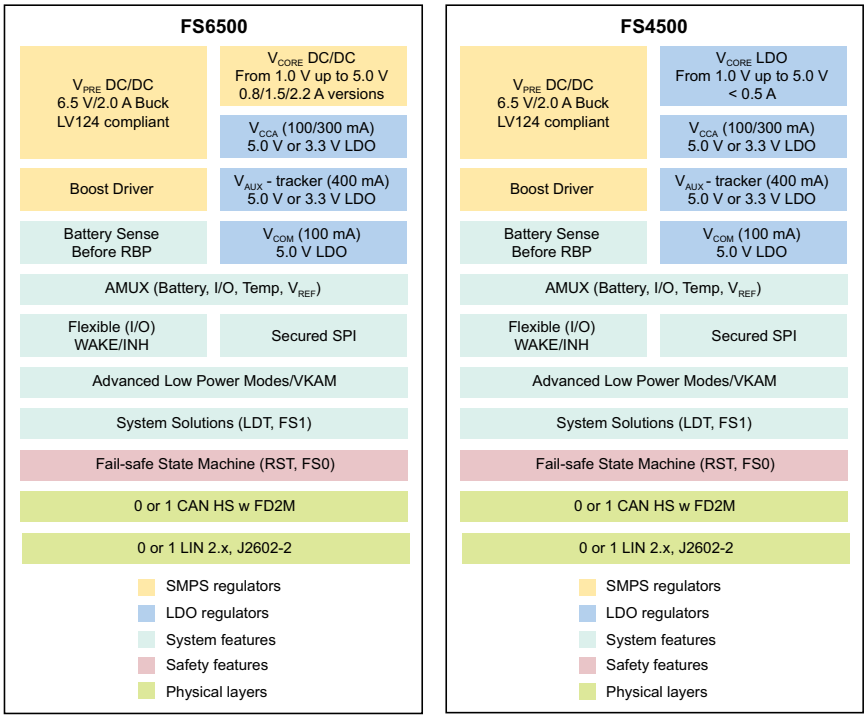
FEATURES AND BENEFITS

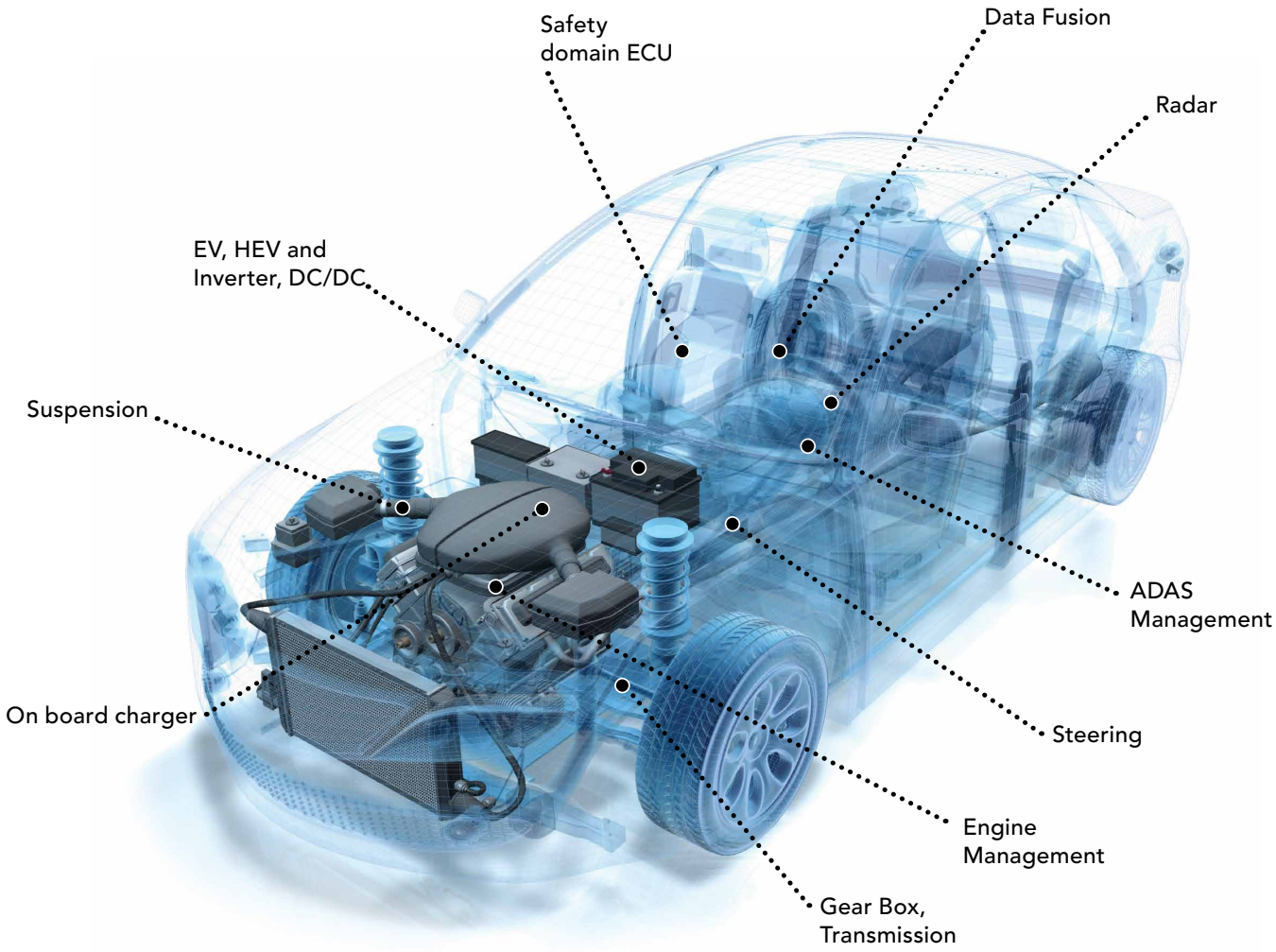
- Availability: voltage operation from 2.7 V up to 28 V
- Buck pre-regulator with optional boost to fit with LV124
- Ultra-low-power modes (30 µA), -50% versus competition
- Independent fail-safe state machine supporting highest functional safety standards
- Robust physical layers with superior EMI/ESD performance
- Efficient dual DC-DC supply, from 0.5 A up to 2.2 A
- Fail silent configurable safety architecture allowing independent monitoring of critical parameters and system availability
- System integration: analog multiplexer, battery sensing, long duration timer and live memory supply to reduce BOM
- Scalable family approach through a large range of part numbers supporting different system configurations (including CAN FD and CAN-less options) and different safety levels (ASIL B, ASIL D), pin-to-pin compatible
- FS65 meets grade 0 reliability performance levels: qualified with 1300 hours of HTOL stress at Tj=175°C

NXP SBC SOLUTIONS

	FS45	FS65
6.5 V pre-regulator	2.0 A / 6.5 V Vpre capable 2.7 V to 28 V buck/boost	2.0 A/6.5 V Vpre capable 2.7 to 28 V buck/boost
MCU core supply VCore/ 2%	Vcore LDO 0.5 A	2.4 MHz Vcore 0.8/1.5/ 2.2 A DC-DC
Auxillary ECU supply Vaux/3%	Up to 400 mA LDO and tracker	Up to 400 mA LDO and tracker
CAN interface	1	1
I/Os	Configurable I/Os	Configurable I/Os
AMUX (battery, I/O, temp, Vref)	Yes	Yes
Fail safe	Fail safe state machine (RST, FS0, FS1)	Fail safe state machine (RST, FS0, FS1)
Package	LQFP48eP 7 x 7 mm	LQFP48eP 7 x 7 mm

FS4500 AND FS6500 BLOCK DIAGRAMS





SAFEASSURE PROGRAM

Functional safety. Simplified.

The NXP SafeAssure functional safety program is designed to help you simplify the process of achieving system compliance with functional safety standards in the automotive and industrial markets.

A LEADER IN ANALOG SOLUTIONS

Expanding on more than 30 years of innovation, NXP is a leading provider of high-performance products that use SMARTMOS technology, combining digital, power and standard analog functions. We supply analog and power management ICs that are advancing the automotive, consumer, industrial and networking markets. Analog solutions interface with real-world signals to control and drive for complete embedded systems.

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Document Number: FS65FS45LFA4 REV 3