FS6500, FS4500

Safety Power System Basis Chip with CAN FD and LIN Transceivers

Rev. 1.0 — 14 December 2017 Short data sheet: advance information

1 General description

The FS6500/FS4500 SMARTMOS devices are a multi-output, power supply, integrated circuit, including CAN Flexible Data (FD) and/or LIN transceivers, dedicated to the automotive market.

Multiple switching and linear voltage regulators, including low-power mode (32 µA) are available with various wake-up capabilities. An advanced power management scheme is implemented to maintain high efficiency over a wide range of input voltages (down to 2.7 V) and output current ranges (up to 2.2 A).

The FS6500/FS4500 includes configurable fail-safe/fail silent safety behavior and features, with two fail-safe outputs, becoming a full part of a safety oriented system partitioning, to reach a high integrity safety level (up to ASIL D).

The built-in CAN FD interface fulfills the ISO 11898-2 and -5 standards. The LIN interface fulfills LIN protocol specifications 2.0, 2.1, 2.2, and SAEJ2602-2.

2 Features

- Battery voltage sensing and MUX output pin
- Highly flexible SMPS pre-regulator, allowing two topologies: non-inverting buck-boost and standard buck
- Family of devices to supply MCU core from 1.0 V to 5.0 V, with SMPS (0.8 A, 1.5 A or 2.2 A) or LDO (0.5 A)
- 36 V maximum input operating voltage
- Linear voltage regulator dedicated to auxiliary functions, or to sensor supply (V_{CCA} tracker or independent), 5.0 V or 3.3 V
- Linear voltage regulator dedicated to MCU A/D reference voltage or I/Os supply (V_{CCA}), 5.0 V or 3.3 V
- 3.3 V keep alive memory supply available in low-power mode
- Long duration timer, counting up to 6 months with 1.0 s resolution
- Multiple wake-up sources in low-power mode: CAN, LIN, IOs, LDT
- Five configurable I/Os

3 Applications

- Drive train electrification (BMS, hybrid EV and HEV, inverter, DCDC, alterno starter)
- Drive train - chassis and safety (active suspension, steering, safety domain gateway)
- Power train (EMS, TCU, gear box)
- ADAS (LDW, Radar, sensor fusion safety area)

4 Simplified application diagram

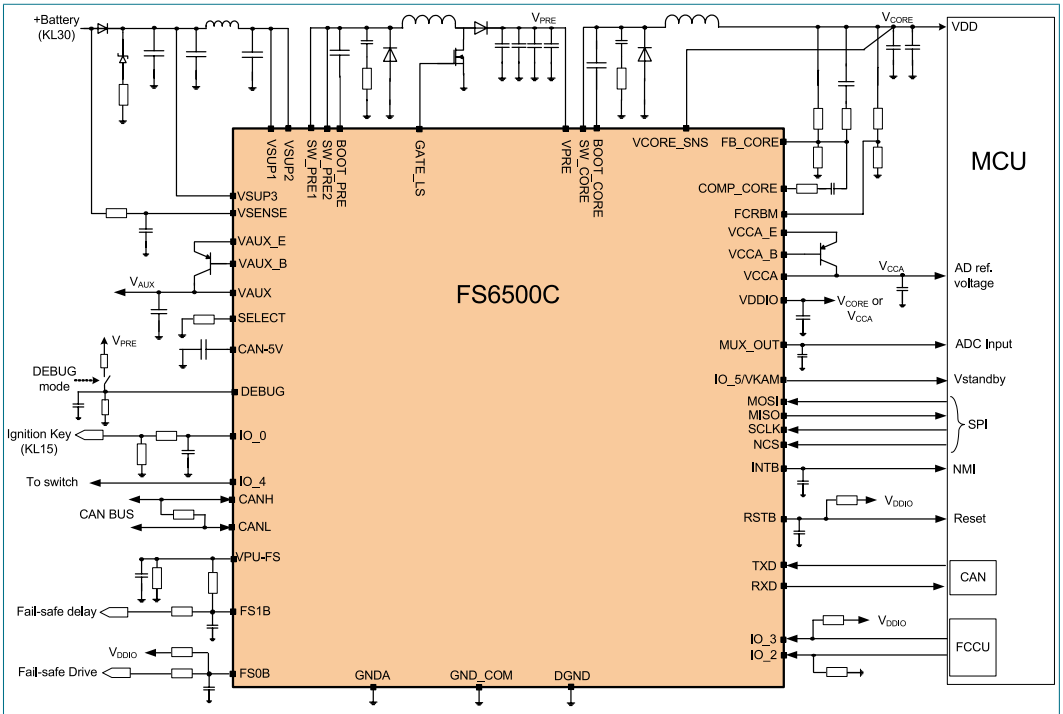


Figure 1. FS6500C simplified application diagram - buck boost configuration - FS1B

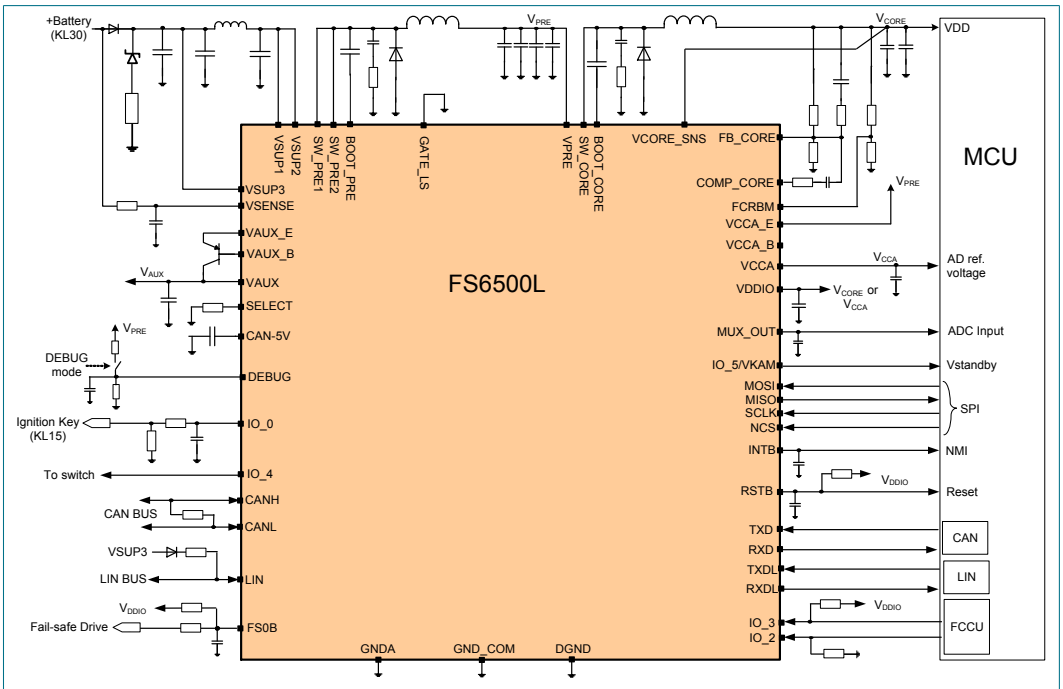


Figure 2. FS6500L simplified application diagram - buck configuration - LIN - V_{CCA} =100 mA

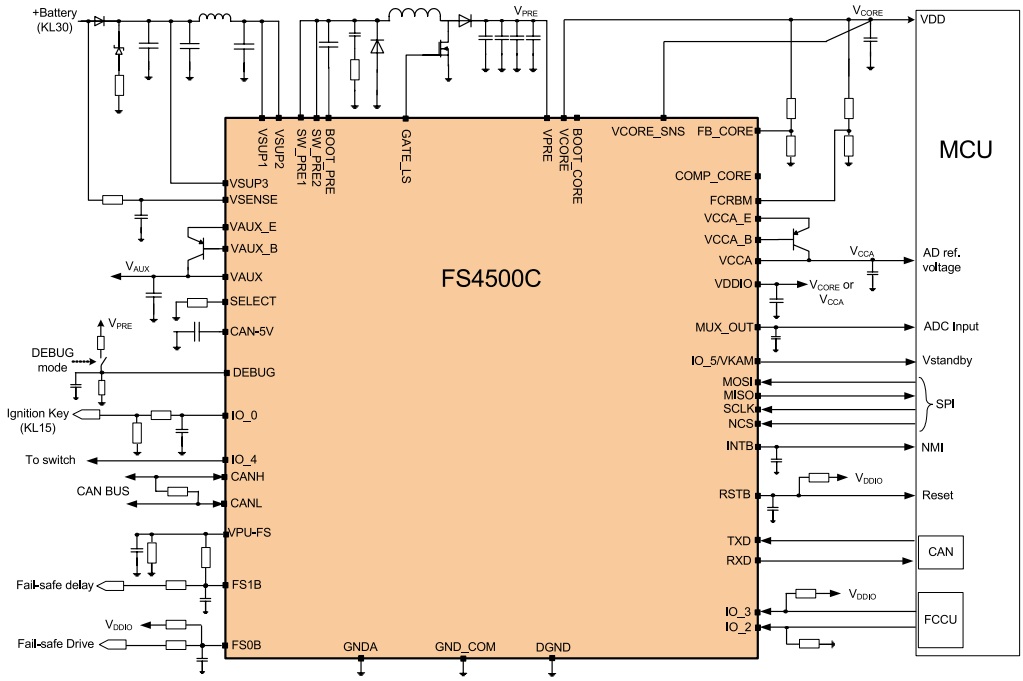


Figure 3. FS4500C simplified application diagram - buck boost configuration - FS1B

5 Ordering information

5.1 Part numbers definition

MC33FS c 5 x y z AE/R2

Table 1. Part number breakdown

Code	Option	Variable	Description
c	4 series	V_{CORE} type	Linear
	6 series		DCDC
x	0	V_{CORE} current	0.5 A or 0.8 A
	1		1.5 A
	2		2.2 A
y	0	Functions	none
	1		FS1B
	2		LDT
	3		FS1B, LDT
	4		LDT, VKAM ON by default
z	N	Physical interface	none
	C		CAN FD
	L		CAN FD and LIN

5.2 Part numbers list

Table 2. Orderable part variations

Part number	Temperature (T_A)	Package	FS1B	LDT	VCORE	VCORE type	VKAM on	CAN FD	LIN	Notes
MC33FS4500CAE	–40 °C to 125 °C	48-pin LQFP exposed pad	0	0	0.5 A	Linear	by SPI	1	0	[1] [2]
MC33FS4500LAE			0	0	0.5 A	Linear	by SPI	1	1	
MC33FS4500NAE			0	0	0.5 A	Linear	by SPI	0	0	
MC33FS4501CAE			1	0	0.5 A	Linear	by SPI	1	0	
MC33FS4501NAE			1	0	0.5 A	Linear	by SPI	0	0	
MC33FS4502CAE			0	1	0.5 A	Linear	by SPI	1	0	
MC33FS4502LAE			0	1	0.5 A	Linear	by SPI	1	1	
MC33FS4502NAE			0	1	0.5 A	Linear	by SPI	0	0	
MC33FS4503CAE			1	1	0.5 A	Linear	by SPI	1	0	
MC33FS4503NAE			1	1	0.5 A	Linear	by SPI	0	0	
MC33FS6500CAE			0	0	0.8 A	DC DC	by SPI	1	0	
MC33FS6500LAE			0	0	0.8 A	DC DC	by SPI	1	1	
MC33FS6500NAE			0	0	0.8 A	DC DC	by SPI	0	0	
MC33FS6501CAE			1	0	0.8 A	DC DC	by SPI	1	0	
MC33FS6501NAE			1	0	0.8 A	DC DC	by SPI	0	0	
MC33FS6502CAE			0	1	0.8 A	DC DC	by SPI	1	0	
MC33FS6502LAE			0	1	0.8 A	DC DC	by SPI	1	1	
MC33FS6502NAE			0	1	0.8 A	DC DC	by SPI	0	0	
MC33FS6503CAE			1	1	0.8 A	DC DC	by SPI	1	0	
MC33FS6503NAE			1	1	0.8 A	DC DC	by SPI	0	0	
MC33FS6504LAE			0	1	0.8 A	DC DC	by default	1	1	
MC33FS6510CAE			0	0	1.5 A	DC DC	by SPI	1	0	
MC33FS6510LAE			0	0	1.5 A	DC DC	by SPI	1	1	
MC33FS6510NAE			0	0	1.5 A	DC DC	by SPI	0	0	
MC33FS6511CAE			1	0	1.5 A	DC DC	by SPI	1	0	
MC33FS6511NAE			1	0	1.5 A	DC DC	by SPI	0	0	
MC33FS6512CAE			0	1	1.5 A	DC DC	by SPI	1	0	
MC33FS6512LAE			0	1	1.5 A	DC DC	by SPI	1	1	
MC33FS6512NAE			0	1	1.5 A	DC DC	by SPI	0	0	
MC33FS6513CAE			1	1	1.5 A	DC DC	by SPI	1	0	
MC33FS6513NAE			1	1	1.5 A	DC DC	by SPI	0	0	
MC33FS6514LAE			0	1	1.5 A	DC DC	by default	1	1	
MC33FS6520CAE			0	0	2.2 A	DC DC	by SPI	1	0	
MC33FS6520LAE			0	0	2.2 A	DC DC	by SPI	1	1	
MC33FS6520NAE			0	0	2.2 A	DC DC	by SPI	0	0	
MC33FS6521CAE			1	0	2.2 A	DC DC	by SPI	1	0	
MC33FS6521NAE			1	0	2.2 A	DC DC	by SPI	0	0	
MC33FS6522CAE			0	1	2.2 A	DC DC	by SPI	1	0	
MC33FS6522LAE			0	1	2.2 A	DC DC	by SPI	1	1	
MC33FS6522NAE			0	1	2.2 A	DC DC	by SPI	0	0	
MC33FS6523CAE			1	1	2.2 A	DC DC	by SPI	1	0	
MC33FS6523NAE			1	1	2.2 A	DC DC	by SPI	0	0	

[1] To order parts in tape and reel, add the R2 suffix to the part number.
[2] LIN and FS1B functions are exclusive. The differentiation is made by part numbers. When LIN is available, FS1B is not, and vice versa. VKAM on by default is available on certain part numbers only.

6 Block diagram

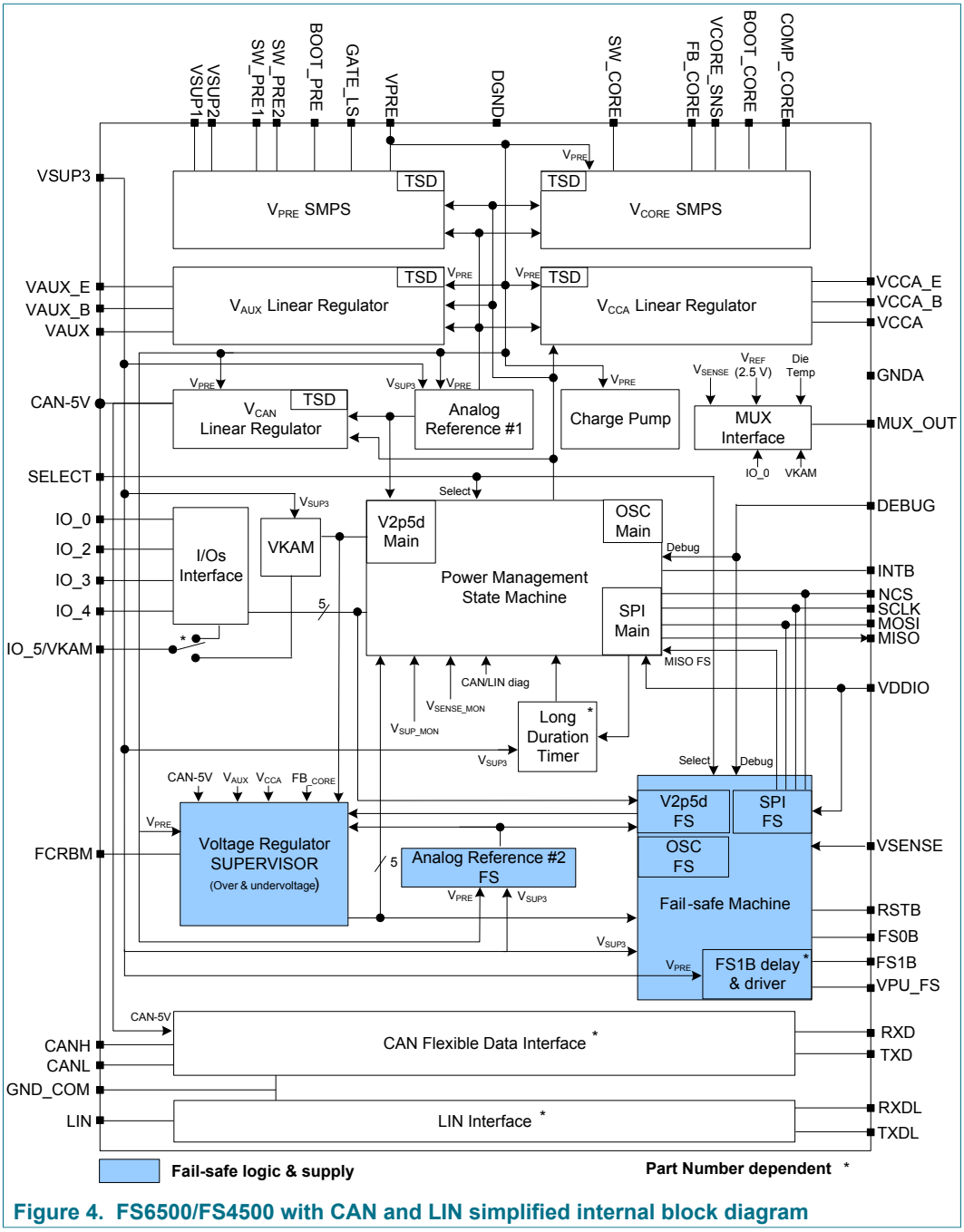


Figure 4. FS6500/FS4500 with CAN and LIN simplified internal block diagram

7 Pinning information

7.1 Pinning

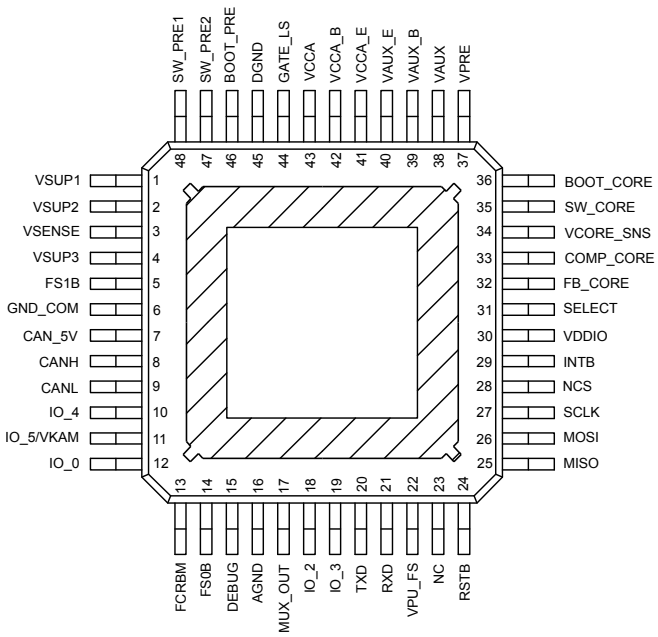


Figure 5. FS6500 pinout with CAN and FS1B

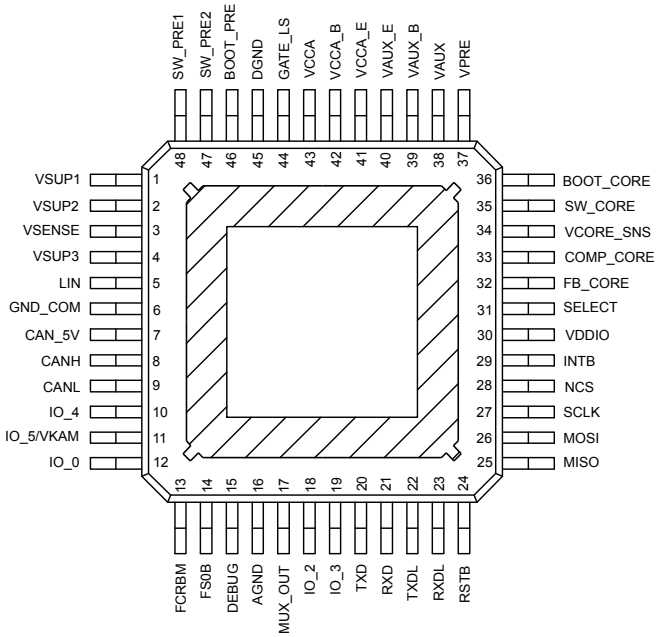


Figure 6. FS6500 pinout with CAN and LIN

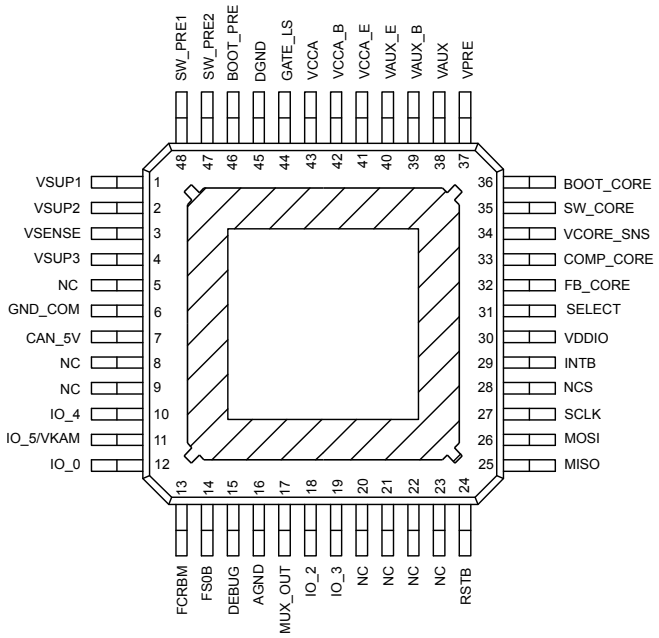


Figure 7. FS6500 pinout without CAN, without LIN

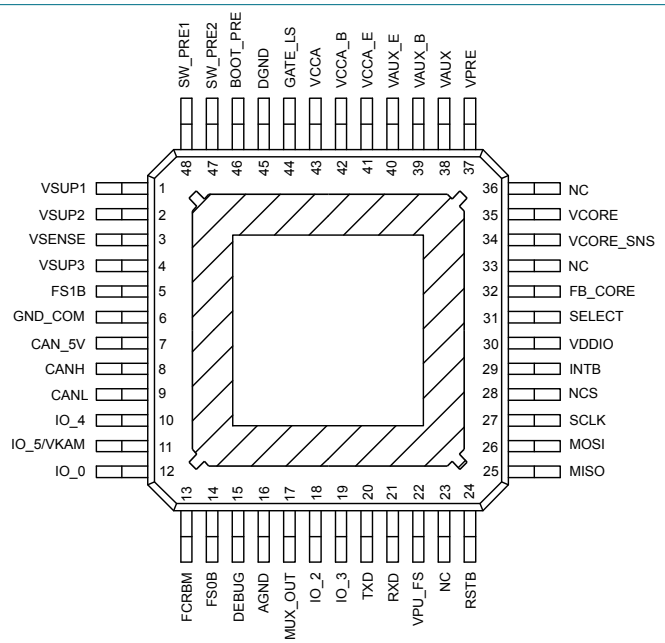


Figure 8. FS4500 pinout with CAN and FS1B

7.2 Pin description

Table 3. FS6500/FS4500 pin definition

Pin	Symbol	Type	Definition
1	VSUP1	A_IN	Power supply of the device. An external reverse battery protection diode in series is mandatory.

Pin	Symbol	Type	Definition
2	VSUP2	A_IN	Second power supply. Protected by the external reverse battery protection diode used for VSUP1. VSUP1 and VSUP2 must be connected together externally.
3	VSENSE	A_IN	Sensing of the battery voltage. Must be connected prior to the reverse battery protection diode.
4	VSUP3	A_IN	Third power supply dedicated to the device supply. Protected by the external reverse battery protection diode used for VSUP1. Must be connected between the reverse protection diode and the input PI filter.
5	LIN	A_IN/OUT	LIN single-wire bus transmitter and receiver
	or FS1B	D_OUT	Second output of the safety block (active low). The pin is asserted low at start-up and when a fault condition is detected, with a configurable delay or duration versus FS0B output terminal. Open drain structure.
	LIN and FS1B functions are exclusive. The differentiation is made by part numbers. When LIN is available, FS1B is not, and vice versa. If neither LIN, nor FS1B functions are used, this pin must be left open.		
6	GND_COM	GROUND	Dedicated ground for physical layers
7	CAN_5V	A_OUT	Output voltage for the embedded CAN FD interface
8	CANH	A_IN/OUT	CAN output high. If CAN function is not used, this pin must be left open.
9	CANL	A_IN/OUT	CAN output low. If CAN function is not used, this pin must be left open.
10	IO_4	D_IN A_OUT	Can be used as digital input (load dump proof) with wake-up capability or as an output gate driver **Digital input:** Pin status can be read through the SPI. Can be used to monitor error signals from another IC for safety purposes (when used in conjunction with IO_5). **Wake-up capability:** Can be selectable to wake-up on edges or levels **Output gate driver:** Can drive a logic level low-side NMOS transistor. Controlled by the SPI.
11	IO_5/VKAM	A_IN D_IN A_OUT	Can be used as digital input with wake-up capability or as an analog output providing keep alive memory supply in low-power mode. **Analog input:** Pin status can be read through the MUX output terminal **Digital input:** Pin status can be read through the SPI. Can be used to monitor error signals from another IC for safety purposes (when used in conjunction with IO_4). **Wake-up capability:** Can be selectable to wake-up on edges or levels **Supply output:** Provide keep alive memory supply in low-power mode
	VKAM can be enabled or disabled by default at power up. The differentiation is made by part numbers.		
12	IO_0	A_IN D_IN	Can be used as analog or digital input (load dump proof) with wake-up capability (selectable) **Analog input:** Pin status can be read through the MUX output terminal **Digital input:** Pin status can be read through the SPI **Wake-up capability:** Can be selectable to wake-up on edges or levels
13	FCRBM	A_IN	Feedback core resistor bridge monitoring: For safety purposes, this pin is used to monitor the middle point of a redundant resistor bridge connected on V_{CORE} (in parallel to the one used to set the V_{CORE} voltage). If not used, this pin must be connected directly to FB_CORE.
14	FS0B	D_OUT	First output of the safety block (active low). The pin is asserted low at start-up and when a fault condition is detected. Open drain structure.
15	DEBUG	D_IN	Debug mode entry input
16	AGND	GROUND	Analog ground connection
17	MUX_OUT	A_OUT	Multiplexed output to be connected to a MCU ADC. Selection of the analog parameter is available at MUX-OUT through the SPI.
18 19	IO_2:3	D_IN	Digital input pin with wake-up capability (logic level compatible) **Digital input:** Pin status can be read through the SPI. Can be used to monitor FCCU error signals from MCU for safety purposes. **Wake-up capability:** Can be selectable to wake-up on edges or levels

Pin	Symbol	Type	Definition
20	TXD	D_IN	Transceiver input from the MCU which controls the state of the CAN bus. Internal pull-up to VDDIO. If CAN function is not used, this pin must be left open.
21	RXD	D_OUT	Receiver output which reports the state of the CAN bus to the MCU If CAN function is not used, this pin must be left open
22	TXDL	D_IN	Transceiver input from the MCU controlling the state of the LIN bus. Internal pull-up to VDDIO.
	or VPU_FS	A_OUT	Pull-up output for FS1B function
	LIN and FS1B functions are exclusive. The differentiation is made by part numbers. When LIN is available, FS1B is not, and vice versa. If neither LIN, nor FS1B functions are used, this pin must be left open.		
23	RXDL	D_OUT	Receiver output reporting the state of the LIN bus to the MCU. If LIN function is not used, this pin must be left open.
24	RSTB	D_OUT	This output is asserted low when the safety block reports a failure. The main function is to reset the MCU. Reset input voltage is also monitored in order to detect external reset and fault condition. Open drain structure.
25	MISO	D_OUT	SPI bus. Master input slave output
26	MOSI	D_IN	SPI bus. Master output slave input
27	SCLK	D_IN	SPI Bus. Serial clock
28	NCS	D_IN	Not chip select (active low)
29	INTB	D_OUT	This output pin generates a low pulse when an Interrupt condition occurs. Pulse duration is configurable. Internal pull-up to VDDIO.
30	VDDIO	A_IN	Input voltage for MISO output buffer. Allows voltage compatibility with MCU I/Os.
31	SELECT	D_IN	Hardware selection pin for VAUX and VCCA output voltages
32	FB_CORE	A_IN	VCORE voltage feedback. Input of the error amplifier.
33	COMP_CORE	A_OUT	Compensation network. Output of the error amplifier. For FS4500 series, this pin must be left open (NC).
34	VCORE_SNS	A_IN	VCORE input voltage sense
35	SW_CORE	A_OUT	VCORE output switching point for FS6500 series
	or VCORE	A_OUT	VCORE output voltage for FS4500 series
36	BOOT_CORE	A_IN/OUT	Bootstrap capacitor for VCORE internal NMOS gate drive. For FS4500 series, this pin must be left open (NC).
37	VPRE	A_IN	VPRE input voltage sense
38	VAUX	A_OUT	VAUX output voltage. External PNP ballast transistor. Collector connection
39	VAUX_B	A_OUT	VAUX voltage regulator. External PNP ballast transistor. Base connection
40	VAUX_E	A_OUT	VAUX voltage regulator. External PNP ballast transistor. Emitter connection
41	VCCA_E	A_OUT	VCCA voltage regulator. External PNP ballast transistor. Emitter connection
42	VCCA_B	A_OUT	VCCA voltage regulator. External PNP ballast transistor. Base connection
43	VCCA	A_OUT	VCCA output voltage. External PNP ballast transistor. Collector connection
44	GATE_LS	A_OUT	Low-side MOSFET gate drive for non-inverting buck-boost configuration
45	DGND	GROUND	Digital ground connection
46	BOOT_PRE	A_IN/OUT	Bootstrap capacitor for the VPRE internal NMOS gate drive
47	SW_PRE2	A_OUT	Second pre-regulator output switching point
48	SW_PRE1	A_OUT	First pre-regulator output switching point

8 Maximum ratings

Table 4. Maximum ratings

All voltages are with respect to ground, unless otherwise specified. Exceeding these ratings may cause a malfunction or permanent damage to the device.

Symbol	Ratings	Value	Unit	Notes
Electrical ratings				
$V_{SUP1/2/3}$	DC voltage at power supply pins	–1.0 to 40	V	[1]
V_{SENSE}	DC voltage at battery sense pin (with ext R in series mandatory)	–14 to 40	V	
$V_{SW1,2}$	DC voltage at SW_PRE1 and SW_PRE2 pins	–1.0 to 40	V	
V_{PRE}	DC voltage at VPRE pin	–0.3 to 8	V	
V_{GATE_LS}	DC voltage at Gate_LS pin	–0.3 to 8	V	
V_{BOOT_PRE}	DC voltage at BOOT_PRE pin	–1.0 to 50	V	
V_{SW_CORE}	DC voltage at SW_CORE pin	–1.0 to 8	V	
V_{CORE_SNS}	DC voltage at VCORE_SNS pin	0.0 to 8	V	
V_{BOOT_CORE}	DC voltage at BOOT_CORE pin	0.0 to 15	V	
V_{FB_CORE}	DC voltage at FB_CORE pin	–0.3 to 2.5	V	
V_{COMP_CORE}	DC voltage at COMP_CORE pin	–0.3 to 2.5	V	
V_{FCRBM}	DC voltage at FCRBM pin	–0.3 to 8	V	
$V_{AUX\_B,E}$	DC voltage at VAUX_B, VAUX_E pins	–0.3 to 40	V	
V_{AUX}	DC voltage at VAUX pin	–2.0 to 40	V	
$V_{CCA\_B,E}$	DC voltage at VCCA_B, VCCA_E pins	–0.3 to 8	V	
V_{CCA}	DC voltage at VCCA pin	–0.3 to 8	V	
V_{DDIO}	DC voltage at VDDIO pin	–0.3 to 8	V	
V_{CAN_5V}	DC voltage on CAN_5V pin	–0.3 to 8	V	
V_{PU_FS}	DC voltage at VPU_FS pin	–0.3 to 8	V	
V_{FSxB}	DC voltage at FS0B, FS1B pins (with ext R in series mandatory)	–0.3 to 40	V	
V_{DEBUG}	DC voltage at DEBUG pin	–0.3 to 40	V	
$V_{IO\_0,4}$	DC voltage at IO_0, IO_4 pins (with ext R in series mandatory)	–0.3 to 40	V	
V_{IO_5}	DC voltage at IO_5 pin	–0.3 to 20	V	
V_{KAM}	DC voltage at VKAM pin	–0.3 to 8	V	
V_{DIG}	DC voltage at INTB, RSTB, MISO, MOSI, NCS, SCLK, MUX_OUT, RXD, TXD, IO_2, IO_3 pins	–0.3 to 8	V	
V_{SELECT}	DC voltage at SELECT pin	–0.3 to 8	V	
V_{BUS_CAN}	DC voltage on CANL, CANH pins	–27 to 40	V	
V_{BUS_LIN}	DC voltage on LIN pin	–18 to 40	V	
I_I_{SENSE}	V_{SENSE} maximum current capability	–5.0 to 5.0	mA	
$I\_IO_{0, 4, 5}$	IOs maximum current capability (IO_0, IO_4, IO_5)	–5.0 to 5.0	mA	

Symbol	Ratings	Value	Unit	Notes
ESD voltage				
	Human body model (JESD22/A114) – 100 pF, 1.5 kΩ			[2]
$V_{ESD-HBM1}$	• All pins	±2.0	kV	
$V_{ESD-HBM2}$	• VSUP1,2,3, VSENSE, VAUX, IO_0,4, FS0B, FS1B, DEBUG	±4.0	kV	
$V_{ESD-HBM3}$	• CANH, CANL	±6.0	kV	
$V_{ESD-HBM4}$	• LIN	±8.0	kV	
	Charge device model (JESD22/C101):			
$V_{ESD-CDM1}$	• All pins	±500	V	
$V_{ESD-CDM2}$	• Corner pins	±750	V	
	System level ESD (gun test) • VSUP1, 2, 3, VSENSE, VAUX, IO_0, 4, 5, FS0B, FS1B			
$V_{ESD-GUN1}$	330 Ω/150 pF unpowered according to IEC61000-4-2	±8.0	kV	
$V_{ESD-GUN2}$	330 Ω/150 pF unpowered according to OEM LIN, CAN, FLexray Conformance	±8.0	kV	
$V_{ESD-GUN3}$	2.0 kΩ/150 pF unpowered according to ISO10605.2008	±8.0	kV	
$V_{ESD-GUN4}$	2.0 kΩ/330 pF powered according to ISO10605.2008 • CANH, CANL	±8.0	kV	
$V_{ESD-GUN5}$	330 Ω/150 pF unpowered according to IEC61000-4-2	±15.0	kV	
$V_{ESD-GUN6}$	330 Ω/150 pF unpowered according to OEM LIN, CAN, FLexray conformance	±12.0	kV	
$V_{ESD-GUN7}$	2.0 kΩ/150 pF unpowered according to ISO10605.2008	±15.0	kV	
$V_{ESD-GUN8}$	2.0 kΩ/330 pF powered according to ISO10605.2008 • LIN	±12.0	kV	
$V_{ESD-GUN9}$	330 Ω/150 pF unpowered according to IEC61000-4-2:	±12.0	kV	
$V_{ESD-GUN10}$	330 Ω/150 pF unpowered according to OEM LIN, CAN, flexray conformance	±12.0	kV	
$V_{ESD-GUN11}$	2.0 kΩ/150 pF unpowered according to ISO10605.2008	±12.0	kV	
$V_{ESD-GUN12}$	2.0 kΩ/330 pF powered according to ISO10605.2008	±12.0	kV	
Thermal ratings				
T_A	Ambient temperature	–40 to 125	°C	
T_J	Junction temperature	–40 to 150	°C	
T_{STG}	Storage temperature	–55 to 150	°C	
Thermal resistance				
$R_{\theta JA}$	Thermal resistance junction to ambient	30	°C/W	[3]
$R_{\theta JCTOP}$	Thermal resistance junction to case top	23.8	°C/W	[4]
$R_{\theta JCBOTTOM}$	Thermal resistance junction to case bottom	0.9	°C/W	[5]

[1] All VSUPs ($V_{SUP1/2/3}$) must be connected to the same supply
[2] Compared to AGND
[3] Per JEDEC JESD51-6 with the board (JESD51-7) horizontal
[4] Thermal resistance between the die and the case top surface as measured by the cold plate method (MIL SPEC - 883 Method 1012.1).
[5] Thermal resistance between the die and the solder pad on the bottom of the packaged based on simulation without any interface resistance.

9 Packaging

9.1 Package mechanical dimensions

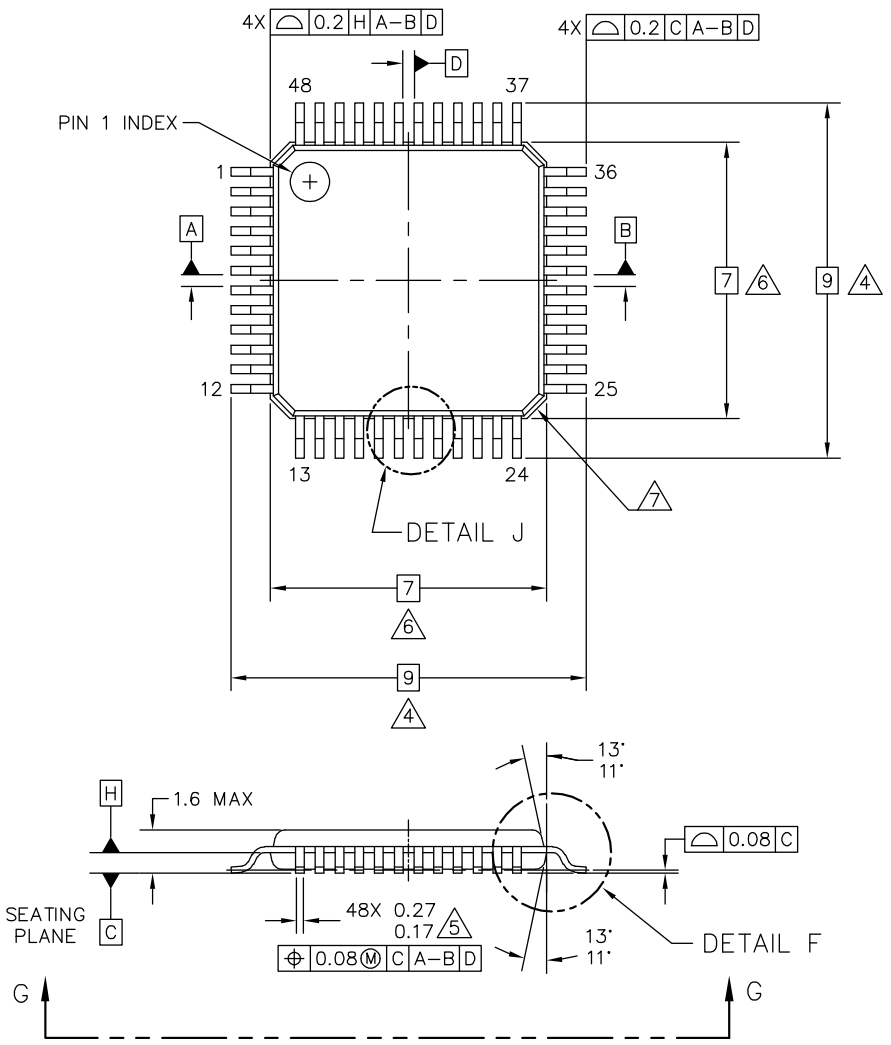
Package dimensions are provided in package drawings. To find the most current package outline drawing, go to www.nxp.com and perform a keyword search for the drawing's document number.

Table 5. Package mechanical dimensions

Package	Suffix	Package outline drawing number
7.0 × 7.0, 48–Pin LQFP exposed pad, with 0.5 mm pitch, and a 4.5 × 4.5 exposed pad	AE	98ASA00173D

MECHANICAL OUTLINE

DO NOT SCALE THIS DRAWING



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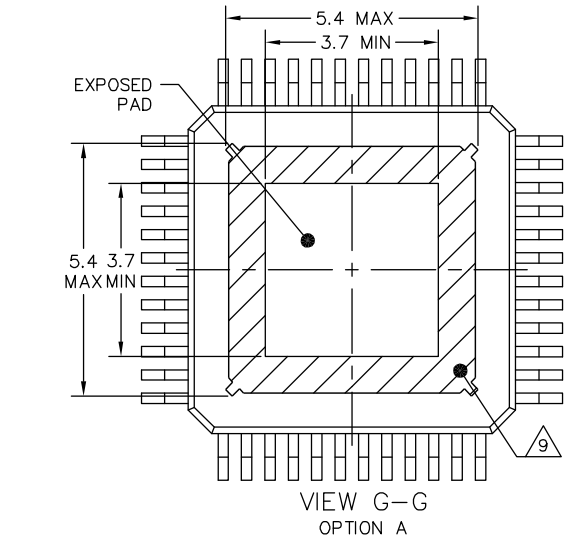
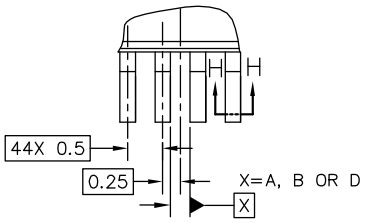
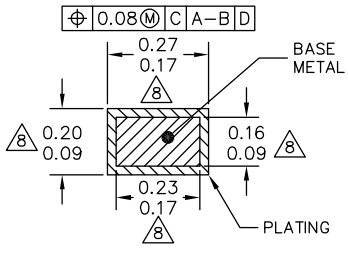
	SOT1571-1 SHEET: 1 OF 4

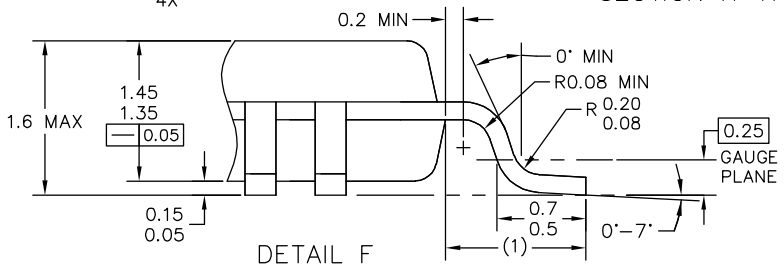
MECHANICAL OUTLINE

DO NOT SCALE THIS DRAWING









TITLE:	DOCUMENT NO: 98ASA00173D	REV: D
48 LEAD LQFP, 7X7X1.4 PKG, 0.5 PITCH, 4.5X4.5 EXPOSED PAD	STANDARD: JEDEC MS-026 BBC	
	SOT1571-1	SHEET: 2

MECHANICAL OUTLINE

DO NOT SCALE THIS DRAWING

NOTES:

1. DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSIONING AND TOLERANCING PER ASME Y14.5M–1994.
3. DATUMS A, B AND D TO BE DETERMINED AT DATUM PLANE H.
4. DIMENSION TO BE DETERMINED AT SEATING PLANE C.
5. THIS DIMENSION DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL NOT CAUSE THE LEAD WIDTH TO EXCEED THE UPPER LIMIT BY MORE THAN 0.08MM AT MAXIMUM MATERIAL CONDITION. DAMBAR CANNOT BE LOCATED ON THE LOWER RADIUS OR THE FOOT. MINIMUM SPACE BETWEEN PROTRUSION AND ADJACENT LEAD SHALL NOT BE LESS THAN 0.07MM.
6. THIS DIMENSION DOES NOT INCLUDE MOLD PROTRUSION. ALLOWABLE PROTRUSION IS 0.25MM PER SIDE. THIS DIMENSION IS MAXIMUM PLASTIC BODY SIZE DIMENSION INCLUDING MOLD MISMATCH.
7. EXACT SHAPE OF EACH CORNER IS OPTIONAL.
8. THESE DIMENSIONS APPLY TO THE FLAT SECTION OF THE LEAD BETWEEN 0.1MM AND 0.25MM FROM THE LEAD TIP.
9. HATCHED AREA TO BE KEEP OUT ZONE FOR PCB ROUTING.

TITLE:	DOCUMENT NO: 98ASA00173D REV: D
48 LEAD LQFP, 7X7X1.4 PKG, 0.5 PITCH, 4.5X4.5 EXPOSED PAD	STANDARD: JEDEC MS-026 BBC
	SOT1571-1 SHEET: 3

10 References

The following are URLs where you can obtain information on related NXP products and application solutions.

NXP.com support pages	Description	URL
AN5238	Hardware design and product guidelines	http://www.nxp.com/AN5238-DOWNLOAD
AN4388	Quad flat package (QFP)	http://www.nxp.com/files/analog/doc/app_note/AN4388.pdf
Power dissipation tool (Excel file)		http://www.nxp.com/files/analog/software_tools/FS6500-FS4500-power-dissipation-calculator.xlsx
V_{CORE} compensation network simulation tool (CNC)		Upon demand
FMEDA	FS6500/FS4500 FMEDA	Upon demand
FS6500-FS4500SMUG	FS6500/FS4500 Safety Manual – user guide	https://www.nxp.com/webapp/Download?colCode=FS6500-FS4500SMUG
FS6500-FS4500	Power System Basis Chip with CAN Flexible Data and LIN Transceivers data sheet	https://www.nxp.com/webapp/Download?colCode=FS6500-FS4500
KITFS6522LAEEVM	FS6500 evaluation board with LIN (no FS1B)	http://www.nxp.com/KITFS6522LAEEVM
KITFS4503CAEEVM	FS4500 evaluation board with FS1B (no LIN)	http://www.nxp.com/KITFS4503CAEEVM
KITFS6523CAEEVM	FS6500 evaluation board with FS1B (no LIN)	http://www.nxp.com/KITFS6523CAEEVM
FS6500 product summary page		http://www.nxp.com/FS6500
FS4500 product summary page		http://www.nxp.com/FS4500
Analog power management home page		http://www.nxp.com/products/power-management

11 Revision history

Table 6. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
FS6500-FS4500SDS v.1.0	20171214	Data sheet: advance information	—	—

12 Legal information

12.1 Data sheet status

Document status[1][2]	Product status[3]	Definition
[short] Data sheet: product preview	Development	This document contains certain information on a product under development. NXP reserves the right to change or discontinue this product without notice.
[short] Data sheet: advance information	Qualification	This document contains information on a new product. Specifications and information herein are subject to change without notice.
[short] Data sheet: technical data	Production	This document contains the product specification. NXP Semiconductors reserves the right to change the detail specifications as may be required to permit improvements in the design of its products.

[1] Please consult the most recently issued document before initiating or completing a design.
[2] The term 'short data sheet' is explained in section "Definitions".
[3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the Internet at URL http://www.nxp.com.

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Tables

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