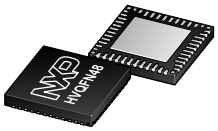


FS23 SBC

Rev. 1 — 8 June 2022 Preliminary product brief

1 General description

The FS23 is a family of automotive Safety SBC devices with multiple power supplies designed to support general purpose body applications, offering low power modes and a CAN flexible data rate (FD) up to 5 Mbit/s transceiver with LIN communication.

This family of devices supports a wide range of applications with a choice of output voltage settings and physical interfaces. It has integrated system level features for low power and noise sensitive applications with automotive safety integrity levels (ASIL) up to ASIL B.

The FS23 integrates an EMC optimized switch mode regulator (HVBUCK), which can be replaced by an LDO voltage regulator (HVLDO1, which is pin to pin and software compatible). This regulator can supply a microcontroller and two other LDO voltage regulators (HVLDO2, HVLDO3), which can in turn supply communication equipment and other devices. The HVBUCK is a high performance switching regulator capable of switching from pulse frequency modulation (PFM) mode to pulse width modulation (PWM) mode via an I^2C or SPI command, to optimize noise management. The LDOs are connected to VSUP.

The FS23 is developed in compliance with the ISO26262:2018 standard. It includes enhanced safety features with fail-safe outputs, allowing creation of a full safety-oriented system that covers the ASIL B safety integrity level.

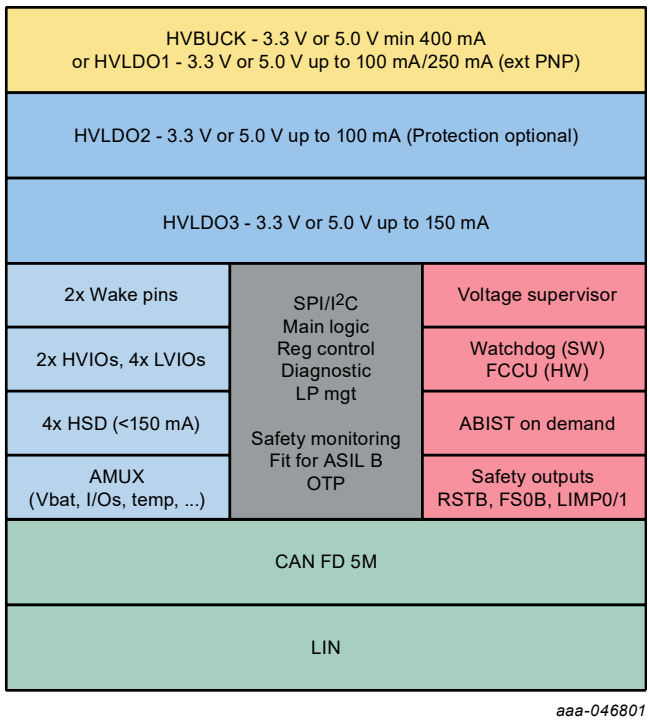


Figure 1. FS23 functional block diagram

2 Features and benefits

Operating range

- 40 V DC maximum input voltage
- Low Power OFF mode with multiple wake-up sources
- Low Power ON mode with HVBUCK or HVLDO1 active and multiple wake-up sources

Power supplies

- HVBUCK: synchronous buck converter with integrated FETs. Configurable output voltage (3.3 V or 5.5 V) and switching frequency, output DC current capability of minimum 400 mA and PFM mode for Low Power ON mode operation
- Or HVLDO1: high voltage LDO instead of the HVBUCK for MCU supply with selectable output voltage (3.3 V or 5.5 V) and up to 100 mA current capability with internal PMOS and 250 mA with external PNP
- HVLDO2: high voltage LDO regulator for system loads, with optional external protection for off-board sensors, selectable output voltage (3.3 V or 5.0 V) and up to 100 mA current capability
- HVLDO3: high voltage LDO regulator for CAN FD block supply or other with selectable output voltage (3.3 V or 5.0 V) and up to 150 mA current capability.

System support

- 1 controller area network (CAN) flexible data rate (FD) transceiver capable of up to 5 Mbits/s
- 1 local interconnect network (LIN) transceiver
- 2 wake-up inputs (40 V capable)
- 2 high voltage IOs with wake-up capability (40 V capable)
- Up to 4 Low voltage IOs with wake-up capability
- 4 high side drivers to supply LEDs/door switch, enable external devices (INH), cyclic sense capability
- Selectable wake-up sources from: WAKE pins, HVIO pins, LVIO pins, CANFD and LIN or SPI activity
- Device control via 32 bit SPI interface or via I^2C, with CRC
- Integrated Long Duration Timer (LDT) and Analog Multiplexer (AMUX)

Functional safety

- Developed following ISO26262 standard to be fit for ASIL B applications
- Internal monitoring circuitry with its own reference.
- Additional input for external voltage monitoring
- Window or timeout watchdog function to monitor the MCU software failure
- FCCU inputs to monitor the MCU hardware failure
- Analog Built-In Self-Test (ABIST) on demand
- Safety outputs (RSTB, FS0B, LIMP0)

Configuration and enablement

- QFN48EP : QFN, 48 pins with exposed pad for optimized thermal management, wettable flanks, 7 x 7 x 0.85 mm, 0.5 mm pitch, 48 pins
- One-Time-Programming (OTP) memory
- OTP emulation mode for system development and evaluation

3 Applications

- Body control module
- Door control module
- Heating ventilation and air conditioning (HVAC)
- Steering wheel control switch and hands off detection
- Automotive advanced exterior lighting
- Seat control modules
- Electric pumps
- Transmission and gearbox
- Matrix front lighting control
- Midsize body control computers
- Sunroof control modules
- Tire pressure monitoring systems (TPMS)
- Car access main ECU
- Seat belt pretension
- Alarm

4 Ordering information

Table 1. Orderable parts example

Part Number	Main regulator type	Main regulator current	Fit for ASIL	Package
PFS230x[1]	LDO	100 mA / 250 mA	QM / B	QFN48EP
PFS232x[1]	BUCK	400 mA	QM / B	QFN48EP

[1] Orderable but not released

Note:

- Exact Part numbers and options will be defined later

5 Block Diagram

The figure below shows the FS23 simplified block diagram for a typical system solution.

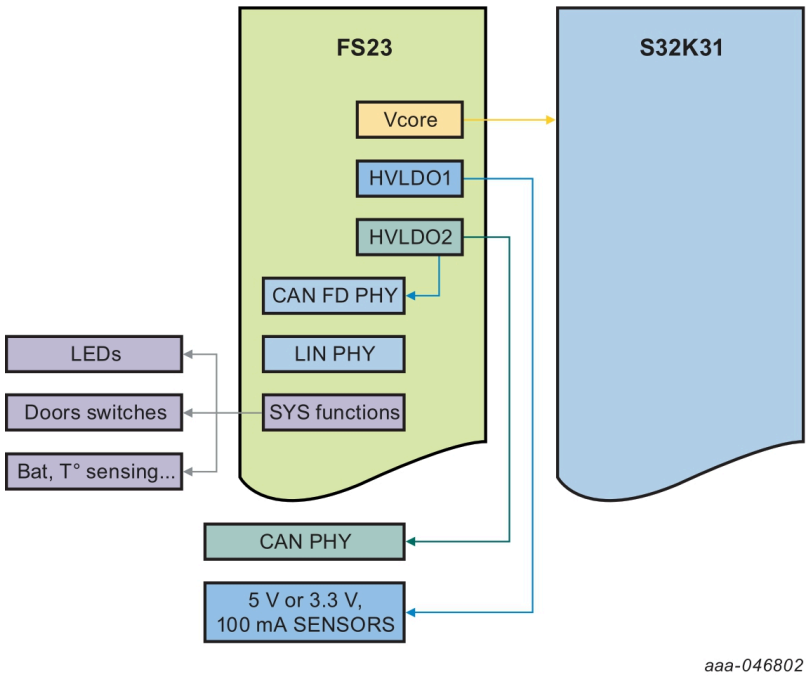
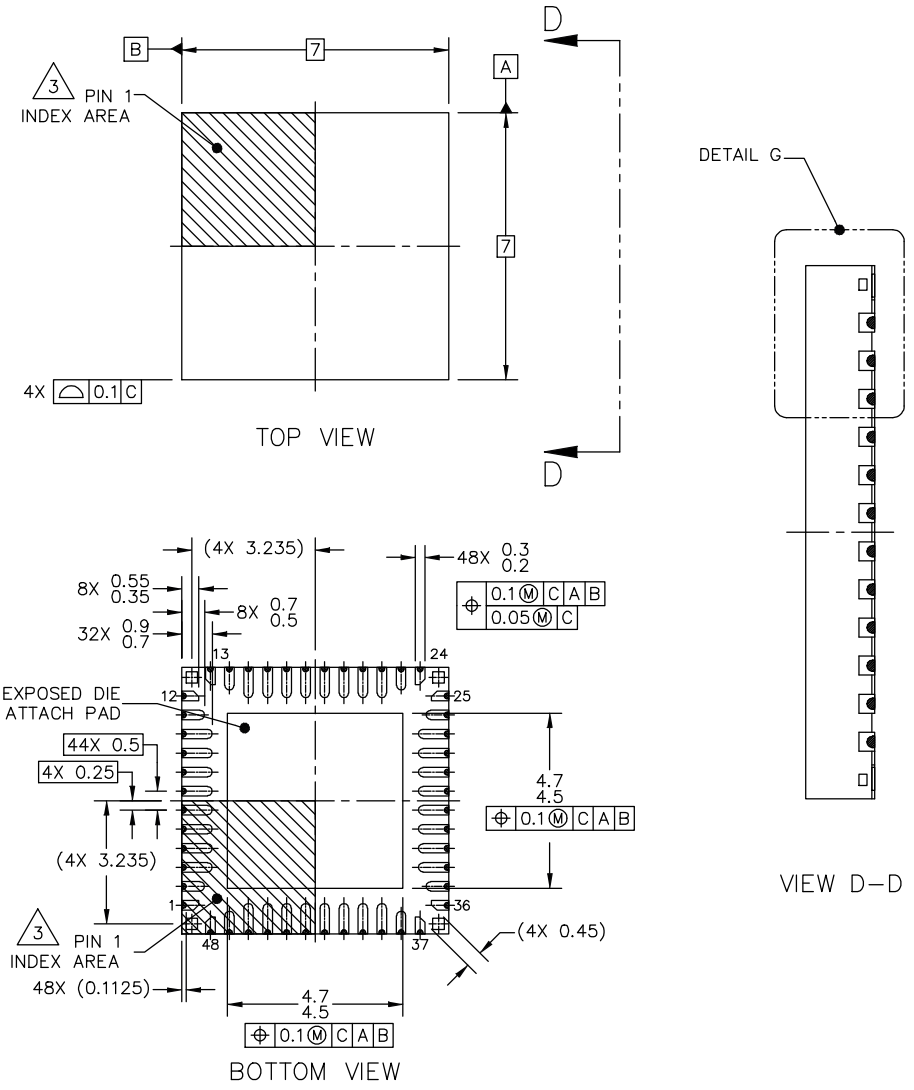


Figure 2. Block Diagram of the FS23

6 Package Drawing

H–PQFN–48 I/O 0.1 DIMPLE WETTABLE FLANK
7 X 7 X 0.9 PKG, 0.5 PITCH

SOT619–27(D)

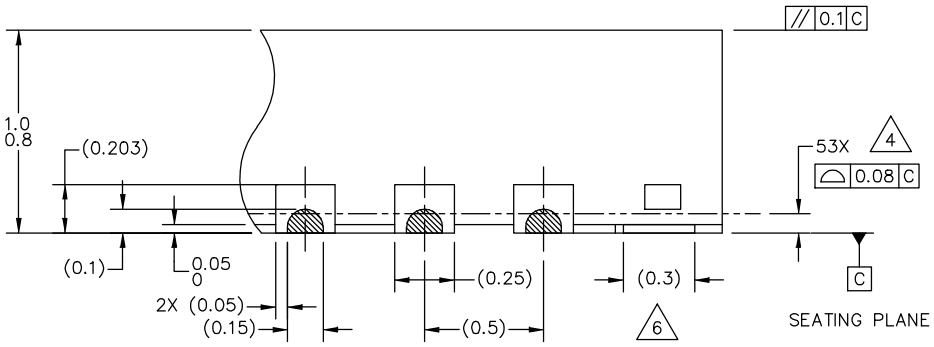


DATE: 20 SEP 2019

MECHANICAL OUTLINE PRINT VERSION NOT TO SCALE	STANDARD: NON JEDEC	DRAWING NUMBER: 98ASA01528D	REVISION: O	

H–PQFN–48 I/O 0.1 DIMPLE WETTABLE FLANK
7 X 7 X 0.9 PKG, 0.5 PITCH

SOT619–27(D)



DETAIL G
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DATE: 20 SEP 2019

MECHANICAL OUTLINE PRINT VERSION NOT TO SCALE	STANDARD: NON JEDEC	DRAWING NUMBER: 98ASA01528D	REVISION: O	

H-PQFN-48 I/O 0.1 DIMPLE WETTABLE FLANK
7 X 7 X 0.9 PKG, 0.5 PITCH

SOT619-27(D)

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994.
3. PIN 1 FEATURE SHAPE, SIZE AND LOCATION MAY VARY.
4. COPLANARITY APPLIES TO LEADS AND DIE ATTACH PAD.
5. MIN. METAL GAP FOR LEAD TO EXPORED PAD SHALL BE 0.2 MM.
6. ANCHORING PADS.

DATE: 20 SEP 2019

MECHANICAL OUTLINE PRINT VERSION NOT TO SCALE	STANDARD: NON JEDEC	DRAWING NUMBER: 98ASA01528D	REVISION: O	

7 Revision history

Table 2.

Revision	Date	Description of changes
1	20220608	Initial release

7.1 Data sheet status

Table 3.

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