

PB_PF5123

Power management integrated circuit (PMIC) for high-performance applications

Rev. 1.1 — 21 December 2023

Product brief



Document information

| Information | Content |
|-------------|--|
| Keywords | PF5123, power management, integrated circuit (PMIC), high performance |
| Abstract | The PF5123 integrates multiple high-performance buck regulators. It can operate as a standalone point-of-load regulator IC, or as a companion chip to a larger PMIC. |



1 Introduction

This product brief is intended to provide overview/summary information for evaluating a product for design suitability. It is intended for quick reference only and should not be relied upon to contain detailed and full information.

Some of the content in this product brief is extracted from the product's full data sheet. In case of any inconsistency or conflict, the full data sheet prevails.

For detailed and full information, see the relevant PF5123 full data sheet, available via the NXP website at <https://www.nxp.com>.

2 General description

The PF5123 integrates multiple high performance buck regulators. This device can operate as a stand-alone point-of-load regulator IC or as a companion chip to a larger PMIC.

Built-in One-Time-Programmable (OTP) memory stores key startup configurations. This feature drastically reduces external components that are typically used to set output voltage and sequence of regulators. Regulator parameters are adjustable through high-speed I²C after start-up, offering flexibility for different system states.

Functional safety features, developed according to ISO26262 specifications, enable the device to reach safety levels up to ASIL B.

3 Feature and benefits

The PF5123 is a Power Management Integrated Circuit (PMIC) designed to be the primary core power supply for NXP high-end ADAS application processors.

- Buck regulators
 - SW1, SW2 and SW3: 0.5 V to 3.3 V; 3500 mA; 1.5 % accuracy
 - Dynamic voltage scaling
 - Configurable as dual- and triple-phase regulator
 - Programmable current limit
 - Spread-spectrum and manual tuning of switching frequency
- PGOOD output and monitor
- Clock synchronization through configurable input sync pin
- System features
 - Advanced state machine for seamless processor interface
 - High-speed I²C interface support (up to 3.4 MHz)
 - Programmable soft-start sequence and power-down sequence
 - Programmable regulator configuration
- One-time programmable (OTP) memory for device configuration
- Monitoring circuit to fit ASIL B safety level
 - Independent voltage monitoring with programmable fault protection
 - Advance thermal monitoring and protection
 - Watchdog monitoring and programmable internal watchdog counter
 - I²C Cyclic Redundancy Check CRC and write protection mechanism
 - Analog built-in self-test (ABIST)

4 Applications

- Automotive – RADAR, infotainment, domain controllers
- High-end consumer and industrial

5 Ordering information

Table 1. Ordering information

| Type number ^[1] | Package | | |
|-------------------------------|---------|--|---------------|
| | Name | Description | Version |
| PPF5123AMBA0ES ^[2] | HWQFN28 | HWQFN28, plastic thermal enhanced very thin quad flat pack; no leads, wettable flank, 28 terminals, 0.5 mm pitch, 4.5 mm x 4.5 mm x 0.53 mm body | SOT2089-1(SC) |
| PPF5123AMMA0ES ^[3] | | | |

[1] To order parts in tape and reel, add the R2 suffix to the part number.

[2] Safety grade: ASIL B, non-programmed device, Custom OTP is PPF5123AMBxxES. xx is unique letter and number by each OTP config.

[3] Safety grade: QM, non-programmed device, Custom OTP is PPF5123AMMxxES. xx is unique letter and number by each OTP config.

6 Block diagram

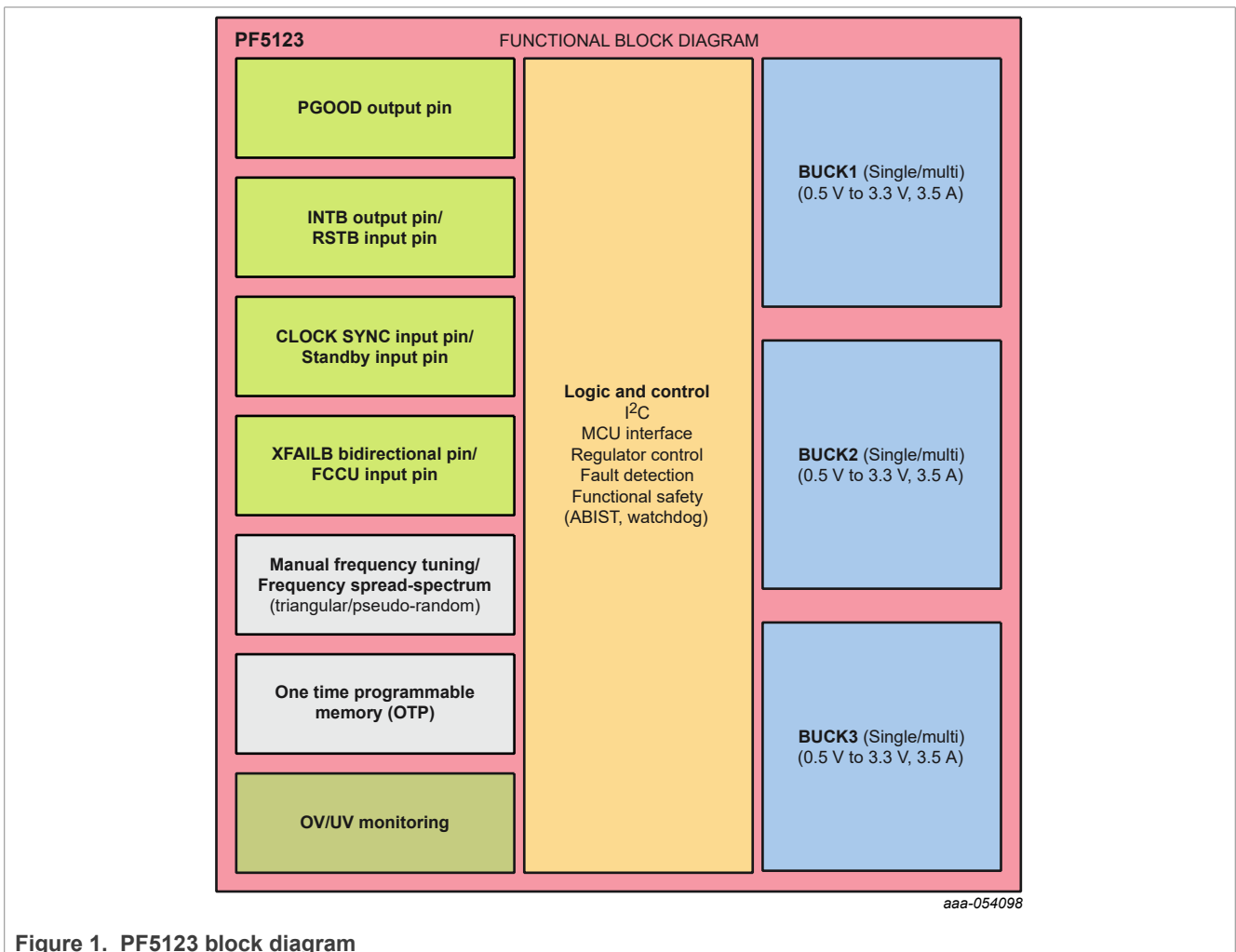
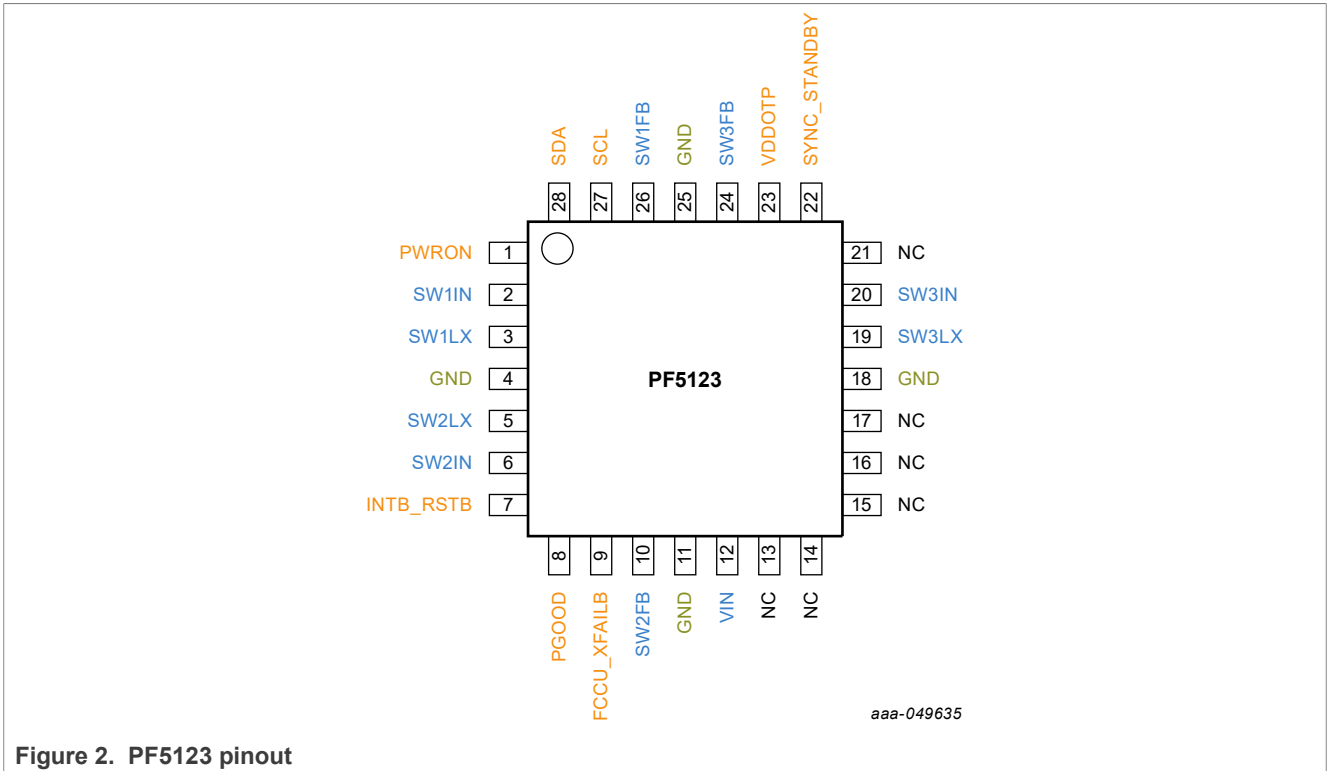


Figure 1. PF5123 block diagram

7 Pinning information

7.1 Pinning



7.2 Pin description

Table 2. PF5123 pinout

| QFN pin number | Pin name | Pin description | Min | Max | Units |
|----------------|--------------|--|------|-----|-------|
| 1 | PWRON | PWRON input | -0.3 | 5.5 | V |
| 2 | SW1IN | SW1 input supply | -0.3 | 5.5 | V |
| 3 | SW1LX | SW1 switching node | -0.3 | 5.5 | V |
| 4 | PGND | Ground | -0.3 | 0.3 | V |
| 5 | SW2LX | SW2 switching node | -0.7 | 5.5 | V |
| 6 | SW2IN | SW2 input supply | -0.3 | 5.5 | V |
| 7 | INTB_RSTB | Interrupt output/External reset input | -0.3 | 5.5 | V |
| 8 | PGOOD | PGOOD output | -0.3 | 5.5 | V |
| 9 | FCCU_XFAILB | FCCU input/XFAILB bidirectional signal | -0.3 | 5.5 | V |
| 10 | SW2FB | SW2 feedback input | -0.3 | 5.5 | V |
| 11 | GND | Ground | -0.3 | 0.3 | V |
| 12 | VIN | Input supply | -0.3 | 5.5 | V |
| 13 | NC | No connect | -0.3 | 5.5 | V |
| 14 | NC | No connect | -0.3 | 5.5 | V |
| 15 | NC | No connect | -0.3 | 0.3 | V |
| 16 | NC | No connect | -0.3 | 5.5 | V |
| 17 | NC | No connect | -0.3 | 5.5 | V |
| 18 | GND | Ground | -0.3 | 0.3 | V |
| 19 | SW3LX | SW3 switching node | -0.7 | 5.5 | V |
| 20 | SW3IN | SW3 input supply | -0.3 | 5.5 | V |
| 21 | NC | No connect | -0.3 | 0.3 | V |
| 22 | SYNC_STANDBY | Clock synchronization input or Standby input | -0.3 | 5.5 | V |
| 23 | VDDOTP | Debug mode / OTP programming input supply | -0.3 | 10 | V |
| 24 | SW3FB | SW3 feedback input | -0.3 | 5.5 | V |
| 25 | GND | Ground | -0.3 | 0.3 | V |
| 26 | SW1FB | SW1 feedback input | -0.3 | 5.5 | V |
| 27 | SCL | I ² C SCL signal | -0.3 | 5.5 | V |
| 28 | SDA | I ² C SDA signal | -0.3 | 5.5 | V |

8 Package outline

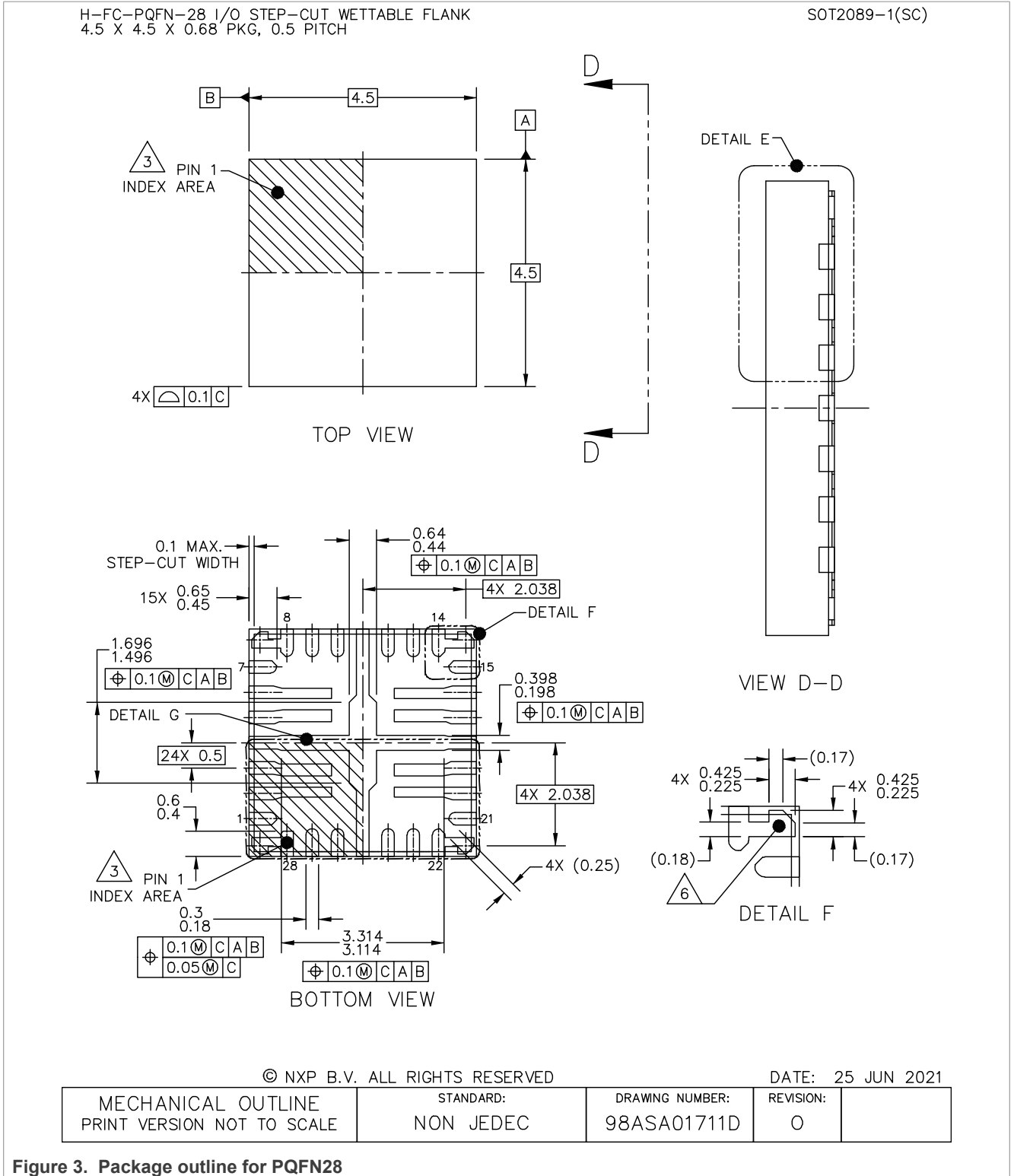


Figure 3. Package outline for PQFN28

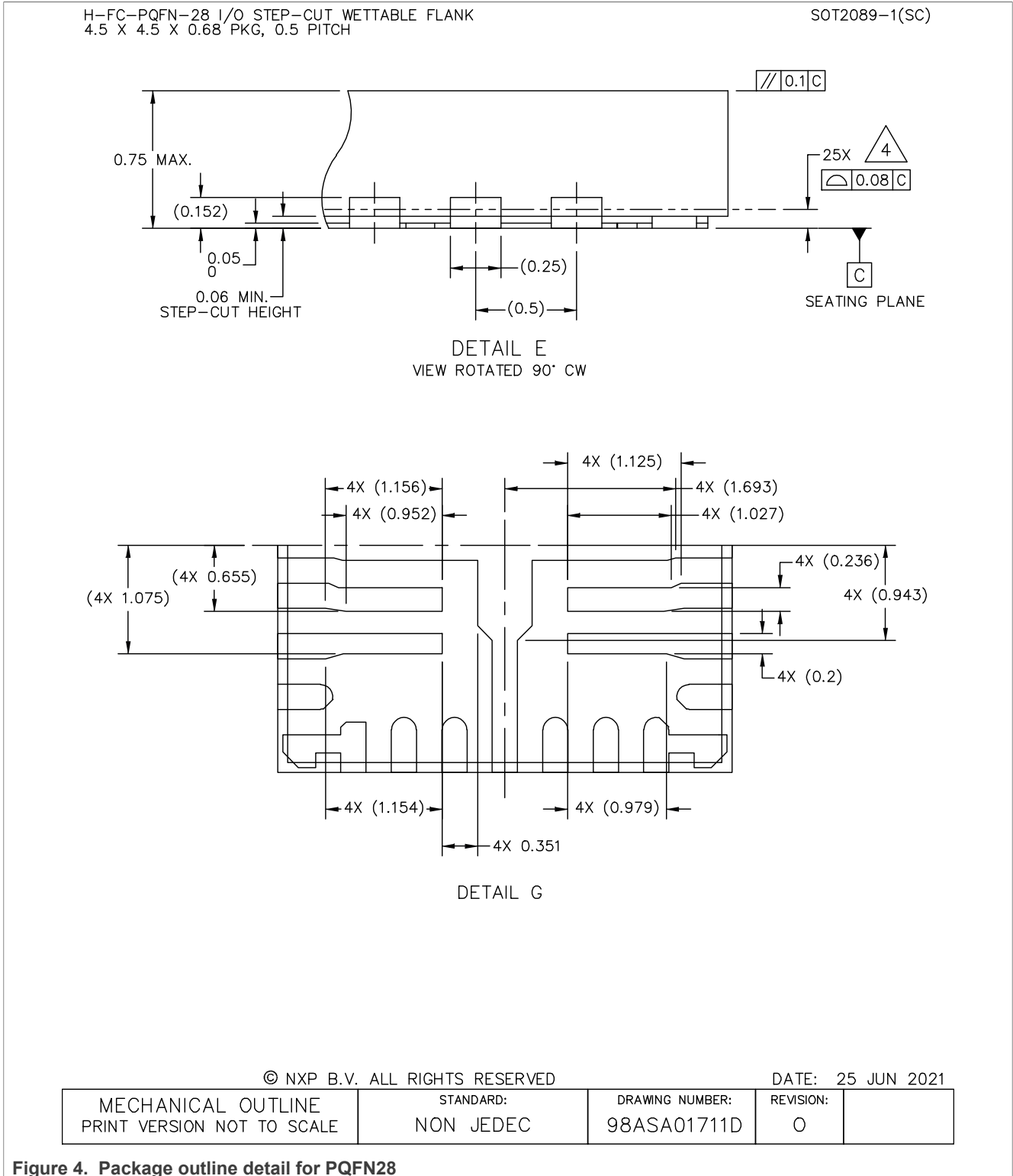


Figure 4. Package outline detail for PQFN28

H-FC-PQFN-28 I/O STEP-CUT WETTABLE FLANK
 4.5 X 4.5 X 0.68 PKG, 0.5 PITCH

SOT2089-1(SC)

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 EXPOSED PAD SHALL BE 0.2 MM.
6. ANCHORING PADS.

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Figure 5. Package outline notes for PQFN28

9 Revision history

Table 3. Revision history

| Rev | Date | Description of changes |
|----------------|----------|---|
| PB_PF5123 v1.1 | 20231221 | <ul style="list-style-type: none">• Changed maximum possible ASIL from D to B• Updated legal information |
| PB_PF5123 v1.0 | 20230110 | Initial release |

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