



PRELIMINARY

GE NovaSensor

NPX1 Sensor

The NPX1 represents the next-generation Remote Tire Pressure Monitoring (RTPM) sensor, which adds a silicon pressure sensor, a 8-bit RISC processor, and a LF-input stage to meet market demands for flexible, customer specific behavior/solutions and overall system cost reduction.

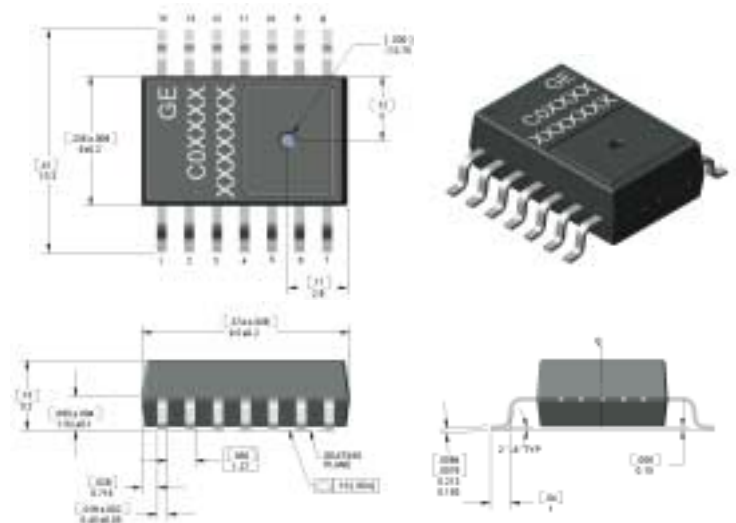
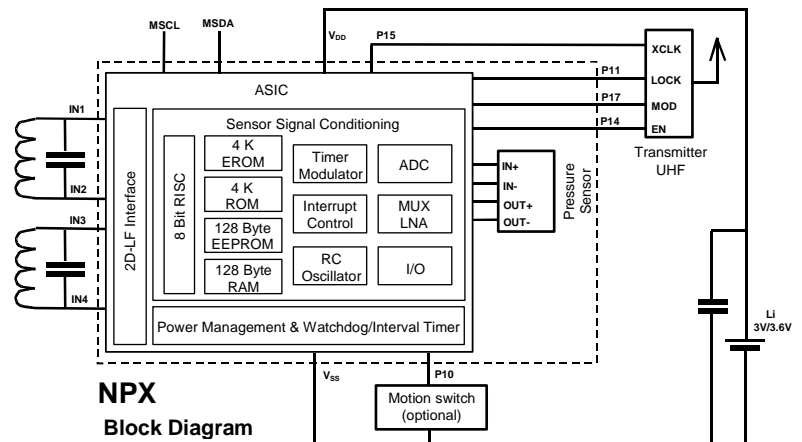
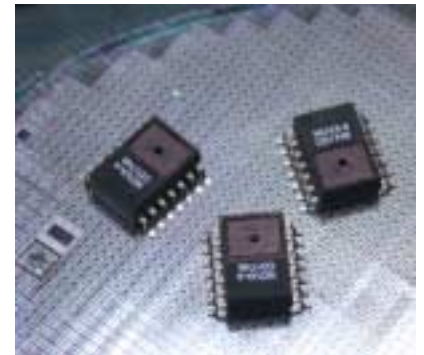
A programmable version of the sensor shall be available for development purposes, allowing the customer to download the application code in an electrically programmable ROM version. This sensor is intended for developing the application specific program. In order to ensure high reliability, the production version of the sensor will have the measurement routines (pressure, temperature, and supply voltage) implemented in a mask ROM version.

FEATURES:

- 12 Bit ADC
- 4k Byte Flash (E-ROM)
- 2k ROM for user application
- 128 Byte RAM
- 128 Byte EEPROM
- Battery Management—minimizing power consumption.
- Measure & Compensate Pressure, Temperature, and Battery Voltage
- Media Compatibility with Tire Pressure Media
- 450, 700, and 1400 kPa absolute pressure ranges. Custom ranges are available.
- On Chip Temperature Sensor
- On Chip Temperature Shut Down

Transfer Functions

| |
|---|
| 450 kPa Pressure |
| $P = 1.3725 \times P_o + 100$ |
| P = Pressure in kPa |
| $P_o = 8 \text{ Bit Scaled Output Pressure}$ |
| 700 kPa Pressure |
| $P = 2.3529 \times P_o + 100$ |
| P = Pressure in kPa |
| $P_o = 8 \text{ Bit Scaled Output Pressure}$ |
| 1400 kPa Pressure |
| $P = 5.490 \times P_o$ |
| P = Pressure in kPa |
| $P_o = 8 \text{ Bit Scaled Output Pressure}$ |
| Temperature |
| $T = T_o - 50$ |
| T = Temperature in °C |
| $T_o = 8 \text{ Bit Scaled Output Temperature}$ |
| V Battery |
| $V = -0.0108 \times V_o + 4$ |
| V = VBattery in V |
| $V_o = 8 \text{ Bit Scaled Output Vbattery}$ |



Package Diagram (all dimensions in mm)

Specifications

| PARAMETER | SPECIFICATION | | | | AMBIENT CONDITIONS | | NOTES |
|--|--|---------|--------|----------------|--------------------|------------|--------------------------|
| | Min | Typ | Max | Unit | Temp [°C] | VDD [V] | |
| Pressure Measurement | The presented performance reflects the use of 12bit sampling of pressure signal. | | | | | | |
| Pressure Ranges | 100-450 | 100-700 | 0-1400 | kPa | -40 to 125 | | |
| 450 kPa Resolution | | 1.37 | | kPa/LSB | -40 to 125 | | (450KPa-100KPa)/255 |
| 700 kPa Resolution | | 2.35 | | kPa/LSB | -40 to 125 | | (700KPa-100KPa)/255 |
| 1400 kPa Resolution | | 5.49 | | kPa/LSB | -40 to 125 | | (1400KPa-0KPa)/255 |
| ALL PRESSURE RANGES | The presented performance reflects the use of 12bit sampling of pressure signal. | | | | | | |
| Measurement Accuracy | -6 | | 6 | LSB | 0 to 50 | 2.1 to 3.6 | 6σ capability |
| Over Pressure | | 10X | | | | | |
| 450-1400kPa Measurement Charge Consumption | | 11 | | Micro-coulombs | 25 | 3.5 | |
| Temperature Measurement | The presented performance reflects the use of 10 bit sampling of temperature signal. | | | | | | |
| Temperature Range | -40 | | 125 | °C | | | |
| Resolution | | 1.0 | | °C/LSB | | | (205°C-(-50°C))/255 |
| Measurement Accuracy | -6 | | 6 | °C | -20 to 70 | 2.1 to 3.6 | 6σ capability |
| | -6 | | 8 | °C | -40 to 125 | 2.1 to 3.6 | 6σ capability |
| Measurement Charge Consumption | | 5 | | Micro-coulombs | 25 | 3.5 | |
| Battery Voltage Measurement | The presented performance reflects the use of 12 bit sampling of battery voltage signal. | | | | | | |
| Resolution | | 10.80 | | mV/LSB | | | (4.0V-1.246V)/255 |
| Measurement Accuracy | -60 | | 60 | mV | -40 to 125 | 2.1 to 3.6 | 6σ capability |
| Measurement Charge Consumption | | 4 | | Micro-coulombs | 25 | 3.5 | |
| TMAX | ϑ _{SHTD} represents the temperature at which the Thermal Shut-down function can be enabled and ϑ _{REL} represents the temperature at which the Master Reset state is released. | | | | | | |
| ϑ _{SHTD} | | | 115 | °C | -40 to 175 | 2.1 – 3.6 | Thermal shutdown enabled |
| ϑ _{REL} | 100 | | | °C | -40 to 175 | 2.1 – 3.6 | Master Reset Release |
| VMIN | The voltage at which the Vmin-circuit will return a low battery voltage status is specified in: | | | | | | |
| Vmin | 2.0 | 2.1 | 2.2 | V | -40 to 125 | 1.5 – 3.6 | |

| General | VALUE | Units | Notes |
|------------------------|--------------|-------|--------------|
| Operating Temperature | -40 to + 125 | °C | |
| Battery Supply Voltage | 2.1 to 3.6 | V | 3.0V Typical |
| Power Dissipation | 120 | mW | |

Detailed performance specifications for 450, 700, 1400 kPa ranges available upon request.

| PIN | NAME | FUNCTION | NOTE |
|-----|------|--|------|
| 1 | IN4 | LF receiver channel 2, negative input | |
| 2 | P10 | General purpose I/O with external wakeup feature, internal pull-up | 1 |
| 3 | P11 | General purpose I/O with external wakeup feature, internal pull-up | 1 |
| 4 | MSDA | Monitor Serial Data I/O with internal pull-up | |
| 5 | MSCL | Monitor Serial Clock input | |
| 6 | VDD | Battery supply voltage (positive terminal) | |
| 7 | NC | | |
| 8 | VSS | Common ground (negative terminal) | |
| 9 | P17 | General purpose I/O or Modulator for UHF transmitter | 2 |
| 10 | P15 | General purpose I/O or external system clock reference input | |
| 11 | P14 | General purpose I/O or Modulator for UHF transmitter | 2 |
| 12 | IN1 | LF receiver channel 1, positive input | |
| 13 | IN2 | LF receiver channel 2, negative input | |
| 14 | IN3 | LF receiver channel 2, positive input | |

How to Order

| Part Number | Description | Shipping |
|-------------|-------------|-------------|
| NPX-C01767 | 450kPa | IC tubes |
| NPX-C01768 | 700kPa | IC tubes |
| NPX-C01769 | 1400kPa | IC tubes |
| NPX-C01767T | 450kPa | tape & reel |
| NPX-C01768T | 700kPa | tape & reel |
| NPX-C01769T | 1400kPa | tape & reel |



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Sales Terms:
GE NovaSensor standard sales terms apply.
Prices and specifications are subject to change without notice.

Warranty:
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¹ P10/P11 inputs have internal pull-up and must be left unconnected if not in use.

² The functions of P14 and P17 may be interchanged by SW.