



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.

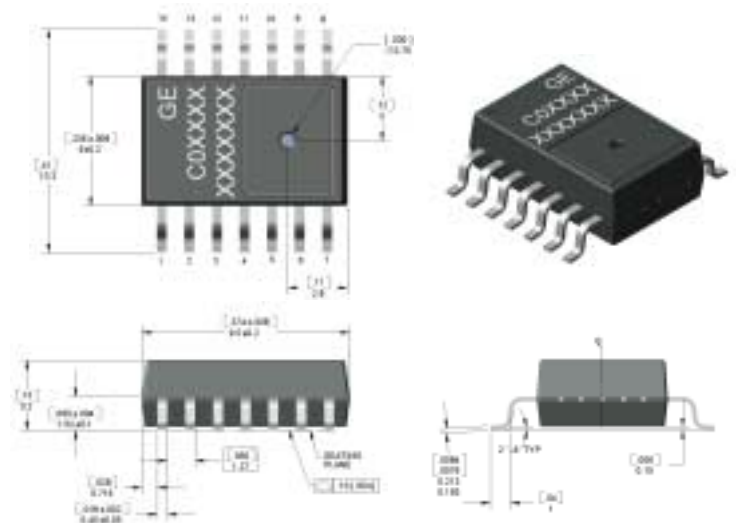
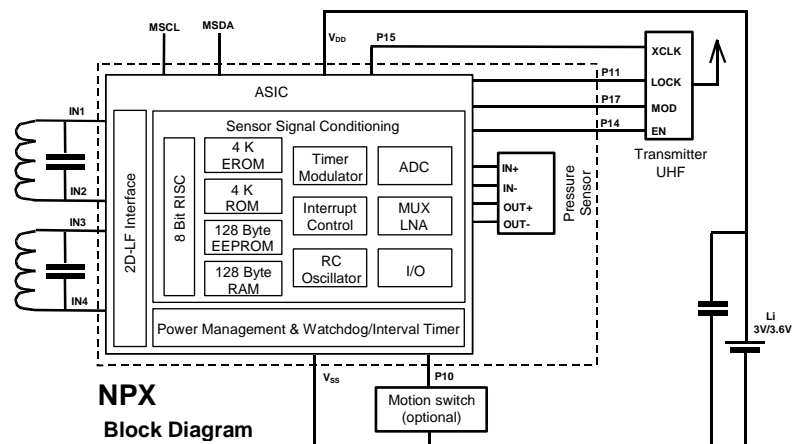
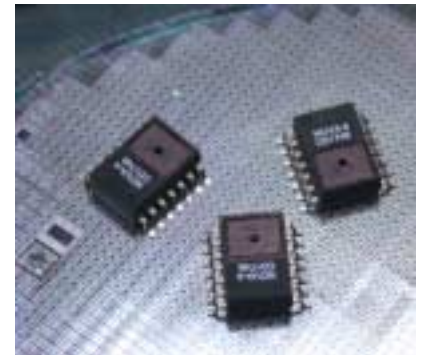
A programmable version of the sensor shall be available for development purposes, allowing the customer to download the application code in an electrically programmable ROM version. This sensor is intended for developing the application specific program. In order to ensure high reliability, the production 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:
GE NovaSensor warrants its products against defects in material and workmanship for 12 months from the date of shipment. Products not subjected to misuse will be repaired or replaced. GE NovaSensor reserves the right to make changes without further notice to any products herein. GE NovaSensor make no warranty, representation or guarantee regarding the suitability of its products for any application, nor does GE NovaSensor assume any liability arising out of the application or use of any product or circuit and specifically disclaims and all liability without limitation consequential or incidental damages. The foregoing warranties are exclusive and in lieu of all other warranties, whether written, oral, implied or statutory. NO IMPLIED STATUTORY WARRANTY OF MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE SHALL APPLY.

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.