TARGET APPLICATIONS
- Tire pressure monitoring systems
- Ultra-low-power wireless sensing

IMPLEMENTATIONS
- Measures dual-axis acceleration to support location of wheel on the vehicle
- Measures temperature
- Measures battery voltage
- Bi-directional wireless communication
- Measures tire pressure for passenger, light-duty or heavy-duty vehicles

NXP TPMS SENSORS
NXP’s tire pressure monitoring sensors (TPMS) has a fully integrated 4 x 4 mm package footprint. These are significantly smaller than the previous generation of QFN packages on the market.

These devices provide:
- Low transmitting power consumption (less than 7 mA Idd)
- Large customer memory size (~8-15 kB)
- Dual-axis accelerometer architecture

NXP’S TPMS SOLUTION INTEGRATES:
- 8-bit MCU
- Pressure sensor
- XZ-axis or Z-axis accelerometer
- 125 kHz LF receiver
- 315–434 MHz RF transmitter

NXP’s portfolio can support cars, light and heavy trucks as well as buses. These TPMS markets are mainly regulation driven with new mandates, resulting in significant growth. NXP continues to produce TPMS products that meet the latest mandates to accommodate customer requirements.

PRODUCT DIFFERENTIATION

<table>
<thead>
<tr>
<th>Features</th>
<th>Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small, fully integrated package size</td>
<td>Enables small module design for lighter weight and space-constrained applications</td>
</tr>
<tr>
<td>Dual-axis XZ inertial sensor</td>
<td>Enables easier localization capability</td>
</tr>
<tr>
<td>Homogeneous firmware as previous generations</td>
<td>Easy transition from between solutions</td>
</tr>
<tr>
<td>8–15 kB customer memory/capability of interfacing with external memory</td>
<td>Flexibility of software development and time to market</td>
</tr>
<tr>
<td>Low RF power consumption</td>
<td>Long battery life</td>
</tr>
<tr>
<td>High production capacity</td>
<td>Secured supply and short lead time</td>
</tr>
</tbody>
</table>
## NTM88 SPECIFICATIONS

<table>
<thead>
<tr>
<th>Part number</th>
<th>Pressure Range (kPa)</th>
<th>Pressure Accuracy (°C &lt;= Ta &lt;= 105°C)</th>
<th>Temperature Range (°C)</th>
<th>Temperature Accuracy (°C &lt;= Ta &lt;= 70°C)</th>
<th>Z-axis Accelerometer Range (g)</th>
<th>Z-axis Accelerometer Accuracy (°C &lt;= Ta &lt;= 125°C)</th>
<th>X-axis Accelerometer Range (g)</th>
<th>X-axis Accelerometer Accuracy (°C &lt;= Ta &lt;= 125°C)</th>
<th>Typical Uses</th>
</tr>
</thead>
<tbody>
<tr>
<td>NTM88H025T1</td>
<td>90 to 930</td>
<td>±5</td>
<td>-40 to +125</td>
<td>±3</td>
<td>-360 to +400</td>
<td>±3 @ 0g</td>
<td>NA</td>
<td>-80 to +90</td>
<td>Rim Mount</td>
</tr>
<tr>
<td>NTM88H055T1</td>
<td>NA</td>
<td>±5</td>
<td>-40 to +125</td>
<td>±3</td>
<td>-360 to +400</td>
<td>NA</td>
<td>-80 to +90</td>
<td>±3 @ 0g</td>
<td>Cap Mount</td>
</tr>
<tr>
<td>NTM88H065T1</td>
<td>NA</td>
<td>NA</td>
<td>-360 to +400</td>
<td>NA</td>
<td>-80 to +90</td>
<td>NA</td>
<td>±3 @ 0g</td>
<td>±3 @ 0g</td>
<td>Rim Mount</td>
</tr>
</tbody>
</table>

### Passenger Car and Light Duty Pressure Range with Single X-axis Accelerometer

<table>
<thead>
<tr>
<th>Part number</th>
<th>Pressure Range (kPa)</th>
<th>Pressure Accuracy (°C &lt;= Ta &lt;= 105°C)</th>
<th>Temperature Range (°C)</th>
<th>Temperature Accuracy (°C &lt;= Ta &lt;= 70°C)</th>
<th>Z-axis Accelerometer Range (g)</th>
<th>Z-axis Accelerometer Accuracy (°C &lt;= Ta &lt;= 125°C)</th>
<th>X-axis Accelerometer Range (g)</th>
<th>X-axis Accelerometer Accuracy (°C &lt;= Ta &lt;= 125°C)</th>
<th>Typical Uses</th>
</tr>
</thead>
<tbody>
<tr>
<td>NTM88H125T1</td>
<td>90 to 930</td>
<td>±5</td>
<td>-40 to +125</td>
<td>±3</td>
<td>-175 to +550</td>
<td>±3 @ 0g</td>
<td>-400 to +400</td>
<td>±3 @ 0g</td>
<td>Tire Mount</td>
</tr>
<tr>
<td>NTM88H155T1</td>
<td>NA</td>
<td>±5</td>
<td>-40 to +125</td>
<td>±3</td>
<td>-360 to +400</td>
<td>NA</td>
<td>-80 to +90</td>
<td>±3 @ 0g</td>
<td>Rim Mount</td>
</tr>
<tr>
<td>NTM88H155T1</td>
<td>NA</td>
<td>NA</td>
<td>-360 to +400</td>
<td>NA</td>
<td>-80 to +90</td>
<td>NA</td>
<td>-360 to +400</td>
<td>±3 @ 0g</td>
<td>Cap Mount</td>
</tr>
</tbody>
</table>

### Medium Duty Pressure Range with Dual XZ-axis Accelerometer — Under Development, contact sales representative for samples

<table>
<thead>
<tr>
<th>Part number</th>
<th>Pressure Range (kPa)</th>
<th>Pressure Accuracy (°C &lt;= Ta &lt;= 105°C)</th>
<th>Temperature Range (°C)</th>
<th>Temperature Accuracy (°C &lt;= Ta &lt;= 70°C)</th>
<th>Z-axis Accelerometer Range (g)</th>
<th>Z-axis Accelerometer Accuracy (°C &lt;= Ta &lt;= 125°C)</th>
<th>X-axis Accelerometer Range (g)</th>
<th>X-axis Accelerometer Accuracy (°C &lt;= Ta &lt;= 125°C)</th>
<th>Typical Uses</th>
</tr>
</thead>
<tbody>
<tr>
<td>NTM88J125T1</td>
<td>90 to 1110</td>
<td>±5</td>
<td>-40 to +125</td>
<td>±3</td>
<td>-175 to +550</td>
<td>±3 @ 0g</td>
<td>-400 to +400</td>
<td>±3 @ 0g</td>
<td>Tire Mount</td>
</tr>
<tr>
<td>NTM88J155T1</td>
<td>NA</td>
<td>±5</td>
<td>-40 to +125</td>
<td>±3</td>
<td>-360 to +400</td>
<td>NA</td>
<td>-80 to +90</td>
<td>±3 @ 0g</td>
<td>Rim Mount</td>
</tr>
<tr>
<td>NTM88J155T1</td>
<td>NA</td>
<td>NA</td>
<td>-360 to +400</td>
<td>NA</td>
<td>-80 to +90</td>
<td>NA</td>
<td>-360 to +400</td>
<td>±3 @ 0g</td>
<td>Cap Mount</td>
</tr>
</tbody>
</table>

### Heavy Duty / Off Highway Pressure Range with Dual XZ-axis Accelerometer — Under Development, contact sales representative for samples

<table>
<thead>
<tr>
<th>Part number</th>
<th>Pressure Range (kPa)</th>
<th>Pressure Accuracy (°C &lt;= Ta &lt;= 105°C)</th>
<th>Temperature Range (°C)</th>
<th>Temperature Accuracy (°C &lt;= Ta &lt;= 70°C)</th>
<th>Z-axis Accelerometer Range (g)</th>
<th>Z-axis Accelerometer Accuracy (°C &lt;= Ta &lt;= 125°C)</th>
<th>X-axis Accelerometer Range (g)</th>
<th>X-axis Accelerometer Accuracy (°C &lt;= Ta &lt;= 125°C)</th>
<th>Typical Uses</th>
</tr>
</thead>
<tbody>
<tr>
<td>NTM88K135T1</td>
<td>90 to 1518</td>
<td>+/–17</td>
<td>-40 to +125</td>
<td>±3</td>
<td>-360 to +400</td>
<td>±3 @ 0g</td>
<td>-80 to +90</td>
<td>±3 @ 0g</td>
<td>Rim Mount</td>
</tr>
</tbody>
</table>

## NTM88 TPMS FAMILY BLOCK DIAGRAM

- **Core**
  - 528-8-bit 4 MHz
  - Debug Interface
  - Interrupt Controller

- **System**
  - 64-byte Battery Backed RAM
  - Periodic Wake-Up Unit

- **Memories**
  - 16 kB Flash
  - 512-byte RAM

- **Sub-1 GHz Radio Transmitter**
  - 315 or 434 MHz ISM band RF Tx
  - 26 MHz Oscillator
  - VCO/PLL
  - 32-byte Buffer

- **Sensor Measurement Interface**
  - Pressure Sensor
  - Accelerometer
  - Temperature Sensor

- **Timers**
  - 2-ch. Timer
  - Periodic Interrupt Timer
  - Low-Power Timer
  - Free-Running Counter

- **Interfaces**
  - Keyboard Interface
  - UART, Medium- and High-Frequency Oscillators

- **Clocks**
  - Internal Reference Clocks

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**NTM88 ATTRIBUTES**

- **Voltage Measurement Range**: 1.8 V to 3.6 V
- **Voltage Resolution (8-bit)**: 10 mV/LSB
- **Voltage Accuracy (>2.1 V)**: ±100 mV
- **Temperature Measurement Range Run Mode**: -40 °C to +125 °C
- **Temperature Resolution (8-bit unsigned)**: 1 °C/LSB
- **Temperature Offset Accuracy (-20 °C ≤ TA ≤ 70 °C)**: ±3 °C

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www.nxp.com/TPMS

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