STMicroelectronics' STTS75 is a precision digital output temperature sensor operating over a -55 °C to +125 °C temperature range.

It is ideal for low-power applications, offering:
- 1 μA standby current
- 75 μA typical active current
- Power-saving one-shot temperature measurement
- SMBus timeout function

Versatile I²C bus programming allows for configuration of thermometer resolution, bus addresses, temperature threshold and hysteresis set points with a bus timeout that prevents lockup of I²C bus.

Key features
- Measurement range: -55 °C to +125 °C
- Measurement accuracy: +/- 2 °C from -25 °C to +100 °C (max)
- Operating voltage range: 2.7 V to 5.5 V
- Low operating current: 75 μA (typ) @ 3.3 V
- 2-wire I²C/SMBus-compatible serial interface:
  - 400 kHz I²C/SMBus
  - Supports bus time-out feature
  - Selectable bus address allows connection of up to eight devices on the bus
- Programmable temperature threshold and hysteresis set points
- Thermometer resolution is user-configurable, from 9 bits (0.5 °C) to 12 bits (0.0625 °C)
- Pin- and software-compatible with LM75, DS75, TCN75, TCN75A and MAX7500
- Power-up defaults permit standalone operation as a thermostat
- One-shot and shutdown modes to minimize power consumption
- Package options:
  - SO-8
  - MSOP8/TSSOP8

Main applications
- Servers and workstations
- Routers
- Multimedia PDA devices
- Set-top boxes
- Backlight for LCD panels
- GPS devices
- Cellular base stations
- Office equipment
- Electronic test equipment
- Thermal protection of sensitive applications

Best in class:
- 1.0 μA standby current
- 75 μA operating current @ 3.3 V
- Configurable 9- to 12-bit resolution
- 360 ms typical 12-bit conversion time
- Power saving one-shot temperature measurement
The STTS75 is a high-precision digital CMOS temperature sensor IC with a sigma-delta temperature-to-digital converter and an I²C-compatible serial digital interface. It is targeted for general applications such as personal computers, system thermal management, electronics equipment and industrial controllers. With best-in-class power-saving features and a small package, it is ideal for handheld devices such as mobile phones and PDAs.

The STTS75 has two package options: industry-standard 8-lead MSOP/TSSOP, and SO.

The device contains a band-gap temperature sensor and programmable 9- to 12-bit ADC, which monitors and digitizes the temperature to a resolution of 0.0625 °C. The part is accurate to +3 °C over the full temperature measurement range of -55 °C to 125 °C, with +2 °C accuracy in the -25 °C to +100 °C range.

The STTS75 is specified to operate at supply voltages from 2.7 V to 5.5 V. Operating at 3.3 V, the supply current is typically 75 µA.

The on-board sigma-delta analog-to-digital converter (ADC) converts the measured temperature to a digital value that is calibrated in degrees Celsius; for Fahrenheit applications, a lookup table or conversion routine is required.

The STTS75 is factory-calibrated and requires no external components to measure temperature. The power-up defaults permit standalone operation as a thermostat. A dual-purpose event pin operates as an interrupt or comparator/thermostat output. The power-saving one-shot mode can be used when the part is in shutdown to perform a single temperature conversion.

The STTS75 has a simple 2-wire I²C-compatible digital serial interface which allows the user to access the data in the temperature register at any time. It communicates via the serial interface with a master controller which operates at speeds up to 400 kHz. Three pins (A0, A1 and A2) are available for address selection, and enable the user to connect up to 8 devices on the same bus without address conflict. In addition, the serial interface gives the user easy access to all STTS75 registers to customize operation of the device.

### Digital temperature sensor family key parameters

<table>
<thead>
<tr>
<th>Part number</th>
<th>Standby current max (µA)</th>
<th>Operating current max (µA)</th>
<th>Accuracy @ -25 °C to 100 °C (+/- °C)</th>
<th>Resolution (bits)</th>
<th>Temperature range (°C)</th>
<th>One shot mode</th>
<th>SMBus timeout</th>
<th>Package</th>
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<tbody>
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<td>STTS75M2F</td>
<td>1.0</td>
<td>100</td>
<td>2.0</td>
<td>9 to 12</td>
<td>-55 to 125</td>
<td>Yes</td>
<td>Yes</td>
<td>SO8</td>
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<td>STTS75D2F</td>
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<td>-55 to 125</td>
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<td>Yes</td>
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<td>No</td>
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