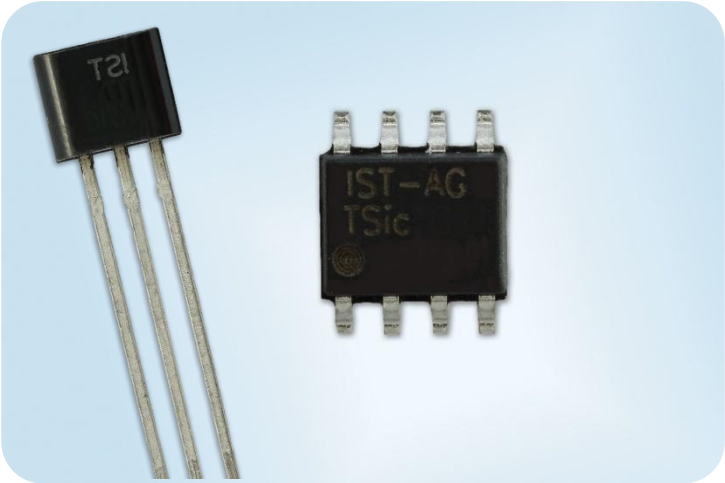
# TSic 206/203/201/306/303/301

## Temperature Sensor IC

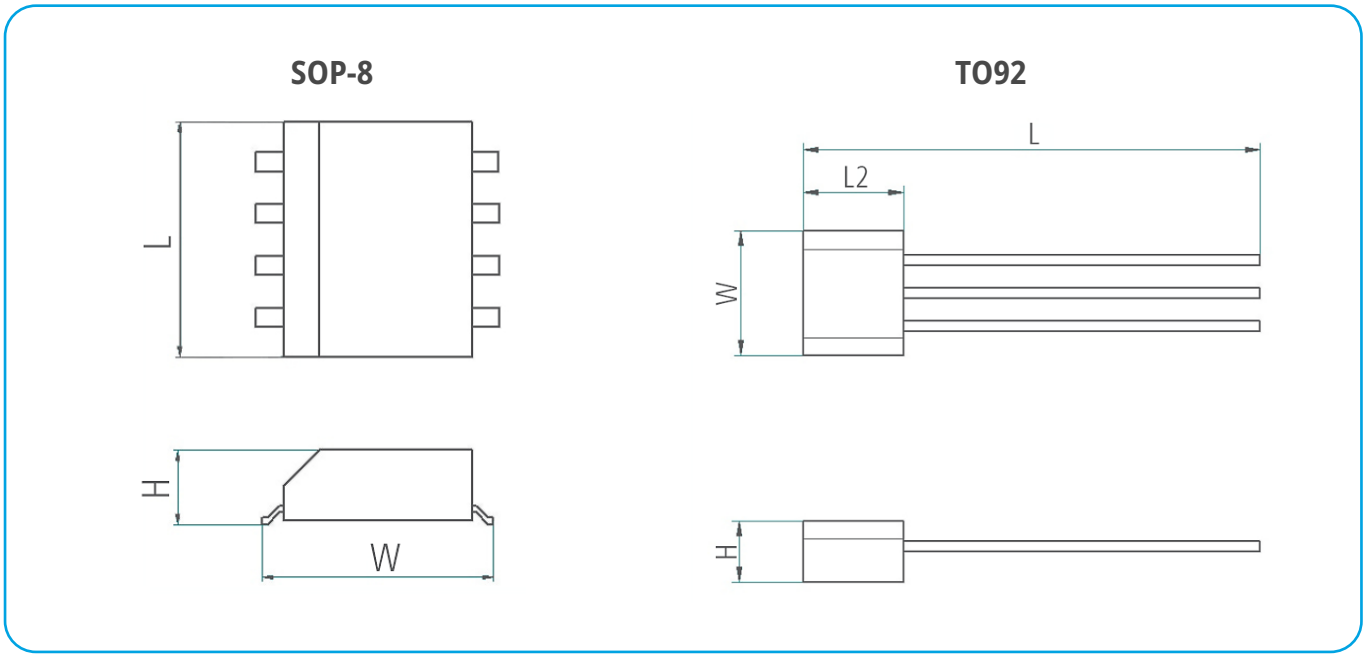
### For a fully calibrated and accurate low power temperature measurement

## Benefits & characteristics

- Fully calibrated
- Custom calibration and assembly available
- Very low power consumption
- Excellent long-term stability
- Accuracy of ±0.3 K (TSic 30x), ±0.5 K (TSic 20x)
- Accuracy range of 80 K can be shifted (default: +10 °C to +90 °C)
- Available with digital, analog and ratiometric output signal




## Illustration [1)]




[1)] for actual size see dimensions in order information

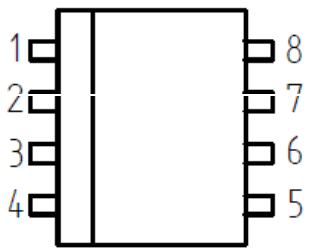
## Technical Data

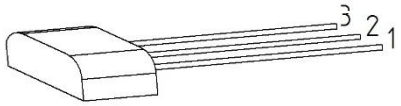
| | | |
|---|---|---|
| Dimensions (L / L2 x W x H in mm): [2)] | 4.93 x 5.99 x 1.63 (SOP-8)<br>17.30 / 3.81 x 4.57 x 2.3 (TO92) | |
| Operating temperature range:* | -50 °C to +150 °C (-47 °C to +147 °C guaranteed) | |
| Accuracy:* | TSic 20x | ±0.5 K in the range of +10 °C to +90 °C (other ranges on request) |
| | TSic 30x | ±0.3 K in the range of +10 °C to +90 °C (other ranges on request) |
| Resolution: * | 0.1 K | |
| Sampling rate: * | 10 Hz | |
| Supply current: | typ. 30 µA at 25 °C and $V_{dd}$ = 3.3 V for minimal self-heating | |
| Packaging: * | SOP-8 or TO92 (other packaging on request) | |
| Output signal: | Analog (TSic xx1), ratiometric (TSic xx3), digital (TSic xx6) - see application note ATTSic_E | |

* Customer-specific alternatives available

[2)] For tolerances, see Application Note

## Pin Assignment




| | Pin 1 | Pin 2 | Pin 3 | Pin 4 |
|---|---|---|---|---|
| **SOP-8*** | $V_{dd}$, Supply voltage (3 V to 5.5V) | Signal | | GND |
| **TO92** | GND | Signal | $V_{dd}$, Supply voltage (3 V to 5.5V) | |

* 3, 5, 6, 7 and 8 not connected

## Absolute maximal ratings

| | Min | Max |
|---|---|---|
| Supply voltage ($V_{dd}$) | -0.3 V | 6 V |
| Voltages to analog I/O – Pins ($V_{SIG}$, $V_{GND}$) | -0.3 V | $V_{dd}$+0.3 V |
| Storage temperature range ($T_{STOR}$) | -20 °C | +80 °C |
| Non-operating temperature range | -50 °C | +150 °C |

## Operating conditions

| | Min | Typ | Max |
|---|---|---|---|
| Supply voltage to GND ($V_{dd}$) | 2.97 V | 5 V | 5.5 V |
| Supply current ($I_{Vdd}$) at $V_{dd}$ = 3.3 V, | 25 µA | 30 µA | 60 µA |
| Operating temperature range ($T_{amb}$) | -50 °C | | +150 °C |
| Output load capacitance ($C_L$) | | | 15 nF |
| External capacitance between $V_{dd}$ and GND[1)] | 100 nF (recommended) | | |
| Output load resistance between signal and GND (or $V_{dd}$) | 47 kΩ | | |

[1)] Recommended as close to TSic $V_{dd}$ and GND-Pins as possible

## Temperature accuracies [2)]

| | TSic 20x | TSic 30x |
|---|---|---|
| T1: +10 °C to +90 °C | ±0.5 K | ±0.3 K |
| T2: -20 °C to +110 °C | ±1 K | ±0.6 K |
| T3: -50 °C to +150 °C | ±2 K | ±1.2 K |

[2)] The sensor is calibrated at 5 V. The provided accuracy is applicable for a supply voltage between 4.5 V and 5.5 V. The accuracy is smaller with a supply voltage between 2.97 V and 4.5 V. For applications where the best accuracy at 3 V is requested, ask for a custom specific, 3 V calibrated device. Other TSic products with custom-specific calibrations are available upon request e.g. other temperature range for high accuracy. Accuracy at delivery; the assembly method can influence the accuracy!

## Order Information

| Output signal | Accuracy | Order code | Reference | Output type | Packaging |
|---|---|---|---|---|---|
| 201 | ±0.5 °C | On request | TSic 201 SOP-8 | Analog | SOP-8 |
| 203 | ±0.5 °C | 103499 | TSic 203 SOP-8 | Analog ratiometric | SOP-8 |
| 206 | ±0.5 °C | 103482 | TSic 206 SOP-8 | Digital, ZACWire | SOP-8 |
| 301 | ±0.3 °C | 103487 | TSic 301 SOP-8 | Analog | SOP-8 |
| 303 | ±0.3 °C | On request | TSic 303 SOP-8 | Analog ratiometric | SOP-8 |
| 306 | ±0.3 °C | 103483 | TSic 306 SOP-8 | Digital, ZACWire | SOP-8 |
| 201 | ±0.5 °C | On request | TSic 201 TO92 | Analog | TO92 |
| 203 | ±0.5 °C | 103510 | TSic 203 TO92 | Analog ratiometric | TO92 |
| 206 | ±0.5 °C | 103494 | TSic 206 TO92 | Digital, ZACWire | TO92 |
| 301 | ±0.3 °C | 103492 | TSic 301 TO92 | Analog | TO92 |
| 303 | ±0.3 °C | 103505 | TSic 303 TO92 | Analog ratiometric | TO92 |
| 306 | ±0.3 °C | 103489 | TSic 306 TO92 | Digital, ZACWire | TO92 |

## Additional Electronics

| | |
|---|---|
| LabKit | Document name: DTTSicLabKit_E |

## Additional Documents

| | |
|---|---|
| Application Note | Document name: ATTSic_E |

# Order Information

## Temperature Sensor IC - Secondary reference

TSic

**Accuracy**

| | | |
|---|---|---|
| 2 | = | ±0.5 °C at +80 °C range |
| 3 | = | ±0.3 °C at +80 °C range |
| 4 | = | not defined |
| 5 | = | ±0.1 °C at +40 °C range (limited measuring range from -10 °C to +60 °C) |
| 6 | = | not defined |
| 7 | = | ±0.07 °C at +20 °C range (limited measuring range from -10 °C to +60 °C) |

**Bit size**

| | | |
|---|---|---|
| 0 | = | 11 bit |
| 1 | = | 14 bit |

**Output signal**

| | | |
|---|---|---|
| 1 | = | analog 0 V to 1 V |
| 3 | = | ratiometric 10 % to 90 % $V_{dd}$ |
| 6 | = | digital ZACWire |

**Housing**

SOP-8

TO92

**Special**

E.g. „250 Hz“ for a high sampling rate or „-30/70“ for temperature and tolerance range

| | | | | | |
|---|---|---|---|---|---|
| TSic | 3 | 0 | 6 | TO92 | -30/70 |

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