



# TSic 506F/503F/501F

## Temperature Sensor IC

For a fully calibrated and very accurate low power temperature measurement

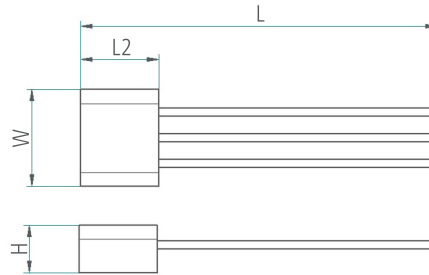


INNOVATIVE SENSOR TECHNOLOGY

### Benefits & Characteristics

- Fully calibrated
- Outstanding accuracy of  $\pm 0.1$  K
- Very low power consumption
- Excellent long-term stability
- Custom calibration and assembly available
- Available with digital, analog and ratiometric output signal
- Accuracy range of 40 K can be shifted (default: +5 °C to +45 °C)

### Illustration<sup>1)</sup>



<sup>1)</sup> For actual size, see dimensions

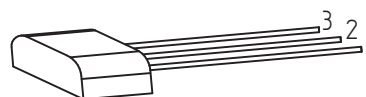
### Technical Data

|  |  |
|--|--|
| Dimensions (L / L2 x W x H in mm): <sup>2)</sup> | 17.30 / 3.81 x 4.57 x 2.3  |
| Operating temperature range:*                    | -10 °C to +60 °C (-7 °C to +57 °C guaranteed)  |
| Accuracy:*                                       | $\pm 0.1$ K in the range of +5 °C to +45 °C (other ranges upon request)                          |
| Resolution:*                                     | 0.034 K  |
| Sampling rate:*                                  | 10 Hz  |
| Supply voltage:                                  | $V_{dd} = 3$ V to 5.5 V, high precision operation in range $V_{dd} = 4.5$ V to 5.5 V             |
| Supply current:                                  | typ. 30 $\mu$ A at 25 °C and $V_{dd} = 3.3$ V for minimal self-heating                           |
| Packaging:*                                      | TO92   |
| Signal output:                                   | Analog (TSic 501F), ratiometric (TSic 503F), digital (TSic 506F) - see application note ATTSic_E |

\* Customer specific alternatives available

<sup>2)</sup> For tolerances, see application note

### Pin Assignment



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



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### 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 ( $T_{STOR}$ )                | -10 °C | +60 °C         |
| Non-operating temperature range                         |        |                |

### Operating conditions

|  | Min                  | Typ        | Max        |
|--|----------------------|------------|------------|
| Supply voltage to GND ( $V^+$ )                              | 2.97 V               | 5 V        | 5.5 V      |
| Supply current ( $I_{Vdd}$ ) at $V_{dd} = 3.3$ V, RT         | 25 $\mu$ A           | 30 $\mu$ A | 60 $\mu$ A |
| Operating temperature range ( $T_{amb}$ )                    | -10 °C               |            | +60 °C     |
| Output load capacitance ( $C_L$ )                            |                      |            | 15 nF      |
| External capacitance between $V_{dd}$ and GND <sup>1)</sup>  | 100 nF (recommended) |            |            |
| Output load resistance between signal and GND (or $V_{dd}$ ) | 47 k $\Omega$        |            |            |

<sup>1)</sup> Recommended as close to TSic  $V_{dd}$  and GND-Pins as possible

### Temperature accuracies<sup>2)</sup>

|                      |             |
|----------------------|-------------|
| T1: +5 °C to +45 °C  | $\pm 0.1$ K |
| T2: -10 °C to +60 °C | $\pm 0.2$ K |

<sup>2)</sup> 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 - TO92

|             |                |                  |                |
|-------------|----------------|------------------|----------------|
| 501/503/506 | TSic 501F TO92 | TSic 503 TO92 5V | TSic 506F TO92 |
| Order code  | 030.00046      | 030.00115        | 030.00045      |



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### Additional Electronics

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Document name:

LabKit

DTTSicLabKit\_E

### Additional Documents

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Document name:

Application note:

ATTSic\_E



# Order Information

## Temperature Sensor IC

### Secondary reference



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TSic

#### Accuracy

- 2 =  $\pm 0.5$  °C at +80 °C range
- 3 =  $\pm 0.3$  °C at +80 °C range
- 4 = not defined
- 5 =  $\pm 0.1$  °C at +40 °C range (limited measuring range from -10 °C to +60 °C)
- 6 = not defined
- 7 =  $\pm 0.07$  °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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All mechanical dimensions are valid at 25 °C ambient temperature, if not differently indicated • All data except the mechanical dimensions only have information purposes and are not to be understood as assured characteristics • Technical changes without previous announcement as well as mistakes reserved • The information on this data sheet was examined carefully and will be accepted as correct; No liability in case of mistakes • Load with extreme values during a longer period can affect the reliability • The material contained herein may not be reproduced, adapted, merged, translated, stored, or used without the prior written consent of the copyright owner • Typing errors and mistakes reserved • Product specifications are subject to change without notice • All rights reserved