



# TSic™ 716

## Temperature Sensor IC



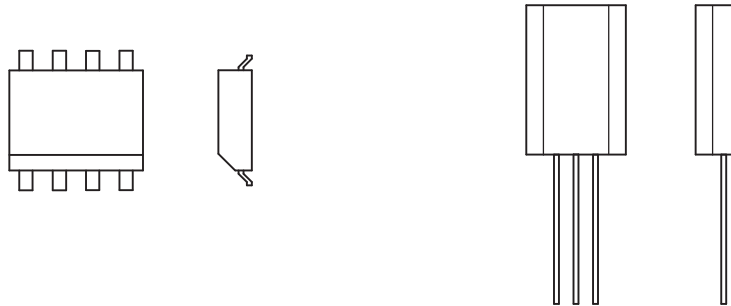
INNOVATIVE SENSOR TECHNOLOGY

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

#### Benefits & Characteristics

- Easy to integrate (digital output signal)
- Outstanding accuracy of  $\pm 0.07$  K
- Very low power consumption
- Excellent long-term stability
- Accuracy range of 20 K can be shifted (default: +25 °C to +45 °C)
- Fully calibrated (custom calibration and assembly available)
- Capable of communicating over a distance of > 10 m

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



1) For actual size, see dimensions

#### Technical Data

Operating temperature range:*	-10 °C to +60 °C ( $\pm 3$ °C of measurement limits)
Accuracy:*	$\pm 0.07$ K in the range of +25 °C to +45 °C (other ranges upon request)
Resolution:*	4 mK
Sampling rate:*	10 Hz
Supply voltage:*	4.5 V to 5.5 V
Supply current:	typ. 45 $\mu$ A at 25 °C and 5 V for minimal self-heating
Digital signal output:	(14 bit) compatible with state-of-the-art microcontrollers using only a single signal wire
Packaging:*	TO92

\* Customer specific alternatives available

#### Pin Assignment



	Pin 1	Pin 2	Pin 3
TO92	GND	Signal	V <sup>+</sup> , Supply voltage (3 V to 5.5 V)



TEMPERATURE



FLOW



HUMIDITY



CONDUCTIVITY

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### Absolute maximal ratings

	Min	Max
Supply voltage ( $V^+$ )	-0.3 V	6 V
Voltages to analog I/O – Pins ( $V_{INA}$ , $V_{OUTA}$ )	-0.3 V	$V_{DDA}+0.3$ V
Storage temperature range ( $T_{STOR}$ )	-20 °C	80 °C

### Operating conditions

	Min	Typ	Max
Supply voltage to GND ( $V^+$ )	2.97 V	5 V	5.5 V
Supply current ( $I_{V^+}$ ) @ $V^+ = 3.3$ V, RT	30 $\mu$ A	45 $\mu$ A	80 $\mu$ A
Operating temperature range ( $T_{amb}$ )	-10 °C		+60 °C
Output load capacitance ( $C_L$ )			15 nF
External capacitance between $V^+$ and GND <sup>1)</sup> ( $C_{V^+}$ )	100 nF (recommended)		
Output load resistance between signal and GND (or $V^+$ )	47 k $\Omega$		

<sup>1)</sup> Recommended as close to TSic  $V^+$  and GND-Pins as possible

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

T1: +25 °C to +45 °C	$\pm 0.07$ 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

Output signal	Digital, ZACWire protocol
716	TSic 716 TO92
Order code	030.00048

### Additional Electronics

	Document name:
LabKit	DTTSicLabKit_E



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### 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 = ±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<sup>+</sup>
- 6 = digital ZACWire protocol

#### Housing

- SOP-8
- TO92
- KGD („known-good-die“ in waffle pack, 100 pcs/pkg)

#### 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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