



TSic 506F/503F/501F



Temperature Sensor IC



For a fully calibrated and very accurate low power
temperature measurement



Benefits & characteristics

- Fully calibrated
- Outstanding accuracy of ± 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)

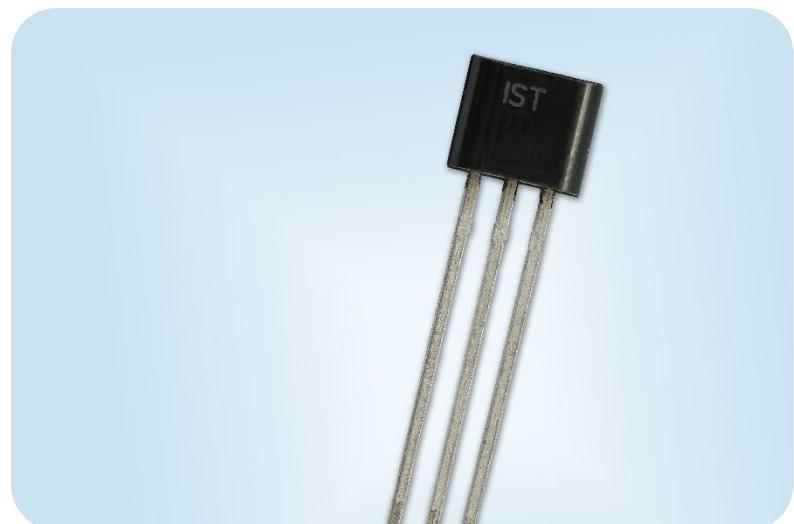
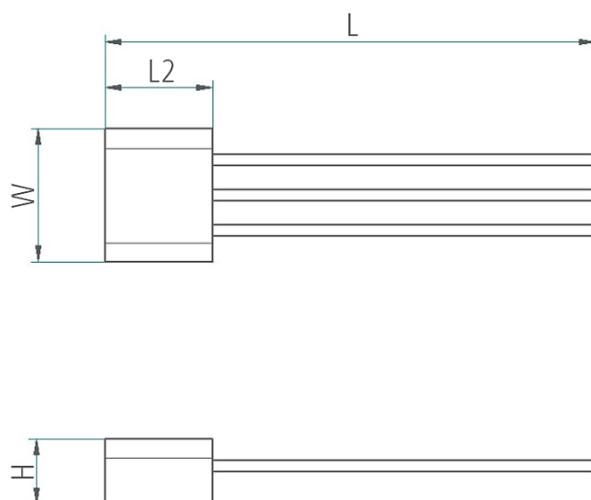


Illustration ¹⁾



¹⁾ for actual size see dimensions in order information



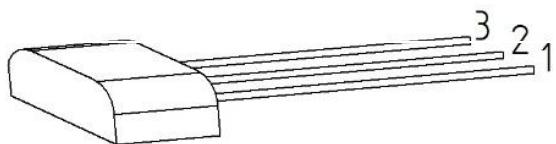
Technical Data

Dimensions (L / L2 x W x H in mm): ²⁾	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:*	±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:	$V_{dd} = 3 \text{ V to } 5.5 \text{ V}$, high precision operation in range $V_{dd} = 4.5 \text{ V to } 5.5 \text{ V}$
Supply current:	typ. 30 μA at 25 °C and $V_{dd} = 3.3 \text{ V}$ for minimal self-heating
Packaging:*	TO92
Signal output:	Analog (TSic 501F), ratiometric (TSic 503F), digital (TSic 506F) – see application note ATT Sic_E

* Customer-specific alternatives available

²⁾ 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)

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

Operating conditions

	Min	Typ	Max
Supply voltage to GND (V^+)	2.97 V	5 V	5.5 V
Supply current ($I_{V_{dd}}$) at $V_{dd} = 3.3$ V, RT	25 μ A	30 μ A	60 μ A
Operating temperature range (T_{amb})	-10 °C		+60 °C
Output load capacitance (C_L)			15 nF
External capacitance between V_{dd} and GND ³⁾	100 nF (recommended)		
Output load resistance between signal and GND (or V_{dd})	47 k Ω		

³⁾ Recommended as close to TSic V_{dd} and GND-Pins as possible

Temperature accuracies⁴⁾

T1: +5 °C to +45 °C	±0.1 K
T2: -10 °C to +60 °C	±0.2 K

⁴⁾ 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 customer 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 – T092

Output signal	Accuracy	Order code	Reference	Output type	Packaging
501	$\pm 0.1 \text{ }^{\circ}\text{C}$	103491	TSic 501F T092	Analog	T092
503	$\pm 0.1 \text{ }^{\circ}\text{C}$	103519	TSic 503 T092 5V	Analog ratiometric	T092
506	$\pm 0.1 \text{ }^{\circ}\text{C}$	103490	TSic 506F T092	Digital, ZACWire	T092

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	=	$\pm 0.5^\circ\text{C}$ at $+80^\circ\text{C}$ range
3	=	$\pm 0.3^\circ\text{C}$ at $+80^\circ\text{C}$ range
4	=	not defined
5	=	$\pm 0.1^\circ\text{C}$ at $+40^\circ\text{C}$ range (limited measuring range from -10°C to $+60^\circ\text{C}$)
6	=	not defined
7	=	$\pm 0.07^\circ\text{C}$ at $+20^\circ\text{C}$ range (limited measuring range from -10°C to $+60^\circ\text{C}$)

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

5

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 or product specifications without previous announcement 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 • All rights reserved.



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