



TSic™-716

Most accurate Temperature Sensor IC in the world!

Product

Accuracy $\pm 0.07^{\circ}\text{C}^1$ in the range 25°C to 45°C

Resolution 0.004°C (4mK)

Digital signal output

The temperature sensor family TSic™ from IST are fully tested and calibrated sensors to allow absolute measurement accuracy at delivery and eliminates further calibration efforts. The temperature measurement with the TSic™ is very simple, can achieve outstanding accuracy combined with a long term stability.

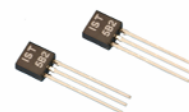
Considerable advantages

- No calibration by customer necessary any more, absolute calibration specified
- Simple to integrate, reducing cost and time for application-development
- Robust and elementary signal transmission requires only one signal line
- Optimum solution for temperature control, thanks to fast data measurement
- Very small power consumption – ideal for mobile and standard applications
- Outstanding long term stability

Packages

TO92 (small THT Package)

The TO92 package is intended for temperature probes e.g. in stainless steel tubes and other assemblies.



For specification of the packages refer to "IST TSic Package and Die Dimensions V3.4.doc".

¹ Accuracy on delivery; the kind of mounting can influence the accuracy!



INNOVATIVE SENSOR TECHNOLOGY



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Features

- **Digital serial signal output** (14-bit) compatible with state of the art μ P controllers using only one single signal wire, capable of communication over a distance of > 10 meter.
- **Accuracy: $\pm 0.07^\circ\text{C}^1$ in the range 25°C to 45°C (other ranges on request)**
- **Resolution: 0.004°C (4mK)**
- Measurement Range -10°C to 60°C
- Signal read out every 1 second
- Supply Voltage $V^+ = 4.5\text{V}$ to 5.5V , others on request
- Low quiescent current of typically **$45\mu\text{A}$** at 25°C and 5V for minimal self-heating

¹⁾ Accuracy on delivery; the kind of mounting can influence the accuracy!

Description TSic™ Series

The TSic™ series of temperature sensor ICs were specifically designed as a powerful, cost-effective solution for temperature sensing in building automation, measurement devices, industrial, medical technology and low power / mobile applications.

The TSic™ employs high precision bandgap reference with proportional-to-absolute-temperature (PTAT); low-power precision ADC; and on-chip DSP core with electrically erasable (EE) memory to precisely calibrate the output temperature signal.

Output Example of TSic™ devices

$$T = \text{Digit}/16384 * 70 - 10 [^\circ\text{C}]$$

Temperature Measurement Range -10°C to 60°C or 14°F to 140°F		
Temp ($^\circ\text{C}$)	Temp ($^\circ\text{F}$)	Digital
35	93.2	0x2925
40	104	0x2DB7
45	113	0x3249



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Absolute Maximum Ratings

PARAMETER	MIN	MAX	UNITS
Supply Voltage (V+)	-0.3	6.0	V
Voltages at analog I/O – Pins (V _{INA} , V _{OUTA})	-0.3	V _{DDA} +0.3	V
Storage Temperature Range (T _{stor})	-50	150	°C

Operating Conditions

PARAMETER	MIN	TYP	MAX	UNITS
Supply ¹ Voltage to Gnd (V+)	2.97	5.0	5.5	V
Supply Current (I _{V+}) @ V+ = 3.3V, RT	30	45	80	µA
Operating Temperature ² Range (T _{amb})	-10		60	°C
Output Load Capacitance (C _L)			15	nF
External Capacitance between V+ and Gnd ³ (C _{V+})	80	100	470	nF
Output Load Resistance between signal and Gnd (or V+)	47			KΩ

Temperature Accuracies⁴⁾

PARAMETER	MIN	TYP	MAX	UNITS
<i>Very High Accuracy Range Device for 25° to 45°C</i>				
25°C to 45°C	-0.07	+/-0.03	+0.07	°C ⁴
-10°C to 60°C	-0.2		+0.2	°C
Measurement range: -10°C to +60°C (±3°C)				

Accuracy on delivery; the kind of mounting can influence the accuracy!

¹Best accuracy with supply voltage 4.5V – 5.5V. With supply voltage 2.97V – 4.5V accuracy reduced. Other supply voltages on request.

²Output signal is limited to this ambient temperature

³Recommended as close to TSic V+ and Gnd-Pins as possible.

⁴ This device gets calibrated at 5V. For applications where best accuracy at 3V is requested: ask for a customer specific 3V calibrated device. Accuracy for supply voltage within V+ = 4.5V to 5.5V, 2K (95%) value.

Other TSic products with customer specific calibration available on request: i.e. with special calibration where the 20°C span with the high precision temperature range of ±0.07 °C is shifted to another (lower or higher) temperature range.



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