

## SS0109

### Accurate Temperature Sensor

**TECH: SMIC 180nm L**  
**Status: waiting for Silicon**

#### PROPOSED KEY FEATURES

- Ultra low-voltage operation
- low power consumption
- 0.4°C accuracy
- 12-bit digital output
- low power consumption ("burst" operation)
- Temperature range: -40-85°C

#### SHORT DESCRIPTION

The circuit is a very accurate temperature sensor, comparing the temperature with a calibrated reference and providing a sampled 12-bit temperature value. The IP includes an A/D converter and an internal oscillator.

#### RECOMMENDED OPERATING CONDITIONS

		Parameter	Min	Max
VDD	Supply voltage		<b>1.1</b>	<b>1.9</b>
	Operating junction temperature		<b>- 40</b>	<b>85</b>

#### ELECTRICAL CHARACTERISTICS

1.1 < VDD < 1.9, -40 < T < 85 °C, unless otherwise specified

Parameter	Condition	Min	Typ	Max	Unit
Tacc	Accuracy Error Offset Trimming <sup>1</sup>	-1		1	°C
TaccSR	Accuracy Error, reduced range Offset Trimming <sup>1</sup> Tcal-10°C < T < Tcal+10°C	-0.4		0.4	°C
Nb	Nominal resolution		12		bit
Tconv	Time required for meas. and A/D conversion Fck =4 MHz (A/D clock freq)			30	ms
AOUT	PTAT analog output (for external A/D conversion)	400		600	mV
IDDA	Current Supply, analog			100u	uA
IDDD	Current Supply, digital Fck =4 MHz (A/D clock freq)			50u	uA

#### NOTE

<sup>1</sup>Sensor require offset trimming at Tcal at wafer sort to compensate against process variations. Offset value is provided as 12-b word. Tcal must be within the operating temperature range (-40 -to- 85°C) and is chosen

by the user.

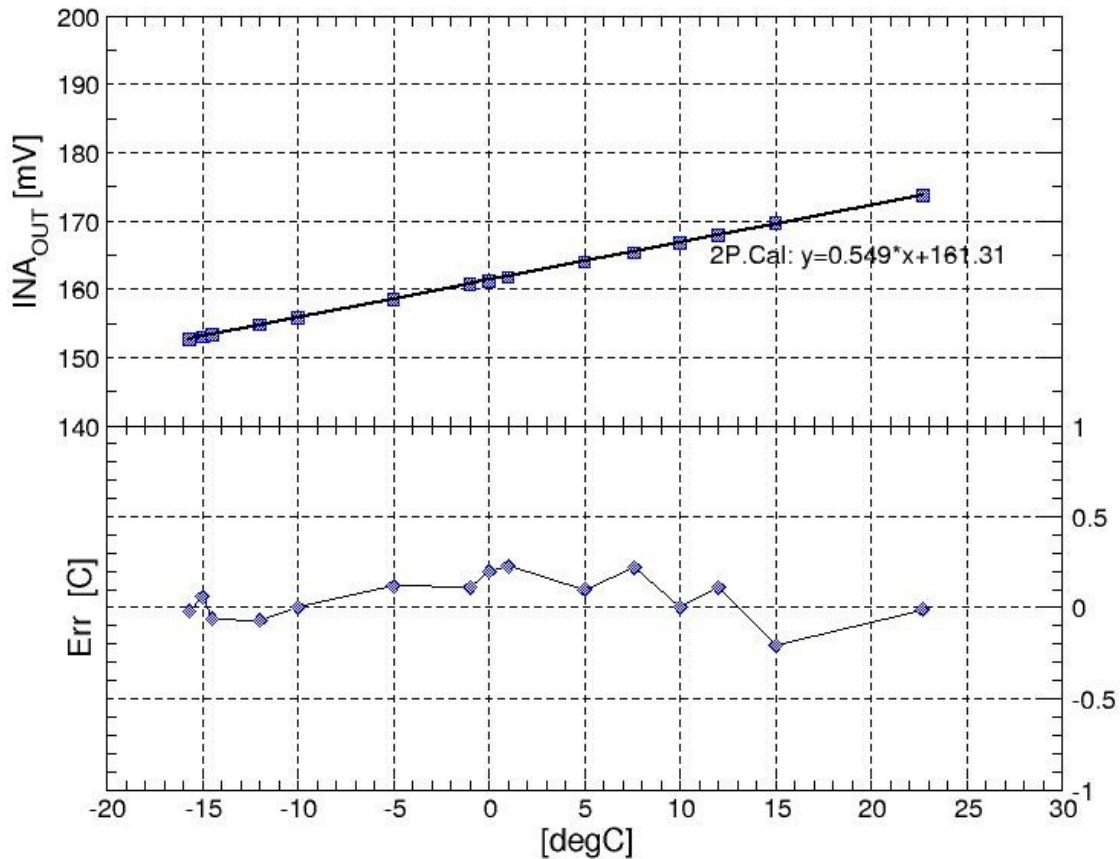


Fig.1 Temperature sensor analog output (not yet digitized): experimental result on engineering samples. Above: experimental samples (squares) and fitting line (obtained by means of a 2-points calibration at -10 and +10°C) . Below: sensor error (°C) with respect to the fitting line (crossing the calibration points).

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