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	**1.1**	**1.9**
	Operating junction temperature	**- 40**	**85**

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[1]	-1		1	°C
TaccSR	Accuracy Error, reduced range	Offset Trimming[1] 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
[1]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.

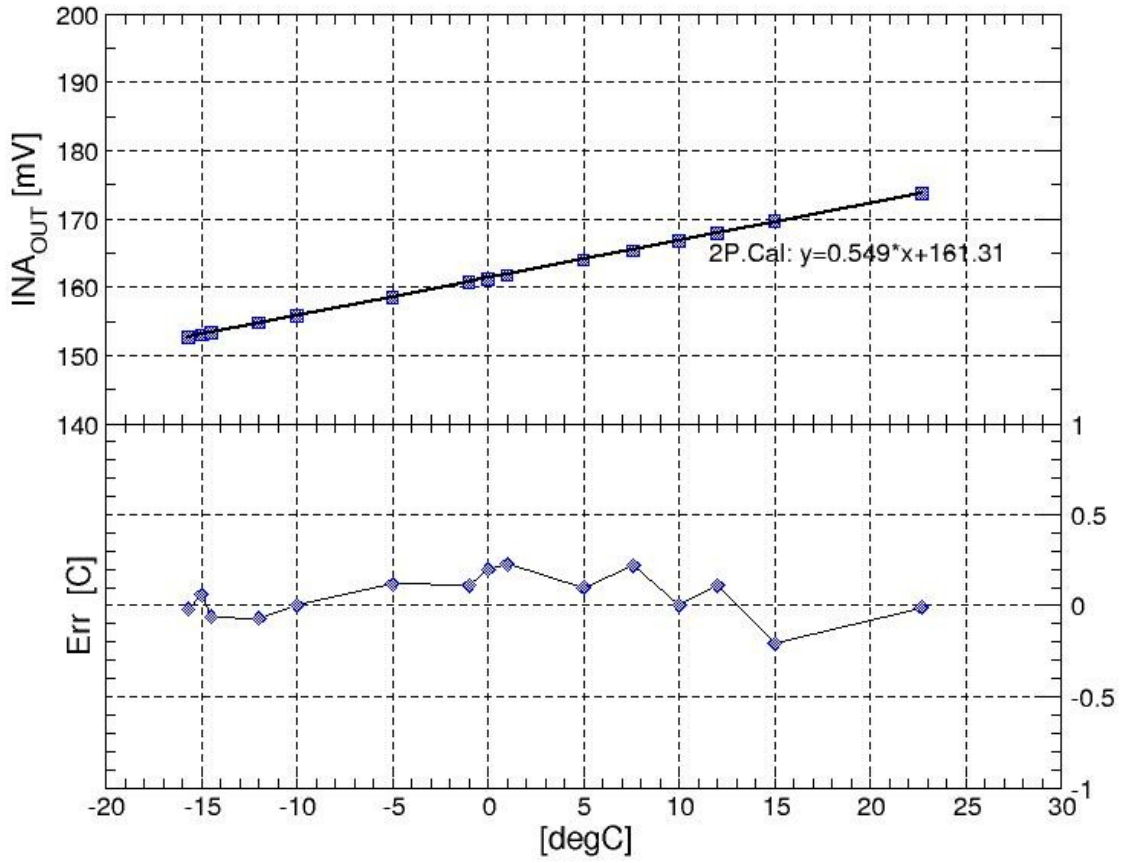

Fig.1 Temperature sensor analog output (not yet digitized): experimental result on engineering samples. Above: experimental samples (squares) and fitting line (obtained by means of a 2-points calibration at -10 and +10°C) . Below: sensor error (°C) with respect to the fitting line (crossing the calibration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