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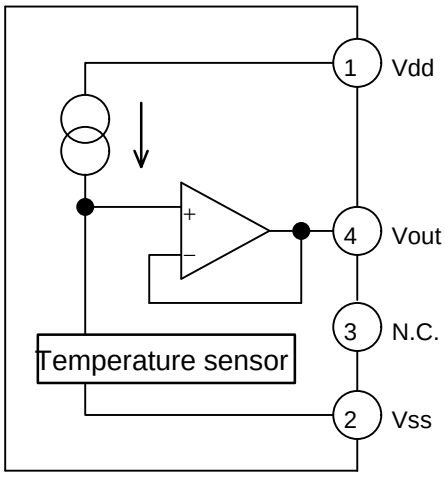
LOW-VOLTAGE C-MOS HIGH-PRECISION TEMPERATURE SENSOR IC S-8120ANP

The S-8120AMP is a ultra-small packaged high-precision temperature sensor IC that outputs voltage with a temperature coefficient of -8.5mV/°C and a temperature accuracy of ±2.5°C. A temperature sensor, a constant current circuit and an operational amplifier are integrated on a single chip to be able to operate at 2.4V. The operating temperature ranges from -40°C to +100°C. The S-8120AMP is superior in linearity over conventional temperature sensors like thermistors. It can be applied to an ever expanding wide range of applications that call for high-precision thermal control.

■ Features

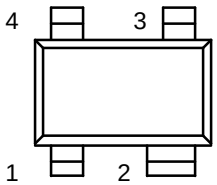
- Temperature accuracy : ±2.5°C (-30°C ~ +100°C)
- Linear Output Voltage : -8.5mV/°C
  Ta = - 30°C : 1.823 V typ.
  Ta = +30°C : 1.326 V typ.
  Ta = + 100°C : 0.718 V typ.
- Nonlinearity : ±0.5 % typ. (-20°C ~ +80°C)
- Vss standard output
- Low voltage operation : Vdd min. = 2.4 V
- Low current consumption : Idd typ. = 4.5µA (+25°C)
- Ultra-small plastic package (SC-82AB)

■ Block Diagram



■ Pin Assignment

SC-82AB



1. Vdd
2. Vss
3. N.C.
4. Vout

(Top view)

LOW-VOLTAGE C-MOS HIGH-PRECISION TEMPERATURE SENSOR IC S-8120ANP

■ Absolute Maximum Ratings

Item	Symbol	Ratings	Unit
Power supply Voltage (Vss=0.0V)	Vdd	6.5	V
Output voltage	Vout	Vss ~ Vdd	V
Operating temperature	Topr	-40 ~ +100	°C
Storage temperature	Tstg	-55 ~ +125	°C

■ Electrical characteristics

(40°C≤Ta≤+100°C,Vdd=5V)

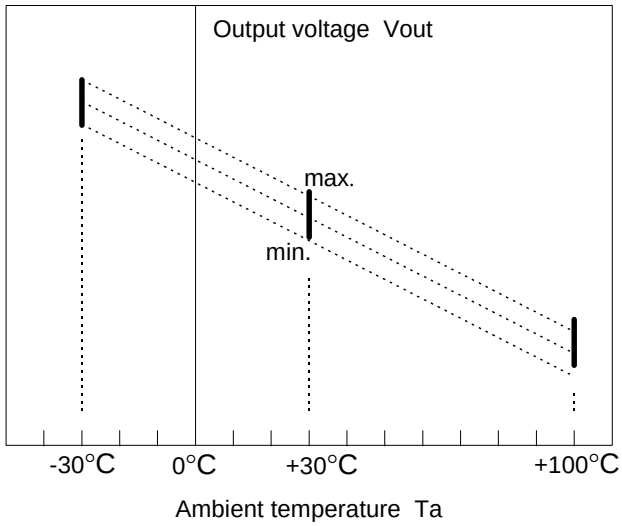
Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Power supply Voltage (Vss=0.0V)	Vdd		2.4	—	6.0	V
Output voltage	Vout	Ta = - 30°C	1.802	1.823	1.844	V
		Ta = + 30°C	1.305	1.326	1.347	V
		Ta = + 100°C	0.697	0.718	0.739	V
Temperature sensitivity	Vse	- 30≤ Ta ≤ + 100°C	- 8.78	- 8.50	- 8.22	mV/°C
Nonlinearity	△NL	- 20≤ Ta ≤ + 80°C	—	±0.5	—	%
Operating temperature	Topr		- 40	—	+ 100	V
Current consumption	Idd	Ta = + 25°C	—	4.5	10.0	μA

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■ Definition of terms

1. Output voltage (Vout)

Output voltage Vout is defined as the voltage between measured pin-4 and Vss.
Vout is linearly proportional to ambient temperature.
S-8120AMP is tested for Vout at -30°C,+30°C and +100°C.

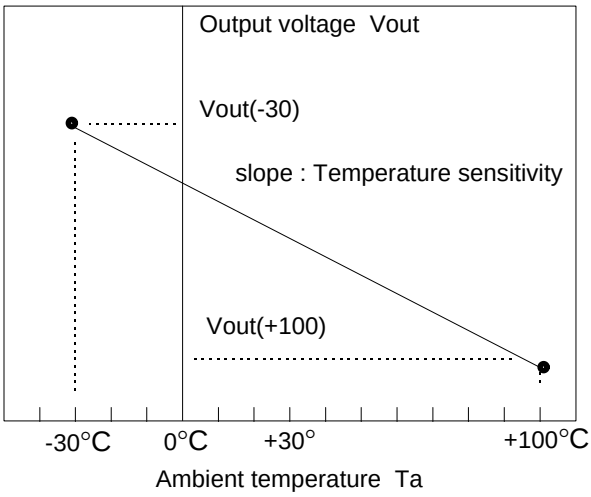


2. Temperature sensitivity (Vse)

Temperature sensitivity Vse is defined as the average slope of the Vout versus Ta curve using the following formula.

$$Vse = \frac{\{Vout(+100) - Vout(-30)\}}{130}$$

Vout(+100) : Output voltage at Ta=+100°C
Vout(- 30) : Output voltage at Ta= - 30°C

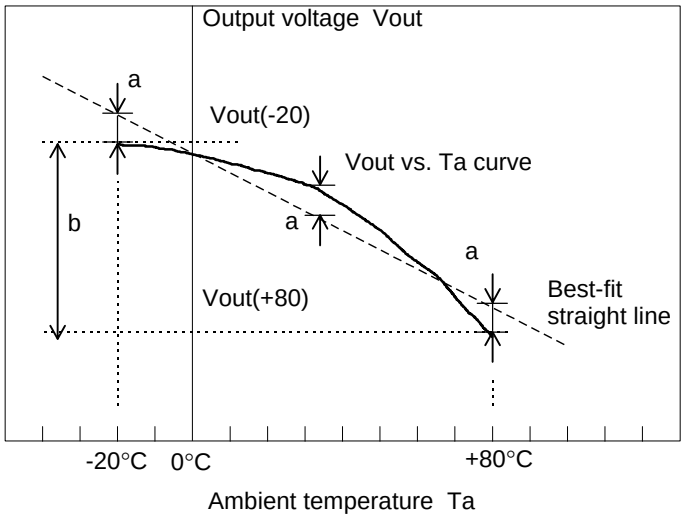


3. Nonlinearity △ NL

Nonlinearity △NL is defined as the deviation of the Vout versus Ta curve from the best-fit straight line over the device's rated temperature range.

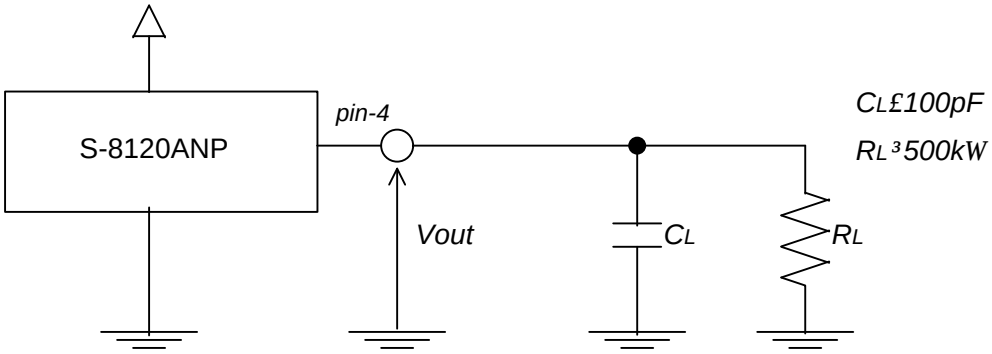
$$\Delta NL = \frac{a}{b} \sim 100$$

a : The maximum deviation of the Vout vs. Ta curve from the best-fit straight line between - 20°C and +80°C.
b : The difference of the output voltage between - 20°C and +80°C.



■ Load conditions

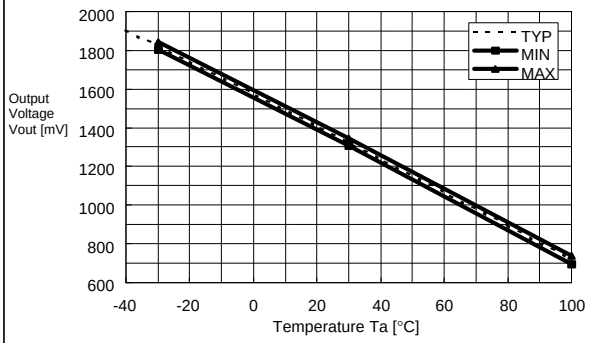
Load capacitance : $C_L \leq 100pF$
Load resistance : $R_L \geq 500k\Omega$
(Note : Do NOT connect a pull-up resistor to Vout pin.)



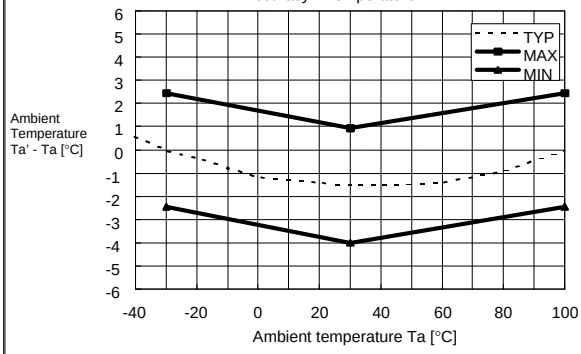
LOW-VOLTAGE C-MOS HIGH-PRECISION TEMPERATURE SENSOR S-8120ANP

■ Typical performance characteristics

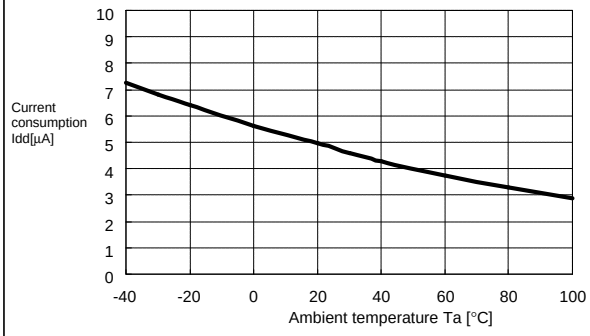
Ambient temperature (Ta) - Output voltage (Vout)



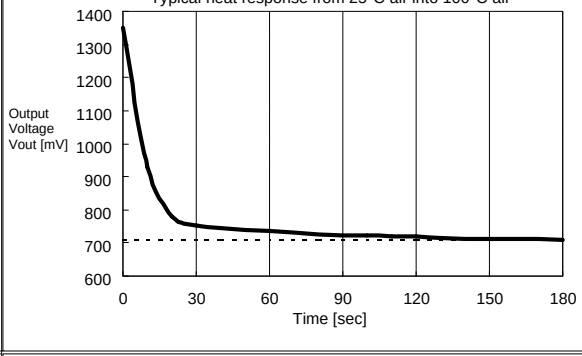
Accuracy - Temperature



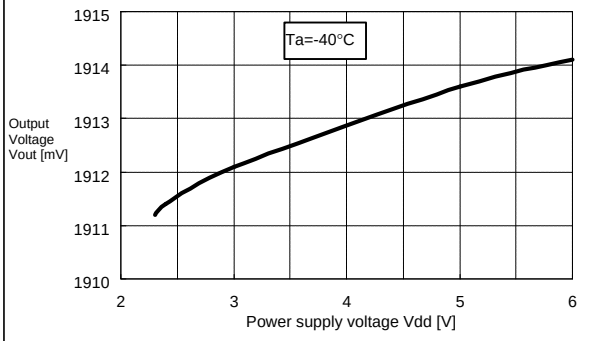
Ambient Temperature (Ta) - Current consumption (Idd typ.)



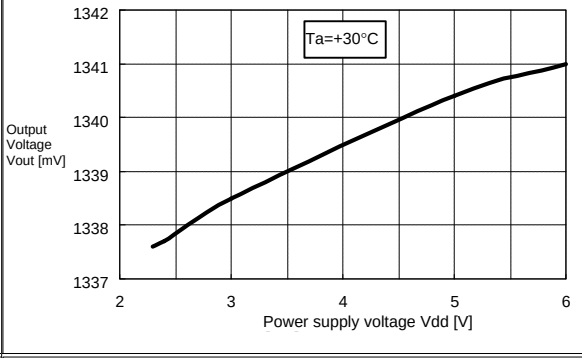
Typical heat response from 25°C air into 100°C air



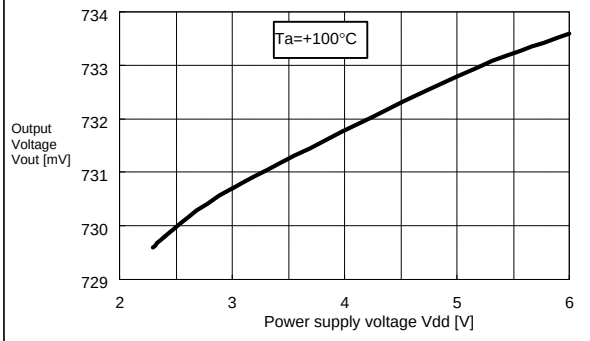
Power supply voltage (Vdd) - Output voltage (Vout typ.)



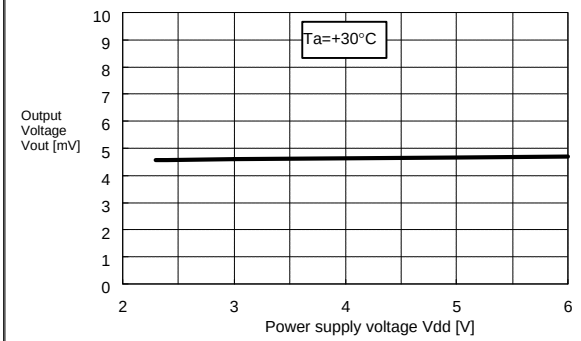
Power supply voltage (Vdd) - Output voltage (Vout typ.)



Power supply voltage (Vdd) - Output voltage (Vout typ.)

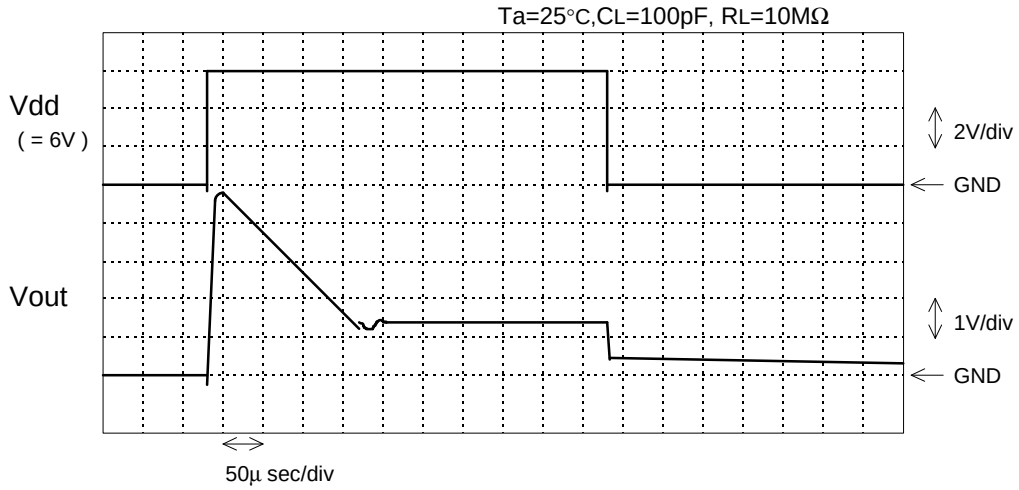


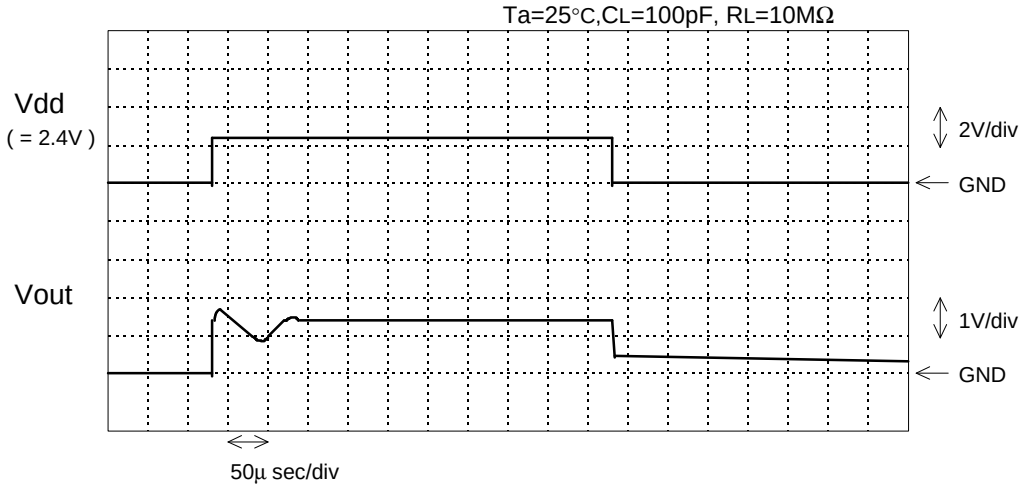
Power supply voltage (Vdd) - Current consumption (Idd typ.)



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Start up response

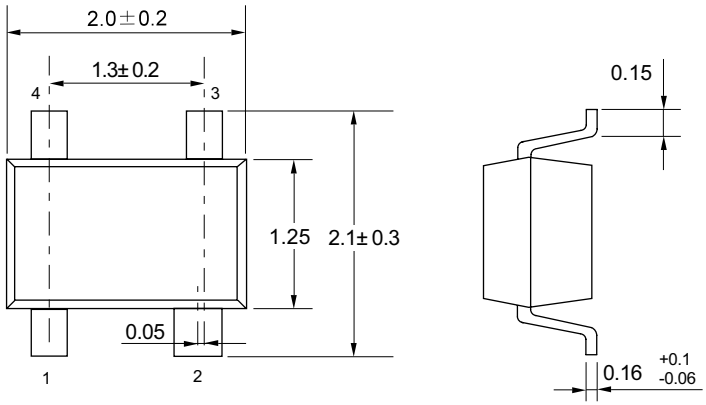




■ SC-82AB

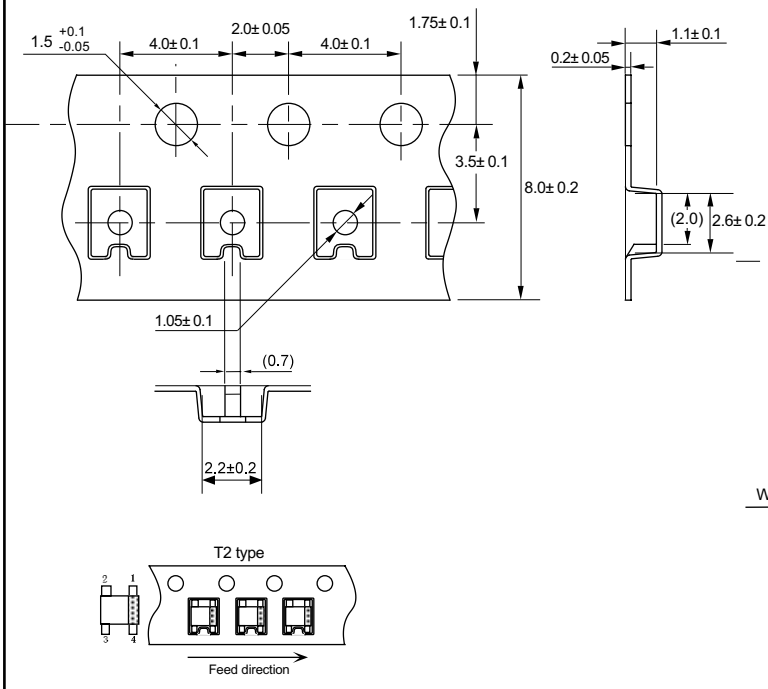
Unit:mm

●Dimensions



No.：NP004-A-P-SD-1.0

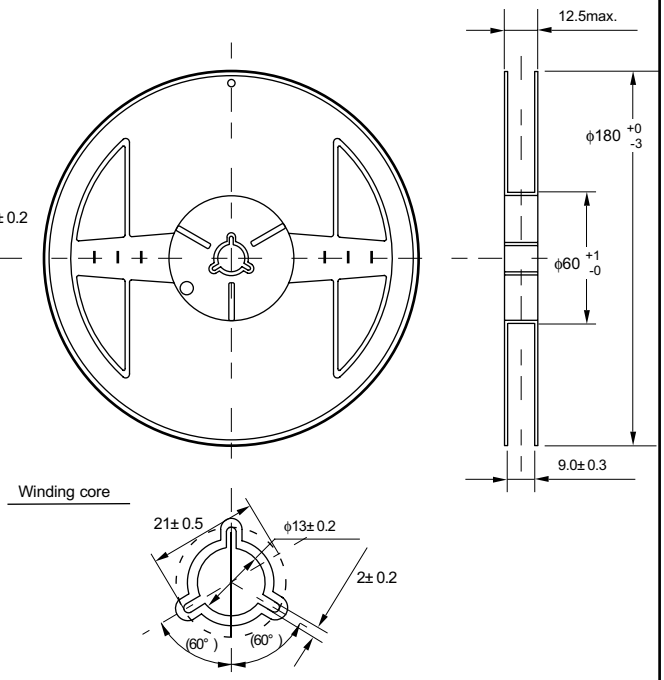
●Taping Specifications



No.：NP004-A-C-SD-1.0

●Reel Specifications

1 reel holds 3000 ICs.



No.：NP004-A-R-SD-1.0

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