NIPPON PRECISION CIRCUITS INC.

SM6610 series

CMOS Monolithic Temperature Sensor IC

OVERVIEW

SM6610 series is high-accuracy temperature sensor IC in the ultra small package.
By using CMOS circuit, it realizes low voltage and low current consumption.
The power down function contributes to decrease the current consumption of application set by activating intermittent function easily.

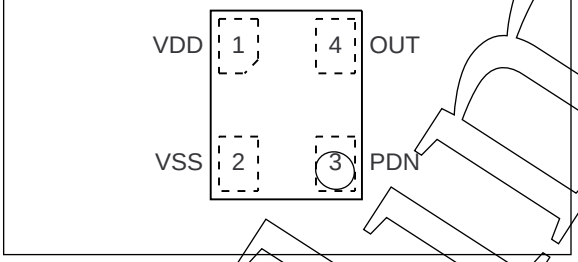
FEATURES

- High linearity: ± 0.5% typ. (Ta = –20 to 80°C)
- Operating temperature range: –40 to 100°C (V_{DD} ≥ 2.7V)
- Maximum output current load: ± 250µA
- Output reference: VSS
- Low current consumption: 5.5µA typ. (Ta = 25°C)
- Low stand-by current: 0.5µA max.
- Very small plastic package: SC82AB
- Very small leadless package: VSP-4
- Power down function
- Molybdenum-gate CMOS Process

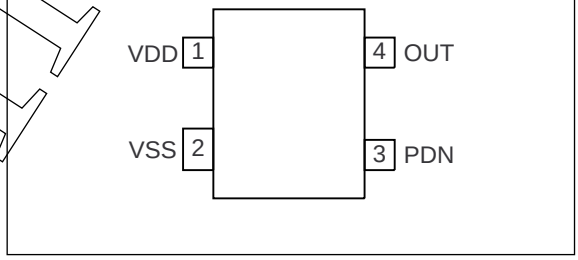
PINOUT

(Top view)

VSP-4



SC82AB



ORDERING INFORMATION

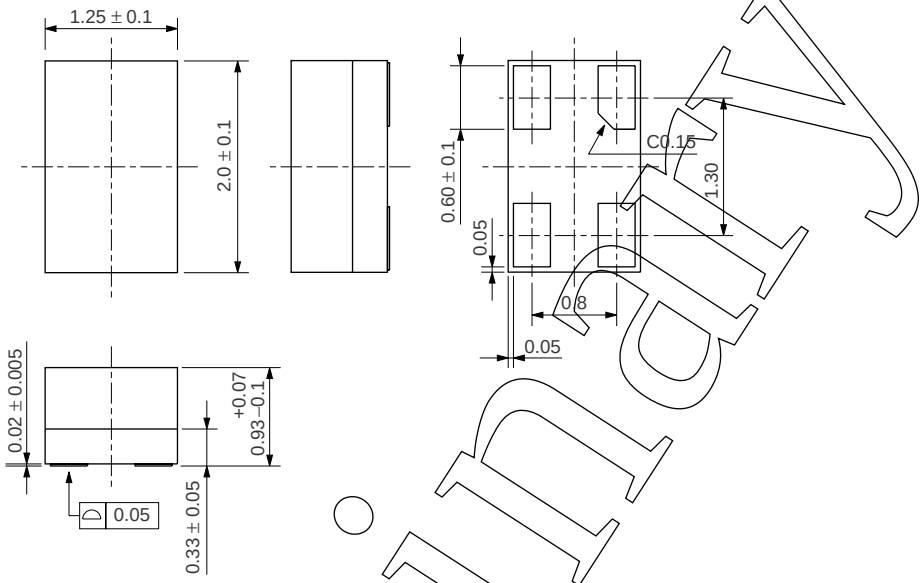
Device	Package	Output center current [V] (Ta = 25°C)	Temperature coefficient [mV/°C]	Operating voltage [V]	Accuracy [°C]
SM6610AH	SC82AB	1.933	– 10.7	4.0 to 6.0	± 5.0
SM6610AD	VSP-4				
SM6610BH	SC82AB	1.449	– 8.2	2.4 to 6.0	± 5.0
SM6610BD	VSP-4				

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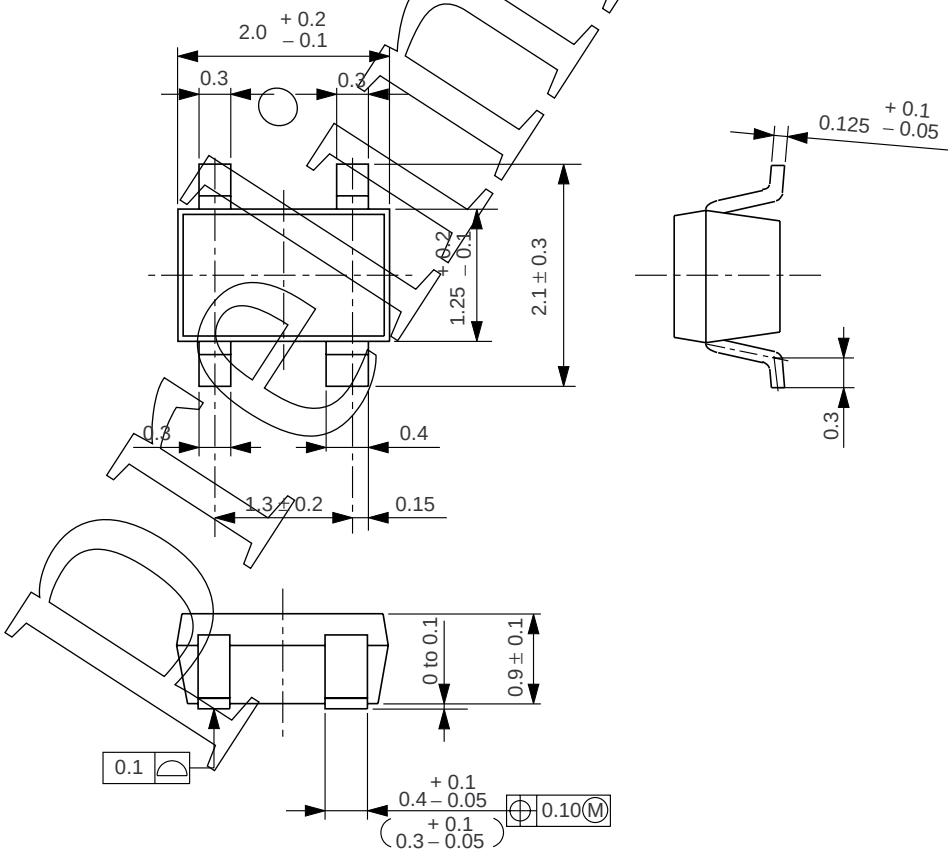
PACKAGE DIMENSIONS

(Unit : mm)

VSP-4

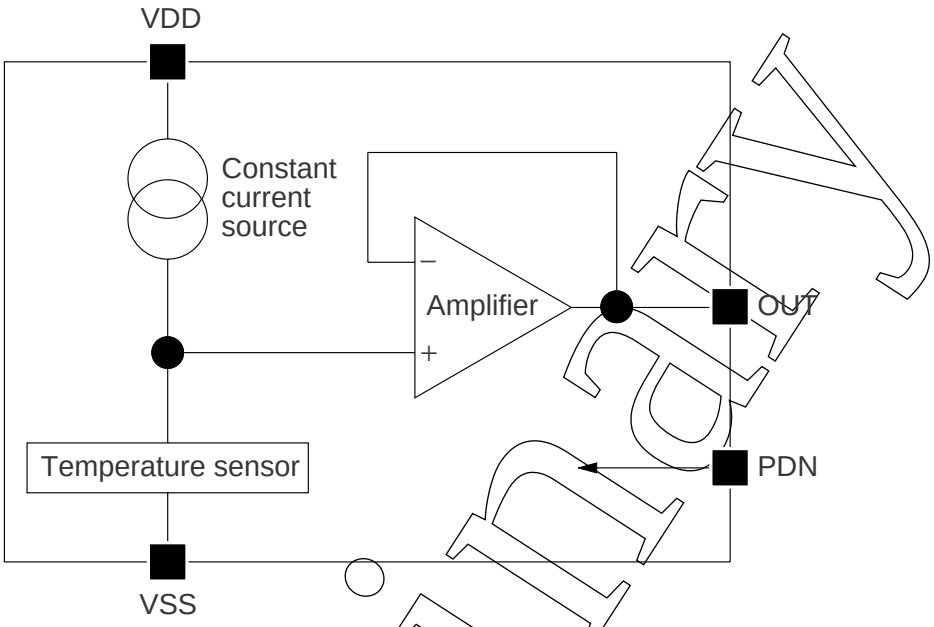


SC82AB



Preliminary

BLOCK DIAGRAM



PIN DESCRIPTION

Number	Name	Description
1	VDD	Positive power supply
2	VSS	Ground
3	PDN[1]	Power down control. Power down when LOW.
4	OUT	Sensor output

1. Connect PDN to VDD when the power down function is not used.

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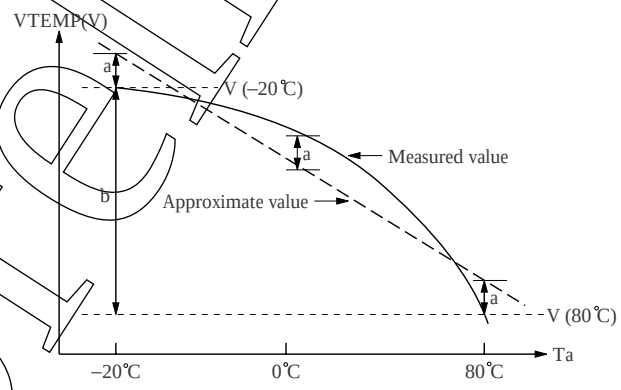
SPECIFICATIONS

DC Characteristics

V_{DD} = 5.0 V, V_{SS} = 0 V, Ta = –40 to 100 °C unless otherwise noted.

Parameter	Symbol	Condition		Rating min	Rating typ	Rating max	Unit
Current consumption	I_{DD}	No load		–	5.5	10.0	µA
Output voltage[1]	V_{OUT}	Ta = – 30 °C	A× version	2.468	2.521	2.574	V
		Ta = + 25 °C		1.880	1.933	1.986	V
		Ta = + 100 °C		1.077	1.130	1.183	V
		Ta = – 30 °C	B× version	1.859	1.900	1.941	V
		Ta = + 25 °C		1.408	1.449	1.490	V
		Ta = + 100 °C		0.793	0.834	0.875	V
Temperature coefficient[1, 2]	T_C	Ta = – 30 to + 100 °C	A× version	–	– 10.7	–	mV/°C
			B× version	–	– 8.2	–	mV/°C
Linearity[3]	N_L	Ta = – 20 to + 80 °C		–	± 0.5	–	%
Maximum capacitive load	C_L			–	–	100	pF
Maximum output current load	I_L	V_{DD} = 2.4V		–	–	± 50	µA
		V_{DD} = 4.5V		–	–	± 250	µA
Start up time	t_D			–	–	300	µs
PDN Input voltage	V_{IH}			V_{DD} – 0.3	–	–	V
	V_{IL}			–	–	V_{SS} + 0.3	V

1. Provisional value
2. Temperature coefficient: $T_C = (V_{OUT}\ (@100°C) - V_{OUT}\ (@-30°C))/130$
3. Linearity: $N_L = (a/b) \times 100$
   a: Maximum deviation between measured and approximate value in the range of – 20 °C to + 80°C.
   b: Measured value difference between the values at – 20 °C and + 80°C.



PRELIMINARY

TYPCAL PERFORMANCE CHARACTERISTICS (Reference value)

SM6610A×

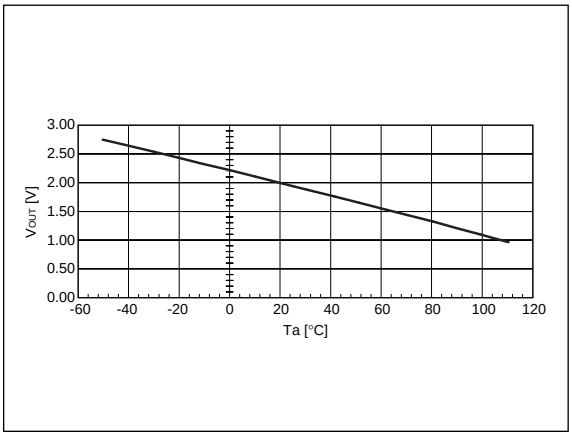


Figure 1. Temperature vs. Output voltage

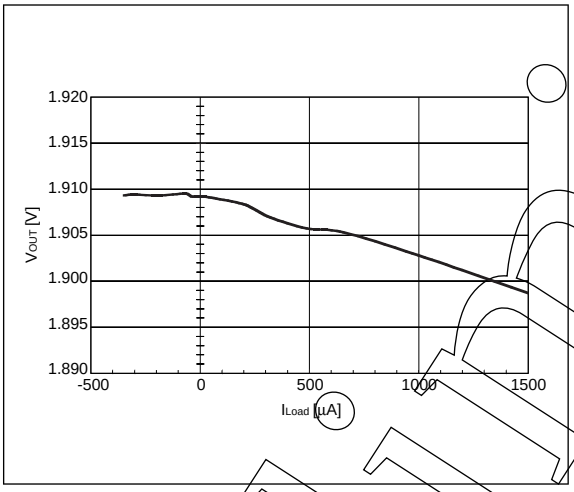


Figure 2. Load current vs. Output voltage
(Ta = 25°C, V_{DD} = 4.0V)

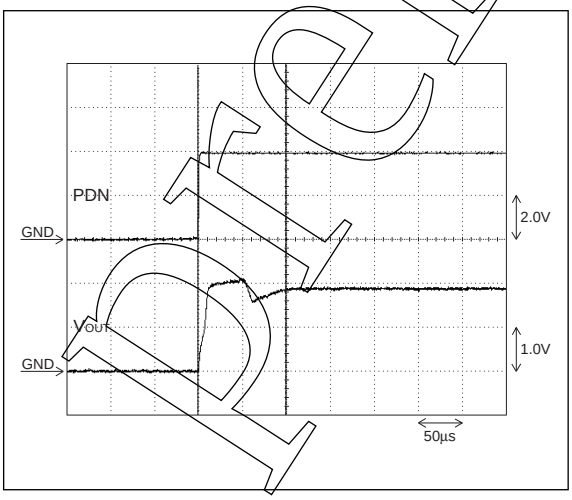


Figure 3. PDN start up response
(Ta = 25°C, V_{DD} = 4.0V, C_L = 100pF)

SM6610B×

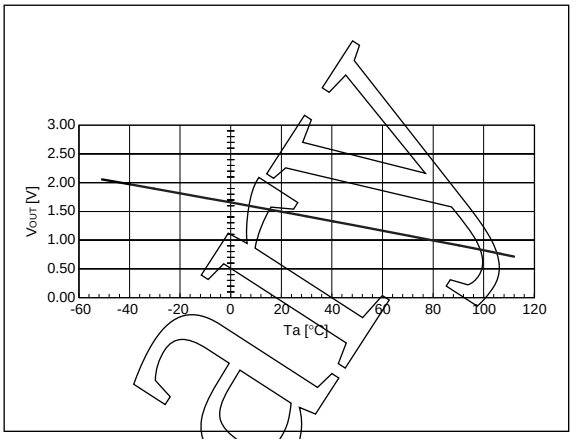


Figure 4. Temperature vs. Output voltage

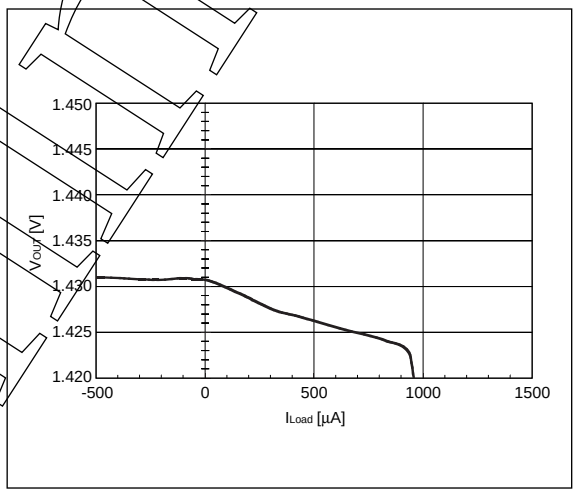


Figure 5. Load current vs. Output voltage
(Ta = 25°C, V_{DD} = 2.4V)

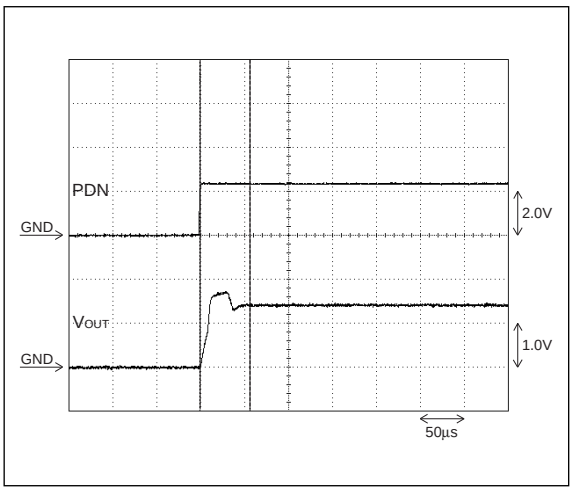


Figure 6. PDN start up response
(Ta = 25°C, V_{DD} = 2.4V, C_L = 100pF)

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NIPPON PRECISION CIRCUITS INC.

NIPPON PRECISION CIRCUITS INC.

4-3, Fukuzumi 2-chome
Koto-ku, Tokyo 135-8430, Japan
Telephone: 03-3642-6661
Facsimile: 03-3642-6698

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