

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.

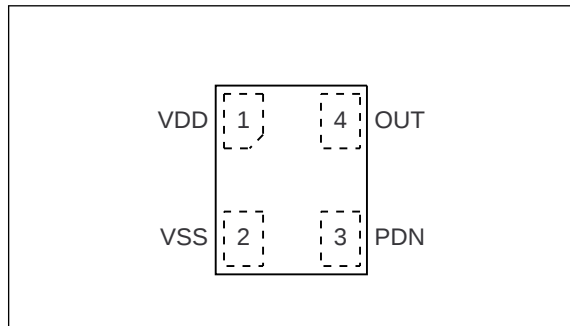
FEATURES

- High linearity: $\pm 0.5\%$ typ. ($T_a = -20$ to 80°C)
- Operating temperature range: -40 to 100°C ($V_{DD} \geq 2.7\text{V}$)
- Maximum output current load: $\pm 250\mu\text{A}$
- Output reference: VSS
- Low current consumption: $5.5\mu\text{A}$ typ. ($T_a = 25^\circ\text{C}$)
- Low stand-by current: $0.5\mu\text{A}$ max.
- Very small plastic package: SC82AB
- Very small leadless package: VSP-4
- Power down function
- Molybdenum-gate CMOS Process

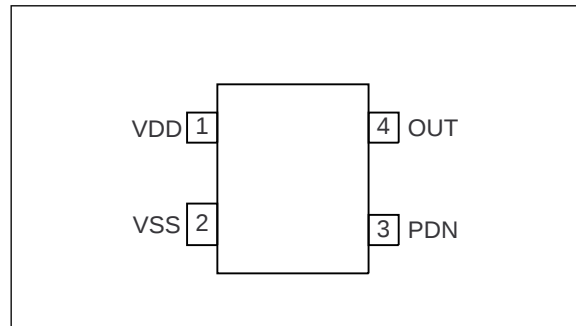
PINOUT

(Top view)

VSP-4



SC82AB



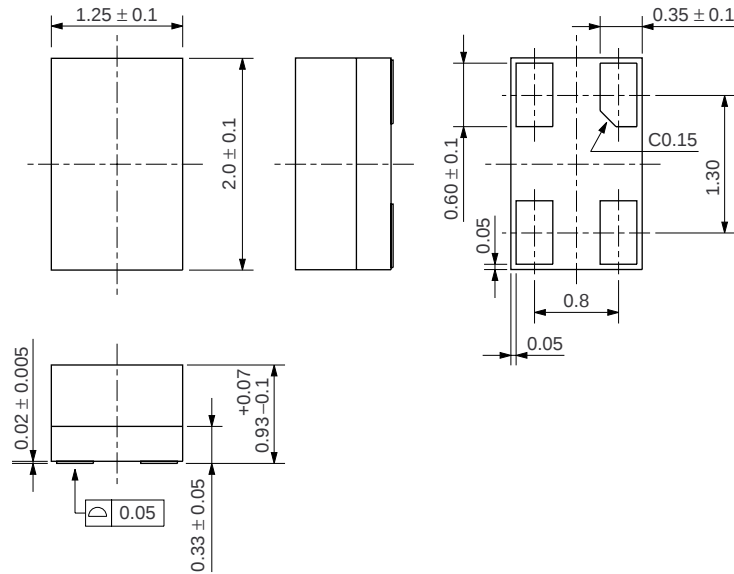
ORDERING INFORMATION

Device	Package	Output center voltage [V] ($T_a = 25^\circ\text{C}$)	Temperature coefficient [mV/ $^\circ\text{C}$]	Operating voltage [V]	Accuracy [$^\circ\text{C}$]
SM6610AH	SC82AB	1.930	- 10.7	4.0 to 5.5	± 5.0
SM6610AD	VSP-4				
SM6610BH	SC82AB	1.450	- 8.2	2.4 to 5.5	± 5.0
SM6610BD	VSP-4				

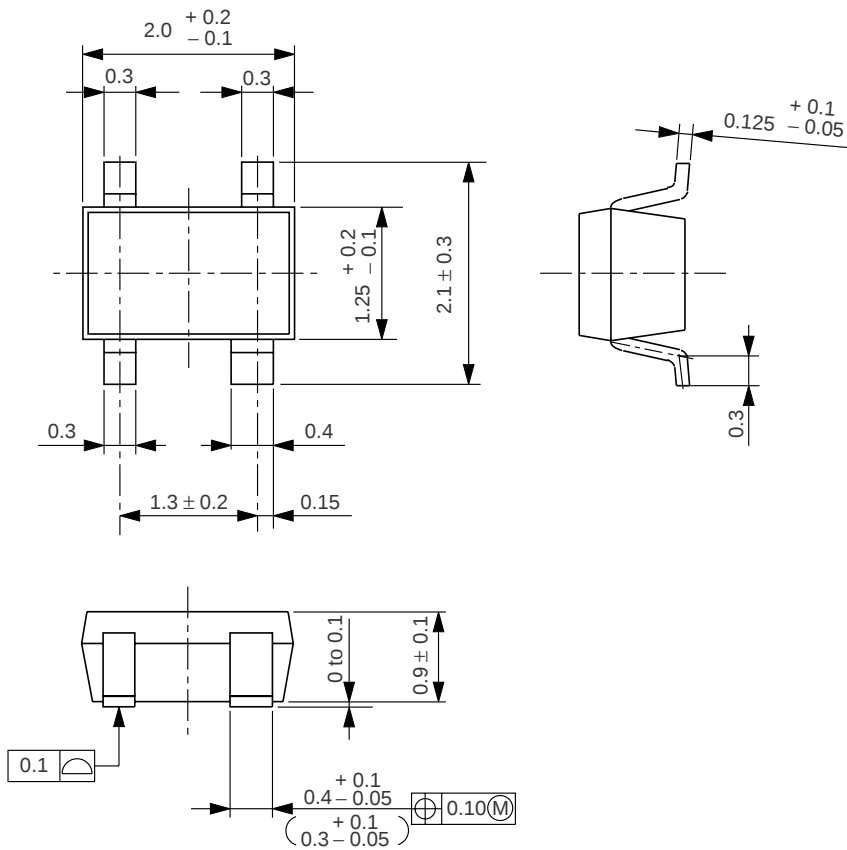
PACKAGE DIMENSIONS

(Unit : mm)

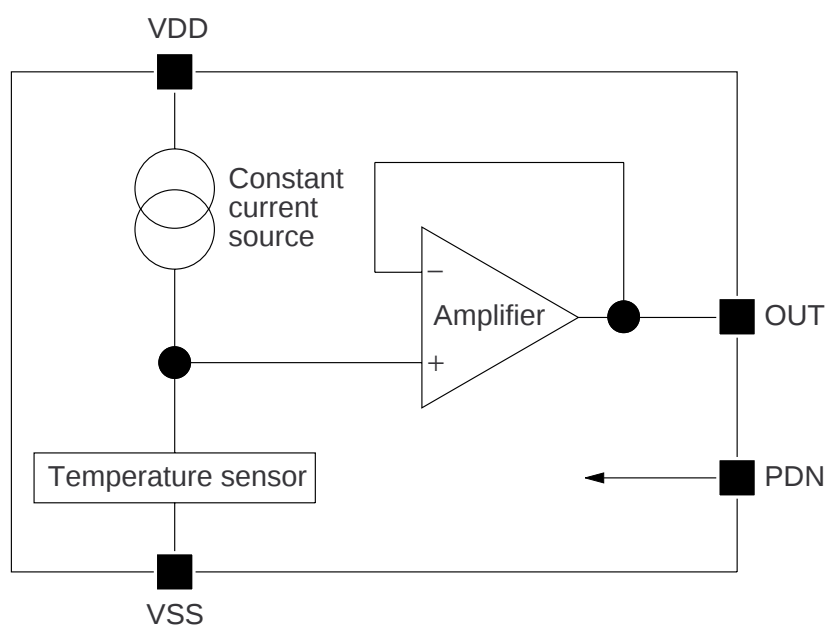
VSP-4



SC82AB



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.

SPECIFICATIONS

Absolute Maximum Ratings

 $V_{SS} = 0V$

Parameter	Symbol	Condition	Rating	Unit
Supply voltage range	V_{DD}		− 0.5 to 7.0	V
Input voltage range	V_{IN}		− 0.5 to $V_{DD} + 0.5$	V
Output voltage range	V_{OUT}		− 0.5 to $V_{DD} + 0.5$	V
Storage temperature range	T_{stg}		− 55 to 125	°C
Power dissipation	P_D		10	mW

Recommended Operating Conditions

 $V_{SS} = 0V$

Parameter	Symbol	Condition		Rating	Unit
Supply voltage range	V_{DD}	A× version		4.0 to 5.5	V
		B× version		2.4 to 5.5	V
Operating temperature range	T_{opr}	A× version		− 40 to 100	°C
		B× version	$V_{DD} = 2.4$ to $2.7V$	− 20 to 100	°C
			$V_{DD} = 2.7$ to $5.5V$	− 40 to 100	°C

DC Characteristics

$V_{DD} = 5.0\text{ V}$, $V_{SS} = 0\text{ V}$, $T_a = -40\text{ to }100\text{ }^{\circ}\text{C}$ unless otherwise noted.

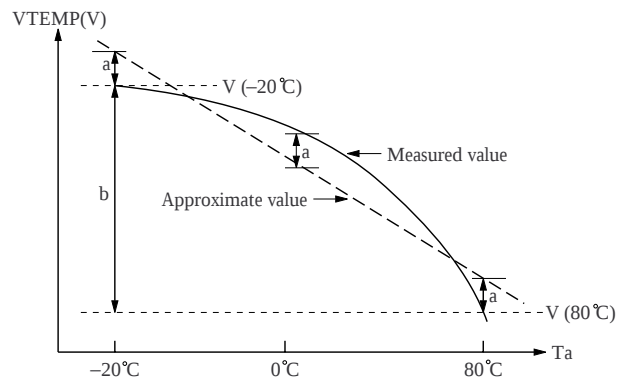
Parameter	Symbol	Condition		Rating			Unit
				min	typ	max	
Current consumption	I _{DD}	No load, Ta = + 25 °C		–	5.5	10.0	μA
Output voltage	V _{OUT}	Ta = – 30 °C	A× version	2.456	2.509	2.563	V
		Ta = + 25 °C		1.877	1.930	1.984	V
		Ta = + 100 °C		1.065	1.118	1.172	V
		Ta = – 30 °C	B× version	1.850	1.891	1.932	V
		Ta = + 25 °C		1.409	1.450	1.491	V
		Ta = + 100 °C		0.784	0.825	0.866	V
Temperature coefficient ¹	T _C	Ta = – 30 to + 100 °C	A× version	– 11.1	– 10.7	– 10.3	mV/°C
			B× version	– 8.5	– 8.2	– 7.9	mV/°C
Linearity ²	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	B× version	–	–	± 50	μA
		V _{DD} = 4.5V	A×, B× version	–	–	± 250	μA
Start up time	t _D	C _L = 100pF		–	–	300	μs
PDN Input voltage	V _{IH}			V _{DD} – 0.3	–	–	V
	V _{IL}			–	–	V _{SS} + 0.3	V

1. Temperature coefficient: $T_C = (V_{OUT} (@100^{\circ}\text{C}) - V_{OUT} (@-30^{\circ}\text{C}))/130$

2. Linearity: $N_L = (a/b) \times 100$

a: Maximum deviation between measured and approximate value in the range of $-20\text{ }^{\circ}\text{C}$ to $+80\text{ }^{\circ}\text{C}$.

b: Measured value difference between the values at $-20\text{ }^{\circ}\text{C}$ and $+80\text{ }^{\circ}\text{C}$.



TYPICAL PERFORMANCE CHARACTERISTICS (Reference value)

SM6610A×

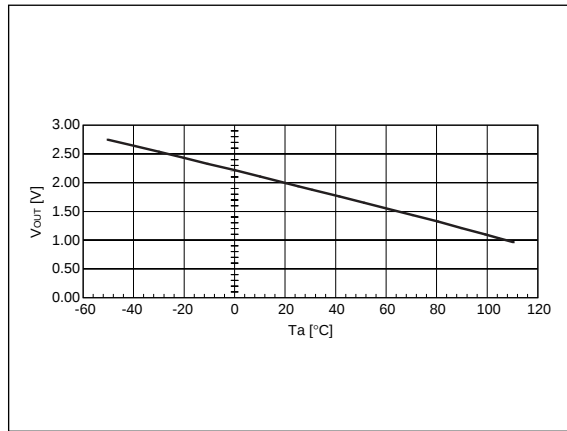


Figure 1. Temperature vs. Output voltage

SM6610B×

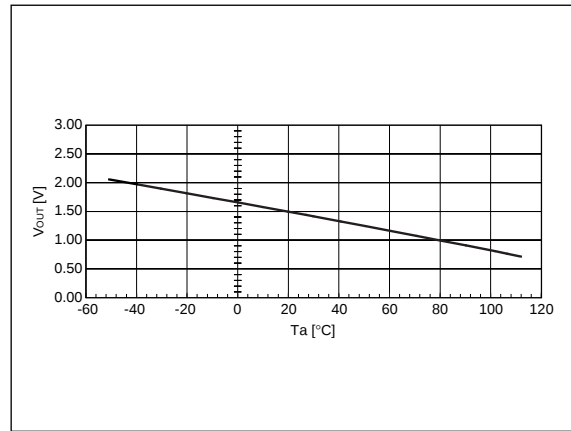
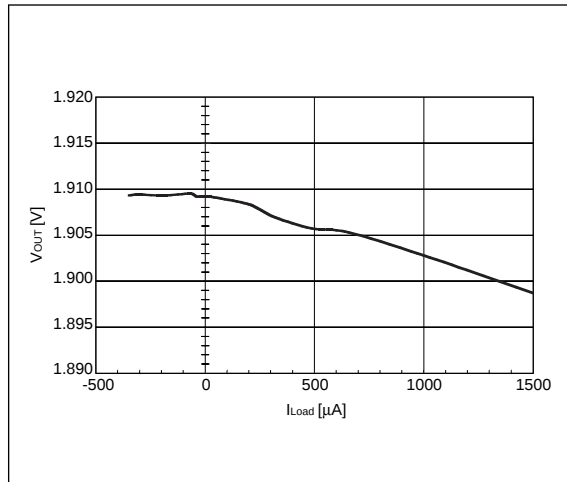
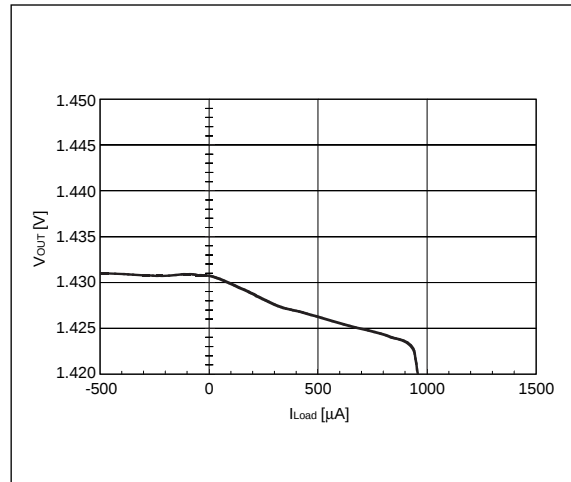
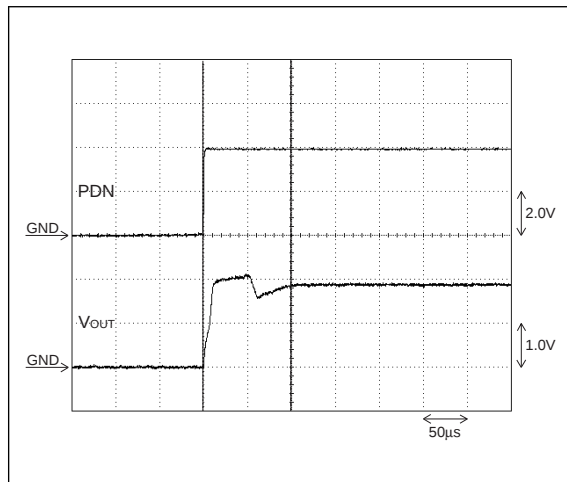
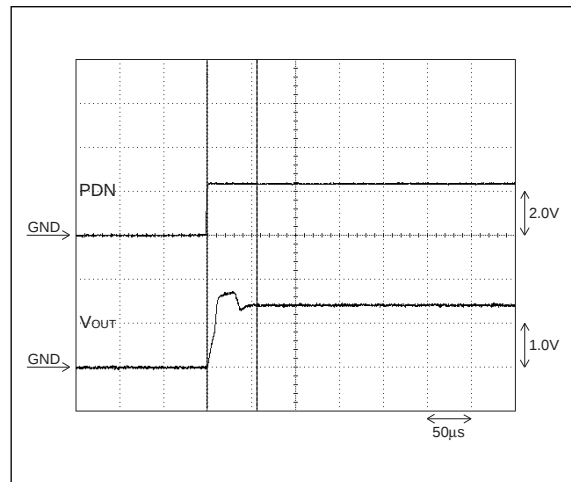


Figure 4. Temperature vs. Output voltage

Figure 2. Load current vs. Output voltage
($T_a = 25^\circ\text{C}$, $V_{DD} = 4.0\text{V}$)Figure 5. Load current vs. Output voltage
($T_a = 25^\circ\text{C}$, $V_{DD} = 2.4\text{V}$)Figure 3. PDN start up response
($T_a = 25^\circ\text{C}$, $V_{DD} = 4.0\text{V}$, $C_L = 100\text{pF}$)Figure 6. PDN start up response
($T_a = 25^\circ\text{C}$, $V_{DD} = 2.4\text{V}$, $C_L = 100\text{pF}$)

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