

# Analog voltage output temperature sensor

## Monolithic IC MM1522XU/XN

### Outline

This is a temperature sensor IC that can obtain +10mV/°C linear output voltage relative to temperature change.

### Features

- |                                  |             |
|----------------------------------|-------------|
| 1. Temperature sensitivity       | ±10mV/°C    |
| 2. Output voltage precision      | +3°C max.   |
| 3. Consumption current           | 70µA typ.   |
| 4. Operating power voltage range | +2.7~+10.0V |
| 5. Operating temperature range   | -40~+125°C  |

### Package

SC-82ABB (MM1522XU)  
SOT-25A (MM1522XN)

### Applications

1. CPU heat protection
2. Battery charger heat protection
3. Cellular phones

### Pin Description

#### SC-82ABB

Pin No.	Pin Name	Function
1	N.C	
2	GND	GND PIN
3	V <sub>CC</sub>	V <sub>CC</sub> PIN
4	V <sub>OUT</sub>	Output PIN

#### SOT-25A

Pin No.	Pin Name	Function
1,3	N.C	
2	GND	GND PIN
4	V <sub>CC</sub>	V <sub>CC</sub> PIN
5	V <sub>OUT</sub>	Output PIN

### Absolute Maximum Ratings (Ta=25°C)

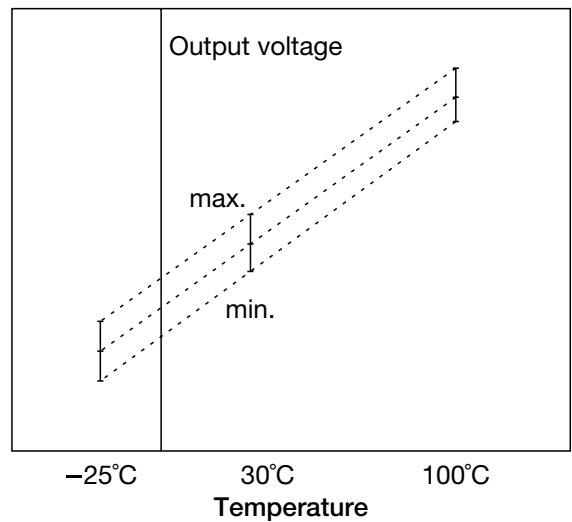
Item	Symbol	Rating	Unit
Storage temperature	T <sub>STG</sub>	-55~+150	°C
Operating temperature	T <sub>OPR</sub>	-40~+125	°C
Supply voltage	V <sub>CC</sub> max.	+13	V
Allowable loss	Pd	154 (SC-82ABB)	mW
		188 (SOT-25A)	

**Electrical Characteristics** (Except where noted otherwise,  $V_{CC}=3V$ ,  $T_a=-25\sim+100^{\circ}C$ ,  $I_{OUT}=0\mu A$ )

Item	Symbol	Measurement Conditions	Min.	Typ.	Max.	Unit
Accuracy	$A_c$	$T_a=-25\sim+100^{\circ}C$			$\pm 3 \star 1$	$^{\circ}C$
Current consumption	$I_{CC}$	$V_{CC}=+2.7\sim+10V$		70	110	$\mu A$
Output voltage $\star 2$	$V_{OUT}$	$T_a=-25^{\circ}C$	0.24	0.27	0.30	V
		$T_a=+30^{\circ}C$	0.79	0.82	0.85	V
		$T_a=+100^{\circ}C$	1.49	1.52	1.55	V
Temperature sensitivity $\star 3$	$V_{SE}$			$10 \star 1$		$mV/^{\circ}C$
Nonlinearity $\star 4$	$\Delta NL$				$\pm 0.8 \star 1$	$^{\circ}C$
Line regulation	LineReg	$T_a=+30^{\circ}C$ $V_{CC}=+2.7\sim+10V$		0	$\pm 1.0$	$mV/V$
Load regulation	LoadReg	$T_a=+30^{\circ}C$ $I_{OUT}=0\sim 400\mu A$		0	1	$\mu V/\mu A$
Temperature sensitivity of current consumption	$I_{SE}$	$T_a=-40\sim+125^{\circ}C$		$0.2 \star 1$		$\mu A/^{\circ}C$

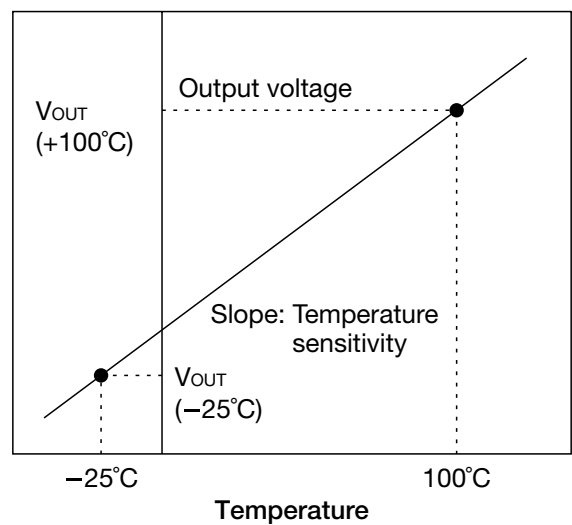
Note:  $\star 1$  Design assurance value

Note:  $\star 2$  Output voltage:  $V_{OUT}$   
Terminal voltage at the time of  $T_a=-25^{\circ}C$ ,  $30^{\circ}C$  and  $100^{\circ}C$ .



Note:  $\star 3$  Temperature Sensitivity:  $V_{SE}$   
Temperature coefficient of output voltage calculated from output voltage at the time of  $T_a=-25^{\circ}C$  and  $+100^{\circ}C$ .

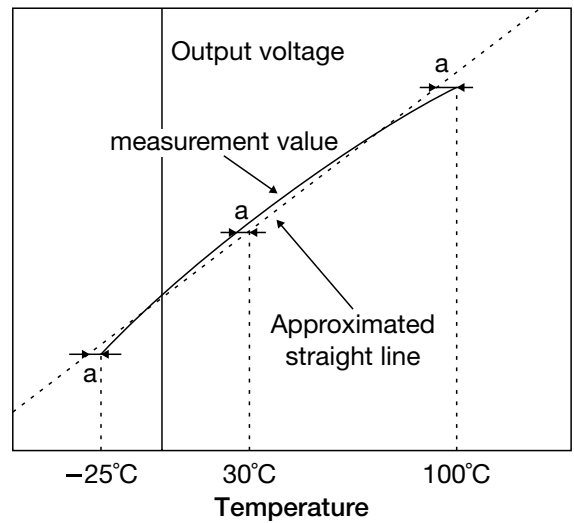
$$V_{SE}=(V_{OUT}(100^{\circ}C)-V_{OUT}(-25^{\circ}C))/125$$



Note: \*4 Nonlinearity:  $\Delta NL$

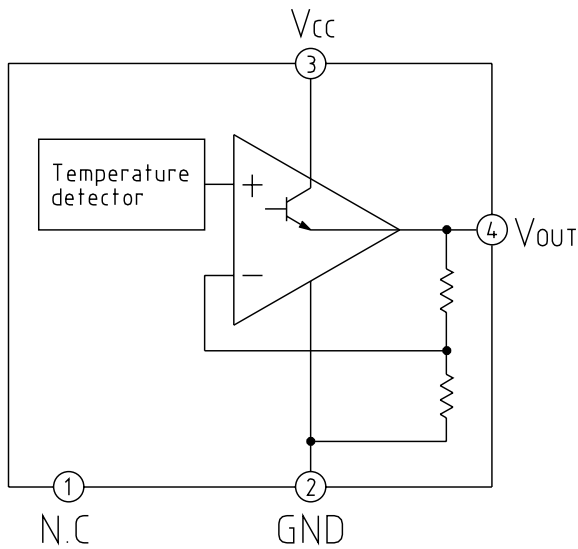
Characteristic curve of output voltage and deflection with the approximation straight line.

In temperature range from  $-25$  to  $+100^{\circ}\text{C}$ , the approximation straight line and the maximum deflection of the temperature of the measurement value among output voltages obtained from the approximation straight line. It assumes the approximation straight line to be a straight line to which a is minimized.

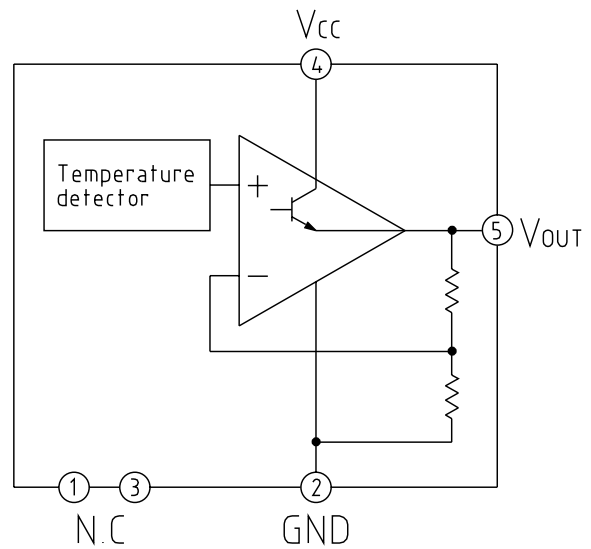


### Block Diagram

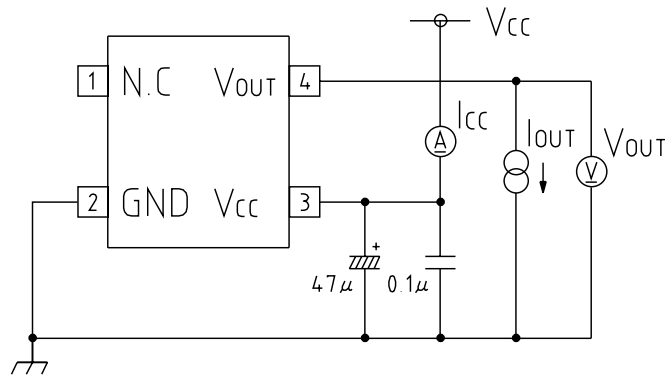
#### MM1522XU



#### MM1522XN

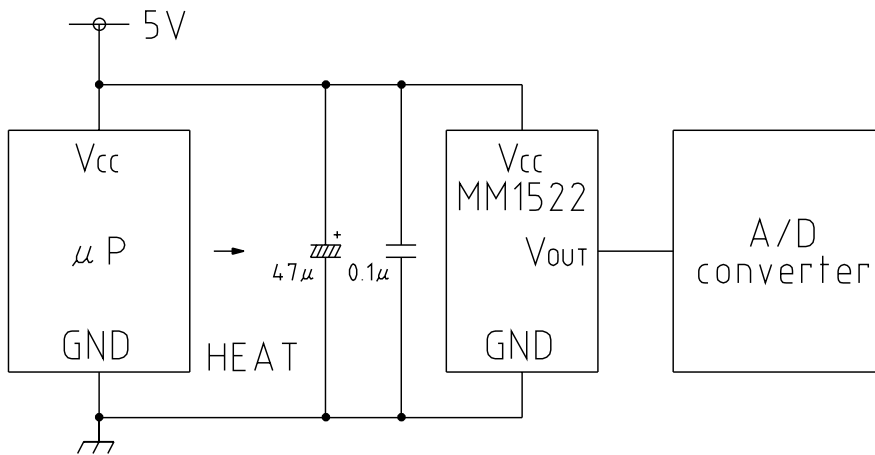


Measuring Circuit



Application Circuits

Thermal watch of Microprocessor



Thermal watch of Battery Cell

