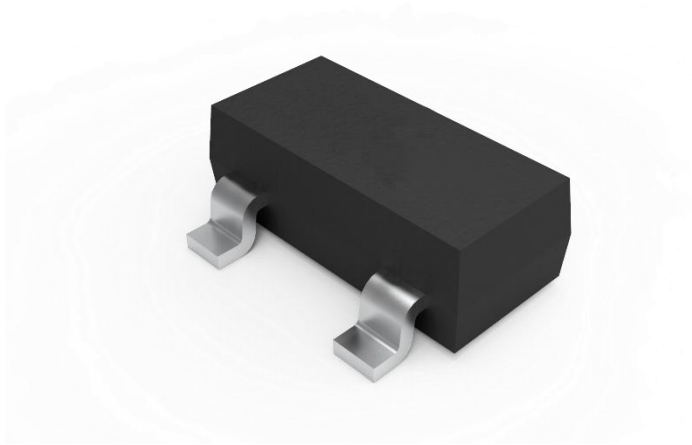


# SST-AM10

## Analog output temperature sensor



### PRODUCTS FEATURES

- Operating voltage: 1.8V to 5.5V
- Average Quiescent current - 7 $\mu$ A
- Temperature accuracy:  $\pm 0.35^{\circ}\text{C}$  (Max.) from  $10^{\circ}\text{C}$  to  $30^{\circ}\text{C}$  (K version);  $\pm 1^{\circ}\text{C}$  (Max.) from  $-50^{\circ}\text{C}$  to  $150^{\circ}\text{C}$  (K version);  $\pm 1.5^{\circ}\text{C}$  (Max.) from  $10^{\circ}\text{C}$  to  $50^{\circ}\text{C}$  (Non K version);  $\pm 3.5^{\circ}\text{C}$  (Max.) from  $-40^{\circ}\text{C}$  to  $125^{\circ}\text{C}$  (Non K version);
- Multi option for slope gain (mV/ $^{\circ}\text{C}$ )
- Output short protection
- Temperature range:  $-50^{\circ}\text{C}$ ~ $+150^{\circ}\text{C}$

# SST-AM10

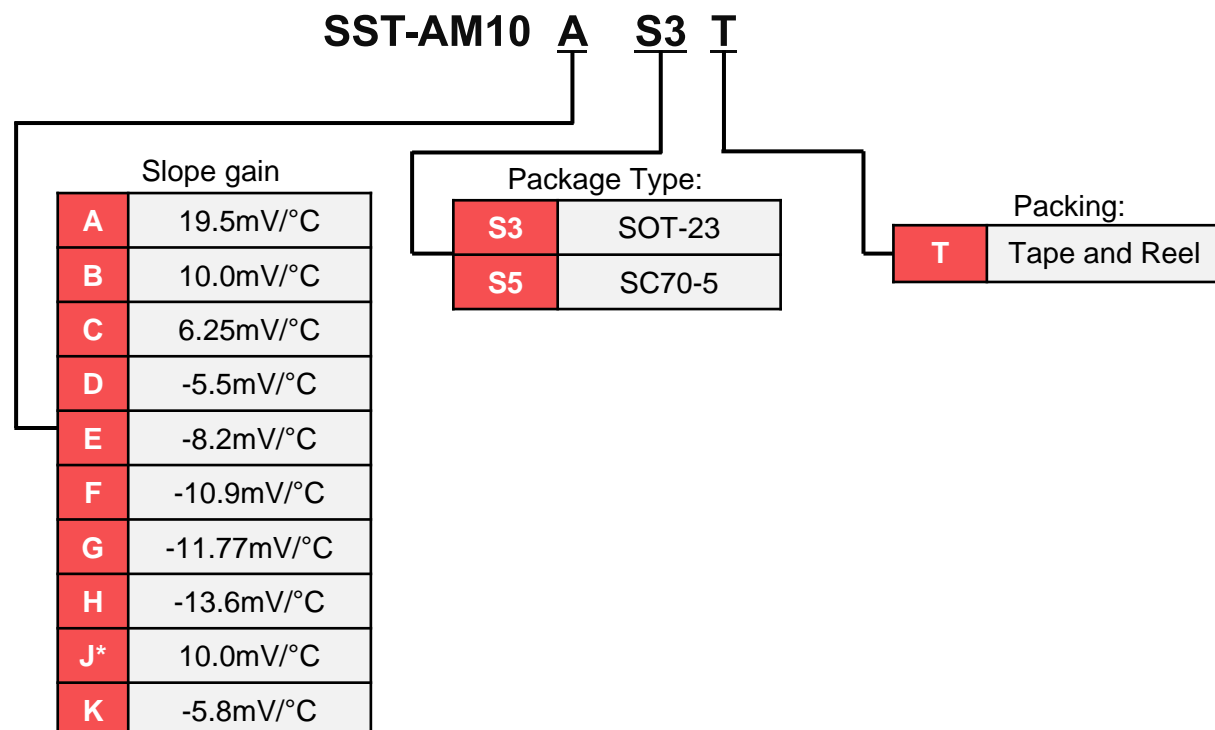
Analog output temperature sensor

## 1. Product model code table

Example:

Series Analog output temperature sensor:

SST-AM10



\* For J version, output voltage is 750mV at Ta = 25°C, for B version, output voltage is 850mV at Ta = 25°C. For other slope gain version unlisted above, please contact with us.

# SST-AM10

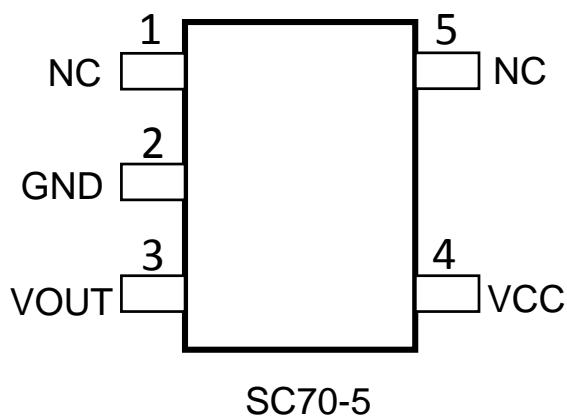
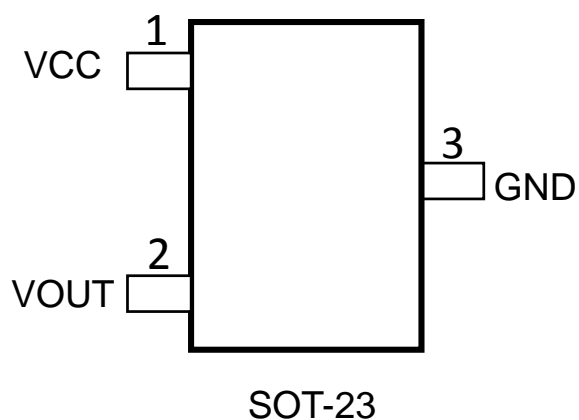
## Analog output temperature sensor

Order PN	Slope Gain [mV/°C]	Package	Operation Temperature
SST-AM10AS3T	19.5	SOT-23	-50°C ~ +150°C
SST-AM10BS3T	10.0	SOT-23	-50°C ~ +150°C
SST-AM10CS3T	6.25	SOT-23	-50°C ~ +150°C
SST-AM10DS3T	-5.5	SOT-23	-50°C ~ +150°C
SST-AM10ES3T	-8.2	SOT-23	-50°C ~ +150°C
SST-AM10FS3T	-10.9	SOT-23	-50°C ~ +150°C
SST-AM10GS3T	-11.77	SOT-23	-50°C ~ +150°C
SST-AM10HS3T	-13.6	SOT-23	-50°C ~ +150°C
SST-AM10JS3T	10.0	SOT-23	-50°C ~ +150°C
SST-AM10KS3T	-5.8	SOT-23	-50°C ~ +150°C
SST-AM10AS5T	19.5	SC70-5	-50°C ~ +150°C
SST-AM10BS5T	10.0	SC70-5	-50°C ~ +150°C
SST-AM10CS5T	6.25	SC70-5	-50°C ~ +150°C
SST-AM10DS5T	-5.5	SC70-5	-50°C ~ +150°C
SST-AM10ES5T	-8.2	SC70-5	-50°C ~ +150°C
SST-AM10FS5T	-10.9	SC70-5	-50°C ~ +150°C
SST-AM10GS5T	-11.77	SC70-5	-50°C ~ +150°C
SST-AM10HS5T	-13.6	SC70-5	-50°C ~ +150°C
SST-AM10JS5T	10.0	SC70-5	-50°C ~ +150°C
SST-AM10KS5T	-5.8	SC70-5	-50°C ~ +150°C

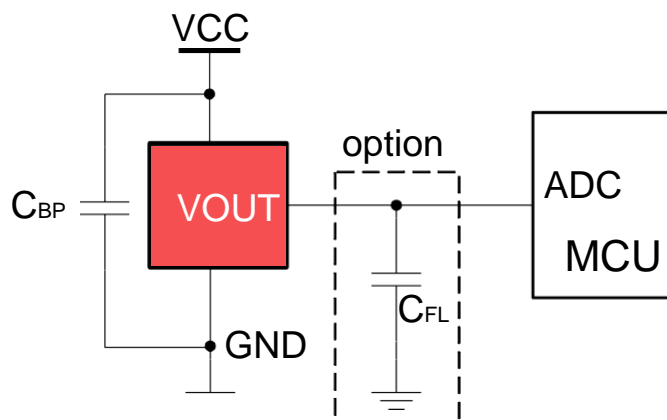
# SST-AM10

Analog output temperature sensor

## 2. Pin configurations (Top view)



## 3. Typical application

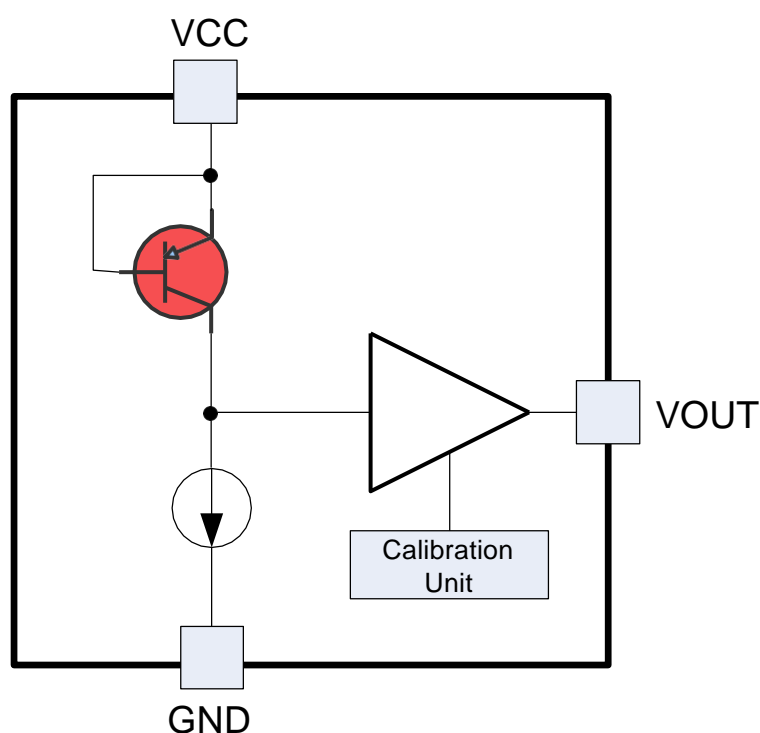


# SST-AM10

Analog output temperature sensor

PIN No.		PIN Name	Description
SOT-23	SC70-5		
1	4	VCC	Power supply input pin, it should connect a 100nF to 1.0uF ceramic cap to ground close to the sensor.
2	3	VOUT	Analog voltage output pin, proportional to temperature.
3	2	GND	Ground pin.
	1, 5	NC	No connection

## 4. Function block



# SST-AM10

## Analog output temperature sensor

### 5. Technical parameters

#### Absolute maximum ratings

Parameter	Symbol	Value	Unit
Supply Voltage	$V_{CC}$ to GND	-0.3 to 5.5	V
Output pin Voltage	$V_{OUT}$ to GND	-0.3 to 5.5	V
Operation junction temperature	$T_J$	-50 to 150	°C
Storage temperature Range	$T_{STG}$	-65 to 150	°C
Lead Temperature (Soldering, 10 Seconds)	$T_{LEAD}$	260	°C
ESD MM	$ESD_{MM}$	400	V
ESD HBM	$ESD_{HBM}$	4000	V
ESD CDM	$ESD_{CDM}$	1000	V

Note: Stresses greater than those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only. Functional operation of the device at the "Absolute Maximum Ratings" conditions or any other conditions beyond those indicated under "Recommended Operating Conditions" is not recommended. Exposure to Absolute Maximum Ratings" for extended periods may affect device reliability.

Using 2oz dual layer (Top, Bottom) FR4 PCB with 4x4 mm<sup>2</sup> cooper as thermal PAD

#### Recommended operating conditions

Parameter	Symbol	Value	Unit
Supply Voltage	$V_{CC}$	1.8 ~ 5.5	V
Ambient Operation Temperature Range	$T_A$	-50 ~ +150	°C

# SST-AM10

## Analog output temperature sensor

### Electrical characteristics

Test Conditions:  $V_{CC}=3.3V$ ,  $T_A=25^{\circ}C$ . Unless otherwise specified.

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit	
Supply Voltage <sup>1</sup>	$V_{CC}$	(Note 3)	1.8		5.5	V	
Temperature Accuracy <sup>2</sup>	$T_{AC}$	K version <sup>2</sup>	$T_A = 10^{\circ}C$ to $30^{\circ}C$	-0.35	$\pm 0.15$	0.35	$^{\circ}C$
			$T_A = -50^{\circ}C$ to $150^{\circ}C$	-1.0	$\pm 0.35$	1.0	$^{\circ}C$
		Non K version	$T_A = 10^{\circ}C$ to $50^{\circ}C$	-1.5	$\pm 0.5$	1.5	$^{\circ}C$
			$T_A = -40^{\circ}C$ to $125^{\circ}C$	-3.5	$\pm 1.0$	3.5	$^{\circ}C$
			$T_A = -50^{\circ}C$ to $150^{\circ}C$		$\pm 2.0$		$^{\circ}C$
Slope Gain	Gain	SST-AM10A		19.5		mV/ $^{\circ}C$	
		SST-AM10B, SST-AM10J		10.0		mV/ $^{\circ}C$	
		SST-AM10C		6.25		mV/ $^{\circ}C$	
		SST-AM10D		-5.5		mV/ $^{\circ}C$	
		SST-AM10E		-8.2		mV/ $^{\circ}C$	
		SST-AM10F		-10.9		mV/ $^{\circ}C$	
		SST-AM10G		-11.77		mV/ $^{\circ}C$	
		SST-AM10H		-13.6		mV/ $^{\circ}C$	
Output Voltage <sup>3</sup> @ $T = 25^{\circ}C$	$V_{T25}$	SST-AM10A		887.5		mV	
		SST-AM10B		850		mV	
		SST-AM10C		580		mV	
		SST-AM10D		895.5		mV	
		SST-AM10E		1365		mV	
		SST-AM10F		1834.5		mV	
		SST-AM10G		1574		mV	
		SST-AM10H		2293		mV	
		SST-AM10J		750		mV	
		SST-AM10K		1914.7		mV	
Supply Current	$I_{CC}$			7.0	12	$\mu A$	
Line Regulation		$V_{CC}$ change from Min. voltage to 5.0V		0.3		mV/V	
Output Resistance	$R_O$	$I_{LOAD} = -500\mu A$ to $500\mu A$		1		ohm	
Maximum Capacitive Load				1000		pF	

# SST-AM10

## Analog output temperature sensor

Note: 1) The Min. supply voltage is always 250mV higher than that of output voltage at least, see below table for each part.

2) Temperature error is defined the temperature difference between temperature-to-voltage transfer function based on Table 1 and absolute temperature. K version means SST-AM10K, which is better temperature accuracy performance than other slope gain version.

3) For SST-AM10J, slope gain is 10.0mV/°C, Vout at Ta = -25°C, is 250mV.



# SST-AM10

Analog output temperature sensor

## 6.Function dependencies

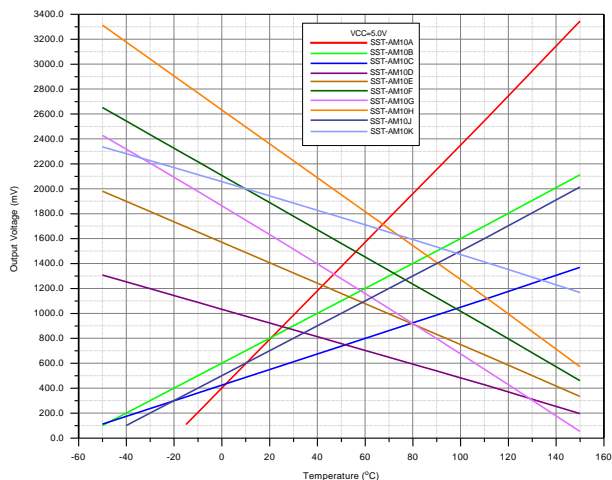


Figure 1. Output voltage vs temperature

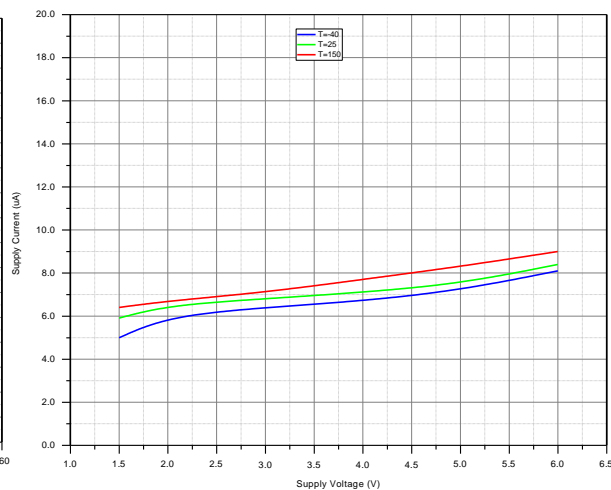


Figure 2. Supply current vs supply voltage

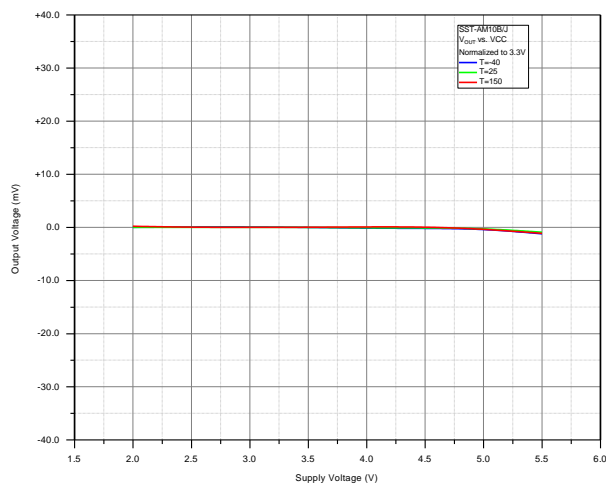


Figure 3. Output voltage vs supply voltage

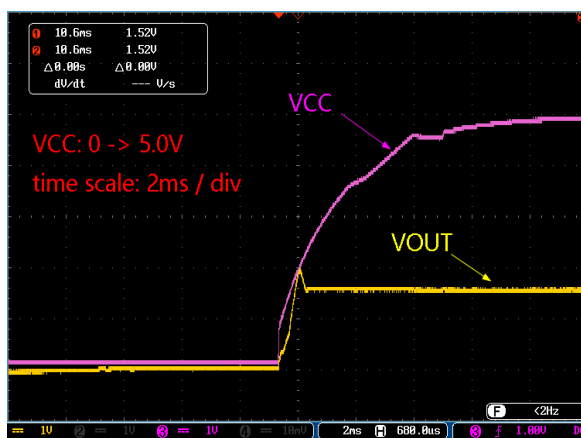


Figure 4. Output voltage vs supply voltage (power on)

# SST-AM10

## Analog output temperature sensor

### 7.Function description

The chip is an analog output temperature sensor with optimized thermal diode as temperature-sensing device. Also the chip has a class-AB output stage with buffer which can offer 500uA source/sink capability. Also SST-AM10 serial chips can offer several kinds of slope gain distinguished by suffix A to H, J and K.

#### 7.1 Temperature-to-Voltage transfer function

It is recommended to use below transfer function to express the relationship between temperature and output voltage. For SST-AM10A/B/C/D/E/F/H/J, to use 1st order equation; for SST-AM10G, SST-AM10K, prefer to use 2nd order equation.

Part No.	Temperature Range	Output Voltage (unit: mV) <sup>NOTE4</sup>	Temperature (unit:°C) <sup>NOTE4</sup>
SST-AM10A	-40°C~150°C	$V_o = 19.5 * T + 400$	$T = (V_o - 400) / 19.5$
SST-AM10B	-40°C~150°C	$V_o = 10.0 * T + 600$	$T = (V_o - 600) / 10.0$
SST-AM10C	-40°C~150°C	$V_o = 6.25 * T + 424$	$T = (V_o - 424) / 6.25$
SST-AM10D	-40°C~110°C	$V_o = -5.5 * T + 1033$	$T = (V_o - 1033) / (-5.5)$
	110°C~150°C	$V_o = -5.8 * (T - 110) + 428$	$T = (V_o - 428) / (-5.8) + 110$
SST-AM10E	-40°C~110°C	$V_o = -8.2 * T + 1570$	$T = (V_o - 1570) / (-8.2)$
	110°C~150°C	$V_o = -8.35 * (T - 110) + 668$	$T = (V_o - 668) / (-8.35) + 110$
SST-AM10F	-40°C~110°C	$V_o = -10.9 * T + 2107$	$T = (V_o - 2107) / (-10.9)$
	110°C~150°C	$V_o = -11.2 * (T - 110) + 908$	$T = (V_o - 908) / (-11.2) + 110$
SST-AM10G	-40°C~150°C	$V_o = -0.00388 * T^2 - 11.5 * T + 1863.9$	$T = -1481.96 + \sqrt{2.1962 * 10^6 + (1863.9 - V_o) / (3.88 * 10^{-3})}$
SST-AM10H	-40°C~110°C	$V_o = -13.6 * T + 2633$	$T = (V_o - 2633) / (-13.6)$
	110°C~150°C	$V_o = -14.1 * (T - 110) + 1137$	$T = (V_o - 1137) / (-14.1) + 110$
SST-AM10J	-40°C~110°C	$V_o = 10.0 * T + 500$	$T = (V_o - 500) / 10.0$
	110°C~150°C	$V_o = 10.35 * (T - 110) + 1600$	$T = (V_o - 1600) / 10.35 + 110$
SST-AM10K	-40°C~150°C	$V_o = -0.00174 * T^2 - 5.666 * T + 2057.4$	$T = -1628.16 + \sqrt{2.65098 * 10^6 + (2057.4 - V_o) / (1.74 * 10^{-3})}$

Note 4: Here T is temperature with Celsius degree, Vo unit is mV

# SST-AM10

## Analog output temperature sensor

Temperature data look-up

Due to different gain slope, there is different working temperature range.

Series - SST-AM10 – “S”

Temperature (°C)	SA	SB	SC	SD	SE	SF	SG	SH	SJ	SK
150	3325	2100	1361.5	196	334	460	51.6	573	2014	1168.4
140	3130	2000	1299	254	417.5	572	177.8	714	1910.5	1230.1
130	2935	1900	1236.5	312	501	684	303.3	855	1807	1291.4
120	2740	1800	1174	370	584.5	796	428	996	1703.5	1352.4
110	2545	1700	1111.5	428	668	908	552	1137	1600	1413.1
100	2350	1600	1049	483	750	1017	675.1	1273	1500	1473.4
90	2155	1500	986.5	538	832	1126	797.5	1409	1400	1533.4
80	1960	1400	924	593	914	1235	919.1	1545	1300	1593
70	1765	1300	861.5	648	996	1344	1039.9	1681	1200	1652.3
60	1570	1200	799	703	1078	1453	1159.9	1817	1100	1711.2
50	1375	1100	736.5	758	1160	1562	1279.2	1953	1000	1769.8
40	1180	1000	674	813	1242	1671	1397.7	2089	900	1828
30	985	900	611.5	868	1324	1780	1515.4	2225	800	1885.9
20	790	800	549	923	1406	1889	1632.3	2361	700	1943.4
10	595	700	486.5	978	1488	1998	1748.5	2497	600	2000.6
0	400	600	424	1033	1570	2107	1863.9	2633	500	2057.4
-10	205	500	361.5	1088	1652	2216	1978.5	2769	400	2113.9
-15	107.5	450	330.3	1115.5	1693	2270.5	2035.5	2837	350	2142
-20	--	400	299	1143	1734	2325	2092.3	2905	300	2170
-30	--	300	236.5	1198	1816	2434	2205.4	3041	200	2225.8
-40	--	200	174	1253	1898	2543	2317.7	3177	100	2281.3
-50	--	100	111.5	1306	1973	2644	2429.2	3308	--	2336.4

# SST-AM10

## Analog output temperature sensor

### 7.2 Minimum supply voltage

Since the chip output is analog voltage, and changed versus temperature with different slope. The minimum supply voltage is different at different temperature shown as below table for each version.

Temperature (°C)	Minimum Supply Voltage (V)									
	SA	SB	SC	SD	SE	SF	SG	SH	SJ	SK
+150	Vout+0.15	Vout+0.18	1.8	1.8	1.8	1.8	1.8	1.8	Vout+0.18	1.8
+125	Vout+0.19	Vout+0.25	1.8	1.8	1.8	1.8	1.8	1.8	Vout+0.25	1.8
+100	Vout+0.21	1.8	1.8	1.8	1.8	1.8	1.8	Vout+0.77	1.8	1.8
+75	Vout+0.24	1.8	1.8	1.8	1.8	1.8	1.8	Vout+0.66	1.8	1.8
+50	1.8	1.8	1.8	1.8	1.8	Vout+0.5	Vout+0.63	Vout+0.58	1.8	Vout+0.20
+25	1.8	1.8	1.8	1.8	1.8	Vout+0.4	Vout+0.54	Vout+0.51	1.8	Vout+0.25
0	1.8	1.8	1.8	1.8	1.8	Vout+0.3	Vout+0.44	Vout+0.44	1.8	Vout+0.30
-25.0	1.8	1.9*	1.8	1.8	Vout+0.23	Vout+0.3	Vout+0.35	Vout+0.36	1.9*	Vout+0.30
-50.0	1.8	2.0*	1.9*	1.9*	Vout+0.23	Vout+0.26	Vout+0.26	Vout+0.29	2.0*	Vout+0.30

\* For SST-AM10B/J (SB/SJ) version, it is better to apply 2.0V at T=-50°C, 1.9V at T = -25°C to keep enough margin; For SST-AM10C/D (SC/SD) version, it is better to apply 2.0V at T = -50°C, 1.9V at T = -25°C to keep enough margin

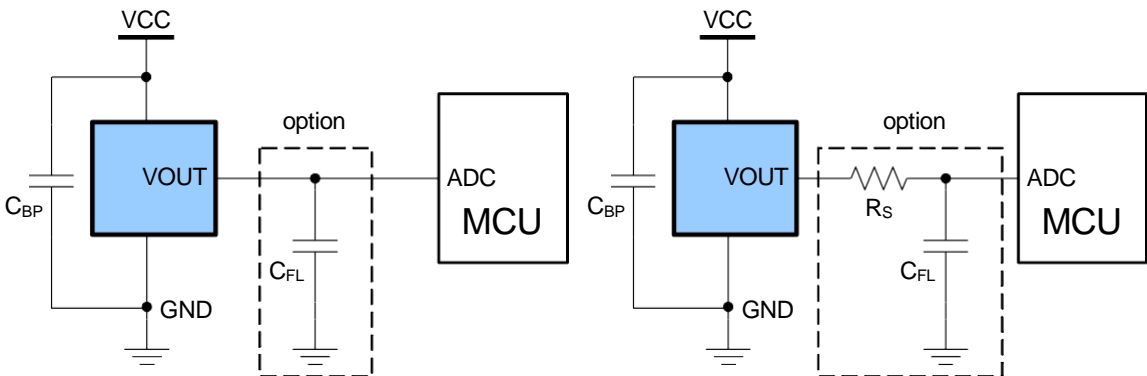
# SST-AM10

## Analog output temperature sensor

### 7.3 Output driver and capacitive load

If the chip is used in noisy environment, or connected to a switched sampling input of post ADC, it is necessary to add a filter capacitor shown as below, to minimize noise coupling. The output can drive maximum capacitive load is 1000pF. If capacitive loads greater than 1000pF, a series resistor is required on the output, to maintain stable conditions.

Capacitive load with/without  $R_s$ :

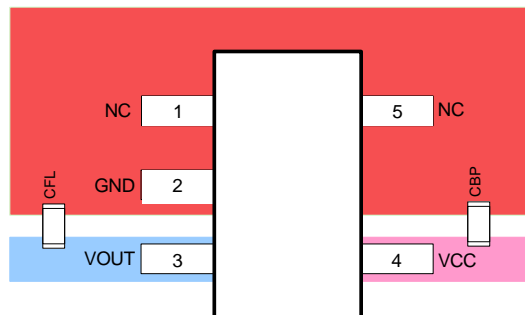


### 7.4 Bypass capacitor

Bypass Capacitor is necessary to filter noise and placed as close as the chip in most application. And the capacitance value could be 100pF to 1.0nF depending on noise frequency.

### 7.5 PCB layout

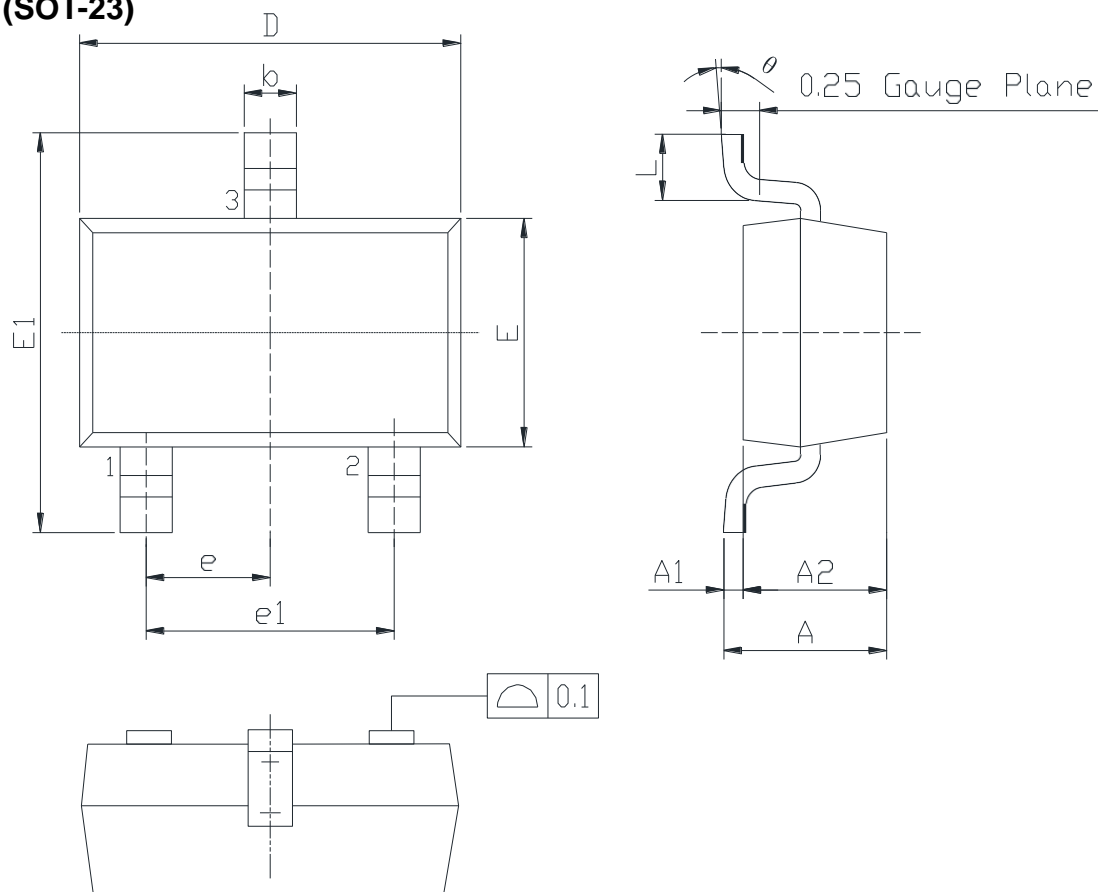
It is recommended PCB layout shown as below.



# SST-AM10

Analog output temperature sensor

## 8.Package outline dimensions (SOT-23)

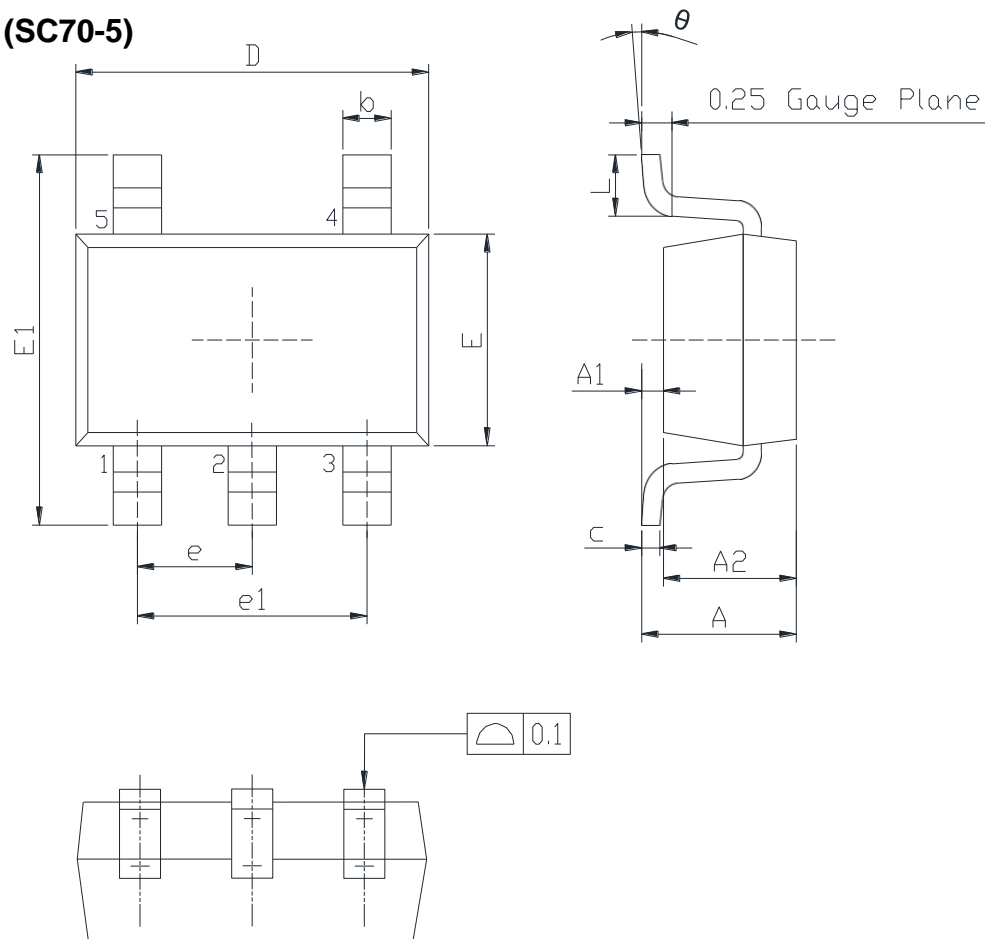


Symbol	Dimensions in Millimeters		Dimensions in Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.200	0.003	0.008
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.200	2.600	0.087	0.102
e	0.950 (BSC)		0.037 (BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
$\theta$	0°	8°	0°	8°

# SST-AM10

Analog output temperature sensor

(SC70-5)

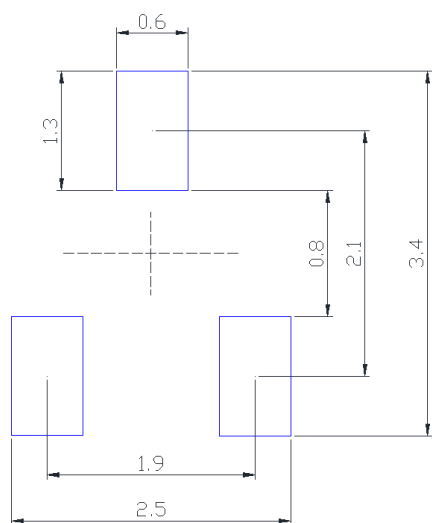


Symbol	Dimensions in Millimeters		Dimensions in Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.100	0.035	0.043
A1	0.000	0.100	0.000	0.004
A2	0.900	1.000	0.035	0.039
b	0.150	0.350	0.006	0.014
c	0.080	0.150	0.003	0.006
D	2.000	2.200	0.079	0.087
E	1.150	1.350	0.045	0.053
E1	2.150	2.450	0.085	0.096
e	0.650 (BSC)		0.026 (BSC)	
e1	1.200	1.400	0.047	0.055
L	0.260	0.460	0.010	0.018
$\theta$	0°	8°	0°	8°

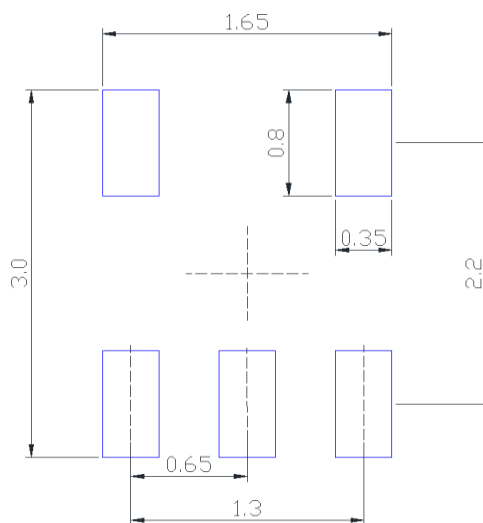
# SST-AM10

Analog output temperature sensor

## Recommend Land Pattern Layout



**SOT-23**



**SC70-5**

### Note:

- 1) All dimensions are in millimeter
- 2) Recommend tolerance is within  $\pm 0.1$  mm
- 3) Change without notice

For more information contact us