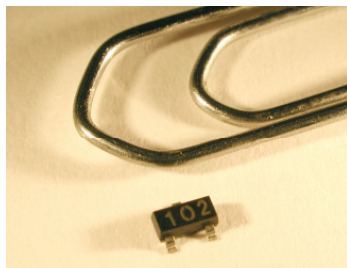
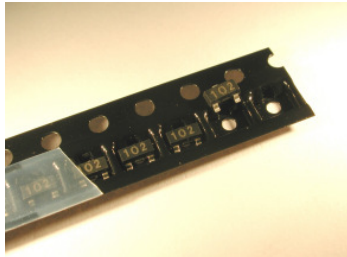


The Ni1000SOT is a temperature sensor for use in contact temperature measurement

The measurement of temperature is for many applications the most important measurement for safety and reliability of systems. Ni-thin film Resistance Temperature Detectors (Ni-RTD's) are manufactured by PVD-deposition on silicon substrate. In the next step the resistance meander is photolithographically structured by wet chemical etching and finally the thin film structure is covered by a passivation layer for environmental protection. Finally these chips are diced and mounted on the lead frame in the SOT23 package. This technology allows producing very small size, low cost, high precision and long term stable temperature sensors.



Parameter	Typical	Condition
Package	SOT23	
Lead frame material	Alloy 42 Ag-Coating: 2 µm Pin Coating (Sn > 99.5%): 8-10 µm	
Soldering	96Sn4Ag	reflow up to 260 °C
Packing units	Reel Size: 7" (180 mm) 3000 sensors or 13" (330 mm) 10000 sensors	
Basic resistance	1000 Ω	0 °C
Temperature coefficient of resistance (according to DIN 43760, see below)	6178 ppm/K	0 °C → +100 °C
Measurement current	1.2 mA, max: 5 mA	
Long term stability	0.1% after 1000 h	150 °C
Operation temperature	-55 ... +160 °C	
Storage temperature	-55 ... +160 °C	
Connections		
Pin 1	Ni-RTD	
Pin 2	Ni-RTD	
Pin 3	Si-Substrate (for potential-free temperature conduction)	

Characteristic

The characteristic of Nickel temperature sensors is specified in DIN 43760. The Ni-RTD sensors have an almost linear relationship between temperature and resistance. The high Temperature Coefficient of Resistance (TCR) of the Ni-RTD, 6178 ppm/K, offers higher output signals than other RTD's, which results in a higher accuracy at small temperature changes. The characteristic can be expressed by the following equation:

Type DIN 43760 TCR = 6178 ppm/K between 0 ... 100 °C

$$R(T) = R_0 \cdot (1 + a \cdot T + b \cdot T^2 + c \cdot T^4 + d \cdot T^6)$$

Coefficients:

$$a = 5.485 \cdot 10^{-3}$$

$$b = 6.650 \cdot 10^{-6}$$

$$c = 2.805 \cdot 10^{-11}$$

$$d = -2.000 \cdot 10^{-17}$$

Data for different temperature values are listed in table 1.

$$T(R) = a' + b' \cdot (1 + c' \cdot R)^{1/2} + d' \cdot R^5 + e' \cdot R^7$$

Coefficients:

$$a' = -412.6$$

$$b' = 140.41$$

$$c' = 0.00764$$

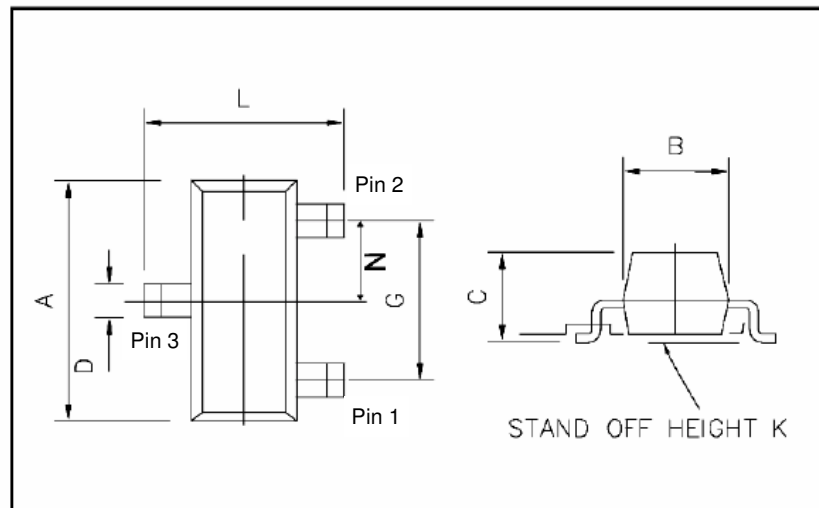
$$d' = -6.25 \cdot 10^{-17}$$

$$e' = -1.25 \cdot 10^{-24}$$

Tolerances: Class B +/- (0.4+0.007·|T|) in range from 0 to 160 °C
 +/- (0.4+0.028·|T|) in range from -55 to 0 °C

Mechanical Dimensions

SOT23



DIM	Millimeters		Inches	
	Min	Max	Min	Max
A	2.67	3.05	0.105	0.120
B	1.20	1.40	0.047	0.055
C	-	1.10	-	0.043
D	0.37	0.53	0.0145	0.021
F	0.085	0.15	0.033	0.0059
G	NOM 1.9		NOM 0.075	
K	0.01	0.10	0.0004	0.004
L	2.10	2.50	0.0825	0.0985
N	NOM 0.95		NOM 0.37	

Table 1: Ni1000 DIN 43760 temperature versus resistance

T/°C	0	1	2	3	4	5	6	7	8	9
-60	695.2	699.9	704.6	709.3	714.0	718.7	723.4	728.2	733.0	737.8
-50	742.6	747.4	752.2	757.0	761.9	766.8	771.6	776.5	781.4	786.4
-40	791.3	796.3	801.2	806.2	811.2	816.2	821.2	826.3	831.3	836.4
-30	841.5	846.5	851.7	856.8	861.9	867.0	872.2	877.4	882.6	887.8
-20	893.0	898.2	903.4	908.7	913.9	919.2	924.5	929.8	935.1	940.5
-10	945.8	951.2	956.5	961.9	967.3	972.7	978.2	983.6	989.1	994.5
0	1000.0	1005.5	1011.0	1016.5	1022.0	1027.6	1033.1	1038.7	1044.3	1049.9
10	1055.5	1061.1	1066.8	1072.4	1078.1	1083.8	1089.5	1095.2	1100.9	1106.6
20	1112.4	1118.1	1123.9	1129.7	1135.5	1141.3	1147.1	1153.0	1158.8	1164.7
30	1170.6	1176.5	1182.4	1188.3	1194.2	1200.2	1206.1	1212.1	1218.1	1224.1
40	1230.1	1236.1	1242.2	1248.2	1254.3	1260.4	1266.5	1272.6	1278.8	1284.9
50	1291.1	1297.2	1303.4	1309.6	1315.8	1322.0	1328.3	1334.5	1340.8	1347.1
60	1353.4	1359.7	1366.0	1372.4	1378.7	1385.1	1391.5	1397.9	1404.3	1410.8
70	1417.2	1423.7	1430.1	1436.6	1443.1	1449.7	1456.2	1462.8	1469.3	1475.9
80	1482.5	1489.1	1495.7	1502.4	1509.1	1515.7	1522.4	1529.1	1535.9	1542.6
90	1549.3	1556.1	1562.9	1569.7	1576.5	1583.4	1590.2	1597.1	1604.0	1610.9
100	1617.8	1624.7	1631.7	1638.6	1645.6	1652.6	1659.6	1666.7	1673.7	1680.8
110	1687.9	1695.0	1702.1	1709.3	1716.4	1723.6	1730.8	1738.0	1745.2	1752.5
120	1759.7	1767.0	1774.3	1781.6	1788.9	1796.3	1803.7	1811.1	1818.5	1825.9
130	1833.3	1840.8	1848.3	1855.8	1863.3	1870.9	1878.4	1886.0	1893.6	1901.2
140	1908.9	1916.5	1924.2	1931.9	1939.6	1947.4	1955.1	1962.9	1970.7	1978.5
150	1986.3	1994.2	2002.1	2010.0	2017.9	2025.9	2033.8	2041.8	2049.8	2057.8
160	2065.9	2074.0	2082.1	2090.2	2098.3	2106.5	2114.6	2122.8	2131.1	2139.3

Specifications are subject to change without notice!