

Semiconductors

Sensing Element Description

Semiconductors are made to have a defined current output directly proportional to the absolute temperature ($^{\circ}\text{K}$). This property makes them the most linear of all the common commercial HVAC sensing elements. By putting this current output across a resistor, a proportional voltage output is produced. An example of a Semiconductor output curve can be seen in figure 1.

The AD592 semiconductor temperature sensor supplied with **BAPI** products provides a two wire 248 to 378 micro amp output or a three wire 2.48 to 3.78 volt output over a range of -13 to 221 $^{\circ}\text{F}$ (-25 to 105 $^{\circ}\text{C}$). These units are offset using equipment traceable to the National Institute of Standards and Technology (NIST). Each unit is then labeled with the actual temperature and the corresponding offset.

Specifications

Interchangeability Tolerance

(Accuracy): Offset to 0.1 $^{\circ}\text{F}$ (0.18 $^{\circ}\text{C}$) - NIST traceable

Sensor Range:

248 $^{\circ}\text{K}$ to 378 $^{\circ}\text{K}$ (-25 $^{\circ}\text{C}$ to 105 $^{\circ}\text{C}$) (-13 $^{\circ}\text{F}$ to 221 $^{\circ}\text{F}$)

Supply Voltage: 4 to 30 VDC

Output: 1 $\mu\text{A}/^{\circ}\text{K}$ (2 wire)
10 $\text{mV}/^{\circ}\text{K}$ (3 wire)

Temperature Coefficient:

2 wire	1 $\mu\text{A}/^{\circ}\text{K}$	1 $\mu\text{A}/^{\circ}\text{C}$	0.556 $\text{mA}/^{\circ}\text{F}$
3 wire	10 $\mu\text{V}/^{\circ}\text{K}$	10 $\mu\text{V}/^{\circ}\text{C}$	5.556 $\text{mV}/^{\circ}\text{F}$

Linearity: ± 0.15 $^{\circ}\text{C}$ (0.27 $^{\circ}\text{F}$ max)
from 0 to 70 $^{\circ}\text{C}$ (32 to 158 $^{\circ}\text{F}$)

Repeatability: ± 0.10 $^{\circ}\text{C}$ (0.18 $^{\circ}\text{F}$)

Typical Compatible Systems:
Control Systems International

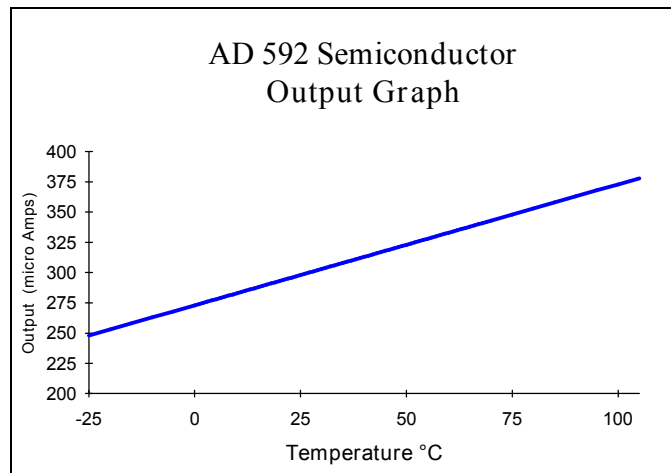


Figure 1

Output Table

Deg C	Deg F	592 micro amps	592-10K volts	Deg C	Deg F	592 micro amps	592-10K volts
-25	-13.0	248	2.48	37	98.6	310	3.10
-20	-4.0	253	2.53	38	100.4	311	3.11
-15	5.0	258	2.58	39	102.2	312	3.12
-10	14.0	263	2.63	40	104.0	313	3.13
-5	23.0	268	2.68	41	105.8	314	3.14
0	32.0	273	2.73	42	107.6	315	3.15
1	33.8	274	2.74	43	109.4	316	3.16
2	35.6	275	2.75	44	111.2	317	3.17
3	37.4	276	2.76	45	113.0	318	3.18
4	39.2	277	2.77	46	114.8	319	3.19
5	41.0	278	2.78	47	116.6	320	3.20
6	42.8	279	2.79	48	118.4	321	3.21
7	44.6	280	2.80	49	120.2	322	3.22
8	46.4	281	2.81	50	122.0	323	3.23
9	48.2	282	2.82	51	123.8	324	3.24
10	50.0	283	2.83	52	125.6	325	3.25
11	51.8	284	2.84	53	127.4	326	3.26
12	53.6	285	2.85	54	129.2	327	3.27
13	55.4	286	2.86	55	121.0	328	3.28
14	57.2	287	2.87	56	132.8	329	3.29
15	59.0	288	2.88	57	134.6	330	3.30
16	60.8	289	2.89	58	136.4	331	3.31
17	62.6	290	2.90	59	138.2	332	3.32
18	64.4	291	2.91	60	140.0	333	3.33
19	66.2	292	2.92	61	141.8	334	3.34
20	68.0	293	2.93	62	143.6	335	3.35
21	69.8	294	2.94	63	145.4	336	3.36
22	71.6	295	2.95	64	147.2	337	3.37
23	73.4	296	2.96	65	149.0	338	3.38
24	75.2	297	2.97	66	150.8	339	3.39
25	77.0	298	2.98	67	152.6	340	3.40
26	78.8	299	2.99	68	154.4	341	3.41
27	80.6	300	3.00	69	156.2	342	3.42
28	82.4	301	3.01	70	158.0	343	3.43
29	84.2	302	3.02	75	167.0	348	3.48
30	86.0	303	3.03	80	176.0	353	3.53
31	87.8	304	3.04	85	185.0	358	3.58
32	89.6	305	3.05	90	194.0	363	3.63
33	91.4	306	3.06	95	203.0	368	3.68
34	93.2	307	3.07	100	212.0	373	3.73
35	95.0	308	3.08	105	221.0	378	3.78
36	96.8	309	3.09				