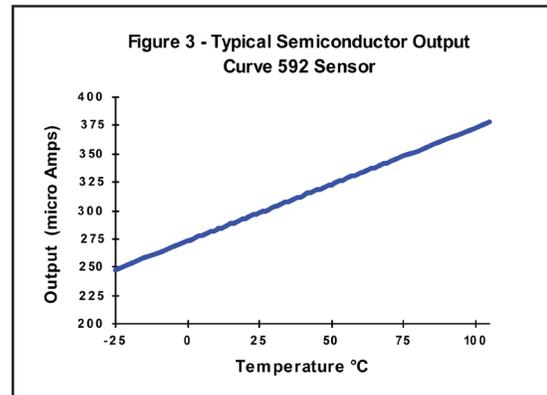




Semiconductor Description

BAPI semiconductors are designed to exhibit a defined current output directly proportional to the absolute temperature (°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 output voltage is produced. An example of a semiconductor output curve can be seen in **Figure 3**.



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 °F (-25 to 105 °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.

Semiconductor Specifications

Interchangeability Tolerance (Accuracy):

Offset to 0.1 °C (0.18 °F) - NIST Traceable

Offset: Required to achieve maximum accuracy. Each sensor includes a custom offset listed on each sensor.

Repeatability: ± 0.10 °C (± 0.18°F)

Linearity: ± 0.15 °C max from 0 to 70 °C
(± 0.27°F max from 32 to 158°F)

Sensor Range: -25 to 105 °C
(-13 to 221 °F) [248 to 378 °K]

Bias Voltage: 5 to 30 VDC

Accuracy Reference: 298.2 mA @ 25°C or 2.982 V @ 25°C

Temperature Output Coefficient: 2 wire: 1 µA/°C (0.556 µA/°F) [1 µA/°K]
3 wire: 10 mV/°C (5.556 mV/°F) [10 mV/°K]

Definition of Specification Terms

Interchangeability Tolerance (Accuracy)

The maximum amount that sensors following the same curve will differ from each other.

Repeatability-

A measure of a sensor's ability to repeat the same output value for a given input value.

Custom Offset Definition and Example

This is how BAPI calculates the offset value provided on the sensor label:

Therm Reading _____
The actual temperature reading according to a thermometer that is certified traceable to recognized standards by the National Institute of Standards and Technology (NIST).

Sensor Reading _____
The temperature reading according to the AD592 sensor, using the output in either µA or mV and converting the output to a Fahrenheit temperature.

Offset _____
The difference between the Thermometer Reading and the Sensor Reading

To maximize the sensor accuracy, simply add the offset value of the sensor reading into the controller.

e.g. Therm Reading 74.6 Sensor Reading 73.0 Offset +1.6
Correction: Add (+1.6) °F to the sensor for an accurate reading: 73 + 1.6 = 74.6°F

e.g. Therm Reading 75.4 Sensor Reading 77.2 Offset -1.8
Correction: Add (-1.6) °F to the sensor for an accurate reading: 77.2 + (-1.8) = 75.4°F

