



Cryogenic Control Systems, Inc.

# S800

## Silicon Diode Temperature Sensor

### General Description

Cryo-Con Silicon Diode Sensors offer high sensitivity over a wide temperature range. Close conformance to a standard response curve ensures reliable and repeatable measurements with a high degree of interchangeability.

The S800 diode sensors use the industry standard 0.310" copper bobbin package.

### Specifications

**Useful Temperature Range:** 1.4K to 380K.

**Standard Curve:** Cryo-con S800.

**Excitation Current:** 10 $\mu$ A  $\pm$ 0.1%

**Repeatability:** 10mK @4.2K, 16mK @77K, 75mK @273K.

**Magnetic Field Use:** Not recommended for fields above 0.1 Tesla or below 40K.

### Features

- **Accuracy:** Available in four tolerance bands.
- **Interchangeability:** Conforms to a standard calibration curve with high accuracy.
- **Wide temperature range:** 1.4K to 380K.
- **Extremely stable:** Minimum long-term drift.
- **High Repeatability.**

**Use in Radiation:** Not recommended for high radiation environments.

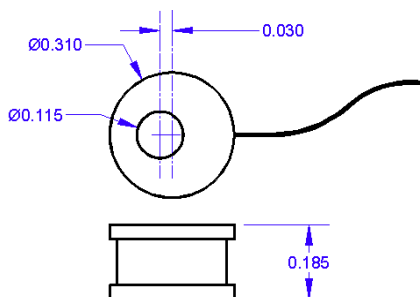
**Maximum Storage Temperature:** 400K.

**Recommended Connection:** Four-wire for accuracy.

**Maximum Reverse Voltage:** 60V.

**Maximum Excitation Current:** 2mA.

**S800**



**S800 Bobbin Package:** The industry standard bobbin package features excellent thermal contact to the diode junction. This ensures a rapid thermal response and minimizes thermal gradients between the sensing element and the sensor package. Mechanical integrity of the sensor assures reliable performance even in severe applications. Thermal integrity plus a single value excitation current (10 $\mu$ A) insure against self-heating and current switching errors. With the bobbin package, the lead wires are thermally anchored to the sensor mounting. This is essential for accurate sensor readings.

**Installation:** Connection is made using a four-wire, 36 AWG cryogenic ribbon cable. Wires may be separated by dipping in Isopropyl Alcohol and then wiped clean. Lead insulation is difficult to strip. A mechanical stripper or scraping is recommended.

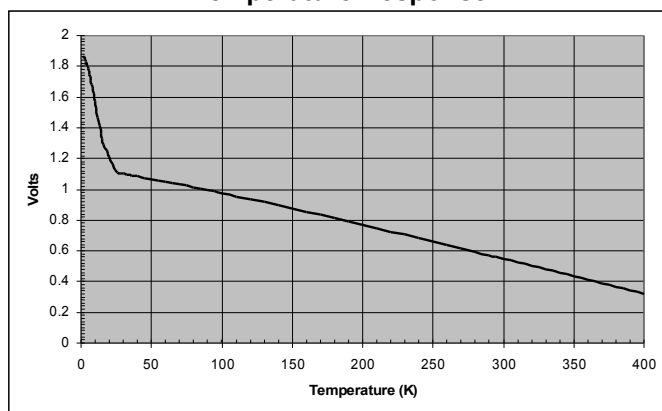
Mounting is done with a 4-40 machine screw. A thin layer of Apiezon<sup>®</sup> N grease is recommended.

Bobbin Package Specifications	
<b>Bobbin Material</b>	Gold plated Oxygen free hard Copper.
<b>Marking</b>	Individual serial number.
<b>Sensor Bonding</b>	Stycast <sup>®</sup> epoxy.
<b>Mass</b>	1.1g excluding leads.
<b>Leads</b>	36 inches, 36AWG Phosphor-Bronze. Four-lead color coded cryogenic ribbon cable. Insulation is heavy Formvar <sup>®</sup> .
<b>Mounting</b>	4-40 machine screw.

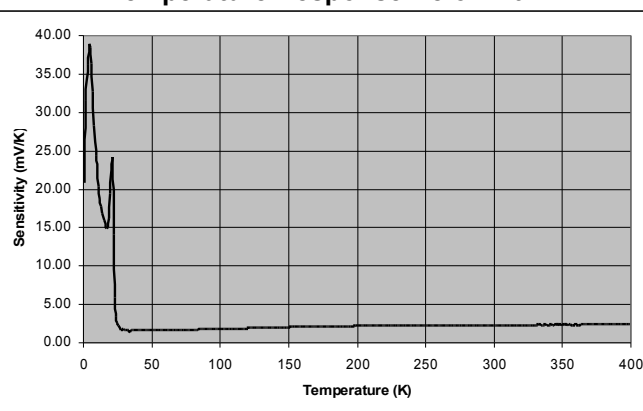
Cable Color Code	
V+	Clear
V-	Green
I+	Black
I-	Red

## Typical Performance Characteristics

**Temperature Response**



**Temperature Response Below 70K**



**Tolerance Bands**

	1.5K to 30K	30K to 100K	100K to 400K
<b>Band AA*</b>	±0.1K	±0.1K	±0.1K
<b>Band A</b>	±0.25K	±0.5K	±0.5K
<b>Band B</b>	±0.5K	±0.5K	±0.33% of temp
<b>Uncalibrated</b>	±1.5K	±1.5K	±1.5K

\*Each sensor provided with an individual calibration curve.

**Typical Temperature Response**

T(K)	V	S(V/K)
1.5	1.866	-19.5
4.20	1.809	-21.90
50.00	1.071	-1.64
77.35	1.023	-1.94
100	0.979	-1.82
273	0.623	-2.29
380	0.380	-2.37

## Ordering Information

Silicon Diode Sensor, Bobbin Package.	
S800-AA	Tolerance Band AA
S800-A	Tolerance Band A.
S800-B	Tolerance Band B.
S800	Uncalibrated.



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