

SB-15B-00

# FIS GAS SENSOR SB-15B-00

## for LP-GAS (PROPANE/BUTANE) DETECTION

The SB-15B is a tin dioxide semiconductor gas sensor which has an excellent performance in propane/butane detection. The features are: high sensitivity, low sensitivity to noise gases, quick response speed, strong poisoning resistance and significant low power consumption design (120 mW).

### Structure

Gas sensitive semiconductor material is a mini bead type and a heater coil and electrode wire are embedded in the element. The sensing element is installed in the metal housing which uses double stainless steel mesh (100 mesh) in the path of gas flow. The mesh is an anti-explosion feature (Fig 1b).

### Operating conditions

Fig 2 shows the standard operating circuit for this model. The change of the sensor resistance ( $R_S$ ) is obtained as the change of the output voltage across the fixed or variable resistor ( $R_L$ ). In order to obtain the best performance and specified characteristics, the values of the heater voltage ( $V_H$ ) circuit voltage ( $V_C$ ) and load resistance ( $R_L$ ) must be within the range of values given in the standard operating conditions shown in the specification table on the next page.

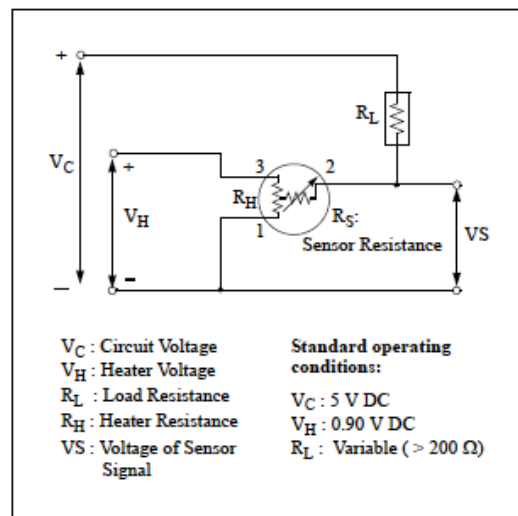


Fig 2. Standard circuit

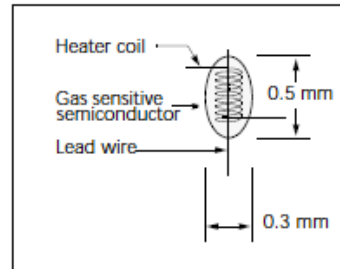


Fig 1a. Sensing element

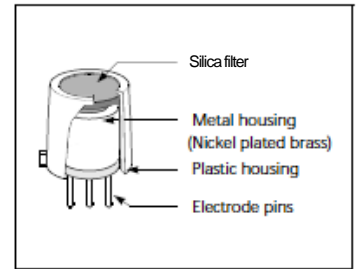


Fig 1b. Configuration

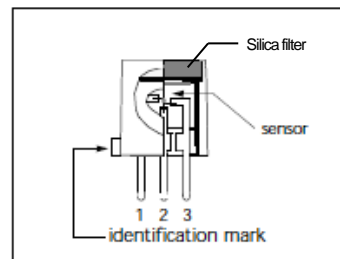


Fig 1c. Pin Layout

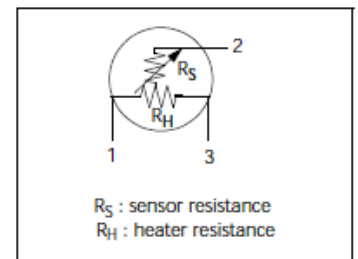


Fig 1d. Equivalent circuit

### Sensitivity characteristics

Fig 3 shows the sensitivity characteristics curves of the SB-15B (typical data). Sensitivity characteristics of our gas sensors are expressed by the relationship between the sensor resistance and gas concentration. The sensor resistance decreases with an increase of gas concentration based on a logarithmic function.

The sensitivity characteristics of the SB-15B is specified by the following parameters.

- Sensor resistance level: at iso-butane 1000 ppm
- Sensor resistance change ratio: between iso-butane 1000 ppm and 3000 ppm
- Sensor resistance change ratio: between and in air iso-butane 1000ppm

See the specification table on the next page for further details.

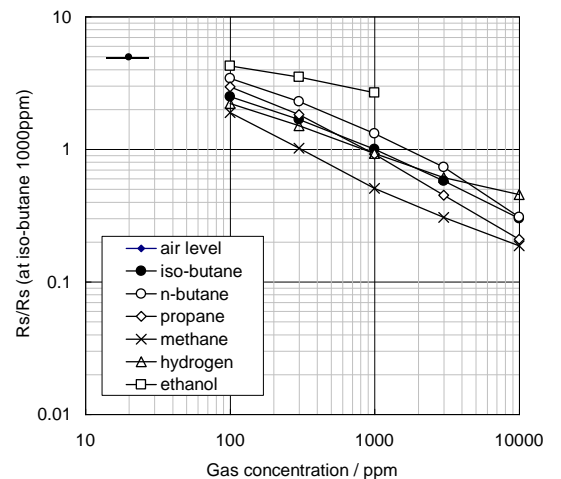


Fig3. Sensitivity characteristics

## Specifications: SB-15B-00

### A. Standard Operating conditions

Symbol	Parameter	Specification	Conditions etc.
VH	Heater voltage	0.9 V ± 0.05 V	AC, DC or pulse
VC	Circuit voltage	Less than 5 V	DC: Pin2 (+) - Pin 1 (-)
RL	Load resistance	Variable (> 200 Ω)	P <sub>S</sub> < 10 mW
RH	Heater resistance	2.8 Ω ± 0.2 Ω	at room temperature
IH	Heater current	130 mA (Typical value)	IH = VH / RH
PH	Heater power consumption	120 mW (Typical value)	PH = VH <sup>2</sup> / RH
PS	Power dissipation of sensing element	Less than 10mW	$P_S = \frac{(VC-VRL)^2}{R}$

### B. Environmental conditions

Symbol	Parameter	Specification	Conditions etc.
T <sub>ao</sub>	Operating temperature	-10 °C to 50 °C	
T <sub>as</sub>	Storage temp	-20 °C to 60 °C	
RH	Relative humidity	Less than 95%RH	
(O <sub>2</sub> )	Oxygen concentration	21% ± 1% (Standard condition)  The sensitivity characteristics are influenced by the variation in oxygen concentration. Please consult us for details.	Absolute minimum level : more than 18%.

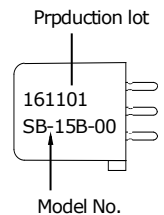
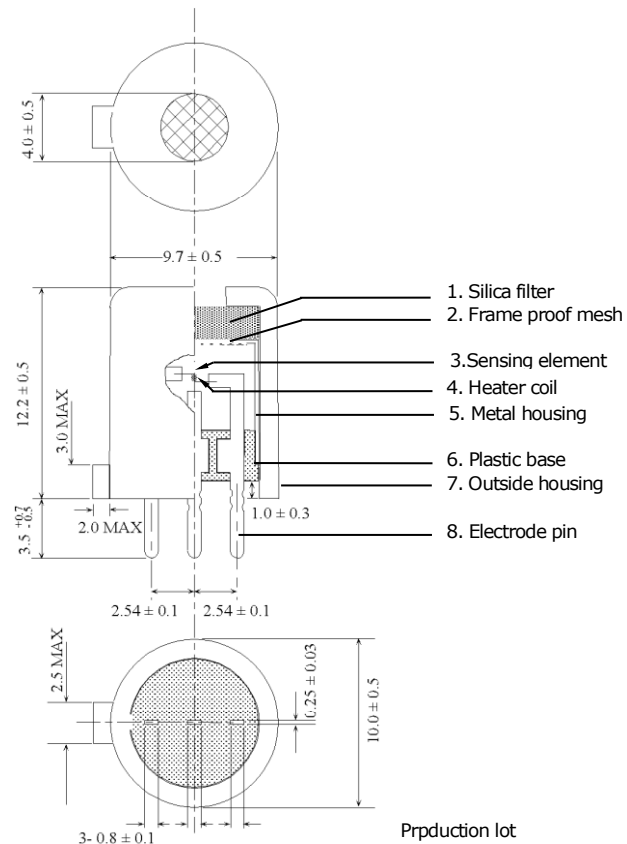
### C. Sensitivity characteristics

Model	SB-15B-00		
Symbol	Parameter	Specification	Conditions etc.
R <sub>s</sub>	Sensor resistance	0.3k ~ 3.0kΩ	at 1000 ppm of iso-butane
β	Sensitivity	0.55 ~ 0.75	$\frac{R_s \text{ (at IB 3000 ppm)}}{R_s \text{ (at IB 1000 ppm)}}$
Sensitivity of iso-butane		more than 3	$\frac{R_s \text{ (in air)}}{R_s \text{ (at IB 1000 ppm)}}$
Standard Test Conditions: Temp : 20°C±2°C      VC : 5.0 V ± 1 % Humidity : 65%±5%      VH : 0.9 V ± 1 % (in clean air)      RL : 10 kΩ ± 5% Pre-heating time: more than 48 hours			

### D. Mechanical characteristics

Items	Conditions	Specifications
Vibration	Frequency: 5 -500 Hz Acceleration: 1.3G Sweep Time: 40min.	Should satisfy the specifications shown in the C.Sensitivity characteristics after test.
	Drop	

### Dimensions



### E. Parts and Materials

No.	Parts	Materials
1	Silica filter	Silica gel
2	Frame proof mesh	SUS 316 (100 mesh, double)
3	Sensing element	Tin dioxide
4	Heater coil	Platinum
5	Metal housing	Nickel plated brass
6	Plastic base	PBT (GF30%)
7	Outside housing	Nylon 6 (UL94 V-0)
8	Electrode pin	Iron-nickel alloy

Please contact

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Nissha FIS, Inc.  
2-4-28, Tagawa  
Yodogawa, Osaka  
532-0027 Japan

Tel: +81 6-7176-3911  
Fax: +81 6-7176-3912  
<http://www.fisinc.co.jp>

In the interest of continued product improvement, we reserve the right to change design features without prior notice.