NISSHA FIS

SB-12C-00

FIS GAS SENSOR SB-12C-00

for LOW POWER METHANE DETECTION

The SB-12C is a tin dioxide semiconductor gas sensor which has an excellent performance in methane detection with significant low power consumption concept (12 mW) and small temperature dependency. High sensitivity, low sensitivity to noise gases, quick response speed and strong poisoning resistance features achieve reliable gas detection system applications.

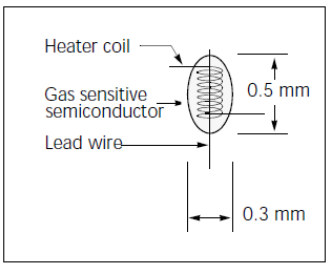


Fig 1a. Sensing element

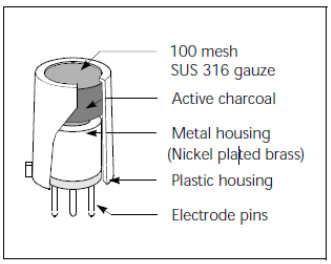


Fig 1b. Configuration

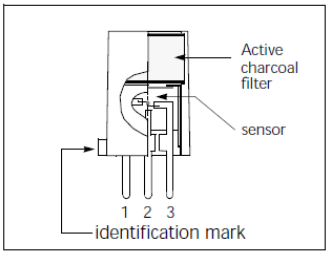


Fig 1c. Pin Layout

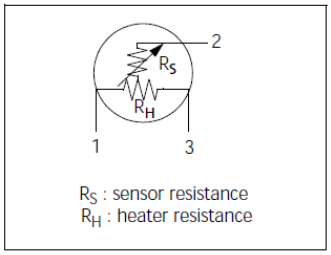


Fig 1d. Equivalent circuit

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 (Fig1b).

Operating conditions
Fig 2 shows the standard operating circuit for this model. Fig.3 shows the operating condition. The change of the sensor resistance (Rs) is obtained as the change of the output voltage across the fixed or variable resistor (RL). In order to obtain the best performance and specified characteristics, the values of the heater voltage (VH) circuit voltage (VC) and load resistance (RL) must be within the range of values given in the standard operating conditions shown in the Specification table on the next page.

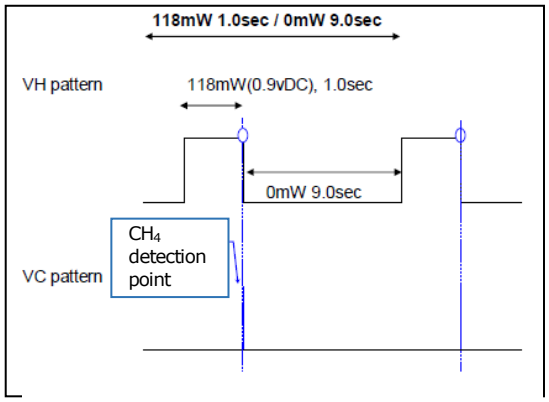


Fig3. Operating condition

Sensitivity characteristics
Fig 4 shows the sensitivity characteristics curves of the SB-12C (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.

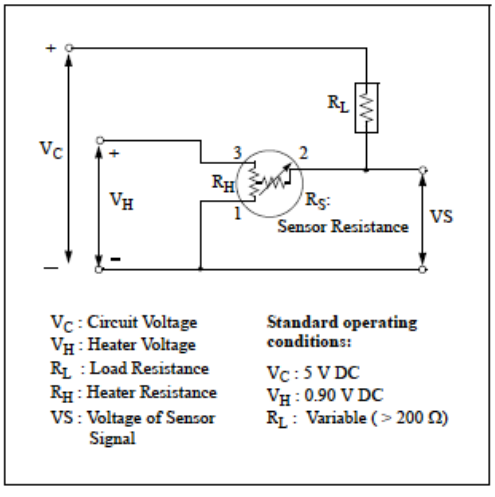


Fig 3. Standard circuit

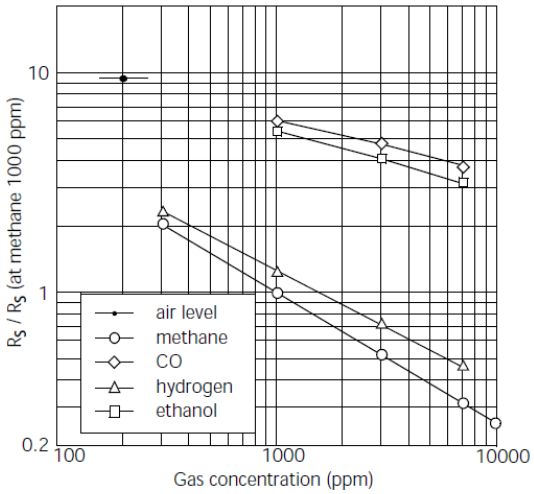


Fig4. Sensitivity characteristics

SPECIFICATIONS

Specifications: SB-12C-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_S < 10 mW
RH	Heater resistance	2.8 Ω ± 0.2 Ω	at room temperature
IH	Heater current	130 mA (Typical value)	IH = VH / RH,VH on
PH	Heater power consumption	12 mW (Typical value)	PH = VH^2 / 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_{ao}	Operating temperature	-10 °C to 50 °C	
T_{as}	Storage temp	-20 °C to 60 °C	
RH	Relative humidity	Less than 95%RH	
(O_2)	Oxygen concentration	21% ± 1% (Standard condition)	Absolute minimum level : more than 18%.
		The sensitivity characteristics are influenced by the variation in oxygen concentration. Please consult us for details.	

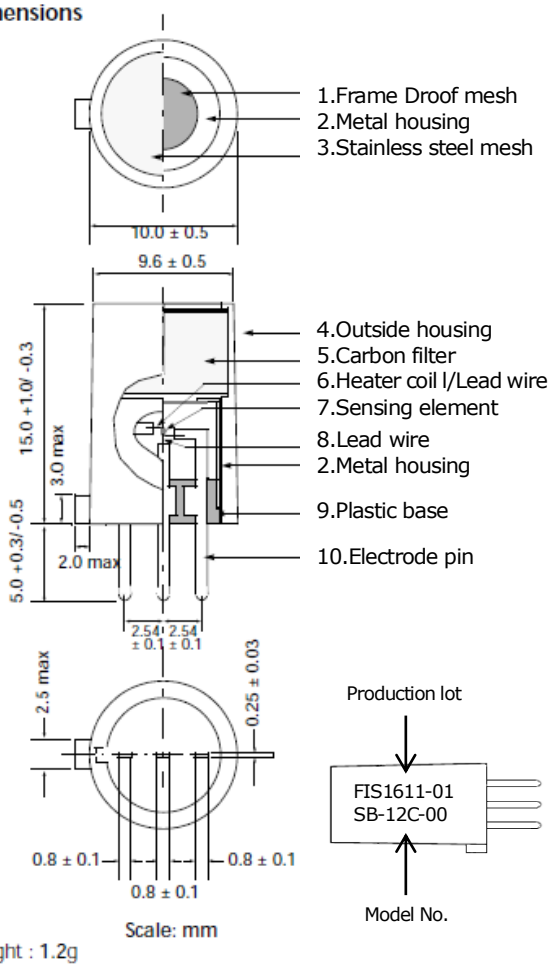
C. Sensitivity characteristics

Model	SB-12C-00		
Symbol	**Parameter**	**Specification**	**Conditions etc.**
Ethanol selectivity		≥ 5.0	Rs (at Ethanol 1000ppm) / Rs(at CH_4 6000ppm)
CH_4 selectivity		≥ 10	Rs in air / Rs(at CH_4 6000ppm)
Standard Test Conditions:		Temp : 20℃±2℃ Humidity : 65%±5% (in clean air) Pre-heating time: more than 48 hours	VC : 5.0 V ± 1 % VH : 0.9 V ± 1 % RL : 10 kΩ ± 5%

D. Mechanical characteristics

Items	Conditions	Specifications
Vibration	Frequency : 5 - 500 Hz Acceleration : 1.3 G Sweep Time : 40 min.	Should satisfy the specifications shown in the sensitivity characteristics after test.
Drop	Height : 60 cm Number of impacts : 3 times	

Dimensions



Weight : 1.2g

E. Parts and Materials

No.	Parts	Materials
1	Flameproof mesh	SUS 316 (100 mesh, double)
2	Metal housing	Nickel plated brass
3	Stainless steel mesh	SUS 316 (100 mesh, single)
4	Outside housing	Nylon 6 (UL94 V-0)
5	Carbon filter	Activated carbon
6	Heater coil	Platinum
7	Sensing element	Tin dioxide
8	Lead wire	Platinum
9	Plastic base	PBT (poly butylen telephtalate)
10	Electrode pins	Iron-nickel alloy

Please contact

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