


MESSRS. : \_\_\_\_\_

AGENT : \_\_\_\_\_

**SPECIFICATION  
OF  
PYROELECTRIC PASSIVE  
INFRARED SENSOR**

MODEL NO. : SBG446-671PART NO. : **NIPPON CERAMIC CO., LTD.**

APPROVED BY	CHECKED BY	DRAWN BY

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## Scope

This specification describes a pyroelectric passive infrared sensor supplied by NIPPON CERAMIC CO.,LTD.

## Type of sensor


Balanced differential(series opposed type.)

## Physical configuration

- 1) Package : TO-5 metal can with dimensions shown in Figure 1-c (Ni-plated)
- 2) Element geometry : Four sensitive areas 1.0 mm \* 1.0 mm and spaced 1.0 mm apart.
- 3) Element orientation : See Figure 1-b
- 4) Lead configuration : See Figure 1-c,1-d

## Electrical characteristics (at 25 (+/-) 5 degC)

- 1) Circuit configuration : Three-terminal sensor with source follower  
See Figure 2
- 2) Operating voltage : 3 ~ 10 V dc (Rs: 470kohm)
- 3) Element polarity : Element A,C:(+) B,D:(-) or A,C:(-) B,D:(+)
- 4) Source voltage : 0.35 ~ 1.4 V (Vd: 5V, Vs: 470kohm)

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- 5) Signal output : Min. 4.5 Vp-p (Typ. 6.5 Vp-p)  
( S1, S2 )

Signal output is measured at chopper frequency of 1 Hz when connected to the amplifier of gain 72.5 dB (at 1 Hz) and submitted to the emission of Infrared energy of 13 microW/cm<sup>2</sup> from 420 K Black Body.

See Figure 3

- 6) Noise output : Max. 250 mVp-p (Typ. 120 mVp-p)

Noise output shall be measured for 20 seconds when connected to the amplifier of gain 72.5 dB (at 1 Hz) and shut out from Infrared energy.

See Figure 3

- 7) Balance output : Max. 15 %

$$\left[ \frac{|S1-S2|}{|S1+S2|} \right] \leq 0.15$$


S1 : Signal output on Element A + C

S2 : Signal output on Element B + D

Balance output is measured at chopper frequency of 1 Hz when connected to the amplifier of gain 72.5 dB (at 1 Hz) and submitted to the emission of Infrared energy of 13 microW/cm<sup>2</sup> from 420 K Black Body.

See Figure 3

- 8) Frequency response : 0.3 Hz to 3.0 Hz / (+/-) 10 dB

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### Optical characteristics


- 1) Field of view : 132 ° from center of element on axis x,y  
: 146 ° from center of element on 45 °  
: See Figure 1-a
- 2) Filter substrate : Silicon
- 3) Cut on (5 %T ABS) : 5.5 (+/-) 0.5 microm
- 4) Transmission :  $\geq 70$  % average 8 to 13 microm

### Environmental requirements

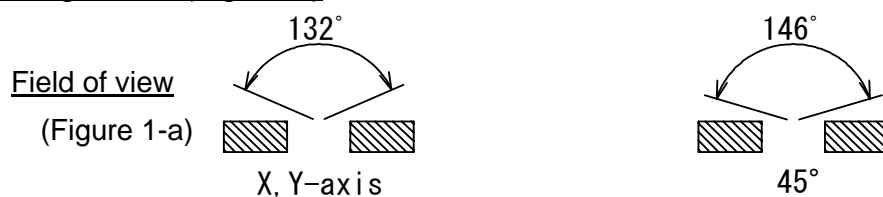
- 1) Operating temperature : -30 degC to +70 degC
- 2) Storage temperature : -40 degC to +80 degC
- 3) Relative humidity :  
The sensor shall operate without increase in noise output when exposed to  
90 ~ 95 % RH at 30 degC continuously.
- 4) Hermetic seal :  
The sensor shall be sealed to withstand a vacuum of 21.28 kPa.

### RoHS compliance

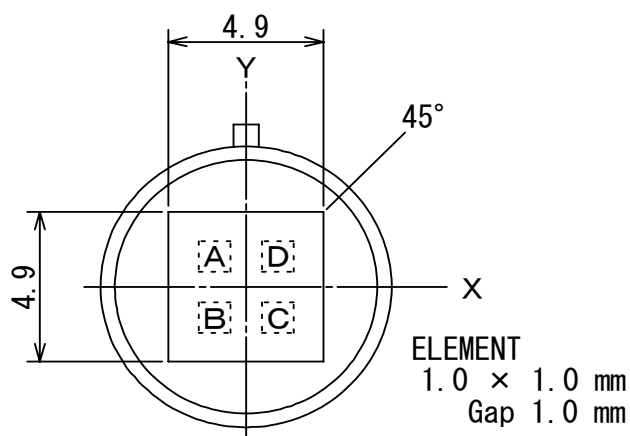
This product conforms to the RoHS Directive in force at the date of issuance of this Specification Sheet.

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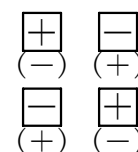
# **Configuration (Figure 1)**



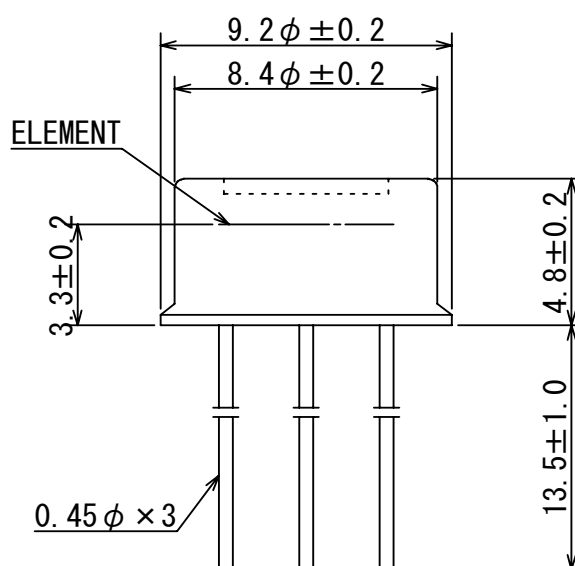
**Top view**  
(Figure 1-b)



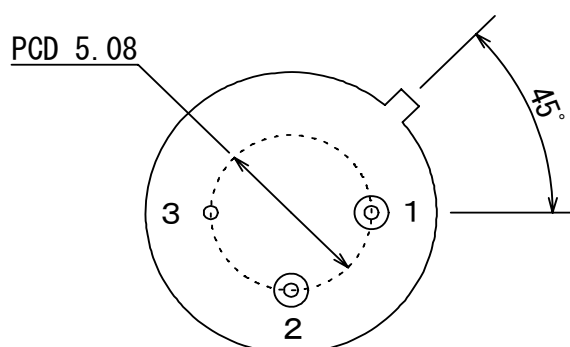
**Element Polarity**



**Side view**  
(Figure 1-c)




**Base view**  
(Figure 1-d)

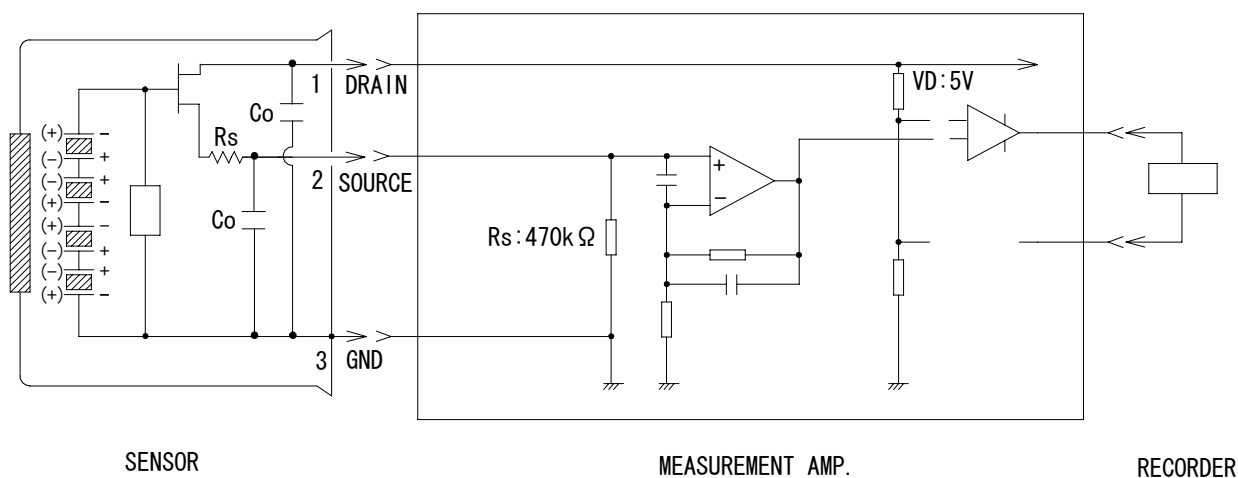


- 1: Drain
- 2: Source
- 3: Ground

unit : mm

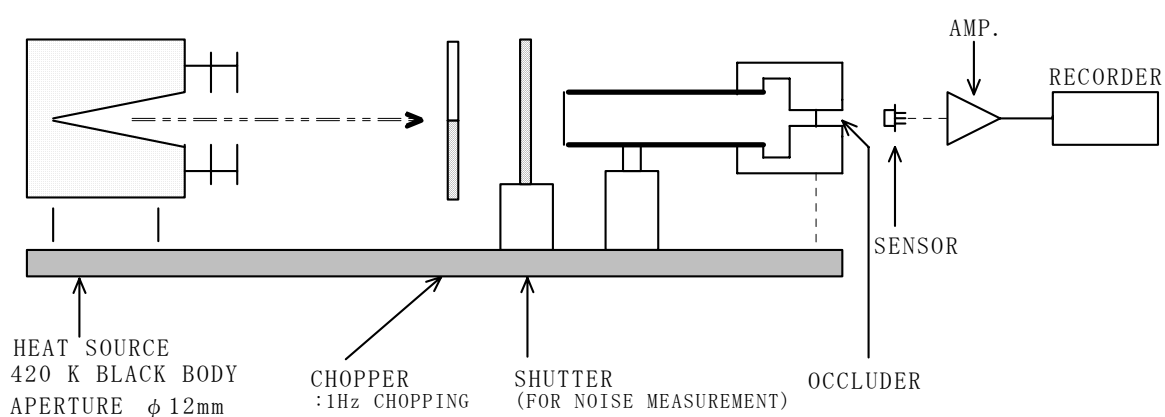
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### Circuit configuration (Figure 2)

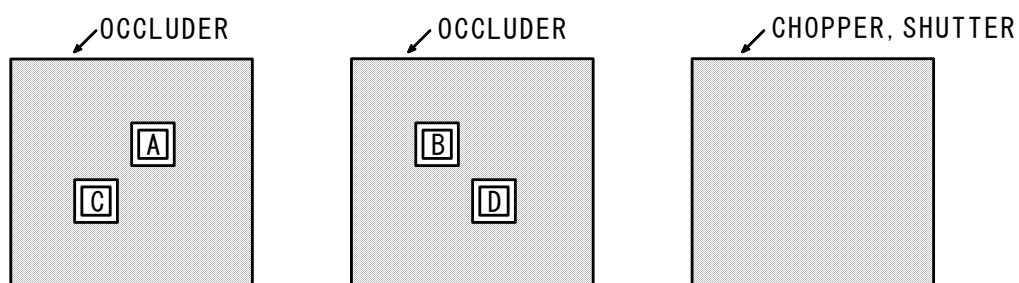


※ Measurement Amp.: Non-inverted type, gain 72.5 dB at 1 Hz , 0.4 to 2.7 Hz / -3 dB

### Test set-up block diagram (Figure 3)




### Occluder position



Signal output 1 (S1)

Signal output 2 (S2)

Noise output

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## ※ Notes

### 1.Design restrictions/precautions

If used for outdoor applications, be sure to apply suitable supplementary optical filter and drip-proof, anti-dew construction. This sensor is designed for indoor use.

in cases where secondary accidents due to operation failure or malfunctions can be anticipated, add a fail safe function to the design.

### 2.Usage restrictions/precautions

To prevent sensor malfunctions, operational failure or any deterioration of its characteristics, do not use this sensor in the following, or similar, conditions.

- a. In rapid environmental temperature changes.
- b. In strong shock or vibration.
- c. In a place where there are obstructing materials (glass,fog,etc.) Through which Infrared rays cannot pass within detection area.
- d. In fluid, corrosive gases and sea breeze.
- e. Continual use in high humidity atmosphere.
- f. Exposed to direct sun light or headlights of automobiles.
- g. Exposed to direct wind from a heater or air conditioner.


### 3.Assembly restrictions/precautions

Soldering \_\_\_\_\_

- a. Use soldering irons when soldering.
- b. Avoid keeping pins of this sensor hot for a long time as excessive heat may cause deterioration of its quality.(e.g. within 5 sec. at 350 degC)

Washing \_\_\_\_\_

- a. Be sure to wash out all flux after soldering as remainder may cause malfunctions.
- b. Use a brush when washing. Washing with an ultrasonic cleaner may cause operational failure.

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#### 4.Handling and storage restrictions/precautions


To prevent sensor malfunctions, operational failure, appearance damage or any deterioration of its characteristics, do not expose this sensor to the following or similar, handling and storage conditions.

- a. Vibration for a long time.
- b. Strong shock.
- c. Static electricity or strong electromagnetic waves.
- d. High temperature and humidity for a long time.
- e. Corrosive gases or sea breeze.
- f. Dirty and dusty environments that may contaminate the optical window.

#### 5.Restrictions on product use

The product described in this document shall not be used or embedded to any downstream products of which manufacture, use and/or sales are prohibited under any applicable laws and regulations.

Sensor troubles resulting from misuse, inappropriate handling or storage are not the manufacturer's responsibility.

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