

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

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

**SPECIFICATION  
of  
PYROELECTRIC PASSIVE  
INFRARED SENSOR**


MODEL NO. : SW-ULP23-20

 **NIPPON CERAMIC CO., LTD.**

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APPROVED BY	CHECKED BY	DRAWN BY

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## 1. SCOPE

This specification describes a Pyroelectric Passive Infrared Sensor supplied by Nippon Ceramic Co., Ltd.

## 2. TYPE of SENSOR

Balanced differential type. (series opposed type.)  
Built - in amplifier circuit.

## 3. PHYSICAL CONFIGURATION

Table 1

PARAMETER	SPECIFICATION
3.1. Package	TO-5 metal can with dimensions shown in Fig.1. (Nickel-plated)
3.2. Element geometry	Four sensitive areas 2.3 mm * 0.75 mm and spaced 0.6 mm apart.
3.3. Element orientation	See Fig.1
3.4. Lead configuration	See Fig.1

## 4. ABSOLUTE MAXIMUM RATINGS

{ at 25 (+/-) 5 [degrees Celsius] }

Table 2


PARAMETER	SPECIFICATION
4.1. Supply Voltage(Vdd)	6.8 V
4.2. Output Pin Current(Source/Sink)	7.0 mA

## 5. ELECTRICAL CHARACTERISTICS

{ at 25 (+/-) 5 [degrees Celsius] , Vdd = 3.3V }

Table 3

PARAMETER	CONDITION	SPECIFICATION
5.1. Supply Voltage(Vdd)	Single Power Supply	1.8 ~ 5.4 V
5.2. Output Voltage	Single Power Supply	0 ~ Vdd V
5.3. Offset Voltage	Without Incident Infrared Energy	1/2*Vdd V
5.4. Current consumption	-	Max. 1 $\mu$ A (Typ. 0.8 $\mu$ A)
5.4. Signal Output	Incident Infrared Energy : 13 microW / cm <sup>2</sup> from 420 K Black Body Chopping Frequency : 1 Hz by Measurement method shown in Fig. 2.	Min. 0.75 Vp-p (Typ. 1.5 Vp-p)
5.5. Noise Output	Under shut out from Infrared Energy by Measurement method shown in Fig. 2.	Max. 250 mVp-p (Typ. 100 mVp-p)
5.6. Balance Output	Incident Infrared Energy : 13 microW / cm <sup>2</sup> from 420 K Black Body Chopping Frequency : 1 Hz by Measurement method shown in Fig. 2.  Bo : Balance output SA : Signal output on Element A SB : Signal output on Element B	[Bo /  SA+SB  ] =< 0.15
5.8. Waiting Time after supplied Power	-	Max. 90 sec.
5.9. Circuit Configuration	See Fig. 3	

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**6. OPTICAL CHARACTERISTICS**

Table 4

PARAMETER	SPECIFICATION
6.1. Field of View	134 ° from center of element on axis X 120 ° from center of element on axis Y See Fig. 1
6.2. Response wavelength band	Filter Substrate : Silicon Cut On (5 %T ABS) : 5.0 (+/-) 0.5 micron Transmission : >= 70 % Average 7 ~ 14 micron
6.3. Transmission Characteristics of Filter	See Fig. 4

**7. ENVIRONMENTAL REQUIREMENTS**

Table 5

PARAMETER	SPECIFICATION
7.1. Operating Temperature	- 40 ~ 70 degrees Celsius
7.2. Storage Temperature	- 50 ~ 80 degrees Celsius
7.3. Relative Humidity	The Sensor shall operate without increase in Noise Output when exposed to 90 ~ 95 % RH at 30 degrees Celsius continuously.
7.4. Hermetic Seal	The Sensor shall be sealed withstand a vacuum of 21.28 kPa.

**8. NOTES**
**8.1. Design restrictions/precautions**

If used for outdoor applications, be sure to apply suitable supplementary optical filter, drip-proof and 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.

**8.2. 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.

8.2.1. In rapid environmental temperature changes.

8.2.2. In strong shock or vibration.

8.2.3. In a place where there are obstructing materials (Glass, Fog, etc.) through which infrared rays cannot pass within detection area.

8.2.4. In fluid, corrosive gases and sea breeze.

8.2.5. Continual use in high humidity atmosphere.

8.2.6. Exposed to direct sun light or headlight of automobiles.

8.2.7. Exposed to direct wind from a heater or air conditioner.

**8.3. Assembly restrictions/precautions**
**8.3.1. 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 degrees Celsius.)

**8.3.2. 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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#### 8.4. 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.

8.4.1. Vibration for a long time.

8.4.2. Strong shock.


8.4.3. Static electricity or strong electromagnetic waves.

8.4.4. High temperature and humidity for a long time.

8.4.5. Corrosive gases or sea breeze.

8.4.6. Dirty and dusty environments that may contaminate the optical window.

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

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Configuration (Figure 1)

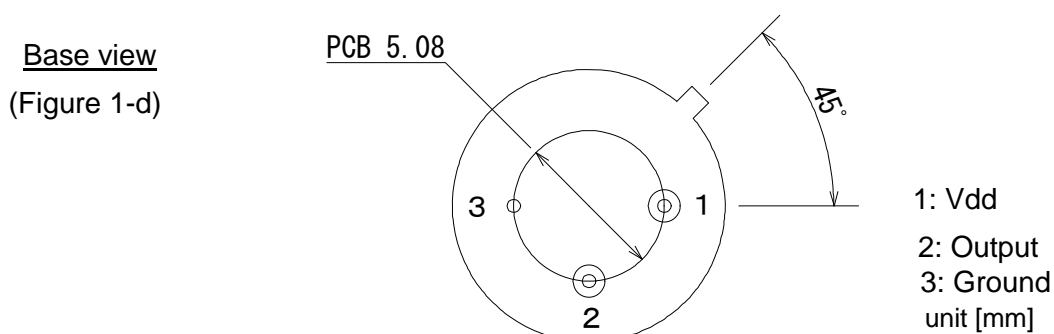
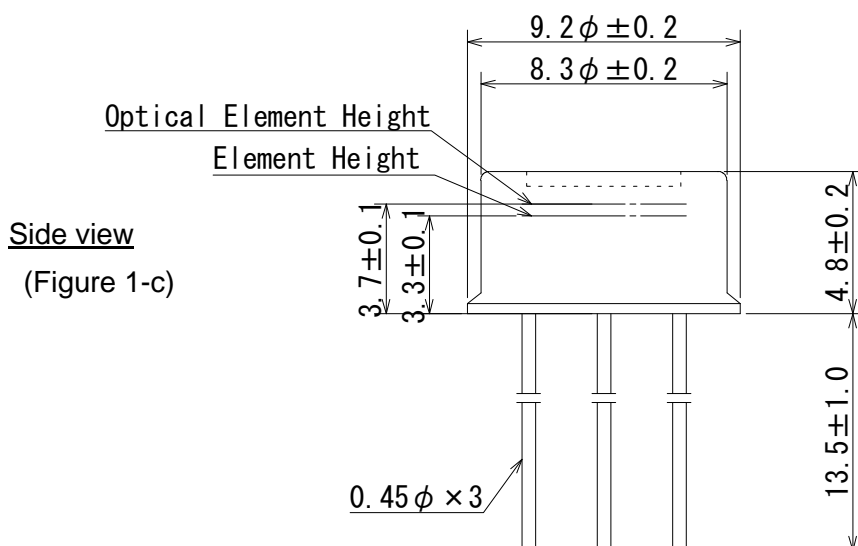
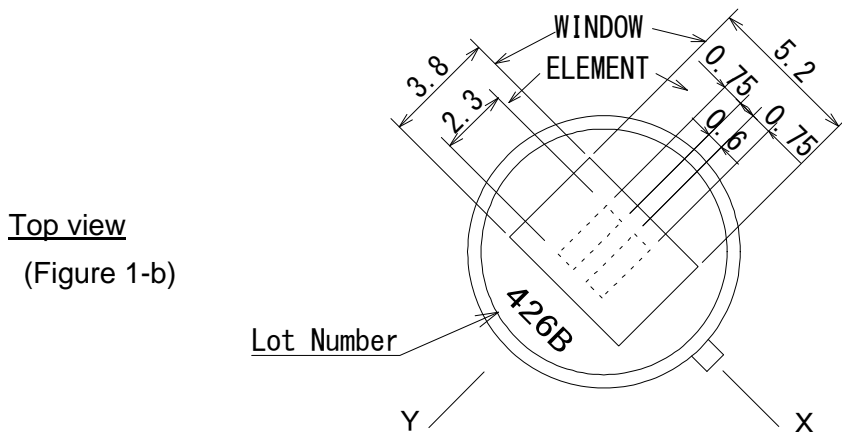
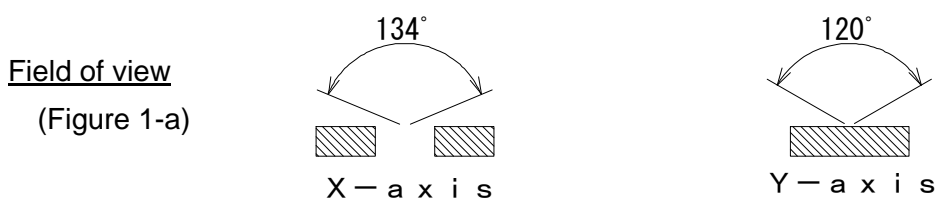
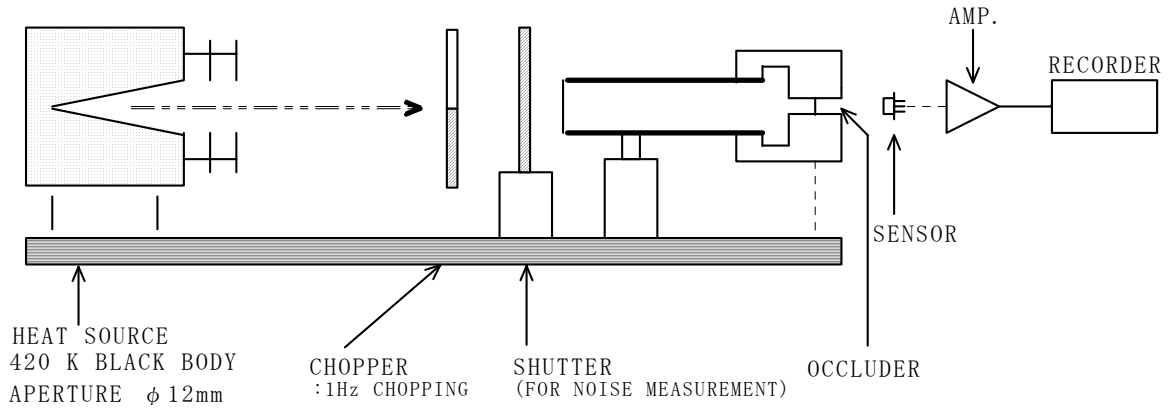


Fig. 1 : Dimensions (Flat package type)

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Occluder Position

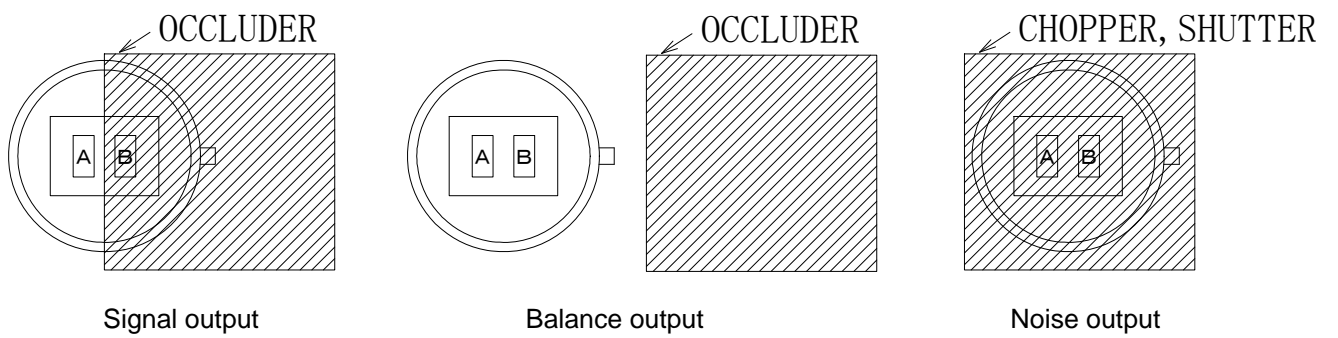


Fig. 2 : Test Set-up Block Diagram

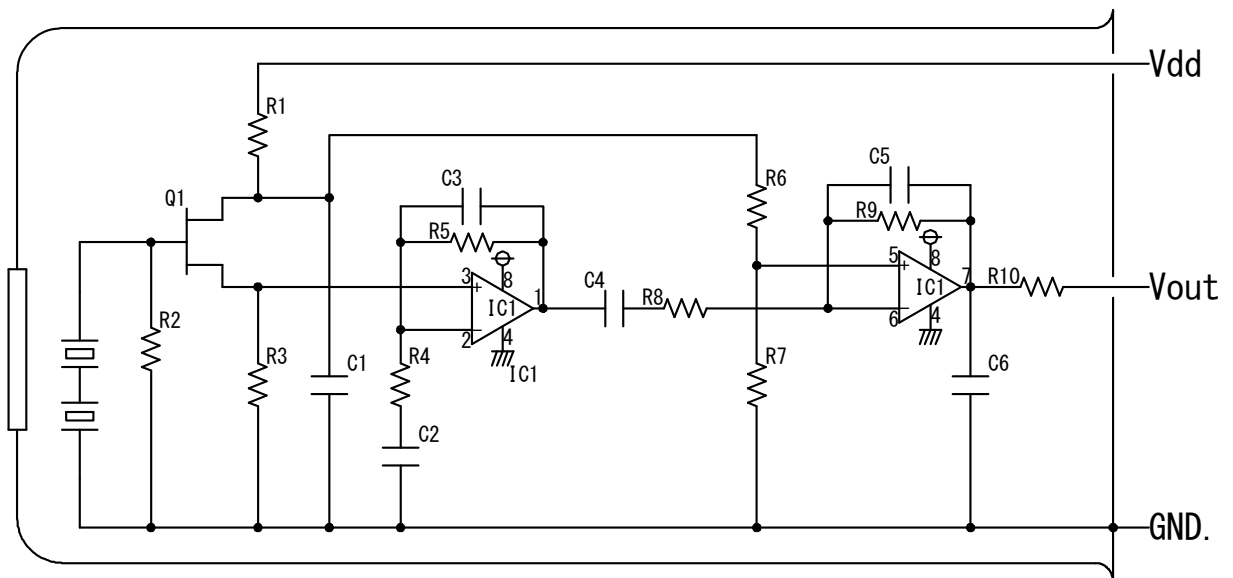
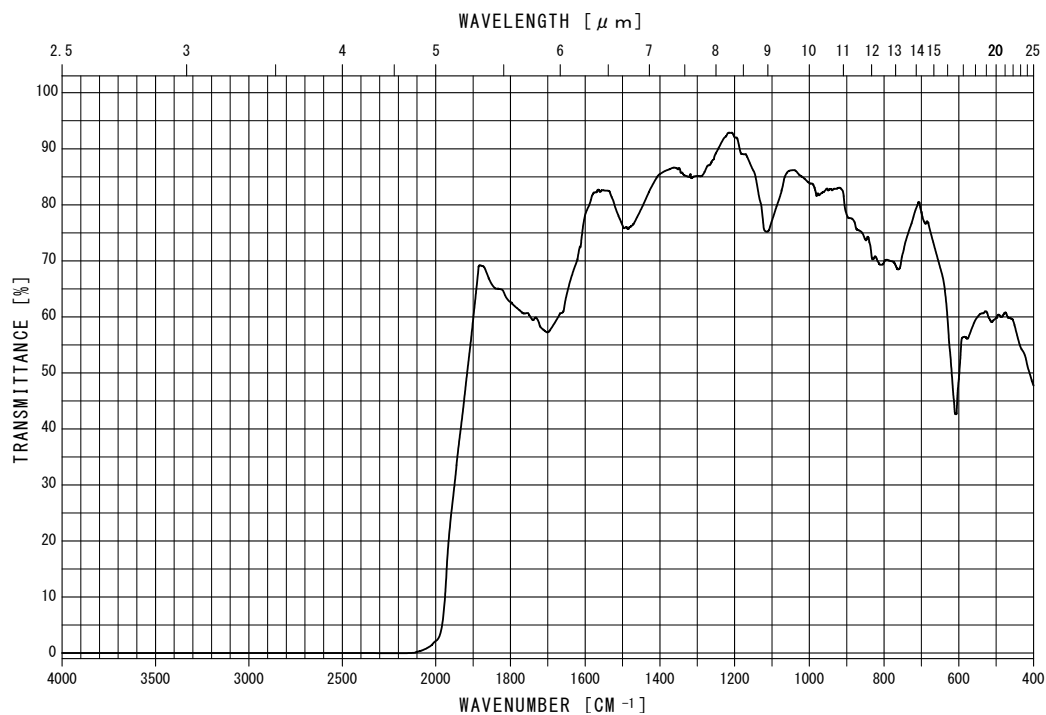



Fig. 3 : Circuit Configuration

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**Fig. 4 : Typical Transmission Characteristics of Filter**

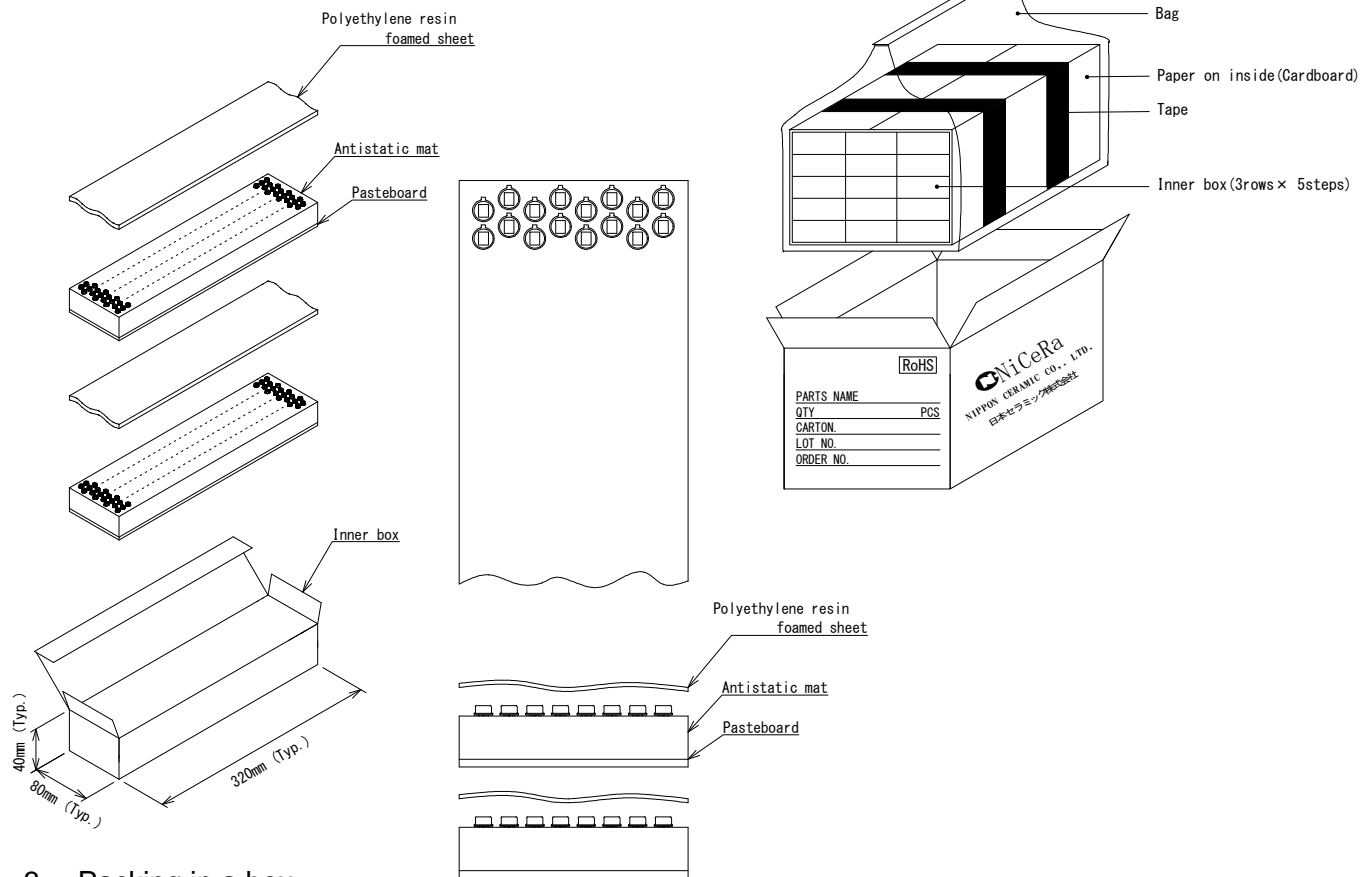
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## Packing Specification

The products are packaged in inner box, and the boxes are piled up as shown on the following sketch.

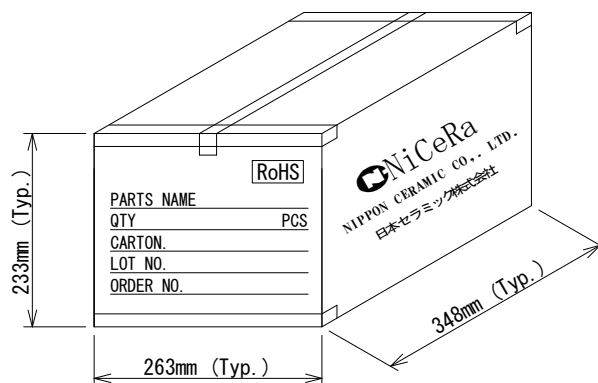
1. Product arrangement 200 pcs./Sheet  
400 pcs./Box

2. Packing



3. Packing in a box

The outer box is sealed with stick tape.



4. Standard Package Quantity : 6,000 pcs.

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