

MESSRS. : _____

AGENT : _____

SPECIFICATION of THERMOPILE INFRARED SENSOR UNIT

MODEL NO. : TSUP-6C-STC -1 (500mm)


PART NO. : _____

 **NIPPON CERAMIC CO., LTD.**

APPROVED BY

CHECKED BY

DRAWN BY

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1. SCOPE

This specification describes a Thermopile Infrared Sensor Unit for non-contact temperature measurement supplied by Nippon Ceramic Co., Ltd.

2. TYPE of UNIT

2.1. TYPE NAME

Thermopile Infrared Sensor Unit

2.2. MODEL NO.

TSUP-6C-STC-1

3. DIMENSIONS

See Fig. 1.

Production Lot No. is put on a Unit.

4. GENERAL CHARACTERISTICS


Table 1

PARAMETER	SPECIFICATION
4.1. Thermopile Sensor	Single type Thermopile
4.2. Optics	Silicon-Lens(uncoated)
4.3. Outputs	Thermopile Signal Output (for Incident Infrared Energy Detection) Thermistor Signal Output (for Ambient Temp. Detection) * Both analog outputs are supplied individually.
4.4. Time Constant	Typ. 50 msec. (+/-) 50 %
4.5. Circuit Configuration	See Fig. 2
4.6. Detection Area	See Fig. 3
4.7. Directivity	See Fig. 4
4.8. Detecting Temperature Range	0 ~ 100 degrees Celsius
4.9. Accuracy	Within (+/-) 2 degrees Celsius
4.10. Operating Temperature	0 ~ 40 degrees Celsius
4.11. Storage Temperature	-20 ~ 80 degrees Celsius

5. ELECTRICAL CHARACTERISTICS

Table 2

PARAMETER	CONDITION	SPECIFICATION
5.1. Thermopile Signal Output	Object Temp. : 50 degrees Celsius (Emissivity = 0.99) Ambient Temp. : 20 degrees Celsius Distance : 500 mm	2.135 V (+/-) 3 %
5.2. Temperature Characteristics of Thermopile Signal Output	Object Temp. : 0 ~ 100 degrees Celsius (Ambient Temp. : 0 ~ 40 degrees Celsius)	See Data 1
5.3. Thermistor Signal Output	Ambient Temp. : 20 degrees Celsius	0.484 V (+/-) 3 %
5.4. Temperature Characteristics of Thermistor Signal Output	Ambient Temp. : 0 ~ 40 degrees Celsius	See Data 2
5.5. Reference Voltage	25 degrees Celsius	1.225 V (+/-) 1 %
5.6. Supply Voltage	Single Power Supply	5 V (Maximum Rating : 6 V)
5.7. Current Consumption	+Vs = 5 V Supply	Max. 5 mA
5.8. Output Current	Short Circuit to Ground	Max. 60 mA

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6. MEASUREMENT METHOD

6.1. Thermopile Signal Output

See Fig. 5.

7. NOTES

7.1. 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.

7.2. Usage restrictions/precautions

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

7.2.1 In rapid environmental temperature changes.

7.2.2 In strong shock or vibration.

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

7.2.4 In fluid, corrosive gases and sea breeze.

7.2.5 Continual use in high humidity atmosphere.

7.2.6 In field of static electricity or strong electromagnetic waves.

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

7.3. Handling and storage restrictions/precautions

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

7.3.1. Vibration for a long time.

7.3.2. Strong shock.

7.3.3. Static electricity or strong electromagnetic waves.

7.3.4. High or Low temperature and humidity for a long time.


7.3.5. Corrosive gases or sea breeze.

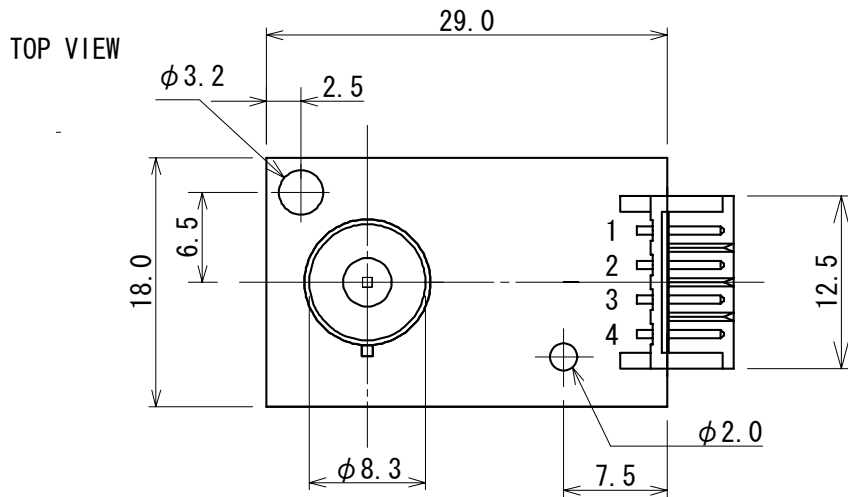
7.3.6. Dirty and dusty environments that may contaminate the optical window.

7.4. 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.

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

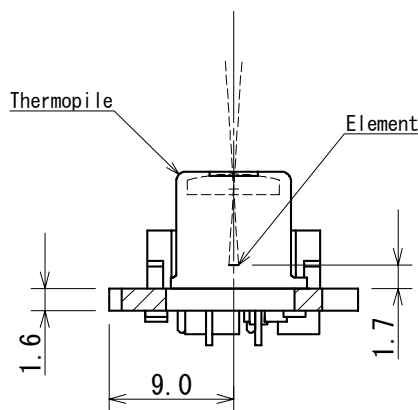
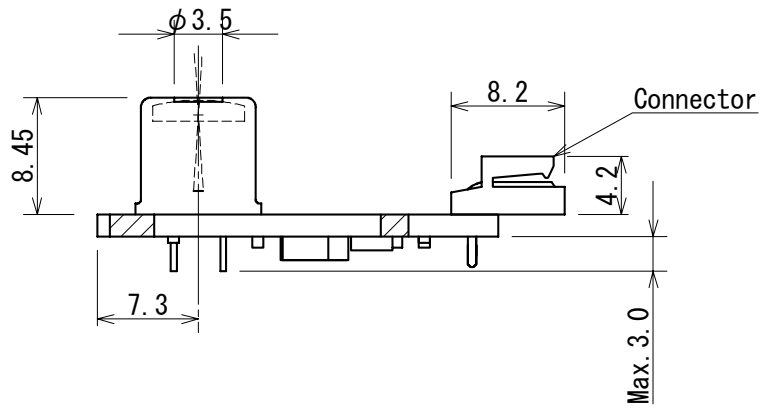
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Pin Arrangement

- 1 : Vtp(Thermopile Voltage Output)
- 2 : Ground
- 3 : +Vs
- 4 : Vntc(Thermistor Signal Output)

SIDE VIEW

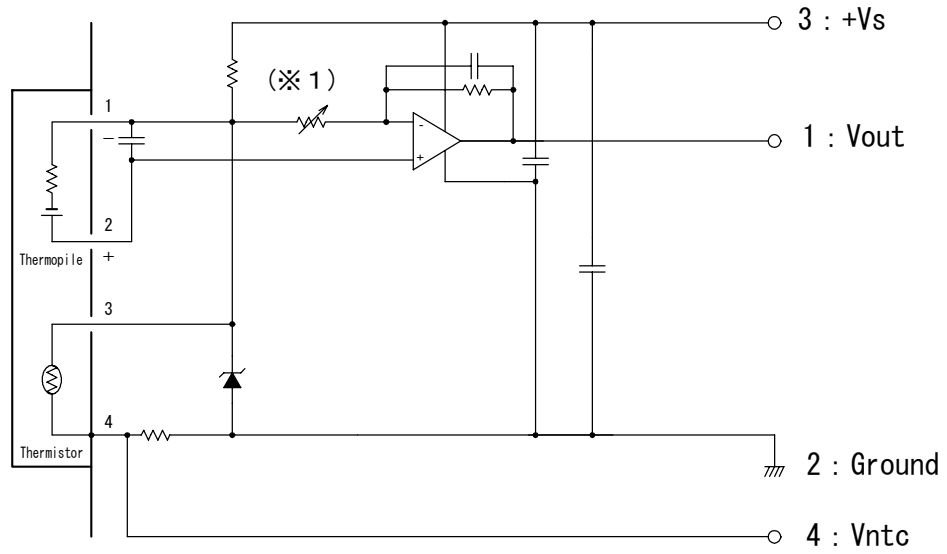


Tolerance : ± 0.2

unit [mm]

Fig. 1 : Dimensions

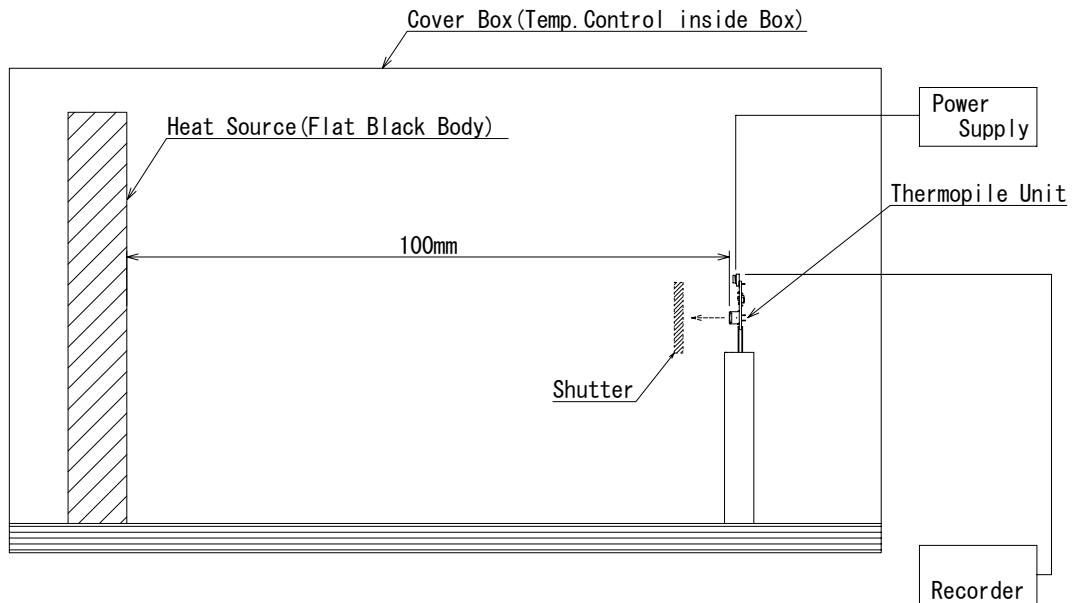
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Single type

(*1) Thermopile Signal Output of Unit is calibrated by VR1 at outgoing inspection, Do not touch VR1.

Fig. 2 : Circuit Configuration



Distance : 100 mm
 Supply Voltage : 5 V
 Reference Voltage : Typ. 1.225 V

* Thermopile Signal Output Shutter On/Off
 Shutter On(Open) : Infrared Incidence
 Shutter Off(Close) : Infrared Cut-off

Fig. 5 : Test Set-up Block Diagram

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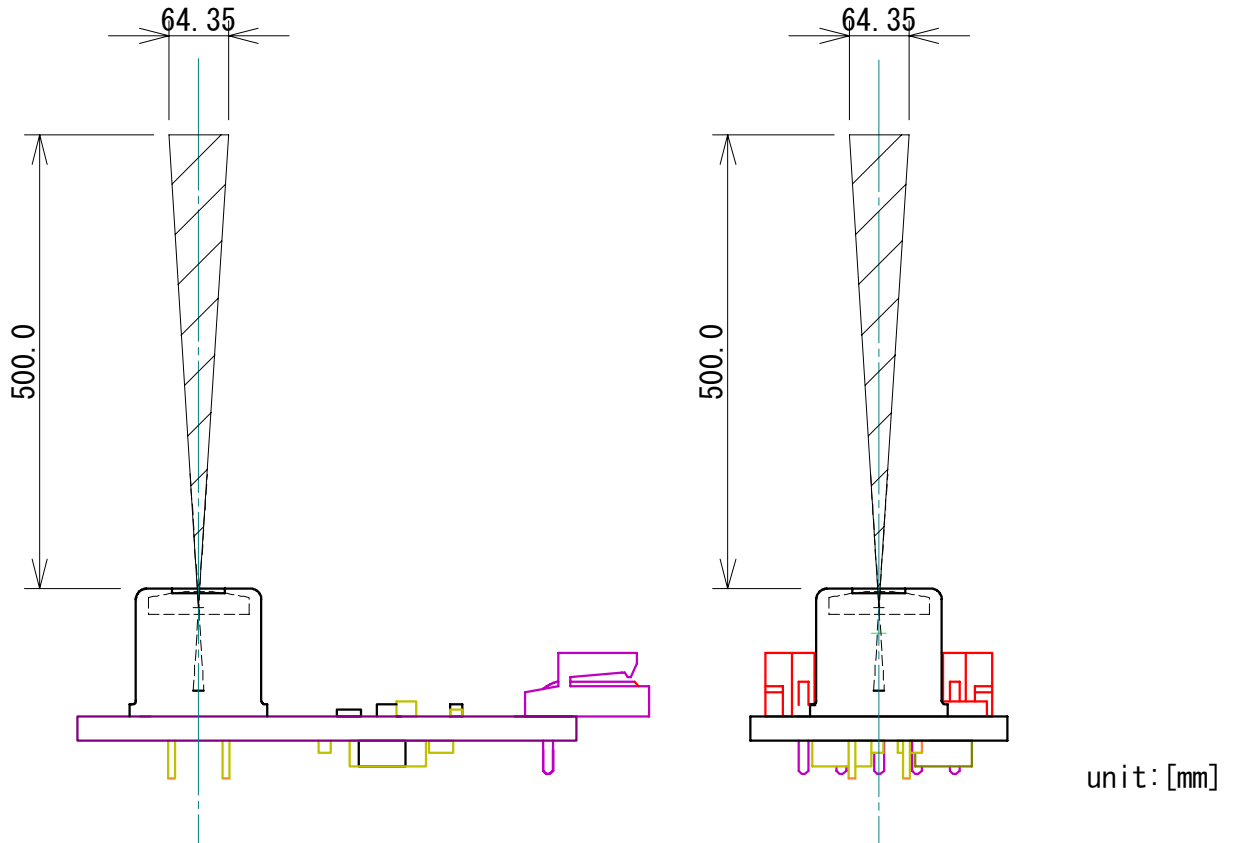


Fig. 3 : Detection Area

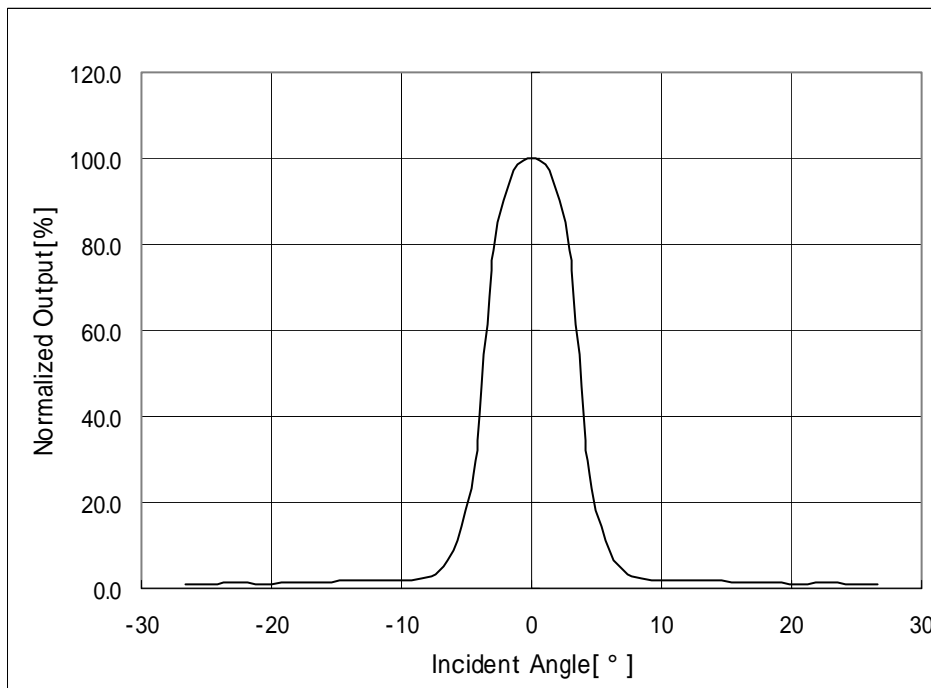

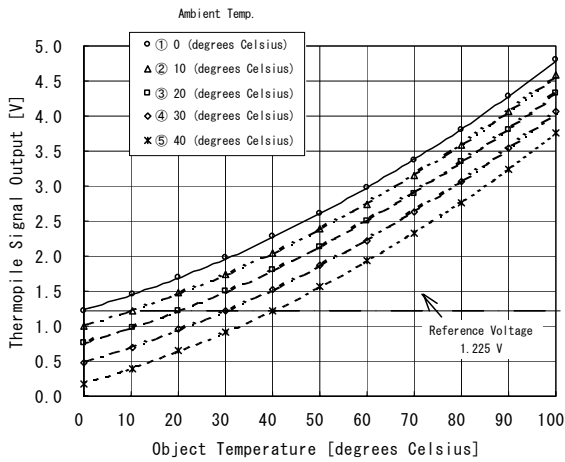


Fig. 4 : Directivity

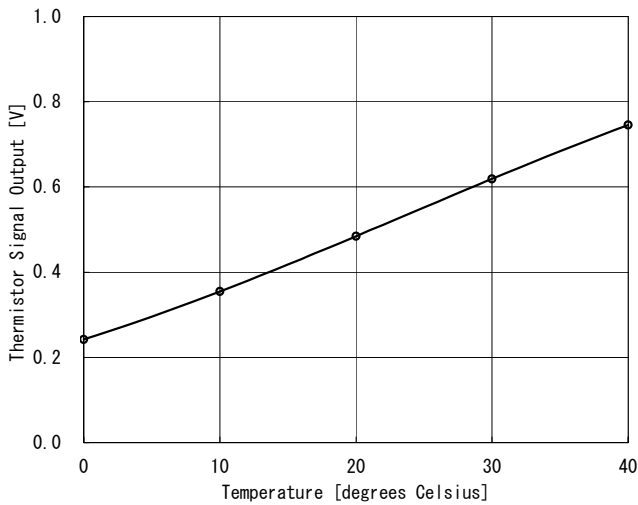
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Ambient Temp. (°C)	Thermopile Signal Output [°C]											Data
	0	10	20	30	40	50	60	70	80	90	100	
0	1.225	1.448	1.695	1.970	2.272	2.606	2.971	3.372	3.808	4.284	4.800	--△-- ①
10	1.002	1.225	1.473	1.747	2.050	2.383	2.749	3.149	3.586	4.061	4.577	--○-- ②
20	0.755	0.977	1.225	1.499	1.802	2.135	2.501	2.901	3.338	3.813	4.330	--□-- ③
30	0.480	0.703	0.951	1.225	1.528	1.861	2.227	2.627	3.064	3.539	4.055	--◇-- ④
40	0.178	0.400	0.648	0.922	1.225	1.558	1.924	2.324	2.761	3.236	3.753	--×-- ⑤

* Distance : 100 mm

Data 1 : Temperature Characteristics of Thermopile Signal Output



Temp. [degrees Celsius]	* Reference Voltage : Typ. 1.225 V					Data
	0	10	20	30	40	
Typical Thermistor Signal Output [V]	0.242	0.355	0.484	0.619	0.746	--○--

Thermistor
Resistance : Typ. R = 100 kohm (at 25 [degrees Celsius])
Beta Value : 3955K (+/-) 0.5 % (T1/T2 : 0/50 [degrees Celsius])

Data 2 : Temperature Characteristics of Thermistor Signal Output

** If you need numerical data of each condition, please ask NiCeRa.
Temperature Conversion Table or arithmetic program etc are available.

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TEL: 029-81022619 13072977981 FAX:029-88789382