

**SPECIFICATION  
of  
THERMOPILE INFRARED SENSOR  
UNIT**

TSEA01 - 4A

MODEL NO. : TSEA01 - 4A	DRAWING NO. :	REV :		December 13, 2004
PART NO. :		1.0		

**1. SCOPE**

This specification describes a Thermopile Infrared Sensor Unit for non-contact temperature measurement.

**2. TYPE of UNIT**

## 2.1. TYPE NAME

Thermopile Infrared Sensor Unit

## 2.2. MODEL NO.

TSE01-4A

**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. Time Constant	Typ. 50 msec. (+/-) 50 %
4.4. Circuit Configuration	See Fig. 2
4.5. Detection Area	See Fig. 3
4.6. Directivity	See Fig. 4
4.7. Detecting Temperature Range	20 ~ 60 degrees Celsius
4.8. Accuracy	Within (+/-) 0.5 degrees Celsius
4.9. Operating Temperature	0 ~ 60 degrees Celsius
4.10. Storage Temperature	-20 ~ 100 degrees Celsius

**5. ELECTRICAL CHARACTERISTICS**

Table 2

PARAMETER	CONDITION	SPECIFICATION
5.1. Thermopile Signal Output	Object Temp. : 35 degrees Celsius (Emissivity = 0.99) Ambient Temp. : 25 degrees Celsius Distance : 100 mm	3.010 V (+/-) 3 %
5.2. Temperature Characteristics of Thermopile Signal Output	Object Temp. : 20 ~ 60 degrees Celsius (Supply Voltage:5V)	See Data 1
5.3. Supply Voltage	Single Power Supply	5 ~ 16 V (Maximum Rating : 18 V)
5.4. Current Consumption	+Vs = 5 V Supply	Max. 5 mA
5.5. Output Current	Short Circuit to Ground	Max. 60 mA

**6. MEASUREMENT METHOD**

## 6.1. Thermopile Signal Output

See Fig. 5.

MODEL NO. : TSEA01 - 4A	DRAWING NO. :	REV :  1.0	December 13, 2004
PART NO. :			

**7. NOTES**

## 7.1. Design restrictions/precautions

For outdoor applications, be sure to apply suitable supplementary optical filter, drip-proof and anti-dew construction. This Unit 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.

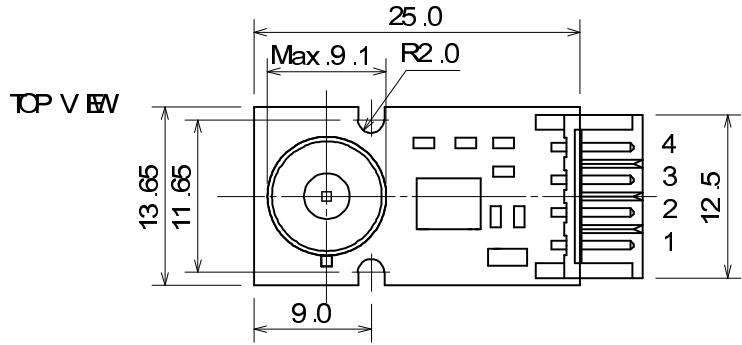
7.3.4. High or Low temperature and humidity for a long time.

7.3.5. Corrosive gases or sea breeze.

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

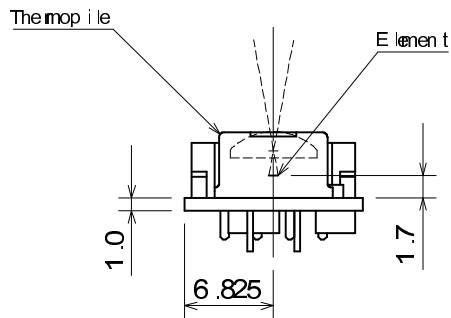
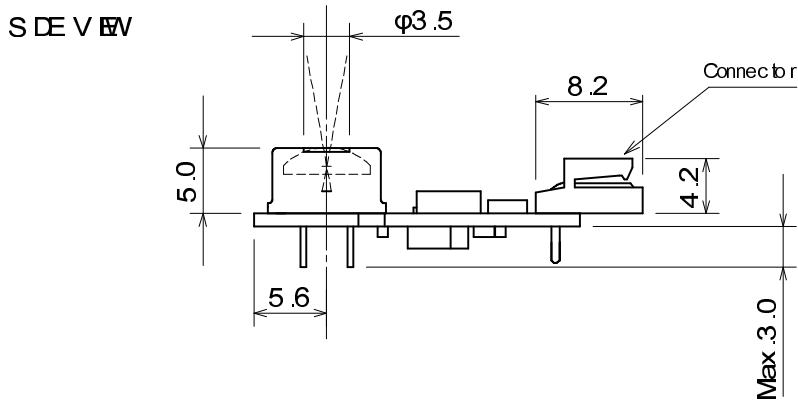
Unit troubles resulting from misuse, inappropriate handling or storage are not the manufacturer's responsibility.

MODEL NO. : TSEA01 - 4A	DRAWING NO. :	REV :  1.0	December 13, 2004
PART NO. :			



P in Arrangement t

- 4 : Vou t
- 3 : G round
- 2 : +Vs
- 1 : Vn tc (Them is to r S igna l Ou tpu t)

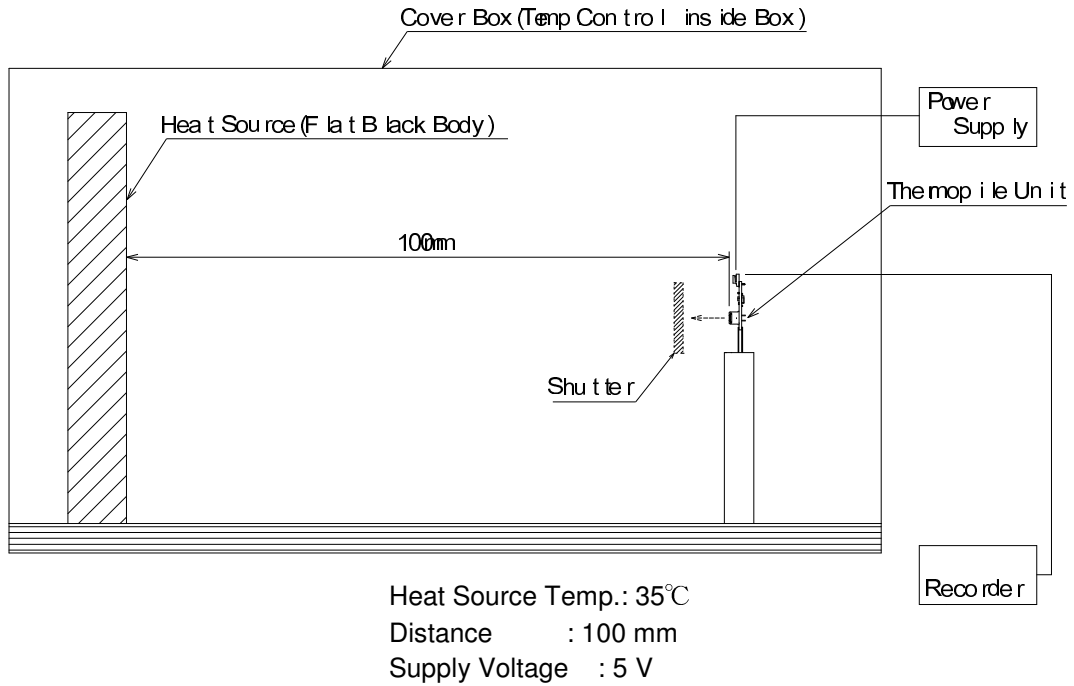


To l erance :  $\pm 0.2$

unit [mm]

**Fig. 1 : Dimensions**

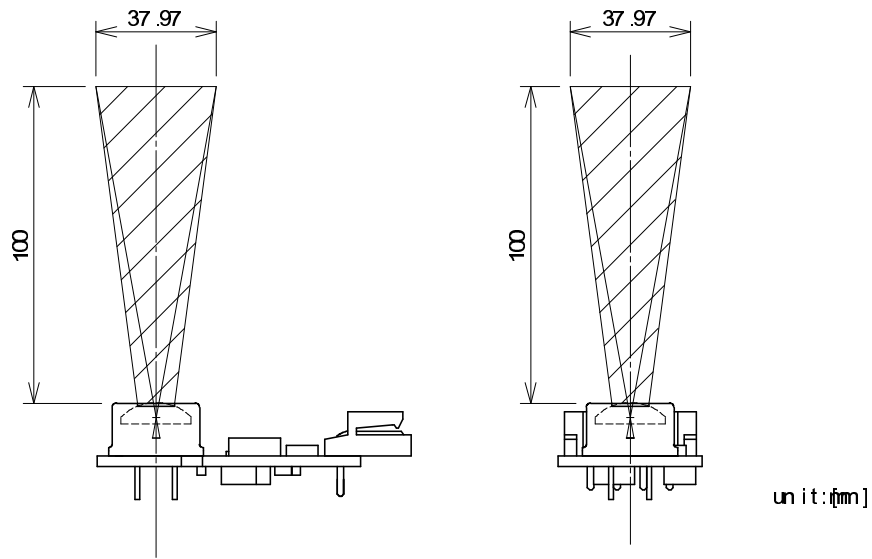
MODEL NO. : TSEA01 - 4A	DRAWING NO. :	REV :  1.0	December 13, 2004
PART NO. :			



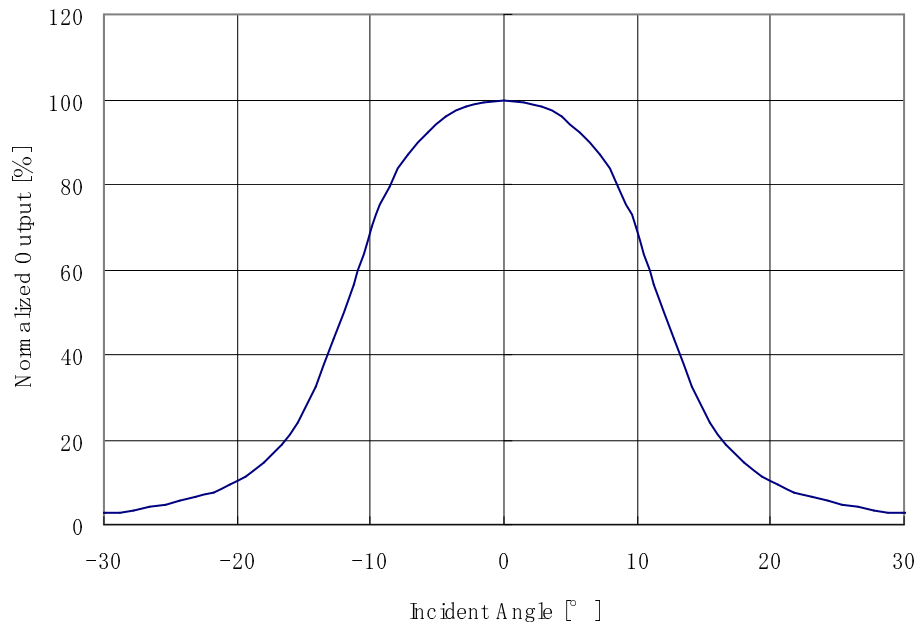
\* Thermopile Signal Output .... Shutter On/Off  
Shutter On(Open) : Infrared Incidence  
Shutter Off(Close) : Infrared Cut-off

**Fig. 5 : Test Set-up Block Diagram**

MODEL NO. : TSEA01 - 4A	DRAWING NO. :	REV :  1.0	December 13, 2004
PART NO. :			

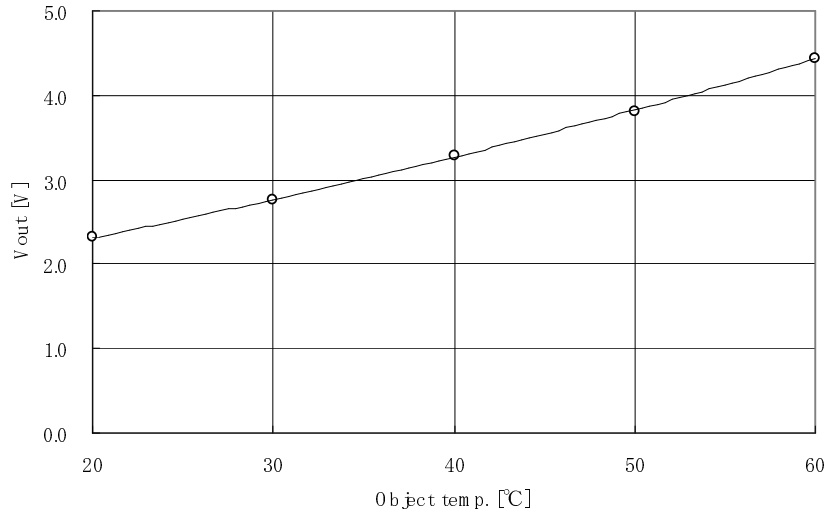


**Fig. 3 : Detection Area**



**Fig. 4 : Directivity**

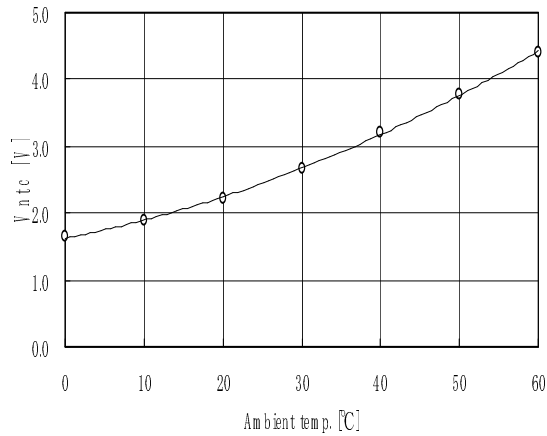
MODEL NO. : TSEA01 - 4A	DRAWING NO. :	REV :	December 13, 2004
PART NO. :		1.0	



Object temp. [°C]	20	30	40	50	60	Data
Vout [V]	2.312	2.759	3.292	3.799	4.442	—○—

\* Distance : 100 mm

**Data 1 : Temperature Characteristics of Thermopile Signal Output**



Thermistor

Resistance: Typ. R = 100kohm ( at 25 [degrees Celsius])

Beta value: 3955K (+/-) 0.5 % (T1/T2: 0/50 [degrees Celsius])

Ambient temp. [°C]	0	10	20	30	40	50	60	Data
Vntc [V]	1.640	1.883	2.223	2.661	3.196	3.786	4.402	—○—

**Data 2 : Temperature Characteristics of Thermistor Signal Output**

MODEL NO. : TSEA01 - 4A	DRAWING NO. :	REV :  1.0	December 13, 2004
PART NO. :			