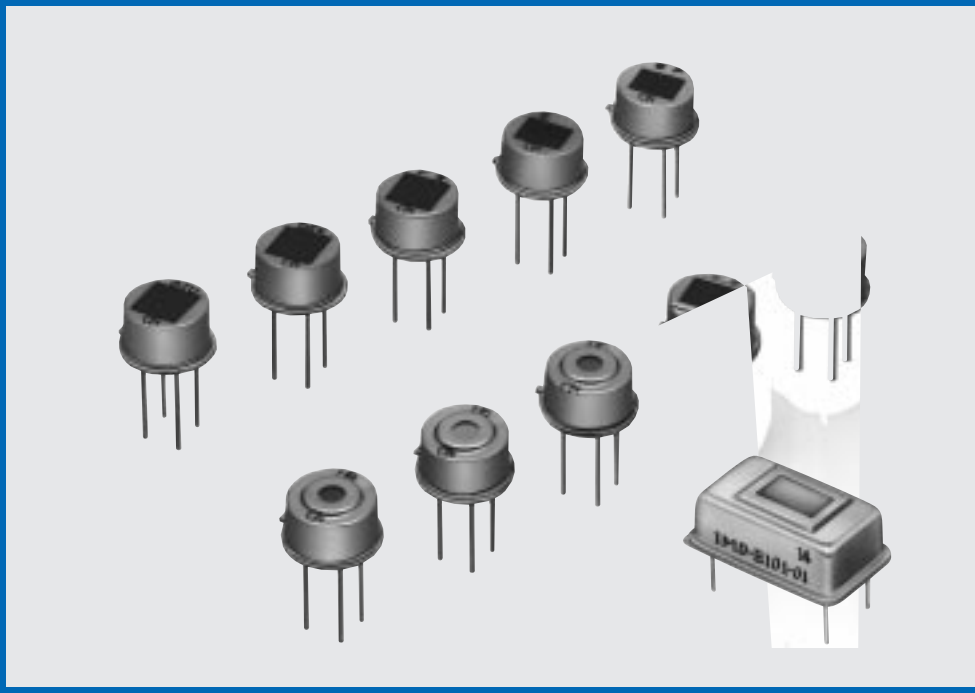
PYROELECTRIC INFRARED SENSOR & SENSOR MODULE

PYROELECTRIC INFRARED SENSOR & SENSOR MODULE



muRata Innovator in Electronics

Murata
Manufacturing Co., Ltd.

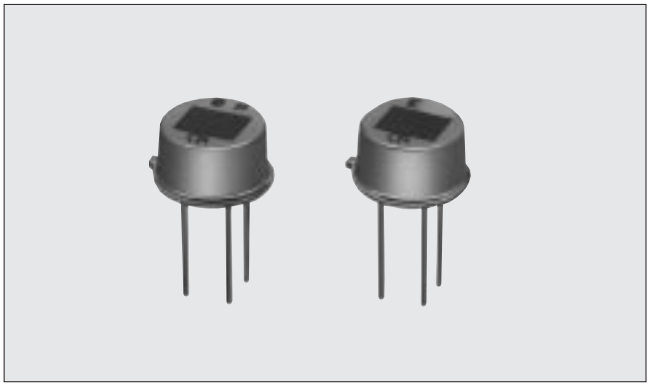
Cat.No.S21E-2

PYROELECTRIC INFRARED SENSOR

Pyroelectric Infrared Sensor **IRA-E700** Series

High Quality Dual Infrared Sensor

Pyroelectric infrared sensor, IRA series, exhibit high sensitivity and reliable performance made possible by Murata's ceramic technology and Hybrid IC technique expertise developed over many years.
IRA-E700 series realize cost benefits and higher performance with a new infrared sensor element of improved material parameters and fabrication.
IRA-E700 series is available in two types.
IRA-E710ST0 has enhanced immunity to RFI (Radio Frequency Interference).



■FEATURES

1. High sensitivity and excellent S/N ratio.
2. High stability to the temperature change.
3. Slight movement can be detectable.
4. High immunity to the external noise. (Vibration, RFI etc.)
5. Custom design is available.
6. Higher in cost-performance.

■APPLICATIONS

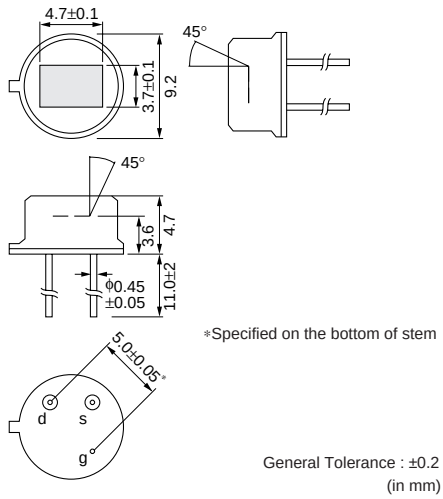
- Security
- Lighting appliances
- Household or other appliances

■RATING (25˚C)

IRA-E700ST1, IRA-E710ST1

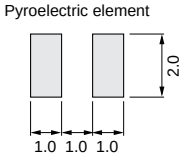
Sensitivity (500K, 1Hz, 1Hz)	4.3mV$_{p-p}$ (Typ.)
Wave length Range	5—14μm
Field of View	$\theta_1=\theta_2=45°$
Optical Filter	5μm long-pass Silicon
Electrode	(2.0×1.0mm)×2
Supply Voltage	2—15V
Operating Temperature	−40 to +70℃
Storage Temperature	−40 to +85℃

■DIMENSIONS & CIRCUIT DIAGRAMS



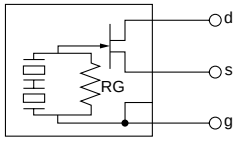
*Specified on the bottom of stem

General Tolerance : ±0.2
(in mm)

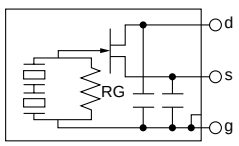


(in mm)

IRA-E700ST0



IRA-E710ST0

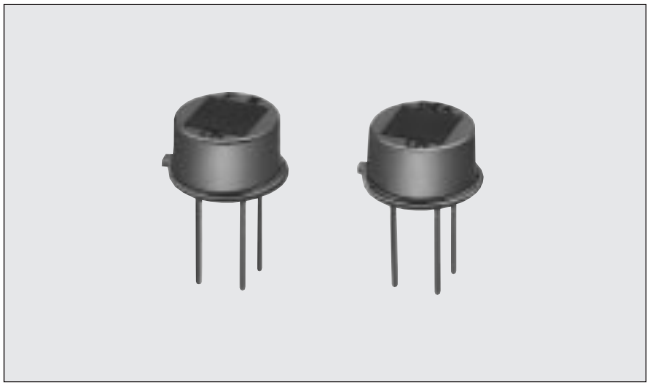


PYROELECTRIC INFRARED SENSOR

Pyroelectric Infrared Sensor **IRA-E900** Series

High Quality Quad Type Infrared Sensor

Pyroelectric infrared sensor, IRA series, exhibit high sensitivity and reliable performance made possible by Murata's ceramic technology and Hybrid IC technique expertise developed over many years.
IRA-E900 series realize cost benefits and higher performance with a new infrared sensor element of improved material parameters and fabrication.
IRA-E900 series is available in two types.
IRA-E910ST1 has enhanced immunity to RFI (Radio Frequency Interference).



■FEATURES

1. High sensitivity and excellent S/N ratio.
2. High stability to the temperature change.
3. Slight movement can be detectable.
4. Non directional sensing with wide F.O.V.
5. High immunity to the external noise. (Vibration, RFI etc.)
6. Custom design is available.
7. Higher in cost-performance.

■APPLICATIONS

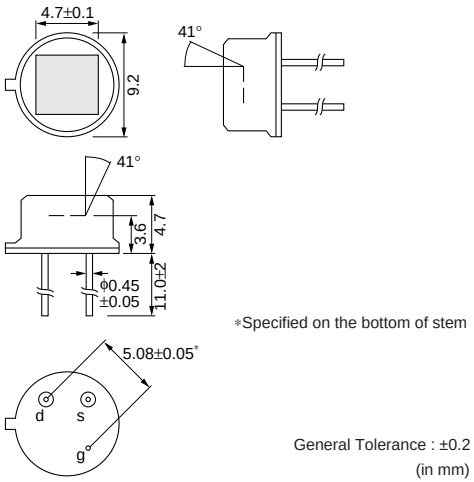
- Security
- Lighting appliances
- Household or other appliances

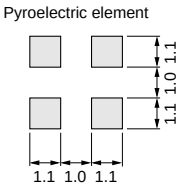
■RATING (25˚C)

IRA-E900ST1, IRA-E910ST1

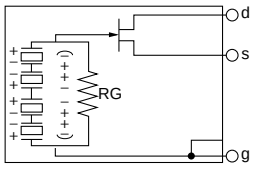
Sensitivity (500K, 1Hz, 1Hz)	3.3mV$_{p-p}$ (Typ.)
Wave length Range	5—14μm
Field of View	$\theta_1=\theta_2=41°$
Optical Filter	5μm long-pass Silicon
Electrode	(1.1×1.1mm)×4
Supply Voltage	3—15V
Operating Temperature	−25 to +55℃
Storage Temperature	−40 to +85℃

■DIMENSIONS & CIRCUIT DIAGRAMS

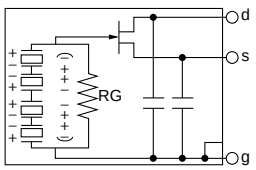




IRA-E900ST1



IRA-E910ST1



PYROELECTRIC INFRARED SENSOR

IRA-E940 Series

High Quality Quad Type Infrared Sensor

Pyroelectric infrared sensor, IRA series, exhibit high sensitivity and reliable performance made possible by Murata's ceramic technology and Hybrid IC technique expertise developed over many years.
IRA-E940ST1 realizes cost benefits and higher performance with a new infrared sensor element of improved material parameters and fabrication.
IRA-E940ST1 which has quad elements and 2 outputs will detect human body more correct with OR/AND logic circuit.

■FEATURES

1. High sensitivity and excellent S/N ratio.
2. High stability to the temperature change.
3. High immunity to the external noise. (Vibration, RFI etc.)
4. Higher in cost-performance.
5. Custom design is available.

■APPLICATIONS

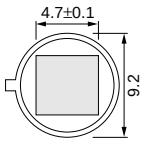
- Security
- Lighting appliances
- Household or other appliances

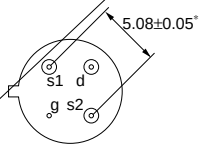
■RATING (25˚C)

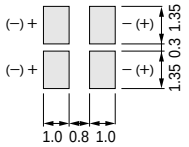
Sensitivity (500K, 1Hz, 1Hz)	3.3mV$_{p-p}$ (Typ.)
Wave length Range	5—14μm
Field of View	θ_1=55°, θ_2=50°
Optical Filter	5μm long-pass Silicon
Electrode	(1.35×1.0mm)×4
Supply Voltage	2—15V
Operating Temperature	−25 to +55℃
Storage Temperature	−40 to +85℃

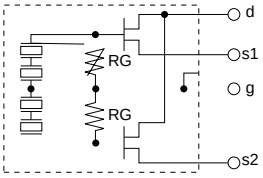
■DIMENSIONS & CIRCUIT DIAGRAMS

1







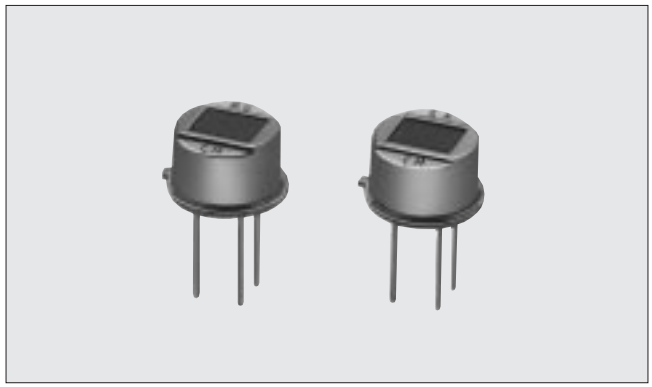


PYROELECTRIC INFRARED SENSOR

Pyroelectric Infrared Sensor **IRA-E500** Series

High Quality Dual Type Infrared Sensor

Pyroelectric infrared sensor, IRA-E500 series have dual sensing patterns.
The E500 series are available in two types with improved immunity to RFI and light.



■FEATURES

1. High immunity to the external light.
2. High immunity to the radio frequency interference.
3. Two type of optical filter are available for varying applications.

■APPLICATIONS

- Security
- Lighting appliances
- Household or other appliances

■RATING (25˚C)

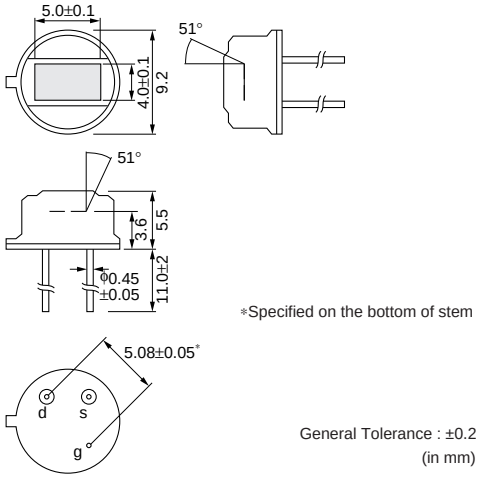
IRA-E500SZ0

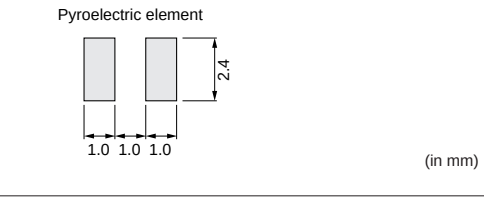
Sensitivity (500K, 1Hz, 1Hz)	3.2mV$_{p-p}$ (Typ.)
Wave length Range	7—14μm
Field of View	$\theta_1=\theta_2=51°$
Optical Filter	7μm long-pass silicon
Electrode	(2.4×1.0mm)×2
Supply Voltage	3—15V
Operating Temperature	−25 to +55℃
Storage Temperature	−30 to +100℃

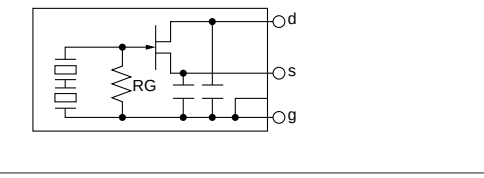
IRA-E500ST0

Sensitivity (500K, 1Hz, 1Hz)	3.9mV$_{p-p}$ (Typ.)
Wave length Range	7—14μm
Field of View	$\theta_1=\theta_2=51°$
Optical Filter	5μm long-pass silicon
Electrode	(2.4×1.0mm)×2
Supply Voltage	3—15V
Operating Temperature	−25 to +55℃
Storage Temperature	−30 to +100℃

■DIMENSIONS & CIRCUIT DIAGRAMS





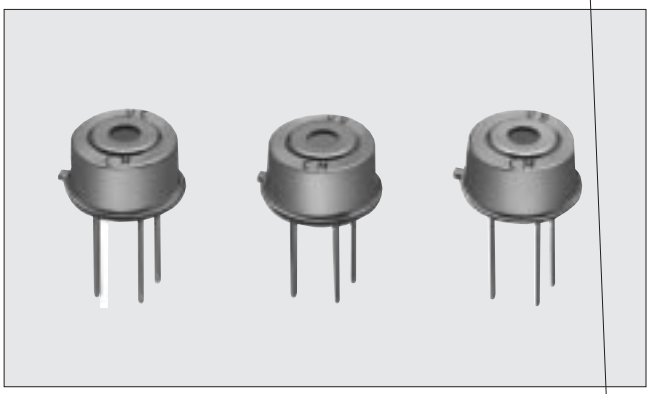


PYROELECTRIC INFRARED SENSOR

IRA-E410 Series

Temperature Compensation Single Type Infrared Sensor

Single type pyroelectric infrared sensor IRA-E410 seires has a temperature compensation element.
They are suitable for flame detection and remote temperature measurement.



■FEATURES

1. High stability against abrupt ambient temperature change.
2. High immunity to the radio frequency interference.
3. Three type of optical filter are available for varying applications.
4. Custom design is available with varying optical filter.

■APPLICATIONS

Part Number	Optical Filter	Applications
IRA-E410S1	Silicon	Temperature measurement
IRA-E410ST1	5μm long-pass filter	Human body detection
IRA-E410QW1	4.3μm band-pass filter	Flame detection

■DIMENSIONS & CIRCUIT DIAGRAMS

■RATING (25˚C)

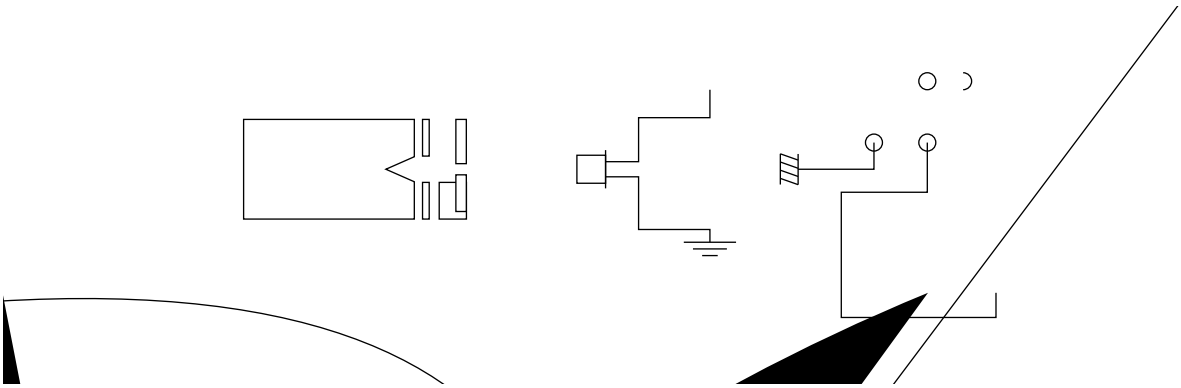
Item	IRA-E410S1	IRA-E410ST1	IRA-E410QW1
Sensitivity (500K, 1Hz, 1Hz)	3.0mV$_{p-p}$ (Typ.)	3.3mV$_{p-p}$ (Typ.)	1.3mV$_{p-p}$ (Typ.)*
Wave length Range	1—20μm	5—14μm	4.3μm
Field of View	$\theta_1=\theta_2=17°$		
Optical Filter	Silicon	5μm long-pass silicon	4.3μm band-pass silicon
Electrode	ϕ1.6mm		
Supply Voltage	3—15V		
Operating Temperature	−25 to +55℃		
Storage Temperature	−30 to +100℃		

* 700K,5Hz,1Hz

PYROELECTRIC INFRARED SENSOR

IRA Series

■TEST METHOD OF SENSITIVITY

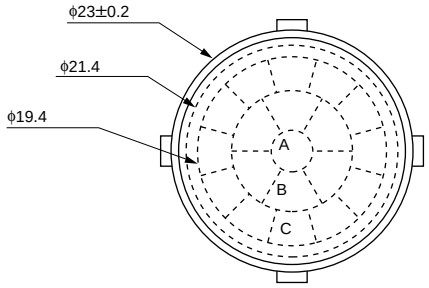


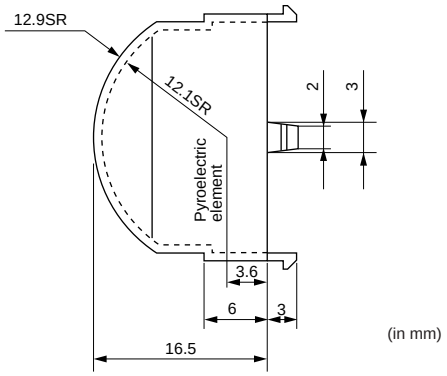
■TYPICAL APPLICATION CIRCUIT (Human detection)

PYROELECTRIC INFRARED SENSOR

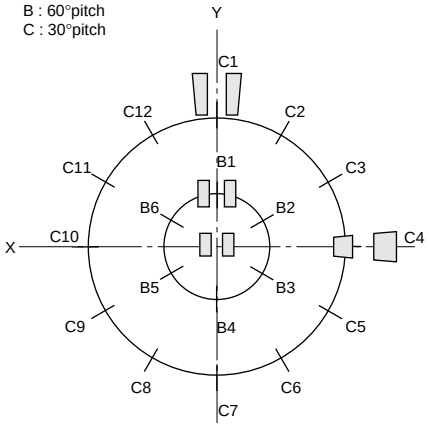
Pyroelectric Infrared Sensor **IRA** Series

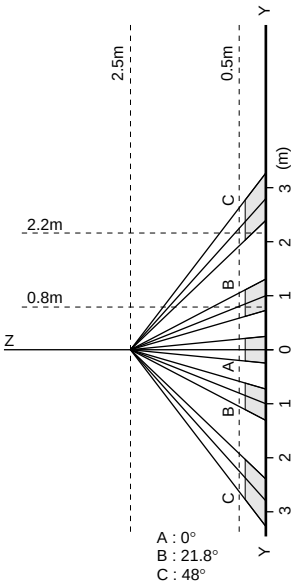
PPGI0626





Detection area on the floor





Freshel lens are available upon request.

PYROELECTRIC INFRARED SENSOR

Pyroelectric Infrared Sensor **IRA** Series

■RELIABILITY TEST

IRA-E700 series, IRA-E900 series

Test Items	Test Conditions	Criteria
High Temperature	100℃ for 500 hours	After completion of testing, leave for three hours normal humidity condition temperature, and then measure. 1. External appearance: No significant damage. 2. Sensitivity: Tolerance within 20% deviation from original value. 3. Noise: Maximum tolerance +100mV of original value
Low Temperature	−40℃ for 500 hours	
Humidity	60℃, 95% RH for 500 hours	
Heat Cycle	20 times of following cycle. −25℃, 30min.⇨Room temp., 30min⇩ ⇧Room temp., 30min.⇦55℃, 30min.	
Vibration	Apply vibration of amplitude of 1.5mm with 10 to 55Hz band to each of 3 perpendicular directions for 60min.	
Shock	Apply shock of 100G sinewave by standard shock tester to each of 3 perpendicular directions.	
Soldering Heat	Immerse up to 3.0mm from can case in solder bath of 260±5℃ for 10±1sec.	
Hermetic Sealing	Conform to MIL-STD-202F chapter 112D, condition D. Immerse in fluorocarbon bath (FC-40) of 125±5℃ for 20sec.	No generation of bubbles.
Solderability	Conform to MIL-STD-202F chapter 208B. Immerse in rosin flax and Immerse up to 2.0 to 2.5mm from can case in solder bath of 230±5℃ for 5±0.5sec.	More than 95% of the terminal should be covered by solder.

IRA-E410 series, IRA-E500 series

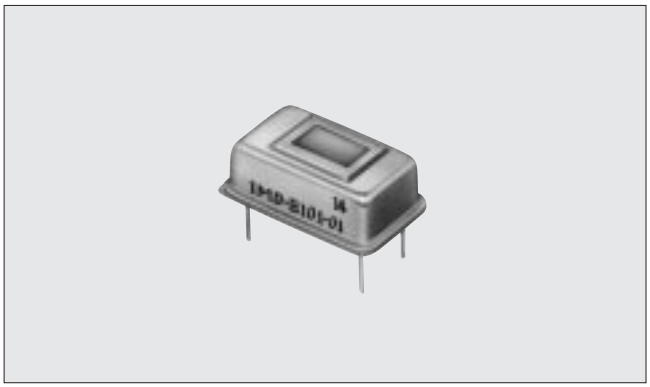
Test Items	Test Conditions	Criteria
High Temperature	100℃ for 500 hours	After completion of testing, leave for three hours normal humidity condition temperature, and then measure. 1. External appearance: No significant damage. 2. Sensitivity: Tolerance within 20% deviation from original value. 3. Noise: Maximum tolerance +100mV of original value
Low Temperature	−30℃ for 500 hours	
Humidity	60℃, 95% RH for 500 hours	
Heat Cycle	20 times of following cycle. −25℃, 30min.⇨Room temp., 30min⇩ ⇧Room temp., 30min.⇦55℃, 30min.	
Vibration	Apply vibration of amplitude of 1.5mm with 10 to 55Hz band to each of 3 perpendicular directions for 60min.	
Shock	Apply shock of 100G sinewave by standard shock tester to each of 3 perpendicular directions.	
Soldering Heat	Immerse up to 3.0mm from can case in solder bath of 260±5°C for 10±1sec.	
Hermetic Sealing	Conform to MIL-STD-202F chapter 112D, condition D. Immerse in fluorocarbon bath (FC-40) of 125±5℃ for 20sec.	No generation of bubbles.
Solderability	Conform to MIL-STD-202F chapter 208B. Immerse in rosin flux and Immerse up to 2.0 to 2.5mm from can case in solder bath of 230±5℃ for 5±0.5sec.	More than 95% of the terminal should be covered by solder.

PYROELECTRIC INFRARED SENSOR MODULE

IMD Series

Newly Developed Module with Lower Power Consumption and Extra Features.

The IMD Series comprises a amplifier, high performance infrared sensor modules in compact, hermetically sealed, metal can packages.
The modules exhibit extremely low power consumption and an exclusive fresnel lens is also preparation.
Two models are available for different applications:
1. Analog & Digital Output Model (IMD-B101-01)
2. Digital Output & Brightness Sensor (CdS) Input Model (IMD-B102-01)



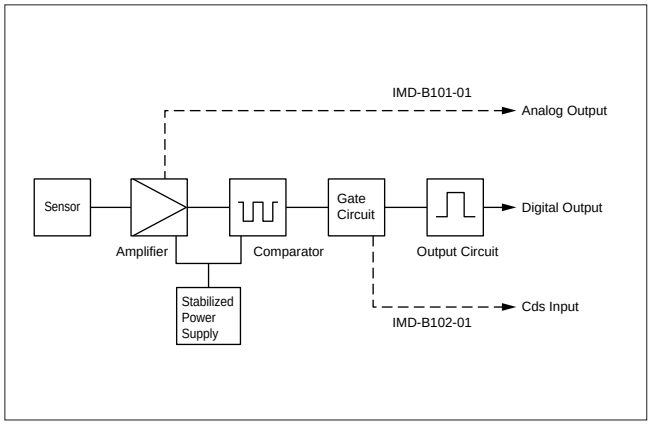
■FEATURES

1. With the fresnel lens, the sensor is able to detect the human body at a distance of 5m through angles of 119°×38°.
2. The modules have a compact size (20.3×12.6×7.8mm).
3. The modules incorporate an amplifier and a single processing circuit.
4. The have outstanding reliability and EMI characteristics.
5. They have low power consumption.

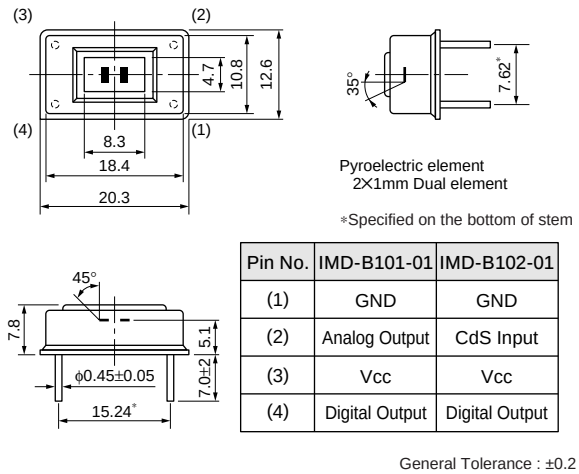
■APPLICATIONS

- Automatic light switches.
- On/off controls for household appliances, industrial equipment and office equipment.
- Amusement devices (Games, Toys, etc.)

■BLOCK DIAGRAM



■DIMENSIONS



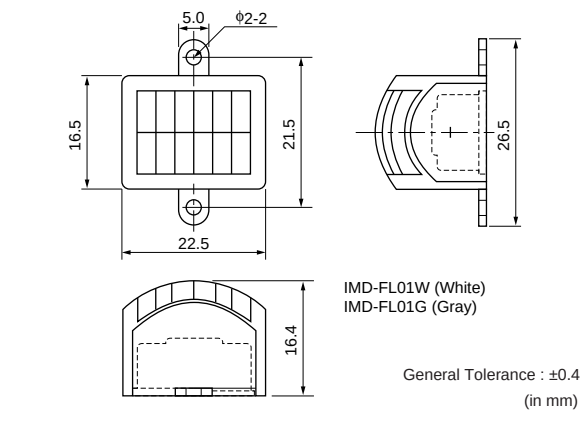
Pyroelectric element
2×1mm Dual element

*Specified on the bottom of stem

Pin No.	IMD-B101-01	IMD-B102-01
(1)	GND	GND
(2)	Analog Output	CdS Input
(3)	Vcc	Vcc
(4)	Digital Output	Digital Output

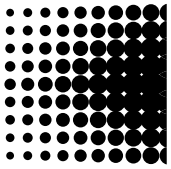
General Tolerance : ±0.2
(in mm)

■FRESNEL LENS



IMD-FL01W (White)
IMD-FL01G (Gray)

General Tolerance : ±0.4
(in mm)



PYROELECTRIC INFRARED SENSOR MODULE

Pyroelectric Infrared Sensor Module **IMD** Series

■RELIABILITY TEST

Test Items	Test Conditions	Criteria
High Temperature	60℃ for 500 hours	After completion of testing, leave for three hours normal humidity condition temperature, and then measure. 1. External appearance: No significant damage. 2. Sensitivity: Min. 70% of original value. 3. Current consumption: Within rated value.
Low Temperature	−20℃ for 500 hours	
Humidity	60℃, 95% RH for 150 hours	
Heat Cycle	20 times of following cycle. −20℃, 30min.⇨Room temp., 30min⇩ ⇧Room temp., 30min.⇦60℃, 30min.	
Vibration	Apply vibration of amplitude of 1.5mm with 10 to 55Hz band to each of 3 perpendicular directions for 2 hours.	
Shock	Apply shock of 30G sinewave by standard shock tester to each of 3 perpendicular directions for 5 times.	
Soldering Heat	Immerse up to 3.0mm from can case in solder bath of 260±5℃ for 10±1sec.	
Hermetic Sealing	Conform to MIL-STD-202F chapter 112D, condition D. Immerse in fluorocarbon bath (FC-40) of 125±5℃ for 20sec.	No generation of bubbles.

⚠Note:

1. Export Control
   〈For customers outside Japan〉
   Murata products should not be used or sold for use in the development, production, stockpiling or utilization of any conventional weapons or mass-destructive weapons (nuclear weapons, chemical or biological weapons, or missiles), or any other weapons.
   〈For customers in Japan〉
   For products which are controlled items subject to the “Foreign Exchange and Foreign Trade Law” of Japan, the export license specified by the law is required for export.
2. Please contact our sales representatives or product engineers before using our products listed in this catalog for the applications listed below which require especially high reliability for the prevention of defects which might directly cause damage to the third party's life, body or property, or when intending to use one of our products for other applications than specified in this catalog.
   ●❶Aircraft equipment
   ●❷Aerospace equipment
   ●❸Undersea equipment
   ●❹Medical equipment
   ●❺Transportation equipment (vehicles, trains, ships,etc.)
   ●❻Traffic signal equipment
   ●❼Disaster prevention / crime prevention equipment
   ●❽Data-processing equipment
   ●❾Application of similar complexity and/or reliability requirements to the applications listed in the above
3. Product specifications in this catalog are as of August 1999. They are subject to change or our products in it may be discontinued without advance notice. Please check with our sales representatives or product engineers before your ordering. If there are any questions, please contact our sales representatives or product engineers.
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