Special designs from Panasonic that provide high sensitivity and reliability
Pyroelectric infrared motion sensors from Panasonic for optimal usability and reliability

Panasonic develops and produces PIR motion sensors, which combine easy integration, high reliability and environment-friendly materials. The Panasonic PIR motion sensors abbreviated as PaPIRs, have different series of products, including:

**EK M PaPIRs: 3rd generation**

- EKMB (WL) digital output for battery-operated devices (1, 2, 6μA)
- EKMC (VZ) digital and analog output for battery-free devices (170μA)
  Available lens colors: white, black and pearl white

**AMN NaPiOn: 2nd generation**

- AMN3 digital output for battery-free devices (170μA)
  Available lens colors: white and black

**Applications**

- Digital signage, vending machine
- Wake-up switch for LCD displays and panels
- IP cameras, intrusion alarms
- Multi-function printers, video-conference systems
- Lighting controls in general, smart luminaires, smart LED bulbs
- Thermostats, HVAC (heater, ventilator or air conditioner)
- Smart home and IoT applications

Further information at www.panasonic-electric-works.com/eu/pyroelectric-infrared-sensors.htm
We support you in the design-in phase:

Please contact your local sales representative for CAD data and design support.

Further information at www.panasonic-electric-works.com/eu/pyroelectric-infrared-sensors.htm
PaPIRs design features

The PIR motion sensors from Panasonic offer crucial advantages over conventional PIR motion sensors. The unique design concept (explained below) ranges from the production of the pyroelectric sensing devices to the internal signal processing, thus guaranteeing an optimal detection capability and high reliability.

Easy design-in

The integrated amplifier/comparator circuit inside a TO-5 metal can (digital type) prevents interferences caused by electromagnetic fields, such as those generated by cell phones and wireless devices. A special differential circuit design is introduced for the EKMB 6μA type for applications where a high noise resistance is required (up to GHz range).

Small and fancy lens design

Thanks to the special design of the small pyroelectric elements, it is possible to use a smaller lens size while keeping the same detection area and distance compared to conventional sensors.

Two times better sensitivity

The sensitivity has been significantly improved thanks to a unique slit design of the pyroelectric elements. The separated sensing areas prevent thermal crosstalk between the single sensing elements. Therefore, reliable detection is possible even if the temperature difference between the background (e.g. floor/wall) and the target object (human) is small. (e.g. ∆T = 4°C)

Four times better signal-to-noise ratio

Improved signal-to-noise ratio thanks to a special I/V circuit which is used for converting a current signal from the pyroelectric element to voltage. Panasonic PIR motion sensors perform by the feedback capacitor and the operational amplifier, different from the conventional FET-type, thereby decreasing the probability of false alarms due to temperature fluctuation.

Lead-free pyroelectric element

A ferroelectric Lithiumtantalate (LiTaO₃) single lead-free crystal is used as the pyroelectric element for Panasonic PIR motion sensors. Conventional PIR motion sensors normally use a ceramic base material (e.g. PZT) for the pyroelectric element, which contains lead in many cases.

Low current consumption EKMB (WL)

Reduction of current consumption (1, 2 or 6μA) thanks to the special circuit design technology allows battery life to be extended for battery-driven products.

Further information at www.panasonic-electric-works.com/eu/pyroelectric-infrared-sensors.htm
Technical information for all sensors (EKM and AMN)

Block diagram output circuit

Digital output with integrated amplifier and comparator

Analog output with integrated amplifier

Wiring diagram

Digital output

Analog output

Notes:
- **Digital output types:**
  The output signal for the digital output type is from inside FET drain, therefore pull-down resistors are necessary. Please select an output resistor (pull-down concept) in accordance with \(V_{\text{OUT}}\), so that the output current is maximum 100\(\mu\)A. If the output current is more than 100\(\mu\)A, this may cause false alarms.
  
  If the microcomputer has a pull-down function, there is no need for a resistor as long as the output current does not exceed 100\(\mu\)A.

- **Analog output types (EKM26 series):**
  In either case, a microcomputer or a resistor needs to be chosen in accordance to \(V_{\text{OUT}}\), so that the output current is maximum 200\(\mu\)A.

Further information at [www.panasonic-electric-works.com/eu/pyroelectric-infrared-sensors.htm](http://www.panasonic-electric-works.com/eu/pyroelectric-infrared-sensors.htm)
**EKM - Low Profile Type**

Specified detection distance (Note 1) up to 5 m

Typical ceiling installation height (Note 2) 3 m

Field of view 109.6° x 109.6°

Detection zones 32

**Note 1:**
- ∆T ≥ 4°C
- Object speed: 1 m/s
- Object size: 700x250 mm
- Crossing 2 detection zones

**Note 2:**
The sensitivity of passive infrared sensors is influenced by environmental conditions, so a performance evaluation test under representative conditions is recommended.

**Typical applications**
- Slim luminaires
- Smart LED bulbs
- Thermostats
- IP cameras
- Advertisement panels, displays and TV screens

**Dimension (in mm, inches in brackets)**

Further information on electrical characteristics please see page 15

**Detection area**

Further information at [www.panasonic-electric-works.com/eu/pyroelectric-infrared-sensors.htm](http://www.panasonic-electric-works.com/eu/pyroelectric-infrared-sensors.htm)
EKM - Standard Detection Type

PaPIRs: 3rd generation
Preference type
Flat lens for an unobtrusive integration
Lens diameter 9.5mm

Specified detection distance (Note 1) | up to 5m
---|---
Typical ceiling installation height (Note 2) | 3m
Field of view | 106° x 97°
Detection zones | 64

Note 1:
- ∆T ≥ 4°C
- Object speed: 1m/s
- Object size: 700 x 250mm
- Crossing 2 detection zones

Note 2:
The sensitivity of passive infrared sensors is influenced by environmental conditions, so a performance evaluation test under representative conditions is recommended

Further information on electrical characteristics please see page 15

Typical applications
- Lighting controls for offices and smart homes
- Smart luminaires
- Smart LED bulbs
- Ventilation systems and air conditioners
- IP cameras
- Digital signage
- Wake-up switch for displays

Further information at www.panasonic-electric-works.com/eu/pyroelectric-infrared-sensors.htm

Notes
<table>
<thead>
<tr>
<th>Standby current consumption</th>
<th>Output type</th>
<th>Sensitivity</th>
<th>White</th>
<th>Black</th>
<th>Pearl White</th>
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<td>EKMB1201113</td>
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</table>

Note: The specification shows the X-Y cross section at 2.5m.
**EKM - Slight Motion Detection Type**

PaPIRs: 3rd generation
Optimized for small movements
Lens diameter 14.6mm
Almost the same mechanical dimensions like the Standard and Slight Motion Detection Type (lens diameter 0.3mm smaller)

**Specified detection distance (Note 1)**
- up to 2.5m - 4m

**Typical ceiling installation height (Note 2)**
- 3m

**Field of view**
- 104° x 104°

**Detection zones**
- 112

**Note 1:**
- ∆T ≥ 4°C
- Object speed: 0.5m/s
- Object size: 200 x 200mm
- Crossing 1 detection zone

**Note 2:**
The sensitivity of passive infrared sensors is influenced by environmental conditions, so a performance evaluation test under representative conditions is recommended

**Typical applications**
- Lighting controls for offices and smart homes
- Smart luminaires
- Smart LED bulbs
- Ventilation systems and air conditioners

**Dimension (in mm, inches in brackets)**

**Detection area**

**Notes**

<table>
<thead>
<tr>
<th>Notes</th>
<th>Standby current consumption</th>
<th>Output type</th>
<th>Sensitivity</th>
<th>White</th>
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<th>Pearl White</th>
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<tr>
<td></td>
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<td>Please contact us if a higher or a lower sensitivity is required.</td>
<td></td>
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</table>

Note: The specification shows the X-Y cross section at 2.5m.

Further information at www.panasonic-electric-works.com/eu/pyroelectric-infrared-sensors.htm
**EKM - Standard and Slight Motion Detection Type**

PaPIRs: 3rd generation
The rectangular center zone is optimized detecting smallest movements.
Lens diameter 14.9mm
Almost the same mechanical dimensions like the Slight Motion Detection Type (lens diameter 0.3mm bigger)

### Typical applications
- Lighting controls for restrooms, changing rooms, smoking cabins and hotel rooms
- Smart luminaires
- Smart LED bulbs
- Ventilation systems and air conditioners
- Hot desking
- Digital signage
- Vending machines
- Wake-up switch for displays

### Detection area

Further information on electrical characteristics please see page 15

<table>
<thead>
<tr>
<th>Notes</th>
<th>Standby current consumption</th>
<th>Output type</th>
<th>Sensitivity</th>
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<th>Pearl White</th>
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<tr>
<td></td>
<td>170µA</td>
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<td>Standard</td>
<td>EKMC1693111</td>
<td>EKMC1693112</td>
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<td></td>
<td>170µA</td>
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<td>Please contact us if a higher or a lower sensitivity is required.</td>
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</table>

Note: The specification shows the X-Y cross section at 2.2m.
Further information at [www.panasonic-electric-works.com/eu/pyroelectric-infrared-sensors.htm](http://www.panasonic-electric-works.com/eu/pyroelectric-infrared-sensors.htm)
**EKM - High Density Long Distance Detection Type**

PaPIRs: 3rd generation
Smallest long range sensor
Maximum installation height of 17m (high sensitivity type)
Lens diameter 19.3mm
Additional lip (20.45mm) ready for an o-ring

**Specified detection distance (Note 1)**
- up to 12m - 14.5m

**Typical ceiling installation height (Note 2)**
- 12m

**Field of view**
- 69° x 69°

**Detection zones**
- 128

**Note 1:**
- ∆T ≥ 4°C
- Object speed: 1m/s
- Object size: 700 x 250mm
- Crossing 2 detection zones

**Note 2:**
The sensitivity of passive infrared sensors is influenced by environmental conditions, so a performance evaluation test under representative conditions is recommended.

Further information on electrical characteristics please see page 15

---

**Typical applications**
- Lighting controls for warehouses, industrial buildings, entrance halls and retail shops
- Street lighting
- Security cameras
- Smart high-bay luminaires
- Lighting controls for warehouses, industrial buildings, entrance halls and retail shops
- Smart high-bay luminaires
- Street lighting

---

**Dimension (in mm, inches in brackets)**

**Detection area**

**Further information at**
- www.panasonic-electric-works.com/eu/pyroelectric-infrared-sensors.htm

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<table>
<thead>
<tr>
<th>Notes</th>
<th>Standby current consumption</th>
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<th>Sensitivity</th>
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<td>EKMC2606113K</td>
</tr>
</tbody>
</table>

Please contact us if a higher or a lower sensitivity is required.
PIR MOTION SENSORS

EKM - Horizontally Wide Detection Type

PaPIRs: 3rd generation
World’s first PIR with “Approach Sensing” technology
Panasonic presents the world’s first PIR sensor in the shape of a hammerhead with a special optic, which is more sensitive to radial motion.

Specific detection distance (Note 1 & 2)
up to 5m

Field of view area A
122° x 35°

Field of view area B
150° x 20°

Detection zones area A
88

Detection zones area B
16

Note 1:
- ∆T ≥ 4°C (Area A)
- ∆T ≥ 8°C (Area B)
- Object speed: 1m/s
- Object size: 700 x 250mm
- Crossing 2 detection zones

Note 2:
The sensitivity of passive infrared sensors is influenced by environmental conditions, so a performance evaluation test under representative conditions is recommended.

Typical applications

- Corridor sensors
- Wall switches
- Thermostats
- Intrusion alarm sensors for windows and doors
- Door intercom systems
- Entrance and garden lamps
- Wake-up switch for displays

Further information on electrical characteristics please see page 15

Detection area

Further information at www.panasonic-electric-works.com/eu/pyroelectric-infrared-sensors.htm
EKM - Wall Installation Detection Type (corner)

PaPIRs: 3rd generation
Lens diameter 20.7mm
Similar dimensions like the Long Distance Detection Type

Specified detection distance
(Note 1 & 2)

- up to 12m (1st step lens)
- up to 6m (2nd step lens)
- up to 3m (3rd step lens)

Field of view
56° x 112°

Detection zones
68

Note 1:
- ∆T ≥ 4°C
- Object speed: 1m/s
- Object size: 700 x 250mm
- Crossing 2 detection zones

Note 2:
The sensitivity of passive infrared sensors is influenced by environmental conditions, so a performance evaluation test under representative conditions is recommended.

Typical applications
- Intrusion alarm sensors
- Thermostats
- Door intercom systems
- Entrance and garden lamps

Further information on electrical characteristics please see page 15

Dimension (in mm, inches in brackets)

Detection area

Further information at www.panasonic-electric-works.com/eu/pyroelectric-infrared-sensors.htm
PIR MOTION SENSORS

EKM - Long Distance Detection Type

PaPIRs: 3rd generation
Lens diameter 20.7mm
Similar dimensions like the Wall Installation Type

Specified detection distance (Note 1) | up to 12m
---|---
Typical ceiling installation height (Note 2) | 7m
Field of view | 108° x 99°
Detection zones | 92

**Note 1:**
- \( \Delta T \geq 4°C \)
- Object speed: 1m/s
- Object size: 700 x 250mm
- Crossing 2 detection zones

**Note 2:**
The sensitivity of passive infrared sensors is influenced by environmental conditions, so a performance evaluation test under representative conditions is recommended

Further information on electrical characteristics please see page 15

*Typical applications*
- Lighting control for sport halls and public areas
- Intrusion alarm sensors
- Street lighting
- Security cameras

Further information at [www.panasonic-electric-works.com/eu/pyroelectric-infrared-sensors.htm](http://www.panasonic-electric-works.com/eu/pyroelectric-infrared-sensors.htm)
EKM - Lensless Type

Detection sensitivity
- Average: 5.6μW/cm²
- Maximum: 7.6μW/cm²

Detection sensitivity is measured by following system:
- Black body 250°C
- Aperture 20.3mm
- Masking plate
- PaPIRs
- Pin-hole lens
- Combination with lenses from external suppliers

Typical applications
- Pin-hole lens
- Combination with lenses from external suppliers

Please contact us whenever a customized lens is required, the sensor shall be used with an external lens or for the design data of the pin-hole lens.

Detection area

Further information on electrical characteristics please see page 15

Notes
- Standby current consumption
- Output type
- Sensitivity
- Part numbers

<table>
<thead>
<tr>
<th>Notes</th>
<th>Standby current consumption</th>
<th>Output type</th>
<th>Sensitivity</th>
<th>Part numbers</th>
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Please contact us if a higher or a lower sensitivity is required.

Further information at www.panasonic-electric-works.com/eu/pyroelectric-infrared-sensors.htm
**EKM - Characteristics**

### EKM - Maximum rated values

<table>
<thead>
<tr>
<th>Items</th>
<th>EKMB series</th>
<th>EKMC series</th>
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<tbody>
<tr>
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<td>-0.3 to 7V DC</td>
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<td>Ambient temperature</td>
<td>-20 to 60°C</td>
<td>(high sensitivity type)</td>
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<tr>
<td></td>
<td>-20 to 55°C (high sensitivity type)</td>
<td>(no frost, no condensation)</td>
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### EKM - Electrical characteristics (digital output types)

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<th>Item</th>
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<tr>
<td>Operating voltage</td>
<td>VDD</td>
<td>Max 4.0V DC 6.0V DC</td>
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<tr>
<td>Current consumption (in standby/sleep mode)</td>
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<td>Min 2.3V DC 3.0V DC</td>
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<td>Output current (during detection period)</td>
<td>IOUT</td>
<td>Max 100μA</td>
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<td>Output voltage (during detection period)</td>
<td>VOUT</td>
<td>Min VDD - 0.5V DC</td>
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<td>Circuit stability time (when voltage is applied)</td>
<td>tWU</td>
<td>Ave 25 seconds Max 210 seconds 10 seconds 30 seconds</td>
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**Note 1:** The total current consumption during detection is the current consumption in standby mode (IWI) plus the output current (IOUT). For the 1μA type the average current consumption (IWI) is 1μA in sleep mode and 1.9μA in standby mode. Please also refer to the timing charts on the next page.

**Note 2:** Please select an output resistor (pull-down concept) in accordance with VOUT so that the output current is maximum 100μA.

### EKM - Electrical characteristics (analog output)

<table>
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<tr>
<th>Item</th>
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<th>Remarks</th>
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<tbody>
<tr>
<td>Operating voltage</td>
<td>VDD</td>
<td>Max 5.5V</td>
<td></td>
</tr>
<tr>
<td>Current consumption (in standby mode) Note 1</td>
<td>IW</td>
<td>Min 3.0V</td>
<td></td>
</tr>
<tr>
<td>Output current (during detection period) Note 2</td>
<td>IOUT</td>
<td>Max 200μA</td>
<td></td>
</tr>
<tr>
<td>Analog output saturated voltage</td>
<td>VOUT</td>
<td>Min. 1.9V</td>
<td></td>
</tr>
<tr>
<td>Output offset voltage (at non detection)</td>
<td>VOFF</td>
<td>Max 1.2V</td>
<td>Ambient temperature: 25°C</td>
</tr>
<tr>
<td>Steady noise</td>
<td>VNI</td>
<td>Max 150mVp</td>
<td>Steady output voltage at non detection</td>
</tr>
<tr>
<td>Circuit stability time (after applying voltage)</td>
<td>tWU</td>
<td>Max 30 seconds</td>
<td>Ambient temperature: 25°C</td>
</tr>
</tbody>
</table>

**Note 1:** The total current consumption during detection is the current consumption in standby mode (IW) plus the output current (IOUT).

**Note 2:** The output offset voltage has a certain tolerance. Please assure to measure the offset voltage before setting the upper and lower threshold values. Otherwise the threshold window could be unsymmetrical relative to the offset voltage.

Further information at [www.panasonic-electric-works.com/eu/pyroelectric-infrared-sensors.htm](http://www.panasonic-electric-works.com/eu/pyroelectric-infrared-sensors.htm)
PIR MOTION SENSORS

Timing chart

2μA / 6μA / 170μA type (digital output)

1μA type (digital output)

Explanation of the timing

\( t_{\text{WU}} \)

Circuit stability time: about 25 seconds (typ.) for 2μA type, max. 10 seconds for 6μA type, max. 30 seconds for 170μA type.

While the circuitry is stabilizing after the power is turned on, the sensor output is not fixed in the High or Low state. This is true regardless of whether or not the sensor has detected anything.

170μA type (analog output)

Explanation of modes

1) Sleep mode:
   When the output is Low. The electrical current consumption is around 1μA.

2) Standby mode:
   After the sensor’s output has reached High status, the sensor switches to standby mode. The electrical current consumption gets close to 1.9μA. When the sensor’s output returns to its Low value after the “hold time” has expired, the sensor switches again to sleep mode.

3) Mask mode:
   Time during which the output is forced to Low status after the end of the standby mode. (No detection is possible during this period.)

Explanation of the timing

\( t_{\text{WU}} \)

Circuit stability time: about 25 seconds (typ.)

While the circuitry is stabilizing after the power is turned on, the sensor output is not fixed. This is true regardless of whether or not the sensor has detected anything.

Further information at www.panasonic-electric-works.com/eu/pyroelectric-infrared-sensors.htm
AMN - Standard Detection Type

Specified detection distance (Note 1) | up to 5m
---|---
Typical ceiling installation height (Note 2) | 3m
Field of view | 120° x 106°
Detection zones | 64

Note 1:
- ∆T ≥ 4°C
- Object speed: 1m/s
- Object size: 700 x 250mm
- Crossing 2 detection zones

Note 2:
The sensitivity of passive infrared sensors is influenced by environmental conditions, so a performance evaluation test under representative conditions is recommended.

Typical applications:
- Lighting controls
- Heaters
- Ventilators and air conditioners
- Multi-functional printers

Further information on electrical characteristics please see page 21

NaPiOn: 2nd generation
Small lens diameter of only 9.5mm

Notes| Standby current consumption| Output type| Sensitivity| White| Black
---|---|---|---|---|---
NaPiOn 2nd generation| 170μA| Digital (open drain)| Standard| AMN31112| AMN31111

Note: The specification shows the X-Y cross section at 2.5m.

Further information at www.panasonic-electric-works.com/eu/pyroelectric-infrared-sensors.htm
AMN - Slight Motion Detection Type

NaPiOn: 2nd generation
Optimized for small movements

Specified detection distance (Note 1) | up to 2m - 3.3m
Typical ceiling installation height (Note 2) | 3m
Field of view | 107° x 106°
Detection zones | 104

Note 1:
- $\Delta T \geq 4°C$
- Object speed: 0.5m/s
- Object size: 200mm x 200mm
- Crossing 1 detection zone

Note 2:
The sensitivity of passive infrared sensors is influenced by environmental conditions, so a performance evaluation test under representative conditions is recommended

Typical applications
- Lighting controls
- Heaters
- Ventilators and air conditioners
- Multi-functional printers

Further information on electrical characteristics please see page 21

<table>
<thead>
<tr>
<th>Dimension (in mm, inches in brackets)</th>
<th>Detection area</th>
</tr>
</thead>
</table>

Further information at [www.panasonic-electric-works.com/eu/pyroelectric-infrared-sensors.htm](http://www.panasonic-electric-works.com/eu/pyroelectric-infrared-sensors.htm)
**AMN - Spot Detection Type**

NaPiOn: 2nd generation
- Flat lens
- Lens diameter 8.9mm
- Narrow field of view

### Specified detection distance (Note 1)
- up to 5m - 5.6m

### Typical ceiling installation height (Note 2)
- 5m

### Field of view
- 57° x 42°

### Detection zones
- 24

**Note 1:**
- $\Delta T \geq 4^\circ C$
- Object speed: 1m/s
- Object size: 700 x 250mm
- Crossing 2 detection zones

**Note 2:**
- The sensitivity of passive infrared sensors is influenced by environmental conditions, so a performance evaluation test under representative conditions is recommended

Further information on electrical characteristics please see page 21

### Typical applications
- Vending machines
- Multi-functional printers
- Intrusion alarm sensors for windows and doors
- Digital signage

### Dimension (in mm, inches in brackets)

<table>
<thead>
<tr>
<th>Notes</th>
<th>Standby current consumption</th>
<th>Output type</th>
<th>Sensitivity</th>
<th>White</th>
<th>Black</th>
</tr>
</thead>
<tbody>
<tr>
<td>NaPiOn 2nd generation</td>
<td>170µA</td>
<td>Digital (open drain)</td>
<td>Standard</td>
<td>AMN33112</td>
<td>AMN33111</td>
</tr>
</tbody>
</table>

Further information at [www.panasonic-electric-works.com/eu/pyroelectric-infrared-sensors.htm](http://www.panasonic-electric-works.com/eu/pyroelectric-infrared-sensors.htm)
**AMN - 10m Detection Type (long distance)**

NaPiOn: 2nd generation

<table>
<thead>
<tr>
<th>Specified detection distance (Note 1)</th>
<th>up to 5 - 10m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typical ceiling installation height (Note 2)</td>
<td>5m</td>
</tr>
<tr>
<td>Field of view</td>
<td>120° x 107°</td>
</tr>
<tr>
<td>Detection zones</td>
<td>80</td>
</tr>
</tbody>
</table>

**Note 1:**
- $\Delta T \geq 4°C$
- Object speed: 1m/s
- Object size: 700 x 250mm
- Crossing 2 detection zones

**Note 2:**
The sensitivity of passive infrared sensors is influenced by environmental conditions, so a performance evaluation test under representative conditions is recommended.

Typical applications:
- Lighting controls
- Heaters
- Ventilators and air-conditioners

Further information on electrical characteristics please see page 21

### Dimension (in mm, inches in brackets)

**Detection area**

Further information at [www.panasonic-electric-works.com/eu/pyroelectric-infrared-sensors.htm](http://www.panasonic-electric-works.com/eu/pyroelectric-infrared-sensors.htm)
AMN - Characteristics

AMN - Maximum rated values (digital output)

<table>
<thead>
<tr>
<th>Items</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power supply voltage</td>
<td>-0.3 to 7V DC</td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>-20 to +60°C (no frost, no condensation)</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>-20 to +70°C</td>
</tr>
</tbody>
</table>

AMN - Electrical characteristics (digital output)

<table>
<thead>
<tr>
<th>Items</th>
<th>Symbol</th>
<th>AMN3* series</th>
<th>Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating voltage</td>
<td>VDD</td>
<td></td>
<td>Max 6.0V DC</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Min 3.0V DC</td>
<td></td>
</tr>
<tr>
<td>Current consumption (in standby mode)</td>
<td>Ave</td>
<td></td>
<td>170μA Ambient temperature: 25°C I&lt;sub&gt;OUT&lt;/sub&gt; = 0A V&lt;sub&gt;DD&lt;/sub&gt; = 5V DC</td>
</tr>
<tr>
<td>Note 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output current (during detection)</td>
<td>Max</td>
<td>V&lt;sub&gt;DD&lt;/sub&gt; - 0.5V Ambient temperature: 25°C</td>
<td></td>
</tr>
<tr>
<td>Note 2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output voltage (during detection)</td>
<td>Min</td>
<td>V&lt;sub&gt;DD&lt;/sub&gt; - 0.5V Ambient temperature: 25°C</td>
<td></td>
</tr>
<tr>
<td>Note 3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Circuit stability time</td>
<td>Max</td>
<td></td>
<td>30 seconds Ambient temperature: 25°C</td>
</tr>
</tbody>
</table>

**Note 1:** The total current consumption is equal to the current consumption in standby mode (I<sub>W</sub>) plus the output current (I<sub>OUT</sub>).

**Note 2:** Please select an output resistor (pull-down concept) in accordance with V<sub>OUT</sub> so that the output current is maximum 100μA. If the output current is more than 100μA, this may cause false alarms.

**Note 3:** The sensor temperature has to be constant for the time specified.

Digital output

Explanation of the timing

i<sub>WU</sub> Circuit stability time: max. 30 seconds

While the circuitry is stabilizing after the power is turned on, the sensor output is not fixed in the High or Low state. This is true regardless of whether or not the sensor has detected anything.

Further information at www.panasonic-electric-works.com/eu/pyroelectric-infrared-sensors.htm
PIR MOTION SENSORS

Cautions for use

Basic principles

PaPIRs are pyroelectric infrared sensors that detect variations in infrared rays. However, detection may not be successful in the following cases: lack of movement or no temperature change in the heat source. They could also detect the presence of heat sources other than a human body. Efficiency and reliability of the system may vary depending on the actual operating conditions.

1) Detecting heat sources other than the human body, such as:
   a) small animals entering the detection area
   b) When a heat source, for example sun light, incandescent lamp, car headlights etc., or strong light beam hit the sensor regardless whether the detection area is inside or outside.
   c) Sudden temperature change inside or around the detection area caused by hot or cold wind from HVAC, or vapor from a humidifier, etc.

2) Difficulty in sensing the heat source
   a) Glass, acrylic or similar materials standing between the target and the sensor may not allow a correct transmission of infrared rays.
   b) Non-movement or quick movements of the heat source inside the detection area.
      (Please refer to the table on page 8 or 11 for details about movement speed.)

3) Expansion of the detection area
   In case of a considerable difference in the ambient temperature and the human body temperature, the detection area may be larger than the configured detection area.

4) Malfunction / Detection error
   In rare occasions, an erroneous detection signal may be output due to the nature of pyroelectric element. When the application cannot tolerate erroneous detection signals, take countermeasures by introducing a pulse-count circuit, etc.

5) Detection distance
   Panasonic’s PIR Motion sensors state the detection distance in the specifications because they are usually provided with the lens (please refer to item 6 for lensless types). The PIR Motion sensor cannot detect if the erroneous detection signals, take countermeasures by introducing a pulse-count circuit, etc.

6) Lensless Type
   The lensless type cannot detect any targets because it is not possible to focus infrared rays on the pyroelectric element. When the application cannot tolerate erroneous detection signals, take countermeasures by introducing a pulse-count circuit, etc.

7) Lens material and the plate setting in front of the lens
   Typically, the only material that can be passed by infrared rays is Polyethylene. The lens material of Panasonic’s PIR Motion sensors is “High density polyethylene, HDPE.” When you need to set a plate in front of the lens, please choose one made from the Polyethylene. Please note the thickness or color of the plate will affect the detection ability, e.g. it may make the detection distance shorter. Therefore, please confirm by testing the sensor with the plate under realistic conditions.

Safety precautions

Obey the following precautions to prevent injury or accidents.

1) Do not use these sensors under any circumstance in which the range of their ratings, environment conditions or other specifications are exceeded. Using the sensors in any way which causes their specifications to be exceeded may generate abnormally high levels of heat, emit smoke, etc., resulting in damage to the circuitry and possibly causing an accident.
2) Our company is committed to making products that are of the highest quality and reliability. Nevertheless, all electrical components are subject to natural deterioration, and durability of a product will depend on the operating environment and conditions of use. Continued use after such deterioration could lead to overheating, smoke or fire. Always use the product in conjunction with proper fire-prevention, safety and maintenance measures to avoid accidents, reduction in product life expectancy or break-down.
3) Before connecting, check the pin layout by referring to the connector wiring diagram, specifications diagram, etc., to verify that the connector is connected properly. Mistakes made in connection may cause unforeseen problems in operation, generate abnormally high levels of heat, emit smoke, etc., resulting in damage to the circuitry.
4) Do not use any motion sensor which has been disassembled or remodeled.
5) Failure modes of sensors include short-circuiting, open-circuiting and temperature rises. If this sensor is to be used in equipment where safety is a prime consideration, examine the possible effects of these failures on the equipment concerned, and ensure safety by providing protection circuits or protection devices.

Further information at www.panasonic-electric-works.com/eu/pyroelectric-infrared-sensors.htm
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