



(W)  
White



(B)  
Black



(PW)  
Pearl White

Standard Detection - 5m



(W)  
White



(B)  
Black



(PW)  
Pearl White

Long Distance Detection - 12m

**FEATURES**

**1μA low current consumption with Panasonic's proprietary design**

Development of a specialized circuit allows the reduction of current consumption to 1 μA (during sleep mode). When motion is detected, the sensor will shift to "stand-by" mode.

Reduction of current consumption allows battery life to be extended for battery driven products, including wireless based and low power consumption devices. (Product lineup includes 1 μA, 2 μA, and 6 μA sensors.)

**Simplified circuitry with fully integrated sensor design**

Panasonic's proprietary high-density embedded circuit design eliminates external sensing circuits. Advantages include reduced development and design schedules.

**Robust design prevents false detection**

PaPIRS sensing circuits are enclosed in a metallic can to minimize adverse effects of external electromagnetic fields. Examples include radiated noise caused by cellular phones.

A high S/N ratio minimizes sensitivity to false tripping when operated under various environmental conditions.

**Low curvature lens for product designs**

Panasonic's lens formation technology achieves a semi-flat lens with a smooth surface and minimum protrusion from the device (lens diameter: φ9.5mm).

In addition to white and black lens options, pearl white is offered for design aesthetics.

(※Refer to "Dimensions" on page 5)

**Lead-free pyroelectric elements**

PaPIRS sensing elements contain lithium tantalate and are lead-free. Typical PIR sensing elements are ferroelectric ceramic (PZT) containing lead.

**APPLICATIONS**

**Security Equipment:**

- Wireless security sensors, and cameras

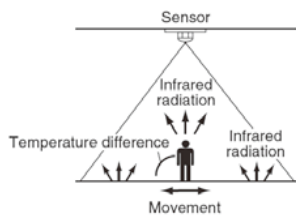
**Wireless Devices / Mobile Equipment:**

- Wireless occupancy sensors (powered by PV cells or battery)
- PC and smart phone
- Commercial & Residential Lighting Fixtures
- Video Intercoms
- Vending Machines
- Home Automation

**What is passive infrared type?**

This sensor detects changes in infrared radiation that occur when there is movement by a person (or object) which is different in temperature from the surroundings.

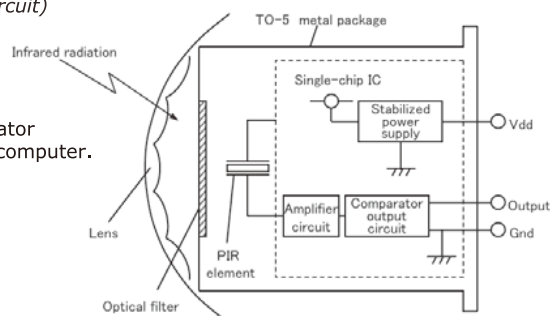
- 1 As this sensor detects temperature differences, it is well suited to detecting the motion of people by their body temperature.
- 2 Wide sensing area.



**Compliance with RoHS Directive**

**Block Diagram (Digital output circuit)**

Built-in amplifier and comparator connected directly to a microcomputer.



EKMB

Output: **1:** Digital

Current Consumption: **1:** 1 μA, **2:** 2 μA, **3:** 6 μA

Detection Performance: **01:** Standard Detection: 5m  
**03:** Long Distance Detection: 12m

Lens Color:  
**1:** White **2:** Black **3:** Pearl White

Lens Material: **1:** Polyethylene

Mounting: **1:** TO-5

**PRODUCT TYPES**

Detection Performance	Current Consumption	Lens Color	Model No.	Inner Package	Outer Package
Standard Detection 5m	1 $\mu$ A	White	EKMB1101111	50pcs	1000pcs
		Black	EKMB1101112		
		Pearl White	EKMB1101113		
	2 $\mu$ A	White	EKMB1201111		
		Black	EKMB1201112		
		Pearl White	EKMB1201113		
	6 $\mu$ A	White	EKMB1301111		
		Black	EKMB1301112		
		Pearl White	EKMB1301113		
Long Distance Detection 12m	1 $\mu$ A	White	EKMB1103111	50pcs	1000pcs
		Black	EKMB1103112		
		Pearl White	EKMB1103113		
	2 $\mu$ A	White	EKMB1203111		
		Black	EKMB1203112		
		Pearl White	EKMB1203113		
	6 $\mu$ A	White	EKMB1303111		
		Black	EKMB1303112		
		Pearl White	EKMB1303113		

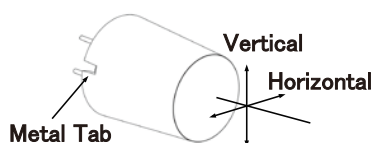
**PRODUCT TYPES**

**1. Detection Performance** [Conditions for measuring: Ambient temperature: 25°C(77°F) Operating voltage: 3VDC]

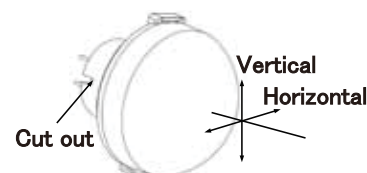
Items		Standard Detection 5m	Long Distance Detection - 12m	Conditions concerning target
Detection Range *1)		Max. 5m	Max. 12m	1. The temperature difference between the target and the surroundings should be superior to 4°C (7.2°F). 2. Movement speed: 1.0m/s 3. Target concept is human body (Size: 700 × 250mm)
Detection Area	Horizontal *2)	94° (±47°)	102° (±51°)	
	Vertical *2)	82° (±41°)	92° (±46°)	
	Detection Zone *3)	64 zones	92 zones	

\*1) Depending on the target's speed and temperature difference compared to the surroundings, detection can occur at a range superior to the above value. Please use this sensor according to the specifications for guaranteed performance.

\*2) Definitions for "Horizontal" and "Vertical"



Standard detection type



Long Distance detection type

\*3) Refer to the "detection area" diagram on P.4.

## 2. Maximum Rated Values

Items	Specified value
Power Supply Voltage	-0.3~4.5V DC
Usable Ambient Temperature	-20~+60°C (-4~+140°F) Do not use in a freezing or condensation environment.
Storage Temperature	-20~+70°C (-4~+158°F)

## 3. Electrical Characteristic

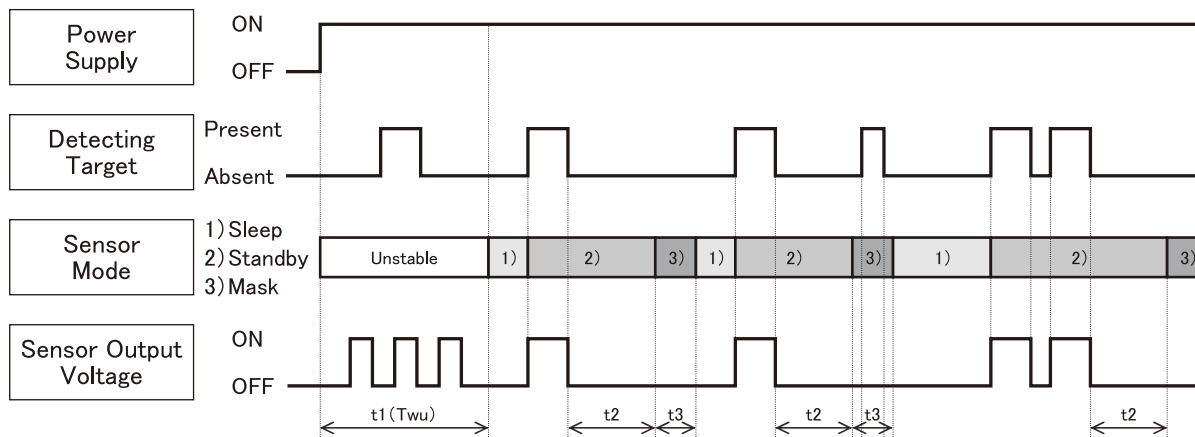
 [Conditions for Measuring: Ambient temperature 25°C(77°F)]

Items	Symbol	1 $\mu$ A type	2 $\mu$ A type	6 $\mu$ A type	Measured Conditions
Operating Voltage	Min.	2.3V DC	2.3V DC	2.3V DC	—
	Max.	4.0V DC	4.0V DC	4.0V DC	—
Electrical Current Consumption (Sleep mode) (*4)	Avg.	1.0 $\mu$ A	—	—	Iout=0
	Max.	1.6 $\mu$ A	—	—	
Electrical Current Consumption (Standby mode) (*4)	Avg.	1.9 $\mu$ A	1.9 $\mu$ A	6.0 $\mu$ A	Iout=0
	Max.	3.0 $\mu$ A	3.0 $\mu$ A	12.0 $\mu$ A	
Output Current	Max.	Iout	100 $\mu$ A	100 $\mu$ A	Vout $\geq$ Vdd-0.5
Output Voltage	Min.	Vout	Vdd-0.5VDC	Vdd-0.5VDC	Vdd-0.5VDC
Circuit Stability Time (When voltage is applied)	Avg.	T <sub>wu</sub>	25s	25s	—
	Max.	T <sub>wu</sub>	210s	210s	30s

(\*4)(\*5): "Sleep mode" or "Standby mode" is for 1  $\mu$  A current consumption version. Please refer to "TIMING CHART" below.

## TIMING CHART

### 1. Digital output (1 $\mu$ A current consumption)



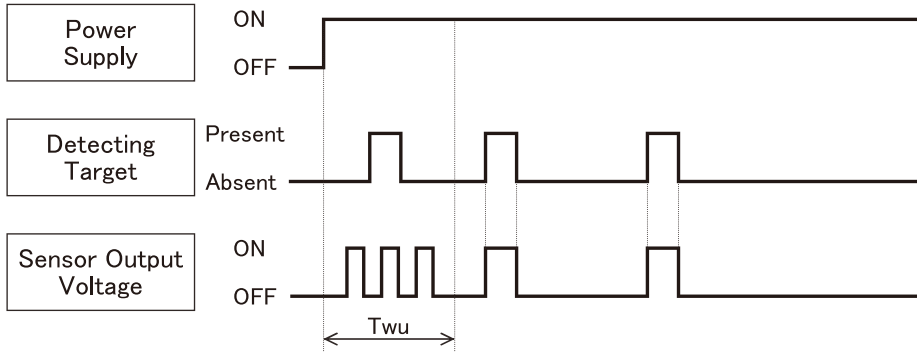
### [Modes]

- 1) Sleep Mode : When the output is OFF. The electrical current consumption is approximately 1  $\mu$  A.
- 2) Standby Mode : After the sensor's output reaches ON status, the sensor switches to standby mode. The electrical current consumption is ~ 1.9  $\mu$  A. When the sensor's output returns to an OFF value after expiration of the "hold time", the sensor switches again to sleep mode.
- 3) Mask Mode : Time during which the output is forced to OFF after the end of the standby mode. (no detection is possible during this period.)

### [Durations]

- $t_1$ (T<sub>wu</sub>): Circuit Stability Time: ~ 25s (typ.)  
During this stage, the output's status is undefined (ON/OFF) and detection is not guaranteed.
- $t_2$  : Standby Hold Time: ~ 2.6s (typ.)  
Depending on the number of output occurrences during standby mode, the hold time can differ (※1)
- $t_3$  : Mask Time ~ 1.3s (typ.)  
During this stage, even if the sensor detects something, output will not switch ON.(※2)

**2. Digital Output (2  $\mu$ A and 6  $\mu$ A current consumption)**

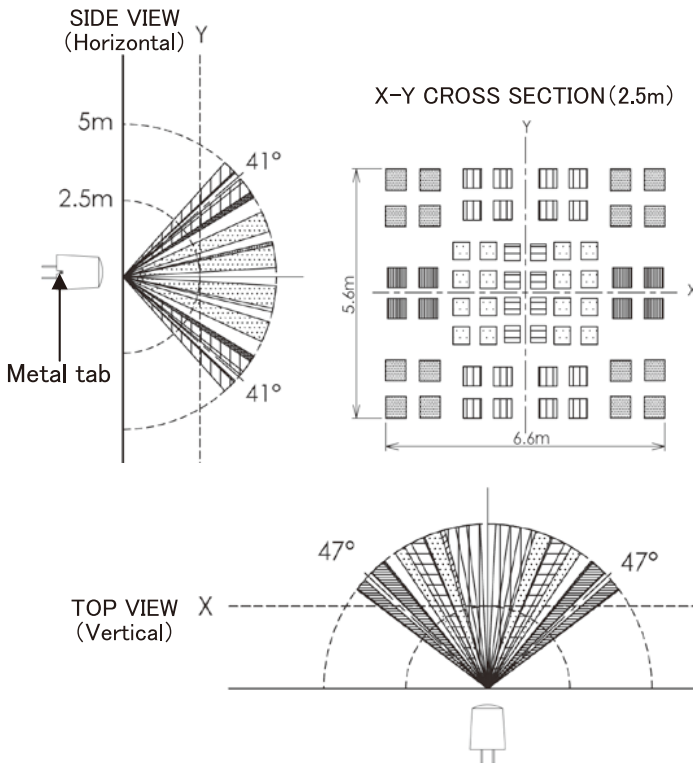


**[Durations]**

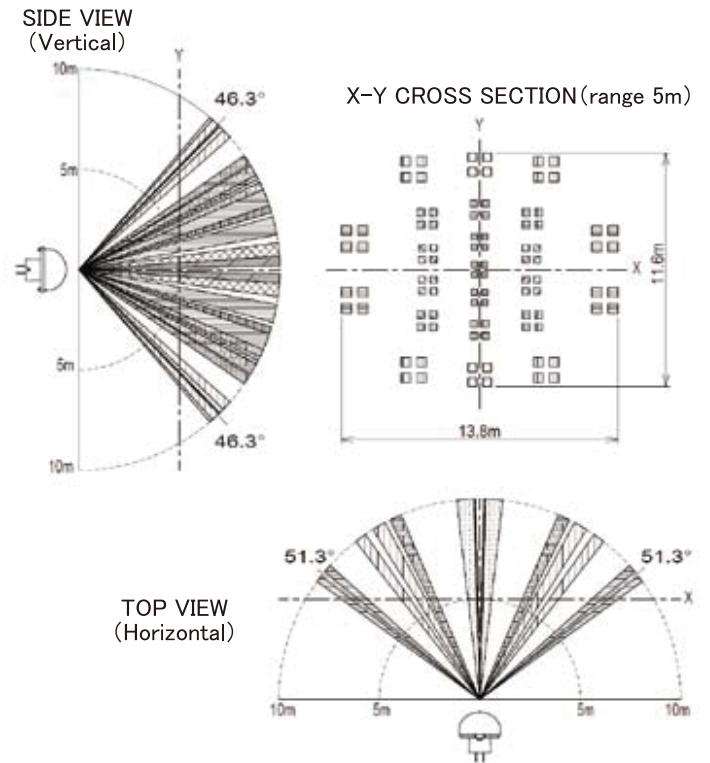
Twu: Circuit Stability Time (2  $\mu$ A): ~ 25s (typ.)  
 Circuit Stability Time (6  $\mu$ A): ~ 30s (max.)  
 During this stage, output status is undefined (ON/OFF) and detection is not guaranteed.

**DETECTION PERFORMANCE**

**1) Standard detection type**

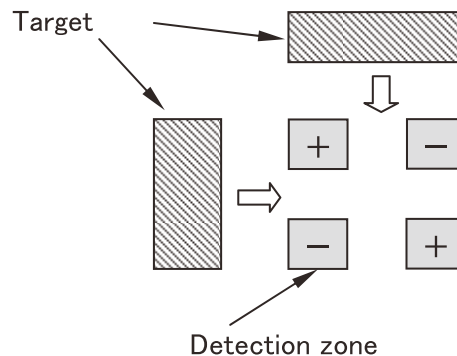


**2) Long Distance detection type**



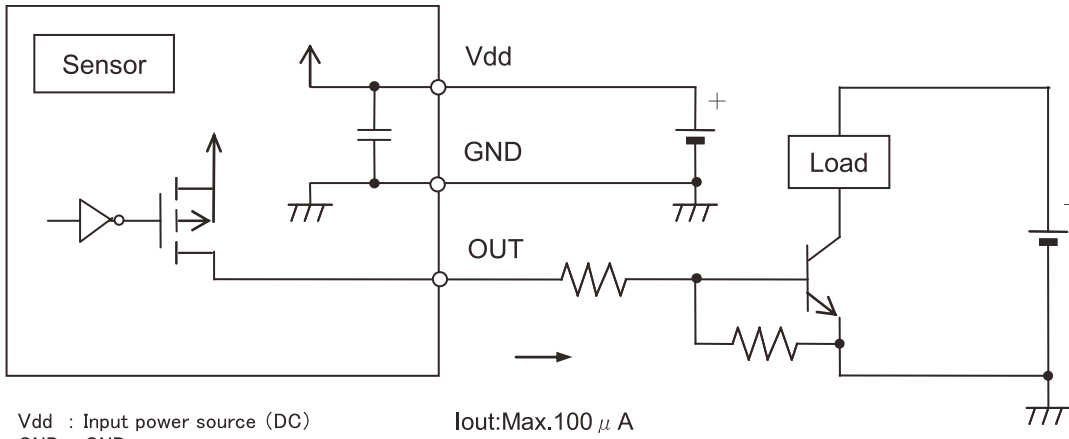
**2. Detection Zone Notes**

As shown on the diagram, the detection zone is polarized. If a target enters the detection zones + and - at the same time, the signals are respectively cancelled and detection could become impossible at maximum detection range. (Please refer to the detection area diagram for details)



**HOW TO USE**

**1. Wiring Diagram (Digital Output)**

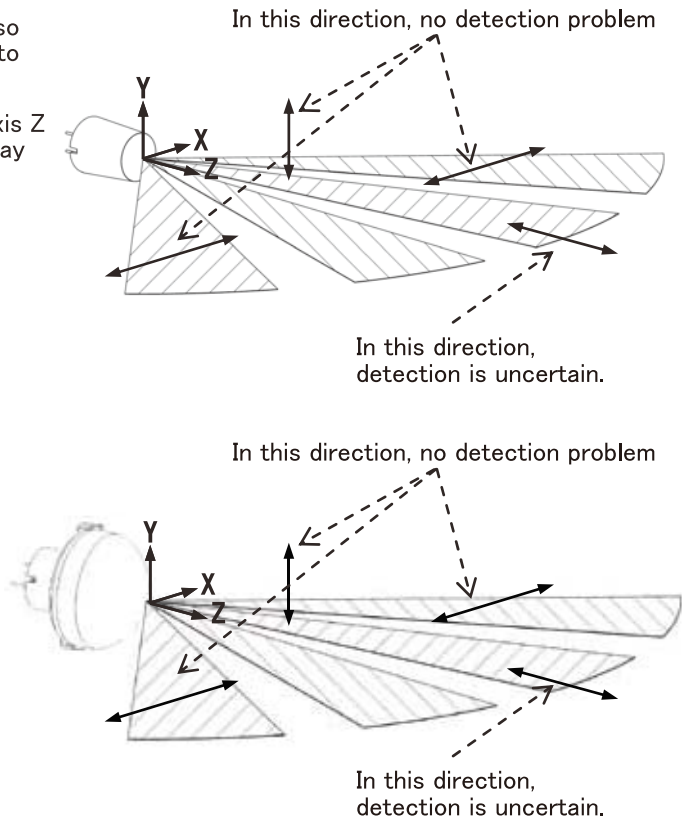


Vdd : Input power source (DC)  
 GND : GND  
 Out : Output (Comparator)  
 Iout:Max.100  $\mu$  A

**2. Moving Direction**

As detailed on the diagram, please install the sensor so that the expected trespassing direction corresponds to the axis X or axis Y.

In some cases, intrusions that occur parallel to the axis Z in every detection zone, closing toward the sensor, may not be detected.

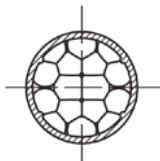


**DIMENSION**

**1) Standard Detection type**



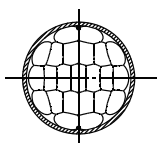
**A-A Cross Sectional**



**2) Long Distance Detection type**



**A-A Cross Sectional**

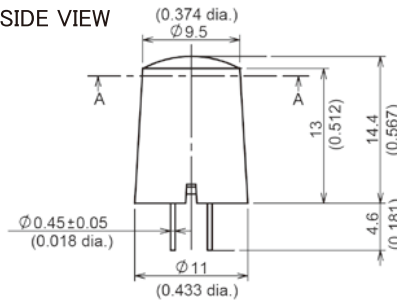


**Dimensions**

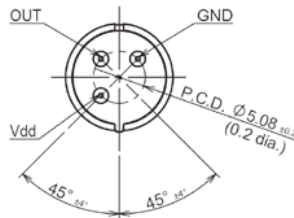
TOP VIEW



SIDE VIEW



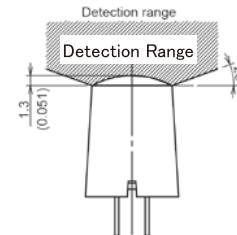
BOTTOM VIEW



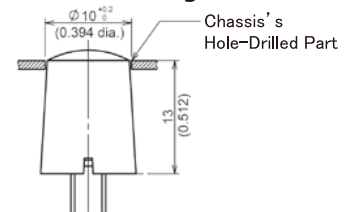
**When designing your products**

To maintain specified detection capability, position the sensor so that the lens tip is a minimum 1.3mm above the chassis.

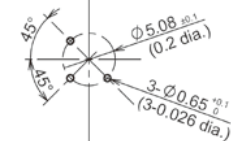
The chassis hole requires a taper according to the lens shape, or a larger hole.



**Recommended Hole Drilling Diameter**



**Recommended PCB Pattern Design**

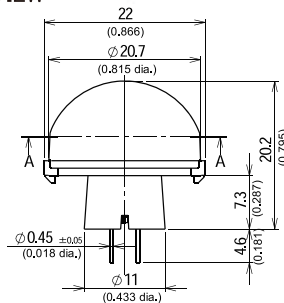


**Dimensions**

TOP VIEW



SIDE VIEW



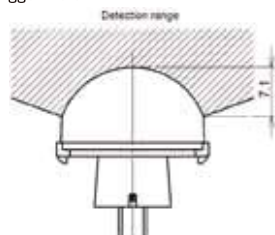
BOTTOM VIEW



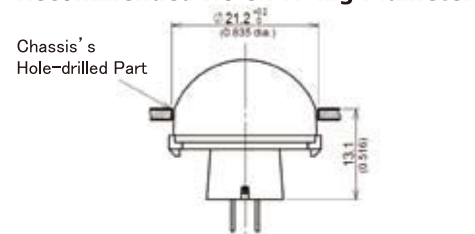
**When designing your products**

To maintain specified detection capability, please place and expose the sensor so that tip of lens will be more than 7.1mm above the chassis.

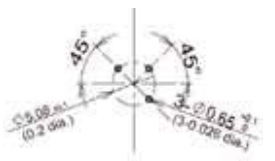
The hole of the chassis should have a taper depending on the lens shape, or have a bigger hole.



**Recommended Hole Drilling Diameter**



**Recommended PCB Pattern Design**



General Tolerance ±0.5mm (±0.020inch)