

INFRARED SENSORS  
MeDIR

INFRARED SENSORS

Highly precise detection of people and objects using sensor technologies installed in satellites

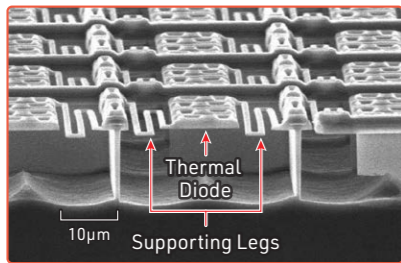
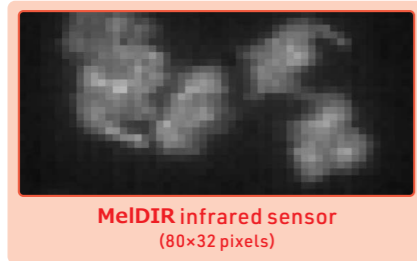
Infrared Sensor  
**MeIDIR**



Please visit our website for further details.

## Features

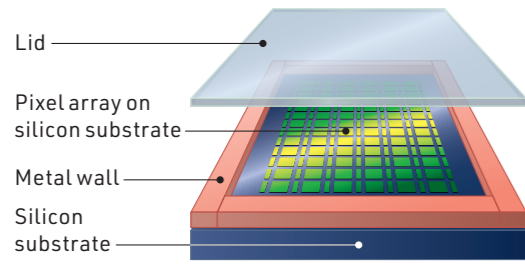
### 1 High pixel count and high temperature-resolution enable highly precise understanding of people/object movement



#### Mitsubishi Electric Original Pixel Structure

- 1) The supporting legs are ultrathin thanks to the introduction of an innovative microfabrication technique. This makes it possible to transfer energy more efficiently without releasing heat, thereby enabling the pixel count to be increased and achieving higher image resolution.
- 2) The generation of electromagnetic noise is minimized by mounting the thermal diode and high-performance amplifier on the same chip, achieving high temperature-resolution.

### 2 Vacuum-sealing, Chip-scale Packaging Contributes to Compact Space-saving Size



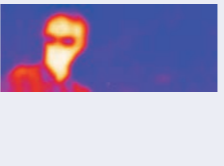


#### Vacuum-sealing, Chip-scale technology

- 1) Chip-scale packaging technology developed in-house eliminates the use of ceramic package and achieves vacuum state performance.
- 2) New packaging technology reduces product size to approximately 80% compared to conventional products\*, enabling greater compactness and space savings.

\*1: Compared to general 16x16 pixel thermopiles available in market.

## Specifications

	MIR8060 series		MIR8032 series
Type No.	MIR8060B3*	MIR8060B1	MIR8032B1
Pixels	80 × 60 pixels 	80 × 60 pixels 	80 × 32 pixels 
Field of View (FOV)	78° × 53° (Typ.)	78° × 53° (Typ.)	78° × 29° (Typ.)
Frame rate	4 / 8 fps (selective)	4 / 8 fps (selective)	4 fps (fixed)
Temp. resolution (NETD**)	250 mK (Typ.)	100 mK (Typ.)	100 mK (Typ.)
Operating voltage	3.3 V	3.3 V	3.3 V
Current consumption	50mA (Max.)	50mA (Max.)	50mA (Max.)
Product dimensions	19.5 × 13.5 × 9.5 mm	19.5 × 13.5 × 9.5 mm	19.5 × 13.5 × 9.5 mm
Detectable temp. range	-5 °C ~ +200 °C	-5 °C ~ +60 °C	-5 °C ~ +60 °C
Interface	Serial Peripheral Interface (SPI)	Serial Peripheral Interface (SPI)	Serial Peripheral Interface (SPI)

\*2: Noise Equivalent Temperature Difference

\*: New Product

## Application of Infrared Sensor

The following are possible areas of application for the Infrared Sensor. With the exception of HVAC, none of these applications have yet been tested and no products are currently under development or available for purchase. Accordingly, there are no claims made as to the ability of the Infrared Sensor to achieve success in these applications.

Silhouette detection (movement, posture, fever)	Both temperature and silhouette	Temperature measurement
<b>Security</b> <ul style="list-style-type: none"> <li>• Detects intruders, etc.</li> </ul>	<b>Care</b> <ul style="list-style-type: none"> <li>• Detects posture</li> <li>• Detects abnormal body surface temperature*</li> </ul>	<b>HVAC</b> <ul style="list-style-type: none"> <li>• Measures room temperature</li> <li>• Detects the position of person</li> </ul>
<b>Body surface temperature measurement</b> <ul style="list-style-type: none"> <li>• Measures body surface temperature*</li> </ul>	<b>People count</b> <ul style="list-style-type: none"> <li>• Counts the number of people</li> <li>• Detects behavior</li> </ul>	<b>Care robot</b> <ul style="list-style-type: none"> <li>• Detects movement/posture</li> <li>• Detects body surface temperature*</li> </ul>
<b>Person count</b> <ul style="list-style-type: none"> <li>• Counts the number of people</li> <li>• Detects behavior</li> </ul>	<b>Kitchen/Home appliances</b> <ul style="list-style-type: none"> <li>• Measures temperature of food being cooked</li> <li>• Detects people</li> </ul>	<b>Raising livestock</b> <ul style="list-style-type: none"> <li>• Measures surface temperature of livestock</li> </ul>
<b>Elevator/Escalator</b> <ul style="list-style-type: none"> <li>• Detects congestion</li> </ul>	<b>Toilets</b> <ul style="list-style-type: none"> <li>• Detects possible falls</li> <li>• Detects abnormal movement/posture</li> </ul>	<b>Bath</b> <ul style="list-style-type: none"> <li>• Measures temperature</li> <li>• Detects abnormal posture</li> </ul>
<b>Light</b> <ul style="list-style-type: none"> <li>• Detects the movement of people</li> </ul>	<b>Drone</b> <ul style="list-style-type: none"> <li>• Detects people</li> <li>• Measures temperature</li> </ul>	<b>Mobile</b> <ul style="list-style-type: none"> <li>• Measures body surface temperature*</li> <li>• Detects gestures</li> </ul>
<b>Animal damage detection</b> <ul style="list-style-type: none"> <li>• Detects the presence of animal damage</li> </ul>	<b>Smart speaker</b> <ul style="list-style-type: none"> <li>• Detects room temperature distribution and presence of people, and instructs various home appliances</li> </ul>	<b>Fire detection</b> <ul style="list-style-type: none"> <li>• Detects possible fire outbreaks</li> <li>• Detects people</li> </ul>
<b>Home appliance</b> <ul style="list-style-type: none"> <li>• Gesture-based operation</li> </ul>	<b>Factory safety/Electric fence</b> <ul style="list-style-type: none"> <li>• Detects people</li> <li>• Detects possible falls</li> </ul>	<b>Car cabin</b> <ul style="list-style-type: none"> <li>• Detects presence of children</li> <li>• Detects driver's possible condition</li> </ul>
<b>Health/beauty</b> <ul style="list-style-type: none"> <li>• Measures body and face surface temperature* distribution</li> </ul>	<b>Farm</b> <ul style="list-style-type: none"> <li>• Controls crop/environment temperature</li> </ul>	

\*: This cannot be used for medical diagnosis.

### Examples of use by Mitsubishi Electric (These products are available for purchase and use only in Japan.)



An infrared sensor has been fitted on the toilet monitoring system (kizkia-Knight T). This system monitors a user in the toilet in nursing care facilities, etc. while ensuring privacy.



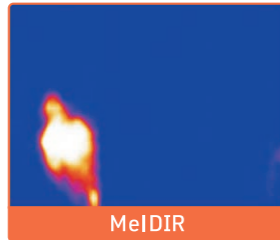
The i-See Sensor equipped with MeIDIR features "Touch Airflow" which allows the user to adjust the airflow simply by touching the place where the user wants the airflow to be delivered while viewing the thermal image of the room on the user's smartphone.

## Infrared Sensor MeDIR Thermal Images

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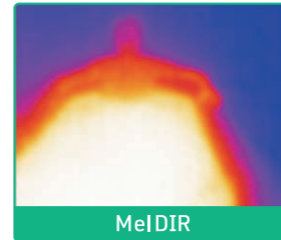
### Security

- Detects heat sources in the dark
- Distinguishes between heat sources and a person
- Detects people
- Assesses a person's behavior



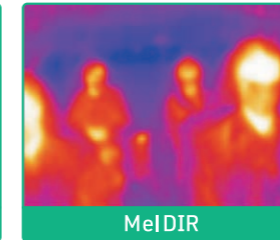
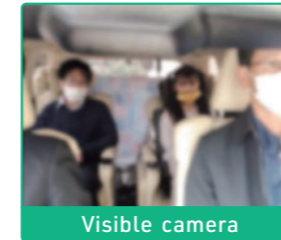
### Bath\*

- Privacy protection
- May aid in predicting heat shock
- May aid in detecting drowning



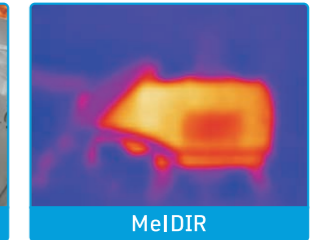
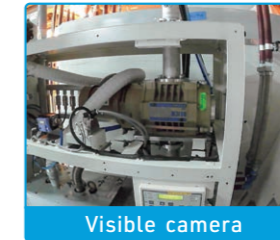
### Car cabin

- Child presence detection
- Measures passenger body surface temperature\*



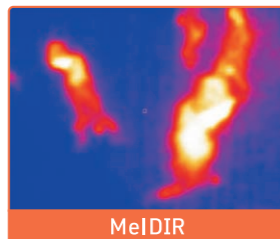
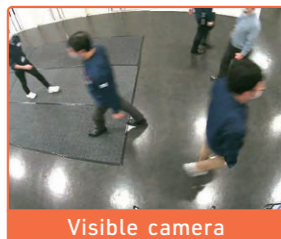
### Equipment monitoring

- Monitors the temperature of machines and equipment
- Detects hotspots



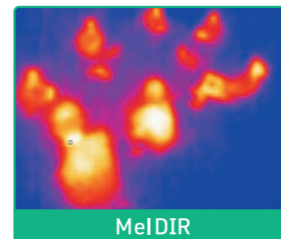
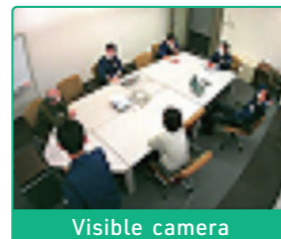
### People count

- Counts the number of people
- Detects abnormal behavior
- Detects people flow
- Measures stay time



### HVAC

- Counts the number of people
- Detects the position of person
- Measures room temperature



### Kitchen

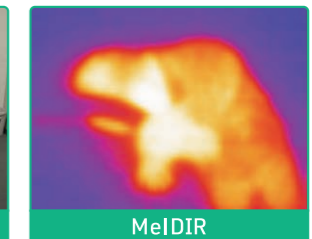
- Measures the temperature of food being cooked
- Detects people
- Detects the number of stoves in use
- May detect open flame



### Care

Detects patient movement

- Posture
- Behavior (getting up, falling)
- Detects abnormal body surface temperature\*



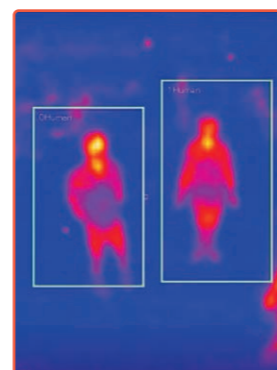
\*: This cannot be used for medical diagnosis.

## AI Infrared sensor MeDIR × Deep Learning

Provides a detection algorithm based on deep learning of AI that takes advantage of the features of infrared sensor MeDIR

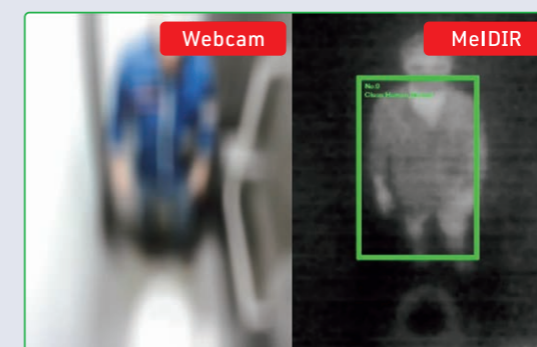
### Features

- Uses thermal imagery to protect privacy
- Since MeDIR detects human shape, it can detect with high accuracy even with a small amount of calculation
- System cost is reduced by edge AI that can operate with a general-purpose microcontroller

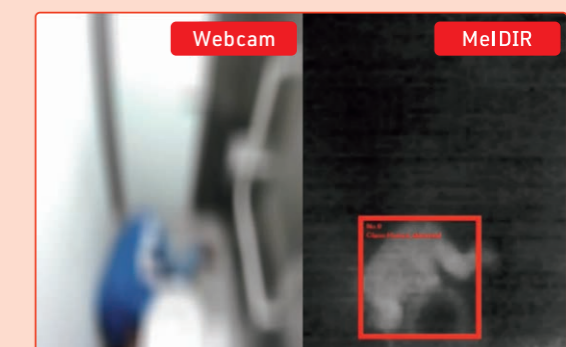


### Detection example using deep-learning algorithm

[example of possible bathroom fall]



Normal posture detection



Abnormal posture detection





### Mitsubishi Electric Infrared Sensors Website

[www.MitsubishiElectric.com/semiconductors/infraredsensor/](http://www.MitsubishiElectric.com/semiconductors/infraredsensor/)



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