



INFRARED SENSORS
MeDIR

INFRARED SENSORS

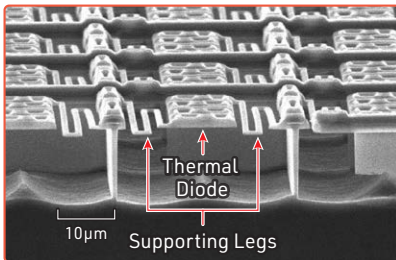
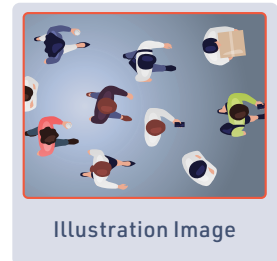
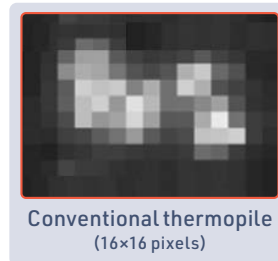
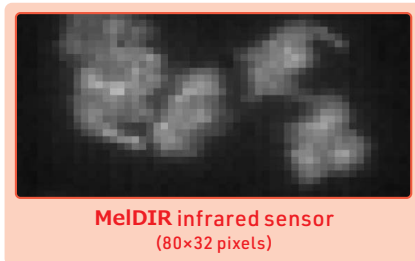




Features

1

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

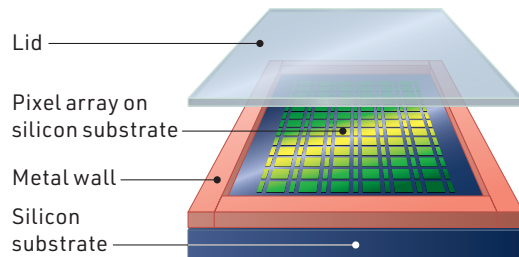


Mitsubishi Electric Original Pixel Structure

- 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.	MIR8060C1*	MIR8060B3	MIR8060B1	MIR8032B1
Temp. resolution (NETD*2)	180 mK (Typ.)	250 mK (Typ.)	100 mK (Typ.)	100 mK (Typ.)
Field of View (FoV)	100° × 73° (Typ.)	78° × 53° (Typ.)		78° × 29° (Typ.)
Frame rate	4 / 8 fps (selective)			4 fps (fixed)
Operating voltage	3.3 V			3.3 V
Current consumption	50mA (Max.)			50mA (Max.)
Product dimensions	19.5 × 13.5 × 9.7 mm	19.5 × 13.5 × 9.5 mm		19.5 × 13.5 × 9.5 mm
Detectable temp. range	-5 °C ~ +60 °C	-5 °C ~ +200 °C	-5 °C ~ +60 °C	-5 °C ~ +60 °C
Interface	Serial Peripheral Interface (SPI)			Serial Peripheral Interface (SPI)
Pixels	80 × 60 pixels			80 × 32 pixels
	<p>(This image is from MIR8060B1)</p>			

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

*: This cannot be used for medical diagnosis.

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



AI×Care service kizkia-Knight

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.



Room AC Kirigamine



The i-See Sensor equipped with MeDIR 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



Security

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



Visible camera



MeDIR

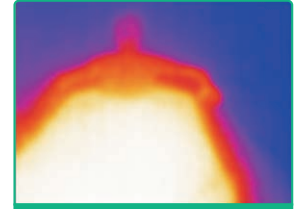


Bath*

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



Visible camera

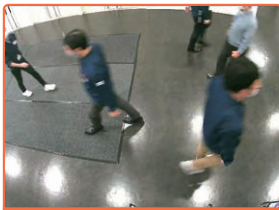


MeDIR

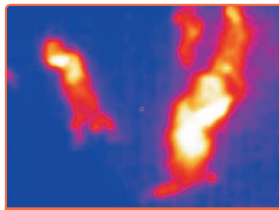


People count

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



Visible camera



MeDIR

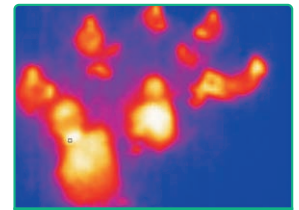


HVAC

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



Visible camera



MeDIR

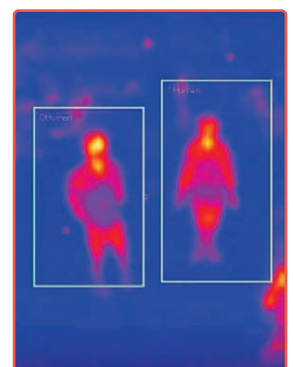
AI

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



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Restroom


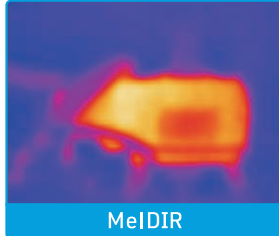
- Privacy protection
- Detects people
- Detects abnormal posture (vomiting, falling)




Visible camera MeIDIR

Equipment monitoring

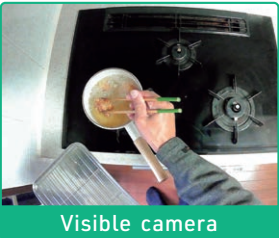
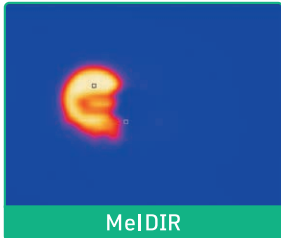
- Monitors the temperature of machines and equipment
- Detects hotspots

Visible camera MeIDIR

Kitchen

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

Visible camera MeIDIR

Care

Detects patient movement

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

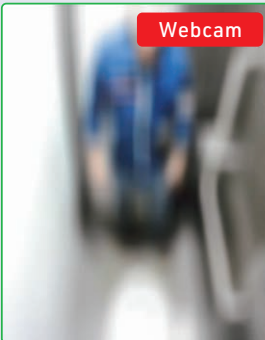



Visible camera MeIDIR

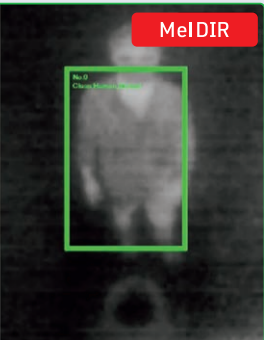
*: This cannot be used for medical diagnosis.

Detection example using deep-learning algorithm

[example of possible bathroom fall]

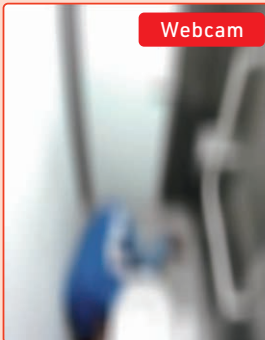


Webcam




MeIDIR

Normal posture detection



Webcam



MeIDIR

Abnormal posture detection

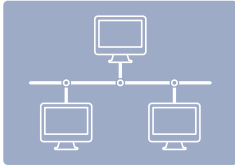
User-Support Tools

User-support tools that contribute to reducing customer development time

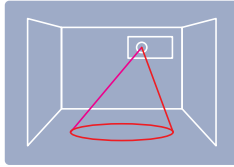
Product
planning

Proposal

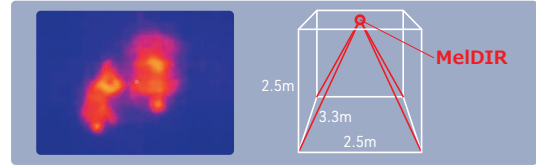
Propose use for each application



System configuration



Installation example

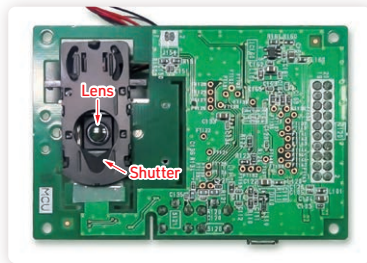


Monitoring example

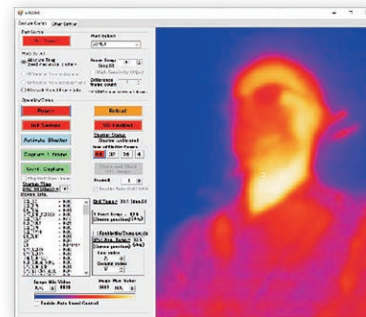
Technology
development

Demo Kit

Provide hardware and image display software required to evaluate MeDIR



Demo kit EVA series



Viewer

Product
development

Reference Design

Software/hardware design support

Hardware information

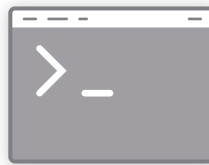


Gerber data

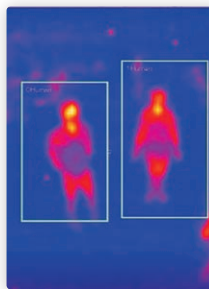


BOM lists

Software information



Reference cords

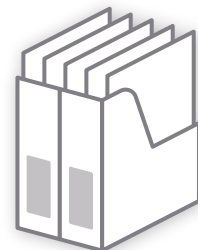


Detection algorithm
(Learning of human/posture/action)

Documents



Application notes

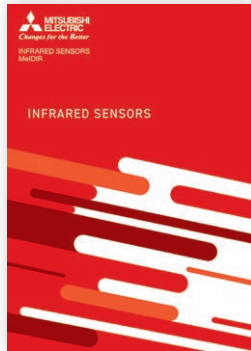


Manuals

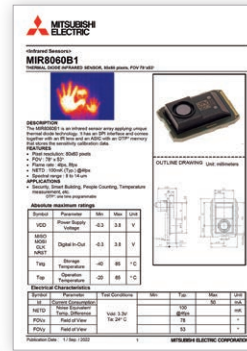
Introducing "Infrared Sensor Members" (membership registration required)

By registering with "Infrared Sensor Members," you will gain access to a wealth of resources on our website, including infrared sensor catalogs, data sheets, and videos of application examples. We are planning to enhance the exclusive content for "Infrared Sensor Members" in the future. We look forward to your registration.

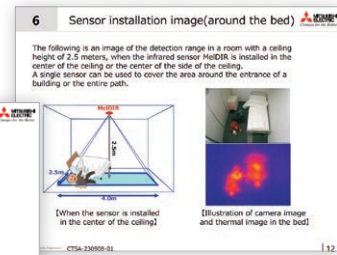
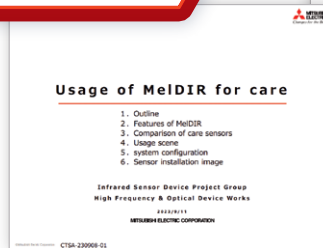
Catalog



Data Sheet



Infrared Sensor Members

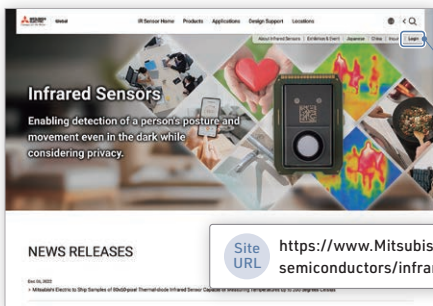


User Support Tools – Example of utilization –

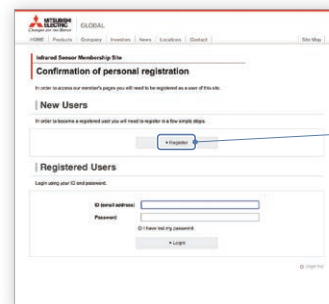
Planning to expand exclusive contents!

How to Register

1 Access "Infrared Sensor Website."



2 Click Login



3 Click Register

4 Enter your "Registration information"

5 Receive the "Registration completion" email

6 Please login to view various information

Mitsubishi Electric Infrared Sensors Website

www.MitsubishiElectric.com/semiconductors/infraredsensor/



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- Mitsubishi Electric Corporation puts the maximum effort into making semiconductor products better and more reliable, but there is always the possibility that trouble may occur with them. Trouble with semiconductors may lead to personal injury, fire or property damage. Remember to give due consideration to safety when making your circuit designs, with appropriate measures such as (i) placement of substitutive, auxiliary circuits, (ii) use of non-flammable material or (iii) prevention against any malfunction or mishap.

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