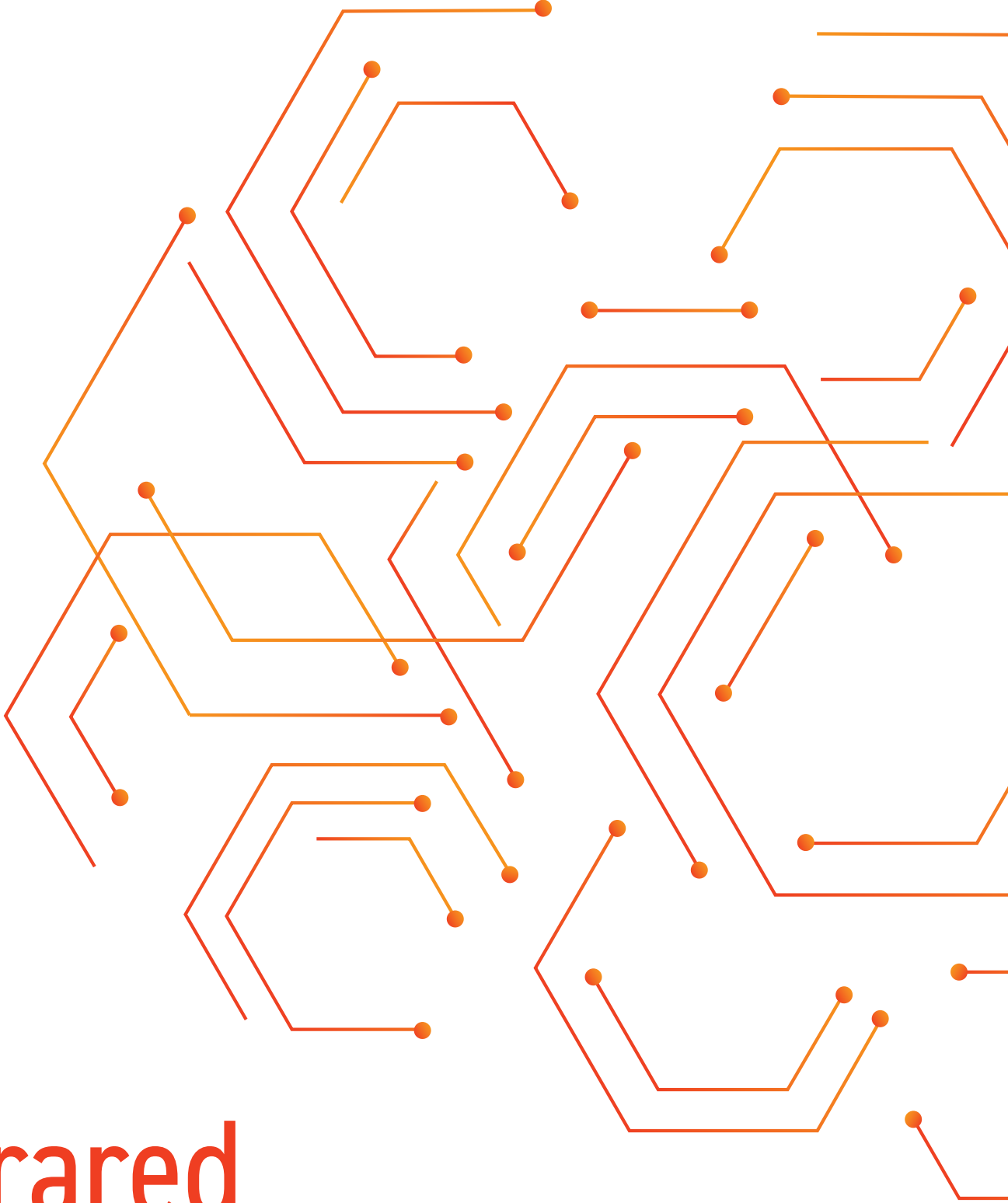MITSUBISHI ELECTRIC
Changes for the Better

INFRARED SENSORS
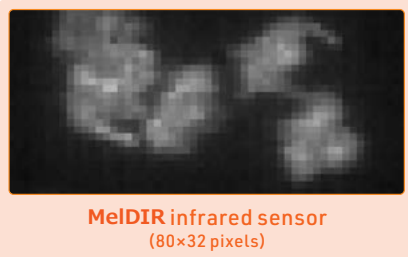MelDIR

Infrared
Sensors

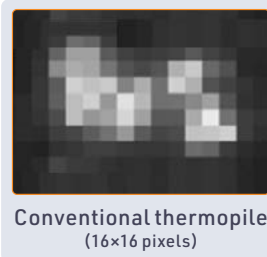# Highly precise detection of people and objects using sensor technologies installed in satellites

Features

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

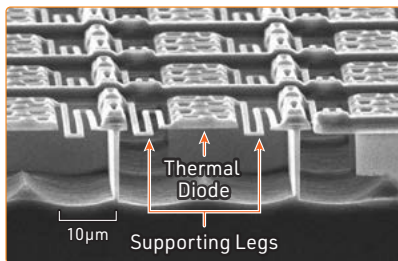**MelDIR** infrared sensor
(80×32 pixels)

Conventional thermopile
(16×16 pixels)

Illustration Image

Mitsubishi Electric Original Pixel Structure

Thermal Diode
10μm
Supporting Legs

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**

Lid

Pixel array on silicon substrate

Metal wall

Silicon substrate
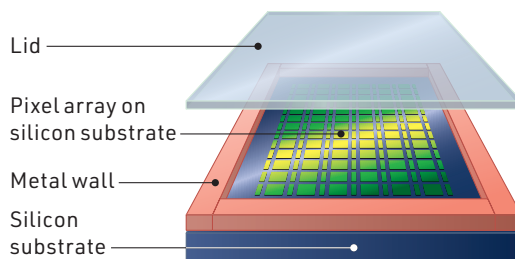
Vacuum-sealing, Chip-scale technology

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[*1], enabling greater compactness and space savings.

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

Specifications

High pixel count
- More tenfold compared to conventional products[*1] (80 × 60 / 80 × 32 pixels)
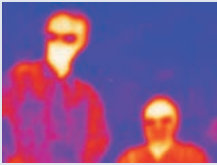
High temp. resolution
- Fivefold compared to conventional products[*1] (by units of 0.1 ℃, 100mK)

Compact & Space-saving
- Reduces product size to 80% compared to conventional products[*1] (19.5 × 13.5 × 9.5 mm)

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

＊1: Compared to general 16x16 pixel thermopiles available in market.　　★: New product

Infrared Sensor
MelDIR

Example Images by Application

| Patient Monitor | Crime Prevention | People Counting | Smart Buildings | Smart Farms | Smart Factories | Lighting/Temperature Monitor |

MelDIR infrared sensor (80×32 pixels) | Illustration Image

Crime Prevention

Patient Monitor

People Counting

Smart Buildings

Temperature Sensitive Equipment

*Image was obtained after heating the surface of the face to simulate the condition of having a fever. The color tone of the image was adjusted to define the difference in body temperature (i.e., difference between high body temperature and normal body temperature is approx. 2℃). This cannot be used for medical diagnosis.

High Normal Normal Normal

■ Sensor Technology Installed in Satellites

Thermal diode sensor technology adopted to install a Compact InfraRed Camera (CIRC) in the ALOS-2[†]

DAICHI-2 (ALOS-2)

† ALOS-2: Advanced Land Observing Satellite -2, which Mitsubishi Electric delivered to the Japan Aerospace Exploration Agency in 2014 and is now in operation

■ Installed in Kirigamine FZ·Z Series Room Air Conditioners

Move eye mirA.I+

The newly developed "Move Eye mirA.I+" is equipped with AI technology and high-resolution sensors.
A world-first[*2], the airflow from the air conditioner is detected with high accuracy[*3] and adjust to various residential environmental, leading to comfortability

Judgement as warm air reached the floor

Image

＊2: Beginning Installation from FZ Series released in November 1, 2019, according to in-house research.　＊3: Technology to infer airflow and strength based on temperature change at destinations of warm and cool air.

User-Support Tools

■ User-support tools that contribute to reducing customer development time

Product planning	Technology development	Product development	
Proposal	**Evaluation kit**	**Reference code**	**Reference design**
Propose use for each application	Provide hardware and image display software required to evaluate MelDIR	Provide information on drivers, temperature measurement programs etc., required for software design	Provide information required for hardware design

Proposal:
System configuration
Example installation

Evaluation kit:
Connecting board
MelDIR
MCU board

Reference code:
MCU board
PC
MelDIR
Temperature measurement program
Example of temperature measurement

INFRARED SENSORS
MelDIR