

Safety precautions

- Do not use these sensors under any circumstances 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.
- Before connecting a connector, check the pin layout by referring to the connector wiring diagram, specifications diagram, etc., and make sure that the connector is connected properly. Take note that 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.
- Do not use any motion sensor which has been disassembled or remodeled.
- Protection circuit recommended.
The possible failure mode is either open or short of the output transistor.
An excess heat is the cause for short mode failure. For any important and serious application in terms of safety, add protection circuit or any other protection method.
 - Various safety equipment and safety equipment
 - Traffic light
 - Security crime prevention equipment
 - Equipment concerning control and safety of trains, cars, etc.
 - Applications such as temperature control using sensor output etc.
- If it is expected that malfunction of each sensor may cause injury to persons or serious expansion damage, be sure to implement safety measures such as double safety circuit.

Request for ordering and use

The products and specifications listed in this document are subject to change for product improvement, etc. (including specification changes and discontinued manufacturing). When examining mass-production design or placing an order for the listed products, please contact Panasonic to make sure that the information listed in this document is up-to-date.

- If it is expected that malfunction of each sensor may cause injury to persons or serious expansion damage, be sure to implement safety measures.
 - Reference Standards : Computers, office automation equipment, communications equipment, audio-video products, home electrical appliances, machine tools, personal devices, industrial robots.
 - Special Standards : Transportation equipment (automobiles, trains, ships, etc.), traffic signal equipment, crime and disaster prevention devices, electric power equipment, various safety devices, and medical equipment not directly targeted for life support
 - Specified Standards : Aircraft equipment, aeronautical and space equipment, seabed relay equipment, nuclear power control systems, and medical equipment, devices and systems for life support.
- Before considering the use of our products under the following conditions, you must contact one of our customer service representatives without fail and exchange written specifications.
 - When our products are to be used in any of the applications listed for the Special Standards or Specified Standards.
 - When, even for any of the applications listed for the Reference Standards, our products may possibly be used beyond the range of the specifications, environment or conditions listed in the document or when you are considering the use of our products in any conditions or an environment that is not listed in the document.

[Acceptance Inspection]

For a purchased or delivered product, please conduct an acceptance inspection promptly with adequate consideration given to the management and maintenance of the product before and during the acceptance inspection.

[Warranty Period]

The warranty period of these products is one year after the purchase or delivery to a location designated by your company, unless otherwise specified by both parties.

[Scope of Warranty]

If a failure or a defect attributable to Panasonic is found during the warranty period, we will promptly provide a replacement or a necessary replacement part or change/repair the defective part free of charge at the location of the purchase or delivery.

The warranty does not cover a failure or a defect when any of the following applies :

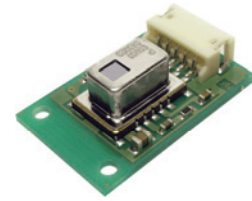
- (1) Caused by specifications, standards, or handling methods, etc. designated by your company.
- (2) Caused by modification of the structure, capabilities, or specifications, etc., in which Panasonic is not engaged, carried out after the purchase or delivery.
- (3) Caused by an unforeseen phenomenon that cannot be predicted with the technologies available after the time of the purchase or at the time of concluding the agreement.
- (4) When the product was used outside the scope of the conditions/environments described in the catalog or specifications.
- (5) When the product is incorporated in your company's equipment for use, damages that could be avoided if your company's equipment had industry-standard functions, structures, etc.
- (6) Caused by natural disasters or Force Majeure.

The warranty described here is limited to the purchased or delivered product only and does not cover any consequential damages arising from the failure or defect of the product.

[Before Purchase]

- The standard prices of the products listed in this catalog do not include consumption tax, delivery, installation & adjustment fees, used product collection fees, etc.
- The specifications/appearance are subject to change without notice for product improvement.
- The export of products that fall into the category of strategic goods (or services) require an export (or a service transaction) license under the Foreign Exchange and Foreign Trade Law. Please contact Panasonic for details.
- For details of the products listed in this catalog, please contact distributors, specialty contractor stores, or Panasonic.

Infrared Array Sensor Grid-EYE



High Precision Infrared Array Sensor based on Advanced MEMS Technology

Features

- Temperature detection of two-dimensional area: 8 × 8 (64 pixels)
- Digital output (capability of temperature value output)
- PCB mounting with connector (5pin)
- RoHS compliant

Typical applications

- High function home appliances (microwaves)
- Energy saving at office (lighting control)
- Digital signage
- Automatic doors/elevators

Ordering information

AMG 8 8 5 4 M01

- Vertical pixel
8 : 8 pixels
- Horizontal pixel
8 : 8 pixels
- Applied voltage
5 : 5.0 V.DC
- Gain amplification factor
4 : High performance type Low gain

Type

Shipment package : 1,000 pcs.

Product name	Number of pixel	Operating voltage	Part number
Infrared array sensor Grid-EYE Narrow angle type	64 (Vertical 8 × Horizontal 8 Matrix)	5.0 V.DC	AMG8854M01

Ratings

Item	Performance
Applied voltage	5.0 V.DC±0.5 V.DC
Temperature range of measuring object	-20 °C to 100 °C -4 °F to +212 °F
Operating temperature range	-20 °C to 100 °C -4 °F to +212 °F
Storage temperature range	-20 °C to 100 °C -4 °F to +212 °F

Absolute maximum ratings

Item	Absolute maximum ratings	Terminal
Applied voltage	-0.3 V.DC to 6.5 V.DC	VDD
Input voltage	-0.3 V.DC to VDD +0.3 V.DC	SCL, SDA, AD_SELECT
Output sink current	-10 mA to 10 mA	INT, SDA
Static electricity (Human body model)	1 kV	All terminals
Static electricity (Machine model)	200 V	All terminals

Characteristics

Item	Performance
Temperature accuracy	Typical $\pm 3.0\text{ }^{\circ}\text{C}$ $\pm 5.4\text{ }^{\circ}\text{F}$
NETD *1	Max : $0.95\text{ }^{\circ}\text{C}$ $33.71\text{ }^{\circ}\text{F}$ 10 Hz
Viewing angle	Typ. $35.6\pm 3.0\text{ }^{\circ}$
Optical axis gap	Within 4.3 °
Current consumption	Max 6.0 mA (normal mode at $25\text{ }^{\circ}\text{C}$ $77\text{ }^{\circ}\text{F}$) Max 0.4 mA (sleep mode at $25\text{ }^{\circ}\text{C}$ $77\text{ }^{\circ}\text{F}$) Max 1.1 mA (stand-by mode at $25\text{ }^{\circ}\text{C}$ $77\text{ }^{\circ}\text{F}$)
Setup time	Typical 50 ms (Time to enable communication after setup) Typical 15 s (Time to stabilize output after setup)

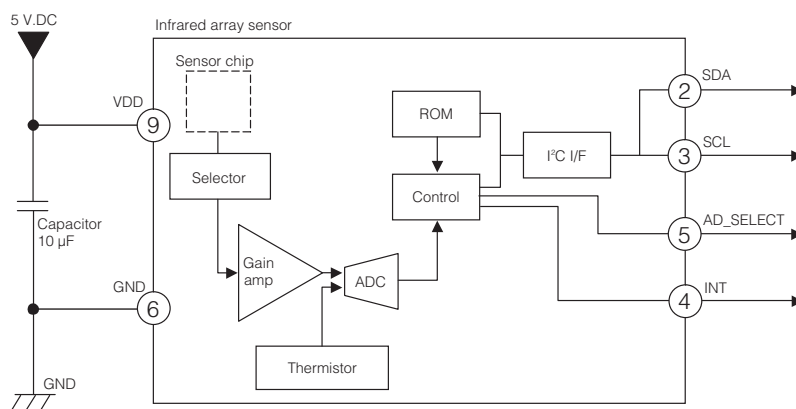
Note: *1 It is calculated from 4 pixels of centers.

Performance

Item	Performance
Number of pixel	64 (Vertical 8 × Horizontal 8 Matrix)
External interface	I ² C (fast mode)
Frame rate	Typical 10 frames/sec or 1 frame/sec
Operating mode *1	Normal Sleep Stand-by (10 sec or 60 sec intermittence)
Output mode	Temperature output
Calculate mode	No moving average or Twice moving average
Temperature output resolution	$0.25\text{ }^{\circ}\text{C}$ $32.45\text{ }^{\circ}\text{F}$
I ² C slave address	1101 000
Thermistor output temperature range	$-20\text{ }^{\circ}\text{C}$ to $80\text{ }^{\circ}\text{C}$ $-4\text{ }^{\circ}\text{F}$ to $+176\text{ }^{\circ}\text{F}$
Thermistor output resolution	$0.0625\text{ }^{\circ}\text{C}$ $32.1125\text{ }^{\circ}\text{F}$

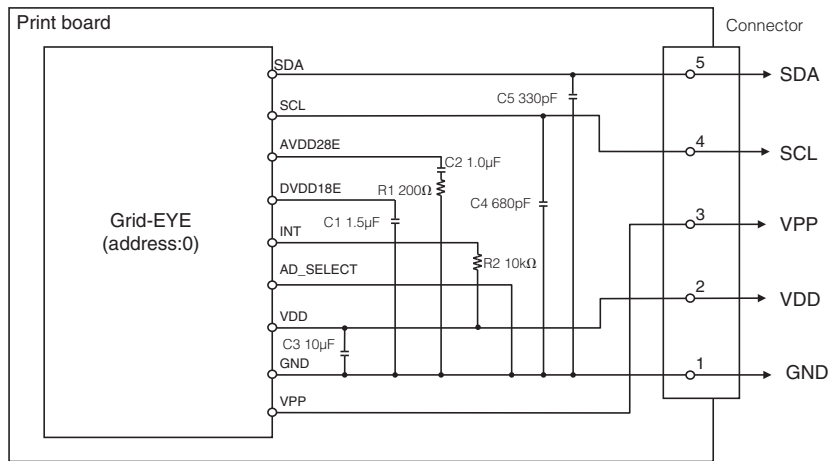
Note: *1 Normal Mode : normal operation mode; Sleep Mode: detection is off (output and data reading not possible); Standby Mode: 1 frame measuring intermittently every 10 or 60 sec.

Internal circuit



* INT terminal (4) normally has same voltage as VDD. When interrupting, same as GND (0V)

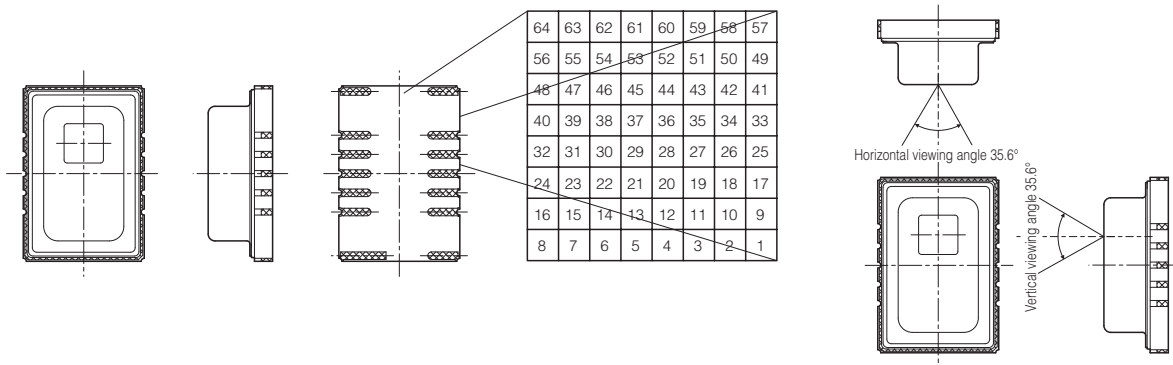
Print board circuit



Pixel array and viewing field

(1) Pixel array
Pixel array from 1 to 64 is shown below.

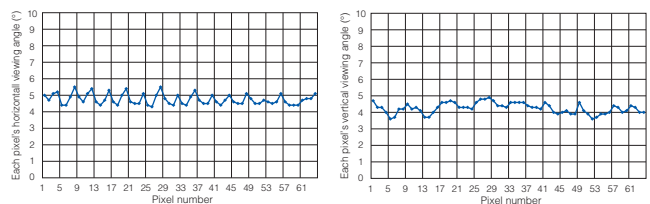
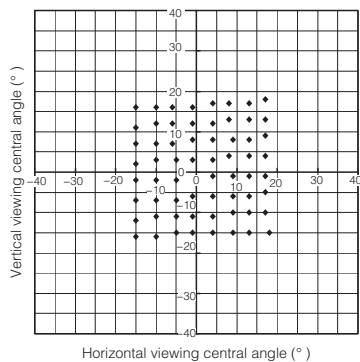
(2) Viewing field
Sensor viewing field (typical) is shown below.



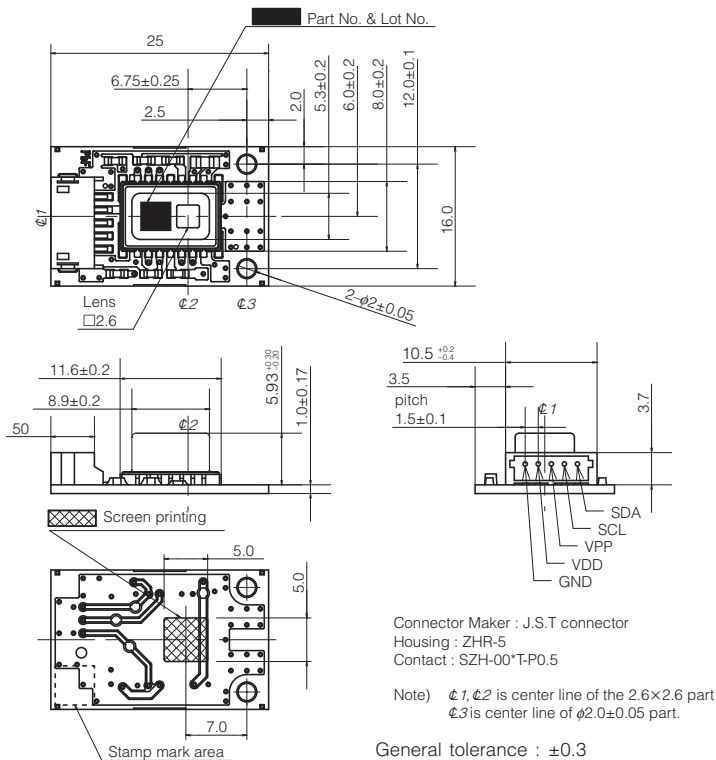
Optical properties

(1) Each pixel's viewing central angle
Sensor's optical center (the origin of graph below)
gap: within $\pm 4.3^\circ$ (Both horizontal and vertical directions)

(2) Each pixel's viewing angle (half angle)
Central 4 pixels (Pixel No. 28, 29, 36, 37) viewing angle (half angle): horizontal direction Typ. 5.0° vertical direction Typ. 4.7°



Dimensions



Notes

■ Precaution for fundamental structure of sensor

Infrared Array Sensor is a thermopile type infrared sensor which detects the amount of infrared rays. Below conditions generally degrade the temperature accuracy. Carefully check the performance and stability under actual use conditions, and perform temperature corrections when necessary.

- When heating elements exist near the Setting position of the sensor.
- When the sensor is exposed to cold or hot air.
- When the temperature of the sensor body rapidly changes.
- When substances (e.g., glasses, acrylics or steams), which hardly transmit a far infrared ray, exist between the sensor and the detected object.
- When substances (e.g., foreign substances or water), which hardly transmit a far infrared ray, adhere to the lens of the sensor.

■ Use environment

- 1) Temperature: See the specifications
- 2) Humidity: Between 15% and 85% R.H. (Avoid freezing and dew condensation)
- 3) Atmospheric pressure: Between 86 and 106 kPa
- 4) Vibrations and shocks may damage the sensor, and cause malfunction and performance deterioration. If loads and shocks are applied on the lens, the damaged sensor may cause malfunction and performance deterioration.
- 5) The product is not water/splash-proof. Perform water/dust-proofing and dew condensation/freezing countermeasures in accordance with use environment. When dew condensation occurs, responsiveness of heat source detection may delay for several seconds.

- 6) Avoid use and storage in the corrosive gas (organic solvent, sulfurous acid and hydrogen sulfide gases) to avoid malfunction and performance deterioration.
- 7) Use surge absorbers as applying the external surge voltage may damage the internal circuit.
- 8) Malfunction may occur near electric noises from static electricity, lightning, broadcast or amateur radio stations and mobile phones.
- 9) The sensor can continuously operate within the range of using ambient temperature (using ambient humidity). However, ensure that humidity is within the range described in the following page as humidity varies according to temperature. Avoid the continuous operation near the operational limit. The temperature range does not guarantee the durability.

■ Other precautions

These specifications are for individual components. Before use, carefully check the performance and quality under actual use conditions to enhance stability.

- 1) Once the individual sensor is dropped, do not use. Drop may cause functional disorders.
- 2) Writing to the unspecified register/with the unspecified bit may cause malfunction and performance deterioration. (please consult us)
- 3) Misconnection and use beyond the specified temperature range may damage the product.
- 4) Once below shocks are applied, do not use the product as applying highfrequency oscillation to the sensor body may damage the product.
 - Contact with metal objects
 - Contact with other sensors

- 5) Follow the instructions below as static electricity may damage the product.
 - For storage and transportation, avoid plastic containers which are easily electrified.
 - When storing and transporting the sensor, choose the environment where static electricity is hardly generated (e.g., humidity between 45 and 60 %) and protect the product by using electroconductive packaging materials.
 - Once unpacked, perform antistatic countermeasures.
 - (1) Operators handling sensors must wear antistatic cloths and human body grounding devices.
 - (2) Cover the surface of workbench by electro-conductive plates and ground measuring instruments and jigs.
 - (3) Ground the assembling equipment.
 - Use a stabilized power supply. A power superimposed noise may cause malfunction.

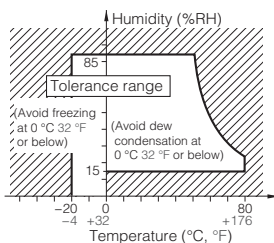
■ Range of using ambient temperature (using ambient humidity)

The sensor can continuously operate within the range of using ambient temperature (using ambient humidity). However, ensure that humidity is within the range below as humidity varies according to temperature. Avoid the continuous operation near the operational limit. Before use, check the stability under the usage environment as high humidity or high temperatures generally accelerates deterioration of the electronic component.

- The temperature range does not guarantee the durability

■ Storage and transportation

- 1) Excessive vibrations and shocks during transport may damage the product. Carefully handle the exterior box.
- 2) Extremely bad storage conditions may characteristics, and defect the appearance. Recommended conditions of the storage place are below.
 - Temperature: 0 to 45 °C 32 to 113 °F
 - Humidity: Below 70 % R.H.
 - Atmosphere: Low-dust and free from noxious chemicals such as sulfurous acid gas



■ Special notes

We exert maximum efforts for quality control of the product, however :

- 1) To prevent occurrence of unexpected circumstances, please inform us of the specifications of your product, customers, use conditions and details of the attachment position.
- 2) Have sufficient margin values of driving/performance guarantee described in the specifications and apply safety measures with double circuits, if serious effects on human lives or property are predicted due to a quality failure of the product. Those countermeasures are also for the product liability.
- 3) A warranty period is one year after the delivery to your company. Quality assurance is limited to the items and the scopes described in the specifications.

If a defect is found after the delivery, we will promptly provide a replacement or change/repair the defect part at the place of delivery in good faith. Exceptions are below.

- Damages by a failure or a defect which arose after the delivery.
- After the delivery, when storing and transporting, if conditions other than conditions in the specifications are applied to the product.
- Damages by unforeseen phenomenon which cannot be predicted with the technologies available at the time of delivery.
- Damages by natural and anthropogenic disasters, such as earthquake, flood, fire and war, which are beyond our reasonable control.

Guidelines and precautions regarding the technical information and use of our products described in this online catalog.

- If you want to use our products described in this online catalog for applications requiring special qualities or reliability, or for applications where the failure or malfunction of the products may directly jeopardize human life or potentially cause personal injury (e.g. aircraft and aerospace equipment, traffic and transportation equipment, combustion equipment, medical equipment, accident prevention, anti-crime equipment, and/or safety equipment), it is necessary to verify whether the specifications of our products fit to such applications. Please ensure that you will ask and check with our inquiry desk as to whether the specifications of our products fit to such applications use before you use our products.
- The quality and performance of our products as described in this online catalog only apply to our products when used in isolation. Therefore, please ensure you evaluate and verify our products under the specific circumstances in which our products are assembled in your own products and in which our products will actually be used.
- If you use our products in equipment that requires a high degree of reliability, regardless of the application, it is recommended that you set up protection circuits and redundancy circuits in order to ensure safety of your equipment.
- The products and product specifications described in this online catalog are subject to change for improvement without prior notice. Therefore, please be sure to request and confirm the latest product specifications which explain the specifications of our products in detail, before you finalize the design of your applications, purchase, or use our products.
- The technical information in this online catalog provides examples of our products' typical operations and application circuits. We do not guarantee the non-infringement of third party's intellectual property rights and we do not grant any license, right, or interest in our intellectual property.
- If any of our products, product specifications and/or technical information in this online catalog is to be exported or provided to non-residents, the laws and regulations of the exporting country, especially with regard to security and export control, shall be observed.

<Regarding the Certificate of Compliance with the EU RoHS Directive/REACH Regulations>

- The switchover date for compliance with the RoHS Directive/REACH Regulations varies depending on the part number or series of our products.
- When you use the inventory of our products for which it is unclear whether those products are compliant with the RoHS Directive/REACH Regulation, please select "Sales Inquiry" in the website inquiry form and contact us.

We do not take any responsibility for the use of our products outside the scope of the specifications, descriptions, guidelines and precautions described in this online catalog.
