

Infrared Array Sensor Grid-EYE

PC Board Mounting

AMG8854M01 (Narrow type)

High precision infrared array sensor based on advanced MEMS technology

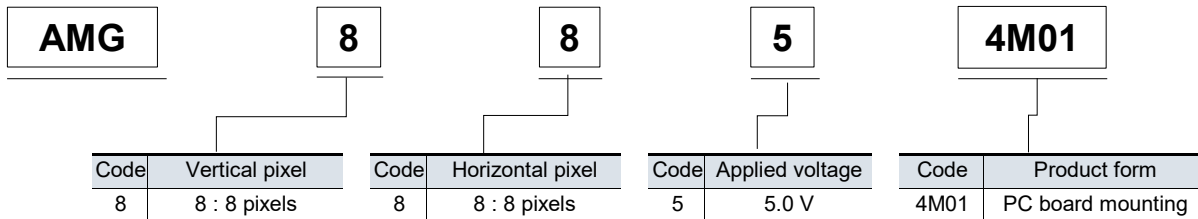
Feature

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

Recommended applications

- Home appliance (microwaves and air-conditioners)
- Energy saving at office (air conditioning control)
- Home automation (heat source detection)
- Factory automation (Fault prevention)

Ordering information



Types

Product name	Number of pixel	Operating voltage	Part number	Tape and reel package (pcs)
Infrared array sensor Grid-EYE Narrow angle type	64 (Vertical 8 × Horizontal 8 Matrix)	5.0 V	AMG8854M01	1000

Rating

Item	Performance
Applied voltage	5.0 V ± 0.5 V
Temperature range of measuring object	-20 °C to 100 °C -4 °F to +212 °F
Operating temperature range	-20 °C to 80 °C -4 °F to +176 °F
Storage temperature range	-20 °C to 80 °C -4 °F to +176 °F

Absolute maximum ratings

Item	Absolute maximum ratings	Terminal
Applied voltage	-0.3 V to 6.5 V	VDD
Input voltage	-0.3 V to VDD +0.3 V	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	Typ. $\pm 3.0\text{ }^{\circ}\text{C}$ $\pm 5.4\text{ }^{\circ}\text{F}$
Viewing angle	Typ. 35.6 °
Current consumption	Typ. 4.5 mA (normal mode) Typ. 0.2 mA (sleep mode)
Setup time	Typ. 50 ms (Time to enable communication after setup) 15 s or more (Time to stabilize output after setup)

Performance

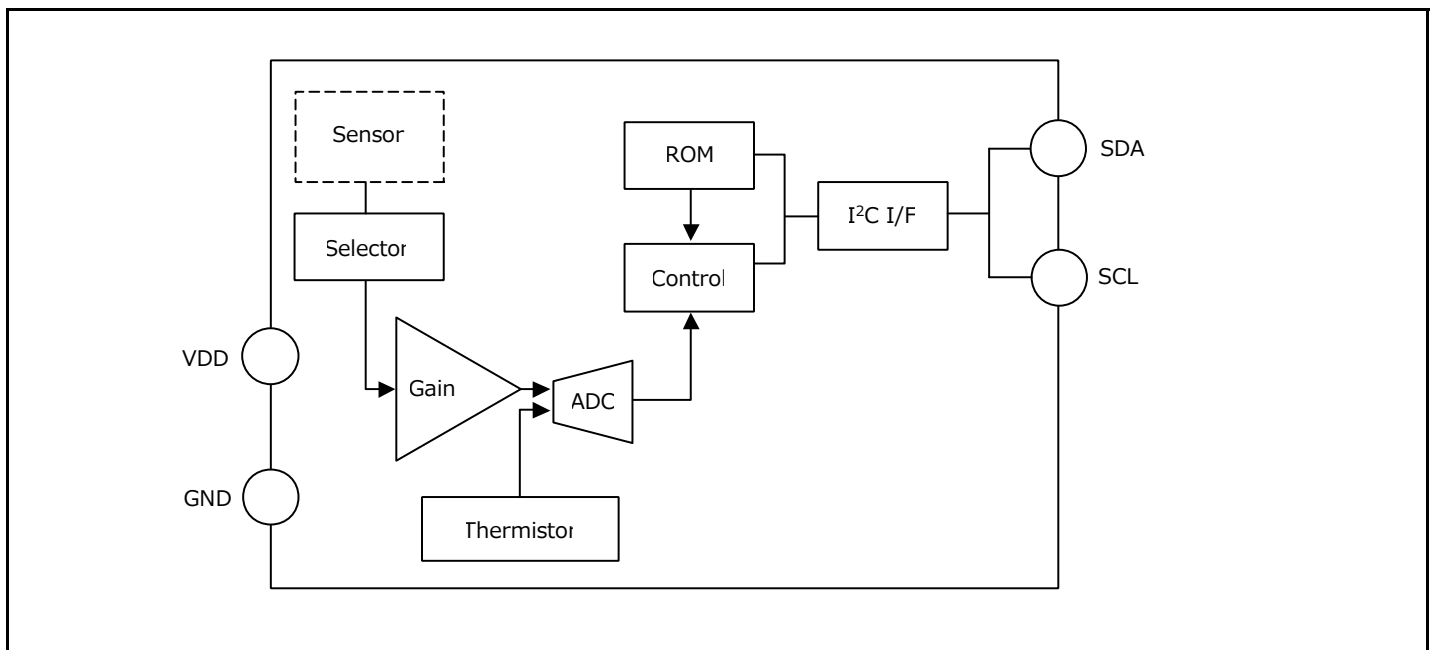
Item	Performance
Number of pixel	64 (Vertical 8 × Horizontal 8 Matrix)
External interface	I ² C
Frame rate	Typ. 1 fps or Typ. 10 fps ^{*1}
Operating mode ^{*2}	Normal Sleep
Output mode	Temperature output
Calculate mode	No moving average or Twice moving average
Temperature output resolution	0.25 $^{\circ}\text{C}$ 0.45 $^{\circ}\text{F}$
Number of sensor address	1 (I ² C slave address : 1101 000)
Thermistor output temperature range	-20 $^{\circ}\text{C}$ to 80 $^{\circ}\text{C}$ -4 $^{\circ}\text{F}$ to +176 $^{\circ}\text{F}$
Thermistor output resolution	0.0625 $^{\circ}\text{C}$ 0.1125 $^{\circ}\text{F}$

*1: fps: frame per second

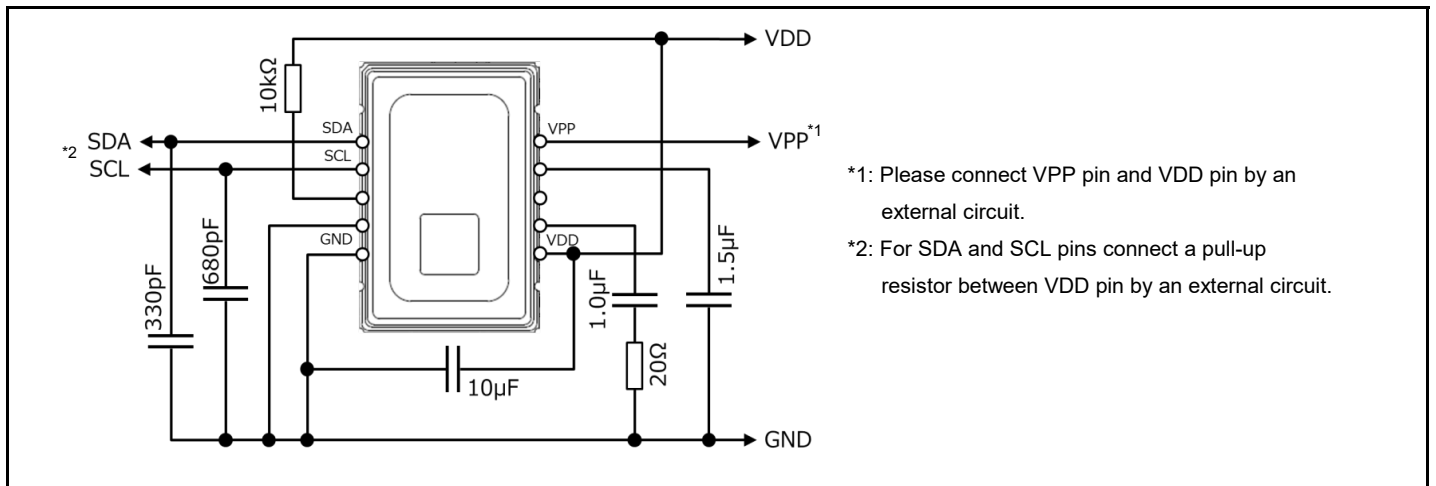
*2: Normal Mode : normal operation mode

Sleep Mode: detection is off (output and data reading not possible)

Internal circuit



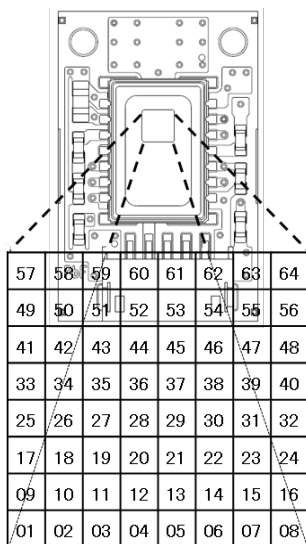
Print board circuit



Pixel array and viewing angle

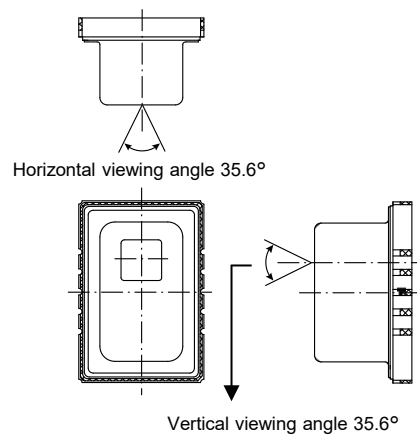
(1) Pixel array

Pixel array from 1 to 64 is shown below.



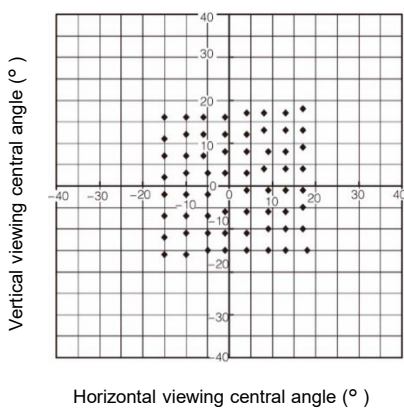
(2) Viewing field

Sensor viewing field (Typ.) is shown below.

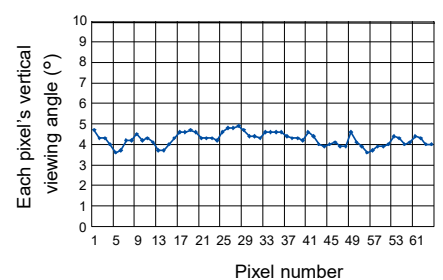
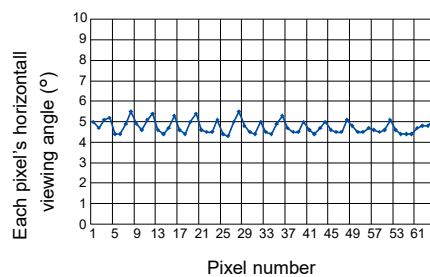


Optical properties

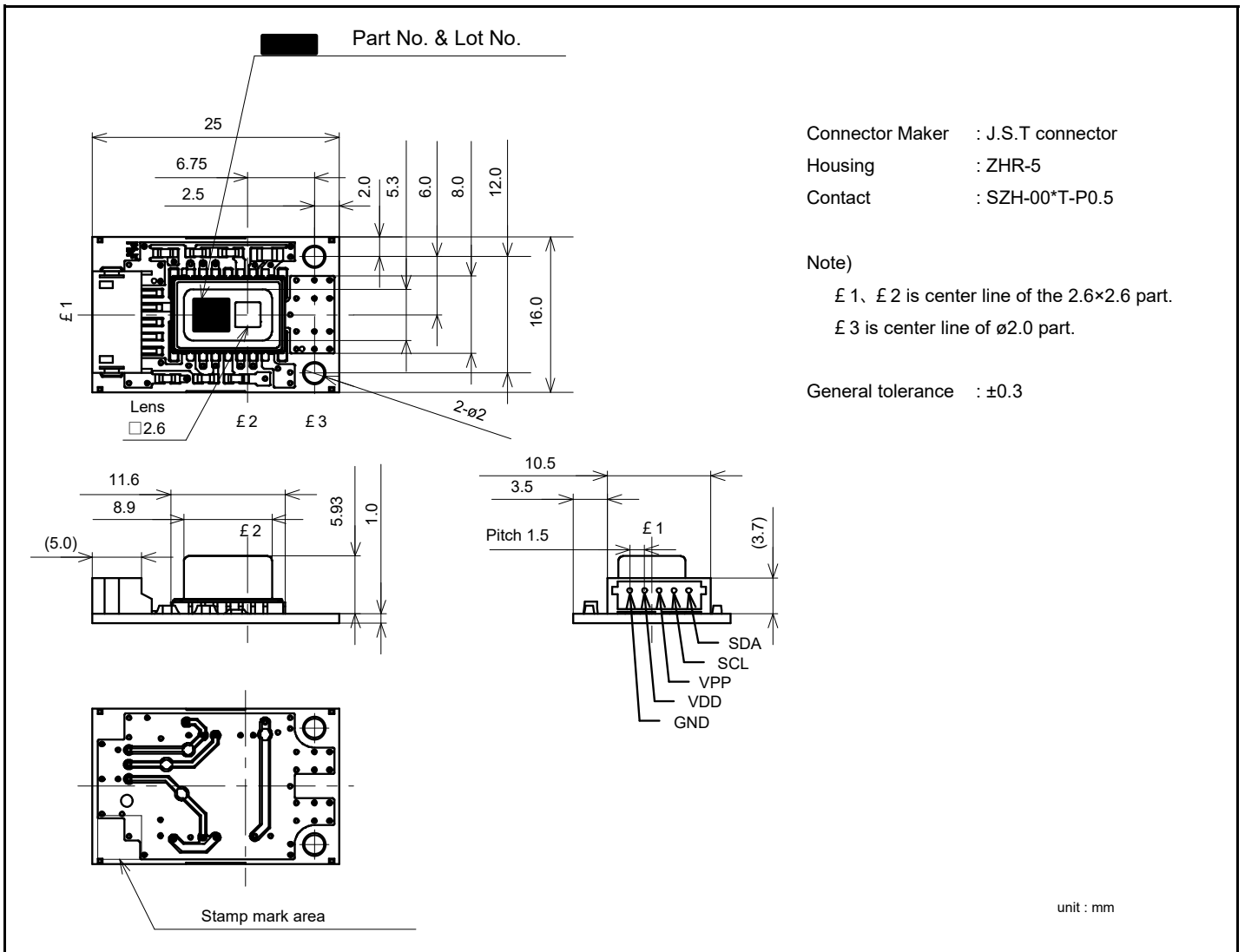
(1) Each pixel's viewing central angle



(2) Each pixel's viewing angle (half angle)



Dimensions



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- 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.
- Please ensure the safety by means of protection circuit, redundant circuit etc. in your system design in order to prevent the occurrence of life crisis and other serious damages due to the failure of our products.
- 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.
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- 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.

Please note that we do not owe any liability and responsibility if our products are used beyond the description of this catalog or without complying with precautions in this catalog.

! Application Guidelines (AMG8854M01)

1. Safety precautions

Head the following precautions to prevent injury or accidents.

- (1) We take no responsibility for troubles caused by the product usage that is not specified in this specification. 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.
- (2) 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.
- (3) If the module heats up abnormally or smells abnormal, stop using it immediately by turning off the main power supply of the device etc.
- (4) The fact remains that electrical components and devices generally cause failures at probability. Furthermore, their durability varies with use environments or use conditions. In this respect, we ask you to check for actual electrical components and devices under actual conditions before use without fail.
- (5) Failure modes of sensors include short-circuiting, open-circuiting and temperature rises. If the failure of the product is considered to cause a personal injury or death or property damage, the safety rate should be added to the specified values shown in this specifications and please consider the fail-safe design in the following considerations and ensure safety.
 - Provide protection circuits and protection devices to ensure system safety.
 - Provide of a redundant circuit so that a malfunction does not make the system unsafety.
- (6) When a dogma shall be occurred about safety for this product, be sure to inform us rapidly, operate your technical examination.

2. Precaution for fundamental structure of sensor

Infrared Array Sensor is a thermopile type infrared sensor which detects the amount of infrared rays.

In general, the sensor output may change in the following cases.

Be sure to check the performance and reliability under actual operating conditions, and correct, if necessary, the output under the actual operating conditions.

If the sensor partially changes temperature.

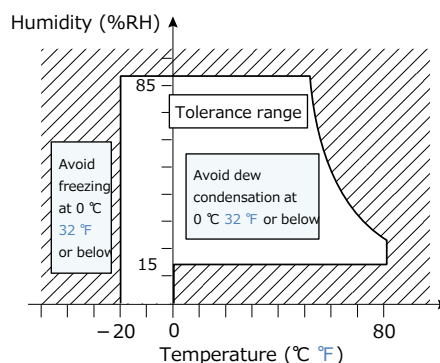
- If there is a heating element (MCU, power supply, etc.) near the sensor.
- If the sensor unit is exposed to warm or cold air.
- If the sensor body is in contact with the housing of the equipment.

If there is an obstacle between the sensor and the target object.

- If there is an object between the sensor and the target object that does not easily transmit far infrared rays, such as glass, acrylic, or steam.
- If a foreign matter (dust, dirt, water drops, etc.) that inhibits transmissions of far-infrared rays is attached to the lens of the sensor body.

3. Use environment

- (1) Temperature: See the specifications
- (2) Humidity: 15 % to 85 % R.H. (Avoid freezing and dew condensation)
- (3) Atmospheric pressure: 86 to 106 kPa
- (4) Vibrations and shocks may damage the sensor, and cause malfunction and performance deterioration. If loads and shocks are applied on the lense, the damaged sensor may cause malfunction and performance deterioration.
- (5) The product is not water/splash-proof. Therefore, take measures against water, dust, condensation, and freezing depending on the operating environment. If water drops adhere to a soldered part, a short circuit will occur due to solder migration. Therefore, take measures to prevent water from leaking.
- (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.



6. About wiring

- (1) Wiring should be done exactly as shown in the terminal connection diagram. In particular, be careful not to connect the power supply in the reverse direction, as this may cause damage or deterioration of the product.
- (2) VPP must be connected to VDD. Failure to do so may cause sensor failure.
- (3) To avoid the effects of noise, it is recommended to use a shielded cable and keep the length of the cable as short as possible.

7. Cleaning

- (1) If the dirt or water droplets is attached to the lens, wipe it with soft cloth. Wiping too strongly may cause the lens to peel off or scratch the surface of the lens, which may result in malfunction.
- (2) Do not use ultrasonic cleaning as it may cause damage such as wire disconnection.

8. Transportation and storage

- (1) Extreme vibration and shock during transport will damage the sensor. Handle the outer box and reel with care.
- (2) Storage under extreme conditions will cause soldering degradation, external appearance defects, and characteristic 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

9. Other handling cautions

- (1) This product may malfunction if dropped on its own before it is installed. Do not use if this happens.
- (2) If the sensor get high frequency vibration, it can be cause of breakdown. When the product get impulse like below, do not use it.
 - Touch to a object made of metal
 - Touch of mutual sensors
- (3) Since static charge can damage the sensor, bear in mind the following handling precautions.
 - Plastic containers should not be used to store or transport the sensors since they readily become charged.
 - Store or transport the product in an environment that hinders the occurrence of static electricity (for example, places with 45% to 60% humidity) and protect the product using electrically conductive packaging.
 - Any personnel handling the sensor should wear electrostatic clothing and be body grounded.
 - Place an electrically conducting board on the work surface and ground any devices used such as measuring instruments and jigs.

10. Special remarks

We will do our utmost to control the quality of this product, but please be aware of the following:

- (1) This product is designed to use in general applications at general electric equipment (Household electric appliances, AV products, office equipment, information and equipment, etc.). This product is not an important safety product. This product is not equipped with fail proof/fault diagnosis functions. Therefore, we are not responsible for any loss or damage to life, body, or property caused by the malfunction of this product, in such unsafe events as described in (a) through (d) below.
 - (a) Fire accident (Fire, smoke)
 - (b) Electrocution (Electric shock)
 - (c) Damages (Fall down/Explosion/Poisoning)
 - (d) Fire/electrocution/damages at life end
- (2) This catalog shows the quality and performance of individual components. Be sure to evaluate and confirm them in the condition in which they are mounted on your products and in the actual operating environment when using the products.
- (3) The warranty period for this product is one year after purchase or delivery to the designated location unless otherwise specified between both parties.

- (4) In the event that we are found to blame for any failures or defects in our products during the warranty period, we will provide replacements or supply the necessary spare parts or replace and/or repair the defective sections free of charge and with all due speed at the location where the products concerned were purchased or delivered. However, the following failures and defects are not covered by the warranty:
- When the failure or defect was caused by a specification, standard, handling method, etc. which was specified by you.
 - When the failure or defect was caused after purchase by you or delivery to your premises by an alteration in construction, performance, specification, etc. which did not involve us.
 - The case that the product condition changed by handling, storage and / or transportation after delivery.
 - When the failure or defect was caused by a phenomenon that could not be predicted by the technology that was being applied in practice either after purchase by you or at the time when the contract was signed.
 - If the product is used outside the range of conditions and environments described in this catalog.
 - When, after our products were incorporated into your products or equipment for use, damage resulted which could have been avoided if your products or equipment had been equipped with the functions, construction, etc. the provision of which is accepted practice in the industry.
 - When the failure or defect was caused by a natural disaster or other force majeure. The terms and conditions of the warranty here set forth apply solely to the warranty of the discrete products which were purchased by you or delivered to your premises, and they do not cover any damage induced by their failure or defects.
- (5) Products and specifications described in this catalog are subject to change (including specification changes and discontinuation) due to product improvements or other reasons. When considering the use of this product for a new product, contact us and confirm that the information described in these specifications is the latest available.
- (6) Have the product you purchased undergo an acceptance inspection as soon as possible, and take sufficient care in the management and maintenance of the product before and during the acceptance inspection.
- (7) As to the disposal of the product, check the method of disposal in each country or region where the product are incorporated in your products to be used.
- (8) The technical information contained in this catalog is intended to provide examples of typical product operation and applicable circuits and does not constitute a guarantee of non-infringement of intellectual property rights or a license to use such information by us or any third party.
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