MEMS Gyro Sensors for Rollover Detection

SMD type

EWTS64G

This series is not recommended for new design.
Click here for replacement.

This sensor is a gyro sensor for rollover detection which adopts the SMD type. A ceramic package contains a bare chip IC and a MEMS silicon tuning fork whose surface is formed directly by PZT elements.
Moreover, self-diagnostic functions are embedded to achieve high reliability.

Features

- Compact, Low height 5 mm
- SMD type
- High durability against the crash impact or vibration
- 5 V operating voltage (Ratio-metric output)
- Built-in self diagnosis
- RoHS compliant

Recommended Applications

- Automotive rollover detection
- Various types of motion controls for industrial equipment

Ratings

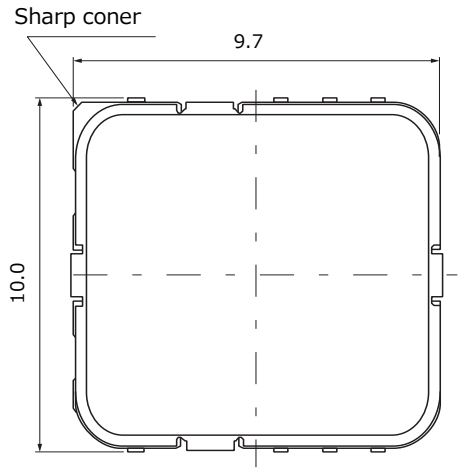
- Electrical Characteristics

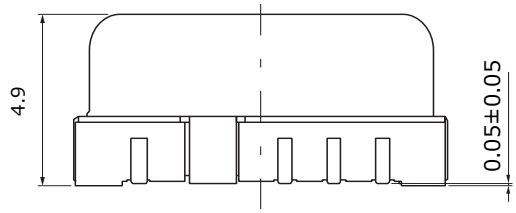
Operating Temperature Range	−40 °C to +95 °C
Storage Temperature	−40 °C to +105 °C
Operating Voltage Range	5±0.25 V
Zero Point Voltage (−40 to +95 °C)	2.5±0.15 V
Sensitivity (−40 to +95 °C)	6±0.3 mV/ (° ·s^{-1})
Dynamic Range	±300 °/s
Frequency Response (−3 dB)	31 Hz to 61 Hz
Cross Axis Sensitivity	±5 %
Output Noise	< 20 m Vp-p

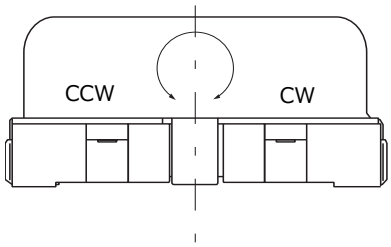
- Environmental Characteristics

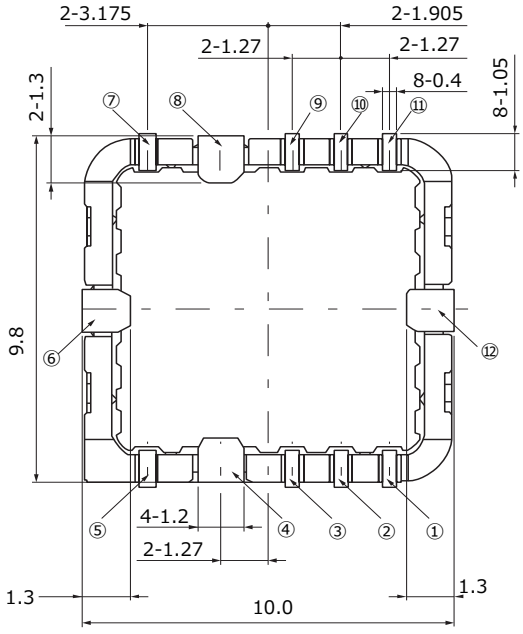
Low Temperature Operation	−40 °C for 1000 h
High Temperature Storage	+105 °C for 1000 h
High Temperature Operation	+95 °C for 1000 h
Thermal Shock	−40 °C to +95 °C for 1000 cycles
Mechanical Shock	19600 m/s^2, 0.5 ms

Dimensions in mm (not to scale)









Terminal

①	VDD
②	DIAG
③	NC
④	GND
⑤	CHECK
⑥	GND
⑦	GND
⑧	GND
⑨	NC
⑩	NC
⑪	SIG
⑫	GND

Safety and Legal Matters to Be Observed

Product specifications and applications

■ Please be advised that this product and product specifications are subject to change without notice for improvement purposes. Therefore, please request and confirm the latest delivery specifications that explain the specifications in detail before the final design, or purchase or use of the product, regardless of the application. In addition, do not use this product in any way that deviates from the contents of the company's delivery specifications.

■ Unless otherwise specified in this catalog or the product specifications, this product is intended for use in general electronic equipment (AV products, home appliances, commercial equipment, office equipment, information and communication equipment, etc.).
When this product is used for the following special cases, the specification document suited to each application shall be signed/sealed (with Panasonic Industry and the user) in advance..These include applications requiring special quality and reliability, wherein their failures or malfunctions may directly threaten human life or cause harm to the human body (e.g.: space/aircraft equipment, transportation/traffic equipment, combustion equipment, medical equipment, disaster prevention/crime prevention equipment, safety equipment, etc.).

Safety design and product evaluation

■ Please ensure safety through protection circuits, redundant circuits, etc., in the customer's system design so that a defect in our company's product will not endanger human life or cause other serious damage.

■ This catalog shows the quality and performance of individual parts. The durability of parts varies depending on the usage environment and conditions. Therefore, please ensure to evaluate and confirm the state of each part after it has been mounted in your product in the actual operating environment before use.
If you have any doubts about the safety of this product, then please notify us immediately, and be sure to conduct a technical review including the above protection circuits and redundant circuits at your company.

Laws / Regulations / Intellectual property

■ The transportation of dangerous goods as designated by UN numbers, UN classifications, etc., does not apply to this product. In addition, when exporting products, product specifications, and technical information described in this catalog, please comply with the laws and regulations of the countries to which the products are exported, especially those concerning security export control.

■ Each model of this product complies with the RoHS Directive (Restriction of the use of hazardous substances in electrical and electronic equipment) (2011/65/EU and (EU) 2015/863). The date of compliance with the RoHS Directive and REACH Regulation varies depending on the product model.
Further, if you are using product models in stock and are not sure whether or not they comply with the RoHS Directive or REACH Regulation, please contact us by selecting "Sales Inquiry" from the inquiry form.

■ During the manufacturing process of this product and any of its components and materials to be used, Panasonic Industry does not intentionally use ozone-depleting substances stipulated in the Montreal Protocol and specific bromine-based flame retardants such as PBBs (Poly-Brominated Biphenyls) / PBDEs (Poly-Brominated Diphenyl Ethers). In addition, the materials used in this product are all listed as existing chemical substances based on the Act on the Regulation of Manufacture and Evaluation of Chemical Substances.

■ With regard to the disposal of this product, please confirm the disposal method in each country and region where it is incorporated into your company's product and used.

■ The technical information contained in this catalog is intended to show only typical operation and application circuit examples of this product. This catalog does not guarantee that such information does not infringe upon the intellectual property rights of Panasonic Industry or any third party, nor imply that the license of such rights has been granted.

■ Design, materials, or process related to technical owned by Panasonic Industry are subject to change without notice.

Panasonic Industry will assume no liability whatsoever if the use of our company's products deviates from the contents of this catalog or does not comply with the precautions. Please be advised of these restrictions.

Safety Precautions (Gyro Sensors for Rollover detection/EWTS64G□)

1. Soldering

1) Thickness of Solder Paste (Recommendation)	: 0.15 mm to 0.20 mm
2) Flux	: Use non-corrosive rosin, and alcohol based solvent with little chemical reaction.
3) Pre-heat	: Control the temperature on PWB to be under 180 °C and no longer than 120 s.
4) Reflow Soldering condition	: The Maximum temperature on PWB is 260 °C.
5) Atmospheric Temperature	: The atmospheric temperature should be under 300 °C.
6) Cooling	: To avoid deterioration of the sensor due to heat, immediately cool the sensor with blown air.
7) Number of times it can be Reflow Soldered	: Once.
8) Hand soldering (recommendation)	: a) Use a 20 W or less soldering iron at less than 350 °C b) Soldering time: within 3 s

2. Washing

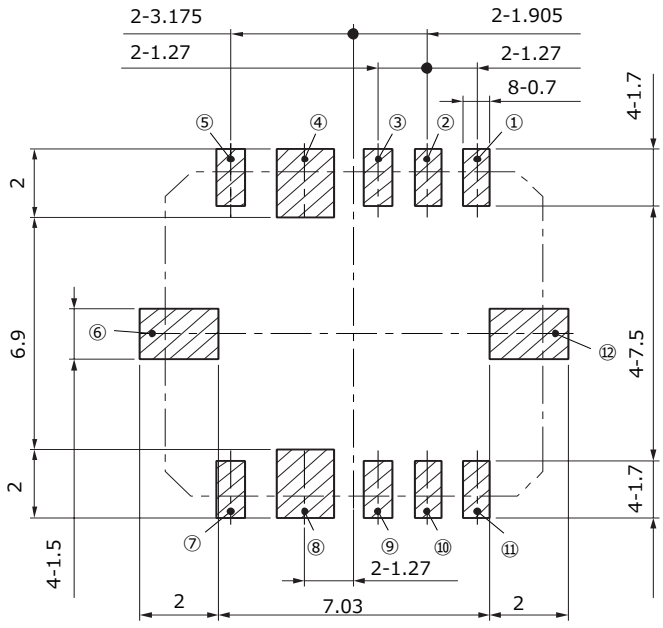
Do not wash.

3. Handling

1) Handle with care. Do not drop or apply any strong impact to the sensor this may degrade some performances.
2) Do not store under the following conditions, they may degrade some performances and solderability.
   a) Relative humidity of more than 85 %
   b) Atmospheres of corrosive gas(Cl_2, H_2S, NH_3, NO_X, SO_2 etc.)
   c) Long term storage of over 3 months after delivery
      Do not store the package under severe load and stress.

4. Pattern layout of the circuit board

See the following recommended pattern design. (mm)



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5. Layout

The sensor has a slight zero point temperature drift due to surrounding conditions. Locate the sensor with care of the following items.

1) Do not locate the sensor close to heat radiating objects such as power transistors.
2) Do not locate the sensor where it will be effected by heat convection.

6. The application method of a coating agent.

Please apply by the spray system about a coating agent. (Recommendation)
Dip coating of a coating agent is disapproval.

7. Vibration from outside

If the PWB with the sensor is resonant to frequencies caused by external vibrations, take the following items into consideration.

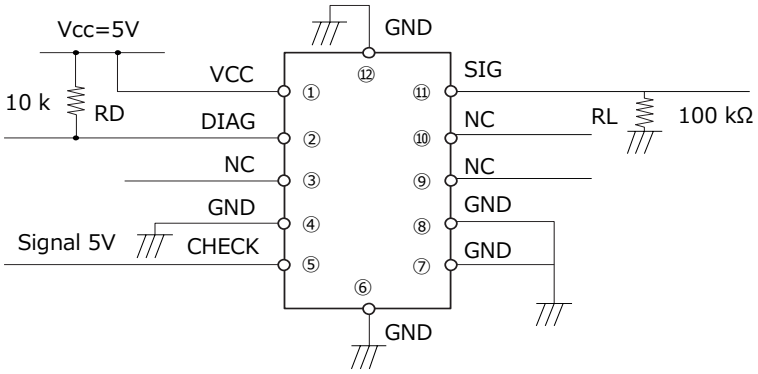
1) Rigid glass-epoxy circuit board is recommended. Locate the sensor close to the mounting screws of the PWB. (Since tuning fork part has a resonating point (detuning frequency) between 500 to 900Hz, vibration evaluation in actual use is necessary.)

2) Locate other parts so that they will not touch the sensor directly due to external vibration.

3) Do not allow the mounting screws in the circuit board to become loose.

✻ Perform a vibration test and carefully check the condition of the sensor attached to the unit.

8. Recommended circuit



1) Be sure to use 100 k load resistors.

2) The sensor does not have a power-supply backup capacitor. Insert a backup capacitor in the power supply line close to the sensor when power supply is far or the power is supplied through connectors.
In case of instant power break, vibration of the tuning fork stops and takes 0.5 second to reboot.

3) Reverse voltage or over-voltage of more than 6.3 V may destroy the sensor.

4) When the sensor signal goes to an A/D converter, use the same 5 V power supply for both the sensor and the A/D converter.

5) EMC characteristics depend on whether the shield-case is power grounded or case grounded. Choose which one after evaluating the assembled set.

9. Limited Warranty

Great attention has been paid to the quality of this sensor. As a failure mode, however, zero point output, sensitivity error, instability, or the like may occur. For a single failure of the sensor, study the infl uence of the whole circuit in advance.

1) Install the following systems for a failsafe design to ensure safety if these products are to be used in equipment where a defect in these products may cause the loss of human life or other signifi cant damage, such as damage to vehicles (automobile, train, vessel), trafficlights, medical equipment, aerospace equipment, electric heating appliances, combustion/gas equipment, rotating equipment, disaster/crime prevention equipment, nuclear apparatus, and machine tools.
   1. Systems equipped with a protection circuit and a protection device
   2. Systems equipped with a redundant circuit or other system to prevent an unsafe status in the event of a single fault

2) If questions about the safety of this product arise, please do not hesitate to contact our company and be sure to perform the technical assessment.