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

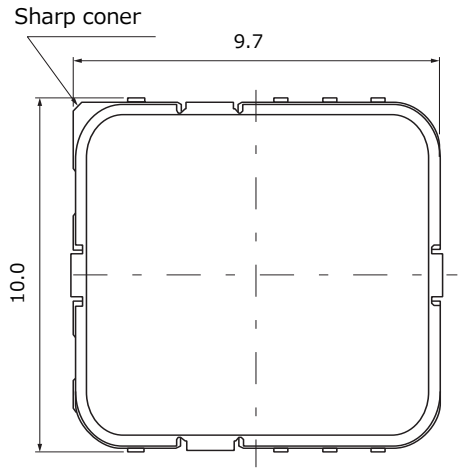
- Electrical Characteristics

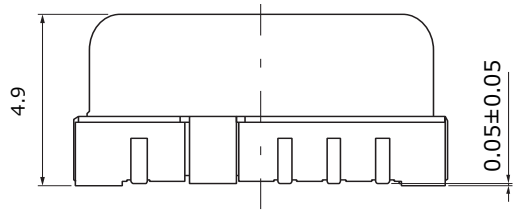
Operating Temperature Range	−40 °C to +95 °C
Storage Temperature	−40 °C to +105 °C
Operating Voltage Range	5±0.25 V
Zero Point Voltage (−40 to +95 °C)	2.5±0.15 V
Sensitivity (−40 to +95 °C)	6±0.3 mV/ (° ·s^{-1})
Dynamic Range	±300 °/s
Frequency Response (−3 dB)	31 Hz to 61 Hz
Cross Axis Sensitivity	±5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

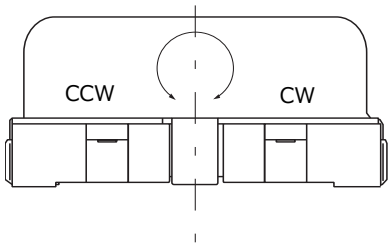
- Environmental Characteristics

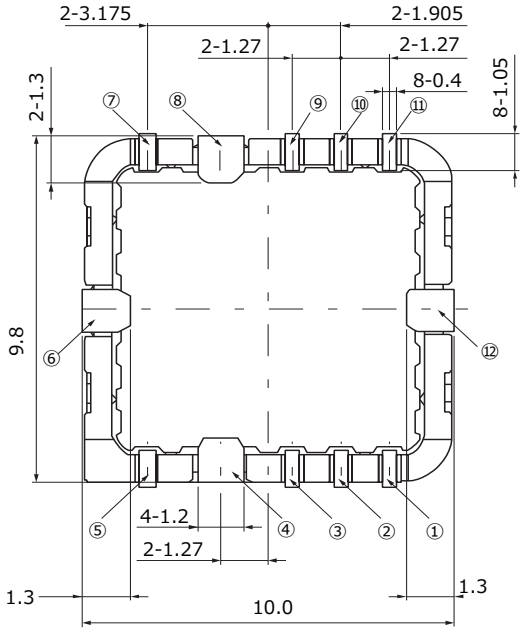
Low Temperature Operation	−40 °C for 1000 h
High Temperature Storage	+105 °C for 1000 h
High Temperature Operation	+95 °C for 1000 h
Thermal Shock	−40 °C to +95 °C for 1000 cycles
Mechanical Shock	19600 m/s^2, 0.5 ms

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

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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

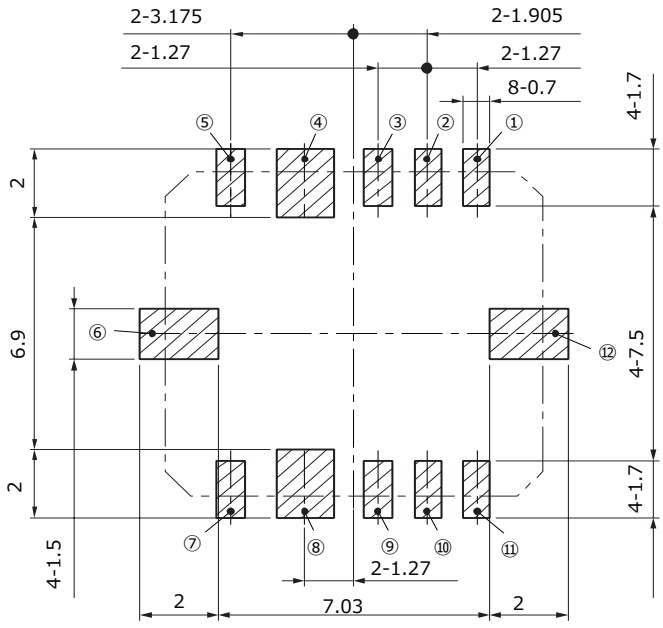
Do not wash.

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.

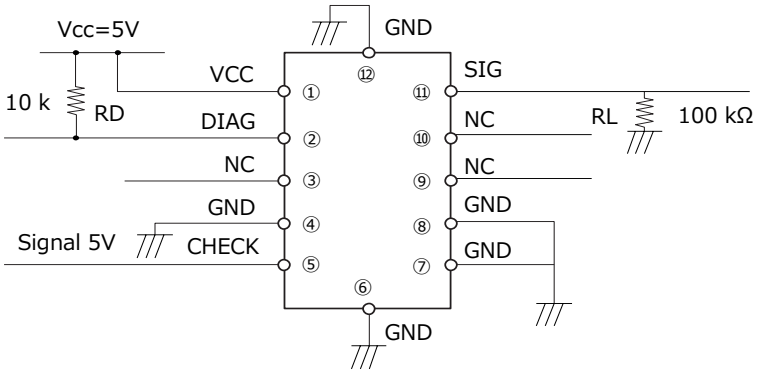
1) Rigid glass-epoxy circuit board is recommended. Locate the sensor close to the mounting screws of the PWB. (Since tuning fork part has a resonating point (detuning frequency) between 500 to 900Hz, vibration evaluation in actual use is necessary.)

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.