

## Gyro Sensors for General-Purpose SMD, Inclined Detection Axis Type

# Discontinued

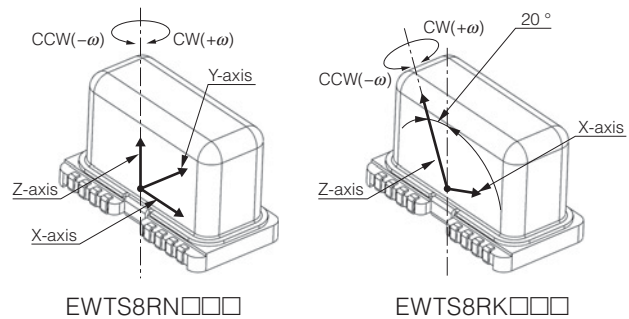
Type: **EWTS8RN**□□□/**EWTS8RK**□□□

MEMS gyro sensor for navigation using an inclined detection axis. The inclination of the unit can be changed. This micro-sensor has high precision and reliability due to the sealing around the bear chip IC and MEMS silicone based tuning fork, formed with piezo-electric thin film directly on the surface.



### Features

- Compact, Low-height 5.0 mm max., Low-profile 4.3 mm
- SMD type
- 5.0 V.DC operating voltage
- Detection axis 0 deg / 20 deg inclination (Refer to the diagram on the right)
- Analog Output (Ratio-metric output)
- RoHS compliant



### Recommended Applications

- Detects the direction of movement for car-navigation
- Detects the posture control for robot

### Ratings

● Electrical Characteristics

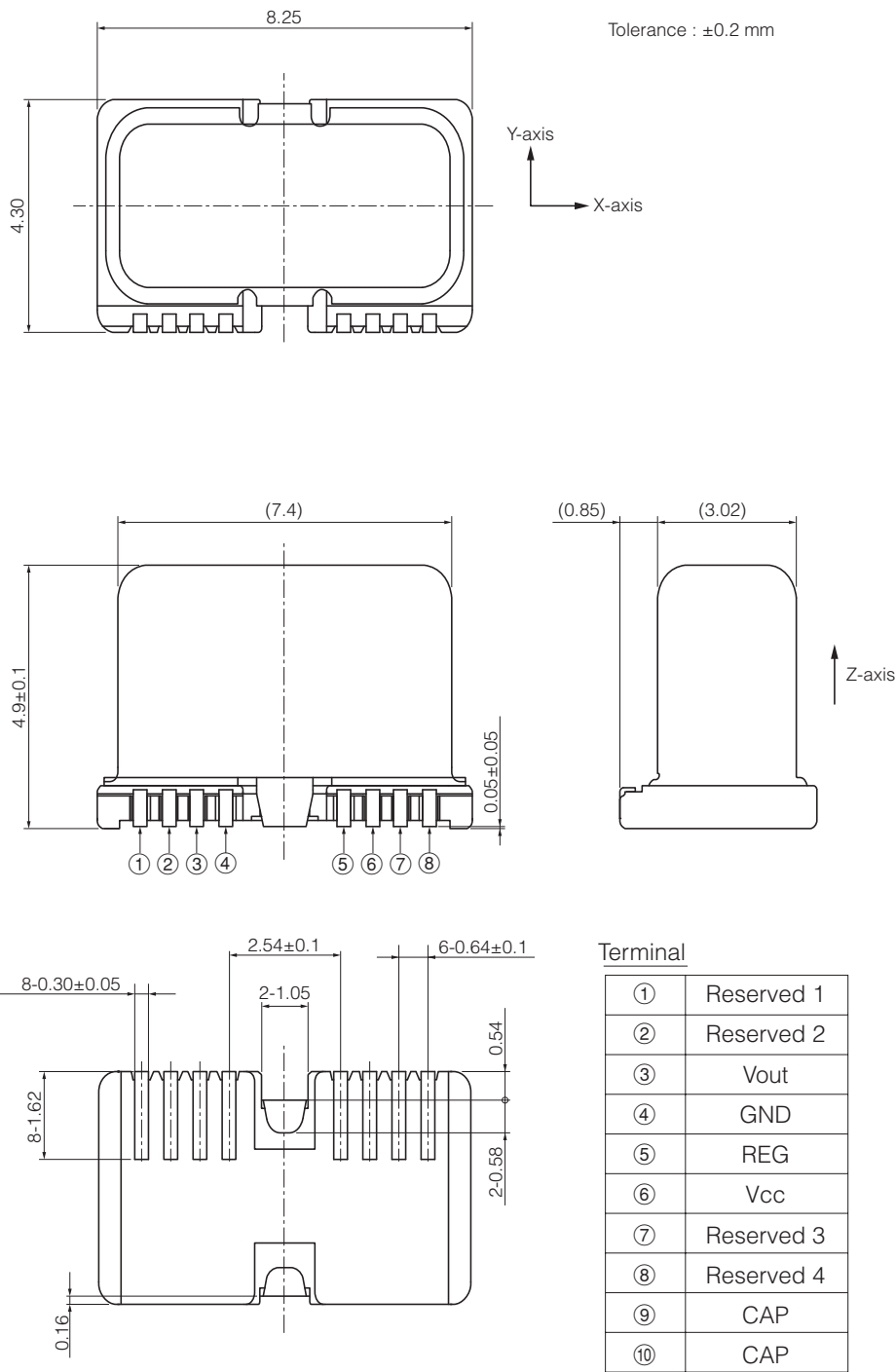
Operating Voltage Range	5.0 V.DC±0.25 V.DC
Operating Temperature Range	-40 °C to +85 °C
Zero Point Output (-40 °C to +85 °C)	2.5 V.DC ± 0.4 V.DC
Sensitivity (Z axis) (-40 °C to +85 °C)	25 mV/ ° /s
Dynamic Range	±60 %/s
Frequency Response	-4.0 dB to 0 dB
Output Noise	< 10 mV

● Environmental Characteristics

Low Temperature Operation	-40 °C for 72 h
High Temperature Operation	+85 °C for 120 h
Thermal Shock	-40 °C to +85 °C for 25 cycles
Heat and Damp Cycling Test	-40 °C to +60 °C 90 %RH for 5 cycles
Life (Operating Durability)	2 Hz, 1×10 <sup>7</sup> cycles

Dimensions in mm (not to scale)

Discontinued



## 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.
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## <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.**

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## ⚠ Safety Precautions (Gyro sensor of General-Purpose/EWTS8R□□□□)

### 1. Soldering

- (1) Thickness of Solder Paste (Recommendation) : 0.12 mm to 0.15 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

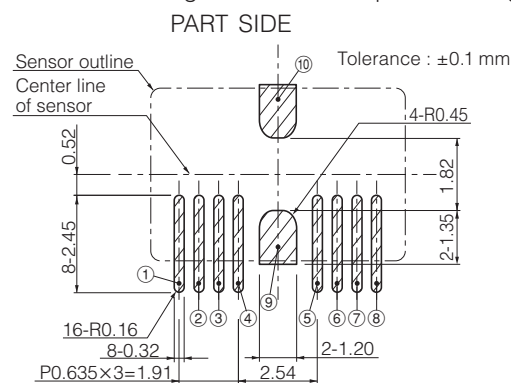
Do not wash.

### 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<sub>2</sub>, H<sub>2</sub>S, NH<sub>3</sub>, NO<sub>x</sub>, SO<sub>2</sub> 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)

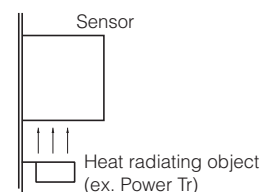
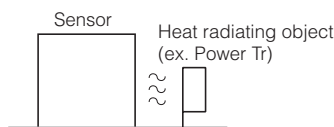


	EWTS8RD□□□□/EWTS8RS□□□□	EWTS8RN□□□□/EWTS8RK□□□□
No.	Connection	Connection
①	CSB	Connect to Vcc
②	SCLK	NC
③	NC	Vout
④	GND	GND
⑤	Capacitor to GND	Capacitor to GND
⑥	Vcc	Vcc
⑦	MISO	NC
⑧	MOSI	NC
⑨	Connect to GND	Connect to GND
⑩	Connect to GND	Connect to GND

### 5. Layout

The sensor has a little zero point temperature drift due to surrounding conditions. Take this into consideration when determining the location of the sensor.

- (1) Do not locate the sensor close to heat radiating objects such as power transistors.
- (2) Do not locate the sensor where it can be affected by heat convection.



- (3) Do not locate two or more sensors on the same PWB, otherwise periodical drift of zero point output may occur due to mutual interference by the vibration of each tuning fork in the sensor.

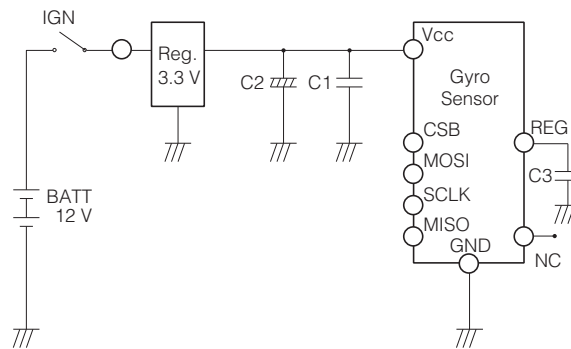
### 6. Vibration from outside

To prevent the PWB's (mounted sensor) from resonating with external vibration, please consider following these guides for the design of your PWB.

- (1) Take into consideration the location of other parts which may cause vibration.
- (2) Do not allow the screws, which fix the circuit board to become loose.
- \* Do a vibration test and carefully check the condition of the sensor attached to the unit.

## 7. Recommended Circuit

### (1) EWTS8RD□□□□/EWTS8RS□□□□



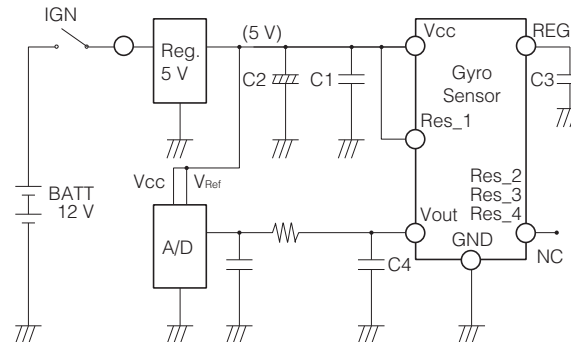
C1 : Design chip capacitor with good high frequency characteristic about 0.1  $\mu\text{F}$  near the terminals of the sensor as possible in parallel as measure for EMS.

C2 : Since the sensor does not have a power supply back up, insert a backup capacitor as an instantaneous power failure.

C3 : Design chip capacitor 0.1  $\mu\text{F}$  near the terminals of the sensor as possible.

\* NC terminal of the sensor connects with nowhere on your PWB.

### (2) EWTS8RN□□□□/EWTS8RK□□□□



C1 : Design chip capacitor with good high frequency characteristic about 0.1  $\mu\text{F}$  near the terminals of the sensor as possible in parallel as measure for EMS.

C2 : Since the sensor does not have a power supply back up, insert a backup capacitor as an instantaneous power failure.

C3 : Design chip capacitor 0.1  $\mu\text{F}$  near the terminals of the sensor as possible.

C4 : Design chip capacitor 0.1  $\mu\text{F}$  near the terminals of the sensor as possible.

\* NC terminal of the sensor connects with nowhere on your PWB.

- (3) If the noise of the frequency near the integral multiple (especially odd times) of the vibrator drive frequency and detuning frequency (drive frequency–sense frequency) are impressed to a power supply line, the low frequency wave noise of the difference of the frequency of a power supply noise and the frequency of the integral multiple of the vibrator drive frequency will be amplified and outputted ten times by signal processing of an gyro sensor. Please avoid the connection which contains high frequency noises, such as LCD, in the same power supply.

Drive frequency : 42.8 kHz $\pm$ 1 kHz

Detuning frequency 300 Hz to 1500 Hz

- (4) Since it may be influenced by the radiation noise from the line containing many high frequency noises, such as a digital power supply and digital GND, please give me consideration of wiring.

## 8. Limited Warranty

- (1) Customer acknowledges that the gyro Sensor ("Product") delivered to Customer by Panasonic Corporation. ("Panasonic") is designed and manufactured by Panasonic, or its affiliates, only for the purpose of incorporation into Customer's car navigation system (hereinafter called "Purpose"). Accordingly, Customer understands that Panasonic, or its affiliates, shall only guarantee the performance of the Product under the Product Specification for information to the extent such Product is used by Customer for the Purpose defined in this paragraph.
- (2) Customer agrees that it shall, at its sole cost and responsibility, test and evaluate the performance of Customer's system which incorporates the Product (hereinafter called "System").
- (3) Customer acknowledges that some failure mode, such that Product does not comply with this Specification in terms of Zero Point Output and/or Sensitivity or shows any unstable performance, should be observed depending on the characteristics of the System, or the environment at which such System is installed. Therefore, Customer shall design the System taking into account such influences.
- (4) Customer agrees that Panasonic shall not be responsible for any loss or damage due to defective Product, including, but not limited to, economic loss, bodily injury or property damage, as far as Customer utilizes the Product for any purpose other than the Purpose defined in the above paragraph 8-1. Therefore, Customer shall ensure the "fail-safe" design of the System, if it deems necessary, to mitigate any such loss or damage.