

MEMS Gyro Sensors for Consumers 2 shafts in a package, SMD type

Discontinued

Type: EWTS9P□□□□



This sensor is an SMD-type two-axis integrated gyro sensors for consumer products. The ultra-miniature body is achieved by integrating two MEMS silicon tuning forks on which a piezoelectric thin film is directly formed, a bare IC chip, and other components into a single ceramic package. In addition to analog output as a replacement for the existing model, digital output is also available with this series. Therefore, this series is ideal for image stabilizers of DSCs and DVCs.

Features

- 2 shafts in a package, SMD type
- Compact, Low-height 4.6 mm×3.8 mm×0.9 mm (T)
- Capable of both analog and digital output
- RoHS compliant

Recommended Applications

- For image stabilizers (DSCs, DVCs, and Cellular phones)

Ratings

Operating Voltage Range	2.7 to 3.3 V
Rated Voltage	3 V
Absolute max. Rating	4.4 V
Storage Temperature Range	-40 °C to +85 °C
Operating Temperature Range	-10 °C to +75 °C
Operating Humidity Range	35 to 85 %RH

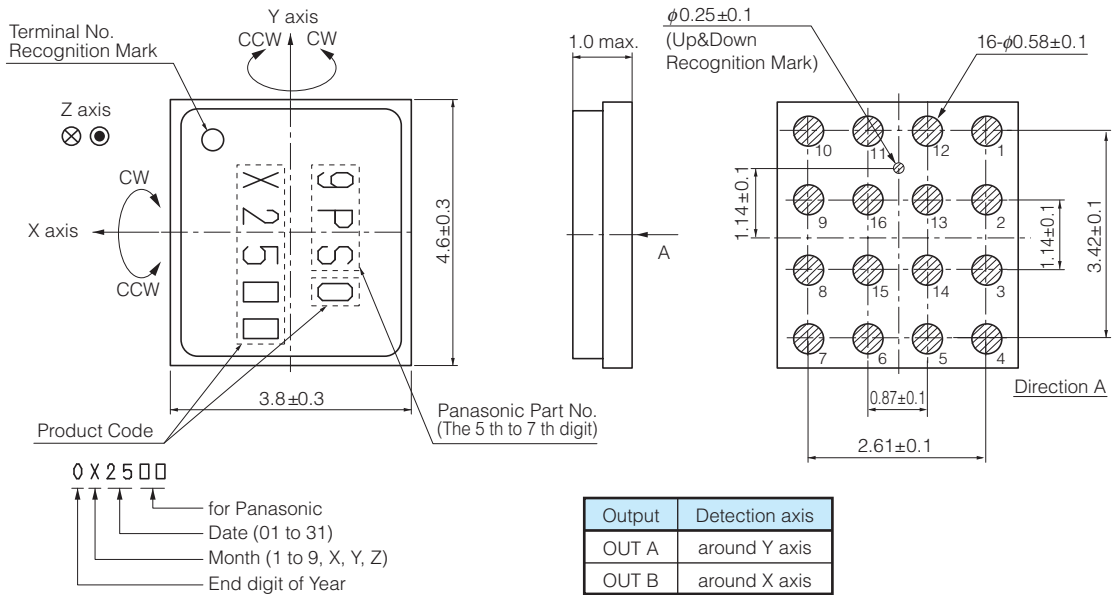
Electrical Characteristics

Type	EWTS9P Series (Analog Output)	EWTS9P Series (Digital Output)
Dynamic Range	±300 °/s	±300 °/s
Current Consumption	8 mA max.	9 mA max.
Sleep Mode Current Consumption ⁽¹⁾	1 mA max.	1 mA max.
Zero Point Voltage : Outa/b	0.95±0.1 V	32768±4000 LSB
Reference Voltage : Vref	0.95±0.05 V	-
Output Voltage Range	0.05 to 1.85 V	11500 to 54000 LSB
Sensitivity	2 mV/(°·s ⁻¹)±5 %	50 LSB/(°·s ⁻¹)±5 %
Sensitivity Drift	±4 %	±4 %

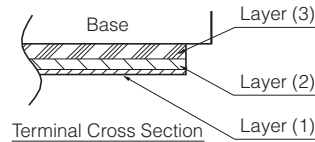
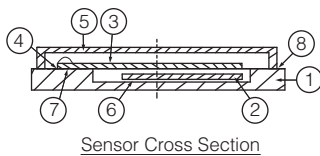
(1)Current consumption in sleep mode : Current consumption in standby mode when the SL terminal is set to H.

Dimensions in mm (not to scale)

EWTS9P Series



Terminal No.	Character	Function	Analog output mode spec	Digital output mode spec
1	Vcc	Power supply for analog block	3 V±0.3 V	3 V±0.3 V
2	GND1	Ground	Connect to ground (0V)	Connect to analog ground (0V)
3	V1	Internal reference voltage	Connect to GND through capacitor (0.1 μF)	Connect to analog GND through capacitor (0.1 μF)
4	GND2	Ground	Connect to ground (0V)	Connect to analog ground (0V)
5	Vref/COSR	Reference voltage/Capacitor for oscillator	Connet to external amp cicuit	Connect to analog ground (0V)
6	GND3	Ground	Connect to ground (0V)	Connect to analog ground (0V)
7	Vdd	Power supply for digital interface	3 V±0.3 V	3V $\pm 0.6V$
8	CSB	Chip Select (for Digital output mode)	NC or Vdd	Chip Select
9	SCLK	Serial Clock (for Digital output mode)	NC or Vdd	Serial Clock
10	MISO/OUT A	Serial Data Output (Master In Slave Out for Digital output mode) / Output A (for Analog output mode)	Out A output	Serial Data Output (Master In Slave Out)
11	MOSI/OUT B	Serial Data Input (Master Out Slave In for Digital output mode) / Output B (for Analog output mode)	Out B output	Serial Data Input (Master Out Slave In)
12	SL	Control terminal of sleep mode (for Analog output mode)	Sleep mode : min.2.5 V (to Vcc+0.3) Normal mode : Open or max. 0.5 V	NC
13	OUT MODE	Control terminal that select Analog output mode or Digital output mode	Analog output mode : min. 2.6 V	Digital output mode : max. 0.4 V
14	Vreg A	Regulator for analog block	Connect to GND through capacitor (0.1 μF)	Connect to analog GND through capacitor (0.1 μF)
15	NC	The terminal for internal adjustment Those with pull down resistance	Connect to ground (0V)	Connect to analog ground (0V)
16	Vreg D	Regulator for digital block	Connect to GND through capacitor (0.1 μF)	Connect to digital GND through capacitor (0.1 μF)



No.	Name	Number	Material
1	Base	1	90 alumina
2	IC	1	Silicon
3	Tuning fork	2	PZT on silicon
4	Au wire	12	Au
5	Cap	1	90 alumina
6	Underfill	-	Epoxy resin
7	T.F. glue	-	Epoxy resin
8	Cap glue	-	Epoxy resin

Name	Material
Layer(1)	Au plating (0.2 to 0.6 μm)
Layer(2)	Ni plating (1 to 10 μm)
Layer(3)	W pattern

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⚠ Safety Precautions (MEMS Gyro Sensors for Consumers/EWTS9P)**1. Soldering**

- (1) Thickness of Solder Paste(Recommendation) : 0.10 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 under 260 °C, Soldering time of the Maximum temperature within 10 s
- (5) Atmospheric Temperature : The atmospheric temperature should be under 300 °C
- (6) Number of times it can be Reflow Soldered : 2 time as the limit
- (7) Hand soldering : Do not apply Hand soldering or correction of soldering

2. Washing

Since this sensor package is not sealed, do not apply any flux washing.
And at the set assembly process, please do not let oil etc. adhered because it may interfere with the sensor behavior.

3. Handling

- (1) Handle with care. Do not drop or apply any strong impact to the sensor as it may degrade some performances.
- (2) Static Electricity
Since CMOS IC is used, there is a possibility of static electricity destruction. Handle with care against static electricity.
- (3) Storage under the following condition should be avoided as it degrades the performance and solderability.
 - a) Relative humidity more than 85 %, or outside of storage temp. range.
 - b) Exposure to the direct rays of the sun.
 - c) Atmospheres of corrosive gas (Cl₂, H₂S, NH₃, NO_x, SO₂ etc.)
 - d) Long term storage of over 3 months after delivery
Do not store the package under severe load and stress..

4. Recommendation item on the circuit composition

- (1) Place a chip capacitor (0.01 μF to 0.1 μF) near Vdd terminal across GND.
- (2) Load of terminal OUTa and OUTb.
Load Resistor (OUTa & OUTb to GND) : 100 kΩ min. or none.
Load Capacitor (OUTa & OUTb to GND with series resistor 1kΩ) : 0.01 μF max.
- (3) When the sensor signal goes to an A/D converter, use the same 3 V power supply both for the sensor and for A/D converter.
- (4) Misconnection
As misconnection causes a failure, do not reuse the sensor if once misconnected.

5. Caution of sensor layout

- (1) Do not locate the sensor close to heat radiating objects such as power transistors. Since the sensor has a little temp. drift by surrounding condition, carefully consider the location of the sensor.
- (2) Do not locate two or more sensors on the same PWB because periodical drift of zero point output may occur due to mutual interference by the vibration of each tuning fork of the sensor.

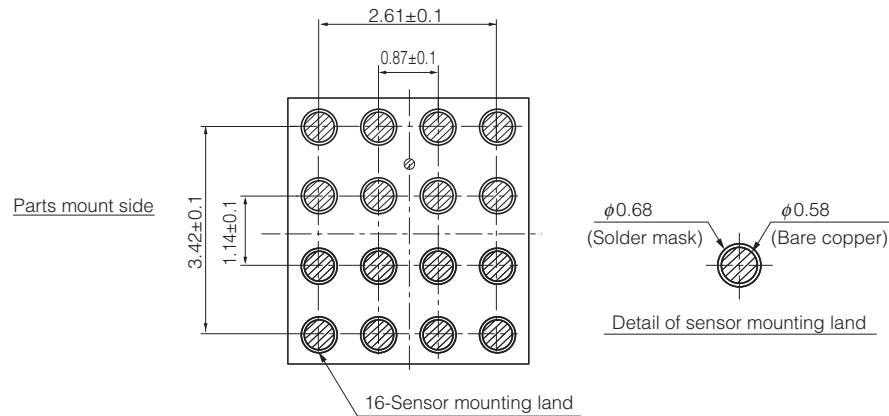
6. Caution of vibration from outside

To prevent the PWB's (mounted sensor) from resonating with external vibration, please follow the instructions below when designing PWB.

- (1) Rigid glass epoxy circuit board is recommended. Locate the sensor near the screws which fix the circuit board.
- (2) Place parts to avoid possible contacts with the sensor by external vibrations.
- (3) Since the tuning fork may be damaged by the impact of cutting a mother board or a router, please check carefully.
- (4) This sensor has oscillators (tuning forks), which have some resonant frequencies. Since the sensor may cause a malfunction by incoming frequencies similar to the sensor (41 kHz to 46 kHz), carefully check frequencies and locations of DC/DC converters.
- (5) Avoid screw loose of the circuit board.
- (6) Conduct vibration tests and carefully check the condition of sensor when attached to the system. If the location of the sensor is far from the screws of the circuit board, or the screws become loose, vibrations and temperature change may degrade the performance.

7. Recommended pattern design

See the following recommended pattern design. (mm)



8. Limited Warranty

- (1) Customer acknowledges that the Gyro Sensors ("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 Digital Still Camera and Digital Video Camera system (hereinafter called "Purpose"). Accordingly, Customer understands that Panasonic or its affiliates, shall only guarantee the performance of the Product under this Product Specification for Information (this "Specification") 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.
- (3) 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 (1).