



Messrs.:

Specification No. JEN06C-241

SHENZHEN QILIN INDUSTRY CO., LTD.

## Product Specification

Issued Date: 7 JAN., 2011.

Part Description: Angular velocity sensor

Customer Part No.:

MURATA Part No.: ENC-03RC-10-R

### Acknowledgement of reception

We have received the attached specification

Date:

Company:

Dept.:

Representative

Received by

Sales office

Technical Dept.

Prepared by

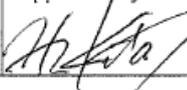
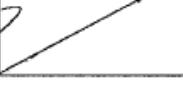
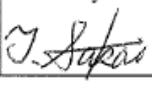
T.SAKAI

Representative

H.KITA

Products Engineering Sec.2  
Sensor Products Department  
Sensor Products Division

MURATA MFG. CO., LTD.

<b>GYROSTAR® SPECIFICATION</b>				
	PRODUCT ENGINEERING SECTION SENSOR PRODUCTS DEPARTMENT SENSOR PRODUCTS DIVISION	Approved by 	Confirmed by 	Issued by 

1. Scope

This product specification is applied to angular velocity sensor used for radio control air plane.  
Please contact us when using this product for any other applications than described in the above.

2. Part number

Customer Part No,	Murata Part No,	Notes
	ENC-03RC-10-R	fc : 30.8kHz type



ENC-03RC-10-R: "-10" indicates the improvement type of static output temperature drift.

3. Structurally characteristics

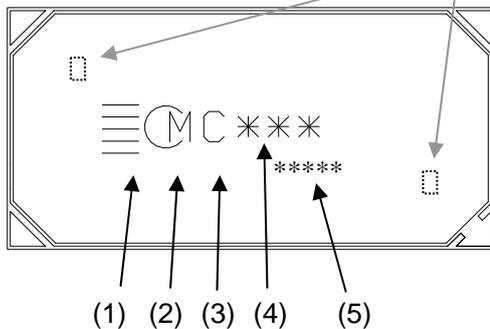
- 3-1 External dimensions: Shown in Fig.1 at page 12
- 3-2 Weight: 0.2g max.
- 3-3 Materials

Metal cap	Nickel silver
Base	Glass Epoxy Base
Terminals	Au plated
Adhesive	Electrically conductive adhesive
	Epoxy resin

3-4 Output of sensor by direction of rotation: Shown in Fig.2 at page 13

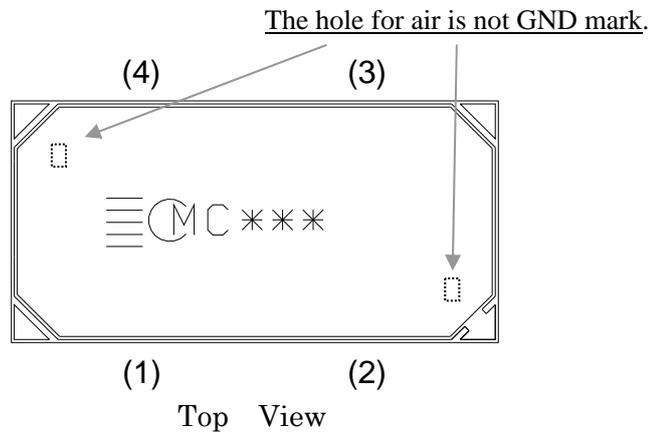
3-5 Indication

\* There is a hole for air vent at upper left or lower right corner of the cap.  
This is not 1pin mark



- (1) Direction mark
- (2) Manufacturing company
- (3) Model name  
ENC-03RC type
- (4) Lot number
- (5) Lot management number  
It is shown 5 alphanumeric characters.

4. Terminals



Terminal	Symbol	Descriptions
(1)	Vref	Reference voltage
(2)	GND	Ground
(3)	+Vcc	Supply voltage
(4)	OUT	Sensor output

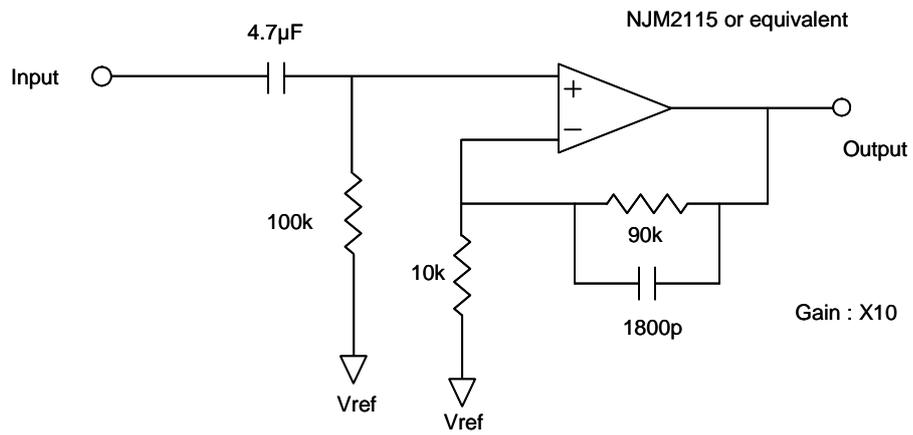
5. Maximum ratings (unless otherwise specified, ambient temp. = +25°C)

Items	Symbols	Conditions	Max ratings	Units
Supply voltage	Vcc max		+7.0	VDC
Max. current consumption	I <sub>sup</sub> max	at Vcc = +3.0V	3.0	mA
Operating temp. range	T <sub>opr</sub>		-5~+75°C	°C
Storage temp. range	T <sub>stg</sub>		-30~+85°C	°C

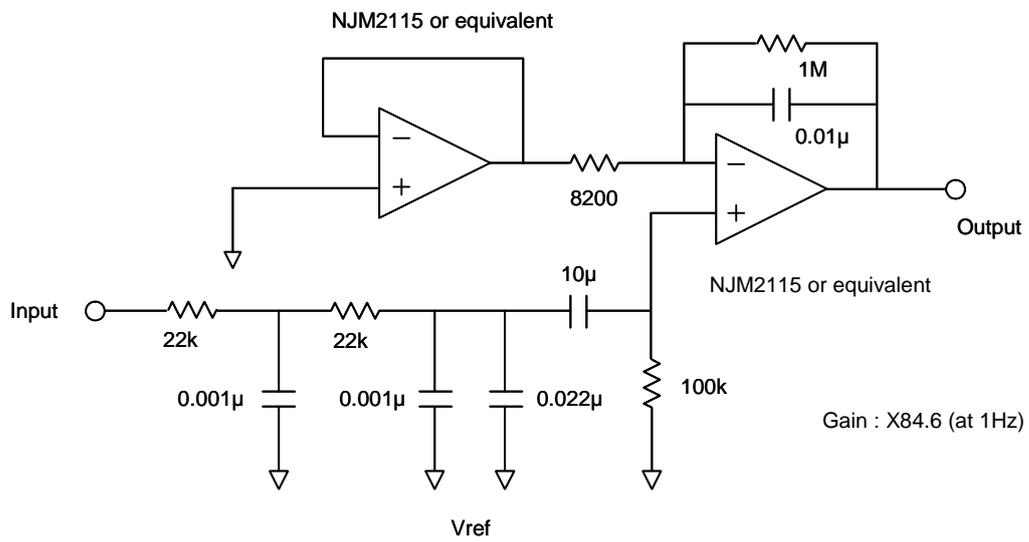


7 Measurement circuit

7-1



7-2



8. Reliability test

8-1 Test conditions

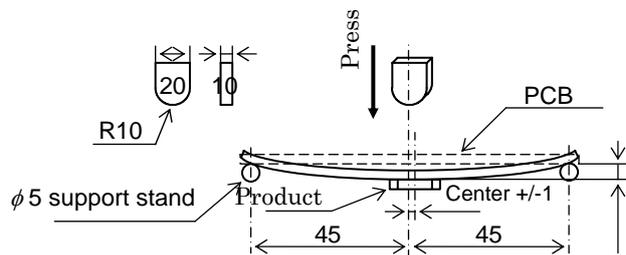
Ambient temp.= $25 \pm 3^{\circ}\text{C}$ , relative humidity =  $65 \pm 5\% \text{RH}$

8-2 Mechanical test

8-2-1 Bend Strength PCB

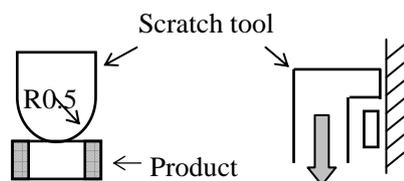
The sensor is soldered onto the center of PCB which is laid on the 2 small supporters spaced 90 mm. PCB is deflected to 3 mm below from horizontal level by the pressing force with  $20 \times 10$ . R10 stick at the speed of 0.5mm per second. The state is maintained for 3 seconds. After the above, there should be no visible damage and the measured values shall be met Table 1.

Stick



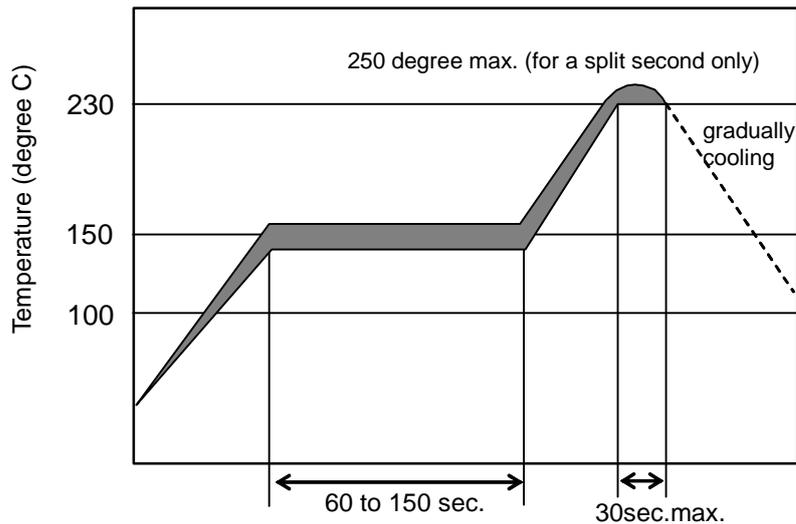
8-2-2 Share Strength

The sensor is soldered onto the PCB. As shown in the figure below, the force is 20N added with R0.5 scratch tool. The state is maintained for 10 seconds. After the above, there should be no visible damage and the measured values shall be met Table 1.



### 8-2-3 Reflow soldering condition

Following figure shows temperature profile when reflow soldering. Maximum temperature is 250 degree. It can be applied up to 2 times of reflow soldering. But the second time reflow is soldered after returning to room temperature. Then stored at room condition for minimum 24 hours, after the above, there should be no visible damage and the measured values shall be met Table2.



### Hand soldering condition:

The solder (JIS Z 3282) and the solder gauntlet (350deg) are used.

Max time to touch should be two seconds.

### 8-2-4 Shock test

Shock is applied to the samples with  $4900\text{m/s}^2$  (500G) MAX., 1ms., half sine wave for 6 directions of  $\pm X$ ,  $\pm Y$ ,  $\pm Z$  each axis. After the above, there should be no visible damage and the measured values shall be met Table 2.

### 8-2-5 Vibration test (Sweeping vibration endurance test )

Samples are tested under the following test conditions. After the above, there should be no visible damage and the measured values shall be met Table 2.

- Frequency : 10 to 55Hz
- Direction : X,Y,Z
- Vibration amplitude: 1.5mmp-p
- Sweeping period : 1min.
- Testing time : 2 hours each directions

8-3 Environment test

8-3-1 High temperature exposure test

Samples are kept in  $+85 \pm 2^{\circ}\text{C}$  chamber for 500 hours. Then stored at room condition for minimum 24 hours. After the above, there should be no visible damage and the measured values shall be met Table2.

8-3-2 Low temperature exposure test

Samples are kept in  $-40 \pm 4^{\circ}\text{C}$  chamber for 500 hours. Then stored at room condition for minimum 24 hours. After the above, there should be no visible damage and the measured values shall be met Table2.

8-3-3 High temperature and high humid operation test

Samples are kept in  $60 \pm 2^{\circ}\text{C}, 90$  to 95% RH chamber for 500 hours. Applied voltage must be regulated. Then stored at room condition for minimum 24 hours. After the above, there should be no visible damage and the measured values shall be met Table2.

8-3-4 Heat shock test

Samples are subjected to 24 heat cycles as shown in Table1. Then stored at room condition for minimum 24 hours. After the above, there should be no visible damage and the measured values shall be met Table2.

Table1: Heat shock test condition

Step	Temperature	Time
1	$-40 \pm 3^{\circ}\text{C}$	30 min.
2	Room temp.	5s. Max.
3	$+85 \pm 2^{\circ}\text{C}$	30min.
4	Room temp.	5s. Max.

Table2: Judgement criteria of reliability test

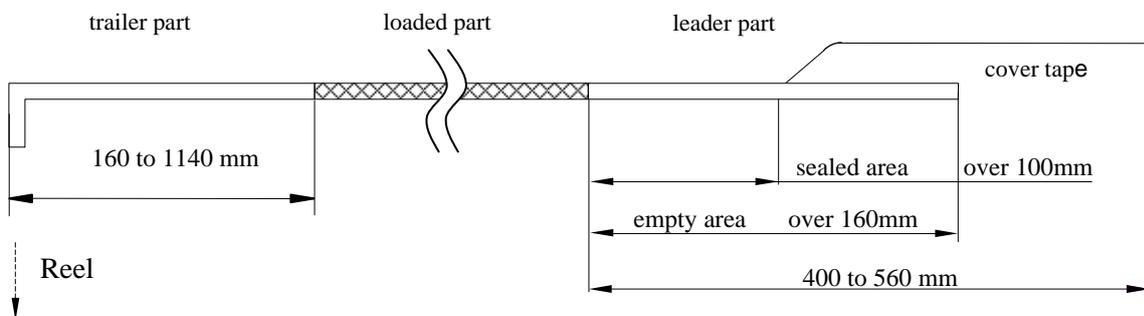
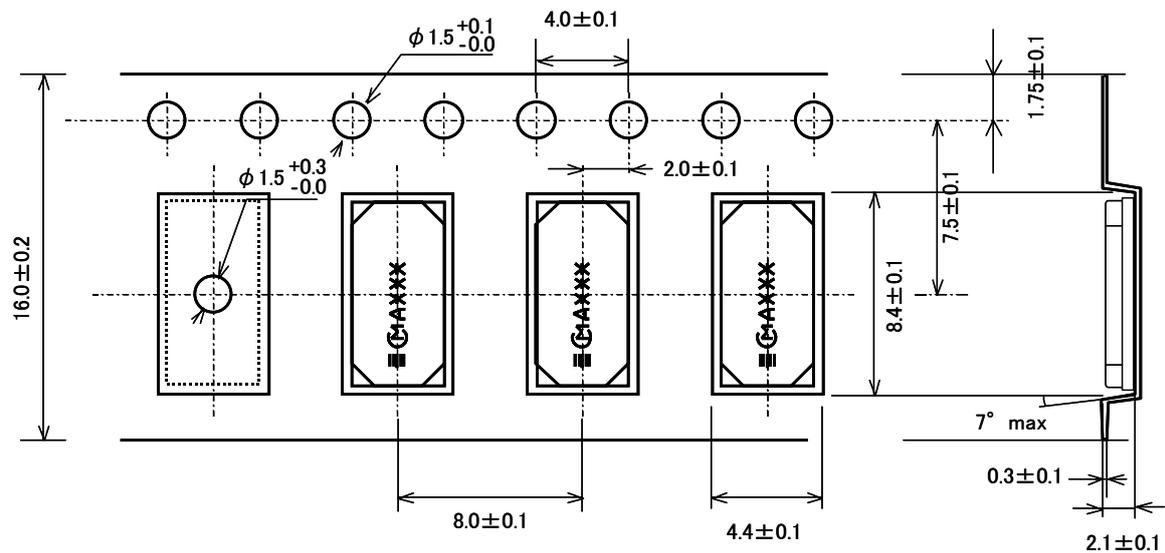
Items	Judgment criteria
Scale factor	Initial $\pm 10\%$ MAX.
Null output	Initial $\pm 0.27\text{V}$ MAX.

9. Packing Style

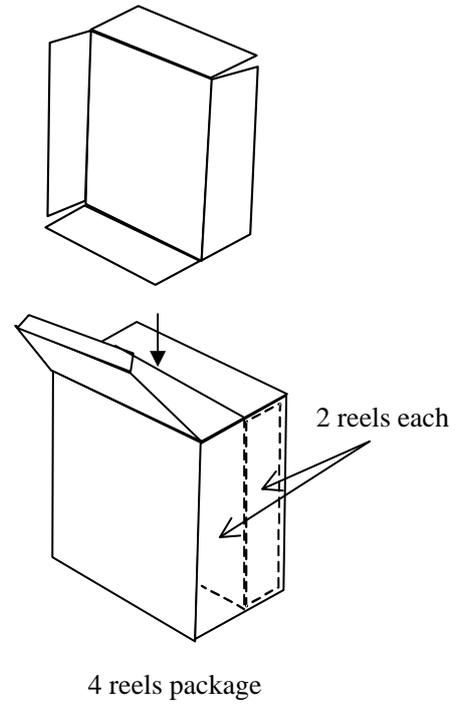
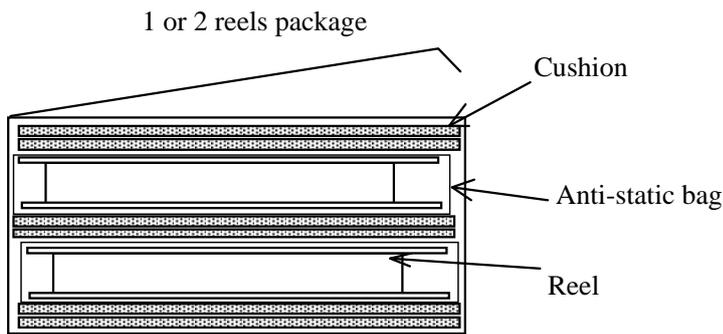
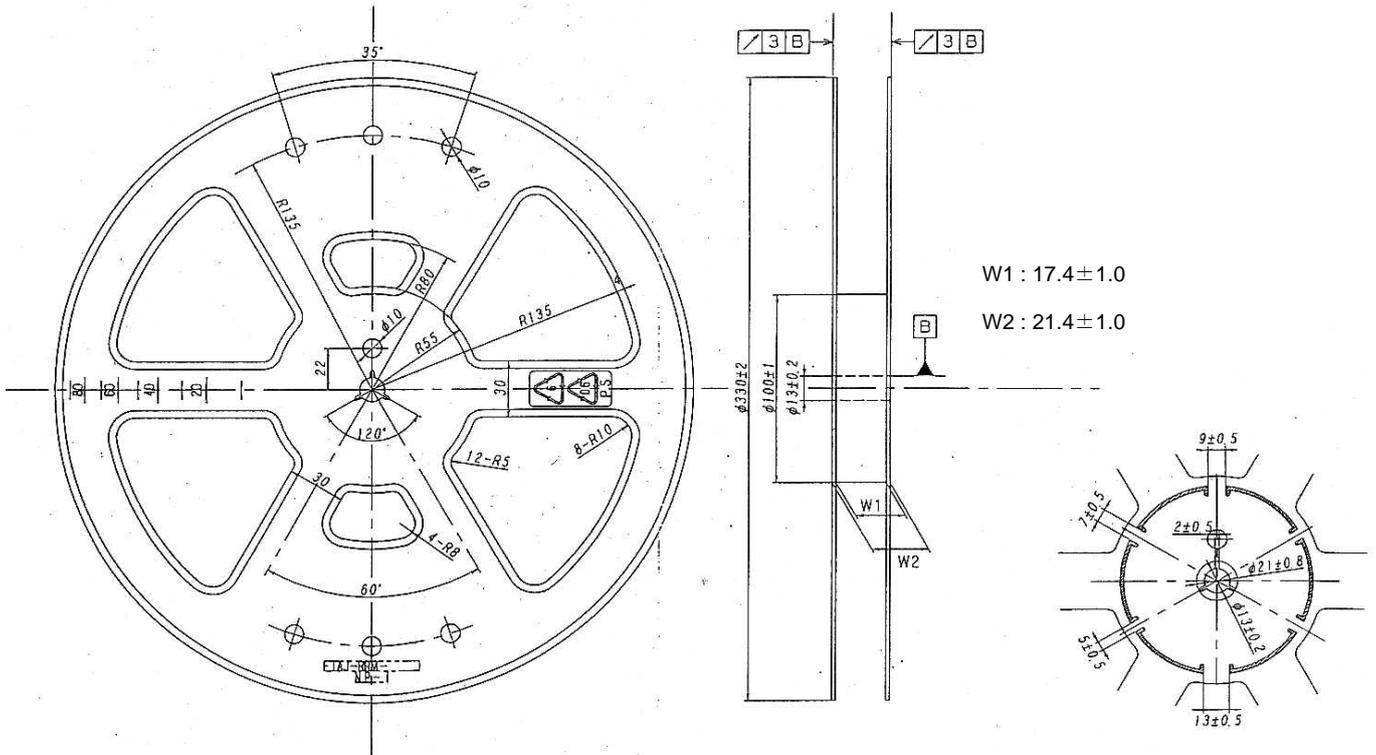
9-1 Package

		Style A	Style B	Style C
		2000pcs 1 REEL	4000pcs 2REEL	8000pcs 4REEL
Cardboard box	4reels	—	—	1
	2reels	—	1	—
	1reel	1	—	—
Cardboard screen		—	—	1
Label		1	1	1
Cushion		8	12	24
Anti-static bag		1	2	4

9-2 Emboss tape



9-3 Reel



CAUTION

- 1) Incorrect handling may affect the sensor characteristics. Please note the following precautions:
  - A. Do not subject the sensor to shock or vibration which exceed the rated limit.
  - B. Do not install or store the sensor in a location where condensation is likely to form on it.
  - C. Do not install or store the sensor in a location where water may splash directly on it.
  - D. Do not install or store the sensor in a location in which it is likely to be exposed to salt water or corrosive vapor.
- 2) Precision electronic parts, such as ICs, are used for the sensor; therefore, it is necessary to take anti-electrostatic precautions when handling.
- 3) Do not wash the sensor, as it is not water-resistant.
- 4) Do not mount the sensor on electric circuit line arranged on the circuit board, because the sensor has electric circuit on their back.
- 5) Do not touch the terminal directly with hand.
- 6) Do not disassemble.
- 7) Do not use or store the products in a corrosive atmosphere, especially where chloride gas, sulfide gas, acid, alkali, salt or the like are present. And avoid exposure to moisture. Store the products where the temperature and relative humidity do not exceed -10 to 40 degrees centigrade and 15 to 85%. Use the products within 6 months.
- 8) Please take care that the interference between the resonance frequency of gyro (30~33kHz) and the any other signal.

 Limitation of Applications

- 1) Please contact us before using our products for the applications listed below which require especially high reliability for the prevention of defects which might directly cause damage to the third party's life, body or property.
  - (1) Aircraft equipment (2) Aerospace equipment (3) Undersea equipment
  - (4) Medical equipment (5) Transportation equipment (automobiles, trains, ships, etc)
  - (6) Traffic signal equipment (7) Disaster prevention / crime prevention equipment
  - (8) Data-processing equipment (9) Applications of similar complexity or with reliability requirements to the applications listed in the above.
- 2) Be sure to provide an appropriate fail-safe function on your product to prevent a second damage that may be caused by the abnormal function or the failure of our product.

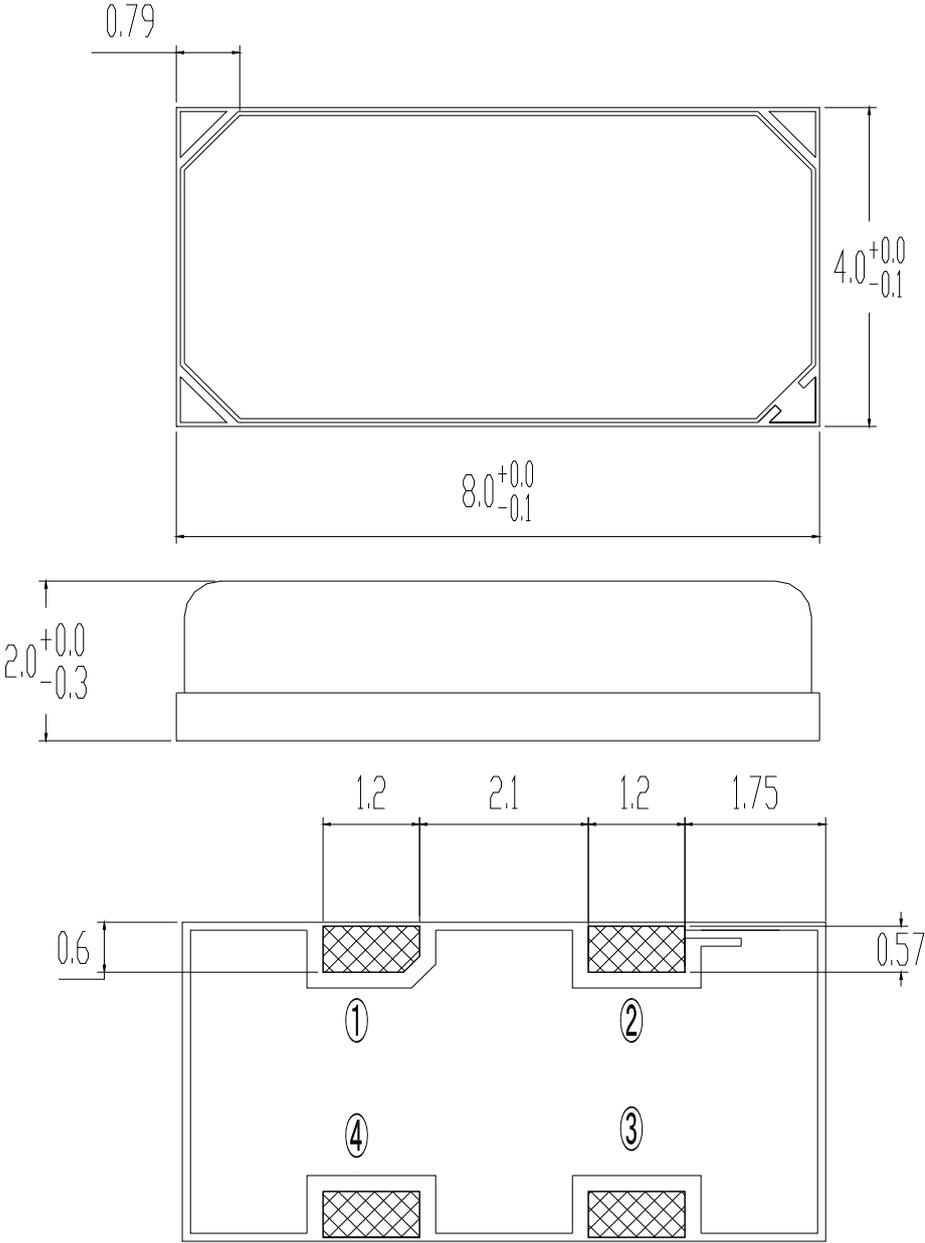
 Note

1. Please make sure that your product has been evaluated and confirmed against your specifications when our product is mounted to your product.
2. All the items and parameters in this product specification have been prescribed on the premise that our product is used for the purpose, under the condition and in the environment agreed upon between you and us. You are requested not to use our product deviating from such agreement.
3. Please return one duplicate of this product specification to us with your receipt signature. If the duplicate is not returned by 3 months after our submission, this product specification will be deemed to have been received by you.
4. We consider it not appropriate to include other terms and conditions for transaction warranty in product specifications, drawings or other technical documents. Therefore, if your technical documents as above include such terms and conditions as warranty clause, product liability clause, or intellectual property infringement liability clause, we will not be able to accept such terms and conditions unless they are based on the governmental regulation or they are stated in a separate contract agreement.

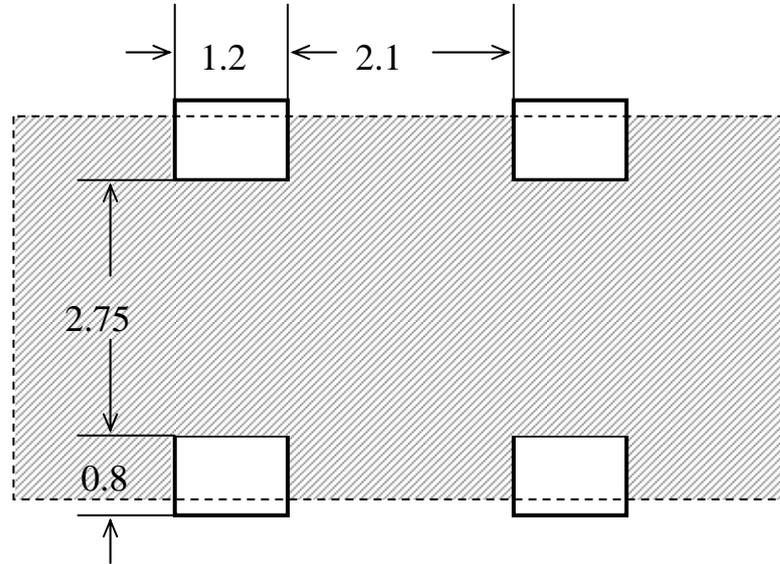
Fig.1 Dimension

All dimensions are in "mm"

With no assignment, measurement tolerance = +/-0.2mm



Standard round pattern



Please escape drawing pattern on slash area.

Fig.2 Output by direction of rotation

