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CUSTOMER : \_\_\_\_\_



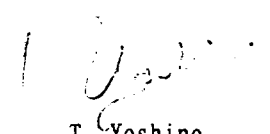
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## SPECIFICATION FOR SAW RESONATOR

MODEL NAME : SAR433. 92MDA10X250

REFERENCE ONLY

KANAZAWA MURATA MFG. CO., LTD.

Approved by	Issued by	Drawn by	Issue Date	Drawing No.
 K. Masaie	 S. Heguri	 T. Yoshino	Apr. 17, 1998	JESA90-0264

1. SCOPE

This specification is applied to the 400MHz range SAW resonator : SAR433.92MDA10X250.

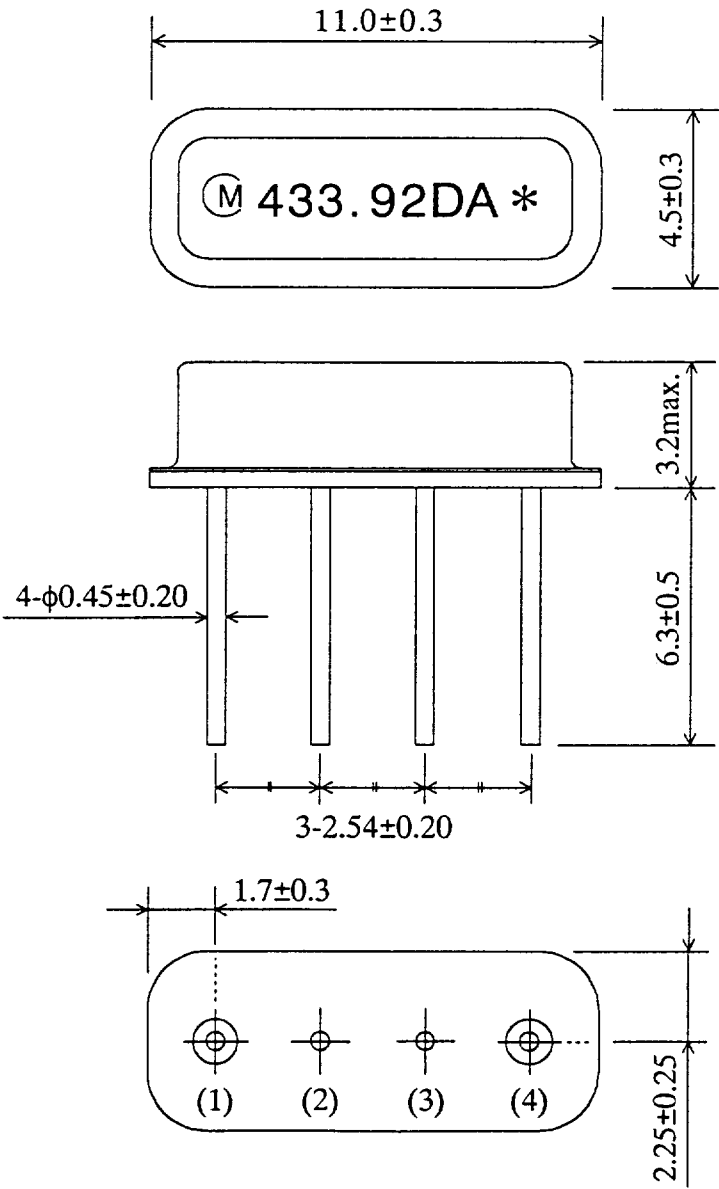
2. CUSTOMER NUMBER

Customer's Part No.		Customer's Drawing No.	
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3. MURATA PART NUMBER

SAR433.92MDA10X250	: BULK PACKING
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4. DIMENSIONS



\* : EIAJ Code

- (1) : Input (Output)
- (4) : Output (Input)
- Others : Ground

Unit : mm

## 5. MAXIMUM RATINGS

5.1	Withstanding Voltage for a moment between each Terminal	Maximum Rating 10V D. C. (Insulation Resistance 100MΩ min., 25 ± 2°C)
5.2	D. C. Voltage between each Terminal	Maximum Rating 3V D. C. (25 ± 2°C)
5.3	A. C. Voltage between each Terminal	10V p-p
5.4	RF Input Voltage	7V p-p
5.5	Operating Temperature Range	-10°C ... + 60°C
5.6	Storage Temperature Range	-40°C ... + 85°C

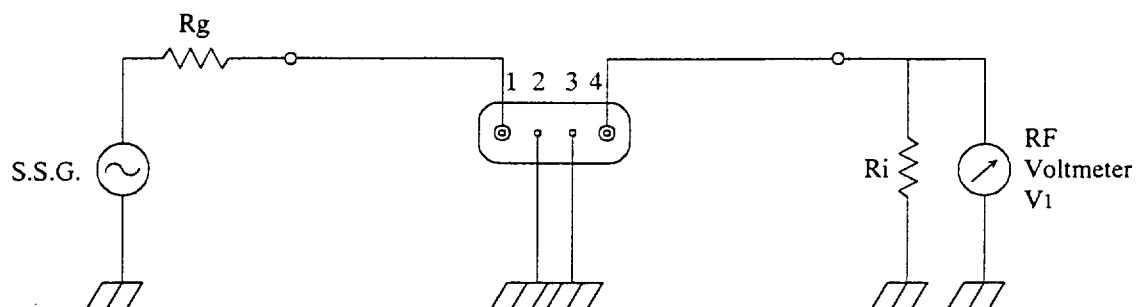
## 6. ELECTRICAL CHARACTERISTICS (25 ± 2°C)

	Item	Specifications
6-1	Center Frequency (at peak point)	433.920 ± 0.250 MHz
6-2	Insertion Loss (at peak point)	8 dB max.
6-3	Spurious Response (from peak point) [ within $f_c - 1.5$ MHz ... $f_c - 0.5$ MHz ]	8 dB min.
6-4	Input/Output Capacitance at 1 MHz	1.65 ± 0.5 pF

\* Unless otherwise specified, all tests shall be carried out under the standard atmospheric conditions  
[ Temperature : 5 ... 35°C, Humidity : 45 ... 85% ]

Test Circuit

(a) Measurement Circuit

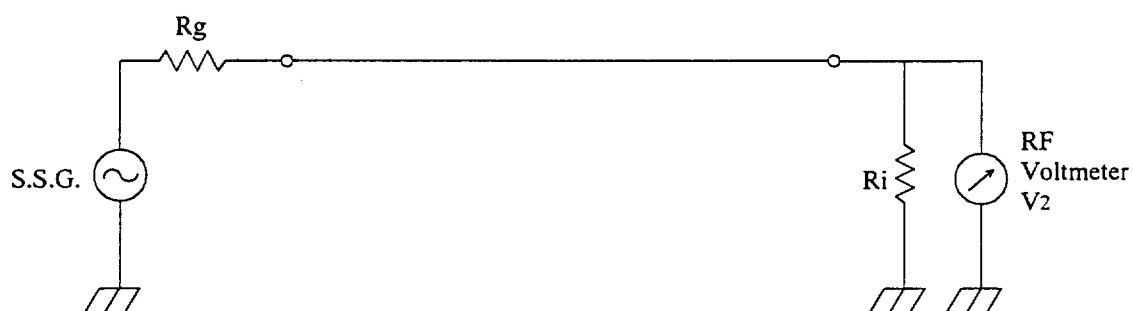


(1) : Input (Output)

(4) : Output (Input)

Others : Ground

(b) 0 dB Level

 $R_g$  :  $50\Omega$  (Internal resistance of S.S.G.) $R_i$  :  $50\Omega$  (Input impedance of network analyzer or spectrum analyzer)Insertion Loss =  $20 \log (V_2 / V_1)$  [ dB ] $V_1$  : Output voltage of Test Circuit (a) $V_2$  : Output voltage of Test Circuit (b)

## 7. PHYSICAL AND ENVIRONMENTAL CHARACTERISTICS

	Test Item	Condition of Test	Requirements
7-1	Lead Strength Lead Bending	A force of 1.0Kg shall be applied to each terminal in the direction of the axis of terminal for $30 \pm 5$ seconds. This component is inserted onto PCB which has 1mm thickness then a force of 250gf is applied to each lead in axial direction. The lead shall be bent 90 degree to one direction, then in opposite direction and returned to the original position	No visible damage and the measured values shall meet Item 6.
7-2	Vibration	This component shall be measured after being applied vibration of amplitude of 1.5mm with 10 to 55 Hz of vibration frequency to each of 3 perpendicular directions for 1 hour.	The measured values shall meet Item 6.
7-3	Shock	This component shall be measured after a dropping to each of 6 perpendicular directions from height of 75cm onto wooden plate. This component shall be with housing (around 100g).	
7-4	Solderability	Lead terminals are immersed in methanol with 7 to 10% of rosin flux for about 5 seconds, then immersed in soldering bath at $230 \pm 5^\circ\text{C}$ or $5 \pm 0.5$ seconds. ROSIN : JIS-K-5902 METHANOL : JIS-K-1501 SOLDER : JIS-Z-3282, H63A or H60A	75%min. of the immersed surface shall be covered with solder.
7-5	Resistance to Soldering Heat	Lead terminals are immersed up to 1.5mm from package base in soldering bath of $260 \pm 5^\circ\text{C}$ for $10 \pm 1$ seconds, and then this component shall be measured after being placed in natural condition for 1 hour.	The measured values shall meet Item 6.
7-6	Temperature Characteristics	This component shall be measured within $-10^\circ\text{C} \dots +60^\circ\text{C}$ temperature range.	The measured values shall meet Table 1.
7-7	Humidity	This component shall be measured after being placed in a chamber with 90... 95% R.H. at $40^\circ\text{C}$ for 100 hours and then being placed in natural condition for 2 hours.	
7-8	Life Test (High Temperature)	This component shall be measured after being placed in a chamber with $85^\circ\text{C}$ for 100 hours and then being placed in natural condition for 2 hours.	
7-9	Life Test (Low Temperature)	This component shall be measured after being placed in a chamber with $-30^\circ\text{C}$ for 100 hours and then being placed in natural condition for 2 hours.	
7-10	Thermal shock	After temperature cycling of $-55^\circ\text{C}$ for 30 minutes to $+85^\circ\text{C}$ for 30 minutes was performed 5 times, this component shall be returned to room temperature. And this component shall be measured after being placed in natural condition for 2 hours.	

Item	Specifications
Center Frequency (at peak point)	$433.920 \pm 0.310$ MHz
Insertion Loss (at peak point)	9 dB max.
Spurious Response (from peak point) [ within $f_c - 1.5$ MHz ... $f_c - 0.5$ MHz ]	8 dB min.
Input/Output Capacitance at 1 MHz	$1.65 \pm 0.5$ pF

Table 1.

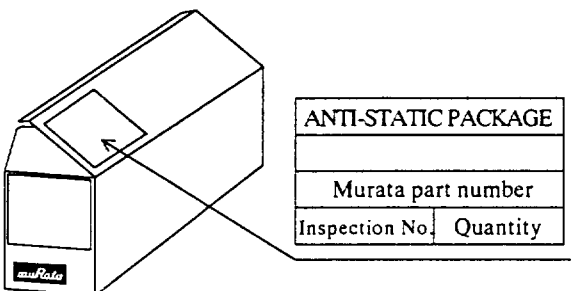
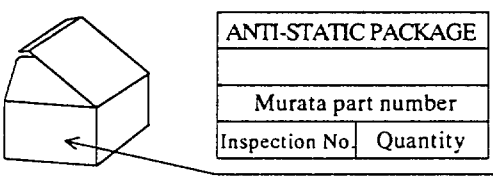
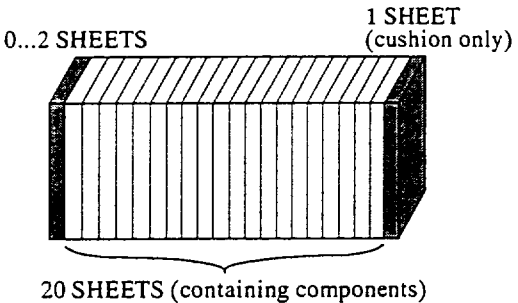
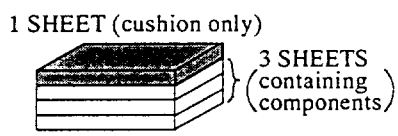
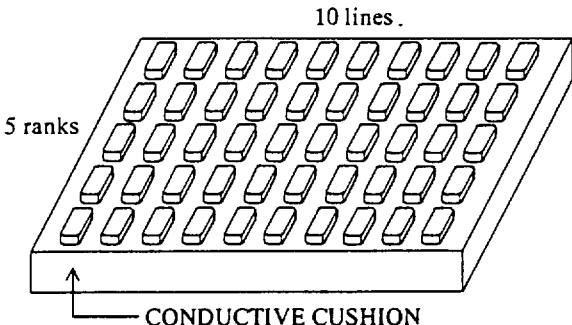
## 8. PACKING

## 8.1 Indication on packing box

Part number, quantity and inspection number are indicated on each minimum packing unit.

## 8.2 Packing and transportation

This component is packed as the following figure to protect from the damage by temperature, humidity, mechanical shock, vibration and so on.

QUANTITY : less than 1000 pcs	QUANTITY : less than 150 pcs
<p>[ EXTERIOR ]</p>  <p>No.5 THOMSON BOX (80 × 245 × 105mm)</p>	<p>[ EXTERIOR ]</p>  <p>No.1 THOMSON BOX (75 × 105 × 50mm)</p>
<p>[ INTERIOR ]</p>  <p>0...2 SHEETS</p> <p>1 SHEET (cushion only)</p> <p>20 SHEETS (containing components)</p> <p>Conductive cushions are used 21 sheets minimum. When quantity of component is small, We use more cushion without component than above figure.</p>	<p>[ INTERIOR ]</p>  <p>1 SHEET (cushion only)</p> <p>3 SHEETS (containing components)</p> <p>Conductive cushions are used 4 sheets max. When quantity of component is small, We use more cushion without component than above figure.</p>
<p>(PACKING COMPONENTS ON CUSHION)</p>  <p>10 lines.</p> <p>5 ranks</p> <p>CONDUCTIVE CUSHION</p> <p>50 pcs max. per 1 cushion.</p>	

## 9. Notice

## 9.1 USAGE CONDITIONS

- 1) Use this component within operating temperature range. It might not be satisfied with electrical specification without operating temperature range. When it is used less than  $-40^{\circ}\text{C}$  or more than  $+85^{\circ}\text{C}$ , it might be a cause of degradation or destruction of the component. Even if it endures during a short time, it causes degradation of qualification.
- 2) This component designed for use of electrical equipment in the standard environment (temperature, humidity, atmospheric pressure and so on). As it causes degradation of characteristics and qualification, do not use in the following environments.
  - Ambient air containing corrosive gas ( $\text{Cl}_2$ ,  $\text{H}_2\text{S}$ ,  $\text{NH}_3$ ,  $\text{SO}_x$ ,  $\text{NO}_x$ , etc.)
  - Ambient air containing volatile or combustible gas
  - In dusty place
  - In the places where the water splashes and it tends to condense for high humid.
  - In direct sunlight
  - In the places under the strong influence of static electricity or electric field strengthContact the manufacturer before using the component in any of the above environments.
- 3) This component can not use in liquid (water, oil, chemical solution, organic solvents, etc.).
- 4) Apply electrical power less than specified in the drawing. When it is used more than rating power greater than specified in the drawing, it might be a cause of degradation or destruction of the component. Even if it endures during a short time, it causes degradation of qualification.
- 5) As outer coating of this component is not for insulation, do not contact with other components.

## 9.2 STORAGE CONDITIONS

- 1) Store in manufacturer's package or tightly reclosed box with the following conditions.

Temperature :  $-10^{\circ}\text{C}$  ...  $+40^{\circ}\text{C}$   
Humidity : 30 ... 85%RH

As more than 6 months storage might be a cause of degradation of solderability, confirm solderability before using this component. Notice that long-term storage might be a cause of the discoloration.
- 2) To keep solderability of outer-electrode, do not store in the following environments.
  - Ambient air containing corrosive gas ( $\text{Cl}_2$ ,  $\text{H}_2\text{S}$ ,  $\text{NH}_3$ ,  $\text{SO}_x$ ,  $\text{NO}_x$ , etc.)
  - Ambient air containing volatile or combustible gas
  - In dusty place
  - In the places where the water splashes and it tends to condense for high humid.
  - In direct sunlight
  - In the places under the strong influence of static electricity or electric field strengthContact the manufacturer before using the component in any of the above environments.
- 3) Do not open minimum packing unit until usage.

### 9.3 SOLDERING CONDITIONS

1) Solder on the following standard condition. Contact the manufacturer before soldering this component on the different standard condition. It might be a cause of destruction on some conditions.

1. soldering with soldering iron

- temperature at the tip of the soldering iron :  $260^{\circ}\text{C} \pm 10^{\circ}\text{C}$
- time of soldering : 3 seconds max.
- diameter at the tip of the soldering iron :  $\phi$  3mm max.
- power of soldering iron : 30W max.

2. flow soldering

- Solder on the specification of Resistance to Soldering Heat in this drawing.

2) In the case of soldering to the stem with soldering iron, solder to 1 corner only on the following standard soldering condition.

- temperature at the tip of the soldering iron :  $350^{\circ}\text{C} \pm 10^{\circ}\text{C}$
- time of soldering : 5 seconds max.
- diameter at the tip of the soldering iron :  $\phi$  3mm max.
- power of soldering iron : 30W max.

3) Use rosin flux. Do not use strong acidity flux (more than 0.2wt% chlorine content).

4) Use H63A eutectic solder or H50A solder.

5) Solder with soldering iron or flow soldering. Contact the manufacturer before using this component in the case of soldering without soldering iron and flow soldering. As the lack of preheating gives this component rapid temperature change, it might be a cause of degradation and destruction. Contact the manufacturer before using this component in any of the standard condition in this drawing.

6) Notice that the allowed time is the accumulated time, when soldering is repeated.

7) Do not apply pressure to the lead in the direction of axis and vertical.



#### 9.4 CLEANING CONDITIONDS

- 1) Cleaning agent isopropyl alcohol and ethyl alcohol can be used. Contact the manufacturer before using this component in any other cleaning agent. Do not use flon, trichloroethane and so on in point of protection for global environment.
- 2) As rapid temperature change for cleaning after flow soldering might be a cause of degradation or destruction, clean this component after confirming that temperature of this component goes down to room temperature.
- 3) As ultrasonic vibration might be a cause of degradation or destruction, do not use ultrasonic cleaning.
- 4) Dry this component immediately after cleaning.
- 5) Confirm that there are not any influence for qualification to this component in mounting on PCB when this component is cleaned.

#### 9.5 HANDLING CONDITIONS

- 1) Notice that it might be a cause of destruction to apply excessive shock more than specified in the drawing while handling.
- 2) Notice that it might be a cause of degradation of qualification to apply excessive shock and vibration while transportation.
- 3) Notice to apply no shock and no pressure to this component while transportation of this component on PCB.
- 4) As it might be a cause of degradation or destruction to apply static electricity to this component, do not apply static electricity or excessive voltage while assembling and measuring.
- 5) Do not transport this component with bare hand.

## 9.6 MOUNTING CONDITIONS

- 1) Mount this component at the position so that stress by warp or bend of the PCB may not apply to it
- 2) Mount to the same hole pitch on PCB as lead pitch of this component, It might be a cause of destruction to apply pressure to lead terminal while mounting to the different hole pitch on PCB from lead pitch.
- 3) Mount all terminals, or terminal strength might be degraded.
- 4) Face stem of this component with PCB.

## 9.7 APPLICATION

- 1) When this component is used for following applications which require extremely high reliability, be sure to inform us before usage.
  - for space instrument (ex. a man-made satellite, rocket, etc.)
  - for submarine instrument (ex. submarine repeater, working instrument in submarine, etc.)
  - for the Defense Agency.
  - for controller of mobile (ex. controller of automobile, airplane, railway, ship, etc.)
  - for controller of power generator (ex. instrument for atomic, water and fire generating station, etc.)
  - for medical instrument (ex. instrument of life-support system, pacemaker, a man-made clairvoyant analysis, etc.)
  - for instrument of information processing (ex. computer controlling a large system, etc.)
  - for other instruments which require similar reliability as described above.

### NOTE

- 1) This product specification guarantees the quality of our product as a single unit.  
Please make sure that your product is evaluated and confirmed against your specifications when our product is mounted to your product.
- 2) We can not warrant against failure caused by any use of our product that deviates from the intended use as described in this product specification.
- 3) Please return one copy of this product specification with your signature of receipt.  
If the copy is not returned within three months, this product specification will be deemed to have been received.