

Please read this notice before using the TAIYO YUDEN products.

## REMINDERS

- Product information in this catalog is as of October 2017. All of the contents specified herein are subject to change without notice due to technical improvements, etc. Therefore, please check for the latest information carefully before practical application or use of our products.

Please note that TAIYO YUDEN shall not be in any way responsible for any damages and defects in products or equipment incorporating our products, which are caused under the conditions other than those specified in this catalog or individual product specification sheets.

- Please contact TAIYO YUDEN for further details of product specifications as the individual product specification sheets are available.
- Please conduct validation and verification of our products in actual condition of mounting and operating environment before using our products.
- The products listed in this catalog are intended for use in general electronic equipment (e.g., AV equipment, OA equipment, home electric appliances, office equipment, information and communication equipment including, without limitation, mobile phone, and PC) and medical equipment classified as Class I or II by IMDRF. Please be sure to contact TAIYO YUDEN for further information before using the products for any equipment which may directly cause loss of human life or bodily injury (e.g., transportation equipment including, without limitation, automotive powertrain control system, train control system, and ship control system, traffic signal equipment, disaster prevention equipment, medical equipment classified as Class III by IMDRF, highly public information network equipment including, without limitation, telephone exchange, and base station).

Please do not incorporate our products into any equipment requiring high levels of safety and/or reliability (e.g., aerospace equipment, aviation equipment\*, medical equipment classified as Class IV by IMDRF, nuclear control equipment, undersea equipment, military equipment).

\*Note: There is a possibility that our products can be used only for aviation equipment that does not directly affect the safe operation of aircraft (e.g., in-flight entertainment, cabin light, electric seat, cooking equipment) if such use meets requirements specified separately by TAIYO YUDEN. Please be sure to contact TAIYO YUDEN for further information before using our products for such aviation equipment.

When our products are used even for high safety and/or reliability-required devices or circuits of general electronic equipment, it is strongly recommended to perform a thorough safety evaluation prior to use of our products and to install a protection circuit as necessary.

Please note that unless you obtain prior written consent of TAIYO YUDEN, TAIYO YUDEN shall not be in any way responsible for any damages incurred by you or third parties arising from use of the products listed in this catalog for any equipment requiring inquiry to TAIYO YUDEN or prohibited for use by TAIYO YUDEN as described above.

- Information contained in this catalog is intended to convey examples of typical performances and/or applications of our products and is not intended to make any warranty with respect to the intellectual property rights or any other related rights of TAIYO YUDEN or any third parties nor grant any license under such rights.
- Please note that the scope of warranty for our products is limited to the delivered our products themselves and TAIYO YUDEN shall not be in any way responsible for any damages resulting from a fault or defect in our products. Notwithstanding the foregoing, if there is a written agreement (e.g., supply and purchase agreement, quality assurance agreement) signed by TAIYO YUDEN and your company, TAIYO YUDEN will warrant our products in accordance with such agreement.
- The contents of this catalog are applicable to our products which are purchased from our sales offices or authorized distributors (hereinafter "TAIYO YUDEN's official sales channel"). Please note that the contents of this catalog are not applicable to our products purchased from any seller other than TAIYO YUDEN's official sales channel.
- Caution for Export  
Some of our products listed in this catalog may require specific procedures for export according to "U.S. Export Administration Regulations", "Foreign Exchange and Foreign Trade Control Law" of Japan, and other applicable regulations. Should you have any questions on this matter, please contact our sales staff.

# RING VARISTORS



## FEATURES

- Use of strontium titanate semiconductor ceramics.
- Large net voltage non-linear coefficient ( $\alpha$ ) of 3 to 7, and large electrostatic capacitance of 10 to 150 nF. Noise can thus be absorbed over a wide range of frequencies.
- Surface electrode type/Side mount electrode type

## APPLICATIONS

- Eliminates sparks between governor contact and commutator and brushes; absorbs noise in micro motors.

## ORDERING CODE

Ordering Code: S R J △ △ 0 4 0 F 3 ○ ○ ○ ○

1 Material  
S STR

2 Electrode Position  
R Surface

3 External Dimension  $\phi D$  [mm]  
H△ 6.0\*  
J△ 8.0\*  
△=Blank Space  
\*mark indicates non-standard code for custom design development.

4 Individual Spec  
△ Standard  
△=Blank Space

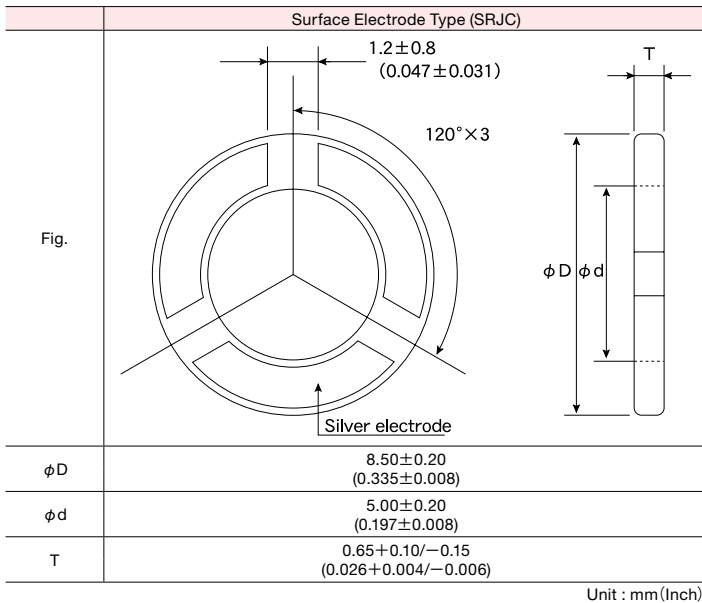
5 Nominal Lower Limit Voltage  $E_{10}$  [V]  
example Number×0.1  
020 2.0  
176 17.6

6 Upper Limit Voltage [V]  
A 1  
B 2  
C 3  
D 4  
E 5  
F 6  
G 7  
H 8  
I 9  
J 0

7 Number of Electrode  
3 3Poles  
5 5Poles

8 Internal Code  
△△△△ Standard  
△=Blank Space

## EXTERNAL DIMENSIONS



## PART NUMBERS/MINIMUM QUANTITY

	Ordering code	EHS (Environmental Hazardous Substances)	Outside diameter $\phi D$ [mm]	Inside diameter $\phi d$ [mm]	Thickness T [mm]	Measuring Current [mA]	$E_{10}$ Voltage [V]	Non-linear coefficient	Number of Electrode	Minimum Quantity [pcs] Case Package
Surface Electrode	SRR	RoHS	12.70±0.40	9.50±0.30	1.30 max.	10	13.0 to 50.0	≥2.0	3 or 5	1000
	SRPP	RoHS	12.00±0.30	6.95±0.15	1.10 max.		4.0 to 60.0		3 or 5	2000
	SRJA	RoHS	8.50±0.25	5.80±0.15	0.65±0.15		2.0 to 35.0		3	3000
	SRJC	RoHS	8.50±0.20	5.00±0.20	0.65 <sup>+0.10</sup> <sub>-0.15</sub>		2.0 to 35.0			
	SRG	RoHS	5.85±0.15	4.10 <sup>+0.10</sup> <sub>-0.05</sub>	0.5±0.1		3.0 to 9.0			
	SRHN	RoHS	4.20±0.15	2.80 <sup>+0.20</sup> <sub>-0.10</sub>	0.50 <sup>+0.10</sup> <sub>-0.20</sub>		2.0 to 6.5			
	SRHTT	RoHS	3.00±0.12	2.15±0.10	0.55 max.		3.0 to 6.5			
	SRHVP	RoHS	2.80 <sup>+0.05</sup> <sub>-0.15</sub>	1.90 <sup>+0.15</sup> <sub>-0.00</sub>	0.50 max.		2.5 to 6.0			

\*We have various shape besides the above. We will cope with the custom about the shape and the character after consultation.

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# RING VARISTORS

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## ■ PACKAGING

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### ① Minimum Quantity

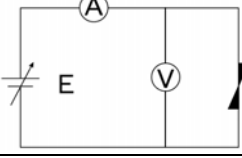
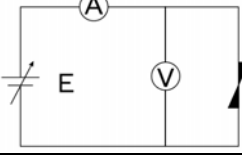
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Type	Minimum Quantity [pcs]
	Case Package
SRR	1000
SRPP	2000
SRJA	3000
SRJC	3000
SRG	3000
SRHN	6000
SRHTT	6000
SRHVP	6000

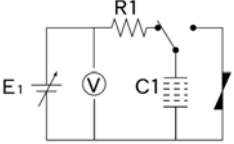
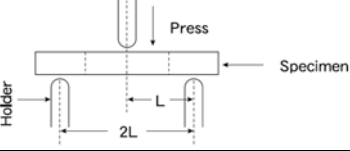
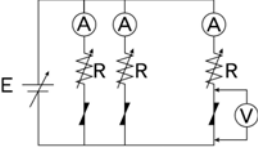
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# RING VARISTORS

## RELIABILITY DATA

1. Operating Temperature Range							
Specified Value	-25~+120°C For the range of 50 to 120°C, refer to the derating curve.						
2. Storage Temperature Range							
Specified Value	-25~+ 120°C						
3. Rated Power							
Specified Value	Refer to the individual specification						
4. E <sub>10</sub> Characteristic							
Specified Value	Refer to the individual specification						
Test Methods and Remarks	<p>(at 25±5°C)</p>  <p>E : Constant-current source A : Digital ammeter V : Digital voltmeter E<sub>10</sub> : Voltage at reference current with application of 10mADC Input waveform is square wave. (Width : 50m sec., max.)</p>						
5. Non-linear Coefficient Rated α (at 25±5°C)							
Specified Value	Refer to the individual specification Definition $\alpha = \frac{1}{\log E_{10}/E_1}$						
Test Methods and Remarks	<p>E<sub>1</sub> : Voltage at reference current with application of 1mADC E<sub>10</sub> : Voltage at reference current with application of 10mADC</p>  <p>E : Constant-current source A : Digital ammeter V : Digital voltmeter E<sub>10</sub> : Voltage at reference current with application of 10mADC Input waveform is square wave. (Width : 50m sec., max.)</p>						
6. Capacitance							
Specified Value	Refer to the individual specification						
Test Methods and Remarks	<p>Measuring frequency : 1kHz±10% Measuring voltage : 1.0±0.5Vrms Measuring temperature : 25±5°C</p>						
7. Tangent of Loss Angle (tan δ)							
Specified Value	Refer to the individual specification						
Test Methods and Remarks	<p>Measuring frequency : 1kHz±10% Measuring voltage : 1.0±0.5Vrms Measuring temperature : 25±5°C</p>						
8. Temperature Characteristic of Capacitance							
Specified Value	Refer to the individual specification						
Test Methods and Remarks	<p>Measurement of voltage at reference current at 25°C and 50°C shall be made for the calculation by the following equation.</p> $\alpha = \frac{E_{10}(50^\circ\text{C}) - E_{10}(25^\circ\text{C})}{E_{10}(25^\circ\text{C})} \times \frac{100}{50^\circ\text{C} - 25^\circ\text{C}} (\% / ^\circ\text{C})$ <p>Change of maximum capacitance deviation in step 1 to 5</p> <table border="1"> <thead> <tr> <th>step</th> <th>Temperature(°C)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>25 (Reference temperature)</td> </tr> <tr> <td>2</td> <td>50</td> </tr> </tbody> </table>	step	Temperature(°C)	1	25 (Reference temperature)	2	50
step	Temperature(°C)						
1	25 (Reference temperature)						
2	50						

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9. Pulse	
Specified Value	Refer to the individual specification
Test Methods and Remarks	 <p>           R1 : 2kΩ            C1 : 35±5 μF            E<sub>1</sub> : Individual specification            Number of pulse application : 10 times            Measuring temperature : 25±5°C         </p>
10. Body Strength	
Specified Value	Refer to the individual specification
Test Methods and Remarks	 <p>           Pressing force : Refer to Individual specification            L : Depends upon the sample size         </p>
11. Adhesion of Electrode	
Specified Value	No detachment of electrode or sign of such defects
Test Methods and Remarks	Lead wire shall be soldered perpendicularly onto the electrode, then pulled out perpendicularly. Speed to pull out : 2.5cm/2sec. Solder to be used : Eutectic solder
12. Resistance to Soldering Heat	
Specified Value	E <sub>10</sub> : Within ±20%, α : Refer to the individual specification
Test Methods and Remarks	Temperature at the tip of soldering iron : 280±5°C, 300±5°C Duration : 2 sec. Preheating temperature : 150°C, 170°C Recovery : 1 hr of recovery under the standard condition after the test.
13. Resistance to Solvent	
Specified Value	No significant abnormality in appearance and legible marking.
14. Damp Heat	
Specified Value	E <sub>10</sub> : Within ±20%, α : Refer to the individual specification
Test Methods and Remarks	Temperature : 60±10°C Humidity : 90 to 95% RH Duration : 300±8 hrs Recovery : 1 hr of recovery under the standard condition after the removal from test chamber. Measuring conditions : E <sub>1</sub> = Current application for 30 sec. : E <sub>10</sub> = Current application for 60 sec.
15. DC Load Resistance	
Specified Value	E <sub>10</sub> : Within ±20%, α : Refer to the individual specification
Test Methods and Remarks	 <p>           E : Constant-current source            A : Digital ammeter            V : Digital voltmeter            R : Load adjusting variable resistor            P = V × A         </p> <p>           Test environment : standard condition            Current : Refer to the individual specification            Duration : 300±8 hrs            Recovery : 1 hr of recovery under the standard condition after the removal from test chamber.         </p>
Note on standard condition : "standard condition" referred to herein is defined as follows : 5 to 35°C of temperature, 45 to 85% relative humidity and 86 to 106kPa of air pressure.	
When there are questions concerning measurement results : In order to provide correlation data, the test shall be conducted under condition of 25±2°C of temperature, 60 to 70% relative humidity and 86 to 106kPa of air pressure. Unless otherwise specified, all the tests are conducted under the "standard condition."	

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# RING VARISTORS

## ■ PRECAUTIONS

1. Circuit Design	
Precautions	<ul style="list-style-type: none"><li>◆ Verification of operating environment, electrical rating and performance<ol style="list-style-type: none"><li>1. A malfunction in medical equipment, spacecraft, nuclear reactors, etc. may cause serious harm to human life or have severe social ramifications. As such, any varistors to be used in such equipment may require higher safety and/or reliability considerations and should be clearly differentiated from components used in general purpose applications.</li></ol></li><li>◆ Operating Environment precautions<ol style="list-style-type: none"><li>1. Varistors should not be used in the following environments :<ol style="list-style-type: none"><li>(1) Environmental conditions to avoid<ol style="list-style-type: none"><li>a. exposure to water or salt water.</li><li>b. exposure to moisture or condensation.</li><li>c. exposure to corrosive gases (such as hydrogen sulfide, sulfurous acid, chlorine, and ammonia).</li></ol></li></ol></li></ol></li></ul>
2. Soldering	
Precautions	<ul style="list-style-type: none"><li>◆ Soldering<ul style="list-style-type: none"><li>• Be sure to do pre-heating sufficiently so that the difference between a soldering iron and ring varistors in temperature should be 150°C or less.</li><li>• Ring Varistors are susceptible to thermal shock when exposed to rapid or concentrated heating or rapid cooling. Therefore, the soldering process must be conducted with a great care so as to prevent malfunction of the components due to excessive thermal shock.</li><li>• Use a 30W soldering iron with a maximum tip diameter of 3.0mm.</li><li>• The soldering iron should not directly touch the products.</li></ul></li></ul>
Technical considerations	<ul style="list-style-type: none"><li>◆ Soldering<ul style="list-style-type: none"><li>Refer to individual specifications.</li></ul></li></ul>