Notice for TAIYO YUDEN products

Please read this notice before using the TAIYO YUDEN products.

⚠ REMINDERS

- Product information in this catalog is as of October 2009. 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 usage of the Products.

  Please note that Taiyo Yuden Co., Ltd. shall not be responsible for any defects in products or equipment incorporating such products, which are caused under the conditions other than those specified in this catalog or individual specification.

- Please contact Taiyo Yuden Co., Ltd. for further details of product specifications as the individual specification is available.

- Please conduct validation and verification of products in actual condition of mounting and operating environment before commercial shipment of the equipment.

- All electronic components or functional modules listed in this catalog are developed, designed and intended for use in general electronics equipment.(for AV, office automation, household, office supply, information service, telecommunications, (such as mobile phone or PC) etc.). Before incorporating the components or devices into any equipment in the field such as transportation,(automotive control, train control, ship control), transportation signal, disaster prevention, medical, public information network (telephone exchange, base station) etc. which may have direct influence to harm or injure a human body, please contact Taiyo Yuden Co., Ltd. for more detail in advance.
  Do not incorporate the products into any equipment in fields such as aerospace, aviation, nuclear control, submarine system, military, etc. where higher safety and reliability are especially required.

  In addition, even electronic components or functional modules that are used for the general electronic equipment, if the equipment or the electric circuit require high safety or reliability function or performances, a sufficient reliability evaluation check for safety shall be performed before commercial shipment and moreover, due consideration to install a protective circuit is strongly recommended at customer's design stage.

- The contents of this catalog are applicable to the products which are purchased from our sales offices or distributors (so called "TAIYO YUDEN's official sales channel").
  It is only applicable to the products purchased from any of TAIYO YUDEN's official sales channel.

- Please note that Taiyo Yuden Co., Ltd. shall have no responsibility for any controversies or disputes that may occur in connection with a third party's intellectual property rights and other related rights arising from your usage of products in this catalog. Taiyo Yuden Co., Ltd. grants no license for such rights.

- Caution for export
  Certain items in this catalog may require specific procedures for export according to "Foreign Exchange and Foreign Trade Control Law" of Japan, "U.S. Export Administration Regulations", and other applicable regulations. Should you have any question or inquiry on this matter, please contact our sales staff.
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RING VARISTORS

FEATURES

- Use of strontium titanate semiconductor ceramics.
- Large net voltage non-linear coefficient (α) 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

S R J △ △ 0 4 0 F 3 ○ ○ ○ ○

❶Material

S	STR

❷Electrode Position

S	Side
R	Surface

❸External Dimension ϕD [mm]

B△	8.6
H△	6.0※
J△	8.0※

△=Blank Space

※mark indicates non-standard code for custom design development.

❹Individual Spec

△	Standard

△=Blank Space

❺Nominal Lower Limit Voltage E_{10} [V]

example	Number×0.1
020	2.0
176	17.6

❻Upper Limit Voltage [V]

A	1
B	2
C	3
D	4
E	5
F	6
G	7
H	8
I	9
J	0

❼Number of Electrode

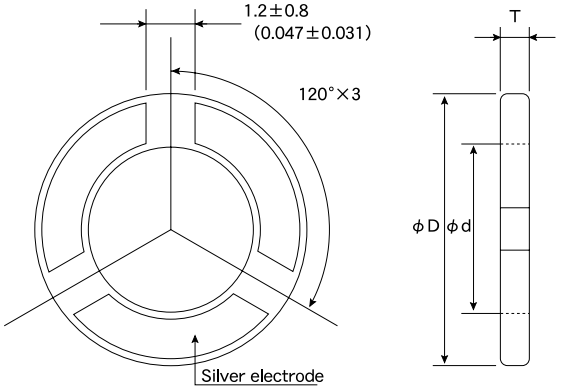
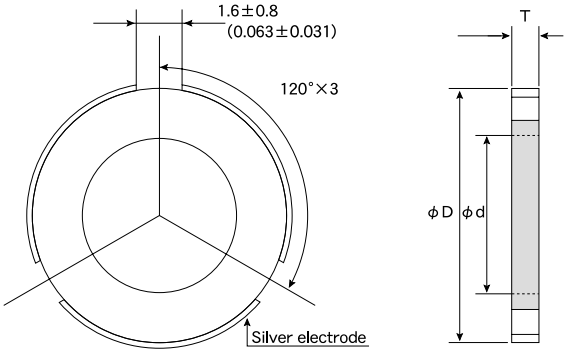
3	3Poles
5	5Poles

❽Internal Code

△△△△	Standard

△=Blank Space

EXTERNAL DIMENSIONS

	Surface Electrode Type (SRJC)	Side Electrode Type (SSB)
Fig.		
ϕD	8.50±0.20 (0.335±0.008)	8.60±0.20 (0.339±0.008)
ϕd	5.00±0.20 (0.197±0.008)	5.00±0.20 (0.197±0.008)
T	0.65+0.10/−0.15 (0.026+0.004/−0.006)	0.75 max. (0.030 max.)

Unit : mm(Inch)

PART NUMBERS/MINIMUM QUANTITY

	Ordering code	EHS (Environmental Hazardous Substances)	Outside diameter ϕD [mm]	Inside diameter ϕd [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	$0.65^{+0.10}_{-0.15}$		2.0 to 35.0			
	SRG	RoHS	5.85±0.15	$4.10^{+0.10}_{-0.05}$	0.5±0.1		3.0 to 9.0			
	SRHN	RoHS	4.20±0.15	$2.80^{+0.20}_{-0.10}$	$0.50^{+0.10}_{-0.20}$		2.0 to 6.5			6000
	SRHTT	RoHS	3.00±0.12	2.15±0.10	0.55 max.		3.0 to 6.5			
	SRHVP	RoHS	$2.80^{+0.05}_{-0.15}$	$1.90^{+0.15}_{-0.00}$	0.50 max.		2.5 to 6.0			
Side Electrode	SSB	RoHS	8.60±0.20	5.00±0.20	0.75 max.	10	2.0 to 14.0	≧2.0	3	4000
	SSKT	RoHS	7.80±0.20	$5.35^{+0.20}_{-0.10}$	0.55±0.10		4.0 to 16.0			
	SSJ	RoHS	6.80±0.15	4.70±0.15	0.75 max.		2.0 to 20.0			3000

※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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PACKAGING

Minimum Quantity

Type	Minimum Quantity [pcs] Case Package
SRR	1000
SRPP	2000
SRJA	3000
SRJC	3000
SRG	3000
SRHN	6000
SRHTT	6000
SRHVP	6000
SSB	4000
SSKT	4000
SSJ	3000

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RELIABILITY DATA

RING VARISTORS

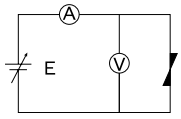
1. Operating Temperature Range	
Specified Value	−25～+120℃ For the range 50 to 120℃, refer to the derating curve.

2. Storage Temperature Range	
Specified Value	−25～+120℃

3. Rated Power	
Specified Value	Refer to individual specification

4. E_{10} Characteristic	
Specified Value	Refer to individual specification

【Test Methods and Remarks】
(at 25±5℃)

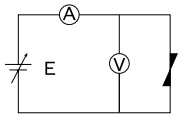


E : Constant-current source
A : Digital ammeter
V : Digital voltmeter
E_{10} : Voltage at reference current with application of 10mADC

Input waveform is square wave. (Width : 50m sec., max.)

5. Non-linear Coefficient Rated α (at 25±5℃)	
Specified Value	Refer to individual specification Difinition $\alpha = \frac{1}{\log E_{10} / E_1}$ E_1 : Voltage at reference current with application of 1mADC E_{10} : Voltage at reference current with application of 10mADC

【Test Methods and Remarks】



E : Constant-current source
A : Digital ammeter
V : Digital voltmeter
E_{10} : Voltage at reference current with application of 10mADC

Input waveform is square wave. (Width : 50m sec., max.)

6. Capacitance	
Specified Value	Refer to individual specification

【Test Methods and Remarks】
Measuring frequency : 1kHz±10%
Measuring voltage : 1.0±0.5Vrms
Measuring temperature : 25±5℃

7. Tangent of Loss Angle (tanδ)	
Specified Value	Refer to individual specification

【Test Methods and Remarks】
Measuring frequency : 1kHz±10%
Measuring voltage : 1.0±0.5Vrms
Measuring temperature : 25±5℃

8. Temperature Characteristic of Capacitance	
Specified Value	Refer to individual specification

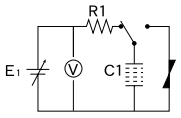
【Test Methods and Remarks】
Measurement of voltage at reference current at 25℃ and 50℃shall be made for the calculation by the following equation.

$$\alpha = \frac{E_{10}(50℃) - E_{10}(25℃)}{E_{10}(25℃)} \times \frac{100}{50℃ - 25℃} \ (\%/℃)$$

Change of maximum capacitance deviation in step 1 to 5
Temperature at step 1 : 25℃ (Reference temperature)
Temperature at step 2 : 50℃

9. Pulse	
Specified Value	Refer to individual specification

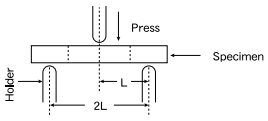
【Test Methods and Remarks】



R1 : 2kΩ
C1 : 35±5μF
E_1 : Individual specification
Number of pulse application : 10 times
Measuring temperature : 25±5℃

10. Body Strength	
Specified Value	Refer to individual specification

【Test Methods and Remarks】



Pressing force : Refer to Individual specification
L : Depends upon the sample size

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

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RELIABILITY DATA

RING VARISTORS

12. Resistance to Soldering Heat	
Specified Value	E_{10} : Within ±20%, α : Refer to individual specification

【Test Methods and Remarks】
Temperature at the tip of soldering iron : 280±5℃, 300±5℃
Duration : 2 sec.
Preheating temperature : 150℃, 170℃
Recovery : 1 hr of recovery under the standard condition after the test.

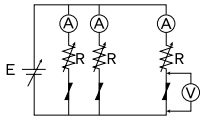
13. Resistance to Solvent	
Specified Value	No significant abnormality in appearance and legible marking.

14. Damp Heat	
Specified Value	E_{10} : Within ±20%, α : Refer to individual specification

【Test Methods and Remarks】
Temperature : 60±10℃
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_1 = Current application for 30 sec.
E_{10} = Current application for 60 sec.

15. DC Load Resistance	
Specified Value	E_{10} : Within ±20%, α : Refer to individual specification

【Test Methods and Remarks】



E : Constant-current source
A : Digital ammeter
V : Digital voltmeter
R : Load adjusting variable resistor
P=Ⓥ×Ⓐ

Test environment : standard condition
Current : Refer to individual specification
Duration : 300±8 hrs
Recovery : 1 hr of recovery under the standard condition after the removal from test chamber.

Note on standard condition :
"standard condition" referred to herein is defined as follows :
5 to 35℃ 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℃ 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."

PRECAUTIONS

RING VARISTORS

1. Circuit Design	
Precautions	◆Verification of operating environment, electrical rating and performance 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. ◆Operating Environment precautions 1. Varistors should not be used in the following environments : (1) Environmental conditions to avoid a.exposure to water or salt water. b.exposure to water or salt water.exposure to moisture or condensation. c.exposure to corrosive gases (such as hydrogen sulfide, sulfurous acid, chlorine, and ammonia).

2. Soldering	
Precautions	◆Soldering ・Please heat so that the difference of soldering iron tip temperature and ring varistor temperature becomes 150℃ or less. ・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. ・Use a 30W soldering iron with a maximum tip diameter of 3.0mm. ・The soldering iron should not directly touch the products.
Technical consider-ations	◆Soldering Refer to individual specifications.

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