⊗TDK

Ring Varistors

For micro-motors

VAR-18 series

Type: VAR-18-P (Plane surface electrode type) VAR-18-S (Side surface electrode type)

Issue date: December 2010

• All specifications are subject to change without notice.

• Conformity to RoHS Directive: This means that, in conformity with EU Directive 2002/95/EC, lead, cadmium, mercury, hexavalent chromium, and specific bromine-based flame retardants, PBB and PBDE, have not been used, except for exempted applications.

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Conformity to RoHS Directive

Varistors(SrTiO₃) For Micro-motors

VAR-18 Series

Ring varistors are used in a wide range of applications from micro motor noise absorption to the protection of circuit contacts. TDK has greatly improved the electrical and physical performances of these varistors to meet the latest demands. This varistor line covers the traditional shapes and dimensions as well as the more varied and specialized applications.

FEATURES

ELECTRICAL PERFORMANCES

- The temperature characteristics of the varistor voltage (E10 value) are positive. This prevents the varistor voltage from decreasing at high temperatures and from large currents flowing through the varistor. Therefore, these varistors remove design obstacles by eliminating the need for setting the room temperature varistor voltage (E10 value) higher—a measure that compromises noise reduction levels.
- Furthermore, the VAR-18 series has also eliminated the problem of the noise level being amplified at low-temperatures and having a negative impact on the life of the motor.
- Because the VAR-18 series has the same large capacitance as the conventional varistors, it has excellent functions to eliminate and control motor noise in high frequency bands.

PHYSICAL PERFORMANCES

- Because copper electrodes are used and the heat resistance of the ceramic elements has been improved, there is no concern for electrode erosion or thermal crack even at the higher soldering temperatures that are used in lead-free soldering.
- The ceramic element has excellent flexure strength as is suitable for automatic motor assembly.

PRODUCT LINEUP

- The varistors in this series come in a wide range of dimensions and so can be accurately used for almost all motors.
- This lineup includes side-surface electrode varistors that can be used with ultra-compact micro motors.

VARISTOR VOLTAGE TEMPERATURE CHARACTERISTICS





PRODUCT IDENTFICATIONS



- (1) Series name
- (2) Outer diameter 080: ø8mm 107: ø10.7mm
- (3) Varistor voltage 053: 5.3V 157: 15.7V
- (4) Varistor voltage tolerance M: ±20%
- (5) Number of electrodes
 - 3, 5, 7
- (6) Electrode location
 - P: Plane
 - S: Side
- (7)TDK classification

PERFORMANCES

Operating temperature range	–25 to +85°C
Pulse resistance	$\Delta E_{10,\Delta\alpha_{10\pm}15\%}$
[DC.60V, ON-OFF: 50 cycles]	ΔE10,Δ0.10±15 /8
Moisture resistance	$\Delta E_{10,\Delta\alpha_{10\pm}10\%}$
[60±2°C, 90 to 95(%)RH, 240 hours]	ΔE10,Δ0.10±10 /8
Soldering heat resistance [320°C, 3 seconds]	$\Delta E_{10,\Delta \alpha_{10\pm}10\%}$
Flexure strength	9.8N min.
Electrode tensile strength	14.7N min.

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SHAPES AND DIMENSIONS PLANE SURFACE ELECTRODE TYPE(3-ELECTRODE)





Diameter Symbol	Dimensions(mm)			Number of	
	øD1	øD2	T max.	electrodes	
024	2.45±0.1	1.78±0.08	0.50	3	
030	3.0±0.15	2.0±0.1	0.50	3	
030	3.0±0.12	2.15±0.1	0.50	3	
042	4.2±0.15	2.8+0.2, -0.1	0.60	3	
048	4.8+0.1, -0.2	3.5+0.2, -0.1	0.60	3	
060	6.0±0.2	4.0+0.2, -0.1	0.70	3	
066	6.6±0.2	4.7±0.15	0.75	3	
080	8.0±0.3	5.0±0.2	0.75	3	
085	8.5±0.2	5.0±0.2	0.75	3	
085	8.5±0.3	5.8±0.15	0.75	3	
094	9.4±0.3	5.78±0.15	1.05	3	
107	10.7+0.2, -0.35	6.7+0.25, -0.1	1.10	3	
120	12.0+0.4, -0.1	7.5±0.2	1.10	3 or 5	
160	16.0±0.4	9.4±0.3	1.70	5	

SIDE SURFACE ELECTRODE TYPE(3-ELECTRODE)



SIDE SURFACE ELECTRODE TYPE(6-ELECTRODE)



Diameter Symbol	Dimensions(mm)			Number of
	øD1	øD2	T max.	electrodes
042	4.2±0.15	2.85+0.2, -0.1	0.60	3
066	6.6±0.2	4.7±0.15	0.60	3 or 6
076	7.6±0.2	5.0±0.2	0.60	3 or 6
078	7.8±0.2	5.35±0.2	0.65	3
086	8.6±0.2	5.0±0.2	0.75	3

ELECTRICAL CHARACTERISTICS (EXAMPLE: OD ø10.7mm type)

Varistor voltage Nominal varistor voltage		α10[1 to 10mA]	Rated power (mW)	Varistor voltage temperature	Capacitance
Tolerance E10mA (V)	coefficient (%/°C)			(nF)	
	[25 to 50°C]			[at 1kHz]	
032Y	2.0 to 4.5	2.3	500	±0.2	1 to 100
053M	4.0 to 6.6	2.3	500	±0.2	1 to 100
077M	5.9 to 9.4	2.3	500	±0.2	1 to 100
115M	9.0 to 14.0	2.3	500	±0.2	1 to 100
157M	13.0 to 18.4	2.3	500	±0.2	1 to 100
218M	17.6 to 26.0	2.3	500	±0.2	1 to 100
240M	19.0 to 29.0	2.3	500	±0.2	1 to 100
320M	26.0 to 38.0	2.3	500	±0.2	1 to 100

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