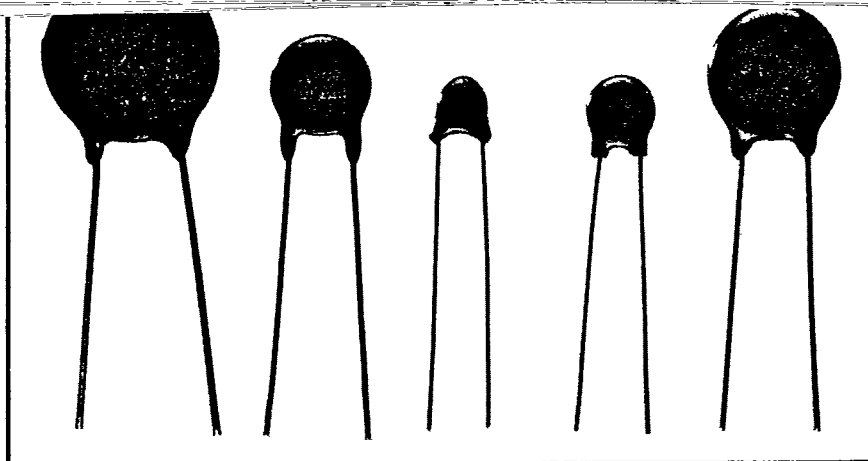




METAL
OXIDE
VARISTORS
VSA
9-800

TYPE VSA VARISTORS TRANSIENT / SURGE ABSORBER

APPLICATIONS

Transistor, diode, IC, thyristor and triac semiconductor protection.

Surge protection in consumer electronics.

Surge protection in industrial electronics.

Surge protection in communication, measuring and controller electronics.

Surge protection in electronic home appliances and gas and petroleum appliances.

Electrostatic discharge and noise spike suppression.

Relay and electromagnetic valve surge absorption.

FEATURES

Fast response to the rapidly rising surge voltage.

High performance clamping voltage characteristics.

Broad products range.

Varistor voltage: 18v to 1.2 kv.

Withstanding surge current: 50A to 6,500A
(8 x 20 μ sec., 1 time).

Mallory VSAs are zinc oxide nonlinear resistors whose resistance changes as a function of the applied voltage. The VSA has a bilateral and symmetrical V-I characteristic curve and can therefore be used in circuits in place of back-to-back zener diodes. This gives your circuit clamping protection in either direction. The VSA thus provides a highly reliable and economical way to protect against repeated high voltage transients and surges such as those produced by lightning, switching surges and noise spikes.

The VSA utilizes a ceramic element composed of zinc oxide and several kinds of metal oxide additives that have been sintered at relatively high temperatures. Ohmic electrodes are connected to each end of the element by firing. The specific characteristics of each VSA are determined by the properties of the ceramics used.

MALLORY

EMHART MALLORY

ORDERING INFORMATION

V	S	A	C																																
Common Code				Element Dia.		Type		Tolerance		Varistor Voltage		Suffix																							
				<table border="1" style="font-size: small;"> <tr><td>05</td><td>φ 5mm</td><td>(.197")</td></tr> <tr><td>07</td><td>φ 7mm</td><td>(.276")</td></tr> <tr><td>10</td><td>φ 10mm</td><td>(.394")</td></tr> <tr><td>14</td><td>φ 14mm</td><td>(.551")</td></tr> <tr><td>20</td><td>φ 20mm</td><td>(.787")</td></tr> </table>		05	φ 5mm	(.197")	07	φ 7mm	(.276")	10	φ 10mm	(.394")	14	φ 14mm	(.551")	20	φ 20mm	(.787")	<table border="1" style="font-size: small;"> <tr><td>D</td><td>Type D</td></tr> </table>		D	Type D	<table border="1" style="font-size: small;"> <tr><td>J</td><td>± 5%</td></tr> <tr><td>K</td><td>± 10%</td></tr> <tr><td>S</td><td>Special</td></tr> </table>		J	± 5%	K	± 10%	S	Special	The first two digits are significant figures and the third one denotes the number of zeros following. Decimal point is expressed by R.		
05	φ 5mm	(.197")																																	
07	φ 7mm	(.276")																																	
10	φ 10mm	(.394")																																	
14	φ 14mm	(.551")																																	
20	φ 20mm	(.787")																																	
D	Type D																																		
J	± 5%																																		
K	± 10%																																		
S	Special																																		

TYPE VSA STANDARD RATINGS

Part No.	Maximum Allowable Voltage		Varistor* Voltage (V)	Max. Clamping Voltage @ Test Current (8 x 20 μsec.)		Energy (2ms.) (J)	Withstanding Surge Current (8 x 20 μsec. 1 time) (A)	Typical Capacitance @ 1kHz(pF)
	ACrms(V)	DC(V)		Vc(V)	Ip(A)			
VSAC05DK180 VSAC07DK180 VSAC10DK180 VSAC14DK180 VSAC20DK180	11	14	18 (16 ~ 20)	40	1	0.3	100	1600
				36	2.5	0.8	250	3500
				36	5	1.5	500	7500
				36	10	3.5	1000	18000
				36	20	10	2000	37000
VSAC05DK220 VSAC07DK220 VSAC10DK220 VSAC14DK220 VSAC20DK220	14	18	22 (20 ~ 24)	48	1	0.4	100	1300
				43	2.5	0.9	250	2800
				43	5	2.0	500	6000
				43	10	4.0	1000	15000
				43	20	13	2000	30000
VSAC05DK270 VSAC07DK270 VSAC10DK270 VSAC14DK270 VSAC20DK270	17	22	27 (24 ~ 30)	60	1	0.5	100	1050
				53	2.5	1.0	250	2000
				53	5	2.5	500	4000
				53	10	5.0	1000	10000
				53	20	15	2000	22000
VSAC05DK330 VSAC07DK330 VSAC10DK330 VSAC14DK330 VSAC20DK330	20	26	33 (30 ~ 36)	73	1	0.6	100	900
				65	2.5	1.2	250	1500
				65	5	3.0	500	3000
				65	10	6.0	1000	7500
				65	20	20	2000	17000
VSAC05DK390 VSAC07DK390 VSAC10DK390 VSAC14DK390 VSAC20DK390	25	31	39 (35 ~ 43)	86	1	0.8	100	500
				77	2.5	1.5	250	1350
				77	5	3.5	500	2600
				77	10	7.0	1000	6500
				77	20	24	2000	15000
VSAC05DK470 VSAC07DK470 VSAC10DK470 VSAC14DK470 VSAC20DK470	30	38	47 (42 ~ 52)	104	1	1.0	100	450
				93	2.5	1.8	250	1150
				93	5	4.5	500	2200
				93	10	8.5	1000	5500
				93	20	30	2000	13000
VSAC05DK560 VSAC07DK560 VSAC10DK560 VSAC14DK560 VSAC20DK560	35	45	56 (50 ~ 62)	123	1	1.0	100	400
				110	2.5	2.2	250	950
				110	5	5.5	500	1800
				110	10	10.0	1000	4500
				110	20	35	2000	11000
VSAC05DK680 VSAC07DK680 VSAC10DK680 VSAC14DK680 VSAC20DK680	40	56	68 (61 ~ 75)	150	1	1.2	100	350
				135	2.5	2.5	250	700
				135	5	6.5	500	1300
				135	10	12.0	1000	3300
				135	20	40	2000	7000

(continued)

TYPE VSA STANDARD RATINGS

Part No.	Maximum Allowable Voltage		Varistor* Voltage (V)	Max. Clamping Voltage @ Test Current (8 x 20 μ sec.)		Energy (2ms.) (J)	Withstanding Surge Current (8 x 20 μ sec. 1 time) (A)	Typical Capacitance @ 1kHz(pF)
	ACrms(V)	DC(V)		Vc(V)	Ip(A)			
VSAC05DK820 VSAC07DK820 VSAC10DK820 VSAC14DK820 VSAC20DK820	50	65	82 (74 ~ 90)	145	5	1.7	400	250
				135	10	3.5	1200	550
				135	25	8	2500	1800
				135	50	14	4500	2900
				135	100	27	6500	5500
VSAC05DK101 VSAC07DK101 VSAC10DK101 VSAC14DK101 VSAC20DK101	60	85	100 (90 ~ 110)	175	5	2.0	400	200
				165	10	4	1200	500
				165	25	10	2500	1400
				165	50	18	4500	2400
				165	100	30	6500	4800
VSAC05DK121 VSAC07DK121 VSAC10DK121 VSAC14DK121 VSAC20DK121	75	100	120 (108 ~ 132)	210	5	2.5	400	170
				200	10	5	1200	450
				200	25	12	2500	1100
				200	50	20	4500	1900
				200	100	40	6500	3800
VSAC05DK151 VSAC07DK151 VSAC10DK151 VSAC14DK151 VSAC20DK151	95	125	150 (135 ~ 165)	260	5	3.0	400	140
				250	10	6	1200	350
				250	25	16	2500	900
				250	50	25	4500	1500
				250	100	50	6500	3000
†VSAC05DK201 †VSAC07DK201 †VSAC10DK201 †VSAC14DK201 †VSAC20DK201	130	170	200 (185 ~ 225)	355	5	4.0	400	80
				340	10	10	1200	250
				340	25	20	2500	500
				340	50	35	4500	1000
				340	100	70	6500	2000
†VSAC05DK221 †VSAC07DK221 †VSAC10DK221 †VSAC14DK221 †VSAC20DK221	140	180	220 (198 ~ 242)	380	5	4.5	400	70
				360	10	10	1200	250
				360	25	23	2500	450
				360	50	40	4500	1000
				360	100	75	6500	2000
†VSAC05DK241 †VSAC07DK241 †VSAC10DK241 †VSAC14DK241 †VSAC20DK241	150	200	240 (216 ~ 264)	415	5	5.0	400	70
				395	10	10	1200	200
				395	25	25	2500	400
				395	50	40	4500	900
				395	100	80	6500	1800
†VSAC05DK271 †VSAC07DK271 †VSAC10DK271 †VSAC14DK271 †VSAC20DK271	175	225	270 (247 ~ 303)	475	5	6.0	400	65
				455	10	12	1200	170
				455	25	30	2500	350
				455	50	50	4500	750
				455	100	90	6500	1600
†VSAC05DK361 †VSAC07DK361 †VSAC10DK361 †VSAC14DK361 †VSAC20DK361	230	300	360 (324 ~ 396)	620	5	7.5	400	50
				595	10	15	1200	130
				595	25	35	2500	300
				595	50	65	4500	550
				595	100	120	6500	1200
†VSAC05DK391 †VSAC07DK391 †VSAC10DK391 †VSAC14DK391 †VSAC20DK391	250	320	390 (351 ~ 429)	675	5	8.0	400	50
				650	10	17	1200	130
				650	25	40	2500	270
				650	50	70	4500	500
				650	100	130	6500	1000
†VSAC05DK431 †VSAC07DK431 †VSAC10DK431 †VSAC14DK431 †VSAC20DK431	275	350	430 (387 ~ 473)	745	5	9.0	400	45
				710	10	20	1200	110
				710	25	45	2500	250
				710	50	75	4500	450
				710	100	140	6500	900
†VSAC05DK471 †VSAC07DK471 †VSAC10DK471 †VSAC14DK471 †VSAC20DK471	300	385	470 (423 ~ 517)	810	5	10.0	400	40
				775	10	20	1200	100
				775	25	45	2500	230
				775	50	80	4500	400
				775	100	150	6500	900
†VSAC10DK621 †VSAC14DK621 †VSAC20DK621	385	505	620 (558 ~ 682)	1025	25	45	2500	130
				1025	50	85	4500	250
				1025	100	150	6500	500
†VSAC10DK681 †VSAC14DK681 †VSAC20DK681	420	560	680 (612 ~ 748)	1120	25	45	2500	130
				1120	50	90	4500	250
				1120	100	160	6500	460
†VSAC10DK751 †VSAC14DK751 †VSAC20DK751	460	615	750 (675 ~ 825)	1240	25	50	2500	120
				1240	50	100	4500	230
				1240	100	175	6500	420

(continued)

†: UL approved model available with your indication of suffix "U".

TYPE VSA STANDARD RATINGS

Part No.	Maximum Allowable Voltage		Varistor* Voltage (V)	Max. Clamping Voltage @ Test Current (8 x 20 μ.sec.)		Energy (2ms.) (J)	Withstanding Surge Current (8 x 20 μ.sec. 1 time) (A)	Typical Capacitance (@ 1kHz)(pF)
	ACrms(V)	DC(V)		Vc(V)	Ip(A)			
†VSAC10DK781 †VSAC14DK781 †VSAC20DK781	485	640	780 (702 ~ 858)	1290	25	50	2500	120
1290				50	105	4500	230	
1290				100	180	6500	420	
†VSAC10DK821 †VSAC14DK821 †VSAC20DK821	510	670	820 (738 ~ 902)	1355	25	55	2500	110
1355				50	110	4500	200	
1355				100	190	6500	400	
†VSAC10DK911 †VSAC14DK911 †VSAC20DK911	550	745	910 (819 ~ 1001)	1500	25	60	2500	100
1500				50	120	4500	180	
1500				100	215	6500	350	
†VSAC10DK102 †VSAC14DK102 †VSAC20DK102	625	825	1000 (900 ~ 1100)	1650	25	65	2500	90
1650				50	130	4500	150	
1650				100	230	6500	320	
†VSAC10DK112 †VSAC14DK112 †VSAC20DK112	680	895	1100 (990 ~ 1210)	1815	25	70	2500	80
1815				50	140	4500	150	
1815				100	250	6500	300	

Notes: 1. *Varistor Voltage: 5 Series — V0.1mA
7, 10, 14, 20 Series — V1mA

2. Rated Wattage:

Part No.	Rated Wattage (W)	Part No.	Rated Wattage (W)
VSAC05DK180 ~ 680	0.01	VSAC05DK820 ~ 471	0.1
VSAC07DK180 ~ 680	0.02	VSAC07DK820 ~ 471	0.25
VSAC10DK180 ~ 680	0.05	VSAC10DK820 ~ 112	0.4
VSAC14DK180 ~ 680	0.1	VSAC14DK820 ~ 182	0.6
VSAC20DK180 ~ 680	0.2	VSAC20DK820 ~ 182	1.0

3. Operating temperature range: -40 to 85°C (-40 to 185°F)
 4. Storage temperature range: -40 to 125°C (-40 to 257°F)
 5. Maximum clamping voltage as a function of surge current is obtainable from the respective V-I characteristic curves.
 6. Maximum leakage current: refer to the V-I curves.
 7. † : UL approved model available with your indication of suffix "U". File No. E6274 Across the line varistor.
 File No. F86821 Transient Voltage surge suppressor.

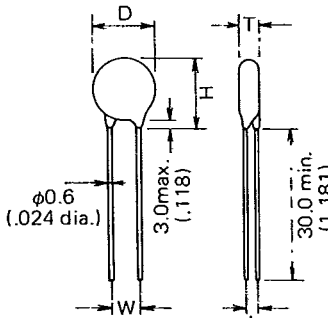
OUTLINE DIMENSIONS

5 Series

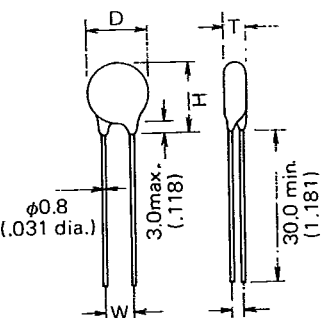
Part No.	Dmax.	T ± 1.0(.039)	W ± 1.0(.039)	Hmax.	L ± 1.0(.039)	Dimensions mm(in.)
VSAC 05DK180	7.5 (.295)	3.5(.138)	5.0 (.197)	10.0 (.394)	1.5(.059)	
VSAC 05DK220						
VSAC 05DK270						
VSAC 05DK330						
VSAC 05DK390						
VSAC 05DK470						
VSAC 05DK560						
VSAC 05DK680						
VSAC 05DK820						
VSAC 05DK101	7.0 (.276)	3.7(.146)	5.0 (.197)	10.0 (.394)	1.6(.063)	
VSAC 05DK121		3.8(.150)			1.8(.071)	
VSAC 05DK151		4.0(.157)			2.0(.079)	
†VSAC 05DK201		4.2(.165)			2.0(.079)	
†VSAC 05DK221		4.3(.169)			2.1(.083)	
†VSAC 05DK241		4.4(.173)			2.2(.087)	
†VSAC 05DK271		4.6(.181)			2.4(.094)	
†VSAC 05DK361		5.2(.205)			3.0(.118)	
†VSAC 05DK391		5.4(.215)			3.2(.126)	
†VSAC 05DK431		5.7(.224)			3.5(.138)	
†VSAC 05DK471		6.0(.236)			3.8(.150)	

OUTLINE DIMENSIONS

7 Series

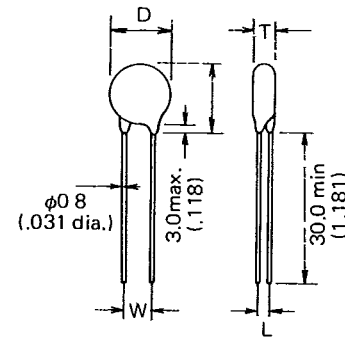
Part No.	Dmax.	T ± 1.0(.039)	W ± 1.0(.039)	Hmax.	L ± 1.0(.039)	Dimensions mm(in.)
VSAC 07DK180	9.0 (.354)	3.5(.138)	5.0 (.197)	12.0 (.472)	1.3(.051)	
VSAC 07DK220		3.6(.142)			1.4(.055)	
VSAC 07DK270		3.7(.146)			1.5(.059)	
VSAC 07DK330		3.9(.154)			1.7(.067)	
VSAC 07DK390		3.8(.150)			1.7(.067)	
VSAC 07DK470		3.9(.154)			1.8(.071)	
VSAC 07DK560		4.0(.157)			1.9(.075)	
VSAC 07DK680		4.2(.165)			2.1(.083)	
VSAC 07DK820		3.6(.142)			1.6(.063)	
VSAC 07DK101		3.7(.146)			1.6(.063)	
VSAC 07DK121		3.8(.150)			1.8(.071)	
VSAC 07DK151		4.0(.157)			2.0(.079)	
†VSAC 07DK201		4.2(.165)			2.0(.079)	
†VSAC 07DK221		4.3(.169)			2.1(.083)	
†VSAC 07DK241		4.4(.173)			2.2(.087)	
†VSAC 07DK271		4.6(.181)			2.4(.094)	
†VSAC 07DK361		5.2(.205)			3.0(.118)	
†VSAC 07DK391		5.4(.213)			3.2(.126)	
†VSAC 07DK431		5.7(.224)			3.5(.138)	
†VSAC 07DK471		6.0(.236)			3.8(.150)	

10 Series

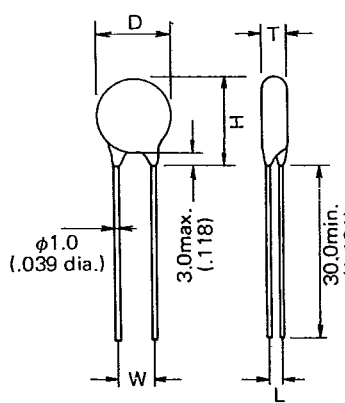
Part No.	Dmax.	T ± 1.0(.039)	W ± 1.0(.039)	Hmax.	L ± 1.0(.039)	Dimensions mm(in.)
VSAC 10DK180	13.5 (.531)	3.6(.142)	7.5 (.295)	16.5 (.650)	1.3(.051)	
VSAC 10DK220		3.7(.146)			1.4(.055)	
VSAC 10DK270		3.8(.150)			1.5(.059)	
VSAC 10DK330		4.0(.157)			1.7(.067)	
VSAC 10DK390		4.1(.161)			1.8(.071)	
VSAC 10DK470		4.0(.157)			1.7(.067)	
VSAC 10DK560		4.1(.161)			1.9(.075)	
VSAC 10DK680		4.3(.169)			2.2(.087)	
VSAC 10DK820		4.0(.157)			1.6(.063)	
VSAC 10DK101		4.1(.161)			1.8(.071)	
VSAC 10DK121		4.2(.165)			2.0(.079)	
VSAC 10DK151		4.5(.177)			2.2(.087)	
†VSAC 10DK201		4.6(.181)			2.2(.087)	
†VSAC 10DK221		4.7(.185)			2.3(.091)	
†VSAC 10DK241		4.8(.181)			2.4(.094)	
†VSAC 10DK271	14.0 (.551)	5.1(.201)		17.0 (.669)	2.6(.102)	
†VSAC 10DK361		5.7(.224)			3.2(.126)	
†VSAC 10DK391		5.8(.228)			3.4(.134)	
†VSAC 10DK431		6.2(.244)			3.7(.146)	
†VSAC 10DK471		6.5(.256)			4.0(.157)	
†VSAC 10DK621		6.2(.244)			3.8(.150)	
†VSAC 10DK681		6.5(.256)			4.1(.161)	
†VSAC 10DK751		6.8(.268)			4.4(.173)	
†VSAC 10DK781		6.9(.272)			4.5(.177)	
†VSAC 10DK821		7.1(.280)			4.7(.185)	
†VSAC 10DK911		7.6(.299)			5.2(.205)	
†VSAC 10DK102		8.0(.315)			5.6(.220)	
†VSAC 10DK112		8.5(.335)			6.1(.240)	

14 Series

OUTLINE DIMENSIONS

Part No.	Dmax.	T ± 1.0(.039)	W ± 1.0(.039)	Hmax.	L ± 1.0(.039)	Dimensions mm(in.)
VSAC 14DK180	17.0 (.669)	3.6(.142)	7.5 (.295)	20.0 (.787)	1.3(.051)	
VSAC 14DK220		3.7(.146)			1.4(.055)	
VSAC 14DK270		3.8(.150)			1.5(.059)	
VSAC 14DK330		4.0(.157)			1.7(.067)	
VSAC 14DK390		4.1(.161)			1.8(.071)	
VSAC 14DK470		4.0(.157)			1.7(.067)	
VSAC 14DK560		4.1(.161)			1.9(.075)	
VSAC 14DK680		4.3(.169)			2.2(.087)	
VSAC 14DK820		4.0(.157)			1.6(.063)	
VSAC 14DK101		4.1(.161)			1.8(.071)	
VSAC 14DK121		4.2(.165)			2.0(.079)	
VSAC 14DK151		4.5(.177)			2.2(.087)	
†VSAC 14DK201		4.6(.181)			2.2(.087)	
†VSAC 14DK221		4.7(.185)			2.3(.091)	
†VSAC 14DK241		4.8(.189)			2.4(.094)	
†VSAC 14DK271	17.5 (.689)	5.1(.201)		20.5 (.807)	2.6(.102)	
†VSAC 14DK361		5.7(.224)			3.2(.126)	
†VSAC 14DK391		5.8(.228)			3.4(.134)	
†VSAC 14DK431		6.2(.244)			3.7(.146)	
†VSAC 14DK471		6.5(.256)			4.0(.157)	
†VSAC 14DK621		6.2(.244)			3.8(.150)	
†VSAC 14DK681		6.5(.256)			4.1(.161)	
†VSAC 14DK751		6.8(.268)			4.4(.173)	
†VSAC 14DK781		6.9(.272)			4.5(.177)	
†VSAC 14DK821		7.1(.280)			4.7(.185)	
†VSAC 14DK911		7.6(.299)			5.2(.205)	
†VSAC 14DK102		8.0(.315)			5.6(.220)	
†VSAC 14DK112		8.5(.335)			6.1(.240)	

20 Series

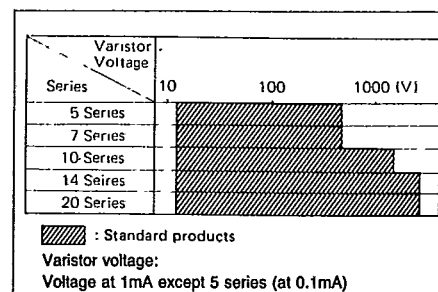
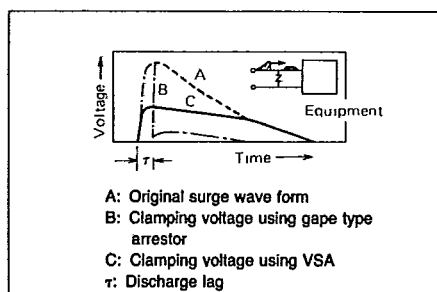
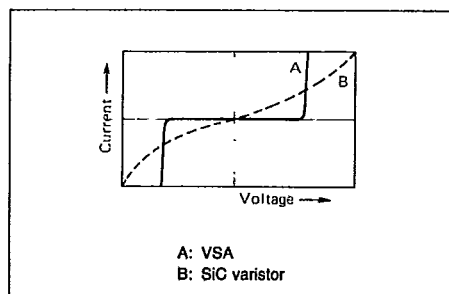
Part No.	Dmax.	T ± 1.0(.039)	W ± 1.0(.039)	Hmax.	L ± 1.0(.039)	Dimensions mm(in.)
VSAC 20DK180	23.0 (.906)	4.1(.161)	10.0 (.394)	27.0 (1.063)	1.5(.059)	
VSAC 20DK220		4.2(.165)			1.6(.063)	
VSAC 20DK270		4.3(.169)			1.7(.067)	
VSAC 20DK330		4.5(.177)			1.9(.075)	
VSAC 20DK390		4.5(.177)			1.9(.075)	
VSAC 20DK470		4.6(.181)			1.9(.075)	
VSAC 20DK560		4.7(.185)			2.1(.083)	
VSAC 20DK680		4.8(.189)			2.4(.094)	
VSAC 20DK820		4.5(.177)			1.8(.071)	
VSAC 20DK101		4.6(.181)			2.0(.079)	
VSAC 20DK121		4.7(.185)			2.2(.087)	
VSAC 20DK151		4.9(.193)			2.4(.094)	
†VSAC 20DK201		5.0(.197)			2.4(.094)	
†VSAC 20DK221		5.2(.205)			2.6(.102)	
†VSAC 20DK241		5.3(.209)			2.7(.106)	
†VSAC 20DK271	24.0 (.945)	5.5(.217)		28.0 (1.102)	2.9(.114)	
†VSAC 20DK361		6.2(.244)			3.5(.138)	
†VSAC 20DK391		6.4(.252)			3.7(.146)	
†VSAC 20DK431		6.7(.264)			4.0(.157)	
†VSAC 20DK471		7.0(.276)			4.3(.169)	
†VSAC 20DK621		6.6(.260)			4.1(.161)	
†VSAC 20DK681		6.9(.272)			4.4(.173)	
†VSAC 20DK751		7.3(.287)			4.8(.189)	
†VSAC 20DK781		7.4(.291)			4.9(.193)	
†VSAC 20DK821		7.6(.299)			5.1(.201)	
†VSAC 20DK911		8.1(.319)			5.6(.220)	
†VSAC 20DK102		8.5(.335)			6.0(.236)	
†VSAC 20DK112		9.0(.354)			6.5(.256)	

FEATURES

Excellent clamping voltage characteristic and fast response time (< 50nsec.) when subjected to impulse surges. Eliminates the discharge lag that is indicative of gap-type arrestors.

Bilateral and symmetrical V-I characteristic curve. The VSA can, therefore, be used both in AC and DC circuits, for protection of either positive or negative transients.

■ Broad varistor voltage from 18 to 1800V.



ELECTRICAL RATINGS

Item	Test Condition/Description	Requirement
Varistor Voltage	The voltage between two terminals with the specified measuring current C_m A DC applied is called V_c . The measurement shall be made as fast as possible to avoid heat affection.	To meet the specified value.
Maximum Allowable voltage	The recommended maximum sine wave voltage (rms) or the maximum DC voltage that can be applied continuously.	
Maximum Clamping voltage	The maximum voltage between two terminals with the specified standard impulse current ($8 \times 20 \mu\text{sec.}$) illustrated below applied.	
Rated Wattage	The maximum power that can be applied within the specified ambient temperature.	
Energy	The maximum energy within the varistor voltage change of $\pm 10\%$ when one impulse of 2msec. is applied. The maximum energy which is figured out as follows. $E = V_m \cdot I_m \cdot T$ E: Energy I_m: Maximum allowable single surge current of 2ms. (rectangular wave form) V_m: Maximum clamping voltage at I_m T: Duration of surge current (2ms.)	
Withstanding Surge Current	The maximum current within the varistor voltage change of $\pm 10\%$ with the standard impulse current ($8 \times 20 \mu\text{sec.}$) applied one time.	
Varistor voltage Temperature Coefficient	$\frac{V_c \text{ at } 20^\circ\text{C}(68^\circ\text{F}) - V_c \text{ at } 70^\circ\text{C}(158^\circ\text{F})}{V_c \text{ at } 20^\circ\text{C}(68^\circ\text{F})} \times \frac{1}{50} \times 100(\%/^\circ\text{C})$	$-0.05\%/^\circ\text{C max.}$

CROSS REFERENCE SELECTOR GUIDE

MALLORY VSA VARISTOR

MALLORY	PANASONIC	GE	SIEMENS	MARCON
—	—	V8ZA05	—	—
—	ERZ-C07DM8R2	V8ZA1	—	—
—	ERZ-C10DM8R2	V8ZA2	—	—
—	—	V12ZA05	—	—
—	ERZ-C07DM120	V12ZA1	—	—
—	ERZ-C10DM120	V12ZA2	—	—
VSAC05DK180	ERZ-C05DK180	V18ZA05	S05K11	TNR-9G180KM
VSAC07DK180	ERZ-C07DK180	V18ZA1	S07K11	
VSAC10DK180	ERZ-C10DK180	V18ZA2	S10K11	
VSAC14DK180	ERZ-C14DK180	V18ZA3	S14K11	
VSAC20DK180	ERZ-C20DK180	V18ZA40	S20K11	
VSAC05DK220	ERZ-C05DK220	V22ZA05	S05K14	TNR-15G220KM
VSAC07DK220	ERZ-C07DK220	V22ZA1	S07K14	
VSAC10DK220	ERZ-C10DK220	V22ZA2	S10K14	
VSAC14DK220	ERZ-C14DK220	V22ZA3	S14K14	
VSAC20DK220	ERZ-C20DK220	V24ZA50	S20K14	
VSAC05DK270	ERZ-C05DK270	V27ZA05	S05K17	TNR-9G270KM
VSAC07DK270	ERZ-C07DK270	V27ZA1	S07K17	
VSAC10DK270	ERZ-C10DK270	V27ZA2	S10K17	
VSAC14DK270	ERZ-C14DK270	V27ZA4	S14K17	
VSAC20DK270	ERZ-C20DK270	V27ZA60	S20K17	
VSAC05DK330	ERZ-C05DK330	V33ZA05	S05K20	TNR-9G330KM
VSAC07DK330	ERZ-C07DK330	V33ZA1	S07K20	
VSAC10DK330	ERZ-C10DK330	V33ZA2	S10K20	
VSAC14DK330	ERZ-C14DK330	V33ZA5	S14K20	
VSAC20DK330	ERZ-C20DK330	V33ZA70	S20K20	
VSAC05DK390	ERZ-C05DK390	V39ZA05	S05K25	TNR-9G390KM
VSAC07DK390	ERZ-C07DK390	V39ZA1	S07K25	
VSAC10DK390	ERZ-C10DK390	V39ZA3	S10K25	
VSAC14DK390	ERZ-C14DK390	V39ZA6	S14K25	
VSAC20DK390	ERZ-C20DK390	V36ZA80	S20K25	
VSAC05DK470	ERZ-C05DK470	V47ZA05	S05K30	TNR-9G470KM
VSAC07DK470	ERZ-C07DK470	V47ZA1	S07K30	
VSAC10DK470	ERZ-C10DK470	V47ZA3	S10K30	
VSAC14DK470	ERZ-C14DK470	V47ZA7	S14K30	
VSAC20DK470	ERZ-C20DK470	—	S20K30	
VSAC05DK560	ERZ-C05DK560	V56ZA05	S05K35	TNR-9G560KM
VSAC07DK560	ERZ-C07DK560	V56ZA2	S07K35	
VSAC10DK560	ERZ-C10DK560	V56ZA3	S10K35	
VSAC14DK560	ERZ-C14DK560	V56ZA8	S14K35	
VSAC20DK560	ERZ-C20DK560	—	S20K35	
VSAC05DK680	ERZ-C05DK680	V68ZA05	S05K40	TNR-9G680KM
VSAC07DK680	ERZ-C07DK680	V68ZA2	S07K40	
VSAC10DK680	ERZ-C10DK680	V68ZA3	S10K40	
VSAC14DK680	ERZ-C14DK680	V68ZA10	S14K40	
VSAC20DK680	ERZ-C20DK680	—	S20K40	
VSAC05DK820	ERZ-C05DK820	V82ZA05	S05K50	TNR-9G820KM
VSAC07DK820	ERZ-C07DK820	V82ZA2	S07K50	
VSAC10DK820	ERZ-C10DK820	V82ZA4	S10K50	
VSAC14DK820	ERZ-C14DK820	V82ZA12	S14K50	
VSAC20DK820	ERZ-C20DK820	—	S20K50	

continued

CROSS REFERENCE SELECTOR GUIDE

MALLORY VSA VARISTOR

MALLORY	PANASONIC	GE	SIEMENS	MARCON
VSAC05DK101 VSAC07DK101 VSAC10DK101 VSAC14DK101 VSAC20DK101	ERZ-C05DK101 ERZ-C07DK101 ERZ-C10DK101 ERZ-C14DK101 ERZ-C20DK101	V100ZA05 V100ZA3 V100ZA4 V100ZA15 —	S05K60 S07K60 S10K60 S14K60 S20K60	TNR-9G101KM TNR-15G101KM
VSAC05DK121 VSAC07DK121 VSAC10DK121 VSAC14DK121 VSAC20DK121	ERZ-C05DK121 ERZ-C07DK121 ERZ-C10DK121 ERZ-C14DK121 ERZ-C20DK121	V120ZA05 V120ZA1 V120ZA4 V120ZA6 —	S05K75 S07K75 S10K75 S14K75 S20K75	TNR-9G121KM TNR-15G121KM
VSAC05DK151 VSAC07DK151 VSAC10DK151 VSAC14DK151 VSAC20DK151	ERZ-C05DK151 ERZ-C07DK151 ERZ-C10DK151 ERZ-C14DK151 ERZ-C20DK151	V150ZA05 V150ZA1 V150ZA4 V150ZA8 —	S05K95 S07K95 S10K95 S14K95 S20K95	TNR-9G151KM TNR-15G151KM
†VSAC05DK201 †VSAC07DK201 †VSAC10DK201 †VSAC14DK201 †VSAC20DK201	ERZ-C05DK201U ERZ-C07DK201U ERZ-C10DK201U ERZ-C14DK201U ERZ-C20DK201U	V180ZA05 V180ZA1/V130LA1,2 V180ZA5/V130LA5 V180ZA10/V130LA10A V130LA20A,20B	S05K130 S07K130 S10K130 S14K130 S20K130	TNR-9G181KM/TNR-9G211 TNR-15G181KM/TNR-15G211 TNR-23G201KM/TNR-23G211
†VSAC05DK221 †VSAC07DK221 †VSAC10DK221 †VSAC14DK221 †VSAC20DK221	ERZ-C05DK221U ERZ-C07DK221U ERZ-C10DK221U ERZ-C14DK221U ERZ-C20DK221U	V220ZA05 V140LA2 V140LA5 V140ZA10A —	S05K140 S07K140 S10K140 S14K140 S20K140	
†VSAC05DK241 †VSAC07DK241 †VSAC10DK241 †VSAC14DK241 †VSAC20DK241	ERZ-C05DK241U ERZ-C07DK241U ERZ-C10DK241U ERZ-C14DK241U ERZ-C20DK241U	— V150LA1,2 V150LA5 V150LA10A V150LA20A,20B	S05K150 S07K150 S10K150 S14K150 S20K150	TNR-9G241KM TNR-15G241KM TNR-23G291KM
†VSAC05DK271 †VSAC07DK271 †VSAC10DK271 †VSAC14DK271 †VSAC20DK271	ERZ-C05DK271 ERZ-C07DK271 ERZ-C10DK271 ERZ-C14DK271 ERZ-C20DK271	V270ZA05 V175LA2 — V175LA10A —	S05K175 S07K175 S10K175 S14K175 S20K175	
†VSAC05DK361 †VSAC07DK361 †VSAC10DK361 †VSAC14DK361 †VSAC20DK361	ERZ-C05DK361 ERZ-C07DK361 ERZ-C10DK361 ERZ-C14DK361 ERZ-C20DK361	V330ZA05 V230LA4 V230LA10 V230LA20A —	S05K230 S07K230 S10K230 S14K230 S20K230	
†VSAC05DK391 †VSAC07DK391 †VSAC10DK391 †VSAC14DK391 †VSAC20DK391	ERZ-C05DK391 ERZ-C07DK391 ERZ-C10DK391 ERZ-C14DK391 ERZ-C20DK391	V390ZA05 V250LA2,4 V250LA10 V250LA20A V250LA40A,40B	S05K250 S07K250 S10K250 S14K250 S20K250	TNR-15G391KM TNR-23G391KM
†VSAC05DK431 †VSAC07DK431 †VSAC10DK431 †VSAC14DK431 †VSAC20DK431	ERZ-C05DK431 ERZ-C07DK431 ERZ-C10DK431 ERZ-C14DK431 ERZ-C20DK431	V430ZA05 V275LA2,4 V275LA10 V275LA20A V275LA40A,40B	S05K275 S07K275 S10K275 S14K275 S20K275	TNR-9G431KM TNR-15G431KM TNR-23G431KM

CROSS REFERENCE SELECTOR GUIDE

MALLORY VSA VARISTOR

MALLORY	PANASONIC	GE	SIEMENS	MARCON
†VSAC05DK471	ERZ-C05DK471	—	S05K300	
†VSAC07DK471	ERZ-C07DK471	V300LA2,4	S07K300	
†VSAC10DK471	ERZ-C10DK471	—	S10K300	
†VSAC14DK471	ERZ-C14DK471	V320LA20A	S14K300	
†VSAC20DK471	ERZ-C20DK471	V320LA40B	S20K300	
†VSAC10DK621	ERZ-C10DK621	V385LA10	S10K385	
†VSAC14DK621	ERZ-C14DK621	V385LA20A	S14K385	
†VSAC20DK621	ERZ-C20DK621	V385LA40B	S20K385	
†VSAC10DK681	ERZ-C10DK681	V420LA10	S10K420	
†VSAC14DK681	ERZ-C14DK681	V420LA20A	S14K420	TNR-15G681KM
†VSAC20DK681	ERZ-C20DK681	V420LA40B	S20K420	TNR-28G651KM
†VSAC10DK751	ERZ-C10DK751	V460LA10	S10K460	
†VSAC14DK751	ERZ-C14DK751	V460LA20A	S14K460	TNR-15G751KM
†VSAC20DK751	ERZ-C20DK751	V460LA40B	S20K460	
†VSAC10DK781	ERZ-C10DK781	—	S10K485	
†VSAC14DK781	ERZ-C14DK781	V480LA40A	S14K485	TNR-15G751KM
†VSAC20DK781	ERZ-C20DK781	V480LA80B	S20K485	
†VSAC10DK821	ERZ-C10DK821	—	S10K510	
†VSAC14DK821	ERZ-C14DK821	V510LA40A	S14K510	TNR-15G821KM
†VSAC20DK821	ERZ-C20DK821	V510LA80B	S20K510	
†VSAC10DK911	ERZ-C10DK911	—	S10K550	
†VSAC14DK911	ERZ-C14DK911	V575LA40A	S14K550	
†VSAC20DK911	ERZ-C20DK911	V575LA80B	S20K550	
†VSAC10DK102	ERZ-C10DK102	—	S10K625	
†VSAC14DK102	ERZ-C14DK102	V660LA50A	S14K625	
†VSAC20DK102	ERZ-C20DK102	V660LA100B	S20K625	
†VSAC10DK112	ERZ-C10DK112	—	S10K680	
†VSAC14DK112	ERZ-C14DK112	V660LA50A	S14K680	
†VSAC20DK112	ERZ-C20DK112	V660LA100B	S20K680	
—	ERZ-C14DK182	V1000LA80A	S14K1000	
—	ERZ-C20DK182	V1000LA160B	S20K1000	

† UL Approved. Model available with your indication of suffix "U".

MALLORY

Type VSA● Varistors: Transient/Surge Absorbers

Part No.	Maximum Allowable Voltage		Varistor* Voltage	Max. Clamping Voltage @ Test Current (8 × 20μsec.)		Energy (2ms.)	Withstanding Surge Current (8 × 20μsec. 1 time)	Typical Capacitance @ 1kHz(pF)
	ACrms(V)	DC(V)		Vc(V)	Ip(A)			
*VSAC10DK781 *VSAC14DK781 *VSAC20DK781	485	640	780 (702 ~ 858)	1290 1290 1290	25 50 100	50 105 180	2500 4500 6500	120 230 420
*VSAC10DK821 *VSAC14DK821 *VSAC20DK821	510	670	820 (738 ~ 902)	1355 1355 1355	25 50 100	55 110 190	2500 4500 6500	110 200 400
*VSAC10DK911 *VSAC14DK911 *VSAC20DK911	550	745	910 (819 ~ 1001)	1500 1500 1500	25 50 100	60 120 215	2500 4500 6500	100 180 350
*VSAC10DK102 *VSAC14DK102 *VSAC20DK102	625	825	1000 (900 ~ 1100)	1650 1650 1650	25 50 100	65 130 230	2500 4500 6500	90 150 320
*VSAC10DK112 *VSAC14DK112 *VSAC20DK112	680	895	1100 (990 ~ 1210)	1815 1815 1815	25 50 100	70 140 250	2500 4500 6500	80 150 300

Notes: 1. *Varistor Voltage: 5 Series — V01.mA
7, 10, 14, 20 Series — V1mA

2. Rated Wattage:

Part No.	Rated Wattage (W)	Part No.	Rated Wattage (W)
VSAC05DK180 ~ 680	0.01	VSAC05DK820 ~ 471	0.1
VSAC07DK180 ~ 680	0.02	VSAC07DK820 ~ 471	0.25
VSAC10DK180 ~ 680	0.05	VSAC10DK820 ~ 112	0.4
VSAC14DK180 ~ 680	0.1	VSAC14DK820 ~ 182	0.6
VSAC20DK180 ~ 680	0.2	VSAC20DK820 ~ 182	1.0

3. Operating temperature range: -40 to 85°C (-40 to 185°F)

4. Storage temperature range: -40 to 125°C (-40 to 257°F)

5. Maximum clamping voltage as a function of surge current is obtainable from the respective V-I characteristic curves.

6. Maximum leakage current: refer to the V-I curves.

7. *: UL approved model available with your indication of suffix "U".

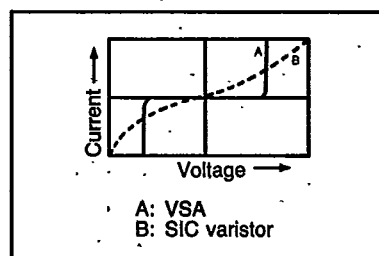
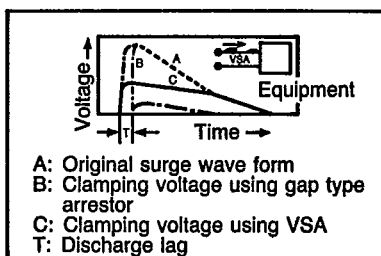
File No. E62674 Across the line varistor.

File No. E86821 Transient Voltage surge suppressor.

Features

* Excellent clamping voltage characteristic and fast response time (<50nsec.) when subjected to impulse surges. Eliminates the discharge lag that is indicative of gap-type arrestors.

* Bilateral and symmetrical V-I characteristic curve. The VSA can, therefore, be used both in AC and DC circuits, for protection of either positive or negative transient.



Part Number Code

Common Code	Element Dia.	Type	Tolerance	Varistor Voltage	Suffix
V S A C					
05	ø 5mm (.197")	D	J ± 5%		
07	ø 7mm (.276")		K ± 10%		
10	ø 10mm (.394")		S Special		
14	ø 14mm (.551")				
20	ø 20mm (.787")				

The first two digits are significant figures and the third one denotes the number of zeros following. Decimal point is expressed by R.