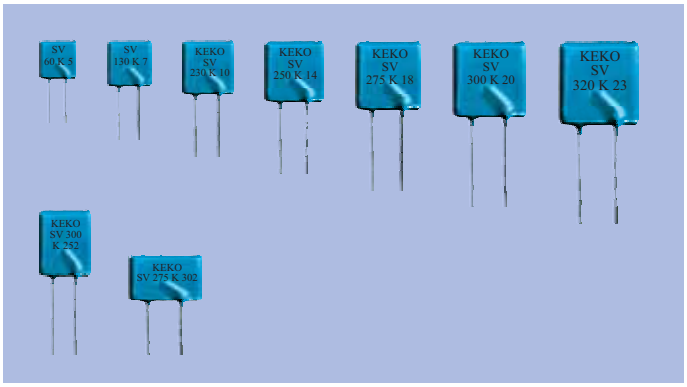
KEKO

VARICON

SPECIAL MEDIUM VOLTAGE VARISTORS
SV SERIES

Description

SV Series is a series of lead style epoxy coated square or rectangular shaped varistors with AC operating voltage ranging from 60 V to 550 V. There are two branches of these varistors.



The first consists of square shaped varistors with extremely high current and energy capabilities and low clamping voltage, providing increased level of protection necessary for the transients expected in telecommunication and AC power networks. Compared to electrically equivalent disc varistors, SV varistors are realised on smaller nominal dimensions.

With the second branch of SV series the customer is offered the opportunity to design the optimum varistor with the minimum dimensions to satisfy his own specific application. Parameters free to be chosen are : non-standard DC/AC operating voltage, leakage current, clamping voltage, maximum surge current, energy absorption level, maximum dissipation power as well as shape, the dimensions being the function of required electrical parameters and vice-versa.

Features

Standard Varistor Types

- *Operating voltage range V_{rms} .....60 V to 550 V.*
- *Operating voltage range V_{dc} .....85 V to 745 V.*
- *6 Models sizes equivalent to standard disc varistors : 5 mm, 7 mm, 10 mm, 14 mm, 20 mm, 23 mm.*
- *Smaller nominal dimensions.*
- *Broad range of current and energy handling capabilities.*
- *+ 85 °C continuous operating temperature.*
- *Low clamping voltage.*
- *Available with straight and crimped leads.*
- *Available in tape and reel for automatic pick and place.*
- *UL1449 & CSA C22.2 File E221545 Section4.* c UL us
- *Lead free components.*

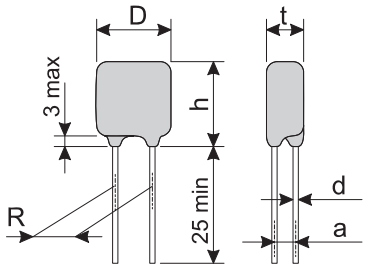
Full Custom Parameter Design Varistors

- *Operating voltage range V_{rms} .....60 V to 1000 V.*
- *Operating voltage range V_{dc} .....85 V to 1300 V.*
- *Indefinite number of sizes of both square and rectangular shape, the maximum one being 23 x 23 mm.*
- *Broad range of current and energy handling capabilities.*
- *+ 125 °C continuous operating temperature.*
- *Electrical parameters free to be chosen are AC/DC operating voltage, leakage current, clamping voltage, maximum surge current, energy absorption level, maximum dissipation power and threshold voltage temperature coefficient.*
- *Available in tape and reel for automatic pick and place.*
- *SV...K 20 with Imax = 1 x 15 kA @ 8/20 ms is available upon request.*
- *SV...K 23 with Imax = 1 x 20 kA @ 8/20 ms is available upon request.*

Absolute Maximum Ratings

Continuous :	**Standard Types**	Units	**Custom Designed Types**	Units
Steady State Applied Voltage :				
DC Voltage Range (V_{dc})	85 to 745	V	85 to 1300	V
AC Voltage Range (V_{rms})	60 to 550	V	60 to 1000	V
Transient :				
Peak Single Pulse Surge Current, 8/20 µs Waveform, (I_{max})	600 to 15,000	A	> 5500	A/cm^2
Single Pulse Surge Energy, 10/1000 µs Waveform (W_{max})	4 to 815	J	> 400	J/cm^3
Operating Ambient Temperature	-40 to +85	°C	-40 to +125	°C
Storage Temperature Range	-40 to +125	°C	-40 to +125	°C
Threshold Voltage Temperature Coefficient	< +0.05	%/°C	< +0.05	%/°C
Insulation Resistance	> 1	GΩ	> 1	GΩ
Isolation Voltage Capability	> 2.5	kV	> 2.5	kV
Response Time	< 25	ns	< 25	ns
Climatic Category	40 / 85 / 56		40 / 125 / 56	

Device Ratings and Characteristics



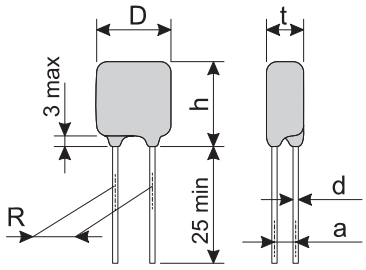
SV 60 K 5.....SV 230 K 23

Type	V_{rms}	V_{dc}	V_n @ 1 mA	V_c	I_c	W_{max} 10/1000 µs	P max	I_{max}* 8/20 µs	$C_{typ.}$ 1 kHz	D max	t max	R	d	h max
	V	V	V	V	A	J	W	A	pF	mm	mm	mm	mm	mm
SV 60 K 5	60	85	100	155	5	4	0,1	600	370	7	3,5	5	0,6	9,5
SV 60 K 7	60	85	100	155	10	9	0,25	1750	900	9	3,5	5	0,6	11,5
SV 60 K 10	60	85	100	155	25	20	0,4	3500	1380	12	4,1	7,5	0,8	15
SV 60 K 14	60	85	100	155	50	42	0,6	8000	2300	16	4,2	7,5	0,8	19
SV 60 K 20	60	85	100	155	100	89	1	12000	3400	22,5	4,5	10	0,8	26
SV 75 K 5	75	100	120	190	5	5	0,1	600	300	7	3,6	5	0,6	9,5
SV 75 K 7	75	100	120	190	10	11	0,25	1750	720	9	3,6	5	0,6	11,5
SV 75 K 10	75	100	120	190	25	26	0,4	3500	1080	12	4,2	7,5	0,8	15
SV 75 K 14	75	100	120	190	50	51	0,6	8000	1850	16	4,2	7,5	0,8	19
SV 75 K 20	75	100	120	190	100	101	1	12000	3100	22,5	4,6	10	0,8	26
SV 95 K 5	95	125	150	240	5	7	0,1	600	240	7	3,8	5	0,6	9,5
SV 95 K 7	95	125	150	240	10	14	0,25	1750	580	9	3,8	5	0,6	11,5
SV 95 K 10	95	125	150	240	25	31	0,4	3500	870	12	4,3	7,5	0,8	15
SV 95 K 14	95	125	150	240	50	64	0,6	8000	1480	16	4,3	7,5	0,8	19
SV 95 K 20	95	125	150	240	100	133	1	12000	2700	22,5	4,6	10	0,8	26
SV 115 K 5	115	150	180	290	5	8	0,1	600	200	7	4,0	5	0,6	9,5
SV 115 K 7	115	150	180	290	10	16	0,25	1750	480	9	4,0	5	0,6	11,5
SV 115 K 10	115	150	180	290	25	37	0,4	3500	750	12	4,3	7,5	0,8	15
SV 115 K 14	115	150	180	290	50	78	0,6	8000	1230	16	4,4	7,5	0,8	19
SV 115 K 20	115	150	180	290	100	147	1	12000	2200	22,5	4,8	10	0,8	26
SV 130 K 5	130	170	205	320	5	9	0,1	600	180	7	4,0	5	0,6	9,5
SV 130 K 7	130	170	205	320	10	19	0,25	1750	430	9	4,0	5	0,6	11,5
SV 130 K10	130	170	205	320	25	42	0,4	3500	670	12	4,5	7,5	0,8	15
SV 130 K 14	130	170	205	320	50	85	0,6	8000	1100	16	4,6	7,5	0,8	19
SV 130 K 20	130	170	205	320	100	177	1	12000	2150	22,5	5,0	10	1	26
SV 130 K 23	130	170	205	320	100	222	1	15000	3390	25	5,0	10	1	27
SV 140 K 5	140	180	220	340	5	9	0,1	600	170	7	4,1	5	0,6	9,5
SV 140 K 7	140	180	220	340	10	22	0,25	1750	400	9	4,1	5	0,6	11,5
SV 140 K 10	140	180	220	340	25	46	0,4	3500	620	12	4,6	7,5	0,8	15
SV 140 K 14	140	180	220	340	50	94	0,6	8000	1020	16	4,7	7,5	0,8	19
SV 140 K 20	140	180	220	340	100	196	1	12000	1900	22,5	5,4	10	1	26
SV 140 K 23	140	180	220	340	100	247	1	15000	3340	25	5,4	10	1	27
SV 150 K 5	150	200	240	360	5	11	0,1	600	160	7	4,3	5	0,6	9,5
SV 150 K 7	150	200	240	360	10	23	0,25	1750	380	9	4,3	5	0,6	11,5
SV 150 K 10	150	200	240	360	25	51	0,4	3500	590	12	4,8	7,5	0,8	15
SV 150 K 14	150	200	240	360	50	101	0,6	8000	690	16	4,8	7,5	0,8	19
SV 150 K 20	150	200	240	360	100	213	1	12000	1740	22,5	5,6	10	1	26
SV 150 K 23	150	200	240	360	100	270	1	15000	3050	25	5,6	10	1	27
SV 175 K 5	175	225	270	420	5	11	0,1	600	140	7	4,8	5	0,6	9,5
SV 175 K 7	175	225	270	420	10	26	0,25	1750	330	9	4,8	5	0,6	11,5
SV 175 K 10	175	225	270	420	25	58	0,4	3500	500	12	5,0	7,5	0,8	15
SV 175 K 14	175	225	270	420	50	119	0,6	8000	830	16	5,0	7,5	0,8	19
SV 175 K 20	175	225	270	420	100	241	1	12000	1630	22,5	5,8	10	1	26
SV 175 K 23	175	225	270	420	100	305	1	15000	2870	25	5,8	10	1	27
SV 230 K 5	230	300	360	550	5	16	0,1	600	110	7	4,8	5	0,6	9,5
SV 230 K 7	230	300	360	550	10	35	0,25	1750	250	9	4,8	5	0,6	11,5
SV 230 K 10	230	300	360	550	25	78	0,4	3500	400	12	5,4	7,5	0,8	15
SV 230 K 14	230	300	360	550	50	157	0,6	8000	650	16	5,5	7,5	0,8	19
SV 230 K 20	230	300	360	550	100	322	1	12000	1220	22,5	5,9	10	1	26
SV 230 K 23	230	300	360	550	100	407	1	15000	2020	25	5,9	10	1	27

Type SV....K 20 with Imax = 1 x 15 kA @ 8/20 µs available upon request

Type SV....K 23 with Imax = 1 x 20 kA @ 8/20 µs available upon request

Device Ratings and Characteristics



SV 250 K 5.....SV 550 K 23

Type	V_{rms}	V_{dc}	V_n @ 1 mA	V_c	I_c	W_{max} 10/1000 µs	P max	I_{max}* 8/20 µs	$C_{typ.}$ 1 kHz	D max	t max	R	d	h max
	V	V	V	V	A	J	W	A	pF	mm	mm	mm	mm	mm
SV 250 K 5	250	320	390	590	5	17	0,1	600	100	7	5,0	5	0,6	9,5
SV 250 K 7	250	320	390	590	10	38	0,25	1750	240	9	5,0	5	0,6	11,5
SV 250 K 10	250	320	390	590	25	85	0,4	3500	370	12	5,6	7,5	0,8	15
SV 250 K 14	250	320	390	590	50	169	0,6	8000	600	16	5,7	7,5	0,8	19
SV 250 K 20	250	320	390	590	100	345	1	12000	1130	22,5	6,1	10	1	26
SV 250 K 23	250	320	390	590	100	437	1	15000	1980	25	6,1	10	1	27
SV 275 K 5	275	350	430	680	5	20	0,1	600	90	7	5,6	5	0,6	9,5
SV 275 K 7	275	350	430	680	10	44	0,25	1750	220	9	5,6	5	0,6	11,5
SV 275 K 10	275	350	430	680	25	97	0,4	3500	350	12	6,0	7,5	0,8	15
SV 275 K 14	275	350	430	680	50	187	0,6	8000	550	16	6,0	7,5	0,8	19
SV 275 K 20	275	350	430	680	100	380	1	12000	1030	22,5	6,3	10	1	26
SV 275 K 23	275	350	430	680	100	481	1	15000	1800	25	6,3	10	1	27
SV 300 K 7	300	385	470	700	10	46	0,25	1750	200	9	5,8	5	0,6	11,5
SV 300 K 10	300	385	470	700	25	102	0,4	3500	320	12	6,1	7,5	0,8	15
SV 300 K 14	300	385	470	700	50	211	0,6	8000	510	16	6,1	7,5	0,8	19
SV 300 K 20	300	385	470	700	100	437	1	12000	940	22,5	6,6	10	1	27
SV 300 K 23	300	385	470	700	100	554	1	15000	1650	25	6,6	10	1	29
SV 320 K 10	320	420	510	760	25	144	0,4	3500	300	12	6,5	7,5	0,8	15
SV 320 K 14	320	420	510	760	50	230	0,6	8000	480	16	6,8	7,5	0,8	19
SV 320 K 20	320	420	510	760	100	485	1	12000	860	22,5	6,8	10	1	27
SV 320 K 23	320	420	510	760	100	611	1	15000	1520	25	6,8	10	1	29
SV 385 K 10	385	505	620	900	25	116	0,4	3500	270	12	6,9	7,5	0,8	15
SV 385 K 14	385	505	620	900	50	241	0,6	8000	410	16	6,9	7,5	0,8	19
SV 385 K 20	385	505	620	900	100	495	1	12000	710	22,5	7,5	10	1	27
SV 385 K 23	385	505	620	900	100	624	1	15000	1250	25	7,5	10	1	29
SV 420 K 10	420	560	680	980	25	121	0,4	3500	240	12	7,3	7,5	0,8	15
SV 420 K 14	420	560	680	980	50	253	0,6	8000	380	16	7,4	7,5	0,8	19
SV 420 K 20	420	560	680	980	100	523	1	12000	680	22,5	7,8	10	1	27
SV 420 K 23	420	560	680	980	100	670	1	15000	1200	25	7,8	10	1	29
SV 460 K 10	460	615	750	1080	25	132	0,4	3500	230	12	7,8	7,5	0,8	15
SV 460 K 14	460	615	750	1080	50	275	0,6	8000	350	16	7,8	7,5	0,8	19
SV 460 K 20	460	615	750	1080	100	572	1	12000	620	22,5	8,2	10	1	27
SV 460 K 23	460	615	750	1080	100	728	1	15000	1080	25	8,2	10	1	29
SV 510 K 10	510	670	820	1200	25	144	0,4	3500	210	12	8,2	7,5	0,8	15
SV 510 K 14	510	670	820	1200	50	284	0,6	8000	330	16	8,2	7,5	0,8	19
SV 510 K 20	510	670	820	1200	100	598	1	12000	570	22,5	8,7	10	1	27
SV 510 K 23	510	670	820	1200	100	750	1	15000	1000	25	8,7	10	1	29
SV 550 K 10	550	745	910	1350	25	168	0,4	3500	200	12	8,8	7,5	0,8	15
SV 550 K 14	550	745	910	1350	50	330	0,6	8000	310	16	8,8	7,5	0,8	19
SV 550 K 20	550	745	910	1350	100	644	1	12000	510	22,5	9,2	10	1	27
SV 550 K 23	550	745	910	1350	100	815	1	15000	900	25	9,2	10	1	29

Type SV....K 20 with Imax = 1 x 15 kA @ 8/20 µs available upon request

Type SV....K 23 with Imax = 1 x 20 kA @ 8/20 µs available upon request

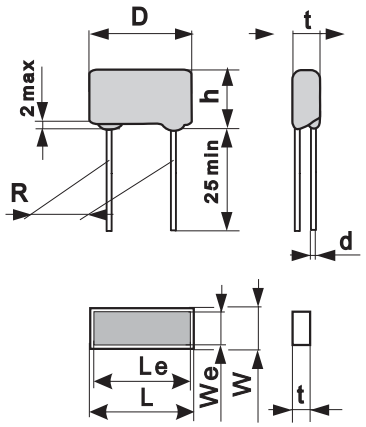
KEKO

VARICON

Full Custom Parameter Design Varistors

SV Series branch of full custom parameter designed varistors consists of square or rectangular shaped varistors, available either as epoxy coated lead style components or as metallized pellets.

The customer can specify varistor electrical properties and set the limits of size parameters following General Technical Data given below. The customer can also choose to have standard electrical parameters in non-standard varistor shape and size to fit the available housing. The customer will have our full engineering support in realising his specific protection requirement.



General Technical Data

		Value	Units
Electrical Parameters			
Varistor Threshold Voltage (V_n) Range at 1 mA		100 to 910	V
Continuous :			
Steady State Applied Voltage :			
DC Voltage Range (V_{dc})		85 to 745	V
AC Voltage Range (V_{rms})		60 to 550	V
Transient :			
Peak Single Pulse Surge Current, 8/20 µs Waveform, (I_{max})		> 5500	A/cm^2
Single Pulse Surge Energy, 10/1000 µs Waveform (W_{max})		> 400	J/cm^3
Protective Level			
Clamping Voltage		< 1.9 x Vdc	V
Coefficient of non - linearity a	minimum	45	
	typical	60	
Leakage Current Level	at 25 °C	0.5	µA/cm^2
	at 85 °C	10	µA/cm^2
Temperature behaviour			
Operating Ambient Temperature		-40 to +85	°C
Storage Temperature Range		-40 to +125	°C
Minimum Threshold Voltage Temperature Coefficient		- 0.001	%/°C
Design			
Leaded	- coating	epoxy resin	
	- lead style	straight or crimped	
Pellet		solderable electrode finish	
Size Parameters			
Minimum Size		3 x 3	mm
Maximum Size		23 x 23	mm
Shape		square, rectangular	
Lead Spacing R		2.5, 5.0, 7.5, 10,	mm
Wire Diameter d		0.6, 0.8, 1.0	mm
Packaging		bulk, tape and reel	

Ordering Information

SV1 250 K 802 B

- **SV -** Series Name
- **1 -** Design : no number = pellet, 1 = straight leads, 5 = inward crimped leads
- **250 -** Maximum Continuous Operating Voltage V_{rms}
- **K -** V_n Tolerance : J = ± 5 %, K = ± 10 %, S = special
- **802 -** Surge Current (8/20 µs) Code : 802 = 8000 A
- **B -** Packaging : R = Reel, A = Ammo pack, B = Bulk
- **Other -** Other parameters are either specified separately or are the function of electrical and/or size parameters

Varistor Marking

KEKO
SV 250
K 802

- **KEKO -** Tradename
- **SV -** Series Name
- **250 -** V_{rms}
- **K -** V_n Tolerance
- **802 -** Surge Current Code