

DISC Ceramic Capacitors



Ceramic Type 96

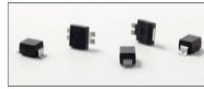
Ultra High Voltage(UHV) Ceramic Capacitor 106

SVC Varistors Type 114



新产品介绍

SMDC(Surface Mount Disc Capacitor-表面安装用盘式电容器)



产品概要

原先的DCC(Disc Ceramic Capacitor-片式陶瓷电容器)为Dip Type, 因为其产品高度和安装方法的限制, 不适合电子设备的小型化/薄层化。相反, SMDC特殊设计为表面安装用, 具有高精度和宽幅1kV~6kV范围的额定电压。

项目	DCC	SMDC	SMDC的优点
结构			表面安装容易 节省安装费用 抗冲击强 可以使用多层PCB
应用领域	- LCD Backlighting Inverter的 Ballast线路 (3~6kVDC) - Switching Power Supply的 Snubber线路 (1~2kVDC)		

产品特点

- Reflow Soldering用Resin Mold Type SMD (节省安装费用/空间)
- 高精度
- 宽幅额定电压范围(1kV~6kV)

应用领域

- LCD Backlight用变频器/Ballast线路
- Switching Power Supply或DC-DC Converter的Snubber Capacitor

Ceramic Type

Introduction

SAMWHA disc ceramic capacitors are designed and produced to offer the user capacitors with high reliability and small size. With wide selection of temperature characteristics and voltage ratings, the user can make use for in various circuit application.

* special specification like a Automobile, Medical, Military, Aviation should be discuss with our sales representatives

How to Order

EK R 3A 102 K 09 F K 5



Style & Class

Mark	Product Name	Mark	Product Name
CC, EC	Temperature Compensating Type	SD	AC250V(420V)Testing Voltage: AC400V
OK, EK	High Dielectric Type	SC	AC250V(420V)Testing Voltage: AC250V
CG	Semiconductive Type		

Temp. Char.

CC, EC Type (PPM/°C)				OK, EK, CG, SC, SD Type			
C	NPO(0)	T	N470(-470)	B	Y5P(+15~-12%)		
L	N40(-40)	U	N750(-750)	K	Y5R(+15~-15%)		
P	N750(-150)	O	S(-150~-1000)	E	Y5U(+22~-54%)		
R	N220(-220)			F	Y5V(+22~-82%)		
S	N330(-330)						

Rating Voltage

1A	10V	1B	12.5V	1C	16V	1E	25V	1F	30V	1G	40V	1H	50V	1I	60V	1J	75V	1K	100V	1L	125V	1M	160V	1N	200V	1O	250V	1P	300V	1Q	350V	1R	400V	1S	450V	1T	500V	1U	550V	1V	600V	1W	650V	1X	700V	1Y	750V	1Z	800V	1AA	850V	1AB	900V	1AC	950V	1AD	1000V	1AE	1050V	1AF	1100V	1AG	1150V	1AH	1200V	1AI	1250V	1AJ	1300V	1AK	1350V	1AL	1400V	1AM	1450V	1AN	1500V	1AO	1550V	1AP	1600V	1AQ	1650V	1AR	1700V	1AS	1750V	1AT	1800V	1AU	1850V	1AV	1900V	1AW	1950V	1AX	2000V	1AY	2050V	1AZ	2100V	1BA	2150V	1BB	2200V	1BC	2250V	1BD	2300V	1BE	2350V	1BF	2400V	1BG	2450V	1BH	2500V	1BI	2550V	1BJ	2600V	1BK	2650V	1BL	2700V	1BM	2750V	1BN	2800V	1BO	2850V	1BP	2900V	1BQ	2950V	1BR	3000V	1BS	3050V	1BT	3100V	1BU	3150V	1BV	3200V	1BW	3250V	1BX	3300V	1BY	3350V	1BZ	3400V	1CA	3450V	1CB	3500V	1CC	3550V	1CD	3600V	1CE	3650V	1CF	3700V	1CG	3750V	1CH	3800V	1CI	3850V	1CJ	3900V	1CK	3950V	1CL	4000V	1CM	4050V	1CN	4100V	1CO	4150V	1CP	4200V	1CQ	4250V	1CR	4300V	1CS	4350V	1CT	4400V	1CU	4450V	1CV	4500V	1CW	4550V	1CX	4600V	1CY	4650V	1CZ	4700V	1DA	4750V	1DB	4800V	1DC	4850V	1DD	4900V	1DE	4950V	1DF	5000V	1DG	5050V	1DH	5100V	1DI	5150V	1DJ	5200V	1DK	5250V	1DL	5300V	1DM	5350V	1DN	5400V	1DO	5450V	1DP	5500V	1DQ	5550V	1DR	5600V	1DS	5650V	1DT	5700V	1DU	5750V	1DV	5800V	1DW	5850V	1DX	5900V	1DY	5950V	1DZ	6000V	1EA	6050V	1EB	6100V	1EC	6150V	1ED	6200V	1EE	6250V	1EF	6300V	1EG	6350V	1EH	6400V	1EI	6450V	1EJ	6500V	1EK	6550V	1EL	6600V	1EM	6650V	1EN	6700V	1EO	6750V	1EP	6800V	1EQ	6850V	1ER	6900V	1ES	6950V	1ET	7000V	1EU	7050V	1EV	7100V	1EW	7150V	1EX	7200V	1EY	7250V	1EZ	7300V	1FA	7350V	1FB	7400V	1FC	7450V	1FD	7500V	1FE	7550V	1FF	7600V	1FG	7650V	1FH	7700V	1FI	7750V	1FJ	7800V	1FK	7850V	1FL	7900V	1FM	7950V	1FN	8000V	1FO	8050V	1FP	8100V	1FQ	8150V	1FR	8200V	1FS	8250V	1FT	8300V	1FU	8350V	1FV	8400V	1FW	8450V	1FX	8500V	1FY	8550V	1FZ	8600V	1GA	8650V	1GB	8700V	1GC	8750V	1GD	8800V	1GE	8850V	1GF	8900V	1GG	8950V	1GH	9000V	1GI	9050V	1GJ	9100V	1GK	9150V	1GL	9200V	1GM	9250V	1GN	9300V	1GO	9350V	1GP	9400V	1GQ	9450V	1GR	9500V	1GS	9550V	1GT	9600V	1GU	9650V	1GV	9700V	1GW	9750V	1GX	9800V	1GY	9850V	1GZ	9900V	1HA	9950V	1HB	10000V	1HC	10050V	1HD	10100V	1HE	10150V	1HF	10200V	1HG	10250V	1HH	10300V	1HI	10350V	1HJ	10400V	1HK	10450V	1HL	10500V	1HM	10550V	1HN	10600V	1HO	10650V	1HP	10700V	1HQ	10750V	1HR	10800V	1HS	10850V	1HT	10900V	1HU	10950V	1HV	11000V	1HW	11050V	1HX	11100V	1HY	11150V	1HZ	11200V	1IA	11250V	1IB	11300V	1IC	11350V	1ID	11400V	1IE	11450V	1IF	11500V	1IG	11550V	1IH	11600V	1II	11650V	1IJ	11700V	1IK	11750V	1IL	11800V	1IM	11850V	1IN	11900V	1IO	11950V	1IP	12000V	1IQ	12050V	1IR	12100V	1IS	12150V	1IT	12200V	1IU	12250V	1IV	12300V	1IW	12350V	1IX	12400V	1IY	12450V	1IZ	12500V	1JA	12550V	1JB	12600V	1JC	12650V	1JD	12700V	1JE	12750V	1JF	12800V	1JG	12850V	1JH	12900V	1JI	12950V	1JJ	13000V	1JK	13050V	1JL	13100V	1JM	13150V	1JN	13200V	1JO	13250V	1JP	13300V	1JQ	13350V	1JR	13400V	1JS	13450V	1JT	13500V	1JU	13550V	1JV	13600V	1JW	13650V	1JX	13700V	1JY	13750V	1JZ	13800V	1KA	13850V	1KB	13900V	1KC	13950V	1KD	14000V	1KE	14050V	1KF	14100V	1KG	14150V	1KH	14200V	1KI	14250V	1KJ	14300V	1KK	14350V	1KL	14400V	1KM	14450V	1KN	14500V	1KO	14550V	1KP	14600V	1KQ	14650V	1KR	14700V	1KS	14750V	1KT	14800V	1KU	14850V	1KV	14900V	1KW	14950V	1KX	15000V	1KY	15050V	1KZ	15100V	1LA	15150V	1LB	15200V	1LC	15250V	1LD	15300V	1LE	15350V	1LF	15400V	1LG	15450V	1LH	15500V	1LI	15550V	1LJ	15600V	1LK	15650V	1LL	15700V	1LM	15750V	1LN	15800V	1LO	15850V	1LP	15900V	1LQ	15950V	1LR	16000V	1LS	16050V	1LT	16100V	1LU	16150V	1LV	16200V	1LW	16250V	1LX	16300V	1LY	16350V	1LZ	16400V	1MA	16450V	1MB	16500V	1MC	16550V	1MD	16600V	1ME	16650V	1MF	16700V	1MG	16750V	1MH	16800V	1MI	16850V	1MJ	16900V	1MK	16950V	1ML	17000V	1MM	17050V	1MN	17100V	1MO	17150V	1MP	17200V	1MQ	17250V	1MR	17300V	1MS	17350V	1MT	17400V	1MU	17450V	1MV	17500V	1MW	17550V	1MX	17600V	1MY	17650V	1MZ	17700V	1NA	17750V	1NB	17800V	1NC	17850V	1ND	17900V	1NE	17950V	1NF	18000V	1NG	18050V	1NH	18100V	1NI	18150V	1NJ	18200V	1NK	18250V	1NL	18300V	1NM	18350V	1NN	18400V	1NO	18450V	1NP	18500V	1NQ	18550V	1NR	18600V	1NS	18650V	1NT	18700V	1NU	18750V	1NV	18800V	1NW	18850V	1NX	18900V	1NY	18950V	1NZ	19000V	1OA	19050V	1OB	19100V	1OC	19150V	1OD	19200V	1OE	19250V	1OF	19300V	1OG	19350V	1OH	19400V	1OI	19450V	1OJ	19500V	1OK	19550V	1OL	19600V	1OM	19650V	1ON	19700V	1OO	19750V	1OP	19800V	1OQ	19850V	1OR	19900V	1OS	19950V	1OT	20000V	1OU	20050V	1OV	20100V	1OW	20150V	1OX	20200V	1OY	20250V	1OZ	20300V	1PA	20350V	1PB	20400V	1PC	20450V	1PD	20500V	1PE	20550V	1PF	20600V	1PG	20650V	1PH	20700V	1PI	20750V	1PJ	20800V	1PK	20850V	1PL	20900V	1PM	20950V	1PN	21000V	1PO	21050V	1PP	21100V	1PQ	21150V	1PR	21200V	1PS	21250V	1PT	21300V	1PU	21350V	1PV	21400V	1PW	21450V	1PX	21500V	1PY	21550V	1PZ	21600V	1QA	21650V	1QB	21700V	1QC	21750V	1QD	21800V	1QE	21850V	1QF	21900V	1QG	21950V	1QH	22000V	1QI	22050V	1QJ	22100V	1QK	22150V	1QL	22200V	1QM	22250V	1QN	22300V	1QO	22350V	1QP	22400V	1QQ	22450V	1QR	22500V	1QS	22550V	1QT	22600V	1QU	22650V	1QV	22700V	1QW	22750V	1QX	22800V	1QY	22850V	1QZ	22900V	1RA	22950V	1RB	23000V	1RC	23050V	1RD	23100V	1RE	23150V	1RF	23200V	1RG	23250V	1RH	23300V	1RI	23350V	1RJ	23400V	1RK	23450V	1RL	23500V	1RM	23550V	1RN	23600V	1RO	23650V	1RP	23700V	1RQ	23750V	1RR	23800V	1RS	23850V	1RT	23900V	1RU	23950V	1RV	24000V	1RW	24050V	1RX	24100V	1RY	24150V	1RZ	24200V	1SA	24250V	1SB	24300V	1SC	24350V	1SD	24400V	1SE	24450V	1SF	24500V	1SG	24550V	1SH	24600V	1SI	24650V	1SJ	24700V	1SK	24750V	1SL	24800V	1SM	24850V	1SN	24900V	1SO	24950V	1SP	25000V	1SQ	25050V	1SR	25100V	1SS	25150V	1ST	25200V	1SU	25250V	1SV	25300V	1SW	25350V	1SX	25400V	1SY	25450V	1SZ	25500V	1TA	25550V	1TB	25600V	1TC	25650V	1TD	25700V	1TE	25750V	1TF	25800V	1TG	25850V	1TH	25900V	1TI	25950V	1TJ	26000V	1TK	26050V	1TL	26100V	1TM	26150V	1TN	26200V	1TO	26250V	1TP	26300V	1TQ	26350V	1TR	26400V	1TS	26450V	1TT	26500V	1TU	26550V	1TV	26600V	1TW	26650V	1TX	26700V	1TY	26750V	1TZ	26800V	1UA	26850V	1UB	26900V	1UC	26950V	1UD	27000V	1UE	27050V	1UF	27100V	1UG	27150V	1UH	27200V	1UI	27250V	1UJ	27300V	1UK	27350V	1UL	27400V	1UM	27450V	1UN	27500V	1UO	27550V	1UP	27600V	1UQ	27650V	1UR	27700V	1US	27750V	1UT	27800V	1UU	27850V	1UV	27900V	1UW	27950V	1UX	28000V	1UY	28050V	1UZ	28100V	1VA	28150V	1VB	28200V	1VC	28250V	1VD	28300V	1VE	28350V	1VF	28400V	1VG	28450V	1VH	28500V	1VI	28550V	1VJ	28600V	1VK	28650V	1VL	28700V	1VM	28750V	1VN	28800V	1VO	28850V	1VP	28900V
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CLASS | Temperature Compensating Ceramic Capacitors

Specification

Temp. Range: -25 ~ +85°C (Y class)

Capacitance: Measured at 1MHz, 1Vrms and 20°C ± 2°C

Testing Voltage

R.V	T.V
10V DC	10V DC
50V DC	150V DC
1-2KV DC	R.V x 2

Quality Factor(Q)

Capacitance	Q value
30pF and over	≥ 1000
less than 30pF	≥ 400 (20°C)

Insulation Resistance: 10,000MΩ Min. at Rating voltage for 1 minute (50V and above / 550V)

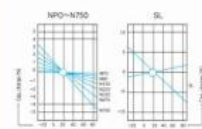
Color Code

TC	Color	TC	Color	TC	Color
NPO(C)	Black	N80(L)	Red	N50(Y)	Orange
N20(R)	Yellow	N30(B)	Green	N40(T)	Blue
N70(B)	Purple	SL	Omitted		

Temp. Coefficient Tolerance

Code	Tol.(PPM/°C)	Code	Tol.(PPM/°C)
G	±30	L	±500
H	±60	M	±1000
J	±100	N	±2500
K	±2500		

Temp. Coefficient



Combination of the Capacitance Value and the TC.

Cap.	TC PPM/°C	TC
NPO	N80	N20
N80	N30	N40
N30	N50	N70
N50	N70	SL

SAMWHA Standard (Cap. and Cap. Tol.)

T.C	Cap.Tol	T.C	Cap.Tol	T.C	Cap.Tol	T.C	Cap.Tol	T.C	Cap.Tol
Cap.(pF)	C-U, SL	Cap.(pF)	C-U, SL	Cap.(pF)	C-U, SL	Cap.(pF)	C-U, SL	Cap.(pF)	C-U, SL
0.5	C.D	9	D.F	22	1.K	51	3		
1	C.D	10	D.F	24	3	56	3.K		
3	C.D	11	J	27	1.K	62	3		
5	C.D	12	1.K	30	3	68	1.K		
10	C.D	15	3	33	1.K	75	3		
15	C.D	16	3	36	3	82	1.K		
22	D.F	18	3	39	1.K	91	3		
33	D.F	19	1.K	43	3	100	1.K		
47	D.F	20	3	47	1.K	110	3		

100 SAMWHA CAPACITOR

Ceramic Type

T.C	Cap.Tol	T.C	Cap.Tol	T.C	Cap.Tol	T.C	Cap.Tol
Cap.(pF)	C-U, SL	Cap.(pF)	C-U, SL	Cap.(pF)	C-U, SL	Cap.(pF)	C-U, SL
100	1.K	200	3	300	1.K	500	3
150	3	220	1.K	360	3	560	1.K
180	1.K	240	3	390	1.K	620	3
200	3	270	1.K	430	3	680	1.K
220	1.K	300	3	470	1.K	820	3

Lead Variation(Bulk Type)

R.V(DC)	Unit : mm
50	1.0Max.
100	2.0Max.
Above 1KV	3.0Max.



Capacitance Value According to Type(pF)

T.C R.V	Capacitance(pF)								Dimensions(mm)					Part No. (How to order)	Marking
	NPO (C)	N80 (L)	N150 (P)	N220 (R)	N330 (S)	N470 (T)	N750 (U)	P850- N1000 (SL)	D	T	F	g.d			
10V DC	10, 15, 22, 33, 47, 56, 68, 82, 100, 150, 220, 330, 470, 560, 680, 820, 1000	10, 15, 22, 33, 47, 56, 68, 82, 100, 150, 220, 330, 470, 560, 680, 820, 1000	10, 15, 22, 33, 47, 56, 68, 82, 100, 150, 220, 330, 470, 560, 680, 820, 1000	10, 15, 22, 33, 47, 56, 68, 82, 100, 150, 220, 330, 470, 560, 680, 820, 1000	10, 15, 22, 33, 47, 56, 68, 82, 100, 150, 220, 330, 470, 560, 680, 820, 1000	10, 15, 22, 33, 47, 56, 68, 82, 100, 150, 220, 330, 470, 560, 680, 820, 1000	10, 15, 22, 33, 47, 56, 68, 82, 100, 150, 220, 330, 470, 560, 680, 820, 1000	10, 15, 22, 33, 47, 56, 68, 82, 100, 150, 220, 330, 470, 560, 680, 820, 1000	10, 15, 22, 33, 47, 56, 68, 82, 100, 150, 220, 330, 470, 560, 680, 820, 1000	10, 15, 22, 33, 47, 56, 68, 82, 100, 150, 220, 330, 470, 560, 680, 820, 1000	10, 15, 22, 33, 47, 56, 68, 82, 100, 150, 220, 330, 470, 560, 680, 820, 1000	10, 15, 22, 33, 47, 56, 68, 82, 100, 150, 220, 330, 470, 560, 680, 820, 1000	10, 15, 22, 33, 47, 56, 68, 82, 100, 150, 220, 330, 470, 560, 680, 820, 1000	10, 15, 22, 33, 47, 56, 68, 82, 100, 150, 220, 330, 470, 560, 680, 820, 1000	
	10, 15, 22, 33, 47, 56, 68, 82, 100, 150, 220, 330, 470, 560, 680, 820, 1000	10, 15, 22, 33, 47, 56, 68, 82, 100, 150, 220, 330, 470, 560, 680, 820, 1000	10, 15, 22, 33, 47, 56, 68, 82, 100, 150, 220, 330, 470, 560, 680, 820, 1000	10, 15, 22, 33, 47, 56, 68, 82, 100, 150, 220, 330, 470, 560, 680, 820, 1000	10, 15, 22, 33, 47, 56, 68, 82, 100, 150, 220, 330, 470, 560, 680, 820, 1000	10, 15, 22, 33, 47, 56, 68, 82, 100, 150, 220, 330, 470, 560, 680, 820, 1000	10, 15, 22, 33, 47, 56, 68, 82, 100, 150, 220, 330, 470, 560, 680, 820, 1000	10, 15, 22, 33, 47, 56, 68, 82, 100, 150, 220, 330, 470, 560, 680, 820, 1000	10, 15, 22, 33, 47, 56, 68, 82, 100, 150, 220, 330, 470, 560, 680, 820, 1000	10, 15, 22, 33, 47, 56, 68, 82, 100, 150, 220, 330, 470, 560, 680, 820, 1000	10, 15, 22, 33, 47, 56, 68, 82, 100, 150, 220, 330, 470, 560, 680, 820, 1000	10, 15, 22, 33, 47, 56, 68, 82, 100, 150, 220, 330, 470, 560, 680, 820, 1000	10, 15, 22, 33, 47, 56, 68, 82, 100, 150, 220, 330, 470, 560, 680, 820, 1000	10, 15, 22, 33, 47, 56, 68, 82, 100, 150, 220, 330, 470, 560, 680, 820, 1000	
	10, 15, 22, 33, 47, 56, 68, 82, 100, 150, 220, 330, 470, 560, 680, 820, 1000	10, 15, 22, 33, 47, 56, 68, 82, 100, 150, 220, 330, 470, 560, 680, 820, 1000	10, 15, 22, 33, 47, 56, 68, 82, 100, 150, 220, 330, 470, 560, 680, 820, 1000	10, 15, 22, 33, 47, 56, 68, 82, 100, 150, 220, 330, 470, 560, 680, 820, 1000	10, 15, 22, 33, 47, 56, 68, 82, 100, 150, 220, 330, 470, 560, 680, 820, 1000	10, 15, 22, 33, 47, 56, 68, 82, 100, 150, 220, 330, 470, 560, 680, 820, 1000	10, 15, 22, 33, 47, 56, 68, 82, 100, 150, 220, 330, 470, 560, 680, 820, 1000	10, 15, 22, 33, 47, 56, 68, 82, 100, 150, 220, 330, 470, 560, 680, 820, 1000	10, 15, 22, 33, 47, 56, 68, 82, 100, 150, 220, 330, 470, 560, 680, 820, 1000	10, 15, 22, 33, 47, 56, 68, 82, 100, 150, 220, 330, 470, 560, 680, 820, 1000	10, 15, 22, 33, 47, 56, 68, 82, 100, 150, 220, 330, 470, 560, 680, 820, 1000	10, 15, 22, 33, 47, 56, 68, 82, 100, 150, 220, 330, 470, 560, 680, 820, 1000	10, 15, 22, 33, 47, 56, 68, 82, 100, 150, 220, 330, 470, 560, 680, 820, 1000	10, 15, 22, 33, 47, 56, 68, 82, 100, 150, 220, 330, 470, 560, 680, 820, 1000	
	10V AC	10, 15, 22, 33, 47, 56, 68, 82, 100, 150, 220, 330, 470, 560, 680, 820, 1000	10, 15, 22, 33, 47, 56, 68, 82, 100, 150, 220, 330, 470, 560, 680, 820, 1000	10, 15, 22, 33, 47, 56, 68, 82, 100, 150, 220, 330, 470, 560, 680, 820, 1000	10, 15, 22, 33, 47, 56, 68, 82, 100, 150, 220, 330, 470, 560, 680, 820, 1000	10, 15, 22, 33, 47, 56, 68, 82, 100, 150, 220, 330, 470, 560, 680, 820, 1000	10, 15, 22, 33, 47, 56, 68, 82, 100, 150, 220, 330, 470, 560, 680, 820, 1000	10, 15, 22, 33, 47, 56, 68, 82, 100, 150, 220, 330, 470, 560, 680, 820, 1000	10, 15, 22, 33, 47, 56, 68, 82, 100, 150, 220, 330, 470, 560, 680, 820, 1000	10, 15, 22, 33, 47, 56, 68, 82, 100, 150, 220, 330, 470, 560, 680, 820, 1000	10, 15, 22, 33, 47, 56, 68, 82, 100, 150, 220, 330, 470, 560, 680, 820, 1000	10, 15, 22, 33, 47, 56, 68, 82, 100, 150, 220, 330, 470, 560, 680, 820, 1000	10, 15, 22, 33, 47, 56, 68, 82, 100, 150, 220, 330, 470, 560, 680, 820, 1000	10, 15, 22, 33, 47, 56, 68, 82, 100, 150, 220, 330, 470, 560, 680, 820, 1000	10, 15, 22, 33, 47, 56, 68, 82, 100, 150, 220, 330, 470, 560, 680, 820, 1000

DISC Ceramic Capacitors 100

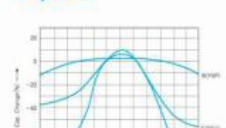
CLASS || High Dielectric Constant Ceramic Capacitors

Specification

Temp. Range: -25 ~ +85°C (Y class)

Capacitance: Measured at 1KHz, 1Vrms and 20°C ± 2°C

Temp. Char.



Testing Voltage

R.V	50V DC	100V DC	1-2KV DC	3KV DC	6-10KV DC
T.V	R.V x 3	R.V x 2.5	R.V x 2	R.V x 1.5	R.V x 1.5

Insulation Resistance: 10,000MΩ or 200MΩ / μF. Whichever less at Rating Voltage for 1 minute

Dissipation Factor(tanδ)

T.C	tanδ	tanδ	tanδ	tanδ
10V DC	2.5% Max.	2.5% Max.	2.5% Max.	2.5% Max.

Capacitance Value According to Type(pF)

T.C	Capacitance(pF)				Dimensions(mm)			Part No.	Marking	
R.V	YS(P)	YS(U)	YS(V)	D	T	F	g.d	(How to order)		
50V DC	100, 150, 220, 330, 390, 470, 560, 680, 820, 1000, 1500, 2200, 3300, 4700, 5600, 6800, 8200, 10000	-	2200, 3300, 4700, 5600, 6800, 8200, 10000	5.0	3.5	5.0/2.3	0.50	OK-39-00-00-00		
	100, 150, 220, 330, 390, 470, 560, 680, 820, 1000, 1500, 2200, 3300, 4700, 5600, 6800, 8200, 10000	-	1000, 15000, 4700	5.0	3.5	5.0/2.3	0.50	OK-39-00-00-00		
	1000, 2200	-	5600, 10000	6.3	3.5	5.0	0.50	OK-39-00-00-00		
	2700, 5500, 3900, 4700, 5600	-	6500, 22000, 27000	8.5	5.5	5.0	0.50	OK-39-00-00-00		
	6800, 8200	-	3300, 40000	10.0	3.5	5.0	0.50	OK-39-00-00-00		
	10000	-	47000	12.5	3.5	5.0	0.50	OK-39-00-00-00		
500V DC	100, 150, 160, 220, 270, 330, 390, 470, 560, 680, 820, 1000, 1500, 2200, 3300, 4700, 5600, 6800, 8200, 10000	-	2200	5.0	4.0	5.0	0.50	OK-29-00-00-00		
	100, 150, 220, 330, 390, 470, 560, 680, 820, 1000, 1500, 2200, 3300, 4700, 5600, 6800, 8200, 10000	-	1000, 1000, 4700	4.3	4.0	5.0	0.50	OK-29-00-00-00		
	1000, 2200	-	2200, 10000	8.0	4.0	5.0	0.50	OK-29-00-00-00		
	2700, 3300	-	4700	-	10.0	4.0	5.0	0.50	OK-29-00-00-00	
	4700, 5600, 6800	-	6800, 20000, 22000	12.5	4.0	5.0	0.50	OK-29-00-00-00		
	8200, 10000	-	10000	-	16.0	4.0	5.0	0.50	OK-29-00-00-00	

100 SAMWHA CAPACITOR

Ceramic Type

DC High Voltage Ceramic Capacitors

High Voltage Ceramic Capacitors(Epoxy Coated Ceramic Capacitors)

T.C	Capacitance(pF)	Dimensions(mm)	Part No.	Marking						
R.V	YS(P)	YS(U)	YS(V)	D	T	F	g.d	(How to order)	Marking	
10V DC	100, 150, 220, 330, 470, 560, 680, 820, 1000, 1500, 2200, 3300, 4700, 5600, 6800, 8200, 10000	100, 150, 220, 330, 470, 560, 680, 820, 1000, 1500, 2200, 3300, 4700, 5600, 6800, 8200, 10000	100, 150, 220, 330, 470, 560, 680, 820, 1000, 1500, 2200, 3300, 4700, 5600, 6800, 8200, 10000	100, 150, 220, 330, 470, 560, 680, 820, 1000, 1500, 2200, 3300, 4700, 5600, 6800, 8200, 10000	100, 150, 220, 330, 470, 560, 680, 820, 1000, 1500, 2200, 3300, 4700, 5600, 6800, 8200, 10000	100, 150, 220, 330, 470, 560, 680, 820, 1000, 1500, 2200, 3300, 4700, 5600, 6800, 8200, 10000	100, 150, 220, 330, 470, 560, 680, 820, 1000, 1500, 2200, 3300, 4700, 5600, 6800, 8200, 10000	100, 150, 220, 330, 470, 560, 680, 820, 1000, 1500, 2200, 3300, 4700, 5600, 6800, 8200, 10000	100, 150, 220, 330, 470, 560, 680, 820, 1000, 1500, 2200, 3300, 4700, 5600, 6800, 8200, 10000	100, 150, 220, 330, 470, 560, 680, 820, 1000, 1500, 2200, 3300, 4700, 5600, 6800, 8200, 10000

DISC Ceramic Capacitors 100

Ultra High Voltage (UHV) Ceramic Capacitor

Introduction

SAMWHA UHV (Ultra High Voltage) Ceramic Capacitor series uses the line up ceramic technology for long life and high reliability in application such as SMPS (X-ray equipment, TV and monitors, DC pulse high voltage) for power electronics.

Various disc types cover a wide range of capacitances and voltages as shown in the following table. Specific properties depend on the dielectric material used. Please consult with SAMWHA for special requirements

Features

- Wide rated voltage range, wide nominal capacitance range
- Flame-retardant insulating coating applied

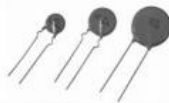
Applications

- Fiber circuit of high voltage power
- High voltage circuit of TV set and monitor
- High voltage circuit of various electronic equipment's
- X-Ray equipment
- DC Pulse High Voltage

How to Order

EK B 4C 102 K 17 D S 2

1 2 3 4 5 6 7 8 9



Type & Class

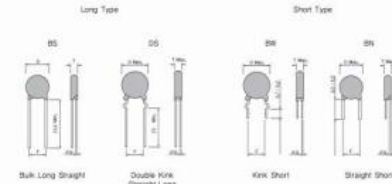
EK: High Dielectric Type (Class II)

EC: Temperature Compensating Type (Class I)

Typical Performance Characteristics

Characteristics	B (YSP)	E (YSU)	F (YSV)	R (YSR)	O (SL)
Rated Temp. Range	25°C ~ +85°C	25°C ~ +85°C	25°C ~ +85°C	25°C ~ +85°C	+10°C ~ +85°C
Temperature Coefficient	-10% ~ +10%	-56% ~ +22%	-82% ~ +22%	-15% ~ +15%	-1000 ~ +350ppm
Dispersion Factor	tg δ ≤ 0.5%	tg δ ≤ 0.5%	tg δ ≤ 0.5%	tg δ ≤ 0.2%	C ≤ 30pF, Q ≥ 400-20C C ≥ 30pF, Q ≥ 1000
Insulation Resistance	Charge at 500VDC for 60 seconds, R ≥ 10000 MW				
Rated Voltage (RV) I	0 ~ 15kVdc	10 ~ 15kVdc	10 ~ 15kVdc	10 ~ 15kVdc	10 ~ 20kVdc
Dielectric Strength (TV) I	50% x RV	150% x RV	150% x RV	150% x RV	150% x RV

PACKING STYLE



(UHV) Ceramic Capacitor

Temperature Characteristics

Temp. Char	Temp. Range	Change Rate
B (YSP)	-25°C ~ +85°C	-10% ~ +10%
E (YSU)	-25°C ~ +85°C	-56% ~ +22%
F (YSV)	-25°C ~ +85°C	-82% ~ +22%
R (YSR)	-25°C ~ +85°C	-15% ~ +15%
O (SL)	+10°C ~ +85°C	-1000 ~ +350ppm/°C

Rating Voltage

Code	Rating Voltage (RV)	Testing Voltage (In Silicon Oil)
4A	10 kV	R.V x 150%
4C	15 kV	R.V x 150%
4D	20 kV	R.V x 150%

Capacitance

In Pico farads. The first two digits indicate significant digits. The 3rd digits indicate the number of zero following.
For example: 220 = 22pF, 221 = 220pF, 222 = 2200pF

Tolerance

Mark	K	M	Z
Cap. Tolerance	±10%	±20%	-20% ~ +80%

Disc Diameter

Code	10	11	12	13	14	15	16	17	18	19	20	22	23
Max Dia. (mm)	10.5	11.5	12.5	13.5	14.5	15.5	16.5	17.5	18.5	19.5	20.5	22.5	25.5

Packing Style & Lead Variation

Packing Style	Lead Variation
B	S W N
D	S
	Straight Long Type Kink Short Type Straight Short Type Straight Long Type

Lead Spacing & Pitch of Components

Code	Bulk Type	Lead Spacing (mm)
1		10.0
2		12.5
3		15.0

(UHV) Ceramic Capacitor

Specifications

10kVDC

TC	Cap.	TOL.	D	T	PJSL	WIRE SIZE	Min L/W	Lead style	Size
	(pF)	(%)	Dmax (mm)	Tmax (mm)	mm	mm	mm		
B (YSP) -25~+85°C ±10%	100	±10%	10.5	8.5	10±2.0	0.80±0.05			10
	150	±10%	10.5	8.5	10±2.0	0.80±0.05			10
	220	±10%	11.5	8.5	10±2.0	0.80±0.05			11
	270	±10%	11.5	8.5	10±2.0	0.80±0.05			11
	330	±10%	12.5	8.5	10±2.0	0.80±0.05			12
	470	±10%	14.5	8.5	10±2.0	0.80±0.05			14
E (YSU) -25~+85°C ±22~56%	560	±10%	14.5	8.5	10±2.0	0.80±0.05			14
	680	±10%	14.5	8.5	10±2.0	0.80±0.05			14
	1000	±10%	17.5	8.5	10±2.0	0.80±0.05			17
	1000	±20%	12.5	9	10±2.0	0.80±0.05			12
	2200	±20%	14.5	9	10±2.0	0.80±0.05			14
	2200	±20%	15.5	9	10±2.0	0.80±0.05			15
F (YSV) -25~+85°C ±22~82%	3300	±20%	20.5	9	10±2.0	0.80±0.05			20
	4700	±20%	22.5	9	10±2.0	0.80±0.05			22
	1000	±20%	15.5	9	10±2.0	0.80±0.05			15
	2200	±20%	15.5	9	10±2.0	0.80±0.05			15
	2200	±20%	15.5	9	10±2.0	0.80±0.05			15
	3300	±20%	15.5	9	10±2.0	0.80±0.05			15
R (YSR) -25~+85°C ±10%	4700	±20%	18.5	9	10±2.0	0.80±0.05			18
	1000	±20%	15.5	9	10±2.0	0.80±0.05			15
	2200	±20%	15.5	9	10±2.0	0.80±0.05			15
	2200	±20%	15.5	9	10±2.0	0.80±0.05			15
	3300	±20%	15.5	9	10±2.0	0.80±0.05			15
	4700	±20%	18.5	9	10±2.0	0.80±0.05			18
O (SL) +10~+85°C +350~-100ppm	10	±10%	9.5	8.5	10±2.0	0.80±0.05			9
	15	±10%	9.5	8.5	10±2.0	0.80±0.05			9
	22	±10%	10.5	8.5	10±2.0	0.80±0.05			10
	27	±10%	10.5	8.5	10±2.0	0.80±0.05			10
	33	±10%	11.5	8.5	10±2.0	0.80±0.05			11
	47	±10%	12.5	8.5	10±2.0	0.80±0.05			12
B (YSP) -25~+85°C ±10%	56	±10%	14.5	8.5	10±2.0	0.80±0.05			14
	68	±10%	14.5	8.5	10±2.0	0.80±0.05			14
	82	±10%	14.5	8.5	10±2.0	0.80±0.05			14
	100	±10%	14.5	8.5	10±2.0	0.80±0.05			14
	150	±10%	15.5	8.5	10±2.0	0.80±0.05			15
	220	±10%	17.5	8.5	10±2.0	0.80±0.05			17

Specifications

15kVDC

TCC	Cap. (pF)	TOL (%)	D (mm)	T (mm)	F(LS) (mm)	WIRE SIZE ORDERING (mm)	Min L/W (mm)	Lead style	Size Code
B(YSP) -25~+85°C ±10%	100	±10%	10.5	10	12.5±2.0	0.80±0.05	25	Bulk Long	10
	150	±10%	10.5	10	12.5±2.0	0.80±0.05			11
	220	±10%	11.5	10	12.5±2.0	0.80±0.05			12
	270	±10%	11.5	10	12.5±2.0	0.80±0.05			13
	330	±10%	12.5	10	12.5±2.0	0.80±0.05			14
	470	±10%	14.5	10	12.5±2.0	0.80±0.05			15
	560	±10%	14.5	10	12.5±2.0	0.80±0.05			16
	680	±10%	17.5	10	12.5±2.0	0.80±0.05			17
	1000	±10%	20.5	10	12.5±2.0	0.80±0.05			18
	1000	±20%	12.5	10	12.5±2.0	0.80±0.05			19
E(YSU) -25~+85°C ±20~54%	2000	±20%	15.5	10	12.5±2.0	0.80±0.05	25	Bulk Long	15
	2200	±20%	16.5	10	12.5±2.0	0.80±0.05			16
	3300	±20%	20.5	10	12.5±2.0	0.80±0.05			17
	4700	±20%	22.5	10	12.5±2.0	0.80±0.05			18
	1000	±20%	11.5	10	12.5±2.0	0.80±0.05			19
	2000	±20%	14.5	10	12.5±2.0	0.80±0.05			20
	2200	±20%	16.5	10	12.5±2.0	0.80±0.05			21
	3300	±20%	17.5	10	12.5±2.0	0.80±0.05			22
	4700	±20%	20.5	10	12.5±2.0	0.80±0.05			23
	1000	±20%	11.5	10	12.5±2.0	0.80±0.05			24
F(YSI) -25~+85°C ±20~82%	2000	±20%	14.5	10	12.5±2.0	0.80±0.05	25	Bulk Long	25
	2200	±20%	16.5	10	12.5±2.0	0.80±0.05			26
	3300	±20%	17.5	10	12.5±2.0	0.80±0.05			27
	4700	±20%	20.5	10	12.5±2.0	0.80±0.05			28
	1000	±20%	11.5	10	12.5±2.0	0.80±0.05			29
	2000	±20%	14.5	10	12.5±2.0	0.80±0.05			30
	2200	±20%	16.5	10	12.5±2.0	0.80±0.05			31
	3300	±20%	17.5	10	12.5±2.0	0.80±0.05			32
	4700	±20%	20.5	10	12.5±2.0	0.80±0.05			33
	1000	±20%	11.5	10	12.5±2.0	0.80±0.05			34
SL -25~+85°C +50~-100 ppm	15	±10%	10.5	9	12.5±2.0	0.80±0.05	25	Bulk Long	35
	20	±10%	10.5	9	12.5±2.0	0.80±0.05			36
	22	±10%	10.5	9	12.5±2.0	0.80±0.05			37
	27	±10%	11.5	9	12.5±2.0	0.80±0.05			38
	33	±10%	12.5	9	12.5±2.0	0.80±0.05			39
	47	±10%	15.5	9	12.5±2.0	0.80±0.05			40
	56	±10%	14.5	9	12.5±2.0	0.80±0.05			41
	68	±10%	16.5	9	12.5±2.0	0.80±0.05			42
	82	±10%	17.5	9	12.5±2.0	0.80±0.05			43
	100	±10%	10.5	9	12.5±2.0	0.80±0.05			44
R(YSR) -25~+85°C ±10%	150	±10%	0.5	9	12.5±2.0	0.80±0.05	25	Bulk Long	45
	220	±10%	11.5	9	12.5±2.0	0.80±0.05			46
	330	±10%	14.5	9	12.5±2.0	0.80±0.05			47
	470	±10%	14.5	9	12.5±2.0	0.80±0.05			48
	680	±10%	17.5	9	12.5±2.0	0.80±0.05			49
	1000	±10%	20.5	9	12.5±2.0	0.80±0.05			50

110 SARIWA CAPACITOR

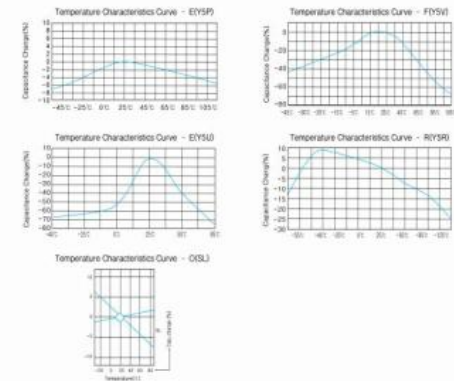
(UHV) Ceramic Capacitor

Specifications

20kVDC

TCC	Cap. (pF)	TOL (%)	D (mm)	T (mm)	F(LS) (mm)	WIRE SIZE ORDERING (mm)	Min L/W (mm)	Lead style	Size Code
SL +20~85°C +50~-100 ppm	15	±10%	10.5	10	15±2.0	0.80±0.05	25	Bulk Long	51
	20	±10%	10.5	10	15±2.0	0.80±0.05			52
	22	±10%	11.5	10	15±2.0	0.80±0.05			53
	27	±10%	11.5	10	15±2.0	0.80±0.05			54
	33	±10%	13.5	10	15±2.0	0.80±0.05			55
	47	±10%	15.5	10	15±2.0	0.80±0.05			56
	56	±10%	15.5	10	15±2.0	0.80±0.05			57
	68	±10%	17.5	10	15±2.0	0.80±0.05			58
	82	±10%	18.5	10	15±2.0	0.80±0.05			59
	100	±10%	10.5	10	15±2.0	0.80±0.05			60

Typical Characteristics Graph

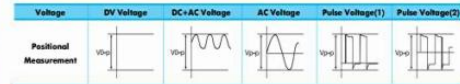


DISC Ceramic Capacitors 111

Caution(Rating)

1. Operating Voltage

When DC-rated capacitors are to be used in AC or ripple current circuits, be sure to maintain the Vp-p value of the applied voltage or the Vo-p which contains DC bias within the rated voltage range. When the voltage is applied to the circuit, starting or stopping may generate irregular voltage for a transit period because of resonance or switching. Be sure to use a capacitor with a rated voltage range that includes these irregular voltages.



2. Operating Temperature and Self-generated Heat

Keep the surface temperature of a capacitor below the upper limit of its rated operating temperature range. Be sure to take into account the heat generated by the capacitor itself. When the capacitor is used in a high frequency current, pulse current or similar current, it may self-generate heat due to dielectric loss. The applied voltage load should be such that the capacitor's self-generated heat is within 10°C at an atmosphere temperature of 25°C. When measuring, use a thermocouple of small thermal capacity K of 0.1°C/1mm in conditions where the capacitor is not affected by radiant heat from other components or surrounding ambient fluctuations. Excessive heat may lead to deterioration of the capacitor's characteristics and reliability. (Never attempt to perform measurement with the cooling fan running. Otherwise, accurate measurement cannot be ensured.)

FAILURE TO FOLLOW THE ABOVE CAUTIONS MAY RESULT, WORST CASE, IN A SHORT CIRCUIT AND CAUSE FUMING OR PARTIAL DISPERSION WHEN THE PRODUCT IS USED.

112 SARIWA CAPACITOR

Caution/Notice

Caution (Storage and Operation Condition)

Operating and Storage Environment
The insulating coating of capacitors does not form a perfect seal; therefore, do not use or store capacitors in a corrosive atmosphere, especially where chloride gas, sulfide gas, acid, alkali, salt or the like are present. And avoid exposure to moisture.
The capacitor is designed to be used in insulating media, such as epoxy resin, silicone oil, etc. There must be 3mm or more of insulating media for each direction of the capacitor.

Caution (Soldering and Mounting)

1. Vibration and Impact
Do not expose a capacitor or its leads to excessive shock or vibration during use.
2. Soldering
When soldering this product to a PCB/PWB, do not exceed the solder heat resistance specification of the capacitor. Subjecting this product to excessive heating could melt the internal junction solder and may result in thermal shocks that can crack the ceramic element.

Caution (Handling)

Vibration and Impact
Do not expose a capacitor or its leads to excessive shock or vibration during use.
FAILURE TO FOLLOW THE ABOVE CAUTIONS MAY RESULT, WORST CASE, IN A SHORT CIRCUIT AND CAUSE FUMING OR PARTIAL DISPERSION WHEN THE PRODUCT IS USED.

Notice (Rating)

Capacitance Change of Capacitor
1. Class 1 Capacitors
Capacitance might change a little depending on the surrounding temperature or an applied voltage. Please contact us if you intend to use this product in a strict time constant circuit.

Before cleaning, bonding, or molding this product, verify that these processes do not affect product quality by testing the performance of a cleaned, bonded or molded product in the intended equipment.

Store the capacitors where the temperature and relative humidity do not exceed -10 to 40 degrees centigrade and 15 to 85%. Use capacitors within 6 months after delivered.

FAILURE TO FOLLOW THE ABOVE CAUTIONS MAY RESULT, WORST CASE, IN A SHORT CIRCUIT AND CAUSE FUMING OR PARTIAL DISPERSION WHEN THE PRODUCT IS USED.

When soldering capacitor with a soldering iron, it should be performed in following conditions. Temperature of iron-tip: 400 degrees C. max. Soldering iron wattage: 50W max. Soldering time: 3.5 sec. max.

FAILURE TO FOLLOW THE ABOVE CAUTIONS MAY RESULT, WORST CASE, IN A SHORT CIRCUIT AND CAUSE FUMING OR PARTIAL DISPERSION WHEN THE PRODUCT IS USED.

Notice (Soldering and Mounting)

Cleaning (ultrasonic cleaning)
To perform ultrasonic cleaning conditions. Rinse bath capacity: Output of less. Rinsing time: 5 min. maximum. Do not vibrate the PCB/PWB directly. Excessive ultrasonic cleaning may destruction of the lead wires.

2. Class 2 Capacitors
Class 2 capacitors with temperature characteristics B, E and F have an aging characteristic, whereby the capacitor continually decreases its capacitance slightly if the capacitor is left on for a long time. Moreover, capacitance might change greatly depending on the surrounding temperature or an applied voltage. So, it is not likely to be suitable for use in a time constant circuit.

DISC Ceramic Capacitors 113

SVC Varistors Type

Introduction

SVC series Varistors are gapless ceramic surge absorbers of a new type made of metal oxide which is designed to protect various kinds of electronic devices and semiconducting elements from surges.

Features

- High discharge current capability up to 4000 Amps.
 - Excellent clamping characteristics.
 - Fast response time under 50 nanoseconds.
 - Improve Product safety
 - UL, CSA, VDE recognized
- Special specification like a Automobile, Medical, Military, Aviation should be discuss with our sales representatives

How to Order

SVC 471 D-14A FF 7

- 1 Basic Type**
ZnO Varistor
- 2 Varistor Nominal Voltage**
(The first two digit indicate significant digits)
(The 3rd digit indicate the number of zeros following)
- 3 Style**
D-Disk Type Varistor
- 4 Chip Element Size(Dia)**
05 : Ø5mm, 07 : Ø7mm,
10 : Ø10mm, 14 : Ø14mm,
20 : Ø20mm
- 5 Classification**
A : High Voltage(82V and above)
B : Low Voltage(less than 68V)
- 6 Packing Style & Lead Variation**
- 7 Lead Spacing & Pitch of Component**

Packing Style	Lead Variation	Packing Style	Lead Variation
F Taping Type Flat Pack	S Straight Type	B Bulk	S Straight Long Type
	K In-Kink Type		W Kink Short Type
	F OutKink Type		K Kink Long Type
			L Kink Short Type
			N Straight Short Type

SVC Varistors Type

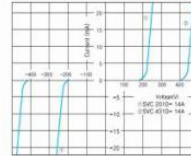
Suffix Code

Taping Type			Bulk Type	
Code	Lead Spacing(mm)	Pitch of Component(mm)	Code	Lead Spacing(mm)
5	5.0	12.7	5	5.0
7	7.5	15.0	7	7.5
8	7.5	30.0	1	10.0
9	7.5	25.4		
1	10.0	30.0		

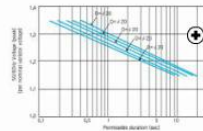
SVC Characteristic Curves

V - I Curve

- Small - current region of V - I curve

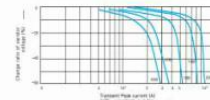


- Temporary power frequency over voltage capability



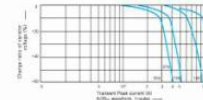
B Type

- Withstand discharge impulse current characteristic(Typical)



A Type

- Withstand discharge impulse current characteristic(Typical)



Specification

Minimum Ratings										Characteristics			
Device Type	Chip Element Size Dia (mm)	Applied Voltage		Energy (J)	Transient		Peak Voltage (V _{Peak})	Nominal Varistor (V _{Nom})		Tolerance (Max./Min.)	Max. Clamping Voltage (V _C)		
		RMS 50/60Hz (25°C)	DC (25°C)		Average Power Dissipation (W _{avg})	Peak Current (A _{Peak})		100V	1000V		50µs	10ms	
SVC 180D-05B	5			0.5	0.01	125					40	1	
SVC 180D-07B	7			0.8	0.02	250					56	2.5	
SVC 180D-10B	10	11	14	1.0	0.05	500	18	16	20	36	56	5	
SVC 180D-14B	14			3.5	0.1	1000					56	10	
SVC 180D-20B	20			10.0	0.2	2000					56	20	
SVC 220D-05B	5			0.4	0.01	125					40	1	
SVC 220D-07B	7			0.9	0.02	250					45	2.5	
SVC 220D-10B	10	14	18	2.0	0.05	500	22	20	24	45	5	5	
SVC 220D-14B	14			4.0	0.1	1000					45	10	
SVC 220D-20B	20			11.0	0.2	2000					45	20	
SVC 270D-05B	5			0.5	0.01	125					40	1	
SVC 270D-07B	7			1.0	0.02	250					55	2.5	
SVC 270D-10B	10	17	22	2.5	0.05	500	27	24	30	55	5	5	
SVC 270D-14B	14			5.0	0.1	1000					54	10	
SVC 270D-20B	20			15.0	0.2	2000					55	20	
SVC 330D-05B	5			0.6	0.01	125					75	1	
SVC 330D-07B	7			1.2	0.02	250					65	2.5	
SVC 330D-10B	10	20	26	5.0	0.05	500	33	30	36	65	5	5	
SVC 330D-14B	14			6.0	0.1	1000					65	10	
SVC 330D-20B	20			20.0	0.2	2000					65	20	
SVC 390D-05B	5			0.8	0.01	125					86	1	
SVC 390D-07B	7			1.5	0.02	250					77	2.5	
SVC 390D-10B	10	25	31	3.5	0.05	500	39	35	43	77	5	5	
SVC 390D-14B	14			7.0	0.1	1000					77	10	
SVC 390D-20B	20			24.0	0.2	2000					77	20	
SVC 470D-05B	5			1.0	0.01	125					104	1	
SVC 470D-07B	7			1.8	0.02	250					95	2.5	
SVC 470D-10B	10	30	36	4.5	0.05	500	47	42	52	95	5	5	
SVC 470D-14B	14			6.5	0.1	1000					95	10	
SVC 470D-20B	20			30.0	0.2	2000					95	20	
SVC 560D-05B	5			1.0	0.01	125					125	1	
SVC 560D-07B	7			2.2	0.02	250					110	2.5	
SVC 560D-10B	10	35	45	5.5	0.05	500	56	50	62	110	5	5	
SVC 560D-14B	14			10.5	0.1	1000					110	10	
SVC 560D-20B	20			35.0	0.2	2000					110	20	
SVC 680D-05B	5			1.2	0.01	125					150	1	
SVC 680D-07B	7			2.5	0.02	250					135	2.5	
SVC 680D-10B	10	40	54	6.5	0.05	500	68	61	75	135	5	5	
SVC 680D-14B	14			12.0	0.1	1000					135	10	
SVC 680D-20B	20			40.0	0.2	2000					135	20	
SVC 820D-05A	5			1.7	0.1	400					145	5	
SVC 820D-07A	7			3.5	0.25	1200					135	10	
SVC 820D-10A	10	50	65	8.0	0.4	2000	82	74	90	135	25	25	
SVC 820D-14A	14			14.0	0.6	4000					135	50	
SVC 820D-20A	20			27.0	1.0	4000					135	100	
SVC 100D-05A	5			2.0	0.1	400					175	5	
SVC 100D-07A	7			4.0	0.25	1200					165	10	
SVC 100D-10A	10	60	85	10.0	0.4	2000	100	90	110	165	25	25	
SVC 100D-14A	14			18.0	0.6	4000					165	50	
SVC 100D-20A	20			30.0	1.0	4000					165	100	

SVC Varistors Type

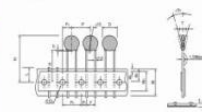
		Mechanical Ratings					Characteristics				
Device Type	Chip Element Size	Applied Voltage		Transient		Nominal Varistor Peak Voltage (V _{1mA})	Max. Clamping Voltage @ Test Current (50µs)		Max. Clamping Voltage @ Test Current (100µs)		
		RMS 50/60Hz (25°C)	DC (25°C)	Average Energy (J)	Peak Power Dissipation (W)		V _{1mA} (V)	V _{100µs} (V)	V _{100µs} (V)	V _{100µs} (V)	
Device Type	Chip Element Size	V _{RMS} (V)	V _{DC} (V)	V _{1mA} (V)	P _{100µs} (W)	V _{1mA} (V)	V _{100µs} (V)	V _{100µs} (V)	V _{100µs} (V)	V _{100µs} (V)	
SVC 120D-05A	5			2.5	0.1	400		210	5		
SVC 120D-07A	7			5.0	0.25	1200		200	10		
SVC 120D-10A	10	75	100	12.0	0.4	2500	120	108	132	200	
SVC 120D-14A	14			20.0	0.6	4000		200	50		
SVC 120D-20A	20			40.0	1.0	4000		200	100		
SVC 150D-05A	5			3.0	0.1	400		240	5		
SVC 150D-07A	7			6.0	0.25	1200		250	10		
SVC 150D-10A	10	95	125	16.0	0.4	2500	150	135	165	250	
SVC 150D-14A	14			25.0	0.6	4000		250	50		
SVC 150D-20A	20			50.0	1.0	4000		250	100		
SVC 200D-05A	5			4.0	0.1	400		355	5		
SVC 200D-07A	7			8.0	0.25	1200		340	10		
SVC 200D-10A	10	100	170	20.0	0.4	2500	200	180	220	340	
SVC 200D-14A	14			30.0	0.6	4000		340	50		
SVC 200D-20A	20			70.0	1.0	4000		340	100		
SVC 220D-05A	5			4.5	0.1	400		380	5		
SVC 220D-07A	7			9.0	0.25	1200		360	10		
SVC 220D-10A	10	140	180	25.0	0.4	2500	220	198	242	360	
SVC 220D-14A	14			40.0	0.6	4000		360	50		
SVC 220D-20A	20			75.0	1.0	4000		360	100		
SVC 240D-05A	5			5.0	0.1	400		415	5		
SVC 240D-07A	7			10.0	0.25	1200		395	10		
SVC 240D-10A	10	150	200	25.0	0.4	2500	240	216	264	395	
SVC 240D-14A	14			40.0	0.6	4000		395	50		
SVC 240D-20A	20			80.0	1.0	4000		395	100		
SVC 270D-05A	5			6.0	0.1	400		475	5		
SVC 270D-07A	7			12.0	0.25	1200		455	10		
SVC 270D-10A	10	175	225	30.0	0.4	2500	270	245	297	455	
SVC 270D-14A	14			50.0	0.6	4000		455	50		
SVC 270D-20A	20			100.0	1.0	4000		455	100		
SVC 360D-05A	5			7.5	0.1	400		620	5		
SVC 360D-07A	7			15.0	0.25	1200		595	10		
SVC 360D-10A	10	250	300	35.0	0.4	2500	360	324	396	595	
SVC 360D-14A	14			60.0	0.6	4000		595	50		
SVC 360D-20A	20			120.0	1.0	4000		595	100		
SVC 390D-05A	5			8.0	0.1	400		675	5		
SVC 390D-07A	7			17.0	0.25	1200		650	10		
SVC 390D-10A	10	250	320	40.0	0.4	2500	390	351	429	650	
SVC 390D-14A	14			70.0	0.6	4000		650	50		
SVC 390D-20A	20			150.0	1.0	4000		650	100		
SVC 430D-05A	5			9.0	0.1	400		754	5		
SVC 430D-07A	7			20.0	0.25	1200		710	10		
SVC 430D-10A	10	275	350	45.0	0.4	2500	430	387	475	710	
SVC 430D-14A	14			75.0	0.6	4000		710	50		
SVC 430D-20A	20			140.0	1.0	4000		710	100		
SVC 470D-05A	5			10.0	0.1	400		805	5		
SVC 470D-07A	7			20.0	0.25	1200		775	10		
SVC 470D-10A	10	300	385	45.0	0.4	2500	470	425	517	775	
SVC 470D-14A	14			80.0	0.6	4000		775	50		
SVC 470D-20A	20			160.0	1.0	4000		775	100		

Maximum Ratings										Characteristics			
Device Type	Chip Size (mm)	Applied Voltage RMS (Vrms)	DC (VDC)	Energy (J)	Average Power Dissipation (Watts)	Peak Current (Amps)	Nominal Voltage @ Peak Voltage		Max. Clamping (Voltage @ Test Current)		Tolerance	Iy (Amps)	
							Vrms (Vrms)	VDC (VDC)	Vrms (Vrms)	VDC (VDC)			
SVC 54D-15A	10	350	460	45.0	0.4	2500	560	504	456	100	25		
SVC 54D-14A	10	350	460	45.0	0.4	2500	560	504	456	100	25		
SVC 54D-13A	10	350	460	45.0	0.4	2500	560	504	456	100	25		
SVC 47D-15A	10	350	460	45.0	0.4	2500	560	504	456	100	25		
SVC 47D-14A	10	350	460	45.0	0.4	2500	560	504	456	100	25		
SVC 47D-13A	10	350	460	45.0	0.4	2500	560	504	456	100	25		
SVC 40D-15A	10	350	460	45.0	0.4	2500	560	504	456	100	25		
SVC 40D-14A	10	350	460	45.0	0.4	2500	560	504	456	100	25		
SVC 40D-13A	10	350	460	45.0	0.4	2500	560	504	456	100	25		
SVC 33D-15A	10	350	460	45.0	0.4	2500	560	504	456	100	25		
SVC 33D-14A	10	350	460	45.0	0.4	2500	560	504	456	100	25		
SVC 33D-13A	10	350	460	45.0	0.4	2500	560	504	456	100	25		
SVC 27D-15A	10	350	460	45.0	0.4	2500	560	504	456	100	25		
SVC 27D-14A	10	350	460	45.0	0.4	2500	560	504	456	100	25		
SVC 27D-13A	10	350	460	45.0	0.4	2500	560	504	456	100	25		
SVC 22D-15A	10	350	460	45.0	0.4	2500	560	504	456	100	25		
SVC 22D-14A	10	350	460	45.0	0.4	2500	560	504	456	100	25		
SVC 22D-13A	10	350	460	45.0	0.4	2500	560	504	456	100	25		
SVC 18D-15A	10	350	460	45.0	0.4	2500	560	504	456	100	25		
SVC 18D-14A	10	350	460	45.0	0.4	2500	560	504	456	100	25		
SVC 18D-13A	10	350	460	45.0	0.4	2500	560	504	456	100	25		
SVC 15D-15A	10	350	460	45.0	0.4	2500	560	504	456	100	25		
SVC 15D-14A	10	350	460	45.0	0.4	2500	560	504	456	100	25		
SVC 15D-13A	10	350	460	45.0	0.4	2500	560	504	456	100	25		
SVC 12D-15A	10	350	460	45.0	0.4	2500	560	504	456	100	25		
SVC 12D-14A	10	350	460	45.0	0.4	2500	560	504	456	100	25		
SVC 12D-13A	10	350	460	45.0	0.4	2500	560	504	456	100	25		
SVC 10D-15A	10	350	460	45.0	0.4	2500	560	504	456	100	25		
SVC 10D-14A	10	350	460	45.0	0.4	2500	560	504	456	100	25		
SVC 10D-13A	10	350	460	45.0	0.4	2500	560	504	456	100	25		
SVC 8D-15A	10	350	460	45.0	0.4	2500	560	504	456	100	25		
SVC 8D-14A	10	350	460	45.0	0.4	2500	560	504	456	100	25		
SVC 8D-13A	10	350	460	45.0	0.4	2500	560	504	456	100	25		
SVC 6D-15A	10	350	460	45.0	0.4	2500	560	504	456	100	25		
SVC 6D-14A	10	350	460	45.0	0.4	2500	560	504	456	100	25		
SVC 6D-13A	10	350	460	45.0	0.4	2500	560	504	456	100	25		
SVC 5D-15A	10	350	460	45.0	0.4	2500	560	504	456	100	25		
SVC 5D-14A	10	350	460	45.0	0.4	2500	560	504	456	100	25		
SVC 5D-13A	10	350	460	45.0	0.4	2500	560	504	456	100	25		
SVC 4D-15A	10	350	460	45.0	0.4	2500	560	504	456	100	25		
SVC 4D-14A	10	350	460	45.0	0.4	2500	560	504	456	100	25		
SVC 4D-13A	10	350	460	45.0	0.4	2500	560	504	456	100	25		
SVC 3D-15A	10	350	460	45.0	0.4	2500	560	504	456	100	25		
SVC 3D-14A	10	350	460	45.0	0.4	2500	560	504	456	100	25		
SVC 3D-13A	10	350	460	45.0	0.4	2500	560	504	456	100	25		
SVC 2D-15A	10	350	460	45.0	0.4	2500	560	504	456	100	25		
SVC 2D-14A	10	350	460	45.0	0.4	2500	560	504	456	100	25		
SVC 2D-13A	10	350	460	45.0	0.4	2500	560	504	456	100	25		
SVC 1D-15A	10	350	460	45.0	0.4	2500	560	504	456	100	25		
SVC 1D-14A	10	350	460	45.0	0.4	2500	560	504	456	100	25		
SVC 1D-13A	10	350	460	45.0	0.4	2500	560	504	456	100	25		

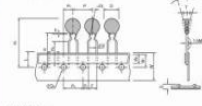
Notes:

- The waveform of the maximum DC applied voltage is flat. When a ripple voltage as from a rectifier source is supplied make sure that the peak voltage is kept under the VDC max. AC applied voltage (50/60Hz) form a sine wave shape. When the distortion in the waveform is extensive make sure that the peak voltage is less than 1.1 times the VDC max.
- Energy: Wttn
Transient energy ratings are given in the Wttn column of the specifications in Joules(watt-second). The rating is the maximum allowable energy for a single impulse of 2ms square-waveform current with continuous voltage applied. Energy ratings are based on a shift of Vnom of less than 10% of initial value.
- Transient peak current(Itp)
The peak current rating, Itp, of varistor is based on an 8/20μs test impulse wave shape. This peak current is the maximum peak current in which the nominal varistor voltage shift does not exceed ±10% when the test impulse is applied once at 5 minutes intervals.
- Nominal varistor voltage: Vnom
Indicates the peak terminal voltage measured with a 1mA DC applied. -31mA DC in the case of the LSA and ESS series.
- Maximum clamping voltage: Vc
Indicates the peak terminal voltage measured with an 8/20μs impulse current applied.
- Operating ambient temperature: -40°C to +85°C
Storage temperature: -40°C to +125°C
UL and CSA recognized (UL 1449, UL 4788 or UL 1414, CSA) SVC varistors have been tested by Underwriter's Laboratories, Inc. and Canadian Standards Association File No. E7754, E13195, E15471.

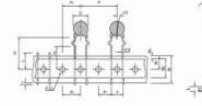
FS5 Type



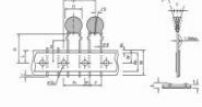
FK5 Type



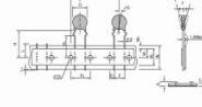
FF8 Type



FF7 Type



FF8 Type

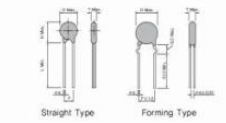


Item	Code	Dimensions(mm)
Body Diameter	D	See page 119
Body Thickness	T	See page 119
Lead Diameter	φd	0.50±0.05 0.40±0.05
Pitch of Sprocket Hole	P	12.7±0.5
Pitch of Component	P	6.35±1.5 25.4±1.0
Lead Length from Hole Center Lead	L	3.85±0.7 6.95±1.0
Lead Length from Hole	L	6.35±1.5 12.7±1.5
Center to Component Center	C	5.0±1.0 7.5±1.0
Lead Spacing	S	0.5±0.1 0.5±0.1
Deviation Along Tape, Left or Right	±S	0.5±0.1
Deviation Across Tape	±A	0.5±0.1
Carrier Tape Width	W	38.0±1.0
Hold Down Tape Width	W	5.0Min. 1.0Max.
Position of Sprocket Hole	W	9.0±0.5
Hole Down Tape Position	W	3.0Max.
Lead Wire Clinch Height	H	16.0±0.5
Height of Component Hole	H	26.0±1.0
Component Height	H	32.0Max.
Diameter of Sprocket Hole	φD	4.0±0.2
Length of Snipped Lead	L	11.0Max.
Total Tape Thickness	T	0.7±0.2
Total Thickness Tape and Lead Wire	T	1.3Max.
Length of Snipped Lead	L	1.0Max.

Item	Code	Dimensions(mm)
Body Diameter	D	See page 119
Body Thickness	T	See page 119
Lead Diameter	φd	0.40±0.05
Pitch of Sprocket Hole	P	12.7±0.5
Pitch of Component	P	15.0±0.5 30.0±1.0
Lead Length from Hole Center Lead	L	3.75±1.0
Lead Length from Hole	L	7.50±1.5
Center to Component Center	C	7.5±1.0
Lead Spacing	S	0.5±0.1
Deviation Along Tape, Left or Right	±S	0.5±0.1
Deviation Across Tape	±A	0.5±0.1
Carrier Tape Width	W	38.0±1.0
Hold Down Tape Width	W	5.0Min. 1.0Max.
Position of Sprocket Hole	W	10.0±0.5
Hole Down Tape Position	W	3.0Max.
Lead Wire Clinch Height	H	16.0±0.5
Height of Component Hole	H	26.0±1.0
Component Height	H	40.0Max.
Diameter of Sprocket Hole	φD	4.0±0.2
Length of Snipped Lead	L	11.0Max.
Total Tape Thickness	T	0.7±0.2
Total Thickness Tape and Lead Wire	T	1.7Max.
Length of Snipped Lead	L	1.0Max.

SVC Varistors Type

Dimensions



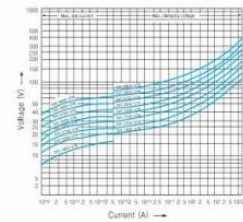
B Type

Type	T Max.	D Max.	H Max.	L Min.	F	φd
SVC 10D-05B	4.5	7.5	10.0	25	5.0	0.50
SVC 12D-05B	4.5	7.5	10.0	25	5.0	0.50
SVC 15D-05B	4.5	7.5	10.0	25	5.0	0.50
SVC 18D-05B	4.5	7.5	10.0	25	5.0	0.50
SVC 22D-05B	4.5	7.5	10.0	25	5.0	0.50
SVC 27D-05B	4.5	7.5	10.0	25	5.0	0.50
SVC 33D-05B	4.5	7.5	10.0	25	5.0	0.50
SVC 40D-05B	4.5	7.5	10.0	25	5.0	0.50
SVC 47D-05B	4.5	7.5	10.0	25	5.0	0.50
SVC 54D-05B	4.5	7.5	10.0	25	5.0	0.50
SVC 60D-05B	4.5	7.5	10.0	25	5.0	0.50
SVC 66D-05B	4.5	7.5	10.0	25	5.0	0.50
SVC 72D-05B	4.5	7.5	10.0	25	5.0	0.50
SVC 78D-05B	4.5	7.5	10.0	25	5.0	0.50
SVC 84D-05B	4.5	7.5	10.0	25	5.0	0.50
SVC 90D-05B	4.5	7.5	10.0	25	5.0	0.50
SVC 96D-05B	4.5	7.5	10.0	25	5.0	0.50
SVC 102D-05B	4.5	7.5	10.0	25	5.0	0.50
SVC 108D-05B	4.5	7.5	10.0	25	5.0	0.50
SVC 114D-05B	4.5	7.5	10.0	25	5.0	0.50
SVC 120D-05B	4.5	7.5	10.0	25	5.0	0.50
SVC 126D-05B	4.5	7.5	10.0	25	5.0	0.50
SVC 132D-05B	4.5	7.5	10.0	25	5.0	0.50
SVC 138D-05B	4.5	7.5	10.0	25	5.0	0.50
SVC 144D-05B	4.5	7.5	10.0	25	5.0	0.50
SVC 150D-05B	4.5	7.5	10.0	25	5.0	0.50
SVC 156D-05B	4.5	7.5	10.0	25	5.0	0.50
SVC 162D-05B	4.5	7.5	10.0	25	5.0	0.50
SVC 168D-05B	4.5	7.5	10.0	25	5.0	0.50
SVC 174D-05B	4.5	7.5	10.0	25	5.0	0.50
SVC 180D-05B	4.5	7.5	10.0	25	5.0	0.50
SVC 186D-05B	4.5	7.5	10.0	25	5.0	0.50
SVC 192D-05B	4.5	7.5	10.0	25	5.0	0.50
SVC 198D-05B	4.5	7.5	10.0	25	5.0	0.50
SVC 204D-05B	4.5	7.5	10.0	25	5.0	0.50
SVC 210D-05B	4.5	7.5	10.0	25	5.0	0.50
SVC 216D-05B	4.5	7.5	10.0	25	5.0	0.50
SVC 222D-05B	4.5	7.5	10.0	25	5.0	0.50
SVC 228D-05B	4.5	7.5	10.0	25	5.0	0.50
SVC 234D-05B	4.5	7.5	10.0	25	5.0	0.50
SVC 240D-05B	4.5	7.5	10.0	25	5.0	0.50
SVC 246D-05B	4.5	7.5	10.0	25	5.0	0.50
SVC 252D-05B	4.5	7.5	10.0	25	5.0	0.50
SVC 258D-05B	4.5	7.5	10.0	25	5.0	0.50
SVC 264D-05B	4.5	7.5	10.0	25	5.0	0.50
SVC 270D-05B	4.5	7.5	10.0	25	5.0	0.50
SVC 276D-05B	4.5	7.5	10.0	25	5.0	0.50
SVC 282D-05B	4.5	7.5	10.0	25	5.0	0.50
SVC 288D-05B	4.5	7.5	10.0	25	5.0	0.50
SVC 294D-05B	4.5	7.5	10.0	25	5.0	0.50
SVC 300D-05B	4.5	7.5	10.0	25	5.0	0.50
SVC 306D-05B	4.5	7.5	10.0	25	5.0	0.50

Transient V-I Characteristic Curves

Current waveform under 10^3 A : DC
over 10^3 A : $8/20\mu$ s

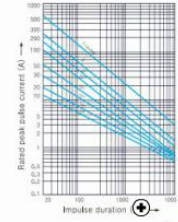
07B(SVC 180D-07B to SVC 680D-07B)



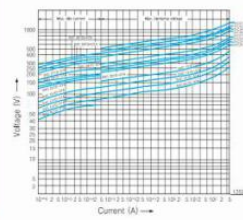
Pulse Lifetime Ratings

Notes : 2-pulse : 5-minute interval
3 to 10-pulse : 2-minute interval
Up to 10³-pulse : 10-second interval

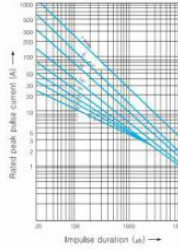
07B(SVC 180D-07B to SVC 680D-07B)



07A(SVC 820D-07A to SVC 471D-07A)



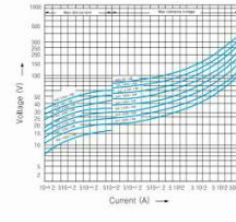
07A(SVC 820D-07A to SVC 471D-07A)



Transient V-I Characteristic Curves

Current waveform under 10^3 A : DC
over 10^3 A : $8/20\mu$ s

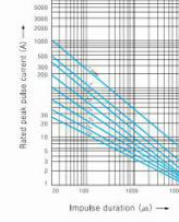
10B(SVC 180D-10B to SVC 680D-10B)



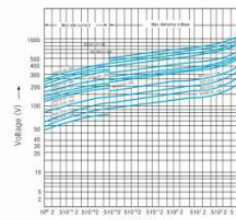
Pulse Lifetime Ratings

Notes : 2-pulse : 5-minute interval
3 to 10-pulse : 2-minute interval
Up to 10³-pulse : 10-second interval

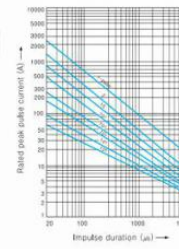
10B(SVC 180D-10B to SVC 680D-10B)



10A(SVC 820D-10A to SVC 471D-10A)



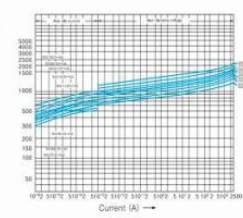
10A(SVC 820D-10A to SVC 471D-10A)



Transient V-I Characteristic Curves

Current waveform under 10^3 A : DC
over 10^3 A : $8/20\mu$ s

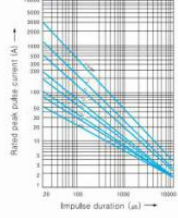
10A(SVC 561D-10A to SVC 112D-10A)



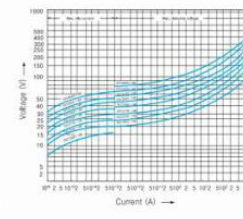
Pulse Lifetime Ratings

Notes : 2-pulse : 5-minute interval
3 to 10-pulse : 2-minute interval
Up to 10³-pulse : 10-second interval

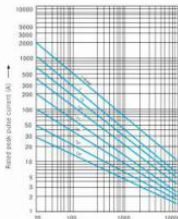
10A(SVC 561D-10A to SVC 112D-10A)



14B(SVC 180D-14B to SVC 680D-14B)



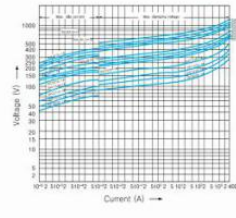
14B(SVC 180D-14B to SVC 680D-14B)



Transient V-I Characteristic Curves

Current waveform under 10^3 A : DC
over 10^3 A : $8/20\mu$ s

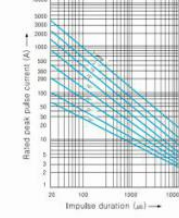
14A(SVC 820D-14A to SVC 471D-14A)



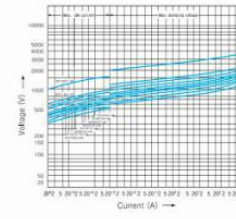
Pulse Lifetime Ratings

Notes : 2-pulse : 5-minute interval
3 to 10-pulse : 2-minute interval
Up to 10³-pulse : 10-second interval

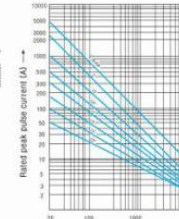
14A(SVC 820D-14A to SVC 471D-14A)



14A(SVC 561D-14A to SVC 182D-14A)



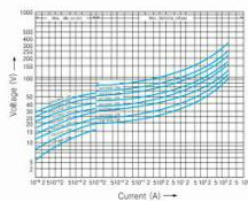
14A(SVC 561D-14A to SVC 182D-14A)



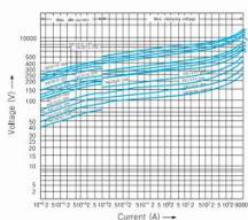
Transient V-I Characteristic Curves

Current waveform under 10¹ A: DC
over 10¹ A: 8/20 μ s

20B(SVC 180D-20B to SVC 680D-20B)



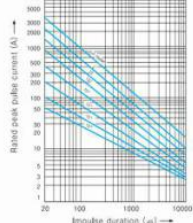
20A(SVC 820D-20A to SVC 471D-20A)



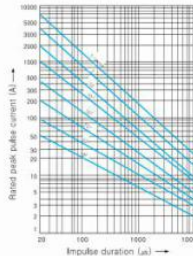
Pulse Lifetime Ratings

Notes : 2-pulse : 5-minute interval
3 to 10-pulse : 2-minute interval
Up to 10¹-pulse : 10-second interval

20B(SVC 180D-20B to SVC 680D-20B)



20A(SVC 820D-20A to SVC 471D-20A)

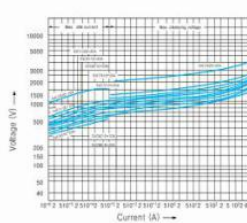


SVC Varistors Type

Transient V-I Characteristic Curves

Current waveform under 10¹ A: DC
over 10¹ A: 8/20 μ s

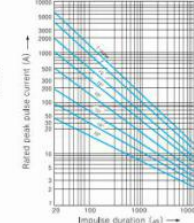
20A(SVC 561D-20A to SVC 182D-20A)



Pulse Lifetime Ratings

Notes : 2-pulse : 5-minute interval
3 to 10-pulse : 2-minute interval
Up to 10¹-pulse : 10-second interval

20A(SVC 561D-20A to SVC 182D-20A)



Applications

- The Protection of semiconducting elements such as diodes, thyristors, transistors, IC and relays against transient Voltages.
- Similar protection of many types of measuring instruments, control machinery and communication equipment and broadcasting equipment against inductive lightning and switching surges.
- Protection of general purpose electrical equipment, domestic machinery and appliances, TV and radios and similar consumer products against lightning and switching surges.

Power Supply Circuit Protection

Line circuit
Varistor voltage selection table (Z)

Power Supply Voltage	Type
100V AC	SVC210-□□A SVC220-□□A SVC240-□□A SVC270-□□A SVC310-□□A SVC350-□□A SVC410-□□A SVC470-□□A SVC560-□□B
200V AC	SVC390-□□A SVC430-□□A SVC510-□□A SVC590-□□B
12V DC	SVC210-□□A
24V DC	SVC270-□□A

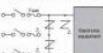
Notes :

- The power supply voltage must not exceed the maximum allowable circuit voltage.
- Since independent wiring loads and capacitive loads cause the voltage build-up at the time of opening or closing the load, use SVC having a varistor voltage as high as possible ("mark").
- The bold faced portions of the type letters vary.

AC/DC single-phase circuit



AC three-phase circuit



Line and ground circuit

Varistor voltage selection table (Z)

Power Supply Voltage	Type
100V AC	SVC430-□□A SVC470-□□A
200V AC	SVC510-□□A to SVC1820-□□A SVC1820-□□A

Notes :

- When subjected to meager testing(500V DC), the insulation resistance value can decrease due to the leakage current of the SVC. To avoid this remove the varistor or use "mark" marked SVC.
- When subjected to dielectric strength test(1000V AC), remove the SVC or use "mark" marked SVC.

Select varistors taking a note of operating conditions peculiar to the equipment.

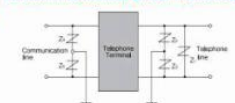
AC/DC single-phase circuit



AC three-phase circuit



Telecommunication Circuit Protection



Varistor voltage selection guided

Power Supply Voltage	Type
12V DC	SVC210-□□B SVC220-□□B SVC240-□□A SVC270-□□B SVC310-□□A
24V AC	SVC390-□□B SVC430-□□A

Notes :

- The varistor SVC has a capacitance value. Take note of this when applying them to high-frequency signal circuits.

Switching Circuit Protection

Protection of relay
(Contact coil)



Protection of semiconductors



Varistor voltage selection guide

Power Supply Voltage	Type
12V DC	SVC210-□□B
24V DC	SVC220-□□B
100V DC	SVC240-□□A SVC270-□□A SVC310-□□A SVC350-□□A SVC410-□□A SVC470-□□A

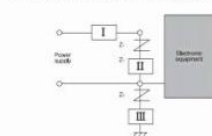
Notes :

- The power supply voltage must not exceed the maximum allowable circuit voltage of the SVC.
- Pay due attention to the surge energy generated by the load.
- Select SVC referring to the pulse lifetime rating.
- To further reduce the tendency of sparking across the contacts connect a capacitor parallel with the SVC. This will also protect the equipment from electromagnetic wave jamming.

Application Notes

Overcurrent protection

When surges exceed the rating for the SVC, short-circuits or damages can be expected. Take following precautions.



SVC Varistors Type

① Connect the SVC at a position nearer to the equipment than the overcurrent protection device "I" (fuse, MCCB) as is shown in the diagram.

When the SVC is shunted, the overcurrent protection device "I" operates (trips or blows off the fuse).

② If the overcurrent protection device "I" can not be installed in "I" position, connect a fuse at "II" position. Select fuse rated current for the SVC referring to the following table.

SVC	65A	67A	10A	14A	20A
Applicable fuse rated current(A)	1 to 2	2 to 3	3 to 5	5 to 10	5 to 15

③ When "Z" SVC is connected between the equipment and ground install an ELCB (Earth Leakage Circuit Breaker). If not possible, connect a fuse or thermal fuse at "II" position.

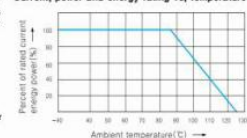
Installation

- When operated at location near heating element or exposed to direct sun light, confirm that the ambient temperature range.
- When operated in dusty or dirty locations, or exposed to corrosive atmospheres, or where metallic powders or salt can be expected, be sure to mount within a protective enclosure.

Molding

When shielding the SVC in a resin molding, take a note of the materials used and temperature, since they influence the reliability. For further information please contact SAMWHA.

Current, power and energy rating vs. temperature



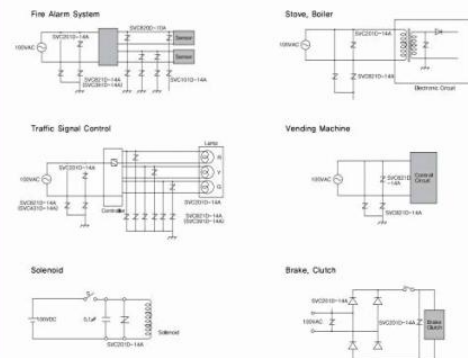
Electrical Characteristics

Operating ambient temperature	-40°C to +85°C
Storage temperature	-40°C to +125°C
Voltage temperature coefficient	-0.05% / °C
IR change of test condition	
471 (at 500V)	over 10M Ω
561 (at V _{ia})	over 10M Ω

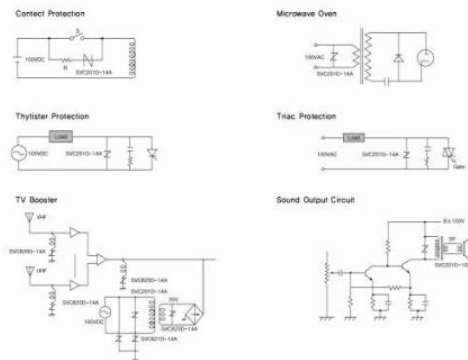
Recognized standards

Standard	Content	Applicable SVC series	File No.
UL	UL 1449 3rd edition Surge-protective Devices - Component	Other SPD Applications : 05/07/10 Series, 14B/20B Series	E332621
VDE	IEC61051-1:2007-04 IEC61051-2:1999-01 IEC61051-3:2:1999-01	Varistor	05/07/10/14 Series
CAS	CLASS 2221 01	AUDIO AND VIDEO EQUIPMENT - Accessories and Parts for Electronic Equipment	SVC2010 - □ - SVC1820 - □
			15/7876

Application Example



SVC Varistors Type



Varistor Terminology

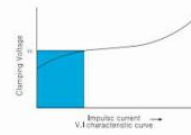
Varistor Voltage : Vnom

Varistor peak terminal voltage measured with a specified current applied. The DC current applied is 1mA normally.



Clamping Voltage : Vc

Maximum terminal voltage (peak voltage across the varistor) measured with an applied 8/20μs impulse of a given peak current.



Capacitance

Typical values measured at a test frequency of 1kHz

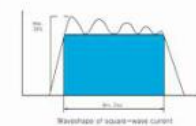
Rated peak transient current : itm

Maximum peak current through the varistor with line voltage applied.

The maximum peak current with in the varistor voltage change ratio of $\pm 10\%$ with the standard 8/20μs impulse current applied two times at 5 minute interval.

Rated transient energy : Wtm

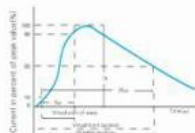
Maximum allowable energy for a single impulse of 2ms square-wave current waveform with rated continuous voltage applied. Maximum energy rating base on a shift of Vnom of less than $\pm 10\%$ of initial value.



Test current waveform

Characteristics tests for Varistors are carried out by using 8/20μs test impulses. Data such as the maximum clamping voltage (Vc) and the transient peak current (Itm) are obtained by using this impulse current.

However, for the Vc characteristics of the Axial Package type a 10mA DC squarewave current is used to carry out the test.



Rated RMS Voltage : Vacm

Maximum continuous sinusoidal RMS voltage at 50/60Hz which may be applied.

Rated DC Voltage : Vdcm

Maximum continuous DC voltage which may be applied.

Pulse lifetime rating

This is expressed as the maximum allowable number of impulse currents applied.

8/20μs impulse current (or 2ms square wave) is applied at prescribed interval.

This curve also provides for derating current as required with repetitive pulsing.

