■壓敏電阻器

ZINC OXIDE VARISTOR

是以氧化鋅為主要原料製造的半導體電子陶瓷元件，其電阻值隨施加電壓的改變而呈非線性變化，由於電阻值對電壓變化十分敏感，故稱壓敏電阻器或突波吸收器。

Are non-linear resistors utilize a semiconductor electronic ceramic element mainly composed of Zinc Oxide and its resistors change as a function of the applied voltage .It`s called Varistor or Transient surge absorbers

● 特性FEATURES

* 電壓範圍寬(18V～1.8KV) Widely voltage range 18V ～1.8KV
* 反應速度快(<25ns) Fast response to the rapidly increase Voltage(<25ns)
* 非線性指數大Excellent non-linearity voltage
* 無極性Symmetric V-I characteristics
* 通流量大(2000A/cm^2) Great withstanding surge current (2000A/cm^2)
* 壽命長Long life

● 訂貨方式HOW TO ORDER

S	471	K	C
貼片压敏电阻 SMD ZINC OXIDE VARISTOR	壓敏電壓(V) Varistor Voltage	允許誤差 Tolerance	外形(Inch) Packing code
	470=47x10^0=47V	J ±5%	C 6244
	471=47x10^1=470V	K ±10%	B 5032
	472=47x10^2=4700V	M ±20%	A 4324

● 特性曲線CHARACTERISTICS

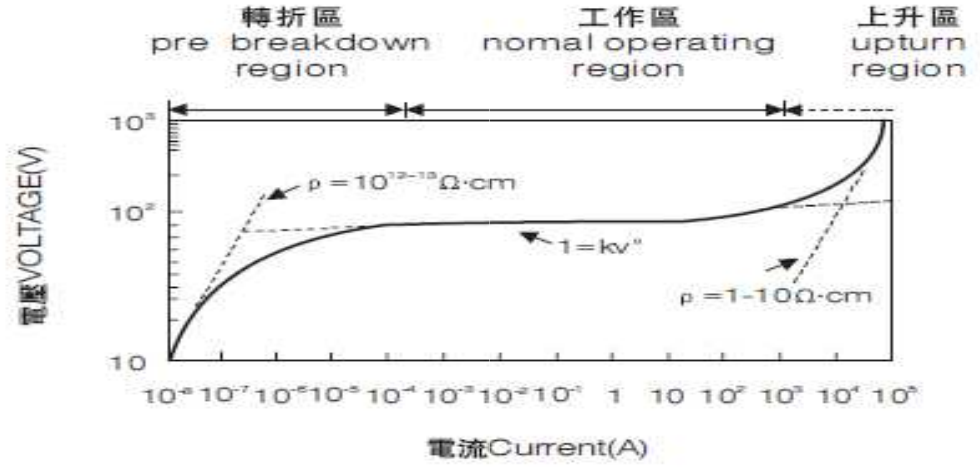
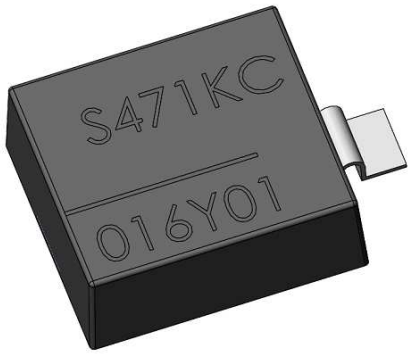
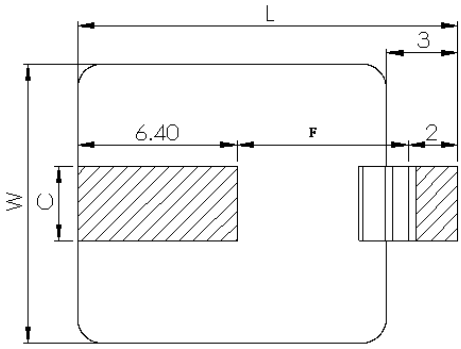


圖 Fig1
Voltage Current Characteristic

● 外形尺寸DIMENSIONS 单位Unit: mm





單位Unit: mm

型号末位 MODEL NO.	封装尺寸 英制(Inch)	長(L)	寬(W)	高(H)	脚宽(C)	脚距(F)
A	4324	10.8	6.2	4.5	3	6.3
B	5032	12.8	8.2	4.5	3	6.6
C	6244	15.8	11.2	4.5	3	7.8

- 包装方式及数量QUANTITY& MEASURE

型号末位 Outline Code	数量Quantity (PCS)	
	13寸卷盘 Reel Size 13inch	15寸卷盘 Reel Size 15inch
A(4324)	1800	2500
B(5032)	1200	1700
C(6244)	900	1250

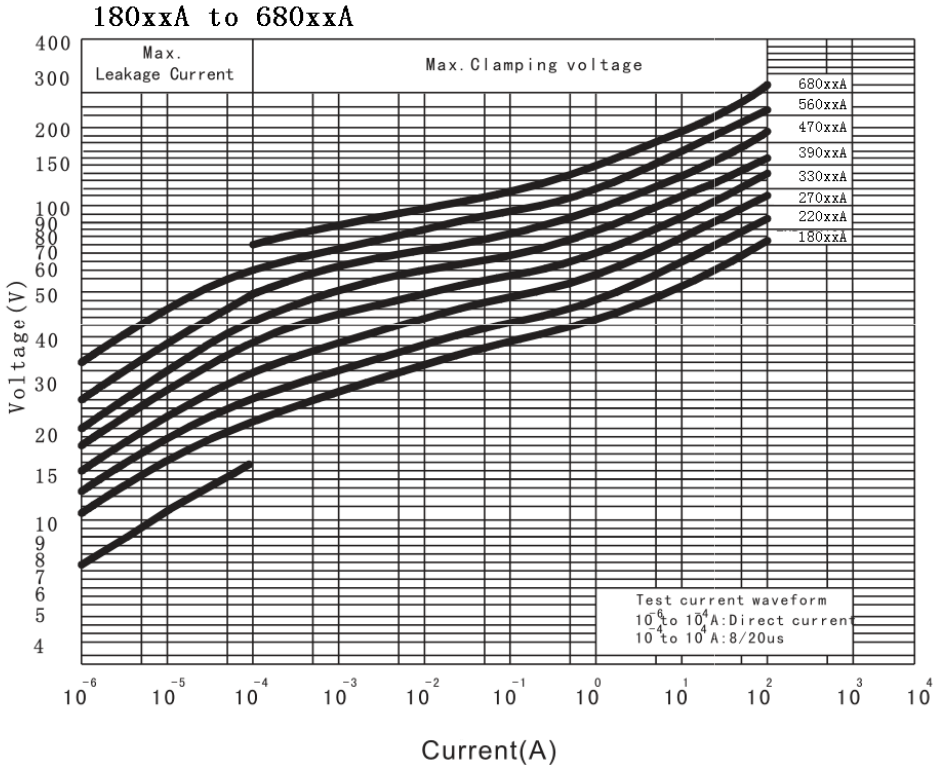
● A系列電性能 A SERIES SPECIFICATION

型號規格 Part Number	最大允許使用電壓 Maximun operation Voltage		壓敏電壓 Varistor Voltage	最大限制電壓 Maximun clamping Voltage		最大通流容量 Maximun Withstanding Surge Current (8/20uS)	最大能量耐量 Maximun Energy (2ms)	最大靜態功率 Rated Wattage	靜態電容量(參考值) (1Khz) Capacitance (Reference)
	AC (V)	DC (V)	V0.1mA (V)	Vc (V)	IP (A)	1 Time (A)	(J)	(W)	(PF)
180xA	11	14	18 (16.2~19.8)	40	1	100	0.4	0.01	1600
220xA	14	18	22 (19.8~24.2)	48	1	100	0.5	0.01	1300
270xA	17	22	27 (24.3~29.7)	60	1	100	0.6	0.01	1050
330xA	20	26	33 (29.7~36.3)	73	1	100	0.8	0.01	900
390xA	25	31	39 (35.1~42.9)	86	1	100	0.9	0.01	500
470xA	30	38	47 (42.3~51.7)	104	1	100	1.1	0.01	450
560xA	35	45	56 (50.4~61.6)	123	1	100	1.3	0.01	400
680xA	40	56	68 (61.2~74.8)	150	1	100	1.6	0.01	350
820xA	50	65	82 (73.8~90.2)	155	5	400	1.8	0.1	250
101xA	60	85	100 (90~110)	175	5	400	2.2	0.1	200
121xA	75	100	120 (108~132)	210	5	400	2.5	0.1	170
151xA	95	125	150 (135~165)	260	5	400	4.0	0.1	140
181xA	115	150	180 (162~198)	315	5	400	4.5	0.1	110
201xA	130	170	200 (180~220)	355	5	400	5.0	0.1	80
221xA	140	180	220 (198~242)	380	5	400	6.0	0.1	70
241xA	150	200	240 (216~264)	415	5	400	6.5	0.1	70
271xA	175	225	270 (243~297)	475	5	400	8.0	0.1	65
301xA	200	250	300 (270~330)	525	5	400	8.0	0.1	55
331xA	210	275	330 (297~363)	580	5	400	8.5	0.1	60
361xA	230	300	360 (324~396)	620	5	400	10.0	0.1	50
391xA	250	320	390 (351~429)	675	5	400	10.0	0.1	50
431xA	275	350	430 (387~473)	745	5	400	12.0	0.1	45
471xA	300	385	470 (423~517)	810	5	400	13.0	0.1	40
511xA	320	415	510 (459~561)	845	5	400	14.0	0.1	39
561xA	350	460	560 (504~616)	920	5	400	14.0	0.1	39

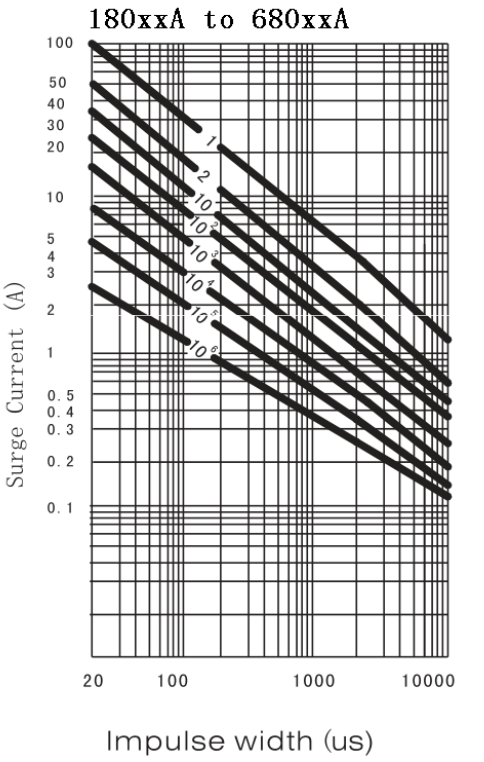
x:代表误差J、K、M;

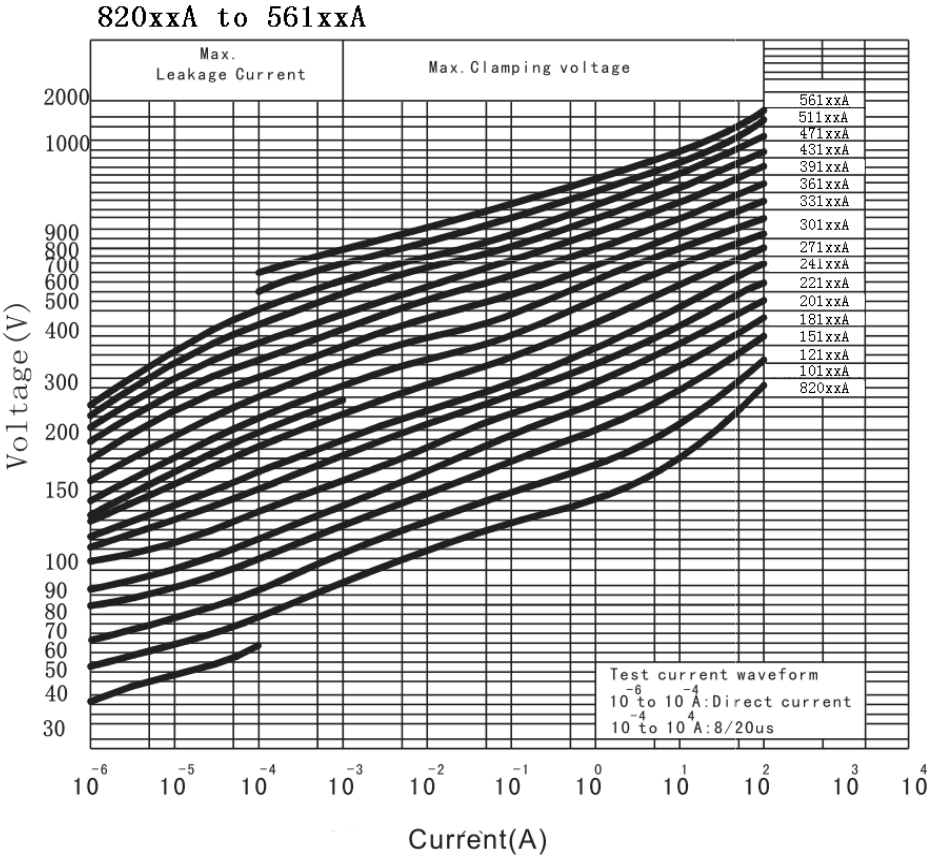
● A系列 A Series

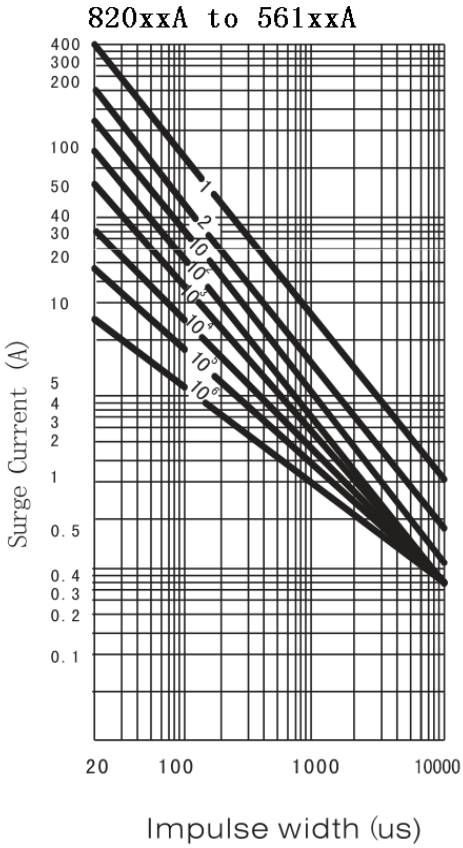
V-I Curve



Impluse Lifetime Ratings
(2 time:5 minutes internal
up to 10 times 2 minutes internal
up to 10^6 times 10 seconds internal)







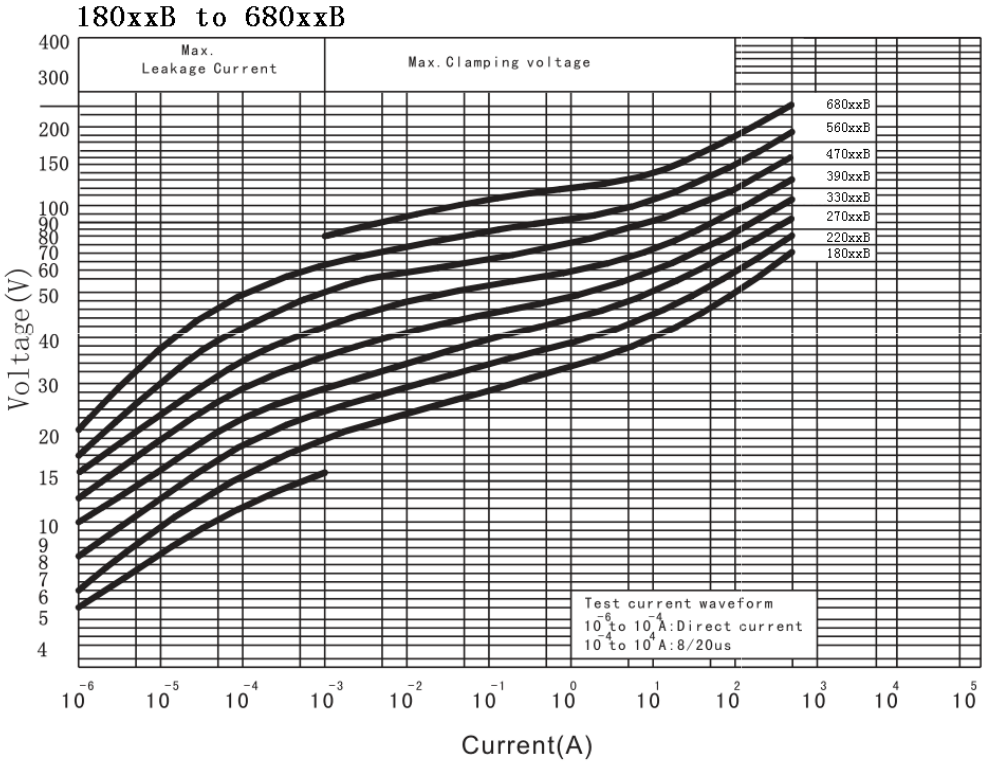
● B系列電性能 B SERIES SPECIFICATION

型號規格 Part Number	最大允許使用電壓 Maximun operation Voltage		壓敏電壓 Varistor Voltage	最大限制電壓 Maximun clamping Voltage		最大通流容量 Maximun Withstanding Surge Current (8/20uS)	最大能量耐量 Maximun Energy (2ms)	最大靜態功率 Rated Wattage	靜態電容量 (參考值) (1Khz) Capacitance (Reference)
	AC (V)	DC (V)	V0.1mA (V)	Vc (V)	IP (A)	1 Time (A)	(J)	(W)	(PF)
180xB	11	14	18 (16.2~19.8)	36	3	250	0.9	0.02	3500
220xB	14	18	22 (19.8~24.2)	43	3	250	1.1	0.02	2800
270xB	17	22	27 (24.3~29.7)	53	3	250	1.4	0.02	2000
330xB	20	26	33 (29.7~36.3)	65	3	250	1.7	0.02	1500
390xB	25	31	39 (35.1~42.9)	77	3	250	2.1	0.02	1350
470xB	30	38	47 (42.3~51.7)	93	3	250	2.5	0.02	1150
560xB	35	45	56 (50.4~61.6)	110	3	250	3.1	0.02	950
680xB	40	56	68 (61.2~74.8)	135	3	250	3.6	0.02	700
820xB	50	65	82 (73.8~90.2)	135	10	1200	4.2	0.25	550
101xB	60	85	100 (90~110)	165	10	1200	4.8	0.25	500
121xB	75	100	120 (108~132)	200	10	1200	5.9	0.25	450
151xB	95	125	150 (135~165)	250	10	1200	8.0	0.25	350
181xB	115	150	180 (162~198)	300	10	1200	10.0	0.25	300
201xB	130	170	200 (180~220)	340	10	1200	13.0	0.25	250
221xB	140	180	220 (198~242)	360	10	1200	13.0	0.25	250
241xB	150	200	240 (216~264)	395	10	1200	13.0	0.25	200
271xB	175	225	270 (243~297)	455	10	1200	15.0	0.25	170
301xB	200	250	300 (270~330)	500	10	1200	17.0	0.25	150
331xB	210	275	330 (297~363)	550	10	1200	22.0	0.25	150
361xB	230	300	360 (324~396)	595	10	1200	20.0	0.25	130
391xB	250	320	390 (351~429)	650	10	1200	22.0	0.25	130
431xB	275	350	430 (387~473)	710	10	1200	26.0	0.25	110
471xB	300	385	470 (423~517)	775	10	1200	26.0	0.25	100
511xB	320	415	510 (459~561)	840	10	1200	26.0	0.25	100
561xB	350	460	560 (504~616)	925	10	1200	26.0	0.25	90
621xB	385	505	620 (558~682)	1025	10	1200	26.0	0.25	80
681xB	420	561	680 (612~748)	1120	10	1200	26.0	0.25	75

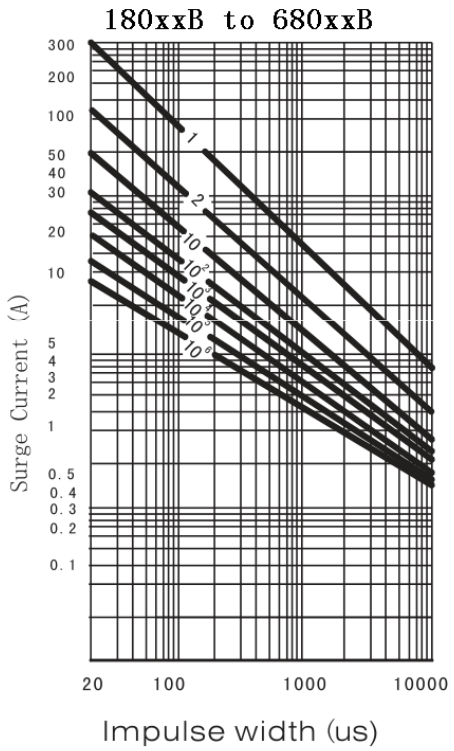
x:代表误差J、K、M;

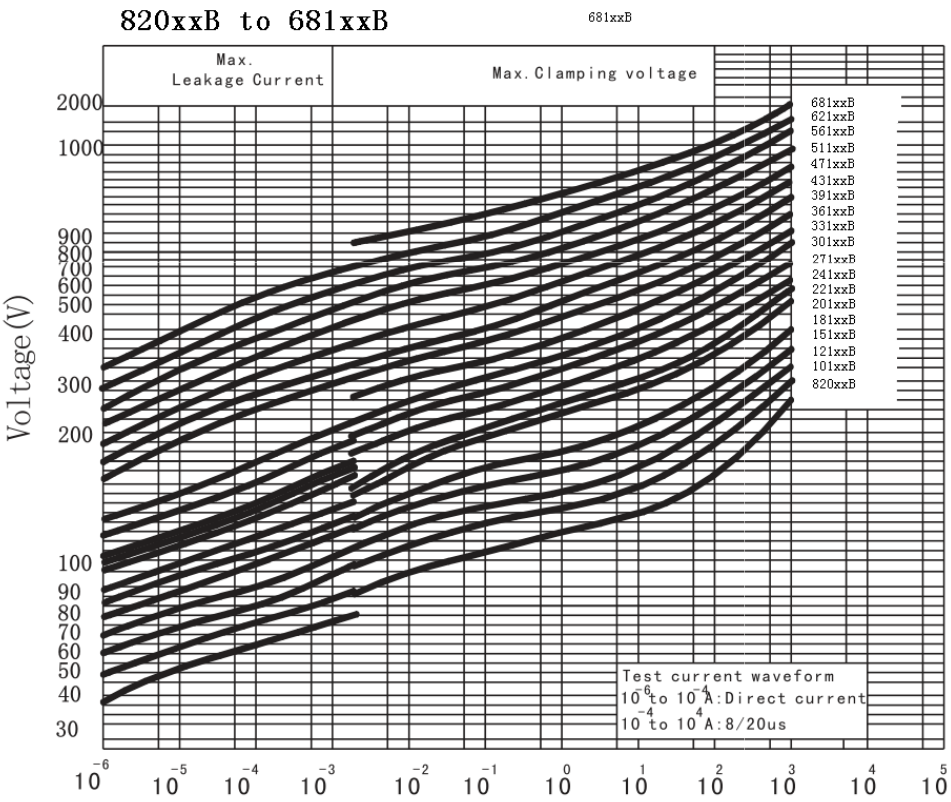
● B系列 B Series

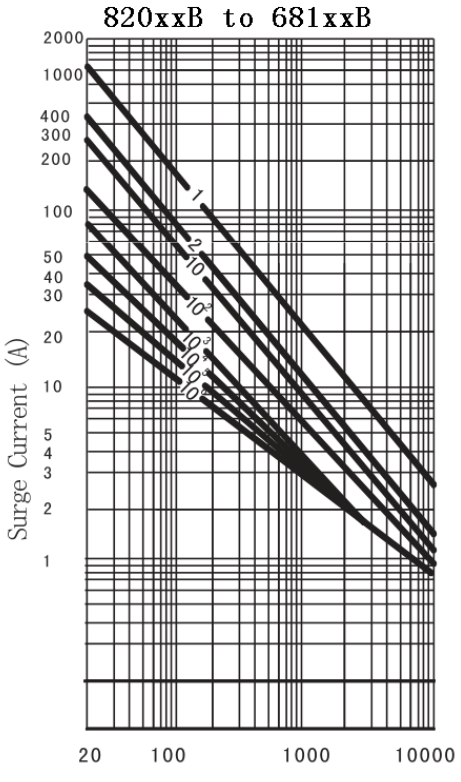
V-I Curve



Impluse Lifetime Ratings
(2 time:5 minutes internal
up to 10 times 2 minutes internal
up to 10^6 times 10 seconds internal)







● C系列電性能 C SERIES SPECIFICATION

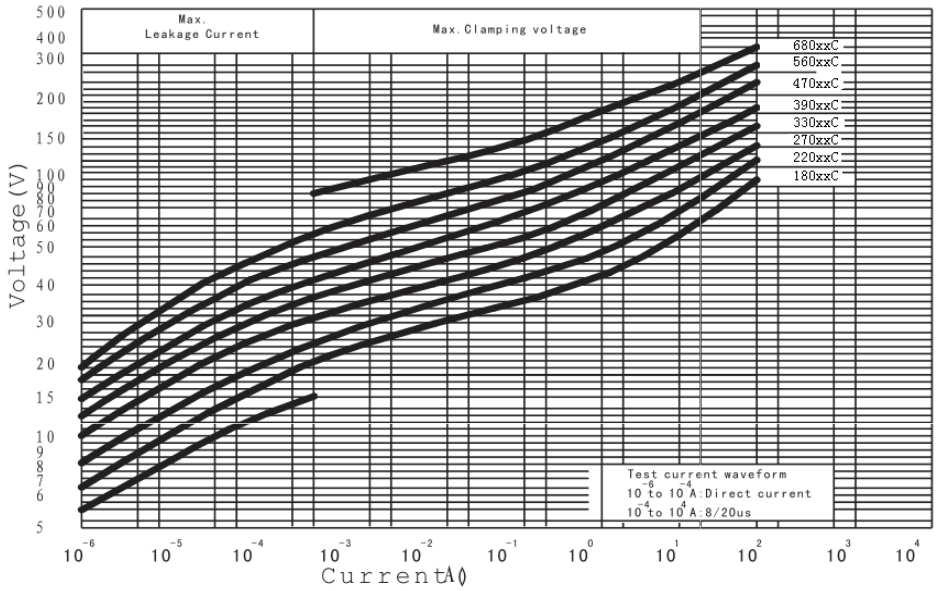
型號規格 Part Number	最大允許使用電壓 Maximun operation Voltage		壓敏電壓 Varistor Voltage	最大限制電壓 Maximun clamping Voltage		最大通流容量 Maximun Withstanding Surge Current (8/20uS)	最大能量耐量 Maximun Energy (2ms)	最大靜態功率 Rated Wattage	靜態電容量 (參考值) (1Khz) Capacitance (Reference)
	AC (V)	DC (V)	V0.1mA (V)	Vc (V)	IP (A)	1 Time (A)	(J)	(W)	(PF)
180xC	11	14	18 (16.2~19.8)	36	5	500	2.1	0.05	7500
220xC	14	18	22 (19.8~24.2)	43	5	500	2.5	0.05	6000
270xC	17	22	27 (24.3~29.7)	53	5	500	3.0	0.05	4000
330xC	20	26	33 (29.7~36.3)	65	5	500	4.0	0.05	3000
390xC	25	31	39 (35.1~42.9)	77	5	500	4.6	0.05	2600
470xC	30	38	47 (42.3~51.7)	93	5	500	5.5	0.05	2200
560xC	35	45	56 (50.4~61.6)	110	5	500	7.0	0.05	1800
680xC	40	56	68 (61.2~74.8)	135	5	500	8.2	0.05	1300
820xC	50	65	82 (73.8~90.2)	135	25	2500	8.4	0.4	1800
101xC	60	85	100 (90~110)	165	25	2500	10.0	0.4	1400
121xC	75	100	120 (108~132)	200	25	2500	15.0	0.4	1100
151xC	95	125	150 (135~165)	250	25	2500	20.0	0.4	900
181xC	115	150	180 (162~198)	300	25	2500	23.0	0.4	700
201xC	130	170	200 (180~220)	340	25	2500	26.0	0.4	500
221xC	140	180	220 (198~242)	360	25	2500	30.0	0.4	450
241xC	150	200	240 (216~264)	395	25	2500	32.0	0.4	400
271xC	175	225	270 (243~297)	455	25	2500	40.0	0.4	350
301xC	200	250	300 (270~330)	500	25	2500	35.0	0.4	325
331xC	210	275	330 (297~363)	550	25	2500	39.0	0.4	325
361xC	230	300	360 (324~396)	595	25	2500	32.0	0.4	300
391xC	250	320	390 (351~429)	650	25	2500	52.0	0.4	270
431xC	275	350	430 (387~473)	710	25	2500	58.0	0.4	250
471xC	300	385	470 (423~517)	775	25	2500	58.0	0.4	230
511xC	320	415	510 (459~561)	840	25	2500	58.0	0.4	200
561xC	350	460	560 (504~616)	925	25	2500	58.0	0.4	180
621xC	385	505	620 (558~682)	1025	25	2500	58.0	0.4	130
681xC	420	561	680 (612~748)	1120	25	2500	60.0	0.4	130
751xC	460	615	750 (675~825)	1240	25	2500	65.0	0.4	120
781xC	485	640	780 (702~858)	1290	25	2500	65.0	0.4	120
821xC	510	670	820 (738~902)	1355	25	2500	71.0	0.4	110
911xC	550	745	910 (819~1001)	1500	25	2500	78.0	0.4	100
102xC	625	825	1000 (900~1100)	1650	25	2500	84.0	0.4	90
112xC	680	895	1100 (990~1210)	1815	25	2500	91.0	0.4	80

x:代表误差J、K、M;

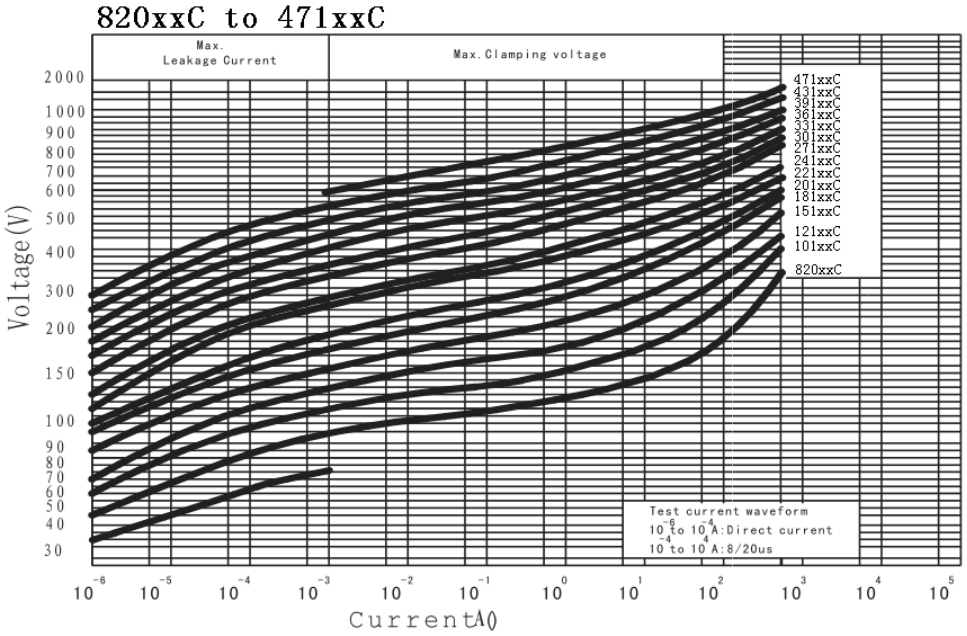
● C系列 C Series

V-I Curve

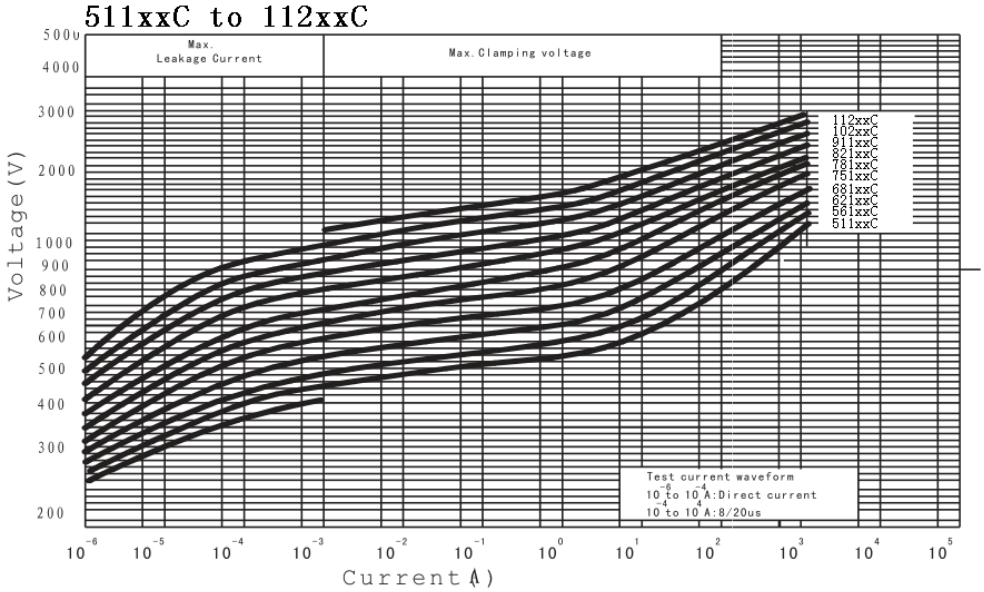
180xxC to 680xxC



820xxC to 471xxC

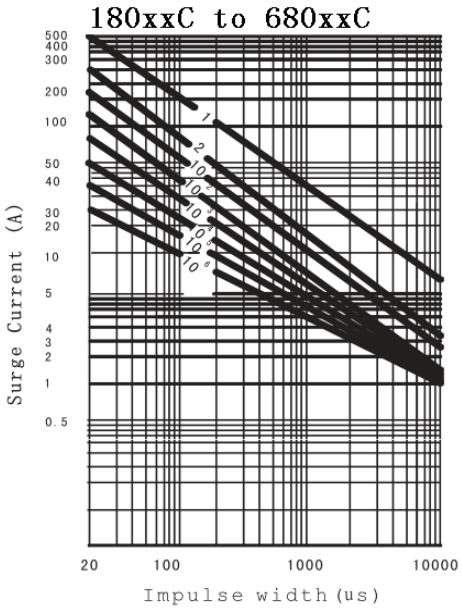


511xxC to 112xxC

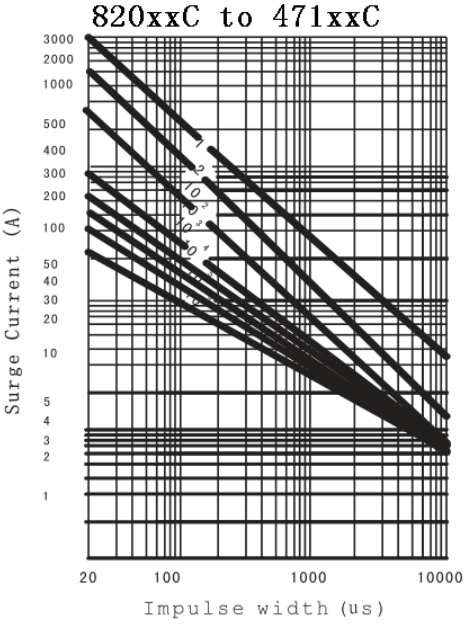


Impluse Lifetime Ratings

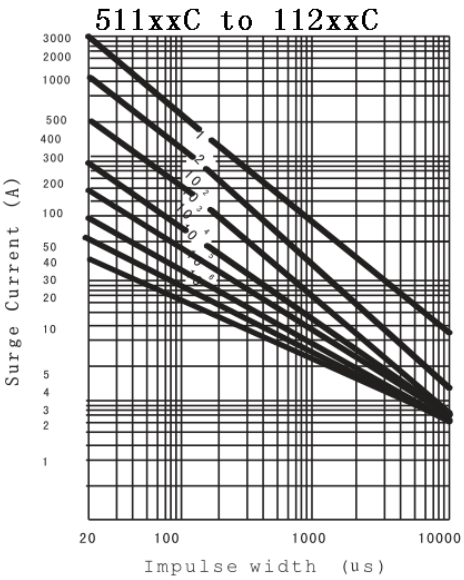
180xxC to 680xxC



820xxC to 471xxC



511xxC to 112xxC



● 壓敏電阻器的選用方法(參考) HOW TO SELECT A VARISTOR(ONLY REFERENCE)

A:壓敏電壓的選取

對於過壓保護方面的應用,壓敏電壓值應大於實際電路的電壓值,一般可以用以下公式計算:

$$V_{1ma}=a\cdot v/b\cdot c$$

a:電源電壓波動係數,一般取值1.2
v:在電路中的壓敏電阻器兩端的直流電壓(交流時取電壓峰值)
b:壓敏電壓誤差,一般取0.85
c:元件的老化係數,一般取0.9

A: Varistor voltage

Varistor Voltage should be more than the operating voltage in over protective circuit,The formula is shown as the following.

$$V_{1ma}=a\cdot v/b\cdot c$$

a -power Voltage ripple coefficient usually 1.2
v -DC Voltage (significant value only AC power)
b -Tolerance usually take 0.85
c -Ageing coefficient usually take 0.9

B:通流量的選取

通常產品給出的通流量是按照產品標準給定的波形、衝擊次數和間隙時間進行脈衝實驗時產品所能承受的最大電流值，產品所能承受的衝擊數是波形、幅值和間隙時間的函數，當電流波形幅值降低50%時衝擊次數可增加一倍，所以實際應用中，壓敏電阻器所吸收的浪湧電流應小於產品的最大通流量，以延長產品的工作壽命。

B:Withstanding surge current

In general, withstanding surge current is max,Pulse current value which determined by test conditions Such as wave-shape, amplitude and intermal time, when the amplitude decrease to 50% of the initial, It should be increased to 2 times of the initial in order to keep the life longer,the surge current which is Sbsorbed by the varistor should be less than max. withstanding surge current

● 用途 APPLICATIONS

MODEL NUMBER	MODEL NUMBER	MODEL NUMBER	主要用途 Recommended Applications
180xA 220xA 270xA 330xA 390xA 470xA 560xA 680xA	180xB 220xB 270xB 330xB 390xB 470xB 560xB 680xB	180xC 220xC 270xC 330xC 390xC 470xC 560xC 680xC	. Protection of various kinds of semiconductors . Protection of automobile Equipment . Absorption of switching surge from various kinds of relays and electro-magnetic valves (DC below 48V) . Protection of electronic equipment from electrostatic discharge .積體電路、電晶體等半導體元件保護 .汽車電裝品 . DC48V以下激磁線圈,如:繼電器、電磁等 . 靜電防制 .行動電話
820xA 101xA 121xA 151xA	820xB 101xB 121xB 151xB	820xC 101xC 121xC 151xC	. Telephone. Communication line (DC 48V) .電話機用:DC48V通信回路
181xA 201xA 221xA	181xB 201xB 221xB	181xC 201xC 221xC	.AC100V Line-Line Applications (Japan) .用於AC100V電源線間(日本)
241xA 271xA 301xA	241xB 271xB 301xB	241xC 271xC 301xC	.AC100V to AC 120V, Line-Line Applications (Japan.,U.S.,Canada) .用於AC100V~AC120V電源線間(日本、美國、加拿大等)
331xA 361xA 391xA	331xB 361xB 391xB	331xC 361xC 391xC	. Telephone Line Application (250V Insulation Resistance Test Applicable) .用於電話機250V絕緣阻抗測試

http://www.uchidg.com Email: james@uchidg.com

壓敏電阻器
ZINC OXIDE VARISTOR

MODEL NUMBER	MODEL NUMBER	MODEL NUMBER	主要用途 Recommended Applications
431xA 471xA	431xB 471xB	431xC 471xC	.AC200~220V Line-line Applications .AC100~220V Line-Ground Applications .AC200~220V電源線間應用 .AC100~220電源與對地應用
561xA	561xB 621xB 681xB	561xC 621xC 681xC	.AC200~220V Line-line Applications (U.K.,Australia,Middle East Countries) .AC200~220V電源線間應用 (英國,中東,澳洲等國)
		751xC 781xC 821xC	.AC380V Line-Line , Line-Ground Applications .AC380V電源線間應用及電源對地間應用
		911xC	.AC415V, Line-Line , Line-Ground Applications .AC415V電源線間應用及電源對地間應用
		102xC 112xC	.AC480V, Line-Line , Line-Ground Applications .AC480V電源線間應用及電源對地間應用

- 保險絲配用建議(SELECT OF FUSE in conformity to Varistor):

*和壓敏電阻大小配合選用表(If conform with diameter):

Part Number	xA series	xB series	xC series
Fuse rating	1 To 2A	2 To 3A	3 To 5A

*和壓敏電阻最大峰值電流配合選用表(If conform with Max Peak current):

Max.Peak Current 8/20uS 1 time(A)	Up to 500	501 To 2000	2001 To 6000
Fuse rating	3A	5A	10A

http://www.uchidg.com Email: james@uchidg.com

- 電氣特性及測試方法ELECTRICAL PERFORMANCE TEST

標準測試條件:溫度5℃~35℃,溫度:45%~85%
Standard Test Conditions:Temppreture: 5℃~35℃,Humidity:45%~85%

項目 Item	測試方法 Test method	性能 Performance
壓敏電壓 Varistor Voltage	在DC 1mA(xxA系列產品為0.1mA)電流條件下的電壓值U_{1mA}(xxA系列產品為$U_{0.1mA}$)定為壓敏電壓。 In DC 1mA(Only xxA Series products voltage at DC 0.1mA) would be set to varistor's voltage in ±10%	公差:±10% Tolerance:±10%
漏電流 Leakage current	在0.83U_{1mA}(xxA系列產品為0.1mA)電壓下的電流值. Current in 0.83U_{1mA}(xxA Series products $U_{0.1mA}$) voltage.	請看標準 Please see standard
限制電壓 Clamping Voltage	在規定波形下施加規定電流後壓敏電阻器兩端的電壓峰值. The max voltage between two terminates with the specified standard impulse current.	請看標準 Please see standard
最大通流容量 Max peak current	用8/20uS波形衝擊後應無損傷,壓敏電壓變化率≤±10%。 Use 8/20uS wave form,According to following current no damage after shock one times in single direction every five minutes,voltage change percentage≤±10%。	壓敏電壓變化率在±10%內。 Varistor Voltage changed Percentage≤±10%。
能量耐量 Maximun energy	用2ms波衝擊一次,衝擊後應無損傷,壓敏電壓變化率≤±10%. No damage after shock with 2ms square wave, Varistor voltage changed percentage≤±10%	壓敏電壓變化率在±10%以內. Varistor Voltage changed percentage≤±10%.
電壓溫度係數 Temperature coefficient of varistor Voltage	在規定溫度下顯示壓敏電壓的變化值. Varistor Voltage changed percentage on Specified Temperature.	≤±5%。
靜態電容量 Capacitance	條件:1KHz,1V Condition:1Khz,1V	
耐電壓 Bear of voltage	條件:2500VAC 引出端與外殼間1min. Conditon:2500VAC The distance of leads terminal and crust is 1 min.	要求:外觀無可風損傷;應無擊穿或飛弧。 Request: No break out and damage; No hit into product and flying arc.

- 機械性能測試Machine characteristic test

項目 Item	試驗方法及測試設備 Test method and tester	要求 Request
標誌耐溶劑 The sign of melted-resistant solvent	條件:70%的1.1.2三氯,1.2.2氯乙烷和30%的異丙醇的混合物;室溫,浸漬5min;用脫脂棉在正反方向各擦拭5次,共10次;擦拭速度:2次/秒。 Condition: Mixture with 70% 1.1.2 three chlorin, 1.2.2 fluorin- ethane and 30% cymene-alcohol; room temperature, dip 5 min; clean 5 times on positive and negative direction with absorbent cotton, total 10 times; cleaning speed: 2 times/S	要求：標誌清晰。 -5%≤ △V/V≤5% Request: Clear Sign. -5%≤ △V/V≤5%
耐焊接熱特性 Resistance to Soldering Heat	條件: 回流焊250℃. Condition: reflow soldering 250℃	要求:無可見損傷 -5%≤ △V/V≤5% I_L≤20 uA Request: Clear Sign. -5%≤ △V/V≤5% I_L≤20 uA
振動 Vibration	條件:正弦波; 10Hz~55Hz~10Hz 一次掃描時間:1min 全振幅:1.5mm 3個方向,共6h。 Condition: Sine Wave; 10Hz~55Hz~10Hz Scaning time once :1min Whole view picture:1.5mm 3direction,total 6h.	要求:無可見損傷 -5%≤ △V/V≤5% Request:No break out and damage -5%≤ △V/V≤5%
碰撞 Impact	條件: 390m/s²6ms 三個方向,共4000次. Condition:390m/s²6ms 3 Direction,total 4000 times.	要求:無可見損傷 -5%≤ △V/V≤5% Request:No break out and damage -5%≤ △V/V≤5%

- 氣候試驗

項目 Item	試驗方法及測試設備 Test method and tester	要求 Request
溫度快速變化 Temp cycle test	條件: θA: -40±2℃; θB: -40±2℃; T1:30min t2:2min~3min 迴圈次數:5次 Condition:θA: -40±2℃; θB: -40±2℃; T1:30min t2:2min~3min Cycle times:5	要求:無可見損傷 -5%≤ △V/V≤5% Request: No break out and damage -5%≤ △V/V≤5%
高溫負荷 Heat burthen	條件:85℃ 施加電壓:505VDC 負荷方式:連續 週期測量時間:500h 累計試驗時間:1000h 恢復1h~2h後測量。 Condition:85℃ Inflicted voltage:505VDC Burthen quomodo:continuous; Circular measure time:500h Total testing time:1000h Measure after coming back in 1h~2h	要求:無可見損傷、標誌清晰 -5%≤ △V/V≤5% Request: No break out and damage ,and sign is clear; -5%≤ △V/V≤5%
高溫儲存 Stockpile in high temperature	條件:125±2℃ 週期測量時間:500h 恢復時間:1000h Condition:125±2℃ Circular measure time:500h Total testing time:1000h Measure after coming back in 1h~2h.	要求:無可見損傷 -5%≤ △V/V≤5% Request: No break out and damage -5%≤ △V/V≤5%
氣候順序 Weather oder	條件:幹熱:85±2℃, 16h 迴圈濕熱: Db, 一個迴圈, 24h, 55℃級; 低溫:-40±3℃, 2h Condition: Dry and heat:85 2 16h Low temperature -40±3℃, 2h Circular wet and heat:Db,a cycle,24h,55℃ level;	要求:無可見損傷 -5%≤ △V/V≤5% Request: No break out and damage -5%≤ △V/V≤5%
穩態濕熱 Steady state hot and damp	4個樣品不施加電壓,另4個樣品施加最大連續電壓的10% 嚴酷度:96h 4 samples not with voltage, and other 4 samples with 10 percent of maximal continuous voltage Strict degree:96h	要求:外觀無可見損傷 限制電壓變化率 ≤+20% 壓敏電壓變化率 ≤±10% Request: No break out and damage. Limited voltage changed rate≤+20% Varistor voltage changed rete≤±10%