

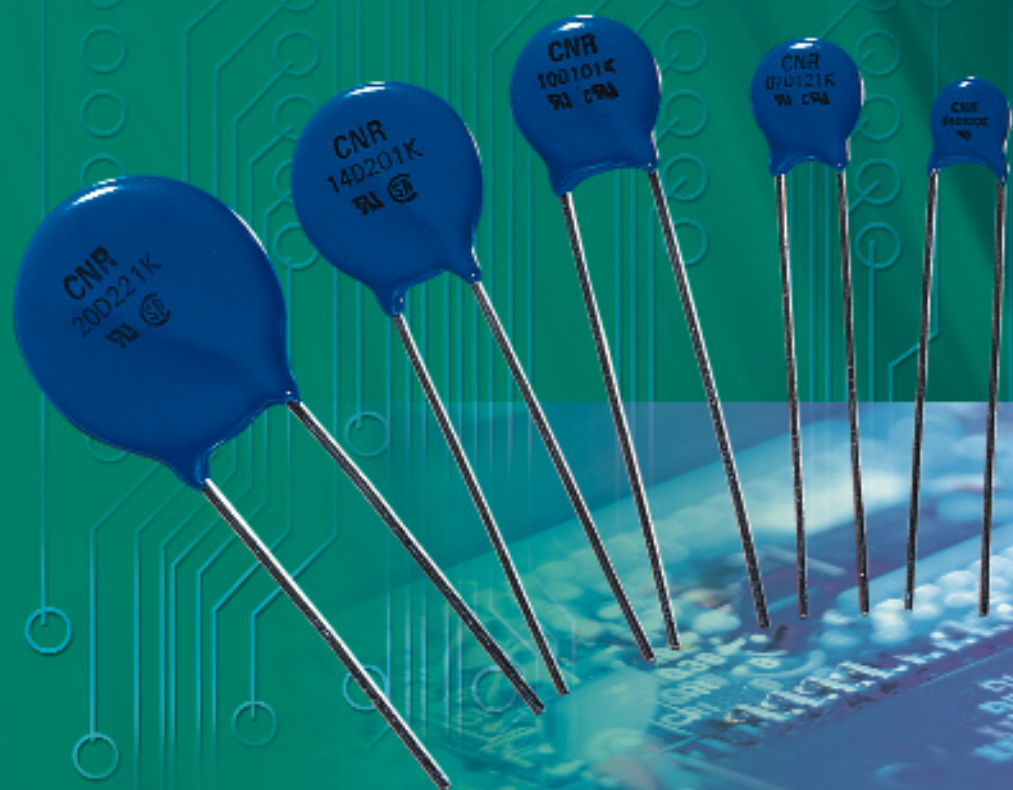
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Jameco Part Number 667198



突波吸收器

INNOVATION
HONEST
QUALITY
GUARANTEE

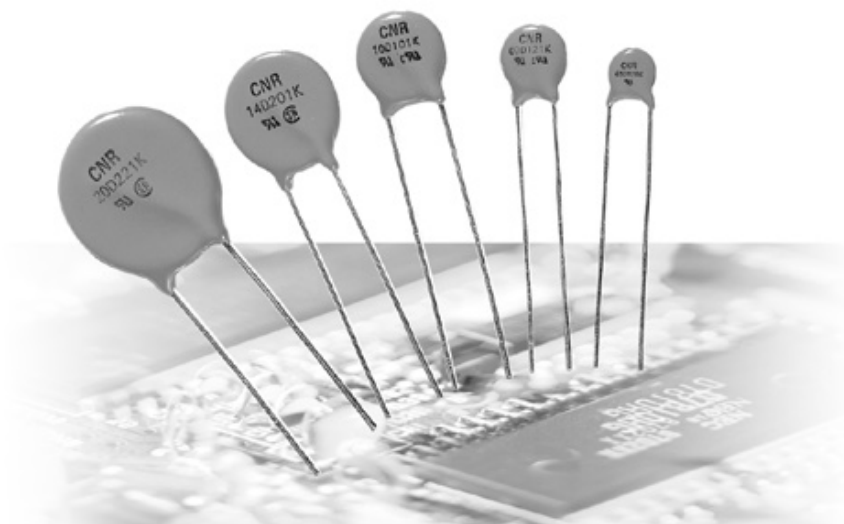
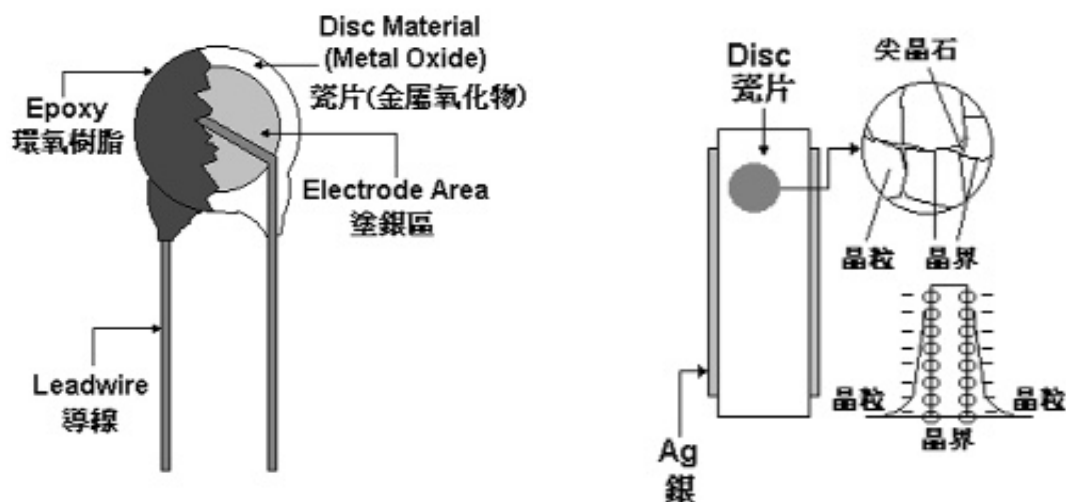
METAL OXIDE VARISTOR (MOV)

Varistors are voltage-dependent, nonlinear device which have an electrical behavior similar to back-to-back zener diodes.

CNR zinc-oxide varistor are nonlinear resistor, consisting main of zinc-oxide and several kinds of metal oxide additive.

They are symmetrical V-I characteristics in both side and unparalleled large peak current capability are used for absorption of transient voltage, suppression of pulse noise and circuit voltage stabilization.

突波吸收器 / 壓敏電阻元件，因為對電壓具有非線性之電阻變化在雙向（正，反）亦有對稱性，並且能對線路上的異常電壓反應，吸收掉大部份的突波 / 浪湧能量，同時把異常電壓抑制到安全範圍使線路的安全性及穩定性提高。



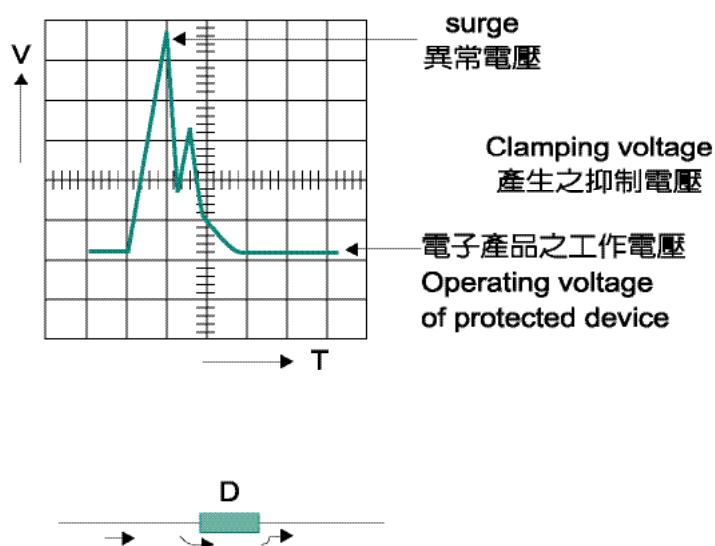
Protection principle of CNR-VARISTOR component

The varistor's stand-by state has a high impedance (several mega-ohms) in relation to the component to be protected and does not affect the characteristic of the electric circuit. In the presence of transient voltage (over the breakdown voltage of varistor), the varistor then has a low impedance (a few ohms) and short circuits, i. e. the assembly D(device) to be protected.

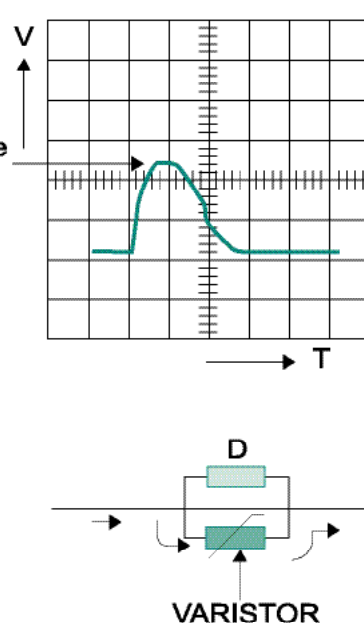
CNR 突波吸收器之保護原理

壓敏電阻在預備狀態時，相對於受保護之電子元件而言，具有很高的阻抗（數兆歐姆）而且不會影響原設計電路之特性。但當瞬間突波電壓出現（超過突波吸收器之崩潰電壓時），該突波吸收器之阻抗會變低（僅有幾個歐姆）並造成線路短路，也因此電子產品或較昂貴之元件受到保護。

Without varistor
未受突波吸收器保護之線路



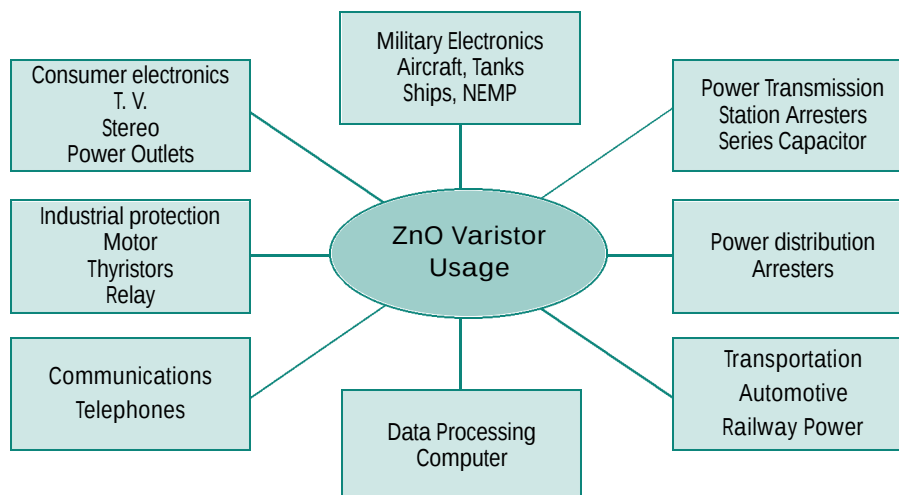
With varistor
受突波吸收器保護之線路



特性 Features

- 快速反應時間
- 優越的電壓比
- 高穩定性的回路電壓
- 無比的暫態電壓吸收特性
- 電壓電流的對稱特性
- Fast response
- Excellent voltage ratio
- High stabilization for circuit voltage
- Unparalleled absorption for transient voltage characteristics
- Symmetrical V-I Characteristics curve

應用 Applications



領 域 應 用 實 例

通訊 電話機,繼電器接點保護,傳真機

消費電子 電視,微波爐,音響輸出線路,安全插座,自動洗衣機

商業機器 影印機,電動打字機,自動販賣機,火災警報器,緊急照明裝備

資訊處理 微電腦,電視終端機

工業機器 馬達控制器,閘流體,繼電器,電磁開關,電源線路,三相整流線路

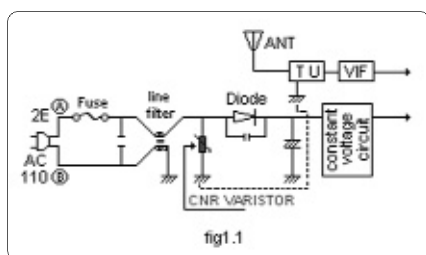
運輸 汽車,交通路誌

電力分配輸送 避雷器,變壓器,電力輸送線

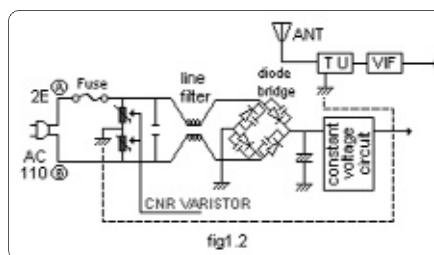
軍事電子 飛機,船艦,坦克

應用 Applications

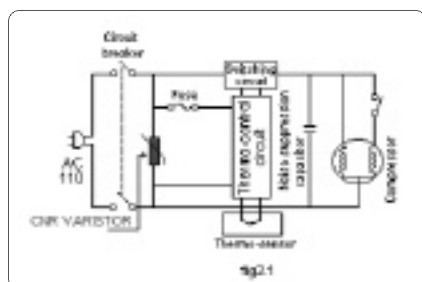
- Television 電視
- Portable Television 小型電視機 (Fig1.1)



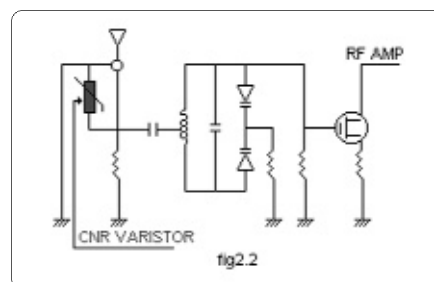
- Console Television 大型電視機 (Fig1.2)



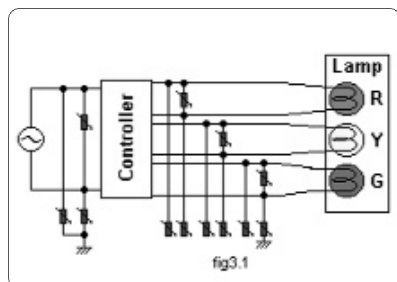
- Air Conditioner 冷氣機 (FIG2.1)



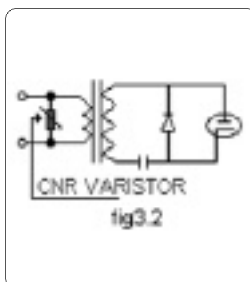
- Radio-Cassette Recorder(Antenna circuit) 錄音機天線系統



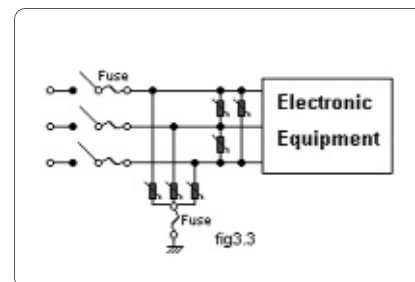
- Traffic Signal Control 交通號誌控制 (FIG3.1)



- Microwave 微波爐 (FIG3.2)



- AC Three-phase Circuit AC 三相電路 (FIG3.3)



Electrical Characteristics 電氣特性說明

Characteristics 項次	Marks 符號	Descriptions 說明
Varistor voltage (breakdown voltage)	V1mA or V0.1mA	The voltage across the varistor measured at a specified current I _c (1.0mA or 0.1mA) of specified duration.
突波電壓(崩潰電壓)		一定的電流(1.0mA或0.1mA)於一定時間內通過突波器所量取之電壓
Non linear exponent	α	$\alpha = \frac{\log I_1/I_2}{\log V_1/V_2}$ I ₁ 及I ₂ 係電壓等於V ₁ 及V ₂ 時相對應之電流值 I ₁ and I ₂ are the current value corresponding to the voltage value V ₁ and V ₂
非線性指數		

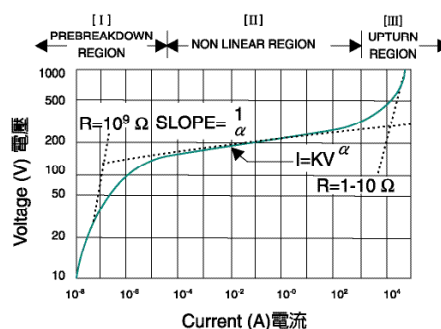
V-I Characteristics

電壓電流特性曲線

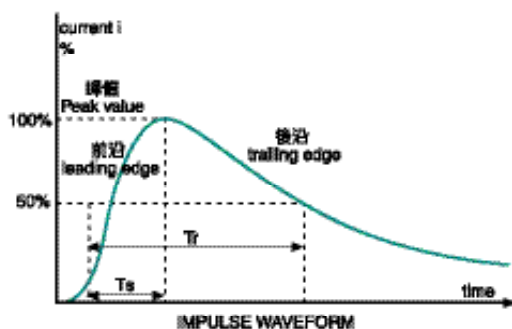
I: 預潰區

II: 非線性區

III: 上揚區



Normal impulse discharge current	8*20μsec	Rated discharge current of 8*20μsec waveform
耐沖擊電流(短波)		以8*20μsec 波形沖擊之電流峰值
Normal impulse discharge current	10*1000μsec	Rated discharge current of 10*1000μsec waveform
耐沖擊電流(長波)		以10*1000μsec 波形沖擊之電流峰值



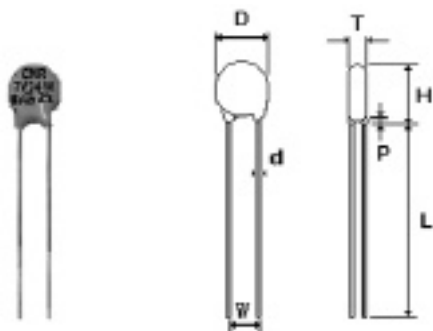
time waveform	Ts μsec	Tr μsec
8*20μsec	8	20
10*1000μsec	10	1000

Rated power	W(瓦特數)	The maximum power that can be applied within the specified ambient temperature
額定功率		表示在一定環境溫度下所能消耗的最大功率
Capacitance	C	Measured at 1kHz ± 10%, 1Vrms max OV bias and 20 ± 2°C
電容值		

CNR突波吸收器

CNR VARISTOR

CNR 7V 突波吸收器



Dimension	Unit:mm
D max	9.0
H max	12.0
W max (± 1.0)	5.0
L min	25.0
P max	3.0
d (± 0.02)	0.6

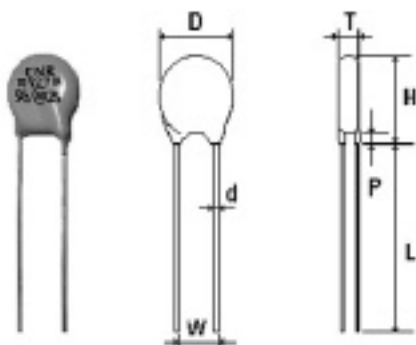
Device Ratings and Characteristics

Part No.	Maximum Allowable Voltage		Varistor Voltage (@1mA)			Clamping Voltage @ Test Current (8/20μs)		Maximum Energy 10/1000μs	Maximum Peak Current (8/20μs)	Rated Power	Typical Capacitance (@1KHz)	Standards
Device Marking	ACrms(V)	DC(V)	Min.	Vb(Vdc)	Max.	Vc(V)	Ip(A)	(J)	(A)	(W)	(pF)	
CNR-07V201K	130	175	185	200	225	340	10	17.5	1750	0.25	200	
CNR-07V221K	140	180	198	220	242	360	10	19.0	1750	0.25	190	
CNR-07V241K	150	200	216	240	264	395	10	21.0	1750	0.25	170	
CNR-07V271K	180	230	247	270	303	455	10	24.0	1750	0.25	150	
CNR-07V301K	195	250	270	300	330	500	10	26.0	1750	0.25	140	
CNR-07V331K	210	275	297	330	363	540	10	28.0	1750	0.25	130	
CNR-07V361K	230	300	324	360	396	595	10	32.0	1750	0.25	130	
CNR-07V391K	250	320	351	390	429	650	10	35.0	1750	0.25	130	
CNR-07V431K	275	350	387	430	473	710	10	40.0	1750	0.25	120	
CNR-07V471K	300	385	423	470	517	775	10	42.0	1750	0.25	100	
CNR-07V511K	320	420	459	510	561	845	10	45.0	1750	0.25	90	

Related Standards

Standard No.	UL 1414	UL 1449(2nd Edition)	CSA	VDE
Title	Across-The-Line Components	Transient Voltage Surge Suppressors	Accessories and Parts for Electronic Products	Varistors for use in Electronic equipment
File No.	E165143	E150709	LR109736-1	21557-4790-001
Symbols				

CNR 10V 突波吸收器



Dimension	Unit:mm
D max	14.0
H max	17.0
W max (± 1.0)	7.5
L min	25.0
P max	3.0
d (± 0.02)	0.8

Device Ratings and Characteristics

Part No.	Maximum Allowable Voltage		Varistor Voltage (@1mA)			Clamping Voltage @ Test Current (8/20μs)		Maximum Energy 10/1000μs	Maximum Peak Current (8/20μs)	Rated Power	Typical Capacitance (@1KHz)	Standards
Device Marking	ACrms(V)	DC(V)	Min.	Vb(Vdc)	Max.	Vc(V)	Ip(A)	(J)	(A)	(W)	(pF)	
CNR-10V201K	130	175	185	200	225	340	25	35.0	3500	0.40	430	
CNR-10V221K	140	180	198	220	242	360	25	39.0	3500	0.40	410	
CNR-10V241K	150	200	216	240	264	395	25	42.0	3500	0.40	380	
CNR-10V271K	180	230	247	270	303	455	25	49.0	3500	0.40	350	
CNR-10V301K	195	250	270	300	330	500	25	55.0	3500	0.40	330	
CNR-10V331K	210	275	297	330	363	540	25	58.0	3500	0.40	300	
CNR-10V361K	230	300	324	360	396	595	25	65.0	3500	0.40	300	
CNR-10V391K	250	320	351	390	429	650	25	70.0	3500	0.40	300	
CNR-10V431K	275	350	387	430	473	710	25	80.0	3500	0.40	270	
CNR-10V471K	300	385	423	470	517	775	25	85.0	3500	0.40	230	
CNR-10V511K	320	420	459	510	561	845	25	92.0	3500	0.40	210	

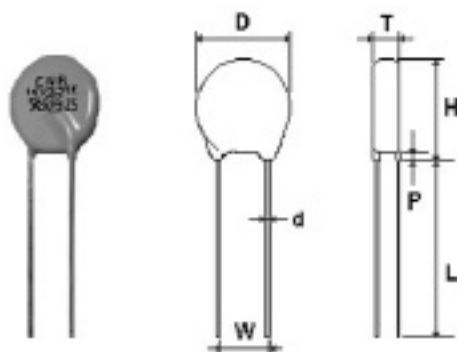
Related Standards

Standard No.	UL 1414	UL 1449(2nd Edition)	CSA	VDE
Title	Across-The-Line Components	Transient Voltage Surge Suppressors	Accessories and Parts for Electronic Products	Varistors for use in Electronic equipment
File No.	E165143	E150709	LR109736-1	21557-4790-001
Symbols				

CNR突波吸收器

CNR VARISTOR

CNR 14V 突波吸收器



Dimension	Unit:mm
D max	17.5
H max	20.5
W max (± 1.0)	7.5
L min	25.0
P max	3.0
d (± 0.02)	0.8

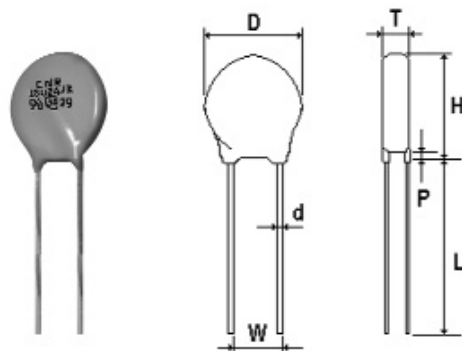
Device Ratings and Characteristics

Part No.	Maximum Allowable Voltage		Varistor Voltage (@1mA)			Clamping Voltage @ Test Current (8/20μs)		Maximum Energy 10/1000μs	Maximum Peak Current (8/20μs)	Rated Power	Typical Capacitance (@1KHz)	Standards
Device Marking	ACrms(V)	DC(V)	Min.	Vb(Vdc)	Max.	Vc(V)	Ip(A)	(J)	(A)	(W)	(pF)	
CNR-14V201K	130	175	185	200	225	340	50	70.0	6000	0.60	770	
CNR-14V221K	140	180	198	220	242	360	50	78.0	6000	0.60	740	
CNR-14V241K	150	200	216	240	264	395	50	84.0	6000	0.60	700	
CNR-14V271K	180	230	247	270	303	455	50	99.0	6000	0.60	640	
CNR-14V301K	195	250	270	300	330	500	50	108.0	6000	0.60	600	
CNR-14V331K	210	275	297	330	363	540	50	115.0	6000	0.60	580	
CNR-14V361K	230	300	324	360	396	595	50	130.0	6000	0.60	540	
CNR-14V391K	250	320	351	390	429	650	50	140.0	6000	0.60	500	
CNR-14V431K	275	350	387	430	473	710	50	155.0	6000	0.60	450	
CNR-14V471K	300	385	423	470	517	775	50	175.0	6000	0.60	400	
CNR-14V511K	320	420	459	510	561	845	50	190.0	6000	0.60	350	

Related Standards

Standard No.	UL 1414	UL 1449(2nd Edition)	CSA	VDE
Title	Across-The-Line Components	Transient Voltage Surge Suppressors	Accessories and Parts for Electronic Products	Varistors for use in Electronic equipment
File No.	E165143	E150709	LR109736-1	21557-4790-001
Symbols				

CNR 18V突波吸收器



Dimension	Unit:mm
D max	23.0
H max	26.0
W max (± 1.0)	7.5
L min	25.0
P max	3.0
d (± 0.02)	0.8

Device Ratings and Characteristics

Part No.	Maximum Allowable Voltage		Varistor Voltage (@1mA)			Clamping Voltage @ Test Current (8/20μs)		Maximum Energy 10/1000μs	Maximum Peak Current (8/20μs)	Rated Power	Typical Capacitance (@1KHz)	Standards
Device Marking	ACrms(V)	DC(V)	Min.	Vb(Vdc)	Max.	Vc(V)	Ip(A)	(J)	(A)	(W)	(pF)	
CNR-18V201K	130	175	185	200	225	340	75	112.0	9000	0.80	1350	
CNR-18V221K	140	180	198	220	242	360	75	124.0	9000	0.80	1290	
CNR-18V241K	150	200	216	240	264	395	75	136.0	9000	0.80	1200	
CNR-18V271K	180	230	247	270	303	455	75	152.0	9000	0.80	1100	
CNR-18V301K	195	250	270	300	330	500	75	172.0	9000	0.80	1030	
CNR-18V331K	210	275	297	330	363	540	75	182.0	9000	0.80	1000	
CNR-18V361K	230	300	324	360	396	595	75	204.0	9000	0.80	930	
CNR-18V391K	250	320	351	390	429	650	75	220.0	9000	0.80	870	
CNR-18V431K	275	350	387	430	473	710	75	242.0	9000	0.80	780	
CNR-18V471K	300	385	423	470	517	775	75	280.0	9000	0.80	710	
CNR-18V511K	320	420	459	510	561	845	75	305.0	9000	0.80	630	

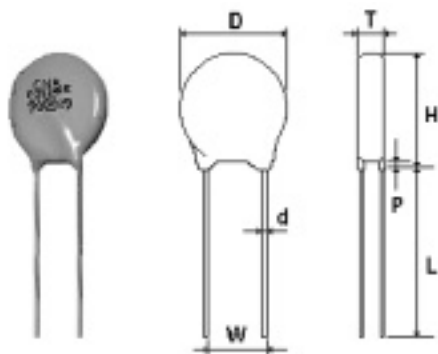
Related Standards

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Title	Across-The-Line Components	Transient Voltage Surge Suppressors	Accessories and Parts for Electronic Products	Varistors for use in Electronic equipment
File No.	E165143	E150709	LR109736-1	21557-4790-001
Symbols				

CNR突波吸收器

CNR VARISTOR

CNR 20V 突波吸收器



Dimension	Unit:mm
D max	25.0
H max	28.0
W max (± 1.0)	10.0
L min	25.0
P max	3.0
d (± 0.02)	1.0

Device Ratings and Characteristics

Part No. Device Marking	Maximum Allowable Voltage		Varistor Voltage (@1mA)			Clamping Voltage @ Test Current (8/20μs)		Maximum Energy 10/1000μs	Maximum Peak Current (8/20μs)	Rated Power	Typical Capacitance (@1KHz)	Standards
	ACrms(V)	DC(V)	Min.	Vb(Vdc)	Max.	Vc(V)	Ip(A)	(J)	(A)	(W)	(pF)	
CNR-20V201K	130	175	185	200	225	340	100	140.0	10000	1.00	1700	
CNR-20V221K	140	180	198	220	242	360	100	155.0	10000	1.00	1600	
CNR-20V241K	150	200	216	240	264	395	100	170.0	10000	1.00	1500	
CNR-20V271K	180	230	247	270	303	455	100	190.0	10000	1.00	1300	
CNR-20V301K	195	250	270	300	330	500	100	215.0	10000	1.00	1200	
CNR-20V331K	210	275	297	330	363	540	100	228.0	10000	1.00	1100	
CNR-20V361K	230	300	324	360	396	595	100	255.0	10000	1.00	1100	
CNR-20V391K	250	320	351	390	429	650	100	275.0	10000	1.00	1100	
CNR-20V431K	275	350	387	430	473	710	100	303.0	10000	1.00	1000	
CNR-20V471K	300	385	423	470	517	775	100	350.0	10000	1.00	900	
CNR-20V511K	320	420	459	510	561	845	100	382.0	10000	1.00	800	

Related Standards

Standard No.	UL 1414	UL 1449(2nd Edition)	CSA	VDE
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Symbols				

CNR突波吸收器

CNR VARISTOR



T max. Table(mm) 各規格最大厚度對照表

part No	07V	10V	14V	18V	20V	part No	07V	10V	14V	18V	20V
820K	*	*	*	*	*	361K	4.3	4.7	4.8	5.0	5.1
101K	*	*	*	*	*	391K	4.4	4.8	4.9	5.1	5.2
121K	*	*	*	*	*	431K	4.6	5.0	5.1	5.3	5.4
151K	*	*	*	*	*	471K	4.8	5.2	5.3	5.5	5.6
181K	*	*	*	*	*	511K	5.0	5.3	5.4	5.6	5.7
201K	3.5	3.9	4.0	4.2	4.3	561K	*	*	*	*	*
221K	3.6	4.0	4.1	4.3	4.4	621K	*	*	*	*	*
241K	3.7	4.1	4.2	4.4	4.5	681K	*	*	*	*	*
271K	3.9	4.2	4.3	4.5	4.6	751K	*	*	*	*	*
301K	4.1	4.3	4.4	4.6	4.7	781K	*	*	*	*	*
331K	4.2	4.5	4.6	4.8	4.9	821K	*	*	*	*	*

Packaging Specifications(Bulk) 散裝數量明細

part No	Min.Q'ty(pcs)/Bags	Q'ty(pcs)/inner box	Q'ty(pcs)/carton
CNR-07V820K TO CNR-07V391K	1000	10000	20000
CNR-07V431K TO CNR-07V621K	1000	8000	16000
CNR-07V681K TO CNR-07V751K	1000	5000	10000
CNR-10V820K TO CNR-10V391K	500	5000	10000
CNR-10V431K TO CNR-10V821K	500	4000	8000
CNR-14V820K TO CNR-14V391K	500	3000	6000
CNR-14V431K TO CNR-14V621K	500	2500	5000
CNR-14V681K TO CNR-14V821K	500	2000	4000
CNR-20V820K TO CNR-20V391K	250	1500	3000
CNR-20V431K TO CNR-20V621K	250	1250	2500
CNR-20V681K TO CNR-20V821K	250	1000	2000

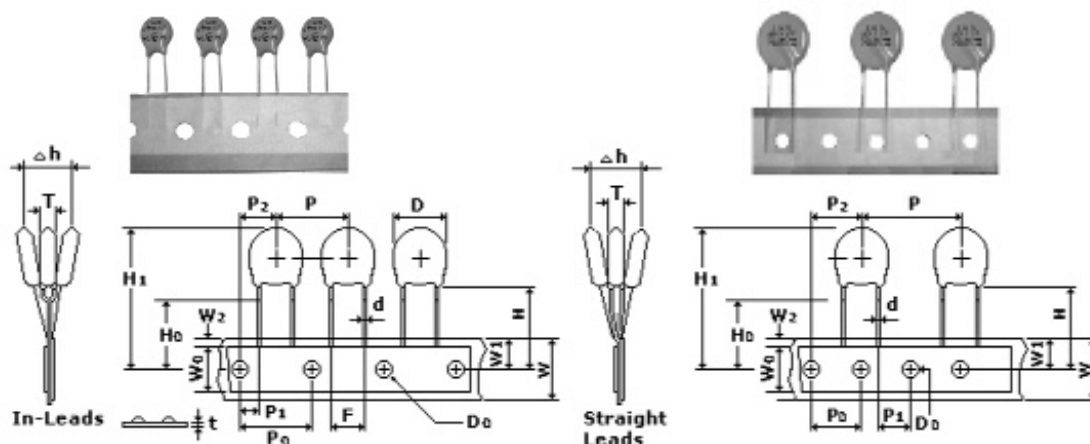
Note: The packaging of 18V series is the same as 20V series.

Standard Marking 標準印字



Designation System 標示說明		
Brand	CNR	廠牌
Disc Diameter	20	瓷片直徑
Normal Product	D	一般品
High Energy(V series)	V	高能量產品(V 系列)
Higher Energy than V series(P series)	P	超高能量(P 系列)
Varistor Voltage	241	突波吸收器電壓
Tolerance	K	公差(± 10%)
Safety Applicable		安規認證
Year	Z	年碼
Month	9	月碼

Part Number System 編碼說明					
CNR		V		K	
Disc Diameter		Varistor Voltage		Examples	
07=7.0mm 10=10.0mm 14=14.0mm 18=18.0mm 20=20.0mm				241 24 × 10 ¹ =240V	
				Lead & package style	

Tape and Reel Specifications


Symbol	PARAMETER	Model Size				
		05D series	07D series	10D series		14D series
P	Pitch of Component	$12.7 \pm .1.0$	$12.7 \pm .1.0$	$12.7 \pm .1.0$	$15.0 \pm .1.0$	$25.4 \pm .1.0$
P ₀	Feed Hole Pitch	$12.7 \pm .0.2$	$12.7 \pm .0.2$	$12.7 \pm .0.2$	$15.0 \pm .0.2$	$12.7 \pm .0.2$
P ₁	Feed Hole Center to Pitch	3.85 ± 0.7	3.85 ± 0.7	3.85 ± 0.7	3.75 ± 0.7	8.95 ± 0.7
P ₂	Hole Center to Component Center	6.35 ± 1.0	6.35 ± 1.0	6.35 ± 1.0	7.50 ± 1.3	12.7 ± 0.7
F	Lead to Lea Distance	5.0 ± 1.0	5.0 ± 1.0	7.5 ± 1.0	7.5 ± 1.0	7.5 ± 1.0
W	Tape Width	$18.0+1.0$	$18.0+1.0$	$18.0+1.0$	$18.0+1.0$	$18.0+1.0$
		$18.0-0.5$	$18.0-0.5$	$18.0-0.5$	$18.0-0.5$	$18.0-0.5$
W ₀	Hold Down Tape Width	5.0Min.	5.0Min.	5.0Min.	5.0Min.	5.0Min.
W ₁	Hole Position	$9.0+0.75$	$9.0+0.75$	$9.0+0.75$	$9.0+0.75$	$9.0+0.75$
		$9.0-0.50$	$9.0-0.50$	$9.0-0.50$	$9.0-0.50$	$9.0-0.50$
W ₂	Hold Down Tape Position	3.0Max	3.0Max	3.0Max	3.0Max	3.0Max
H	Height from Tape Center to Component Base	$18.0+2.0$	$18.0+2.0$	$18.0+2.0$	$18.0+2.0$	$18.0+2.0$
		$18.0-0.0$	$18.0-0.0$	$18.0-0.0$	$18.0-0.0$	$18.0-0.0$
H ₀	Seating Plane Height	16.0 ± 0.5	16.0 ± 0.5	16.0 ± 0.5	16.0 ± 0.5	16.0 ± 0.5
H ₁	Component Height	29.0Max	32.0Max	36.0Max	36.0Max	40.0Max
D ₀	Feed Hole Diameter	4.0 ± 0.2	4.0 ± 0.2	4.0 ± 0.2	4.0 ± 0.2	4.0 ± 0.2
t	Total Tape Thickness	0.7 ± 0.2	0.7 ± 0.2	0.7 ± 0.2	0.7 ± 0.2	0.7 ± 0.2
Dh	Component Alignment	2.0Max	2.0Max	2.0Max	2.0Max	2.0Max

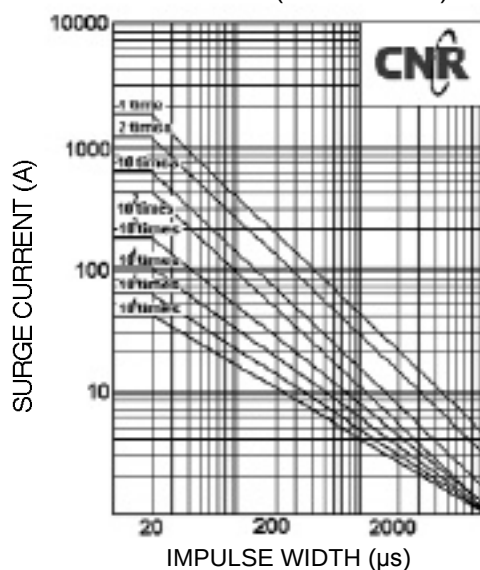
Umit : mm

Impulse Life Time Rating Curves

2 times: 5 minutes interval
up to 10 times: 2 minutes interval
up to 10^6 times: 10 seconds interval

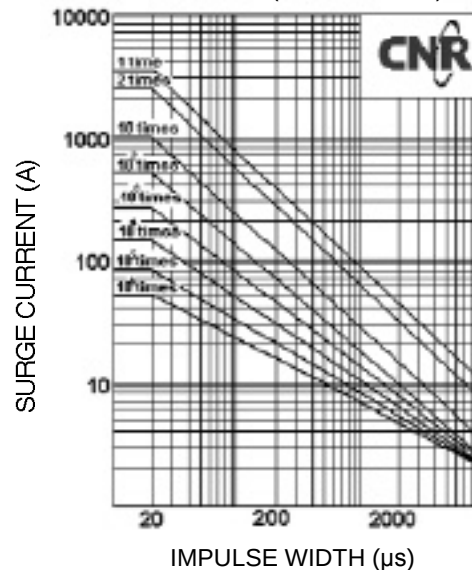
7 Series

CNR07V(201K~511K)



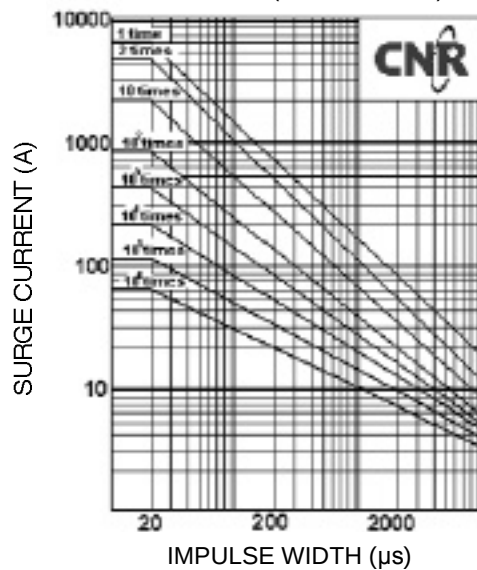
10 Series

CNR10V(201K~511K)



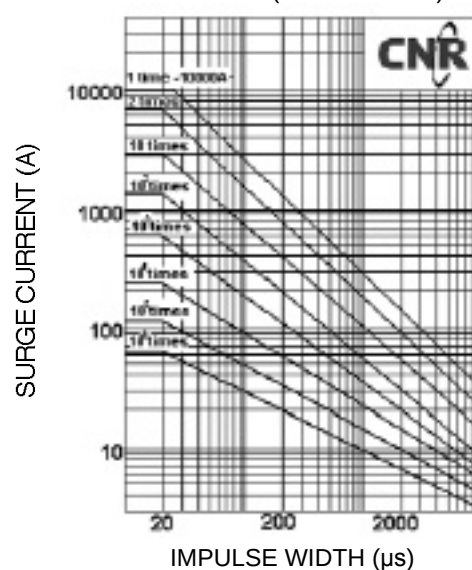
14 Series

CNR14V(201K~511K)

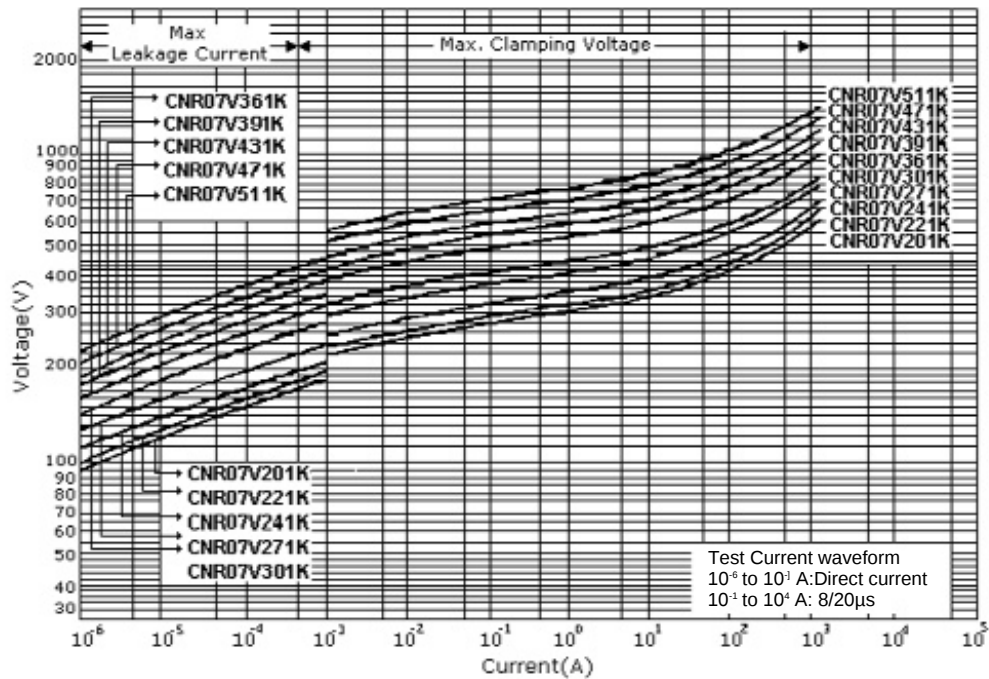


20 Series

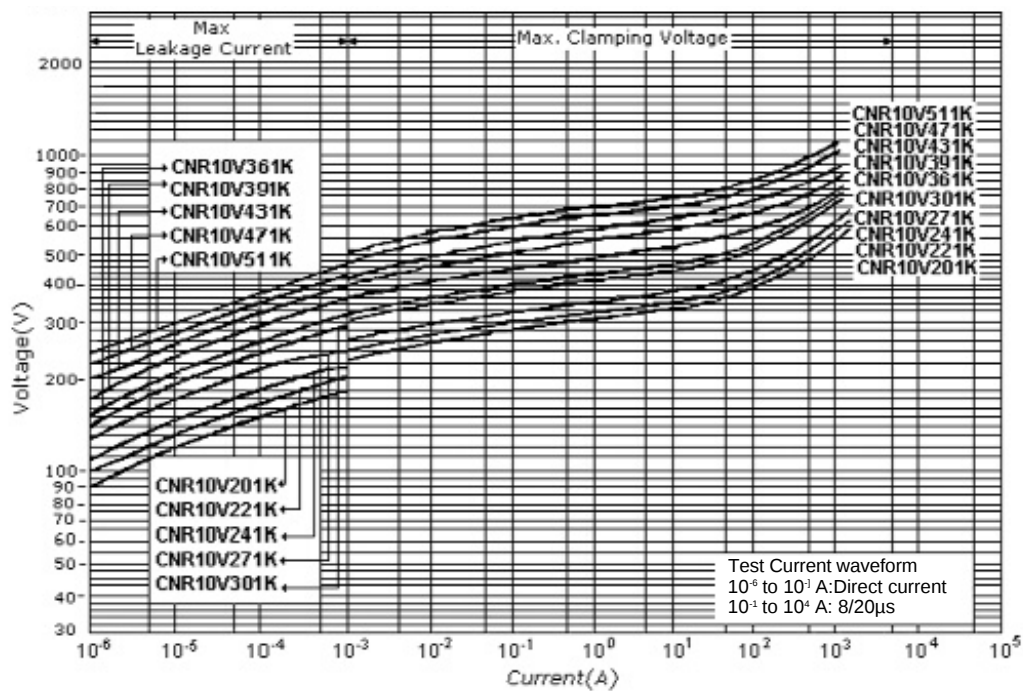
CNR20V(201K~511K)



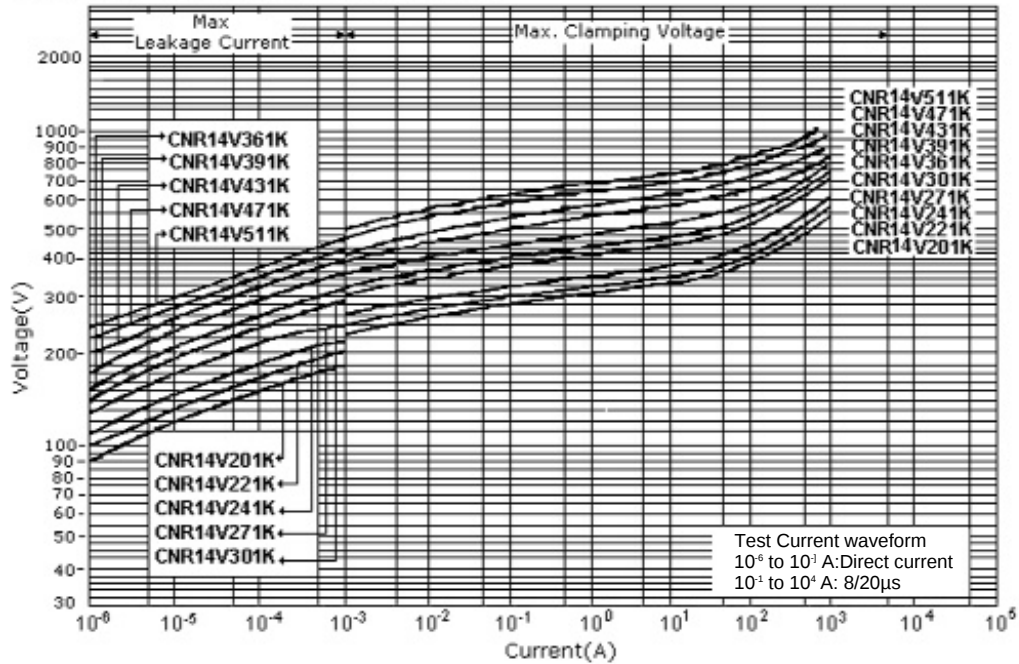
V-I Curve CNR07V 201K to CNR07V 511K



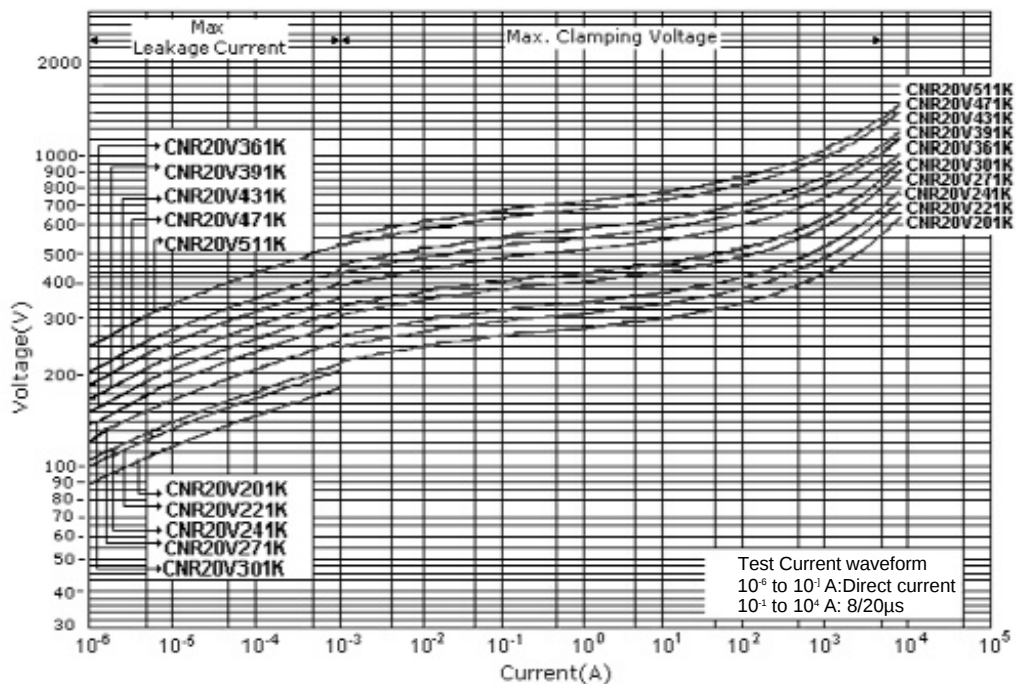
V-I Curve CNR10V 201K to CNR10V 511K



V-I Curve CNR14V 201K to CNR14V 511K



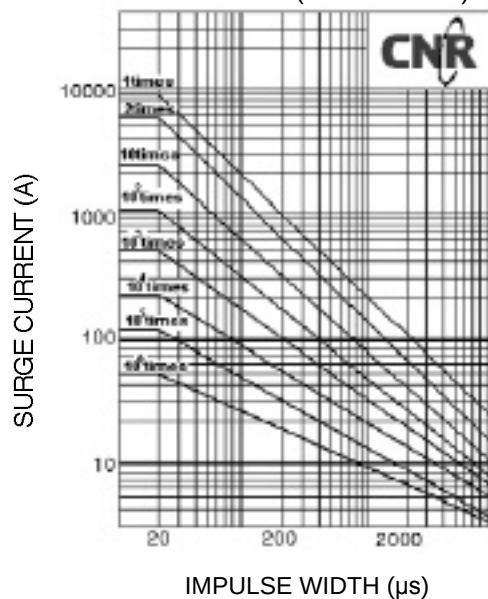
V-I Curve CNR20V 201K to CNR20V 511K



Impulse Life Time Rating Curves

18 Series

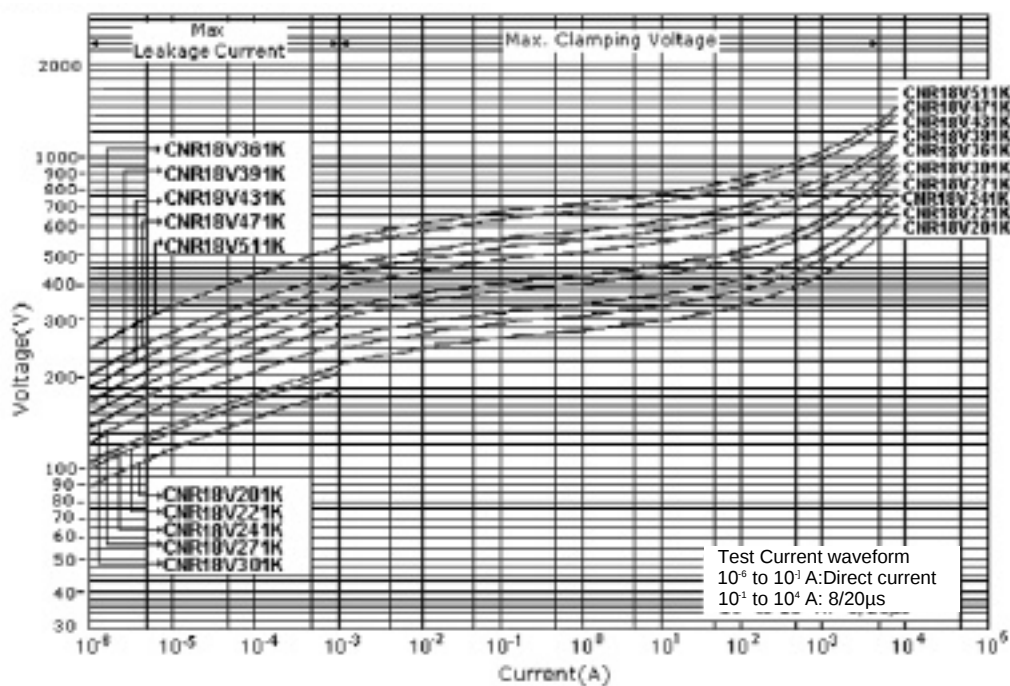
CNR18V(201K~511K)



2 times: 5 minutes interval
up to 10 times: 2 minutes interval
up to 10^6 times: 10 seconds interval



V-I Curve CNR18V 201K to CNR18V 511K



CNR VARISTOR

Device Ratings and Characteristics

Part No.	Maximum Allowable Voltage		Varistor Voltage (@1mA)			Clamping Voltage @ Test Current (8/20 μ s)		Maximum Energy 10/1000 μ s	Maximum Peak Current (8/20 μ s)	Rated Power	Typical Capacitance (@1KHz)	Standards
Device Marking	ACrms(V)	DC(V)	Min.	Vb(Vdc)	Max.	Vc(V)	Ip(A)	(J)	(A)	(W)	(pF)	
CNR-14P201K	130	170	185	200	225	340	50	96.0	7000	0.60	770	
CNR-14P221K	140	180	198	220	242	360	50	104.0	7000	0.60	740	
CNR-14P241K	150	200	216	240	264	395	50	112.0	7000	0.60	700	
CNR-14P271K	175	225	247	270	303	455	50	120.0	7000	0.60	640	
CNR-14P301K	195	250	270	300	330	500	50	136.0	7000	0.60	600	
CNR-14P331K	210	275	297	330	363	550	50	152.0	7000	0.60	580	
CNR-14P361K	230	300	324	360	396	595	50	164.0	7000	0.60	540	
CNR-14P391K	250	320	351	390	429	650	50	176.0	7000	0.60	500	
CNR-14P431K	275	350	387	430	473	710	50	200.0	7000	0.60	450	
CNR-14P471K	300	385	423	470	517	775	50	220.0	7000	0.60	400	
CNR-14P511K	320	420	459	510	561	845	50	240.0	7000	0.60	350	
CNR-18P201K	275	350	185	200	225	340	75	153.0	12000	0.80	1350	
CNR-18P221K	300	385	198	220	242	360	75	164.0	12000	0.80	1290	
CNR-18P241K	320	410	216	240	264	395	75	180.0	12000	0.80	1200	
CNR-18P271K	350	460	247	270	303	455	75	212.0	12000	0.80	1100	
CNR-18P301K	385	505	270	300	330	500	75	224.0	12000	0.80	1030	
CNR-18P331K	420	560	297	330	363	550	75	244.0	12000	0.80	1000	
CNR-18P361K	460	615	324	360	396	595	75	268.0	12000	0.80	930	
CNR-18P391K	300	385	351	390	429	650	75	296.0	12000	0.80	870	
CNR-18P431K	320	410	387	430	473	710	75	328.0	12000	0.80	780	
CNR-18P471K	350	460	423	470	517	775	75	348.0	12000	0.80	710	
CNR-18P511K	385	505	459	510	561	845	75	384.0	12000	0.80	630	

Related Standards

Standard No.	UL 1414	UL 1449(2nd Edition)	CSA	VDE
Title	Across-The-Line Components	Transient Voltage Surge Suppressors	Accessories and Parts for Electronic Products	Varistors for use in Electronic equipment
File No.	E165143	E150709	LR109736-1	21557-4790-001
Symbols				

CNR VARISTOR

Device Ratings and Characteristics

Part No. Device Marking	Maximum Allowable Voltage		Varistor Voltage (@1mA)			Clamping Voltage @ Test Current (8/20μs)		Maximum Energy 10/1000μs	Maximum Peak Current (8/20μs)	Rated Power	Typical Capacitance (@1KHz)	Standards
	ACrms(V)	DC(V)	Min.	Vb(Vdc)	Max.	Vc(V)	Ip(A)	(J)	(A)	(W)	(pF)	
CNR-20P201K	130	170	185	200	225	340	100	192.0	15000	1.0	1700	
CNR-20P221K	140	180	198	220	242	360	100	204.0	15000	1.0	1600	
CNR-20P241K	150	200	216	240	264	395	100	224.0	15000	1.0	1500	
CNR-20P271K	175	225	247	270	303	455	100	264.0	15000	1.0	1300	
CNR-20P301K	195	250	270	300	330	500	100	280.0	15000	1.0	1200	
CNR-20P331K	210	275	297	330	363	550	100	304.0	15000	1.0	1100	
CNR-20P361K	230	300	324	360	396	595	100	336.0	15000	1.0	1100	
CNR-20P391K	250	320	351	390	429	650	100	368.0	15000	1.0	1100	
CNR-20P431K	275	350	387	430	473	710	100	408.0	15000	1.0	1000	
CNR-20P471K	300	385	423	470	517	775	100	432.0	15000	1.0	900	
CNR-20P511K	320	420	459	510	561	845	100	480.0	15000	1.0	800	

Performance Characteristics (Electrical)

Characteristics		Test Methods/Description	Specifications						
Standard Test Condition		Environmental conditions under which every measuring is done without doubt on the measuring results. Unless specially specified, temperature, relative humidity are 5 to 35℃ , 45 to 85 % RH.	—						
Maximum Allowable Voltage		The maximum sinusoidal RMS voltage or maximum DC voltage that can be applied continuously in the specified environmental temperature range	To meet the specified value						
Clamping Voltage		The maximum voltage between two terminals with the specified standard impulse current (8/20μs) illustrated below applied.							
Maximum Energy		The maximum energy within the varistor voltage change of ± 10 % when one impulse of 2 ms or 10/1000μs is applied.							
Maximum peak Current Withstanding Surge Current	2 times	The maximum current within the varistor voltage change of ± 10 % with the standard impulse current (8/20μs) applied two times with an interval of 5 minutes.							
	1 time	The maximum current within the varistor voltage change of ± 10 % with the standard impulse current (8/20 μ s) applied one times.							
Temperature Coefficient of Varistor Voltage		$\frac{V_c \text{ at } 85 - V_c \text{ at } 25}{V_c \text{ at } 25} \times \frac{1}{60} \times 100 (\% / ^\circ C)$	-0.05 % / 100℃ max						
Withstanding Voltage (Body Insulation)		The specified voltage shall be applied both terminals of the specimen connected together and metal foil closely wrapped round its body for 1 minute. Electrical breakdown shall be examined. <table><tr><td>Classification (Nominal varistor voltage)</td><td>test Voltage (AC)</td></tr><tr><td>$V_{0.1mA}, V_{1mA}, 330V$</td><td>1000Vrms</td></tr><tr><td>$V_{0.1mA}, V_{1mA}, > 330V$</td><td>1500Vrms</td></tr></table>	Classification (Nominal varistor voltage)	test Voltage (AC)	$V_{0.1mA}, V_{1mA}, 330V$	1000Vrms	$V_{0.1mA}, V_{1mA}, > 330V$	1500Vrms	No breakdown
Classification (Nominal varistor voltage)	test Voltage (AC)								
$V_{0.1mA}, V_{1mA}, 330V$	1000Vrms								
$V_{0.1mA}, V_{1mA}, > 330V$	1500Vrms								
Impulse Life		The change of Vc shall be measured after the impulse current listed below is applied 10000 or 100000 times continuously with the interval of 10 seconds at room temperature .(impulse current see impulse life time rating curves.)	VcmA / VcmA ± 10%						

Note: Varistor voltage change of forward direction shall be measured in the test of uni-pole surge life and DC load life

(Mechanical)

Characteristics	Test Methods	Specifications															
Robustness of Terminations (Tensile)	After gradually applying the force specified below and keeping the unit fixed for the seconds, the terminal shall be visually examined for any damage. <table><tr><td colspan="2">Terminal diameter</td><td>Force</td></tr><tr><td>ø0.6mm</td><td>ø 0.8mm</td><td>9.8 N (1.0Kgf)</td></tr><tr><td colspan="2">ø1.0mm</td><td>19.6 N (2.0Kgf)</td></tr></table>	Terminal diameter		Force	ø0.6mm	ø 0.8mm	9.8 N (1.0Kgf)	ø1.0mm		19.6 N (2.0Kgf)	No outstanding damage						
Terminal diameter		Force															
ø0.6mm	ø 0.8mm	9.8 N (1.0Kgf)															
ø1.0mm		19.6 N (2.0Kgf)															
Robustness of Terminations (Bending)	The unit shall be secured with its terminal kept vertical and the force specified below be applied in the axial direction. The terminal shall gradually be bent by 90° in one direction, then 90° in the opposite direction, and again back to the original position, The damage of the terminal shall be visually examined. <table><tr><td colspan="2">Terminal diameter</td><td>Force</td></tr><tr><td>ø0.6mm</td><td>ø 0.8mm</td><td>4.9 N (0.5Kgf)</td></tr><tr><td colspan="2">ø1.0mm</td><td>9.8 N (1.0Kgf)</td></tr></table>	Terminal diameter		Force	ø0.6mm	ø 0.8mm	4.9 N (0.5Kgf)	ø1.0mm		9.8 N (1.0Kgf)							
Terminal diameter		Force															
ø0.6mm	ø 0.8mm	4.9 N (0.5Kgf)															
ø1.0mm		9.8 N (1.0Kgf)															
Vibration	After repeatedly applying a single harmonic vibration (amplitude: 0.75mm) double amplitude: 1.5mm with 1 minute vibration frequency cycles (10 Hz to 55 Hz to 10 Hz) to each of three perpendicular directions for 2 hours.thereafter Thereafter, the terminal shall be visually examined.																
Solderadility	After dipping the terminals to a depth of approximately 3mm from the body in a soldering bath of 235±5°C for 2±0.5 seconds, the terminal shall be visually examined.	Approximately 95% of the terminals shall be covered with solder uniformly															
Resistance to Soldering Heat	After each lead shall be dipped into a solder bath having a temperature 260±5°C (3 series: 250±5°C) to a point 2.0 to 2.5 mm from the body of the unit, using shieldig board (t=1.5mm), be held there for specified time (3series: 3±1 s, 5 series: 5±1 s and others: 10±1 s) hen stored at room temperature and humidity for 1 to 2 hours. The change of Vc and mechanical damages are examined.	VcmA/VcmA ±5% No outstanding damage															
(Environmental)																	
Characteristics	Test Methods	Specifications															
High Temperatuer Storage/ Dry Heat	The specimen shall be subjected to 125 ± 2°C for 1000 hours in a thermostatic bath without load and then stored at room temperatureand humidity for 1 to 2 hours. Thereafter, the change of Vc shall be measured.	VcmA/VcmA ±5%															
Damp Heat/ Humidity (Steady State)	The specimen shall be subjected to 40 ± 2 , 90 to 95 %RH for 1000 hours load and then stored at room temperature and humidity for one to two hours. Thereafter, the change of Vc shall be measured.																
Temperature Cycle	The temperature cycle shown below shall be repeated five times and then stored at room temperature and humidity for one to two hours. The change of Vc and mechanical damage shall be examined. <table><tr><td>Step</td><td>Temperature(°C)</td><td>Period (minutes)</td></tr><tr><td>1</td><td>-40±3</td><td>30±3</td></tr><tr><td>2</td><td>Room temperature</td><td>15±3</td></tr><tr><td>3</td><td>125±2</td><td>30±3</td></tr><tr><td>4</td><td>Room temperatuer</td><td>15±3</td></tr></table>		Step	Temperature(°C)	Period (minutes)	1	-40±3	30±3	2	Room temperature	15±3	3	125±2	30±3	4	Room temperatuer	15±3
Step	Temperature(°C)		Period (minutes)														
1	-40±3	30±3															
2	Room temperature	15±3															
3	125±2	30±3															
4	Room temperatuer	15±3															
High Temperatuer Load/ Dry Heat Load	TAfter being continuously applied the Maximum Allowable Voltage at 85 ± 2 for 1000 hours. The specimen shall be stored at room temperature and humidity for one to two hours Thereafter, the change of Vc shall be measured.																
Damp Heat Load/ Humidity Load	The specimen shall be subjected to 40 ± 2 , 90 to 95 %RH and the Maximum Allowable Voltage for 1000 hours and then stored at room temperature and humidity for one to two hours. Thereafter, the change of Vc shall be measured.	VcmA/VcmA ±10%															
Low Temperatuer Storage/Cold	The specimen shall be subjected to -40 ± 2 without load for 1000 hours and then stored at room temperature for one to two hours. Thereafter, the change of Vc shall be measured.	VcmA/VcmA ±5%															