



ZR・NR Series (Radial type)

Disk type general use ZR type (Low voltage) and NR type (Medium/High Voltage) are for protection of electronics and control equipments from surge and noise.

1. Features

- Superior nonlinearity of voltage to maintain low limiting voltage.
- Symmetry V-I characteristics to be applicable for +/- surge and AC circuit.
- Small in size, high in surge endurance to be stable for repetitive surges.
- Quicker response and sharper cut-off compared with discharge type protector.
- Low temperature coefficient.
- Wide applicable voltage range.
- High reliability.

2. Application

- Protection of semiconductors from surge voltage.
- Protection of circuit and lines from induced lightning surge.
- Protection from relay noise.
- Voltage stabilization.

3. Qualification

MNR disk type is qualified for UL1414, 1449 and CSA C22.2, to be available for exporting. Also international standard, ISO-9001 qualification is obtained.

4. Patents

Japanese Patent No.55-48442 and several patents are registered.



ZR·NR series Radial Type

a) Rating and Characteristics

Disk Type 05D

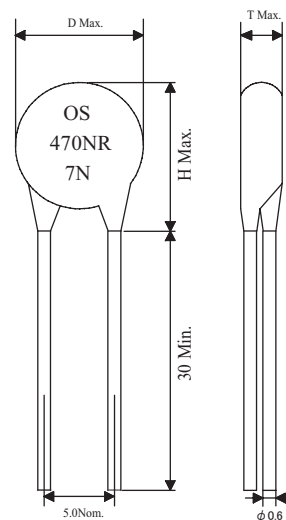
*Rated

Series	Part No.	Rated Voltage		Energy (2ms) J	Rated Power W	Rated Peak Current(8×20μs)		Varistor Voltage V0.1mA DC		Max. Clamping Voltage (8×20μs)		Typ. cap. (Reference) (1kHz) pF	UL CSA (*)	
		AC	DC			1time	2times	V	±%	V	Ip(A)			
		Vrms	V	A	A	V		V						
ZR	18ZR-05D	10	13	0.4	0.01	100	50	18	20	43	1.0	800	○	
	22ZR-05D	13	17	0.5				22	15	51		720		
	24ZR-05D	14	18	0.5				24		55		700		
	27ZR-05D	17	22	0.6				27	10	60		640		
	33ZR-05D	20	26	0.7				33		73		560		
	39ZR-05D	25	31	0.8				39		86		500		
	47ZR-05D	30	38	1.1				47		104		460		
	56ZR-05D	35	45	1.3				56		123		400		
	68ZR-05D	40	56	1.6				68		150		350		
	82ZR-05D	50	65	2.0				82		160		290		
100ZR-05D	60	85	2.0	100	190	230								
NR	120NR-05D	75	100	2.5	0.10	400	200	120			225	5.0	120	○☆
	150NR-05D	95	120	3.0				150		265	85			
	200NR-05D	125	165	4.0				200	355	70				
	220NR-05D	140	180	4.5				220	380	65				
	240NR-05D	150	200	5.0				240	415	60				
	270NR-05D	170	225	6.0				270	475	55				
	330NR-05D	210	270	7.0				330	565	45				
	360NR-05D	230	300	7.5				360	620	45				
	390NR-05D	250	320	8.0				390	675	40				
	430NR-05D	270	350	9.0				430	745	40				
	470NR-05D	300	385	10.0				470	810	38				

(*) ○: UL-1449 ☆: UL-1414 △: CSA C22.2No.1

*Dimensions (unit: mm)

Series	Part No.	D	H	T
ZR	18ZR-05D	7.0	11.0	4.5
	22ZR-05D			
	24ZR-05D			
	27ZR-05D			
	33ZR-05D			
	39ZR-05D	7.5		5.5
	47ZR-05D			5.0
	56ZR-05D			5.5
	68ZR-05D			5.0
	82ZR-05D			5.5
100ZR-05D				
NR	120NR-05D	7.0	11.0	5.0
	150NR-05D			
	200NR-05D			
	220NR-05D			
	240NR-05D			
	270NR-05D	7.5		5.5
	330NR-05D			6.0
	360NR-05D			6.5
	390NR-05D			
	430NR-05D			
470NR-05D				



(unit: mm)

Lead wire: Soldered copper wire

Armor: Non-flammable epoxy resin(Green) [UL94V-0]



ZR·NR series Radial Type

Disk Type 07D

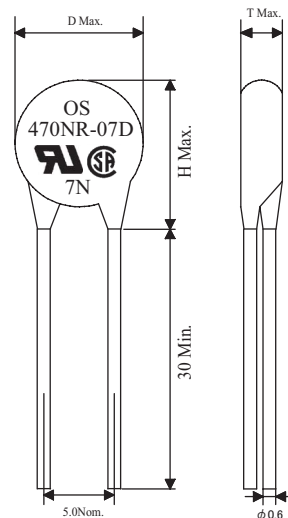
*Rated

Series	Part No.	Rated Voltage		Energy (2ms)	Rated Power	Rated Peak Current(8×20μs)		Varistor Voltage		Max. Clamping Voltage (8×20μs)		Typ. cap. (Reference) (1kHz)	UL. CSA (*)
		AC	DC			1time	2times	V1mA DC					
		Vrms	V	J	W	A	A	V	±%	V	Ip(A)	pF	
ZR	18ZR-07D	10	13	0.8	0.02	250	125	18	20	39	2.5	1350	○
	22ZR-07D	13	17	1.0				22	15	46		1250	
	24ZR-07D	14	18	1.2				24		50		1200	
	27ZR-07D	17	22	1.3				27	10	53		1100	
	33ZR-07D	20	26	1.5				33		65		990	
	39ZR-07D	25	31	1.7				39		77		890	
	47ZR-07D	30	38	2.3				47		93		800	
	56ZR-07D	35	45	2.7				56		110		720	
	68ZR-07D	40	56	3.2				68		135		620	
	82ZR-07D	50	65	4.0				0.25	1200	600		82	
100ZR-07D	60	85	6.0	100		175	410						
NR	120NR-07D	75	100	5.0	120		200				190		
	150NR-07D	95	120	6.0	150		250				150		
	200NR-07D	125	165	9.0	200		330				115		
	220NR-07D	140	180	10.0	220		360				110		
	240NR-07D	150	200	11.0	240		395				105		
	270NR-07D	170	225	12.0	270		450				95		
	330NR-07D	210	270	13.0	330		545				80		
	360NR-07D	230	300	15.0	360		595				75		
	390NR-07D	250	320	17.0	390		645	70					
	430NR-07D	270	350	20.0	430		710	65					
470NR-07D	300	385	20.0	470		775	60						

(*) ○: UL-1449 ☆: UL-1414 △: CSA C22.2No.1

*Dimensions (unit: mm)

Series	Part No.	D	H	T
ZR	18ZR-07D	8.5	12.5	4.5
	22ZR-07D			
	24ZR-07D			
	27ZR-07D			
	33ZR-07D			
	39ZR-07D	9.0		5.5
	47ZR-07D			5.0
	56ZR-07D			5.5
	68ZR-07D			5.5
	82ZR-07D			5.5
100ZR-07D				
NR	120NR-07D	8.5	12.0	5.0
	150NR-07D			
	200NR-07D			
	220NR-07D			
	240NR-07D			
	270NR-07D	9.0		6.0
	330NR-07D			6.5
	360NR-07D			
	390NR-07D			
	430NR-07D			
470NR-07D				



(unit: mm)

Lead wire: Soldered copper wire

Armor: Non-flammable epoxy resin(Green) [UL94V-0]



ZR·NR series Radial Type

Disk Type 10D

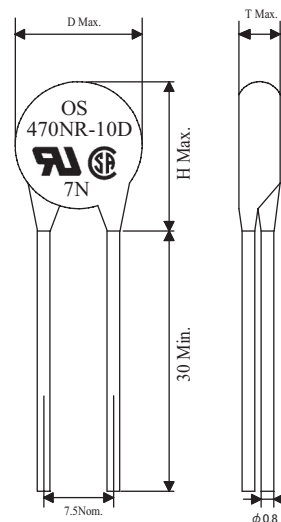
*Rated

Series	Part No.	Rated Voltage		Energy (2ms) J	Rated Power W	Rated Peak Current(8×20μs)		Varistor Voltage V1mA DC		Max. Clamping Voltage (8×20μs)		Typ. cap. (Reference) (1kHz) pF	UL. CSA (*)
		AC	DC			1time	2times	V	±%	V	I p(A)		
		Vrms	V	A	A	V	±%	V	I p(A)				
ZR	18ZR-10D	10	13	1.6	0.05	500	250	18	20	39	5	3800	○
	22ZR-10D	13	17	2.0				22	15	46		3600	
	24ZR-10D	14	18	2.0				24	10	50		3500	
	27ZR-10D	17	22	2.5				27		53		3300	
	33ZR-10D	20	26	3.0				33		65		3000	
	39ZR-10D	25	31	3.5				39		77		2700	
	47ZR-10D	30	38	4.5				47		93		2300	
	56ZR-10D	35	45	5.5				56		110		2050	
	68ZR-10D	40	56	6.5				68		135		1750	
	82ZR-10D	50	65	9.0				82		150		1400	
100ZR-10D	60	85	13.0	100	175	1200							
NR	120NR-10D	75	100	12.0	0.4	2500	1250	120	200	200	25	500	○☆
	150NR-10D	95	120	15.0				150	250	400			
	200NR-10D	125	165	20.0				200	330	290			
	220NR-10D	140	180	23.0				220	360	260			
	240NR-10D	150	200	25.0				240	395	240			
	270NR-10D	170	225	30.0				270	450	220			
	330NR-10D	210	270	33.0				330	545	180			
	360NR-10D	230	300	35.0				360	595	165			
	390NR-10D	250	320	40.0				390	645	155			
	430NR-10D	270	350	45.0				430	710	145			
	470NR-10D	300	385	45.0				470	775	135			
	620NR-10D	390	505	50.0				620	1025	115			
	680NR-10D	425	550	55.0				680	1135	105			
	750NR-10D	470	610	65.0				750	1255	100			
	820NR-10D	510	665	70.0				820	1370	90			
	910NR-10D	570	740	75.0				910	1520	85			
	1000NR-10D	630	810	80.0				1000	1700	75			
	1100NR-10D	690	890	85.0				1100	1860	70			
1800NR-10D	1000	1460	140.0	1800	3070	40							

(*) ○ : UL-1449 ☆ : UL-1414 △ : CSA C22.2No.1

*Dimensions (unit: mm)

Series	Part No.	D	H	T	
ZR	18ZR-10D	12.5	16.0	5.0	
	22ZR-10D				
	24ZR-10D				
	27ZR-10D				
	33ZR-10D				
	39ZR-10D			13.0	5.5
	47ZR-10D				6.0
	56ZR-10D				5.5
	68ZR-10D				6.0
	82ZR-10D				
100ZR-10D					
NR	120NR-10D	12.5	17.0	5.5	
	150NR-10D				
	200NR-10D				
	220NR-10D				
	240NR-10D				
	270NR-10D				13.5
	330NR-10D	6.5			
	360NR-10D				
	390NR-10D	7.0			
	430NR-10D	7.5			
	470NR-10D	8.5			
	620NR-10D	9.0			
	680NR-10D	9.5			
	750NR-10D	10.0			
	820NR-10D	10.5			
	910NR-10D	14.0	19.0	14.5	
	1800NR-10D				



(unit: mm)

Lead wire: Soldered copper wire

Armor: Non-flammable epoxy resin(Green) [UL94V-0]



ZR·NR series Radial Type

Disk Type 12D

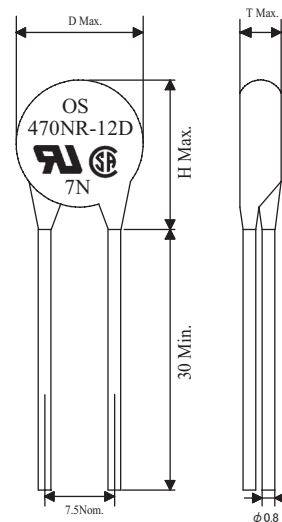
*Rated

Series	Part No.	Rated Voltage		Energy (2ms)	Rated Power	Rated Peak Current(8×20μs)		Varistor Voltage		Max. Clamping Voltage (8×20μs)		Typ. cap. (Reference) (1kHz)	UL CSA (*)
		AC	DC			1time	2times	V1mA DC					
		Vrms	V	J	W	A	A	V	±%	V	Ip(A)	pF	
NR	120NR-12D	75	100	14.0	0.5	3000	1500	120	10	200	35	650	○
	150NR-12D	95	120	18.0				150		250		450	
	180NR-12D	115	150	21.0				180		300		380	
	200NR-12D	125	165	23.0				200		330		350	○☆
	220NR-12D	140	180	26.0				220		360		320	
	240NR-12D	150	200	28.0				240		395		290	
	270NR-12D	170	225	32.0				270		450		270	
	330NR-12D	210	270	40.0				330		545		230	
	360NR-12D	230	300	42.0				360		595		210	
	390NR-12D	250	320	47.0				390		645		200	
	430NR-12D	270	350	52.0				430		710		185	
	470NR-12D	300	385	55.0				470		775		175	
	620NR-12D	390	505	65.0				620		1025		140	
	680NR-12D	425	550	70.0				680		1135		135	
	750NR-12D	470	610	80.0				750		1255		120	
	820NR-12D	510	665	90.0				820		1370		115	
	910NR-12D	570	740	95.0				910		1520		105	
	1000NR-12D	630	810	100.0				1000		1700		95	
1100NR-12D	690	890	110.0	1100	1860	90	☆△						
1800NR-12D	1000	1460	180.0	1800	3070	60	○☆△						

(*) ○: UL-1449 ☆: UL-1414 △: CSA C22.2No.1

*Dimensions (unit: mm)

Series	Part No.	D	H	T
NR	120NR-12D	14.0	18.0	5.5
	150NR-12D			
	180NR-12D			
	200NR-12D			
	220NR-12D			
	240NR-12D			
	270NR-12D	14.5	18.0	6.0
	330NR-12D			6.5
	360NR-12D			7.0
	390NR-12D	15.0	19.0	8.5
	430NR-12D			9.0
	470NR-12D			9.5
	620NR-12D			10.0
	680NR-12D			10.5
	750NR-12D			10.5
	820NR-12D	15.5	20.0	10.5
	910NR-12D			10.5
	1000NR-12D			10.5
1100NR-12D	15.5	20.0	14.5	
1800NR-12D			14.5	



(unit: mm)

Lead wire: Soldered copper wire

Armor: Non-flammable epoxy resin(Green) [UL94V-0]



ZR·NR series Radial Type

Disk Type 14D

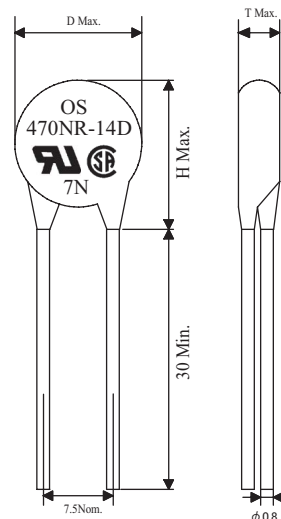
*Rated

Series	Part No.	Rated Voltage		Energy (2ms) J	Rated Power W	Rated Peak Current(8×20μs)		Varistor Voltage V1mA DC		Max. Clamping Voltage (8×20μs)		Typ. cap. (Reference) (1kHz) pF	UL CSA (*)
		AC	DC			1time	2times	V	±%	V	Ip(A)		
		Vrms	V	A	A	V	±%	V	Ip(A)				
ZR	18ZR-14D	10	13	3.5	0.1	1000	500	18	20	39	10	7000	○
	22ZR-14D	13	17	4.0				22	15	46		6500	
	24ZR-14D	14	18	4.0				24	10	50		6200	
	27ZR-14D	17	22	5.0				27		53		5800	
	33ZR-14D	20	26	6.0				33		65		5200	
	39ZR-14D	25	31	7.0				39		77		4700	
	47ZR-14D	30	38	8.5				47		93		4200	
	56ZR-14D	35	45	10.0				56		110		3700	
	68ZR-14D	40	56	13.0				68		135		3100	
	82ZR-14D	50	65	14.0				82		150		2600	
100ZR-14D	60	85	19.0	100	175	1900							
120NR-14D	75	100	20.0	120	200	990	○☆△						
150NR-14D	95	120	25.0	150	250	750							
180NR-14D	115	150	30.0	180	300	610							
200NR-14D	125	165	35.0	200	330	595							
220NR-14D	140	180	40.0	220	360	540							
240NR-14D	150	200	45.0	240	395	500							
270NR-14D	170	225	50.0	270	450	450							
330NR-14D	210	270	55.0	330	545	370							
360NR-14D	230	300	65.0	360	595	340							
390NR-14D	250	320	70.0	390	645	315							
430NR-14D	270	350	75.0	430	710	295							
470NR-14D	300	385	80.0	470	775	270							
620NR-14D	390	505	85.0	620	1025	205							
680NR-14D	425	550	90.0	680	1135	195							
750NR-14D	470	610	100.0	750	1255	185							
800NR-14D	500	650	105.0	800	1350	170							
820NR-14D	510	665	110.0	820	1370	170							
910NR-14D	570	740	120.0	910	1520	155							
1000NR-14D	630	810	130.0	1000	1700	140							
1100NR-14D	690	890	140.0	1100	1860	130							
1800NR-14D	1000	1460	230.0	1800	3070	80							

(*) ○: UL-1449 ☆: UL-1414 △: CSA C22.2No.1

*Dimensions (unit: mm)

Series	Part No.	D	H	T	
ZR	18ZR-14D	16.5	20.0	5.0	
	22ZR-14D				
	24ZR-14D				
	27ZR-14D				
	33ZR-14D				5.5
	39ZR-14D				
	47ZR-14D				
	56ZR-14D				
	68ZR-14D				
	82ZR-14D			6.0	
100ZR-14D					
NR	120NR-14D	16.5	21.0	5.5	
	150NR-14D				
	180NR-14D				
	200NR-14D				
	220NR-14D				
	240NR-14D				
	270NR-14D				6.0
	330NR-14D				
	360NR-14D				
	390NR-14D				
	430NR-14D				
	470NR-14D				
	620NR-14D	17.5	22.0	8.5	
	680NR-14D				
	750NR-14D				
	820NR-14D				
	910NR-14D				
	1000NR-14D				
1100NR-14D					
1800NR-14D	18.0				14.5



(unit: mm)

Lead wire: Soldered copper wire

Armor: Non-flammable epoxy resin(Green) [UL94V-0]



ZR·NR series Radial Type

Disk Type 20D

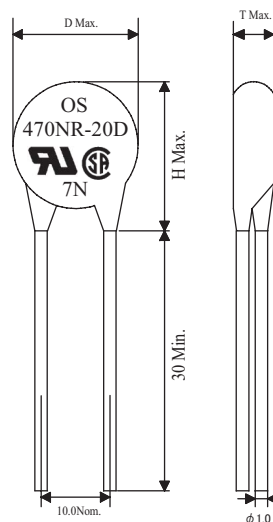
*Rated

Series	Part No.	Rated Voltage		Energy (2ms)	Rated Power	Rated Peak Current(8×20μs)		Varistor Voltage		Max. Clamping Voltage (8×20μs)		Typ. cap. (Reference) (1kHz)	UL CSA (*)
		AC	DC			1time	2times	V1mA DC					
		Vrms	V	J	W	A	A	V	±%	V	Ip(A)	pF	
NR	120NR-20D	75	100	40.0	1.0	6500	4000	120	10	002	100	1980	○
	150NR-20D	95	120	50.0				150		250		1850	
	180NR-20D	115	150	60.0				180		300		1600	
	200NR-20D	125	165	70.0				200		330		1190	○☆
	220NR-20D	140	180	75.0				220		360		1100	○☆△
	240NR-20D	150	200	80.0				240		395		960	
	270NR-20D	170	225	90.0				270		450		860	
	330NR-20D	210	270	100.0				330		545		720	
	360NR-20D	230	300	120.0				360		595		660	
	390NR-20D	250	320	130.0				390		645		620	
	430NR-20D	270	350	140.0				430		710		575	
	470NR-20D	300	385	150.0				470		775		525	
	620NR-20D	390	505	150.0				620		1025		425	
	680NR-20D	425	550	160.0				680		1135		410	
	750NR-20D	470	610	175.0				750		1255		370	
	820NR-20D	510	665	190.0				820		1370		340	
	910NR-20D	570	740	190.0				910		1520		315	
	1000NR-20D	630	810	220.0				1000		1700		290	
1100NR-20D	690	890	240.0	1100	1860	265	☆△						
1800NR-20D	1000	1460	400.0	1800	3070	140	○☆△						

(*) ○ : UL-1449 ☆ : UL-1414 △ : CSA C22.2No.

*Dimensions (unit: mm)

Series	Part No.	D	H	T		
NR	120NR-20D	22.0	26.0	6.0		
	150NR-20D					
	180NR-20D					
	200NR-20D					
	220NR-20D					
	240NR-20D					
	270NR-20D	23.0	27.0	6.5		
	330NR-20D			7.0		
	360NR-20D			7.5		
	390NR-20D	24.0	28.0	9.5		
	430NR-20D			10.0		
	470NR-20D			10.5		
	620NR-20D			25.0	29.0	11.0
	680NR-20D					
	750NR-20D					
	820NR-20D					
	910NR-20D					
	1000NR-20D					
1100NR-20D	25.0	29.0	15.0			
1800NR-20D						



(unit: mm)

Lead wire: Soldered copper wire

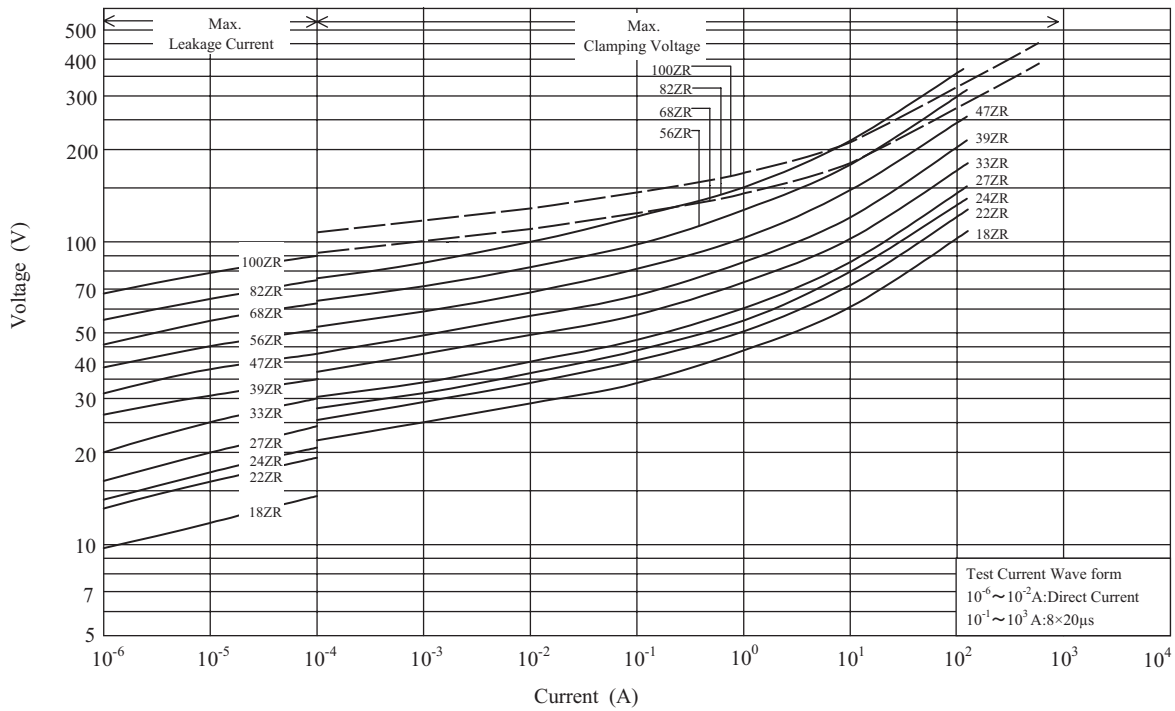
Armor: Non-flammable epoxy resin(Green) [UL94V-0]



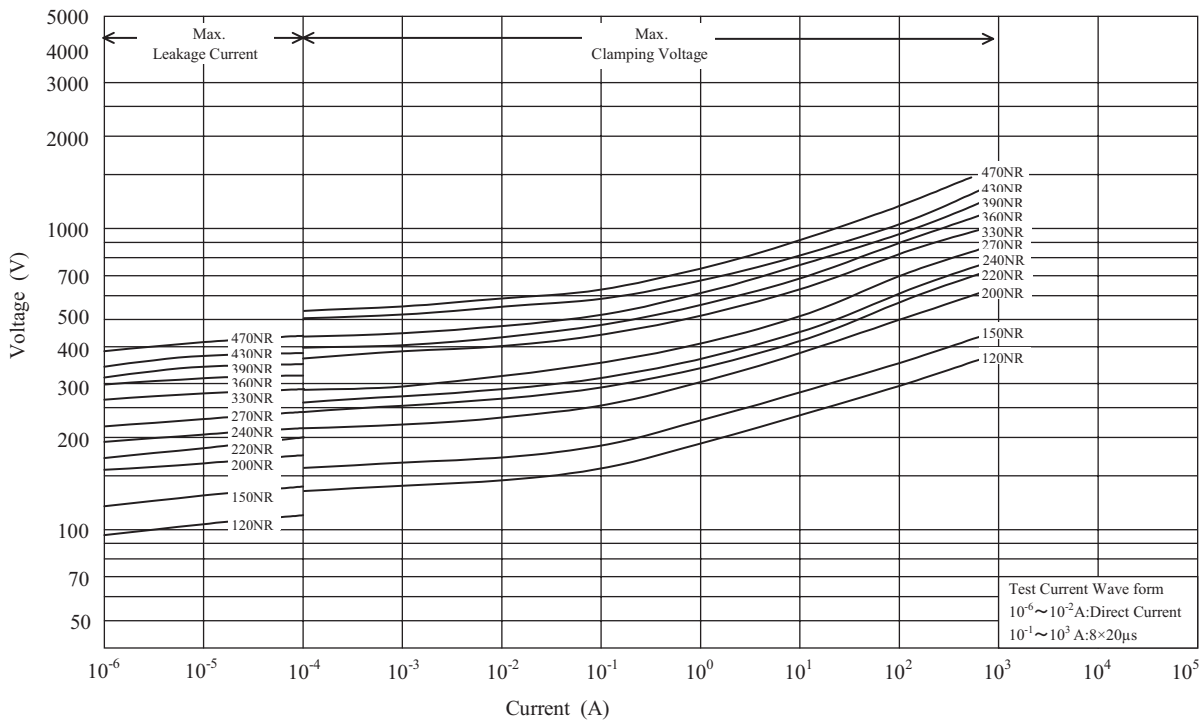
b) V-I Characteristics

Disk Type

■ 05D Series (18ZR-05D~100ZR-05D)



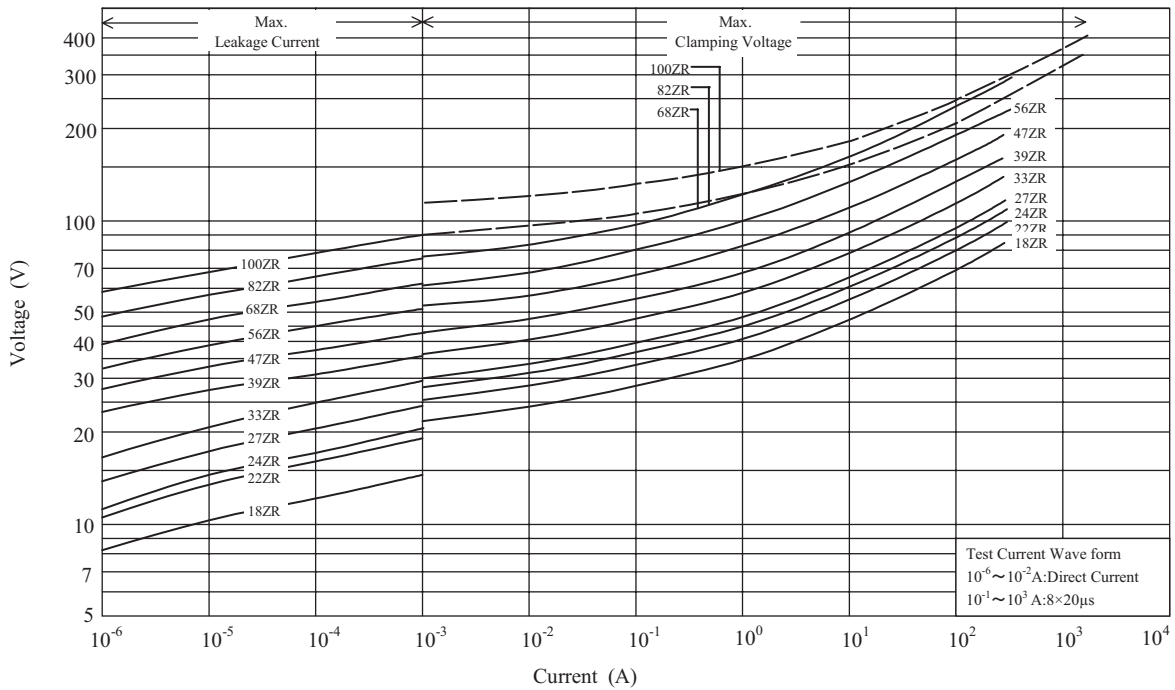
■ 05D Series (120NR-05D~500NR-05D)



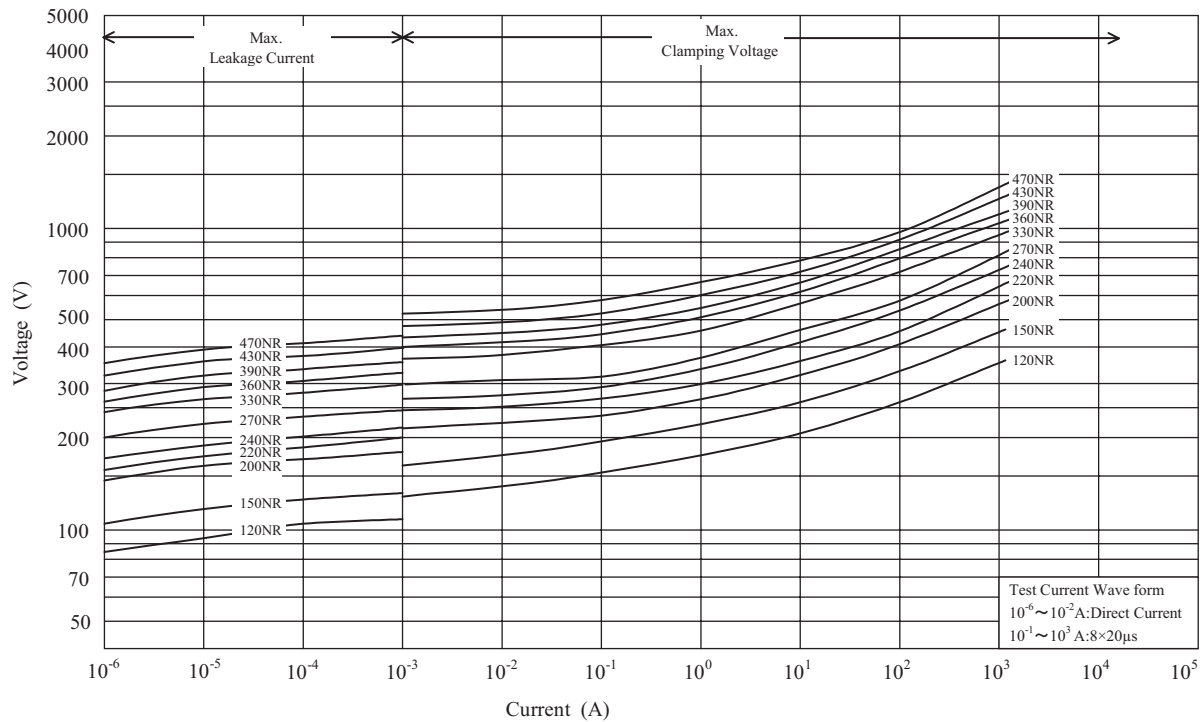


ZR·NR series Radial Type

■07D Series (18ZR-07D~100ZR-07D)



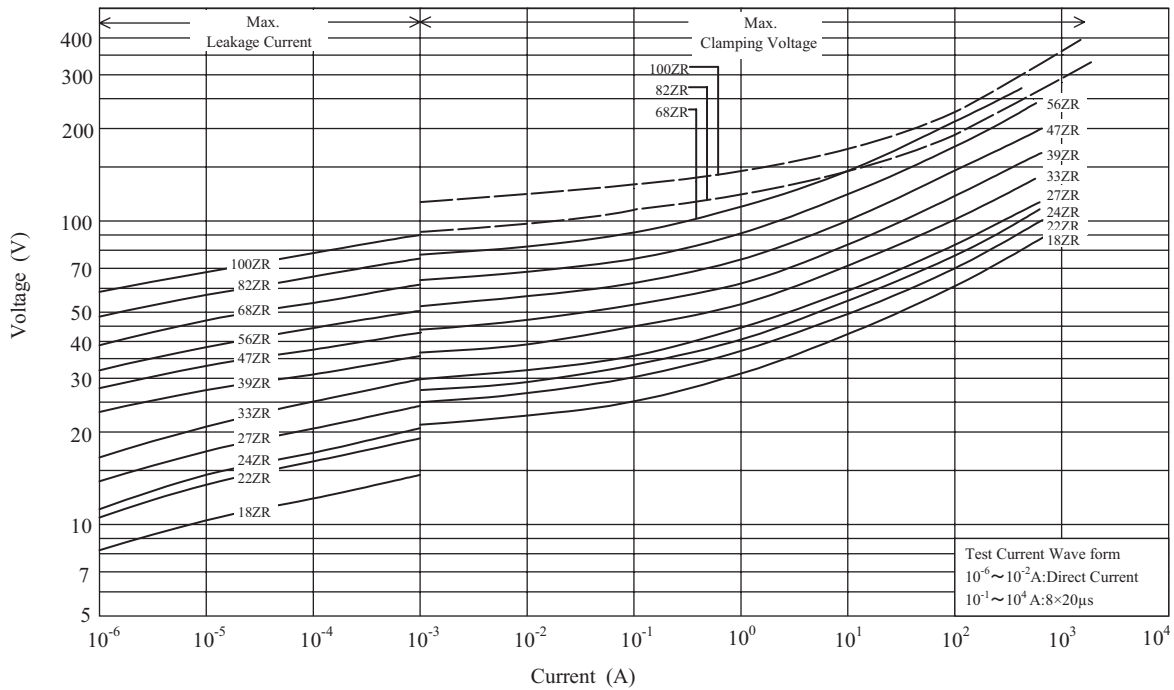
■07D Series (120NR-07D~500NR-07D)



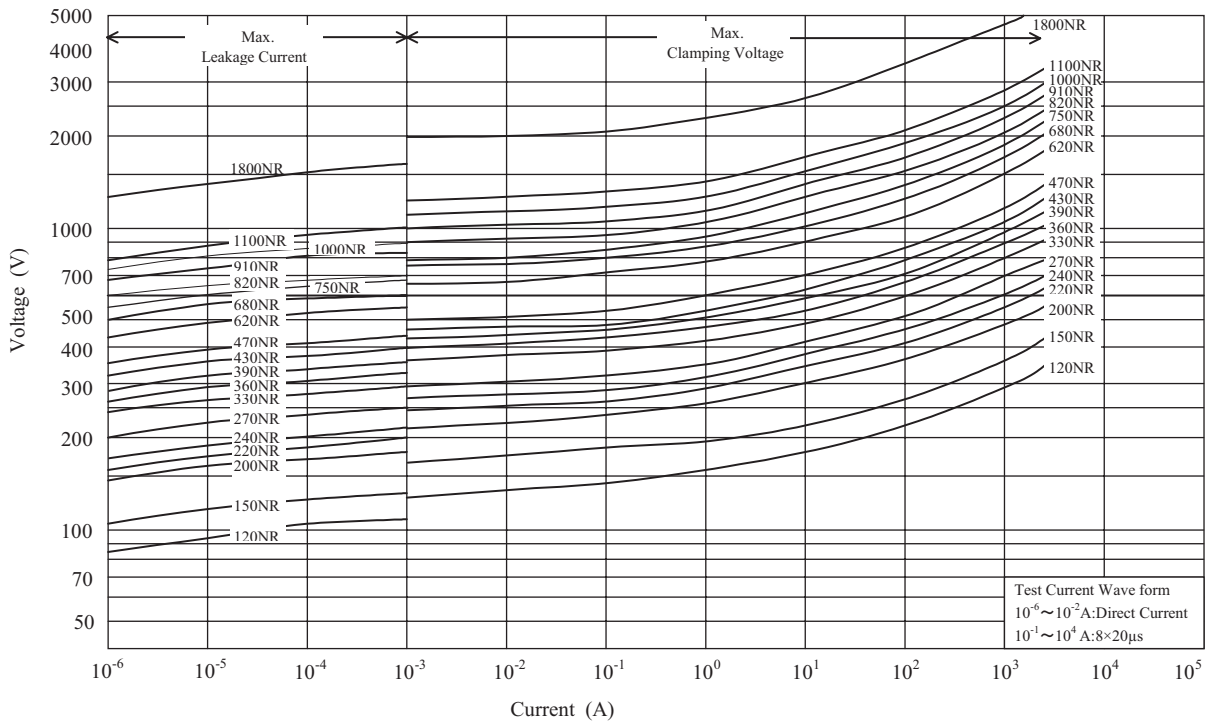


ZR·NR series Radial Type

■ 10D Series (18ZR-10D~100ZR-10D)



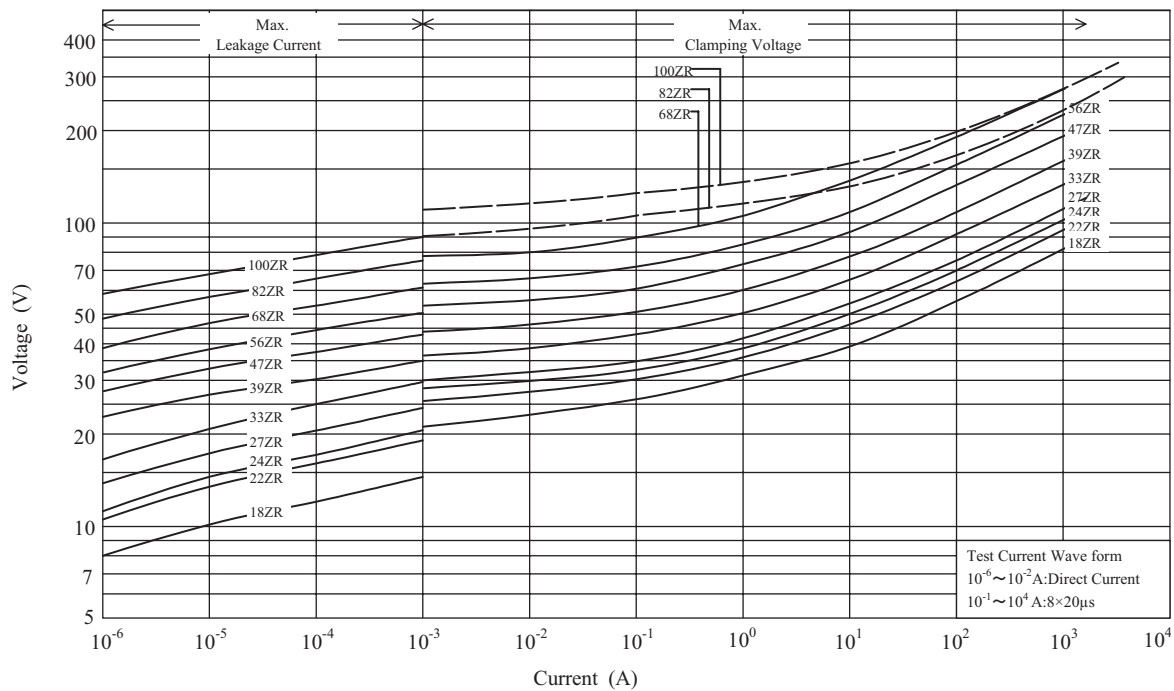
■ 10D Series (120NR-10D~1800NR-10D)



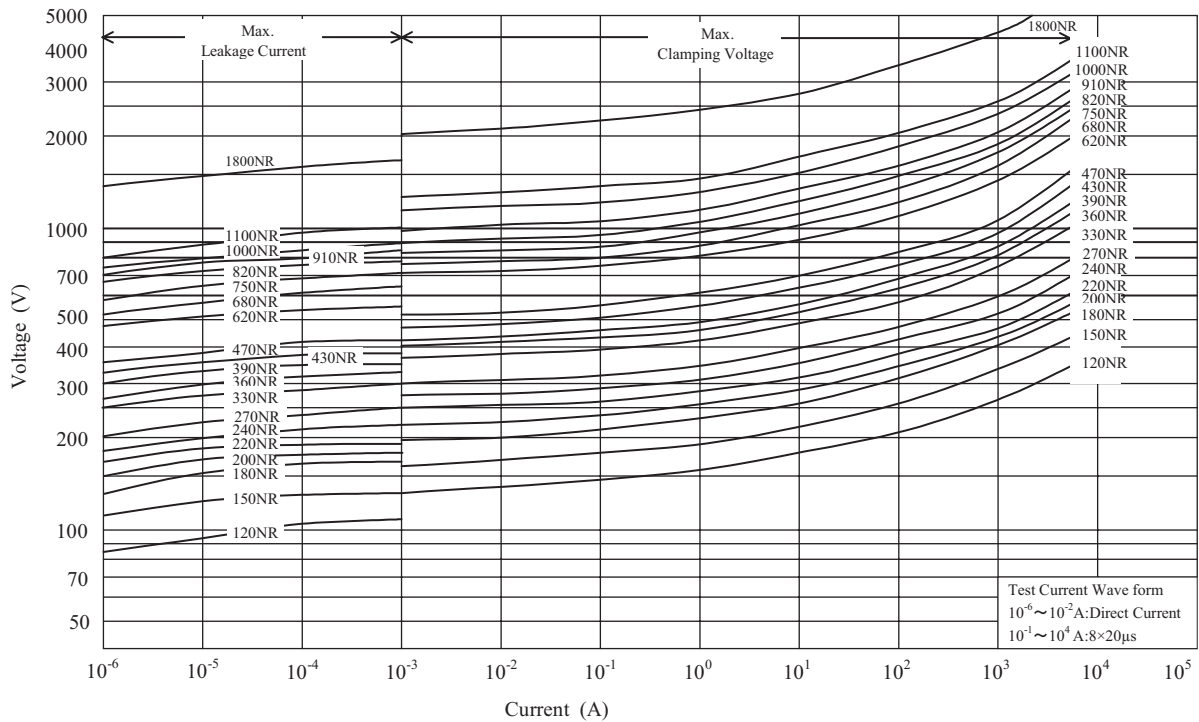


ZR·NR series Radial Type

■ 14D Series (18ZR-14D~100ZR-14D)

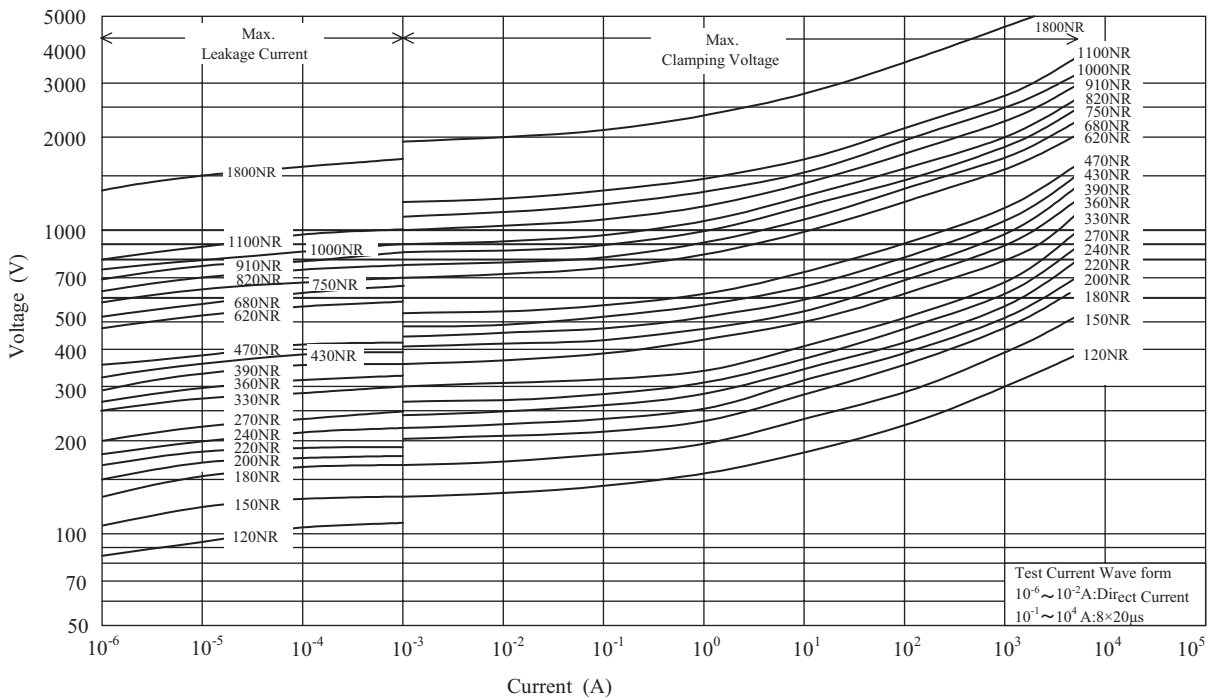


■ 14D Series (120NR-14D~1800NR-14D)





■ 12D Series (120NR-12D~1800NR-12D)



■ 20D Series (120NR-20D~1800NR-20D)

