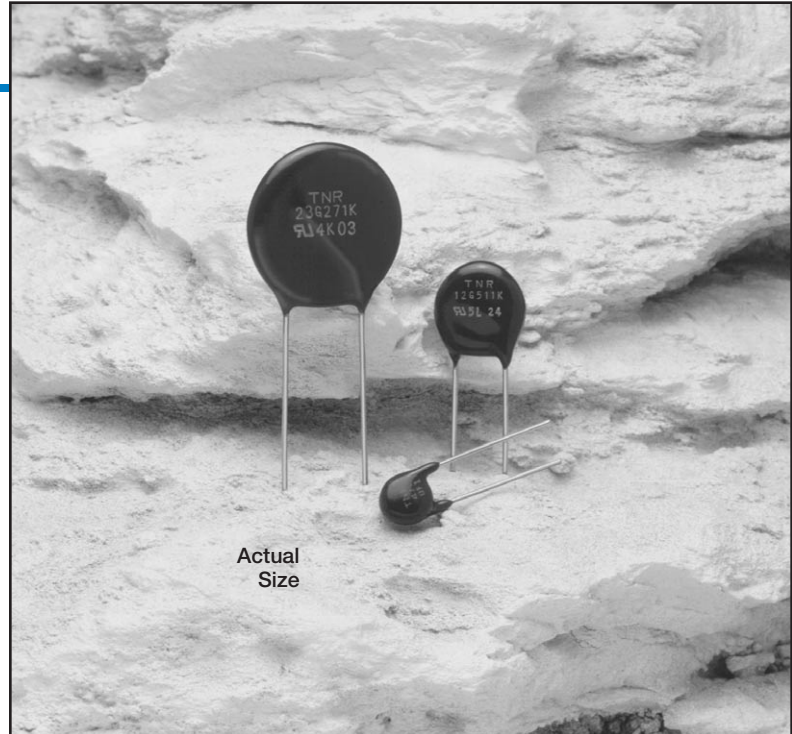


- **Metal Oxide Varistor**
- **General Purpose**
- **UL 1414 and 1449 Approved**
- **CSA 097864 Approved**
- **+85°C Maximum Temperature**



The G series is the standard metal oxide varistor series from UCC/NCC. These MOVs are available in a wide variety of voltages and sizes, which will make them ideal in most applications where a surge protector is needed. The G series is also ideal because of the variety of UL and CSA approvals. The varistors with a 5mm or 7.5mm lead spacing are available with ammo pack taping.

Refer to the Mini-Glossary at the end of the metal oxide varistors section for additional technical information and specifications.

## Summary of Specifications

- Radial lead terminals.
- Operating temperature range:  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$ .
- Maximum voltage range: 8 to 625VAC or 12 to 825VDC.
- Standard varistor voltage tolerance:  $\pm 10\%$
- Maximum energy: 0.4 to 230J depending on case size.
- Maximum surge current: 100 to 6,500A.
- Maximum case size (D×H×T): 8.0×11.0×5.0mm to 25.0×28.0×9.5mm.

# G Series

## G Specifications

Item	Characteristics
Operating Temperature Range	-40 to +85°C
Storage Temperature Range	-50 to +125°C
Maximum Voltage Range	8 to 625VAC or 12 to 825VDC
Varistor Voltage	22 to 470V at 0.1mA DC for $\varnothing 7$ mm; 15 to 1,000V at 1mA DC for $\varnothing 9$ mm to $\varnothing 23$ mm.
Varistor Voltage Tolerance	$\pm 10\%$ (K)
Maximum Energy	0.4 to 230 Joules at 2ms
Maximum Surge Current	100 to 6,500A at 8/20 $\mu$ s
Maximum Case Size (D $\times$ H $\times$ T)	8.0 $\times$ 11.0 $\times$ 5.0mm to 25.0 $\times$ 28.0 $\times$ 9.5mm
Agency Approvals	UL1414 and 1449; CSA 097864

## Diagram of Dimensions

Unit: mm and inches

**Metal Oxide Varistor/Radial Lead**

**Dimensions (mm)**

Nom. Dia.	Varistor Voltage	$\varnothing D$ max.	H max.	T max.	L min.	$\varnothing d$ $\pm 0.05$	F $\pm 1.0$
7mm	$\leq 270$	8	11	5	25	0.6	5
	$\geq 330$	8	11	7	25	0.6	5
9mm	$\leq 270$	10	13	5	25	0.6	5
	$\geq 330$	10	13	7	25	0.6	5
12mm	$\leq 270$	13.5	16.5	5	25	0.8	7.5
	330-680	14	17	7.5	25	0.8	7.5
	$\geq 820$	14	17	9	25	0.8	7.5
15mm	$\leq 270$	16	19	5	25	0.8	7.5
	330-680	17	20	7.5	25	0.8	7.5
	$\geq 820$	17	20	9	25	0.8	7.5
23mm	$\leq 270$	24	27	5	25	0.8	10
	330-680	25	28	8	25	0.8	10
	$\geq 820$	25	28	9.5	25	0.8	10

**Dimensions (inches)**

Nom. Dia.	Varistor Voltage	$\varnothing D$ max.	H max.	T max.	L min.	$\varnothing d$ $\pm 0.002$	F $\pm 0.039$
7mm	$\leq 270$	0.315	0.433	0.197	0.984	0.024	0.197
	$\geq 330$	0.315	0.433	0.276	0.984	0.024	0.197
9mm	$\leq 270$	0.394	0.512	0.197	0.984	0.024	0.197
	$\geq 330$	0.394	0.512	0.276	0.984	0.024	0.197
12mm	$\leq 270$	0.531	0.650	0.197	0.984	0.031	0.295
	330-680	0.551	0.669	0.295	0.984	0.031	0.295
	$\geq 820$	0.551	0.669	0.354	0.984	0.031	0.295
15mm	$\leq 270$	0.630	0.748	0.197	0.984	0.031	0.295
	330-680	0.669	0.787	0.295	0.984	0.031	0.295
	$\geq 820$	0.669	0.787	0.354	0.984	0.031	0.295
23mm	$\leq 270$	0.945	1.063	0.197	0.984	0.031	0.394
	330-680	0.984	1.102	0.315	0.984	0.031	0.394
	$\geq 820$	0.984	1.102	0.374	0.984	0.031	0.394

**Part Numbering System for G Series** When ordering, always specify complete catalog number for G Series.

<b>TNR</b>	<b>9</b>	<b>G</b>	<b>271</b>	<b>K</b>	
					Varistor Voltage Tolerance: K = $\pm 10\%$
					Nominal Varistor Voltage: Expressed in volts. The first two digits are significant figures, and the third digit indicates the number of zeros following these figures (e.g. 270 = 27V; 271 = 270V).
					Series Name: Indicates Basic Varistor Style.
					Nominal Case Diameter: 7 = $\varnothing 7$ mm; 9 = $\varnothing 9$ mm; 12 = $\varnothing 12$ mm; 15 = $\varnothing 15$ mm; 23 = $\varnothing 23$ mm.
					TNR: Alpha Prefix for Varistors.

# G Series

## Varistor Standard Ratings - Radial Lead

Nom. Case Dia.	Catalog Part Number	Maximum Applied Voltage (Continuous)		Maximum Peak Current (8/20 $\mu$ sec.) (A)	Maximum Energy (2msec.) (J)	Rated Wattage (W)	Maximum Clamping Voltage		Capacitance (typical) at 1kHz (pF)	Varistor Voltage at 0.1mA DC (V $\pm$ 10%)
		VAC <sub>rms</sub>	VDC				(A)	(V)		
$\varnothing$ 7 mm	TNR7G220K	14	18	100	0.4	0.01	1	48	1,800	22
	TNR7G270K	17	22	100	0.5	0.01	1	60	1,500	27
	TNR7G330K	20	26	100	0.6	0.01	1	73	1,300	33
	TNR7G390K	25	30	100	0.8	0.01	1	86	1,150	39
	TNR7G470K	30	37	100	1.0	0.01	1	104	980	47
	TNR7G560K	35	44	100	1.1	0.01	1	123	840	56
	TNR7G680K	40	55	100	1.3	0.01	1	150	720	68
	TNR7G820K	50	65	400	2.0	0.1	5	145	260	82
	TNR7G101K	60	85	400	2.0	0.1	5	175	200	100
	TNR7G121K	75	100	400	3.0	0.1	5	210	170	120
	TNR7G151K	95	125	400	3.0	0.1	5	260	140	150
	TNR7G181K	110	145	400	4.0	0.1	5	325	120	180
	TNR7G201K	130	170	400	5.0	0.1	5	355	110	200
	TNR7G221K	140	180	400	5.0	0.1	5	380	105	220
	TNR7G241K	150	200	400	5.0	0.1	5	415	98	240
	TNR7G271K	175	225	400	6.0	0.1	5	475	88	270
	TNR7G331K	210	270	400	8.0	0.1	5	600	76	330
TNR7G391K	250	320	400	9.0	0.1	5	675	67	390	
TNR7G431K	275	350	400	10.0	0.1	5	745	60	430	
TNR7G471K	300	385	400	10.0	0.1	5	810	57	470	

Nom. Case Dia.	Catalog Part Number	Maximum Applied Voltage (Continuous)		Maximum Peak Current (8/20 $\mu$ sec.) (A)	Maximum Energy (2msec.) (J)	Rated Wattage (W)	Maximum Clamping Voltage		Capacitance (typical) at 1kHz (pF)	Varistor Voltage at 1mA DC (V $\pm$ 10%)
		VAC <sub>rms</sub>	VDC				(A)	(V)		

$\varnothing$ 9 mm	TNR9G180K	10	14	250	0.8	0.02	2	35	5,400	18
	TNR9G220K	14	18	250	1.0	0.02	2	43	4,900	22
	TNR9G270K	17	22	250	1.0	0.02	2	53	4,200	27
	TNR9G330K	20	26	250	1.2	0.02	2	65	3,500	33
	TNR9G390K	25	30	250	1.5	0.02	2	77	3,100	39
	TNR9G470K	30	37	250	1.8	0.02	2	93	2,600	47
	TNR9G560K	35	44	250	2.2	0.02	2	110	2,300	56
	TNR9G680K	40	55	250	2.5	0.02	2	135	1,900	68
	TNR9G820K	50	65	1,200	4.0	0.2	10	135	620	82
	TNR9G101K	60	85	1,200	4.0	0.2	10	165	530	100
	TNR9G121K	75	100	1,200	5.0	0.2	10	195	460	120
	TNR9G151K	95	125	1,200	6.0	0.2	10	245	380	150
	TNR9G181K	110	145	1,200	8.0	0.2	10	295	335	180
	TNR9G201K	130	170	1,200	10.0	0.2	10	330	310	200
	TNR9G221K	140	180	1,200	10.0	0.2	10	360	280	220
	TNR9G241K	150	200	1,200	10.0	0.2	10	390	270	240
	TNR9G271K	175	225	1,200	12.0	0.2	10	440	245	270
TNR9G331K	210	270	1,200	15.0	0.2	10	540	210	330	
TNR9G391K	250	320	1,200	17.0	0.2	10	640	185	390	
TNR9G431K	275	350	1,200	20.0	0.2	10	700	170	430	
TNR9G471K	300	385	1,200	20.0	0.2	10	765	160	470	

$\varnothing$ 12 mm	TNR12G180K	10	14	500	1.5	0.05	5	35	9,000	18
	TNR12G220K	14	18	500	2.0	0.05	5	43	8,200	22
	TNR12G270K	17	22	500	2.5	0.05	5	53	6,900	27
	TNR12G330K	20	26	500	3.0	0.05	5	65	5,900	33
	TNR12G390K	25	30	500	3.5	0.05	5	77	5,100	39
	TNR12G470K	30	37	500	4.5	0.05	5	93	4,400	47
	TNR12G560K	35	44	500	5.5	0.05	5	110	3,800	56
	TNR12G680K	40	55	500	6.5	0.05	5	135	3,200	68
	TNR12G820K	50	65	2,500	8.0	0.4	25	135	1,200	82
	TNR12G101K	60	85	2,500	10.0	0.4	25	165	1,050	100
	TNR12G121K	75	100	2,500	12.0	0.4	25	195	910	120
	TNR12G151K	95	125	2,500	16.0	0.4	25	245	770	150
	TNR12G181K	110	145	2,500	18.0	0.4	25	295	670	180

# G Series

## Varistor Standard Ratings - Radial Lead

Nom. Case Dia.	Catalog Part Number	Maximum Applied Voltage (Continuous)		Maximum Peak Current (8/20 $\mu$ sec.) (A)	Maximum Energy (2msec.) (J)	Rated Wattage (W)	Maximum Clamping Voltage		Capacitance (typical) at 1kHz (pF)	Varistor Voltage at 1mA DC (V $\pm$ 10%)
		VAC <sub>rms</sub>	VDC				(A)	(V)		

<b>Ø12 mm</b>	TNR12G201K	130	170	2,500	20.0	0.4	25	330	620	200
	TNR12G221K	140	180	2,500	25.0	0.4	25	360	570	220
	TNR12G241K	150	200	2,500	25.0	0.4	25	390	530	240
	TNR12G271K	175	225	2,500	30.0	0.4	25	440	490	270
	TNR12G331K	210	270	2,500	35.0	0.4	25	540	420	330
	TNR12G391K	250	320	2,500	40.0	0.4	25	640	370	390
	TNR12G431K	275	350	2,500	45.0	0.4	25	700	340	430
	TNR12G471K	300	385	2,500	45.0	0.4	25	765	320	470
	TNR12G561K	350	460	2,500	45.0	0.4	25	910	280	560
	TNR12G681K	420	560	2,500	45.0	0.4	25	1,110	240	680
TNR12G821K	510	670	2,500	55.0	0.4	25	1,340	210	820	
TNR12G102K	625	825	2,500	65.0	0.4	25	1,630	180	1,000	

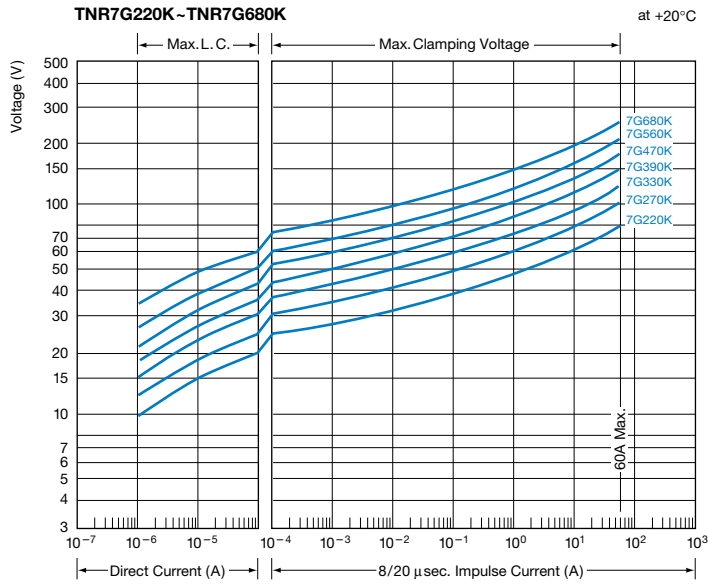
<b>Ø15 mm</b>	TNR15G150K	8	12	1,000	5.0	0.1	10	30	12,000	15
	TNR15G180K	10	14	1,000	5.0	0.1	10	35	11,500	18
	TNR15G220K	14	18	1,000	5.0	0.1	10	43	11,000	22
	TNR15G270K	17	22	1,000	5.0	0.1	10	53	10,000	27
	TNR15G330K	20	26	1,000	6.0	0.1	10	65	8,500	33
	TNR15G390K	25	30	1,000	10.0	0.1	10	77	7,500	39
	TNR15G470K	30	37	1,000	10.0	0.1	10	93	6,500	47
	TNR15G560K	35	44	1,000	10.0	0.1	10	110	5,600	56
	TNR15G680K	40	55	1,000	12.0	0.1	10	135	4,800	68
	TNR15G820K	50	65	4,500	15.0	0.6	50	135	1,700	82
	TNR15G101K	60	85	4,500	20.0	0.6	50	165	1,470	100
	TNR15G121K	75	100	4,500	20.0	0.6	50	195	1,280	120
	TNR15G151K	95	125	4,500	25.0	0.6	50	245	1,070	150
	TNR15G181K	110	145	4,500	30.0	0.6	50	295	930	180
	TNR15G201K	130	170	4,500	35.0	0.6	50	330	850	200
	TNR15G221K	140	180	4,500	40.0	0.6	50	360	800	220
	TNR15G241K	150	200	4,500	40.0	0.6	50	390	740	240
	TNR15G271K	175	225	4,500	50.0	0.6	50	440	680	270
	TNR15G331K	210	270	4,500	60.0	0.6	50	540	590	330
	TNR15G391K	250	320	4,500	70.0	0.6	50	640	510	390
TNR15G431K	275	350	4,500	75.0	0.6	50	700	480	430	
TNR15G471K	300	385	4,500	80.0	0.6	50	765	450	470	
TNR15G561K	350	460	4,500	85.0	0.6	50	910	390	560	
TNR15G681K	420	560	4,500	90.0	0.6	50	1,110	340	680	
TNR15G821K	510	670	4,500	110.0	0.6	50	1,340	280	820	
TNR15G102K	625	825	4,500	130.0	0.6	50	1,630	250	1,000	

<b>Ø23 mm</b>	TNR23G181K	110	145	6,500	60.0	1.0	100	295	2,500	180
	TNR23G201K	130	170	6,500	70.0	1.0	100	330	2,300	200
	TNR23G221K	140	180	6,500	75.0	1.0	100	360	2,150	220
	TNR23G241K	150	200	6,500	80.0	1.0	100	390	2,000	240
	TNR23G271K	175	225	6,500	90.0	1.0	100	440	1,850	270
	TNR23G331K	210	270	6,500	110.0	1.0	100	540	1,600	330
	TNR23G391K	250	320	6,500	130.0	1.0	100	640	1,400	390
	TNR23G431K	275	350	6,500	140.0	1.0	100	700	1,300	430
	TNR23G471K	300	385	6,500	150.0	1.0	100	765	1,200	470
	TNR23G561K	350	460	6,500	150.0	1.5	100	910	1,050	560
	TNR23G681K	420	560	6,500	160.0	1.5	100	1,110	900	680
	TNR23G821K	510	670	6,500	190.0	1.5	100	1,340	800	820
	TNR23G102K	625	825	6,500	230.0	1.5	100	1,630	680	1,000

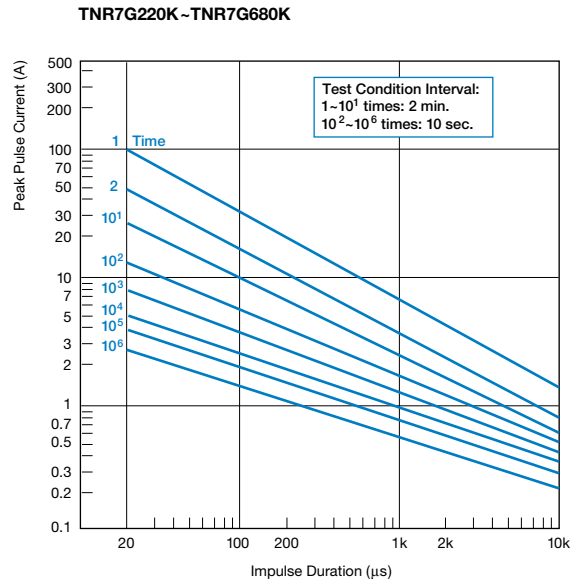
# G Series

## Varistor Volt - Ampere and Pulse Lifetime Characteristics

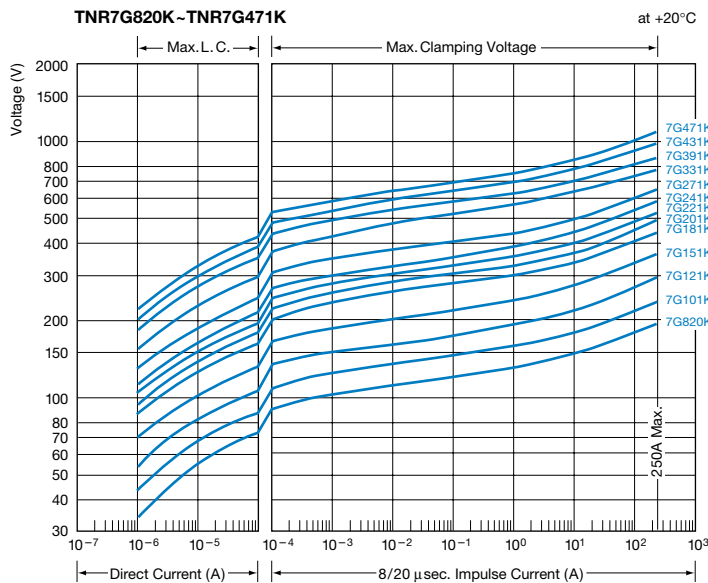
### V-I Curve - 7mm Nominal Diameter



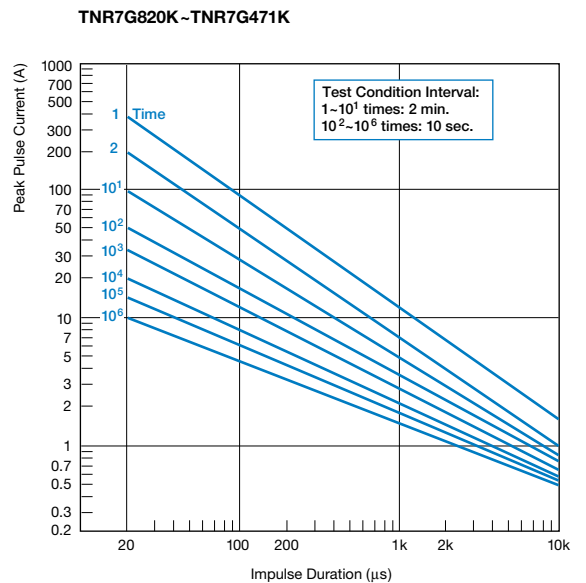
### Pulse Lifetime Ratings - 7mm Nominal Diameter



### V-I Curve - 7mm Nominal Diameter



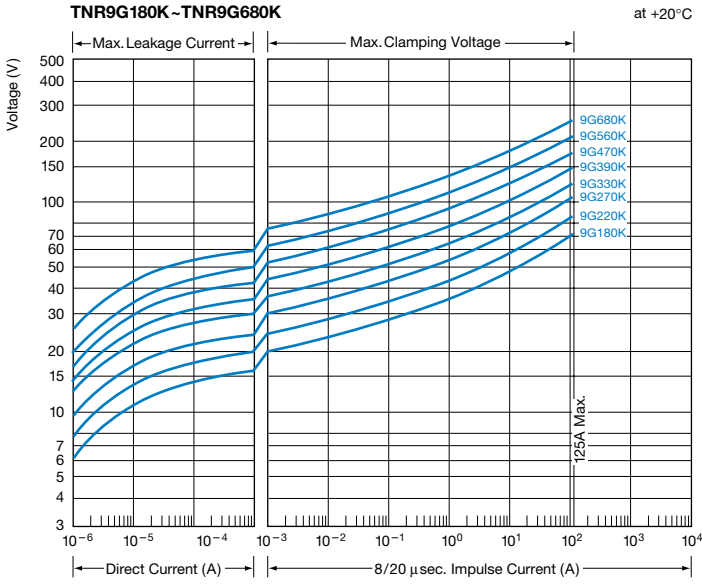
### Pulse Lifetime Ratings - 7mm Nominal Diameter



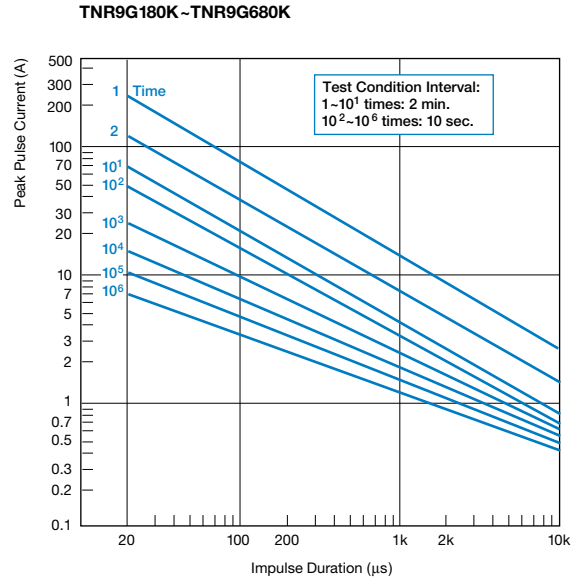
# G Series

## Varistor Volt-Ampere and Pulse Lifetime Characteristics

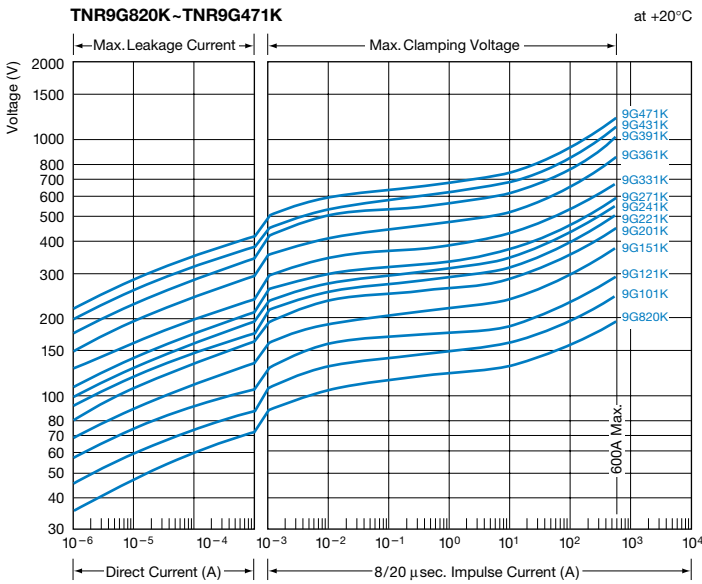
### V-I Curve - 9mm Nominal Diameter



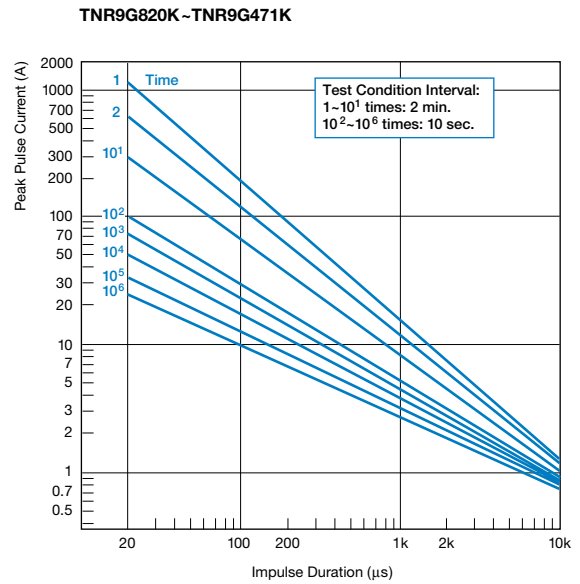
### Pulse Lifetime Ratings - 9mm Nominal Diameter



### V-I Curve - 9mm Nominal Diameter



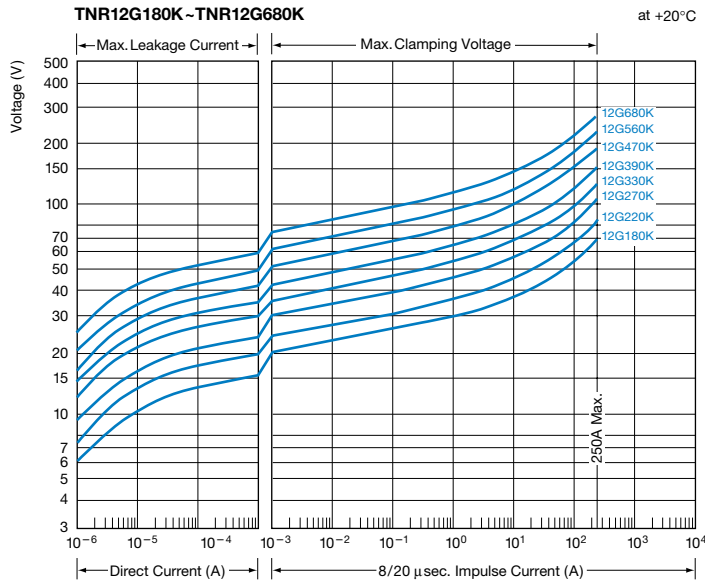
### Pulse Lifetime Ratings - 9mm Nominal Diameter



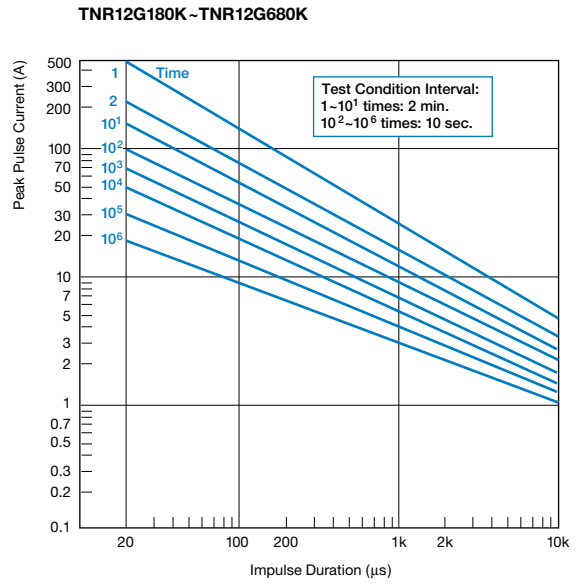
# G Series

## Varistor Volt - Ampere and Pulse Lifetime Characteristics

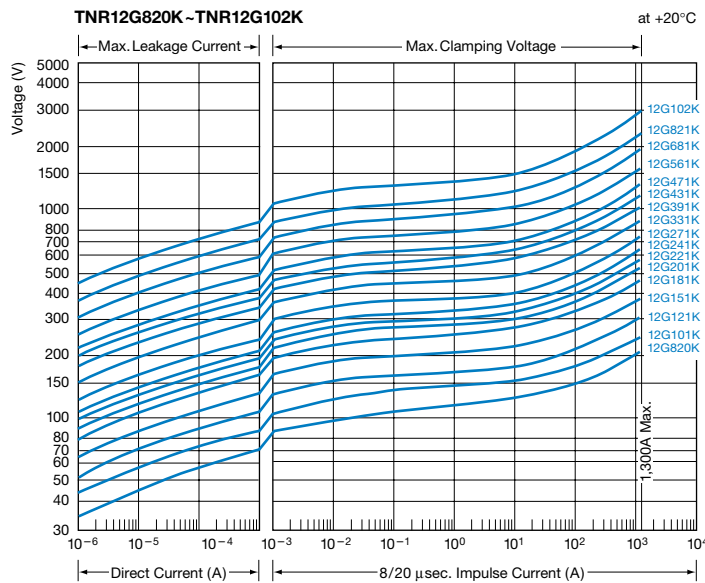
### V-I Curve - 12mm Nominal Diameter



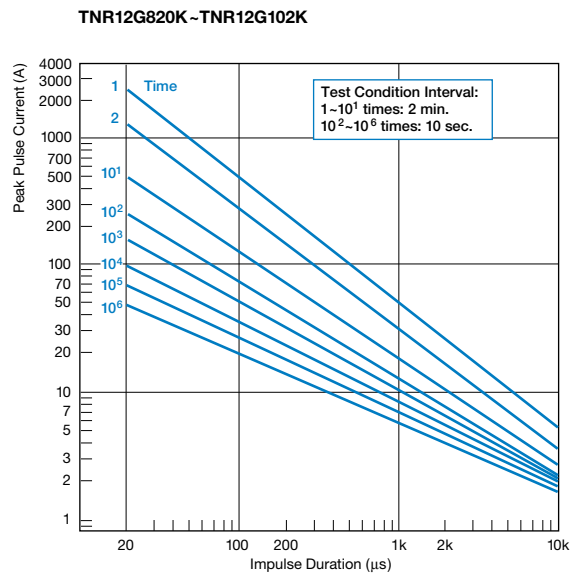
### Pulse Lifetime Ratings - 12mm Nominal Diameter



### V-I Curve - 12mm Nominal Diameter



### Pulse Lifetime Ratings - 12mm Nominal Diameter

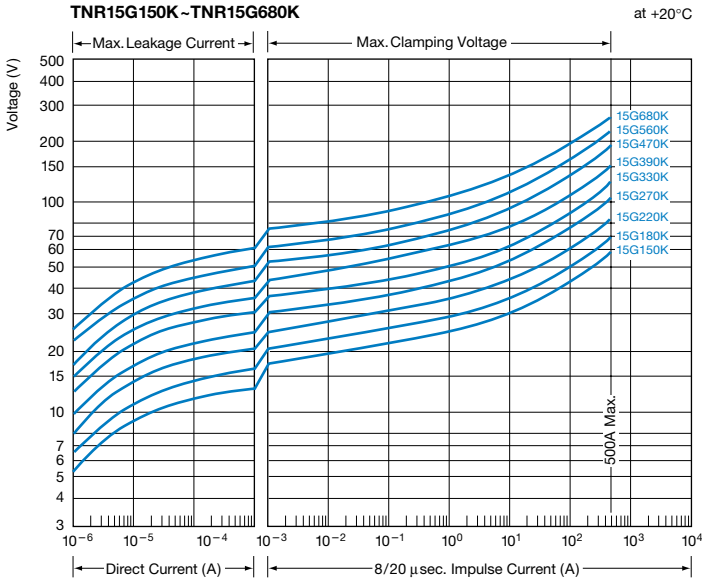




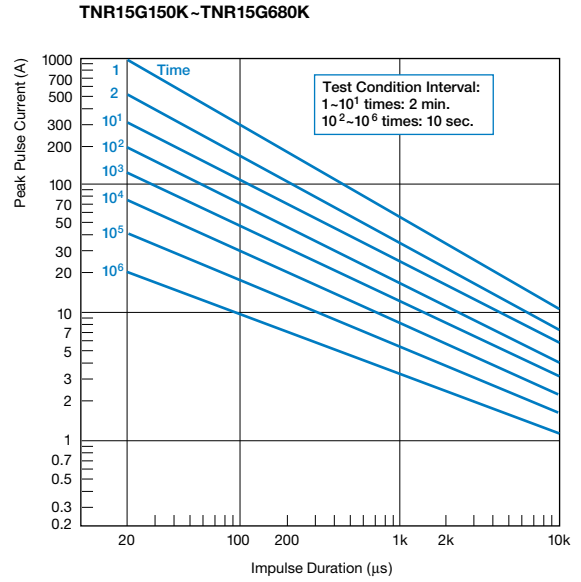
# G Series

## Varistor Volt-Ampere and Pulse Lifetime Characteristics

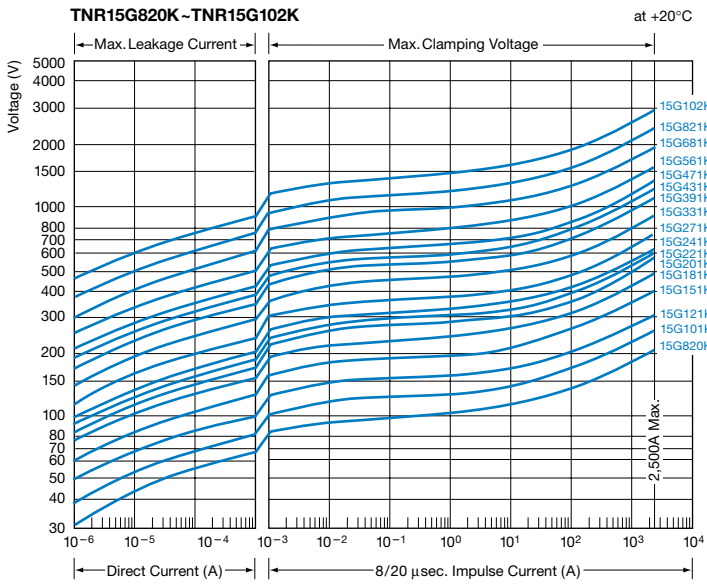
### V-I Curve - 15mm Nominal Diameter



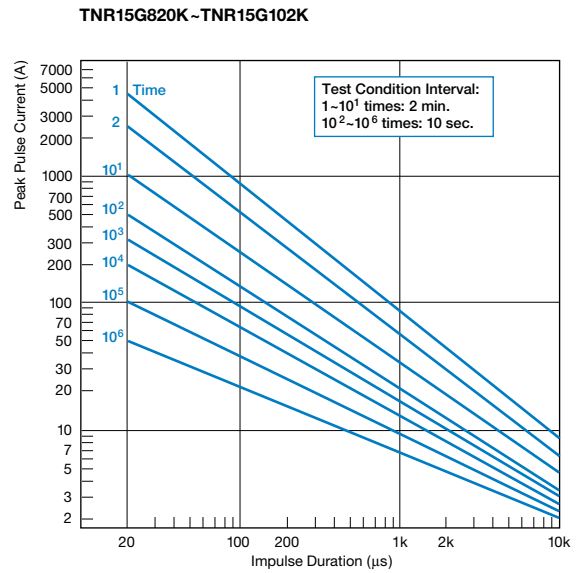
### Pulse Lifetime Ratings - 15mm Nominal Diameter



### V-I Curve - 15mm Nominal Diameter



### Pulse Lifetime Ratings - 15mm Nominal Diameter

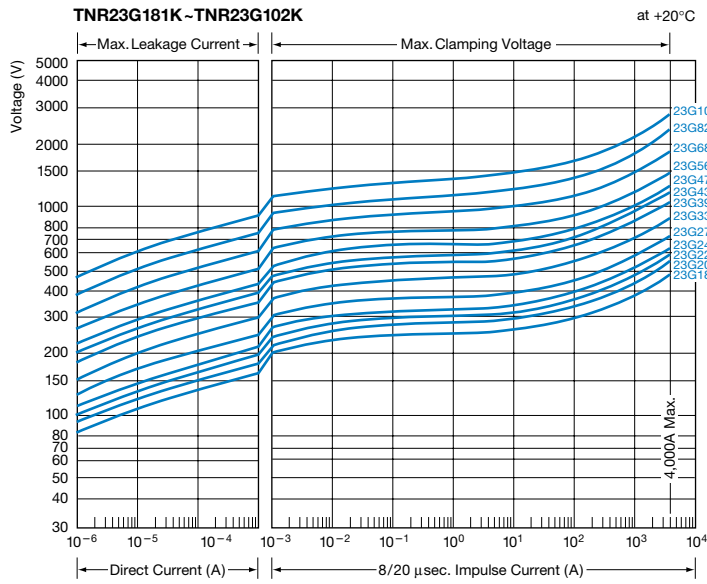




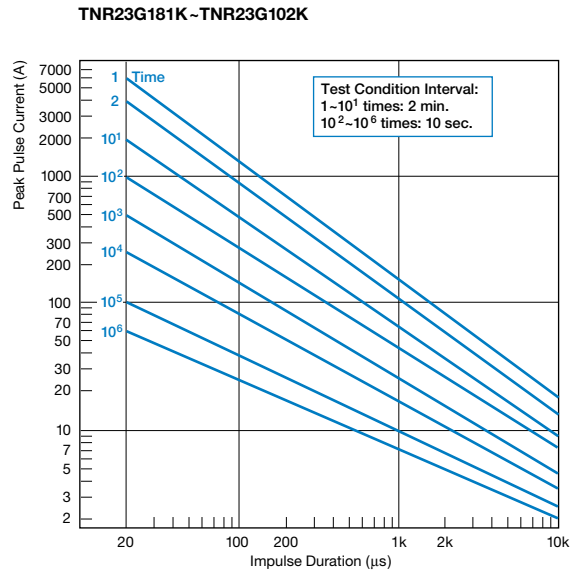
# G Series

## Varistor Volt - Ampere and Pulse Lifetime Characteristics

### V-I Curve - 23mm Nominal Diameter



### Pulse Lifetime Ratings - 23mm Nominal Diameter



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