

# KEKOVARICON

## Varistors

SMD, THD, High Energy

## Varicons

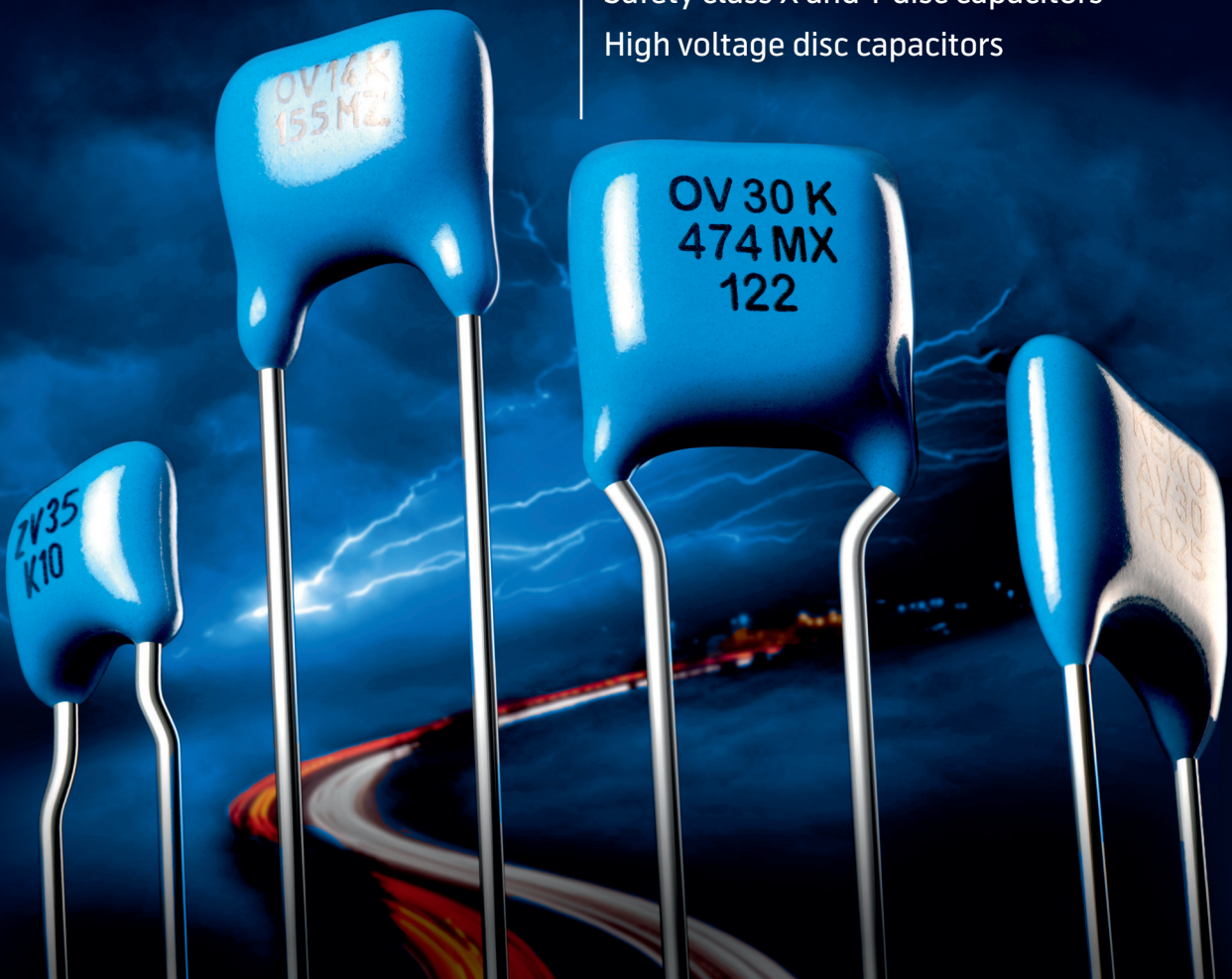
Multilayer SMD and THD

Dual Function Varicons

## Capacitors

Safety class X and Y disc capacitors

High voltage disc capacitors

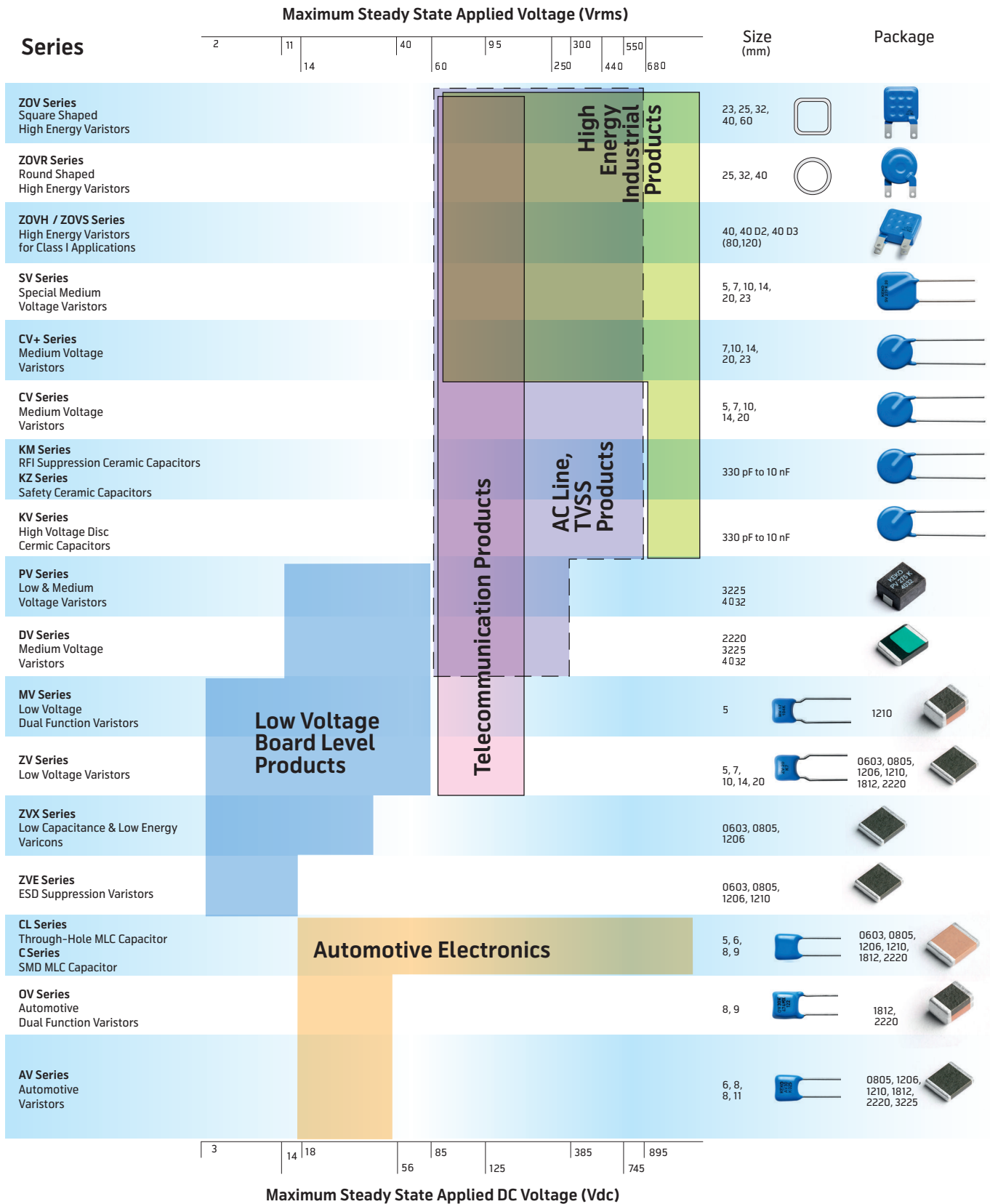


# OVERVIEW OF PROTECTIVE DEVICES

Basic Electrical Parameters	Maximum Steady State Applied Voltage (Vrms)										Size (mm)	Package											
	2	11	14	40	60	95	250	300	440	550			680										
I <sub>max</sub> = 13000 to 80000 A, W <sub>max</sub> = 90 to 4140 J I <sub>max</sub> > 5500 A/cm <sup>2</sup> , W <sub>max</sub> > 400 J/cm <sup>3</sup>	<b>ZOV Series</b> Square Shaped High Energy Varistors										23, 25, 32, 40, 60												
I <sub>max</sub> = 15000 to 40000 A, W <sub>max</sub> = 30 to 2590 J											<b>ZOVR Series</b> Round Shaped High Energy Varistors										25, 32, 40		
I <sub>max</sub> (8/20μs) up to 150 kA, I <sub>imp</sub> (10/350μs) up to 25 kA Custom Design																					<b>ZOVH / ZOVS Series</b> High Energy Varistors for class I applications		
I <sub>max</sub> = 600 to 15000 A, W <sub>max</sub> = 4 to 815 J I <sub>max</sub> > 5500 A/cm <sup>2</sup> , W <sub>max</sub> > 400 J/cm <sup>3</sup>	<b>SV Series</b> Special Medium Voltage Varistors										5, 7, 10, 14, 20, 23												
I <sub>max</sub> = 1750 to 15000 A, W <sub>max</sub> = 9 to 627 J											<b>CV+ Series</b> Medium Voltage Varistors										7, 10, 14, 20, 23		
I <sub>max</sub> = 400 to 6500 A, W <sub>max</sub> = 2,7 to 620 J	<b>CV Series</b> Medium Voltage Varistors																				5, 7, 10, 14, 20		
KM - C = 10 to 15 nF, Class X1, 300 VAC KM - C = 1 to 10 nF, Class Y2, 300 VAC KZL, KZH - C = 330 to 4700 pF, Class X1/Y1/Y2, 300/500 VAC											<b>KM Series</b> RFI Suppression Ceramic Capacitors <b>KZ Series</b> Safety Ceramic Capacitors										330 pF to 10 nF		
C = 300pF to 10nF Vr = 1kV to 6kV	<b>KV Series</b> High Voltage Disc Ceramic Capacitors																				330 pF to 10 nF		
I <sub>max</sub> = 100 to 1200 A, W <sub>max</sub> = 0,6 to 30 J											<b>PV Series</b> Low & Medium Voltage Varistors										3225 4032		
I <sub>max</sub> = 100 to 1200 A, W <sub>max</sub> = 0,6 to 30 J	<b>DV Series</b> Medium Voltage Varicons																				2220 3225 4032		
I <sub>max</sub> = 1500 A, W <sub>max</sub> = 0,1 to 2,6 J C (@ 1kHz) = 10 nF to 1000 nF											<b>MV Series</b> Low Voltage Dual Function Varicons										5		1210
I <sub>max</sub> = 20 to 2000 A, W <sub>max</sub> = 0,1 to 37,8 J	<b>ZV Series</b> Low Voltage Varicons																				5, 7, 10, 14, 20		0603, 0805, 1206, 1210, 1812, 2220
I <sub>max</sub> = 30 to 40 A W <sub>max</sub> = 1,0 J											<b>ZVX Series</b> Low Capacitance & Low Energy Varicons										0603, 0805, 1206		
tr < 1 ns, W <sub>max</sub> = 0,05 to 0,1 J	<b>ZVE Series</b> ESD Suppression Varicons																				0603, 0805, 1206, 1210		
CL and C Series: C = 1pF to 4,7μF, V = from 16 V to 630 V X7R, C series: AgPd, Barrier End Terminations, Ni / Sn End terminations											<b>CL Series</b> Through-Hole MLC Capacitor C Series <b>SMD MLC Capacitor</b>										5, 6, 8, 9		0603, 0805, 1206, 1210, 1812, 2220
I <sub>max</sub> = 800 to 1200 A, WLD = 6 to 12 J C (@ 1kHz) = 470 nF to 1500 nF Custom Design	<b>OVS Series</b> Automotive Dual Function Varicons																				8, 9		1812, 2220
I <sub>max</sub> = 120 to 2000 A, WLD = 3 to 100 J Custom Design											<b>AVS Series</b> Automotive Varicons										6, 8, 8, 11		0805, 1206, 1210, 1812, 2220, 3225
	3	14	18	56	85	125	385	745	895														
	Maximum Steady State Applied DC Voltage (Vdc)																						

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# APPLICATION FIELDS



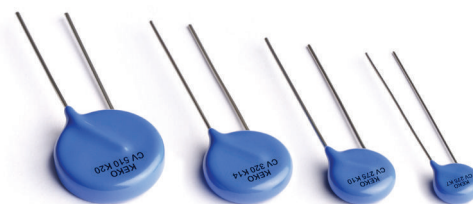
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## MEDIUM VOLTAGE DISC VARISTORS - CV SERIES


### Description

The CV series of transient surge suppressors are disc shaped varistors that can be operated continuously in low and medium voltage circuits of electronic systems as well as across AC power lines.

Due to their radial lead construction, these components require very little mounting space. They are available in five model sizes: 5 mm, 7 mm, 10 mm, 14 mm and 20 mm and feature a wide AC operating voltage ranging from 50 V to 680 V.



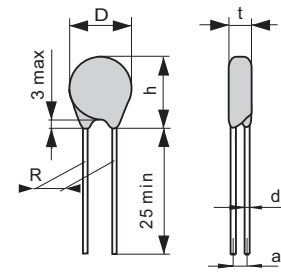
### Features

- Operating voltage range  $V_{rms}$  .....50 V to 680 V; higher voltages available upon request.
- Operating voltage range  $V_{dc}$  .....65 V to 895 V.
- 5 model sizes available .....5 mm, 7 mm, 10 mm, 14 mm, 20 mm.
- Broad current handling capability  $I_{max}$ ..... 400 to 6500 A (8/20  $\mu$ s).
- Broad energy absorption capability  $W_{max}$ .....2,7 to 620 J (10/1000  $\mu$ s).
- +85 °C continuous operating temperature.
- Available in tape and reel for automatic pick and place.
-  UL 1449 & CSA C22.2 File E163318, Across-The-Line Components Section 1. UL 1449, 3rd edition & CSA C22.2. File E326499 Section 5.
- VDE Reg. Nr. 10144-CECC 42200 and IEC 61051, Approval No. 010144
- Lead free components.
- For RMS voltages below 50V see ZV Leaded series.

### Absolute Maximum Ratings

Continuous:	Units	Value
Steady State Applied Voltage:		
DC Voltage Range ( $V_{dc}$ )	V	65 to 895
AC Voltage Range ( $V_{rms}$ )	V	50 to 680
<b>Transient:</b>		
Peak Single Pulse Surge Current, 8/20 $\mu$ s Waveform ( $I_{max}$ )	A	400 to 6500
Single Pulse Surge Energy, 10/1000 $\mu$ s Waveform ( $W_{max}$ )	J	2,7 to 620
<b>Operating Ambient Temperature</b>	°C	-40 to +85
<b>Storage Temperature</b>	°C	-40 to +125
<b>Threshold Voltage Temperature Coefficient</b>	%/°C	< + 0,05
<b>Insulation Resistance</b>	G $\Omega$	> 1
<b>Isolation Voltage Capability</b>	kV	> 2,5
<b>Response Time</b>	ns	< 25
<b>Climatic Category</b>		40 / 85 / 56

## Device Ratings and Characteristics

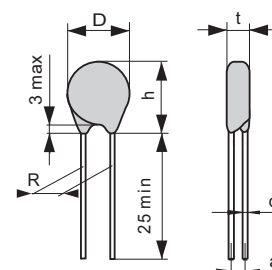


### CV 50 K 5.....CV 175 K 20

Type	$V_{rms}$ V	$V_{dc}$ V	$V_n$ @ 1 mA V	$V_c$ V	$I_c$ A	$W_{max}$ 10/1000 $\mu s$ J	P max W	$I_{max}$ 8/20 $\mu s$ A	C typ. @ 1 kHz pF	D max mm	t max mm	R mm	d mm	h max mm
CV 50 K 5	50	65	82	135	5	2,7	0,1	400	350	7	3,5	5	0,6	9,5
CV 50 K 7	50	65	82	135	10	6,8	0,25	1200	820	9	3,5	5	0,6	11,5
CV 50 K 10	50	65	82	135	25	17	0,4	2500	1400	12,5	4,1	7,5	0,8	15
CV 50 K 14	50	65	82	135	50	35	0,6	4500	2600	16,5	4,1	7,5	0,8	20
CV 50 K 20	50	65	82	135	100	75	1	6500	5000	22,5	4,5	10	1	26
CV 60 K 5	60	85	100	165	5	3	0,1	400	300	7	3,5	5	0,6	9,5
CV 60 K 7	60	85	100	165	10	7	0,25	1200	680	9	3,5	5	0,6	11,5
CV 60 K 10	60	85	100	165	25	16	0,4	2500	1200	12,5	4,1	7,5	0,8	15
CV 60 K 14	60	85	100	165	50	34	0,6	4500	2200	16,5	4,2	7,5	0,8	20
CV 60 K 20	60	85	100	165	100	71	1	6500	4100	22,5	4,6	10	1	26
CV 75 K 5	75	100	120	200	5	4	0,1	400	250	7	3,6	5	0,6	9,5
CV 75 K 7	75	100	120	200	10	9	0,25	1200	550	9	3,6	5	0,6	11,5
CV 75 K 10	75	100	120	200	25	21	0,4	2500	950	12,5	4,2	7,5	0,8	15
CV 75 K 14	75	100	120	200	50	41	0,6	4500	1800	16,5	4,2	7,5	0,8	20
CV 75 K 20	75	100	120	200	100	81	1	6500	3300	22,5	4,6	10	1	26
CV 95 K 5	95	125	150	250	5	6	0,1	400	200	7	3,8	5	0,6	9,5
CV 95 K 7	95	125	150	250	10	11	0,25	1200	440	9	3,8	5	0,6	11,5
CV 95 K 10	95	125	150	250	25	25	0,4	2500	750	12,5	4,3	7,5	0,8	15
CV 95 K 14	95	125	150	250	50	51	0,6	4500	1400	16,5	4,3	7,5	0,8	20
CV 95 K 20	95	125	150	250	100	106	1	6500	2600	22,5	4,6	10	1	26
CV 115 K 5	115	150	180	300	5	6	0,1	400	170	7	4,0	5	0,6	9,5
CV 115 K 7	115	150	180	300	10	13	0,25	1200	360	9	4,0	5	0,6	11,5
CV 115 K 10	115	150	180	300	25	30	0,4	2500	650	12,5	4,3	7,5	0,8	15
CV 115 K 14	115	150	180	300	50	62	0,6	4500	1200	16,5	4,4	7,5	0,8	20
CV 115 K 20	115	150	180	300	100	118	1	6500	2100	22,5	4,8	10	1	26
CV 130 K 5	130	170	205	340	5	7	0,1	400	150	7	4,0	5	0,6	9,5
CV 130 K 7	130	170	205	340	10	15	0,25	1200	320	9	4,0	5	0,6	11,5
CV 130 K 10	130	170	205	340	25	34	0,4	2500	580	12,5	4,5	7,5	0,8	15
CV 130 K 14	130	170	205	340	50	68	0,6	4500	1050	16,5	4,6	7,5	0,8	20
CV 130 K 20	130	170	205	340	100	142	1	6500	1900	22,5	5,0	10	1	26
CV 140 K 5	140	180	220	360	5	7	0,1	400	140	7	4,1	5	0,6	9,5
CV 140 K 7	140	180	220	360	10	18	0,25	1200	1200	9	4,1	5	0,6	11,5
CV 140 K 10	140	180	220	360	25	37	0,4	2500	2500	12,5	4,6	7,5	0,8	15
CV 140 K 14	140	180	220	360	50	75	0,6	4500	4500	16,5	4,7	7,5	0,8	20
CV 140 K 20	140	180	220	360	100	157	1	6500	6500	22,5	5,1	10	1	26
CV 150 K 5	150	200	240	395	5	9	0,1	400	130	7	4,3	5	0,6	9,5
CV 150 K 7	150	200	240	395	10	18	0,25	1200	280	9	4,3	5	0,6	11,5
CV 150 K 10	150	200	240	395	25	41	0,4	2500	510	12,5	4,6	7,5	0,8	15
CV 150 K 14	150	200	240	395	50	81	0,6	4500	900	16,5	4,8	7,5	0,8	20
CV 150 K 20	150	200	240	395	100	170	1	6500	1550	22,5	5,2	10	1	26
CV 175 K 5	175	225	270	455	5	9,5	0,1	400	120	7	4,8	5	0,6	9,5
CV 175 K 7	175	225	270	455	10	21	0,25	1200	250	9	4,8	5	0,6	11,5
CV 175 K 10	175	225	270	455	25	46	0,4	2500	440	12,5	4,9	7,5	0,8	15
CV 175 K 14	175	225	270	455	50	95	0,6	4500	800	16,5	4,9	7,5	0,8	20
CV 175 K 20	175	225	270	455	100	193	1	6500	1400	22,5	5,3	10	1	26

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## Device Ratings and Characteristics



## CV 230 K 5 ..... CV 680 K 20

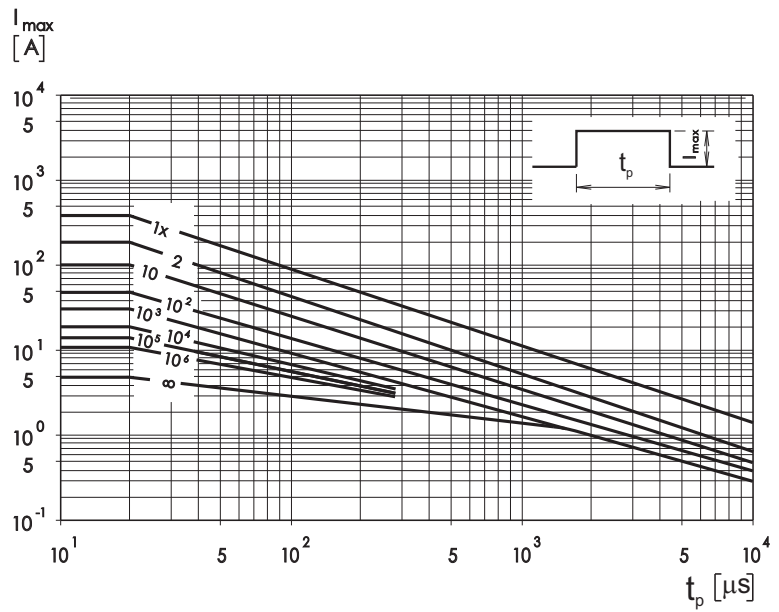
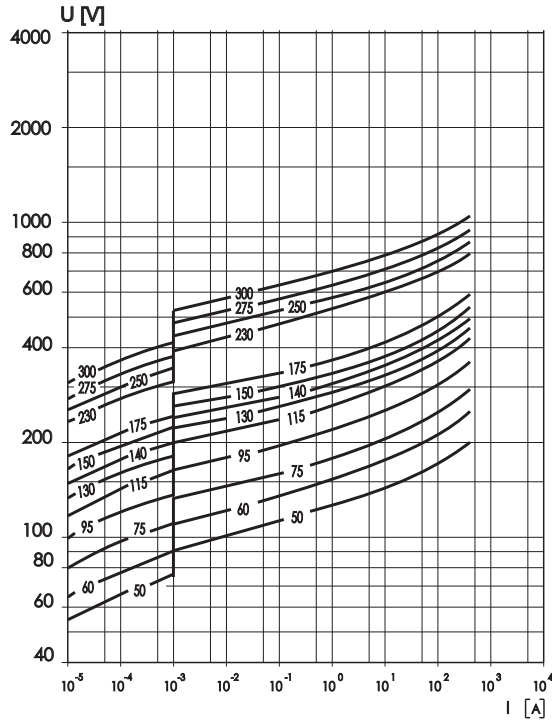
Type	$V_{rms}$ V	$V_{dc}$ V	$V_n$ @ 1 mA V	$V_c$ V	$I_c$ A	$W_{max}$ 10/1000 $\mu s$ J	P max W	$I_{max}$ 8/20 $\mu s$ A	C typ. @ 1 kHz pF	D max mm	t max mm	R mm	d mm	h max mm
CV 230 K 5	230	300	360	595	5	13	0,1	400	90	7	4,8	5	0,6	9,5
CV 230 K 7	230	300	360	595	10	28	0,25	1200	190	9	4,8	5	0,6	11,5
CV 230 K 10	230	300	360	595	25	62	0,4	2500	350	12,5	5,4	7,5	0,8	15
CV 230 K 14	230	300	360	595	50	126	0,6	4500	650	16,5	5,5	7,5	0,8	20
CV 230 K 20	230	300	360	595	100	258	1	6500	1200	22,5	5,9	10	1	26
CV 250 K 5	250	320	390	650	5	14	0,1	400	80	7	5,0	5	0,6	9,5
CV 250 K 7	250	320	390	650	10	30	0,25	1200	180	9	5,0	5	0,6	11,5
CV 250 K 10	250	320	390	650	25	68	0,4	2500	320	12,5	5,6	7,5	0,8	15
CV 250 K 14	250	320	390	650	50	135	0,6	4500	580	16,5	5,7	7,5	0,8	20
CV 250 K 20	250	320	390	650	100	276	1	6500	1000	22,5	6,1	10	1	26
CV 275 K 5	275	350	430	710	5	16	0,1	400	70	7	5,6	5	0,6	9,5
CV 275 K 7	275	350	430	710	10	35	0,25	1200	160	9	5,6	5	0,6	11,5
CV 275 K 10	275	350	430	710	25	78	0,4	2500	300	12,5	6,0	7,5	0,8	15
CV 275 K 14	275	350	430	710	50	150	0,6	4500	530	16,5	6,0	7,5	0,8	20
CV 275 K 20	275	350	430	710	100	304	1	6500	900	22,5	6,3	10	1	26
CV 300 K 5	300	385	470	775	5	21	0,1	400	65	7	5,8	5	0,6	9,5
CV 300 K 7	300	385	470	775	10	37	0,25	1200	150	9	5,8	5	0,6	11,5
CV 300 K 10	300	385	470	775	25	82	0,4	2500	280	12,5	6,1	7,5	0,8	15
CV 300 K 14	300	385	470	775	50	169	0,6	4500	490	16,5	6,1	7,5	0,8	20
CV 300 K 20	300	385	470	775	100	350	1	6500	850	22,5	6,6	10	1	26
CV 320 K 10	320	420	510	840	25	91	0,4	2500	260	12,5	6,8	7,5	0,8	16
CV 320 K 14	320	420	510	840	50	184	0,6	4500	460	16,5	6,8	7,5	0,8	21
CV 320 K 20	320	420	510	840	100	388	1	6500	800	22,5	6,8	10	1	27
CV 385 K 10	385	505	620	1025	25	93	0,4	2500	240	12,5	7,4	7,5	0,8	16
CV 385 K 14	385	505	620	1025	50	193	0,6	4500	400	16,5	7,4	7,5	0,8	21
CV 385 K 20	385	505	620	1025	100	396	1	6500	700	22,5	7,5	10	1	27
CV 420 K 10	420	560	680	1120	25	97	0,4	2500	220	12,5	7,3	7,5	0,8	16
CV 420 K 14	420	560	680	1120	50	202	0,6	4500	350	16,5	7,4	7,5	0,8	21
CV 420 K 20	420	560	680	1120	100	418	1	6500	650	22,5	7,8	10	1	27
CV 460 K 10	460	615	750	1240	25	106	0,4	2500	200	12,5	7,8	7,5	0,8	16
CV 460 K 14	460	615	750	1240	50	220	0,6	4500	330	16,5	7,8	7,5	0,8	21
CV 460 K 20	460	615	750	1240	100	460	1	6500	550	22,5	8,2	10	1	27
CV 510 K 10	510	670	820	1355	25	115	0,4	2500	180	12,5	8,2	7,5	0,8	16
CV 510 K 14	510	670	820	1355	50	227	0,6	4500	310	16,5	8,2	7,5	0,8	21
CV 510 K 20	510	670	820	1355	100	478	1	6500	500	22,5	8,7	10	1	27
CV 550 K 10	550	745	910	1500	25	134	0,4	2500	170	12,5	8,8	7,5	0,8	16
CV 550 K 14	550	745	910	1500	50	264	0,6	4500	290	16,5	8,8	7,5	0,8	21
CV 550 K 20	550	745	910	1500	100	515	1	6500	450	22,5	9,2	10	1	27
CV 625 K 10	625	825	1000	1650	25	140	0,4	2500	160	12,5	9,1	7,5	0,8	16
CV 625 K 14	625	825	1000	1650	50	280	0,6	4500	270	16,5	9,2	7,5	0,8	21
CV 625 K 20	625	825	1000	1650	100	565	1	6500	400	22,5	9,7	10	1	27
CV 680 K 10	680	895	1100	1815	25	155	0,4	2500	150	12,5	9,7	7,5	0,8	16
CV 680 K 14	680	895	1100	1815	50	310	0,6	4500	250	16,5	9,8	7,5	0,8	21
CV 680 K 20	680	895	1100	1815	100	620	1	6500	350	22,5	10,2	10	1	27

Protection Level

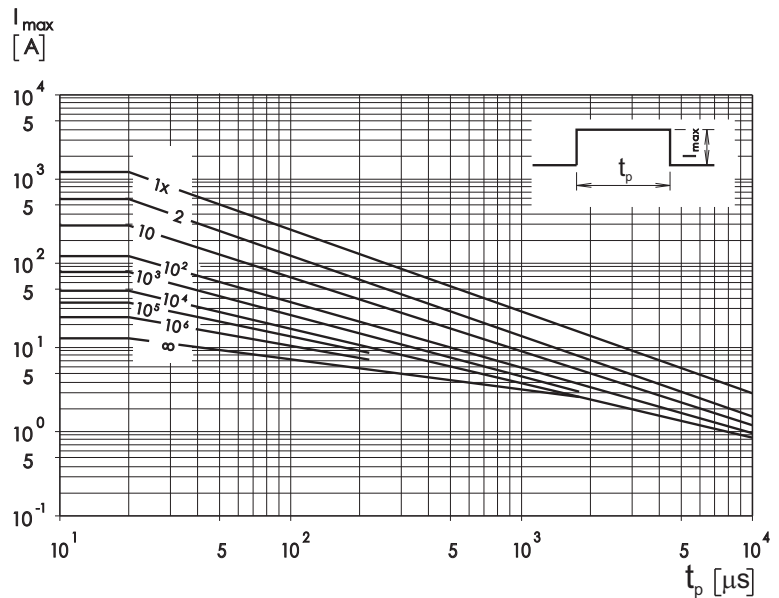
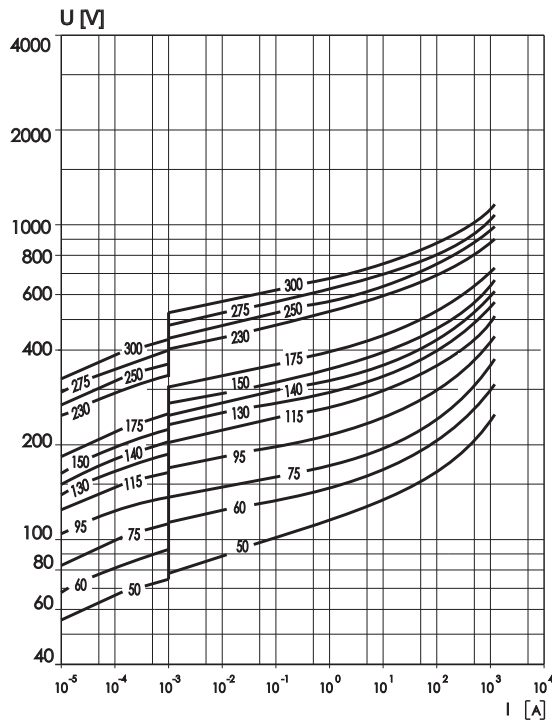
Pulse Rating Curves

\* With the worst-case condition in the tolerance region

Model Size 5  
CV 50...275



Model Size 7  
CV 50...300



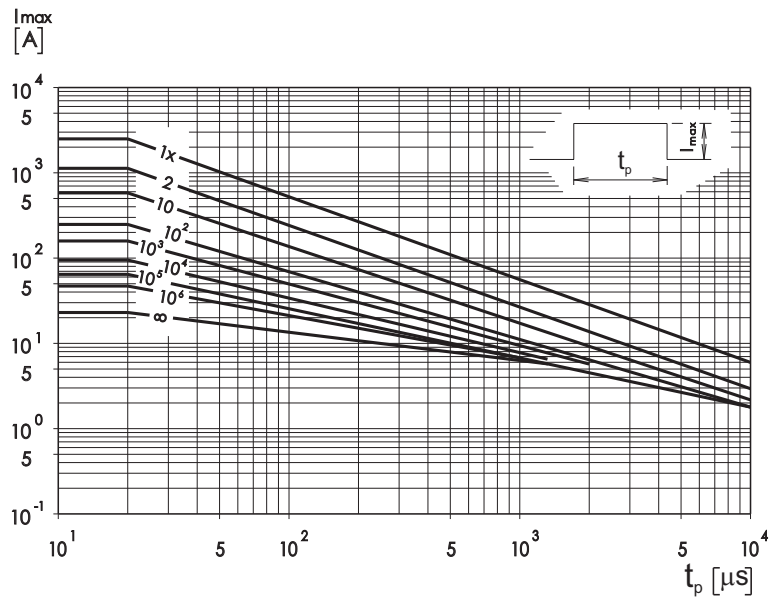
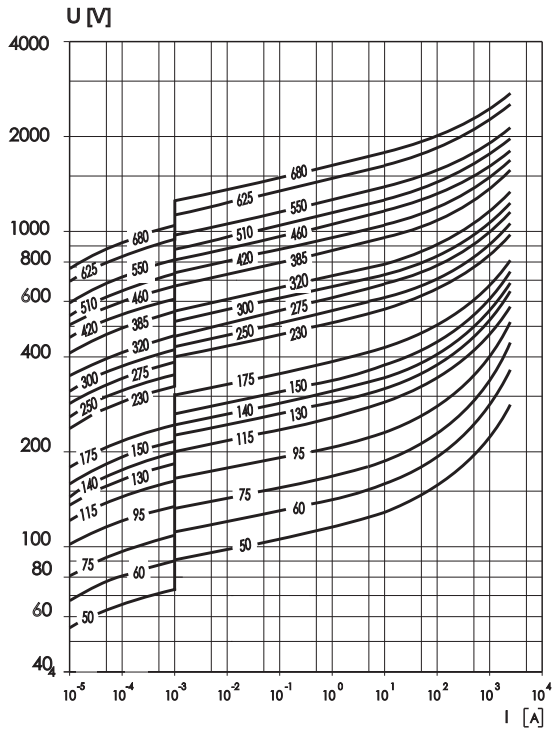
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Protection Level

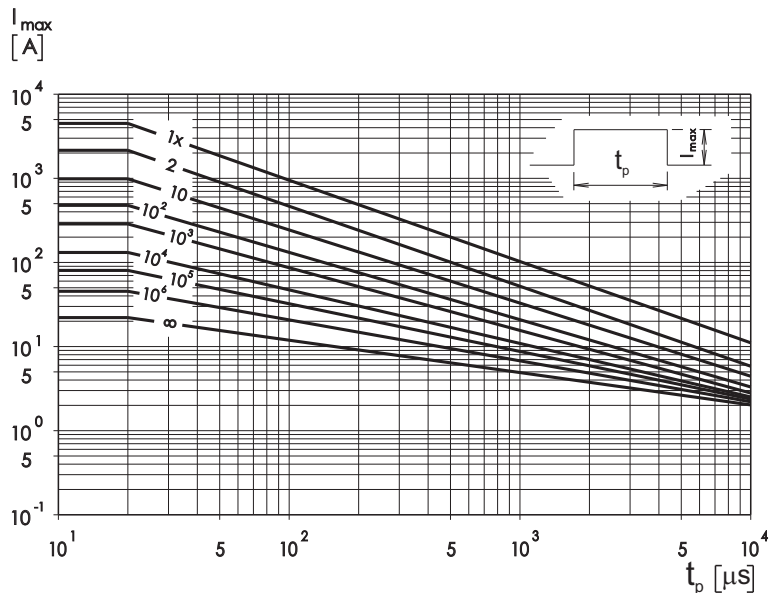
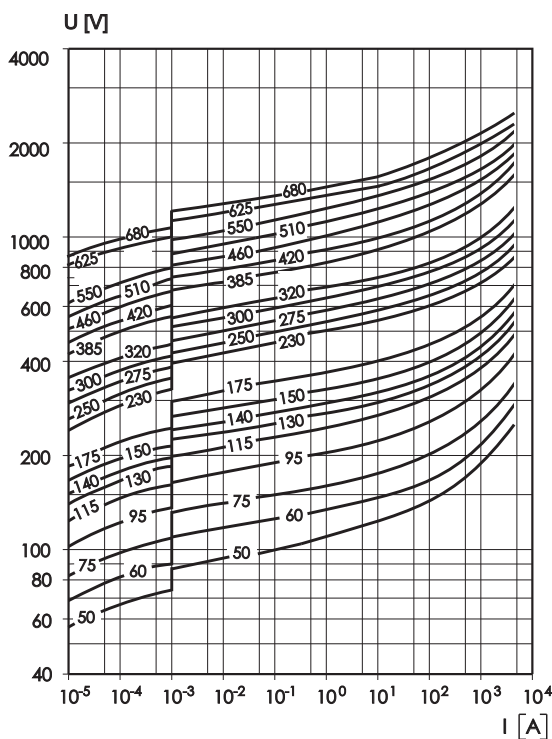
Pulse Rating Curves

\* With the worst-case condition in the tolerance region

Model Size 10  
CV 50...680



Model Size 14  
CV 50...680



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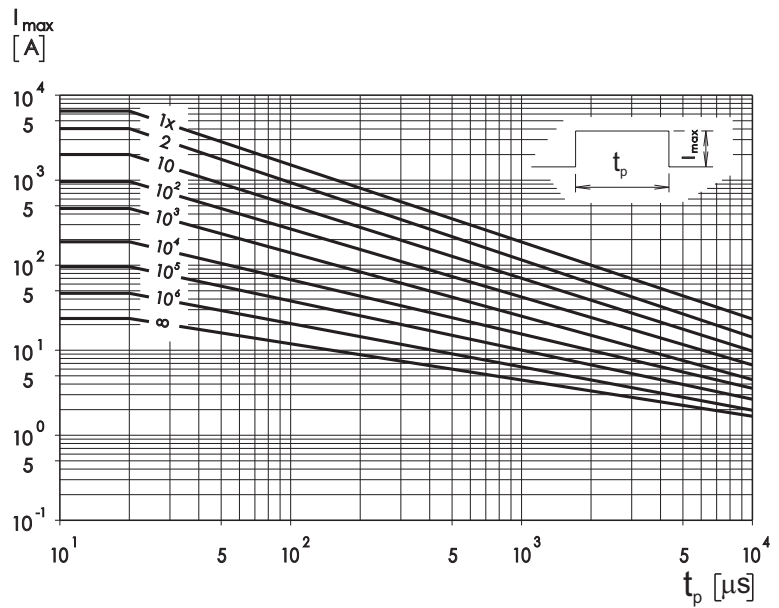
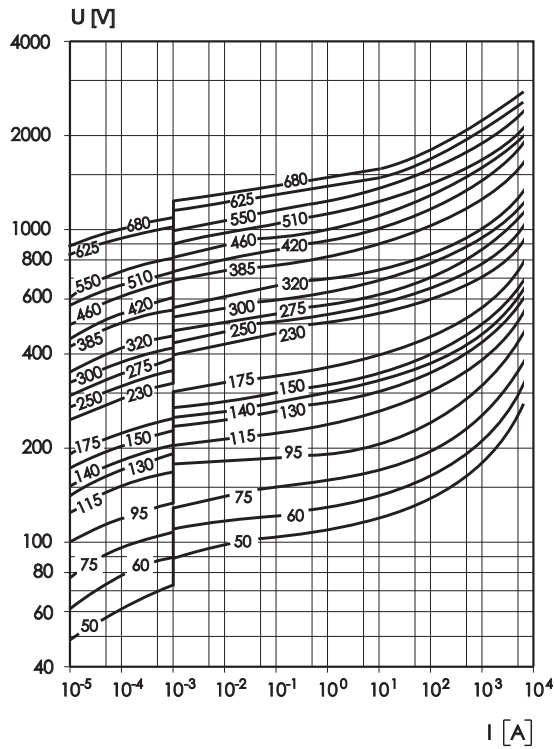


Protection Level

Pulse Rating Curves

\* With the worst-case condition in the tolerance region

Model Size 20  
CV 50...680



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