Tubular Metal-Oxide Varistors

The CP Series of transient voltage surge suppressors are metal-oxide varistors (MOVs) of tubular construction. These varistors are intended for mounting within a multipin connector assembly. This series is available in a wide range of voltage ratings from 6V to 150V $V_{M(AC)RMS}$. Their internal dimensions allow them to be used with 16, 20, or 22 gauge connector pins. The unique coaxial mounting arrangement of these tubular varistors allow them to become part of a transmission line itself. Added inductive lead effects are eliminated.

Varistor action takes place between the inside and outside diameters of the tube. Typically, data or signal lines make electrical connection to the inside of the tube. The outside tube surface is then connected to ground or common.

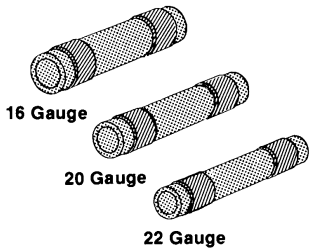
The CP Series is supplied in Bulk Pack.

Features

- Unique Coaxial Design and Mounting Arrangement in Tubular Form
- Designed to be Integrated Within Standard Connector Assemblies
- Wide Operating Voltage Range $V_{M(AC)RMS}$ . . . . 6V to 150V
- Can be Used with 16, 20, or 22 Gauge Standard Connector Pins
- No Derating up to 125^{O}C Ambient

Packaging

CP SERIES



Absolute Maximum Ratings For ratings of individual members of a series, see Device Ratings and Specifications chart

	CP SERIES	UNITS
Continuous:		
Steady State Applied Voltage:		
AC Voltage Range ($V_{M(AC)RMS}$)	6 to 150	V
DC Voltage Range ($V_{M(DC)}$)	8 to 150	V
Transient:		
Peak Pulse Current (I_{TM})		
For 8/20µs Current Wave (See Figure 2)	250 to 500	A
Single Pulse Energy Range		
For 10/1000µs Current Wave (W_{TM})	1.5 to 5	J
Operating Ambient Temperature Range (T_A)	-55 to 125	°C
Storage Temperature Range (T_{STG})	-55 to 150	°C
Temperature Coefficient (αV) of Clamping Voltage (V_C) at Specified Test Current	<0.01	%/°C

CAUTION: Stresses above those listed in "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress only rating and operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied.

Device Ratings and Specifications

MODEL NUMBER	PART SIZE	MAXIMUM RATINGS (125°C)				SPECIFICATIONS (25°C)						
		CONTINUOUS		TRANSIENT							CAPACITANCE AT f = 1MHz	
		RMS Voltage	DC Voltage	Energy (10/1000µs)	Peak Current (8/20µs)	Varistor Voltage at 1mA DC Test Current			Clamping Voltage V_C at Test Current (8/20µs)			
		$V_{M(AC)}$	$V_{M(DC)}$	W_{TM}	I_{TM}	V_N MIN	V_N (DC)	V_N MAX	V_C	I	MIN	MAX
		(V)	(V)	(J)	(A)	(V)	(V)	(V)	(V)	(A)	(pF)	(pF)
V8CP22	22B	6.0	8.0	1.5	250	12.5	16.0	19.5	34.0	10	1600	2950
V14CP22	22B	10.0	14.0	1.5	250	18.5	22.0	25.5	42.0	10	1600	2950
V31CP22	22B	25.0	31.0	1.5	50	35.0	39.0	48.0	85.0	5	450	1950
V38CP22	22B	30.0	38.0	1.5	25	42.0	47.0	58.0	100.0	5	450	1950
V130CP22	22A	130.0	130.0	2.4	300	184.0	200.0	228.0	375.0	5	150	350
V150CP22	22A	150.0	150.0	2.4	300	212.0	240.0	268.0	430.0	5	100	300
V31CP20	20B	25.0	31.0	2.0	300	35.0	39.0	48.0	85.0	10	700	2200
V38CP20	20B	30.0	38.0	2.0	300	42.0	47.0	58.0	100.0	10	650	1950
V130CP20	20A	130.0	130.0	3.0	400	184.0	200.0	228.0	375.0	10	150	400
V150CP20	20A	150.0	150.0	3.0	400	212.0	240.0	268.0	430.0	10	100	350
V38CP16	16A	30.0	38.0	3.0	350	42.0	47.0	58.0	100.0	20	1000	2750
V130CP16	16A	130.0	130.0	5.0	500	184.0	200.0	228.0	375.0	20	250	700
V150CP16	16A	150.0	150.0	5.0	500	212.0	240.0	268.0	430.0	20	200	650

NOTE: Average power dissipation of transients not to exceed 250mW, 300mW and 350mW for sizes 22AWG, 20AWG and 16AWG, respectively.

Device Leakage Current

MODEL NUMBER	PART SIZE	LEAKAGE CURRENT AT $V_{T(DC)}$				
		25°C		125°C		
		I_L TYP	I_L MAX	I_L TYP	I_L MAX	$V_{T(DC)}$
		(µA)	(µA)	(µA)	(µA)	(V)
V8CP22	22B	0.5	5.0	5.0	50	8
V14CP22	22B	0.5	5.0	5.0	50	14
V31CP22	22B	0.5	5.0	5.0	50	28
V38CP22	22B	0.5	5.0	5.0	50	36
V130CP22	22A	0.5	5.0	25.0	100	130
V150CP22	22A	0.5	5.0	25.0	100	150
V31CP20	20B	0.5	5.0	5.0	50	28
V38CP20	20B	0.5	5.0	5.0	50	36
V130CP20	20A	0.5	5.0	25.0	100	130
V150CP20	20A	0.5	5.0	25.0	100	150
V38CP16	16A	0.5	5.0	5.0	50	36
V130CP16	16A	0.5	5.0	25.0	100	130
V150CP16	16A	0.5	5.0	25.0	100	150

Power Dissipation Ratings

Should transients occur in rapid succession the average power dissipation required is simply the energy (watt-seconds) per pulse times the number of pulses per second. The power so developed must be within the specifications shown on the Device Ratings and Specifications table for the specific device. Furthermore, the operating values need to be derated at high temperatures as shown in Figure 1. Because varistors can only dissipate a relatively small amount of average power they are, therefore, not suitable for repetitive applications that involve substantial amounts of average power dissipation.

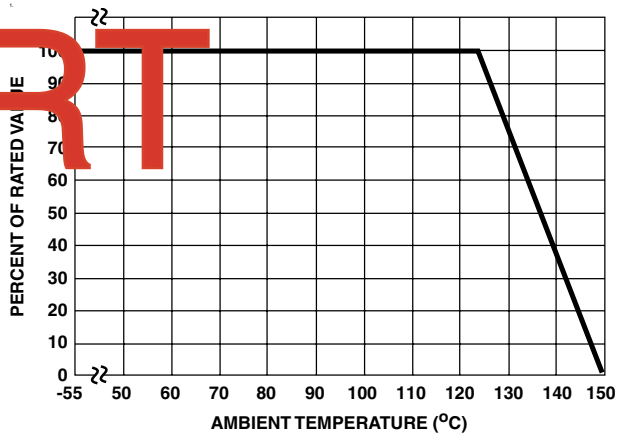
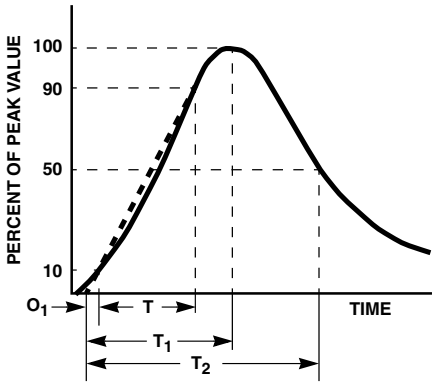


FIGURE 1. CURRENT, ENERGY AND POWER DERATING CURVE



O_1 = Virtual Origin of Wave
T = Time From 10% to 90% of Peak
T_1 = Virtual Front time = 1.25 • t
T_2 = Virtual Time to Half Value (Impulse Duration)
Example: For an 8/20µs Current Waveform:
8µs = T_1 = Virtual Front Time
20µs = T_2 = Virtual Time to Half Value

FIGURE 2. PEAK PULSE CURRENT TEST WAVEFORM

Transient V-I Characteristics Curves

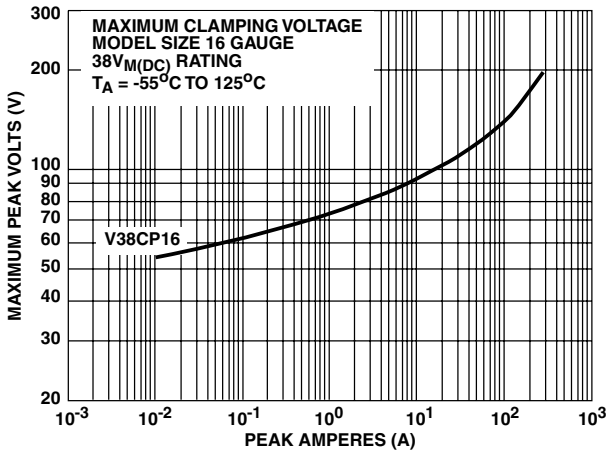


FIGURE 3. CLAMPING VOLTAGE FOR V38CP16

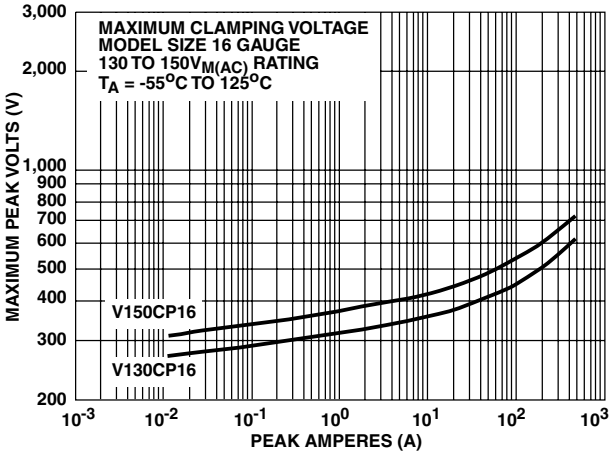


FIGURE 4. CLAMPING VOLTAGE FOR V130CP16 - V150CP16

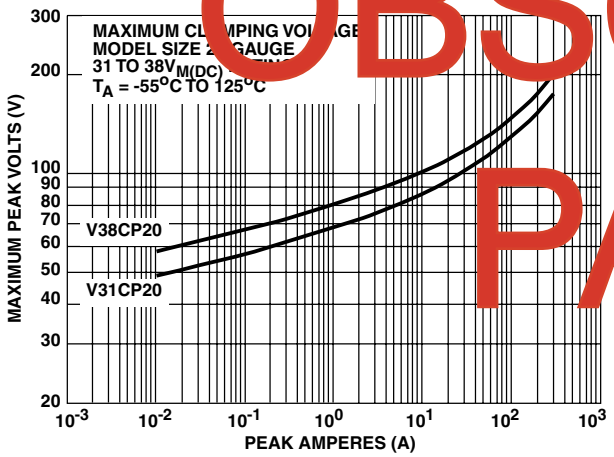


FIGURE 5. CLAMPING VOLTAGE FOR V31CP20 - C38CP20

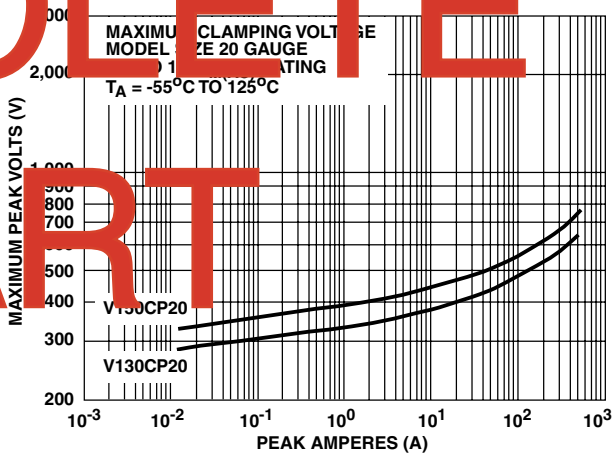


FIGURE 6. CLAMPING VOLTAGE FOR V130CP20 - V150CP20

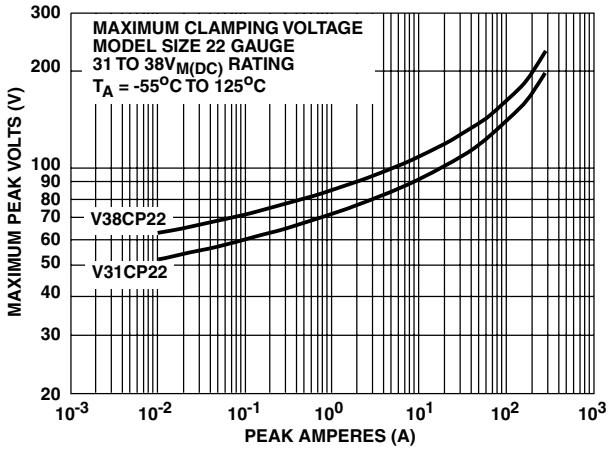


FIGURE 7. CLAMPING VOLTAGE FOR V31CP22 - V38CP22

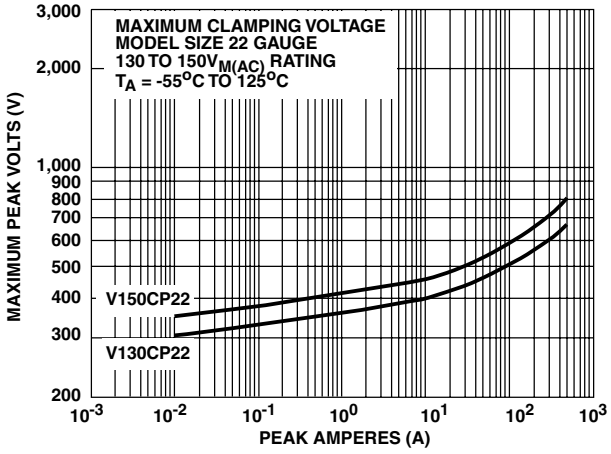


FIGURE 8. CLAMPING VOLTAGE FOR V130CP22 - V150CP22

Transient V-I Characteristics Curves (Continued)

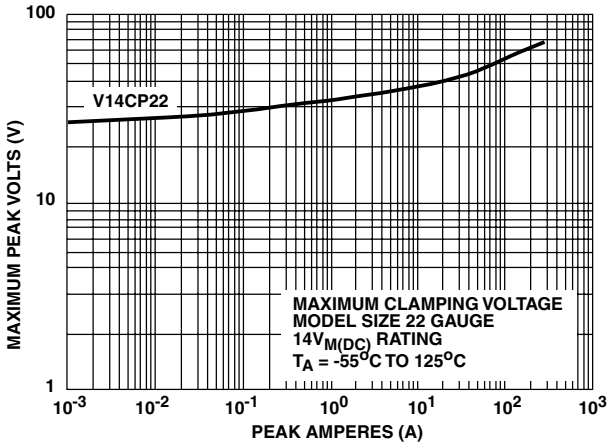


FIGURE 9. CLAMPING VOLTAGE FOR V14CP22

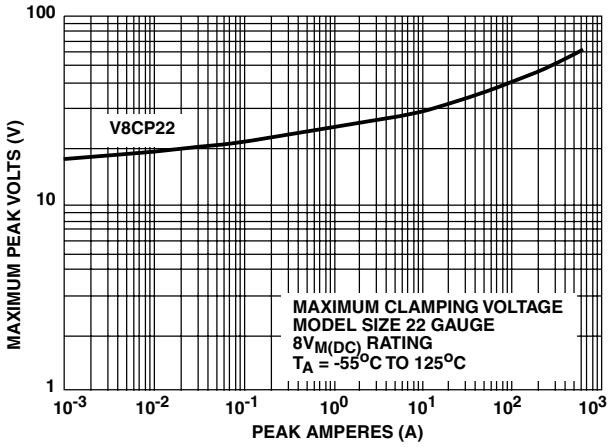


FIGURE 10. CLAMPING VOLTAGE FOR V8CP22

Pulse Rating Curves

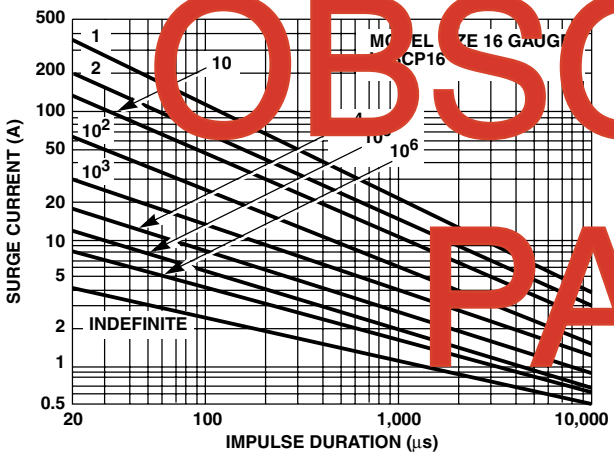


FIGURE 11. SURGE CURRENT RATING CURVES FOR V38CP16

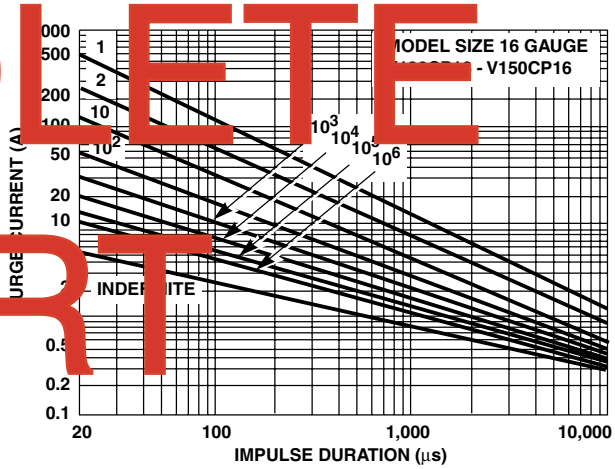


FIGURE 12. SURGE CURRENT RATING CURVES FOR V130CP16 - V150CP16

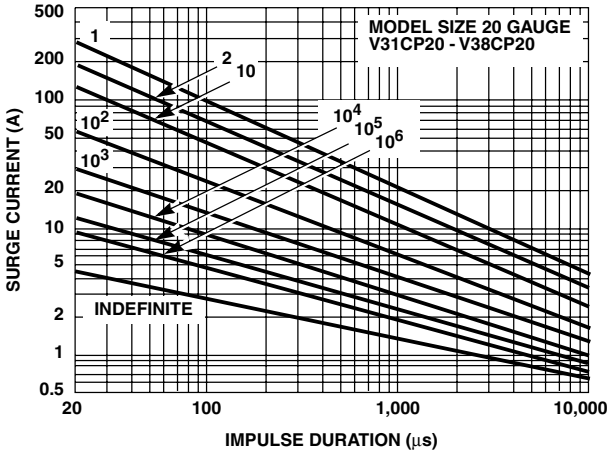


FIGURE 13. SURGE CURRENT RATING CURVES FOR V31CP20 - V38CP20

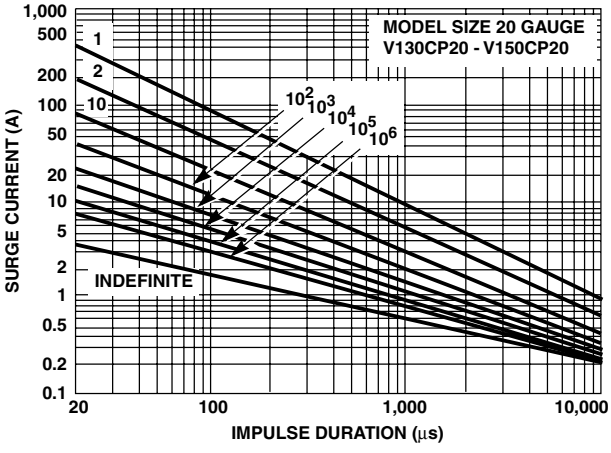
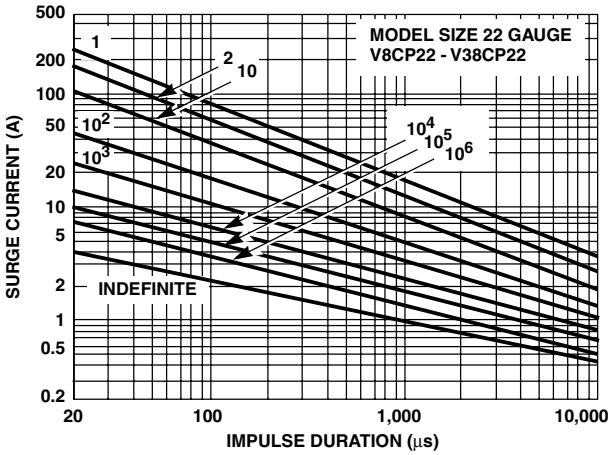


FIGURE 14. SURGE CURRENT RATING CURVES FOR V130CP20 - V150CP20

Pulse Rating Curves (Continued)



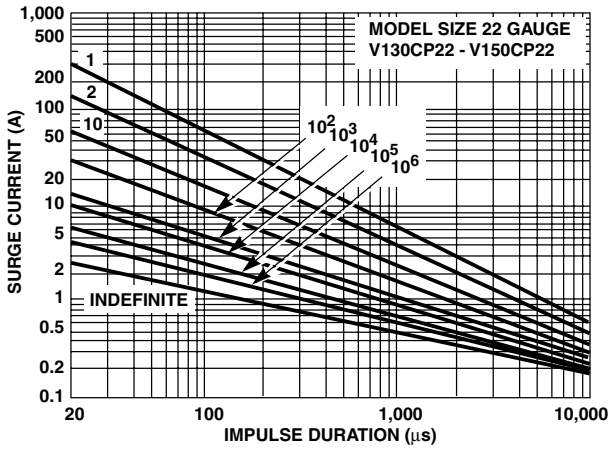
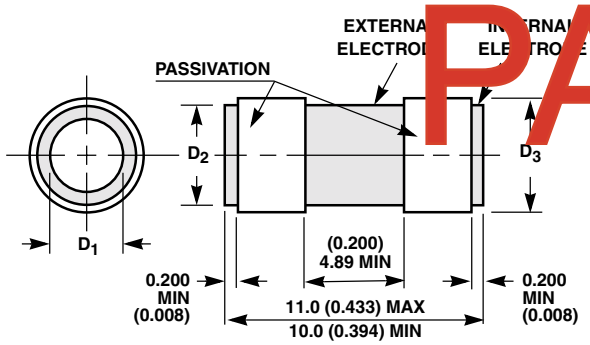


FIGURE 15. SUR[illegible] V8[illegible]22 - V38[illegible]22

FIGURE 16. [illegible] 130CP22 - V15[illegible]P22

NOTE: If pulse ra[illegible]gs are exc[illegible]de[illegible] a shift [illegible] $V_{N(DC)}$ ([illegible] specif[illegible]d current) c[illegible]mo[illegible] than ±10% [illegible]ould result. This [illegible]pe of sh[illegible], which normally results in a decrease of $V_{N(DC)}$, may [illegible]sult [illegible] the dev[illegible]e [illegible]t meetin[illegible] he[illegible]riginal pu[illegible]she[illegible] specificati[illegible]s, but it does no[illegible]revent t[illegible] device from continuing to function, and to p[illegible]ide [illegible]ple p[illegible]

Mechanical Dimensions



SIZE	INTERNAL DIAMETER (D_1)		EXTERNAL DIAMETER (D_2)		PASSIVATION DIAMETER (D_3)	
	MIN	MAX	MIN	MAX	MIN	MAX
22A	0.8[illegible] (0.034)	1.02 (0.040)	1.73 (0.068)	1.88 (0.074)	1.83 (0.072)	1.98 (0.078)
22B	0.86 (0.034)	1.25 (0.049)	1.73 (0.068)	1.88 (0.074)	1.83 (0.072)	1.98 (0.078)
20A	1.09 (0.043)	1.25 (0.049)	2.08 (0.082)	2.39 (0.094)	2.18 (0.086)	2.54 (0.100)
20B	1.09 (0.043)	1.83 (0.072)	2.08 (0.082)	2.39 (0.094)	2.18 (0.086)	2.54 (0.100)
16A	2.27 (0.090)	2.41 (0.095)	3.40 (0.134)	3.56 (0.140)	3.50 (0.138)	3.56 (0.144)

NOTE: Dimensions in millimeters and (inches)

Ordering Information

The CP Series is supplied in bulk pack. Note that this series receives no branding on the device itself.