Fo

Power Dissipation Ratings

Should transients occur in rapid succession, the average power dissipation is 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.The operating values of a MOV need to be deratedat high temperatures as shown in Figure 1. Because varistors only dissipate a relatively small amount of average power they are not suitable 0for repetitive applications that involve substantial amounts of average power dissipation.

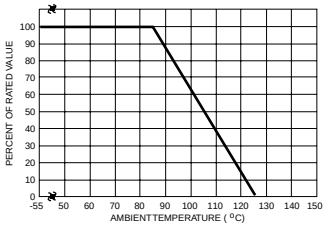
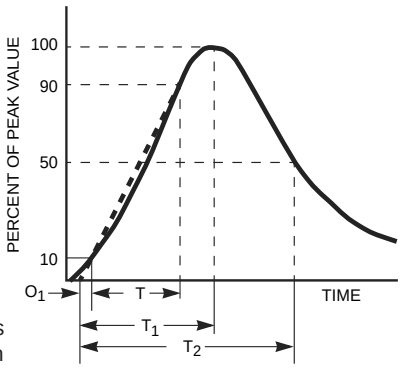


FIGURE 1. CURRENT, ENERGY AND POWER DERATING CURVE



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 8/20 s Current Waveform:
8 s = T_1 = Virtual Front Time
20 s = T_2 = Virtual Time to Half Value

FIGURE 2. PEAK PULSE CURRENT TEST WAVEFORM

Transient V-I Characteristics Curves

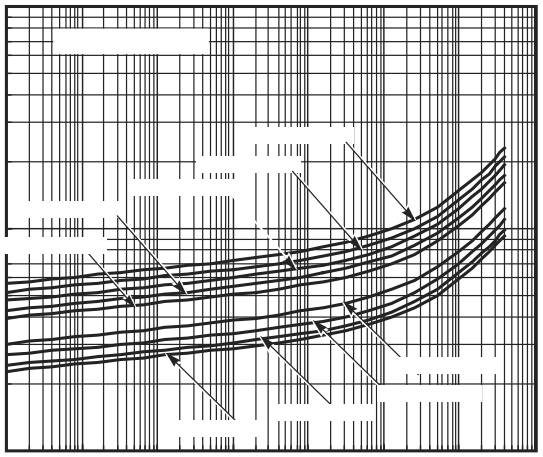


Figure 3. Maximum Clamping Voltage for 10mm Parts (V130LA5C(P) -V320LA10C(P))

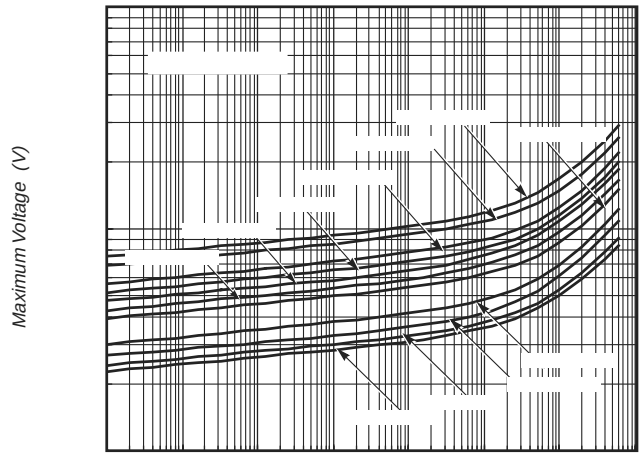


Figure 4. Maximum Clamping Voltage for 14mm Parts (V130LA10C(P) -V420LA20C(P))

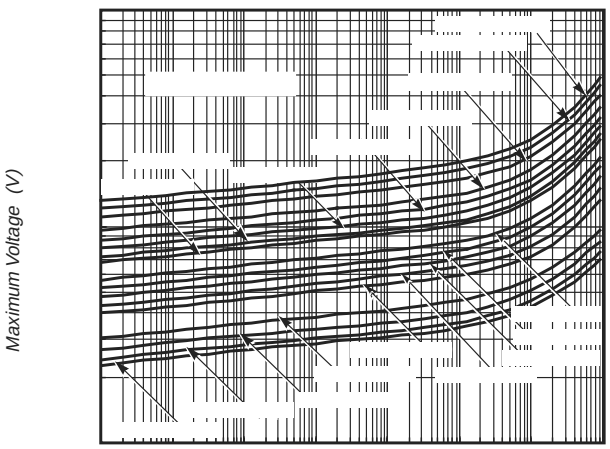


Figure 5. Maximum Clamping Voltage for 20mm Parts (V130LA20C(P) -V680LA100C(P))

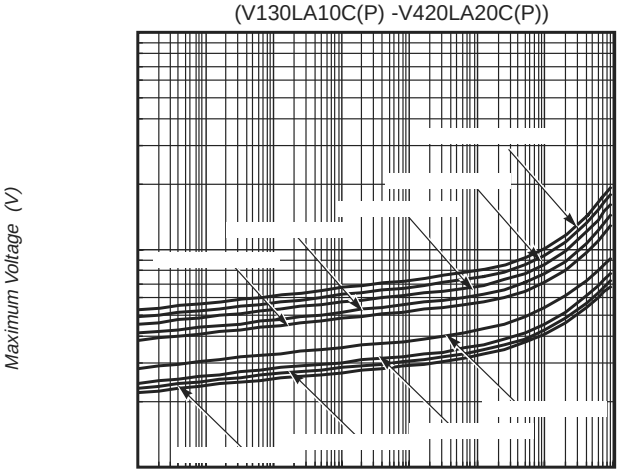
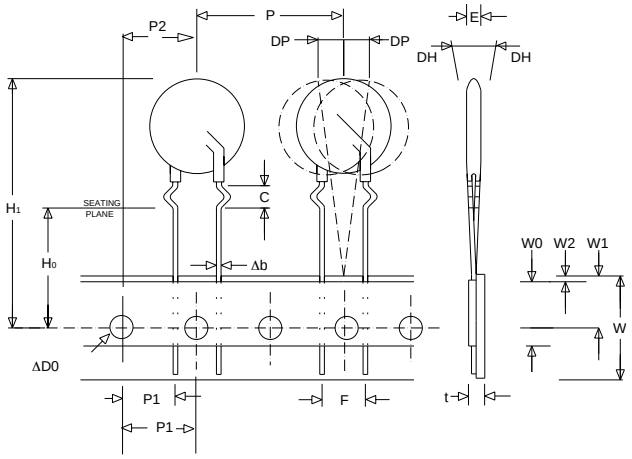


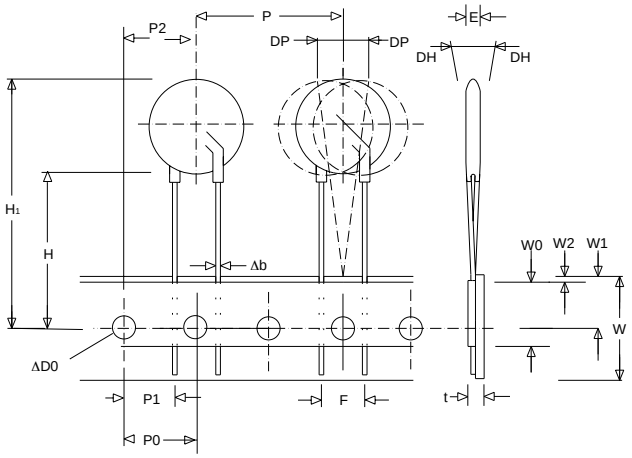
Figure 6. Maximum Clamping Voltage for Low Clamping Voltage Parts (V130LA20CX325(P) -V300LA40CX245(P))

P_0

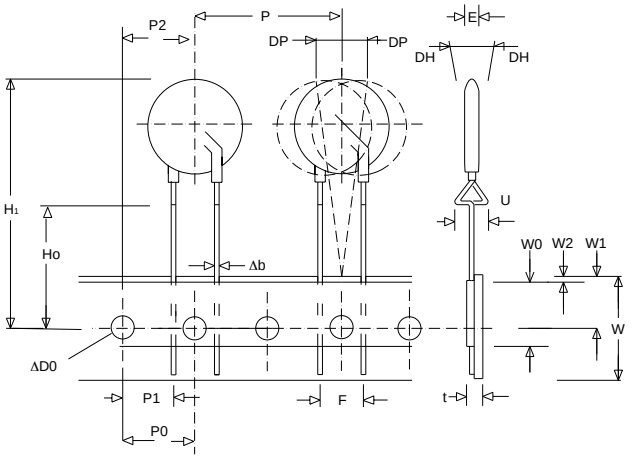
Tape and Reel Specification(available for voltage ratings up to 320V only)



Crimped Leads "LT"



Straight Leads "LS"



Under-crimped Leads "LU"

SYMBOL	DESCRIPTION	MODEL SIZE		
		10mm	14mm	20mm
P	Pitch of Component	25.4 ± 1.0		
P_0	Feed Hole Pitch	12.7 ± 0.2		
P_1	Feed Hole Center to Pitch	8.85 ± 0.8		
P_2	Hole Center to Component Center	12.7 ± 0.7		
F	Lead to Lead Distance	7.50 ± 0.8		
h	Component Alignment	2.00 Max		
W	Tape Width	18.25 ± 0.75		
W_0	Hold Down Tape Width	12.0 ± 0.3		
W_1	Hole Position	9.125 ± 0.625		
W_2	Hold Down Tape Position	0.5 Max		
H	Height From Tape Center To Component Base	19.0 ± 1.0		
H_0	Seating Plane Height	16.0 ± 0.5		
H_1	Component Height	36 Max	40 Max	46.5 Max
D_0	Feed Hole Diameter	4.0 ± 0.2		
t	Total Tape Thickness	0.7 ± 0.2		
p	Component Alignment	3^o Max		
U	Under-crimp Width	8.0 Max		

Fo

Tape and Reel Data

- Conforms to ANSI and EIA Specifications
- Can be supplied to IEC publication 286-2
- Radial devices on tape and reel are supplied with either crimped leads, straight leads, or under-crimped leads
- Available for voltage ratings up to 320V only

Tape and Reel Ordering Information

- Crimped leads are standard on LA types supplied in tape and reel and are denoted by the model letter “T”. Also, in tape and reel, model letter “S” denotes straight leads and letter “U” denotes special under-crimped leads.

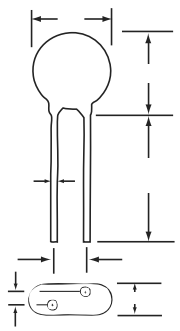
Example:

STANDARD MODEL	CRIMPED LEADS	STRAIGHT LEADS	UNDER CRIMP LEADS
V130LA20C	V130LT20C	V130LS20C	V130LU20C

Shipping Quantity

DEVICE SIZE	QUANTITY PER REEL		
	ÒTÓREEL	ÒSÓREEL	ÒUÓREEL
10mm	500	500	500
14mm	500	500	500
20mm	500	500	500

Mechanical Dimensions



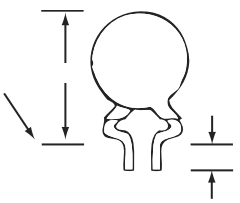
2. 7mm and 12mm devices also available upon request. Contact factory for details.

Additional Lead Style Options

Radial lead types can be supplied with combination preformed crimp and trimmed leads. This option is suppliedto the dimensions shown below.
*Seating plane interpretation per IEC-717

SYMBOL	VARISTOR MODEL SIZE					
	10mm		14mm		20mm	
	MIN	MAX	MIN	MAX	MIN	MAX
A	-	19.5 (0.768)	-	23.5 (0.925)	-	30 (1.18)
L_{TRIM}	2.41 (0.095)	4.69 (0.185)	2.41 (0.095)	4.69 (0.185)	2.41 (0.095)	4.69 (0.185)

NOTE: Dimensions are in millimeters (inches).



- To order this crimped and trimmed lead style, the standard radial type model number “LA” is changed to the model number “LC”.This option is supplied in bulk only.

Example:

STANDARD MODEL	ORDER AS
V130LA20C	V130LC20C

- For 10 ± 1mm lead spacing on 20mm units only; append standard model numbers by adding “X10” suffix.

Example:

STANDARD MODEL	ORDER AS
V130LA20C	V130LC20CX10

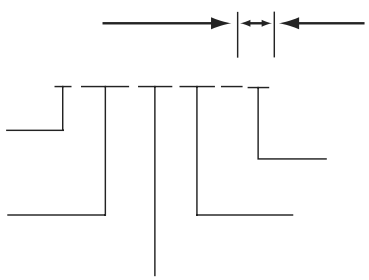
- For other lead style variations to the above, please contact Littelfuse.

Ordering Information

C-III series Varistors are shipped standard in bulk pack with straight leads and lead spacing outlined in the package dimensions on page 4-13. Contact your Littelfuse sales representative to discuss the non-standard options outlined below.

For Lead-free and RoHS compliant parts add the letter 'P' after the base part number and before any option as shown in the ordering example below.

ex: V150LS20CP
V300LS40CPX745



AC Bias Reliability

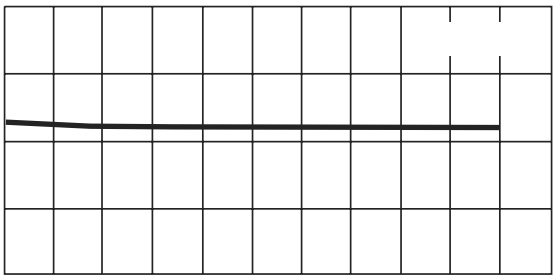
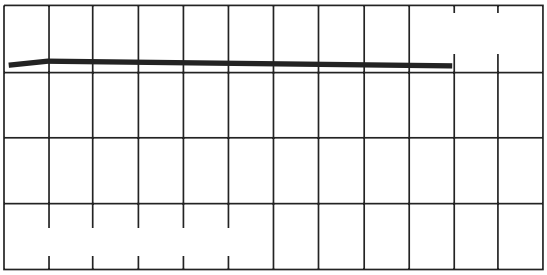
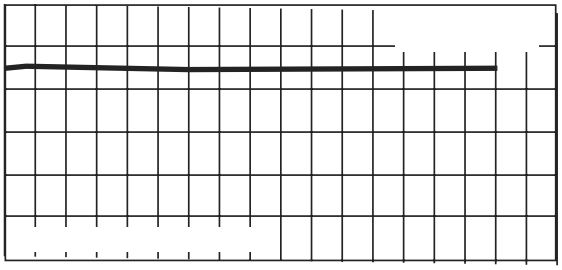
The C-III series of metal oxide varistors was designed for use on the AC line. The varistor is connected across the AC line and is biased with a constant amplitude sinusoidal voltage. It should be noted that the definition of failure is a shift in the nominal varistor voltage (VN) exceeding ±10%. Although this type of varistor is still functioning normally after this magnitude of shift, devices at the lower extremities of VN tolerance will begin to dissipate more power.

Because of this possibility, an extensive series of statistically designed tests were performed to determine the reliability of the C-III type of varistor under AC bias combined with high levels of temperature stress. To date, this test has generated over 50,000 device hours of operation at a temperature of 125°C, although only rated at 85°C. Changes in the nominal varistor voltage, measured at 1mA, of less than 2% have been recorded (Figure 8).

Transient Surge Current/Energy Transient Capability

The transient surge rating serves as an excellent figure of merit for the C-III varistor. This inherent surge handling capability is one of the C-III varistor's best features. The enhanced surge absorption capability results from improved process uniformity and enhanced construction. The homogeneity of the raw material powder and improved control over the sintering and assembly processes are contributing factors to this improvement.

In the low power AC mains environment, industry standards (UL, IEC, NEMA and IEEE) all suggest that the worst case surge occurrence will be 3kA. Such a transient event may occur up to five times over the equipment life time (approximately 10 years). While the occu rences of five 3kA transients is the required capability, the rated, repetitive surge current for the C-III series is 80 pulses for the 20mm units and 40 pulses for the

Additionally, all 20mm C-III devices are listed to the "Permanently Connected" category (10kA) of UL1449, by Underwriter's Laboratories, Inc.

As a measure of the inherent device capability, samples of the 20mm V130LA20C devices were subjected to a worst case repetitive transient surges test. After 100 pulses, each of 3kA, there was negligible change in the device characteristics. Changes in the clamping voltage, measured at 100 amps, of less than 3% were recorded (Figure 9). Samples of the 14mm Series V175LA20C were subjected to repetitive surge occurrences of 750A. Again, there was negligible changes in any of the device characteristics after 2000 pulses (Figure 10). In both cases the inherent device capability is far in excess of the expected worst case scenario.