

## HB34 Varistor Series



The HB34 Series of transient surge suppressors are industrial high-energy Metal-Oxide Varistors (MOVs). They are designed to provide surge suppression in the AC mains outdoor and service entrance environment (distribution panels) of buildings. HB34 applications also include industrial heavy motors, controls, and power supplies such as used in the oil-drilling, mining, and transportation fields, including HVAC and motor/generator applications.

The HB34 Series provides rigid terminals for through-hole solder mounting on printed circuit boards, thereby eliminating the need for screw mounting.

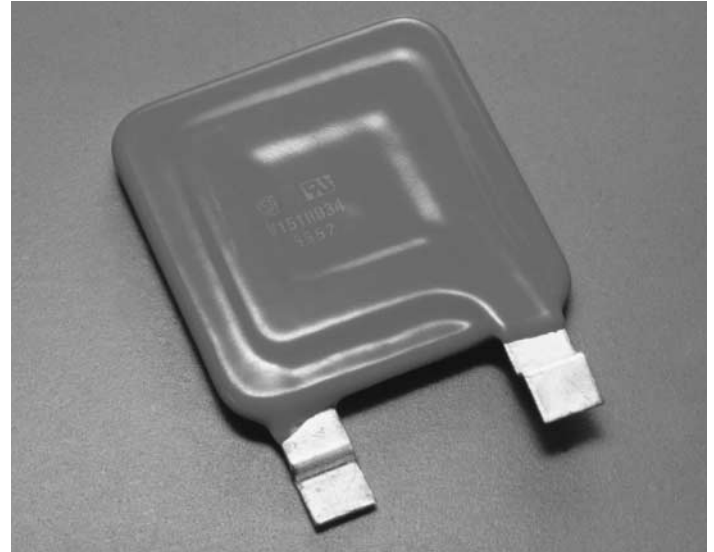
See Ratings and Specifications table for part numbers.

### Features

- Wide Operating Voltage Range  
 $V_{M(AC)RMS}$  ..... 130V to 750V
- High Energy Absorption  
 Capability .....  $W_{TM} = 200J$  to 1050J
- High Peak Pulse Current  
 Capability .....  $I_{TM} = 40,000A$
- Rigid Terminals for Secure Through-Hole Solder Mounting
- No Derating Up to 85°C Ambient

**AGENCY APPROVALS:** Recognized under the components program of Underwriters Laboratories. Certified by CSA.

**AGENCY FILE NUMBERS:** UL E75961, CSA LR91788.



### HB34 Varistor Series

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

	HB34 SERIES	UNITS
Continuous:		
Steady State Applied Voltage:		
AC Voltage Range ( $V_{M(AC)RMS}$ )	130 to 750	V
DC Voltage Range ( $V_{M(DC)}$ )	175 to 970	V
Transient:		
Peak Pulse Current ( $I_{TM}$ )		
For 8/20 $\mu$ s Current Wave (See Figure 2)	40,000	A
Single Pulse Energy Range		
For 2ms Current Square Wave ( $W_{TM}$ )	270 to 1050	J
Operating Ambient Temperature Range ( $T_A$ )	-55 to 85	$^{\circ}C$
Storage Temperature Range ( $T_{STG}$ )	-55 to 125	$^{\circ}C$
Temperature Coefficient ( $\alpha_V$ ) of Clamping Voltage ( $V_C$ ) at Specified Test Current	<0.01	%/ $^{\circ}C$

*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	SIZE (mm)	MAXIMUM RATINGS (85 $^{\circ}C$ )				SPECIFICATIONS (25 $^{\circ}C$ )				
		CONTINUOUS		TRANSIENT		VARISTOR VOLTAGE AT 1mA DC TEST CURRENT			MAXIMUM CLAMPING VOLTAGE ( $V_C$ ) AT 200A (8/20 $\mu$ s)	TYPICAL CAPACITANCE
		$V_{RMS}$	$V_{DC}$	ENERGY (2ms)	PEAK CURRENT (8/20 $\mu$ s)					
		$V_{M(AC)}$	$V_{M(DC)}$	$W_{TM}$	$I_{TM}$	MIN (V)	$V_{N(DC)}$ (V)	MAX (V)	$V_C$ (V)	f = 1MHz (pF)
V131HB34	34	130	175	270	40,000 <sup>1</sup>	184	200	228	345	10,000
V151HB34	34	150	200	300	40,000 <sup>2</sup>	212	240	268	405	8,000
V251HB34	34	250	330	370	40,000	354	390	429	650	5,000
V271HB34	34	275	369	400	40,000	389	430	473	730	4,500
V321HB34	34	320	420	460	40,000	462	510	561	830	3,800
V421HB34	34	420	560	600	40,000	610	680	748	1,130	3,000
V481HB34	34	480	640	650	40,000	670	750	825	1,240	2,700
V511HB34	34	510	675	700	40,000	735	820	910	1,350	2,500
V571HB34	34	575	730	770	40,000	805	910	1000	1,480	2,200
V661HB34	34	660	850	900	40,000	940	1050	1160	1,720	2,000
V751HB34	34	750	970	1050	40,000	1080	1200	1320	2,000	1,800

NOTE: Average power dissipation of transients not to exceed 2.0W.

1. Peak current applies to applications rated up to 115  $V_{RMS}$ . Peak current is 30kA for applications greater than 115  $V_{RMS}$ .
2. Peak current applies to applications rated up to 132  $V_{RMS}$ . Peak Current is 30kA for applications greater than 132  $V_{RMS}$ .

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### Power Dissipation Ratings

Should transients occur in rapid succession, the average power dissipation result 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. The operating values must be derated as shown in Figure 1.

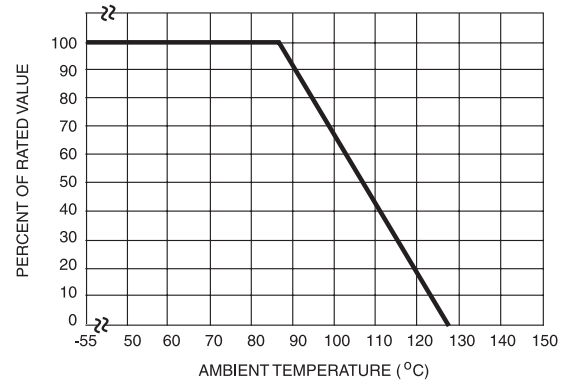
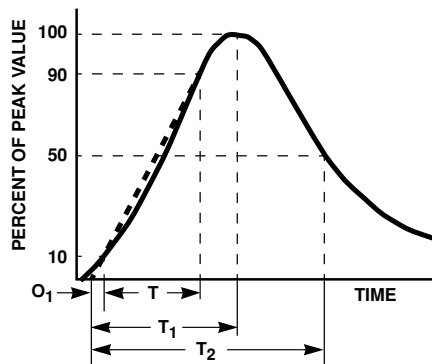


FIGURE 1. CURRENT, ENERGY AND POWER DERATING CURVE



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

FIGURE 2. PEAK PULSE CURRENT TEST WAVEFORM

### Transient V-I Characteristics Curves

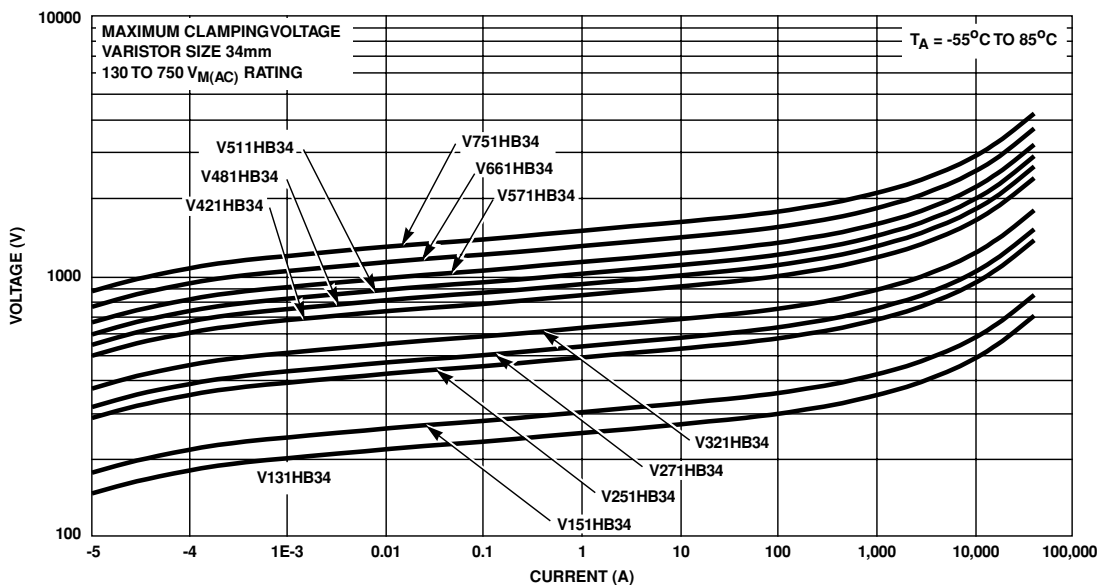


FIGURE 3. CLAMPING VOLTAGE FOR V131HB34 - V751HB34

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## Pulse Rating Curves

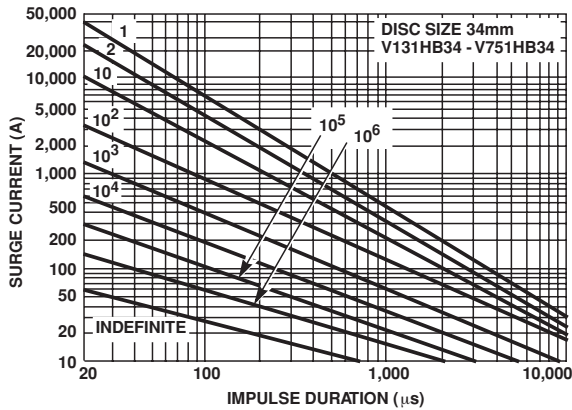
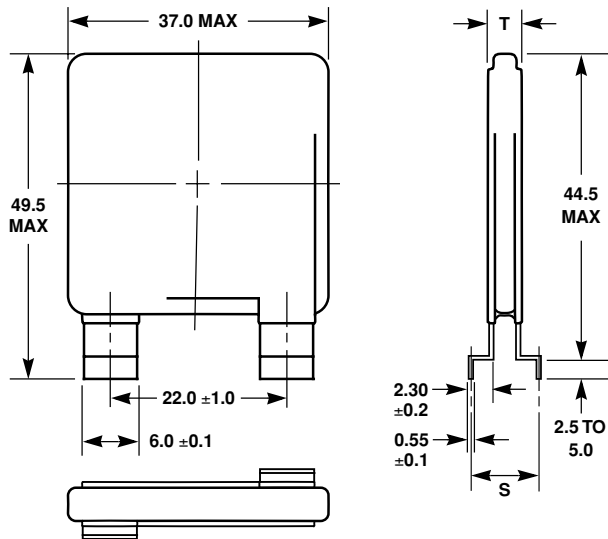


FIGURE 4. SURGE CURRENT RATING CURVES FOR V131HB34 - V751HB34

NOTE: If pulse ratings are exceeded, a shift of  $V_{N(DC)}$  (at specified current) of more than  $\pm 10\%$  could result. This type of shift, which normally results in a decrease of  $V_{N(DC)}$ , may result in the device not meeting the original published specifications, but it does not prevent the device from continuing to function, and to provide ample protection.

## Mechanical Dimensions



NOTE: Dimension in mm is typical, unless otherwise specified.

TABLE OF DIMENSIONS - THICKNESS AND TERMINAL OFFSETS

PART TYPE	T BODY THICKNESS (MAXIMUM)	S MOUNTING TERMINAL OFFSET
V131HB34	5.7	5.50 ±0.65
V151HB34	5.9	5.90 ±0.65
V251HB34	6.1	6.25 ±0.65
V271HB34	6.4	6.50 ±0.65
V321HB34	6.9	6.90 ±0.65
V421HB34	7.8	7.85 ±0.85
V481HB34	8.3	8.25 ±1.00
V511HB34	8.8	8.60 ±1.00
V571HB34	9.4	8.85 ±1.5
V661HB34	10.2	9.65 ±1.5
V751HB34	10.7	10.65 ±1.5

## Ordering Information

