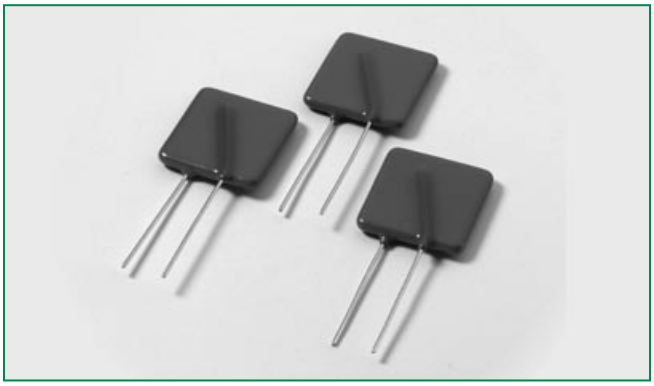
UltraMOV™ 25S Varistor Series



Agency Approvals

Agency	Agency FIle Number	Status
	E320116	Approved
	091788	Approved

Description

The UltraMOV™ 25S Varistor Series is designed for applications requiring high peak surge current ratings and high energy absorption capability. UltraMOV™ varistors are primarily intended for use in AC Line Voltage applications such as Surge Protective Devices (SPD), Uninterruptable Power Supplies (UPS), AC Power Taps, AC Power Meters, or other products that require voltage clamping of high transient surge currents from sources such as lightning, inductive load switching, or capacitor bank switching.

These devices have 25mm square forms are produced in a radial lead package and offered with straight leads. UltraMOVs are manufactured with recognized epoxy encapsulation and are rated for ambient temperatures up to 85°C with no derating. This 25S Series is LASER-branded and is supplied in bulk packaging.

Features

- Lead–free and RoHS compliant.
- High peak surge current rating (I_{TM}) 22kA, single 8/20μs pulse, (25mm)
- 40kA rating when 2 devices paralleled (VN(DC) matched within +/- 5%, contact factory for special selections
- Standard operating voltage range compatible with common AC line voltages (115 to 750VAC)
- Characterized for maximum standby current (Leakage)
- Custom voltage types available
- Standard lead form and lead space options

Absolute Maximum Ratings

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

Continuous	UltraMOV™ 25S Series	Units
Steady State Applied Voltage:		
AC Voltage Range ($V_{M(AC)RMS}$)	115 to 750	V
DC Voltage Range ($V_{M(DC)}$)	150 to 970	V
Transients:		
Peak Pulse Current (I_{TM}) 8x20μs Current Wave Single Pulse	22,000	A
Single-Pulse Energy Capability (W_{TM}) 2ms Current Wave	230 to 890	J
Operating Ambient Temperature Range (T_A)	-55 to +85	°C
Storage Temperature Range (T_{STG})	-55 to +125	°C
Temperature Coefficient (a^V) of Clamping Voltage (V_C) at Specified Test Current	<0.01	%/C
Hi-Pot Encapsulation (COATING Isolation Voltage Capability) Dielectic Withstand DC for 1 min per MIL–STD–202, Method 301	2500	V
Insulation Resistance of the Epoxy Coating	1000	MΩ

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.

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UltraMOV™ 25S Series Ratings & Specifications

Part Number	Branding	Maximum Rating (85°C)				Specifications (25°C)				
		Continuous		Transient		Varistor Voltage at 1mA DC Test Current		Maximum Clamping Voltage at 100A, 8 x 20μs	UL 1449 ed.3 Voltage Protection Rating	Typical Capacitance f = 1MHz
		AC Volts	DC Volts	Energy 2ms	Peak Surge Current 8 x 20μs					
		$V_{M(AC)RMS}$	$V_{M(DC)}$	W_{TM} 1 x Pulse	I_{TM} 1 x Pulse	V_{NOM} Min	V_{NOM} Max	V_C	VPR	C
		(V)	(V)	(J)	(A)	(V)		(V)		(pF)
V25S115P	P25S115	115	150	230	22000	162	198	295	400	4500
V25S130P	P25S130	130	170	255	22000	184	226	335	500	3900
V25S140P	P25S140	140	180	285	22000	200	240	355	500	3500
V25S150P	P25S150	150	200	300	22000	216	264	390	500	3200
V25S175P	P25S175	175	225	315	22000	243	297	450	600	2550
V25S230P	P25S230	230	300	400	22000	324	396	585	700	1900
V25S250P	P25S250	250	320	435	22000	351	429	640	800	1750
V25S275P	P25S275	275	350	470	22000	387	473	700	900	1610
V25S300P	P25S300	300	385	500	22000	423	517	765	1000	1450
V25S320P	P25S320	320	420	540	22000	459	561	825	1000	1350
V25S385P	P25S385	385	505	630	22000	558	682	1010	1200	1080
V25S420P	P25S420	420	560	655	22000	612	748	1100	1500	1000
V25S440P	P25S440	440	585	675	22000	643	787	1160	n/a	900
V25S460P	P25S460	460	615	690	22000	675	825	1220	n/a	870
V25S510P	P25S510	510	670	700	22000	738	902	1335	n/a	820
V25S550P	P25S550	550	745	765	22000	819	1001	1475	n/a	750
V25S625P	P25S625	625	825	800	22000	900	1100	1625	n/a	660
V25S750P	P25S750	750	970	890	22000	1080	1320	1950	n/a	550

Transient V-I Characteristics Curves

Peak Current, Energy and Power Derating Curve

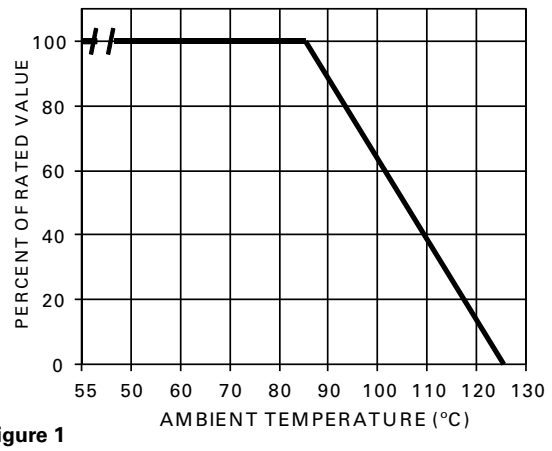

Figure 1

For applications exceeding 85ºC ambient temperature, the peak surge current and energy ratings must be reduced as shown above.

Peak Pulse Current Test Waveform for Clamping Voltage

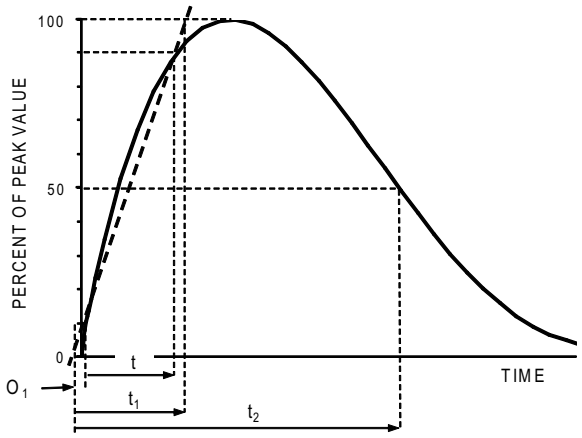

Figure 2

0_1 = Virtual Origin of Wave
T = Time from 10% to 90% of Peak
T_1 = Rise Time = 1.25 x T
T_2 = Decay Time

Example - For an 8/20 μs Current Waveform:
8μs = T_1 = Rise Time
20μs = T_2 = Decay Time

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V-I Limit Curves

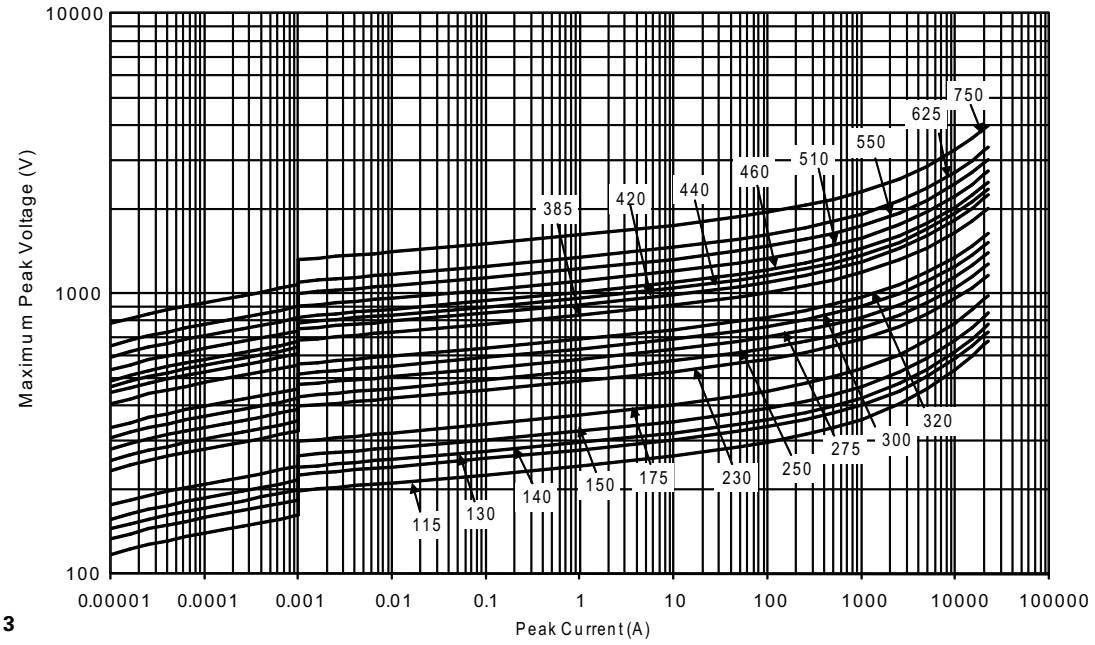

Figure 3

Pulse Rating Curves

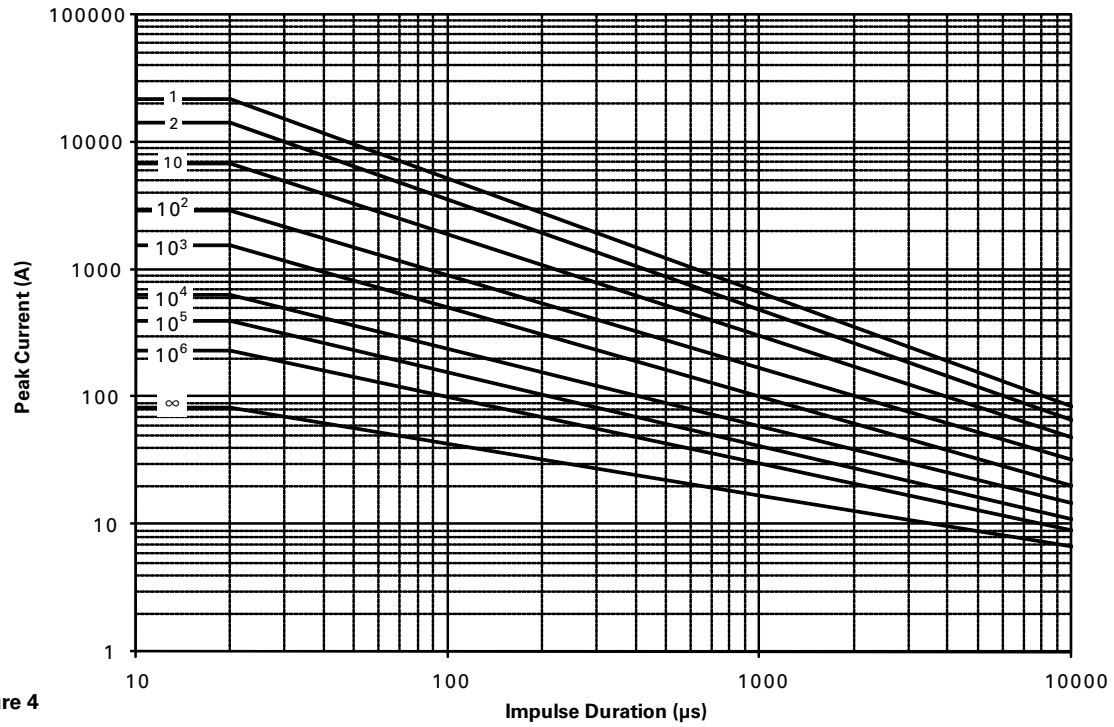

Figure 4

ULTRAMOV™ 25S Series

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Wave Solder Profile

Non Lead–free Wave Solder Profile

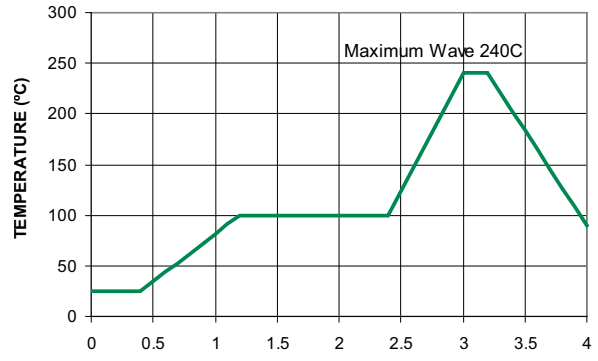

Figure 5

Lead–free Wave Solder Profile

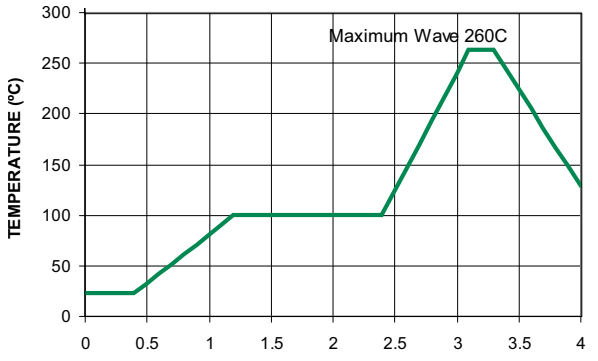

Figure 6

Physical Specifications

Lead Material	Tin–coated Copper wire
Soldering Characteristics	Solderability per MIL–STD–202, Method 208E
Insulating Material	Cured, flame retardant epoxy polymer meets UL94V–0 requirements
Device Labeling	Marked with LF, voltage, UL/CSA Logos, and date code

Environmental Specifications

Operating/Storage Temperature	-55°C to +85°C/ -55°C to +125°C
Passive Aging	+85°C, 1000 hours +/-10% typical voltage change
Humidity Aging	+85°C, 85% RH, 1000 hours +/-10% typical voltage change
Thermal Shock	+85°C to -40°C 5 times +/-10% typical voltage change
Solvent Resistance	MIL–STD–202, Method 215F
Moisture Sensitivity	Level 1, J–STD–020C

UltraMOV™ 25S Series Varistors for High-Temperature Operating Conditions:

Phenolic coated devices are available with improved maximum operating temperature 125°C. These devices also have improved temperature cycling capability. Ratings and specifications are per standard series except Hi–Pot Encapsulation (Isolation Voltage Capability) = 500V.

To order: add 'X1347' to part number (e.g. V25S150PX1347). These devices are NOT UL, CSA, CECC or VDE certified.Contact factory for further details.

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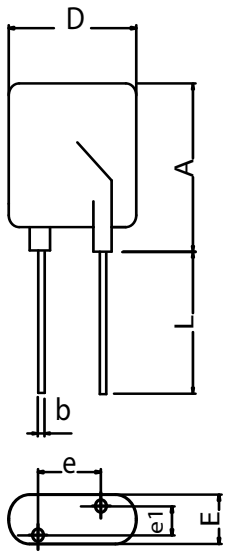
Product Dimensions (mm)



	A max	b min	b max	D max	e min	e max	e1 min	e1 max	E max	L min
V25S115P							1.5	2.7	5.7	
V25S130P							1.6	2.9	5.9	
V25S140P							1.7	3.0	6.0	
V25S150P							1.8	3.1	6.1	
V25S175P							1.9	3.3	6.3	
V25S230P							2.0	3.4	6.4	
V25S250P							2.1	3.5	6.5	
V25S275P							2.3	3.7	6.7	
V25S300P	**32.5**	**0.95**	**1.05**	**28**	**11.7**	**13.7**	2.4	3.9	6.9	**25.4**
V25S320P							2.6	4.1	7.1	
V25S385P							3.0	4.7	7.7	
V25S420P							3.3	5.0	8.0	
V25S440P							3.4	5.2	8.2	
V25S460P							3.6	5.4	8.4	
V25S510P							1.6	3.4	8.7	
V25S550P							1.9	3.9	9.2	
V25S625P							2.3	4.3	9.6	
V25S750P							3.1	5.4	10.7	

Notes

1. Additional optional lead form, packaging and lead spacing requirements are subject to availability and to minimum order requirements. Please contact factory for details.

2. Nickel Barrier Wire option (Suffix 'X2855')Standard parts use Tin-Coated Copper wire. Nickel Barrier Coated Wire is available as an option. This is Copper Wire with a flashing of Nickel, followed by a top coat of Tin. To order please add suffix 'X2855' to end of standard part number. Contact factory for more details if required.

3. UltraMOV 25S have been qualified as type 1 application by UL1449 edition 3, which allows Permanant Connection between the secondary of the service transformer and the line side of the service equipment overcurrent device, as well as the load side, including watt-hour meter socket enclosures and intended to be installed without an external overcurrent protective device.

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