

SMOV25S® Varistor Series





Agency Approvals

Agency	Agency Approval	Agency File Number
71 °	UL1449	E320116

Additional Information







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Description

The Littelfuse SMOV®25S thermally protected varistor is a self-protected device. It consists of a 25mm square varistor with an integral thermal disconnect designed to open in the event of overheating due to abnormal overvoltage as outlined in UL1449. The SMOV® helps facilitate SPD module compliance to UL1449 and offers quick thermal response due to the close proximity of the integrated thermal element to the MOV body. This configuration also offers lower inductance than most discreet solutions resulting in improved clamping performance to fast over voltage transients.

The device has a separate micro-switch, which can be used to indicate that the MOV has been disconnected from the circuit. This separate switch makes the monitoring circuitry completely isolated from the main power which ensures indicator circuit safety and simplifies the customers circuit design.

Features

- Maximum single surge capability 20 kA, 8/20 waveshape.
- Nominal Discharge Current Value: 10kA.
- Intermediate current rating: 50A/150A.
- -45°C to +75°C operating temperature.
- Recognized to UL 1449.
- Lead-Free and RoHS compliant.
- Integrated micro-switch for indication circuitry/design.

Applications

- SPD applications
- AC/DC distribution
- IT/Data center
- Power supplier
- Telecommunication

Absolute Maximum Ratings

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

	SMOV25S Varistor Series	Units
Continous:		
Steady State Applied Voltage:		
DC Voltage Range (VM(DC))	150 to 970	V
AC Voltage Range (V _{M(AC)RMS})	115 to 750	V
Transient:		
Non-Repetitive Surge Current, 8/20 μ s Waveform (I_{TM})	20,000	A
Non-Repetitive Energy Capability, 2ms Waveform ($W_{\scriptscriptstyle TM}$)	170 to 670	J
Operating Ambient Temperature Range (T_A)	-45 to +75	°C
Storage Temperature Range (T _{STG})	-45 to +85	°C
Hi-Pot Encapsulation (Isolation Voltage Capability)	2500	V
Isolation Voltage Capability (when the thermal disconnect opens)	1500	V
Housing Insulation Resistance	>1,000	ΜΩ

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.

Metal-Oxide Varistors (MOVs) Thermally Protected Varistors > SMOV®25S Varistor Series

Device Ratings & Specifications

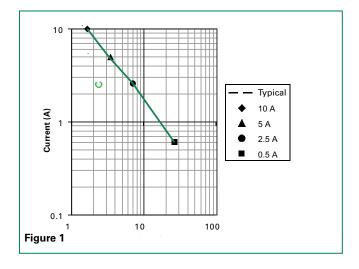
	Maximum Rating (75°C)					Specifications (25 °C)				
Part Number	Continuous		Transient		Varistor		Maximum		Typical	
	AC Volts	DC Volts	Energy 2ms	Peak Surge Current 8/20µs	Nominal Discharge Current (In)	Volta 1mA Curi		Clam _l Volta 8/20	age	Capacitance f = 1MHz
	V _{M (AC)}	V _{M(DC)}	$W_{\scriptscriptstyle TM}$	I _™ 1 × Pulse	ln	V _{N(DC)} Min	V _{N(DC)} Max	Vc	I _{PK}	С
	(V)	(V)	(J)	(A)	(A)		(V)	(V)	(A)	(pF)
SMOV25S111MP	115	150	170	20000	10000	162	198	295	100	3200
SMOV25S111NP	110	150	170	20000	10000	102	130	233	100	3200
SMOV25S131MP	130	170	190	20000	10000	184.5	225.5	335	100	2800
SMOV25S131NP	150	170								
SMOV25S151MP	150	200	220	20000	10000	216	264	390	100	2300
SMOV25S151NP		200								
SMOV25S181MP	175	225	250	20000	10000	243	297	450	100	1900
SMOV25S181NP										
SMOV25S251MP	250	320	330	20000	10000	351	429	640	100	1400
SMOV25S251NP	250	020								
SMOV25S271MP	275	350	350	20000	10000	387	473	700	100	1250
SMOV25S271NP										
SMOV25S301MP	300	385	370	20000	10000	423	517	765	100	1150
SMOV25S301NP	000									
SMOV25S321MP	320	20 420	390	20000	10000	459	561	825	100	1080
SMOV25S321NP	020	120	000	20000	10000	100	001	020	100	1000
SMOV25S421MP	420	560	460	20000	10000	612	748	1100	100	820
SMOV25S421NP	.20			20000						
SMOV25S461MP	460	615	490	20000	10000	675	825	1220	100	750
SMOV25S461NP										
SMOV25S511MP	510	670	520	20000	10000	738	902	1335	100	680
SMOV25S511NP										
SMOV25S551MP	550	745	550	20000	10000	819	1001	1475	100	630
SMOV25S551NP						0.10				
SMOV25S621MP	620	620 800	600	20000	10000	900	1100	1625	100	550
SMOV25S621NP	520									
SMOV25S751MP	750	970	670	20000	10000	1080	1320	1950	100	460
SMOV25S751NP	, 55	0,0	0,0	20000	10000	1000	1020	1000		

Average power dissipation of transients should not exceed 1.5 watts
Same ratings and specifications apply to Non Isolated Monitored Switch alternative design. Replace "M" with "N" in the part number. e.g.: SMOV25S111NP.
Refer to Part Number System at the end of this document.



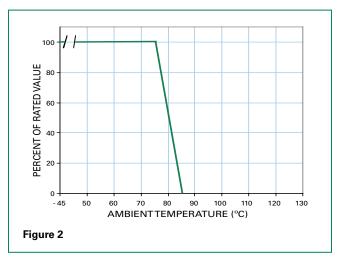
Thermal Characteristics

Typical time to open circuit under UL 1449 Limited Current Abnormal Overvoltage Test:

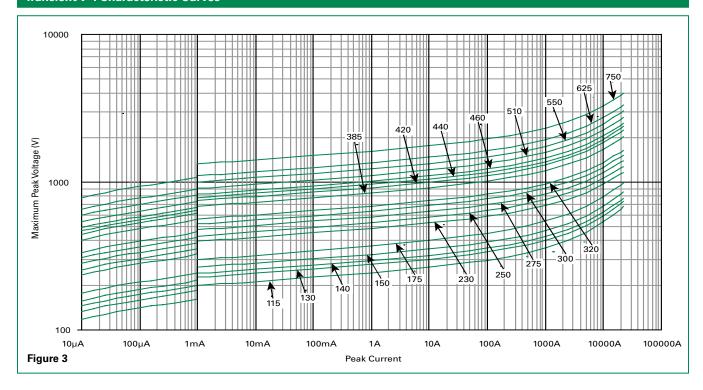


Peak Current & Energy Derating Curve

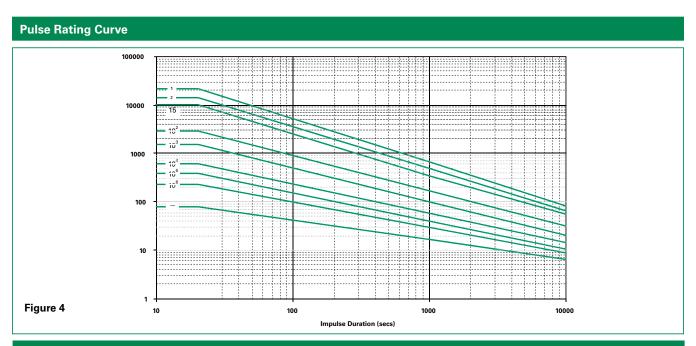
For applications exceeding 75°C ambient temperature, the peak surge current and energy ratings must be reduced as shown below.



Transient V-I Characteristic Curves



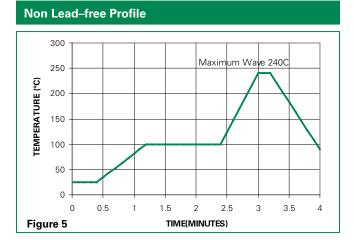




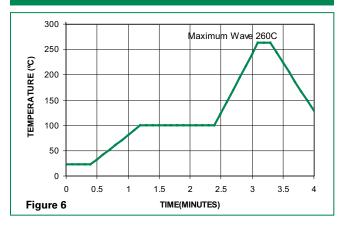
Wave Solder Profile

Because the SMOV®25S Varistors contain a thermal protection device, care must be taken when soldering the devices into place. Two soldering methods are possible. Firstly, hand soldering: It is

recommended to heat-sink the leads of the device. Secondly, wave-soldering: It is critically important that all preheat stage and the solder bath temperatures are rigidly controlled.



Lead-free Profile



Physical Specifications

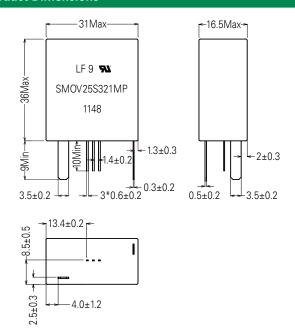
Lead Material	Tin-plated		
Soldering Characteristics	Solderability per MIL-STD-202, Method 208		
Insulating Material	Cured, flame retardant epoxy polymer meets UL94V-0 requirements		
Device Labeling	Marked with LF, voltage, UL logos, and date code		

Environmental Specifications

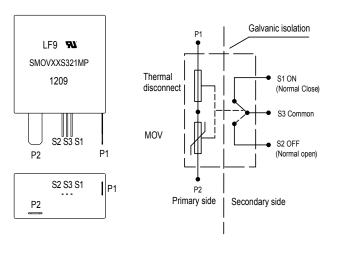
Operating/Storage Temp.	-45°C to +75°C	
Passive Aging	+75°C, 1000 hours -/+10% typical voltage change	
Humidity Aging	+75°C, 85%R.H., 1000 hours -/+10% typical voltage change	
Thermal Shock	+75°C to -40°C 5 times -/+10% typical voltage change	
Solvent Resistance	MIL-STD-202, Method 215	
Moisture Sensitivity	Level 1, J-STD-020	



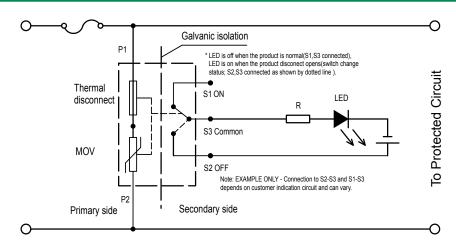
Product Dimensions



Lead Configuration



Application Example

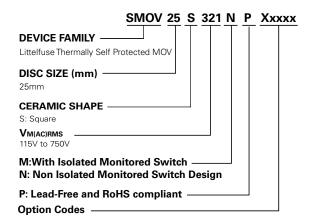


Switch Specification

SMOV Switch	Voltage DC	Current (Amps)	Contact Resistance Max.	Insulation Resistance Min.	Dialectric Strength 0.5mA/Minute
Switch	12V	0.1A	70mΩ	100ΜΩ	500VAC

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Part Numbering System



Part Marking System

