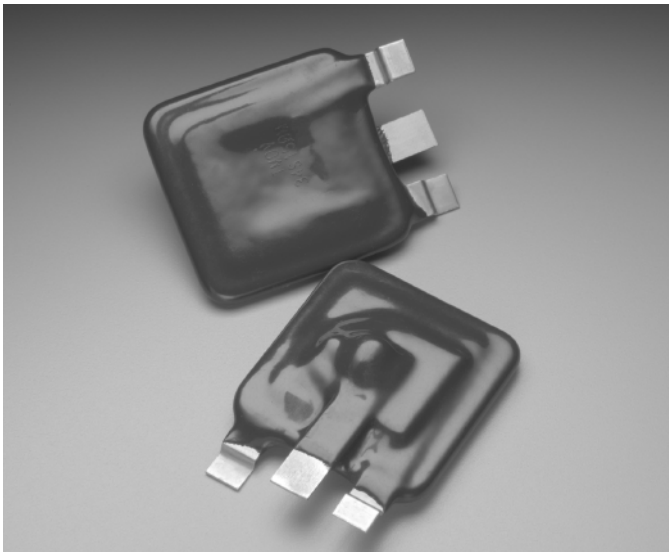
RoHS TMOV34S® Varistor Series

The Littelfuse Industrial TMOV34S series thermally protected varistor represents a new development in circuit protection. It consists of a 34mm square format varistor element (MOV) with an integral thermally activated element designed to open in the event of overheating due to abnormal over-voltage, limited current conditions as outlined in UL1449 Feb. 1998 edition.The device has a third lead, an indicator lead, which may be used to indicate that the MOV has been disconnected from the circuit. This lead facilitates connection to monitoring circuitry. The TMOV34S devices offer quick thermal response due to the close proximity of the integrated thermal element to the MOV body. The integrated configuration also offers lower inductance than most discreet solutions resulting in improved clamping performance to fast over-voltage transients.



Features

- US Patent for Thermally Protected MOV- Patent # 6636403
- Designed to facilitate compliance to UL1449 for TVSS product.
- Hi Peak Current Rating to 40 kA.
- -55 Deg C to +85 Deg C operating temp.
- Agency Recognition : UL
- Alternative Design available with narrow 3mm wide monitor (right) lead.

AGENCY APPROVALS:
Recognized by UL under File UL E75901

34mm Devices-Devices are approved as an MOV to UL1449. Devices with ratings greater than 420VAC are not affected by these abnormal voltage conditions.

Accelerated Aging Testing-34mm devices comply with Acclerated Aging Test requirements per. ANSI/IEEE C62.11 and may be used in secondary surge arrestors.

AGENCY FILE NUMBERS: ULE75961 (UL1449)

Applications

- TVSS Products
- AC Panel Protection Modules
- AC Line Power Supplies
- AC Power Meters
- UPS (Uninterruptable Power Supply)
- Inverters
- AC/DC Power Supplies
- DIN Rail

NEW LEAD-FREE AND RoHS COMPLIANT PARTS AVAILABLE

RoHS Pb TMOV34S® Varistor Series

Absolute Maximum Ratings

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

Continuous:		
Steady State Applied Voltage:		
AC Voltage Range ($V_{M(AC)RMS}$)	115 to 750	V
Transient:		
Peak Pulse Current (I_{TM})		
For 8x20µs Current Wave, single pulse	up to 40,000	A
Single-Pulse Energy Capability		
For 2ms Current Wave	235 to 1050	J
Operating Ambient Temperature Range (T_A)	-55 to +85	˚C
Storage Temperature (T_{STG})	-55 to +125	ºC
Temperature Coefficient (αV) of Clamping Voltage (V_C) at Specified Test Current	<0.01	%/ºC
Hi-Pot Encapsulation (Isolation Voltage Capability)	2500	V
Thermal Protection Isolation Voltage Capability (when operated)		
-Under UL1449 Limited Current Test Procedure-see Note #1	600	V
Insulation Resistance	1,000	MΩ

I#1 - Under Ul1449 limited current testing parts rated >420V will not open due to 600V voltage limit. Devices with ratings >420V have not yet been evaluated.

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.

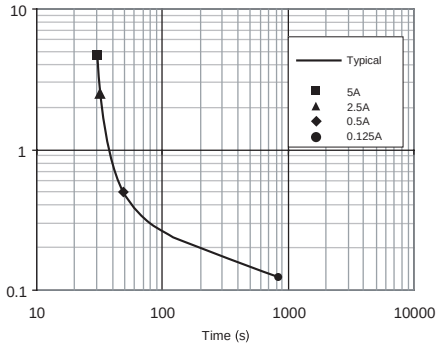
Device Ratings and Specifications - TMOV Varistor Series

RoHS Pb LEAD-FREE AND RoHS COMPLIANT MODELS PART NUMBER	STANDARD MODELS PART NUMBER	MAXIMUM RATING (85°C) CONTINUOUS AC VOLTS VM(AC)RMS (V)	MAXIMUM RATING (85°C) TRANSIENT MCOV SURGE ARRESTER VM(AC)RMS (V)	MAXIMUM RATING (85°C) TRANSIENT ENERGY 2ms WTM 1 x PULSE (J)	MAXIMUM RATING (85°C) TRANSIENT PEAK SURGE CURRENT 8/20µs ITM 1 x PULSE (A)	SPECIFICATIONS (25°C) VARISTOR VOLTAGE AT 1mA TEST CURRENT VN(DC) MIN (V)	SPECIFICATIONS (25°C) VARISTOR VOLTAGE AT 1mA TEST CURRENT VN(DC) MAX (V)	SPECIFICATIONS (25°C) MAXIMUM CLAMPING VOLTAGE 8/20µs at 200A VC (V)	SPECIFICATIONS (25°C) TYPICAL CAPACITANCE f = 1MHz C (pF)
TMOV34S111MP	TMOV34S111M	115	98	235	40000[1]	163	202	305	11500
TMOV34S131MP	TMOV34S131M	130	111	270	40000[2]	184	228	345	10000
TMOV34S141MP	TMOV34S141M	140	119	291	40000[3]	198	248	375	9000
TMOV34S151MP	TMOV34S151M	150	128	300	40000[4]	212	268	405	8000
TMOV34S181MP	TMOV34S181M	180	153	330	40000[5]	254	312	488	6800
TMOV34S201MP	TMOV34S201M	200	170	335	40000	283	357	540	6500
TMOV34S251MP	TMOV34S251M	250	213	370	40000	354	429	650	5000
TMOV34S271MP	TMOV34S271M	275	234	400	40000	389	473	730	4500
TMOV34S301MP	TMOV34S301M	300	255	435	40000	433	528	780	4050
TMOV34S321MP	TMOV34S321M	320	272	460	40000	462	561	830	3800
TMOV34S331MP	TMOV34S331M	330	281	475	40000	476	581	855	3700
TMOV34S351MP	TMOV34S351M	350	298	500	40000	505	616	910	3500
TMOV34S391MP	TMOV34S391M	385	327	550	40000	555	678	1005	3300
TMOV34S421MP	TMOV34S421M	420	357	600	40000	610	748	1130	3000
TMOV34S461MP	TMOV34S461M	460	391	620	40000	642	783	1188	2800
TMOV34S481MP	TMOV34S481M	480	408	650	40000	670	825	1240	2700
TMOV34S511MP	TMOV34S511M	510	434	700	40000	735	910	1350	2500
TMOV34S551MP	TMOV34S551M	550	468	735	40000	770	939	1415	2250
TMOV34S571MP	TMOV34S571M	575	489	770	40000	805	1000	1480	2200
TMOV34S621MP	TMOV34S621M	620	527	840	40000	880	1074	1589	2100
TMOV34S661MP	TMOV34S661M	660	561	900	40000	940	1160	1720	2000
TMOV34S681MP	TMOV34S681M	680	578	950	40000	980	1195	1772	1970
TMOV34S751MP	TMOV34S751M	750	638	1050	40000	1080	1320	2000	1800

Notes
1. Peak current applies to applications rated up to 100 VAC_{RMS}, 132 VDC. Peak current is 30kA max for applications greater than 100 VAC_{RMS}, 132 VDC.
2. Peak current applies to applications rated up to 115 VAC_{RMS}, 145 VDC. Peak current is 30kA max for applications greater than 115 VAC_{RMS}, 145 VDC.
3. Peak current applies to applications rated up to 123 VAC_{RMS}, 165 VDC. Peak current is 30kA max for applications greater than 123 VAC_{RMS}, 165 VDC.
4. Peak current applies to applications rated up to 132 VAC_{RMS}, 176 VDC. Peak current is 30kA max for applications greater than 132 VAC_{RMS}, 176 VDC.
5. Peak current applies to applications rated up to 158 VAC_{RMS}, 211 VDC. Peak current is 30kA max for applications greater than 158 VAC_{RMS}, 211 VDC.

RoHS Pb TMOV34S® Varistor Series

Thermal Characteristics



* **Figure 4**: Typical time to open circuit under UL1449 Abnormal Overvoltage Limited Current Test

Note : The Industrial TMOV Series TMOV34S devices are intended, in conjunction with appropriate enclosure design, to help facilitate TVSS module compliance to UL 1449, Section 37.4 (abnormal over-voltage limited current requirements). Under these extreme abnormal over-voltage conditions, the units will exhibit substantial heating and potential venting prior to opening. Modules should be designed to contain this possibility. Application testing is strongly recommended.

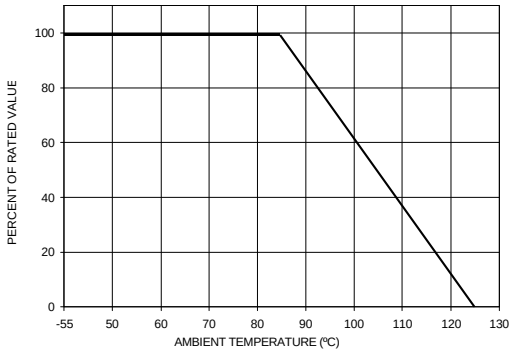


Figure 5: Peak Current & Energy Derating Curve

For applications exceeding 85ºC ambient temperature, the peak surge current and energy ratings must be reduced as shown in Figure 3.

Pulse Rating Curves

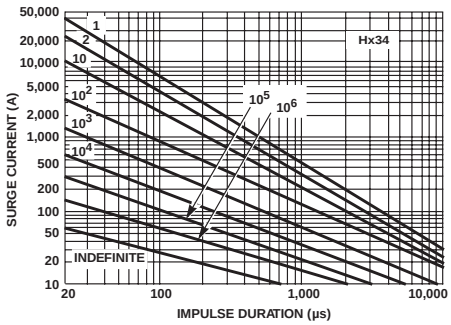


FIGURE 6. SURGE CURRENT RATING CURVES FOR TMOV43S

RoHS TMOV34S® Varistor Series

Transient V-I Characteristic Curves

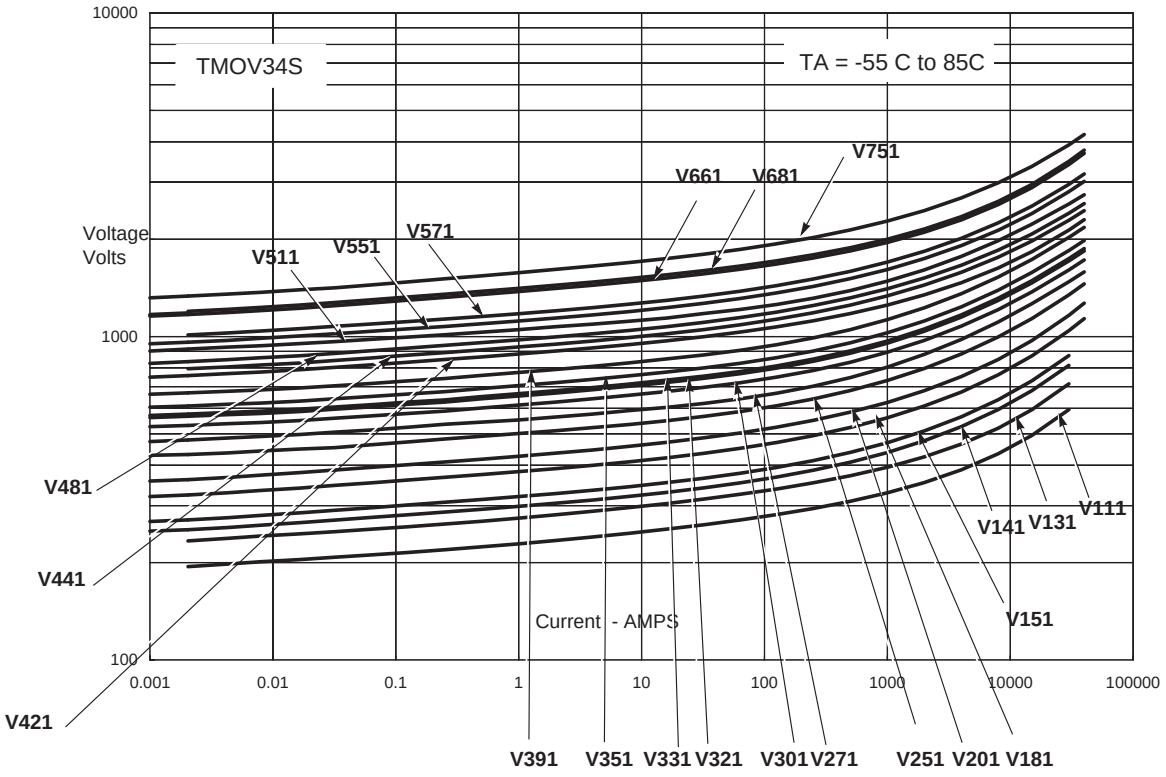
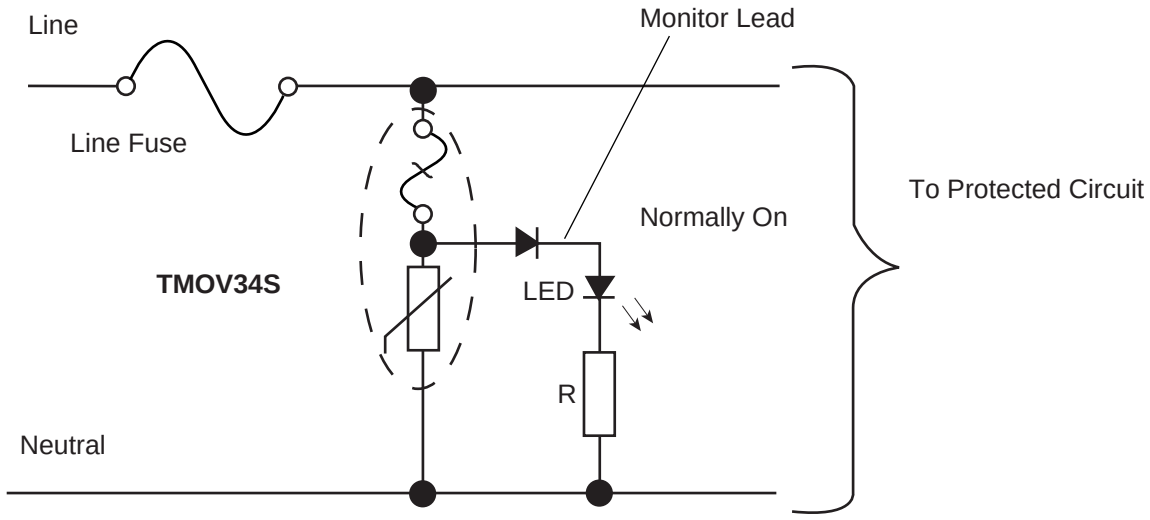


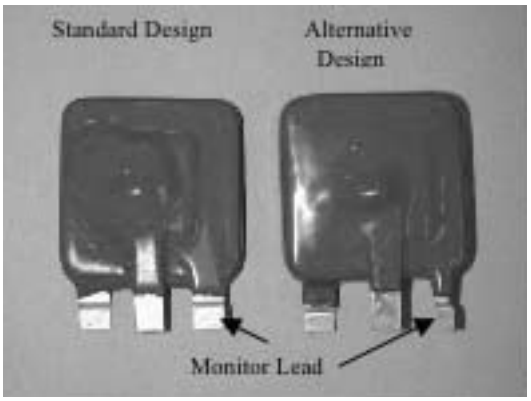
Fig 7. V-I Characteristic Curves For TMOV34S® Varistor

RoHS TMOV34S® Varistor Series

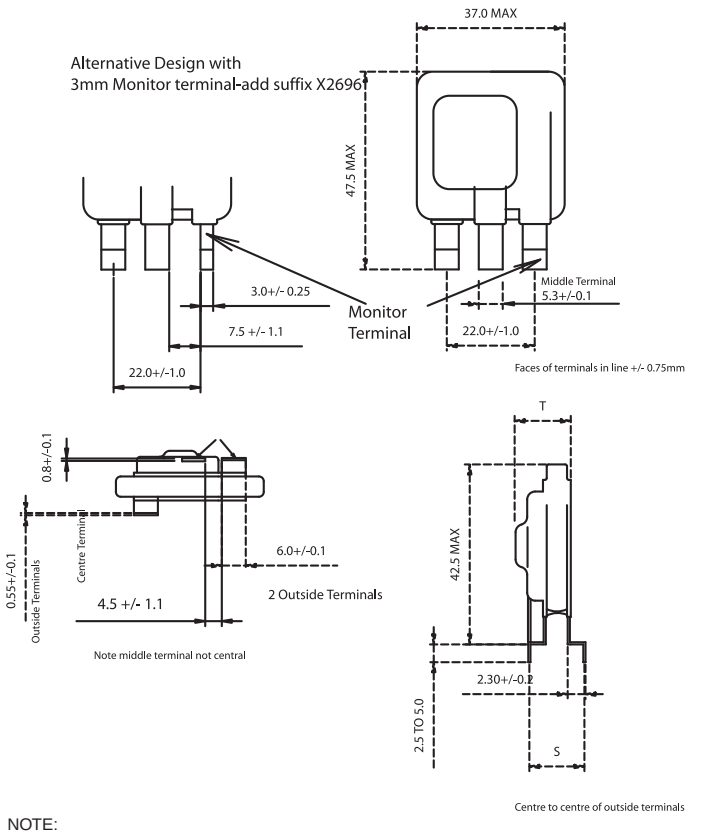
iTMOV Varistor Application Examples

The application examples below show how the indicator lead on the *i*TMOV can be used to indicate that the thermal element has been opened. This signifies that the circuit is no longer protected from transients by the MOV.





RoHS Pb TMOV34S® Varistor Series



NOTE:

Dimension in mm is typical, unless otherwise specified

To order alternative design with narrow 3mm monitor lead(right hand terminal as shown) add suffix X2696 to part number

Part Number	T max Body Thickness	S Mounting Terminal Offset
TMOV34S111M(P)	11.90	5.2 ±.65
TMOV34S131M(P)	12.20	5.5 ±.65
TMOV34S141M(P)	12.30	5.7 ±0.85
TMOV34S151M(P)	12.40	5.9 ±0.85
TMOV34S181M(P)	12.80	6.3 ±0.85
TMOV34S201M(P)	13.00	6.5 ±0.85
TMOV34S251M(P)	12.75	6.25 ±0.85
TMOV34S271M(P)	12.95	6.5 ±0.85
TMOV34S301M(P)	13.30	6.8 ±1.0
TMOV34S321M(P)	13.50	6.9 ±1.0
TMOV34S331M(P)	13.60	7.2 ±1.0
TMOV34S351M(P)	13.80	7.4 ±1.0
TMOV34S391M(P)	14.20	7.6 ±1.0
TMOV34S421M(P)	14.50	7.85 ±1.0
TMOV34S461M(P)	14.75	8.15 ±1.0
TMOV34S481M(P)	14.95	8.25 ±1.0
TMOV34S511M(P)	15.40	8.6 ±1.0
TMOV34S551M(P)	15.60	8.65 ±1.0
TMOV34S571M(P)	15.90	8.85 ±1.0
TMOV34S621M(P)	16.40	9.25 ±1.0
TMOV34S661M(P)	16.85	9.65 ±1.0
TMOV34S681M(P)	17.20	9.85 ±1.0
TMOV34S751M(P)	17.80	10.65 ±1.0

Ordering Information

Standard Parts

TMOV 34 S 151 M P X2696

DEVICE FAMILY
Littelfuse Thermally Protected MOV

DISC DIAMETER (mm)
34 mm

CERAMIC SHAPE
S: Square

$V_{M(AC)RMS}$
115V to 750V

Series Designator
M: 3-Leaded TMOV34S Varistor Series Supplied in Bulk Pack

P: LEAD-FREE AND RoHS COMPLIANT OPTION

Optional Design
5 digit suffix when alternative 3mm wide monitor lead is required