

TVZ : Thermo-Fuse Varistor

DESCRIPTION

The Thermo-Fuse Varistor (TVZ) is a family of Transient Voltage Surge Suppression products. TVZ is a three-lead Thermally Protected Metal Oxide Varistor. One lead of the TVZ varistor is connected to a thermal fuse, which will open when the varistor is subjected to prolonged abnormal over-voltage conditions. The TVZ series is designed to meet the abnormal over-voltage requirements of UL 1449, Section 37.

Traditionally, the Metal Oxide Varistor (MOV) can withstand 150% of its rated voltage for a given duration. Typically, an MOV will initially fail to a short-circuit condition or fail open when subjected to sustained steady-state over-voltage conditions that exceed rated specifications.

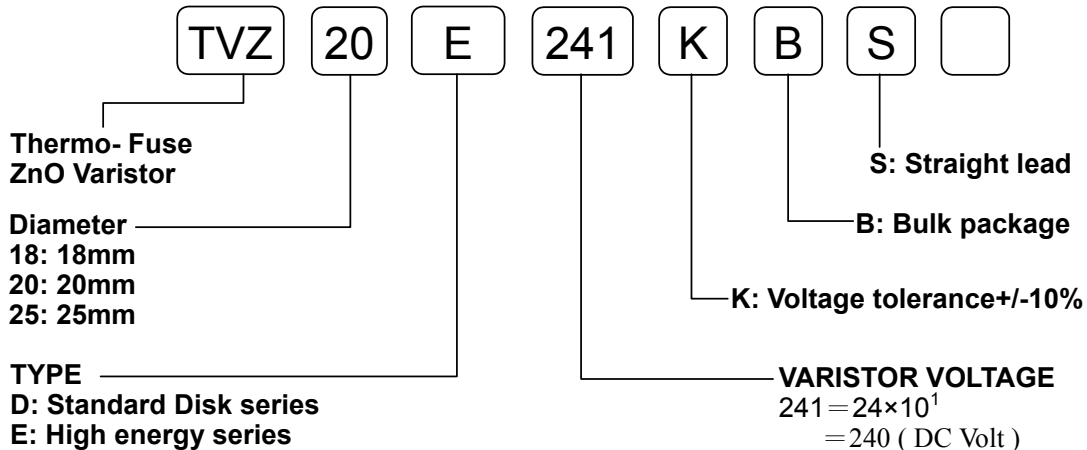
The TVZ incorporates a thermal fuse with an MOV. The TVZ will respond to prolonged over-voltage conditions by disconnecting the MOV from the power source should the temperature exceed a certain level.

Therefore, the TVZ provides "Fail Safe" protection to sensitive downstream components.

FEATURES

- Low Leakage Current under normal operating voltage. Meets UL 1449 abnormal over-voltage test (5A,2.5A,0.5A and 0.125A).
- UL1449 recognized which includes selected testing from UL1020 for thermal cutoff.

PART NUMBER CODES



- *Marking: (a) SINCERA. which is the brand name.
(b) Part marking, for example: T20E241K
(c) Date code (backside): Manufactured year and month. (2 digit)
(ie: 2002=2, 1-9 for January through September and O for October, N for November, D for December)

RATING

- -55°C to 85°C Operating Temperature Range
- -55°C to 125°C Storage Temperature Range
- Maximum Voltage-Temperature Coefficient: < 0.01 %/°C
- Hi-Pot Encapsulation: 2500 Vdc
- Insulation Resistance: >1000 MΩ
- Typical Response Time: <15 nseconds
- Continuous RMS Current: 100 mA
- Isolation Capability (When thermal element is open): 600 Vac

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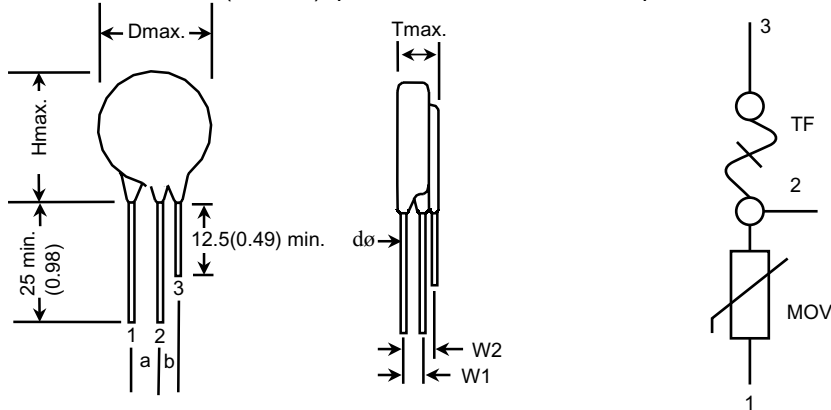
DIMENSION

TVZ Series	Dmax	Hmax	dø (NOM.)	a	b
TVZ18	21.0 (0.83)	24.0 (0.94)	0.8 (0.031)	7.5 (0.30)	6.5 (0.26)
TVZ20	24.0 (0.94)	29.0 (1.14)	1.0 (0.039)	10.0 (0.39)	6.5 (0.26)
TVZ25	28.5 (1.12)	33.0 (1.30)	1.0 (0.039)	12.7 (0.50)	6.5 (0.26)

(1) Unit: mm (inch) (2) $a \pm 1.0$ (0.039), $b \pm 1.2$ (0.047)

(3) 1mm lead diameter is available upon special request for 18mm. Please add suffix "R" after part number

(4) For 25mm min. fuse lead (lead #3), please add suffix "FL" after part number



Varistor Type	TVZ18 Series			TVZ20 Series			TVZ25 Series		
	Tmax	W1	W2	Tmax	W1	W2	Tmax	W1	W2
180K				7.0 (0.28)	1.7 (0.07)	3.3 (0.13)			
220K				7.2 (0.28)	1.8 (0.07)	3.4 (0.13)			
270K				7.2 (0.28)	2.0 (0.08)	3.6 (0.14)			
330K				7.4 (0.29)	2.1 (0.08)	3.7 (0.15)			
390K				7.4 (0.29)	2.4 (0.09)	4.0 (0.16)			
470K				7.4 (0.29)	2.7 (0.11)	4.3 (0.17)			
560K				7.5 (0.30)	3.0 (0.12)	4.6 (0.18)			
680K				7.6 (0.30)	3.1 (0.12)	4.7 (0.19)			
820K	7.4 (0.29)	1.8 (0.07)	3.3 (0.13)	7.6 (0.30)	1.8 (0.07)	3.3 (0.13)			
181K	7.4 (0.29)	1.9 (0.07)	3.4 (0.13)	7.6 (0.30)	1.9 (0.07)	3.4 (0.13)			
201K	7.8 (0.31)	2.0 (0.08)	3.5 (0.14)	7.9 (0.31)	2.0 (0.08)	3.6 (0.14)	7.9 (0.31)	2.1 (0.08)	3.7 (0.15)
221K	8.0 (0.31)	2.0 (0.08)	3.6 (0.14)	8.1 (0.32)	2.1 (0.08)	3.7 (0.15)	8.2 (0.32)	2.2 (0.09)	3.8 (0.15)
241K	8.1 (0.32)	2.1 (0.08)	3.7 (0.15)	8.2 (0.32)	2.2 (0.09)	3.8 (0.15)	8.3 (0.33)	2.3 (0.09)	3.9 (0.15)
271K	8.2 (0.32)	2.2 (0.09)	3.8 (0.15)	8.3 (0.33)	2.3 (0.09)	3.9 (0.15)	8.4 (0.33)	2.4 (0.09)	4.0 (0.16)
301K	8.4 (0.33)	2.4 (0.09)	4.0 (0.16)	8.4 (0.33)	2.5 (0.10)	4.1 (0.16)	8.6 (0.34)	2.6 (0.10)	4.2 (0.17)
331K	8.5 (0.33)	2.6 (0.10)	4.2 (0.17)	8.5 (0.33)	2.7 (0.11)	4.3 (0.17)	8.8 (0.35)	2.8 (0.11)	4.4 (0.17)
361K	8.5 (0.33)	2.7 (0.11)	4.3 (0.17)	8.6 (0.34)	2.8 (0.11)	4.4 (0.17)	8.9 (0.35)	2.9 (0.11)	4.5 (0.18)
391K	8.6 (0.34)	2.9 (0.11)	4.5 (0.18)	8.7 (0.34)	3.0 (0.12)	4.6 (0.18)	9.0 (0.35)	3.1 (0.12)	4.7 (0.19)
431K	8.7 (0.34)	3.0 (0.12)	4.7 (0.19)	8.8 (0.35)	3.2 (0.13)	4.8 (0.19)	9.2 (0.36)	3.3 (0.13)	4.9 (0.19)
471K	9.0 (0.35)	3.2 (0.13)	4.9 (0.19)	9.1 (0.36)	3.4 (0.13)	5.1 (0.20)	9.5 (0.37)	3.5 (0.14)	5.2 (0.20)
511K	9.4 (0.37)	3.4 (0.13)	5.2 (0.20)	9.5 (0.37)	3.6 (0.14)	5.4 (0.21)	9.9 (0.39)	3.7 (0.15)	5.5 (0.22)
561K	9.6 (0.38)	3.7 (0.15)	5.4 (0.21)	9.7 (0.38)	3.8 (0.15)	5.6 (0.22)	10.1 (0.40)	3.9 (0.15)	5.7 (0.22)
621K	10.0 (0.39)	3.9 (0.15)	5.7 (0.22)	10.1 (0.40)	4.1 (0.16)	5.9 (0.23)	10.4 (0.41)	4.2 (0.17)	6.0 (0.24)
681K	10.3 (0.41)	4.2 (0.17)	6.0 (0.24)	10.4 (0.41)	4.4 (0.17)	6.2 (0.24)	10.7 (0.42)	4.5 (0.18)	6.3 (0.25)
751K	10.4 (0.41)	4.5 (0.18)	6.4 (0.25)	10.7 (0.42)	4.7 (0.19)	6.6 (0.26)	11.1 (0.44)	4.8 (0.19)	6.7 (0.26)
781K	10.6 (0.42)	4.7 (0.19)	6.6 (0.26)	10.9 (0.43)	4.9 (0.19)	6.8 (0.27)	11.3 (0.44)	5.0 (0.20)	6.9 (0.27)
821K	10.8 (0.43)	4.9 (0.19)	6.8 (0.27)	11.0 (0.43)	5.1 (0.20)	7.0 (0.28)	11.4 (0.45)	5.2 (0.20)	7.1 (0.28)
911K	11.3 (0.44)	5.3 (0.21)	7.2 (0.28)	11.5 (0.45)	5.5 (0.22)	7.5 (0.30)	11.8 (0.46)	5.6 (0.22)	7.6 (0.30)
102K	11.8 (0.46)	5.7 (0.22)	7.8 (0.31)	12.0 (0.47)	6.0 (0.24)	8.0 (0.31)	12.4 (0.49)	6.1 (0.24)	8.1 (0.32)
112K	12.0 (0.47)	6.3 (0.25)	8.3 (0.33)	12.2 (0.48)	6.5 (0.26)	8.6 (0.34)	12.6 (0.50)	6.6 (0.26)	8.7 (0.34)

(1) W1 and W2 are maximum dimension. (2) Unit: mm (inch)

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SPECIFICATIONS

PART NUMBER	MAXIMUM RATINGS					SPECIFICATIONS		
	MAXIMUM CONTINUOUS WORKING VOLTAGE		MAXIMUM NON-REPETITIVE SURGE CURRENT (8/20 μ s)	MAXIMUM NON-REPETITIVE SURGE ENERGY (10/1000 μ s)	MAXIMUM CLAMPING VOLTAGE AT SPECIFIED CURRENT (8/20 μ s)	NOMINAL VOLTAGE AT 1mA (DC) CURRENT		TYPICAL CAPACITANCE @1KHZ
						min.	max.	
	V _(AC)	V _(DC)	(A)	(J)	(V)	(V)	(V)	(pF)
(V)	(V)	(A)	(J)	(V)	(V)	(V)	(pF)	
TVZ20D180KBS	11	14	2000	12	36 / 20A	16	20	27000
TVZ20D220KBS	14	18	2000	15	43 / 20A	20	24	20000
TVZ20D270KBS	17	22	2000	17	53 / 20A	24	30	15000
TVZ20D330KBS	20	26	2000	22	65 / 20A	30	36	12200
TVZ20D390KBS	25	31	2000	26	77 / 20A	35	43	10000
TVZ20D470KBS	30	38	2000	33	93 / 20A	42	52	9350
TVZ20D560KBS	35	45	2000	38	110 / 20A	50	62	8000
TVZ20D680KBS	40	56	2000	43	135 / 20A	61	75	6800
TVZ20E820KBS	50	66	8000	56	135 / 100A	74	90	5100
TVZ20E181KBS	120	160	12000	135	320 / 100A	170	207	1800
TVZ20E201KBS	130	175	12000	170	340 / 100A	185	225	1700
TVZ20E221KBS	140	180	12000	180	360 / 100A	198	242	1600
TVZ20E241KBS	150	200	12000	190	395 / 100A	216	264	1500
TVZ20E271KBS	180	230	12000	200	455 / 100A	255	311	1300
TVZ20E301KBS	195	250	12000	210	505 / 100A	270	330	1200
TVZ20E331KBS	210	275	12000	228	545 / 100A	297	363	1100
TVZ20E361KBS	230	300	12000	275	595 / 100A	324	396	1050
TVZ20E391KBS	250	330	12000	305	650 / 100A	351	429	1000
TVZ20E431KBS	275	370	12000	330	710 / 100A	387	473	950
TVZ20E471KBS	300	385	12000	350	775 / 100A	423	517	900
TVZ20E511KBS	320	420	12000	382	840 / 100A	459	561	800
TVZ20E561KBS	360	470	12000	420	910 / 100A	522	638	720
TVZ20E621KBS	390	505	12000	430	1025 / 100A	558	682	710
TVZ20E681KBS	420	560	12000	435	1120 / 100A	612	748	680
TVZ20E751KBS	460	615	12000	440	1240 / 100A	675	825	620
TVZ20E781KBS	485	640	12000	450	1250 / 100A	702	858	560
TVZ20E821KBS	510	675	12000	460	1350 / 100A	738	902	530
TVZ20E911KBS	550	745	12000	510	1400 / 100A	819	1001	440
TVZ20E102KBS	625	825	12000	560	1620 / 100A	900	1100	425
TVZ20E112KBS	680	895	12000	620	1800 / 100A	962	1175	380

UL1414 Recognized (File# E182369) for 130VAC through 680VAC values.

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	MAXIMUM CONTINUOUS WORKING VOLTAGE		MAXIMUM NON-REPETITIVE SURGE CURRENT (8/20 μ s)	MAXIMUM NON-REPETITIVE SURGE ENERGY (10/1000 μ s)	MAXIMUM CLAMPING VOLTAGE AT SPECIFIED CURRENT (8/20 μ s)	NOMINAL VOLTAGE AT 1mA (DC) CURRENT		TYPICAL CAPACITANCE @1KHZ
						min.	max.	
	V _(AC)	V _(DC)	(A)	(J)	(V)	(V)	(V)	(pF)
(V)	(V)	(A)	(J)	(V)	(V)	(V)	(pF)	
TVZ18E 820KBS	50	66	6500	56	135 / 80A	74	90	4300
TVZ18E181KBS	120	160	9000	135	320 / 80A	170	207	1300
TVZ18E201KBS	130	175	9000	140	340 / 80A	185	225	1270
TVZ18E221KBS	140	180	9000	150	360 / 80A	198	242	1220
TVZ18E241KBS	150	200	9000	155	395 / 80A	216	264	1200
TVZ18E271KBS	180	230	9000	163	455 / 80A	255	311	1050
TVZ18E301KBS	195	250	9000	170	505 / 80A	270	330	1000
TVZ18E331KBS	210	275	9000	190	545 / 80A	297	363	950
TVZ18E361KBS	230	300	9000	220	595 / 80A	324	396	870
TVZ18E391KBS	250	330	9000	245	650 / 80A	351	429	800
TVZ18E431KBS	275	370	9000	270	710 / 80A	387	473	730
TVZ18E471KBS	300	.385	9000	290	775 / 80A	423	517	660
TVZ18E511KBS	320	420	9000	314	840 / 80A	459	561	570
TVZ18E561KBS	360	470	9000	330	910 / 80A	522	638	560
TVZ18E621KBS	390	505	9000	345	1025 / 80A	558	682	540
TVZ18E681KBS	420	560	9000	355	1120 / 80A	612	748	500
TVZ18E751KBS	460	615	9000	365	1240 / 80A	675	825	460
TVZ18E781KBS	485	640	9000	378	1250 / 80A	702	858	400
TVZ18E821KBS	510	675	9000	388	1350 / 80A	738	902	310
TVZ18E911KBS	550	745	9000	415	1400 / 80A	819	1001	300
TVZ18E102KBS	625	825	9000	430	1620 / 80A	900	1100	285
TVZ18E112KBS	680	895	9000	440	1800 / 80A	962	1175	260

UL1414 Recognized (File# E182369) for 130VAC through 680VAC values.

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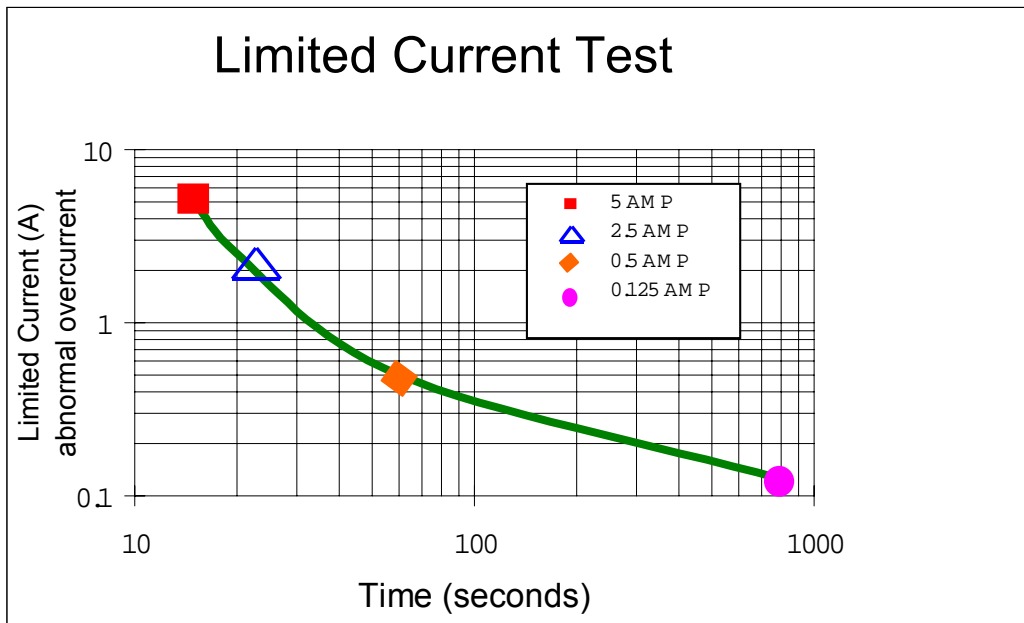
SPECIFICATIONS

PART NUMBER	MAXIMUM RATINGS				SPECIFICATIONS			
	MAXIMUM CONTINUOUS WORKING VOLTAGE		MAXIMUM NON-REPETITIVE SURGE CURRENT (8/20 μ s)	MAXIMUM NON-REPETITIVE SURGE ENERGY (10/1000 μ s)	MAXIMUM CLAMPING VOLTAGE AT SPECIFIED CURRENT (8/20 μ s)	NOMINAL VOLTAGE AT 1mA (DC) CURRENT		TYPICAL CAPACITANCE @1KHZ
	V _(AC)	V _(DC)				min.	max.	
	(V)	(V)	(A)	(J)	(V)	(V)	(V)	(V)
TVZ25D201KBS	130	175	18000	200	340 / 100A	185	225	3600
TVZ25D221KBS	140	180	18000	225	360 / 100A	198	242	3300
TVZ25D241KBS	150	200	18000	235	395 / 100A	216	264	3050
TVZ25D271KBS	180	230	18000	245	465 / 100A	255	311	2600
TVZ25D301KBS	195	250	18000	255	505 / 100A	270	330	2400
TVZ25D331KBS	210	275	18000	270	540 / 100A	297	363	2200
TVZ25D361KBS	230	300	18000	315	595 / 100A	324	396	2050
TVZ25D391KBS	250	330	18000	342	650 / 100A	351	429	1900
TVZ25D431KBS	275	370	18000	370	710 / 100A	387	473	1700
TVZ25D471KBS	300	385	18000	390	775 / 100A	423	517	1600
TVZ25D511KBS	320	420	18000	422	840 / 100A	459	561	1400
TVZ25D561KBS	360	470	18000	460	910 / 100A	522	638	1200
TVZ25D621KBS	390	505	18000	495	1025 / 100A	558	682	1180
TVZ25D681KBS	420	560	18000	515	1120 / 100A	612	748	1100
TVZ25D751KBS	460	615	18000	530	1240 / 100A	675	825	1000
TVZ25D781KBS	485	640	18000	540	1250 / 100A	702	858	980
TVZ25D821KBS	510	675	18000	550	1350 / 100A	738	902	920
TVZ25D911KBS	550	745	18000	600	1400 / 100A	819	1001	880
TVZ25D102KBS	625	825	18000	630	1620 / 100A	900	1100	760
TVZ25D112KBS	680	895	18000	700	1800 / 100A	962	1175	650

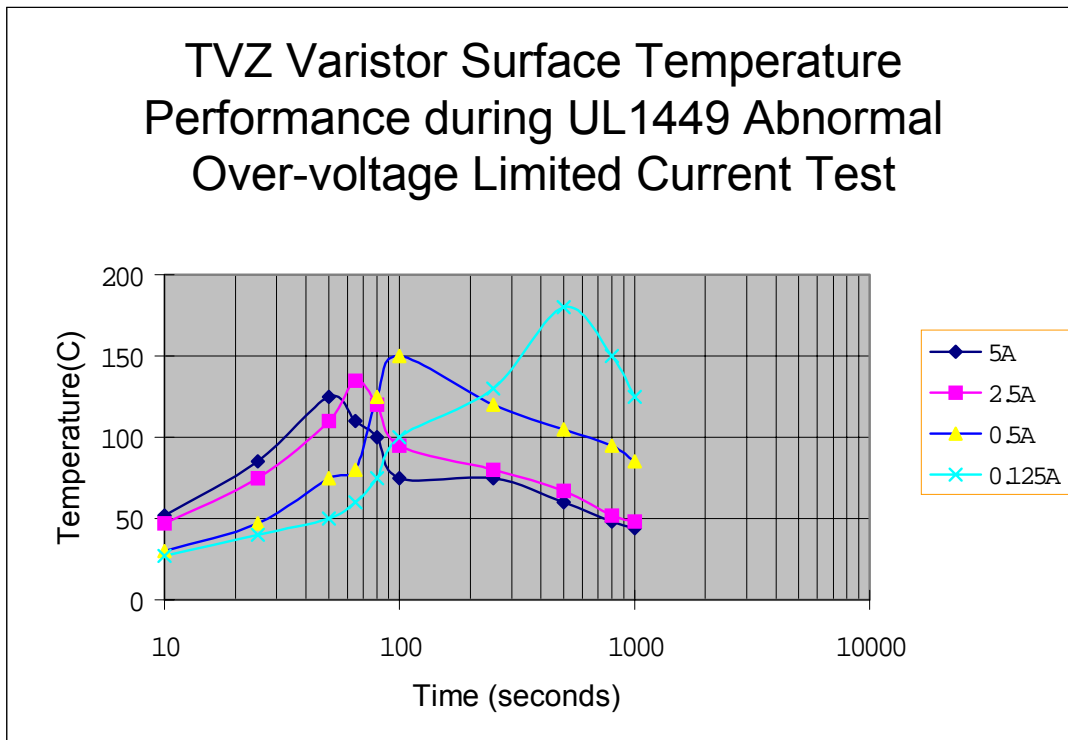
UL1414 Recognized (File# E182369) for 130VAC through 680VAC values.

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THERMO CHARACTERISTIC

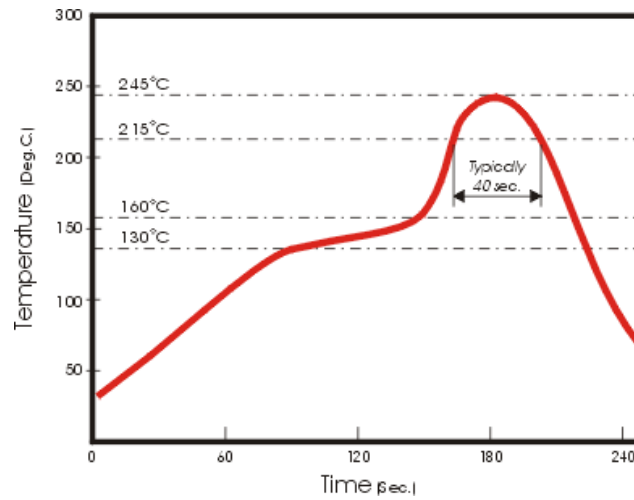


Time to open circuit under UL1449 abnormal over-voltage limited current test



TVZ : Thermo-Fuse Varistor

SOLDERING PROFILE



APPLICATION

- »» REPLACEMENT FOR STANDARD MOV PLUS PROTECTION ELEMENT (FUSE)
- »» TRANSIENT VOLTAGE SURGE SUPPRESSION PRODUCTS
- »» AC POWER METERS
- »» AC LINE POWER SUPPLIES