

Metal Oxide Varistors (MOV) Data Sheet

Description

The FTR TMOV thermally protected varistors represent a new development in integrated circuit protection. Both versions are comprised of radial leaded Metal Oxide Varistors (MOV) with an integrated thermally activated element designed to open in the event of overheating due to the abnormal overvoltage, limited current, conditions outlined in UL1449. The TMOV varistor's integrated thermal element, in conjunction with appropriate enclosure design, helps facilitate SPD module compliance to UL1449 for both cord connected and permanently connected applications.

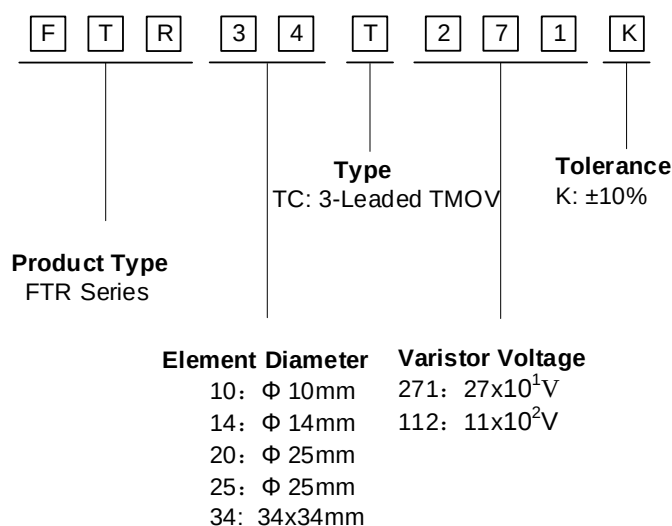
Features

- TMOV integrated thermal protection device
- Fast responding to transient over-voltage
- High peak surge current rating up to 40KA
- Large absorbing transient energy capability
- Low clamping ratio and no follow-on current
- Three-lead version available for indication purposes
- Meets MSL level 1, per J-STD-020
- Operating Temperature: -55°C ~ +85°C
- Storage Temperature: -55°C ~ +125°C
- Agency recognition: UL 1449 4th /cUL /CQC

Applications

- SPD Products, Power supply, Telecommunication, Smart meter, or PLC protection
- Surge protection in consumer and industrial electronics
- Surge protection in electronic home appliances, gas and petroleum appliances
- Relay and electromagnetic valve surge absorption
- AC panel protection Modules

Part Number Code

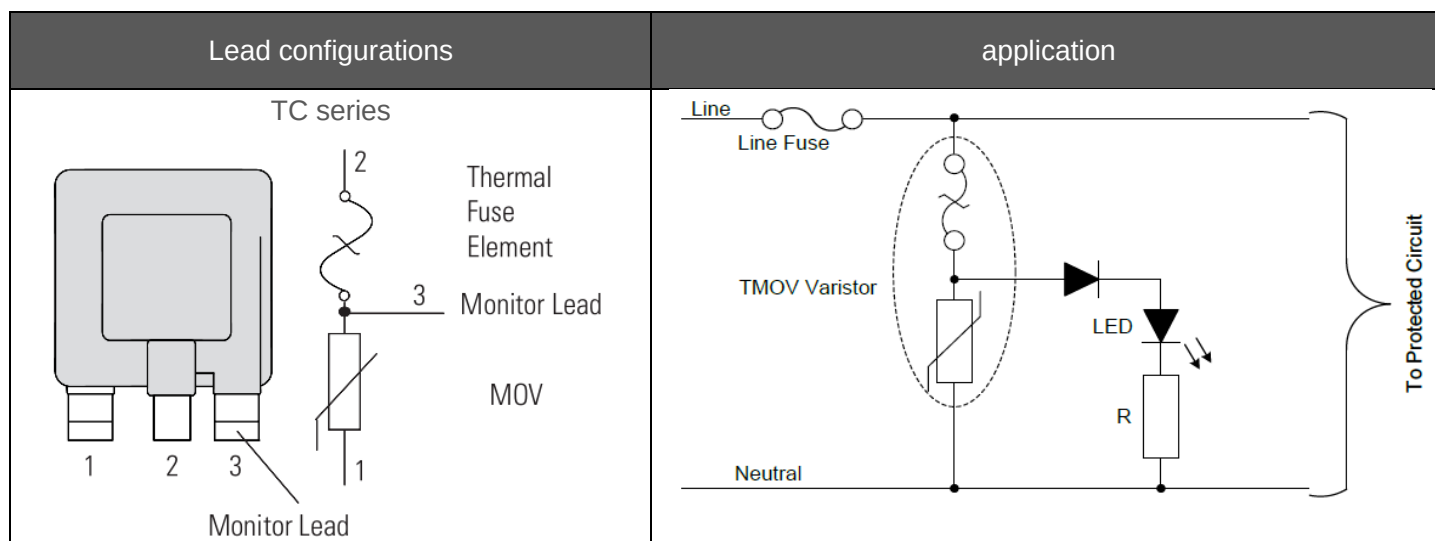


Electrical Characteristics

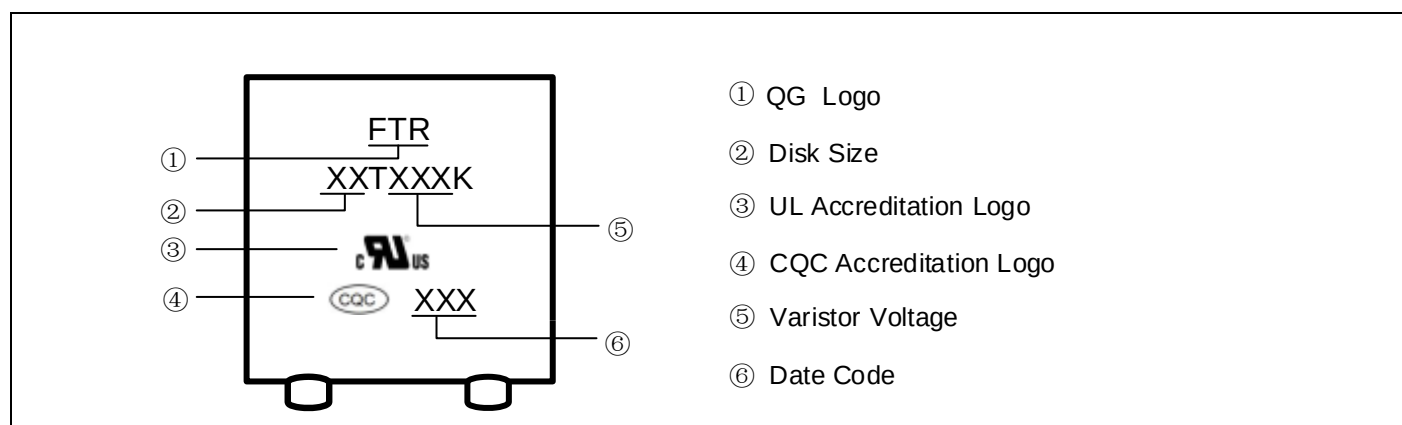
Part Number	Maximum Allowable Voltage		Varistor Voltage	Maximum Clamping Voltage		Withstanding Surge current	Maximum Energy (10/1000 μ s)	Dimension Tmax	T Series Dimension S (± 1)	TC Series Dimension S (± 1)
	V _{AC} (V)	V _{DC} (V)	V _{1mA} (V)	I _P (A)	V _C (V)	8/20 μ s(A)	(J)	(mm)	(mm)	(mm)
FTR34TC181K	115	150	180(162~198)	300	300	40000	350	13.0	2.8	5.2
FTR34TC201K	130	170	200(180~220)	300	340	40000	360	13.0	2.9	5.5
FTR34TC221K	140	180	220(198~242)	300	360	40000	360	13.0	3.0	5.7
FTR34TC241K	150	200	240(216~264)	300	395	40000	390	13.0	3.1	5.9
FTR34TC271K	175	225	270(243~297)	300	455	40000	420	13.0	3.4	6.3
FTR34TC301K	190	250	300(270~330)	300	500	40000	460	13.0	3.5	6.4
FTR34TC331K	210	275	330(297~363)	300	550	40000	500	13.0	3.6	6.5
FTR34TC361K	230	300	360(324~396)	300	595	40000	510	13.0	3.9	6.5
FTR34TC391K	250	320	390(351~429)	300	650	40000	530	13.0	4.0	6.5
FTR34TC431K	275	350	430(387~473)	300	710	40000	600	14.5	4.3	6.8
FTR34TC471K	300	385	470(423~517)	300	775	40000	650	14.5	4.5	6.8
FTR34TC511K	320	415	510(459~561)	300	845	40000	700	15.0	4.7	6.9
FTR34TC561K	350	460	560(504~616)	300	925	40000	730	15.0	5.0	7.4
FTR34TC621K	385	505	620(558~682)	300	1025	40000	780	15.8	5.4	7.6
FTR34TC681K	420	560	680(612~718)	300	1120	40000	810	15.8	5.7	7.85
FTR34TC751K	460	615	750(675~825)	300	1240	40000	850	15.8	5.9	8.15
FTR34TC781K	485	640	780(702~858)	300	1290	40000	930	17.0	6.1	8.25
FTR34TC821K	510	670	820(738~902)	300	1355	40000	970	17.0	6.6	8.6
FTR34TC911K	550	745	910(819~1001)	300	1500	40000	1050	17.0	6.8	8.65
FTR34TC102K	625	825	1000(900~1100)	300	1650	40000	1120	18.0	7.5	9.25
FTR34TC112K	680	895	1100(990~1210)	300	1815	40000	1250	18.0	8.2	9.85
FTR34TC122K	750	990	1200(1080~1320)	300	1980	40000	1340	18.0	8.8	10.65

Notes: Leakage Current (@83% of V_{1mA}): I_R ≤ 25 μ A

Lead configurations and application examples



Marking Code



Ratings and Characteristic Curves

Figure 1. Thermal Characteristics

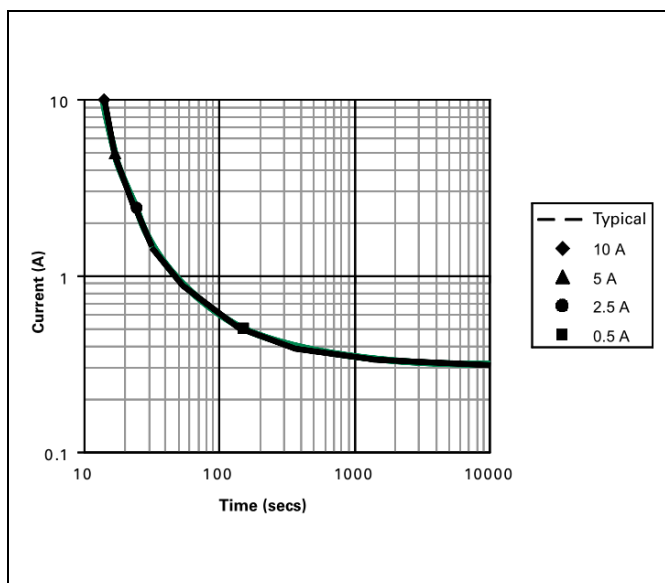
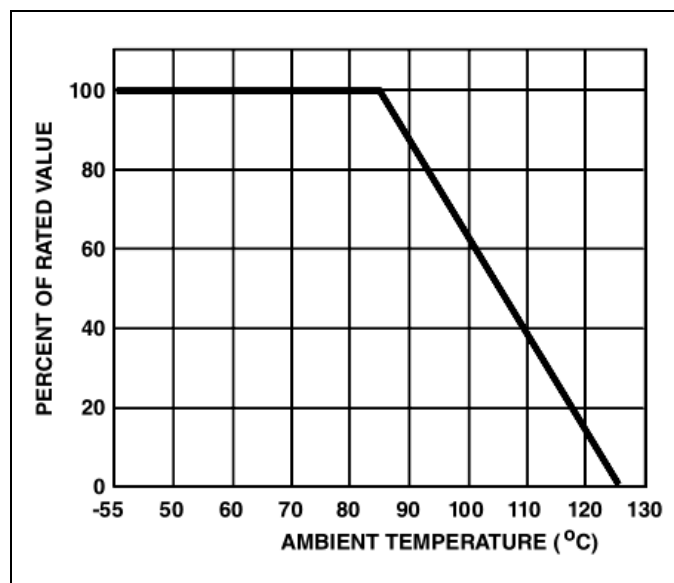
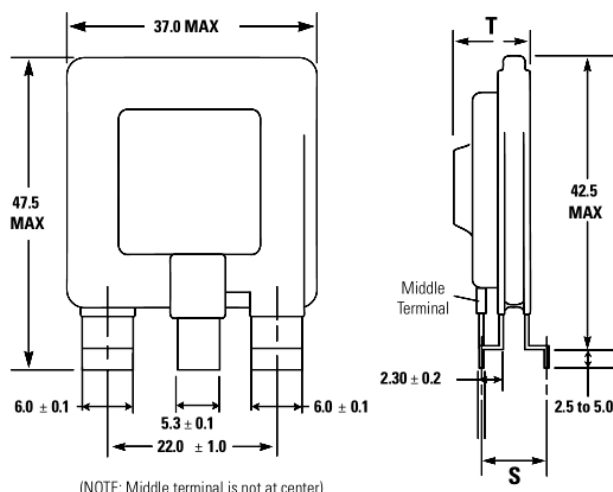


Figure 2. Current, Energy, Power Derating Curve



Dimensions



Notes: "S" Dimension please refer to the Electrical Characteristics Table

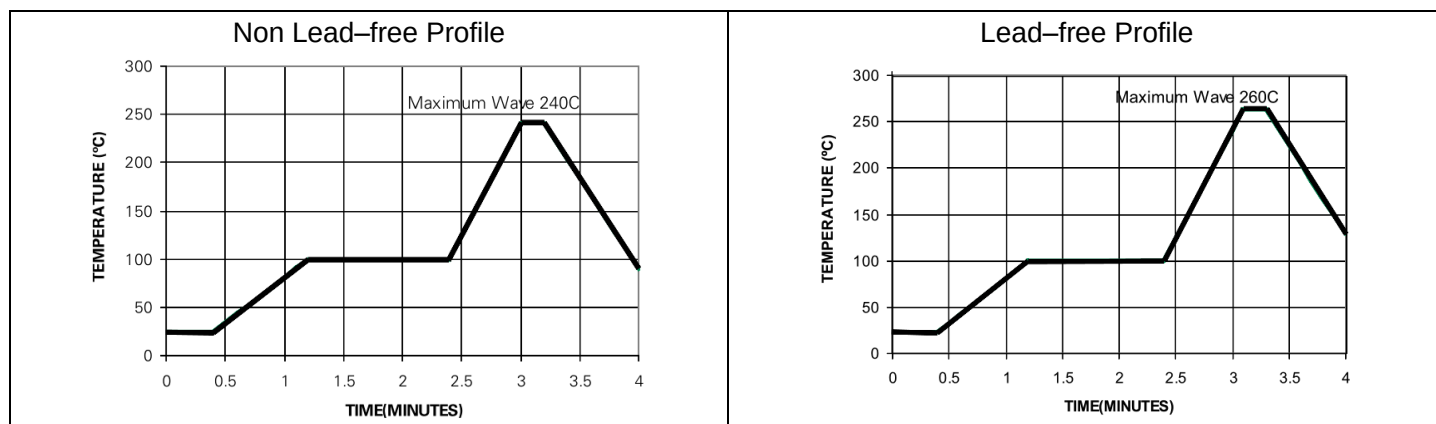
Mechanical Characteristics

Items	Test conditions / Methods	Specifications								
Tensile Strength of Terminals	Gradually applying the force specified and keeping the unit fixed for 10±1 sec. <table><tr><td>Terminal diameter (mm)</td><td>Froce(kg)</td></tr><tr><td>0.5<d≤0.8</td><td>1.0</td></tr><tr><td>0.8<d≤1.25</td><td>2.0</td></tr><tr><td>1.25<d</td><td>4.0</td></tr></table>	Terminal diameter (mm)	Froce(kg)	0.5<d≤0.8	1.0	0.8<d≤1.25	2.0	1.25<d	4.0	NO Visible damage Δ V1mA/V1mA ≤5%
Terminal diameter (mm)	Froce(kg)									
0.5<d≤0.8	1.0									
0.8<d≤1.25	2.0									
1.25<d	4.0									
Bending Strength of Terminals	Hold specimen and apply the force specified below to each lead. Bend the specimen to 90°, then return to the original position. Repeat the procedure in the opposite direction. <table><tr><td>Terminal diameter (mm)</td><td>Froce(kg)</td></tr><tr><td>0.5<d≤0.8</td><td>0.5</td></tr><tr><td>0.8<d≤1.25</td><td>1.0</td></tr><tr><td>1.25<d</td><td>2.0</td></tr></table>	Terminal diameter (mm)	Froce(kg)	0.5<d≤0.8	0.5	0.8<d≤1.25	1.0	1.25<d	2.0	NO Visible damage Δ V1mA/V1mA ≤5%
Terminal diameter (mm)	Froce(kg)									
0.5<d≤0.8	0.5									
0.8<d≤1.25	1.0									
1.25<d	2.0									
Vibration	Frequency range: 10~55 Hz Amplitude: 0.75mm or 98m/s2 Direction: 3 mutually perpendicular directions, 2hrs each.	NO Visible damage Δ V1mA/V1mA ≤5%								
Solder ability	Solder Temp: 245±5℃ Dipping Time: 2±0.5 sec	At least 95% of terminal electrode is covered by new solder								
Resistanceto Soldering Heat	Solder Temp: 260±5℃ Dipping Time: 10±1 sec	NO Visible damage Δ V1mA/V1mA ≤5%								

Reliability

Items	Test conditions / Methods	Specifications															
High Temperature Storage	Ambient Temp: $85 \pm 2^{\circ}\text{C}$ Duration: 1000hrs	$ \Delta V1\text{mA}/V1\text{mA} \leq 5\%$															
Low Temperature Storage	Ambient Temp: $-55 \pm 2^{\circ}\text{C}$ Duration: 1000hrs	$ \Delta V1\text{mA}/V1\text{mA} \leq 5\%$															
Humidity	Ambient Temp: $40 \pm 2^{\circ}\text{C}$, 90~95% R.H. Duration: 1000hrs	$ \Delta V1\text{mA}/V1\text{mA} \leq 5\%$															
Temperature Cycle	The conditions shown below shall be repeated 5 cycles <table border="1"> <thead> <tr> <th>Step</th><th>Temperature ($^{\circ}\text{C}$)</th><th>Period (minutes)</th></tr> </thead> <tbody> <tr> <td>1</td><td>-55 ± 3</td><td>30 ± 3</td></tr> <tr> <td>2</td><td>Room temperature</td><td>15 ± 3</td></tr> <tr> <td>3</td><td>85 ± 3</td><td>30 ± 3</td></tr> <tr> <td>4</td><td>Room temperature</td><td>15 ± 3</td></tr> </tbody> </table>	Step	Temperature ($^{\circ}\text{C}$)	Period (minutes)	1	-55 ± 3	30 ± 3	2	Room temperature	15 ± 3	3	85 ± 3	30 ± 3	4	Room temperature	15 ± 3	No visible damage $ \Delta V1\text{mA}/V1\text{mA} \leq 5\%$
Step	Temperature ($^{\circ}\text{C}$)	Period (minutes)															
1	-55 ± 3	30 ± 3															
2	Room temperature	15 ± 3															
3	85 ± 3	30 ± 3															
4	Room temperature	15 ± 3															
High Temperature Load	Ambient Temp: $85 \pm 2^{\circ}\text{C}$ Duration: 1000hrs Load: Max. Allowable Voltage In AC eara.	$ \Delta V1\text{mA}/V1\text{mA} \leq 5\%$															
Damp Heat Load	Ambient Temp: $40 \pm 2^{\circ}\text{C}$, 90~95% R.H. Duration: 1000hrs Load: Max. Allowable Voltage	No visible damage $ \Delta V1\text{mA}/V1\text{mA} \leq 5\%$															
Voltage Proof	Metal balls method, 2500Vac 1 min.	No visible damage															

Soldering Recommendation



Quantity

Packaging Dimensions (Unit: mm)	Quantity
	60pcs/bag (181K~511K)
	32pcs/bag (561K~112K)