

FTR

FTR Series - **MOV**

ISO9001:2015 ISO14001:2015 IATF16949:2016

Metal Oxide Varistors (MOV) Data Sheet



MOV

Metal Oxide Varistors

Wfyear Electronics - Authorized Distributor of FTR

<https://wfyearsemi.com/brand/ftr>

Safety Regulation certification For FTR 07D MOV							
Certificate Number:		E507891	B105791 0004 Rev.00	CQC2000 1268211		E507891	CQC2000 1268211
Part Number	Copper Electrode	UL/CUL	TUV	CQC	Silver Electrode	UL/CUL	CQC
FTR07D180K					Silver	✓	✓
FTR07D220K					Silver	✓	✓
FTR07D270K					Silver	✓	✓
FTR07D330K					Silver	✓	✓
FTR07D390K					Silver	✓	✓
FTR07D470K					Silver	✓	✓
FTR07D560K					Silver	✓	✓
FTR07D680K					Silver	✓	✓
FTR07D820K					Silver	✓	✓
FTR07D101K					Silver	✓	✓
FTR07D121K					Silver	✓	✓
FTR07D151K	Copper	✓	✓	✓			
FTR07D181K	Copper	✓	✓	✓			
FTR07D201K	Copper	✓	✓	✓			
FTR07D221K	Copper	✓	✓	✓			
FTR07D241K	Copper	✓	✓	✓			
FTR07D271K	Copper	✓	✓	✓			
FTR07D301K	Copper	✓	✓	✓			
FTR07D331K	Copper	✓	✓	✓			
FTR07D361K	Copper	✓	✓	✓			
FTR07D391K	Copper	✓	✓	✓			
FTR07D431K	Copper	✓	✓	✓			
FTR07D471K	Copper	✓	✓	✓			
FTR07D511K	Copper	✓	✓	✓			
FTR07D561K	Copper	✓	✓	✓			
FTR07D621K	Copper	✓	✓	✓			
FTR07D681K	Copper	✓	✓	✓			
FTR07D751K	Copper	✓	✓	✓			
FTR07D781K	Copper	✓	✓	✓			
FTR07D821K	Copper	✓	✓	✓			

Safety Regulation certification For FTR 10D MOV							
Certificate Number:		E507891	40051843	CQC20001268175		E507891	CQC20001268175
Part Number	Copper Electrode	UL/CUL	VDE	CQC	Silver Electrode	UL/CUL	CQC
FTR10D180K					Silver	✓	✓
FTR10D220K					Silver	✓	✓
FTR10D270K					Silver	✓	✓
FTR10D330K					Silver	✓	✓
FTR10D390K					Silver	✓	✓
FTR10D470K					Silver	✓	✓
FTR10D560K					Silver	✓	✓
FTR10D680K					Silver	✓	✓
FTR10D820K					Silver	✓	✓
FTR10D101K					Silver	✓	✓
FTR10D121K					Silver	✓	✓
FTR10D151K	Copper	✓	✓	✓			
FTR10D181K	Copper	✓	✓	✓			
FTR10D201K	Copper	✓	✓	✓			
FTR10D221K	Copper	✓	✓	✓			
FTR10D241K	Copper	✓	✓	✓			
FTR10D271K	Copper	✓	✓	✓			
FTR10D301K	Copper	✓	✓	✓			
FTR10D331K	Copper	✓	✓	✓			
FTR10D361K	Copper	✓	✓	✓			
FTR10D391K	Copper	✓	✓	✓			
FTR10D431K	Copper	✓	✓	✓			
FTR10D471K	Copper	✓	✓	✓			
FTR10D511K	Copper	✓	✓	✓			
FTR10D561K	Copper	✓	✓	✓			
FTR10D621K	Copper	✓	✓	✓			
FTR10D681K	Copper	✓	✓	✓			
FTR10D751K	Copper	✓	✓	✓			
FTR10D781K	Copper	✓	✓	✓			
FTR10D821K	Copper	✓	✓	✓			
FTR10D911K	Copper	✓	✓	✓			
FTR10D102K	Copper	✓	✓	✓			
FTR10D112K	Copper	✓	✓	✓			

Safety Regulation certification For FTR 14D MOV									
Certificate Number:		E507891	40051843	CQC2000 1268254		E507891	B105791 0002 Rev.00	CQC20001268254	CQC2400 1439296
Part Number	Copper Electrode	UL/CUL	VDE	CQC	Silver Electrode	UL/CUL	TUV	CQC	CQC
FTR14D180K					Silver	✓		✓	
FTR14D220K					Silver	✓		✓	
FTR14D270K					Silver	✓		✓	
FTR14D330K					Silver	✓		✓	
FTR14D390K					Silver	✓		✓	
FTR14D470K					Silver	✓		✓	
FTR14D560K					Silver	✓		✓	
FTR14D680K					Silver	✓		✓	
FTR14D820K					Silver	✓		✓	
FTR14D101K					Silver	✓		✓	
FTR14D121K					Silver	✓		✓	
FTR14D151K	Copper	✓	✓	✓	Silver	✓	✓		✓
FTR14D181K	Copper	✓	✓	✓	Silver	✓	✓		✓
FTR14D201K	Copper	✓	✓	✓	Silver	✓	✓		✓
FTR14D221K	Copper	✓	✓	✓	Silver	✓	✓		✓
FTR14D241K	Copper	✓	✓	✓	Silver	✓	✓		✓
FTR14D271K	Copper	✓	✓	✓	Silver	✓	✓		✓
FTR14D301K	Copper	✓	✓	✓	Silver	✓	✓		✓
FTR14D331K	Copper	✓	✓	✓	Silver	✓	✓		✓
FTR14D361K	Copper	✓	✓	✓	Silver	✓	✓		✓
FTR14D391K	Copper	✓	✓	✓	Silver	✓	✓		✓
FTR14D431K	Copper	✓	✓	✓	Silver	✓	✓		✓
FTR14D471K	Copper	✓	✓	✓	Silver	✓	✓		✓
FTR14D511K	Copper	✓	✓	✓	Silver	✓	✓		✓
FTR14D561K	Copper	✓	✓	✓	Silver	✓	✓		✓
FTR14D621K	Copper	✓	✓	✓	Silver	✓	✓		✓
FTR14D681K	Copper	✓	✓	✓	Silver	✓	✓		✓
FTR14D751K	Copper	✓	✓	✓	Silver	✓	✓		✓
FTR14D781K	Copper	✓	✓	✓	Silver	✓	✓		✓
FTR14D821K	Copper	✓	✓	✓	Silver	✓	✓		✓
FTR14D911K	Copper	✓	✓	✓	Silver	✓	✓		✓
FTR14D102K	Copper	✓	✓	✓	Silver	✓	✓		✓
FTR14D112K	Copper	✓	✓	✓	Silver	✓	✓		✓
FTR14D122K	Copper	✓	✓	✓	Silver	✓	✓		✓

Safety Regulation certification For FTR 20D MOV							
Certificate Number:		E507891	40051843	CQC20001268253		E507891	CQC20001268253
Part Number	Copper Electrode	UL/CUL	VDE	CQC	Silver Electrode	UL/CUL	CQC
FTR20D180K					Silver	✓	✓
FTR20D220K					Silver	✓	✓
FTR20D270K					Silver	✓	✓
FTR20D330K					Silver	✓	✓
FTR20D390K					Silver	✓	✓
FTR20D470K					Silver	✓	✓
FTR20D560K					Silver	✓	✓
FTR20D680K					Silver	✓	✓
FTR20D820K					Silver	✓	✓
FTR20D101K					Silver	✓	✓
FTR20D121K					Silver	✓	✓
FTR20D151K					Silver	✓	✓
FTR20D181K	Copper	✓	✓	✓			
FTR20D201K	Copper	✓	✓	✓			
FTR20D221K	Copper	✓	✓	✓			
FTR20D241K	Copper	✓	✓	✓			
FTR20D271K	Copper	✓	✓	✓			
FTR20D301K	Copper	✓	✓	✓			
FTR20D331K	Copper	✓	✓	✓			
FTR20D361K	Copper	✓	✓	✓			
FTR20D391K	Copper	✓	✓	✓			
FTR20D431K	Copper	✓	✓	✓			
FTR20D471K	Copper	✓	✓	✓			
FTR20D511K	Copper	✓	✓	✓			
FTR20D561K	Copper	✓	✓	✓			
FTR20D621K	Copper	✓	✓	✓			
FTR20D681K	Copper	✓	✓	✓			
FTR20D751K	Copper	✓	✓	✓			
FTR20D781K	Copper	✓	✓	✓			
FTR20D821K	Copper	✓	✓	✓			
FTR20D911K	Copper	✓	✓	✓			
FTR20D102K	Copper	✓	✓	✓			
FTR20D112K	Copper	✓	✓	✓			
FTR20D122K	Copper	✓	✓	✓			

Safety Regulation certification For FTR 25D MOV

Certificate Number:		E507891	B105791 0002 Rev.00	CQC25001464716
Part Number	Copper Electrode	UL/CUL	TUV	CQC
FTR25D181K	Copper	✓	✓	✓
FTR25D201K	Copper	✓	✓	✓
FTR25D221K	Copper	✓	✓	✓
FTR25D241K	Copper	✓	✓	✓
FTR25D271K	Copper	✓	✓	✓
FTR25D301K	Copper	✓	✓	✓
FTR25D331K	Copper	✓	✓	✓
FTR25D361K	Copper	✓	✓	✓
FTR25D391K	Copper	✓	✓	✓
FTR25D431K	Copper	✓	✓	✓
FTR25D471K	Copper	✓	✓	✓
FTR25D511K	Copper	✓	✓	✓
FTR25D561K	Copper	✓	✓	✓
FTR25D621K	Copper	✓	✓	✓
FTR25D681K	Copper	✓	✓	✓
FTR25D751K	Copper	✓	✓	✓
FTR25D781K	Copper	✓	✓	✓
FTR25D821K	Copper	✓	✓	✓
FTR25D911K	Copper	✓	✓	✓
FTR25D102K	Copper	✓	✓	✓
FTR25D112K	Copper	✓	✓	✓
FTR25D122K	Copper	✓	✓	✓
FTR25D142K	Copper	✓	✓	✓
FTR25D162K	Copper	✓	✓	✓
FTR25D182K	Copper	✓	✓	✓

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Features

- Fast responding to transient over-voltage
- Large absorbing transient energy capability
- Low clamping ratio and no follow-on current
- Meets MSL level 1, per J-STD-020
- Operating Temperature: -40°C ~ +105°C & -40°C ~ +125°C
- Storage Temperature: -40°C ~ +125°C
- Agency recognition: UL/CUL/CSA/VDE/CQC

Applications

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

1, Part Number Code **Φ5 Series (Metal Oxide Varistors)**

FTR	05	D	561	K	Z	N	-	D14. 5H17. 5A11G017TB
FTR logo	Diameter 05:05mm 07:07mm 10:010mm 14:014mm 20:020mm 25:025mm 32:032mm	Pellet Type: D Circular type S Square L Rectangle	Varistor Voltage 180:18x10 ⁰ V 471:47x10 ¹ V 561:56x10 ¹ V ...	Toleranc e K: ±10%	Surge Series No Suffix: Standard Type J:High Surge Type Z:High Energy	Pin Type No Suffix: Straight Type G:G Type W:Out K type N:Inner K type X:Special type		Internal Controls Code

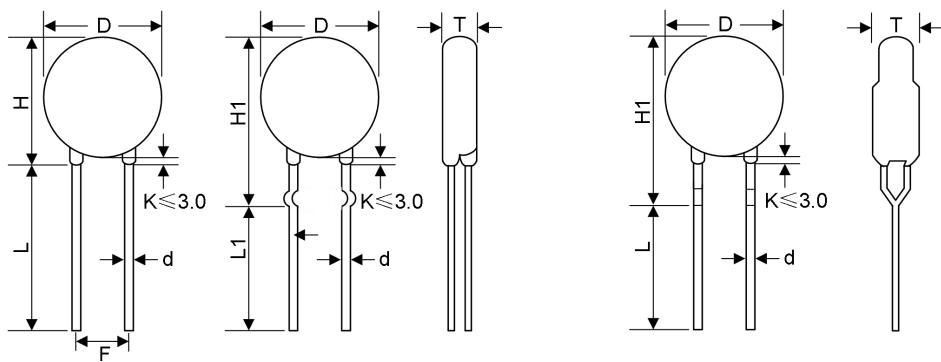
1.1 Electrical Characteristics: Φ5 Series (Metal Oxide Varistors)

Part Number		Maximum Allowable Voltage		Varistor Voltage	Maximum Clamping Voltage		Withstanding Surge current		Maximum Energy (10/1000μs)		Rated Power	Dimension Tmax
Standard	High Surge	V _{AC} (V)	V _{DC} (V)	V _{1mA} (V)	I _P (A)	V _C (V)	(A) Standard	(A) High Surge	(J) Standard	(J) High Surge	(W)	(mm)
FTR05D180K	FTR05D180KJ	11	14	18(15-21.6)	1	40	100	250	0.4	0.6	0.01	5.0
FTR05D220K	FTR05D220KJ	14	18	22(19.5-26)	1	48	100	250	0.5	0.7	0.01	5.0
FTR05D270K	FTR05D270KJ	17	22	27(24-31)	1	60	100	250	0.6	0.9	0.01	5.0
FTR05D330K	FTR05D330KJ	20	26	33(29.5-36.5)	1	73	100	250	0.8	1.1	0.01	5.0
FTR05D390K	FTR05D390KJ	25	31	39(35-43)	1	80	100	250	0.9	1.2	0.01	5.0
FTR05D470K	FTR05D470KJ	30	38	47(42-52)	1	104	100	250	1.1	1.5	0.01	5.0
FTR05D560K	FTR05D560KJ	35	45	56(50-62)	1	123	100	250	1.3	1.8	0.01	5.0
FTR05D680K	FTR05D680KJ	40	56	68(61-75)	1	145	100	250	1.6	2.2	0.01	5.0
FTR05D820K	FTR05D820KJ	50	65	82(74-90)	5	150	400	800	2.5	4	0.1	5.0
FTR05D101K	FTR05D101KJ	60	85	100(90-110)	5	177	400	800	3	4.1	0.1	3.8
FTR05D121K	FTR05D121KJ	75	100	120(108-132)	5	210	400	800	4	4.9	0.1	4.0
FTR05D151K	FTR05D151KJ	95	125	150(135-165)	5	260	400	800	4.1	6.5	0.1	3.6
FTR05D181K	FTR05D181KJ	115	150	180(162-198)	5	320	400	800	4.9	7.5	0.1	3.7
FTR05D201K	FTR05D201KJ	130	170	200(180-220)	5	355	400	800	6.5	8.5	0.1	3.8
FTR05D221K	FTR05D221KJ	140	180	220(198-242)	5	380	400	800	7.5	9	0.1	3.9
FTR05D241K	FTR05D241KJ	150	200	240(216-264)	5	415	400	800	8	10.5	0.1	4.0
FTR05D271K	FTR05D271KJ	175	225	270(243-297)	5	475	400	800	8.5	11	0.1	4.2
FTR05D301K	FTR05D301KJ	190	250	300(270-330)	5	520	400	800	9	12	0.1	4.3
FTR05D331K	FTR05D331KJ	210	275	330(297-363)	5	570	400	800	9.5	13	0.1	4.3
FTR05D361K	FTR05D361KJ	230	300	360(324-396)	5	620	400	800	10	16	0.1	4.5
FTR05D391K	FTR05D391KJ	250	320	390(351-429)	5	675	400	800	12	17	0.1	4.6
FTR05D431K	FTR05D431KJ	275	350	430(387-473)	5	745	400	800	13	20	0.1	4.8
FTR05D471K	FTR05D471KJ	300	385	470(423-517)	5	810	400	800	15	21	0.1	5.0
FTR05D511K	FTR05D511KJ	320	415	510(459-561)	5	845	400	800	16	22.5	0.1	5.2
FTR05D561K	FTR05D561KJ	350	460	560(504-616)	5	920	400	800	16.8	24	0.1	5.4
FTR05D621K	FTR05D621KJ	385	505	620(558-682)	5	1025	400	800	17.7	25	0.1	5.7
FTR05D681K	FTR05D681KJ	420	560	680(612-748)	5	1120	400	800	21	29	0.1	6.0
FTR05D751K	FTR05D751KJ	460	615	750(675-825)	5	1240	400	800	22.4	32	0.1	6.1

Notes: 1. The tolerance of varistor voltage between 18V and 27V is more than 10%.

2. Leakage Current (@83% of V_{1mA}): IR≤40μA (180K~680K) ; IR≤25μA (820K~112K)

1.2 Dimensions

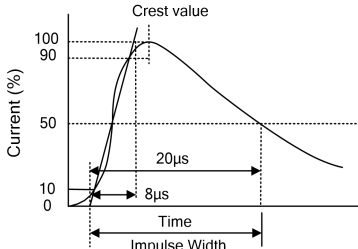


Symbol	H(max.)	H1(Max.)	L(min.)	L1(min.)	D (max.)	F(±0.8)	d(±0.05)	Tmax
Dimension(mm)	9.5	11.5	20	15	7	5	0.6	Please refer to the Electrical Characteristics Table

1.3 Reliability

Items	Test conditions / Methods	Specifications															
High Temperature Storage	Ambient Temp: 125±2℃ Duration: 1000hrs	$ \Delta V_{1mA}/V_{1mA} \leq 5\%$															
Low Temperature Storage	Ambient Temp: -40±2℃ Duration: 1000hrs	$ \Delta V_{1mA}/V_{1mA} \leq 5\%$															
Humidity	Ambient Temp: 40±2℃, 90~95% R.H. Duration: 1000hrs	$ \Delta V_{1mA}/V_{1mA} \leq 5\%$															
Temperature Cycle	The conditions shown below shall be repeated 5 cycles <table> <tr> <th>Step</th><th>Temperature (℃)</th><th>Period (minutes)</th></tr> <tr> <td>1</td><td>-40±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>125±3</td><td>30±3</td></tr> <tr> <td>4</td><td>Room temperature</td><td>15±3</td></tr> </table>	Step	Temperature (℃)	Period (minutes)	1	-40±3	30±3	2	Room temperature	15±3	3	125±3	30±3	4	Room temperature	15±3	No visible damage $ \Delta V_{1mA}/V_{1mA} \leq 5\%$
Step	Temperature (℃)	Period (minutes)															
1	-40±3	30±3															
2	Room temperature	15±3															
3	125±3	30±3															
4	Room temperature	15±3															
High Temperature Load	Ambient Temp: 125±2℃ Duration: 1000hrs Load: Max. Allowable Voltage In AC eara.	$ \Delta V_{1mA}/V_{1mA} \leq 5\%$															
Damp Heat Load	Ambient Temp: 40±2℃, 90~95% R.H. Duration: 1000hrs Load: Max. Allowable Voltage	No visible damage $ \Delta V_{1mA}/V_{1mA} \leq 5\%$															
Voltage Proof	Metal balls method, 2500Vac 1 min.	No visible damage															

1.4 Electrical Ratings

Items	Test Condition/Description	Requirement					
Varistor Voltage	The voltage between two terminals with the specified measuring current 1mA.DC applied is called Vb.	To meet the Specified value					
Maximum Allowable Voltage	The recommended maximum sine wave voltage (RMS) or the Maximum DC voltage can be applied continuously.						
Maximum Clamping Voltage	The maximum voltage between two terminals with the specification standard impulse current. Applied waveform: 8/20μs 						
Rated Wattage	The maximum average power that can be applied within the specified ambient temperature.						
Energy	The maximum energy within the varistor voltage change of ±10% when one impulse of 10/1000μs or 2ms is applied.						
Withstanding Surge Current	The maximum current within the varistor voltage change of ± 10% with the standard impulse current (8/20 μs) applied one time.						
Varistor Voltage Temp. Coefficient	$\left \frac{V_{1mA@85^{\circ}C} - V_{1mA@25^{\circ}C}}{V_{1mA@25^{\circ}C}} \times \frac{1}{60} \times 100\%(\%/^{\circ}C) \right $	≤ 0.05%/°C					
	$\left \frac{V_{1mA@-40^{\circ}C} - V_{1mA@25^{\circ}C}}{V_{1mA@25^{\circ}C}} \times \frac{1}{65} \times 100\%(\%/^{\circ}C) \right $						
Surge Life	The change of Vb shall be measured after the impulse listed below which is applied 10,000 times continuously with the interval of ten seconds at room temperature. <table border="1" data-bbox="572 1637 1203 1785"> <tr> <td rowspan="2">5Φ series</td><td>180K to 680K</td><td>10A (8/20μs)</td></tr> <tr> <td>820K to 751K</td><td>20A (8/20μs)</td></tr> </table>	5Φ series	180K to 680K	10A (8/20μs)	820K to 751K	20A (8/20μs)	$\frac{\Delta V_b}{V_b} \leq \pm 10\%$
5Φ series	180K to 680K		10A (8/20μs)				
	820K to 751K	20A (8/20μs)					

2,Part Number Code

Φ7 Series (Metal Oxide Varistors)

FTR	07	D	561	K	Z	N	-	D14. 5H17. 5A11G017TB
FTR logo	Diameter 05:05mm 07:07mm 10:010mm 14:014mm 20:020mm 25:025mm 32:032mm	Pellet Type: D Circular type S Square L Rectangle	Varistor Voltage 180:18x10 ⁰ V 471:47x10 ¹ V 561:56x10 ¹ V ...	Toleranc e K: ±10%	Surge Series No Suffix: Standard Type J:High Surge Type Z:High Energy	Pin Type No Suffix: Straight Type G:G Type W:Out K type N:Inner K type X:Special type	Internal Controls Code	

2.1 Electrical Characteristics: $\Phi 7$ Series (Metal Oxide Varistors)

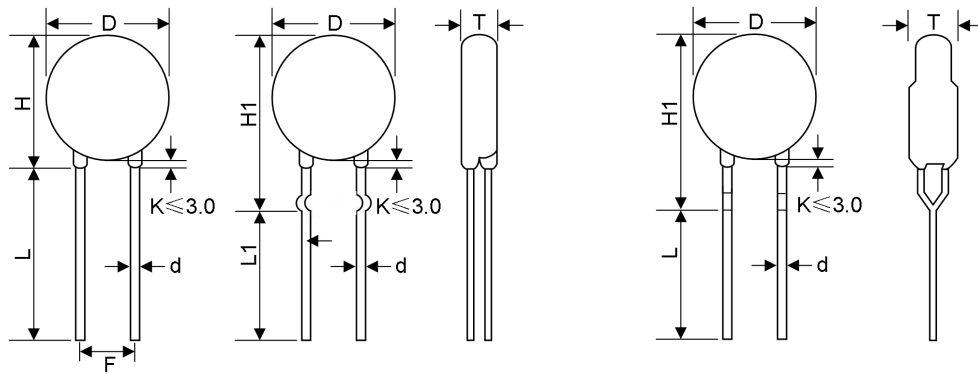
Part Number		Maximum Allowable Voltage		Varistor Voltage	Maximum Clamping Voltage		Withstanding Surge current		Maximum Energy (10/1000 μ s)		Rated Power	Dimension Tmax
Standard	High Surge	V _{AC} (V)	V _{DC} (V)	V _{1mA} (V)	I _g (A)	V _C (V)	(A) Standard	(A) High Surge	(J) Standard	(J) High Surge	(W)	(mm)
FTR07D180K	FTR07D180KJ	11	14	18(15-21.6)	2.5	36	250	500	0.9	2	0.02	5.0
FTR07D220K	FTR07D220KJ	14	18	22(19.5-26)	2.5	43	250	500	1.1	2.4	0.02	5.0
FTR07D270K	FTR07D270KJ	17	22	27(24-31)	2.5	53	250	500	1.4	3	0.02	5.0
FTR07D330K	FTR07D330KJ	20	26	33(29.5-36.5)	2.5	65	250	500	1.7	3.5	0.02	5.0
FTR07D390K	FTR07D390KJ	25	31	39(35-43)	2.5	77	250	500	2.1	4	0.02	5.0
FTR07D470K	FTR07D470KJ	30	38	47(42-52)	2.5	93	250	500	2.5	5	0.02	5.0
FTR07D560K	FTR07D560KJ	35	45	56(50-62)	2.5	110	250	500	3.1	6	0.02	5.0
FTR07D680K	FTR07D680KJ	40	56	68(61-75)	2.5	135	250	500	3.6	7	0.02	5.0
FTR07D820K	FTR07D820KJ	50	65	82(74-90)	10	135	1200	1750	5	10	0.25	5.0
FTR07D101K	FTR07D101KJ	60	85	100(90-110)	10	165	1200	1750	6.5	12	0.25	3.8
FTR07D121K	FTR07D121KJ	75	100	120(108-132)	10	200	1200	1750	7.8	13	0.25	4.0
FTR07D151K	FTR07D151KJ	95	125	150(135-165)	10	250	1200	1750	9.7	15	0.25	3.6
FTR07D181K	FTR07D181KJ	115	150	180(162-198)	10	300	1200	1750	11.7	16	0.25	3.7
FTR07D201K	FTR07D201KJ	130	170	200(180-220)	10	340	1200	1750	13	17	0.25	3.8
FTR07D221K	FTR07D221KJ	140	180	220(198-242)	10	360	1200	1750	14	19	0.25	3.9
FTR07D241K	FTR07D241KJ	150	200	240(216-264)	10	395	1200	1750	15	21	0.25	4.0
FTR07D271K	FTR07D271KJ	175	225	270(243-297)	10	455	1200	1750	18	24	0.25	4.2
FTR07D301K	FTR07D301KJ	190	250	300(270-330)	10	500	1200	1750	20	26	0.25	4.3
FTR07D331K	FTR07D331KJ	210	275	330(297-363)	10	550	1200	1750	23	28	0.25	4.3
FTR07D361K	FTR07D361KJ	230	300	360(324-396)	10	595	1200	1750	24	32	0.25	4.5
FTR07D391K	FTR07D391KJ	250	320	390(351-429)	10	650	1200	1750	26	35	0.25	4.6
FTR07D431K	FTR07D431KJ	275	350	430(387-473)	10	710	1200	1750	28	40	0.25	4.8
FTR07D471K	FTR07D471KJ	300	385	470(423-517)	10	775	1200	1750	29	42	0.25	5.0
FTR07D511K	FTR07D511KJ	320	415	510(459-561)	10	845	1200	1750	31	45	0.25	5.2
FTR07D561K	FTR07D561KJ	350	460	560(504-616)	10	925	1200	1750	35	49	0.25	5.4
FTR07D621K	FTR07D621KJ	385	505	620(558-682)	10	1025	1200	1750	38	55	0.25	5.7
FTR07D681K	FTR07D681KJ	420	560	680(612-748)	10	1120	1200	1750	42	60	0.25	6.0
FTR07D751K	FTR07D751KJ	460	615	750(675-825)	10	1240	1200	1750	45	64	0.25	6.1
FTR07D781K	FTR07D781KJ	485	640	780(702-858)	10	1290	1200	1750	48	69	0.25	6.2
FTR07D821K	FTR07D821KJ	510	670	820(738-902)	10	1355	1200	1750	52	73	0.25	6.4

Notes: 1. The tolerance of varistor voltage between 18V and 27V is more than 10%.

2. Leakage Current (@83% of V_{1mA}): IR $\leq$ 40 μ A (180K~680K) ; IR $\leq$ 25 μ A (820K~112K)

3. FTR07D820~821KZ: Applied AC220V, 1.2/50&8/20 μ S combination wave form 2KV/1KA,sub 0°、90°、180°、270° phases,each phase $\pm$ 5 times,each time interval 60s, a total of 40 at least times

2.2 Dimensions

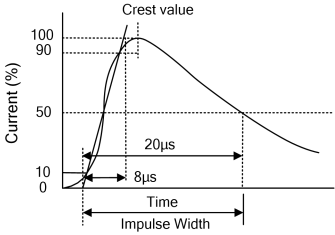


Symbol	H (max.)	H1 (Max.)	L (min.)	L1 (min.)	D (max.)	F (±0.8)	D (±0.05)	Tmax
Dimension (mm)	11.5	13	20	15	9	5	0.6	Please refer to the Electrical Characteristics Table

2.3 Reliability

Items	Test conditions / Methods	Specifications															
High Temperature Storage	Ambient Temp: 125±2°C Duration: 1000hrs	$ \Delta V_{1mA}/V_{1mA} \leq 5\%$															
Low Temperature Storage	Ambient Temp: -40±2°C Duration: 1000hrs	$ \Delta V_{1mA}/V_{1mA} \leq 5\%$															
Humidity	Ambient Temp: 40±2°C, 90~95% R.H. Duration: 1000hrs	$ \Delta V_{1mA}/V_{1mA} \leq 5\%$															
Temperature Cycle	The conditions shown below shall be repeated 5 cycles <table border="1"> <thead> <tr> <th>Step</th><th>Temperature (°C)</th><th>Period (minutes)</th></tr> </thead> <tbody> <tr> <td>1</td><td>-40±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>125±3</td><td>30±3</td></tr> <tr> <td>4</td><td>Room temperature</td><td>15±3</td></tr> </tbody> </table>	Step	Temperature (°C)	Period (minutes)	1	-40±3	30±3	2	Room temperature	15±3	3	125±3	30±3	4	Room temperature	15±3	No visible damage $ \Delta V_{1mA}/V_{1mA} \leq 5\%$
Step	Temperature (°C)	Period (minutes)															
1	-40±3	30±3															
2	Room temperature	15±3															
3	125±3	30±3															
4	Room temperature	15±3															
High Temperature Load	Ambient Temp: 125±2°C Duration: 1000hrs Load: Max. Allowable Voltage In AC eara.	$ \Delta V_{1mA}/V_{1mA} \leq 5\%$															
Damp Heat Load	Ambient Temp: 40±2°C, 90~95% R.H. Duration: 1000hrs Load: Max. Allowable Voltage	No visible damage $ \Delta V_{1mA}/V_{1mA} \leq 5\%$															
Voltage Proof	Metal balls method, 2500Vac 1 min.	No visible damage															

2.4 Electrical Ratings

Items	Test Condition/Description	Requirement					
Varistor Voltage	The voltage between two terminals with the specified measuring current 1mA.DC applied is called Vb.	To meet the Specified value					
Maximum Allowable Voltage	The recommended maximum sine wave voltage (RMS) or the Maximum DC voltage can be applied continuously.						
Maximum Clamping Voltage	The maximum voltage between two terminals with the specification standard impulse current. Applied waveform: 8/20μs 						
Rated Wattage	The maximum average power that can be applied within the specified ambient temperature.						
Energy	The maximum energy within the varistor voltage change of ±10% when one impulse of 10/1000μs or 2ms is applied.						
Withstanding Surge Current	The maximum current within the varistor voltage change of ±10% with the standard impulse current (8/20μs) applied one time.						
Varistor Voltage Temp. Coefficient	$\left \frac{V_{1mA@85^{\circ}C} - V_{1mA@25^{\circ}C}}{V_{1mA@25^{\circ}C}} \times \frac{1}{60} \times 100\% (/%/^{\circ}C) \right $	≤0.05%/°C					
	$\left \frac{V_{1mA@-40^{\circ}C} - V_{1mA@25^{\circ}C}}{V_{1mA@25^{\circ}C}} \times \frac{1}{65} \times 100\% (/%/^{\circ}C) \right $						
Surge Life	The change of Vb shall be measured after the impulse listed below which is applied 10,000 times continuously with the interval of ten seconds at room temperature. <table border="1" data-bbox="579 1610 1211 1753"> <tr> <td rowspan="2">7Φ series</td><td>180K to 680K</td><td>25A (8/20μs)</td></tr> <tr> <td>820K to 112K</td><td>60A (8/20μs)</td></tr> </table>	7Φ series	180K to 680K	25A (8/20μs)	820K to 112K	60A (8/20μs)	$\frac{\Delta V_b}{V_b} \leq \pm 10\%$
7Φ series	180K to 680K		25A (8/20μs)				
	820K to 112K	60A (8/20μs)					

3,Part Number Code **Φ10 Series (Metal Oxide Varistors)**

FTR	10	D	561	K	Z	N	-	D14. 5H17. 5A11G017TB
FTR logo	Diameter 05:05mm 07:07mm 10:010mm 14:014mm 20:020mm 25:025mm 32:032mm ...	Pellet Type: D Circular type S Square L Rectangle	Varistor Voltage 180:18x10 ⁰ V 471:47x10 ¹ V 561:56x10 ¹ V ...	Toleranc e K:±10%	Surge Series No Suffix: Standard Type J:High Surge Type Z:High Energy	Pin Type No Suffix: Straight Type G:G Type W:Out K type N:Inner K type X:Special type		Internal Controls Code

3.1 Electrical Characteristics: Φ10 Series (Metal Oxide Varistors)

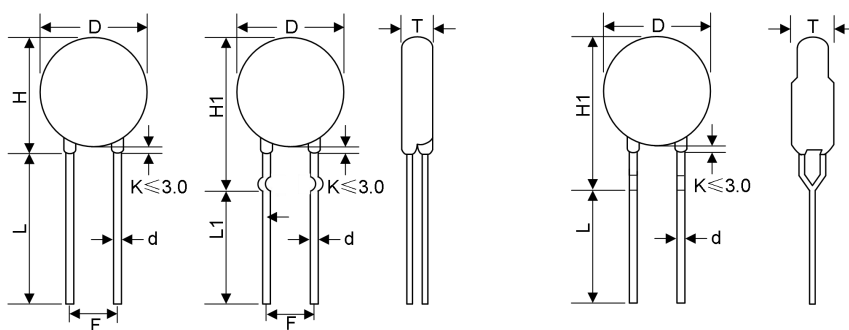
Part Number		Maximum Allowable Voltage		Varistor Voltage	Maximum Clamping Voltage		Withstanding Surge current		Maximum Energy (10/1000μs)		Rated Power	Dimension Tmax
Standard	High Surge	V _{Ac} (V)	V _{Dc} (V)	V _{1mA} (V)	I _p (A)	V _c (V)	(A) Standard	(A) High Surge	(J) Standard	(J) High Surge	(W)	(mm)
FTR10D180K	FTR10D180KJ	11	14	18(15-21.6)	5	36	500	1000	2.1	3	0.05	5.0
FTR10D220K	FTR10D220KJ	14	18	22(19.5-26)	5	43	500	1000	2.5	5	0.05	5.0
FTR10D270K	FTR10D270KJ	17	22	27(24-31)	5	53	500	1000	3	6	0.05	5.0
FTR10D330K	FTR10D330KJ	20	26	33(29.5-36.5)	5	65	500	1000	4	7	0.05	5.0
FTR10D390K	FTR10D390KJ	25	31	39(35-43)	5	77	500	1000	4.6	9	0.05	5.0
FTR10D470K	FTR10D470KJ	30	38	47(42-52)	5	93	500	1000	5.5	11	0.05	5.0
FTR10D560K	FTR10D560KJ	35	45	56(50-62)	5	110	500	1000	7	13	0.05	5.0
FTR10D680K	FTR10D680KJ	40	56	68(61-75)	5	135	500	1000	8.2	15	0.05	5.0
FTR10D820K	FTR10D820KJ	50	65	82(74-90)	25	135	2500	3500	12	17	0.4	5.0
FTR10D101K	FTR10D101KJ	60	85	100(90-110)	25	165	2500	3500	15	18	0.4	4.2
FTR10D121K	FTR10D121KJ	75	100	120(108-132)	25	200	2500	3500	18	21	0.4	4.4
FTR10D151K	FTR10D151KJ	95	125	150(135-165)	25	250	2500	3500	22	25	0.4	4.0
FTR10D181K	FTR10D181KJ	115	150	180(162-198)	25	300	2500	3500	27	30	0.4	4.1
FTR10D201K	FTR10D201KJ	130	170	200(180-220)	25	340	2500	3500	30	35	0.4	4.2
FTR10D221K	FTR10D221KJ	140	180	220(198-242)	25	360	2500	3500	32	39	0.4	4.3
FTR10D241K	FTR10D241KJ	150	200	240(216-264)	25	395	2500	3500	35	42	0.4	4.4
FTR10D271K	FTR10D271KJ	175	225	270(243-297)	25	455	2500	3500	37	49	0.4	4.6
FTR10D301K	FTR10D301KJ	190	250	300(270-330)	25	500	2500	3500	40	54	0.4	4.7
FTR10D331K	FTR10D331KJ	210	275	330(297-363)	25	550	2500	3500	43	58	0.4	4.7
FTR10D361K	FTR10D361KJ	230	300	360(324-396)	25	595	2500	3500	47	65	0.4	4.9
FTR10D391K	FTR10D391KJ	250	320	390(351-429)	25	650	2500	3500	60	70	0.4	5.0
FTR10D431K	FTR10D431KJ	275	350	430(387-473)	25	710	2500	3500	65	80	0.4	5.2
FTR10D471K	FTR10D471KJ	300	385	470(423-517)	25	775	2500	3500	67	85	0.4	5.4
FTR10D511K	FTR10D511KJ	320	415	510(459-561)	25	845	2500	3500	69	90	0.4	5.6
FTR10D561K	FTR10D561KJ	350	460	560(504-616)	25	925	2500	3500	70	92	0.4	5.8
FTR10D621K	FTR10D621KJ	385	505	620(558-682)	25	1025	2500	3500	72	95	0.4	6.1
FTR10D681K	FTR10D681KJ	420	560	680(612-748)	25	1120	2500	3500	75	98	0.4	6.4
FTR10D751K	FTR10D751KJ	460	615	750(675-825)	25	1240	2500	3500	77	100	0.4	6.5
FTR10D781K	FTR10D781KJ	485	640	780(702-858)	25	1290	2500	3500	80	105	0.4	6.6
FTR10D821K	FTR10D821KJ	510	670	820(738-902)	25	1355	2500	3500	85	110	0.4	6.8
FTR10D911K	FTR10D911KJ	550	745	910(819-1001)	25	1500	2500	3500	93	130	0.4	7.2
FTR10D102K	FTR10D102KJ	625	825	1000(900-1100)	25	1650	2500	3500	102	140	0.4	7.2
FTR10D112K	FTR10D112KJ	680	895	1100(990-1210)	25	1815	2500	3500	115	155	0.4	7.6

Notes: 1. The tolerance of varistor voltage between 18V and 27V is more than 10%.

2. Leakage Current (@83% of V_{1mA}): IR ≤ 40μA (180K~680K) ; IR ≤ 25μA (820K~112K)

3. FTR10D820~112KZ: Applied AC220V, 1.2/50&8/20μS combination wave form 4KV/2KA,sub 0°、90°、180°、270° phases,each phase±5 times,each time interval 60s, a total of 40 at least times

3.2 Dimensions

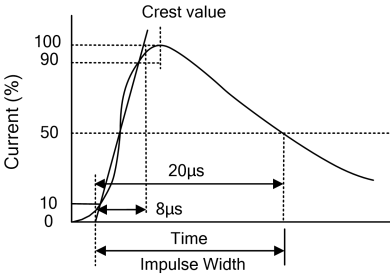


Symbol	H (max.)	H1 (Max.)	L (min.)	L1 (min.)	D (max.)	F (±0.8)	d (±0.05)	Tmax
Dimension (mm)	14.5	16.5	20	15	12	7.5	0.8	Please refer to the Electrical Characteristics Table

3.3 Reliability

Items	Test conditions / Methods	Specifications															
High Temperature Storage	Ambient Temp: 125±2°C Duration: 1000hrs	$ \Delta V_{1mA}/V_{1mA} \leq 5\%$															
Low Temperature Storage	Ambient Temp: -40±2°C Duration: 1000hrs	$ \Delta V_{1mA}/V_{1mA} \leq 5\%$															
Humidity	Ambient Temp: 40±2°C, 90~95% R.H. Duration: 1000hrs	$ \Delta V_{1mA}/V_{1mA} \leq 5\%$															
Temperature Cycle	The conditions shown below shall be repeated 5 cycles <table border="1"> <thead> <tr> <th>Step</th><th>Temperature (°C)</th><th>Period (minutes)</th></tr> </thead> <tbody> <tr> <td>1</td><td>-40±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>125±3</td><td>30±3</td></tr> <tr> <td>4</td><td>Room temperature</td><td>15±3</td></tr> </tbody> </table>	Step	Temperature (°C)	Period (minutes)	1	-40±3	30±3	2	Room temperature	15±3	3	125±3	30±3	4	Room temperature	15±3	No visible damage $ \Delta V_{1mA}/V_{1mA} \leq 5\%$
Step	Temperature (°C)	Period (minutes)															
1	-40±3	30±3															
2	Room temperature	15±3															
3	125±3	30±3															
4	Room temperature	15±3															
High Temperature Load	Ambient Temp: 125±2°C Duration: 1000hrs Load: Max. Allowable Voltage In AC eara.	$ \Delta V_{1mA}/V_{1mA} \leq 5\%$															
Damp Heat Load	Ambient Temp: 40±2°C, 90~95% R.H. Duration: 1000hrs Load: Max. Allowable Voltage	No visible damage $ \Delta V_{1mA}/V_{1mA} \leq 5\%$															
Voltage Proof	Metal balls method, 2500Vac 1 min.	No visible damage															

3.4 Electrical Ratings

Items	Test Condition/Description	Requirement					
Varistor Voltage	The voltage between two terminals with the specified measuring current 1mA.DC applied is called Vb.	To meet the Specified value					
Maximum Allowable Voltage	The recommended maximum sine wave voltage (RMS) or the Maximum DC voltage can be applied continuously.						
Maximum Clamping Voltage	The maximum voltage between two terminals with the specification standard impulse current. Applied waveform: 8/20μs 						
Rated Wattage	The maximum average power that can be applied within the specified ambient temperature.						
Energy	The maximum energy within the varistor voltage change of ± 10% when one impulse of 10/1000μs or 2ms is applied.						
Withstanding Surge Current	The maximum current within the varistor voltage change of ± 10% with the standard impulse current (8/20 μs) applied one time.						
Varistor Voltage Temp. Coefficient	$\left \frac{V_{1mA@85^{\circ}C} - V_{1mA@25^{\circ}C}}{V_{1mA@25^{\circ}C}} \times \frac{1}{60} \times 100\% (/%/^{\circ}C) \right $	≤0.05%/°C					
	$\left \frac{V_{1mA@-40^{\circ}C} - V_{1mA@25^{\circ}C}}{V_{1mA@25^{\circ}C}} \times \frac{1}{65} \times 100\% (/%/^{\circ}C) \right $						
Surge Life	The change of Vb shall be measured after the impulse listed below which is applied 10,000 times continuously with the interval of ten seconds at room temperature. <table border="1" data-bbox="576 1641 1240 1762"> <tr> <td rowspan="2">10Φ series</td><td>180K to 680K</td><td>50A (8/20μs)</td></tr> <tr> <td>820K to 112K</td><td>100A (8/20μs)</td></tr> </table>	10Φ series	180K to 680K	50A (8/20μs)	820K to 112K	100A (8/20μs)	$\frac{\Delta V_b}{V_b} \leq \pm 10\%$
10Φ series	180K to 680K		50A (8/20μs)				
	820K to 112K	100A (8/20μs)					

4,Part Number Code **Φ14 Series (Metal Oxide Varistors)**

FTR	14	D	561	K	Z	N	-	D14. 5H17. 5A11G017TB
FTR logo	Diameter 05:05mm 07:07mm 10:010mm 14:014mm 20:020mm 25:025mm 32:032mm ...	Pellet Type: D Circular type S Square L Rectangle	Varistor Voltage 180:18x10 ⁰ V 471:47x10 ¹ V 561:56x10 ¹ V ...	Toleranc e K:±10%	Surge Series No Suffix: Standard Type J:High Surge Type Z:High Energy	Pin Type No Suffix: Straight Type G:G Type W:Out K type N:Inner K type X:Special type		Internal Controls Code

4.1 Electrical Characteristics: Φ14 Series (Metal Oxide Varistors)

Part Number		Maximum Allowable Voltage		Varistor Voltage	Maximum Clamping Voltage		Withstanding Surge current		Maximum Energy (10/1000μs)		Rated Power	Dimension Tmax
Standard	High Surge	V _{AC} (V)	V _{DC} (V)	V _{1mA} (V)	I _p (A)	V _c (V)	(A) Standard	(A) High Surge	(J) Standard	(J) High Surge	(W)	(mm)
FTR14D180K	FTR14D180KJ	11	14	18(15-21.6)	10	36	1000	2000	4	7	0.1	5.0
FTR14D220K	FTR14D220KJ	14	18	22(19.5-26)	10	43	1000	2000	5	8	0.1	5.0
FTR14D270K	FTR14D270KJ	17	22	27(24-31)	10	53	1000	2000	6	10	0.1	5.0
FTR14D330K	FTR14D330KJ	20	26	33(29.5-36.5)	10	65	1000	2000	7.5	12	0.1	5.0
FTR14D390K	FTR14D390KJ	25	31	39(35-43)	10	77	1000	2000	8.6	13	0.1	5.0
FTR14D470K	FTR14D470KJ	30	38	47(42-52)	10	93	1000	2000	10	17	0.1	5.0
FTR14D560K	FTR14D560KJ	35	45	56(50-62)	10	110	1000	2000	11	20	0.1	5.0
FTR14D680K	FTR14D680KJ	40	56	68(61-75)	10	135	1000	2000	14	24	0.1	5.0
FTR14D820K	FTR14D820KJ	50	65	82(74-90)	50	135	4500	6000	22	27	0.6	5.0
FTR14D101K	FTR14D101KJ	60	85	100(90-110)	50	165	4500	6000	28	33	0.6	4.2
FTR14D121K	FTR14D121KJ	75	100	120(108-132)	50	200	4500	6000	32	40	0.6	4.4
FTR14D151K	FTR14D151KJ	95	125	150(135-165)	50	250	4500	6000	40	53	0.6	4.0
FTR14D181K	FTR14D181KJ	115	150	180(162-198)	50	300	4500	6000	50	60	0.6	4.1
FTR14D201K	FTR14D201KJ	130	170	200(180-220)	50	340	4500	6000	57	70	0.6	4.2
FTR14D221K	FTR14D221KJ	140	180	220(198-242)	50	360	4500	6000	60	78	0.6	4.3
FTR14D241K	FTR14D241KJ	150	200	240(216-264)	50	395	4500	6000	63	84	0.6	4.4
FTR14D271K	FTR14D271KJ	175	225	270(243-297)	50	455	4500	6000	70	99	0.6	4.6
FTR14D301K	FTR14D301KJ	190	250	300(270-330)	50	500	4500	6000	77	108	0.6	4.7
FTR14D331K	FTR14D331KJ	210	275	330(297-363)	50	550	4500	6000	85	115	0.6	4.7
FTR14D361K	FTR14D361KJ	230	300	360(324-396)	50	595	4500	6000	93	130	0.6	4.9
FTR14D391K	FTR14D391KJ	250	320	390(351-429)	50	650	4500	6000	100	140	0.6	5.0
FTR14D431K	FTR14D431KJ	275	350	430(387-473)	50	710	4500	6000	115	155	0.6	5.2
FTR14D471K	FTR14D471KJ	300	385	470(423-517)	50	775	4500	6000	118	175	0.6	5.4
FTR14D511K	FTR14D511KJ	320	415	510(459-561)	50	845	4500	6000	121	180	0.6	5.6
FTR14D561K	FTR14D561KJ	350	460	560(504-616)	50	925	4500	6000	125	185	0.6	5.8
FTR14D621K	FTR14D621KJ	385	505	620(558-682)	50	1025	4500	6000	128	190	0.6	6.1
FTR14D681K	FTR14D681KJ	420	560	680(612-748)	50	1120	4500	6000	130	200	0.6	6.4
FTR14D751K	FTR14D751KJ	460	615	750(675-825)	50	1240	4500	6000	143	210	0.6	6.5
FTR14D781K	FTR14D781KJ	485	640	780(702-858)	50	1290	4500	6000	148	220	0.6	6.6
FTR14D821K	FTR14D821KJ	510	670	820(738-902)	50	1355	4500	6000	157	235	0.6	6.8
FTR14D911K	FTR14D911KJ	550	745	910(819-1001)	50	1500	4500	6000	175	255	0.6	7.1
FTR14D102K	FTR14D102KJ	625	825	1000(900-1100)	50	1650	4500	6000	190	280	0.6	7.1
FTR14D112K	FTR14D112KJ	680	895	1100(990-1210)	50	1815	4500	6000	213	310	0.6	7.6
FTR14D122K	FTR14D122KJ	750	990	1200(1080-1320)	50	1980	4500	6000	232	324	0.6	8.0
FTR14D142K	FTR14D142KJ	880	1140	1400(1260-1540)	50	2310	4500	6000	238	327	0.6	8.6
FTR14D162K	FTR14D162KJ	1000	1280	1600(1440-1760)	50	2640	4500	6000	243	331	0.6	9.3
FTR14D182K	FTR14D182KJ	1100	1465	1800(1620-1980)	50	2970	4500	6000	250	335	0.6	10.1

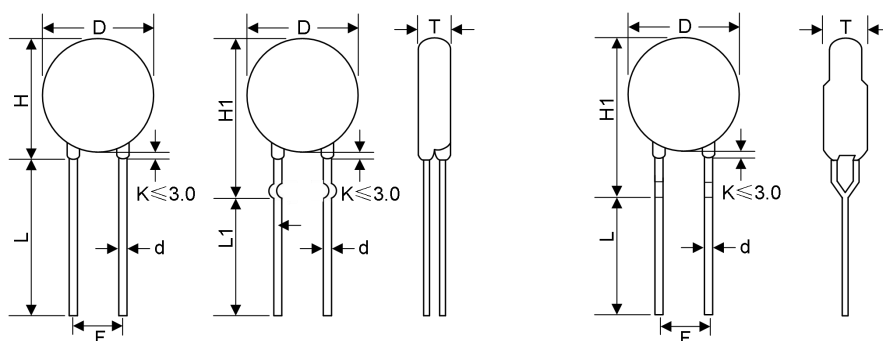
Notes: 1. The tolerance of varistor voltage between 18V and 27V is more than 10%.

2. Varistor voltage $\geq 1200V$, structure diagram is F type.

3. Leakage Current (@83% of V_{1mA}): $IR \leq 40\mu A$ (180K~680K) ; $IR \leq 25\mu A$ (820K~182K)

4. FTR14D820~182KZ: Applied AC220V, 1.2/50&8/20μS combination wave form 6KV/3KA,sub 0°、90°、180°、270° phases,each phase ± 5 times,each time interval 60s, a total of 40 at least times

4.2 Dimensions

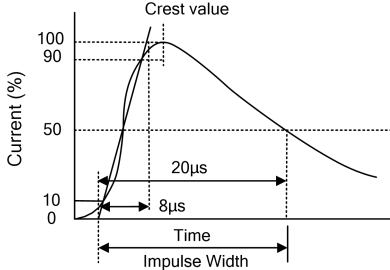


Symbol	H (max.)	H1 (Max.)	L (min.)	L1 (min.)	D (max.)	F (±0.8)	d (±0.05)	Tmax
Dimension (mm)	19	21	20	15	16	7.5	0.8	Please refer to the Electrical Characteristics Table

4.3 Reliability

Items	Test conditions / Methods	Specifications															
High Temperature Storage	Ambient Temp: 125±2°C Duration: 1000hrs	$ \Delta V_{1mA}/V_{1mA} \leq 5\%$															
Low Temperature Storage	Ambient Temp: -40±2°C Duration: 1000hrs	$ \Delta V_{1mA}/V_{1mA} \leq 5\%$															
Humidity	Ambient Temp: 40±2°C, 90~95% R.H. Duration: 1000hrs	$ \Delta V_{1mA}/V_{1mA} \leq 5\%$															
Temperature Cycle	The conditions shown below shall be repeated 5 cycles <table border="1"> <tr> <th>Step</th><th>Temperature (°C)</th><th>Period (minutes)</th></tr> <tr> <td>1</td><td>-40±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>125±3</td><td>30±3</td></tr> <tr> <td>4</td><td>Room temperature</td><td>15±3</td></tr> </table>	Step	Temperature (°C)	Period (minutes)	1	-40±3	30±3	2	Room temperature	15±3	3	125±3	30±3	4	Room temperature	15±3	No visible damage $ \Delta V_{1mA}/V_{1mA} \leq 5\%$
Step	Temperature (°C)	Period (minutes)															
1	-40±3	30±3															
2	Room temperature	15±3															
3	125±3	30±3															
4	Room temperature	15±3															
High Temperature Load	Ambient Temp: 125±2°C Duration: 1000hrs Load: Max. Allowable Voltage In AC eara.	$ \Delta V_{1mA}/V_{1mA} \leq 5\%$															
Damp Heat Load	Ambient Temp: 40±2°C, 90~95% R.H. Duration: 1000hrs Load: Max. Allowable Voltage	No visible damage $ \Delta V_{1mA}/V_{1mA} \leq 5\%$															
Voltage Proof	Metal balls method, 2500Vac 1 min.	No visible damage															

4.4 Electrical Ratings

Items	Test Condition/Description	Requirement					
Varistor Voltage	The voltage between two terminals with the specified measuring current 1mA.DC applied is called Vb.	To meet the Specified value					
Maximum Allowable Voltage	The recommended maximum sine wave voltage (RMS) or the Maximum DC voltage can be applied continuously.						
Maximum Clamping Voltage	The maximum voltage between two terminals with the specification standard impulse current. Applied waveform: 8/20μs 						
Rated Wattage	The maximum average power that can be applied within the specified ambient temperature.						
Energy	The maximum energy within the varistor voltage change of ±10% when one impulse of 10/1000μs or 2ms is applied.						
Withstanding Surge Current	The maximum current within the varistor voltage change of ±10% with the standard impulse current (8/20μs) applied one time.						
Varistor Voltage Temp. Coefficient	$\left \frac{V_{1mA@85^{\circ}C} - V_{1mA@25^{\circ}C}}{V_{1mA@25^{\circ}C}} \times \frac{1}{60} \times 100\%(\%/^{\circ}C) \right $ $\left \frac{V_{1mA@-40^{\circ}C} - V_{1mA@25^{\circ}C}}{V_{1mA@25^{\circ}C}} \times \frac{1}{65} \times 100\%(\%/^{\circ}C) \right $	≤0.05%/°C					
Surge Life	The change of Vb shall be measured after the impulse listed below which is applied 10,000 times continuously with the interval of ten seconds at room temperature. <table border="1" data-bbox="592 1715 1203 1868"> <tr> <td rowspan="2">14Φ series</td><td>180K to 680K</td><td>75A (8/20μs)</td></tr> <tr> <td>820K to 182K</td><td>150A (8/20μs)</td></tr> </table>	14Φ series	180K to 680K	75A (8/20μs)	820K to 182K	150A (8/20μs)	$\frac{\Delta V_b}{V_b} \leq \pm 10\%$
14Φ series	180K to 680K		75A (8/20μs)				
	820K to 182K	150A (8/20μs)					

5,Part Number Code **Φ20 Series (Metal Oxide Varistors)**

FTR	20	D	561	K	Z	N	-	D14. 5H17. 5A11G017TB
FTR logo	Diameter 05:05mm 07:07mm 10:010mm 14:014mm 20:020mm 25:025mm 32:032mm ...	Pellet Type: D Circular type S Square L Rectangle	Varistor Voltage 180:18x10 ⁰ V 471:47x10 ¹ V 561:56x10 ¹ V ...	Toleranc e K:±10%	Surge Series No Suffix: Standard Type J:High Surge Type Z:High Energy	Pin Type No Suffix: Straight Type G:G Type W:Out K type N:Inner K type X:Special type	Internal Controls Code	

5.1 Electrical Characteristics: Φ20 Series (Metal Oxide Varistors)

Part Number		Maximum Allowable Voltage		Varistor Voltage	Maximum Clamping Voltage		Withstanding Surge current		Maximum Energy (10/1000μs)		Rated Power	Dimension Tmax
Standard	High Surge	V _{AC} (V)	V _{DC} (V)	V _{1mA} (V)	I _p (A)	V _c (V)	(A) Standard	(A) High Surge	(J) Standard	(J) High Surge	(W)	(mm)
FTR20D180K	FTR20D180KJ	11	14	18(15-21.6)	20	36	2000	3000	11	13	0.2	5.0
FTR20D220K	FTR20D220KJ	14	18	22(19.5-26)	20	43	2000	3000	14	16	0.2	5.0
FTR20D270K	FTR20D270KJ	17	22	27(24-31)	20	53	2000	3000	16	19	0.2	5.0
FTR20D330K	FTR20D330KJ	20	26	33(29.5-36.5)	20	65	2000	3000	23	24	0.2	5.0
FTR20D390K	FTR20D390KJ	25	31	39(35-43)	20	77	2000	3000	26	28	0.2	5.0
FTR20D470K	FTR20D470KJ	30	38	47(42-52)	20	93	2000	3000	30	34	0.2	5.0
FTR20D560K	FTR20D560KJ	35	45	56(50-62)	20	110	2000	3000	38	44	0.2	5.0
FTR20D680K	FTR20D680KJ	40	56	68(61-75)	20	135	2000	3000	41	49	0.2	5.0
FTR20D820K	FTR20D820KJ	50	65	82(74-90)	100	135	6500	10000	45	56	1.0	5.0
FTR20D101K	FTR20D101KJ	60	85	100(90-110)	100	165	6500	10000	50	70	1.0	4.6
FTR20D121K	FTR20D121KJ	75	100	120(108-132)	100	200	6500	10000	55	85	1.0	4.8
FTR20D151K	FTR20D151KJ	95	125	150(135-165)	100	250	6500	10000	70	106	1.0	4.4
FTR20D181K	FTR20D181KJ	115	150	180(162-198)	100	300	6500	10000	85	130	1.0	4.5
FTR20D201K	FTR20D201KJ	130	170	200(180-220)	100	340	6500	10000	95	140	1.0	4.6
FTR20D221K	FTR20D221KJ	140	180	220(198-242)	100	360	6500	10000	100	155	1.0	4.7
FTR20D241K	FTR20D241KJ	150	200	240(216-264)	100	395	6500	10000	108	168	1.0	4.8
FTR20D271K	FTR20D271KJ	175	225	270(243-297)	100	455	6500	10000	127	190	1.0	5.0
FTR20D301K	FTR20D301KJ	190	250	300(270-330)	100	500	6500	10000	136	210	1.0	5.0
FTR20D331K	FTR20D331KJ	210	275	330(297-363)	100	550	6500	10000	150	228	1.0	5.1
FTR20D361K	FTR20D361KJ	230	300	360(324-396)	100	595	6500	10000	163	255	1.0	5.3
FTR20D391K	FTR20D391KJ	250	320	390(351-429)	100	650	6500	10000	180	275	1.0	5.4
FTR20D431K	FTR20D431KJ	275	350	430(387-473)	100	710	6500	10000	190	305	1.0	5.6
FTR20D471K	FTR20D471KJ	300	385	470(423-517)	100	775	6500	10000	204	350	1.0	5.8
FTR20D511K	FTR20D511KJ	320	415	510(459-561)	100	845	6500	10000	210	360	1.0	6.0
FTR20D561K	FTR20D561KJ	350	460	560(504-616)	100	925	6500	10000	215	380	1.0	6.4
FTR20D621K	FTR20D621KJ	385	505	620(558-682)	100	1025	6500	10000	224	390	1.0	6.7
FTR20D681K	FTR20D681KJ	420	560	680(612-748)	100	1120	6500	10000	230	400	1.0	7.0
FTR20D751K	FTR20D751KJ	460	615	750(675-825)	100	1240	6500	10000	255	420	1.0	7.1
FTR20D781K	FTR20D781KJ	485	640	780(702-858)	100	1290	6500	10000	265	440	1.0	7.2
FTR20D821K	FTR20D821KJ	510	670	820(738-902)	100	1355	6500	10000	282	460	1.0	7.4
FTR20D911K	FTR20D911KJ	550	745	910(819-1001)	100	1500	6500	10000	310	510	1.0	7.8
FTR20D102K	FTR20D102KJ	625	825	1000(900-1100)	100	1650	6500	10000	342	565	1.0	7.8
FTR20D112K	FTR20D112KJ	680	895	1100(990-1210)	100	1815	6500	10000	383	620	1.0	8.2
FTR20D122K	FTR20D122KJ	750	990	1200(1080-1320)	100	1980	6500	10000	408	660	1.0	8.6
FTR20D142K	FTR20D142KJ	880	1140	1400(1260-1540)	100	2310	6500	10000	532	784	1.0	9.1
FTR20D162K	FTR20D162KJ	1000	1280	1600(1440-1760)	100	2640	6500	10000	606	896	1.0	10.2
FTR20D182K	FTR20D182KJ	1100	1465	1800(1620-1980)	100	2970	6500	10000	625	990	1.0	10.8

Notes: 1. The tolerance of varistor voltage between 18V and 27V is more than 10%.

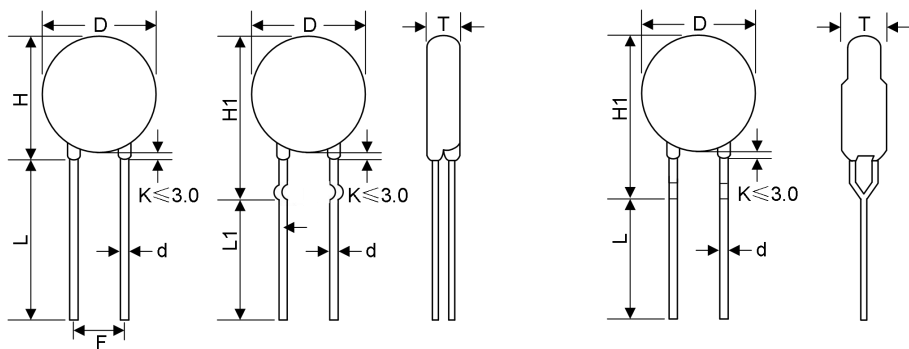
2. Varistor voltage $\geq 1200V$, structure diagram is F type.

3. Leakage Current (@83% of V_{1mA}): IR $\leq 40\mu A$ (180K~680K) ; IR $\leq 25\mu A$ (820K~182K)

4,FTR20D820~182KZ: Applied AC220V, 1.2/50&8/20μS combination wave form 10KV/5KA,

sub 0°、90°、180°、270°phases,each phase ± 5 times,each time interval 60s,a total of 40 at least times

5.2 Dimensions

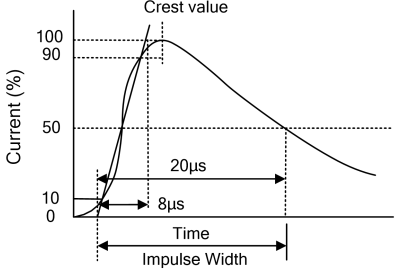


Symbol	H (max.)	H1 (Max.)	L (min.)	L1 (min.)	D (max.)	F (±0.8)	d (±0.05)	Tmax
Dimension (mm)	25.5	28	20	15	22.5	7.5/10.0	0.80/1.0	Please refer to the Electrical Characteristics Table

5.3 Reliability

Items	Test conditions / Methods	Specifications															
High Temperature Storage	Ambient Temp: 125±2℃ Duration: 1000hrs	ΔV1mA/V1mA ≤5%															
Low Temperature Storage	Ambient Temp: -40±2℃ Duration: 1000hrs	ΔV1mA/V1mA ≤5%															
Humidity	Ambient Temp: 40±2℃, 90~95% R.H. Duration: 1000hrs	ΔV1mA/V1mA ≤5%															
Temperature Cycle	The conditions shown below shall be repeated 5 cycles <table> <tr> <th>Step</th><th>Temperature (℃)</th><th>Period (minutes)</th></tr> <tr> <td>1</td><td>-40±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>125±3</td><td>30±3</td></tr> <tr> <td>4</td><td>Room temperature</td><td>15±3</td></tr> </table>	Step	Temperature (℃)	Period (minutes)	1	-40±3	30±3	2	Room temperature	15±3	3	125±3	30±3	4	Room temperature	15±3	No visible damage ΔV1mA/V1mA ≤5%
Step	Temperature (℃)	Period (minutes)															
1	-40±3	30±3															
2	Room temperature	15±3															
3	125±3	30±3															
4	Room temperature	15±3															
High Temperature Load	Ambient Temp: 125±2℃ Duration: 1000hrs Load: Max. Allowable Voltage In AC eara.	ΔV1mA/V1mA ≤5%															
Damp Heat Load	Ambient Temp: 40±2℃, 90~95% R.H. Duration: 1000hrs Load: Max. Allowable Voltage	No visible damage ΔV1mA/V1mA ≤5%															
Voltage Proof	Metal balls method, 2500Vac 1 min.	No visible damage															

5.4 Electrical Ratings

Items	Test Condition/Description	Requirement					
Varistor Voltage	The voltage between two terminals with the specified measuring current 1mA.DC applied is called Vb.	To meet the Specified value					
Maximum Allowable Voltage	The recommended maximum sine wave voltage (RMS) or the Maximum DC voltage can be applied continuously.						
Maximum Clamping Voltage	The maximum voltage between two terminals with the specification standard impulse current. Applied waveform: 8/20μs 						
Rated Wattage	The maximum average power that can be applied within the specified ambient temperature.						
Energy	The maximum energy within the varistor voltage change of ±10% when one impulse of 10/1000μs or 2ms is applied.						
Withstanding Surge Current	The maximum current within the varistor voltage change of ±10% with the standard impulse current (8/20μs) applied one time.						
Varistor Voltage Temp. Coefficient	$\left \frac{V_{1mA@85^{\circ}C} - V_{1mA@25^{\circ}C}}{V_{1mA@25^{\circ}C}} \times \frac{1}{60} \times 100\% (^{\circ}C) \right $ $\left \frac{V_{1mA@-40^{\circ}C} - V_{1mA@25^{\circ}C}}{V_{1mA@25^{\circ}C}} \times \frac{1}{65} \times 100\% (^{\circ}C) \right $	≤0.05%/°C					
Surge Life	The change of Vb shall be measured after the impulse listed below which is applied 10,000 times continuously with the interval of ten seconds at room temperature. <table border="1" data-bbox="574 1680 1236 1836"> <tr> <td rowspan="2">20Φ series</td><td>180K to 680K</td><td>100A (8/20μs)</td></tr> <tr> <td>820K to 182K</td><td>200A (8/20μs)</td></tr> </table>	20Φ series	180K to 680K	100A (8/20μs)	820K to 182K	200A (8/20μs)	$\frac{\Delta V_b}{V_b} \leq \pm 10\%$
20Φ series	180K to 680K		100A (8/20μs)				
	820K to 182K	200A (8/20μs)					

6,Part Number Code **Φ25 Series (Metal Oxide Varistors)**

FTR	25	D	561	K	Z	N	-	D14. 5H17. 5A11G017TB
FTR logo	Diameter 05:05mm 07:07mm 10:010mm 14:014mm 20:020mm 25:025mm 32:032mm ...	Pellet Type: D Circular type S Square L Rectangle	Varistor Voltage 180:18x10 ⁰ V 471:47x10 ¹ V 561:56x10 ¹ V ...	Toleranc e K:±10%	Surge Series No Suffix: Standard Type J:High Surge Type Z:High Energy	Pin Type No Suffix: Straight Type G:G Type W:Out K type N:Inner K type X:Special type		Internal Controls Code

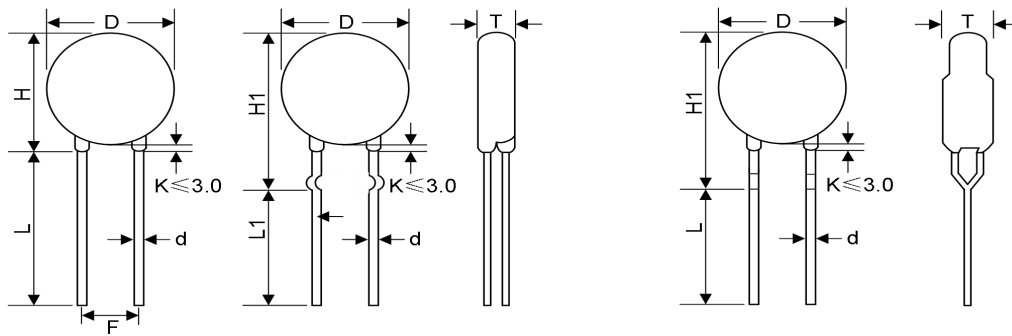
6.1 Electrical Characteristics: Φ25 Series (Metal Oxide Varistors)

Part Number		Maximum Allowable Voltage		Varistor Voltage	Maximum Clamping Voltage		Withstanding Surge current		Maximum Energy (10/1000μs)	Rated Power	Dimension Tmax
Standard	High Surge	V _{ac} (V)	V _{dc} (V)	V _{1mA} (V)	I _r (A)	V _c (V)	(A) Standard	(A) High Surge	(J)	(W)	(mm)
FR25D180K	FTR25D180KJ	11	14	18(15-21.6)	30	36	4500	6000	20	0.25	4.8
FTR25D220K	FTR25D220KJ	14	18	22(19.5-26)	30	43	4500	6000	25	0.25	4.9
FTR25D270K	FTR25D270KJ	17	22	27(24-31)	30	53	4500	6000	30	0.25	5.0
FTR25D330K	FTR25D330KJ	20	26	33(29.5-36.5)	30	65	4500	6000	35	0.25	5.2
FTR25D390K	FTR25D390KJ	25	31	39(35-43)	30	77	4500	6000	40	0.25	5.5
FTR25D470K	FTR25D470KJ	30	38	47(42-52)	30	93	4500	6000	50	0.25	5.1
FTR25D560K	FTR25D560KJ	35	45	56(50-62)	30	110	4500	6000	60	0.25	5.4
FTR25D680K	FTR25D680KJ	40	56	68(61-75)	30	135	4500	6000	70	0.25	5.7
FTR25D820K	FTR25D820KJ	50	65	82(74-90)	150	135	15000	18000	80	1.2	4.5
FTR25D101K	FTR25D101KJ	60	85	100(90-110)	150	165	15000	18000	100	1.2	4.6
FTR25D121K	FTR25D121KJ	75	100	120(108-132)	150	200	15000	18000	120	1.2	4.8
FTR25D151K	FTR25D151KJ	95	125	150(135-165)	150	250	15000	18000	160	1.2	4.9
FTR25D181K	FTR25D181KJ	115	150	180(162-198)	150	300	15000	18000	175	1.2	5.0
FTR25D201K	FTR25D201KJ	130	170	200(180-220)	150	340	15000	18000	190	1.2	4.9
FTR25D221K	FTR25D221KJ	140	180	220(198-242)	150	360	15000	18000	200	1.2	5.2
FTR25D241K	FTR25D241KJ	150	200	240(216-264)	150	395	15000	18000	220	1.2	5.5
FTR25D271K	FTR25D271KJ	175	225	270(243-297)	150	455	15000	18000	255	1.2	5.2
FTR25D301K	FTR25D301KJ	190	250	300(270-330)	150	500	15000	18000	275	1.2	5.3
FTR25D331K	FTR25D331KJ	210	275	330(297-363)	150	550	15000	18000	300	1.2	5.4
FTR25D361K	FTR25D361KJ	230	300	360(324-396)	150	595	15000	18000	330	1.2	5.6
FTR25D391K	FTR25D391KJ	250	320	390(351-429)	150	650	15000	18000	360	1.2	5.8
FTR25D431K	FTR25D431KJ	275	350	430(387-473)	150	710	15000	18000	380	1.2	6.1
FTR25D471K	FTR25D471KJ	300	385	470(423-517)	150	775	15000	18000	400	1.2	6.4
FTR25D511K	FTR25D511KJ	320	415	510(459-561)	150	845	15000	18000	420	1.2	6.7
FTR25D561K	FTR25D561KJ	350	460	560(504-616)	150	925	15000	18000	440	1.2	7.0
FTR25D621K	FTR25D621KJ	385	505	620(558-682)	150	1025	15000	18000	450	1.2	7.3
FTR25D681K	FTR25D681KJ	420	560	680(612-748)	150	1120	15000	18000	460	1.2	7.5
FTR25D751K	FTR25D751KJ	460	615	750(675-825)	150	1240	15000	18000	510	1.2	7.7
FTR25D781K	FTR25D781KJ	485	640	780(702-858)	150	1290	15000	18000	530	1.2	7.8
FTR25D821K	FTR25D821KJ	510	670	820(738-902)	150	1355	15000	18000	570	1.2	8.1
FTR25D911K	FTR25D911KJ	550	745	910(819-1001)	150	1500	15000	18000	620	1.2	8.6
FTR25D102K	FTR25D102KJ	625	825	1000(900-1100)	150	1650	15000	18000	685	1.2	9.2
FTR25D112K	FTR25D112KJ	680	895	1100(990-1210)	150	1815	15000	18000	720	1.2	9.8
FTR25D122K	FTR25D122KJ	750	990	1200(1080-1320)	150	1980	15000	18000	792	1.2	10.4
FTR25D142K	FTR25D142KJ	880	1140	1400(1260-1540)	150	2310	15000	18000	850	1.2	11.2
FTR25D162K	FTR25D162KJ	1000	1280	1600(1440-1760)	150	2640	15000	18000	970	1.2	12.8
FTR25D182K	FTR25D182KJ	1100	1465	1800(1620-1980)	150	2970	15000	18000	1092	1.2	13.5

Notes: 1. The tolerance of varistor voltage between 18V and 27V is more than 10%.

2. Leakage Current (@83% of V_{1mA}): IR ≤ 50μA (180K~680K) ; IR ≤ 35μA (820K~182K)

6.2 Dimensions

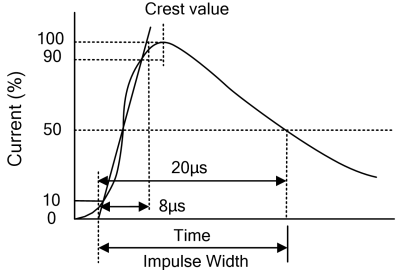


Symbol	H (max.)	H1 (Max.)	L (min.)	L1 (min.)	D (max.)	F (±0.8)	d (±0.05)	Tmax
Dimension (mm)	31	33	20	15	28	10.0/12.5	1.0	Please refer to the Electrical Characteristics Table

6.3 Reliability

Items	Test conditions / Methods	Specifications															
High Temperature Storage	Ambient Temp: 125±2°C Duration: 1000hrs	$ \Delta V_{1mA}/V_{1mA} \leq 5\%$															
Low Temperature Storage	Ambient Temp: -40±2°C Duration: 1000hrs	$ \Delta V_{1mA}/V_{1mA} \leq 5\%$															
Humidity	Ambient Temp: 40±2°C, 90~95% R.H. Duration: 1000hrs	$ \Delta V_{1mA}/V_{1mA} \leq 5\%$															
Temperature Cycle	The conditions shown below shall be repeated 5 cycles <table border="1"> <tr> <th>Step</th><th>Temperature (°C)</th><th>Period (minutes)</th></tr> <tr> <td>1</td><td>-40±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>125±3</td><td>30±3</td></tr> <tr> <td>4</td><td>Room temperature</td><td>15±3</td></tr> </table>	Step	Temperature (°C)	Period (minutes)	1	-40±3	30±3	2	Room temperature	15±3	3	125±3	30±3	4	Room temperature	15±3	No visible damage $ \Delta V_{1mA}/V_{1mA} \leq 5\%$
Step	Temperature (°C)	Period (minutes)															
1	-40±3	30±3															
2	Room temperature	15±3															
3	125±3	30±3															
4	Room temperature	15±3															
High Temperature Load	Ambient Temp: 125±2°C Duration: 1000hrs Load: Max. Allowable Voltage In AC eara.	$ \Delta V_{1mA}/V_{1mA} \leq 5\%$															
Damp Heat Load	Ambient Temp: 40±2°C, 90~95% R.H. Duration: 1000hrs Load: Max. Allowable Voltage	No visible damage $ \Delta V_{1mA}/V_{1mA} \leq 5\%$															
Voltage Proof	Metal balls method, 2500Vac 1 min.	No visible damage															

6.4 Electrical Ratings

Items	Test Condition/Description	Requirement					
Varistor Voltage	The voltage between two terminals with the specified measuring current 1mA.DC applied is called Vb.	To meet the Specified value					
Maximum Allowable Voltage	The recommended maximum sine wave voltage (RMS) or the Maximum DC voltage can be applied continuously.						
Maximum Clamping Voltage	The maximum voltage between two terminals with the specification standard impulse current. Applied waveform: 8/20μs 						
Rated Wattage	The maximum average power that can be applied within the specified ambient temperature.						
Energy	The maximum energy within the varistor voltage change of ±10% when one impulse of 10/1000μs or 2ms is applied.						
Withstanding Surge Current	The maximum current within the varistor voltage change of ±10% with the standard impulse current (8/20μs) applied one time.						
Varistor Voltage Temp. Coefficient	$\left \frac{V_{1mA@85^{\circ}C} - V_{1mA@25^{\circ}C}}{V_{1mA@25^{\circ}C}} \times \frac{1}{60} \times 100\% ({}^{\circ}C) \right $ $\left \frac{V_{1mA@-40^{\circ}C} - V_{1mA@25^{\circ}C}}{V_{1mA@25^{\circ}C}} \times \frac{1}{65} \times 100\% ({}^{\circ}C) \right $	≤0.05%/°C					
Surge Life	The change of Vb shall be measured after the impulse listed below which is applied 10,000 times continuously with the interval of ten seconds at room temperature. <table border="1"> <tr> <td rowspan="2">25Φ series</td><td>180K to 680K</td><td>250A (8/20μs)</td></tr> <tr> <td>820K to 182K</td><td>450A (8/20μs)</td></tr> </table>	25Φ series	180K to 680K	250A (8/20μs)	820K to 182K	450A (8/20μs)	$\frac{\Delta V_b}{V_b}$ $\leq \pm 10\%$
25Φ series	180K to 680K		250A (8/20μs)				
	820K to 182K	450A (8/20μs)					

7,Part Number Code **Φ32 Series (Metal Oxide Varistors)**

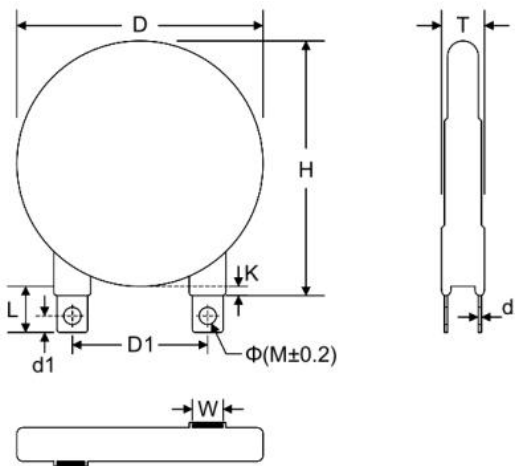
FTR	32	D	561	K	Z	N	-	D14. 5H17. 5A11G017TB
FTR logo	Diameter 05:05mm 07:07mm 10:010mm 14:014mm 20:020mm 25:025mm 32:032mm ...	Pellet Type: D Circular type S Square L Rectangle	Varistor Voltage 180:18x10 ⁰ V 471:47x10 ¹ V 561:56x10 ¹ V ...	Toleranc e K:±10%	Surge Series No Suffix: Standard Type J:High Surge Type Z:High Energy	Pin Type No Suffix: Straight Type G:G Type W:Out K type N:Inner K type X:Special type		Internal Controls Code

7.1 Electrical Characteristics: Φ32 Series (Metal Oxide Varistors)

Part Number	Maximum Allowable Voltage		Varistor Voltage	Maximum Clamping Voltage		Withstanding Surge current	Maximum Energy (10/1000μs)	Dimension Tmax
	V _{AC} (V)	V _{DC} (V)		I _p (A)	V _c (V)			
FTR32D181K	115	150	180(162-198)	200	300	25000	240	6.1
FTR32D201K	130	170	200(180-220)	200	340	25000	250	6.2
FTR32D221K	140	180	220(198-242)	200	360	25000	270	6.3
FTR32D241K	150	200	240(216-264)	200	395	25000	290	6.4
FTR32D271K	175	225	270(243-297)	200	455	25000	300	6.6
FTR32D301K	190	250	300(270-330)	200	500	25000	330	6.8
FTR32D331K	210	275	330(297-363)	200	550	25000	360	6.9
FTR32D361K	230	300	360(324-396)	200	595	25000	380	7.1
FTR32D391K	250	320	390(351-429)	200	650	25000	400	7.3
FTR32D431K	275	350	430(387-473)	200	710	25000	430	7.5
FTR32D471K	300	385	470(423-517)	200	775	25000	460	7.8
FTR32D511K	320	415	510(459-561)	200	845	25000	510	8.0
FTR32D561K	350	460	560(504-616)	200	925	25000	540	8.5
FTR32D621K	385	505	620(558-682)	200	1025	25000	570	8.7
FTR32D681K	420	560	680(612-748)	200	1120	25000	600	9.0
FTR32D751K	460	615	750(675-825)	200	1240	25000	620	9.4
FTR32D781K	485	640	780(702-858)	200	1290	25000	660	9.6
FTR32D821K	510	670	820(738-902)	200	1355	25000	700	9.8
FTR32D911K	550	745	910(819-1001)	200	1500	25000	750	10.4
FTR32D102K	625	825	1000(900-1100)	200	1650	25000	810	11.2
FTR32D112K	680	895	1100(990-1210)	200	1815	25000	910	11.8
FTR32D122K	750	990	1200(1080-1320)	200	1980	25000	960	12.3
FTR32D142K	880	1140	1400(1260-1540)	200	2310	25000	1020	13.3
FTR32D162K	1000	1280	1600(1440-1760)	200	2640	25000	1080	14.3

Notes: 1. Leakage Current (@83% of V1mA): IR ≤ 35μA (181K~162K)

7.2 Dimensions



Symbol	H (max.)	D (max.)	D1 (±1)	L (min.)	K (max.)	W (±0.5)	d (±0.25)	d1 (±0.25)	ΦM (±0.2)	Tmax
Dimension (mm)	40	36	25.4	14.5	3.2	7	0.5	3.7	3.2	Please refer to the Electrical Characteristics Table

8,Part Number Code **Φ34S Series (Metal Oxide Varistors)**

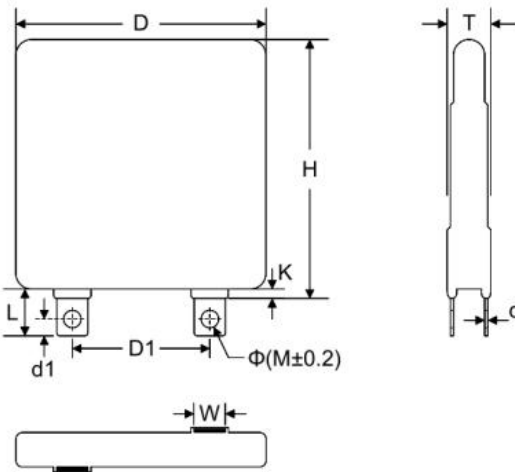
FTR	34	S	621	K	Z	N	*****
FTR logo	Diameter 05:05mm 07:07mm 10:010mm 14:014mm 20:020mm 25:025mm 32:032mm ...	Pellet Type: D Circular type S Square L Rectangle	Varistor Voltage 180:18x10 ⁰ V 471:47x10 ¹ V 561:56x10 ¹ V ...	Toleranc e K:±10%	Surge Series No Suffix: Standard Type J:High Surge Type Z:High Energy	Pin Type No Suffix: Straight Type G:G Type W:Out K type N:Inner K type X:Special type	Internal Controls Code

8.1 Electrical Characteristics: Φ34S Series (Metal Oxide Varistors)

Part Number	Maximum Allowable Voltage		Varistor Voltage	Maximum Clamping Voltage		Withstanding Surge current	Maximum Energy (10/1000μs)	Dimension Tmax
	V _{AC} (V)	V _{DC} (V)		I _p (A)	V _c (V)			
Standard	V _{AC} (V)	V _{DC} (V)	V _{1mA} (V)	I _p (A)	V _c (V)	(A)	(J)	(mm)
FTR34S181K	115	150	180(162-198)	300	300	40000	350	6.3
FTR34S201K	130	170	200(180-220)	300	340	40000	330	6.2
FTR34S221K	140	180	220(198-242)	300	360	40000	360	6.3
FTR34S241K	150	200	240(216-264)	300	395	40000	390	6.4
FTR34S271K	175	225	270(243-297)	300	455	40000	420	6.6
FTR34S301K	190	250	300(270-330)	300	500	40000	460	6.8
FTR34S331K	210	275	330(297-363)	300	550	40000	500	6.9
FTR34S361K	230	300	360(324-396)	300	595	40000	510	7.1
FTR34S391K	250	320	390(351-429)	300	650	40000	530	7.3
FTR34S431K	275	350	430(387-473)	300	710	40000	600	7.5
FTR34S471K	300	385	470(423-517)	300	775	40000	650	7.8
FTR34S511K	320	415	510(459-561)	300	845	40000	700	8.0
FTR34S561K	350	460	560(504-616)	300	925	40000	730	8.3
FTR34S621K	385	505	620(558-682)	300	1025	40000	780	8.7
FTR34S681K	420	560	680(612-748)	300	1120	40000	810	9.0
FTR34S751K	460	615	750(675-825)	300	1240	40000	850	9.4
FTR34S781K	485	640	780(702-858)	300	1290	40000	930	9.6
FTR34S821K	510	670	820(738-902)	300	1355	40000	970	9.8
FTR34S911K	550	745	910(819-1001)	300	1500	40000	1050	10.4
FTR34S102K	625	825	1000(900-1100)	300	1650	40000	1120	11.2
FTR34S112K	680	895	1100(990-1210)	300	1815	40000	1250	11.8
FTR34S122K	750	990	1200(1080-1320)	300	1980	40000	1340	12.3
FTR34S142K	880	1140	1400(1260-1540)	300	2310	40000	1400	13.3
FTR34S162K	1000	1280	1600(1440-1760)	300	2640	40000	1500	14.3

Notes: 1. Leakage Current (@83% of V_{1mA}): IR ≤ 35μA (181K~162K)

8.2,Dimensions



Symbol	H (max.)	D (max.)	D1 (±1)	L (min.)	K (max.)	W (±0.5)	d (±0.25)	d1 (±0.25)	ΦM (±0.2)	Tmax
Dimension (mm)	40	38	25.4	14.5	3.2	7	0.5	3.7	3.2	Please refer to the Electrical Characteristics Table

9,Part Number Code **Φ40 Series (Metal Oxide Varistors)**

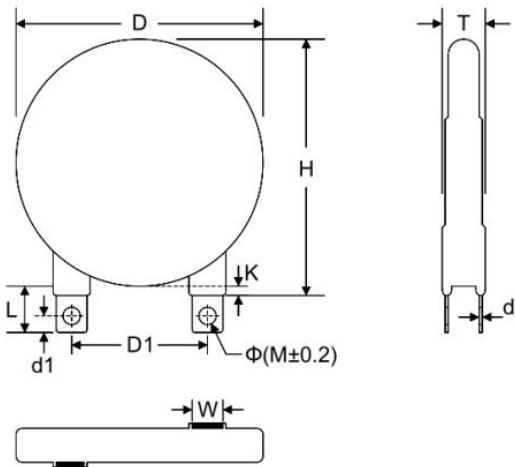
FTR	40	D	621	K	Z	N	*****
FTR logo	Diameter 05:05mm 07:07mm 10:010mm 14:014mm 20:020mm 25:025mm 32:032mm ...	Pellet Type: D Circular type S Square L Rectangle	Varistor Voltage 180:18x10 ⁰ V 471:47x10 ¹ V 561:56x10 ¹ V ...	Toleranc e K:±10%	Surge Series No Suffix: Standard Type J:High Surge Type Z:High Energy	Pin Type No Suffix: Straight Type G:G Type W:Out K type N:Inner K type X:Special type	Internal Controls Code

9.1 Electrical Characteristics: **Φ40 Series (Metal Oxide Varistors)**

Part Number	Maximum Allowable Voltage		Varistor Voltage	Maximum Clamping Voltage		Withstanding Surge current	Maximum Energy (10/1000μs)	Dimension Tmax
	V _{AC} (V)	V _{DC} (V)		I _P (A)	V _C (V)			
Standard	V _{AC} (V)	V _{DC} (V)	V _{1mA} (V)	I _P (A)	V _C (V)	(A)	(J)	(mm)
FTR40D181K	115	150	180(162~198)	300	300	40000	330	6.1
FTR40D201K	130	170	200(180~220)	300	340	40000	370	6.2
FTR40D221K	140	180	220(198~242)	300	360	40000	400	6.3
FTR40D241K	150	200	240(216~264)	300	395	40000	430	6.4
FTR40D271K	175	225	270(243~297)	300	455	40000	470	6.6
FTR40D301K	190	250	300(270~330)	300	500	40000	510	6.8
FTR40D331K	210	275	330(297~363)	300	550	40000	550	6.9
FTR40D361K	230	300	360(324~396)	300	595	40000	570	7.1
FTR40D391K	250	320	390(351~429)	300	650	40000	590	7.3
FTR40D431K	275	350	430(387~473)	300	710	40000	660	7.5
FTR40D471K	300	385	470(423~517)	300	775	40000	720	7.8
FTR40D511K	320	415	510(459~561)	300	845	40000	770	8.0
FTR40D561K	350	460	560(504~616)	300	925	40000	810	8.3
FTR40D621K	385	505	620(558~682)	300	1025	40000	860	8.7
FTR40D681K	420	560	680(612~748)	300	1120	40000	900	9.0
FTR40D751K	460	615	750(675~825)	300	1240	40000	940	9.4
FTR40D781K	485	640	780(702~858)	300	1290	40000	980	9.6
FTR40D821K	510	670	820(738~902)	300	1355	40000	1080	9.8
FTR40D911K	550	745	910(819~1001)	300	1500	40000	1150	10.4
FTR40D102K	625	825	1000(900~1100)	300	1650	40000	1260	11.2
FTR40D112K	680	895	1100(990~1210)	300	1815	40000	1380	11.8
FTR40D122K	750	990	1200(1080~1320)	300	1980	40000	1460	12.3
FTR40D142K	880	1140	1400(1260~1540)	300	2310	40000	1550	13.3
FTR40D162K	1000	1280	1600(1440~1760)	300	2640	40000	1700	14.3

Notes: 1. Leakage Current (@83% of V_{1mA}): IR ≤ 35μA (181K~162K)

9.2 Dimensions



Symbol	H (max.)	D (max.)	D1 (± 1)	L (min.)	K (max.)	W (± 0.5)	d (± 0.25)	d1 (± 0.25)	ΦM (± 0.2)	Tmax
Dimension (mm)	48	42	25.4	14.5	3.2	7	0.5	3.7	3.2	Please refer to the Electrical Characteristics Table

10,Part Number Code **Φ53 Series (Metal Oxide Varistors)**

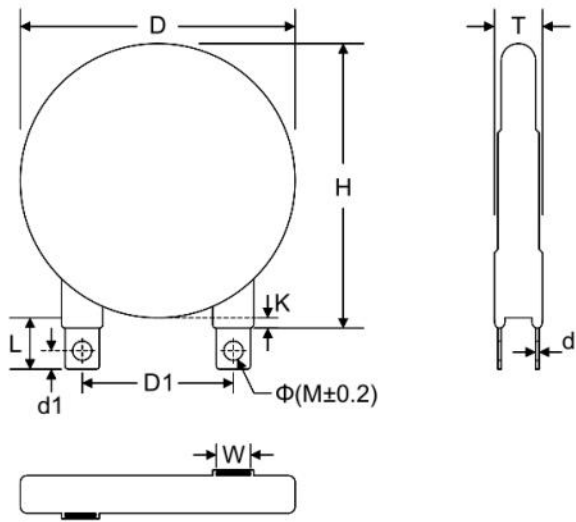
FTR	53	D	621	K	Z	N	*****
FTR logo	Diameter 05:05mm 07:07mm 10:010mm 14:014mm 20:020mm 25:025mm 32:032mm ...	Pellet Type: D Circular type S Square L Rectangle	Varistor Voltage 180:18x10 ⁰ V 471:47x10 ¹ V 561:56x10 ¹ V ...	Toleranc e K:±10%	Surge Series No Suffix: Standard Type J:High Surge Type Z:High Energy	Pin Type No Suffix: Straight Type G:G Type W:Out K type N:Inner K type X:Special type	Internal Controls Code

10.1 Electrical Characteristics: Φ53 Series (Metal Oxide Varistors)

Part Number	Maximum Allowable Voltage		Varistor Voltage	Maximum Clamping Voltage		Withstanding Surge current	Maximum Energy (10/1000μs)	Dimension Tmax
	V _{AC} (V)	V _{DC} (V)		I _p (A)	V _c (V)			
Standard			V _{1mA} (V)			(A)	(J)	(mm)
FTR53D181K	115	150	180(162~198)	500	300	70000	500	6.2
FTR53D201K	130	170	200(180~220)	500	340	70000	550	6.3
FTR53D221K	140	180	220(198~242)	500	360	70000	600	6.4
FTR53D241K	150	200	240(216~264)	500	395	70000	650	6.5
FTR53D271K	175	225	270(243~297)	500	455	70000	700	6.7
FTR53D301K	190	250	300(270~330)	500	500	70000	765	6.9
FTR53D331K	210	275	330(297~363)	500	550	70000	825	7.0
FTR53D361K	230	300	360(324~396)	500	595	70000	850	7.2
FTR53D391K	250	320	390(351~429)	500	650	70000	885	7.4
FTR53D431K	275	350	430(387~473)	500	710	70000	990	7.6
FTR53D471K	300	385	470(423~517)	500	775	70000	1080	7.9
FTR53D511K	320	415	510(459~561)	500	845	70000	1150	8.1
FTR53D561K	350	460	560(504~616)	500	925	70000	1200	8.6
FTR53D621K	385	505	620(558~682)	500	1025	70000	1300	8.8
FTR53D681K	420	560	680(612~748)	500	1120	70000	1350	9.1
FTR53D751K	460	615	750(675~825)	500	1240	70000	1400	9.5
FTR53D781K	485	640	780(702~858)	500	1290	70000	1450	9.7
FTR53D821K	510	670	820(738~902)	500	1355	70000	1600	9.9
FTR53D911K	550	745	910(819~1001)	500	1500	70000	1700	10.5
FTR53D102K	625	825	1000(900~1100)	500	1650	70000	1890	11.3
FTR53D112K	680	895	1100(990~1210)	500	1815	70000	2050	11.9
FTR53D122K	750	990	1200(1080~1320)	500	1980	70000	2160	12.4
FTR53D142K	880	1140	1400(1260~1540)	500	2310	70000	2300	13.4
FTR53D162K	1000	1280	1600(1440~1760)	500	2640	70000	2500	14.4

Notes: 1. Leakage Current (@83% of V_{1mA}): IR ≤ 35μA (181K~162K)

10.2 Dimensions



Symbol	H (max.)	D (max.)	D1 (± 1)	L (min.)	K (max.)	W (± 0.5)	d (± 0.25)	d1 (± 0.25)	ΦM (± 0.2)	Tmax
Dimension (mm)	64.0	56.6	25.4	14.5	3.2	9.7	0.7	3.6	3.8	Please refer to the Electrical Characteristics Table

FTR Series – MOV

Data Sheet

Wfyear Electronics

Authorized Distributor of FTR

Datasheet Request : info@wfyear.com

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