

Metal Oxide Varistors (MOV) Datasheet

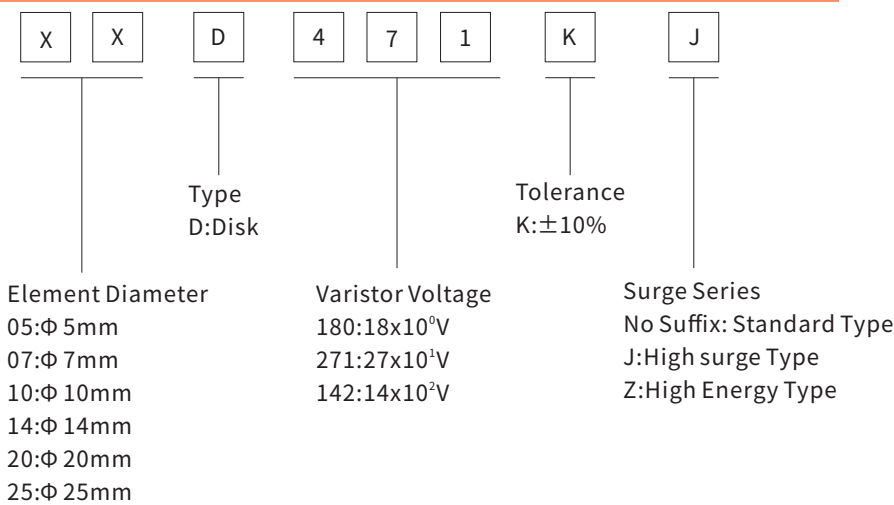
Features

- Wide operating voltage(V1mA)range from 18V to 820V
- Fast responding to transient over-voltage.
- Large absorbing transient energy capability.
- Low clamping ratio and no following-on current.
- Coating (Epoxy Resin): Flame-Retardant to UL94 V-0
- Meets MSL level 1,per J-STD-020
- Operating Temperature: -40℃ ~+105℃
- Storage Temperature: -40℃ ~+125℃
- Safety Certification : UL/CUL , CQC

Applications

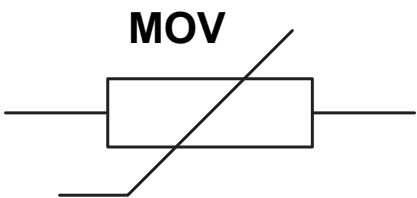
- Surge protection in electronic home appliances,gas and petroleum appliances
- Surge protection in industrial electronics
- Surge protection in consumer electronics
- Transistor,diode,IC,Thyristor or Triac semiconductor protection
- Relay and electromagnetic valve surge absorption

Part Number Code

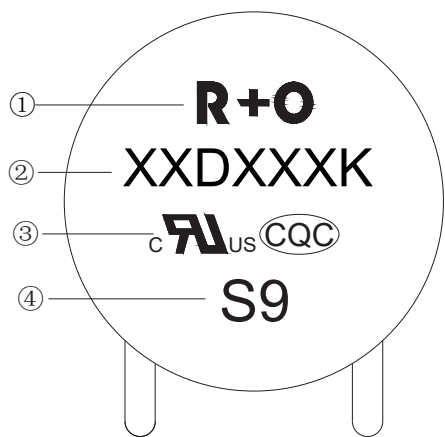


Varistors
Voltage
18V to 820V

07D SERIES



Marking Code



- ① HJC Logo
- ② Part Number
- ③ Safety Certification Marking
- ④ Date Code

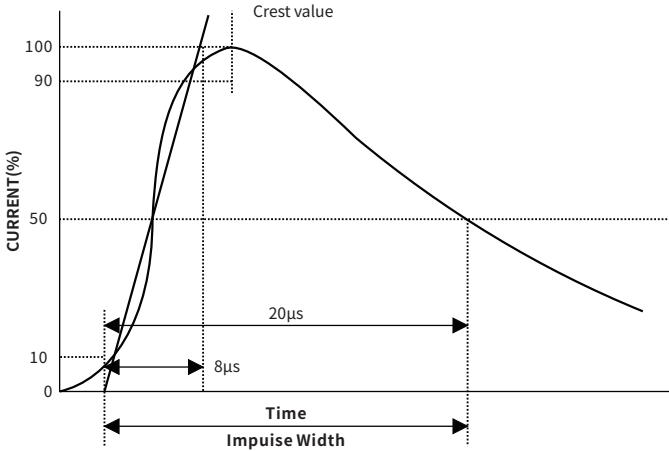
● **Electrical Characteristics** (Ta=25°C Unless otherwise specified)

Part Number		Max. Allowable Voltage		Varistor Voltage	Max. Clamping Voltage 8/20μs		Withstanding Surge Current 8/20μs		Max. Energy 10/1000μs		Rated Power	Typical Capacitance (Reference)
Standard	High Surge	V _{AC} (V)	V _{DC} (V)	V _{1mA} (V)	I _P (A)	V _C (V)	Standard (A)	High Surge(J)	Standard (J)	High Surge(J)	(W)	@1KHz(pF)
07D180K	07D180KJ	11	14	18(15-21.6)	2.5	36	250	500	0.9	2	0.02	3000
07D220K	07D220KJ	14	18	22(19.5-26)	2.5	43	250	500	1.1	2.4	0.02	2500
07D270K	07D270KJ	17	22	27(24-31)	2.5	53	250	500	1.4	3	0.02	2000
07D330K	07D330KJ	20	26	33(29.5-36.5)	2.5	65	250	500	1.7	3.5	0.02	1800
07D390K	07D390KJ	25	31	39(35-43)	2.5	77	250	500	2.1	4	0.02	1500
07D470K	07D470KJ	30	38	47(42-52)	2.5	93	250	500	2.5	5	0.02	1150
07D560K	07D560KJ	35	45	56(50-62)	2.5	110	250	500	3.1	6	0.02	1000
07D680K	07D680KJ	40	56	68(61-75)	2.5	135	250	500	3.6	7	0.02	900
07D820K	07D820KJ	50	65	82(74-90)	10	135	1200	1750	5	10	0.25	800
07D101K	07D101KJ	60	85	100(90-110)	10	165	1200	1750	6.5	12	0.25	700
07D121K	07D121KJ	75	100	120(108-132)	10	200	1200	1750	7.8	13	0.25	500
07D151K	07D151KJ	95	125	150(135-165)	10	250	1200	1750	9.7	15	0.25	430
07D181K	07D181KJ	115	150	180(162-198)	10	300	1200	1750	11.7	16	0.25	330
07D201K	07D201KJ	130	170	200(180-220)	10	340	1200	1750	13	17	0.25	250
07D221K	07D221KJ	140	180	220(198-242)	10	360	1200	1750	14	19	0.25	230
07D241K	07D241KJ	150	200	240(216-264)	10	395	1200	1750	15	21	0.25	210
07D271K	07D271KJ	175	225	270(243-297)	10	455	1200	1750	18	24	0.25	185
07D301K	07D301KJ	190	250	300(270-330)	10	500	1200	1750	20	26	0.25	165
07D331K	07D331KJ	210	275	330(297-363)	10	550	1200	1750	23	28	0.25	150
07D361K	07D361KJ	230	300	360(324-396)	10	595	1200	1750	24	32	0.25	140
07D391K	07D391KJ	250	320	390(351-429)	10	650	1200	1750	26	35	0.25	130
07D431K	07D431KJ	275	350	430(387-473)	10	710	1200	1750	28	40	0.25	115
07D471K	07D471KJ	300	385	470(423-517)	10	775	1200	1750	29	42	0.25	105
07D511K	07D511KJ	320	415	510(459-561)	10	845	1200	1750	31	45	0.25	100
07D561K	07D561KJ	350	460	560(504-616)	10	925	1200	1750	35	49	0.25	90
07D621K	07D621KJ	385	505	620(558-682)	10	1025	1200	1750	38	55	0.25	80
07D681K	07D681KJ	420	560	680(612-748)	10	1120	1200	1750	42	60	0.25	75
07D751K	07D751KJ	460	615	750(675-825)	10	1240	1200	1750	45	64	0.25	70
07D781K	07D781KJ	485	640	780(702-858)	10	1290	1200	1750	48	69	0.25	65
07D821K	07D821KJ	510	670	820(738-902)	10	1355	1200	1750	52	73	0.25	60

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

2.Leakage Current @83%V_{1mA}: IR ≤ 50μA (180K~680K); IR ≤ 25μA (820K~821K)

● 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)orthe 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.	$\frac{\Delta V_b}{V_b} \leq 10\%$							
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><tr><th>Series</th><th>Varistor Voltage</th><th>Surge Current(8/20μs)</th></tr><tr><td rowspan="2">07D Series</td><td>180K to 680K</td><td>25A</td></tr><tr><td>820K to 821K</td><td>50A</td></tr></table>		Series	Varistor Voltage	Surge Current(8/20μs)	07D Series	180K to 680K	25A	820K to 821K
Series	Varistor Voltage	Surge Current(8/20μs)							
07D Series	180K to 680K	25A							
	820K to 821K	50A							

● Electrical Ratings

Items	Test Condition/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															

● Recommended Soldering Conditions

Wave Lead Free Soldering Recommendation

The graph shows the temperature profile for wave lead-free soldering. The y-axis represents Temperature in degrees Celsius (°C), ranging from 0 to 300 in increments of 50. The x-axis represents Time in minutes, ranging from 0 to 4 in increments of 0.5. The profile starts at approximately 25°C at 0 minutes, remains constant until 0.5 minutes, then rises linearly to 100°C at 1 minute. It remains at 100°C until 2.5 minutes, then rises linearly to a peak of 265°C at 3.1 minutes. The peak is labeled 'Soldering' with a double-headed arrow indicating a duration of approximately 0.4 minutes. After the peak, the temperature falls linearly, labeled 'Cooling', reaching approximately 140°C at 4 minutes. Above the graph, three phases are indicated with arrows: 'Preheating' from 0 to 1 minute, 'Maximum Wave 265°C' from 1 to 3.1 minutes, and 'Soldering' at the peak.

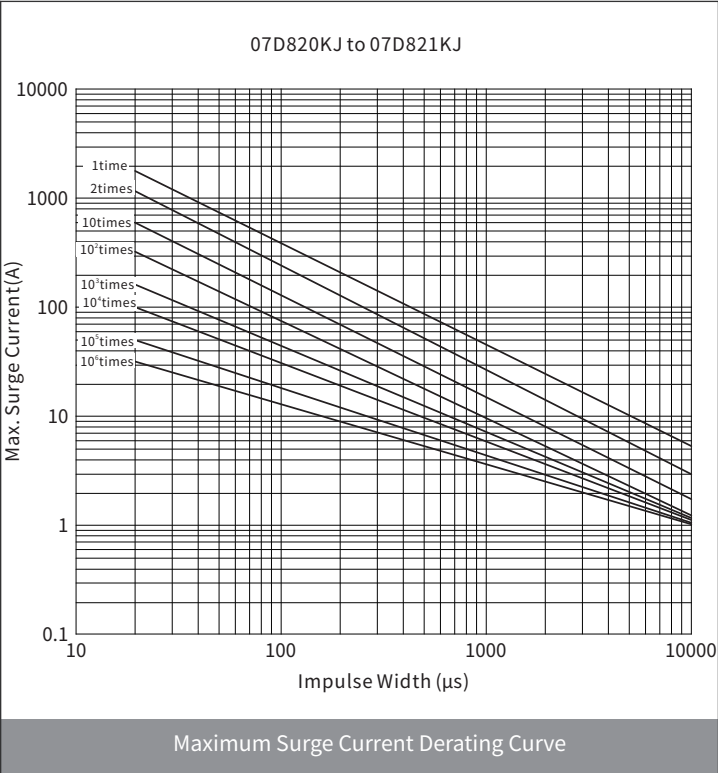
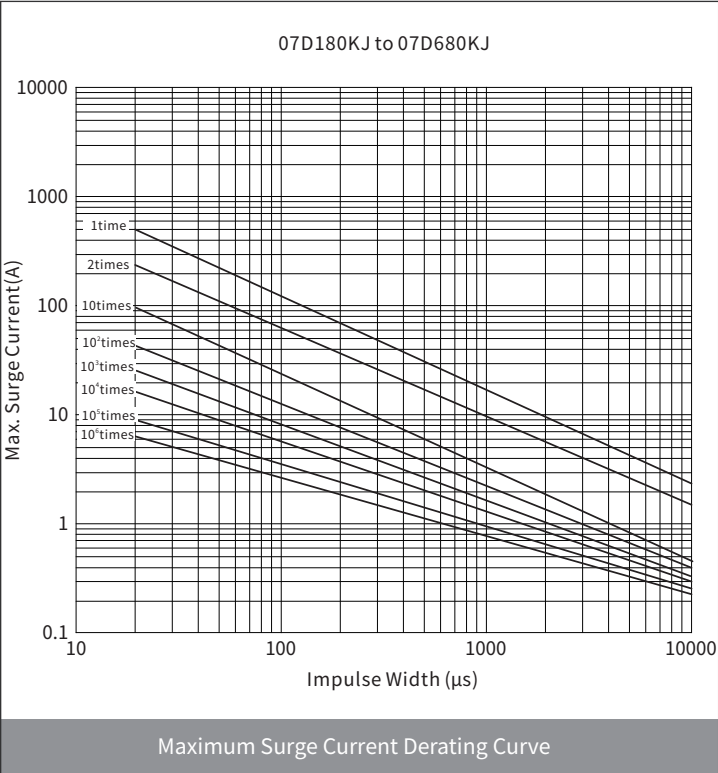
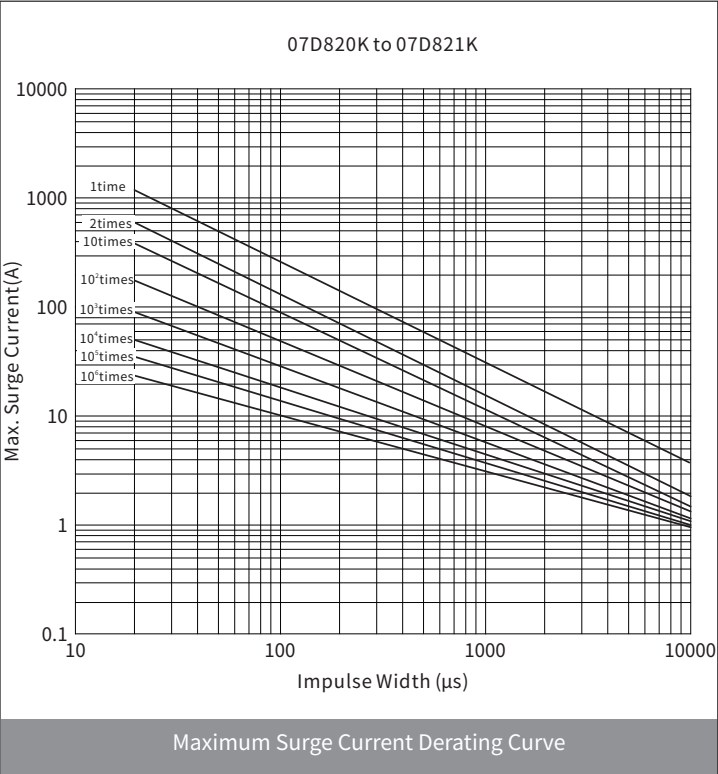
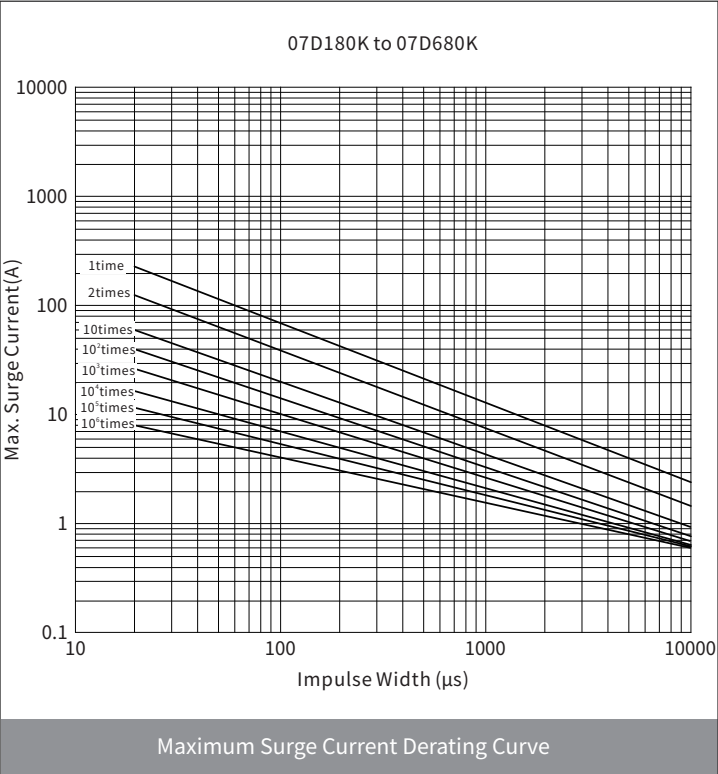
Phase	Start Time (min)	End Time (min)	Temperature (°C)
Preheating	0	1	25 to 100
Maximum Wave	1	3.1	100 to 265
Soldering	3.1	3.5	265
Cooling	3.5	4	265 to 140

Item	Conditions
Peak Temperature	265°C
Dipping Time	10 secs. Max
Soldering	1 time

Recommendation Reworking Conditions with Soldering Iron

Item	Conditions
Temperature of Soldering Iron-tip	360°C Max
Soldering Time	3 secs. Max
Distance from Varistor	2 mm Min

● Maximum Surge Current Derating Curve (Ta=25°C Unless otherwise specified)



● Dimensions

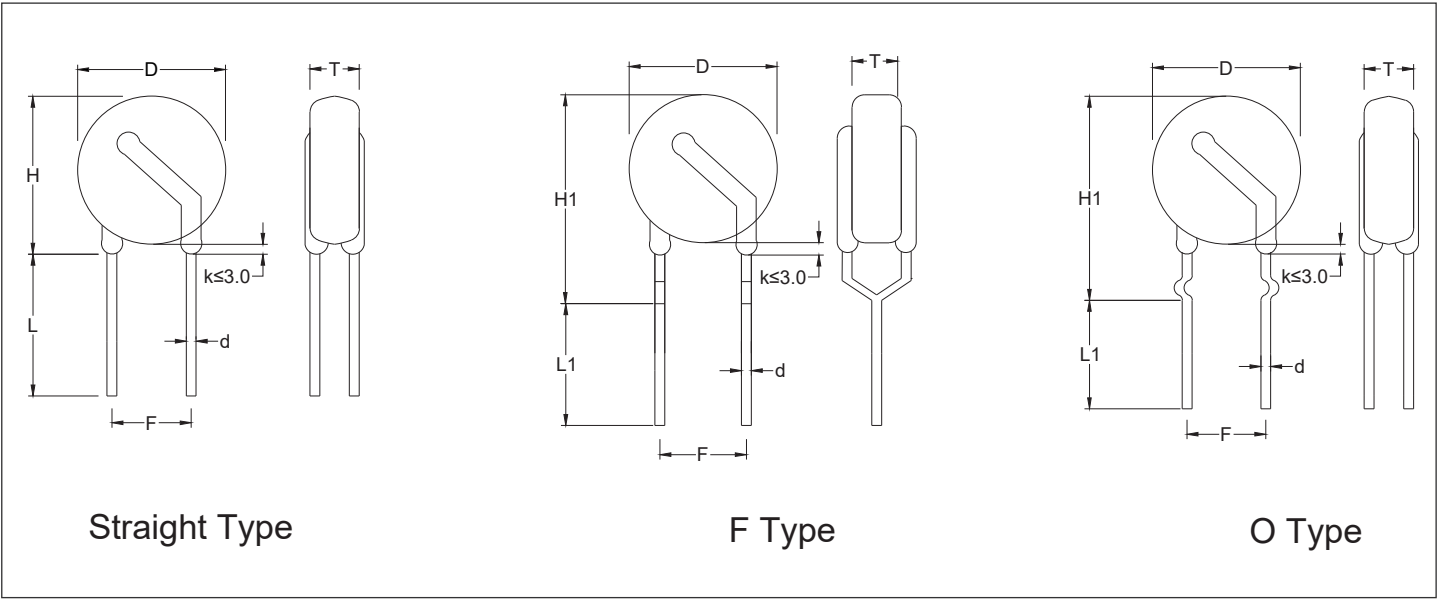


TABLE 1								
Symbol	D(max.)	H(max.)	H1(max.)	L(min.)	L1(min.)	F(±1)	d(±0.1)	T (max.)
Dimension(mm)	9.0	11.5	13	15	15	5.0±1	0.6±0.1	refer to table 2
Dimension(In)	0.354	0.453	0.512	0.591	0.591	0.197±0.04	0.024±0.004	

TABLE 2 T(max.)					
Voltage	180K~820K	101K~241K	271K~471K	511K~681K	751K~821K
Dimension(mm)	5.0	4.0	5.0	6.0	6.8
Dimension(In)	0.197	0.157	0.197	0.236	0.268

Note: 07D Series default Straight Type

● Ordering Information

SERIES	DELIVERY MODE	MPQ(PCS)
07D SERIES	Bulk	1,000