

Metal Oxide Varistors (MOV) Datasheet

Features

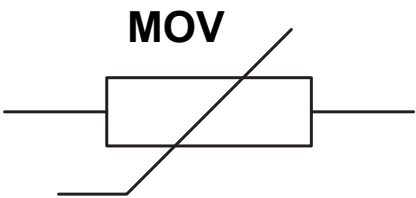
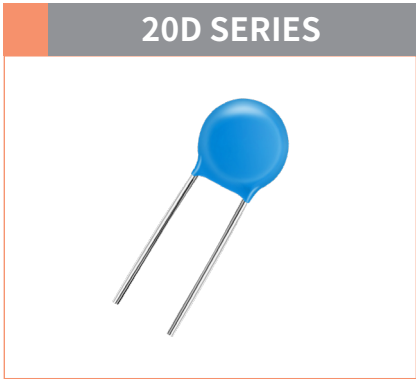
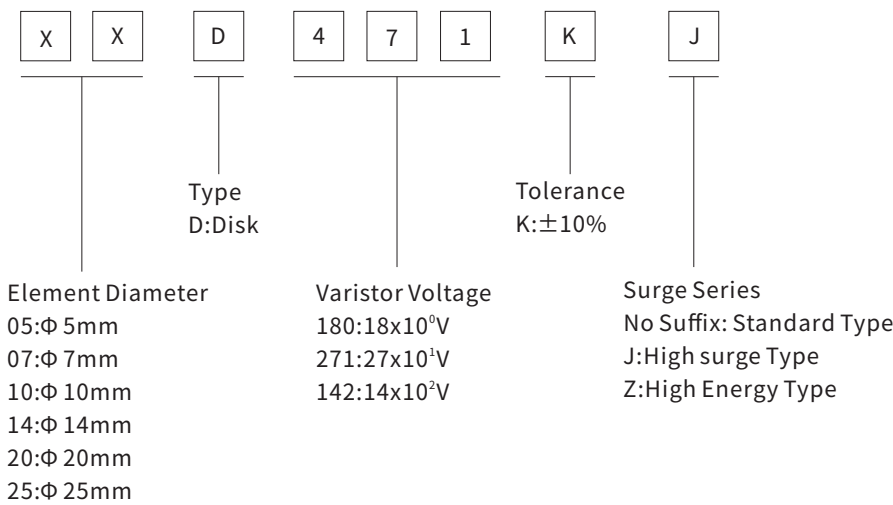
- Wide operating voltage(V1mA)range from 18V to 1800V
- Fast responding to transient over-voltage.
- Large absorbing transient energy capability.
- Low clamping ratio and no following-on current.
- Coating (Epoxy Resin): Flame-Retardant to UL94 V-0
- Meets MSL level 1,per J-STD-020
- Operating Temperature: -40°C ~+105°C
- Storage Temperature: -40°C ~+125°C
- Safety Certification : UL/CUL, CQC

Varistors
Voltage
18V to 1800V

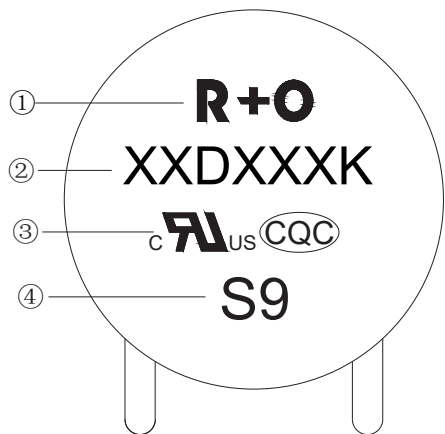
Applications

- 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



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)
20D180K	20D180KJ	11	14	18(15-21.6)	20	36	2000	3000	11	13	0.2	33000
20D220K	20D220KJ	14	18	22(19.5-26)	20	43	2000	3000	14	16	0.2	24000
20D270K	20D270KJ	17	22	27(24-31)	20	53	2000	3000	16	19	0.2	20000
20D330K	20D330KJ	20	26	33(29.5-36.5)	20	65	2000	3000	23	24	0.2	15000
20D390K	20D390KJ	25	31	39(35-43)	20	77	2000	3000	26	28	0.2	13000
20D470K	20D470KJ	30	38	47(42-52)	20	93	2000	3000	30	34	0.2	10000
20D560K	20D560KJ	35	45	56(50-62)	20	110	2000	3000	38	44	0.2	9000
20D680K	20D680KJ	40	56	68(61-75)	20	135	2000	3000	41	49	0.2	8000
20D820K	20D820KJ	50	65	82(74-90)	100	135	6500	10000	45	56	1	6500
20D101K	20D101KJ	60	85	100(90-110)	100	165	6500	10000	50	70	1	5000
20D121K	20D121KJ	75	100	120(108-132)	100	200	6500	10000	55	85	1	3600
20D151K	20D151KJ	95	125	150(135-165)	100	250	6500	10000	70	106	1	3000
20D181K	20D181KJ	115	150	180(162-198)	100	300	6500	10000	85	130	1	2300
20D201K	20D201KJ	130	170	200(180-220)	100	340	6500	10000	95	140	1	2100
20D221K	20D221KJ	140	180	220(198-242)	100	360	6500	10000	100	155	1	1800
20D241K	20D241KJ	150	200	240(216-264)	100	395	6500	10000	108	168	1	1650
20D271K	20D271KJ	175	225	270(243-297)	100	455	6500	10000	127	190	1	1500
20D301K	20D301KJ	190	250	300(270-330)	100	500	6500	10000	136	210	1	1300
20D331K	20D331KJ	210	275	330(297-363)	100	550	6500	10000	150	228	1	1200
20D361K	20D361KJ	230	300	360(324-396)	100	595	6500	10000	163	255	1	1100
20D391K	20D391KJ	250	320	390(351-429)	100	650	6500	10000	180	275	1	1000
20D431K	20D431KJ	275	350	430(387-473)	100	710	6500	10000	190	305	1	930
20D471K	20D471KJ	300	385	470(423-517)	100	775	6500	10000	204	350	1	850
20D511K	20D511KJ	320	415	510(459-561)	100	845	6500	10000	210	360	1	780
20D561K	20D561KJ	350	460	560(504-616)	100	925	6500	10000	215	380	1	710
20D621K	20D621KJ	385	505	620(558-682)	100	1025	6500	10000	224	390	1	650
20D681K	20D681KJ	420	560	680(612-748)	100	1120	6500	10000	230	400	1	600
20D751K	20D751KJ	460	615	750(675-825)	100	1240	6500	10000	255	420	1	530
20D781K	20D781KJ	485	640	780(702-858)	100	1290	6500	10000	265	440	1	510
20D821K	20D821KJ	510	670	820(738-902)	100	1355	6500	10000	282	460	1	500
20D911K	20D911KJ	550	745	910(819-1001)	100	1500	6500	10000	310	510	1	440
20D102K	20D102KJ	625	825	1000(900-1100)	100	1650	6500	10000	342	565	1	400
20D112K	20D112KJ	680	895	1100(990-1210)	100	1815	6500	10000	383	620	1	360
20D122K	20D122KJ	750	990	1200(1080-1320)	100	1980	6500	10000	408	660	1	350
20D142K	20D142KJ	880	1140	1400(1260-1540)	100	2310	6500	10000	532	784	1	340
20D152K	20D152KJ	900	1220	1500(1350-1650)	100	2475	6500	10000	580	840	1	330
20D182K	20D182KJ	1100	1465	1800(1620-1980)	100	2970	6500	10000	625	990	1	320

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~112K)

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 $\pm 10\%$ when one impulse of 10/1000μs or 2ms is applied.									
Withstanding Surge Current	The maximum current within the varistor voltage change of $\pm 10\%$ with the standard impulse current(8/20μs)applied one time.									
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"> <thead> <tr> <th>Series</th><th>Varistor Voltage</th><th>Surge Current (8/20μs)</th></tr> </thead> <tbody> <tr> <td rowspan="2">20D Series</td><td>180K to 680K</td><td>100A</td></tr> <tr> <td>820K to 182K</td><td>200A</td></tr> </tbody> </table>	Series	Varistor Voltage	Surge Current (8/20μs)	20D Series	180K to 680K	100A	820K to 182K	200A	$\frac{\Delta V_b}{V_b} \leq 10\%$
Series	Varistor Voltage	Surge Current (8/20μs)								
20D Series	180K to 680K	100A								
	820K to 182K	200A								

● 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

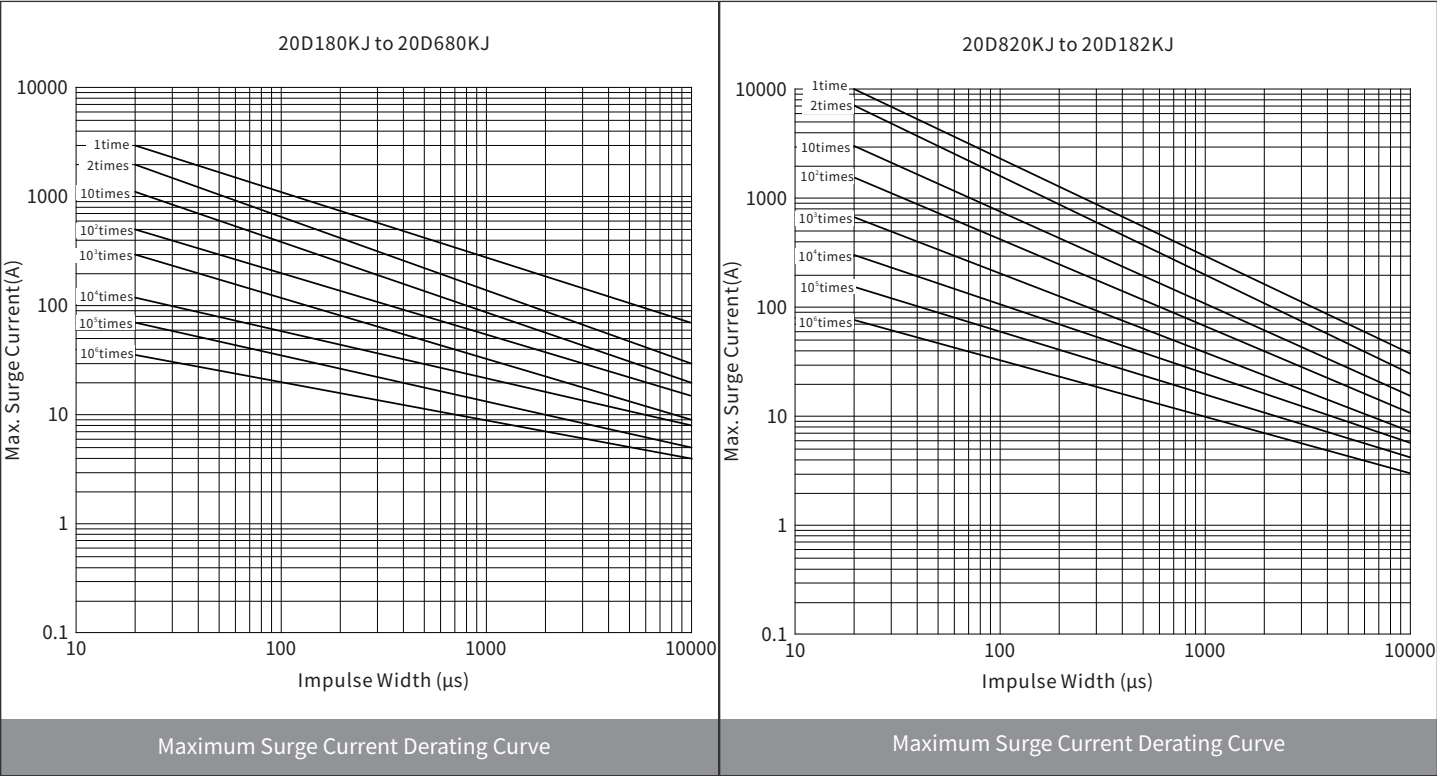
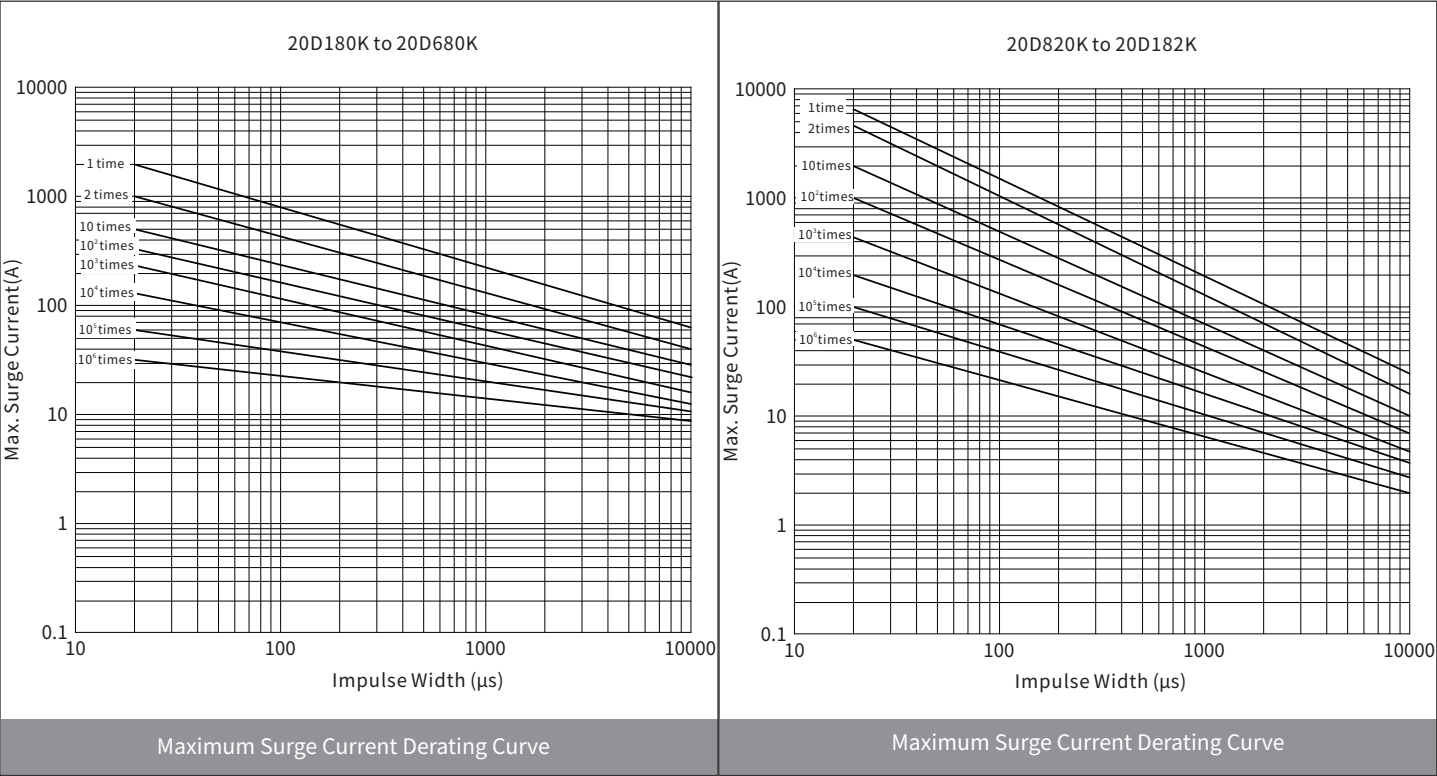
The graph shows the temperature profile for wave lead free soldering. The y-axis is Temperature(°C) from 0 to 300. The x-axis is Time(minutes) from 0 to 4. The profile includes: Preheating (0 to 1 min, 25°C to 100°C), Maximum Wave 265°C (1 to 2.5 min, 100°C), Soldering (2.5 to 3.5 min, 265°C), and Cooling (3.5 to 4 min, 265°C to 150°C).

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

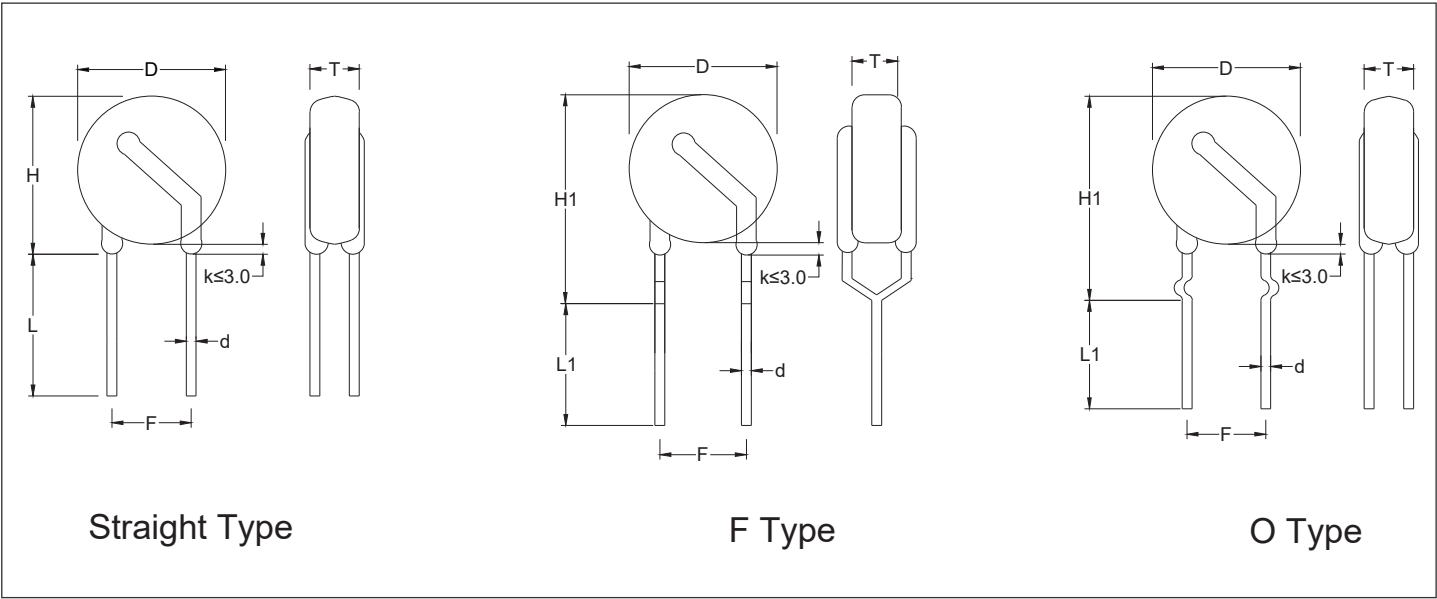


TABLE 1								
Symbol	D(max.)	H(max.)	H1(max.)	L(min.)	L1(min.)	F	d	T (max.)
Dimension(mm)	22.5	25.5	28	15	15	10±1	1±0.1	refer to table 2
Dimension(In)	0.886	1.004	1.102	0.591	0.591	0.393±0.04	0.039±0.004	

TABLE 2 T(max.)					
Voltage	180K~301K	331K~511K	561K~681K	751K~112K	122K~182K
Dimension(mm)	5.0	6.0	7.0	8.2	10.8
Dimension(In)	0.197	0.236	0.276	0.323	0.425

Note: 180K-112K default Straight Type, 122K-182K default F Type,

● Ordering Information

Series	Voltage	DELIVERY MODE	MPQ(PCS)
20D Series	180K~301K	Bulk	250
	331K~561K	Bulk	200
	621K~112K	Bulk	150
	122K~182K	Bulk	100