

Metal Oxide Varistors (MOV) Datasheet

Features

- Wide operating voltage(V1mA)range from 18V to 1100V
- 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 1100V

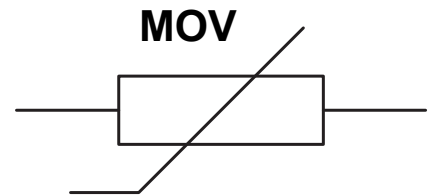
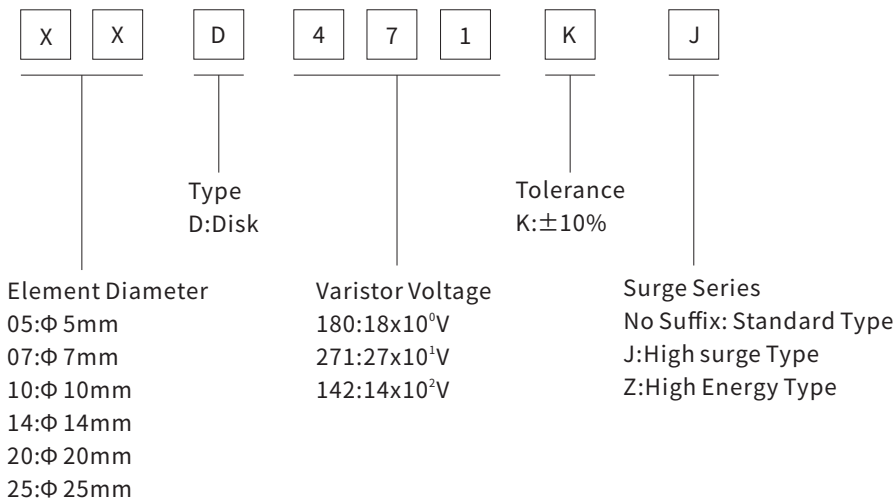
Applications

- 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

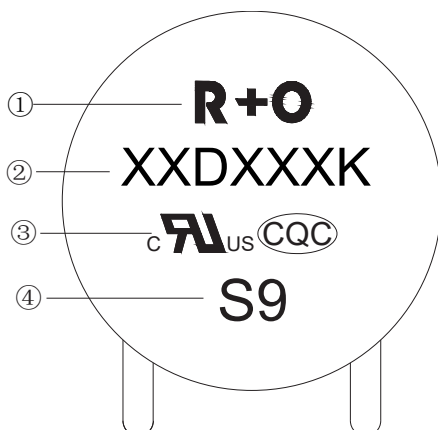
10D SERIES



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)
10D180K	10D180KJ	11	14	18(15-21.6)	5	36	500	1000	2.1	3	0.05	6500
10D220K	10D220KJ	14	18	22(19.5-26)	5	43	500	1000	2.5	5	0.05	5000
10D270K	10D270KJ	17	22	27(24-31)	5	53	500	1000	3	6	0.05	4200
10D330K	10D330KJ	20	26	33(29.5-36.5)	5	65	500	1000	4	7	0.05	3000
10D390K	10D390KJ	25	31	39(35-43)	5	77	500	1000	4.6	9	0.05	2400
10D470K	10D470KJ	30	38	47(42-52)	5	93	500	1000	5.5	11	0.05	2100
10D560K	10D560KJ	35	45	56(50-62)	5	110	500	1000	7	13	0.05	1800
10D680K	10D680KJ	40	56	68(61-75)	5	135	500	1000	8.2	15	0.05	1500
10D820K	10D820KJ	50	65	82(74-90)	25	135	2500	3500	12	17	0.4	1200
10D101K	10D101KJ	60	85	100(90-110)	25	165	2500	3500	15	18	0.4	1000
10D121K	10D121KJ	75	100	120(108-132)	25	200	2500	3500	18	21	0.4	850
10D151K	10D151KJ	95	125	150(135-165)	25	250	2500	3500	22	25	0.4	720
10D181K	10D181KJ	115	150	180(162-198)	25	300	2500	3500	27	30	0.4	560
10D201K	10D201KJ	130	170	200(180-220)	25	340	2500	3500	30	35	0.4	500
10D221K	10D221KJ	140	180	220(198-242)	25	360	2500	3500	32	39	0.4	450
10D241K	10D241KJ	150	200	240(216-264)	25	395	2500	3500	35	42	0.4	420
10D271K	10D271KJ	175	225	270(243-297)	25	455	2500	3500	37	49	0.4	370
10D301K	10D301KJ	190	250	300(270-330)	25	500	2500	3500	40	54	0.4	330
10D331K	10D331KJ	210	275	330(297-363)	25	550	2500	3500	43	58	0.4	300
10D361K	10D361KJ	230	300	360(324-396)	25	595	2500	3500	47	65	0.4	280
10D391K	10D391KJ	250	320	390(351-429)	25	650	2500	3500	60	70	0.4	260
10D431K	10D431KJ	275	350	430(387-473)	25	710	2500	3500	65	80	0.4	230
10D471K	10D471KJ	300	385	470(423-517)	25	775	2500	3500	67	85	0.4	210
10D511K	10D511KJ	320	415	510(459-561)	25	845	2500	3500	69	90	0.4	200
10D561K	10D561KJ	350	460	560(504-616)	25	925	2500	3500	70	92	0.4	180
10D621K	10D621KJ	385	505	620(558-682)	25	1025	2500	3500	72	95	0.4	160
10D681K	10D681KJ	420	560	680(612-748)	25	1120	2500	3500	75	98	0.4	150
10D751K	10D751KJ	460	615	750(675-825)	25	1240	2500	3500	77	100	0.4	130
10D781K	10D781KJ	485	640	780(702-858)	25	1290	2500	3500	80	105	0.4	125
10D821K	10D821KJ	510	670	820(738-902)	25	1355	2500	3500	85	110	0.4	120
10D911K	10D911KJ	550	745	910(819-1001)	25	1500	2500	3500	93	130	0.4	110
10D102K	10D102KJ	625	825	1000(900-1100)	25	1650	2500	3500	102	140	0.4	100
10D112K	10D112KJ	680	895	1100(990-1210)	25	1815	2500	3500	115	155	0.4	90

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

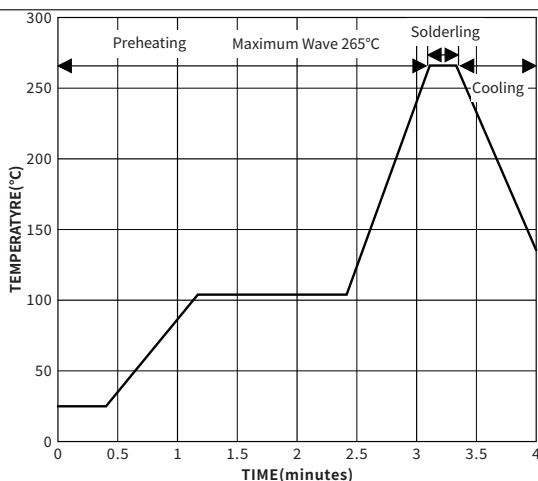
Items	Test Condition/Description	Requirement								
Varistor Voltage	The voltage between two terminals with the specified measuring current 1mA.DC applied is called Vb.									
Maximum Allowable Voltage	The recommended maximum sine wave voltage(RMS)orthe Maximum DC voltage can be applied continuously.									
Maximum Clamping Voltage	<p>The maximum voltage between two terminals with the specification standard impulse current. Applied waveform:8/20μs</p>	To meet the specified value								
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.									
Surge Life	<p>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.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Series</th> <th>Varistor Voltage</th> <th>Surge Current (8/20μs)</th> </tr> </thead> <tbody> <tr> <td rowspan="2">10D Series</td> <td>180K to 680K</td> <td>50A</td> </tr> <tr> <td>820K to 112K</td> <td>100A</td> </tr> </tbody> </table>	Series	Varistor Voltage	Surge Current (8/20μs)	10D Series	180K to 680K	50A	820K to 112K	100A	$\frac{\Delta V_b}{V_b} \leq 10\%$
Series	Varistor Voltage	Surge Current (8/20μs)								
10D Series	180K to 680K	50A								
	820K to 112K	100A								

● Electrical Ratings

Items	Test Condition/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	<p>The conditions shown below shall be repeated 5 cycles</p> <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															

● Recommended Soldering Conditions

Wave Lead Free Soldering Recommendation

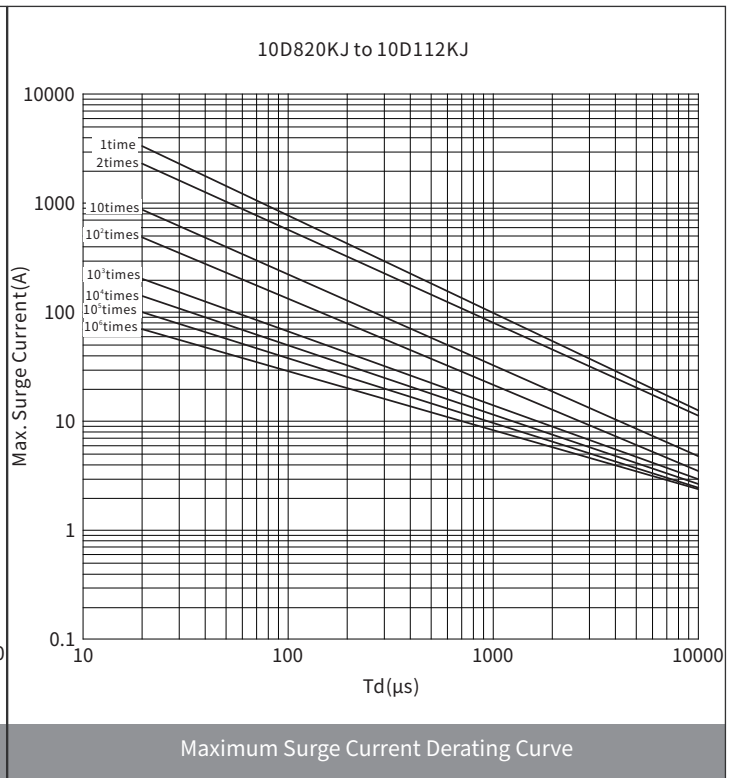
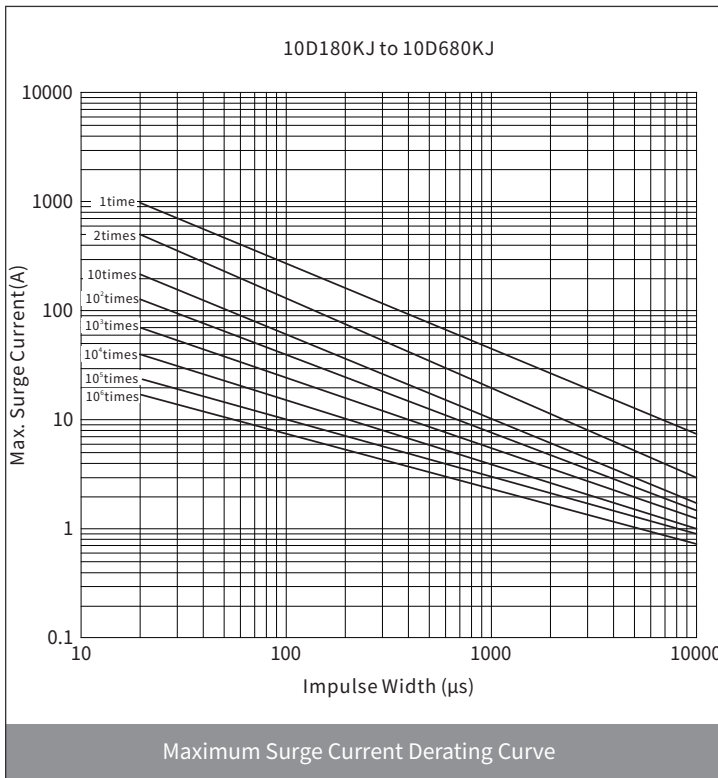
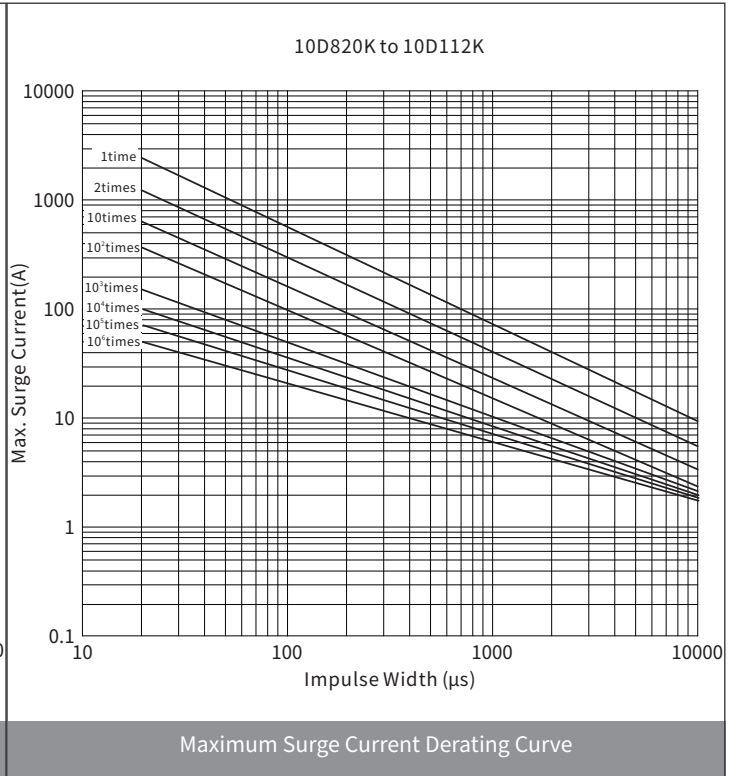
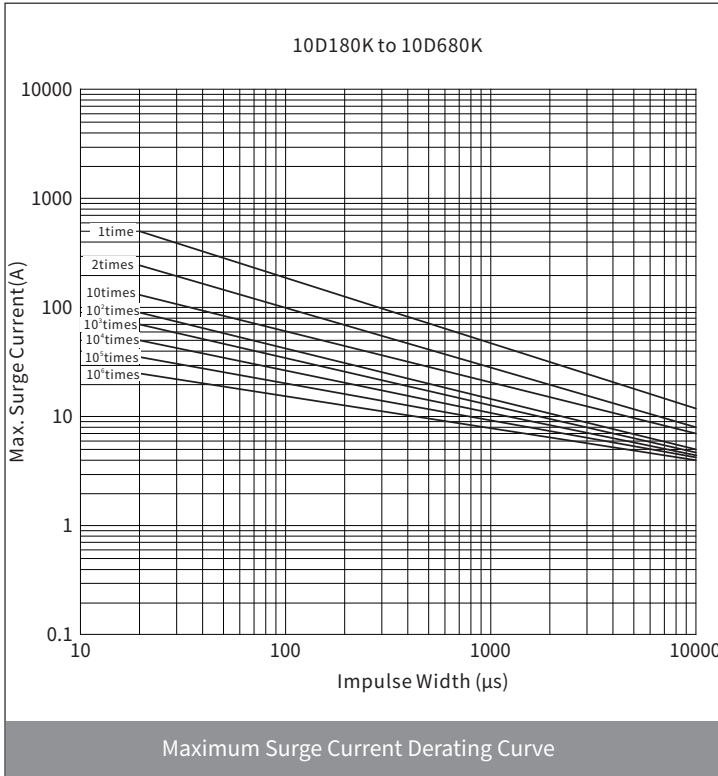


Item	Conditions
Peak Temperature	265°C
Dipping Time	10 secs. Max
Soldering	1 time

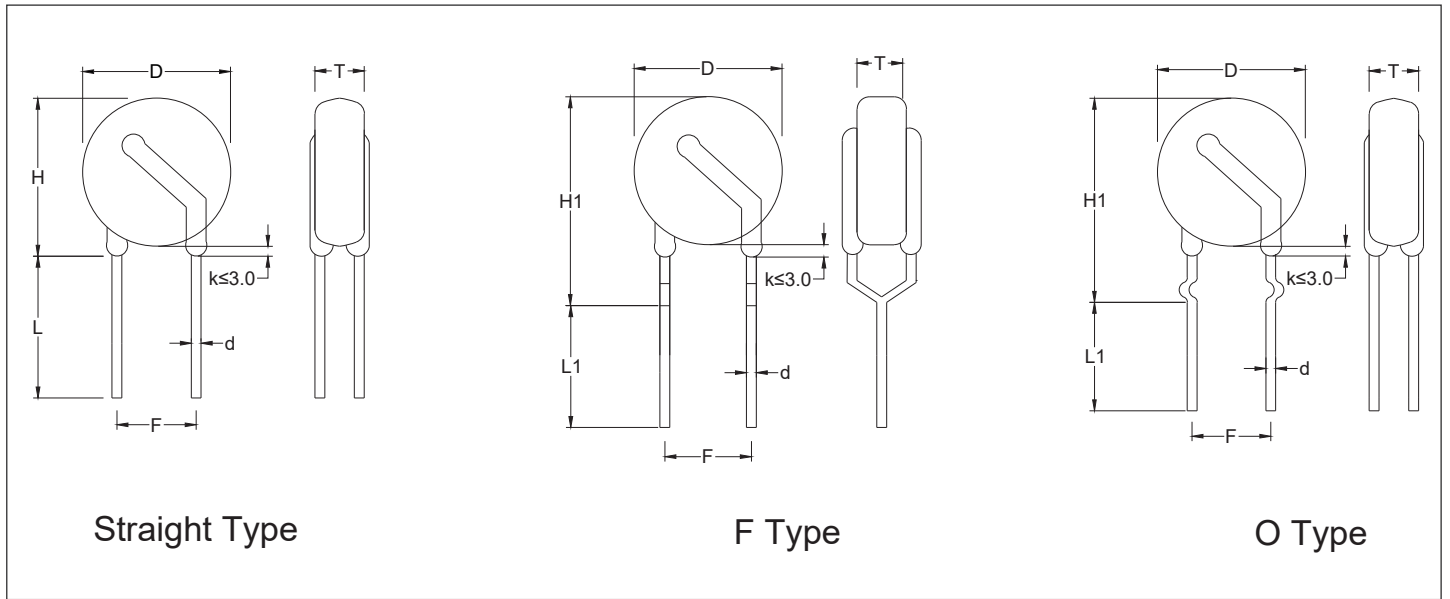
Recommendation Reworking Conditions with Soldering Iron

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** ($T_a=25^{\circ}\text{C}$ Unless otherwise specified)



● Dimensions



Symbol	D(max.)	H(max.)	H1(max.)	L(min.)	L1(min.)	F	d	T (max.)
Dimension(mm)	12	14.5	16.5	15	15	7.5±1	0.8±0.1	refer to table 2
Dimension(In)	0.472	0.571	0.649	0.591	0.591	0.295±0.04	0.031±0.004	

Voltage	180K~391K	431K~561K	621K~821K	911K~112K
Dimension(mm)	5.0	6.0	6.8	7.8
Dimension(In)	0.197	0.236	0.268	0.307

Note: 10D Series default Straight Type

● Ordering Information

Series	Voltage	DELIVERY MODE	MPQ(PCS)
10D Series	180K~621K	Bulk	500
	681K~112K	Bulk	400