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

20D SERIES

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

X	X	D	4	7	1	K	J

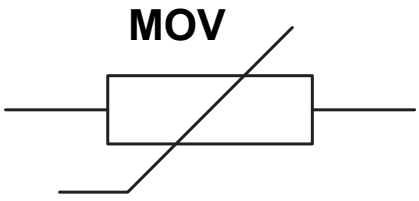
Type
D:Disk

Tolerance
K:±10%

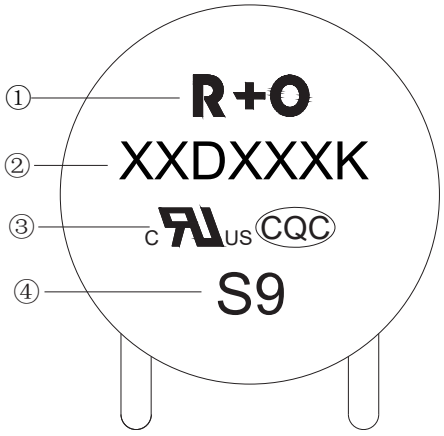
Element Diameter
05:Φ 5mm
07:Φ 7mm
10:Φ 10mm
14:Φ 14mm
20:Φ 20mm
25:Φ 25mm

Varistor Voltage
180:18x10^{0}V
271:27x10^{1}V
142:14x10^{2}V

Surge Series
No Suffix: Standard Type
J:High surge Type
Z:High Energy Type



Marking Code



① HJC Logo

② Part Number

③ Safety Certification Marking

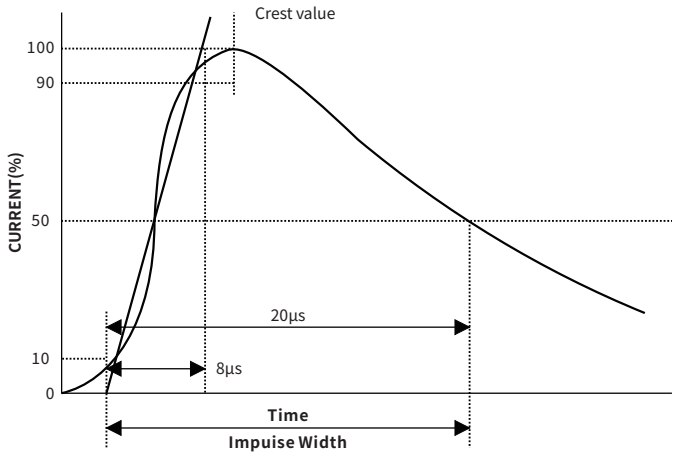
④ Date Code

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

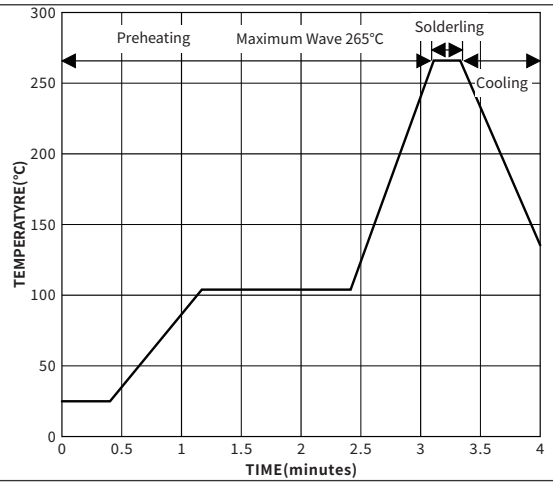
<table>
<tr><th>Items</th><th>Test Condition/Description</th><th>Requirement</th></tr>
<tr><td>Varistor Voltage</td><td>The voltage between two terminals with the specified measuring current 1mA.DC applied is called Vb.</td><td rowspan="7">To meet the specified value</td></tr>
<tr><td>Maximum Allowable Voltage</td><td>The recommended maximum sine wave voltage(RMS)orthe Maximum DC voltage can be applied continuously.</td></tr>
<tr><td rowspan="2">Maximum Clamping Voltage</td><td>The maximum voltage between two terminals with the specification standard impulse current.
Applied waveform:8/20μs</td></tr>
<tr><td> 
</td></tr>
<tr><td>Rated Wattage</td><td>The maximum average power that can be applied within the specified ambient temperature.</td></tr>
<tr><td>Energy</td><td>The maximum energy within the varistor voltage change of ±10% when one impulse of 10/1000μs or 2ms is applied.</td></tr>
<tr><td>Withstanding Surge Current</td><td>The maximum current within the varistor voltage change of±10% with the standard impulse current(8/20μs)applied one time.</td></tr>
<tr><td>Surge Life</td><td>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">20D Series</td><td>180K to 680K</td><td>100A</td></tr>
<tr><td>820K to 182K</td><td>200A</td></tr>
</table></td><td>$\frac{\Delta Vb}{Vb} \leq 10\%$</td></tr>
</table>

Electrical Ratings

<table>
<tr><th>Items</th><th>Test Condition/Methods</th><th>Specifications</th></tr>
<tr><td>High Temperature Storage</td><td>Ambient Temp: 125±2°C Duration: 1000hrs</td><td>|ΔV1mA/V1mA| ⩽ 5%</td></tr>
<tr><td>Low Temperature Storage</td><td>Ambient Temp: -40±2°C Duration: 1000hrs</td><td>|ΔV1mA/V1mA| ⩽ 5%</td></tr>
<tr><td>Humidity</td><td>Ambient Temp: 40±2°C , 90~95% R.H. Duration: 1000hrs</td><td>|ΔV1mA/V1mA| ⩽ 5%</td></tr>
<tr><td>Temperature Cycle</td><td>The conditions shown below shall be repeated 5 cycles
<table>
<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></td><td>No visible damage |ΔV1mA/V1mA| ⩽ 5%</td></tr>
<tr><td>High Temperature Load</td><td>Ambient Temp: 125±2°C Duration: 1000hrs
Load: Max. Allowable Voltage In AC eara.</td><td>|ΔV1mA/V1mA| ⩽ 5%</td></tr>
<tr><td>Damp Heat Load</td><td>Ambient Temp: 40±2°C , 90~95% R.H. Duration: 1000hrs
Load: Max. Allowable Voltage</td><td>No visible damage |ΔV1mA/V1mA| ⩽ 5%</td></tr>
<tr><td>Voltage Proof</td><td>Metal balls method, 2500Vac 1 min.</td><td>No visible damage</td></tr>
</table>

Recommended Soldering Conditions

Wave Lead Free Soldering Recommendation

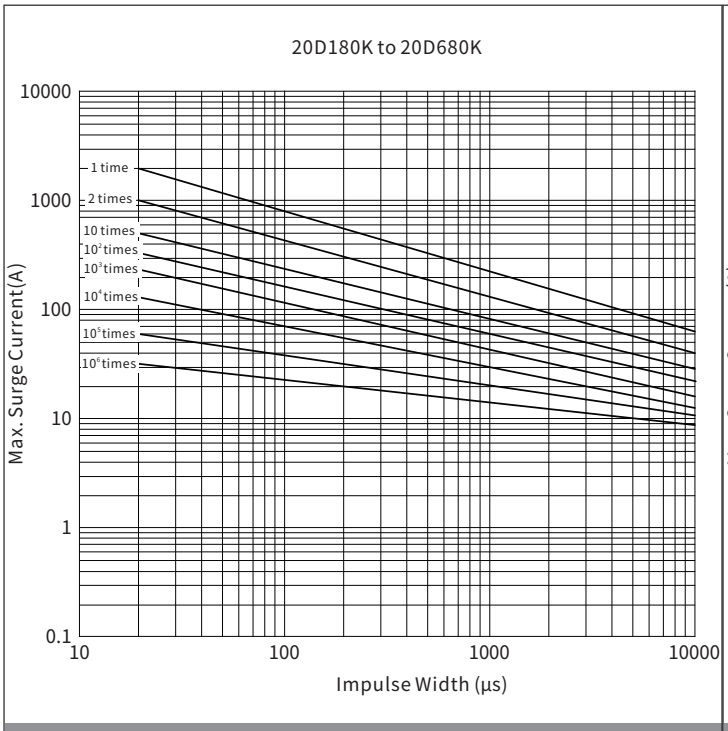


Item	Conditions
Peak Temperature	265°C
Dipping Time	10 secs. Max
Soldering	1 time

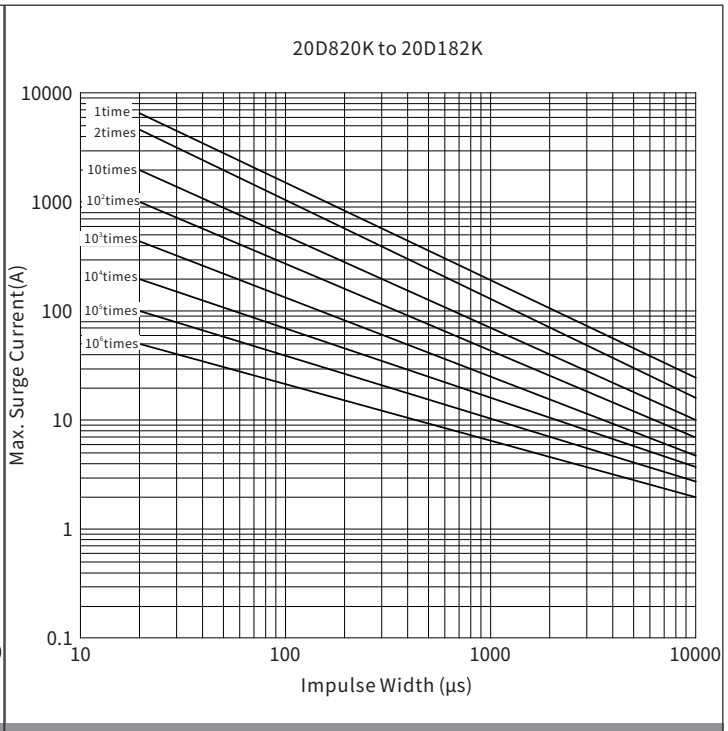
Recommendation Reworking Conditions with Soldering Iron

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

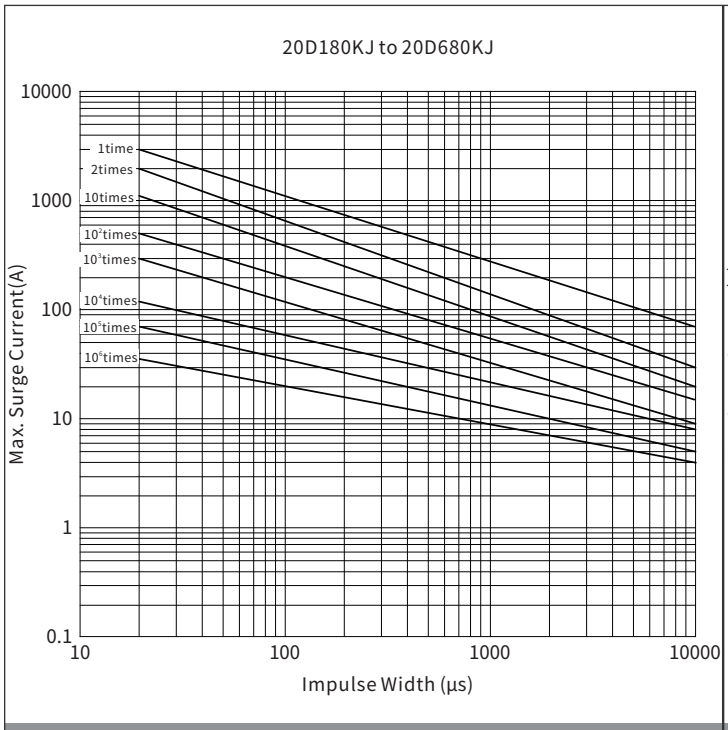
Maximum Surge Current Derating Curve (Ta=25℃ Unless otherwise specified)



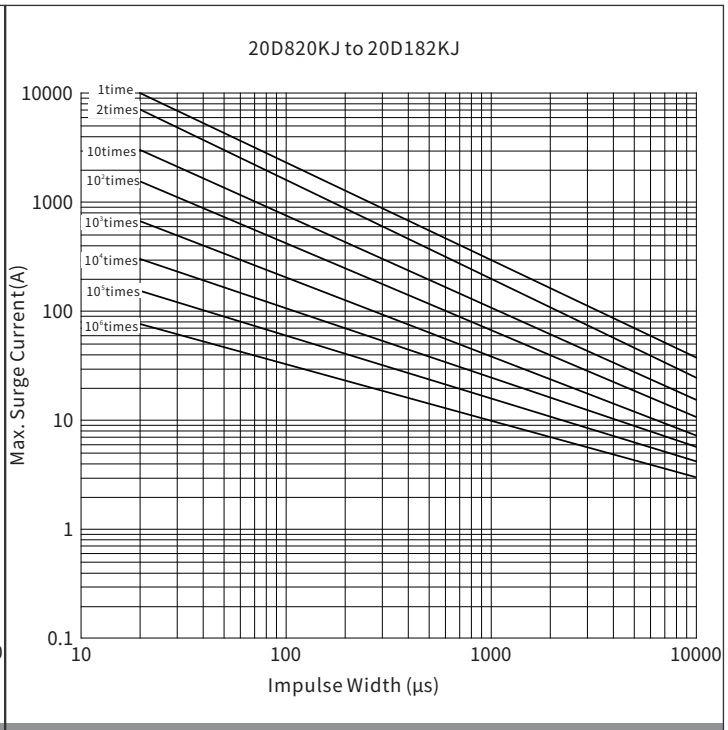
Maximum Surge Current Derating Curve



Maximum Surge Current Derating Curve

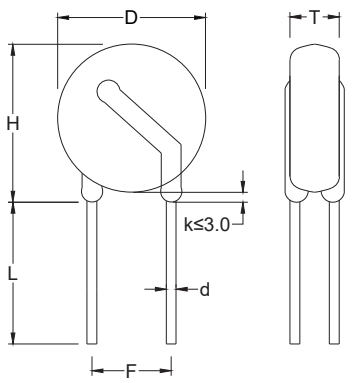


Maximum Surge Current Derating Curve

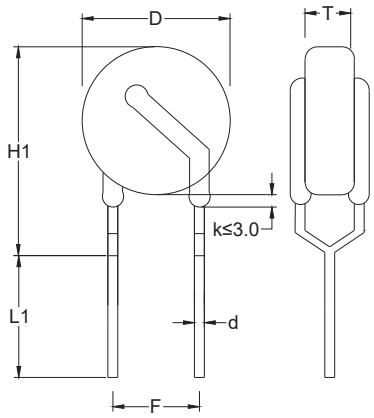


Maximum Surge Current Derating Curve

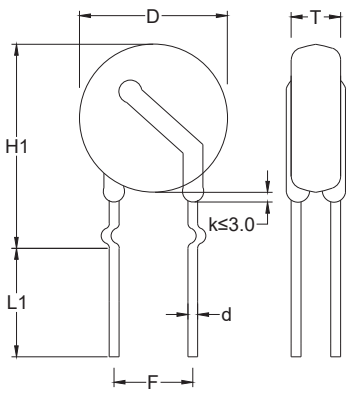
Dimensions



Straight Type



F Type



O Type

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