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

10D 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

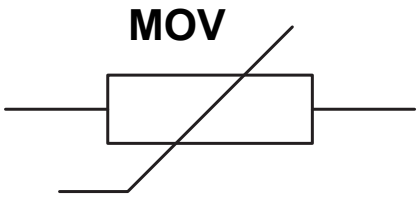
Element Diameter
05:Φ 5mm
07:Φ 7mm
10:Φ 10mm
14:Φ 14mm
20:Φ 20mm
25:Φ 25mm

Type
D:Disk

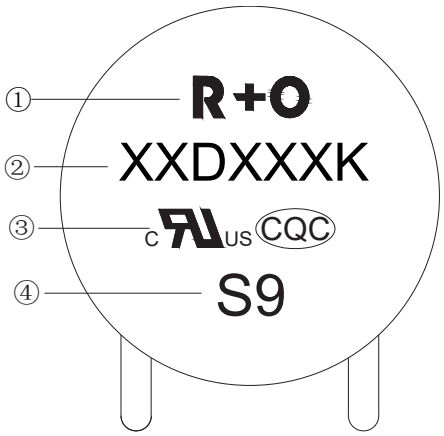
Varistor Voltage
180:18x10^{0}V
271:27x10^{1}V
142:14x10^{2}V

Tolerance
K:±10%

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

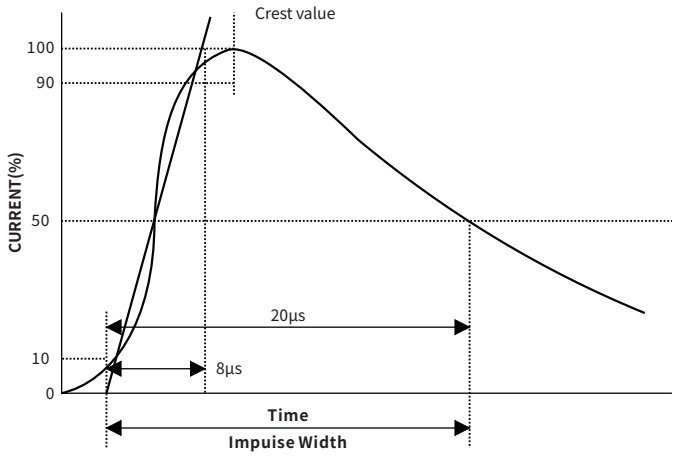
④ Date Code

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(A)	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

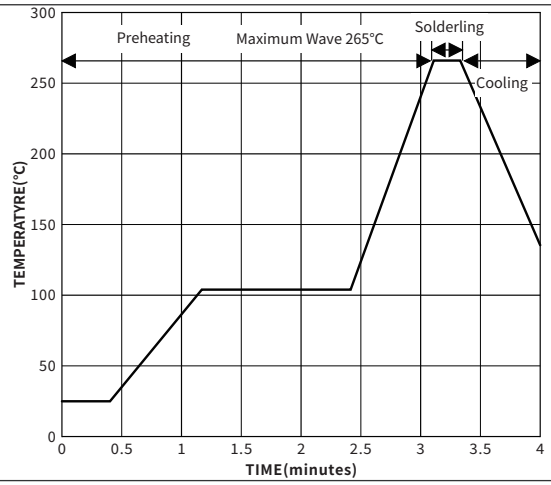
<table>
<tr><th>Items</th><th>Test Condition/Description</th><th>Requirement</th></tr>
<tr><td>Varistor Voltage</td><td>The voltage between two terminals with the specified measuring current 1mA.DC applied is called Vb.</td><td rowspan="7">To meet the specified value</td></tr>
<tr><td>Maximum Allowable 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">10D Series</td><td>180K to 680K</td><td>50A</td></tr>
<tr><td>820K to 112K</td><td>100A</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

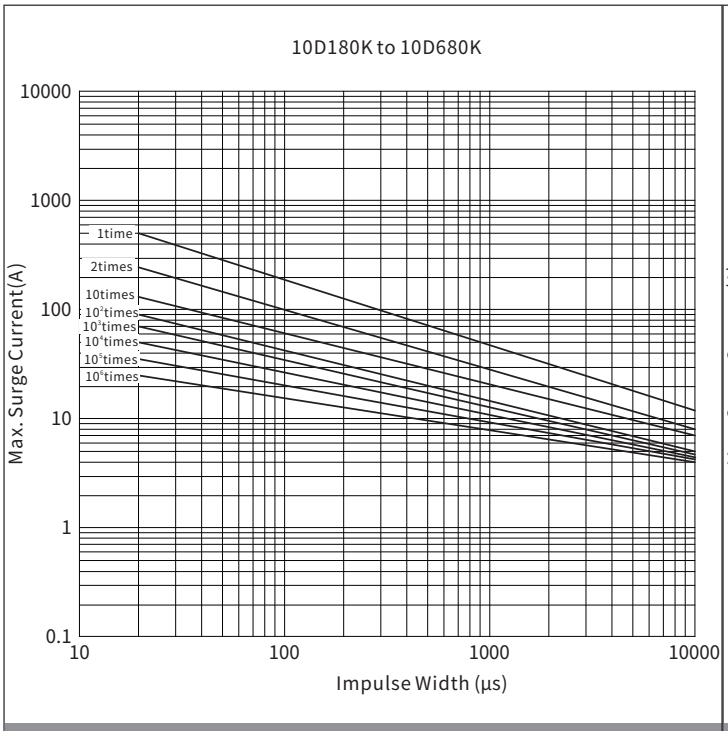


Item	Conditions
Peak Temperature	265°C
Dipping Time	10 secs. Max
Soldering	1 time

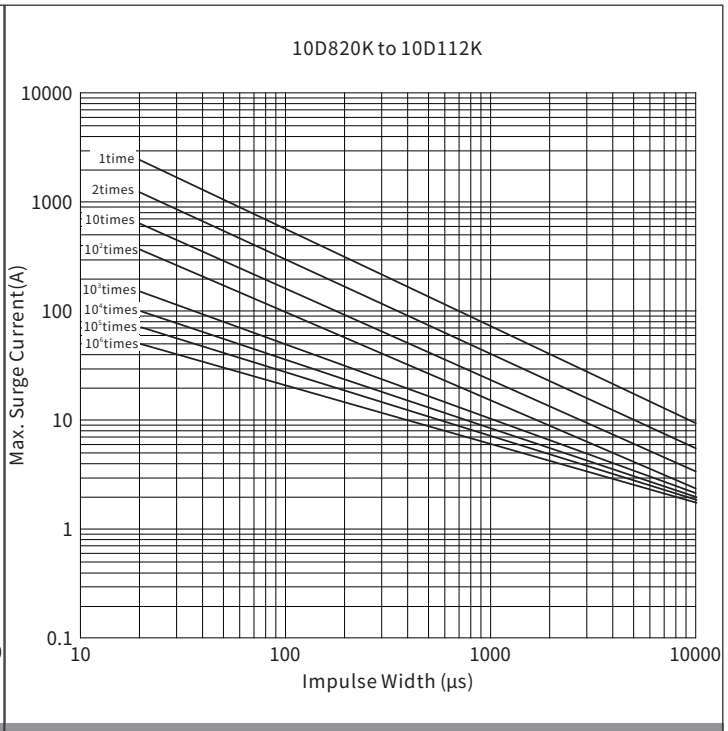
Recommendation Reworking Conditions with Soldering Iron

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

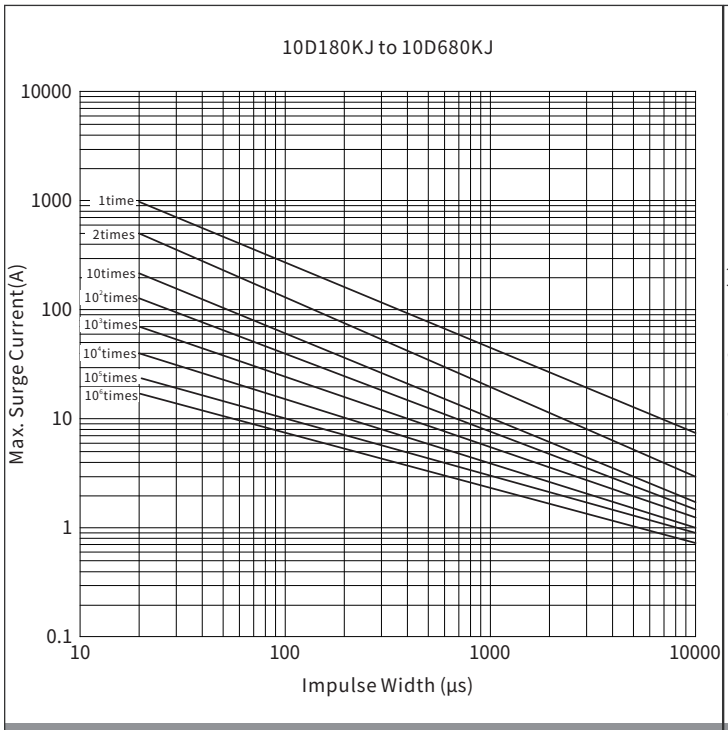
Maximum Surge Current Derating Curve (Ta=25℃ Unless otherwise specified)



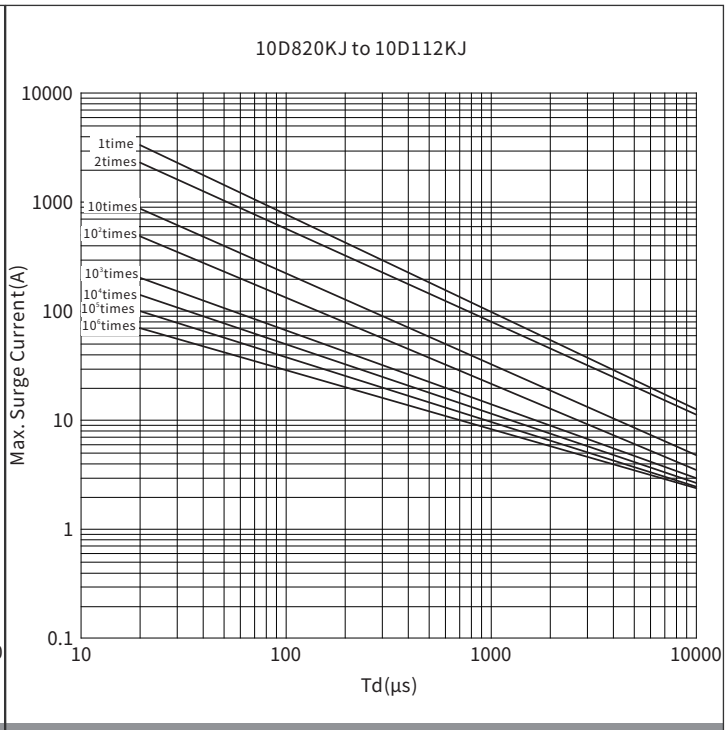
Maximum Surge Current Derating Curve



Maximum Surge Current Derating Curve

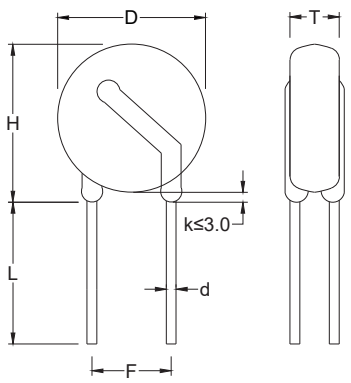


Maximum Surge Current Derating Curve

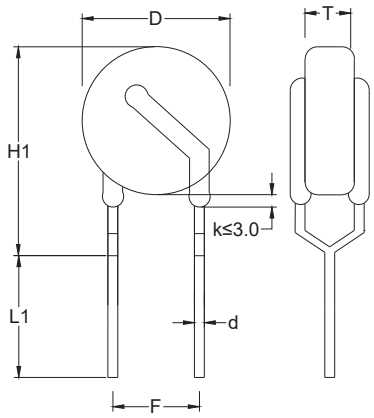


Maximum Surge Current Derating Curve

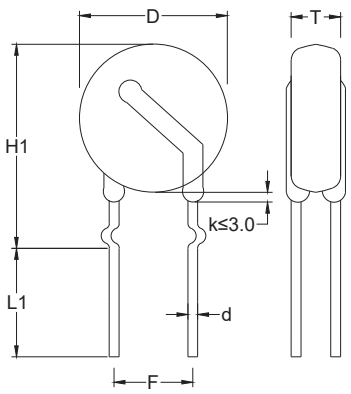
Dimensions



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)	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	

TABLE 2 T(max.)				
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