

Metal Oxide Varistor (MOV) Data Sheet

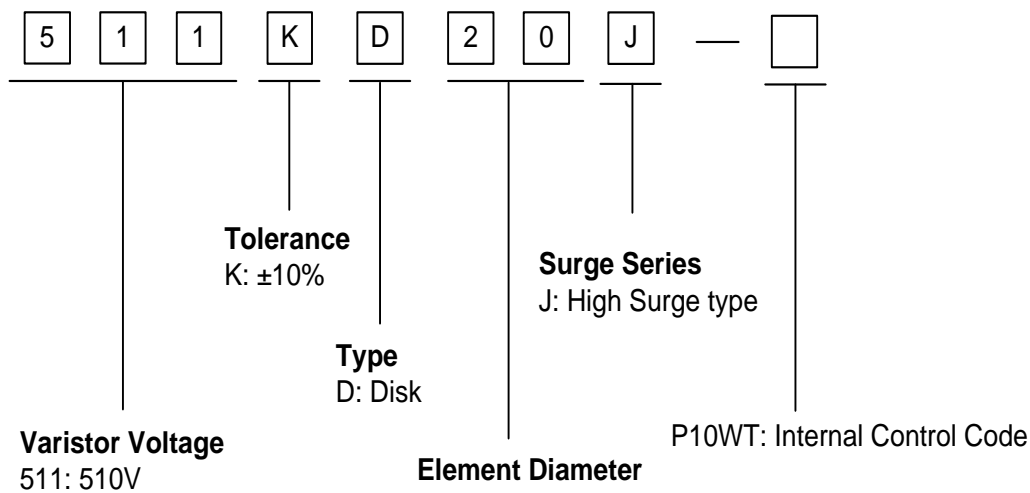
Features

- Fast responding to transient over-voltage
- Large absorbing transient energy capability
- Low clamping ratio and no follow-on current
- Meets MSL level 1, per J-STD-020
- Operating Temperature : -40°C ~ +105°C
- Storage Temperature : -40°C ~ +125°C
- Safety certification : UL 、 CSA 、 VDE

Applications

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

Part Number Code



Dimensions

Symbol	Dimension (mm)
H	21.0~26.0
L(min.)	20.0
D	20.0~23.0
F(±1.0)	10.0
T	3.5~6.2
e(±0.8)	3.6
d(±0.05)	1.0

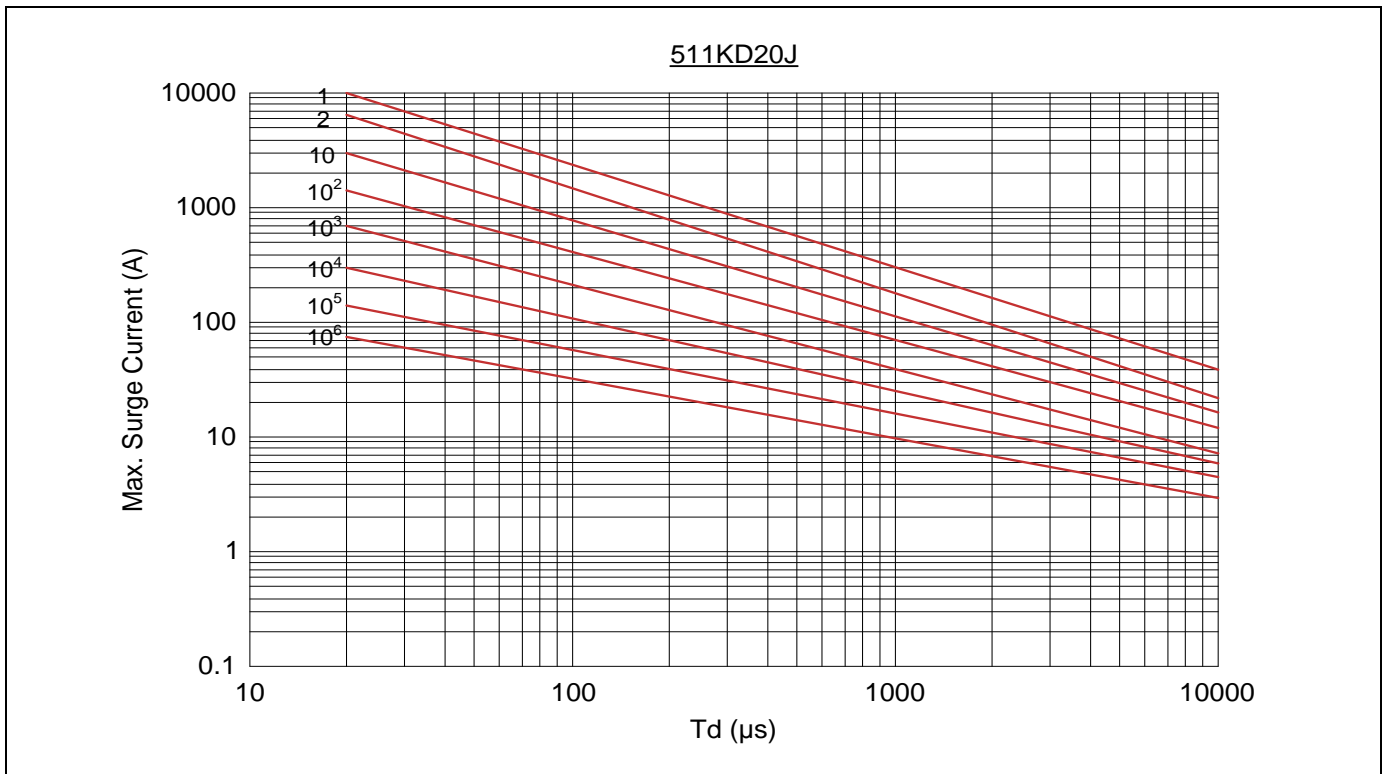
Electrical Characteristics

Model Number: 511KD20J					Part Number: 511KD20J-P10WT				
Maximum Allowable Voltage		Varistor Voltage	Maximum Clamping Voltage		Withstanding Surge current	Maximum Energy (10/1000µs)	Rated Power	Leakage Current	Typical Capacitance (Reference)
V _{AC} (V)	V _{DC} (V)	V _{1mA} (V)	I _P (A)	V _C (V)	I (A)	(J)	(W)	@83% of V _{1mA} (µA)	@1KHz (pf)
320	415	510(459~561)	100	845	10000	360	1.0	≤25	780

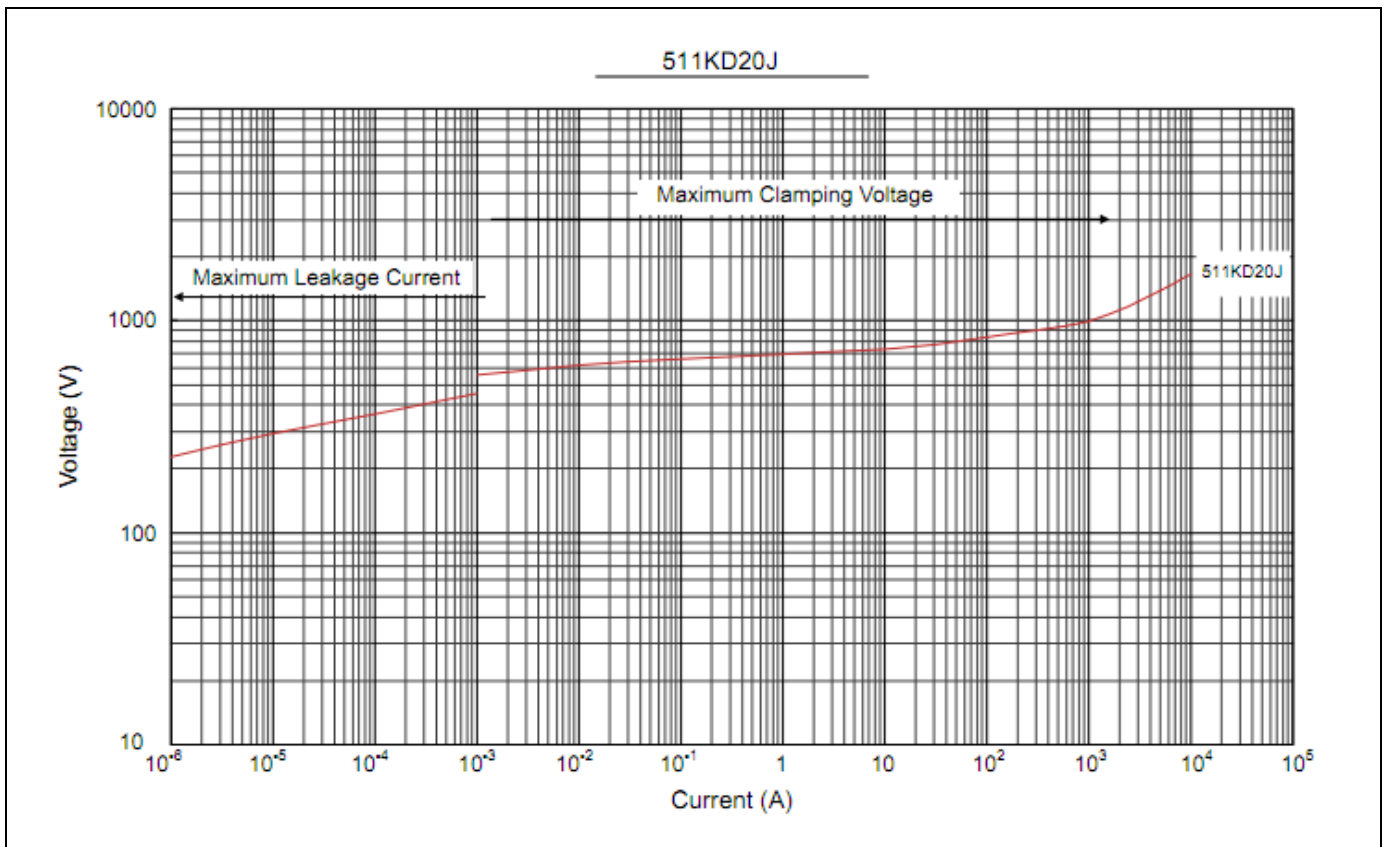
Note: Put the product into an oven and set the temperature at 125 degrees. Put the output device of the digital bridge equipment to both sides of MOV. Under the condition of 1mA direct current output, we can observe the variation trend of MOV varistor voltage by the display of digital bridge equipment. Every batch we can test 3 to 5 pcs. If the varistor voltage goes up then goes down, or the voltage fluctuates obviously within 30 minutes, this batch is rejects.

Marking Code

Maximum Surge Current Derating Curve



Maximum Leakage Current and Maximum Clamping Voltage Curve

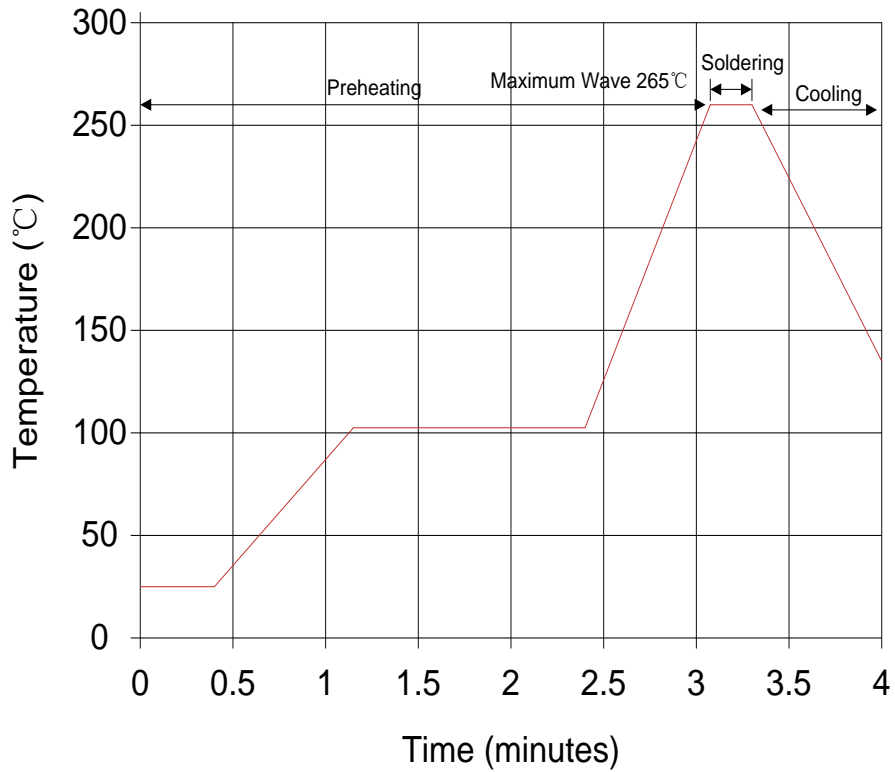


Reliability

Items	Standard	Test conditions / Methods	Specifications															
Tensile Strength of Terminals	IEC60068-2-21	Gradually applying the force specified and keeping the unit fixed for 10±1 sec. <table border="1"> <thead> <tr> <th>Terminal diameter (mm)</th> <th>Force (kg)</th> </tr> </thead> <tbody> <tr> <td>0.5 < d ≤ 0.8</td> <td>1.0</td> </tr> <tr> <td>0.8 < d ≤ 1.25</td> <td>2.0</td> </tr> <tr> <td>1.25 < d</td> <td>4.0</td> </tr> </tbody> </table>	Terminal diameter (mm)	Force (kg)	0.5 < d ≤ 0.8	1.0	0.8 < d ≤ 1.25	2.0	1.25 < d	4.0	No visible damage ΔV _{1mA} /V _{1mA} ≤ 5%							
Terminal diameter (mm)	Force (kg)																	
0.5 < d ≤ 0.8	1.0																	
0.8 < d ≤ 1.25	2.0																	
1.25 < d	4.0																	
Bending Strength of Terminals	IEC60068-2-21	Hold specimen and apply the force specified below to each lead. Bend the specimen to 90°, then return to the original position. Repeat the procedure in the opposite direction. <table border="1"> <thead> <tr> <th>Terminal diameter (mm)</th> <th>Force (kg)</th> </tr> </thead> <tbody> <tr> <td>0.5 < d ≤ 0.8</td> <td>0.5</td> </tr> <tr> <td>0.8 < d ≤ 1.25</td> <td>1.0</td> </tr> <tr> <td>1.25 < d</td> <td>2.0</td> </tr> </tbody> </table>	Terminal diameter (mm)	Force (kg)	0.5 < d ≤ 0.8	0.5	0.8 < d ≤ 1.25	1.0	1.25 < d	2.0	No visible damage ΔV _{1mA} /V _{1mA} ≤ 5%							
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Vibration	IEC60068-2-6	Frequency range: 10~55 Hz Amplitude: 0.75mm or 98m/s ² Direction: 3 mutually perpendicular directions, 2hrs each.	No visible damage ΔV _{1mA} /V _{1mA} ≤ 5%															
Solderability	IEC60068-2-20	Solder Temp: 245±5 °C Dipping Time: 2±0.5 sec	At least 95% of terminal electrode is covered by new solder															
Resistance to Soldering Heat	IEC60068-2-20	Solder Temp: 260±5 °C Dipping Time: 10±1 sec	No visible damage ΔV _{1mA} /V _{1mA} ≤ 5%															
High Temperature Storage	IEC60068-2-2	Ambient Temp: 125±2 °C Duration: 1000±24hrs	No visible damage ΔV _{1mA} /V _{1mA} ≤ 5%															
Low Temperature Storage	IEC60068-2-1	Ambient Temp: -40±2 °C Duration: 1000±24hrs	No visible damage ΔV _{1mA} /V _{1mA} ≤ 5%															
Damp Heat, Steady State	IEC60068-2-78	The test is divided into two groups . a. 40±2 °C , 90~95% RH for 1344±24hrs b. 40±2 °C , 90~95% RH, at 10%VDC , 1344±24 hrs	No visible damage ΔV _{1mA} /V _{1mA} ≤ 10% Insulation Resistance ≥ 100MΩ															
High Temperature Load	MIL-STD-202 Method 108	Ambient Temp: 105±2 °C Duration: 1000±24hrs Load: Max. Allowable Voltage In AC.	ΔV _{1mA} /V _{1mA} ≤ 10%															
Temperature Cycle	IEC60068-2-14	The conditions shown below shall be repeated 5 cycles <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>5±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>5±3</td> </tr> </tbody> </table>	Step	Temperature (°C)	Period (minutes)	1	-40±3	30±3	2	Room temperature	5±3	3	125±3	30±3	4	Room temperature	5±3	No visible damage ΔV _{1mA} /V _{1mA} ≤ 5%
Step	Temperature (°C)	Period (minutes)																
1	-40±3	30±3																
2	Room temperature	5±3																
3	125±3	30±3																
4	Room temperature	5±3																
8/20μS Surge Life	IEC61051-1	8/20μS waveform, 10 surge currents, unipolar, interval 30secs, amplitude corresponding to max. surge current derating curves for 20μS.	No visible damage ΔV _b (1mA) ≤ ±10%															
10/1000μS Surge Life	IEC61051-1	10/1000μS waveform, 10 surge currents, unipolar, interval 2mins, amplitude corresponding to max. surge current derating curves for 1000μS.	No visible damage ΔV _{1mA} /V _{1mA} ≤ 10%															
Voltage Proof	IEC61051-1	Metal balls method, 2500Vac 1 min.	No visible damage															

Soldering Recommendation

Wave Lead Free Soldering Recommendation

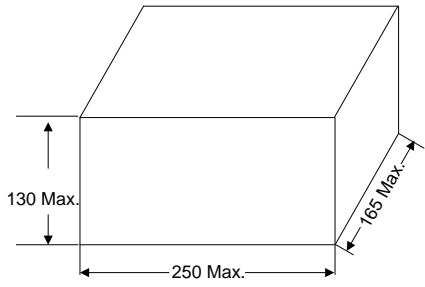


Item	Conditions
Peak Temperature	265°C
Dipping Time	10 seconds (max.)
Soldering	1 time

Recommendation Reworking Conditions with Soldering Iron

Item	Conditions
Temperature of Soldering Iron-tip	360°C (max.)
Soldering Time	3 seconds (max.)
Distance from Varistor	2mm (min.)

Quantity

Packaging Dimensions (Unit: mm)	Quantity
In bulk for Terminals Untrimmed Products 	300pcs/bag 4ags/box

Storage Condition of Products

(I) Storage Conditions :

- 1.Storage Temperature : $-10^{\circ}\text{C} \sim +40^{\circ}\text{C}$
- 2.Relative Humidity : $\leq 80\%RH$
- 3.Keep away from corrosive atmosphere and sunlight.

(II) Period of Storage : 1 year