



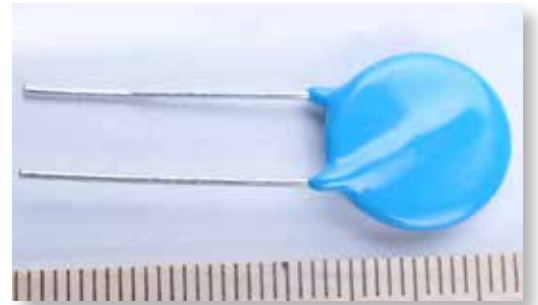
# Metal Oxide Varistors

**20D Series**

## Metal Oxide Varistors - 20D Series

### Features

- Wide operating voltage ( $V_{1mA}$ ) range from 18V to 1800V.
- Fast responding to transient over-voltage.
- Large absorbing transient energy capability.
- Low clamping ratio and no following-on current.



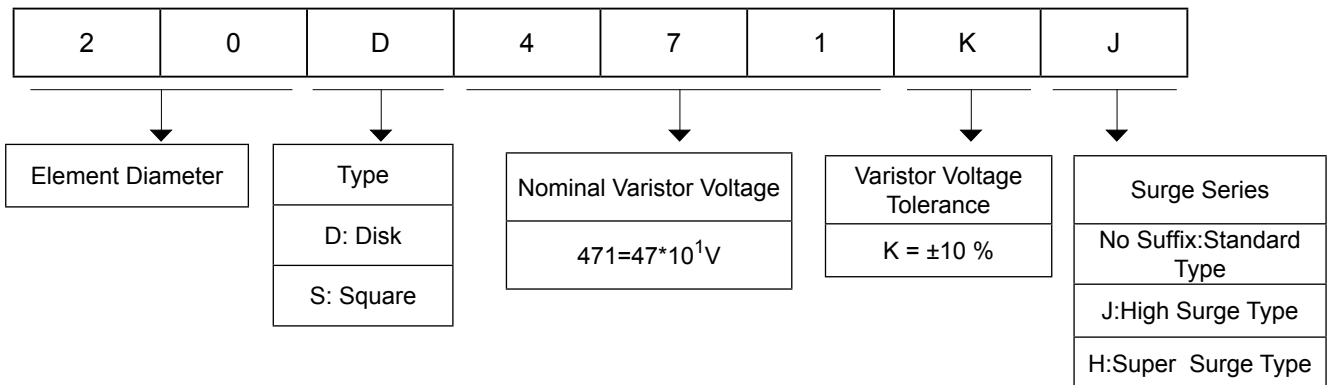
### General Information

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

### General Characteristics

- Body: Nickel Plated
- Devices with No Leads: Nickel Plated
- Operating Temperature:  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$
- Storage Temperature:  $-40^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$
- Leads: Surface-mount, Axial Devices: Tin Plated

### Product Name



## Metal Oxide Varistors - 20D Series

### Electrical Characteristics

Type Number		Maximum Allowable Voltage		Varistor Voltage	Maximum Clamping Voltage		Withstanding Surge Current		Maximum Energy (10/1000µs)		Rated Power	Typical Capacitance (Reference)
Standard	High Surge	V <sub>AC</sub> (V)	V <sub>DC</sub> (V)	V <sub>1mA</sub> (V)	I <sub>P</sub> (A)	V <sub>C</sub> (V)	I(A) Standard	I(A) High Surge	(J) Standard	(J) High Surge	(W)	@1KHz(pf)
20D180K	20D180KJ	11	14	18(15~21.6)	20	36	2000	3000	5.4	6.8	0.2	39000
20D220K	20D220KJ	14	18	22(19.5~26)	20	43	2000	3000	6.6	8.3	0.2	32000
20D270K	20D270KJ	17	22	27(24~30)	20	53	2000	3000	8.1	10.1	0.2	22000
20K330K	20K330KJ	20	26	33(29.5~36.5)	20	65	2000	3000	9.9	12.4	0.2	18000
20D390K	20D390KJ	25	31	39(35~43)	20	77	2000	3000	11.7	14.6	0.2	16000
20D470K	20D470KJ	30	38	47(42~54)	20	93	2000	3000	14.1	17.6	0.2	14000
20D560K	20D560KJ	35	45	56(50~62)	20	100	2000	3000	16.8	21.0	0.2	12000
20D680K	20D680KJ	40	56	68(61~75)	20	135	2000	3000	20.4	25.5	0.2	10000
20D820K	20D820KJ	50	65	82(74~90)	100	135	6500	10000	24.6	30.8	1.0	5800
20D101K	20D101KJ	60	85	100(90~110)	100	165	6500	10000	30.0	37.5	1.0	4800
20D121K	20D121KJ	75	100	120(108~132)	100	200	6500	10000	36.0	45.0	1.0	3800
20D151K	20D151KJ	95	125	150(135~165)	100	250	6500	10000	45.0	56.3	1.0	3000
20D181K	20D181KJ	115	150	180(162~198)	100	300	6500	10000	54.0	67.5	1.0	2600
20D201K	20D201KJ	130	170	200(180~220)	100	340	6500	10000	60.0	75.0	1.0	2400
20D221K	20D221KJ	140	180	220(198~242)	100	360	6500	10000	66.0	82.5	1.0	1800
20D241K	20D241KJ	150	200	240(216~264)	100	395	6500	10000	72.0	90.0	1.0	1500
20D271K	20D271KJ	175	225	270(243~297)	100	455	6500	10000	81.0	101.3	1.0	1400
20D301K	20D301KJ	190	250	300(270~330)	100	500	6500	10000	90.0	112.5	1.0	1350
20D331K	20D331KJ	210	275	330(297~363)	100	550	6500	10000	99.0	123.8	1.0	1300
20D361K	20D361KJ	230	300	360(324~396)	100	595	6500	10000	108.0	135.0	1.0	1250
20D391K	20D391KJ	250	320	390(351~429)	100	650	6500	10000	117.0	146.3	1.0	1180
20D431K	20D431KJ	275	350	430(387~473)	100	710	6500	10000	129.0	161.3	1.0	1100
20D471K	20D471KJ	300	385	470(423~517)	100	775	6500	10000	141.0	176.3	1.0	1050
20D511K	20D511KJ	320	415	510(459~561)	100	845	6500	10000	153.0	191.3	1.0	1000
20D561K	20D561KJ	350	460	560(504~616)	100	925	6500	10000	168.0	210.0	1.0	970
20D621K	20D621KJ	385	505	620(558~682)	100	1025	6500	10000	186.0	232.5	1.0	950
20D681K	20D681KJ	420	560	680(612~748)	100	1120	6500	10000	186.0	232.5	1.0	900
20D751K	20D751KJ	460	615	750(675~825)	100	1240	6500	10000	186.0	232.5	1.0	850
20D781K	20D781KJ	485	640	780(702~858)	100	1290	6500	10000	187.2	234.0	1.0	750
20D821K	20D821KJ	510	670	820(738~902)	100	1355	6500	10000	196.8	246.0	1.0	700
20D911K	20D911KJ	550	745	910(819~1001)	100	1500	6500	10000	218.4	273.0	1.0	600
20D951K	20D951KJ	580	780	950(855~1045)	100	1570	6500	10000	228.0	285.0	1.0	580
20D102K	20D102KJ	625	825	1000(900~1100)	100	1650	6500	10000	240.0	300.0	1.0	500
20D112K	20D112KJ	680	895	1100(990~1210)	100	1815	6500	10000	264.0	330.0	1.0	450
20D152K	20D152KJ	900	1220	1500(1350~1650)	100	2475	6500	10000	359.0	449.0	1.0	400
20D182K	20D182KJ	1100	1465	1800(1620~1980)	100	2970	6500	10000	432.0	540.0	1.0	220

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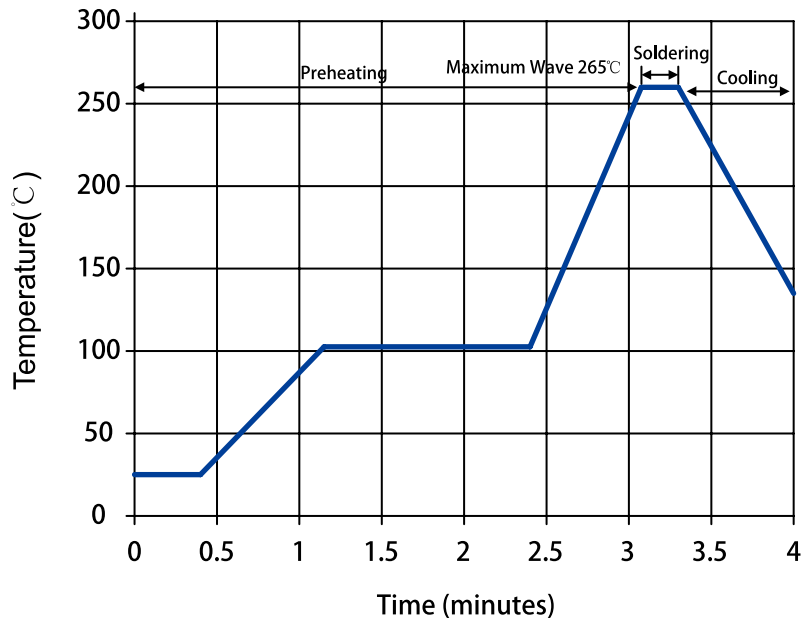
### Electrical Ratings

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) or the 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: 8/20<math>\mu</math>s</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 $\pm 10\%$ when one impulse of 10/1000 $\mu$ s or 2ms is applied.																										
Withstanding Surge Current	The maximum current within the varistor voltage change of $\pm 10\%$ with the standard impulse current (8/20 $\mu$ s) 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"> <tbody> <tr> <td rowspan="2">5<math>\Phi</math> series</td> <td>180K to 680K</td> <td>10A (8/20<math>\mu</math>s)</td> </tr> <tr> <td>820K to 751K</td> <td>20A (8/20<math>\mu</math>s)</td> </tr> <tr> <td rowspan="2">7<math>\Phi</math> series</td> <td>180K to 680K</td> <td>25A (8/20<math>\mu</math>s)</td> </tr> <tr> <td>820K to 821K</td> <td>50A (8/20<math>\mu</math>s)</td> </tr> <tr> <td rowspan="2">10<math>\Phi</math> series</td> <td>180K to 680K</td> <td>50A (8/20<math>\mu</math>s)</td> </tr> <tr> <td>820K to 112K</td> <td>100A (8/20<math>\mu</math>s)</td> </tr> <tr> <td rowspan="2">14<math>\Phi</math> series</td> <td>180K to 680K</td> <td>75A (8/20<math>\mu</math>s)</td> </tr> <tr> <td>820K to 182K</td> <td>150A (8/20<math>\mu</math>s)</td> </tr> <tr> <td rowspan="2">20<math>\Phi</math> series</td> <td>180K to 680K</td> <td>100A (8/20<math>\mu</math>s)</td> </tr> <tr> <td>820K to 182K</td> <td>200A (8/20<math>\mu</math>s)</td> </tr> </tbody> </table>	5 $\Phi$ series	180K to 680K	10A (8/20 $\mu$ s)	820K to 751K	20A (8/20 $\mu$ s)	7 $\Phi$ series	180K to 680K	25A (8/20 $\mu$ s)	820K to 821K	50A (8/20 $\mu$ s)	10 $\Phi$ series	180K to 680K	50A (8/20 $\mu$ s)	820K to 112K	100A (8/20 $\mu$ s)	14 $\Phi$ series	180K to 680K	75A (8/20 $\mu$ s)	820K to 182K	150A (8/20 $\mu$ s)	20 $\Phi$ series	180K to 680K	100A (8/20 $\mu$ s)	820K to 182K	200A (8/20 $\mu$ s)	$\frac{\Delta V_b}{V_b} \leq \pm 10\%$
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### Soldering Recommendation

#### Wave Lead Free Soldering Recommendation



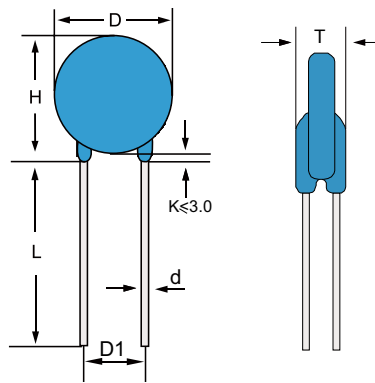
Item	Conditions
Peak Temperature	265°C
Dipping Time	10 seconds (max.)
Soldering	1 time

#### 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.)

## Metal Oxide Varistors - 20D Series

### Package Dimensions (Unit:mm)



**TABLE 1**

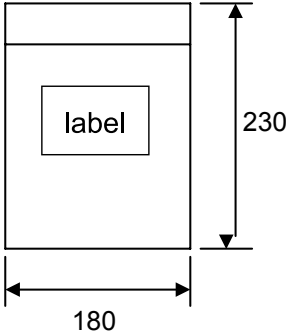
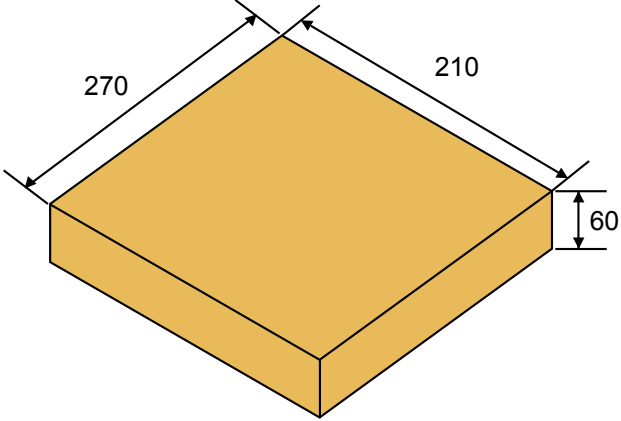
Symbol	Dimensions
H(max.)	26.5
L(min.)	20.0
D(max.)	23.0
D1	7.5±0.8/10.0±1.0
T(max.)	TABLE 2
d(±0.05)	0.8/1.0

**TABLE 2**

Model	T(max.)	Model	T(max.)
180K	4.3	331K	5.2
220K	4.4	361K	5.4
270K	4.6	391K	5.5
330K	4.8	431K	5.7
390K	4.5	471K	6.0
470K	4.7	511K	6.2
560K	5.0	561K	6.5
680K	5.3	621K	6.8
820K	4.5	681K	7.1
101K	4.6	751K	7.5
121K	4.8	781K	7.7
151K	4.5	821K	7.9
181K	4.6	911K	8.1
201K	4.7	951K	8.6
221K	4.8	102K	8.6
241K	4.9	112K	9.1
271K	5.0	152K	11.8
301K	5.0	182K	12.8

## Metal Oxide Varistors - 20D Series

### Packaging Taping

Bag Packing (180*230mm)	Inner Box (270*210*60mm)
	
250 PCS/ Bag	1000 PCS/ Box