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### Features

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- I Wide operating voltage (V1mA) range from 18V to 820V
- I Fast responding to transient over-voltage.
- I Large absorbing transient energy capability.
- I Low clamping ratio and no following-on current.

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### General Information

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




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### General Characteristics

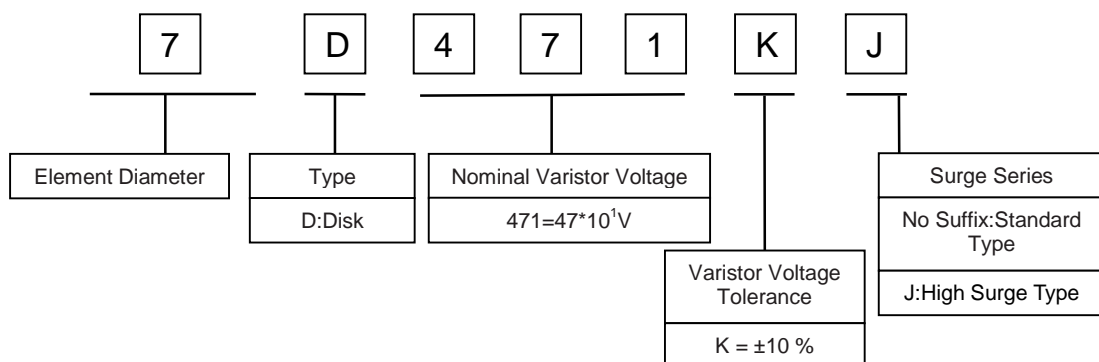
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- I Body: Nickel Plated
- I Devices with No Leads: Nickel Plated
- I Operating Temperature: -40°C to +85°C
- I Storage Temperature: -40 °C to +125°C

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### Part Number Code

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## Electrical Characteristics

Type Number	Varistor Voltage	Max. Allowable Voltage		Max. Energy (2ms) (J) Standard	Max. Clamping Voltage (8/20 $\mu$ s)		Withstanding Surge Current (8/20 $\mu$ s)	Rated Power (W)	Typical Capacitance Reference) @1 KHz(pf)
		V <sub>AC</sub> (V)	V <sub>DC</sub> (V)		I <sub>P</sub> (A)	V <sub>C</sub> (V)			
Standard	V <sub>1mA</sub> (V)	V <sub>AC</sub> (V)	V <sub>DC</sub> (V)	(J) Standard	I <sub>P</sub> (A)	V <sub>C</sub> (V)	I(A) Standard	(W)	@1 KHz(pf)
7D180K	16~20	11	14	0.8	2.5	38	250	0.02	3500
7D220K	20~24	14	18	0.9	2.5	43	250	0.02	2800
7D270K	24~30	17	22	1.1	2.5	53	250	0.02	2200
7D330K	30~36	20	26	1.4	2.5	65	250	0.02	1800
7D390K	35~43	25	31	1.6	2.5	77	250	0.02	1450
7D470K	42~52	30	38	2.0	2.5	93	250	0.02	1150
7D560K	50~62	35	45	2.4	2.5	110	250	0.02	1050
7D680K	61~75	40	56	2.9	2.5	135	250	0.02	970
7D820K	74~90	50	65	3.4	10	135	1200	0.25	930
7D101K	90~110	60	85	4.2	10	165	1200	0.25	860
7D121K	108~132	75	100	5.0	10	200	1200	0.25	670
7D151K	135~165	95	125	6.3	10	250	1200	0.25	490
7D181K	162~198	115	150	7.6	10	300	1200	0.25	330
7D201K	180~220	130	170	8.4	10	340	1200	0.25	240
7D221K	198~242	140	180	9.2	10	360	1200	0.25	190
7D241K	216~264	150	200	10.1	10	395	1200	0.25	165
7D271K	243~297	175	225	11.3	10	455	1200	0.25	150
7D301K	270~330	195	250	12.6	10	505	1200	0.25	135
7D331K	297~363	210	275	13.9	10	550	1200	0.25	130
7D361K	324~396	230	300	15.1	10	595	1200	0.25	125
7D391K	351~429	250	320	16.4	10	650	1200	0.25	105
7D431K	387~473	275	350	18.1	10	710	1200	0.25	100
7D471K	423~517	300	385	19.7	10	775	1200	0.25	90
7D511K	459~561	320	418	21.4	10	842	1200	0.25	80
7D561K	504~616	350	460	23.5	10	920	1200	0.25	75
7D621K	558~682	385	505	26.0	10	1025	1200	0.25	70
7D681K	612~748	420	560	28.6	10	1120	1200	0.25	65
7D751K	675~825	460	615	31.5	10	1240	1200	0.25	61
7D781K	702~858	485	640	32.8	10	1290	1200	0.25	54
7D821K	738~902	510	670	34.4	10	1355	1200	0.25	48

Note. The energy (10/1000 $\mu$ s) is about 1.4 times of energy(2ms)



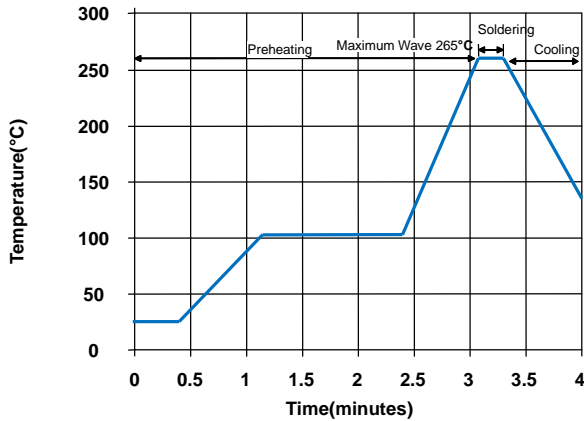
## Electrical Ratings

Items	Test Condition/Description	Requirement					
Varistor Voltage	The voltage between two terminals with the specified measuring current 1mA.DC applied is called Vb.	To meet the Specified value					
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: 8/20μs</p> <p style="text-align: center;"> <math>T_1 = 1.25 \cdot T = 8\mu s \pm 20\%</math>  <math>T_2 = 20\mu s \pm 20\%</math> </p>						
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 10/1000μs or 2ms is applied.						
Withstanding Surge Current	The maximum current within the varistor voltage change of $\pm 10\%$ 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="margin-left: auto; margin-right: auto;"> <tbody> <tr> <td rowspan="2" style="text-align: center;">7Φ series</td> <td style="text-align: center;">180K to 680K</td> <td style="text-align: center;">15A (8/20μs)</td> </tr> <tr> <td style="text-align: center;">820K to 821K</td> <td style="text-align: center;">50A (8/20μs)</td> </tr> </tbody> </table>	7Φ series	180K to 680K	15A (8/20μs)	820K to 821K	50A (8/20μs)	$\frac{\Delta V_b}{V_b} \leq \pm 10\%$
7Φ series	180K to 680K		15A (8/20μs)				
	820K to 821K	50A (8/20μs)					



## 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.)

## Dimensions

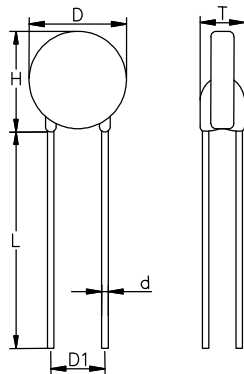


TABLE 1		
Symbol	Millimeters	Inches
H(max.)	12.0	0.472
L(min.)	15.0	0.591
D(max.)	9.0	0.354
D1(±1.0)	5.0	0.197
T(max.)	TABLE 2	
d(±0.1)	0.6	0.024
Packaging Quantity: 1000pcs/bag		

TABLE 2---T(max.)

Model	Millimeters	Inches	Model	Millimeters	Inches
180K~390K	5.5	0.217	331K~391K	7.5	0.295
470K~680K	6.0	0.236	431K~561K	8.0	0.315
820K~151K	6.5	0.256	621K~781K	8.5	0.335
181K~271K	7.0	0.276	821K	9.0	0.354