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## Radial Lead Varistor (MOV)

### Description

The 10D series radial leaded varistors provides an ideal circuit protection solution for lower DC voltage applications by offering higher surge ratings than ever before available in such small discs. The maximum peak surge current rating can reach up to 3.5KA (8/20  $\mu$ s pulse) to protect against high peak surges, including indirect lightning strike interference, system switching transients and abnormal fast transients from the power source.

### Features

- ◆ Wide operating voltages ranging from 11Vrms to 680Vrms(AC)
- ◆ Fast response time of less than 25ns, instantly clamping the transient over voltage.
- ◆ High surge current handling capability.
- ◆ High energy absorption capability.
- ◆ Low clamping voltages, providing better surge protection
- ◆ Low capacitance values, providing digital switching circuitry protection.
- ◆ High insulation resistance, preventing electric arching to the adjacent devices or circuits.

### Applicable

- ◆ 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 Numbering

**10 - D - XXX - K - X - X - X - X**  
 ( 1 ) ( 2 ) ( 3 ) ( 4 ) ( 5 ) ( 6 ) ( 7 ) ( 8 )

(1) Size(mm) : 05mm to 32mm

(2) Type : D: Disk, S: Square

(3) Varistor Voltage : 470(47\*10<sup>0</sup>=47V) , 471( 47\*10<sup>1</sup>=470V)

(4) Tolerance : K $\pm$ 10%, L $\pm$ 15%, M $\pm$ 20%

(5) Surge Current Standard: J:High Surge (E: 4KV/2KA S:6KV/3KA )surge Pulse 40times

(6) Taping Mode : TR : Reel

(7) Lead Form : C:Crimped, Short leg : NO : X.X

(8) Coating : H:Epoxy Coating 125 $^{\circ}$ C

Note: (5)、(6)、(7)、(8) options is non-standard



### Material

- ◆ Coating: Epoxy Resin
- ◆ Lead Wire: The Copper Wire
- ◆ Electrode: Silver Solder
- ◆ Disk: Zinc Oxide




### General Characteristics Definition

- ◆ Operating Temperature: -40 $^{\circ}$ C~ +85 $^{\circ}$ C
- ◆ Storage Temperature: -40 $^{\circ}$ C~ +125 $^{\circ}$ C
- ◆ Working Surface Temperature: +115 $^{\circ}$ C
- ◆ Insulation Resistance: > 100M $\Omega$
- ◆ Coating (Epoxy Resin): Flame-Retardant to UL 94V-0
- ◆ Approval Standard and File Number:  
 VDE : 40046112  
 CQC : 16001161421  
 CSA&CUL : E489912

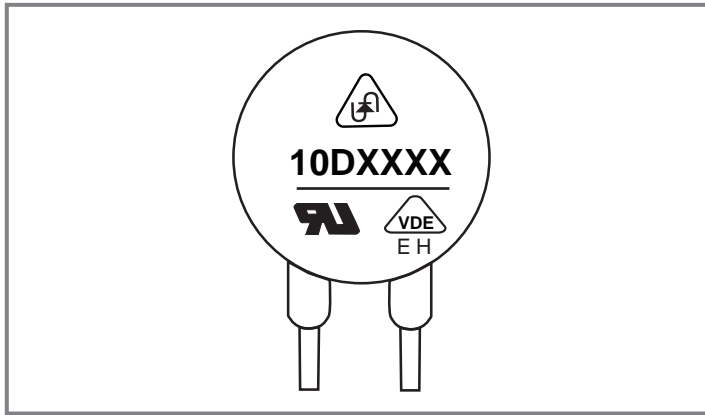
Electrical Characteristics (@ 25°C Unless Otherwise Specified )

Part Number		Maximum Allowable Voltage		Varistor Voltage	Withstanding Surge Current 8/20µS				Max Clamping Voltage		Maximum Energy (10/1000µs)		Rated Power
Standard	High Surge	V <sub>AC</sub> (V)	V <sub>DC</sub> (V)	V <sub>1mA</sub> (V)	I(A) Standard		I(A) High Surge		V <sub>C</sub> (V)	I <sub>P</sub> (A)	(J) Standard	(J) High Surge	(W)
					1 time	2 times	1 time	2 times					
10D180L	10D180LJ	11	14	18(15.3-20.7)	500	250	1000	500	36	5	2.1	3.0	0.05
10D220K	10D220KJ	14	18	22(19.8-24.2)	500	250	1000	500	43	5	2.5	5.0	0.05
10D270K	10D270KJ	17	22	27(24.3-29.7)	500	250	1000	50	53	5	3.0	6.0	0.05
10D330K	10D330KJ	20	26	33(29.7-36.3)	500	250	1000	500	65	5	4.0	7.0	0.05
10D390K	10D390KJ	25	31	39(35.1-42.9)	500	250	1000	500	77	5	4.6	9.0	0.05
10D470K	10D470KJ	30	38	47(42.3-51.7)	500	250	1000	500	93	5	5.5	11.0	0.05
10D560K	10D560KJ	35	45	56(50.4-61.6)	500	250	1000	500	110	5	7.0	13.0	0.05
10D680K	10D680KJ	10	56	68(61.2-74.8)	500	250	1000	500	135	5	8.2	15.0	0.05
10D820K	10D820KJ	50	65	82(73.8-90.2)	2500	1250	3500	2500	135	25	12.0	17.0	0.40
10D101K	10D101KJ	50	85	100(90-110)	2500	1250	3500	2500	165	25	15.0	18.0	0.40
10D121K	10D121KJ	75	100	120(108-132)	2500	1250	3500	2500	200	25	18.0	21.0	0.40
10D151K	10D151KJ	95	125	150(135-165)	2500	1250	3500	2500	250	25	22.0	25.0	0.40
10D181K	10D181KJ	115	150	180(162-198)	2500	1250	3500	2500	300	25	27.0	30.0	0.40
10D201K	10D201KJ	130	170	200(185-225)	2500	1250	3500	2500	340	25	30.0	35.0	0.40
10D221K	10D221KJ	140	180	220(198-242)	2500	1250	3500	2500	360	25	32.0	39.0	0.40
10D241K	10D241KJ	150	200	240(216-264)	2500	1250	3500	2500	395	25	35.0	42.0	0.40
10D271K	10D271KJ	175	225	270(243-297)	2500	1250	3500	2500	455	25	37.0	49.0	0.40
10D301K	10D301KJ	190	250	300(270-330)	2500	1250	3500	2500	505	25	40.0	54.0	0.40
10D331K	10D331KJ	210	275	330(297-363)	2500	1250	3500	2500	550	25	43.0	58.0	0.40
10D361K	10D361KJ	230	300	360(324-396)	2500	1250	3500	2500	595	25	47.0	65.0	0.40
10D391K	10D391KJ	250	320	390(351-429)	2500	1250	3500	2500	650	25	60.0	70.0	0.40
10D431K	10D431KJ	275	350	430(387-473)	2500	1250	3500	2500	710	25	65.0	80.0	0.40
10D471K	10D471KJ	300	385	470(423-517)	2500	1250	3500	2500	775	25	67.0	85.0	0.40
10D511K	10D511KJ	320	415	510(459-561)	2500	1250	3500	2500	845	25	69.0	90.0	0.40
10D561K	10D561KJ	350	460	560(504-616)	2500	1250	3500	2500	920	25	70.0	92.0	0.40
10D621K	10D621KJ	385	505	620(558-682)	2500	1250	3500	2500	1025	25	72.0	95.0	0.40
10D681K	10D681KJ	420	560	680(612-748)	2500	1250	3500	2500	1120	25	75.0	98.0	0.40
10D751K	10D751KJ	460	615	750(675-825)	2500	1250	3500	2500	1240	25	77.0	100.0	0.40
10D781K	10D781KJ	485	640	780(702-858)	2500	1250	3500	2500	1290	25	80.0	105.0	0.40
10D821K	10D821KJ	510	670	820(738-902)	2500	1250	3500	2500	1355	25	85.0	110.0	0.40
10D911K	10D911KJ	550	745	910(819-1001)	2500	1250	3500	2500	1500	25	93.0	130.0	0.40
10D102K	10D102K	625	825	1000(900-1100)	2500	1250	3500	2500	1650	25	102.0	140.0	0.40
10D112K	10D112KJ	680	895	1100(990-1210)	2500	1250	3500	2500	1815	25	115.0	150.0	0.40

**Approval Standard And File Number**

Certified Model No.		 <b>E489912</b>		 <b>40046112</b>		 <b>16001161423</b>		<b>CSA &amp; CUL E489912</b>	
10D180L	10D180LJ	YES		YES		YES		YES	
10D220K	10D220KJ	YES		YES		YES		YES	
10D270K	10D270KJ	YES		YES		YES		YES	
10D330K	10D330KJ	YES		YES		YES		YES	
10D390K	10D390KJ	YES		YES		YES		YES	
10D470K	10D470KJ	YES		YES		YES		YES	
10D560K	10D560KJ	YES		YES		YES		YES	
10D680K	10D680KJ	YES		YES		YES		YES	
10D820K	10D820KJ	YES		YES		YES		YES	
10D101K	10D101KJ	YES		YES		YES		YES	
10D121K	10D121KJ	YES		YES		YES		YES	
10D151K	10D151KJ	YES		YES		YES		YES	
10D181K	10D181KJ	YES		YES	3KA/6KV	YES		YES	
10D201K	10D201KJ	YES		YES	3KA/6KV	YES		YES	
10D221K	10D221KJ	YES		YES	3KA/6KV	YES		YES	
10D241K	10D241KJ	YES		YES	3KA/6KV	YES		YES	
10D271K	10D271KJ	YES		YES	3KA/6KV	YES		YES	
10D301K	10D301KJ	YES		YES	3KA/6KV	YES		YES	
10D331K	10D331KJ	YES		YES	3KA/6KV	YES		YES	
10D361K	10D361KJ	YES		YES	3KA/6KV	YES		YES	
10D391K	10D391KJ	YES		YES	3KA/6KV	YES		YES	
10D431K	10D431KJ	YES		YES	3KA/6KV	YES	3KA/6KV	YES	
10D471K	10D471KJ	YES	3KA/6KV	YES	3KA/6KV	YES	3KA/6KV	YES	
10D511K	10D511KJ	YES	3KA/6KV	YES	3KA/6KV	YES	3KA/6KV	YES	
10D561K	10D561KJ	YES	3KA/6KV	YES	3KA/6KV	YES	3KA/6KV	YES	
10D621K	10D621KJ	YES	3KA/6KV	YES	3KA/6KV	YES	3KA/6KV	YES	
10D681K	10D681KJ	YES	3KA/6KV	YES	3KA/6KV	YES	3KA/6KV	YES	
10D751K	10D751KJ	YES		YES	3KA/6KV	YES	3KA/6KV	YES	
10D781K	10D781KJ	YES		YES	3KA/6KV	YES	3KA/6KV	YES	
10D821K	10D821KJ	YES		YES	3KA/6KV	YES	3KA/6KV	YES	
10D911K	10D911KJ	YES		YES	3KA/6KV	YES	3KA/6KV	YES	
10D102K	10D102KJ	YES		YES	3KA/6KV	YES	3KA/6KV	YES	
10D112K	10D112KJ	YES		YES	3KA/6KV	YES	3KA/6KV	YES	

Part Marking



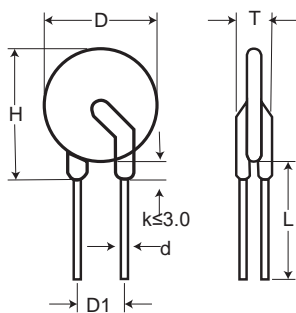
Marking	
Trademark	UN logo
Part No.	10DXXXX
Standard for Safety	UL / VDE / CQC
E / S	4KV/2KA /6KV/3KA
H	H:Epoxy Coating 125°C
—	High Surge

Packaging Information

Unit:Pcs

Dimension	Part No.	Bag	Small Carton	Carton
10D	180L to112K	500	5000	10000
10D (Short leg)	180L to 112K	500	7500	15000

Package Dimensions Unit: mm



Symbol	Dimension
H(max.)	16.5
L(min.)	20.0
D(max.)	12.5/14.5(3KA/6KA)
D1(±0.8)	7.5
T(max.)	TABLE2
d(±0.05)	0.8

Model	T(max.)	Model	T(max.)
180L	4.5	301K	5.0
220K	4.6	331K	5.1
270K	4.7	361K	5.2
330K	4.9	391K	5.4
390K	4.8	431K	5.7
470K	4.9	471K	6.0
560K	5.0	511K	6.2
680K	5.2	561K	6.5
820K	4.1	621K	7.1
101K	4.3	681K	7.3
121K	4.5	751K	7.5
151K	4.8	781K	7.7
181K	4.3	821K	8.0
201K	4.4	911K	8.8
221K	4.5	102K	9.3
241K	4.6	112K	9.9
271K	4.9		

Reliability Test (Mechanical Ratings)

Test Parameter	Test Condition / Description		Performance Requirements	
Terminal Pull Strength	After gradually applying the load specified below and keeping the unit fixed for ten seconds, the terminal shall be visually examined for any damage	Diameter	Loading	No visible damage
		0.6mm	1.0 Kg	
		0.8mm	1.0 Kg	
		1.0mm	2.0 Kg	
Terminal Bending Strength	The unit shall be secured with its terminal kept vertical and the weight specified below be applied in the axial direction. The terminal shall gradually be bent by 90° in one direction, then 90° in the opposite direction, and again back to the original position. The damage of the terminal shall be visually examined.	Diameter	Loading	No visible damage
		0.6mm	0.5 Kg	
		0.8mm	0.5 Kg	
		1.0mm	1.0 Kg	
Vibration	The Specimen shall be vibrated by its lead wires with a total amplitude of 1.5mm and a varying frequency of 10~55~10HZ(each minutes) for a period of 2 hours respectively in each X,Y and Z directions.		No visible damage $\Delta VB/VB\% \leq \pm 5\%$	
Soldering-solder ability	After dipping the terminal to depth of approximately 3mm from the specimen in a soldering bath of 260°C for 10±1(D5: 5±1) seconds. Thereafter the terminal shall be visually examined.		Terminations shall be uniformly tinned	
Soldering-Resistance to Solder Heat	After preheating the specimen, the specimen shall be completely immersed into a soldering bath having a temperature of 260±5°C for 10±1 (D5: 5±1) seconds or iron of 400±5°C for 3±0.5 seconds. There after the change of Vb and mechanical damage shall be examined.		No visible damage $\Delta VB/VB\% \leq \pm 5\%$	

Reliability Test (ENVIRONMENTAL RATINGS)

Test Parameter	Test Condition / Description				Performance Requirements
Dry Heat Loading	The specimen shall be applied continuously the maximum allowable voltage at the specified conditions for specified period and then stored at room temperature and normal humidity over 2 hours. Thereafter, the change of Vb and mechanical damage shall be examined. Ambient temp: 125±2°C ; Period: 1000±24hours				$\Delta VB/VB\% \leq \pm 10\%$
High Temperature Storage	In a drying oven without load. Ambient temp: 125±2°C ; period: 1000±24hours				$\Delta VB/VB\% \leq \pm 5\%$
Damp Heat Loading	The Specimen shall be vibrated by its lead wires with a total amplitude of 1.5mm and a varying frequency of 10~55~10HZ(each minutes) for a period of 2 hours respectively in each X,Y and Z directions.				$\Delta VB/VB\% \leq \pm 10\%$
Temperature Cycle	Condition the specimen to each temperature form step 1 to step 4 in this order for the period shown in the table of specifications. The change of Vb and mechanical damage shall be examined after 2 hours.	Step	Temp°C	Period	No visible damage $\Delta VB/VB\% \leq \pm 10\%$
		1	40+3°C	30 min.	
		2	Room Temp	15 min.	
		3	85+2°C	30 min.	
		4	Room Temp	15 min.	
Surge Lifetime Rating	The change of Vb shall be measured after the impulse listed below is applied 10,000 times continuously with the interval of ten seconds at room temperature. Vb and mechanical damage shall be examined.				No visible damage $\Delta VB/VB\% \leq \pm 10\%$
Voltage Proof	Voltage: 2500VAC Leakage Current $\leq 0.5mA$ Time: 60 Seconds				No Breakdown

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