14D Series

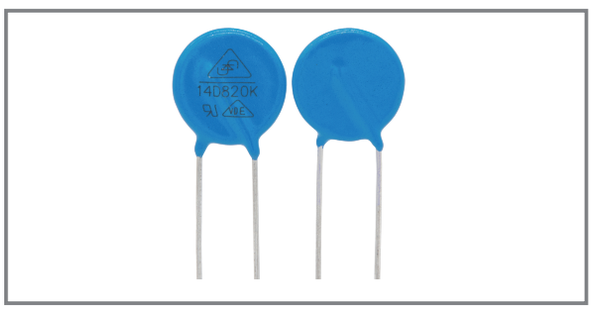
ROHS

Radial Lead Varistor (MOV)

www.unsemi.com.tw

Description

The 14D 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 6KA (8/20 μs 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 1100Vrms(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.

Material

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

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.

General Characteristics Definition

- Operating Temperature: -40℃~ +85℃
- Storage Temperature: -40℃~ +125℃
- Working Surface Temperature: +115℃
- Insulation Resistance: > 100MΩ
- Coating (Epoxy Resin): Flame-Retardant to UL 94V-0
- Approval Standard and File Number:
  VDE: 40046112
  CQC: 16001161422
  CSA&CUL: E489912

Part Numbering

14 - 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*10^0=47V) , 471(47*10^1=470V)

(4) Tolerance : K±10%, L±15%, M±20%

(5) Surge Current Standard: J:High Surge S:6KV/3KA Y:10KV/5KA surge Pulse 40times

(6) Taping Mode : TR : Reel

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

(8) Coating : H:Epoxy Coating 125℃

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

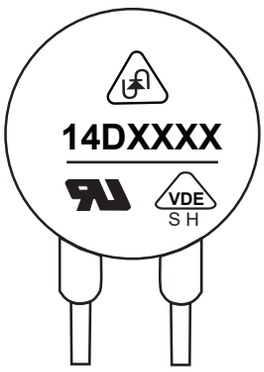
Electrical Characteristics (@ 25℃ Unless Otherwise Specified)

Part Number		Maximum Allowable Voltage		Varistor Voltage	Withstanding Surge Current 8/20μS				Max Clamping Voltage		Maximum Energy (10/1000μs)		Rated Power
Standard	High Surge	VAC (V)	VDC (V)	V1mA (V)	I(A) Standard		I(A) High Surge		Vc (V)	IP (A)	(J) Standard	(J) High Surge	(W)
					1 time	2 times	1 time	2 times					
14D180L	14D180LJ	11	14	18(15.3-20.7)	1000	500	1000	2000	36	10	4	7	0.1
14D220K	14D220KJ	14	18	22(19.8-24.2)	1000	500	1000	2000	43	10	5	8	0.1
14D270K	14D270KJ	17	22	27(24.3-29.7)	1000	500	1000	2000	53	10	6	10	0.1
14D330K	14D330KJ	20	26	33(29.7-36.3)	1000	500	1000	2000	65	10	8	12	0.1
14D390K	14D390KJ	25	31	39(35.1-42.9)	1000	500	1000	2000	77	10	9	13	0.1
14D470K	14D470KJ	30	38	47(42.3-51.7)	1000	500	1000	2000	93	10	10	17	0.1
14D560K	14D560KJ	35	45	56(50.4-61.6)	1000	500	1000	2000	110	10	11	20	0.1
14D680K	14D680KJ	10	56	68(61.2-74.8)	1000	500	1000	2000	135	10	14	24	0.1
14D820K	14D820KJ	50	65	82(73.8-90.2)	4500	2500	6000	5000	135	50	22	27	0.6
14D101K	14D101KJ	50	85	100(90-110)	4500	2500	6000	5000	165	50	28	33	0.6
14D121K	14D121KJ	75	100	120(108-132)	4500	2500	6000.	5000	200	50	32	40	0.6
14D151K	14D151KJ	95	125	150(135-165)	4500	2500	6000	5000	250	50	40	53	0.6
14D181K	14D181KJ	115	150	180(162-198)	4500	2500	6000	5000	300	50	50	60	0.6
14D201K	14D201KJ	130	170	200(185-225)	4500	2500	6000	5000	340	50	57	70	0.6
14D221K	14D221KJ	140	180	220(198-242)	4500	2500	6000.	5000	360	50	60	78	0.6
14D241K	14D241KJ	150	200	240(216-264)	4500	2500	6000	5000	395	50	63	84	0.6
14D271K	14D271KJ	175	225	270(243-297)	4500	2500	6000	5000	455	50	70	99	0.6
14D301K	14D301KJ	190	250	300(270-330)	4500	2500	6000	5000	505	50	77	108	0.6
14D331K	14D331KJ	210	275	330(297-363)	4500	2500	6000	5000	550	50	85	115	0.6
14D361K	14D361KJ	230	300	360(324- 396)	4500	2500	6000	5000	595	50	93	130	0.6
14D391K	14D391KJ	250	320	390(351-429)	4500	2500	6000	5000	650	50	100	140	0.6
14D431K	14D431KJ	275	350	430(387-473)	4500	2500	6000	5000	710	50	115	155	0.6
14D471K	14D471KJ	300	385	470(423-517)	4500	2500	6000.	5000	775	50	125	175	0.6
14D511K	14D511KJ	320	415	510(459-561)	4500	2500	6000	5000	845	50	126	180	0.6
14D561K	14D561KJ	350	460	560(504-616)	4500	2500	6000	5000	920	50	127	185	0.6
14D621K	14D621KJ	385	505	620(558-682)	4500	2500	6000	5000	1025	50	128	190	0.6
14D681K	14D681KJ	420	560	680(612-748)	4500	2500	6000	5000	1120	50	130	200	0.6
14D751K	14D751KJ	460	615	750(675-825)	4500	2500	6000	5000	1240	50	173	210	0.6
14D781K	14D781KJ	485	640	780(702-858)	4500	2500	6000	5000	1290	50	148	220	0.6
14D821K	14D821KJ	510	670	820(738-902)	4500	2500	6000.	5000	1355	50	157	235	0.6
14D911K	14D911KJ	550	745	910(819-1001)	4500	2500	6000	5000	1500	50	175	255	0.6
14D102K	14D102K	625	825	1000(900-1100)	4500	2500	6000	5000	1650	50	190	280	0.6
14D112K	14D112KJ	680	895	1100(990-1210)	4500	2500	6000	5000	1815	50	213	310	0.6
14D122K	14D122KJ	750	990	1200(1080-1320)	4500	2500	6000	5000	1980	50	232	324	0.6
14D142K	14D142KJ	880	1140	1400(1260-1540)	4500	2500	6000	5000	2310	50	238	327	0.6
14D162K	14D162KJ	1000	1280	1600(1400-1760)	4500	2500	6000	5000	2640	50	243	331	0.6
14D182K	14D182KJ	1100	1465	1800(1620-1980)	4500	2500	6000	5000	2970	50	250	335	0.6

Approval Standard And File Number

Certified Model No.		c UL us E489912		VDE 40046112		CQC 16001161422		CSA & CUL E489912
14D180L	14D180LJ	YES				YES		YES
14D220K	14D220KJ	YES				YES		YES
14D270K	14D270KJ	YES		YES		YES		YES
14D330K	14D330KJ	YES		YES		YES		YES
14D390K	14D390KJ	YES		YES		YES		YES
14D470K	14D470KJ	YES		YES		YES		YES
14D560K	14D560KJ	YES		YES		YES		YES
14D680K	14D680KJ	YES		YES		YES		YES
14D820K	14D820KJ	YES	3KA/6KV	YES		YES		YES
14D101K	14D101KJ	YES	3KA/6KV	YES		YES		YES
14D121K	14D121KJ	YES	3KA/6KV	YES		YES		YES
14D151K	14D151KJ	YES	3KA/6KV	YES		YES		YES
14D181K	14D181KJ	YES	3KA/6KV	YES	3KA/6KV	YES		YES
14D201K	14D201KJ	YES	3KA/6KV	YES	3KA/6KV	YES		YES
14D221K	14D221KJ	YES	3KA/6KV	YES	3KA/6KV	YES		YES
14D241K	14D241KJ	YES	3KA/6KV	YES	3KA/6KV	YES		YES
14D271K	14D271KJ	YES	3KA/6KV	YES	3KA/6KV	YES		YES
14D301K	14D301KJ	YES	3KA/6KV	YES	3KA/6KV	YES		YES
14D331K	14D331KJ	YES	3KA/6KV	YES	3KA/6KV	YES		YES
14D361K	14D361KJ	YES	3KA/6KV	YES	3KA/6KV	YES		YES
14D391K	14D391KJ	YES	3KA/6KV	YES	3KA/6KV	YES		YES
14D431K	14D431KJ	YES	3KA/6KV	YES	3KA/6KV	YES	3KA/6KV	YES
14D471K	14D471KJ	YES	3KA/6KV	YES	3KA/6KV	YES	3KA/6KV	YES
14D511K	14D511KJ	YES	3KA/6KV	YES	3KA/6KV	YES	3KA/6KV	YES
14D561K	14D561KJ	YES	3KA/6KV	YES	3KA/6KV	YES	3KA/6KV	YES
14D621K	14D621KJ	YES	3KA/6KV	YES	3KA/6KV	YES	3KA/6KV	YES
14D681K	14D681KJ	YES	3KA/6KV	YES	3KA/6KV	YES	3KA/6KV	YES
14D751K	14D751KJ	YES	3KA/6KV	YES	3KA/6KV	YES	3KA/6KV	YES
14D781K	14D781KJ	YES	3KA/6KV			YES	3KA/6KV	YES
14D821K	14D821KJ	YES	3KA/6KV			YES	3KA/6KV	YES
14D911K	14D911KJ	YES	3KA/6KV			YES	3KA/6KV	YES
14D102K	14D102KJ	YES	3KA/6KV			YES	3KA/6KV	YES
14D112K	14D112KJ	YES	3KA/6KV			YES	3KA/6KV	YES
14D122K	14D122KJ					YES	3KA/6KV	YES
14D142K	14D142KJ					YES	3KA/6KV	YES
14D162K	14D162KJ					YES	3KA/6KV	YES
14D182K	14D182KJ	YES	3KA/6KV			YES	3KA/6KV	YES

Part Marking



Marking	
Trademark	UN logo
Part No.	14DXXXK
Standard for Safety	UL / VDE / CQC
S / Y	6KV/3KA /10KV/5KA
H	H:Epoxy Coating 125℃
—	High Surge

Packaging Information

Unit:Pcs

Dimension	Part No.	Bag	Small Carton	Carton
14D	180L to 681K	500	3000	6000
14D (Short leg)	180L to 681K	500	4000	8000
14D	751K to 182K	500	2500	5000
14D (Short leg)	751K to 182K	500	3000	6000

Package Dimensions Unit: mm

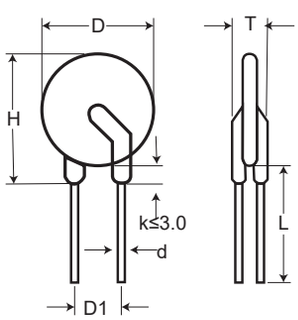


TABLE1	
Symbol	Dimension
H(max.)	21.0
L(min.)	20.0
D(max.)	16.5
D1(±0.8)	7.5
T(max.)	TABLE2
d(±0.05)	0.8

TABLE2			
Model	T(max.)	Model	T(max.)
180L	4.5	361K	5.2
220K	4.6	391K	5.2
270K	4.7	431K	5.4
330K	4.9	471K	5.9
390K	4.8	511K	6.1
470K	4.9	561K	6.4
560K	5.0	621K	6.8
680K	5.2	681K	7.1
820K	4.1	751K	7.2
101K	4.3	781K	7.3
121K	4.5	821K	7.5
151K	4.8	911K	7.6
181K	4.3	102K	8.0
201K	4.4	112K	8.5
221K	4.5	122K	9.0
241K	4.6	142K	10.5
271K	4.7	162K	11.0
301K	4.8	182K	12.0
331K	5.0		

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 0.6mm / 1.0 Kg 0.8mm / 1.0 Kg 1.0mm / 2.0 Kg	No visible damage
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 0.6mm / 0.5 Kg 0.8mm / 0.5 Kg 1.0mm / 1.0 Kg	No visible damage
Vibration	The Specimen shall be vibrated by its lead wires with a total amplitude of 1.5mm and a varying frequency of10~55~10HZ(each minutes) for a period of 2 hours respectively in each X,Y and Z directions.	No visible damage △VB/VB%≦±5%
Soldering-solder ability	After dipping the terminal to depth of approximately 3mm from the specimen in a soldering bath of 260℃ 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℃ for 10±1 (D5: 5±1) seconds or iron of 400±5℃ for 3±0.5 seconds. There after the change of Vb and mechanical damage shall be examined.	No visible damage △VB/VB%≦±5%

Reliability Test (ENVIRONMENTAL RATINGS)

<table>
<tr><th>Test Parameter</th><th>Test Condition / Description</th><th>Performance Requirements</th></tr>
<tr><td>Dry Heat Loading</td><td>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℃ ; Period：1000±24hours</td><td>△VB/VB%≦±10%</td></tr>
<tr><td>High Temperature Storage</td><td>In a drying oven without load.
Ambient temp：125±2℃ ; period：1000±24hours</td><td>△VB/VB%≦±5%</td></tr>
<tr><td>Damp Heat Loading</td><td>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.</td><td>△VB/VB%≦±10%</td></tr>
<tr><td>Temperature Cycle</td><td>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.
<table>
<tr><th>Step</th><th>Temp℃</th><th>Period</th></tr>
<tr><td>1</td><td>40+3℃</td><td>30 min.</td></tr>
<tr><td>2</td><td>Room Temp</td><td>15 min.</td></tr>
<tr><td>3</td><td>85+2℃</td><td>30 min.</td></tr>
<tr><td>4</td><td>Room Temp</td><td>15 min.</td></tr>
</table></td><td>No visible damage
△VB/VB%≦±10%</td></tr>
<tr><td>Surge Lifetime Rating</td><td>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.</td><td>No visible damage
△VB/VB%≦±10%</td></tr>
<tr><td>Voltage Proof</td><td>Voltage：2500VAC Leakage Current≦0.5mA
Time：60 Seconds</td><td>No Breakdown</td></tr>
</table>

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