20D Series

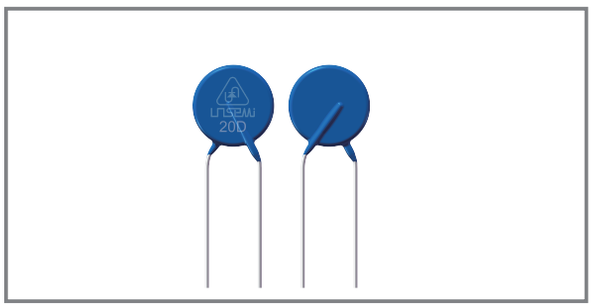
ROHS

Radial Lead Varistor (MOV)

www.unsemi.com.tw

Description

The 20D 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 10KA (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: 16001161413
  CSA&CUL: E489912

Part Numbering

20 - 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 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

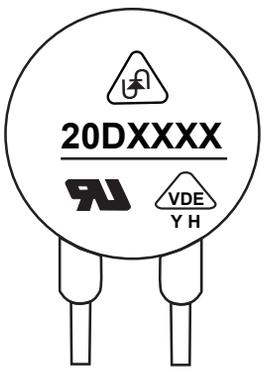
Electrical Characteristics (@ 25℃ Unless Otherwise Specified)

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					
20D180L	20D180LJ	11	14	18(15.3-20.7)	2000	1000	3000	1000	36	20	6.1	13.0	0.2
20D220K	20D220KJ	14	18	22(19.8-24.2)	2000	1000	3000	1000	43	20	7.4	16.0	0.2
20D270K	20D270KJ	17	22	27(24.3-29.7)	2000	1000	3000	1000	53	20	9.1	19.0	0.2
20D330K	20D330KJ	20	26	33(29.7-36.3)	2000	1000	3000	1000	65	20	11.2	24.0	0.2
200390K	20D390KJ	25	31	39(35.1-42.9)	2000	1000	3000	1000	77	20	13.2	28.0	0.2
20D470K	20D470KJ	30	38	47(42.3-51.7)	2000	1000	3000	1000	93	20	16.8	34.0	0.2
20D560K	20D560KJ	35	45	56(50.4-61.6)	2000	1000	3000	1000	110	20	19.6	46.0	0.2
20D680K	20D680KJ	40	56	68(61.2-74.8)	2000	1000	3000	1000	135	20	23.8	49.0	0.2
20D820K	20D820KJ	50	65	82(73.8-90.2)	6500	4000	10000	7000	135	100	37.8	56.0	1.0
20D101K	20D101KJ	60	85	100(90-110)	6500	4000	10000	7000	165	100	45.0	70.0	1.0
20D121K	20D121KJ	75	100	120(108-132)	6500	4000	10000	7000	200	100	55.0	85.0	1.0
20D151K	20D151KJ	95	125	150(135-165)	6500	4000	10000	7000	250	100	77.0	106.0	1.0
20D181K	20D181KJ	115	150	180(162-198)	6500	4000	10000	7000	300	100	85.0	130.0	1.0
20D201K	20D201KJ	130	170	200(185-225)	6500	4000	10000	7000	340	100	95.0	140.0	1.0
20D221K	20D221KJ	140	180	220(198-242)	6500	4000	10000	7000	360	100	100.0	155.0	1.0
20D241K	20D241KJ	150	200	240(216-264)	6500	4000	10000	7000	395	100	108.0	168.0	1.0
20D271K	20D271KJ	175	225	270(243-297)	6500	4000	10000	7000	455	100	127.0	190.0	1.0
20D301K	20D301KJ	190	250	300(270-330)	6500	4000	10000	7000	505	100	136.0	210.0	1.0
20D331K	20D331KJ	210	275	330(297-363)	6500	4000	10000	7000	550	100	150.0	228.0	1.0
20D361K	20D361KJ	230	300	360(324-396)	6500	4000	10000	7000	595	100	163.0	255.0	1.0
20D391K	20D391KJ	250	320	390(351-429)	6500	4000	10000	7000	650	100	180.0	275.0	1.0
20D431K	20D431KJ	275	350	430(387-473)	6500	4000	10000	7000	710	100	190.0	305.0	1.0
20D471K	20D471KJ	300	385	470(423-517)	6500	4000	10000	7000	775	100	220.0	350.0	1.0
20D511K	20D511KJ	320	415	510(459-561)	6500	4000	10000	7000	845	100	225.0	360.0	1.0
20D561K	20D561KJ	350	460	560(504-616)	6500	4000	10000	7000	920	100	230.0	380.0	1.0
20D621K	20D621KJ	385	505	620(558-682)	6500	4000	10000	7000	1025	100	235.0	390.0	1.0
20D681K	20D681KJ	420	560	680(612-748)	6500	4000	10000	7000	1120	100	140.0	400.0	1.0
20D751K	20D751KJ	460	615	750(675-825)	6500	4000	10000	7000	1240	100	255.0	420.0	1.0
20D781K	20D781KJ	485	640	780(702-858)	6500	4000	10000	7000	1290	100	265.0	440.0	1.0
20D821K	20D821KJ	510	670	820(738-902)	6500	4000	10000	7000	1355	100	282.0	460.0	1.0
20D911K	20D911KJ	550	745	910(819-1001)	6500	4000	10000	7000	1500	100	310.0	510.0	1.0
20D102K	20D102KJ	625	825	1000(900-1100)	6500	4000	10000	7000	1650	100	342.0	565.0	1.0
20D112K	20D112KJ	680	895	1100(990-1210)	6500	4000	10000	7000	1815	100	383.0	620.0	1.0
20D122K	20D122KJ	750	990	1200(1080-1320)	6500	4000	10000	7000	1980	100	408.0	660.0	1.0
20D142K	20D142KJ	880	1140	1400(1260-1540)	6500	4000	10000	7000	2310	100	532.0	784.0	1.0
20D162K	20D162KJ	1000	1280	1600(1400-1760)	6500	4000	10000	7000	2640	100	606.0	896.0	1.0
20D182K	20D182KJ	1100	1465	1800(1620-1980)	6500	4000	10000	7000	2970	100	625.0	990.0	1.0

Approval Standard And File Number

Certified Model No.		c UL us E489912		VDE 40046112		CQC 16001161413		CSA & CUL E489912
20D180L	20D180LJ	YES				YES		YES
20D220K	20D220KJ	YES				YES		YES
20D270K	20D270KJ	YES		YES		YES		YES
20D330K	20D330KJ	YES		YES		YES		YES
20D390K	20D390KJ	YES		YES		YES		YES
20D470K	20D470KJ	YES		YES		YES		YES
20D560K	20D560KJ	YES		YES		YES		YES
20D680K	20D680KJ	YES		YES		YES		YES
20D820K	20D820KJ	YES	3KA/6KV	YES		YES		YES
20D101K	20D101KJ	YES	3KA/6KV	YES		YES		YES
20D121K	20D121KJ	YES	3KA/6KV	YES		YES		YES
20D151K	20D151KJ	YES	3KA/6KV	YES		YES		YES
20D181K	20D181KJ	YES	3KA/6KV	YES	3KA/6KV	YES		YES
20D201K	20D201KJ	YES	3KA/6KV	YES	3KA/6KV	YES		YES
20D221K	20D221KJ	YES	3KA/6KV	YES	3KA/6KV	YES		YES
20D241K	20D241KJ	YES	3KA/6KV	YES	3KA/6KV	YES		YES
20D271K	20D271KJ	YES	3KA/6KV	YES	3KA/6KV	YES		YES
20D301K	20D301KJ	YES	3KA/6KV	YES	3KA/6KV	YES		YES
20D331K	20D331KJ	YES	3KA/6KV	YES	3KA/6KV	YES		YES
20D361K	20D361KJ	YES	3KA/6KV	YES	3KA/6KV	YES		YES
20D391K	20D391KJ	YES	3KA/6KV	YES	3KA/6KV	YES		YES
20D431K	20D431KJ	YES	3KA/6KV	YES	3KA/6KV	YES	3KA/6KV	YES
20D471K	20D471KJ	YES	3KA/6KV	YES	3KA/6KV	YES	3KA/6KV	YES
20D511K	20D511KJ	YES	3KA/6KV	YES	3KA/6KV	YES	3KA/6KV	YES
20D561K	20D561KJ	YES	3KA/6KV	YES	3KA/6KV	YES	3KA/6KV	YES
20D621K	20D621KJ	YES	3KA/6KV	YES	3KA/6KV	YES	3KA/6KV	YES
20D681K	20D681KJ	YES	3KA/6KV	YES	3KA/6KV	YES	3KA/6KV	YES
20D751K	20D751KJ	YES	3KA/6KV	YES	3KA/6KV	YES	3KA/6KV	YES
20D781K	20D781KJ	YES	3KA/6KV	YES	3KA/6KV	YES	3KA/6KV	YES
20D821K	20D821KJ	YES	3KA/6KV	YES	3KA/6KV	YES	3KA/6KV	YES
20D911K	20D911KJ	YES	3KA/6KV	YES	3KA/6KV	YES	3KA/6KV	YES
20D102K	20D102KJ	YES	3KA/6KV			YES	3KA/6KV	YES
20D112K	20D112KJ	YES	3KA/6KV			YES	3KA/6KV	YES
20D122K	20D112KJ					YES	3KA/6KV	YES
20D142K	20D142KJ					YES	3KA/6KV	YES
20D162K	20D162KJ					YES	3KA/6KV	YES
20D182K	20D182KJ	YES	3KA/6KV			YES	3KA/6KV	YES

Part Marking



Marking	
Trademark	UN logo
Part No.	20DXXXK
Standard for Safety	UL / VDE / CQC
Y	10KV/5KA
H	H:Epoxy Coating 125℃
———	High Surge

Packaging Information

Unit:Pcs

Dimension	Part No.	Bag	Small Carton	Carton
20D	180L to 681K	250	1500	3000
20D (Short leg)	180L to 681K	250	2000	4000
20D	751K to 182K	200	1000	2000
20D (Short leg)	751K to 182K	200	1500	3000

Package Dimensions Unit: mm

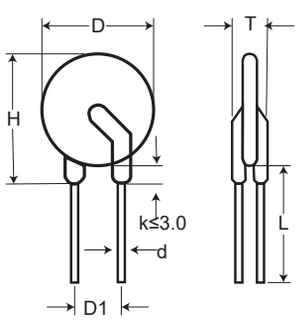


TABLE1	
Symbol	Dimension
H(max.)	26.5
L(min.)	20.0
D(max.)	23.0
D1(±0.8)	10.0
T(max.)	TABLE2
d(±0.05)	1.0

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)

<table>
<tr><th>Test Parameter</th><th>Test Condition / Description</th><th>Performance Requirements</th></tr>
<tr><td>Terminal Pull Strength</td><td>After gradually applying the load specified below and keeping the unit fixed for ten seconds, the terminal shall be visually examined for any damage
<table><tr><td>Diameter</td><td>Loading</td></tr><tr><td>0.6mm</td><td>1.0 Kg</td></tr><tr><td>0.8mm</td><td>1.0 Kg</td></tr><tr><td>1.0mm</td><td>2.0 Kg</td></tr></table></td><td>No visible damage</td></tr>
<tr><td>Terminal Bending Strength</td><td>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.
<table><tr><td>Diameter</td><td>Loading</td></tr><tr><td>0.6mm</td><td>0.5 Kg</td></tr><tr><td>0.8mm</td><td>0.5 Kg</td></tr><tr><td>1.0mm</td><td>1.0 Kg</td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr></table></td><td>No visible damage</td></tr>
<tr><td>Vibration</td><td>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.</td><td>No visible damage
△VB/VB%≦±5%</td></tr>
<tr><td>Soldering-solder ability</td><td>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.</td><td>Terminations shall be uniformly tinned</td></tr>
<tr><td>Soldering-Resistance to Solder Heat</td><td>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.</td><td>No visible damage
△VB/VB%≦±5%</td></tr>
</table>

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℃；Period：1000±24hours	△VB/VB%≦±10%
High Temperature Storage	In a drying oven without load. Ambient temp：125±2℃；period：1000±24hours	△VB/VB%≦±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.	△VB/VB%≦±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.	No visible damage △VB/VB%≦±10%

Step	Temp℃	Period
1	40+3℃	30 min.
2	Room Temp	15 min.
3	85+2℃	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 △VB/VB%≦±10%
Voltage Proof	Voltage：2500VAC Leakage Current≦0.5mA Time：60 Seconds	No Breakdown

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