Shenzhen DXM Technology Co., Ltd

Varistors

Data sheet of Varistor

N(Standard) Series:14D Series

Product Application:

* 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.

Advantages:

1.Wide voltage range
2.Large capacitance and energy tolerance
3.High effective nonlinear coefficient
4.Little leakage current
5.Symmetrical volt-ampere characteristic
6.Low residual voltage
7.Fast action
8.No continued flow
9.Excellent voltage ratio
10.Strong surge absorption ability
11.High surge current handling capability
12.Stable voltage Inhibition execution ability
13.Excellent material
14.Reliable operation
15.Long service life
16.Wide application
17.Rohs compliant

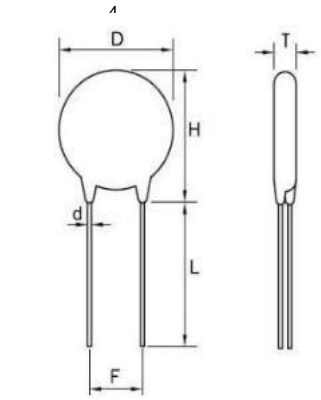
Main parameter:

*Operating Temperature:	-40 °C ~ +85 °C
*Storage Temperature:	-40 °C ~ +125°C
*Coating (Epoxy Resin):	Flame-Retardant to UL 94 V-0

Standard for Safety	
*UL 1449	E171541
*UL 1414	E162455
*CSA	182652(LR107230)
*VDE	127031

Material	
*Coating:	Epoxy Resin
*Electrode:	Silver
	Solder

Dimension(Unit: mm):



Items	14D431KSBNL	14D511KSBNL	14D821KSBNL
D (max)	15.5mm	15.5mm	16.5mm
T (max)	5.8mm	8.6mm	6.0mm
F (±0.5)	7.5mm	7.5mm	7.5mm
H (max)	20.0mm	20.0mm	20.0mm
L (min.)	15.0mm	15.0mm	15.0mm
d(±0.05)	0.8mm	0.8mm	0.8mm

ELECTRICAL PARAMETER OF 14D431KSBNL:

2.1	MAX CONTINUOUS OPERATING VOLTAGE	275	V AC	
		350	V DC	
2.2	VARISTOR VOLTAGE	387~473	(V)	1MA
2.3	RATED WATTAGE	0.6	(W)AND	8/20μs、 200A、
			10^4 TIMES	
2.4	MAX CLAMPING VOLTAGE	710	(V)	8/20μs、
2.5	WITHSTANDING SURGE CURRENT	4500	(A) 1 TIME	8/20μS
		2500	(A) 2 TIMES	
2.6	MAX ENERGY	145	JOULE	
2.7	TEMPFRATURE COEFFICIENT	0~0.05	%/℃	$\frac{U_{1mA}(25^{0}C)-U_{1mA}(85^{0}C)}{U_{1mA}(25^{0}C)}\times\frac{1}{60}\times 100\%$
2.8	TYPICAI CAPACITNACE (reference)	460	PF	

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ELECTRICAL PARAMETER OF 14D511KSBNL:

2.1	MAX ALLOWABLE VOLTAGE	320	V AC	
		415	V DC	
2.2	VARISTOR VOLTAGE	459~561	(V)	1MA
2.3	RATED WATTAGE	0.6	(W)AND	8/20μs、200A、
			10^4 TIMES	
2.4	MAX CLAMPING VOLTAGE	845	(V)	8/20μs、
2.5	WITHSTANDING SURGE CURRENT	4500	(A) 1 TIME	8/20μS
		2500	(A) 2 TIMES	
2.6	MAX ENERGY	150	JOULE	
2.7	TEMPFRATURE COEFFICIENT	0~0.05	%/℃	$\frac{U_{1mA}(25^0C)-U_{1mA}(85^0C)}{U_{1mA}(25^0C)}\times\frac{1}{60}\times 100\%$
2.8	TYPICAI CAPACITNACE TANCE(reference)	260	PF	

ELECTRICAL PARAMETER OF 14D821KSBNL :

2.1	MAX ALLOWABLE VOLTAGE	510	V AC	
		670	V DC	
2.2	VARISTOR VOLTAGE	738-902	(V)	1MA
2.3	RATED WATTAGE	0.60	(W)AND	8/20μs、200A、
			10^4 TIMES	
2.4	MAX CLAMPING VOLTAGE	1355	(V)	8/20μs、
2.5	WITHSTANDING SURGE CURRENT	4500	(A) 1 TIME	.
2.6	MAX ENERGY	203	JOULE	10/1000μS
2.7	TEMPERATURE COEFFICIENT	0~0.05	%/℃	$\frac{U_{1mA}(25^0C)-U_{1mA}(85^0C)}{U_{1mA}(25^0C)}\times\frac{1}{60}\times 100$ %
2.8	TYPICAI CAPACITNACE TANCE(reference)	830	PF	@1KHZ

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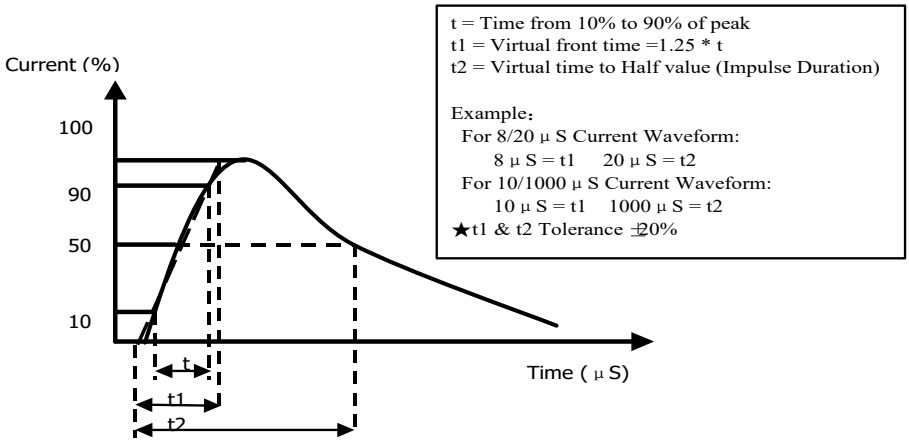
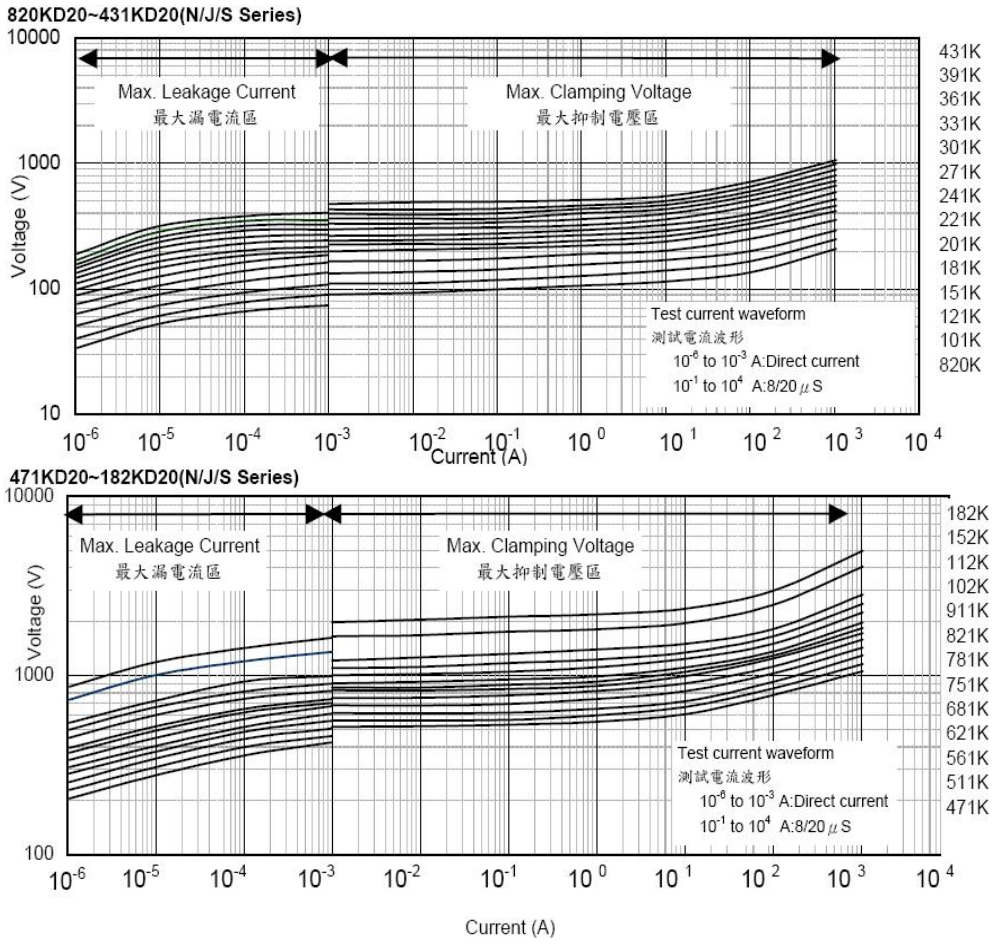
Maximum Clamping Voltage:

The maximum voltage between two terminals with the specification standard impulse current.
Applied waveform:8/20μ sec



V-I CURVE:



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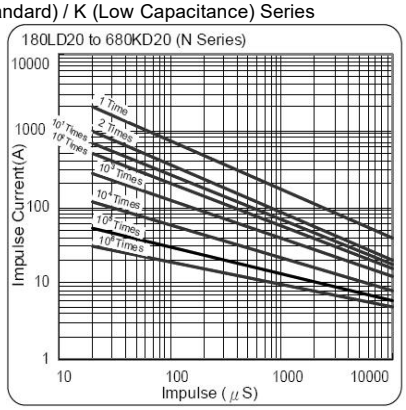
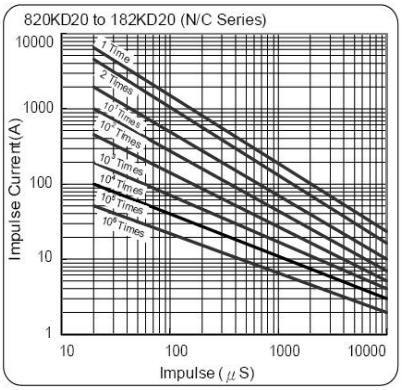
N(Standard) Series:14D Series

Surge Life Time Ratings N (Standard) / K (Low Capacitance) Series

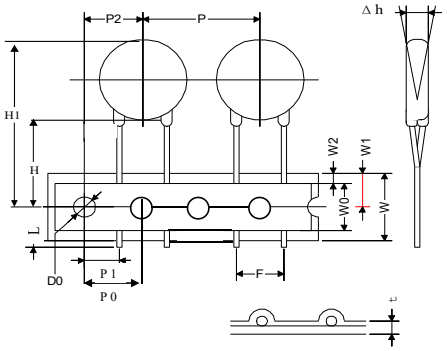




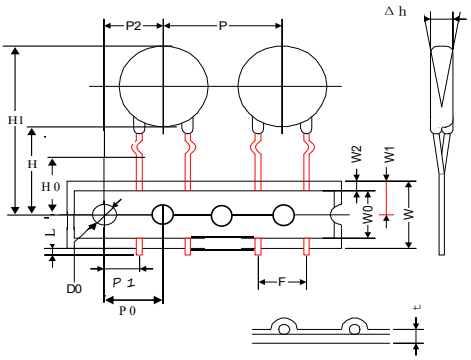
Packing method:

Dimension - SA / SR / CA / CR Ammo & Reel Series

SA / SR



CA / CR Series



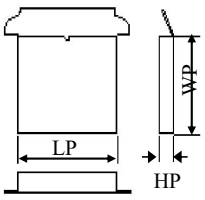
Unit: mm

Symbol	P	P0	P1	P2	F	W	W0	W1
D14	25.4±1.0	12.7±1.0	8.95±0.7	12.7±1.3	7.5±0.5	18.0±1.0	12.5max.	9.0±0.5
Symbol	W2	H	H0	H1	△h	L	D0	t
D14	3.0max.	20.0±2.0	16.0±1.0	40.0max.	0±2	1.0max.	4.0±0.2	0.6±0.3

Packing Specifications

Ammo & Reel Packing Dimension

Ammo & Reel Box



Symbol	Ammo
LP :	335 mm
WP :	243 mm
HP :	50 mm
Carton :	355 mm * 260 mm * 537 mm

Symbol	Reel
LP :	345mm
WP :	345mm
HP :	65mm

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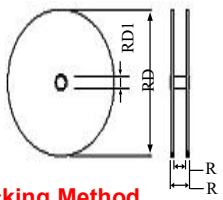
Reel



RD :	340 mm
RD1 :	30 ± 0.5 mm
RW :	51mm
RW1 :	56mm
Carton :	360 mm * 360 mm * 480 mm

Quantity per Packing Method

Item	Part No.		Bulk			Reel		Ammo	
			Bag	Box	Carton	Box	Carton	Box	Carton
1	05D	8R0M-391K	1000	2000	12000	2000	16000	2000	10000
2		431K-751K						1500	7500
3	07D	8R0M-391K	1000	2000	12000	2000	16000	2000	10000
4		431K-821K						1500	7500
5	10D	All	500	1000	6000	500	3500	500	5000
6	14D	120M-471K	500	1000	6000	500	3500	500	5000
7		511K-182K	250	500	3000	400	2800	500	5000
8	18D	180L-471K	250	500	3000	400	2800	400	3000
9		511K-112K	150	300	2000	300	2500	400	2800
10	20D	180L-471K	250	500	3000	400	2800	400	2800
11		511K-182K	125	250	1500	300	2100	300	2100
12	25D	All	125	250	1500				
13	32D	All	20	80	480				
14	34S	All	15	60	360				
15	40D	All	15	60	360				

Marking of Part Number:

VDR 14 D 431 K S B N L

Brand Mark :
VDR

Size(mm)
5mm to 53mm

Type
D: Disk , **S**: Square

Varistor Voltage
181K(180V) to 471K(470V)

★**B**: Bulk (Standard lead 20mm min.)
Digital (Special lead) ex.3:3±0.8mm

Coating & Environment
L:Epoxy Coating & Lead-free

Series
N:Standard Series

Bulk or Taping Mode
B:Bulk★, **A**:Ammo, **R**:Reel

Lead Form
S:Straight, C:Crimped, I:Inner, Y:Y kink

Tolerance
K+10%, L+15%, M+20%

Marking example :

Marking example	Marking description
	VDR-Company Product Code:SHENZHEN DXM TECHNOLOGY CO., LTD. Metal Oxide Varistor,Surge Absorber;
	14D821K ∮ 14MM VARISTOR VOLTAGE 820V(±10%)
	UL1449 3rd safety approval VDE IEC 60950-1 Annex Q
	Canada safety approval GB/T10193-1997 GB/T10194-1997
	Date code:12=year 2012 7=Month 7 CQC11-471551-2009

Specification&part no.: :

N Standard Series

Element Disc Diameter:14mm

Item	Part No.	Max Allowable Voltage		Max Clamping Voltage	Varistor Voltage	Energe 10/1000μS	Withstanding Surge Current 8/20μS		Rated Power
		ACrms(V)	DC(V)	at 50A (V)	at 1mA (V)	(J)	1 time (A)	2 times	(W)

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1	14D182K	1000	1465	2970	1800(1620-1980)	336.0	4500	2500	0.6
2	14D152K	900	1200	2475	1500(1350-1650)	266.0			
3	14D112K	680	895	1815	1100(990-1210)	217.0			
4	14D102K	625	825	1650	1000(900-1100)	217.0			
5	14D911K	550	745	1500	910(819-1001)	217.0			
6	14D821K	510	670	1355	820(738-902)	203.0			
7	14D781K	485	640	1290	780(702-858)	203.0			
8	14D751K	460	615	1240	750(675-825)	203.0			
9	14D681K	420	560	1120	680(612-748)	168.0			
10	14D621K	385	505	1025	620(558-682)	168.0			
11	14D561K	350	460	920	560(504-616)	150.0			
12	14D511K	320	415	845	510(459-561)	150.0			
13	14D471K	300	385	775	470(423-517)	150.0			
14	14D431K	275	350	710	430(387-473)	145.0			
15	14D391K	250	320	650	390(351-429)	135.0			
16	14D361K	230	300	595	360(324-396)	123.0			
17	14D331K	210	275	550	330(297-363)	112.0			
18	14D301K	190	250	505	300(270-330)	103.0			
19	14D271K	175	225	455	270(243-297)	94.0			
20	14D251K	160	205	415	250(225-275)	84.0			
21	14D241K	150	200	395	240(216-264)	82.0			
22	14D221K	140	180	360	220(198-242)	79.8			
23	14D201K	130	170	330	200(185-225)	79.8			
24	14D181K	115	150	300	180(162-198)	58.8			
25	14D151K	95	125	250	150(135-165)	51.8			
26	14D121K	75	100	200	120(108-132)	40.6			
27	14D101K	60	85	165	100(90-110)	33.6			
28	14D820K	50	65	135	82(74-90)	29.4			
29	14D680K	40	56	135	68(61-75)	23.8	1000	500	0.1
30	14D560K	35	45	110	65(50-62)	19.6			
31	14D470K	30	38	93	47(42-52)	16.8			
32	14D390K	25	31	77	39(35-43)	13.2			
33	14D330K	20	26	65	33(30-36)	12.3			
34	14D270K	17	22	53	27(24-30)	9.7			
35	14D220K	14	18	43	22(20-24)	7.6			
36	14D180L	10	14	38	18(15-21)	6.6			

Terminology Definitions

Technical Term	Descriptions
Varistor Voltage (Vb)	Voltage across the varistor measured at a specified current (1mA or 0.1mA)
Maximum Clamping Voltage	Peak voltage across the varistor with a specified peak impulse current (8x20 msec). Waveform see fig. 1
Maximum Allowable/ Rated Voltage	Maximum sine wave voltage (rms) or the maximum dc voltage which may be applied continuously
Non-linear Exponent (α)	A measure of varistor voltage-current nonlinearity between two given operating currents, I1 and I2, as described by $I=KV^{\alpha}$, where K is a device constant, and $\alpha = \log(I1/I2) / \log(V1/V2)$
Leakage Current	Maximum current with rated voltage (80% varistor voltage) applied. 200 μA maximum.
Single Pulse Transient Energy	Energy which may be dissipated for a single 10/1000 μS pulse of a maximum rated current, with AC/DC voltage applied, without causing device failure. **Energy=K*Vc*Ip*T** Where Ip(Ipeak) is the peak current applied, Vc(Vclamp) is the clamp voltage which results, T is the impulse duration and K is a constant (1.4 for 10/1000 μS waveform). Waveform see fig. 1
Withstanding Surge Current	The maximum current within the varistor voltage change of ±10% with the standard impulse current ($8/20_3$sec.) applied one time.
Energy	The maximum energy within the varistor voltage change of ±10% when one impulse is applied. **Energy=K*Vc*Ip*T** Where Ip(Ipeak) is the peak current Applied, Vc(Vclamp) is the clamp voltage which results, T is the impulse duration and K is a constant.
Rated Wattage	The maximum average power that can be applied within the specified ambient temperature.
Varistor Voltage Temperature Coefficient	$\frac{Vb \text{ at } 25\,^{\circ}C - Vb \text{ at } 85\,^{\circ}C}{Vb \text{ at } 25\,^{\circ}C} * \frac{1}{60} * 100\%$ (+0.05%/°C max.)

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Surge Life Time Rating	The change of Vb that measured after 10,000 times pulses applied continuously with the interval of ten seconds at room temperature. Waveform see fig. 1		
	5D Series	05D120M to 05D680	5A (8/20 μ S)
		05D820K to 05D681K	20A (8/20 μ S)
	7D Series	07D120M to 07D680K	20A (8/20 μ S)
		07D820K to 07D821K	50A (8/20 μ S)
	10D Series	10D120M to 10D680K	50A (8/20 μ S)
		10D820K to 10D112K	100A (8/20 μ S)
	14D Series	14D120M to 14D680K	75A (8/20 μ S)
		14D820K to 14D112K	150A (8/20 μ S)
	20D Series	20D120M to 20D680K	125A (8/20 μ S)
		20D820K to 20D112K	200A (8/20 μ S)

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 1.5㎜ and a varying frequency of 10~55~10HZ(each minutes) for a period of 2 hours respectively in each X,Yand Z directions.			No visible damage △VB/VB%≦±5%
Soldering-solderability	After dipping the terminal to depth of approximately 3㎜ 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%

ENVIRONMENTAL RATINGS

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 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 condition：40±2℃ , 90 to 95%R.H. ； period：1000±24 hours				△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.	Step	Temp°C	Period	No visible damage △VB/VB%≦±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.				No visible damage △VB/VB%≦±10%
Voltage Proof	Voltage：2500VAC Leakage Current≦0.5mA Time：60 Seconds				No Breakdown