MICROTECH (HONG KONG) LTD.
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DNR® METAL OXIDE VARISTORS

1.PART NUMBER CODE

DNR □□ D □□□ K □□

- Lead Form:S=Straight lead, K=Kinked lead
- Packing: R=Reel packing, B=Bulk packing
- Tolerance : K=±10% , M=±20%
- Voltage of varistor
- Series NO.
- Element diameter
- Symbol of DON'S VARISTORS

2.CHARACTERISTICS

DNR has the forward-reverse symmetrical electrical characteristics shown in the Fig 1. The curve is plotted for a wider range of current than that normally given in data sheet to show three regions in the Fing2.

Fig 1

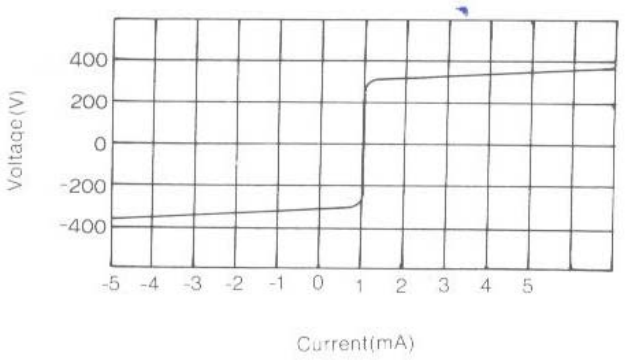
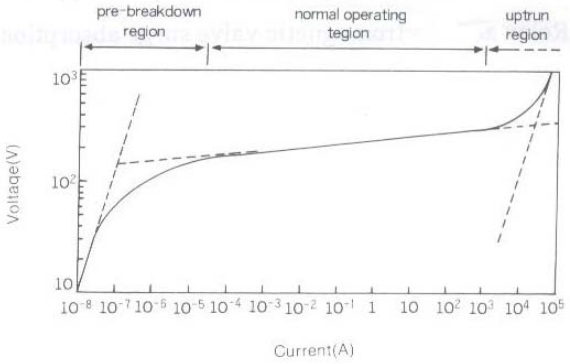


Fig 2



DNR® OXIDE VARISTOR

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14D Series

Part Number	Maximum Allowable Voltage		Varistor Voltage	Clamping Voltage (Max.)		Maxumum Peak Current (8/20 μs)		Maximum Energy (JOULE)		Rated Power	Typical Capacitance (Reference)
	Acrms	DC	V 1mA	VC	IP	1Time	2Times	10/1000 μs	2ms	(W)	@1KHz
	(V)	(V)	(V)	(V)	(A)	(A)					(pf)
DNR14D180K	11	14	18(16-20)	36	10	1000	500	4.0	3.5	0.1	11100
DNR14D220K	14	18	22(20-24)	43	10	1000	500	5.0	4.0	0.1	9100
DNR14D270K	17	22	27(24-30)	53	10	1000	500	6.0	5.0	0.1	7400
DNR14D330K	20	26	33(30-36)	65	10	1000	500	7.5	6.0	0.1	6100
DNR14D390K	25	31	39(35-43)	77	10	1000	500	8.6	7.0	0.1	5100
DNR14D470K	30	38	47(42-52)	93	10	1000	500	10.0	8.5	0.1	4300
DNR14D560K	35	45	56(50-62)	110	10	1000	500	11.0	10.0	0.1	3600
DNR14D680K	40	56	68(61-75)	135	10	1000	500	14.0	12.0	0.1	2900
DNR14D820K	50	65	82(74-90)	135	50	4500	2500	22.0	14.0	0.60	2400
DNR14D101K	60	85	100(90-110)	165	50	4500	2500	28.0	18.0	0.60	2000
DNR14D121K	75	100	120(108-132)	200	50	4500	2500	32.0	20.0	0.60	1700
DNR14D151K	95	125	150(135-165)	250	50	4500	2500	40.0	25.0	0.60	1300
DNR14D181K	115	150	180(162-198)	300	50	4500	2500	50.0	30.5	0.60	1100
DNR14D201K	130	170	200(185-225)	340	50	4500	2500	57.0	35.0	0.60	1000
DNR14D221K	140	180	220(198-242)	360	50	4500	2500	60.0	40.0	0.60	900
DNR14D241K	150	200	240(216-264)	395	50	4500	2500	63.0	40.0	0.60	830
DNR14D271K	175	225	270(243-297)	455	50	4500	2500	70.0	50.0	0.60	740
DNR14D301K	190	250	300(270-330)	500	50	4500	2500	77.0	52.0	0.60	670
DNR14D331K	210	275	330(297-363)	550	50	4500	2500	85.0	64.0	0.60	610
DNR14D361K	230	300	360(324-396)	595	50	4500	2500	93.0	65.0	0.60	560
DNR14D391K	250	320	390(351-429)	650	50	4500	2500	100.0	70.0	0.60	510
DNR14D431K	275	350	430(387-473)	710	50	4500	2500	115.0	75.0	0.60	460
DNR14D471K	300	385	470(423-517)	775	50	4500	2500	125.0	80.0	0.60	430
DNR14D511K	320	415	510(459-561)	845	50	4500	2500	125.0	80.0	0.60	390
DNR14D561K	350	460	560(504-616)	925	50	4500	2500	125.0	85.0	0.60	360
DNR14D621K	385	505	620(558-682)	1025	50	4500	2500	125.0	85.0	0.60	320
DNR14D681K	420	560	680(612-748)	1120	50	4500	2500	130.0	90.0	0.60	290
DNR14D751K	460	615	750(675-825)	1240	50	4500	2500	143.0	100.0	0.60	270
DNR14D781K	485	640	780(702-858)	1290	50	4500	2500	148.0	105.0	0.60	260
DNR14D821K	510	670	820(738-902)	1355	50	4500	2500	157.0	110.0	0.60	240
DNR14D911K	550	745	910(819-1001)	1500	50	4500	2500	175.0	120.0	0.60	220
DNR14D102K	625	825	1000(900-1100)	1650	50	4500	2500	190.0	130.0	0.60	200
DNR14D112K	680	895	1100(990-1210)	1815	50	4500	2500	213.0	140.0	0.60	180
DNR14D182K	1000	1465	800(1620-1980	2970	50	4500	2500	337.0	240.0	0.60	130

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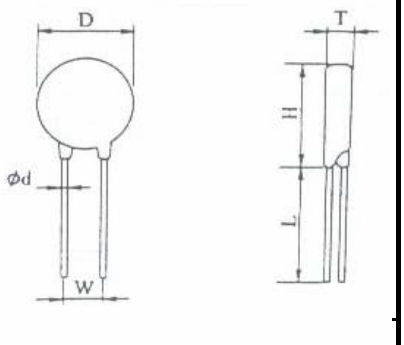
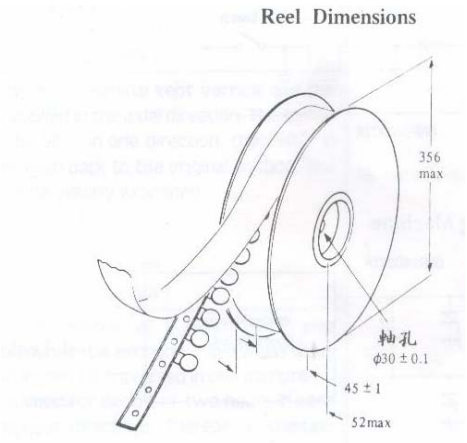
DNR® OXIDE VARISTOR

Dimensions

Model No.	T MAX.	D MAX.	H MAX.	W ±1.0	L Min	φ d	Dimensions
DNR14D180K ∫ DNR14D271K	5.1	17.0	20.0	7.5	25.0	0.8	
DNR14D361K ∫ DNR14D112K	8.5	17.5	20.5				
DNR14D182K	14.0	19.0	22.0				

PACKING

Model No.	BULK	REEL
DNR14D180K ∫ DNR14D241K	500	1000
DNR14D271K ∫ DNR14D182K		800



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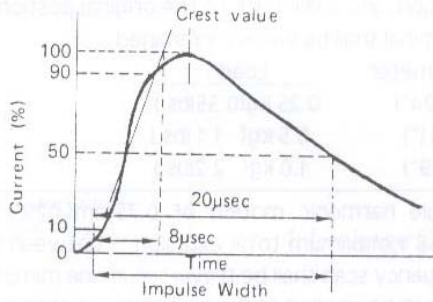
Electrical Ratings

Item	Test Condition / Description	Requirement
Varistor Voltage	The voltage between two terminals with the specified measuring current 1mA DC applied is called Vc. The measurement shall be made as fast as possible to avoid heat affection.	
Maximum Allowable Voltage	The recommended maximum sine wave voltage (rms) or the maximum DC voltage that can be applied continuously.	
Maximum Clamping Voltage	The maximum voltage between two terminals with the specified standard impulse current (8 × 20μsec.) illustrated below applied. 	To meet the specified value.
Rated Wattage	The maximum power that can be applied within the specified ambient temperature.	
Energy	The maximum energy within the varistor voltage change of ± 10 % when one impulse of 2msec. is applied. The maximum energy which is figured out as follows. E = Vm-Im-T E : Energy Im : Maximum allowable single surge current of 2ms. (rectangular wave form) Vm : Maximum clamping voltage at Im T : Duration of surge current (2ms).	
Withstanding Surge Current	The maximum current within the varistor voltage change of ± 10 % with standard impulse current (8 × 20 μsec.) applied one time.	
Varistor Voltage Temperature Ceoefficient	$\frac{Vc \text{ at } 20\,^{\circ}C\,(68\,^{\circ}F) - Vc \text{ at } 70\,^{\circ}C\,(158\,^{\circ}F)}{Vc \text{ at } 20\,^{\circ}C\,(68\,^{\circ}F)} \times \frac{1}{50} \times 100(\%/\,^{\circ}C)$	− 0.05% / ℃ max.
Surge Life	The change of Vc shall be measured after the impulse listed below is applied 10,000 times contimuously with the interval of ten seconds at room temperature.	$\frac{\Delta Vc}{Vc} \leqq \pm 10\%$

5 Series	8ROM to 680K	0.5A(2 msec.)
	820K to 471K	20A(8 × 20 μsec.)
7 Series	8ROM to 680K	1.5A(2 msec.)
	820K to 471K	50A(8 × 20 μsec.)
10 Series	8ROM to 680K	50A(8 × 20 μsec.)
	820K to 821K	100A(8 × 20 μsec.)
14 Series	180L to 680K	75A(8 × 20 μsec.)
	820K to 821K	150A(8 × 20 μsec.)
20 Series	201K to 821K	200A(8 × 20 μsec.)

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Mechanical Ratings

Item	Test Condition / Description	Requirement
Terminal Pull Strength	After gradually applying the load specified below and b keeping the unit fixed for ten seconds, the terminal shall be visually examined for any damage. Terminal diameter — Load 0.6mm(.024") — 0.5 kg(1.1lbs.) 0.8MM(.031") — 0.5 kg(2.2 lbs.) 1.0MM(0.39") — 1.0 kg(4.4lbs.)	
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 by bent by 90 ° in one direction, then 90 ° in the opposite direction, and again back to the original postion. The damage of the terminal shall be visually examined. Terminal diameter — Load 0.6mm(.024") — 0.25 kg(0.55lbs.) 0.8MM(.031") — 0.5 kg(1.1 lbs.) 1.0MM(0.39") — 1.0 kg(2.2lbs.)	No outstanding damage
Vibration	Subjected to simple harmonic motion of 0.75mm(.029") amp litude – 1.5mm(.058") maximum total exursion – between limits of 10 – 55 Hz. Frequency scan shall be traversed in one mimute. This motion shall then be applied for period of two hours in each of three mutually perpendicular directions. Thereafter, the unit shall be visually examined.	
Solderability	After dipping the terminal to a depth of approximately 3mm (.118") from the body in a soldering bath of 260 ℃ (500 ℉) for three seconds, the terminal shall be visually examined.	Almost all the surface should be covered with solder uniformly.
Resistance to Soldering Heat	The terminal shall be dipped into a soldering bath haveing a temperature of 350 ℃ (660 ℉) to a point 3mm (.118") from the body of the unit and then be held there for three seconds. The change of Vc and mechanical damage shall be examined.	△VcmA/VcmA ≦ 5% No outstanding damage

Environmental Ratings		
Item	Test Condition / Description	Requirement
High Temperature Storage	The specimen shall be subjected to 125 ℃ (257 ℉) for 1000 hours in a thermostatic bath without load and then stored at room temperature and humidity for one to two hours. Thereafter, the change of Vc shall be measured.	$\frac{\triangle Vc}{Vc} \leqq \pm 10\%$
Humidity	The specimen shall be subjected to 40 ℃ (104 ℉). 90 to 95% R.H. for 1000 hours without load and then stored at room temperature and humidity for one to two hours, Thereafter, the change of Vc shall be measured.	
Thermal Shock	The temperature cycle shown below shall be repeated five times and then stored at room temperature and humidity for one to two hours. The change ov Vc as well as well as mechanical damage shall be examined. Step — Temperature — Period 1 — – 25 ℃ (– 13 ℉) — 30 minutes 2 — 85 ℃ (185 ℉) — 30 minutes	
High Temperature Operation	After being continuously applied the maximum allowable voltage at 80 ℃ (185 ℉) for 1000 hours, the specimen shall be stored at room temperature and humidity for one to two hours. Thereafter, the change of Vc shall be measured.	$\frac{\triangle Vc}{Vc} \leqq \pm 10\%$

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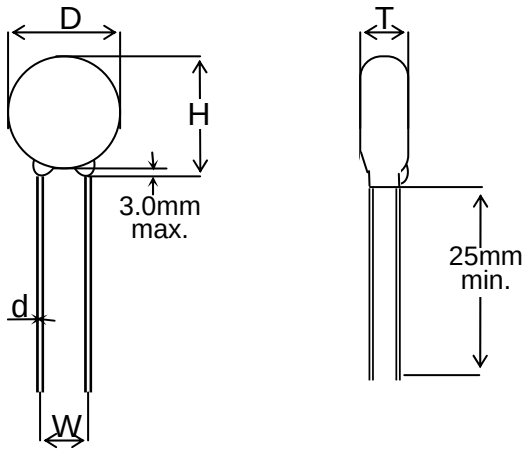
規 格 承 認 書
SPECIFICATION FOR APPROVAL

	SPECIFICATION	NO.
PART NO.	DNR14D271KBS	PAGE 1 OF 2
		DATE: 2012 年 2 月 20 日
UL	E333049	

1.OUTLINE

1.1	APPEARANCE	Without Any Crack, Marking Should be Clear
1.2	DIMENSIONS	DIMENSIONS (mm)



D (max)	17.5
H (max)	20.5
T (max)	8.5
d (±0.1)	0.8
W(±1.0)	7.5

2.ELETRICAL PARAMETER

2.1	Max. Allowable Voltage	AC: 175(V) DC: 225(V)	At 1mA DC
2.2	Varistor Voltage	270(243-297)(V)	V0.1Ma□ V1mA ■
2.3	Rated Wattage	0.6(W)	
2.4	Max. Clamping Voltage	IP: 50 (A) Vc: 500(V)	Test Current Waveform 8/20 μs
2.5	Withstanding Surge Current	1time: 4500(A) 2times: 2500(A)	Test Current Waveform 8/20 μs
2.6	Max. Energy	70(J)	Test Current Waveform 10/1000 μs
2.7	Typical Capacitance	740(pf)	@1KHz
2.8	Leakage Current	≦ 200(μA)	At 80% of Varistor Voltage
2.9	Nonlinear Exponent (α)	≧ 40	$\alpha = \log \frac{I_1}{I_2} \Big/ \log \frac{V_1}{V_2}$
2.10	Temperature Coefficient of Varistor Voltage	≦ ± 0.05%/ ℃ Max.	$\frac{Vc85℃-Vc25℃}{Vcat25℃} \times \frac{1}{60} \times 100(\%℃)$
2.11	Impulse Life	≦±10%(V1mA)	Test Current Waveform 8/20 μs

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PART NO.	DNR14D271KBS	PAGE 2 OF 2
		DATE: 2012 年 2 月 20 日
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3.Mechenical Requirements			
3.1	Tensile of Terminations	No Outstanding Damage	1Kgf; 10Sec.
3.2	Bending of Terminations	No Outstanding Damage	0.5Kgf; 90° ,3 Times
3.3	Vibration	No Outstanding Damage	Freq:10-55hz; Amp:0.75mm,1Min.
3.4	Solderability	Min. 95% of The Terminal Should Be Covered With Solder Uniformly	Solder Temp:265±5℃ Immersed Time: ≦5Sec.
3.5	Resistance of soldering heat	△ V1mA/V1mA ≦±5%	Solder Temp: 260±5℃ Immersed Time: 10±1Sec.
4.Enviromental Requirements			
4.1	High Temperature Storage	△V1mA/V1mA ≦±5%	Ambient Temp: 125±2℃ Duration:1000h
4.2	Low Temperature Storage	△V1mA/V1mA ≦±5%	Ambient Temp: -40±2℃ Duration:1000h
4.3	High Humidity Storage/Damp Heat	△V1mA/V1mA ≦±5%	Ambient Temp: 40±2℃ 90-95% R.H. Duration:1000h
4.4	Temperature Cycle	△V1mA/V1mA ≦±5%	Step / Temperature / Period 1 / -40℃ / 30 min 2 / Room Temp / 15 min 3 / 125℃ / 30 min 4 / Room Temp / 15 min
4.5	High Temperature Load	△V1mA/V1mA ≦±10%	Ambient temp:85±2℃ Duration:1000h Load: MAx. Allowable Voltage
4.6	High Humidity Load	△V1mA/V1mA ≦±10%	Ambient Temp:125±2℃ Duration:1000H Load: MAX. Allowable Voltage
4.7	Operating Temperature Range	-40℃ ~ +85℃	-40℃ ~ +85℃
4.8	Storage Temperature Range	-40℃ ~ +125℃	-40℃ ~ +125℃