KOA SPEER ELECTRONICS, INC.

NVD

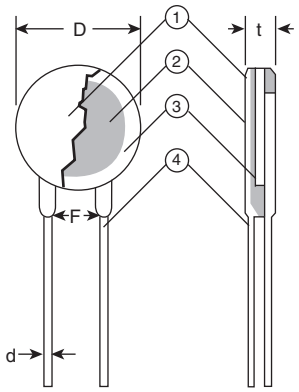
metal oxide varistor disc type

EU RoHS COMPLIANT

features

- Flame retardant coating (UL94V0)
- Excellent transient voltage suppression characteristics
- Higher surge current
- Wide varistor voltage
- V-I characteristics are the same in both polarity
- Marking: Green body color with black marking
- UL1449 (3rd Edition) (file no. E328032) NVD05, NVD07: 82~470V, NVD10: 82~1100V, NVD14: 82~910V, NVD20: 200~910V
- VDE (CECC42000, CECC42200, CECC42201, IEC61051: file no. 40015637) NVD05U, NDV07U: 22~470V, NVD10U: 22~1100V, NVD14U: 22~910V
- Products with lead-free terminations meet EU RoHS requirements

dimensions and construction



Contact KOA Speer for detailed dimensions.

Type	Dimensions inches (mm)			
	øD (max.)*	ød	F	t (max.)*
05U	.276 - .295 (7.0 - 7.5)	.024 (0.6)	.197±.039 (5.0±1.0)	.169±.232 (4.3 - 5.9)
07U	.276 - .374 (9.0 - 9.5)			
10U	.472 - .531 (12.0 - 13.5)	.031 (0.8)	.295±.039 (7.5±1.0)	.169±.567 (4.3 - 14.4)
10UB	.472 (12.0)	.024 (0.6)	.197±.039 (5.0±1.0)	.169±.209 (4.3 - 5.3)
14U	.630 - .669 (16.0 - 17.0)	.031 (0.8)	.295±.039 (7.5±1.0)	.169±.567 (4.3 - 14.4)
20U	.91 - .94 (23.0 - 24.0)	.039 (1.0)	.394±.039 (10±1.0)	.205±.354 (5.2 - 9.0)

* D max. and t ma. vary according to the varistor voltage

ordering information

New Part #

NV	D	05	U	C	D	MHT	A	220
Type	Style	Diameter	Series	Termination Material	Inner Connect Solder Material	Taping	Packaging	Varistor Voltage
	Disc	05 07 10 14 20	S: S series U: U series UB: U series 5mm pitch (D10 only)	C: Sn-Cu	D: SnAgCu Blank: SnPb	MT:5mm straight taping MHT:5mm inside kink taping 10UB:GHT: 7.5mm straight taping GJT: 7.5mm outside kink taping MJT:5mm outside kink taping 10UC: MJT: 7.5mm outside kink taping	A: Ammo	22V 022 220V 220 1800V 1800

For further information on packaging, please refer to Appendix C.

circuit protection

applications and ratings

Type	Varistor Voltage	Maximum Allowable Voltage		NVD05UC				NVD07UC			
				Maximum (2ms) Energy	Max. Peak Current (2 pulses)	Clamping Voltage		Maximum (2ms) Energy	Max. Peak Current (2 pulses)	Clamping Voltage	
	Vc Ic = 0.1mA (V)	a.c. r.m.s. (v)	d.c. (v)	E (J)	Ip (A)	V_{1A}	V_{5A}	E (J)	Ip (A)	$V_{2.5A}$	V_{10A}
NVD☐SCD018	16 - 22	11	14	0.3	50	40	—	—	—	—	—
NVD☐UCD022	20 - 27	14	18	0.5		48	—	1.1		43	—
NVD☐UCD027	25 - 32	17	22	0.7		60	—	1.3		53	—
NVD☐UCD033	30 - 39	20	26	0.8		73	—	1.6		65	—
NVD☐UCD039	37 - 47	25	31	0.9	125	86	—	1.9	250	77	—
NVD☐UCD047	45 - 54	30	38	1.1		104	—	2.3		93	—
NVD☐UCD056	52 - 62	35	45	1.3		123	—	2.7		110	—
NVD☐UCD068	60 - 76	40	56	1.6		150	—	3.3		135	—
NVD☐SCD082	74 - 90	50	65	1.7	200	—	145	3.5	600	—	135
NVD☐UCD100	90 - 110	60	85	3.0		—	175	6.0		—	165
NVD☐UCD120	108 - 132	75	100	3.5		—	210	7.0		—	200
NVD☐UCD150	135 - 165	95	125	4.5		—	260	9.0		—	250
NVD☐UCD200	185 - 225	130	170	6.0		—	355	12.5		—	340
NVD☐UCD220	198 - 242	140	180	6.5		—	380	13.5		—	360
NVD☐UCD240	216 - 264	150	200	7.5	600	—	415	15.0	1250	—	395
NVD☐UCD270	247 - 303	175	225	8.0		—	475	17.0		—	455
NVD☐UCD330	297 - 363	210	270	9.5		—	570	20.0		—	545
NVD☐UCD360	342 - 396	230	300	11.0		—	620	23.0		—	595
NVD☐UCD390	367 - 429	250	320	12.0		—	675	25.0		—	650
NVD☐UCD430	407 - 473	275	350	13.5		—	745	27.5		—	710
NVD☐UCD470	437 - 517	300	385	15.0		—	810	30.0		—	775

☐ Add disk diameter

Type	Varistor Voltage	Maximum Allowable Voltage		NVD10UC - NVD10UBC*				NVD14UC**				NVD20UC		
				Max. (2ms) Energy	Max. Peak Current (2 pulses)	Clamping Voltage		Max. (2ms) Energy	Max. Peak Current (2 pulses)	Clamping Voltage		Max. (2ms) Energy	Max. Peak Current (2 pulses)	Clamping Voltage
	Vc Ic = 0.1mA (V)	a.c. r.m.s. (v)	d.c. (v)	E (J)	Ip (A)	V_{5A}	V_{25A}	E (J)	Ip (A)	V_{10A}	V_{50A}	E (J)	Ip (A)	V_{100A}
NVD☐SCD018	16 - 22	11	14	—	—	—	—	—	—	—	—	—	—	—
NVD☐UCD022	20 - 27	14	18	2.6		43	—	5.3		43	—	—	—	—
NVD☐UCD027	25 - 32	17	22	3.2		53	—	6.5		53	—	—	—	—
NVD☐UCD033	30 - 39	20	26	4.0		65	—	7.9		65	—	—	—	—
NVD☐UCD039	37 - 47	25	31	4.4	500	77	—	9.4	1000	77	—	—	—	—
NVD☐UCD047	45 - 54	30	38	5.7		93	—	11.0		93	—	—	—	—
NVD☐UCD056	52 - 62	35	45	6.7		110	—	13.0		110	—	—	—	—
NVD☐UCD068	60 - 76	40	56	8.2		135	—	16.0		135	—	—	—	—
NVD☐SCD082	74 - 90	50	65	8.0	1250	—	135	14.0	2500	—	135	—	—	—
NVD☐UCD100	90 - 110	60	85	12.0		—	165	18.0		—	165	—	—	—
NVD☐UCD120	108 - 132	75	100	14.5		—	200	30.0		—	200	—	—	—
NVD☐UCD150	135 - 165	95	125	18.0		—	250	37.5		—	250	—	—	—
NVD☐UCD200	185 - 225	130	170	25.0		—	340	50.0	5000	—	340	100		340
NVD☐UCD220	198 - 242	140	180	27.5		—	360	55.0		—	360	110	7000	360
NVD☐UCD240	216 - 264	150	200	30.0	2500	—	395	60.0		—	395	120		395
NVD☐UCD270	247 - 303	175	225	35.0		—	455	70.0		—	455	135		455
NVD☐UCD330	297 - 363	210	270	42.0		—	545	80.0		—	545	—		—
NVD☐UCD360	342 - 396	230	300	45.0		—	595	90.0		—	595	180		595
NVD☐UCD390	367 - 429	250	320	50.0		—	650	100.0	4500	—	650	195	6500	650
NVD☐UCD430	407 - 473	275	350	55.0		—	710	110.0		—	710	215		710
NVD☐UCD470	437 - 517	300	385	60.0		—	775	125.0		—	775	250		775

☐ Add disk diameter * Manufacturing range of NVD10UBC is varistor voltages 22 - 270 ** NVD14C100 is applied

applications and ratings (continued)

Type	Varistor Voltage	Maximum Allowable Voltage		NVD10UC - NVD10UBC*				NVD14UC**				NVD20UC		
	Vc Ic = 0.1mA (V)	a.c. r.m.s. (v)	d.c. (v)	Max. (2ms) Energy	Max. Peak Current (2 pulses)	Clamping Voltage		Max. (2ms) Energy	Max. Peak Current (2 pulses)	Clamping Voltage		Max. (2ms) Energy	Max. Peak Current (2 pulses)	Clamping Voltage
				E (J)	Ip (A)	V_{5A}	V_{25A}	E (J)	Ip (A)	V_{10A}	V_{50A}	E (J)	Ip (A)	V_{100A}
NVD☐UCD510	474 - 561	320	410	67.0		—	845	136.0		—	845	—		—
NVD☐UCD620	577 - 682	380	505	67.0		—	1025	136.0		—	1025	273		1025
NVD☐UCD680	637 - 748	420	560	67.0		—	1120	136.0		—	1120	273		1120
NVD☐UCD750	697 - 825	460	615	70.0		—	1240	150.0		—	1240	300	6500	1240
NVD☐UCD780	737 - 858	485	640	70.0	2500	—	1290	150.0	4500	—	1290	300		1290
NVD☐UCD820	767 - 902	510	670	80.0		—	1355	165.0		—	1355	325		1355
NVD☐UCD910	857 - 1000	550	745	90.0		—	1500	180.0		—	1500	360		1500
NVD☐UCD1100	1070 - 1210	680	895	110.0		—	1815	—		—	—	—	—	—
NVD☐UCD1800	1700 - 1980	1000	1465	183.0		—	2970	360.0		—	2970	—	—	—

☐ Add disk diameter * Manufacturing range of NVD10UBC is varistor voltages 22 - 270 ** NVD14C100 is applied

environmental applications

Performance Characteristics

Parameter	Requirement Δ V±%	Test Method
Varistor Voltage	Within specified tolerance	Voltage between terminals when the specified current is flowed Ic: 0.1mA — Type: NVD05UCD Ic: 1mA — Type: NVD07UCD - NVD20UCD
Solderability	95% coverage minimum	230°C ± 5°C, 5 seconds ± 0.5 second / 250°C ± 5°C, 5 seconds ± 0.5 second (Pb free)
Resistance to Solder Heat	No abnormality in appearance	260°C ± 5°C, 10 seconds ± 1 second
Rapid Change of Temperature	No abnormality in appearance	-40°C (30 minutes)/ +125°C (30 minutes), 5 cycles, except NVD20UCD -40°C (30 minutes)/ +85°C (30 minutes), 5 cycles: NVD20UCD
Maximum Peak Current	±10%	Rated impulse current of (T=8/20μs), positive/negative applied once each
Maximum Energy	±10%	A single standard impulse of 2ms, once
High Temperature Life with d.c. Bias	±10%	85°C ± 5°C, Vc=(Vd.c.) 1000h Load: maximum allowable circuit voltage (d.c.)
High Temperature Life with a.c. Bias	±10%	85°C ± 5°C, Vc=(Va.c.r.m.s.) 1000h Load: maximum allowable circuit voltage (d.c.)
High Temperature & High Humidity Life with Bias	±5%	80°C ± 5°C, 95% RH, 1000h
High Temperature Storage Life	±5%	125°C ± 5°C, 1000h
Low Temperature Storage Life	±5%	-40°C ± 5°C, 1000h

For Typical Characteristics Graphs see Environmental Applications. Additional environmental applications can also be found at www.koaspeer.com

11/23/14

Mouser Electronics

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NVD20UCBK430 NVD05UCD022 NVD05UCD027 NVD05UCD033 NVD05UCD039 NVD05UCD047 NVD05UCD056 NVD05UCD068 NVD05UCD082 NVD05UCD100 NVD05UCD120 NVD05UCD150 NVD05UCD200 NVD05UCD220 NVD05UCD240 NVD05UCD270 NVD05UCD330 NVD05UCD360 NVD05UCD390 NVD05UCD430 NVD05UCD470 NVD07UCD022 NVD07UCD027 NVD07UCD033 NVD07UCD039 NVD07UCD047 NVD07UCD056 NVD07UCD068 NVD07UCD082 NVD07UCD100 NVD07UCD120 NVD07UCD150 NVD07UCD200 NVD07UCD220 NVD07UCD240 NVD07UCD270 NVD07UCD330 NVD07UCD360 NVD07UCD390 NVD07UCD430 NVD07UCD470 NVD10UCD022 NVD10UCD027 NVD10UCD033 NVD10UCD039 NVD10UCD047 NVD10UCD056 NVD10UCD068 NVD10UCD082 NVD10UCD100 NVD10UCD1100 NVD10UCD120 NVD10UCD150 NVD10UCD1800 NVD10UCD200 NVD10UCD220 NVD10UCD240 NVD10UCD270 NVD10UCD330 NVD10UCD360 NVD10UCD390 NVD10UCD430 NVD10UCD470 NVD10UCD510 NVD10UCD620 NVD10UCD750 NVD10UCD780 NVD10UCD820 NVD10UCD910 NVD14UCD022 NVD14UCD027 NVD14UCD033 NVD14UCD039 NVD14UCD047 NVD14UCD056 NVD14UCD068 NVD14UCD082 NVD14UCD100 NVD14UCD120 NVD14UCD150 NVD14UCD1800 NVD14UCD200 NVD14UCD220 NVD14UCD240 NVD14UCD270 NVD14UCD330 NVD14UCD360 NVD14UCD390 NVD14UCD430 NVD14UCD470 NVD14UCD510 NVD14UCD620 NVD14UCD750 NVD14UCD780 NVD14UCD820 NVD14UCD910 NVD20UCD200 NVD20UCD220 NVD20UCD240 NVD20UCD270