



**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<br>(7.0 - 7.5)   | .024<br>(0.6) | .197±.039<br>(5.0±1.0) | .169±.232<br>(4.3 - 5.9)  |
| 07U  | .276 - .374<br>(9.0 - 9.5)   |               |                        |                           |
| 10U  | .472 - .531<br>(12.0 - 13.5) | .031<br>(0.8) | .295±.039<br>(7.5±1.0) | .169±.567<br>(4.3 - 14.4) |
| 10UB | .472<br>(12.0)               | .024<br>(0.6) | .197±.039<br>(5.0±1.0) | .169±.209<br>(4.3 - 5.3)  |
| 14U  | .630 - .669<br>(16.0 - 17.0) | .031<br>(0.8) | .295±.039<br>(7.5±1.0) | .169±.567<br>(4.3 - 14.4) |
| 20U  | .91 - .94<br>(23.0 - 24.0)   | .039<br>(1.0) | .394±.039<br>(10±1.0)  | .205±.354<br>(5.2 - 9.0)  |

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

**ordering information**

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

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

circuit protection

applications and ratings

| Type       | Varistor Voltage<br>Vc Ic = 0.1mA (V) | Maximum Allowable Voltage |          | NVD05UC                       |  |                  |     | NVD07UC                       |  |                  |      |
|------------|---------------------------------------|---------------------------|----------|-------------------------------|--|------------------|-----|-------------------------------|--|------------------|------|
|            |                                       | a.c. r.m.s. (v)           | d.c. (v) | Maximum (2ms) Energy<br>E (J) | Max. Peak Current (2 pulses)<br>Ip (A) | Clamping Voltage |     | Maximum (2ms) Energy<br>E (J) | Max. Peak Current (2 pulses)<br>Ip (A) | Clamping Voltage |      |
|            |                                       |                           |          |                               |  | V1A              | V5A |                               |  | V2.5A            | V10A |
| NVD□SCD018 | 16 - 22                               | 11                        | 14       | 0.3                           | 50                                     | 40               | —   | —                             | —                                      | —                | —    |
| NVD□UCD022 | 20 - 27                               | 14                        | 18       | 0.5                           | 125                                    | 48               | —   | 1.1                           | 250                                    | 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                           |  | 86               | —   | 1.9                           |  | 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  |
| NVD□UCD100 | 90 - 110                              | 60                        | 85       | 3.0                           | 600                                    | —                | 175 | 6.0                           | 1250                                   | —                | 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                           |  | —                | 415 | 15.0                          |  | —                | 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<br>Vc Ic = 0.1mA (V) | Maximum Allowable Voltage |          | NVD10UC - NVD10UCB*        |  |                  |      | NVD14UC**                  |  |                  |      | NVD20UC                    |  |                           |
|------------|---------------------------------------|---------------------------|----------|----------------------------|--|------------------|------|----------------------------|--|------------------|------|----------------------------|--|---------------------------|
|            |                                       | a.c. r.m.s. (v)           | d.c. (v) | Max. (2ms) Energy<br>E (J) | Max. Peak Current (2 pulses)<br>Ip (A) | Clamping Voltage |      | Max. (2ms) Energy<br>E (J) | Max. Peak Current (2 pulses)<br>Ip (A) | Clamping Voltage |      | Max. (2ms) Energy<br>E (J) | Max. Peak Current (2 pulses)<br>Ip (A) | Clamping Voltage<br>V100A |
|            |                                       |                           |          |                            |  | V5A              | V25A |                            |  | V10A             | V50A |                            |  |                           |
| NVD□SCD018 | 16 - 22                               | 11                        | 14       | —                          | —                                      | —                | —    | —                          | —                                      | —                | —    | —                          | —                                      |                           |
| NVD□UCD022 | 20 - 27                               | 14                        | 18       | 2.6                        | 500                                    | 43               | —    | 5.3                        | 1000                                   | 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                        |  | 77               | —    | 9.4                        |  | 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                       | 2500                                   | —                | 200  | 30.0                       | 5000                                   | —                | 200  | —                          | —                                      |                           |
| NVD□UCD150 | 135 - 165                             | 95                        | 125      | 18.0                       |  | —                | 250  | 37.5                       |  | —                | 250  | —                          | —                                      | —                         |
| NVD□UCD200 | 185 - 225                             | 130                       | 170      | 25.0                       |  | —                | 340  | 50.0                       |  | —                | 340  | 100                        | 7000                                   | 340                       |
| NVD□UCD220 | 198 - 242                             | 140                       | 180      | 27.5                       |  | —                | 360  | 55.0                       |  | —                | 360  | 110                        |  | 360                       |
| NVD□UCD240 | 216 - 264                             | 150                       | 200      | 30.0                       |  | —                | 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                       |  | 4500             | —    | 545                        | 80.0                                   | 4500             | —    | 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                                  |                  | —    | 650                        | 195                                    | 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 NVD10UCB is varistor voltages 22 - 270

\*\* NVD14C100 is applied

Specifications given herein may be changed at any time without prior notice. Please confirm technical specifications before you order and/or use.

11/21/08

applications and ratings (continued)

| Type        | Varistor Voltage<br>Vc Ic = 0.1mA (V) | Maximum Allowable Voltage |             | NVD10UC - NVD10UC*   |                                    |                     | NVD14UC**            |                                    |                     |      | NVD20UC              |                                    |                     |       |      |
|-------------|---------------------------------------|---------------------------|-------------|----------------------|------------------------------------|---------------------|----------------------|------------------------------------|---------------------|------|----------------------|------------------------------------|---------------------|-------|------|
|             |                                       | a.c. r.m.s.<br>(v)        | d.c.<br>(v) | Max. (2ms)<br>Energy | Max. Peak<br>Current<br>(2 pulses) | Clamping<br>Voltage | Max. (2ms)<br>Energy | Max. Peak<br>Current<br>(2 pulses) | Clamping<br>Voltage |      | Max. (2ms)<br>Energy | Max. Peak<br>Current<br>(2 pulses) | Clamping<br>Voltage |       |      |
|             |                                       |                           |             | E (J)                | Ip (A)                             | V5A                 | V25A                 | E (J)                              | Ip (A)              | V10A | V50A                 | E (J)                              | Ip (A)              | V100A |      |
| NVD□UCD510  | 474 - 561                             | 320                       | 410         | 67.0                 | 2500                               | —                   | 845                  | 136.0                              | 4500                | —    | 845                  | —                                  | 6500                | —     |      |
| 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                                |                     | —     | 1240 |
| NVD□UCD780  | 737 - 858                             | 485                       | 640         | 70.0                 |                                    | —                   | 1290                 | 150.0                              |                     | —    | 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 NVD10UCB 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<br><table border="1"> <tr> <th>Ic</th> <th>Type</th> </tr> <tr> <td>0.1mA</td> <td>NVD05UCD</td> </tr> <tr> <td>1mA</td> <td>NVD07UCD - NVD20UCD</td> </tr> </table> | Ic | Type | 0.1mA | NVD05UCD | 1mA | NVD07UCD - NVD20UCD |
| Ic  | Type                         |   |    |      |       |          |     |                     |
| 0.1mA   | NVD05UCD                     |   |    |      |       |          |     |                     |
| 1mA   | NVD07UCD - NVD20UCD          |   |    |      |       |          |     |                     |
| Solderability                                   | 95% coverage minimum         | 230°C ± 5°C, 5 seconds ± 0.5 second /<br>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<br>-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<br>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<br>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](http://www.koaspeer.com)

Specifications given herein may be changed at any time without prior notice. Please confirm technical specifications before you order and/or use.

11/23/14



Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



#### Как с нами связаться

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