



## SPECIFICATIONS

PRODUCT : VARISTOR

TYPE : NFV20D□□□K

MODEL :

CITATION :

REVISION : B01

TOTAL PAGES : 5 PAGE : 1/5

RELEASED DATE : Oct. 15, 2001

### REVISION HISTORY

| NO | REV. DATE     | DCR NO. | DESCRIPTION OF CHANGE | REV. |
|----|---------------|---------|-----------------------|------|
| 1  | Oct. 15, 2001 |         | NEW RELEASE           | B01  |
| 2  |               |         |                       |      |
| 3  |               |         |                       |      |
| 4  |               |         |                       |      |
| 5  |               |         |                       |      |
| 6  |               |         |                       |      |
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| 9  |               |         |                       |      |
| 10 |               |         |                       |      |
| 11 |               |         |                       |      |
| 12 |               |         |                       |      |

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|-----------------|---------------------------------------|-------------------|-------|------|----------------------|-----|
| <b>CERAMATE</b> | TYPE                                  | <b>NFV20D□□□K</b> | MODEL |      | PAGE                 | 2/5 |
| CITATION        |                                       |                   |       | DATE | <b>Oct. 15, 2001</b> |     |
| SUBJECT         | <b>QUALITY APPROVAL and STRUCTURE</b> |                   |       | REV. | <b>B01</b>           |     |

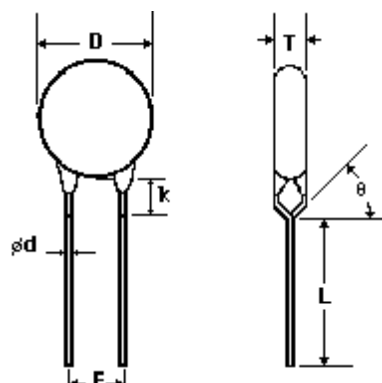
### 1. QUALITY SYSTEM APPROVAL

ISO9001 Certificate of approval No.97-HOU-AQ-1382

### 2. SAFETY STANDARDS APPROVAL

| Standard No. | UL 1414  | UL 1449  | UL 497B  | CUL      | CSA C22.2 No.1 | VDE 42000 |
|--------------|----------|----------|----------|----------|----------------|-----------|
| File No.     | E181368  | E166389  | E187844  | E166389  | LR105317       | 5938      |
| 180K~680K    |          |          | Approved |          |                | Approved  |
| 820K~181K    |          | Approved | Approved | Approved |                | Approved  |
| 201K~471K    | Approved | Approved | Approved | Approved | Approved       | Approved  |
| 511K         |          | Approved | Approved | Approved |                | Approved  |
| 561K~821K    | Approved | Approved | Approved | Approved |                | Approved  |
| 911K~112K    |          |          |          |          |                | Approved  |
| 182K         |          |          |          |          |                |           |

### 3. STRUCTURE

| NO. | ITEM             | DESCRIPTION   |                 |             |
|-----|------------------|---|-----------------|-------------|
| 3.1 | Main Material    | Zinc Oxide  |                 |             |
| 3.2 | Coating Material | Silicone or Phenolic resin  |                 |             |
| 3.3 | Marking          | NFV, Part number, UL,CUL,CSA and VDE recognized component mark, Date code           |                 |             |
| 3.4 | Appearance       | Without dirt and crack, marking should be clear                                     |                 |             |
| 3.5 | Dimensions       |  | D(max.)         | 23.0        |
|     |                  |   | k(max.)         | 5.0         |
|     |                  |   | T(max.)         | <b>*(1)</b> |
|     |                  |   | F               | 10.0± 1.0   |
|     |                  |   | $\phi d$        | 1.0± 0.1    |
|     |                  |   | $\theta$ (max.) | 75°         |
|     |                  |   | L(min)          | 25.0        |
|     |                  |   | Unit: mm        |             |

**\*(1) See Page 3, Dimensions Table**

| Part No. | T <sub>max.</sub> |
|----------|-------------------|
| 20D180K  | 4.3               |
| 20D220K  | 4.5               |
| 20D270K  | 4.8               |
| 20D330K  | 4.1               |
| 20D390K  | 4.3               |
| 20D470K  | 4.5               |
| 20D560K  | 4.7               |
| 20D680K  | 4.5               |
| 20D820K  | 4.1               |
| 20D101K  | 4.3               |
| 20D121K  | 4.5               |
| 20D151K  | 4.8               |
| 20D181K  | 4.2               |
| 20D201K  | 4.3               |
| 20D221K  | 4.4               |
| 20D241K  | 4.5               |
| 20D271K  | 4.6               |
| 20D301K  | 4.8               |
| 20D331K  | 4.9               |
| 20D361K  | 5.1               |
| 20D391K  | 5.2               |
| 20D431K  | 5.4               |
| 20D471K  | 5.6               |
| 20D511K  | 5.7               |
| 20D561K  | 5.8               |
| 20D621K  | 6.1               |
| 20D681K  | 6.4               |
| 20D751K  | 6.7               |
| 20D781K  | 6.8               |
| 20D821K  | 7.0               |
| 20D911K  | 7.1               |
| 20D102K  | 7.3               |
| 20D112K  | 7.7               |
| 20D182K  | 11.7              |

Unit:mm

|                 |                                   |                   |       |      |                      |     |
|-----------------|-----------------------------------|-------------------|-------|------|----------------------|-----|
| <b>CERAMATE</b> | TYPE                              | <b>NFV20D□□□K</b> | MODEL |      | PAGE                 | 4/5 |
| CITATION        |                                   |                   |       | DATE | <b>Oct. 15, 2001</b> |     |
| SUBJECT         | <b>ELECTRICAL CHARACTERISTICS</b> |                   |       | REV. | <b>B01</b>           |     |

#### 4. ELECTRICAL CHARACTERISTICS

| NO. | ITEM                                     | PERFORMANCE   | TEST METHODS  |
|-----|--|---|---|
| 4.0 | Standard Conditions                      |   | Unless otherwise specified, all tests are made under environmental conditions as given below:<br>Temperature: 5~35°C<br>Relative humidity: 45~85 % RH                       |
| 4.1 | Maximum Allowable Voltage                | AC : <b>*(2)</b> V <sub>rms</sub><br>DC : <b>*(2)</b> V | Maximum continuous sine wave(RMS) or DC voltage which may be applied.   |
| 4.2 | Varistor Voltage                         | V <sub>1mA</sub> : <b>*(2)</b> V                        | Voltage across the varistor measured at C <sub>mA</sub> DC.   |
| 4.3 | Varistor Voltage Temperature Coefficient | 0 ~ -0.05 %/°C  | $\frac{V_{CmA} \text{ at } 85^{\circ}\text{C} - V_{CmA} \text{ at } 25^{\circ}\text{C}}{V_{CmA} \text{ at } 25^{\circ}\text{C}} \times \frac{1}{60} \times 100$             |
| 4.4 | Max. Clamping Voltage                    | <b>*(2)</b> V at <b>*(2)</b> A                          | Peak voltage across the varistor with a specified peak impulse current of 8x 20 μs waveform.  |
| 4.5 | Rated Power                              | <b>*(2)</b> W   | Maximum 50~60Hz power which may be loaded for 1,000 hrs at 85± 2°C with $\Delta V_{CmA} / V_{CmA} \leq \pm 10\%$ .  |
| 4.6 | Withstanding Surge Current               | <b>*(2)</b> A   | The max. current within the varistor voltage change of less than ± 10% when one impulse current (8x 20 μs) applied.   |
|     |  |   | The max. current with a varistor voltage change of less than ± 10% when two times impulse current (8x 20 μs) are applied at intervals of 5 minutes.                         |
| 4.7 | Energy                                   | <b>*(2)</b> Joule                                       | The max. energy absorbed with a varistor voltage change of less than ± 10% when one impulse(10 x 1000 μs) is applied.   |
| 4.8 | Surge Life                               | <b>*(2)</b> A   | The max. current with a varistor voltage change of less than ± 10% when 10,000 times impulse current (8x 20 μs) are applied at intervals of 20 seconds at room temperature. |

\* (2) See Page 5

| PART NUMBER | MAXIMUM ALLOWABLE VOLTAGE |       | VARISTOR VOLTAGE (V) | CLAMPING VOLTAGE (MAX.) |        | RATED WATTAGE (MAX.) (W) | SURGE CURRENT (8/20 $\mu$ s) |      | MAXIMUM ENERGY (10/1000 $\mu$ s) $W_{tm}$ (joule) | SURGE LIFE (A) |
|-------------|---------------------------|-------|----------------------|-------------------------|--------|--------------------------|------------------------------|------|---|----------------|
|             | AC <sub>rms</sub> (V)     | DC(V) |                      | (V)                     | Ip(A)  |                          | $I_{tm}$ (A)                 |      |   |                |
|             |                           |       |                      |                         |        | 1 TIME                   | 2 TIMES                      |      |   |                |
| 20D180K     | 11                        | 14    | 16~20                | 36                      | 20     | 0.2                      | 3000                         | 2000 | 13.0  | 130            |
| 20D220K     | 14                        | 18    | 20~24                | 43                      |        |                          |                              |      | 16.0  |                |
| 20D270K     | 17                        | 22    | 24~30                | 53                      |        |                          |                              |      | 19.0  |                |
| 20D330K     | 20                        | 26    | 30~36                | 65                      |        |                          |                              |      | 24.0  |                |
| 20D390K     | 25                        | 31    | 35~43                | 77                      |        |                          |                              |      | 28.0  |                |
| 20D470K     | 30                        | 38    | 42~52                | 93                      |        |                          |                              |      | 34.0  |                |
| 20D560K     | 35                        | 45    | 50~62                | 110                     |        |                          |                              |      | 41.0  |                |
| 20D680K     | 40                        | 56    | 61~75                | 135                     |        |                          |                              |      | 49.0  |                |
| 20D820K     | 50                        | 65    | 74~90                | 135                     |        |                          |                              |      | 56.0  |                |
| 20D101K     | 60                        | 85    | 90~110               | 165                     | 70.0   |                          |                              |      |   |                |
| 20D121K     | 75                        | 100   | 108~132              | 200                     | 85.0   |                          |                              |      |   |                |
| 20D151K     | 95                        | 125   | 135~165              | 250                     | 106.0  |                          |                              |      |   |                |
| 20D181K     | 115                       | 150   | 162~198              | 300                     | 130.0  |                          |                              |      |   |                |
| 20D201K     | 130                       | 170   | 185~225              | 340                     | 140.0  |                          |                              |      |   |                |
| 20D221K     | 140                       | 180   | 198~242              | 360                     | 155.0  |                          |                              |      |   |                |
| 20D241K     | 150                       | 200   | 216~264              | 395                     | 168.0  |                          |                              |      |   |                |
| 20D271K     | 175                       | 225   | 247~303              | 455                     | 190.0  |                          |                              |      |   |                |
| 20D301K     | 190                       | 250   | 270~330              | 505                     | 210.0  |                          |                              |      |   |                |
| 20D331K     | 210                       | 275   | 297~363              | 545                     | 228.0  |                          |                              |      |   |                |
| 20D361K     | 230                       | 300   | 324~396              | 595                     | 255.0  |                          |                              |      |   |                |
| 20D391K     | 250                       | 320   | 351~429              | 650                     | 275.0  |                          |                              |      |   |                |
| 20D431K     | 275                       | 350   | 387~473              | 710                     | 303.0  |                          |                              |      |   |                |
| 20D471K     | 300                       | 385   | 423~517              | 775                     | 350.0  |                          |                              |      |   |                |
| 20D511K     | 320                       | 410   | 459~561              | 845                     | 382.0  |                          |                              |      |   |                |
| 20D561K     | 350                       | 460   | 504~616              | 920                     | 382.0  |                          |                              |      |   |                |
| 20D621K     | 385                       | 505   | 558~682              | 1025                    | 382.0  |                          |                              |      |   |                |
| 20D681K     | 420                       | 560   | 612~748              | 1120                    | 382.0  |                          |                              |      |   |                |
| 20D751K     | 460                       | 615   | 675~825              | 1240                    | 420.0  |                          |                              |      |   |                |
| 20D781K     | 485                       | 640   | 702~858              | 1290                    | 440.0  |                          |                              |      |   |                |
| 20D821K     | 510                       | 670   | 738~902              | 1355                    | 460.0  |                          |                              |      |   |                |
| 20D911K     | 550                       | 745   | 819~1001             | 1500                    | 510.0  |                          |                              |      |   |                |
| 20D102K     | 625                       | 825   | 900~1100             | 1650                    | 565.0  |                          |                              |      |   |                |
| 20D112K     | 680                       | 895   | 990~1210             | 1815                    | 620.0  |                          |                              |      |   |                |
| 20D182K     | 1000                      | 1465  | 1700~1980            | 2970                    | 1020.0 | 200                      |                              |      |   |                |