

## VDR Metal Oxide Varistors High Surge



### FEATURES

- Low  $\beta$  high purity zinc oxide disc
- Halogen free insulating epoxy coating
- Straight or kinked leads
- Higher current surge/size ratio capability up to 10 kA for H20 types
- Certified according to UL 1449 edition 3, VDE/IEC 61051-1/2 and CSA
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**

### APPLICATION

- Overvoltage and transient voltage protection

### DESCRIPTION

The varistors consist of a disc of low- $\beta$  ceramic material with two solid copper leads (H20 types only) or copper clad steel wire. The wires have a matte tin plating. They are coated with a layer of ochre colored halogen-free epoxy, which provides electrical, mechanical and climatic protection. The encapsulation is resistant to all cleaning solvents in accordance with IEC 60068-2-45.

### MOUNTING

The varistors are suitable for processing on automatic insertion, cutting and bending equipment.

### Typical Soldering

- 235 °C, duration: 5 s (Pb-bearing)
- 245 °C, duration: 5 s (lead (Pb)-free)

### Resistance to Soldering Heat

260 °C; duration: 10 s max.

### MARKING

The varistors are marked with the following information:

- Maximum continuous RMS voltage with - E suffix
- Series number (582, 583, 584, 585 or 586)
- Manufacture logo
- Date of manufacture (YYWW)
- Safety marks on VDRH10-14-20 types

### INFLAMMABILITY

The varistors are passive non-flammable. The encapsulation is made of flame resistant epoxy in accordance with UL 94 V-0.

| QUICK REFERENCE DATA  |   |      |
|---|---|------|
| PARAMETER   | VALUE   | UNIT |
| Maximum continuous voltage in operating temperature range:          |   |      |
| RMS   | 11 to 680   | V    |
| DC  | 14 to 895   | V    |
| Maximum non-repetitive transient current $I_{NRP}$ (8 x 20 $\mu$ s) | 250 to 10 000   | A    |
| Maximum energy (10/1000 $\mu$ s)                                    | 0.7 to 620  | J    |
| Detailed specification  | Based on<br>IEC 61051-1<br>IEC 61051-2<br>IEC 61051-2-2 |      |
| Storage temperature   | -40 to +150   | °C   |
| Operating temperature   | -40 to +125   | °C   |

### ORDERING INFORMATION

The varistors are available in a number of packaging options:

- Bulk
- On tape on reel
- On tape in ammpack

The basic ordering code for each option is given in tables titled Varistors on Tape on Reel, Varistors on Tape in Ammpack, and Varistors in Bulk. To complete the catalog number and to determine the required operating parameters, see Electrical Data and Ordering Information table.

#### Note

- Special lead-configuration as inside or outside crimped leads on request.



| ELECTRICAL DATA AND ORDERING INFORMATION |        |                                |                                   |       |  |  |                              |          |           |                                     |                                |
|--|--------|--------------------------------|-----------------------------------|-------|--|--|------------------------------|----------|-----------|-------------------------------------|--------------------------------|
| MAXIMUM CONTINUOUS VOLTAGE               |        | VOLTAGE <sup>(3)</sup> at 1 mA | MAXIMUM VOLTAGE at STATED CURRENT |       | MAXIMUM ENERGY <sup>(4)</sup> (10 x 1000 µs) | MAXIMUM NON-REP. TRANSIENT CURRENT <sup>(5)</sup> I <sub>NRP</sub> (8 x 20 µs) | TYPICAL CAPACITANCE at 1 kHz | T (max.) | E         | UL 1449 ED3 SPD TYPE <sup>(7)</sup> | CATALOG NUMBERS <sup>(1)</sup> |
| RMS <sup>(2)</sup> (V)                   | DC (V) | (V)                            | V (V)                             | I (A) | (J)  | (A)  | (pF)                         | (mm)     | (mm)      |                                     | SAP <sup>(6)</sup>             |
| 11                                       | 14     | 18                             | 40                                | 1.0   | 0.7  | 250  | 1600                         | 3.4      | 0.5 ± 0.3 | 4                                   | VDRH05B011xyE                  |
|  |        |                                | 36                                | 2.5   | 1.5  | 500  | 3600                         | 3.4      | 0.5 ± 0.3 | 4                                   | VDRH07D011xyE                  |
|  |        |                                | 36                                | 5.0   | 2.6  | 1000   | 8000                         | 3.8      | 0.7 ± 0.3 | 4                                   | VDRH10G011xyE                  |
|  |        |                                | 36                                | 10.0  | 5.2  | 2000   | 20 000                       | 3.8      | 0.7 ± 0.3 | 4                                   | VDRH14M011xyE                  |
| 14                                       | 18     | 22                             | 48                                | 1.0   | 0.8  | 250  | 1300                         | 3.4      | 0.7 ± 0.3 | 4                                   | VDRH05B014xyE                  |
|  |        |                                | 43                                | 2.5   | 1.7  | 500  | 2800                         | 3.4      | 0.7 ± 0.3 | 4                                   | VDRH07D014xyE                  |
|  |        |                                | 43                                | 5.0   | 3.2  | 1000   | 6000                         | 3.8      | 0.9 ± 0.3 | 4                                   | VDRH10G014xyE                  |
|  |        |                                | 43                                | 10.0  | 6.3  | 2000   | 15 000                       | 3.8      | 0.9 ± 0.3 | 4                                   | VDRH14M014xyE                  |
|  |        |                                | 43                                | 20.0  | 16.0   | 3000   | 30 000                       | 4.2      | 1.1 ± 0.3 | 3                                   | VDRH20R014ByE                  |
| 17                                       | 22     | 27                             | 60                                | 1.0   | 1.1  | 250  | 1050                         | 3.7      | 0.8 ± 0.3 | 4                                   | VDRH05B017xyE                  |
|  |        |                                | 53                                | 2.5   | 2.1  | 500  | 2000                         | 3.7      | 0.8 ± 0.3 | 4                                   | VDRH07D017xyE                  |
|  |        |                                | 53                                | 5.0   | 3.9  | 1000   | 4000                         | 4.1      | 1.0 ± 0.3 | 4                                   | VDRH10G017xyE                  |
|  |        |                                | 53                                | 10.0  | 7.8  | 2000   | 10 000                       | 4.1      | 1.0 ± 0.3 | 4                                   | VDRH14M017xyE                  |
|  |        |                                | 53                                | 20.0  | 19.0   | 3000   | 20 000                       | 4.5      | 1.2 ± 0.3 | 3                                   | VDRH20R017ByE                  |
| 20                                       | 26     | 33                             | 73                                | 1.0   | 1.3  | 250  | 900                          | 3.9      | 1.0 ± 0.3 | 4                                   | VDRH05B020xyE                  |
|  |        |                                | 65                                | 2.5   | 2.8  | 500  | 1500                         | 3.9      | 1.0 ± 0.3 | 4                                   | VDRH07D020xyE                  |
|  |        |                                | 65                                | 5.0   | 4.8  | 1000   | 3000                         | 4.3      | 1.2 ± 0.3 | 4                                   | VDRH10G020xyE                  |
|  |        |                                | 65                                | 10.0  | 9.5  | 2000   | 7500                         | 4.3      | 1.2 ± 0.3 | 4                                   | VDRH14M020xyE                  |
|  |        |                                | 65                                | 20.0  | 24.0   | 3000   | 15 000                       | 4.7      | 1.4 ± 0.3 | 3                                   | VDRH20R020ByE                  |
| 25                                       | 31     | 39                             | 86                                | 1.0   | 1.5  | 250  | 500                          | 4.2      | 1.2 ± 0.3 | 4                                   | VDRH05B025xyE                  |
|  |        |                                | 77                                | 2.5   | 3.0  | 500  | 1350                         | 4.2      | 1.2 ± 0.3 | 4                                   | VDRH07D025xyE                  |
|  |        |                                | 77                                | 5.0   | 5.6  | 1000   | 2600                         | 4.6      | 1.4 ± 0.3 | 4                                   | VDRH10G025xyE                  |
|  |        |                                | 77                                | 10.0  | 11.0   | 2000   | 6500                         | 4.6      | 1.4 ± 0.3 | 4                                   | VDRH14M025xyE                  |
|  |        |                                | 77                                | 20.0  | 28.0   | 3000   | 13 000                       | 5.0      | 1.6 ± 0.3 | 3                                   | VDRH20R025ByE                  |
| 30                                       | 38     | 47                             | 104                               | 1.0   | 1.8  | 250  | 700                          | 4.4      | 1.4 ± 0.5 | 4                                   | VDRH05B030xyE                  |
|  |        |                                | 93                                | 2.5   | 3.8  | 500  | 1600                         | 4.4      | 1.4 ± 0.5 | 4                                   | VDRH07D030xyE                  |
|  |        |                                | 93                                | 5.0   | 6.8  | 1000   | 2700                         | 4.8      | 1.6 ± 0.5 | 4                                   | VDRH10G030xyE                  |
|  |        |                                | 93                                | 10.0  | 14.0   | 2000   | 6000                         | 4.8      | 1.6 ± 0.5 | 4                                   | VDRH14M030xyE                  |
|  |        |                                | 93                                | 20.0  | 34.0   | 3000   | 12 000                       | 5.2      | 1.8 ± 0.5 | 3                                   | VDRH20R030ByE                  |
| 35                                       | 45     | 56                             | 123                               | 1.0   | 2.2  | 250  | 560                          | 4.8      | 1.7 ± 0.5 | 4                                   | VDRH05B035xyE                  |
|  |        |                                | 110                               | 2.5   | 4.4  | 500  | 1300                         | 4.8      | 1.7 ± 0.5 | 4                                   | VDRH07D035xyE                  |
|  |        |                                | 110                               | 5.0   | 8.1  | 1000   | 2200                         | 5.2      | 1.9 ± 0.5 | 4                                   | VDRH10G035xyE                  |
|  |        |                                | 110                               | 10.0  | 16.0   | 2000   | 4800                         | 5.2      | 1.9 ± 0.5 | 4                                   | VDRH14M035xyE                  |
|  |        |                                | 110                               | 20.0  | 41.0   | 3000   | 9600                         | 5.6      | 2.1 ± 0.5 | 3                                   | VDRH20R035ByE                  |
| 40                                       | 56     | 68                             | 150                               | 1.0   | 2.6  | 250  | 460                          | 5.1      | 2.1 ± 0.5 | 4                                   | VDRH05B040xyE                  |
|  |        |                                | 135                               | 2.5   | 5.4  | 500  | 1000                         | 5.1      | 2.1 ± 0.5 | 4                                   | VDRH07D040xyE                  |
|  |        |                                | 135                               | 5.0   | 9.8  | 1000   | 1800                         | 5.5      | 2.3 ± 0.5 | 4                                   | VDRH10G040xyE                  |
|  |        |                                | 135                               | 10.0  | 20.0   | 2000   | 3800                         | 5.5      | 2.3 ± 0.5 | 4                                   | VDRH14M040xyE                  |
|  |        |                                | 135                               | 20.0  | 49.0   | 3000   | 7600                         | 5.9      | 2.5 ± 0.5 | 3                                   | VDRH20R040ByE                  |
| 50                                       | 65     | 82                             | 145                               | 5.0   | 3.5  | 800  | 370                          | 3.5      | 0.6 ± 0.3 | 4                                   | VDRH05E050xyE                  |
|  |        |                                | 135                               | 10.0  | 7.0  | 1750   | 900                          | 3.5      | 0.6 ± 0.3 | 4                                   | VDRH07K050xyE                  |
|  |        |                                | 135                               | 25.0  | 14.0   | 3500   | 1500                         | 3.9      | 0.8 ± 0.3 | 3                                   | VDRH10S050xyE                  |
|  |        |                                | 135                               | 50.0  | 28.0   | 6000   | 3100                         | 3.9      | 0.8 ± 0.3 | 2                                   | VDRH14V050xyE                  |



| ELECTRICAL DATA AND ORDERING INFORMATION |        |                                |                                   |       |  |  |                              |          |           |                                     |                                |
|--|--------|--------------------------------|-----------------------------------|-------|--|--|------------------------------|----------|-----------|-------------------------------------|--------------------------------|
| MAXIMUM CONTINUOUS VOLTAGE               |        | VOLTAGE <sup>(3)</sup> at 1 mA | MAXIMUM VOLTAGE at STATED CURRENT |       | MAXIMUM ENERGY <sup>(4)</sup> (10 x 1000 µs) | MAXIMUM NON-REP. TRANSIENT CURRENT <sup>(5)</sup> I <sub>NRP</sub> (8 x 20 µs) | TYPICAL CAPACITANCE at 1 kHz | T (max.) | E         | UL 1449 ED3 SPD TYPE <sup>(7)</sup> | CATALOG NUMBERS <sup>(1)</sup> |
| RMS <sup>(2)</sup> (V)                   | DC (V) | (V)                            | V (V)                             | I (A) | (J)  | (A)  | (pF)                         | (mm)     | (mm)      |                                     | SAP <sup>(6)</sup>             |
| 60                                       | 85     | 100                            | 175                               | 5.0   | 4.5  | 800  | 290                          | 3.7      | 0.7 ± 0.3 | 4                                   | VDRH05E060xyE                  |
|  |        |                                | 165                               | 10.0  | 9.0  | 1750   | 700                          | 3.7      | 0.7 ± 0.3 | 4                                   | VDRH07K060xyE                  |
|  |        |                                | 165                               | 25.0  | 18.0   | 3500   | 1200                         | 4.1      | 0.9 ± 0.3 | 4                                   | VDRH10S060xyE                  |
|  |        |                                | 165                               | 50.0  | 36.0   | 6000   | 2300                         | 4.1      | 0.9 ± 0.3 | 2                                   | VDRH14V060xyE                  |
|  |        |                                | 165                               | 100.0 | 72.0   | 10 000   | 4600                         | 4.5      | 1.1 ± 0.3 | 2                                   | VDRH20X060ByE                  |
| 75                                       | 100    | 120                            | 210                               | 5.0   | 5.5  | 800  | 240                          | 4.0      | 0.9 ± 0.3 | 4                                   | VDRH05E075xyE                  |
|  |        |                                | 200                               | 10.0  | 11.0   | 1750   | 530                          | 4.0      | 0.9 ± 0.3 | 4                                   | VDRH07K075xyE                  |
|  |        |                                | 200                               | 25.0  | 22.0   | 3500   | 1000                         | 4.4      | 1.1 ± 0.3 | 4                                   | VDRH10S075xyE                  |
|  |        |                                | 200                               | 50.0  | 44.0   | 6000   | 1900                         | 4.4      | 1.1 ± 0.3 | 2                                   | VDRH14V075xyE                  |
|  |        |                                | 200                               | 100.0 | 88.0   | 10 000   | 3800                         | 4.8      | 1.3 ± 0.3 | 2                                   | VDRH20X075ByE                  |
| 95                                       | 125    | 150                            | 260                               | 5.0   | 6.5  | 800  | 180                          | 4.2      | 1.1 ± 0.3 | 4                                   | VDRH05E095xyE                  |
|  |        |                                | 250                               | 10.0  | 13.0   | 1750   | 450                          | 4.2      | 1.1 ± 0.3 | 4                                   | VDRH07K095xyE                  |
|  |        |                                | 250                               | 25.0  | 25.0   | 3500   | 800                          | 4.6      | 1.3 ± 0.3 | 4                                   | VDRH10S095xyE                  |
|  |        |                                | 250                               | 50.0  | 53.0   | 6000   | 1500                         | 4.6      | 1.3 ± 0.3 | 2                                   | VDRH14V095xyE                  |
|  |        |                                | 250                               | 100.0 | 106.0  | 10 000   | 3000                         | 5.0      | 1.5 ± 0.3 | 2                                   | VDRH20X095ByE                  |
| 115                                      | 150    | 180                            | 320                               | 5.0   | 8.0  | 800  | 150                          | 3.6      | 0.9 ± 0.3 | 4                                   | VDRH05E115xyE                  |
|  |        |                                | 300                               | 10.0  | 16.0   | 1750   | 390                          | 3.6      | 0.9 ± 0.3 | 4                                   | VDRH07K115xyE                  |
|  |        |                                | 300                               | 25.0  | 32.0   | 3500   | 680                          | 4.0      | 1.1 ± 0.3 | 3                                   | VDRH10S115xyE                  |
|  |        |                                | 300                               | 50.0  | 65.0   | 6000   | 1320                         | 4.0      | 1.1 ± 0.3 | 2                                   | VDRH14V115xyE                  |
|  |        |                                | 300                               | 100.0 | 130.0  | 10 000   | 2640                         | 4.4      | 1.3 ± 0.3 | 2                                   | VDRH20X115ByE                  |
| 130                                      | 170    | 205                            | 355                               | 5.0   | 8.5  | 800  | 130                          | 3.8      | 1.0 ± 0.3 | 4                                   | VDRH05E130xyE                  |
|  |        |                                | 340                               | 10.0  | 17.5   | 1750   | 320                          | 3.8      | 1.0 ± 0.3 | 4                                   | VDRH07K130xyE                  |
|  |        |                                | 340                               | 25.0  | 35.0   | 3500   | 580                          | 4.3      | 1.2 ± 0.3 | 3                                   | VDRH10S130xyE                  |
|  |        |                                | 340                               | 50.0  | 70.0   | 6000   | 1050                         | 4.3      | 1.2 ± 0.3 | 2                                   | VDRH14V130xyE                  |
|  |        |                                | 340                               | 100.0 | 140.0  | 10 000   | 2100                         | 4.8      | 1.4 ± 0.3 | 2                                   | VDRH20X130ByE                  |
| 140                                      | 180    | 220                            | 380                               | 5.0   | 9.0  | 800  | 120                          | 3.9      | 1.0 ± 0.3 | 4                                   | VDRH05E140xyE                  |
|  |        |                                | 360                               | 10.0  | 19.0   | 1750   | 290                          | 3.9      | 1.0 ± 0.3 | 4                                   | VDRH07K140xyE                  |
|  |        |                                | 360                               | 25.0  | 39.0   | 3500   | 540                          | 4.3      | 1.2 ± 0.3 | 3                                   | VDRH10S140xyE                  |
|  |        |                                | 360                               | 50.0  | 78.0   | 6000   | 950                          | 4.3      | 1.2 ± 0.3 | 2                                   | VDRH14V140xyE                  |
|  |        |                                | 360                               | 100.0 | 155.0  | 10 000   | 1900                         | 4.8      | 1.5 ± 0.3 | 2                                   | VDRH20X140ByE                  |
| 150                                      | 200    | 240                            | 415                               | 5.0   | 10.5   | 800  | 110                          | 4.1      | 1.1 ± 0.3 | 4                                   | VDRH05E150xyE                  |
|  |        |                                | 395                               | 10.0  | 21.0   | 1750   | 270                          | 4.1      | 1.1 ± 0.3 | 4                                   | VDRH07K150xyE                  |
|  |        |                                | 395                               | 25.0  | 42.0   | 3500   | 490                          | 4.3      | 1.3 ± 0.3 | 3                                   | VDRH10S150xyE                  |
|  |        |                                | 395                               | 50.0  | 84.0   | 6000   | 850                          | 4.3      | 1.3 ± 0.3 | 2                                   | VDRH14V150xyE                  |
|  |        |                                | 395                               | 100.0 | 168.0  | 10 000   | 1700                         | 4.8      | 1.5 ± 0.3 | 2                                   | VDRH20X150ByE                  |
| 175                                      | 225    | 275                            | 475                               | 5.0   | 11.0   | 800  | 90                           | 4.1      | 1.3 ± 0.3 | 4                                   | VDRH05E175xyE                  |
|  |        |                                | 455                               | 10.0  | 24.0   | 1750   | 230                          | 4.1      | 1.3 ± 0.3 | 4                                   | VDRH07K175xyE                  |
|  |        |                                | 455                               | 25.0  | 49.0   | 3500   | 430                          | 4.5      | 1.5 ± 0.3 | 3                                   | VDRH10S175xyE                  |
|  |        |                                | 455                               | 50.0  | 99.0   | 6000   | 750                          | 4.5      | 1.5 ± 0.3 | 2                                   | VDRH14V175xyE                  |
|  |        |                                | 455                               | 100.0 | 190.0  | 10 000   | 1500                         | 4.9      | 1.7 ± 0.3 | 2                                   | VDRH20X175ByE                  |
| 195                                      | 250    | 300                            | 525                               | 5.0   | 12.0   | 800  | 80                           | 4.3      | 1.4 ± 0.8 | 4                                   | VDRH05E195xyE                  |
|  |        |                                | 505                               | 10.0  | 26.0   | 1750   | 210                          | 4.3      | 1.4 ± 0.8 | 4                                   | VDRH07K195xyE                  |
|  |        |                                | 505                               | 25.0  | 52.0   | 3500   | 380                          | 4.8      | 1.6 ± 0.8 | 4                                   | VDRH10S195xyE                  |
|  |        |                                | 505                               | 50.0  | 105.0  | 6000   | 690                          | 4.8      | 1.6 ± 0.8 | 2                                   | VDRH14V195xyE                  |
|  |        |                                | 505                               | 100.0 | 210.0  | 10 000   | 1350                         | 5.1      | 1.9 ± 0.8 | 2                                   | VDRH20X195ByE                  |



| ELECTRICAL DATA AND ORDERING INFORMATION |        |                                |                                   |       |  |  |                              |          |           |                                     |                                |
|--|--------|--------------------------------|-----------------------------------|-------|--|--|------------------------------|----------|-----------|-------------------------------------|--------------------------------|
| MAXIMUM CONTINUOUS VOLTAGE               |        | VOLTAGE <sup>(3)</sup> at 1 mA | MAXIMUM VOLTAGE at STATED CURRENT |       | MAXIMUM ENERGY <sup>(4)</sup> (10 x 1000 µs) | MAXIMUM NON-REP. TRANSIENT CURRENT <sup>(5)</sup> I <sub>NRP</sub> (8 x 20 µs) | TYPICAL CAPACITANCE at 1 kHz | T (max.) | E         | UL 1449 ED3 SPD TYPE <sup>(7)</sup> | CATALOG NUMBERS <sup>(1)</sup> |
| RMS <sup>(2)</sup> (V)                   | DC (V) | (V)                            | V (V)                             | I (A) | (J)  | (A)  | (pF)                         | (mm)     | (mm)      |                                     | SAP <sup>(6)</sup>             |
| 210                                      | 275    | 330                            | 575                               | 5.0   | 13.0   | 800  | 75                           | 4.4      | 1.6 ± 0.8 | 4                                   | VDRH05E210xyE                  |
|  |        |                                | 550                               | 10.0  | 28.0   | 1750   | 190                          | 4.4      | 1.6 ± 0.8 | 4                                   | VDRH07K210xyE                  |
|  |        |                                | 550                               | 25.0  | 58.0   | 3500   | 350                          | 4.8      | 1.8 ± 0.8 | 4                                   | VDRH10S210xyE                  |
|  |        |                                | 550                               | 50.0  | 115.0  | 6000   | 610                          | 4.8      | 1.8 ± 0.8 | 2                                   | VDRH14V210xyE                  |
|  |        |                                | 550                               | 100.0 | 228.0  | 10 000   | 1250                         | 5.3      | 2.0 ± 0.8 | 2                                   | VDRH20X210ByE                  |
| 230                                      | 300    | 360                            | 620                               | 5.0   | 16.0   | 800  | 70                           | 4.6      | 1.7 ± 0.8 | 4                                   | VDRH05E230xyE                  |
|  |        |                                | 595                               | 10.0  | 32.0   | 1750   | 170                          | 4.6      | 1.7 ± 0.8 | 4                                   | VDRH07K230xyE                  |
|  |        |                                | 595                               | 25.0  | 65.0   | 3500   | 320                          | 5.1      | 1.9 ± 0.8 | 4                                   | VDRH10S230xyE                  |
|  |        |                                | 595                               | 50.0  | 130.0  | 6000   | 540                          | 5.1      | 1.9 ± 0.8 | 2                                   | VDRH14V230xyE                  |
|  |        |                                | 595                               | 100.0 | 255.0  | 10 000   | 1100                         | 5.4      | 2.2 ± 0.8 | 2                                   | VDRH20X230ByE                  |
| 250                                      | 320    | 390                            | 675                               | 5.0   | 17.0   | 800  | 60                           | 4.8      | 1.9 ± 0.8 | 4                                   | VDRH05E250xyE                  |
|  |        |                                | 650                               | 10.0  | 35.0   | 1750   | 160                          | 4.8      | 1.9 ± 0.8 | 4                                   | VDRH07K250xyE                  |
|  |        |                                | 650                               | 25.0  | 70.0   | 3500   | 300                          | 5.1      | 2.1 ± 0.8 | 4                                   | VDRH10S250xyE                  |
|  |        |                                | 650                               | 50.0  | 140.0  | 6000   | 480                          | 5.1      | 2.1 ± 0.8 | 2                                   | VDRH14V250xyE                  |
|  |        |                                | 650                               | 100.0 | 275.0  | 10 000   | 960                          | 5.5      | 2.3 ± 0.8 | 2                                   | VDRH20X250ByE                  |
| 275                                      | 350    | 430                            | 745                               | 5.0   | 20.0   | 800  | 55                           | 4.9      | 2.0 ± 0.8 | 4                                   | VDRH05E275xyE                  |
|  |        |                                | 710                               | 10.0  | 40.0   | 1750   | 140                          | 4.9      | 2.0 ± 0.8 | 4                                   | VDRH07K275xyE                  |
|  |        |                                | 710                               | 25.0  | 80.0   | 3500   | 270                          | 5.3      | 2.2 ± 0.8 | 4                                   | VDRH10S275xyE                  |
|  |        |                                | 710                               | 50.0  | 155.0  | 6000   | 440                          | 5.3      | 2.2 ± 0.8 | 5                                   | VDRH14V275xyE                  |
|  |        |                                | 710                               | 100.0 | 303.0  | 10 000   | 900                          | 5.8      | 2.5 ± 0.8 | 5                                   | VDRH20X275ByE                  |
| 300                                      | 385    | 470                            | 810                               | 5.0   | 21.0   | 800  | 50                           | 5.1      | 2.2 ± 0.8 | 4                                   | VDRH05E300xyE                  |
|  |        |                                | 775                               | 10.0  | 42.0   | 1750   | 130                          | 5.1      | 2.2 ± 0.8 | 4                                   | VDRH07K300xyE                  |
|  |        |                                | 775                               | 25.0  | 85.0   | 3500   | 240                          | 5.5      | 2.4 ± 0.8 | 4                                   | VDRH10S300xyE                  |
|  |        |                                | 775                               | 50.0  | 175.0  | 6000   | 400                          | 5.5      | 2.4 ± 0.8 | 5                                   | VDRH14V300xyE                  |
|  |        |                                | 775                               | 100.0 | 350.0  | 10 000   | 810                          | 5.9      | 2.7 ± 0.8 | 5                                   | VDRH20X300ByE                  |
| 320                                      | 420    | 510                            | 880                               | 5.0   | 22.0   | 800  | 45                           | 5.5      | 2.4 ± 0.8 | 4                                   | VDRH05E320xyE                  |
|  |        |                                | 842                               | 10.0  | 45.0   | 1750   | 120                          | 5.5      | 2.4 ± 0.8 | 4                                   | VDRH07K320xyE                  |
|  |        |                                | 842                               | 25.0  | 92.0   | 3500   | 220                          | 6.0      | 2.6 ± 0.8 | 4                                   | VDRH10S320xyE                  |
|  |        |                                | 842                               | 50.0  | 190.0  | 6000   | 370                          | 6.0      | 2.6 ± 0.8 | 5                                   | VDRH14V320xyE                  |
|  |        |                                | 842                               | 100.0 | 382.0  | 10 000   | 750                          | 6.3      | 2.9 ± 0.8 | 5                                   | VDRH20X320ByE                  |
| 350                                      | 460    | 560                            | 940                               | 5.0   | 25.0   | 800  | 42                           | 5.8      | 2.7 ± 0.8 | 4                                   | VDRH05E350xyE                  |
|  |        |                                | 920                               | 10.0  | 51.0   | 1750   | 110                          | 5.8      | 2.7 ± 0.8 | 4                                   | VDRH07K350xyE                  |
|  |        |                                | 920                               | 25.0  | 102.0  | 3500   | 200                          | 6.1      | 2.9 ± 0.8 | 4                                   | VDRH10S350xyE                  |
|  |        |                                | 920                               | 50.0  | 205.0  | 6000   | 320                          | 6.1      | 2.9 ± 0.8 | 2                                   | VDRH14V350xyE                  |
|  |        |                                | 920                               | 100.0 | 410.0  | 10 000   | 650                          | 6.5      | 3.2 ± 0.8 | 2                                   | VDRH20X350ByE                  |
| 385                                      | 505    | 620                            | 1050                              | 5.0   | 27.0   | 800  | 40                           | 6.0      | 3.0 ± 0.8 | 4                                   | VDRH05E385xyE                  |
|  |        |                                | 1025                              | 10.0  | 54.0   | 1750   | 95                           | 6.0      | 3.0 ± 0.8 | 4                                   | VDRH07K385xyE                  |
|  |        |                                | 1025                              | 25.0  | 107.0  | 3500   | 180                          | 6.5      | 3.2 ± 0.8 | 3                                   | VDRH10S385xyE                  |
|  |        |                                | 1025                              | 50.0  | 215.0  | 6000   | 280                          | 6.5      | 3.2 ± 0.8 | 2                                   | VDRH14V385xyE                  |
|  |        |                                | 1025                              | 100.0 | 420.0  | 10 000   | 570                          | 6.8      | 3.5 ± 0.8 | 2                                   | VDRH20X385ByE                  |
| 420                                      | 560    | 680                            | 1150                              | 5.0   | 28.0   | 800  | 35                           | 6.3      | 3.2 ± 0.8 | 4                                   | VDRH05E420xyE                  |
|  |        |                                | 1120                              | 10.0  | 56.0   | 1750   | 85                           | 6.3      | 3.2 ± 0.8 | 4                                   | VDRH07K420xyE                  |
|  |        |                                | 1120                              | 25.0  | 112.0  | 3500   | 165                          | 6.7      | 3.4 ± 0.8 | 3                                   | VDRH10S420xyE                  |
|  |        |                                | 1120                              | 50.0  | 225.0  | 6000   | 250                          | 6.7      | 3.4 ± 0.8 | 2                                   | VDRH14V420xyE                  |
|  |        |                                | 1120                              | 100.0 | 430.0  | 10 000   | 510                          | 7.1      | 3.7 ± 0.8 | 2                                   | VDRH20X420ByE                  |





**ELECTRICAL CHARACTERISTICS**

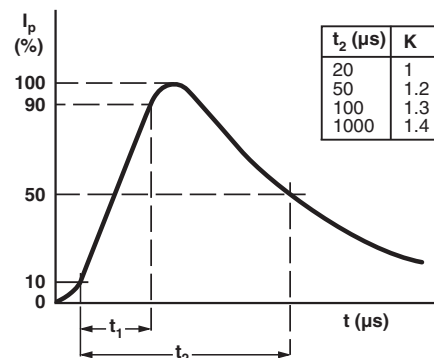
| ELECTRICAL DATA   |                |              |
|---|----------------|--------------|
| PARAMETER   | VALUE          | UNIT         |
| Maximum continuous voltage:   |                |              |
| RMS   | 11 to 680      | V            |
| DC  | 14 to 895      | V            |
| Maximum non-repetitive transient current ( $I_{NRP}$ ) (8 x 20 $\mu$ s) |                |              |
| VDRH05  | 250 or 800     | A            |
| VDRH07  | 500 or 1750    | A            |
| VDRH10  | 1000 or 3500   | A            |
| VDRH14  | 2000 or 6000   | A            |
| VDRH20  | 3000 or 10 000 | A            |
| Thermal resistance:   |                |              |
| VDRH05  | $\approx$ 80   | K/W          |
| VDRH07  | $\approx$ 70   | K/W          |
| VDRH10  | $\approx$ 60   | K/W          |
| VDRH14  | $\approx$ 50   | K/W          |
| VDRH20  | $\approx$ 40   | K/W          |
| Maximum dissipation:  |                |              |
| VDRH05  | 100            | mW           |
| VDRH07  | 250            | mW           |
| VDRH10  | 400            | mW           |
| VDRH14  | 600            | mW           |
| VDRH20  | 1000           | mW           |
| Temperature coefficient of voltage at 1 mA maximum                      | $\pm$ 0.05     | %/K          |
| Voltage proof between interconnected leads and case                     | 2500           | V            |
| Storage temperature   | -40 to +150    | $^{\circ}$ C |
| Operating temperature   | -40 to +125    | $^{\circ}$ C |

**DERATING CURVE**

Maximum Voltage  
Maximum Dissipation  
Maximum Energy  
Maximum Transient Current



**PEAK CURRENT AS A FUNCTION OF PULSE WIDTH**



**COMPONENT DIMENSIONS (BULK TYPE) in millimeters AND CATALOG NUMBERS**

| D MAX.         |           | A MAX.         |           | A <sub>0</sub> MAX. |           | L MIN. | T <sup>(1)</sup> MAX. | E <sup>(1)</sup> | d              | F             | CATALOG NUMBER |
|----------------|-----------|----------------|-----------|---------------------|-----------|--------|-----------------------|------------------|----------------|---------------|----------------|
| V $\leq$ 320 V | V > 320 V | V $\leq$ 300 V | V > 300 V | V $\leq$ 320 V      | V > 320 V |        |                       |                  |                |               |                |
| 7.0            |           | 9.0            |           | 11.0                |           | 24.0   | 6.5                   | 0.7 to 3.6       | 0.6 $\pm$ 0.05 | 5 $\pm$ 1.0   | VDRH05         |
|                | 9.0       | 11.0           |           | 13.0                |           | 24.0   | 6.5                   | 0.7 to 3.6       | 0.6 $\pm$ 0.05 | 5 $\pm$ 1.0   | VDRH07         |
| 12.0           | 12.5      | 14.5           | 15.0      | 16.5                | 17.0      | 17.0   | 8.0                   | 0.9 to 4.5       | 0.8 $\pm$ 0.05 | 7.5 $\pm$ 1.0 | VDRH10         |
| 16.0           | 16.5      | 19.0           |           | 21.0                | 21.5      | 16.0   | 8.0                   | 0.9 to 4.5       | 0.8 $\pm$ 0.05 | 7.5 $\pm$ 1.0 | VDRH14         |
| 22.5           | 23.0      | 25.5           |           | 27.5                | 28.0      | 24.0   | 10.0                  | 1.1 to 5.8       | 1.0 $\pm$ 0.05 | 10 $\pm$ 1.0  | VDRH20         |

**Note**

<sup>(1)</sup>  $T_{max}$  and E values per size and voltage level can be found back in the Electrical Data table

| <b>VARISTORS IN BULK</b>  |  |  |   |   |   |
|---|--|--|---|---|---|
| <b>TYPE</b>   | <b>VDRH05....<br/>Ø 5 mm<br/>11 V to 460 V</b> | <b>VDRH07....<br/>Ø 7 mm<br/>11 V to 510 V</b> | <b>VDRH10....<br/>Ø 10 mm<br/>11 V to 680 V</b> | <b>VDRH14....<br/>Ø 14 mm<br/>11 V to 680 V</b> | <b>VDRH20....<br/>Ø 20 mm<br/>11 V to 680 V</b> |
| Straight leads; see outline of components with straight leads drawing | BSE  | BSE  | BSE   | BSE   | BSE   |
| Kinked leads; see outline of components with kinked leads drawing     | BKE  | BKE  | BKE   | BKE   | BKE   |
| <b>Packaging quantities</b>   |  |  |   |   |   |
| 11 V to 95 V  | 250  | 250  | 250   | 100   | 50  |
| 130 V to 385 V  | 250  | 250  | 250   | 100   | 50  |
| 420 V to 460 V  | 250  | 250  | 200   | 100   | 50  |
| 485 V to max. V   | -  | 250  | 150   | 100   | 50  |

**DIMENSIONS** in millimeters: See Component Dimensions and Electrical Data table

**OUTLINE** of Component with Straight Leads

**OUTLINE** of Component with Kinked Leads



| <b>VARISTORS ON TAPE IN AMMOPACK</b>  |  |  |   |   |
|---|--|--|---|---|
| <b>TYPE</b>   | <b>VDRH05....<br/>Ø 5 mm<br/>11 V to 460 V</b> | <b>VDRH07....<br/>Ø 7 mm<br/>11 V to 510 V</b> | <b>VDRH10....<br/>Ø 10 mm<br/>11 V to 680 V</b> | <b>VDRH14....<br/>Ø 14 mm<br/>11 V to 680 V</b> |
| Straight leads<br>H = 18 mm<br>H = 20 mm<br>See drawing: taped version with straight leads                          | -  | -  | ASE   | ASE   |
| Kinked leads<br>H <sub>0</sub> = 18.25 mm<br>H <sub>0</sub> = 16 mm<br>See drawing: taped version with kinked leads | AME  | AME  | AME   | AME   |
|   | ALE  | ALE  | ALE   | ALE   |
| <b>Packaging quantities</b>   |  |  |   |   |
| 14 V to 210 V   | 1500 <sup>(1)</sup>                            | 1500 <sup>(1)</sup>                            | 500   | 500   |
| 230 V to 510 V  | 1000   | 1000   | 500   | 500   |
| 550 V to max. V   | -  | -  | 400   | 400   |

**Note**

<sup>(1)</sup> Except for 35 V and 40 V = 1000 pieces

**DIMENSIONS OF AMMOPACK** in millimeters




| <b>VARISTORS ON TAPE AND REEL</b>   |  |  |   |   |
|---|--|--|---|---|
| <b>TYPE</b>   | <b>VDRH05....<br/>Ø 5 mm<br/>11 V to 460 V</b> | <b>VDRH07....<br/>Ø 7 mm<br/>11 V to 510 V</b> | <b>VDRH10....<br/>Ø 10 mm<br/>11 V to 680 V</b> | <b>VDRH14....<br/>Ø 14 mm<br/>11 V to 680 V</b> |
| H = 18 mm<br>H = 20 mm<br>See drawing: taped version with straight leads  | Straight leads<br>-                            | -  | TSE   | TSE   |
| Kinked leads<br>H <sub>0</sub> = 18.25 mm<br>H <sub>0</sub> = 16 mm<br>See drawing: taped version with kinked leads | TME<br>TLE                                     | TME<br>TLE                                     | TME<br>TLE                                      | TME<br>TLE                                      |
| <b>Packaging quantities</b>   |  |  |   |   |
| 14 V to 250 V   | 1500   | 1500   | 1000  | 750   |
| 275 V to 300 V  | 1500   | 1500   | 750   | 750   |
| 320 V to 350 V  | 1000   | 1000   | 500   | 500   |
| 385 V to max. V   | 1000   | 1000   | 500   | 500   |

**PACKAGING**
**TAPED VERSION WITH STRAIGHT LEADS** (only for VDRH05 and VDRH07)

**TAPED VERSION WITH STRAIGHT LEADS** (only for VDRH10 and VDRH14)


**TAPED VERSION WITH KINKED LEADS**

(only for VDRH05 and VDRH07)


**TAPED VERSION WITH KINKED LEADS**

(only for VDRH10 and VDRH14)



| TAPING DATA (based on IEC 60286-2) |  |                        |                           |        |                  |        |
|------------------------------------|--|------------------------|---------------------------|--------|------------------|--------|
| SYMBOL                             | PARAMETER  |                        | DIMENSIONS/TOLERANCE      |        |                  |        |
|                                    |  |                        | VDRH05                    | VDRH07 | VDRH10           | VDRH14 |
| A max.                             | Max. mounting height                             | $V \leq 300 \text{ V}$ | 9.0                       | 11.0   | 14.5             | 19.0   |
|                                    |  | $V > 300 \text{ V}$    |                           |        | 15.0             |        |
| $A_0$ max.                         | Max. mounting height                             | $V \leq 320 \text{ V}$ | 11.0                      | 13.0   | 16.5             | 21.0   |
|                                    |  | $V > 320 \text{ V}$    |                           |        | 17.0             | 21.5   |
| D max.                             | Max. body diameter                               | $V \leq 320 \text{ V}$ | 7.0                       | 9.0    | 12.0             | 16.0   |
|                                    |  | $V > 320 \text{ V}$    |                           |        | 12.5             | 16.5   |
| d                                  | Lead wire diameter                               |                        | 0.6 ± 0.05                |        | 0.8 ± 0.05       |        |
| F                                  | Lead to lead distance <sup>(1)</sup>             |                        | 5.0 + 0.8/- 0.2           |        | 7.5 ± 0.8        |        |
| H                                  | Distance component to tape center <sup>(2)</sup> |                        | 20.0 + 2.0/- 0.0          |        | 18.0 + 2.0/- 0.0 |        |
| $H_0$                              | Lead wire clinch height                          |                        | 16.0 or 18.25 ± 0.5       |        |                  |        |
| P                                  | Pitch of components on tape                      |                        | 12.7 ± 1.0                |        | 25.4 ± 1.0       |        |
| T                                  | Total thickness                                  |                        | See Electrical Data table |        |                  |        |

**Notes**

- (1) Guaranteed between component and tape  
 (2) For VDRH14V510xSE and VDRH14V550xSE: H = 20 mm ± 1 mm



V/I CHARACTERISTICS

11 V<sub>RMS</sub> to 40 V<sub>RMS</sub>; VDRH05

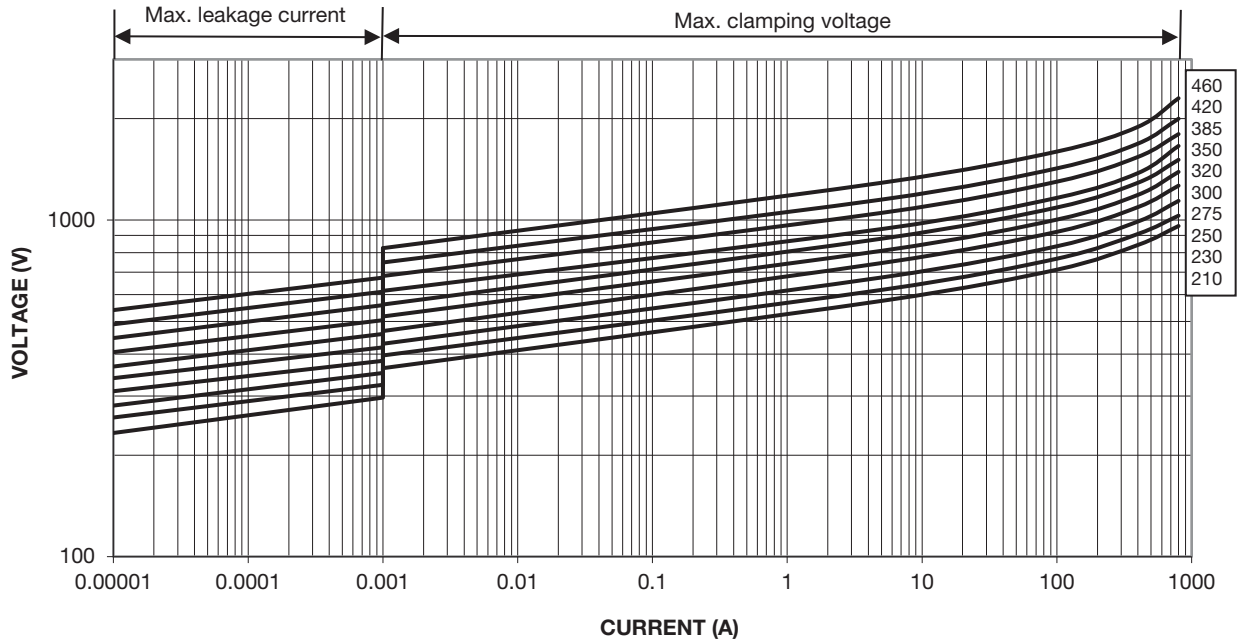


50 V<sub>RMS</sub> to 195 V<sub>RMS</sub>; VDRH05

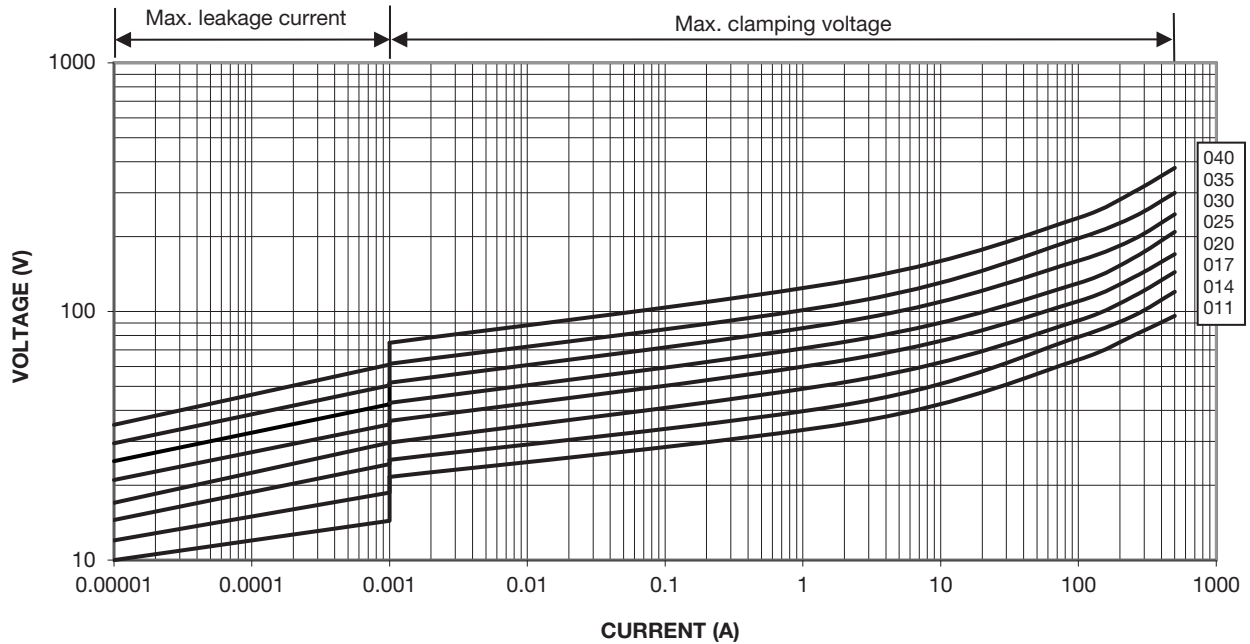




## 210 V<sub>RMS</sub> to 460 V<sub>RMS</sub>; VDRH05



## 11 V<sub>RMS</sub> to 40 V<sub>RMS</sub>; VDRH07





### 50 V<sub>RMS</sub> to 210 V<sub>RMS</sub>; VDRH07

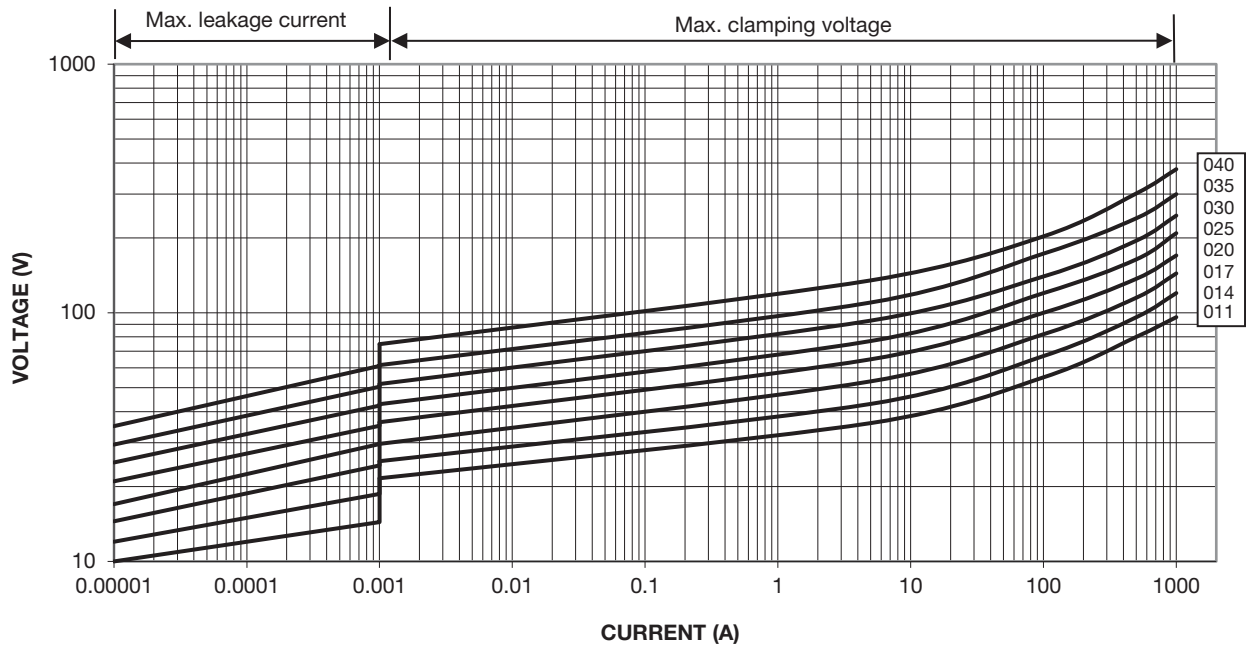


### 230 V<sub>RMS</sub> to 510 V<sub>RMS</sub>; VDRH07

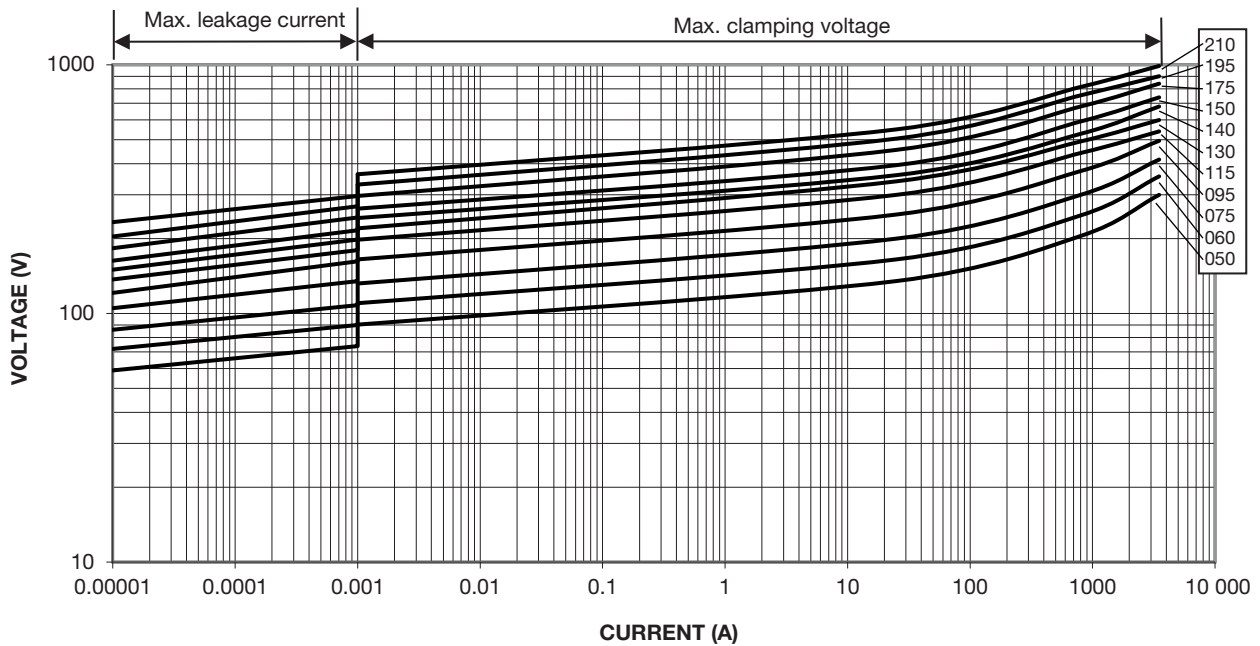




## 11 V<sub>RMS</sub> to 40 V<sub>RMS</sub>; VDRH10



## 50 V<sub>RMS</sub> to 210 V<sub>RMS</sub>; VDRH10





### 230 V<sub>RMS</sub> to 680 V<sub>RMS</sub>; VDRH10

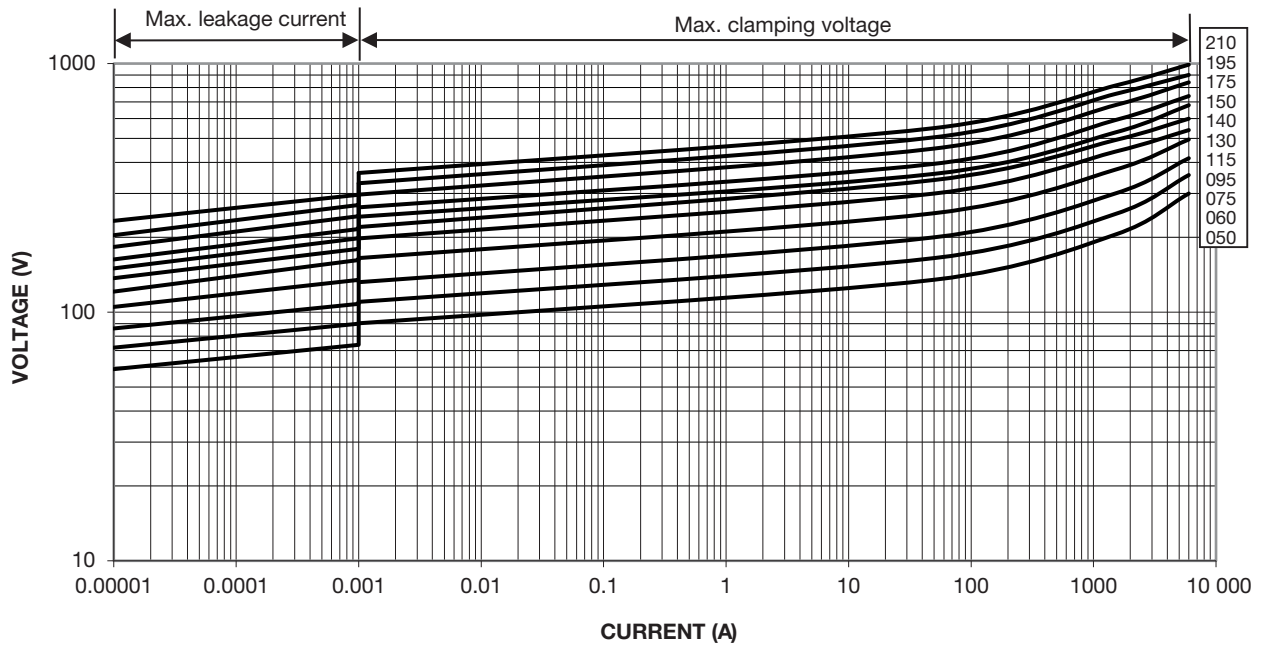


### 11 V<sub>RMS</sub> to 40 V<sub>RMS</sub>; VDRH14

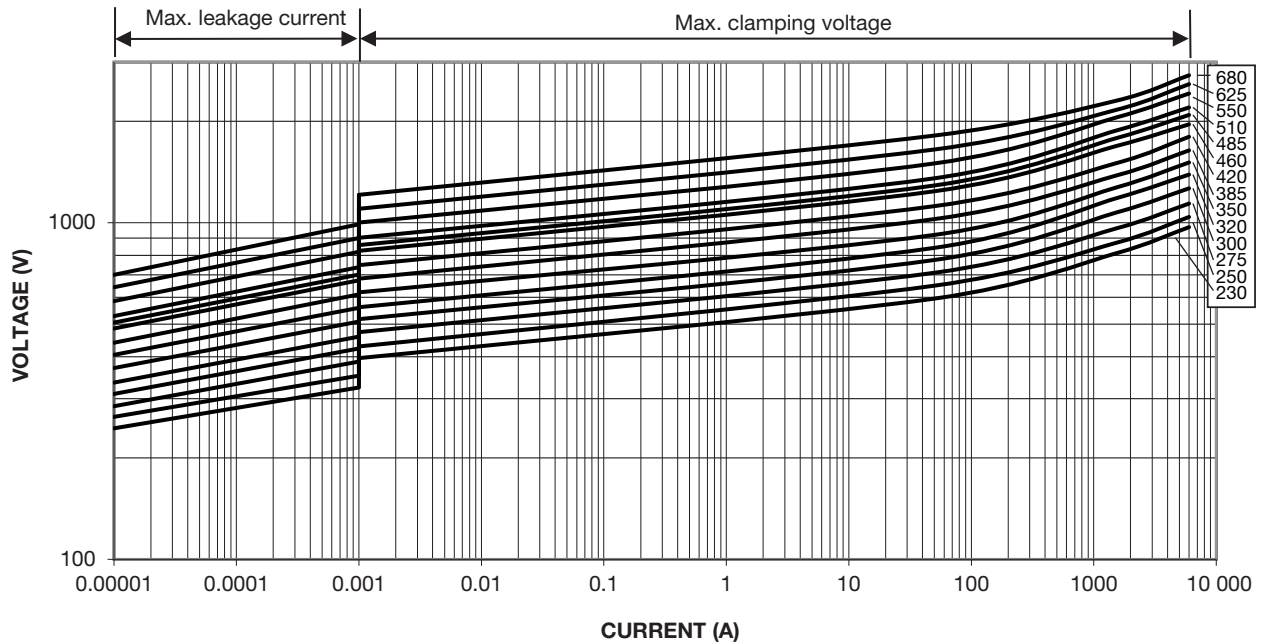




### 50 V<sub>RMS</sub> to 210 V<sub>RMS</sub>; VDRH14



### 230 V<sub>RMS</sub> to 680 V<sub>RMS</sub>; VDRH14







## 14 V<sub>RMS</sub> to 40 V<sub>RMS</sub>; VDRH20

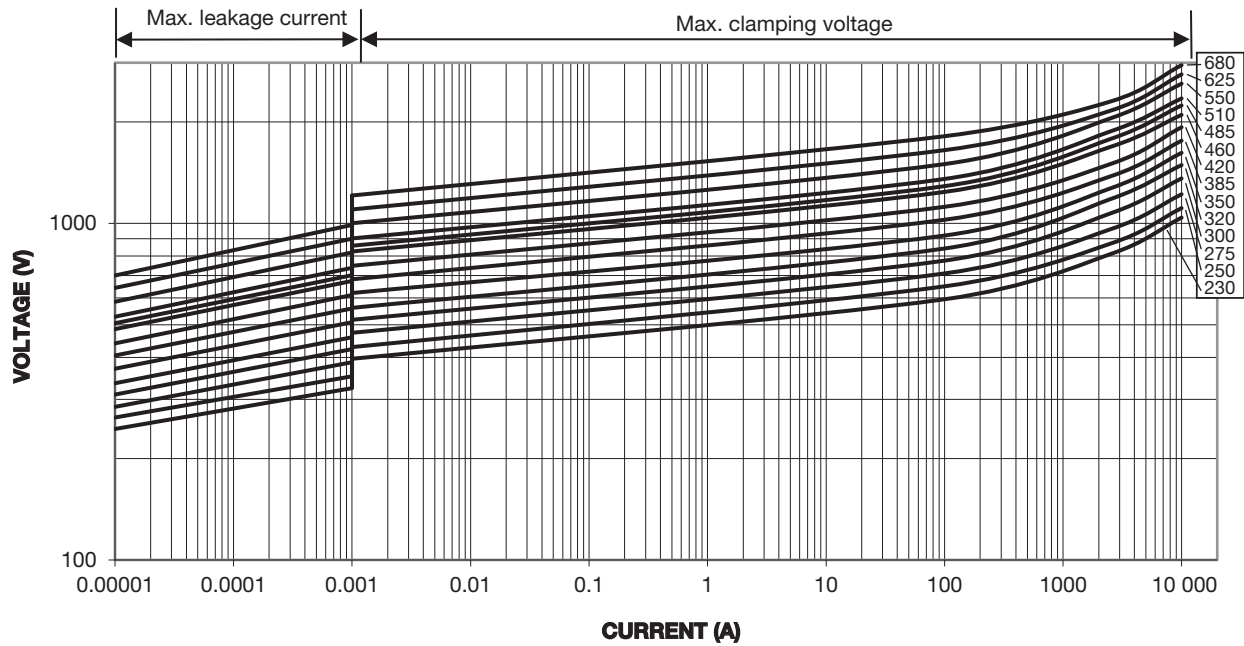


## 60 V<sub>RMS</sub> to 210 V<sub>RMS</sub>; VDRH20





230 V<sub>RMS</sub> to 680 V<sub>RMS</sub>; VDRH20



### MAXIMUM APPLICABLE TRANSIENT CURRENT AS A FUNCTION OF PULSE DURATION

11 V<sub>RMS</sub> to 40 V<sub>RMS</sub>; VDRH05





### 50 V<sub>RMS</sub> to 460 V<sub>RMS</sub>; VDRH05

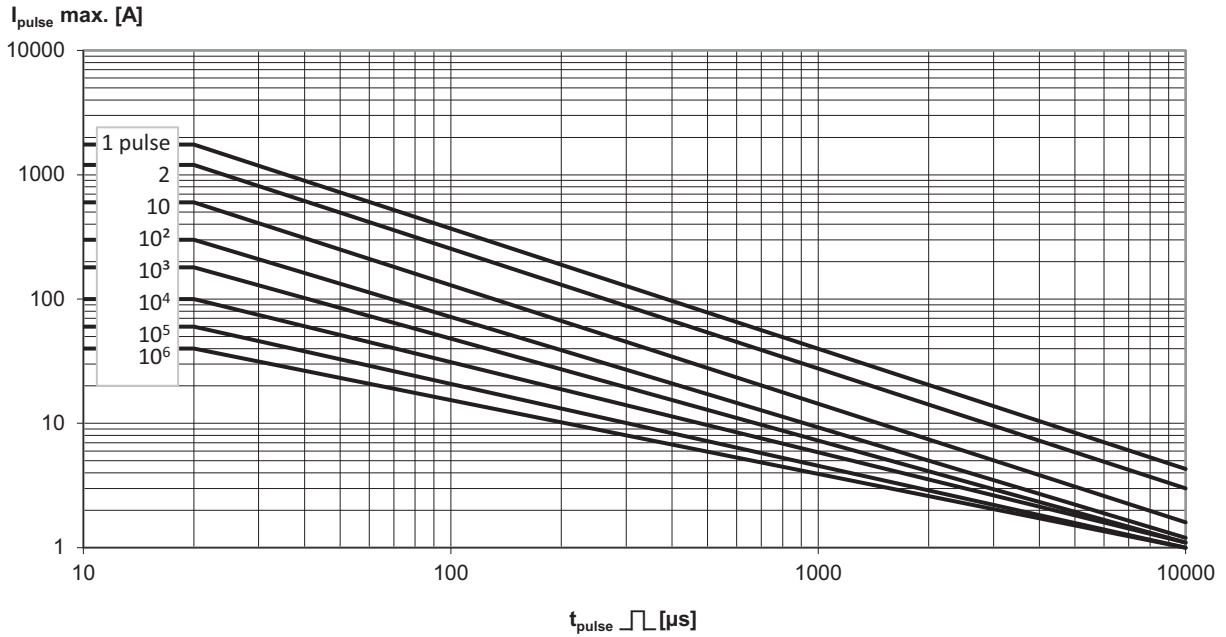


### 11 V<sub>RMS</sub> to 40 V<sub>RMS</sub>; VDRH07

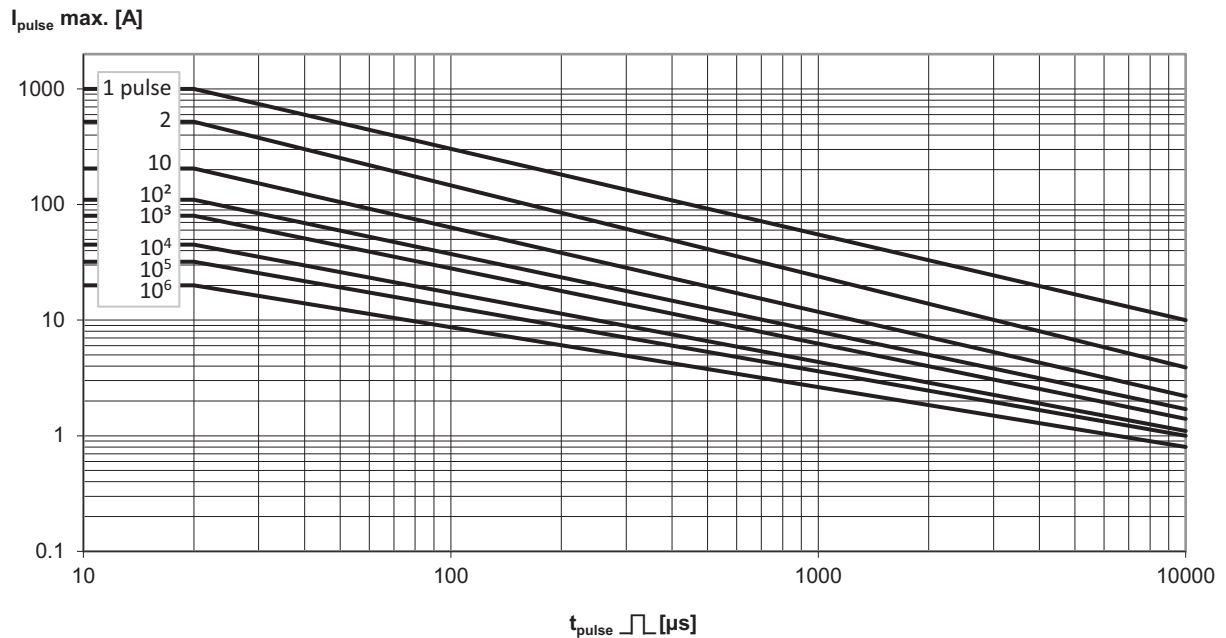




### 50 V<sub>RMS</sub> to 510 V<sub>RMS</sub>; VDRH07

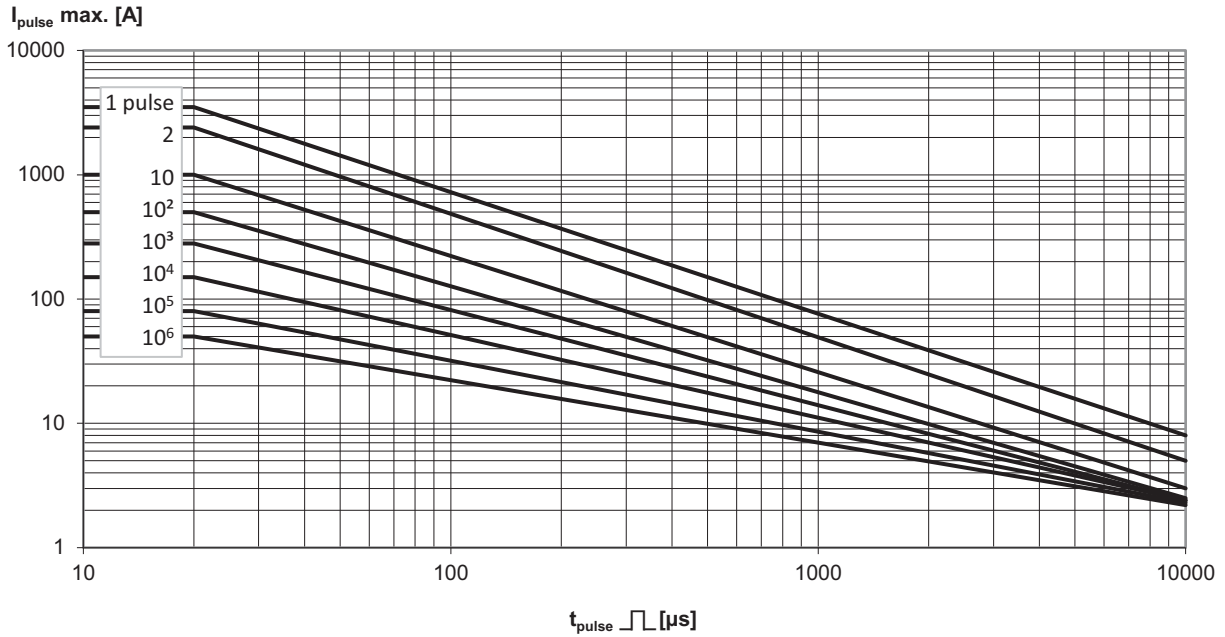


### 11 V<sub>RMS</sub> to 40 V<sub>RMS</sub>; VDRH10

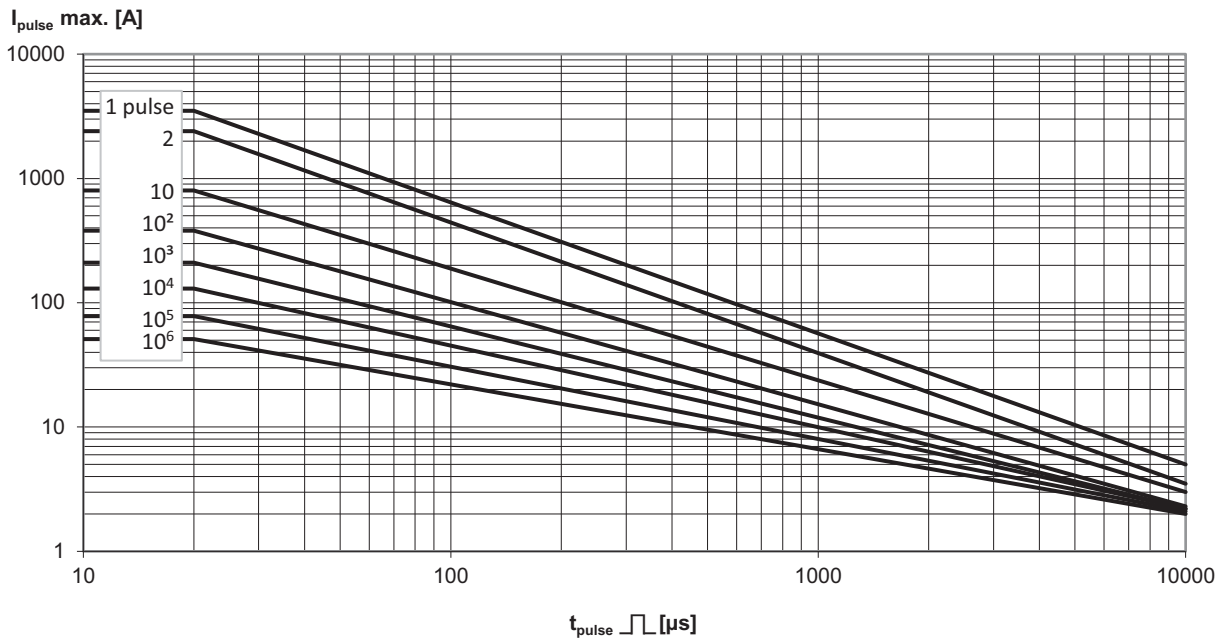




### 50 V<sub>RMS</sub> to 300 V<sub>RMS</sub>; VDRH10



### 320 V<sub>RMS</sub> to 680 V<sub>RMS</sub>; VDRH10





### 11 V<sub>RMS</sub> to 40 V<sub>RMS</sub>; VDRH14



### 50 V<sub>RMS</sub> to 300 V<sub>RMS</sub>; VDRH14





### 320 V<sub>RMS</sub> to 680 V<sub>RMS</sub>; VDRH14



### 14 V<sub>RMS</sub> to 40 V<sub>RMS</sub>; VDRH20





### 60 V<sub>RMS</sub> to 300 V<sub>RMS</sub>; VDRH20



### 320 V<sub>RMS</sub> to 680 V<sub>RMS</sub>; VDRH20







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