

# ANTREX Electronics

## Electronic Components Sourcing Information

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### Product Reference Information

|                      |                                         |
|----------------------|-----------------------------------------|
| <b>Part Number:</b>  | VDRUS14X275BSE                          |
| <b>Manufacturer:</b> | Vishay Beyschlag/Draloric/BC Components |
| <b>Package:</b>      | Disc 14mm                               |
| <b>Availability:</b> | Please confirm with sales               |

#### Product Page:

<https://antrexco.com/product/details/vishay-beyschlag-draloric-bc-components/vdrus14x275bse.html>

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#### Note:

This PDF includes an ANTREX product reference cover page.

The original manufacturer datasheet follows from the next page.

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## VDR Metal Oxide Varistors Ultra Surge High Operating Temperature 125 °C



### LINKS TO ADDITIONAL RESOURCES



| QUICK REFERENCE DATA                                                |                                                         |      |
|---------------------------------------------------------------------|---------------------------------------------------------|------|
| PARAMETER                                                           | VALUE                                                   | UNIT |
| Maximum continuous voltage in operating temperature range:          |                                                         |      |
| RMS                                                                 | 115 to 680                                              | V    |
| DC                                                                  | 150 to 895                                              | V    |
| Maximum non-repetitive transient current $I_{NRP}$ (8 x 20 $\mu$ s) | 1800 to 13 000                                          | A    |
| Maximum energy (10/1000 $\mu$ s)                                    | 19 to 720                                               | 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 available upon request

### AGENCY APPROVALS

- cUL certificate
- ULus certificate
- VDE certificate

#### Note

- Agency approval documents, please see:  
[www.vishay.com/ppg?29185&documents](http://www.vishay.com/ppg?29185&documents)

### FEATURES

- Low  $\beta$  high purity zinc oxide disc
- Halogen free high temperature resistant silicone coated
- Straight or kinked leads
- Ultra high current surge/size ratio capability up to 13 kA for US20 types
- Certified for operation up to 125 °C according to UL 1449 edition 4, VDE/IEC 61051-1/2
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



### APPLICATION

- Overvoltage and transient voltage protection

### DESCRIPTION

The varistors consist of a disc of low- $\beta$  ceramic material with two solid copper leads (US20 types only) or copper clad steel wire. The wires have a matte tin plating. They are coated with UL 94 V-0 approved silicone lacquer, which provides electrical, mechanical and climatic protection.

### MOUNTING

The varistors are suitable for hand-mounting (bulk) or automatic pick and place mounting (T and R). The parts can be connected by wave soldering and pin-in-paste reflow soldering under defined process conditions. Bending of the leads for different angle placement is not recommended.

#### 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 - U suffix
- Series numbers
  - 572 for VDRUS07
  - 573 for VDRUS10
  - 575 for VDRUS14
  - 576 for VDRUS20
- Manufacture logo
- Date of manufacture (YYWW)
- Safety marks on VDRUS10-14-20 types

### INFLAMMABILITY

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



## ELECTRICAL DATA AND ORDERING INFORMATION

| MAXIMUM CONTINUOUS VOLTAGE |           | VOLTAGE AT 1 mA <sup>(3)</sup> | MAXIMUM VOLTAGE AT STATED CURRENT |          | MAXIMUM ENERGY <sup>(4)</sup><br>(10 x 1000 µs) | MAXIMUM NON-REP. TRANSIENT CURRENT <sup>(5)</sup><br>I <sub>NRP</sub><br>(8 x 20 µs) | NOMINAL DISCHARGE CURRENT <sup>(7)</sup> | TYPICAL CAPACITANCE AT 1 kHz | T (MAX.) | E         | CATALOG NUMBERS <sup>(1)</sup> |
|----------------------------|-----------|--------------------------------|-----------------------------------|----------|-------------------------------------------------|--------------------------------------------------------------------------------------|------------------------------------------|------------------------------|----------|-----------|--------------------------------|
| RMS <sup>(2)</sup><br>(V)  | DC<br>(V) | (V)                            | V<br>(V)                          | I<br>(A) | (J)                                             | (A)                                                                                  | (kA)                                     | (pF)                         | (mm)     | (mm)      | SAP <sup>(6)</sup>             |
| 115                        | 150       | 180                            | 300                               | 10.0     | 19                                              | 1800                                                                                 | 1                                        | 390                          | 3.6      | 0.9 ± 0.3 | VDRUS07M115xyE                 |
|                            |           |                                | 300                               | 25.0     | 47                                              | 4500                                                                                 | 2                                        | 680                          | 4.0      | 1.1 ± 0.3 | VDRUS10T115xyE                 |
|                            |           |                                | 300                               | 50.0     | 65                                              | 8000                                                                                 | 3                                        | 1320                         | 4.0      | 1.1 ± 0.3 | VDRUS14X115xyE                 |
|                            |           |                                | 300                               | 100.0    | 152                                             | 13 000                                                                               | 5                                        | 2640                         | 4.4      | 1.3 ± 0.3 | VDRUS20Z115ByE                 |
| 130                        | 170       | 205                            | 340                               | 10.0     | 21                                              | 1800                                                                                 | 1                                        | 320                          | 3.8      | 1.0 ± 0.3 | VDRUS07M130xyE                 |
|                            |           |                                | 340                               | 25.0     | 52                                              | 4500                                                                                 | 2                                        | 580                          | 4.3      | 1.2 ± 0.3 | VDRUS10T130xyE                 |
|                            |           |                                | 340                               | 50.0     | 82                                              | 8000                                                                                 | 3                                        | 1050                         | 4.3      | 1.2 ± 0.3 | VDRUS14X130xyE                 |
|                            |           |                                | 340                               | 100.0    | 175                                             | 13 000                                                                               | 5                                        | 2100                         | 4.8      | 1.4 ± 0.3 | VDRUS20Z130ByE                 |
| 140                        | 180       | 220                            | 360                               | 10.0     | 23                                              | 1800                                                                                 | 1                                        | 290                          | 3.9      | 1.0 ± 0.3 | VDRUS07M140xyE                 |
|                            |           |                                | 360                               | 25.0     | 58                                              | 4500                                                                                 | 2                                        | 540                          | 4.3      | 1.2 ± 0.3 | VDRUS10T140xyE                 |
|                            |           |                                | 360                               | 50.0     | 90                                              | 8000                                                                                 | 3                                        | 950                          | 4.3      | 1.2 ± 0.3 | VDRUS14X140xyE                 |
|                            |           |                                | 360                               | 100.0    | 185                                             | 13 000                                                                               | 5                                        | 1900                         | 4.8      | 1.5 ± 0.3 | VDRUS20Z140ByE                 |
| 150                        | 200       | 240                            | 395                               | 10.0     | 25                                              | 1800                                                                                 | 1                                        | 270                          | 4.1      | 1.1 ± 0.3 | VDRUS07M150xyE                 |
|                            |           |                                | 395                               | 25.0     | 64                                              | 4500                                                                                 | 2                                        | 490                          | 4.3      | 1.3 ± 0.3 | VDRUS10T150xyE                 |
|                            |           |                                | 395                               | 50.0     | 98                                              | 8000                                                                                 | 3                                        | 850                          | 4.3      | 1.3 ± 0.3 | VDRUS14X150xyE                 |
|                            |           |                                | 395                               | 100.0    | 198                                             | 13 000                                                                               | 5                                        | 1700                         | 4.8      | 1.5 ± 0.3 | VDRUS20Z150ByE                 |
| 175                        | 225       | 275                            | 455                               | 10.0     | 28                                              | 1800                                                                                 | 1                                        | 230                          | 4.1      | 1.3 ± 0.3 | VDRUS07M175xyE                 |
|                            |           |                                | 455                               | 25.0     | 67                                              | 4500                                                                                 | 2                                        | 430                          | 4.9      | 1.5 ± 0.3 | VDRUS10T175xyE                 |
|                            |           |                                | 455                               | 50.0     | 116                                             | 8000                                                                                 | 3                                        | 750                          | 4.9      | 1.5 ± 0.3 | VDRUS14X175xyE                 |
|                            |           |                                | 455                               | 100.0    | 220                                             | 13 000                                                                               | 5                                        | 1500                         | 4.9      | 1.7 ± 0.3 | VDRUS20Z175ByE                 |
| 195                        | 250       | 300                            | 505                               | 10.0     | 32                                              | 1800                                                                                 | 1                                        | 210                          | 4.3      | 1.4 ± 0.8 | VDRUS07M195xyE                 |
|                            |           |                                | 505                               | 25.0     | 70                                              | 4500                                                                                 | 2                                        | 380                          | 5.1      | 1.6 ± 0.8 | VDRUS10T195xyE                 |
|                            |           |                                | 505                               | 50.0     | 128                                             | 8000                                                                                 | 3                                        | 690                          | 5.1      | 1.6 ± 0.8 | VDRUS14X195xyE                 |
|                            |           |                                | 505                               | 100.0    | 245                                             | 13 000                                                                               | 5                                        | 1350                         | 5.1      | 1.9 ± 0.8 | VDRUS20Z195ByE                 |
| 210                        | 275       | 330                            | 550                               | 10.0     | 34                                              | 1800                                                                                 | 1                                        | 190                          | 4.4      | 1.6 ± 0.8 | VDRUS07M210xyE                 |
|                            |           |                                | 550                               | 25.0     | 72                                              | 4500                                                                                 | 2                                        | 350                          | 5.3      | 1.8 ± 0.8 | VDRUS10T210xyE                 |
|                            |           |                                | 550                               | 50.0     | 140                                             | 8000                                                                                 | 3                                        | 610                          | 5.3      | 1.8 ± 0.8 | VDRUS14X210xyE                 |
|                            |           |                                | 550                               | 100.0    | 268                                             | 13 000                                                                               | 5                                        | 1250                         | 5.3      | 2.0 ± 0.8 | VDRUS20Z210ByE                 |
| 230                        | 300       | 360                            | 595                               | 10.0     | 37                                              | 1800                                                                                 | 1                                        | 170                          | 4.6      | 1.7 ± 0.8 | VDRUS07M230xyE                 |
|                            |           |                                | 595                               | 25.0     | 76                                              | 4500                                                                                 | 2                                        | 320                          | 5.4      | 1.9 ± 0.8 | VDRUS10T230xyE                 |
|                            |           |                                | 595                               | 50.0     | 158                                             | 8000                                                                                 | 3                                        | 540                          | 5.4      | 1.9 ± 0.8 | VDRUS14X230xyE                 |
|                            |           |                                | 595                               | 100.0    | 315                                             | 13 000                                                                               | 5                                        | 1100                         | 5.4      | 2.2 ± 0.8 | VDRUS20Z230ByE                 |
| 250                        | 320       | 390                            | 650                               | 10.0     | 40                                              | 1800                                                                                 | 1                                        | 160                          | 4.8      | 1.9 ± 0.8 | VDRUS07M250xyE                 |
|                            |           |                                | 650                               | 25.0     | 82                                              | 4500                                                                                 | 2                                        | 300                          | 5.5      | 2.1 ± 0.8 | VDRUS10T250xyE                 |
|                            |           |                                | 650                               | 50.0     | 170                                             | 8000                                                                                 | 3                                        | 480                          | 5.5      | 2.1 ± 0.8 | VDRUS14X250xyE                 |
|                            |           |                                | 650                               | 100.0    | 350                                             | 13 000                                                                               | 5                                        | 960                          | 5.5      | 2.3 ± 0.8 | VDRUS20Z250ByE                 |
| 275                        | 350       | 430                            | 710                               | 10.0     | 46                                              | 1800                                                                                 | 1                                        | 140                          | 4.9      | 2.0 ± 0.8 | VDRUS07M275xyE                 |
|                            |           |                                | 710                               | 25.0     | 93                                              | 4500                                                                                 | 2                                        | 270                          | 6.3      | 2.2 ± 0.8 | VDRUS10T275xyE                 |
|                            |           |                                | 710                               | 50.0     | 185                                             | 8000                                                                                 | 3                                        | 440                          | 5.3      | 2.2 ± 0.8 | VDRUS14X275xyE                 |
|                            |           |                                | 710                               | 100.0    | 380                                             | 13 000                                                                               | 5                                        | 900                          | 5.8      | 2.5 ± 0.8 | VDRUS20Z275ByE                 |
| 300                        | 385       | 470                            | 775                               | 10.0     | 49                                              | 1800                                                                                 | 1                                        | 130                          | 5.1      | 2.2 ± 0.8 | VDRUS07M300xyE                 |
|                            |           |                                | 775                               | 25.0     | 99                                              | 4500                                                                                 | 2                                        | 240                          | 6.5      | 2.4 ± 0.8 | VDRUS10T300xyE                 |
|                            |           |                                | 775                               | 50.0     | 205                                             | 8000                                                                                 | 3                                        | 400                          | 5.5      | 2.4 ± 0.8 | VDRUS14X300xyE                 |
|                            |           |                                | 775                               | 100.0    | 405                                             | 13 000                                                                               | 5                                        | 810                          | 5.9      | 2.7 ± 0.8 | VDRUS20Z300ByE                 |
| 320                        | 420       | 510                            | 842                               | 10.0     | 54                                              | 1800                                                                                 | 1                                        | 120                          | 5.5      | 2.4 ± 0.8 | VDRUS07M320xyE                 |
|                            |           |                                | 842                               | 25.0     | 107                                             | 4500                                                                                 | 2                                        | 220                          | 7.0      | 2.6 ± 0.8 | VDRUS10T320xyE                 |
|                            |           |                                | 842                               | 50.0     | 220                                             | 8000                                                                                 | 3                                        | 370                          | 6.0      | 2.6 ± 0.8 | VDRUS14X320xyE                 |
|                            |           |                                | 842                               | 100.0    | 445                                             | 13 000                                                                               | 5                                        | 750                          | 6.3      | 2.9 ± 0.8 | VDRUS20Z320ByE                 |

## ELECTRICAL DATA AND ORDERING INFORMATION

| MAXIMUM CONTINUOUS VOLTAGE |           | VOLTAGE AT 1 mA <sup>(3)</sup> | MAXIMUM VOLTAGE AT STATED CURRENT |          | MAXIMUM ENERGY <sup>(4)</sup><br>(10 x 1000 µs) | MAXIMUM NON-REP. TRANSIENT CURRENT <sup>(5)</sup><br>I <sub>NRP</sub><br>(8 x 20 µs) | NOMINAL DISCHARGE CURRENT <sup>(7)</sup> | TYPICAL CAPACITANCE AT 1 kHz | T (MAX.) | E         | CATALOG NUMBERS <sup>(1)</sup> |
|----------------------------|-----------|--------------------------------|-----------------------------------|----------|-------------------------------------------------|--------------------------------------------------------------------------------------|------------------------------------------|------------------------------|----------|-----------|--------------------------------|
| RMS <sup>(2)</sup><br>(V)  | DC<br>(V) | (V)                            | V<br>(V)                          | I<br>(A) | (J)                                             | (A)                                                                                  | (kA)                                     | (pF)                         | (mm)     | (mm)      | SAP <sup>(6)</sup>             |
| 350                        | 460       | 560                            | 920                               | 10.0     | 55                                              | 1800                                                                                 | 1                                        | 110                          | 5.8      | 2.7 ± 0.8 | VDRUS07M350xyE                 |
|                            |           |                                | 920                               | 25.0     | 113                                             | 4500                                                                                 | 2                                        | 200                          | 7.1      | 2.9 ± 0.8 | VDRUS10T350xyE                 |
|                            |           |                                | 920                               | 50.0     | 240                                             | 8000                                                                                 | 3                                        | 320                          | 6.1      | 2.9 ± 0.8 | VDRUS14X350xyE                 |
|                            |           |                                | 920                               | 100.0    | 475                                             | 13 000                                                                               | 5                                        | 650                          | 6.5      | 3.2 ± 0.8 | VDRUS20Z350ByE                 |
| 385                        | 505       | 620                            | 1025                              | 10.0     | 59                                              | 1800                                                                                 | 1                                        | 95                           | 6.0      | 3.0 ± 0.8 | VDRUS07M385xyE                 |
|                            |           |                                | 1025                              | 25.0     | 125                                             | 4500                                                                                 | 2                                        | 180                          | 7.5      | 3.2 ± 0.8 | VDRUS10T385xyE                 |
|                            |           |                                | 1025                              | 50.0     | 250                                             | 8000                                                                                 | 3                                        | 280                          | 6.5      | 3.2 ± 0.8 | VDRUS14X385xyE                 |
|                            |           |                                | 1025                              | 100.0    | 490                                             | 13 000                                                                               | 5                                        | 570                          | 6.8      | 3.5 ± 0.8 | VDRUS20Z385ByE                 |
| 420                        | 560       | 680                            | 1120                              | 10.0     | 62                                              | 1800                                                                                 | 1                                        | 85                           | 6.3      | 3.2 ± 0.8 | VDRUS07M420xyE                 |
|                            |           |                                | 1120                              | 25.0     | 128                                             | 4500                                                                                 | 2                                        | 165                          | 7.7      | 3.4 ± 0.8 | VDRUS10T420xyE                 |
|                            |           |                                | 1120                              | 50.0     | 260                                             | 8000                                                                                 | 3                                        | 250                          | 6.7      | 3.4 ± 0.8 | VDRUS14X420xyE                 |
|                            |           |                                | 1120                              | 100.0    | 500                                             | 13 000                                                                               | 5                                        | 510                          | 7.1      | 3.7 ± 0.8 | VDRUS20Z420ByE                 |
| 460                        | 615       | 750                            | 1290                              | 5.0      | 66                                              | 1800                                                                                 | 1                                        | 30                           | 6.6      | 3.6 ± 0.8 | VDRUS07M460xyE                 |
|                            |           |                                | 1240                              | 25.0     | 134                                             | 4500                                                                                 | 2                                        | 150                          | 8.0      | 3.8 ± 0.8 | VDRUS10T460xyE                 |
|                            |           |                                | 1240                              | 50.0     | 270                                             | 8000                                                                                 | 3                                        | 225                          | 7.0      | 3.8 ± 0.8 | VDRUS14X460xyE                 |
|                            |           |                                | 1240                              | 100.0    | 525                                             | 13 000                                                                               | 5                                        | 450                          | 7.5      | 4.1 ± 0.8 | VDRUS20Z460ByE                 |
| 485                        | 640       | 780                            | 1290                              | 10.0     | 68                                              | 1800                                                                                 | 1                                        | 65                           | 6.8      | 3.7 ± 0.8 | VDRUS07M485xyE                 |
|                            |           |                                | 1290                              | 25.0     | 139                                             | 4500                                                                                 | 2                                        | 145                          | 8.3      | 3.9 ± 0.8 | VDRUS10T485xyE                 |
|                            |           |                                | 1290                              | 50.0     | 274                                             | 8000                                                                                 | 3                                        | 220                          | 7.3      | 3.9 ± 0.8 | VDRUS14X485xyE                 |
|                            |           |                                | 1290                              | 100.0    | 530                                             | 13 000                                                                               | 5                                        | 400                          | 7.6      | 4.2 ± 0.8 | VDRUS20Z485ByE                 |
| 510                        | 670       | 820                            | 1355                              | 10.0     | 71                                              | 1800                                                                                 | 1                                        | 62                           | 7.0      | 3.9 ± 0.8 | VDRUS07M510xyE                 |
|                            |           |                                | 1355                              | 25.0     | 146                                             | 4500                                                                                 | 2                                        | 135                          | 8.5      | 4.1 ± 0.8 | VDRUS10T510xyE                 |
|                            |           |                                | 1355                              | 50.0     | 280                                             | 8000                                                                                 | 3                                        | 220                          | 7.5      | 4.1 ± 0.8 | VDRUS14X510xyE                 |
|                            |           |                                | 1355                              | 100.0    | 545                                             | 13 000                                                                               | 5                                        | 400                          | 7.9      | 4.4 ± 0.8 | VDRUS20Z510ByE                 |
| 550                        | 745       | 910                            | 1500                              | 25.0     | 152                                             | 4500                                                                                 | 2                                        | 120                          | 8.9      | 4.5 ± 0.8 | VDRUS10T550xyE                 |
|                            |           |                                | 1500                              | 50.0     | 295                                             | 8000                                                                                 | 3                                        | 180                          | 7.9      | 4.5 ± 0.8 | VDRUS14X550xyE                 |
|                            |           |                                | 1500                              | 100.0    | 595                                             | 13 000                                                                               | 5                                        | 320                          | 8.3      | 4.9 ± 0.8 | VDRUS20Z550ByE                 |
| 625                        | 825       | 1000                           | 1650                              | 25.0     | 170                                             | 4500                                                                                 | 2                                        | 105                          | 9.4      | 5.0 ± 0.8 | VDRUS10T625ByE                 |
|                            |           |                                | 1650                              | 50.0     | 335                                             | 8000                                                                                 | 3                                        | 165                          | 8.4      | 5.0 ± 0.8 | VDRUS14X625ByE                 |
|                            |           |                                | 1650                              | 100.0    | 650                                             | 13 000                                                                               | 5                                        | 280                          | 8.8      | 5.3 ± 0.8 | VDRUS20Z625ByE                 |
| 680                        | 895       | 1100                           | 1815                              | 25.0     | 180                                             | 4500                                                                                 | 2                                        | 80                           | 10.8     | 5.4 ± 0.8 | VDRUS10T680ByE                 |
|                            |           |                                | 1815                              | 50.0     | 360                                             | 8000                                                                                 | 3                                        | 150                          | 9.8      | 5.4 ± 0.8 | VDRUS14X680ByE                 |
|                            |           |                                | 1815                              | 100.0    | 720                                             | 13 000                                                                               | 5                                        | 250                          | 10.2     | 5.8 ± 0.8 | VDRUS20Z680ByE                 |

## Notes

- (1) The products are certified according to cULus (E332800), and VDE (40051495). See Agency Approval section on page1 for certificate download section
- (2) The sinusoidal voltage is assumed as the normal operating condition. If a non-sinusoidal voltage is present, type selection should be based on multiplying the peak voltage by a factor of 0.707
- (3) The voltage measured at 1 mA meets the requirements of IEC 61051.  
The tolerance on the voltage at 1 mA is  $\pm 10\%$
- (4) High energy surges are generally of longer duration. The maximum energy for one pulse of  $10 \times 1000 \mu s$  is given as a reference for longer duration pulses. This pulse can be characterized by peak current ( $I_p$ ) and pulse width  $t_2$  (virtual time of half  $I_p$  value). If  $V_p$  is the clamping voltage corresponding to  $I_p$ , the energy absorbed in the varistor is determined by the formula:  
 $E = K \times V_p \times I_p \times t_2$  where K is dependent on the value of  $t_2$  (see Peak Current as a Function of Pulse Width drawing)
- (5) A current wave of  $8 \times 20 \mu s$  is used as a standard for pulse current and clamping voltage ratings. The maximum non-repetitive transient current is given for one pulse applied during the life of the component
- (6) For composition of the SAP part number:  

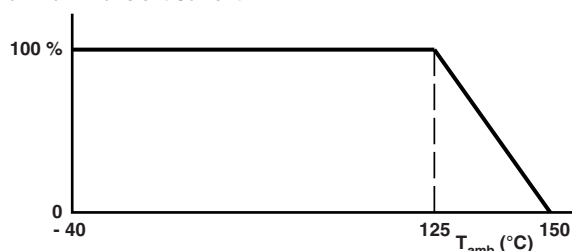
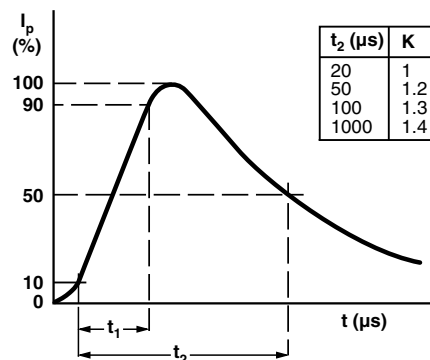
|                |                        |                |                                                                      |
|----------------|------------------------|----------------|----------------------------------------------------------------------|
| Replace "x" by | B for bulk type        | Replace "y" by | S for straight leads                                                 |
|                | T for tape and reel    |                | K for kinked leads (bulk only)                                       |
|                | A for tape and ammpack |                | L for kinked leads with $H0 = 16 \text{ mm}$ (tape and reel/ammo)    |
|                |                        |                | M for kinked leads with $H0 = 18.25 \text{ mm}$ (tape and reel/ammo) |
- (7) All varistors are UL1449 edition 4 recognized as SPD type 5 (component level) for operating temperatures up to  $125^\circ\text{C}$ . The varistors may be used in other SPD types as 2, 3, or 4 depending on the indicated nominal discharge current ratings. The final acceptance of the component is dependent upon its installation and use in complete equipment submitted to Underwriters Laboratories Inc.

**ELECTRICAL CHARACTERISTICS**

| <b>ELECTRICAL DATA</b>                                                  |              |              |
|-------------------------------------------------------------------------|--------------|--------------|
| PARAMETER                                                               | VALUE        | UNIT         |
| Maximum continuous voltage:                                             |              |              |
| RMS                                                                     | 115 to 680   | V            |
| DC                                                                      | 150 to 895   | V            |
| Maximum non-repetitive transient current ( $I_{NRP}$ ) (8 x 20 $\mu$ s) |              |              |
| VDRUS07                                                                 | 1800         | A            |
| VDRUS10                                                                 | 4500         | A            |
| VDRUS14                                                                 | 8000         | A            |
| VDRUS20                                                                 | 13 000       | A            |
| Thermal resistance:                                                     |              |              |
| VDRUS07                                                                 | $\approx 70$ | K/W          |
| VDRUS10                                                                 | $\approx 60$ | K/W          |
| VDRUS14                                                                 | $\approx 50$ | K/W          |
| VDRUS20                                                                 | $\approx 40$ | K/W          |
| Maximum dissipation:                                                    |              |              |
| VDRUS07                                                                 | 250          | mW           |
| VDRUS10                                                                 | 400          | mW           |
| VDRUS14                                                                 | 600          | mW           |
| VDRUS20                                                                 | 1000         | mW           |
| Temperature coefficient of voltage at 1 mA maximum                      | $\pm 0.05$   | %/K          |
| Voltage proof between interconnected leads and case                     | 1000         | 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><br>MAX<br>. | E <sup>(1)</sup> | d          | F         | CATALOG<br>NUMBER | MARKING<br>NUMBER |
| V ≤ 320 V                                                           | V > 320 V | V ≤ 300 V | V > 300 V | V ≤ 320 V           | V > 320 V |        |                              |                  |            |           |                   |                   |
| 9.0                                                                 |           | 11.0      |           | 13.0                |           | 24.0   | 7.0                          | 0.7 to 3.9       | 0.6 ± 0.05 | 5 ± 1.0   | VDRUS07           | 572               |
| 12.0                                                                | 12.5      | 14.5      | 15.5      | 16.5                | 17.0      | 24.0   | 10.8                         | 0.9 to 5.4       | 0.8 ± 0.05 | 7.5 ± 1.0 | VDRUS10           | 573               |
| 16.0                                                                | 16.5      | 19.0      |           | 21.0                | 21.5      | 24.0   | 9.8                          | 0.9 to 5.4       | 0.8 ± 0.05 | 7.5 ± 1.0 | VDRUS14           | 575               |
| 22.5                                                                | 23.0      | 25.5      |           | 27.5                | 28.0      | 24.0   | 10.2                         | 1.1 to 5.8       | 1.0 ± 0.05 | 10 ± 1.0  | VDRUS20           | 576               |

**Note**

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

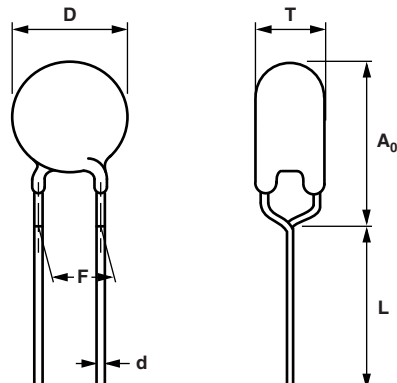
| VARISTORS IN BULK                                                     |                                     |                                      |                                      |                                      |
|-----------------------------------------------------------------------|-------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|
| TYPE                                                                  | VDRUS07<br>Ø 7 mm<br>115 V to 510 V | VDRUS10<br>Ø 10 mm<br>115 V to 680 V | VDRUS14<br>Ø 14 mm<br>115 V to 680 V | VDRUS20<br>Ø 20 mm<br>115 V to 680 V |
| Straight leads; see outline of components with straight leads drawing | BSE                                 | BSE                                  | BSE                                  | BSE                                  |
| Kinked leads; see outline of components with kinked leads drawing     | BKE                                 | BKE                                  | BKE                                  | BKE                                  |
| Packaging quantities                                                  |                                     |                                      |                                      |                                      |
| 115 V to 300 V                                                        | 250                                 | 200                                  | 100                                  | 50                                   |
| 320 V to max. V                                                       | 250                                 | 100                                  | 100                                  | 50                                   |

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

**OUTLINE** of Component with Straight Leads



**OUTLINE** of Component with Kinked Leads



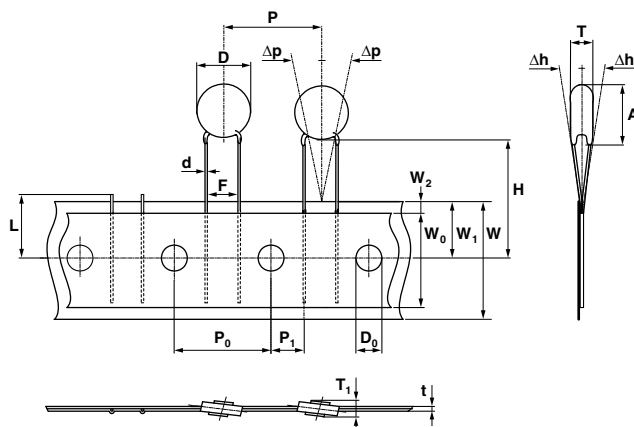
| VARISTORS ON TAPE IN AMMOPACK                                                                                       |                                     |                                      |                                      |
|---------------------------------------------------------------------------------------------------------------------|-------------------------------------|--------------------------------------|--------------------------------------|
| TYPE                                                                                                                | VDRUS07<br>Ø 7 mm<br>115 V to 510 V | VDRUS10<br>Ø 10 mm<br>115 V to 550 V | VDRUS14<br>Ø 14 mm<br>115 V to 550 V |
| Straight leads<br>H = 18 mm<br>H = 20 mm<br>See drawing: taped version with straight leads                          | -<br>ASE                            | -<br>ASE                             | ASE<br>-                             |
| 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<br>ALE                          | AME<br>ALE                           | AME<br>ALE                           |
| Packaging quantities                                                                                                |                                     |                                      |                                      |
| 115 V to 210 V                                                                                                      | 1500                                | 500                                  | 500                                  |
| 230 V to 510 V                                                                                                      | 1000                                | 500                                  | 500                                  |
| 550 V                                                                                                               | -                                   | 400                                  | 400                                  |

**DIMENSIONS OF AMMOPACK** in millimeters

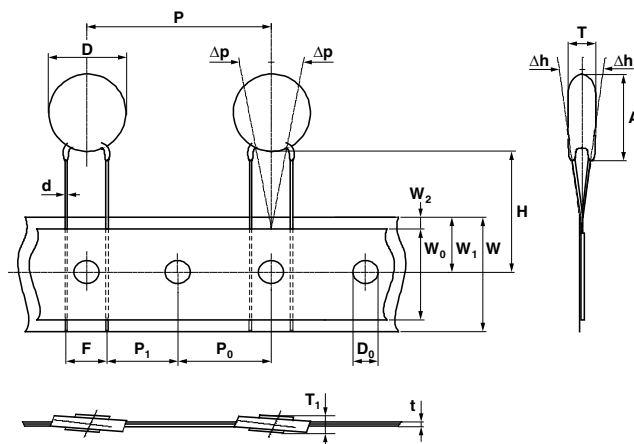

| VARISTORS ON TAPE AND REEL                                                                                          |                                     |                                      |                                      |
|---------------------------------------------------------------------------------------------------------------------|-------------------------------------|--------------------------------------|--------------------------------------|
| TYPE                                                                                                                | VDRUS07<br>Ø 7 mm<br>115 V to 510 V | VDRUS10<br>Ø 10 mm<br>115 V to 550 V | VDRUS14<br>Ø 14 mm<br>115 V to 550 V |
| Straight leads<br>H = 18 mm<br>H = 20 mm<br>See drawing: taped version with straight leads                          | -<br>TSE                            | -<br>TSE                             | TSE<br>-                             |
| 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                           |
| <b>Packaging quantities</b>                                                                                         |                                     |                                      |                                      |
| 115 V to 250 V                                                                                                      | 1500                                | 1000                                 | 750                                  |
| 275 V to 300 V                                                                                                      | 1500                                | 500                                  | 750                                  |
| 320 V to max. V                                                                                                     | 1000                                | 500                                  | 500                                  |

## PACKAGING

### TAPED VERSION WITH STRAIGHT LEADS (only for VDRUS07)



### TAPED VERSION WITH STRAIGHT LEADS (only for VDRUS10 and VDRUS14)

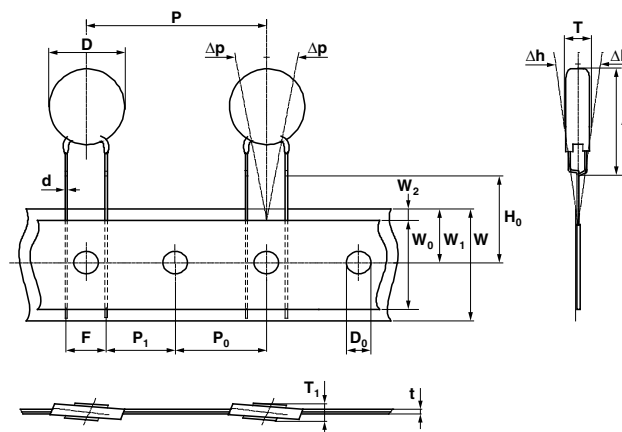


**TAPED VERSION WITH KINKED LEADS**

(only for VDRUS07)


**TAPED VERSION WITH KINKED LEADS**

(only for VDRUS10 and VDRUS14)


**TAPING DATA** (based on IEC 60286-2)

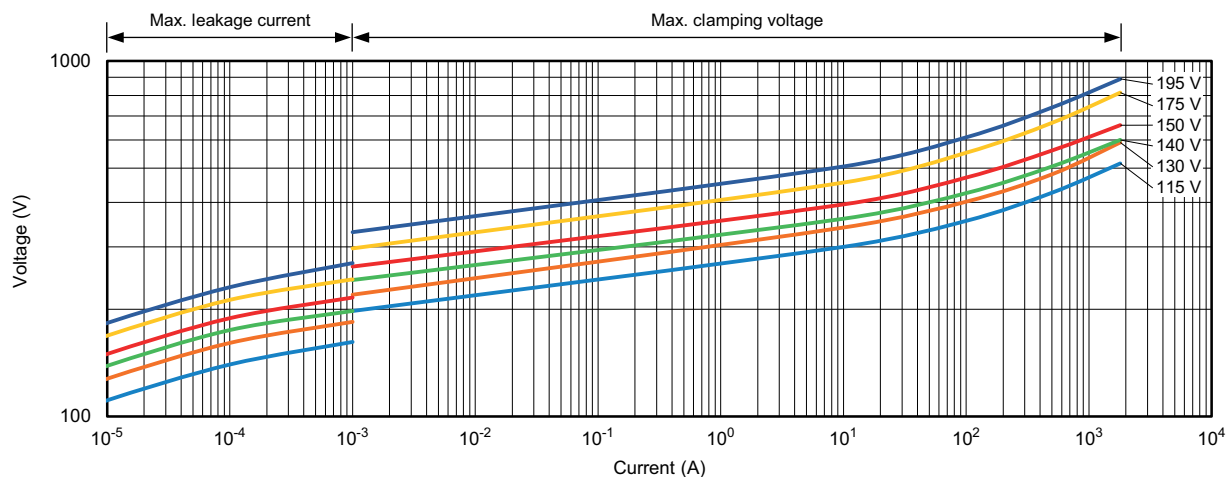
| SYMBOL              | PARAMETER                                        |           | DIMENSIONS/TOLERANCE      |                  |         |
|---------------------|--------------------------------------------------|-----------|---------------------------|------------------|---------|
|                     |                                                  |           | VDRUS07                   | VDRUS10          | VDRUS14 |
| A max.              | Max. mounting height                             | V ≤ 300 V | 11.0                      | 14.5             | 19.0    |
|                     |                                                  | V > 300 V |                           | 15.5             |         |
| A <sub>0</sub> max. | Max. mounting height                             | V ≤ 320 V | 13.0                      | 16.5             | 21.0    |
|                     |                                                  | V > 320 V |                           | 17.0             | 21.5    |
| D max.              | Max. body diameter                               | V ≤ 320 V | 9.0                       | 12.0             | 16.0    |
|                     |                                                  | V > 320 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 <sub>0</sub>      | 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**
<sup>(1)</sup> Guaranteed between component and tape

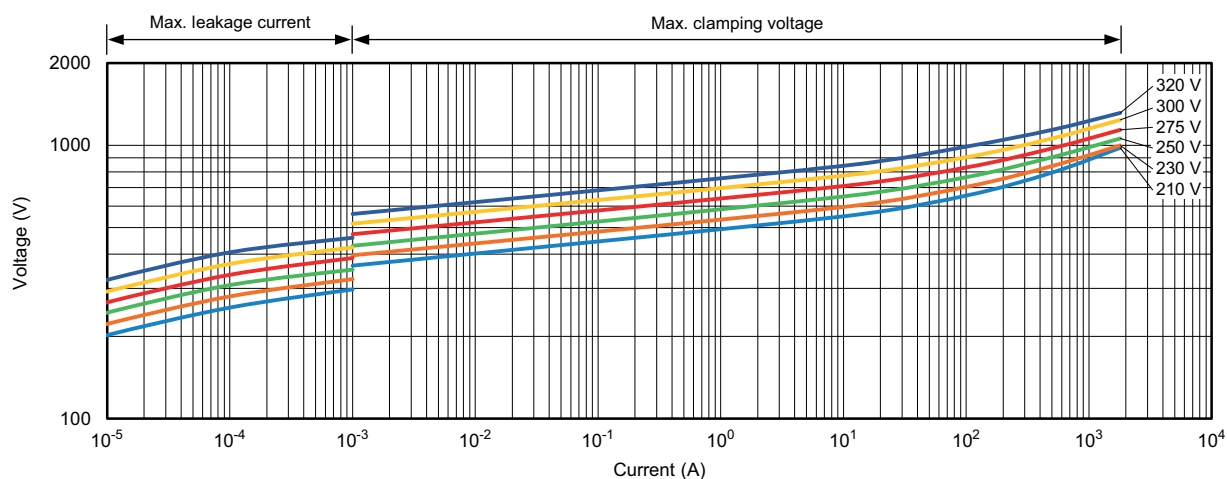
<sup>(2)</sup> For VDRUS14X510xSE and VDRUS14X550xSE: H = 20 mm ± 1 mm



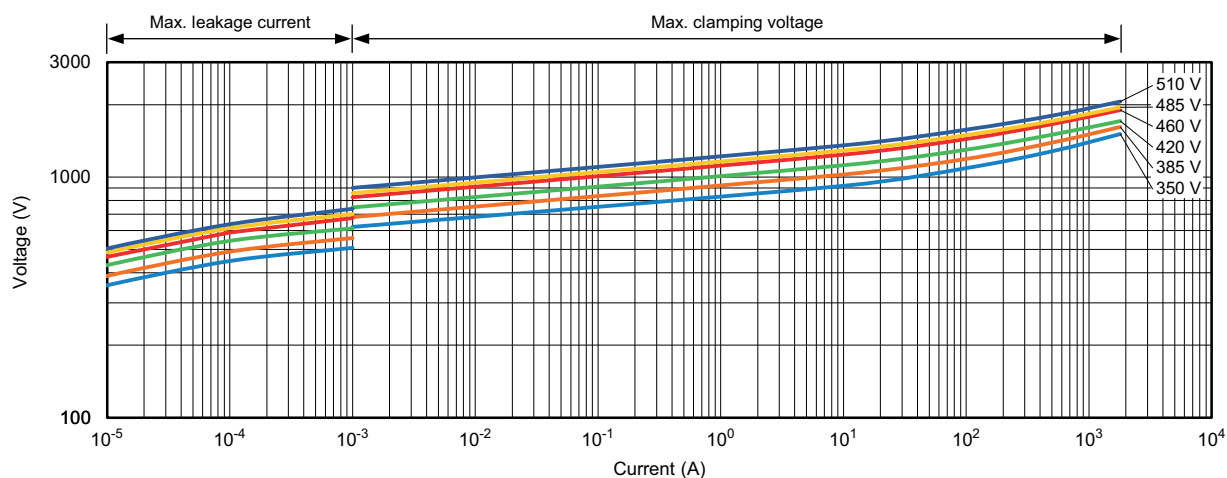
## V/I CHARACTERISTICS



115  $V_{RMS}$  to 195  $V_{RMS}$ ; VDRUS07



210  $V_{RMS}$  to 300  $V_{RMS}$ ; VDRUS07



350  $V_{RMS}$  to 510  $V_{RMS}$ ; VDRUS07



## V/I CHARACTERISTICS



115  $V_{RMS}$  to 210  $V_{RMS}$ ; VDRUS10



230  $V_{RMS}$  to 385  $V_{RMS}$ ; VDRUS10



420  $V_{RMS}$  to 680  $V_{RMS}$ ; VDRUS10



## V/I CHARACTERISTICS



115 V<sub>RMS</sub> to 210 V<sub>RMS</sub>; VDRUS14



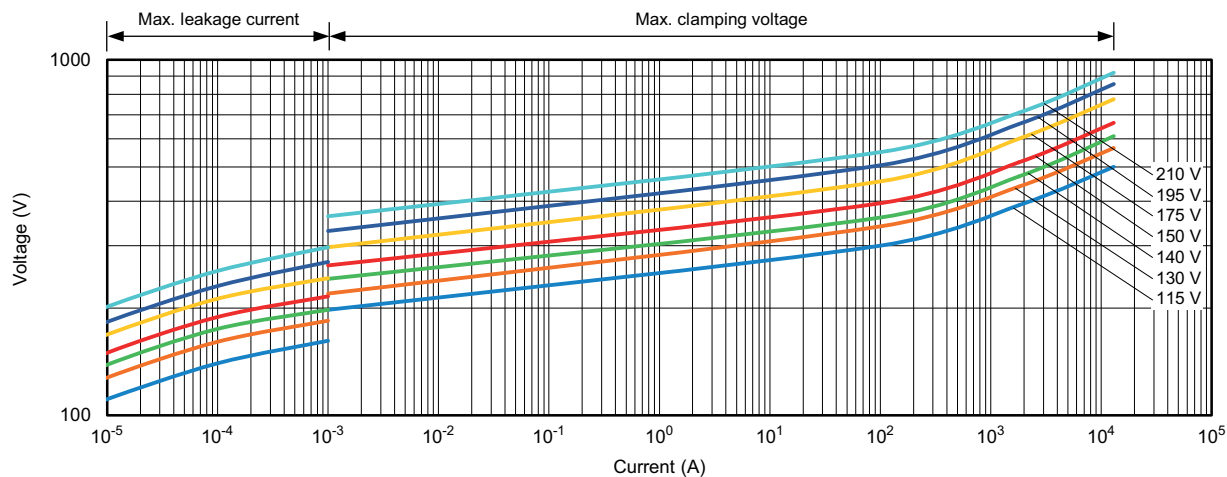
230 V<sub>RMS</sub> to 385 V<sub>RMS</sub>; VDRUS14



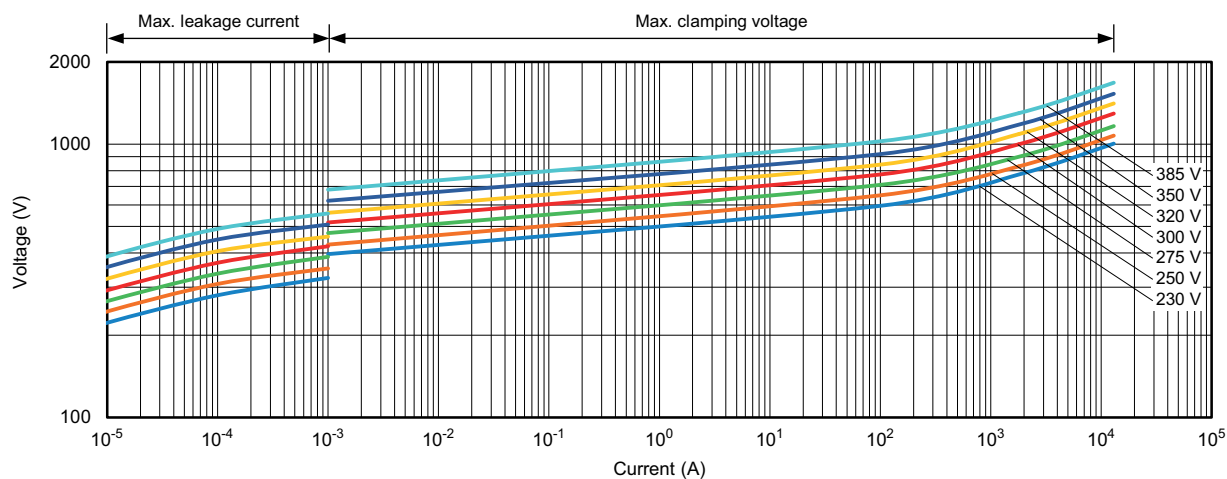
420 V<sub>RMS</sub> to 680 V<sub>RMS</sub>; VDRUS14



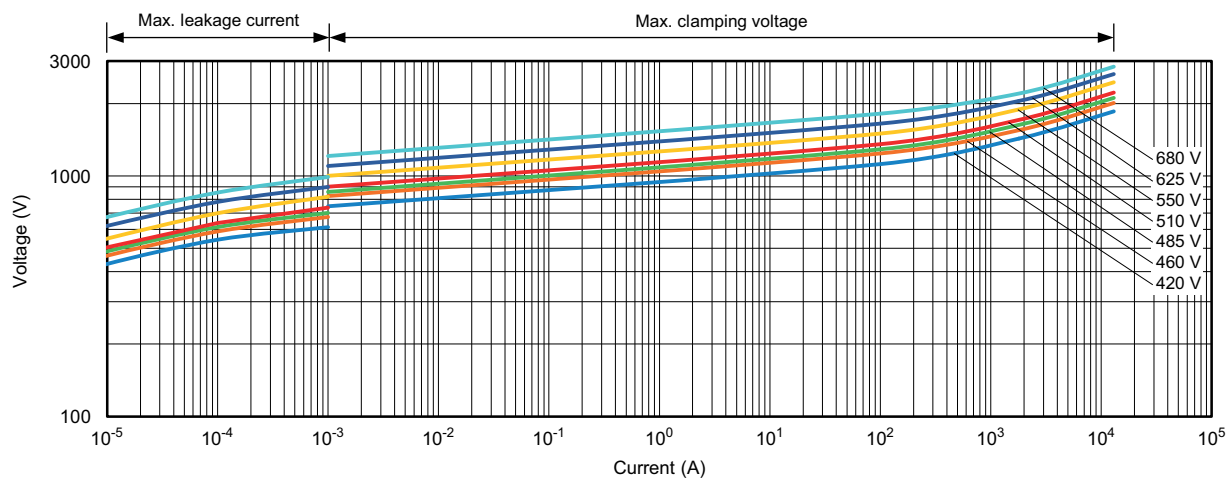
## V/I CHARACTERISTICS



115  $V_{RMS}$  to 210  $V_{RMS}$ ; VDRUS20



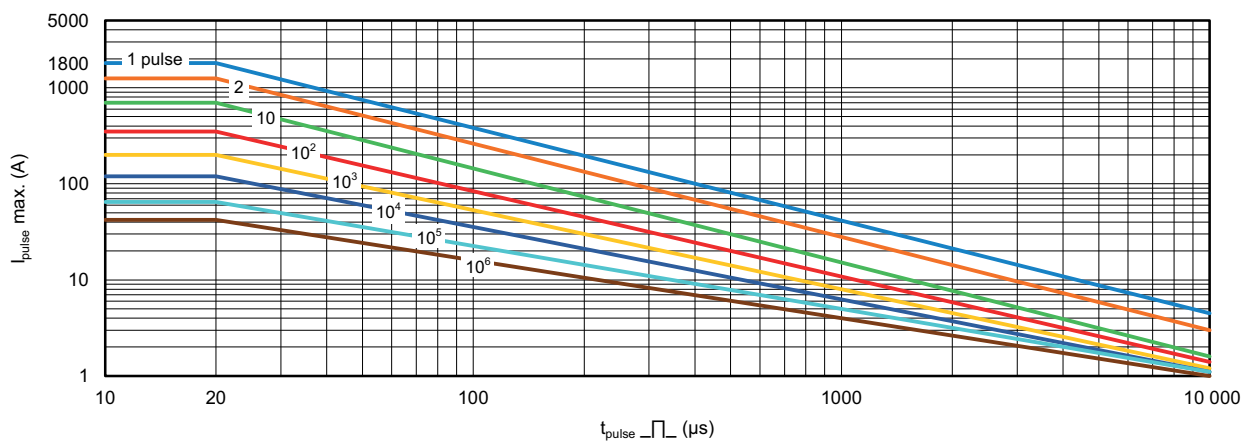
230  $V_{RMS}$  to 385  $V_{RMS}$ ; VDRUS20



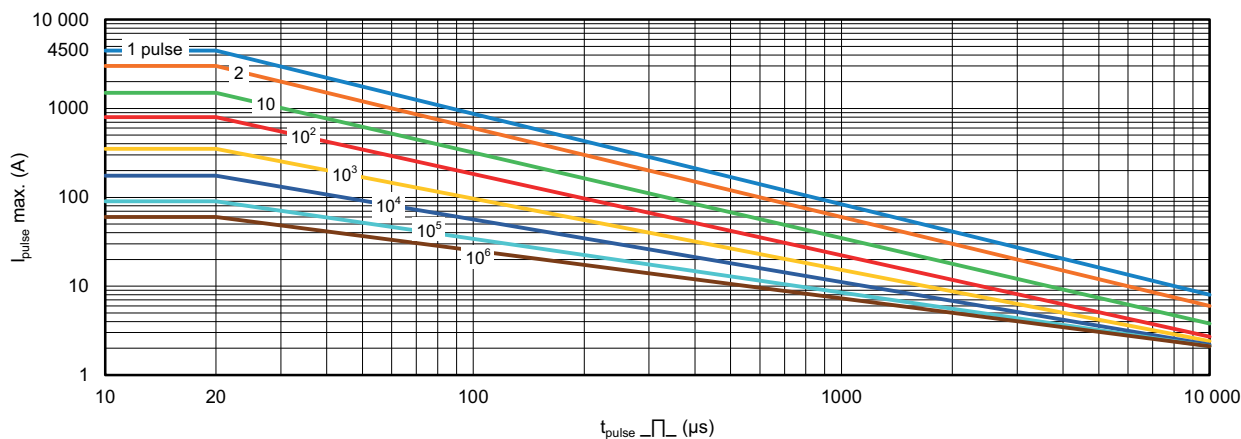
420  $V_{RMS}$  to 680  $V_{RMS}$ ; VDRUS20



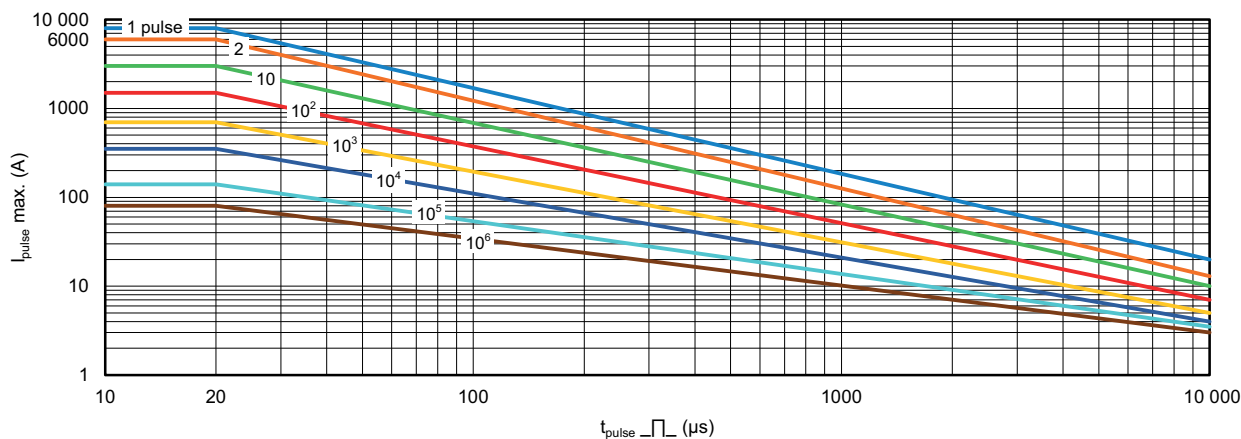
PULSE DERATING



115  $V_{RMS}$  to 510  $V_{RMS}$ ; VDRUS07



115  $V_{RMS}$  to 680  $V_{RMS}$ ; VDRUS10



115  $V_{RMS}$  to 680  $V_{RMS}$ ; VDRUS14



## PULSE DERATING





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