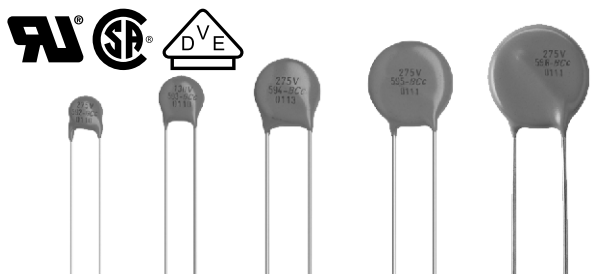


## VDR Metal Oxide Varistors Standard



### QUICK REFERENCE DATA

| PARAMETER                                                           | VALUE                                                   | UNIT |
|---------------------------------------------------------------------|---------------------------------------------------------|------|
| Maximum continuous voltage in operating temperature range:          |                                                         |      |
| RMS                                                                 | 14 to 680                                               | V    |
| DC                                                                  | 18 to 895                                               | V    |
| Maximum non-repetitive transient current $I_{NRP}$ (8 x 20 $\mu$ s) | 100 to 6500                                             | A    |
| Detailed specification                                              | Based on<br>IEC 61051-1<br>IEC 61051-2<br>IEC 61051-2-2 |      |
| Storage temperature                                                 | - 40 to + 125                                           | °C   |
| Operating temperature                                               | - 40 to + 85                                            | °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.

### FEATURES

- Zinc oxide disc, epoxy coated
- Straight leads
- Straight leads with flange (2381 592 and 593 series only)
- Kinked leads
- Compliant to RoHS directive 2002/95/EC and in accordance to WEEE 2002/96/EC
- Certified according to UL 1449 edition 3, VDE/IEC 61051-1/2 and CSA



**RoHS**  
COMPLIANT

### APPLICATION

- Overvoltage and transient voltage protection

### DESCRIPTION

The varistors consist of a disc of low- $\beta$  ceramic material with two tinned solid copper leads or tinned copper clad steel wire. They are coated with a layer of ochre coloured 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 and cutting and bending equipment.

Varistors with flanged leads provide better positioning on printed-circuit boards (PCB) and more accurate control over component height. This is important for hand mounting and automatic insertion techniques; see outlines of flanged leads drawing.

### 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
- Series number (592, 593, 594, 595 or 596)
- Manufacturers logo
- Date of manufacture (YYWW)

### INFLAMMABILITY

The varistors are non-flammable.

The encapsulation is made of flammable resistant epoxy in accordance with UL 94 V-0.

### 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 $\mu$ s) | MAXIMUM NON-REP. TRANSIENT CURRENT <sup>(5)</sup> $I_{NRP}$ (8 x 20 $\mu$ s) | TYPICAL CAP. at 1 kHz | T (max.) | E             | UL 1449 ED3 SPD TYPE <sup>(8)</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>(7)</sup>             | 12NC <sup>(6)</sup> 2381- |
| 14                         | 18     | 22                             | 48                                | 1.0   | 0.5                                               | 100                                                                          | 1300                  | 4.1      | 0.7 $\pm$ 0.3 | 4                                   | VDRS05A014xyE                  | 592 x140y                 |
|                            |        |                                | 43                                | 2.5   | 1.7                                               | 250                                                                          | 2800                  | 4.1      | 0.7 $\pm$ 0.3 | 4                                   | VDRS07B014xyE                  | 593 x140y                 |
|                            |        |                                | 43                                | 5.0   | 4.3                                               | 500                                                                          | 6000                  | 4.4      | 0.9 $\pm$ 0.3 | 4                                   | VDRS10D014xyE                  | 594 x140y                 |
|                            |        |                                | 43                                | 10.0  | 5.4                                               | 1000                                                                         | 15 000                | 4.4      | 0.9 $\pm$ 0.3 | 4                                   | VDRS14G014xyE                  | 595 x140y                 |
|                            |        |                                | 43                                | 20.0  | 8.0                                               | 2000                                                                         | 30 000                | 4.6      | 1.1 $\pm$ 0.3 | 4                                   | VDRS20M014ByE                  | 596 x140y                 |



| ELECTRICAL DATA AND ORDERING INFORMATION |           |                                   |                                      |          |                                                 |                                                                                         |                          |             |           |                                              |                                |                              |
|------------------------------------------|-----------|-----------------------------------|--------------------------------------|----------|-------------------------------------------------|-----------------------------------------------------------------------------------------|--------------------------|-------------|-----------|----------------------------------------------|--------------------------------|------------------------------|
| MAXIMUM CONTINUOUS VOLTAGE               |           | VOLTAGE <sup>(3)</sup><br>at 1 mA | MAXIMUM VOLTAGE<br>at STATED CURRENT |          | MAXIMUM ENERGY <sup>(4)</sup><br>(10 x 1000 µs) | MAXIMUM NON-REP.<br>TRANSIENT CURRENT <sup>(5)</sup><br>I <sub>NRP</sub><br>(8 x 20 µs) | TYPICAL CAP.<br>at 1 kHz | T<br>(max.) | E         | UL 1449<br>ED3<br>SPD<br>TYPE <sup>(8)</sup> | CATALOG NUMBERS <sup>(1)</sup> |                              |
| RMS <sup>(2)</sup><br>(V)                | DC<br>(V) | (V)                               | V<br>(V)                             | I<br>(A) | (J)                                             | (A)                                                                                     | (pF)                     | (mm)        | (mm)      |                                              | SAP <sup>(7)</sup>             | 12NC <sup>(6)</sup><br>2381- |
| 17                                       | 22        | 27                                | 60                                   | 1.0      | 0.7                                             | 100                                                                                     | 1050                     | 4.1         | 0.8 ± 0.3 | 4                                            | VDRS05A017xyE                  | 592 x170y                    |
|                                          |           |                                   | 53                                   | 2.5      | 2.0                                             | 250                                                                                     | 2000                     | 4.1         | 0.8 ± 0.3 | 4                                            | VDRS07B017xyE                  | 593 x170y                    |
|                                          |           |                                   | 53                                   | 5.0      | 5.3                                             | 500                                                                                     | 4000                     | 4.4         | 1.0 ± 0.3 | 4                                            | VDRS10D017xyE                  | 594 x170y                    |
|                                          |           |                                   | 53                                   | 10.0     | 6.9                                             | 1000                                                                                    | 10 000                   | 4.4         | 1.0 ± 0.3 | 4                                            | VDRS14G017xyE                  | 595 x170y                    |
|                                          |           |                                   | 53                                   | 20.0     | 10.0                                            | 2000                                                                                    | 20 000                   | 4.6         | 1.2 ± 0.3 | 4                                            | VDRS20M017ByE                  | 596 x170y                    |
| 20                                       | 26        | 33                                | 73                                   | 1.0      | 0.8                                             | 100                                                                                     | 900                      | 4.1         | 1.0 ± 0.3 | 4                                            | VDRS05A020xyE                  | 592 x200y                    |
|                                          |           |                                   | 65                                   | 2.5      | 2.5                                             | 250                                                                                     | 1500                     | 4.1         | 1.0 ± 0.3 | 4                                            | VDRS07B020xyE                  | 593 x200y                    |
|                                          |           |                                   | 65                                   | 5.0      | 6.5                                             | 500                                                                                     | 3000                     | 4.4         | 1.2 ± 0.3 | 4                                            | VDRS10D020xyE                  | 594 x200y                    |
|                                          |           |                                   | 65                                   | 10.0     | 8.8                                             | 1000                                                                                    | 7500                     | 4.4         | 1.2 ± 0.3 | 4                                            | VDRS14G020xyE                  | 595 x200y                    |
|                                          |           |                                   | 65                                   | 20.0     | 12.0                                            | 2000                                                                                    | 15 000                   | 4.8         | 1.4 ± 0.3 | 4                                            | VDRS20M020ByE                  | 596 x200y                    |
| 25                                       | 31        | 39                                | 86                                   | 1.0      | 0.9                                             | 100                                                                                     | 500                      | 4.2         | 1.2 ± 0.3 | 4                                            | VDRS05A025xyE                  | 592 x250y                    |
|                                          |           |                                   | 77                                   | 2.5      | 3.0                                             | 250                                                                                     | 1350                     | 4.2         | 1.2 ± 0.3 | 4                                            | VDRS07B025xyE                  | 593 x250y                    |
|                                          |           |                                   | 77                                   | 5.0      | 7.7                                             | 500                                                                                     | 2600                     | 4.6         | 1.4 ± 0.3 | 4                                            | VDRS10D025xyE                  | 594 x250y                    |
|                                          |           |                                   | 77                                   | 10.0     | 9.4                                             | 1000                                                                                    | 6500                     | 4.6         | 1.4 ± 0.3 | 4                                            | VDRS14G025xyE                  | 595 x250y                    |
|                                          |           |                                   | 77                                   | 20.0     | 14.0                                            | 2000                                                                                    | 13 000                   | 5.0         | 1.6 ± 0.3 | 4                                            | VDRS20M025ByE                  | 596 x250y                    |
| 30                                       | 38        | 47                                | 96                                   | 1.0      | 1.1                                             | 100                                                                                     | 700                      | 4.4         | 1.4 ± 0.5 | 4                                            | VDRS05A030xyE                  | 592 x300y                    |
|                                          |           |                                   | 93                                   | 2.5      | 3.6                                             | 250                                                                                     | 1600                     | 4.4         | 1.4 ± 0.5 | 4                                            | VDRS07B030xyE                  | 593 x300y                    |
|                                          |           |                                   | 93                                   | 5.0      | 9.2                                             | 500                                                                                     | 2700                     | 4.8         | 1.6 ± 0.5 | 4                                            | VDRS10D030xyE                  | 594 x300y                    |
|                                          |           |                                   | 90                                   | 10.0     | 12.0                                            | 1000                                                                                    | 6000                     | 4.8         | 1.6 ± 0.5 | 4                                            | VDRS14G030xyE                  | 595 x300y                    |
|                                          |           |                                   | 93                                   | 20.0     | 17.0                                            | 2000                                                                                    | 12 000                   | 5.2         | 1.8 ± 0.5 | 4                                            | VDRS20M030ByE                  | 596 x300y                    |
| 35                                       | 45        | 56                                | 123                                  | 1.0      | 1.4                                             | 100                                                                                     | 560                      | 4.8         | 1.7 ± 0.5 | 4                                            | VDRS05A035xyE                  | 592 x350y                    |
|                                          |           |                                   | 115                                  | 2.5      | 4.4                                             | 250                                                                                     | 1300                     | 4.8         | 1.7 ± 0.5 | 4                                            | VDRS07B035xyE                  | 593 x350y                    |
|                                          |           |                                   | 110                                  | 5.0      | 11.0                                            | 500                                                                                     | 2200                     | 5.2         | 1.9 ± 0.5 | 4                                            | VDRS10D035xyE                  | 594 x350y                    |
|                                          |           |                                   | 105                                  | 10.0     | 14.0                                            | 1000                                                                                    | 4800                     | 5.2         | 1.9 ± 0.5 | 4                                            | VDRS14G035xyE                  | 595 x350y                    |
|                                          |           |                                   | 110                                  | 20.0     | 20.0                                            | 2000                                                                                    | 9600                     | 5.6         | 2.1 ± 0.5 | 4                                            | VDRS20M035ByE                  | 596 x350y                    |
| 40                                       | 56        | 68                                | 145                                  | 1.0      | 1.6                                             | 100                                                                                     | 460                      | 5.1         | 2.1 ± 0.5 | 4                                            | VDRS05A040xyE                  | 592 x400y                    |
|                                          |           |                                   | 135                                  | 2.5      | 5.2                                             | 250                                                                                     | 1000                     | 5.1         | 2.1 ± 0.5 | 4                                            | VDRS07B040xyE                  | 593 x400y                    |
|                                          |           |                                   | 130                                  | 5.0      | 13.0                                            | 500                                                                                     | 1800                     | 5.5         | 2.3 ± 0.5 | 4                                            | VDRS10D040xyE                  | 594 x400y                    |
|                                          |           |                                   | 130                                  | 10.0     | 17.0                                            | 1000                                                                                    | 3800                     | 5.5         | 2.3 ± 0.5 | 4                                            | VDRS14G040xyE                  | 595 x400y                    |
|                                          |           |                                   | 135                                  | 20.0     | 24.0                                            | 2000                                                                                    | 7600                     | 5.9         | 2.5 ± 0.5 | 4                                            | VDRS20M040ByE                  | 596 x400y                    |
| 50                                       | 65        | 82                                | 145                                  | 5.0      | 2.6                                             | 400                                                                                     | 370                      | 4.1         | 0.6 ± 0.3 | 4                                            | VDRS05C050xyE                  | 592 x500y                    |
|                                          |           |                                   | 140                                  | 10.0     | 7.0                                             | 1200                                                                                    | 900                      | 4.1         | 0.6 ± 0.3 | 4                                            | VDRS07H050xyE                  | 593 x500y                    |
|                                          |           |                                   | 140                                  | 25.0     | 12.0                                            | 2500                                                                                    | 1500                     | 4.4         | 0.8 ± 0.3 | 4                                            | VDRS10P050xyE                  | 594 x500y                    |
|                                          |           |                                   | 140                                  | 50.0     | 21.0                                            | 4500                                                                                    | 3100                     | 4.4         | 0.8 ± 0.3 | 4                                            | VDRS14T050xyE                  | 595 x500y                    |
|                                          |           |                                   | 140                                  | 100.0    | 34.0                                            | 6500                                                                                    | 4700                     | 4.5         | 1.1 ± 0.3 | 2                                            | VDRS20W060ByE                  | 596 x600y                    |
| 60                                       | 85        | 100                               | 165                                  | 5.0      | 2.9                                             | 400                                                                                     | 290                      | 4.1         | 0.7 ± 0.3 | 4                                            | VDRS05C060xyE                  | 592 x600y                    |
|                                          |           |                                   | 165                                  | 10.0     | 8.3                                             | 1200                                                                                    | 700                      | 4.1         | 0.7 ± 0.3 | 4                                            | VDRS07H060xyE                  | 593 x600y                    |
|                                          |           |                                   | 165                                  | 25.0     | 15.0                                            | 2500                                                                                    | 1200                     | 4.4         | 0.9 ± 0.3 | 4                                            | VDRS10P060xyE                  | 594 x600y                    |
|                                          |           |                                   | 165                                  | 50.0     | 24.0                                            | 4500                                                                                    | 2300                     | 4.4         | 0.9 ± 0.3 | 3                                            | VDRS14T060xyE                  | 595 x600y                    |
|                                          |           |                                   | 165                                  | 100.0    | 34.0                                            | 6500                                                                                    | 4700                     | 4.5         | 1.1 ± 0.3 | 2                                            | VDRS20W075ByE                  | 596 x750y                    |
| 75                                       | 100       | 120                               | 190                                  | 5.0      | 3.4                                             | 400                                                                                     | 240                      | 4.1         | 0.9 ± 0.3 | 4                                            | VDRS05C075xyE                  | 592 x750y                    |
|                                          |           |                                   | 200                                  | 10.0     | 10.0                                            | 1200                                                                                    | 530                      | 4.1         | 0.9 ± 0.3 | 4                                            | VDRS07H075xyE                  | 593 x750y                    |
|                                          |           |                                   | 200                                  | 25.0     | 18.0                                            | 2500                                                                                    | 1000                     | 4.4         | 1.1 ± 0.3 | 4                                            | VDRS10P075xyE                  | 594 x750y                    |
|                                          |           |                                   | 200                                  | 50.0     | 29.0                                            | 4500                                                                                    | 1900                     | 4.4         | 1.1 ± 0.3 | 3                                            | VDRS14T075xyE                  | 595 x750y                    |
|                                          |           |                                   | 200                                  | 100.0    | 34.0                                            | 6500                                                                                    | 3900                     | 4.8         | 1.3 ± 0.3 | 2                                            | VDRS20W075ByE                  | 596 x750y                    |
| 95                                       | 125       | 150                               | 230                                  | 5.0      | 4.1                                             | 400                                                                                     | 180                      | 4.2         | 1.1 ± 0.3 | 4                                            | VDRS05C095xyE                  | 592 x950y                    |
|                                          |           |                                   | 250                                  | 10.0     | 13.0                                            | 1200                                                                                    | 450                      | 4.2         | 1.1 ± 0.3 | 4                                            | VDRS07H095xyE                  | 593 x950y                    |
|                                          |           |                                   | 250                                  | 25.0     | 22.0                                            | 2500                                                                                    | 800                      | 4.6         | 1.3 ± 0.3 | 4                                            | VDRS10P095xyE                  | 594 x950y                    |
|                                          |           |                                   | 250                                  | 50.0     | 37.0                                            | 4500                                                                                    | 1500                     | 4.6         | 1.3 ± 0.3 | 3                                            | VDRS14T095xyE                  | 595 x950y                    |
|                                          |           |                                   | 250                                  | 100.0    | 34.0                                            | 6500                                                                                    | 3000                     | 5.2         | 1.5 ± 0.3 | 2                                            | VDRS20W095ByE                  | 596 x950y                    |

**ELECTRICAL DATA AND ORDERING INFORMATION**

| MAXIMUM CONTINUOUS VOLTAGE |           | VOLTAGE <sup>(3)</sup><br>at 1 mA | MAXIMUM VOLTAGE<br>at STATED<br>CURRENT |          | MAXIMUM<br>ENERGY <sup>(4)</sup><br>(10 x<br>1000 µs) | MAXIMUM<br>NON-REP.<br>TRANSIENT<br>CURRENT <sup>(5)</sup><br>I <sub>NRP</sub><br>(8 x 20 µs) | TYPICAL<br>CAP.<br>at 1 kHz | T<br>(max.) | E         | UL 1449<br>ED3<br>SPD<br>TYPE <sup>(8)</sup> | CATALOG<br>NUMBERS <sup>(1)</sup> |                              |
|----------------------------|-----------|-----------------------------------|-----------------------------------------|----------|-------------------------------------------------------|-----------------------------------------------------------------------------------------------|-----------------------------|-------------|-----------|----------------------------------------------|-----------------------------------|------------------------------|
| RMS <sup>(2)</sup><br>(V)  | DC<br>(V) | (V)                               | V<br>(V)                                | I<br>(A) | (J)                                                   | (A)                                                                                           | (pF)                        | (mm)        | (mm)      |                                              | SAP <sup>(7)</sup>                | 12NC <sup>(6)</sup><br>2381- |
| 130                        | 170       | 205                               | 310                                     | 5.0      | 5.5                                                   | 400                                                                                           | 130                         | 4.2         | 1.0 ± 0.3 | 4                                            | VDRS05C130xyE                     | 592 x131y                    |
|                            |           |                                   | 340                                     | 10.0     | 17.0                                                  | 1200                                                                                          | 320                         | 4.2         | 1.0 ± 0.3 | 4                                            | VDRS07H130xyE                     | 593 x131y                    |
|                            |           |                                   | 340                                     | 25.0     | 30.0                                                  | 2500                                                                                          | 580                         | 4.6         | 1.2 ± 0.3 | 4                                            | VDRS10P130xyE                     | 594 x131y                    |
|                            |           |                                   | 340                                     | 50.0     | 56.0                                                  | 4500                                                                                          | 1050                        | 4.6         | 1.2 ± 0.3 | 3                                            | VDRS14T130xyE                     | 595 x131y                    |
|                            |           |                                   | 340                                     | 100.0    | 114.0                                                 | 6500                                                                                          | 2100                        | 5.3         | 1.4 ± 0.3 | 2                                            | VDRS20W130ByE                     | 596 x131y                    |
| 140                        | 180       | 220                               | 350                                     | 5.0      | 6.3                                                   | 400                                                                                           | 120                         | 4.4         | 1.0 ± 0.3 | 4                                            | VDRS05C140xyE                     | 592 x141y                    |
|                            |           |                                   | 370                                     | 10.0     | 21.0                                                  | 1200                                                                                          | 290                         | 4.4         | 1.0 ± 0.3 | 4                                            | VDRS07H140xyE                     | 593 x141y                    |
|                            |           |                                   | 370                                     | 25.0     | 33.0                                                  | 2500                                                                                          | 540                         | 4.8         | 1.2 ± 0.3 | 4                                            | VDRS10P140xyE                     | 594 x141y                    |
|                            |           |                                   | 370                                     | 50.0     | 57.0                                                  | 4500                                                                                          | 950                         | 4.8         | 1.2 ± 0.3 | 3                                            | VDRS14T140xyE                     | 595 x141y                    |
|                            |           |                                   | 360                                     | 100.0    | 124.0                                                 | 6500                                                                                          | 1900                        | 5.4         | 1.5 ± 0.3 | 2                                            | VDRS20W140ByE                     | 596 x141y                    |
| 150                        | 200       | 240                               | 395                                     | 5.0      | 7.1                                                   | 400                                                                                           | 110                         | 4.4         | 1.1 ± 0.3 | 4                                            | VDRS05C150xyE                     | 592 x151y                    |
|                            |           |                                   | 400                                     | 10.0     | 20.0                                                  | 1200                                                                                          | 270                         | 4.4         | 1.1 ± 0.3 | 4                                            | VDRS07H150xyE                     | 593 x151y                    |
|                            |           |                                   | 400                                     | 25.0     | 36.0                                                  | 2500                                                                                          | 490                         | 4.8         | 1.3 ± 0.3 | 4                                            | VDRS10P150xyE                     | 594 x151y                    |
|                            |           |                                   | 400                                     | 50.0     | 59.0                                                  | 4500                                                                                          | 850                         | 4.8         | 1.3 ± 0.3 | 3                                            | VDRS14T150xyE                     | 595 x151y                    |
|                            |           |                                   | 395                                     | 100.0    | 134.0                                                 | 6500                                                                                          | 1700                        | 5.5         | 1.6 ± 0.3 | 2                                            | VDRS20W150ByE                     | 596 x151y                    |
| 175                        | 225       | 275                               | 410                                     | 5.0      | 7.3                                                   | 400                                                                                           | 90                          | 4.6         | 1.3 ± 0.3 | 4                                            | VDRS05C175xyE                     | 592 x171y                    |
|                            |           |                                   | 455                                     | 10.0     | 23.0                                                  | 1200                                                                                          | 230                         | 4.6         | 1.3 ± 0.3 | 4                                            | VDRS07H175xyE                     | 593 x171y                    |
|                            |           |                                   | 455                                     | 25.0     | 41.0                                                  | 2500                                                                                          | 430                         | 5.0         | 1.5 ± 0.3 | 4                                            | VDRS10P175xyE                     | 594 x171y                    |
|                            |           |                                   | 455                                     | 50.0     | 67.0                                                  | 4500                                                                                          | 750                         | 5.0         | 1.5 ± 0.3 | 3                                            | VDRS14T175xyE                     | 595 x171y                    |
|                            |           |                                   | 455                                     | 100.0    | 158.0                                                 | 6500                                                                                          | 1500                        | 5.7         | 1.7 ± 0.3 | 2                                            | VDRS20W175ByE                     | 596 x171y                    |
| 230                        | 300       | 360                               | 560                                     | 5.0      | 10.0                                                  | 400                                                                                           | 70                          | 4.9         | 1.7 ± 0.8 | 4                                            | VDRS05C230xyE                     | 592 x231y                    |
|                            |           |                                   | 600                                     | 10.0     | 30.0                                                  | 1200                                                                                          | 170                         | 4.9         | 1.7 ± 0.8 | 4                                            | VDRS07H230xyE                     | 593 x231y                    |
|                            |           |                                   | 600                                     | 25.0     | 54.0                                                  | 2500                                                                                          | 320                         | 5.4         | 1.9 ± 0.8 | 4                                            | VDRS10P230xyE                     | 594 x231y                    |
|                            |           |                                   | 600                                     | 50.0     | 88.0                                                  | 4500                                                                                          | 540                         | 5.4         | 1.9 ± 0.8 | 3                                            | VDRS14T230xyE                     | 595 x231y                    |
|                            |           |                                   | 595                                     | 100.0    | 208.0                                                 | 6500                                                                                          | 1100                        | 6.2         | 2.2 ± 0.8 | 2                                            | VDRS20W230ByE                     | 596 x231y                    |
| 250                        | 320       | 390                               | 600                                     | 5.0      | 11.0                                                  | 400                                                                                           | 60                          | 4.9         | 1.9 ± 0.8 | 4                                            | VDRS05C250xyE                     | 592 x251y                    |
|                            |           |                                   | 650                                     | 10.0     | 33.0                                                  | 1200                                                                                          | 160                         | 4.9         | 1.9 ± 0.8 | 4                                            | VDRS07H250xyE                     | 593 x251y                    |
|                            |           |                                   | 650                                     | 25.0     | 58.0                                                  | 2500                                                                                          | 300                         | 5.4         | 2.1 ± 0.8 | 4                                            | VDRS10P250xyE                     | 594 x251y                    |
|                            |           |                                   | 650                                     | 50.0     | 96.0                                                  | 4500                                                                                          | 480                         | 5.4         | 2.1 ± 0.8 | 3                                            | VDRS14T250xyE                     | 595 x251y                    |
|                            |           |                                   | 650                                     | 100.0    | 240.0                                                 | 6500                                                                                          | 960                         | 6.4         | 2.3 ± 0.8 | 2                                            | VDRS20W250ByE                     | 596 x251y                    |
| 275                        | 350       | 430                               | 695                                     | 5.0      | 12.0                                                  | 400                                                                                           | 55                          | 4.9         | 2.0 ± 0.8 | 4                                            | VDRS05C275xyE                     | 592 x271y                    |
|                            |           |                                   | 710                                     | 10.0     | 36.0                                                  | 1200                                                                                          | 140                         | 4.9         | 2.0 ± 0.8 | 4                                            | VDRS07H275xyE                     | 593 x271y                    |
|                            |           |                                   | 710                                     | 25.0     | 63.0                                                  | 2500                                                                                          | 270                         | 5.4         | 2.2 ± 0.8 | 4                                            | VDRS10P275xyE                     | 594 x271y                    |
|                            |           |                                   | 710                                     | 50.0     | 104.0                                                 | 4500                                                                                          | 440                         | 5.4         | 2.2 ± 0.8 | 3                                            | VDRS14T275xyE                     | 595 x271y                    |
|                            |           |                                   | 710                                     | 100.0    | 264.0                                                 | 6500                                                                                          | 900                         | 6.6         | 2.5 ± 0.8 | 2                                            | VDRS20W275ByE                     | 596 x271y                    |
| 300                        | 385       | 470                               | 750                                     | 5.0      | 13.0                                                  | 400                                                                                           | 50                          | 5.3         | 2.2 ± 0.8 | 4                                            | VDRS05C300xyE                     | 592 x301y                    |
|                            |           |                                   | 800                                     | 10.0     | 40.0                                                  | 1200                                                                                          | 130                         | 5.3         | 2.2 ± 0.8 | 4                                            | VDRS07H300xyE                     | 593 x301y                    |
|                            |           |                                   | 800                                     | 25.0     | 71.0                                                  | 2500                                                                                          | 240                         | 5.9         | 2.4 ± 0.8 | 4                                            | VDRS10P300xyE                     | 594 x301y                    |
|                            |           |                                   | 800                                     | 50.0     | 117.0                                                 | 4500                                                                                          | 400                         | 5.9         | 2.4 ± 0.8 | 3                                            | VDRS14T300xyE                     | 595 x301y                    |
|                            |           |                                   | 775                                     | 100.0    | 280.0                                                 | 6500                                                                                          | 810                         | 6.9         | 2.7 ± 0.8 | 2                                            | VDRS20W300ByE                     | 596 x301y                    |
| 320                        | 420       | 510                               | 800                                     | 5.0      | 15.0                                                  | 400                                                                                           | 45                          | 5.5         | 2.4 ± 0.8 | 4                                            | VDRS05C320xyE                     | 592 x321y                    |
|                            |           |                                   | 850                                     | 10.0     | 44.0                                                  | 1200                                                                                          | 120                         | 5.5         | 2.4 ± 0.8 | 4                                            | VDRS07H320xyE                     | 593 x321y                    |
|                            |           |                                   | 850                                     | 25.0     | 77.0                                                  | 2500                                                                                          | 220                         | 6.2         | 2.6 ± 0.8 | 4                                            | VDRS10P320xyE                     | 594 x321y                    |
|                            |           |                                   | 850                                     | 50.0     | 120.0                                                 | 4500                                                                                          | 370                         | 6.2         | 2.6 ± 0.8 | 3                                            | VDRS14T320xyE                     | 595 x321y                    |
|                            |           |                                   | 842                                     | 100.0    | 296.0                                                 | 6500                                                                                          | 750                         | 7.1         | 2.9 ± 0.8 | 2                                            | VDRS20W320ByE                     | 596 x321y                    |
| 350                        | 460       | 560                               | 940                                     | 5.0      | 19.5                                                  | 400                                                                                           | 42                          | 5.8         | 2.7 ± 0.8 | 4                                            | VDRS05C350xyE                     | 592 x351y                    |
|                            |           |                                   | 920                                     | 10.0     | 39.0                                                  | 1200                                                                                          | 110                         | 5.8         | 2.7 ± 0.8 | 4                                            | VDRS07H350xyE                     | 593 x351y                    |
|                            |           |                                   | 920                                     | 25.0     | 78.0                                                  | 2500                                                                                          | 200                         | 6.6         | 2.9 ± 0.8 | 4                                            | VDRS10P350xyE                     | 594 x351y                    |
|                            |           |                                   | 920                                     | 50.0     | 156.0                                                 | 4500                                                                                          | 325                         | 6.6         | 2.9 ± 0.8 | 3                                            | VDRS14T350xyE                     | 595 x351y                    |
|                            |           |                                   | 920                                     | 100.0    | 312.0                                                 | 6500                                                                                          | 660                         | 7.4         | 3.2 ± 0.8 | 2                                            | VDRS20W350ByE                     | 596 x351y                    |

## ELECTRICAL DATA AND ORDERING INFORMATION

| MAXIMUM CONTINUOUS VOLTAGE |           | VOLTAGE <sup>(3)</sup><br>at 1 mA | MAXIMUM VOLTAGE<br>at STATED<br>CURRENT |          | MAXIMUM ENERGY <sup>(4)</sup><br>(10 x 1000 µs) | MAXIMUM NON-REP.<br>TRANSIENT<br>CURRENT <sup>(5)</sup><br>I <sub>NRP</sub><br>(8 x 20 µs) | TYPICAL<br>CAP.<br>at 1 kHz | T<br>(max.) | E         | UL 1449<br>ED3<br>SPD<br>TYPE <sup>(8)</sup> | CATALOG<br>NUMBERS <sup>(1)</sup> |           |
|----------------------------|-----------|-----------------------------------|-----------------------------------------|----------|-------------------------------------------------|--------------------------------------------------------------------------------------------|-----------------------------|-------------|-----------|----------------------------------------------|-----------------------------------|-----------|
| RMS <sup>(2)</sup><br>(V)  | DC<br>(V) |                                   | (V)                                     | V<br>(V) |                                                 |                                                                                            |                             |             |           |                                              | I<br>(A)                          | (J)       |
| 385                        | 505       | 620                               | 1000                                    | 5.0      | 18.0                                            | 400                                                                                        | 40                          | 6.0         | 3.0 ± 0.8 | 4                                            | VDRS05C385xyE                     | 592 x381y |
|                            |           |                                   | 1025                                    | 10.0     | 51.0                                            | 1200                                                                                       | 95                          | 6.0         | 3.0 ± 0.8 | 4                                            | VDRS07H385xyE                     | 593 x381y |
|                            |           |                                   | 1025                                    | 25.0     | 67.0                                            | 2500                                                                                       | 180                         | 6.6         | 3.2 ± 0.8 | 4                                            | VDRS10P385xyE                     | 594 x381y |
|                            |           |                                   | 1025                                    | 50.0     | 110.0                                           | 4500                                                                                       | 280                         | 6.6         | 3.2 ± 0.8 | 3                                            | VDRS14T385xyE                     | 595 x381y |
|                            |           |                                   | 1025                                    | 100.0    | 328.0                                           | 6500                                                                                       | 570                         | 7.7         | 3.5 ± 0.8 | 2                                            | VDRS20W385ByE                     | 596 x381y |
| 420                        | 560       | 680                               | 1100                                    | 5.0      | 20.0                                            | 400                                                                                        | 35                          | 6.1         | 3.2 ± 0.8 | 4                                            | VDRS05C420xyE                     | 592 x421y |
|                            |           |                                   | 1120                                    | 10.0     | 56.0                                            | 1200                                                                                       | 85                          | 6.1         | 3.2 ± 0.8 | 4                                            | VDRS07H420xyE                     | 593 x421y |
|                            |           |                                   | 1120                                    | 25.0     | 73.0                                            | 2500                                                                                       | 165                         | 6.6         | 3.4 ± 0.8 | 4                                            | VDRS10P420xyE                     | 594 x421y |
|                            |           |                                   | 1120                                    | 50.0     | 120.0                                           | 4500                                                                                       | 250                         | 6.6         | 3.4 ± 0.8 | 3                                            | VDRS14T420xyE                     | 595 x421y |
|                            |           |                                   | 1120                                    | 100.0    | 344.0                                           | 6500                                                                                       | 510                         | 8.1         | 3.7 ± 0.8 | 2                                            | VDRS20W420ByE                     | 596 x421y |
| 460                        | 615       | 750                               | 1200                                    | 5.0      | 21.0                                            | 400                                                                                        | 30                          | 6.4         | 3.6 ± 0.8 | 4                                            | VDRS05C460xyE                     | 592 x461y |
|                            |           |                                   | 1240                                    | 10.0     | 63.0                                            | 1200                                                                                       | 75                          | 6.4         | 3.6 ± 0.8 | 4                                            | VDRS07H460xyE                     | 593 x461y |
|                            |           |                                   | 1240                                    | 25.0     | 82.0                                            | 2500                                                                                       | 150                         | 6.8         | 3.8 ± 0.8 | 4                                            | VDRS10P460xyE                     | 594 x461y |
|                            |           |                                   | 1240                                    | 50.0     | 135.0                                           | 4500                                                                                       | 225                         | 6.8         | 3.8 ± 0.8 | 3                                            | VDRS14T460xyE                     | 595 x461y |
|                            |           |                                   | 1240                                    | 100.0    | 360.0                                           | 6500                                                                                       | 460                         | 8.5         | 4.1 ± 0.8 | 2                                            | VDRS20W460ByE                     | 596 x461y |
| 510                        | 670       | 820                               | 1355                                    | 25.0     | 89.0                                            | 2500                                                                                       | 135                         | 7.2         | 4.1 ± 0.8 | 4                                            | VDRS10P510xyE                     | 594 x511y |
|                            |           |                                   | 1355                                    | 50.0     | 145.0                                           | 4500                                                                                       | 220                         | 7.2         | 4.1 ± 0.8 | 3                                            | VDRS14T510xyE                     | 595 x511y |
|                            |           |                                   | 1355                                    | 100.0    | 376.0                                           | 6500                                                                                       | 450                         | 8.9         | 4.4 ± 0.8 | 2                                            | VDRS20W510ByE                     | 596 x511y |
| 550                        | 745       | 910                               | 1500                                    | 25.0     | 98.0                                            | 2500                                                                                       | 120                         | 7.9         | 4.5 ± 0.8 | 4                                            | VDRS10P550xyE                     | 594 x551y |
|                            |           |                                   | 1500                                    | 50.0     | 160.0                                           | 4500                                                                                       | 180                         | 7.9         | 4.5 ± 0.8 | 3                                            | VDRS14T550xyE                     | 595 x551y |
|                            |           |                                   | 1500                                    | 100.0    | 408.0                                           | 6500                                                                                       | 370                         | 9.5         | 4.9 ± 0.8 | 2                                            | VDRS20W550ByE                     | 596 x551y |
| 625                        | 825       | 1000                              | 1650                                    | 100.0    | 448.0                                           | 6500                                                                                       | 320                         | 10.1        | 5.3 ± 0.8 | 2                                            | VDRS20W625ByE                     | 596 x621y |
| 680                        | 895       | 1100                              | 1815                                    | 100.0    | 496.0                                           | 6500                                                                                       | 270                         | 10.6        | 5.8 ± 0.8 | 2                                            | VDRS20W680ByE                     | 596 x681y |

## Notes

- (1) The products are certified according to (c)UL (E332800), VDE (4002622) and CSA (219883).
- (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  $10 \times 1000 \mu\text{s}$  is given as a reference for longer duration pulses. This pulse can be characterised by peak current ( $I_p$ ) and pulse width  $t_2$  (virtual time of half  $I_p$  value, following IEC 60060-2, section 6). 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:  
a) K is dependent on the value of  $t_2$  when the value of  $t_1$  is between  $8 \mu\text{s}$  and  $10 \mu\text{s}$ ; see Peak Current as a Function of Pulse Width drawing.
- (5) A current wave of  $8 \times 20 \mu\text{s}$  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 12NC part number replace “x” and “y” by figures from the sections “Varistors in Bulk”, “Varistors on Tape in Ammopack” and “Varistors on Tape on Reel”.
- (7) For composition of the SAP part number:

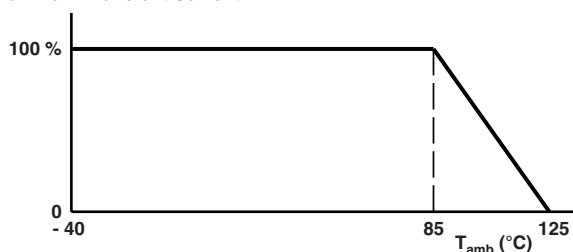
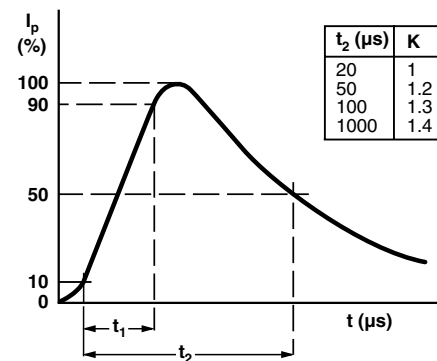
|                         |                                                                                        |
|-------------------------|----------------------------------------------------------------------------------------|
| Replace “x” by          | Replace “y” by                                                                         |
| B for bulk type         | S for straight leads                                                                   |
| T for tape and reel     | F for straight leads with flange (bulk only)                                           |
| A for tape and ammopack | G for straight leads with flange and $H_0 = 16 \text{ mm}$ (tape and reel/ammopack)    |
|                         | H for straight leads with flange and $H_0 = 18.25 \text{ mm}$ (tape and reel/ammopack) |
|                         | K for kinked leads (bulk only)                                                         |
|                         | L for kinked leads with $H_0 = 16 \text{ mm}$ (tape and reel/ammopack)                 |
|                         | M for kinked leads with $H_0 = 18.25 \text{ mm}$ (tape and reel/ammopack)              |
- (8) All varistors are recognized under VZAC2 surge protective devices, components type 4 as specified in UL 1449 edition 3. The parts with indication type 2 or 3 SPD's, are tested and certified to be used in type 2 or 3 SPD applications. 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                                                                      | 14 to 680     | V    |
| DC                                                                       | 18 to 895     | V    |
| Maximum non-repetitive transient current ( $I_{NRP}$ ) (8 x 20 $\mu$ s): |               |      |
| VDRS05.....E/2381 592 ....                                               | 100 or 400    | A    |
| VDRS07.....E/2381 593 ....                                               | 250 or 1200   | A    |
| VDRS10.....E/2381 594 ....                                               | 500 or 2500   | A    |
| VDRS14.....E/2381 595 ....                                               | 1000 or 4500  | A    |
| VDRS20.....E/2381 596 ....                                               | 2000 or 6500  | A    |
| Thermal resistance:                                                      |               |      |
| VDRS05.....E/2381 592 ....                                               | $\approx 80$  | K/W  |
| VDRS07.....E/2381 593 ....                                               | $\approx 70$  | K/W  |
| VDRS10.....E/2381 594 ....                                               | $\approx 60$  | K/W  |
| VDRS14.....E/2381 595 ....                                               | $\approx 50$  | K/W  |
| VDRS20.....E/2381 596 ....                                               | $\approx 40$  | K/W  |
| Maximum dissipation:                                                     |               |      |
| VDRS05.....E/2381 592 ....                                               | 100           | mW   |
| VDRS07.....E/2381 593 ....                                               | 250           | mW   |
| VDRS10.....E/2381 594 ....                                               | 400           | mW   |
| VDRS14.....E/2381 595 ....                                               | 600           | mW   |
| VDRS20.....E/2381 596 ....                                               | 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 + 125 | °C   |
| Operating temperature                                                    | - 40 to + 85  | °C   |

**DERATING CURVE**

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             |
|--------|--------|---------------------|--------|-----------------------|------------------|----------------|---------------|----------------------------|
| 7.0    | 9.0    | 11.0                | 24.0   | 6.5                   | 0.7 to 3.6       | 0.6 $\pm$ 0.05 | 5 $\pm$ 1.0   | VDRS05.....E/2381 592 .... |
| 9.0    | 11.0   | 13.0                | 24.0   | 6.5                   | 0.7 to 3.6       | 0.6 $\pm$ 0.05 | 5 $\pm$ 1.0   | VDRS07.....E/2381 593 .... |
| 13.5   | 15.5   | 18.0                | 17.0   | 8                     | 0.9 to 4.5       | 0.8 $\pm$ 0.05 | 7.5 $\pm$ 1.0 | VDRS10.....E/2381 594 .... |
| 17.0   | 19.0   | 23.0                | 16.0   | 8                     | 0.9 to 4.5       | 0.8 $\pm$ 0.05 | 7.5 $\pm$ 1.0 | VDRS14.....E/2381 595 .... |
| 23.0   | 25.0   | 28.0                | 24.0   | 10                    | 1.1 to 5.8       | 1.0 $\pm$ 0.05 | 10 $\pm$ 1.0  | VDRS20.....E/2381 596 .... |

**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**

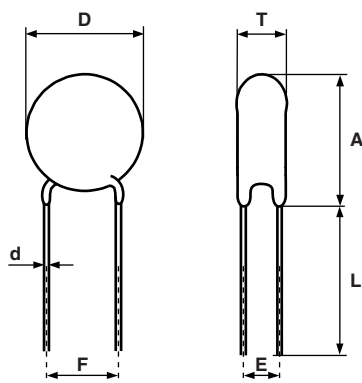
| TYPE                                                                                 | VDRS05...<br>2381 592 ...<br>Ø 5 mm<br>14 V to 460 V | VDRS07...<br>2381 593 .....<br>Ø 7 mm<br>14 V to 460 V | VDRS10...<br>2381 594 .....<br>Ø 10 mm<br>14 V to 550 V | VDRS14...<br>2381 595 .....<br>Ø 14 mm<br>14 V to 550 V | VDRS20...<br>2381 596 .....<br>Ø 20 mm<br>14 V to 680 V |
|--------------------------------------------------------------------------------------|------------------------------------------------------|--------------------------------------------------------|---------------------------------------------------------|---------------------------------------------------------|---------------------------------------------------------|
| Straight leads; see outline of components with straight leads drawing <sup>(1)</sup> | BSE<br>5...6                                         | BSE<br>5...6                                           | BSE<br>5...6                                            | BSE<br>5...6                                            | BSE<br>5...6                                            |
| Straight leads with flange; see outline of components with flanged leads drawing     | BFE<br>7...6                                         | BFE<br>7...6                                           | -                                                       | -                                                       | -                                                       |
| Kinked leads; see outline of components with kinked leads drawing                    | BKE<br>6...6                                         | BKE<br>6...6                                           | BKE<br>6...6                                            | BKE<br>6...6                                            | BKE<br>6...6                                            |
| <b>Packaging quantities</b>                                                          |                                                      |                                                        |                                                         |                                                         |                                                         |
| 14 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                                                      |

**Note**

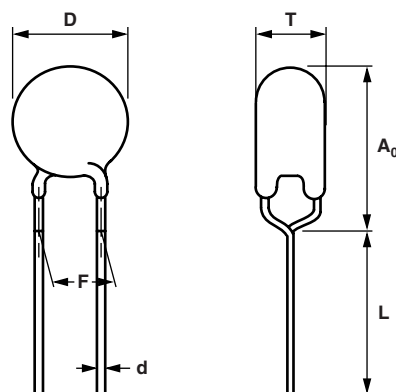
<sup>(1)</sup> Outline of the Ø 20 mm differs from the other dimensions

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

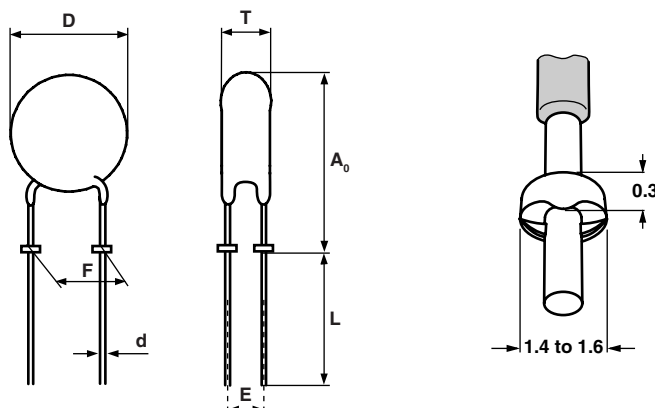
**OUTLINE** of Component with Straight Leads



**OUTLINE** of Component with Kinked Leads

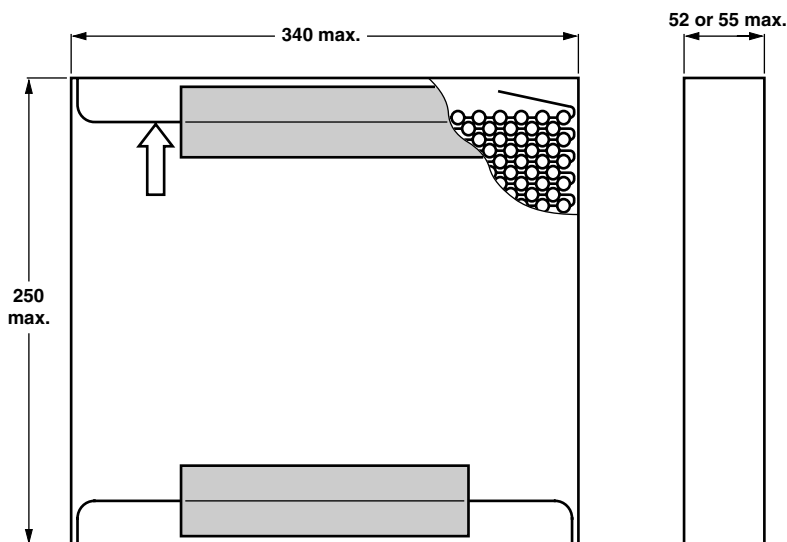


**OUTLINE** of Component with Flanged Leads



| VARISTORS ON TAPE IN AMMOPACK                  |                                                      |                                                      |                                                       |                                                       |
|------------------------------------------------|------------------------------------------------------|------------------------------------------------------|-------------------------------------------------------|-------------------------------------------------------|
| TYPE                                           | VDRS05...<br>2381 592 ...<br>Ø 5 mm<br>14 V to 460 V | VDRS07...<br>2381 593 ...<br>Ø 7 mm<br>14 V to 460 V | VDRS10...<br>2381 594 ...<br>Ø 10 mm<br>14 V to 550 V | VDRS14...<br>2381 595 ...<br>Ø 14 mm<br>14 V to 550 V |
| Straight leads                                 |                                                      |                                                      |                                                       |                                                       |
| H = 18 mm                                      | -                                                    | -                                                    | ASE<br>0...7                                          | ASE<br>0...7                                          |
| H = 20 mm                                      | ASE<br>0...7                                         | ASE<br>0...7                                         | -                                                     | -                                                     |
| See drawing: Taped version with straight leads |                                                      |                                                      |                                                       |                                                       |
| Straight leads with flange                     |                                                      |                                                      |                                                       |                                                       |
| H <sub>0</sub> = 16 mm                         | AGE<br>1...7                                         | AGE<br>1...7                                         | -                                                     | -                                                     |
| H <sub>0</sub> = 18.25 mm                      | AHE<br>2...7                                         | AHE<br>2...7                                         | -                                                     | -                                                     |
| See drawing: Taped version with flanged leads  |                                                      |                                                      |                                                       |                                                       |
| Kinked leads                                   |                                                      |                                                      |                                                       |                                                       |
| H <sub>0</sub> = 18.25 mm                      | AME<br>3...7                                         | AME<br>3...7                                         | AME<br>3...7                                          | AME<br>3...7                                          |
| H <sub>0</sub> = 16 mm                         | ALE<br>8...7                                         | ALE<br>8...7                                         | ALE<br>8...7                                          | ALE<br>8...7                                          |
| See drawing: Taped version with kinked leads   |                                                      |                                                      |                                                       |                                                       |
| Packaging quantities                           |                                                      |                                                      |                                                       |                                                       |
| 14 V to 210 V                                  | 1500 <sup>(1)</sup>                                  | 1500 <sup>(1)</sup>                                  | 500                                                   | 500                                                   |
| 230 V to max. V                                | 1000                                                 | 1000                                                 | 500                                                   | 500                                                   |

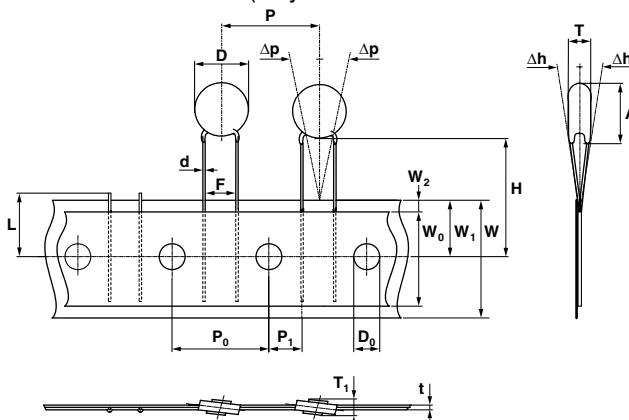
**Note**
<sup>(1)</sup> Except for 35 V and 40 V = 1000 pieces

**DIMENSIONS OF AMMOPACK** in millimeters


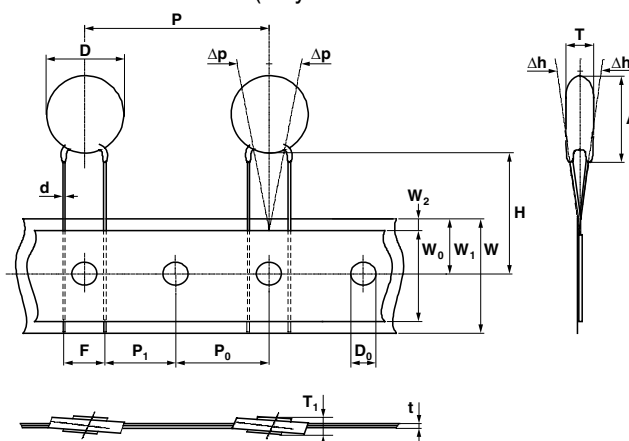
| VARISTORS ON TAPE AND REEL                     |                                                      |                                                      |                                                       |                                                       |
|------------------------------------------------|------------------------------------------------------|------------------------------------------------------|-------------------------------------------------------|-------------------------------------------------------|
| TYPE                                           | VDRS05...<br>2381 592 ...<br>Ø 5 mm<br>14 V to 460 V | VDRS07...<br>2381 593 ...<br>Ø 7 mm<br>14 V to 460 V | VDRS10...<br>2381 594 ...<br>Ø 10 mm<br>14 V to 550 V | VDRS14...<br>2381 595 ...<br>Ø 14 mm<br>14 V to 550 V |
| Straight leads                                 |                                                      |                                                      |                                                       |                                                       |
| H = 18 mm                                      | -                                                    | -                                                    | TSE<br>0...6                                          | TSE<br>0...6                                          |
| H = 20 mm                                      | TSE<br>0...6                                         | TSE<br>0...6                                         | -                                                     | -                                                     |
| See drawing: Taped version with straight leads |                                                      |                                                      |                                                       |                                                       |
| Straight leads with flange                     |                                                      |                                                      |                                                       |                                                       |
| H <sub>0</sub> = 16 mm                         | TGE<br>1...6                                         | TGE<br>1...6                                         | -                                                     | -                                                     |
| H <sub>0</sub> = 18.25 mm                      | THE<br>2...6                                         | THE<br>2...6                                         | -                                                     | -                                                     |
| See drawing: Taped version with flanged leads  |                                                      |                                                      |                                                       |                                                       |
| Kinked leads                                   |                                                      |                                                      |                                                       |                                                       |
| H <sub>0</sub> = 18.25 mm                      | TME<br>3...6                                         | TME<br>3...6                                         | TME<br>3...6                                          | TME<br>3...6                                          |
| H <sub>0</sub> = 16 mm                         | TLE<br>8...6                                         | TLE<br>8...6                                         | TLE<br>8...6                                          | TLE<br>8...6                                          |
| See drawing: Taped version with kinked leads   |                                                      |                                                      |                                                       |                                                       |
| <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 VDRS05.....E/2381 592 .... and VDRS07.....E/2381 593....)

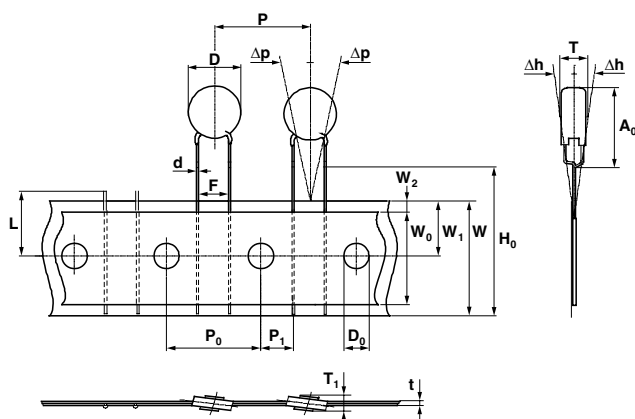


### TAPED VERSION WITH STRAIGHT LEADS (only for VDRS10.....E/2381 594 .... and VDRS14.....E/2381 595 ....)

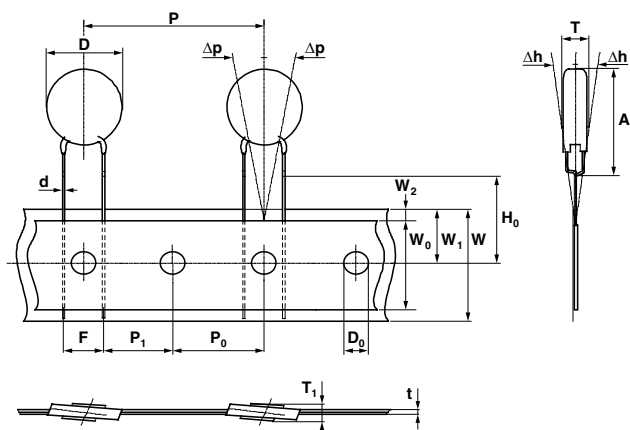


**TAPED VERSION WITH KINKED LEADS**

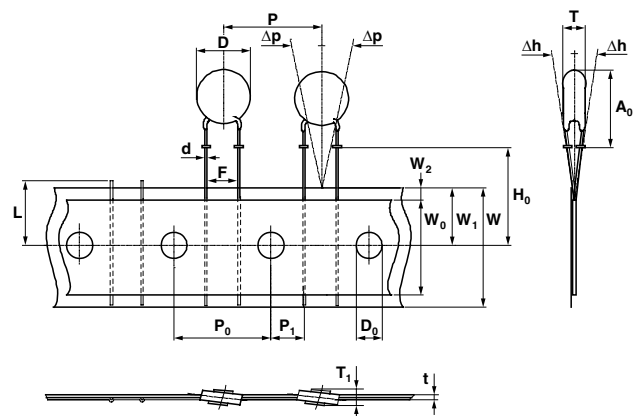
(only for VDRS05.....E/2381 592 .... and  
VDRS07.....E/2381 593 ....)

**TAPED VERSION WITH KINKED LEADS**

(only for VDRS10.....E/2381 594 .... and  
VDRS14.....E/2381 595.....)

**TAPED VERSION WITH FLANGED LEADS**

(only for VDRS05.....E/2381 592 .... and  
VDRS07.....E/2381 593 ....)

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

| SYMBOL         | PARAMETER                                        | DIMENSIONS/TOLERANCE      |               |                  |               |
|----------------|--------------------------------------------------|---------------------------|---------------|------------------|---------------|
|                |                                                  | VDRS05<br>592             | VDRS07<br>593 | VDRS10<br>594    | VDRS14<br>595 |
| A              | Mounting height                                  | 9.0<br>max.               | 11.0<br>max.  | 15.5<br>max.     | 19.0<br>max.  |
| A <sub>0</sub> | Mounting height                                  | 11.0<br>max.              | 13.0<br>max.  | 18.0<br>max.     | 23.0<br>max.  |
| D              | Body diameter                                    | 7.0<br>max.               | 9.0<br>max.   | 13.5<br>max.     | 17.0<br>max.  |
| 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**

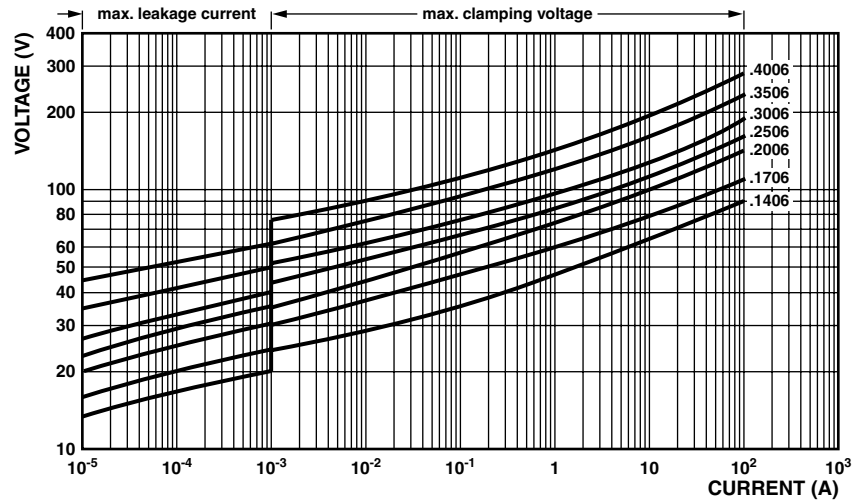
<sup>(1)</sup> Guaranteed between component and tape

<sup>(2)</sup> For 2381 595 0511y and 2381 595 0551y: H = 20 mm ± 1 mm

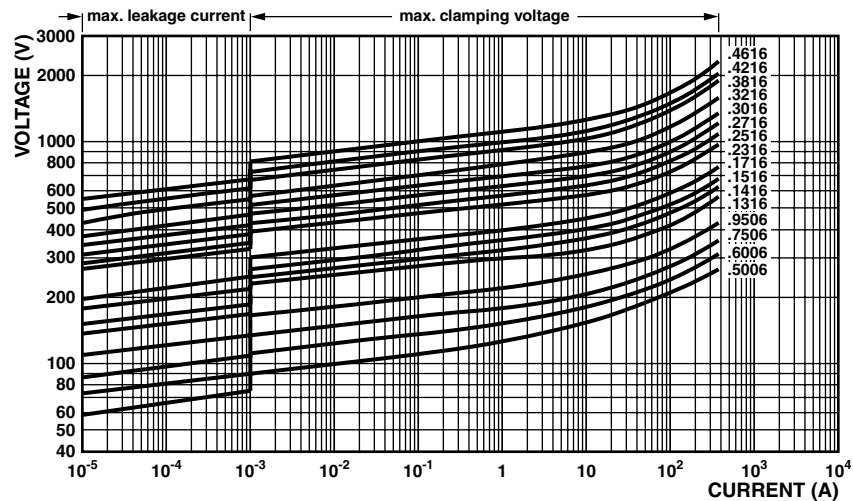


## V/I CHARACTERISTICS

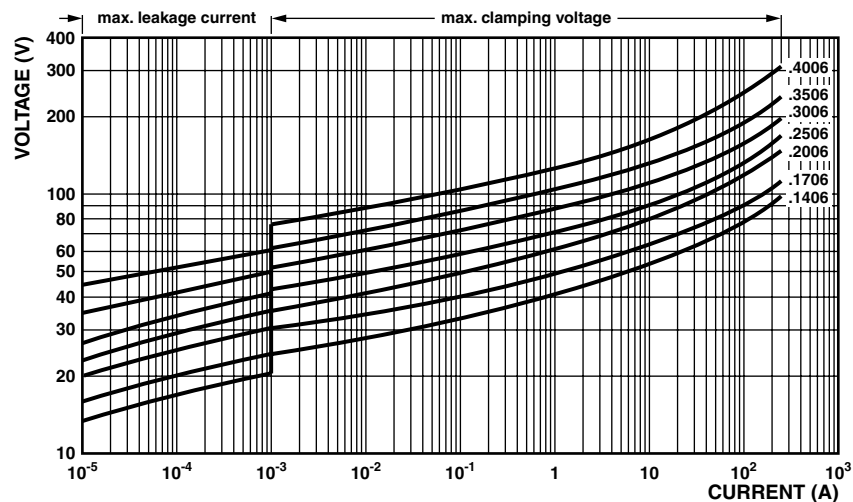
14 V<sub>RMS</sub> to 40 V<sub>RMS</sub>; VDRS05.....E/2381 592 ....



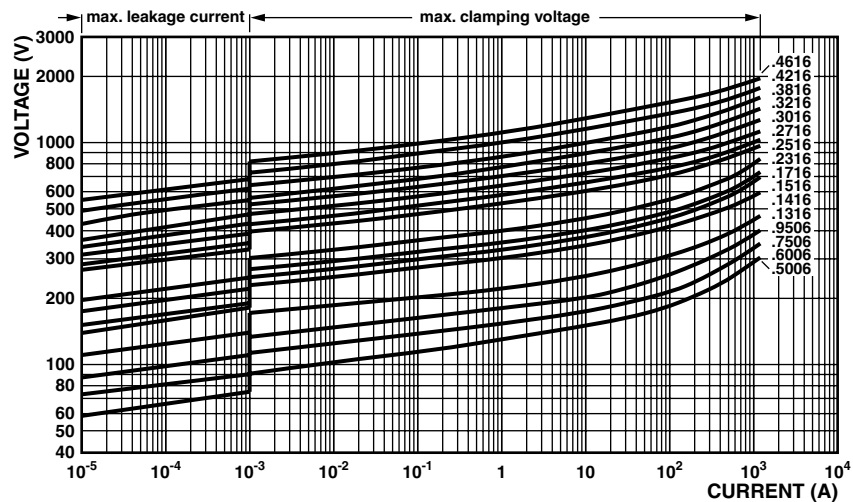
50 V<sub>RMS</sub> to 460 V<sub>RMS</sub>; VDRS05.....E/2381 592 ....



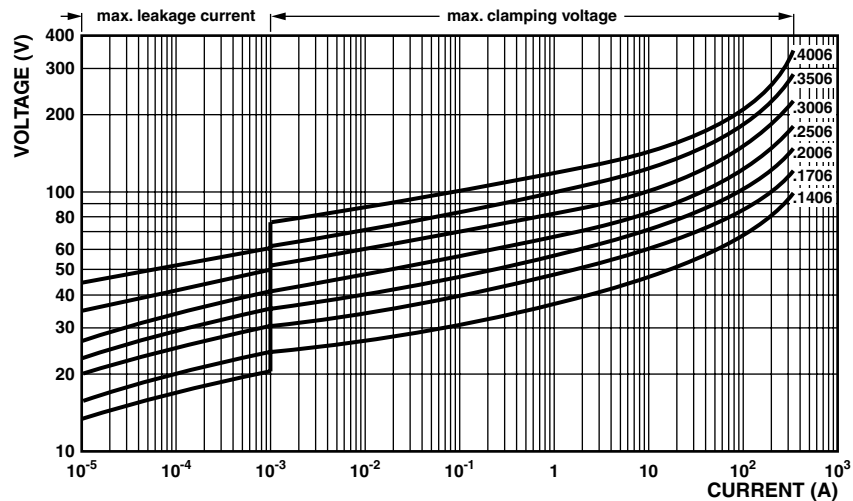
14 V<sub>RMS</sub> to 40 V<sub>RMS</sub>; VDRS07.....E/2381 593 ....



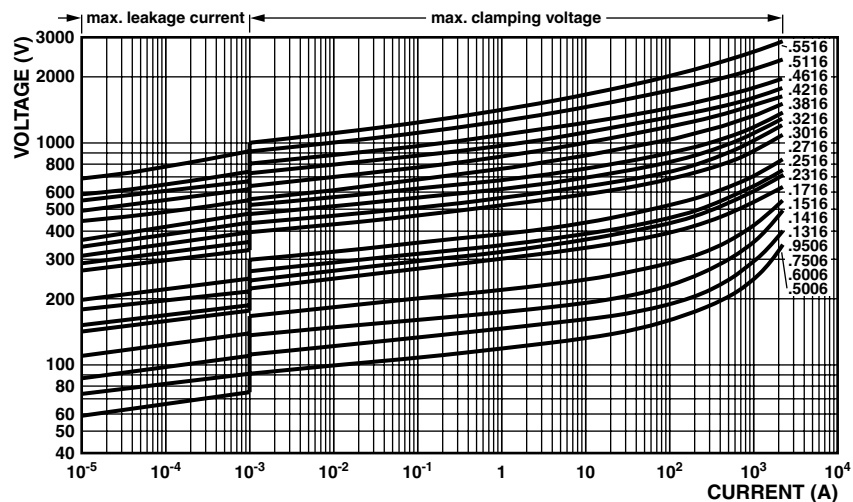
50 V<sub>RMS</sub> to 460 V<sub>RMS</sub>; VDRS07.....E/2381 593 ....



14 V<sub>RMS</sub> to 40 V<sub>RMS</sub>; VDRS10.....E/2381 594 ....

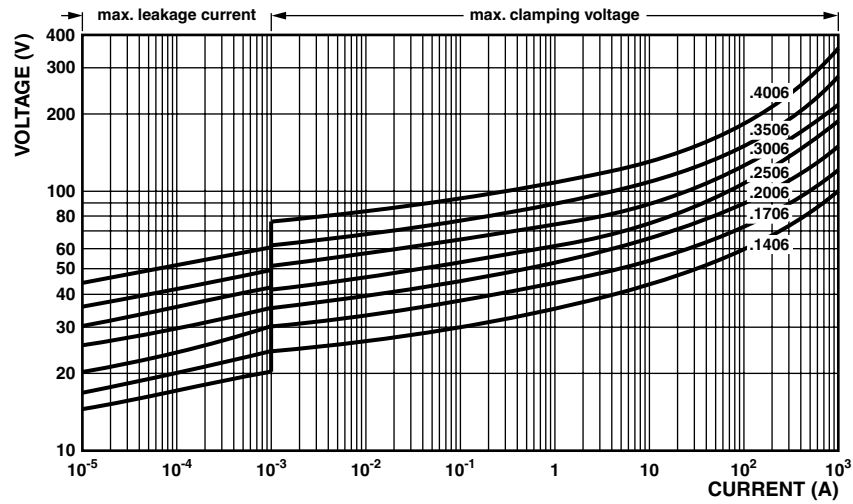


50 V<sub>RMS</sub> to 550 V<sub>RMS</sub>; VDRS10.....E/2381 594 ....

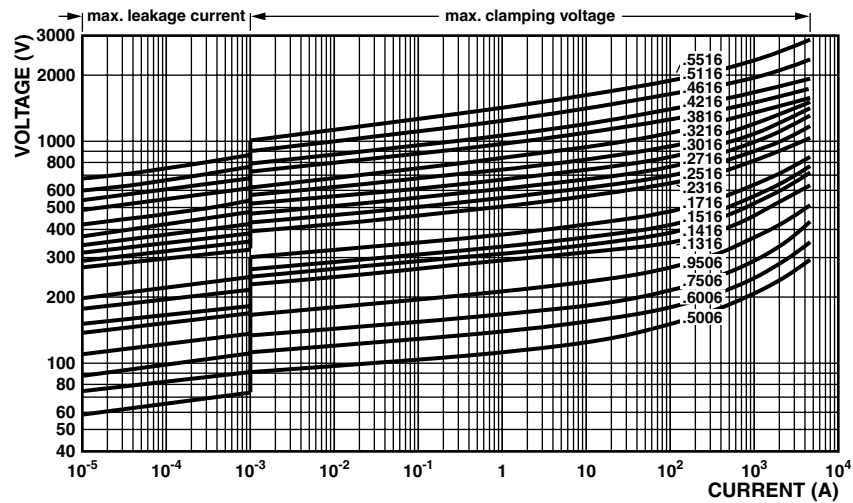




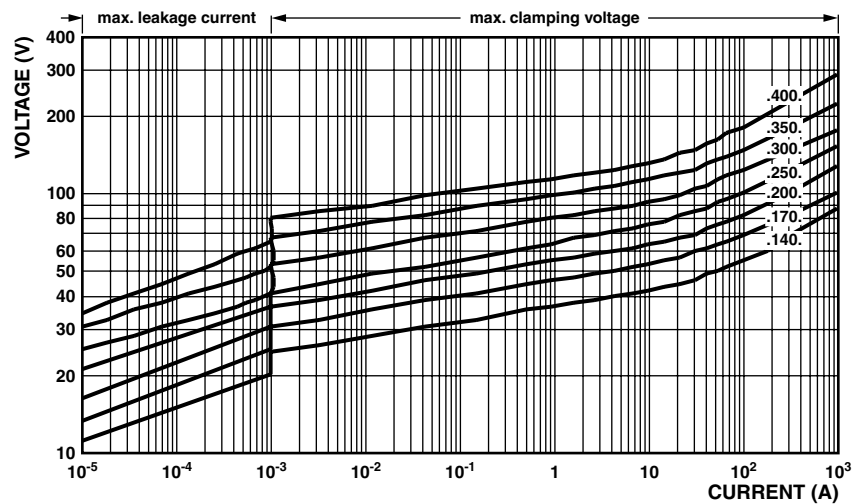
14 V<sub>RMS</sub> to 40 V<sub>RMS</sub>; VDRS14.....E/2381 595 ....



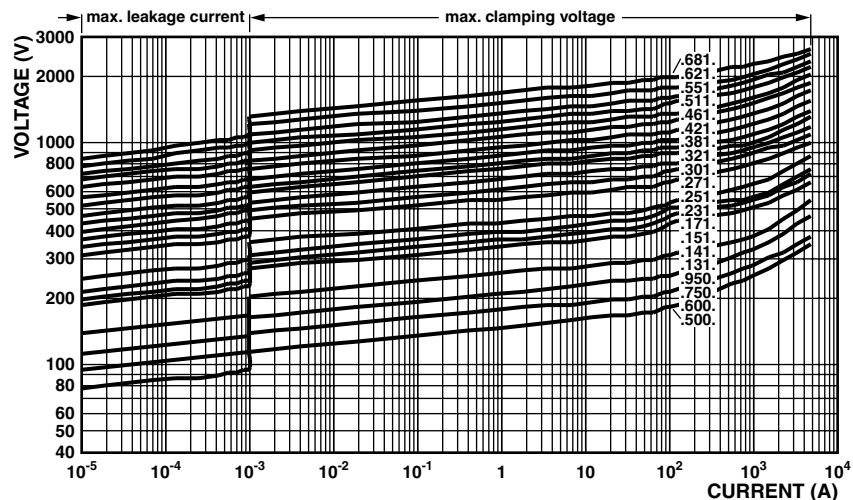
50 V<sub>RMS</sub> to 550 V<sub>RMS</sub>; VDRS14.....E/2381 595 ....



14 V<sub>RMS</sub> to 40 V<sub>RMS</sub>; VDRS20.....E/2381 596 ....

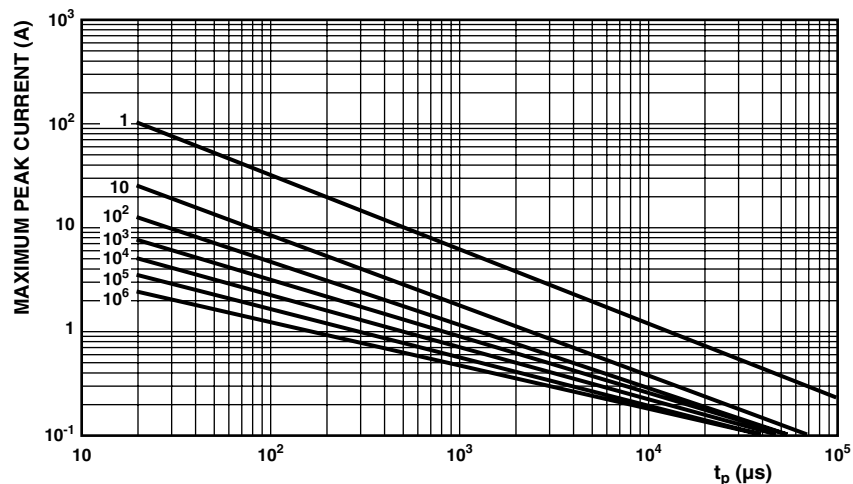


50 V<sub>RMS</sub> to 680 V<sub>RMS</sub>; VDRS20.....E/2381 596 ....

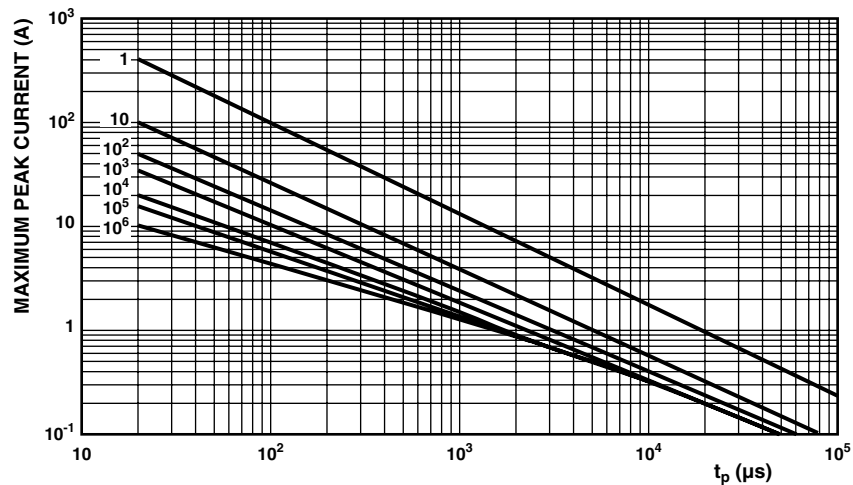


### MAXIMUM APPLICABLE TRANSIENT CURRENT AS A FUNCTION OF PULSE DURATION

14 V<sub>RMS</sub> to 40 V<sub>RMS</sub>; VDRS05.....E/2381 592 ....

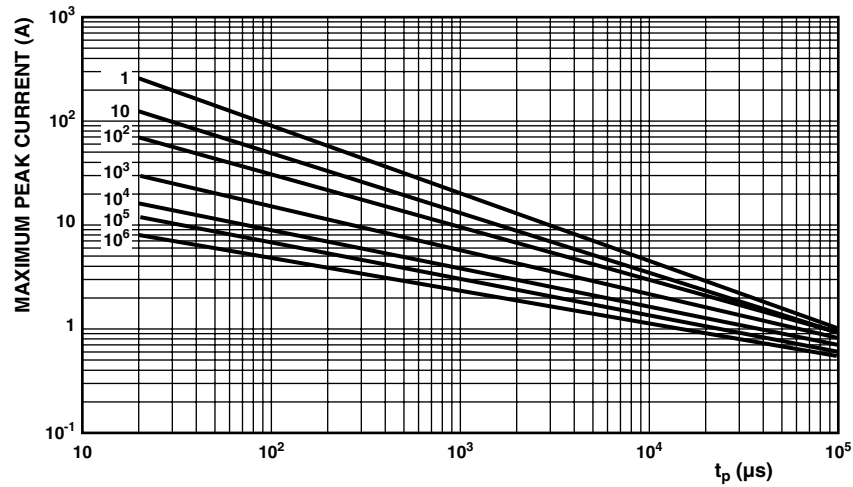


50 V<sub>RMS</sub> to 460 V<sub>RMS</sub>; VDRS05.....E/2381 592 ....

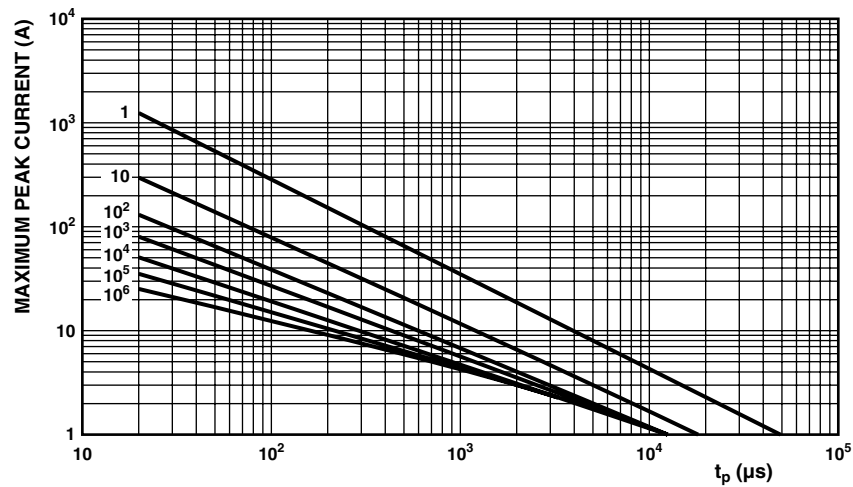




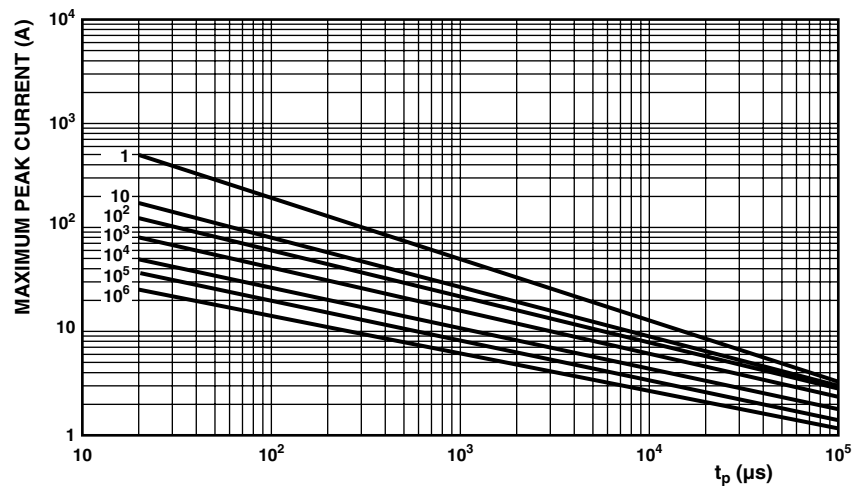
14 V<sub>RMS</sub> to 40 V<sub>RMS</sub>; VDRS07.....E/2381 593 ....



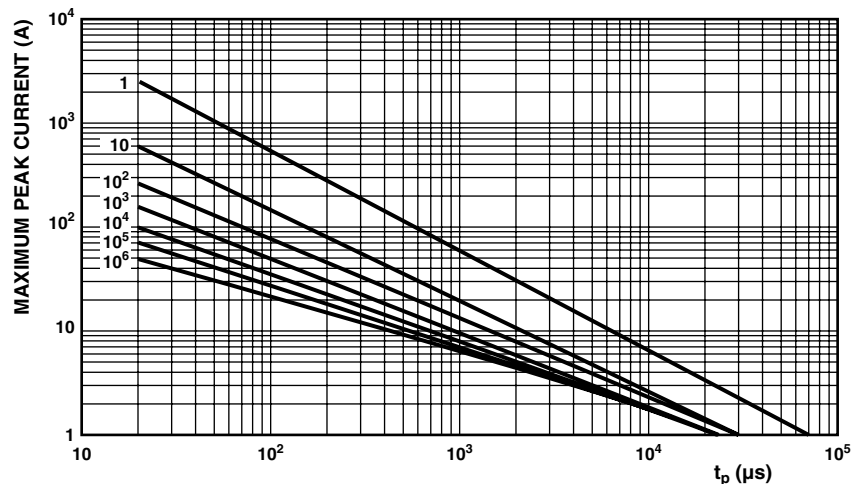
50 V<sub>RMS</sub> to 460 V<sub>RMS</sub>; VDRS07.....E/2381 593 ....



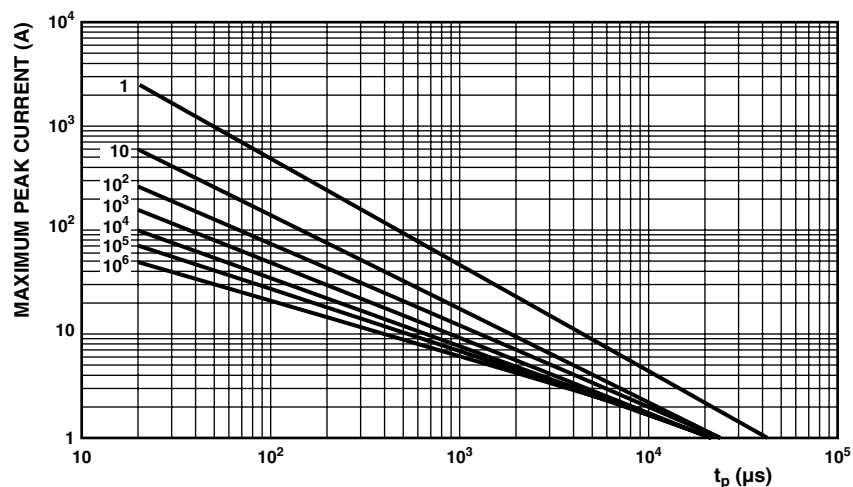
14 V<sub>RMS</sub> to 40 V<sub>RMS</sub>; VDRS10.....E/2381 594 ....



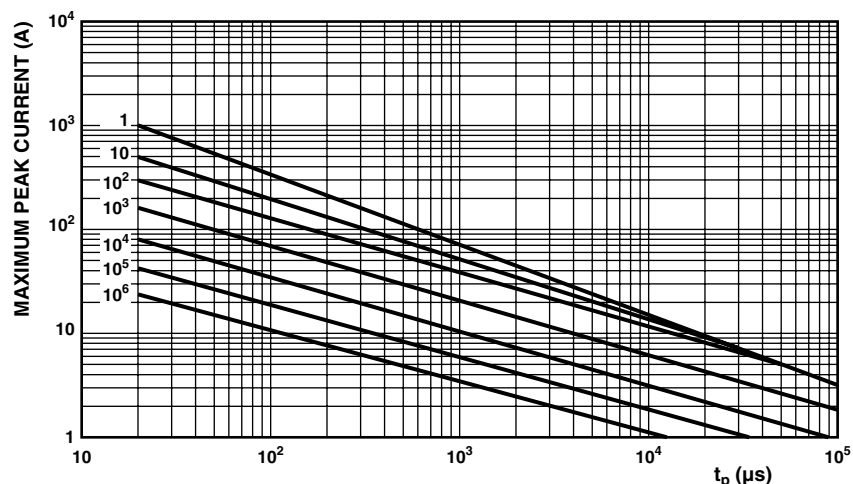
50 V<sub>RMS</sub> to 320 V<sub>RMS</sub>; VDRS10.....E/2381 594 ....



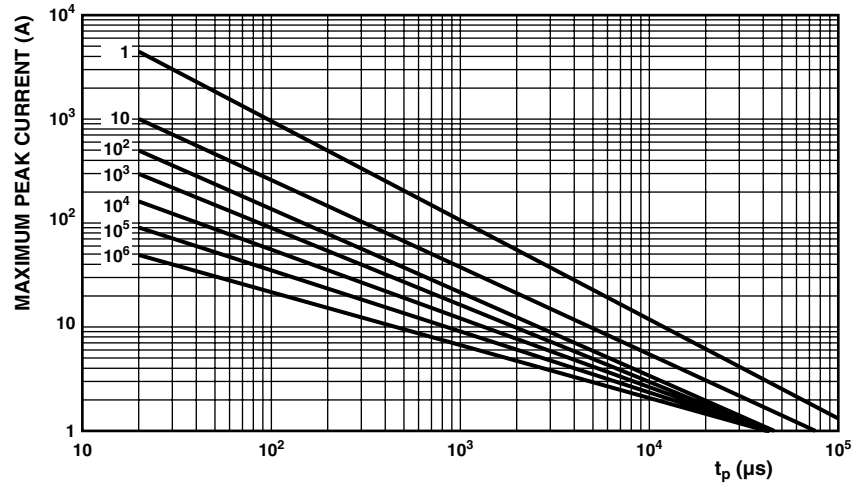
385 V<sub>RMS</sub> to 550 V<sub>RMS</sub>; VDRS10.....E/2381 594 ....



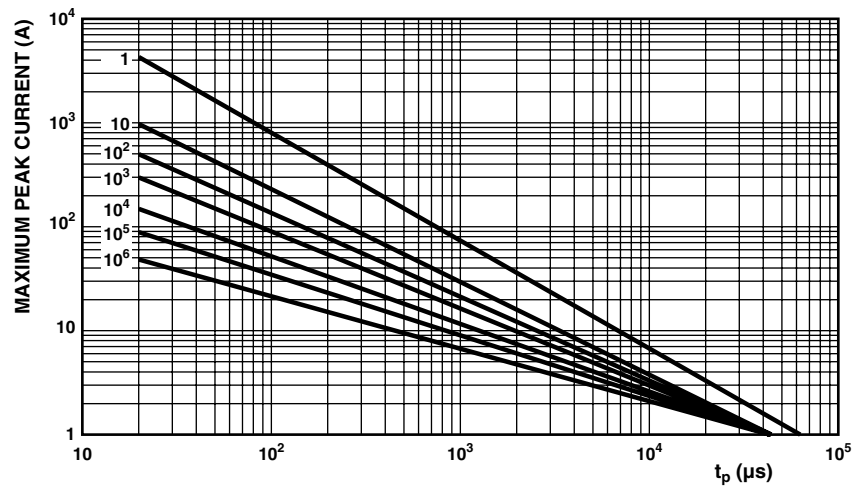
14 V<sub>RMS</sub> to 40 V<sub>RMS</sub>; VDRS14.....E/2381 595 ....



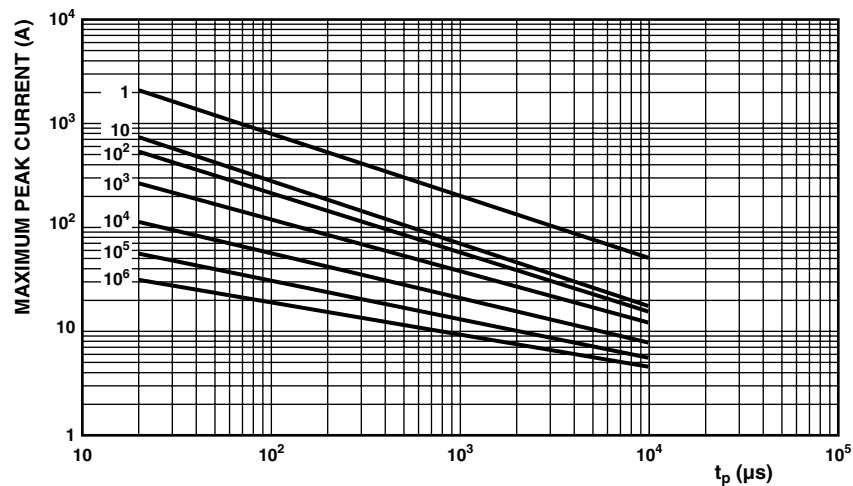
50 V<sub>RMS</sub> to 320 V<sub>RMS</sub>; VDRS14.....E/2381 595 ....



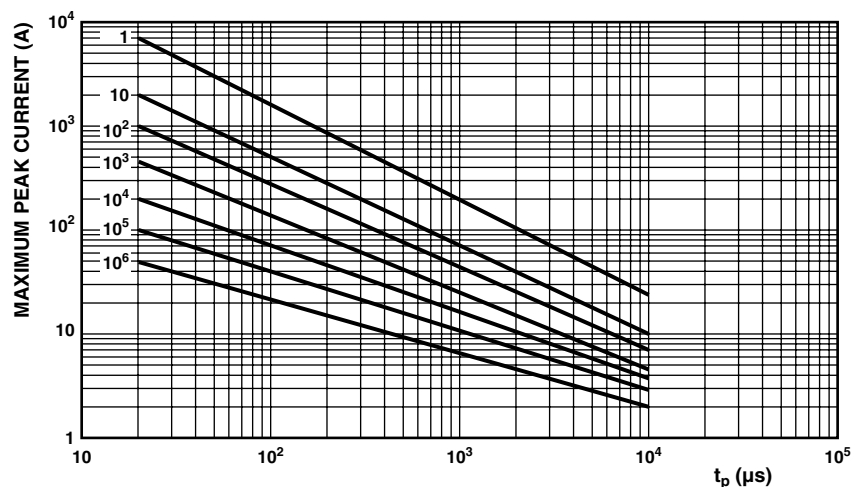
385 V<sub>RMS</sub> to 550 V<sub>RMS</sub>; VDRS14.....E/2381 595 ....



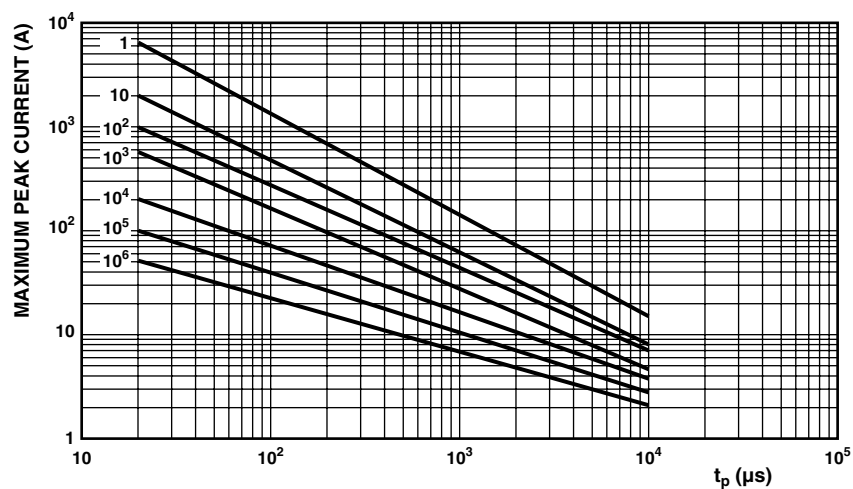
14 V<sub>RMS</sub> to 40 V<sub>RMS</sub>; VDRS20.....E/2381 596 ....



60 V<sub>RMS</sub> to 300 V<sub>RMS</sub>; VDRS20.....E/2381 596 ....



320 V<sub>RMS</sub> to 680 V<sub>RMS</sub>; VDRS20.....E/2381 596 ....





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