

## VDR Metal Oxide Varistors Standard



### 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-β 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.

| 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 μs) | 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.

| ELECTRICAL DATA AND ORDERING INFORMATION |        |                                |                                   |       |                                              |                                                                         |                       |          |           |                                     |                                |                           |
|------------------------------------------|--------|--------------------------------|-----------------------------------|-------|----------------------------------------------|-------------------------------------------------------------------------|-----------------------|----------|-----------|-------------------------------------|--------------------------------|---------------------------|
| MAXIMUM CONTINUOUS VOLTAGE               |        | VOLTAGE <sup>(3)</sup> at 1 mA | MAXIMUM VOLTAGE at STATED CURRENT |       | MAXIMUM ENERGY <sup>(4)</sup> (10 x 1000 μs) | MAXIMUM NON-REP. TRANSIENT CURRENT <sup>(5)</sup> $I_{NRP}$ (8 x 20 μs) | 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 ± 0.3 | 4                                   | VDRS05A014xyE                  | 592 x140y                 |
|                                          |        |                                | 43                                | 2.5   | 1.7                                          | 250                                                                     | 2800                  | 4.1      | 0.7 ± 0.3 | 4                                   | VDRS07B014xyE                  | 593 x140y                 |
|                                          |        |                                | 43                                | 5.0   | 4.3                                          | 500                                                                     | 6000                  | 4.4      | 0.9 ± 0.3 | 4                                   | VDRS10D014xyE                  | 594 x140y                 |
|                                          |        |                                | 43                                | 10.0  | 5.4                                          | 1000                                                                    | 15 000                | 4.4      | 0.9 ± 0.3 | 4                                   | VDRS14G014xyE                  | 595 x140y                 |
|                                          |        |                                | 43                                | 20.0  | 8.0                                          | 2000                                                                    | 30 000                | 4.6      | 1.1 ± 0.3 | 4                                   | VDRS20M014ByE                  | 596 x140y                 |



**ELECTRICAL DATA AND ORDERING INFORMATION**

| MAXIMUM CONTINUOUS VOLTAGE |        | VOLTAGE <sup>(3)</sup> at 1 mA | MAXIMUM VOLTAGE at STATED CURRENT |       | MAXIMUM ENERGY <sup>(4)</sup> (10 x 1000 µs) | MAXIMUM NON-REP. TRANSIENT CURRENT <sup>(5)</sup> I <sub>NRP</sub> (8 x 20 µs) | TYPICAL 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- |
| 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                 |
| 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 | 56.0                                         | 6500                                                                           | 4700                  | 4.5      | 1.1 ± 0.3 | 2                                   | VDRS20W060ByE                  | 596 x600y                 |
| 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 | 64.0                                         | 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 | 88.0                                         | 6500                                                                           | 3000                  | 5.2      | 1.5 ± 0.3 | 2                                   | VDRS20W095ByE                  | 596 x950y                 |



| ELECTRICAL DATA AND ORDERING INFORMATION |        |                                |                                   |       |                                              |                                                                                |                       |          |           |                                     |                                |                           |
|------------------------------------------|--------|--------------------------------|-----------------------------------|-------|----------------------------------------------|--------------------------------------------------------------------------------|-----------------------|----------|-----------|-------------------------------------|--------------------------------|---------------------------|
| MAXIMUM CONTINUOUS VOLTAGE               |        | VOLTAGE <sup>(3)</sup> at 1 mA | MAXIMUM VOLTAGE at STATED CURRENT |       | MAXIMUM ENERGY <sup>(4)</sup> (10 x 1000 µs) | MAXIMUM NON-REP. TRANSIENT CURRENT <sup>(5)</sup> I <sub>NRP</sub> (8 x 20 µs) | TYPICAL 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- |
| 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 CHARACTERISTICS**

| ELECTRICAL DATA                                                          |               |              |
|--------------------------------------------------------------------------|---------------|--------------|
| 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 | $^{\circ}$ C |
| Operating temperature                                                    | - 40 to + 85  | $^{\circ}$ C |

**DERATING CURVE**



**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

| <b>VARISTORS IN BULK</b>                                                             |                                                                |                                                                  |                                                                   |                                                                   |                                                                   |
|--------------------------------------------------------------------------------------|----------------------------------------------------------------|------------------------------------------------------------------|-------------------------------------------------------------------|-------------------------------------------------------------------|-------------------------------------------------------------------|
| <b>TYPE</b>                                                                          | <b>VDRS05...<br/>2381 592 ...<br/>Ø 5 mm<br/>14 V to 460 V</b> | <b>VDRS07...<br/>2381 593 .....<br/>Ø 7 mm<br/>14 V to 460 V</b> | <b>VDRS10...<br/>2381 594 .....<br/>Ø 10 mm<br/>14 V to 550 V</b> | <b>VDRS14...<br/>2381 595 .....<br/>Ø 14 mm<br/>14 V to 550 V</b> | <b>VDRS20...<br/>2381 596 .....<br/>Ø 20 mm<br/>14 V to 680 V</b> |
| 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


| <b>VARISTORS ON TAPE IN AMMOPACK</b>           |                                                      |                                                      |                                                       |                                                       |
|------------------------------------------------|------------------------------------------------------|------------------------------------------------------|-------------------------------------------------------|-------------------------------------------------------|
| 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   |                                                      |                                                      |                                                       |                                                       |
| <b>Packaging quantities</b>                    |                                                      |                                                      |                                                       |                                                       |
| 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**

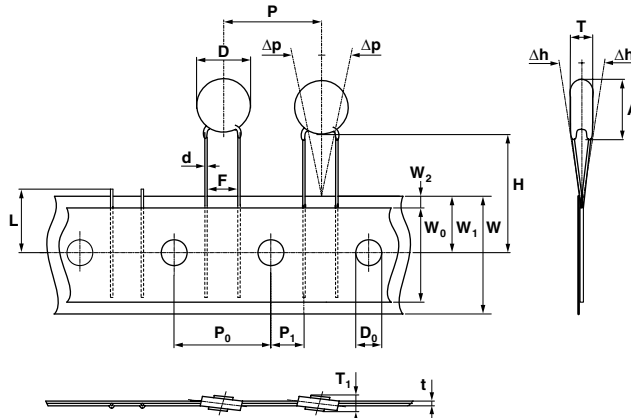
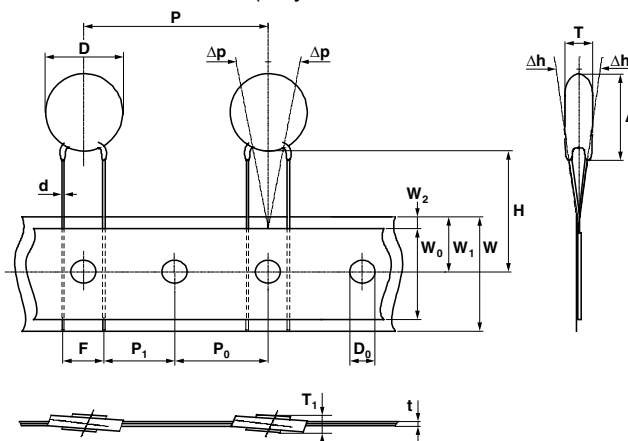
<sup>(1)</sup> Except for 35 V and 40 V = 1000 pieces

**DIMENSIONS OF AMMOPACK** in millimeters





| <b>VARISTORS ON TAPE AND REEL</b>              |                                                                |                                                                |                                                                 |                                                                 |
|------------------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------|-----------------------------------------------------------------|-----------------------------------------------------------------|
| <b>TYPE</b>                                    | <b>VDRS05...<br/>2381 592 ...<br/>Ø 5 mm<br/>14 V to 460 V</b> | <b>VDRS07...<br/>2381 593 ...<br/>Ø 7 mm<br/>14 V to 460 V</b> | <b>VDRS10...<br/>2381 594 ...<br/>Ø 10 mm<br/>14 V to 550 V</b> | <b>VDRS14...<br/>2381 595 ...<br/>Ø 14 mm<br/>14 V to 550 V</b> |
| 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 ....)


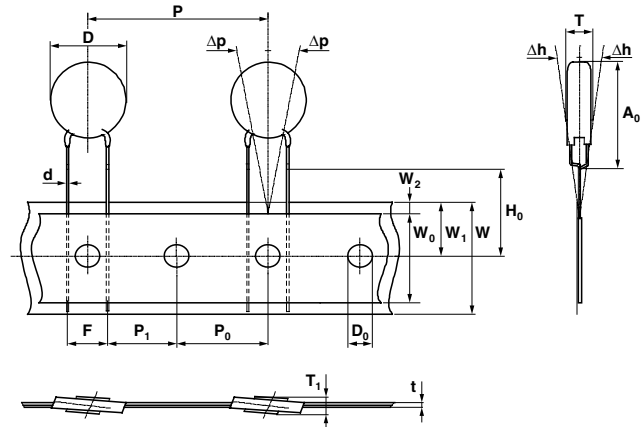


**TAPED VERSION WITH KINKED LEADS**

(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 max.                  | 11.0 max.     | 15.5 max.        | 19.0 max.     |
| A <sub>0</sub>                     | Mounting height                                  | 11.0 max.                 | 13.0 max.     | 18.0 max.        | 23.0 max.     |
| D                                  | Body diameter                                    | 7.0 max.                  | 9.0 max.      | 13.5 max.        | 17.0 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 ....



# VDRS.....E/2381 59. ....



Vishay BCcomponents VDR Metal Oxide Varistors Standard

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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- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
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- Защита от снятия компонента с производства.



#### Как с нами связаться

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