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Zinc Oxide Varistors

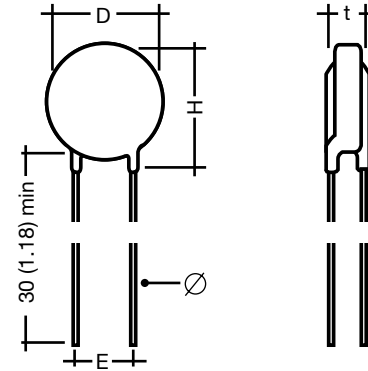


VE 07/09/13/17/24

VF 05/07/10/14/20

FEATURES

- Radial lead varistors
- Wide operating voltage range from 14 V to 625 V (V_{rms} for VE types) or 22 V to 1000 V (V_{1mA} for VF types)
- Available in tape and reel for use with automatic insertion equipment (see pages 31 to 33 for details).



PARTICULAR CHARACTERISTICS

| UL (USA and Canadian Standards) | VE Series P/N codification using (D_{max} , V_{rms}) | VF Series P/N codification using ($d_{ceramic}$, V_{1mA}) | Maximum operating voltage | | Nominal voltage at 1 mA dc | | |
|--|--|--|------------------------------|----------|-------------------------------|--------------------|-----------------|
| | | | V_{rms} | V_{DC} | $V_{1mA\ mini}$ | $V_{1mA\ nominal}$ | $V_{1mA\ maxi}$ |
| ★ ★ ★ ★ | VE07M00140K __ VE09M00140K __ VE13M00140K __ VE17M00140K __ | VF05M10220K __ VF07M10220K __ VF10M10220K __ VF14M10220K __ | 14 | 18 | 19.8 | 22 | 24.2 |
| ★ ★ ★ ★ | VE07M00170K __ VE09M00170K __ VE13M00170K __ VE17M00170K __ | VF05M10270K __ VF07M10270K __ VF10M10270K __ VF14M10270K __ | 17 | 22 | 24.0 | 27 | 30.0 |
| ★ ★ ★ ★ | VE07M00200K __ VE09M00200K __ VE13M00200K __ VE17M00200K __ | VF05M10330K __ VF07M10330K __ VF10M10330K __ VF14M10330K __ | 20 | 26 | 29.5 | 33 | 36.5 |
| ★ ★ ★ ★ | VE07M00250K __ VE09M00250K __ VE13M00250K __ VE17M00250K __ | VF05M10390K __ VF07M10390K __ VF10M10390K __ VF14M10390K __ | 25 | 31 | 35 | 39 | 43 |
| ★ ★ ★ ★ | VE07M00300K __ VE09M00300K __ VE13M00300K __ VE17M00300K __ | VF05M10470K __ VF07M10470K __ VF10M10470K __ VF14M10470K __ | 30 | 38 | 42 | 47 | 52 |
| ★ ★ ★ ★ | VE07M00350K __ VE09M00350K __ VE13M00350K __ VE17M00350K __ | VF05M10560K __ VF07M10560K __ VF10M10560K __ VF14M10560K __ | 35 | 45 | 50 | 56 | 62 |
| ★ ★ ★ ★ | VE07M00400K __ VE09M00400K __ VE13M00400K __ VE17M00400K __ | VF05M10680K __ VF07M10680K __ VF10M10680K __ VF14M10680K __ | 40 | 56 | 61 | 68 | 75 |
| ★ ★ ★ ★ | VE07M00500K __ VE09M00500K __ VE13M00500K __ VE17M00500K __ | VF05M10820K __ VF07M10820K __ VF10M10820K __ VF14M10820K __ | 50 | 65 | 73 | 82 | 91 |

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DIMENSIONS millimeters (inches)

| Type | Type | D | | H max. | t max. | Ø +10% -0.05 (.002) | E ± 0.8 (.031) |
|--------|--------|------------------|-------------------------|-----------|-----------|---------------------------|-------------------|
| | | Ceramic diameter | Maximum coated diameter | | | | |
| VE07 | VF05 | 5 (.196) | 7 (.275) | 10 (.394) | see table | 0.6 (.024) | 5.08 (0.20) |
| VE09 | VF07 | 7 (.275) | 9 (.354) | 12 (.472) | | 0.6 (.024) | 5.08 (0.20) |
| VE13* | VF10* | 10 (.393) | 13* (.512) | 16 (.630) | | 0.8* (.031) | 7.62*(0.30) |
| VE17 | VF14 | 14 (.551) | 17 (.669) | 20 (.787) | | 0.8 (.031) | 7.62 (0.30) |
| VE24** | VF20** | 20 (.787) | 24 (.945) | 27 (1.06) | | 0.8** (.031) | 7.62 (0.30) |

* VE13 / VF10: For models with V_{RMS} 320 V
 other version/suffixes available with:
 E = 5.08 (0.20) Suffix:
 Ø = 0.6 (.024) Bulk: HB
 D = 12.5 (.492) max Tape: DA, DB, DC,
 DD, DQ, ...

**VE24 / VF20: For lead diameter = 1.0 (.039),
 please consult us.

GENERAL CHARACTERISTICS

Storage temperature: -40°C to +125°C
 Max. operating temperature: +85°C
 Response time: < 25 ns
 Voltage coefficient temp.: $|K| < 0.09\%/^{\circ}C$
 Voltage proof: 2500 V
 Epoxy coating: Flame retardant
 UL94-VO

MARKING

Type
 AC nominal voltage (EIA coding) for VE types
 V_{1mA} varistor voltage (EIA coding) for VF types
 Logo
 UL logo (when approved)
 Lot number (VE13/17/24 and VF10/14/20 only)

| Max. clamping voltage (8 x 20 µs) | | Max. energy absorption (10 x 1000 µs) W (J) | | Max. permissible peak current (8 x 20 µs) Ip (A) | | Typical capacitance f = 1kHz pF | Mean power dissipation W | Maximum thickness t mm (inches) | V/I characteristic Page | Derating curves Page |
|-----------------------------------|--------|---|-----|--|----------|---------------------------------|--------------------------|---------------------------------|-------------------------|----------------------|
| Vp (V) | Ip (A) | Number of surges | | 1 surge | 2 surges | | | | | |
| 43 | 1 | 0.4 | 0.2 | 100 | 50 | 1050 | 0.01 | 3.6 (.142) | 22 | 24 |
| 43 | 2.5 | 0.9 | 0.6 | 250 | 125 | 1900 | 0.02 | 3.6 (.142) | 22 | 25 |
| 43 | 5 | 2 | 1.3 | 500 | 250 | 4000 | 0.05 | 4.3 (.169) | 22 | 26 |
| 43 | 10 | 4 | 2.6 | 1000 | 500 | 4000 | 0.10 | 4.3 (.169) | 23 | 27 |
| 53 | 1 | 0.5 | 0.3 | 100 | 50 | 1050 | 0.01 | 3.7 (.146) | 22 | 24 |
| 53 | 2.5 | 1.1 | 0.7 | 250 | 125 | 1900 | 0.02 | 3.7 (.146) | 22 | 25 |
| 53 | 5 | 2.5 | 1.6 | 500 | 250 | 4000 | 0.05 | 4.3 (.169) | 22 | 26 |
| 53 | 10 | 4.7 | 3.0 | 1000 | 500 | 6800 | 0.10 | 4.3 (.169) | 23 | 27 |
| 65 | 1 | 0.6 | 0.3 | 100 | 50 | 750 | 0.01 | 3.9 (.154) | 22 | 24 |
| 65 | 2.5 | 1.3 | 0.9 | 250 | 125 | 1500 | 0.02 | 3.9 (.154) | 22 | 25 |
| 65 | 5 | 3.1 | 2.0 | 500 | 250 | 3100 | 0.05 | 4.5 (.177) | 22 | 26 |
| 65 | 10 | 5.7 | 4.0 | 1000 | 500 | 5700 | 0.10 | 4.5 (.177) | 23 | 27 |
| 77 | 1 | 0.7 | 0.4 | 100 | 50 | 660 | 0.01 | 3.6 (.142) | 22 | 24 |
| 77 | 2.5 | 1.6 | 1.0 | 250 | 125 | 1250 | 0.02 | 3.6 (.142) | 22 | 25 |
| 77 | 5 | 3.7 | 3 | 500 | 250 | 2800 | 0.05 | 4.4 (.173) | 22 | 26 |
| 77 | 10 | 7 | 5 | 1000 | 500 | 4600 | 0.10 | 4.4 (.173) | 23 | 27 |
| 93 | 1 | 0.9 | 0.4 | 100 | 50 | 580 | 0.01 | 3.8 (.150) | 22 | 24 |
| 93 | 2.5 | 2.0 | 1 | 250 | 125 | 1050 | 0.02 | 3.8 (.150) | 22 | 25 |
| 93 | 5 | 4.4 | 4 | 500 | 250 | 2150 | 0.05 | 4.4 (.173) | 22 | 26 |
| 93 | 10 | 9.0 | 7 | 1000 | 500 | 3500 | 0.10 | 4.4 (.173) | 23 | 27 |
| 110 | 1 | 1.1 | 0.4 | 100 | 50 | 460 | 0.01 | 3.9 (.154) | 22 | 24 |
| 110 | 2.5 | 2.5 | 1 | 250 | 125 | 850 | 0.02 | 3.9 (.154) | 22 | 25 |
| 110 | 5 | 5.4 | 4.4 | 500 | 250 | 1900 | 0.05 | 4.7 (.185) | 22 | 26 |
| 110 | 10 | 10.0 | 8 | 1000 | 500 | 3100 | 0.10 | 4.7 (.185) | 23 | 27 |
| 135 | 1 | 1.3 | 0.5 | 100 | 50 | 400 | 0.01 | 4.1 (.161) | 22 | 24 |
| 135 | 2.5 | 3.0 | 1 | 250 | 125 | 720 | 0.02 | 4.1 (.161) | 22 | 25 |
| 135 | 5 | 8.4 | 5.9 | 500 | 250 | 1700 | 0.05 | 4.9 (.193) | 22 | 26 |
| 135 | 10 | 13.0 | 8.5 | 1000 | 500 | 2800 | 0.10 | 4.9 (.193) | 23 | 27 |
| 135 | 5 | 1.8 | 0.6 | 400 | 200 | 300 | 0.1 | 3.5 (.138) | 22 | 24 |
| 135 | 10 | 4.2 | 1.6 | 1200 | 600 | 530 | 0.2 | 3.5 (.138) | 22 | 25 |
| 135 | 25 | 8.4 | 6 | 2500 | 1250 | 950 | 0.4 | 4.1 (.161) | 22 | 26 |
| 135 | 50 | 15.0 | 11 | 4500 | 2500 | 1800 | 0.6 | 4.1 (.161) | 23 | 27 |

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| UL (USA and Canadian Standards) | VE Series P/N codification using (D_{max} , V_{rms}) | VF Series P/N codification using ($d_{ceramic}$, V_{1mA}) | Maximum operating voltage | | Nominal voltage at 1 mA dc | | |
|--|--|--|------------------------------|----------|-------------------------------|--------------------|-----------------|
| | | | V_{rms} | V_{DC} | $V_{1mA\ mini}$ | $V_{1mA\ nominal}$ | $V_{1mA\ maxi}$ |
| ★ ★ ★ ★ | VE07M00600K __ VE09M00600K __ VE13M00600K __ VE17M00600K __ | VF05M10101K __ VF07M10101K __ VF10M10101K __ VF14M10101K __ | 60 | 80 | 90 | 100 | 110 |
| ★ ★ ★ ★ ★ | VE07M00750K __ VE09M00750K __ VE13M00750K __ VE17M00750K __ VE24M00750K __ | VF05M10121K __ VF07M10121K __ VF10M10121K __ VF14M10121K __ VF20M10121K __ | 75 | 100 | 108 | 120 | 132 |
| ★ ★ ★ ★ ★ | VE07M00950K __ VE09M00950K __ VE13M00950K __ VE17M00950K __ VE24M00950K __ | VF05M10151K __ VF07M10151K __ VF10M10151K __ VF14M10151K __ VF20M10151K __ | 95 | 125 | 135 | 150 | 165 |
| ★ ★ ★ ★ ★ | VE07M01150K __ VE09M01150K __ VE13M01150K __ VE17M01150K __ VE24M01150K __ | VF05M10181K __ VF07M10181K __ VF10M10181K __ VF14M10181K __ VF20M10181K __ | 115 | 150 | 162 | 180 | 198 |
| ★ ★ ★ ★ ★ | VE07M00131K __ VE09M00131K __ VE13M00131K __ VE17M00131K __ VE24M00131K __ | VF05M12050K __ VF07M12050K __ VF10M12050K __ VF14M12050K __ VF20M12050K __ | 130 | 170 | 184 | 205 | 226 |
| ★ ★ ★ ★ ★ | VE07M00141K __ VE09M00141K __ VE13M00141K __ VE17M00141K __ VE24M00141K __ | VF05M10221K __ VF07M10221K __ VF10M10221K __ VF14M10221K __ VF20M10221K __ | 140 | 180 | 198 | 220 | 242 |
| ★ ★ ★ ★ ★ | VE07M00151K __ VE09M00151K __ VE13M00151K __ VE17M00151K __ VE24M00151K __ | VF05M10241K __ VF07M10241K __ VF10M10241K __ VF14M10241K __ VF20M10241K __ | 150 | 200 | 216 | 240 | 264 |
| ★ ★ ★ ★ ★ | VE07M01750K __ VE09M01750K __ VE13M01750K __ VE17M01750K __ VE24M01750K __ | VF05M10271K __ VF07M10271K __ VF10M10271K __ VF14M10271K __ VF20M10271K __ | 175 | 225 | 243 | 270 | 297 |
| ★ ★ ★ ★ ★ | VE07M00211K __ VE09M00211K __ VE13M00211K __ VE17M00211K __ VE24M00211K __ | VF05M10331K __ VF07M10331K __ VF10M10331K __ VF14M10331K __ VF20M10331K __ | 210 | 275 | 297 | 330 | 363 |
| ★ ★ ★ ★ ★ | VE07M00231K __ VE09M00231K __ VE13M00231K __ VE17M00231K __ VE24M00231K __ | VF05M10361K __ VF07M10361K __ VF10M10361K __ VF14M10361K __ VF20M10361K __ | 230 | 300 | 324 | 360 | 396 |

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VF 05/07/10/14/20

| Max. clamping voltage (8 x 20 μ s) | | Max. energy absorption (10 x 1000 μ s) W (J) | | Max. permissible peak current (8 x 20 μ s) | | Typical capacitance f = 1kHz pF | Mean power dissipation W | Maximum thickness t mm (inches) | V/I characteristic | Derating curves |
|--|--------|---|------|--|----------|---------------------------------------|-----------------------------|---------------------------------------|--------------------|-----------------|
| Vp (V) | Ip (A) | Number of surges | | Ip (A) | | | | | Page | Page |
| | | 1 | 10 | 1 surge | 2 surges | | | | | |
| 165 | 5 | 2.2 | 0.7 | 400 | 200 | 165 | 0.1 | 3.8 (.150) | 22 | 24 |
| 165 | 10 | 4.8 | 1.7 | 1200 | 600 | 440 | 0.2 | 3.8 (.150) | 22 | 25 |
| 165 | 25 | 10 | 7 | 2500 | 1250 | 870 | 0.4 | 4.5 (.177) | 22 | 26 |
| 165 | 50 | 17 | 14 | 4500 | 2500 | 2200 | 0.6 | 4.5 (.177) | 23 | 27 |
| 200 | 5 | 2.5 | 0.8 | 400 | 200 | 150 | 0.1 | 4.0 (.157) | 22 | 24 |
| 200 | 10 | 5.9 | 1.8 | 1200 | 600 | 400 | 0.2 | 4.0 (.157) | 22 | 25 |
| 200 | 25 | 12 | 8 | 2500 | 1250 | 700 | 0.4 | 4.4 (.173) | 22 | 26 |
| 200 | 50 | 20 | 15 | 4500 | 2500 | 1900 | 0.6 | 4.4 (.173) | 23 | 27 |
| 200 | 100 | 40 | 30 | 6500 | 4000 | 4200 | 0.8 | 4.8 (.189) | 23 | 28 |
| 250 | 5 | 3.4 | 1 | 400 | 200 | 110 | 0.1 | 4.4 (.173) | 22 | 24 |
| 250 | 10 | 7.6 | 3 | 1200 | 600 | 310 | 0.2 | 4.4 (.173) | 22 | 25 |
| 250 | 25 | 15 | 9 | 2500 | 1250 | 560 | 0.4 | 5.0 (.197) | 22 | 26 |
| 250 | 50 | 25 | 20 | 4500 | 2500 | 1200 | 0.6 | 5.0 (.197) | 23 | 27 |
| 250 | 100 | 50 | 33 | 6500 | 4000 | 3400 | 0.8 | 5.4 (.213) | 23 | 28 |
| 300 | 5 | 3.6 | 1.3 | 400 | 200 | 100 | 0.1 | 4.5 (.177) | 22 | 24 |
| 300 | 10 | 8.4 | 3.3 | 1200 | 600 | 280 | 0.2 | 4.5 (.177) | 22 | 25 |
| 300 | 25 | 18 | 10.6 | 2500 | 1250 | 500 | 0.4 | 5.1 (.201) | 22 | 26 |
| 300 | 50 | 30 | 22 | 4500 | 2500 | 1100 | 0.6 | 5.1 (.201) | 23 | 27 |
| 300 | 100 | 60 | 40 | 6500 | 4000 | 3000 | 0.8 | 5.5 (.217) | 23 | 28 |
| 340 | 5 | 4.2 | 1.5 | 400 | 200 | 90 | 0.1 | 4.1 (.161) | 22 | 24 |
| 340 | 10 | 9.5 | 4 | 1200 | 600 | 250 | 0.2 | 4.1 (.161) | 22 | 25 |
| 340 | 25 | 19 | 11 | 2500 | 1250 | 450 | 0.4 | 4.7 (.185) | 22 | 26 |
| 340 | 50 | 34 | 25 | 4500 | 2500 | 1000 | 0.6 | 4.7 (.185) | 23 | 27 |
| 340 | 100 | 74 | 46 | 6500 | 4000 | 2500 | 0.8 | 5.1 (.201) | 23 | 28 |
| 360 | 5 | 4.5 | 1.5 | 400 | 200 | 85 | 0.1 | 4.2 (.165) | 22 | 24 |
| 360 | 10 | 10 | 4 | 1200 | 600 | 235 | 0.2 | 4.2 (.165) | 22 | 25 |
| 360 | 25 | 22 | 12.5 | 2500 | 1250 | 425 | 0.4 | 4.8 (.189) | 22 | 26 |
| 360 | 50 | 36 | 26.5 | 4500 | 2500 | 930 | 0.6 | 4.8 (.189) | 23 | 27 |
| 360 | 100 | 78 | 50 | 6500 | 4000 | 2250 | 0.8 | 5.2 (.205) | 23 | 28 |
| 400 | 5 | 4.9 | 1.8 | 400 | 200 | 80 | 0.1 | 4.3 (.169) | 22 | 24 |
| 400 | 10 | 11 | 4.1 | 1200 | 600 | 220 | 0.2 | 4.3 (.169) | 22 | 25 |
| 400 | 25 | 24 | 13 | 2500 | 1250 | 400 | 0.4 | 4.9 (.193) | 22 | 26 |
| 400 | 50 | 40 | 30 | 4500 | 2500 | 850 | 0.6 | 4.9 (.193) | 23 | 27 |
| 400 | 100 | 85 | 56 | 6500 | 4000 | 2000 | 0.8 | 5.3 (.209) | 23 | 28 |
| 445 | 5 | 5.6 | 1.9 | 400 | 200 | 70 | 0.1 | 4.5 (.177) | 22 | 24 |
| 445 | 10 | 13 | 4.5 | 1200 | 600 | 190 | 0.2 | 4.5 (.177) | 22 | 25 |
| 445 | 25 | 28 | 13.5 | 2500 | 1250 | 340 | 0.4 | 5.1 (.201) | 22 | 26 |
| 445 | 50 | 46 | 31 | 4500 | 2500 | 750 | 0.6 | 5.1 (.201) | 23 | 27 |
| 445 | 100 | 98 | 56 | 6500 | 4000 | 2000 | 0.8 | 5.5 (.217) | 23 | 28 |
| 545 | 5 | 7.2 | 2.2 | 400 | 200 | 60 | 0.1 | 4.9 (.193) | 22 | 24 |
| 545 | 10 | 15 | 5.4 | 1200 | 600 | 155 | 0.2 | 4.9 (.193) | 22 | 25 |
| 545 | 25 | 31 | 14.0 | 2500 | 1250 | 275 | 0.4 | 5.5 (.217) | 22 | 26 |
| 545 | 50 | 54 | 35 | 4500 | 2500 | 600 | 0.6 | 5.5 (.217) | 23 | 27 |
| 545 | 100 | 115 | 70 | 6500 | 4000 | 1650 | 0.8 | 5.9 (.232) | 23 | 28 |
| 595 | 5 | 7.2 | 2.4 | 400 | 200 | 55 | 0.1 | 5.1 (.201) | 22 | 24 |
| 595 | 10 | 17 | 6 | 1200 | 600 | 140 | 0.2 | 5.1 (.201) | 22 | 25 |
| 595 | 25 | 36 | 14.3 | 2500 | 1250 | 250 | 0.4 | 5.7 (.224) | 22 | 26 |
| 595 | 50 | 60 | 38 | 4500 | 2500 | 550 | 0.6 | 5.7 (.224) | 23 | 27 |
| 595 | 100 | 130 | 75 | 6500 | 4000 | 1500 | 0.8 | 6.1 (.240) | 23 | 28 |



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VE 07/09/13/17/24

VF 05/07/10/14/20

| UL (USA and Canadian Standards) | VE Series P/N codification using (D_{max} , V_{rms}) | VF Series P/N codification using ($d_{ceramic}$, V_{1mA}) | Maximum operating voltage | | Nominal voltage at 1 mA dc | | |
|--|--|--|------------------------------|----------|-------------------------------|--------------------|-----------------|
| | | | V_{rms} | V_{DC} | $V_{1mA\ mini}$ | $V_{1mA\ nominal}$ | $V_{1mA\ maxi}$ |
| ★ ★ ★ ★ ★ | VE07M00251K __ VE09M00251K __ VE13M00251K __ VE17M00251K __ VE24M00251K __ | VF05M10391K __ VF07M10391K __ VF10M10391K __ VF14M10391K __ VF20M10391K __ | 250 | 320 | 351 | 390 | 429 |
| ★ ★ ★ ★ ★ | VE07M02750K __ VE09M02750K __ VE13M02750K __ VE17M02750K __ VE24M02750K __ | VF05M10431K __ VF07M10431K __ VF10M10431K __ VF14M10431K __ VF20M10431K __ | 275 | 350 | 387 | 430 | 473 |
| ★ ★ ★ ★ ★ | VE07M00301K __ VE09M00301K __ VE13M00301K __ VE17M00301K __ VE24M00301K __ | VF05M10471K __ VF07M10471K __ VF10M10471K __ VF14M10471K __ VF20M10471K __ | 300 | 385 | 423 | 470 | 517 |
| ★ ★ ★ ★ | VE09M00321K __ VE13M00321K __ VE17M00321K __ VE24M00321K __ | VF07M10511K __ VF10M10511K __ VF14M10511K __ VF20M10511K __ | 320 | 420 | 459 | 510 | 561 |
| ★ ★ ★ ★ | VE09M00351K __ VE13M00351K __ VE17M00351K __ VE24M00351K __ | VF07M10561K __ VF10M10561K __ VF14M10561K __ VF20M10561K __ | 350 | 460 | 504 | 560 | 616 |
| ★ ★ ★ ★ | VE09M03850K __ VE13M03850K __ VE17M03850K __ VE24M03850K __ | VF07M10621K __ VF10M10621K __ VF14M10621K __ VF20M10621K __ | 385 | 505 | 558 | 620 | 682 |
| ★ ★ ★ ★ | VE09M00421K __ VE13M00421K __ VE17M00421K __ VE24M00421K __ | VF07M10681K __ VF10M10681K __ VF14M10681K __ VF20M10681K __ | 420 | 560 | 612 | 680 | 748 |
| ★ ★ ★ | VE13M00441K __ VE17M00441K __ VE24M00441K __ | VF10M17150K __ VF14M17150K __ VF20M17150K __ | 440 | 585 | 643 | 715 | 787 |
| ★ ★ ★ | VE13M00461K __ VE17M00461K __ VE24M00461K __ | VF10M10751K __ VF14M10751K __ VF20M10751K __ | 460 | 615 | 675 | 750 | 825 |
| ★ ★ ★ | VE13M00511K __ VE17M00511K __ VE24M00511K __ | VF10M10821K __ VF14M10821K __ VF20M10821K __ | 510 | 670 | 738 | 820 | 902 |
| ★ ★ ★ | VE13M00551K __ VE17M00551K __ VE24M00551K __ | VF10M10861K __ VF14M10861K __ VF20M10861K __ | 550 | 715 | 774 | 860 | 946 |
| ★ ★ ★ | VE13M05750K __ VE17M05750K __ VE24M05750K __ | VF10M10911K __ VF14M10911K __ VF20M10911K __ | 575 | 730 | 819 | 910 | 1001 |
| ★ ★ ★ | VE13M06250K __ VE17M06250K __ VE24M06250K __ | VF10M10102K __ VF14M10102K __ VF20M10102K __ | 625 | 825 | 900 | 1000 | 1100 |

Zinc Oxide Varistors



VE 07/09/13/17/24

VF 05/07/10/14/20

| Max. clamping voltage (8 x 20 μ s) | | Max. energy absorption (10 x 1000 μ s) W (J) | | Max. permissible peak current (8 x 20 μ s) Ip (A) | | Typical capacitance f = 1kHz pF | Mean power dissipation W | Maximum thickness t mm (inches) | V/I characteristic | Derating curves |
|--|--------|---|-----|--|----------|---------------------------------------|-----------------------------|---------------------------------------|--------------------|-----------------|
| Vp (V) | Ip (A) | Number of surges | | 1 surge | 2 surges | | | | Page | Page |
| | | 1 | 10 | | | | | | | |
| 645 | 5 | 8.2 | 2.8 | 400 | 200 | 50 | 0.1 | 5.4 (.213) | 22 | 24 |
| 645 | 10 | 19 | 7.3 | 1200 | 600 | 130 | 0.2 | 5.4 (.213) | 22 | 25 |
| 645 | 25 | 38 | 19 | 2500 | 1250 | 230 | 0.4 | 5.9 (.232) | 22 | 26 |
| 645 | 50 | 65 | 39 | 4500 | 2500 | 500 | 0.6 | 5.9 (.232) | 23 | 27 |
| 645 | 100 | 140 | 100 | 6500 | 4000 | 1300 | 0.8 | 6.3 (.248) | 23 | 28 |
| 710 | 5 | 8.6 | 3 | 400 | 200 | 45 | 0.1 | 5.7 (.224) | 22 | 24 |
| 710 | 10 | 21 | 7.4 | 1200 | 600 | 120 | 0.2 | 5.7 (.224) | 22 | 25 |
| 710 | 25 | 43 | 20 | 2500 | 1250 | 210 | 0.4 | 6.3 (.248) | 22 | 26 |
| 710 | 50 | 71 | 40 | 4500 | 2500 | 450 | 0.6 | 6.3 (.248) | 23 | 27 |
| 710 | 100 | 151 | 105 | 6500 | 4000 | 1200 | 0.8 | 6.7 (.264) | 23 | 28 |
| 775 | 5 | 9 | 3.3 | 400 | 200 | 40 | 0.1 | 6.0 (.236) | 22 | 24 |
| 775 | 10 | 25 | 7.5 | 1200 | 600 | 100 | 0.2 | 6.0 (.236) | 22 | 25 |
| 775 | 25 | 45 | 20 | 2500 | 1250 | 180 | 0.4 | 6.6 (.260) | 22 | 26 |
| 775 | 50 | 80 | 42 | 4500 | 2500 | 400 | 0.6 | 6.6 (.260) | 23 | 27 |
| 775 | 100 | 150 | 107 | 6500 | 4000 | 1000 | 0.8 | 7.0 (.276) | 23 | 28 |
| 840 | 10 | 25 | 7.5 | 1200 | 600 | 100 | 0.2 | 6.4 (.252) | 22 | 25 |
| 840 | 25 | 45 | 20 | 2500 | 1250 | 170 | 0.4 | 7.0 (.276) | 22 | 26 |
| 840 | 50 | 82 | 42 | 4500 | 2500 | 380 | 0.6 | 7.0 (.276) | 23 | 27 |
| 840 | 100 | 150 | 107 | 6500 | 4000 | 950 | 0.8 | 7.5 (.276) | 23 | 28 |
| 910 | 10 | 25 | 7.5 | 1200 | 600 | 95 | 0.2 | 6.6 (.260) | 22 | 25 |
| 910 | 25 | 45 | 20 | 2500 | 1250 | 160 | 0.4 | 7.3 (.287) | 22 | 26 |
| 910 | 50 | 85 | 42 | 4500 | 2500 | 365 | 0.6 | 7.3 (.287) | 23 | 27 |
| 910 | 100 | 155 | 107 | 6500 | 4000 | 900 | 0.8 | 7.8 (.307) | 23 | 28 |
| 1025 | 10 | 25 | 7.5 | 1200 | 600 | 95 | 0.2 | 7.0 (.276) | 22 | 25 |
| 1025 | 25 | 45 | 20 | 2500 | 1250 | 150 | 0.4 | 7.7 (.303) | 22 | 26 |
| 1025 | 50 | 88 | 42 | 4500 | 2500 | 350 | 0.6 | 7.7 (.303) | 23 | 27 |
| 1025 | 100 | 155 | 107 | 6500 | 4000 | 850 | 0.8 | 8.1 (.319) | 23 | 28 |
| 1120 | 10 | 25 | 7.5 | 1200 | 600 | 80 | 0.2 | 7.4 (.291) | 22 | 25 |
| 1120 | 25 | 45 | 20 | 2500 | 1250 | 120 | 0.4 | 8.2 (.323) | 22 | 26 |
| 1120 | 50 | 90 | 42 | 4500 | 2500 | 300 | 0.6 | 8.2 (.323) | 23 | 27 |
| 1120 | 100 | 160 | 107 | 6500 | 4000 | 700 | 0.8 | 8.6 (.339) | 23 | 28 |
| 1180 | 25 | 45 | 20 | 2500 | 1250 | 115 | 0.4 | 8.4 (.331) | 22 | 26 |
| 1180 | 50 | 95 | 44 | 4500 | 2500 | 275 | 0.6 | 8.4 (.331) | 23 | 27 |
| 1180 | 100 | 165 | 115 | 6500 | 4000 | 650 | 0.8 | 8.8 (.346) | 23 | 28 |
| 1240 | 25 | 45 | 20 | 2500 | 1250 | 110 | 0.4 | 8.5 (.335) | 22 | 26 |
| 1240 | 50 | 100 | 47 | 4500 | 2500 | 250 | 0.6 | 8.5 (.335) | 23 | 27 |
| 1240 | 100 | 175 | 120 | 6500 | 4000 | 600 | 0.8 | 9.0 (.354) | 23 | 28 |
| 1350 | 25 | 55 | 22 | 2500 | 1250 | 100 | 0.4 | 9.0 (.354) | 22 | 26 |
| 1350 | 50 | 110 | 57 | 4500 | 2500 | 220 | 0.6 | 9.0 (.354) | 23 | 27 |
| 1350 | 100 | 190 | 150 | 6500 | 4000 | 550 | 0.8 | 9.4 (.370) | 23 | 28 |
| 1420 | 25 | 57 | 24 | 2500 | 1250 | 90 | 0.4 | 9.3 (.366) | 22 | 26 |
| 1420 | 50 | 113 | 57 | 4500 | 2500 | 200 | 0.6 | 9.3 (.366) | 23 | 27 |
| 1420 | 100 | 200 | 150 | 6500 | 4000 | 500 | 0.8 | 9.7 (.382) | 23 | 28 |
| 1500 | 25 | 60 | 25 | 2500 | 1250 | 80 | 0.4 | 9.7 (.382) | 22 | 26 |
| 1500 | 50 | 120 | 60 | 4500 | 2500 | 180 | 0.6 | 9.7 (.382) | 23 | 27 |
| 1500 | 100 | 210 | 160 | 6500 | 4000 | 450 | 0.8 | 10.1 (.398) | 23 | 28 |
| 1650 | 25 | 68 | 25 | 2500 | 1250 | 74 | 0.4 | 10.5 (.413) | 22 | 26 |
| 1650 | 50 | 130 | 60 | 4500 | 2500 | 165 | 0.6 | 10.5 (.413) | 23 | 27 |
| 1650 | 100 | 230 | 160 | 6500 | 4000 | 410 | 0.8 | 11.0 (.433) | 23 | 28 |



Zinc Oxide Varistors

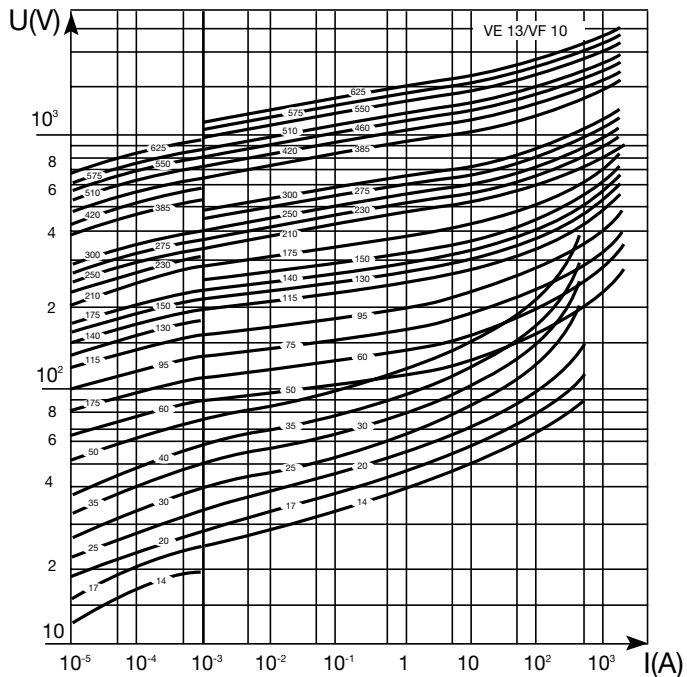
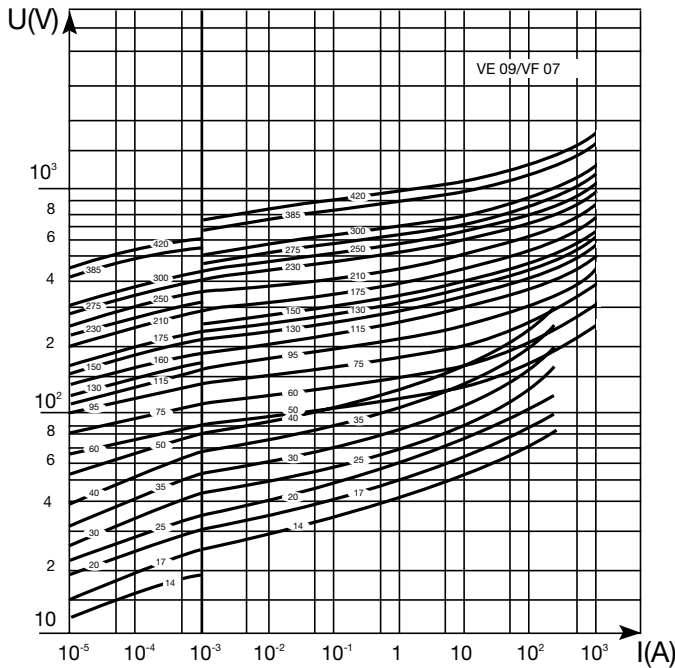
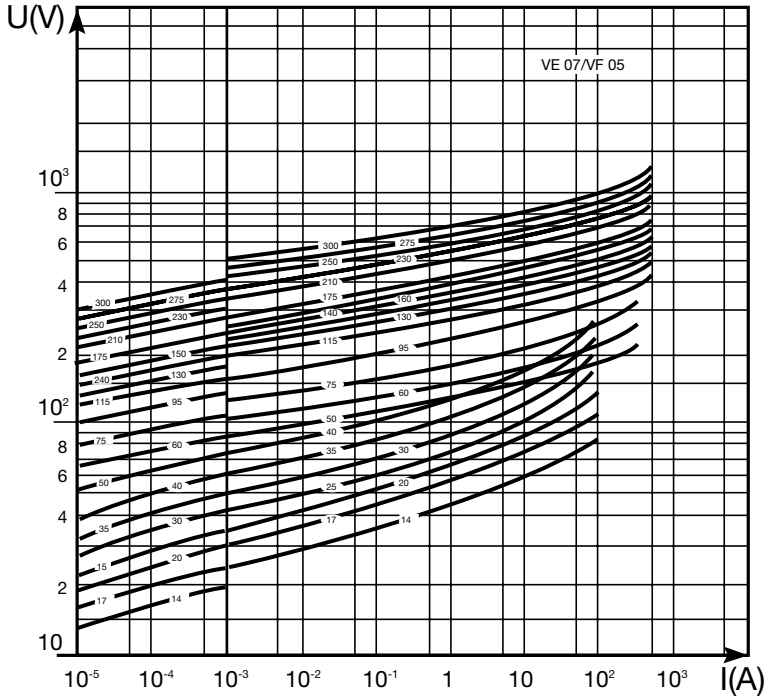


Electrical Characteristics VE / VF Types

VOLTAGE-CURRENT CHARACTERISTICS

V/I characteristics give:

- for I below 1 mA the maximum leakage current under V_{dc}
- for I above 1 mA the maximum clamping voltage

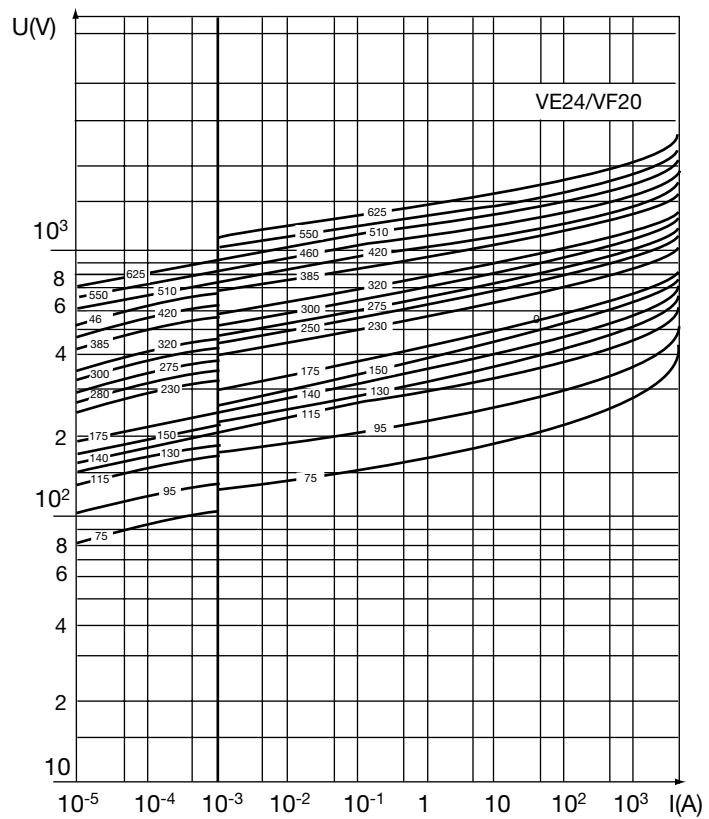
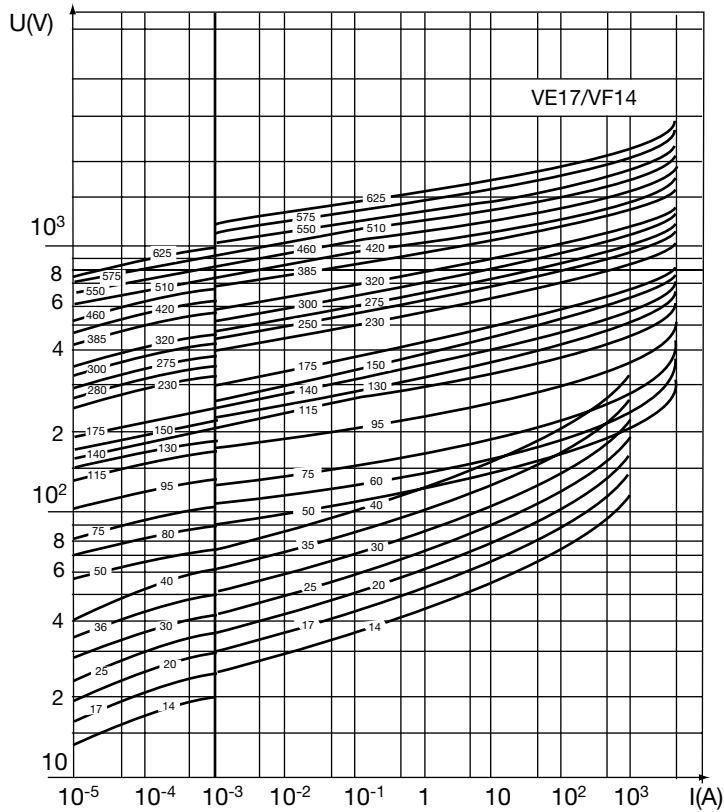


Zinc Oxide Varistors



Electrical Characteristics VE / VF Types

VOLTAGE-CURRENT CHARACTERISTICS

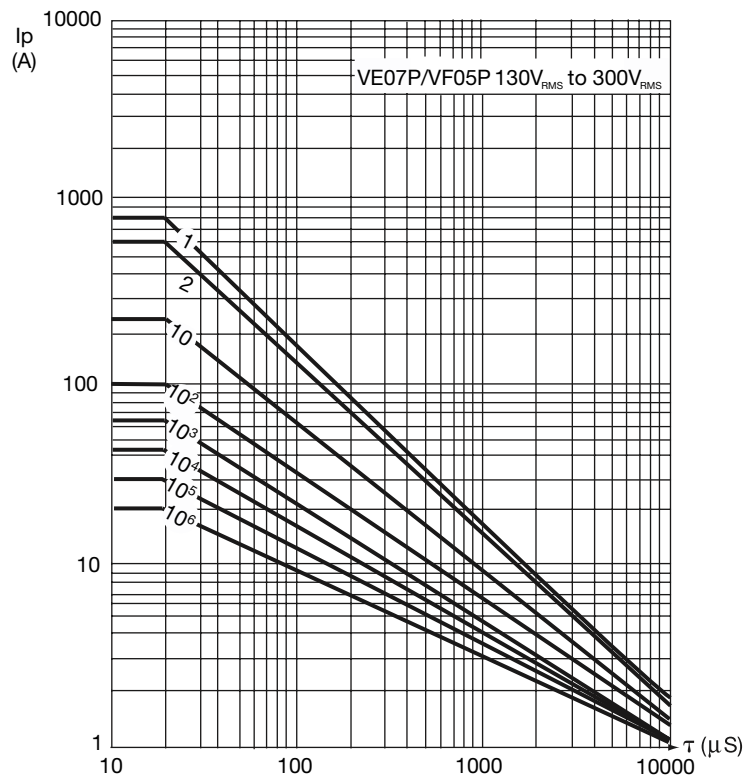
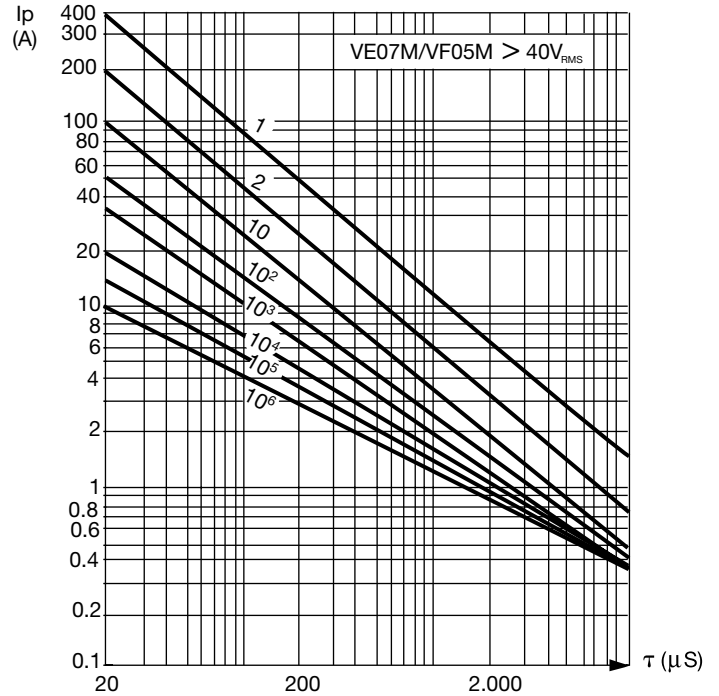
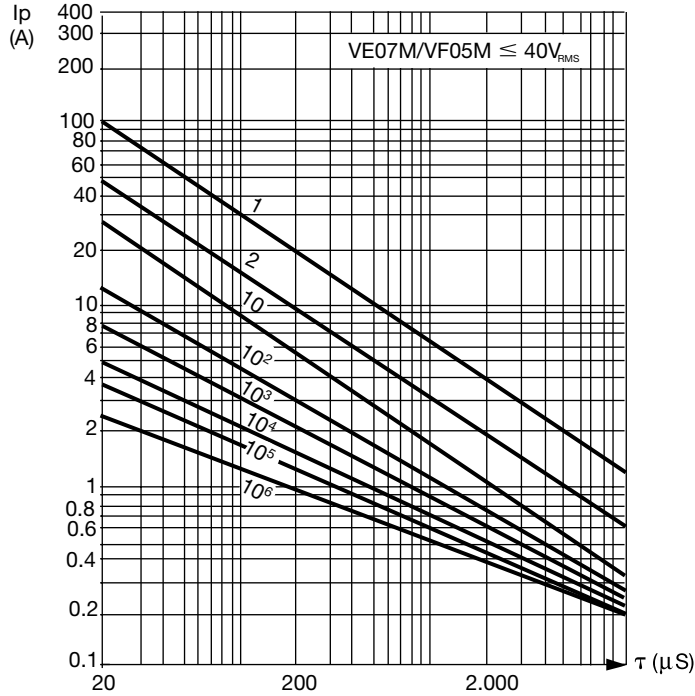


Zinc Oxide Varistors



Electrical Characteristics VE / VF Types

MAXIMUM SURGE CURRENT (I_p) DERATING CURVES WITH PULSE WIDTH (τ) AND FREQUENCY

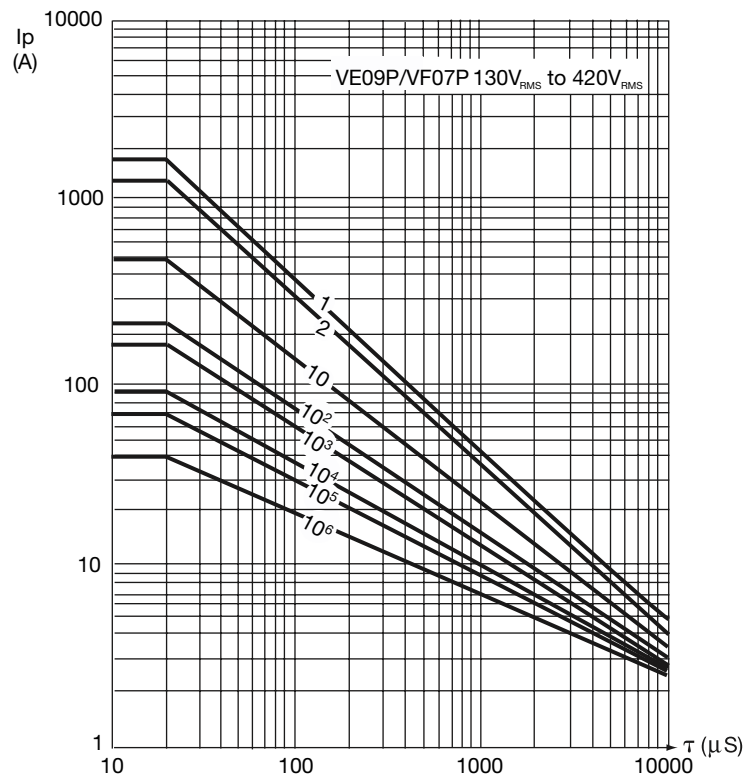
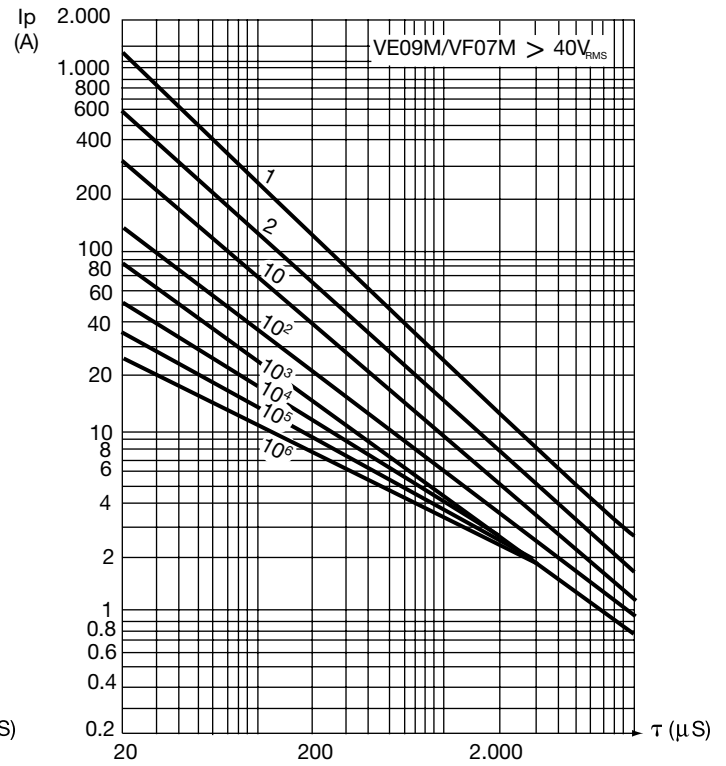
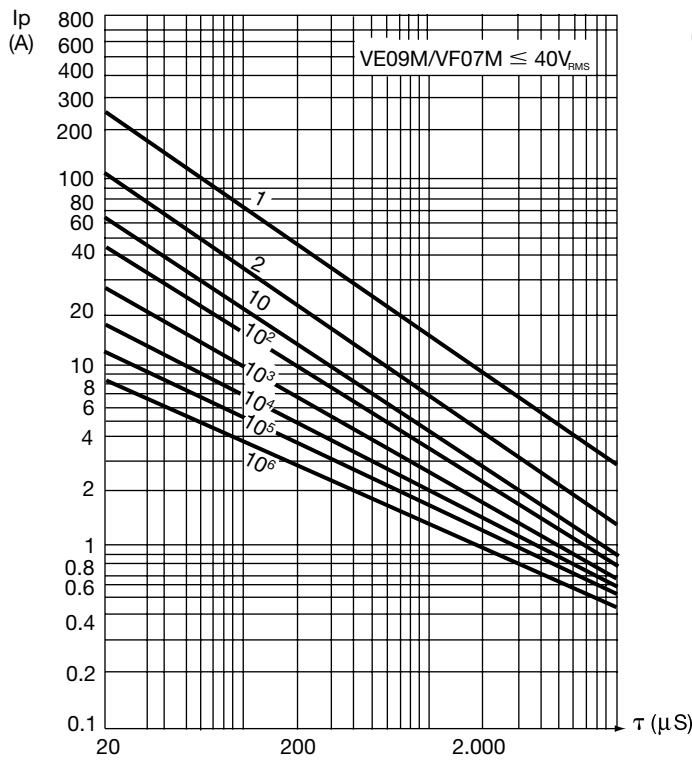


Zinc Oxide Varistors



Electrical Characteristics VE / VF Types

MAXIMUM SURGE CURRENT (I_p) DERATING CURVES WITH PULSE WIDTH (τ) AND FREQUENCY

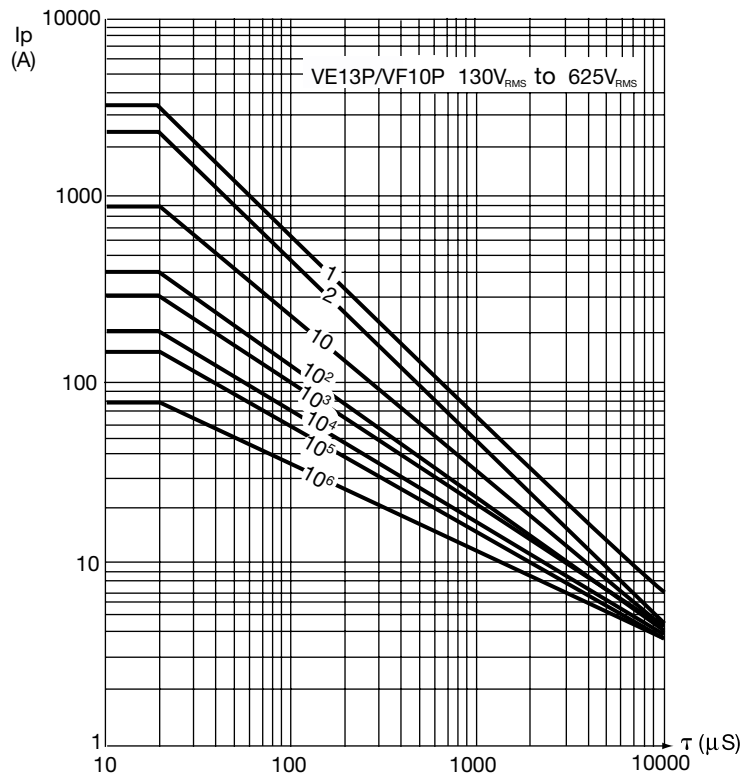
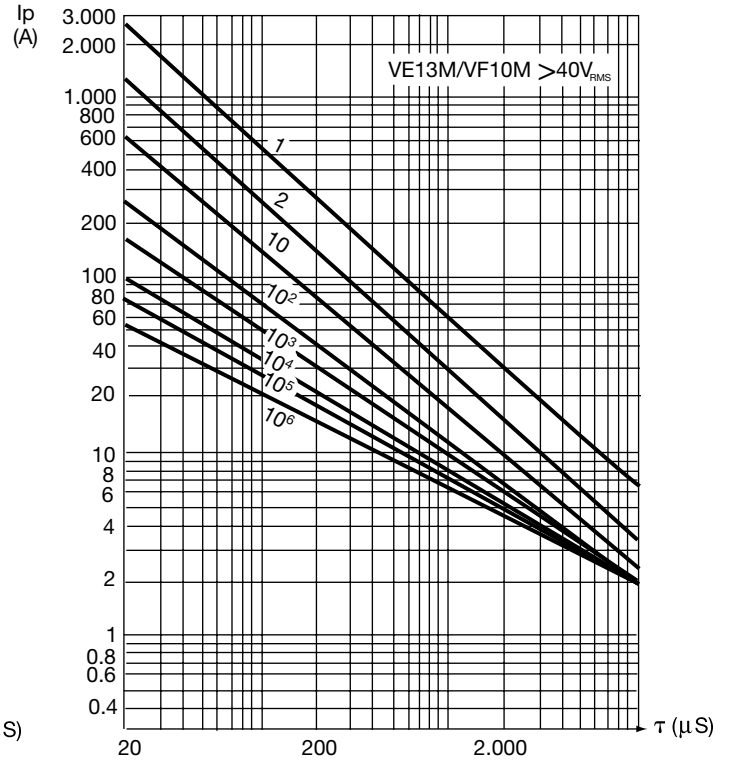
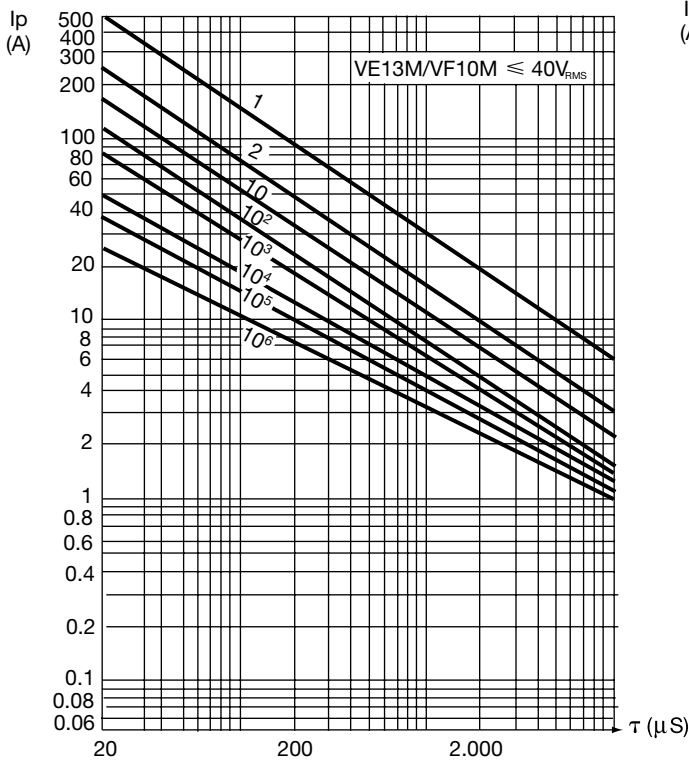


Zinc Oxide Varistors



Electrical Characteristics VE / VF Types

MAXIMUM SURGE CURRENT (I_p) DERATING CURVES WITH PULSE WIDTH (τ) AND FREQUENCY

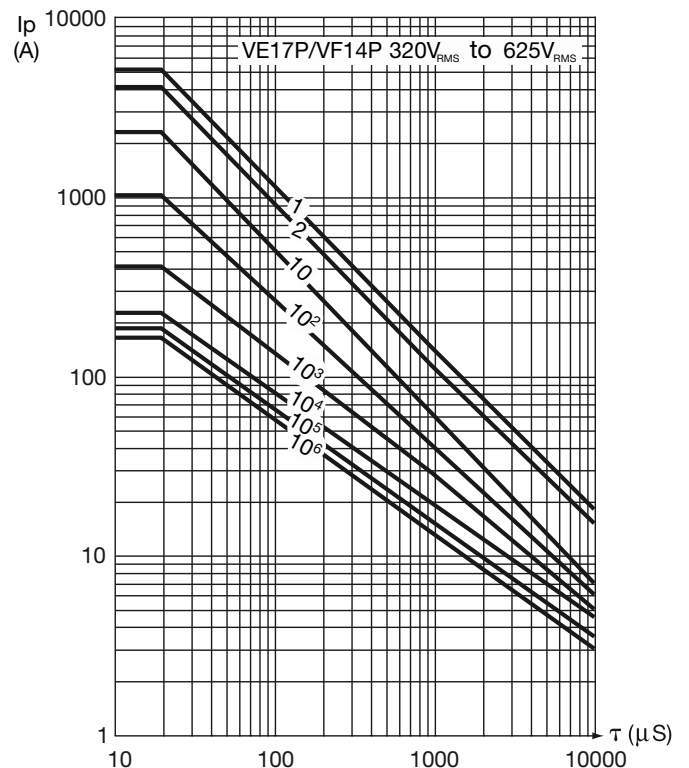
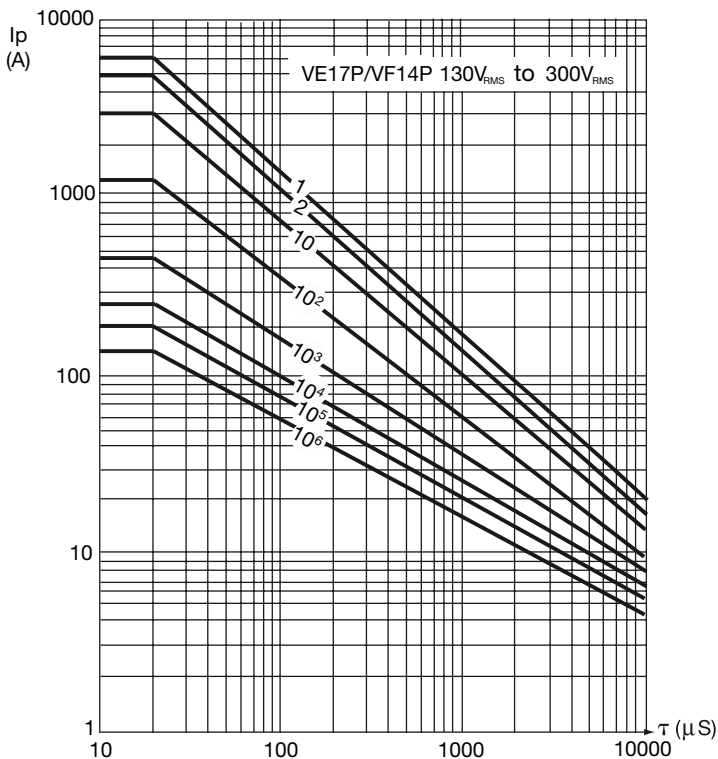
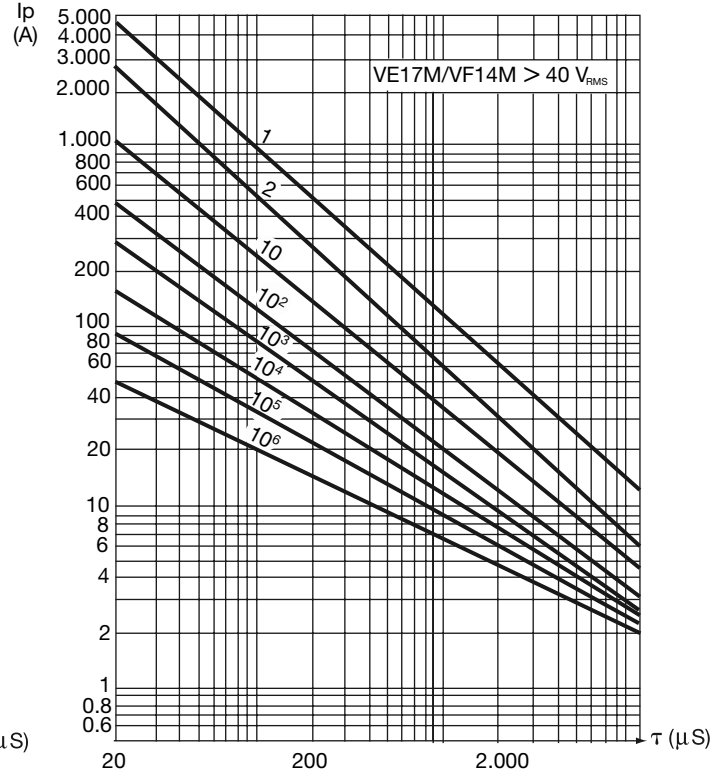
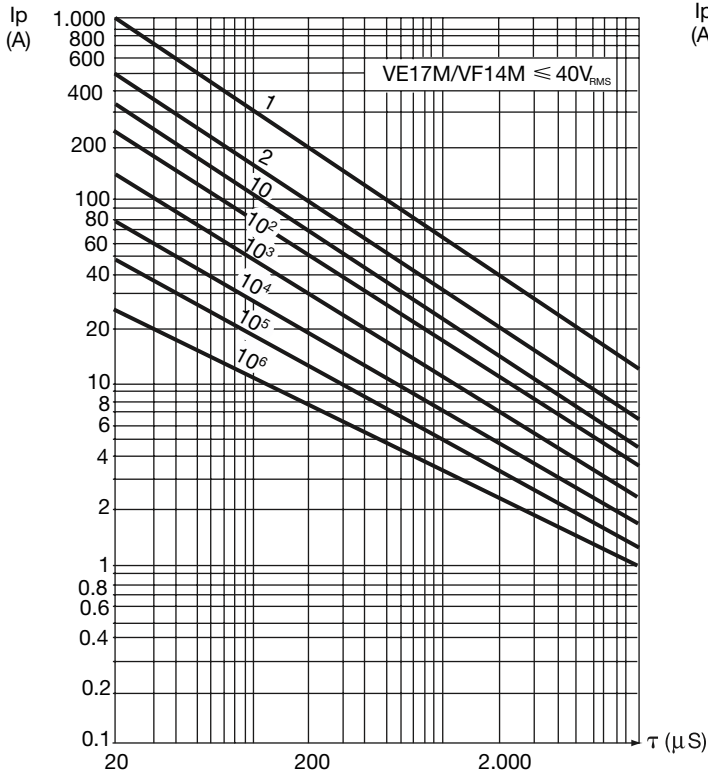


Zinc Oxide Varistors



Electrical Characteristics VE / VF Types

MAXIMUM SURGE CURRENT (I_p) DERATING CURVES WITH PULSE WIDTH (τ) AND FREQUENCY



Zinc Oxide Varistors



Electrical Characteristics VE / VF Types

MAXIMUM SURGE CURRENT (I_p) DERATING CURVES WITH PULSE WIDTH (τ) AND FREQUENCY

