

Metal Oxide Varistors

Applications requiring protection at operating voltage levels as low as 11 volts and as high as 1100 volts with energies rated up to 15000 joules, depending on the device selected.

Typical Protection Applications:

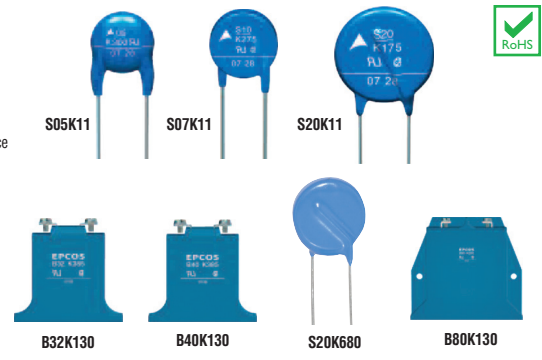
- Protection of Semiconductors (Diodes, Transistors, Thyristors, ICs, Etc.)
- Appliances Connected to 110 V or 220 VAC
- Industrial Equipment Vulnerable to Transients on the AC Power Line (Computers, Traffic Controls, Motor Controllers, Etc.)
- Protection of Equipment Connected to Telephone or Signal Lines, Such as Security Systems, Railroad Equipment, Fire Alarm Systems, Etc.
- Arc Suppression Across Relay and Switch Contacts
- Power Control Equipment for Power Distribution Lines
- GFI (Ground Fault Interrupters)

Benefits:

- Eliminates Dangerous Voltage Transients
- Lowers Overall System Costs by Reducing Downtime and Maintenance Costs
- Improves Component and System Reliability
- Reduces EMP/RFI Interference

Features:

- Nanosecond Switching Response Time, <15 ns, with Minimal Lead Length
- Compatible with Automatic Insertion; Tape and Reel Configuration Available on S05, S07, S10 and S14 Series
- No Extinguishing or Follow-On Current Limitations
- High Transient Current Capability (Up to 100,000 Amps)



| Stock No. | Mfr.'s Type | Rated Voltage AC Volts (RMS) | Rated Voltage DC Volts | Varistor Voltage (±10%) Volts | Rated Single Pulse Transient Energy Joules | Surge Current 8/20 µs Amps | Maximum Clamping Voltage V @ A | EACH   |
|-----------|-------------|------------------------------|------------------------|-------------------------------|--------------------------------------------|----------------------------|--------------------------------|--------|
| 70102307  | S05K11      | 11                           | 14                     | 18                            | 0.3                                        | 100                        | 36 @ 1.0                       | .25    |
| 70102309  | S07K11      | 11                           | 14                     | 18                            | 0.8                                        | 250                        | 36 @ 2.5                       | .27    |
| 70102311  | S14K11      | 11                           | 14                     | 18                            | 3.2                                        | 1000                       | 36 @ 10.0                      | .53    |
| 70102312  | S20K11      | 11                           | 14                     | 18                            | 10.0                                       | 2000                       | 36 @ 20.0                      | 1.03   |
| 70102317  | S20K14      | 14                           | 18                     | 22                            | 12.0                                       | 2000                       | 43 @ 20.0                      | .95    |
| 70102324  | S20K17      | 17                           | 22                     | 27                            | 14.0                                       | 2000                       | 53 @ 20.0                      | .78    |
| 70102330  | S14K20      | 20                           | 26                     | 33                            | 6.0                                        | 1000                       | 65 @ 10.0                      | .52    |
| 70102334  | S05K25      | 25                           | 31                     | 39                            | 0.7                                        | 100                        | 77 @ 1.0                       | .25    |
| 70102335  | S07K25      | 25                           | 31                     | 39                            | 1.6                                        | 250                        | 77 @ 2.5                       | .26    |
| 70102337  | S10K25      | 25                           | 31                     | 39                            | 3.7                                        | 500                        | 77 @ 5.0                       | .26    |
| 70102339  | S14K25      | 25                           | 31                     | 39                            | 7.0                                        | 1000                       | 77 @ 10.0                      | .53    |
| 70102340  | S20K25      | 25                           | 31                     | 39                            | 22.0                                       | 2000                       | 77 @ 20.0                      | .91    |
| 70102345  | S10K30      | 30                           | 38                     | 47                            | 4.4                                        | 500                        | 93 @ 5.0                       | .38    |
| 70102346  | S14K30      | 30                           | 38                     | 47                            | 9.0                                        | 1000                       | 93 @ 10.0                      | .53    |
| 70102349  | S07K35      | 35                           | 45                     | 56                            | 2.5                                        | 250                        | 110 @ 2.5                      | .27    |
| 70102351  | S10K35      | 35                           | 45                     | 56                            | 5.4                                        | 500                        | 110 @ 5.0                      | .38    |
| 70102352  | S14K35      | 35                           | 45                     | 56                            | 10.0                                       | 1000                       | 110 @ 10.0                     | .53    |
| 70102358  | S10K40      | 40                           | 56                     | 68                            | 6.4                                        | 500                        | 135 @ 5.0                      | .38    |
| 70102359  | S14K40      | 40                           | 56                     | 68                            | 13.0                                       | 1000                       | 135 @ 10.0                     | .53    |
| 70102363  | S14K50      | 50                           | 65                     | 82                            | 15.0                                       | 4500                       | 135 @ 50.0                     | .53    |
| 70102733  | S20K50      | 50                           | 65                     | 82                            | 27.0                                       | 6500                       | 135 @ 100.0                    | 1.03   |
| 70102367  | S14K60      | 60                           | 85                     | 100                           | 17.0                                       | 4500                       | 165 @ 50.0                     | .46    |
| 70102369  | S10K95      | 95                           | 125                    | 150                           | 15.0                                       | 2500                       | 250 @ 25.0                     | .37    |
| 70102370  | S07K130     | 130                          | 170                    | 205                           | 9.5                                        | 2500                       | 340 @ 10.0                     | .27    |
| 70102371  | S10K130     | 130                          | 170                    | 205                           | 19.0                                       | 2500                       | 340 @ 25.0                     | .37    |
| 70102372  | S14K130     | 130                          | 170                    | 205                           | 34.0                                       | 4500                       | 340 @ 50.0                     | .53    |
| 70102373  | S14K130E2   | 130                          | 170                    | 205                           | 50.0                                       | 6000                       | 340 @ 50.0                     | .61    |
| 70102374  | S20K130     | 130                          | 170                    | 205                           | 70.0                                       | 8000                       | 340 @ 100.0                    | 1.15   |
| 70102375  | S20K130E2   | 130                          | 170                    | 205                           | 100.0                                      | 10000                      | 340 @ 100.0                    | 1.37   |
| 70102376  | B32K130     | 130                          | 170                    | 205                           | 210.0                                      | 25000                      | 340 @ 100.0                    | 25.53  |
| 70102377  | B40K130     | 130                          | 170                    | 205                           | 310.0                                      | 40000                      | 340 @ 300.0                    | 37.27  |
| 70102731  | B80K130     | 130                          | 170                    | 205                           | 660.0                                      | 100000                     | 340 @ 800.0                    | 170.78 |
| 70102379  | S07K140     | 140                          | 180                    | 220                           | 10.0                                       | 1200                       | 360 @ 10.0                     | .27    |
| 70102380  | S14K140     | 140                          | 180                    | 220                           | 36.0                                       | 4500                       | 360 @ 50.0                     | .53    |
| 70102382  | S14K150     | 150                          | 200                    | 240                           | 40.0                                       | 4500                       | 395 @ 50.0                     | .53    |
| 70102383  | S20K150     | 150                          | 200                    | 240                           | 85.0                                       | 8000                       | 395 @ 100.0                    | 2.87   |

The B80 Series is available with operating voltage levels through 1100 VAC (RMS).

| Stock No. | Mfr.'s Type | Rated Voltage AC Volts (RMS) | Rated Voltage DC Volts | Varistor Voltage (±10%) Volts | Rated Single Pulse Transient Energy Joules | Surge Current 8/20 µs Amps | Maximum Clamping Voltage V @ A | EACH   |
|-----------|-------------|------------------------------|------------------------|-------------------------------|--------------------------------------------|----------------------------|--------------------------------|--------|
| 70102384  | S20K150E2   | 150                          | 200                    | 240                           | 120.0                                      | 10000                      | 395 @ 100.0                    | 1.35   |
| 70102385  | B32K150     | 150                          | 200                    | 240                           | 240.0                                      | 25000                      | 395 @ 200.0                    | 24.95  |
| 70102387  | B40K150     | 150                          | 200                    | 240                           | 360.0                                      | 40000                      | 395 @ 300.0                    | 32.29  |
| 70102389  | B60K150     | 150                          | 200                    | 240                           | 570.0                                      | 70000                      | 395 @ 500.0                    | 113.10 |
| 70102391  | S14K175     | 175                          | 225                    | 270                           | 46.0                                       | 4500                       | 455 @ 50.0                     | .53    |
| 70102541  | S20K175     | 175                          | 225                    | 270                           | 98.0                                       | 8000                       | 455 @ 100.0                    | .70    |
| 70102544  | B32K230     | 230                          | 300                    | 360                           | 300.0                                      | 25000                      | 595 @ 200.0                    | 25.95  |
| 70102396  | S10K250     | 250                          | 320                    | 390                           | 38.0                                       | 2500                       | 650 @ 25.0                     | .37    |
| 70102397  | S14K250     | 250                          | 320                    | 390                           | 65.0                                       | 4500                       | 650 @ 50.0                     | .53    |
| 70102398  | S20K250     | 250                          | 320                    | 390                           | 130.0                                      | 8000                       | 650 @ 100.0                    | 1.11   |
| 70102399  | B32K250     | 250                          | 320                    | 390                           | 340.0                                      | 25000                      | 650 @ 200.0                    | 23.79  |
| 70102401  | B40K250     | 250                          | 320                    | 390                           | 490.0                                      | 40000                      | 650 @ 300.0                    | 37.27  |
| 70102402  | S07K275     | 275                          | 350                    | 430                           | 21.0                                       | 1200                       | 710 @ 10.0                     | .27    |
| 70102404  | S10K275     | 275                          | 350                    | 430                           | 43.0                                       | 2500                       | 710 @ 25.0                     | .37    |
| 70102405  | S14K275     | 275                          | 350                    | 430                           | 71.0                                       | 4500                       | 710 @ 50.0                     | .53    |
| 70102406  | S20K275     | 275                          | 350                    | 430                           | 140.0                                      | 8000                       | 710 @ 100.0                    | 1.16   |
| 70102407  | B32K275     | 275                          | 350                    | 430                           | 360.0                                      | 25000                      | 710 @ 200.0                    | 23.79  |
| 70102408  | B40K275     | 275                          | 350                    | 430                           | 550.0                                      | 40000                      | 710 @ 300.0                    | 37.27  |
| 70102409  | B60K275     | 275                          | 350                    | 430                           | 860.0                                      | 70000                      | 710 @ 500.0                    | 107.86 |
| 70102411  | S14K300     | 300                          | 385                    | 470                           | 76.0                                       | 1400                       | 775 @ 50.0                     | .53    |
| 70102412  | S20K300     | 300                          | 385                    | 470                           | 160.0                                      | 8000                       | 775 @ 100.0                    | 1.15   |
| 70102413  | S14K385     | 385                          | 505                    | 620                           | 80.0                                       | 4500                       | 1025 @ 50.0                    | .53    |
| 70102415  | S20K385     | 385                          | 505                    | 620                           | 140.0                                      | 8000                       | 1025 @ 100.0                   | 1.15   |
| 70102416  | B32K385     | 385                          | 505                    | 620                           | 550.0                                      | 25000                      | 1025 @ 200.0                   | 23.79  |
| 70102419  | B32K420     | 420                          | 560                    | 680                           | 160.0                                      | 8000                       | 1120 @ 100.0                   | 1.54   |
| 70102420  | B32K460     | 460                          | 615                    | 750                           | 520.0                                      | 25000                      | 1240 @ 200.0                   | 26.19  |
| 70102421  | B60K460     | 460                          | 615                    | 750                           | 1200.0                                     | 70000                      | 1240 @ 500.0                   | 90.50  |
| 70102422  | S20K510     | 510                          | 670                    | 820                           | 190.0                                      | 6500                       | 1355 @ 100.0                   | 2.22   |
| 70102424  | S14K550     | 550                          | 745                    | 910                           | 120.0                                      | 4500                       | 1500 @ 50.0                    | 1.27   |
| 70102425  | S20K550     | 550                          | 745                    | 910                           | 210.0                                      | 6500                       | 1500 @ 100.0                   | 2.32   |
| 70102426  | B32K550     | 550                          | 745                    | 910                           | 620.0                                      | 25000                      | 1500 @ 200.0                   | 28.59  |
| 70102543  | B40K550     | 550                          | 745                    | 910                           | 960.0                                      | 40000                      | 1500 @ 300.0                   | 54.35  |
| 70102428  | S20K625     | 625                          | 825                    | 1000                          | 230.0                                      | 6500                       | 1650 @ 100.0                   | 2.64   |
| 70102429  | S20K680     | 680                          | 895                    | 1100                          | 250.0                                      | 4500                       | 1815 @ 100.0                   | 1.30   |
| 70102430  | B40K750     | 750                          | 1060                   | 1200                          | 1200.0                                     | 40000                      | 2000 @ 300.0                   | 53.10  |
| 70102434  | S20K1000    | 1000                         | 1465                   | 1800                          | 410.0                                      | 6500                       | 2970 @ 100.0                   | 4.69   |

The B80 Series is available with operating voltage levels through 1100 VAC (RMS).

SVP — Surge Voltage Protectors

Surge Voltage Protectors

Surge Voltage Protectors. SVPs are gas discharge tubes, hermetically sealed, composed of two or three electrodes properly spaced by insulators and filled with a rare gas. SVPs mainly serve to provide a conductive path for unwanted, excessive transients, which prevents the transient energy and associated voltages from damaging sensitive equipment and components, and from harming personnel.

Electrical Characteristics Common to All Types: Transition Time — 0.1 µs typ. Rms: ≥ 10,000 megohm. Capacitance: 1 pF typ. at 1 MHz. Operating and Storage Temperature Range: -40°C to +90°C.

Two-Electrode Type SVPs. Compact medium-duty two-electrode tubes.

Three-Electrode Type SVPs. These units meet or exceed parameters specified in RUS Specification PE-80.

- High Surge Current Capacity at 20 kA Maximum
- High Insulation Resistance at ≥10<sup>10</sup> Ohm
- Low Capacitance — Down to 1 pF

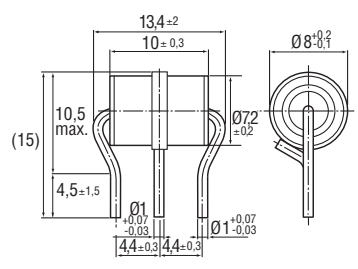
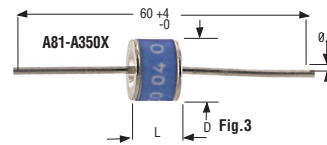
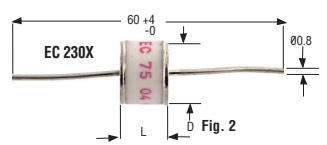


Fig. 1



| Stock No. | Mfr.'s Type | Fig. | Special Notes                 | DC Breakdown Voltage (V) | Nominal OD x L (mm) | Single Impulse Discharge Current (kA) 8/20 µs | AC Discharge Current (A) <sup>1</sup> | Impulse Breakdown Voltage Volts at 100 V/µs | Impulse Breakdown Voltage Volts at 1 kV/µs | AC Follow Current (A Peak) | DC Holdover Voltage (V) <sup>4</sup> | Impulse Life (No. of Pulses) 500 A 10/1000 µs | EACH |
|-----------|-------------|------|-------------------------------|--------------------------|---------------------|-----------------------------------------------|---------------------------------------|---------------------------------------------|--------------------------------------------|----------------------------|--------------------------------------|-----------------------------------------------|------|
| 70102464  | T83-A90X    | 1    | Medium Duty†                  | 90 ±20% <sup>2</sup>     | 8.0 x 10.0          | 5.0                                           | >20                                   | <250                                        | <350                                       | <500                       | —                                    | >100                                          | 1.70 |
| 70102462  | T23-A230X   | 1    | Heavy-Duty†                   | 230 ±20% <sup>2</sup>    | 8.0 x 10.0          | 10.0 <sup>2</sup>                             | >20                                   | <350                                        | <450                                       | <600                       | —                                    | >50 <sup>3</sup>                              | 1.97 |
| 70102463  | T23-A350X   | 1    | Heavy-Duty†                   | 350 ±20% <sup>2</sup>    | 8.0 x 10.0          | 10.0 <sup>2</sup>                             | >20                                   | <550                                        | <650                                       | <800                       | —                                    | >100 <sup>3</sup>                             | 2.60 |
| 70102518  | M51-C90X    | 2    | General-Purpose               | 90 ±20%                  | 5.0 x 5.0           | 2.5                                           | 10                                    | <550                                        | <600                                       | <900                       | —                                    | >50                                           | 2.28 |
| 70102310  | EC75X       | 2    | General-Purpose               | 75 ±20%                  | 8.0 x 6.0           | 5.0                                           | 20                                    | <550                                        | <600                                       | <1000                      | 20                                   | >200                                          | .90  |
| 70102726  | EC90X       | 2    | General-Purpose               | 90 ±20%                  | 8.0 x 6.0           | 5.0                                           | 20                                    | <550                                        | <600                                       | <1000                      | 20                                   | >200                                          | 1.17 |
| 70102729  | EC230X      | 2    | General-Purpose†              | 230 ±15%                 | 8.0 x 6.0           | 5.0                                           | 20                                    | <600                                        | <650                                       | <1000                      | 25                                   | >200                                          | 1.29 |
| 70102458  | A81-A230X   | 3    | General-Purpose, High Current | 230 ±20%                 | 8.0 x 6.0           | 20.0                                          | >65                                   | <450                                        | <600                                       | <800                       | —                                    | >400                                          | 1.60 |
| 70102459  | A81-A350X   | 3    | General-Purpose, High Current | 350 ±20%                 | 8.0 x 6.0           | 20.0                                          | >65                                   | <650                                        | <800                                       | <1000                      | —                                    | >400                                          | 1.75 |

†Communication use. ††1 cycles, 60 Hz, 1 Time. 260 VRMS. <sup>2</sup>Line to ground, single side. <sup>3</sup>Changing polarity after each surge. <sup>4</sup>In accordance with IEEE C62.31.