

## 1.5KE6.8 - 1.5KE440CA series

## 1500 WATT AXIAL TRANSIENT VOLTAGE SUPPRESSORS

Protect sensitive electronics against voltage transients induced by inductive load switching and lightning. Ideal for the protection of I/O interfaces, Vcc bus, and other integrated circuits used in telecom, computer, datacom and industrial electronics.

## FEATURES

- Breakdown voltage range 6.8 to 440 Volts
- Uni-directional and Bi-directional
- Glass passivated junction
- Low clamping factor
- 100% surge tested
- UL recognised

**MAXIMUM RATING**

- Peak Pulse Power (Ppk): 1500 Watts (10 x 1000μs)@25°C  
(see diagram on page 6 for wave form)
- 5 watt steady state
- Response time: 1 x 10<sup>-12</sup> seconds (theoretical)
- Forward surge rating: 200 Amps, 8.3ms half sine wave,  
(uni-directional devices only)
- Operating & storage temperature: -55°C to +150°C

## MECHANICAL CHARACTERISTICS

- Case: DO-201AD: Moulded plastic over glass passivated junction
- Terminals: Axial leads, solderable per MIL-STD-202 Method 208
- Solderable leads = 230°C for 10 seconds (1.59mm from case)
- Marking: cathode band, (positive terminal, uni-directional devices only), device code, logo
- Weight: 1.5 grammes (approx)

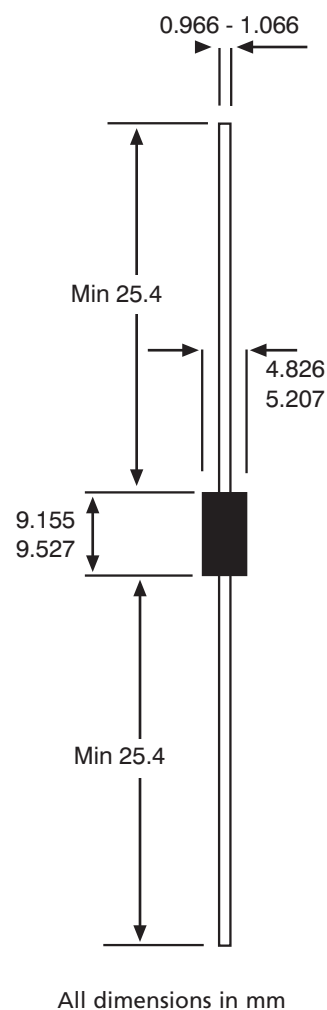


Figure 1 - Capacitance vs. Stand-off Voltage

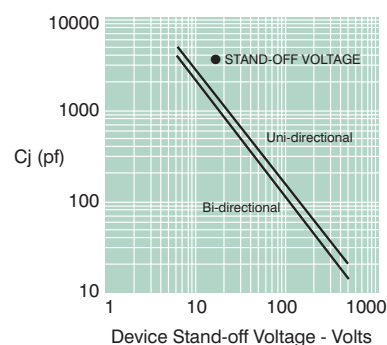
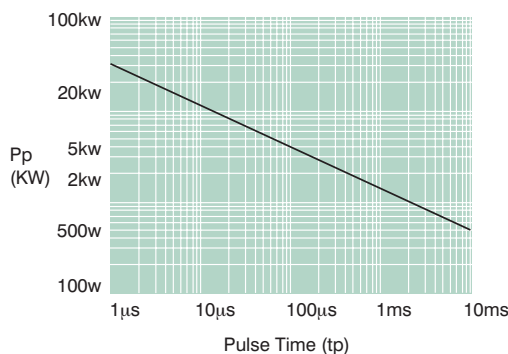


Figure 2 - Peak Pulse Power vs. Pulse Time



## ORDERING INFORMATION

**1.5KE** | | | **C** | **A** |

Voltage —————|—————|—————|—————|

Bi-Directional —————|—————|—————|—————|

5% Voltage Tolerance —————|—————|—————|—————|

Packaging Option —————|—————|—————|—————|

$B = \text{Bulk (500 pcs)}$   
 $T = \text{Tape and reeled (1500 pcs)}$

## ELECTRICAL SPECIFICATION @ Tamb 25°C

| Part Number (Uni) | Part Number (Bi) | Reverse Stand off Voltage $V_R$ (Volts) | Breakdown Voltage $V_{BR}$ (Volts) @ $I_T$ |       |      | Maximum Reverse Leakage $I_R$ @ $V_R$ ( $\mu A$ ) | Maximum Clamping Voltage $V_C$ @ $I_{PP}$ (Volts) | Maximum Peak Pulse Current $I_{PP}$ (A) | Max Voltage Temperature Variation of $V_{BR}$ (%/°C) |
|-------------------|------------------|-----------------------------------------|--------------------------------------------|-------|------|---------------------------------------------------|---------------------------------------------------|-----------------------------------------|------------------------------------------------------|
|                   |                  |                                         | MIN                                        | MAX   | mA   |                                                   |                                                   |                                         |                                                      |
| 1.5KE6.8*         | 1.5KE6.8C*       | 5.50                                    | 6.12                                       | 7.48  | 10.0 | 1000.0                                            | 10.8                                              | 139.0                                   | 0.057                                                |
| 1.5KE6.8A*        | 1.5KE6.8CA*      | 5.80                                    | 6.45                                       | 7.14  | 10.0 | 1000.0                                            | 10.5                                              | 143.0                                   | 0.057                                                |
| 1.5KE7.5          | 1.5KE7.5C        | 6.05                                    | 6.75                                       | 8.25  | 10.0 | 500.0                                             | 11.7                                              | 128.0                                   | 0.061                                                |
| 1.5KE7.5A         | 1.5KE7.5CA       | 6.40                                    | 7.13                                       | 7.88  | 10.0 | 500.0                                             | 11.3                                              | 132.0                                   | 0.061                                                |
| 1.5KE8.2          | 1.5KE8.2C        | 6.63                                    | 7.38                                       | 9.02  | 10.0 | 200.0                                             | 12.5                                              | 120.0                                   | 0.065                                                |
| 1.5KE8.2A         | 1.5KE8.2CA       | 7.02                                    | 7.79                                       | 8.61  | 10.0 | 200.0                                             | 12.1                                              | 124.0                                   | 0.065                                                |
| 1.5KE9.1          | 1.5KE9.1C        | 7.37                                    | 8.19                                       | 10.00 | 1.0  | 50.0                                              | 13.8                                              | 109.0                                   | 0.068                                                |
| 1.5KE9.1A         | 1.5KE9.1CA       | 7.78                                    | 8.60                                       | 9.55  | 1.0  | 50.0                                              | 13.4                                              | 112.0                                   | 0.068                                                |
| 1.5KE10           | 1.5KE10C         | 8.10                                    | 9.00                                       | 11.00 | 1.0  | 10.0                                              | 15.0                                              | 100.0                                   | 0.073                                                |
| 1.5KE10A          | 1.5KE10CA        | 8.55                                    | 9.50                                       | 10.50 | 1.0  | 10.0                                              | 14.5                                              | 103.0                                   | 0.073                                                |
| 1.5KE11           | 1.5KE11C         | 8.92                                    | 9.90                                       | 12.10 | 1.0  | 5.0                                               | 16.2                                              | 93.0                                    | 0.075                                                |
| 1.5KE11A          | 1.5KE11CA        | 9.40                                    | 10.50                                      | 11.60 | 1.0  | 5.0                                               | 15.6                                              | 96.0                                    | 0.075                                                |
| 1.5KE12           | 1.5KE12C         | 9.72                                    | 10.80                                      | 13.20 | 1.0  | 5.0                                               | 17.3                                              | 87.0                                    | 0.078                                                |
| 1.5KE12A          | 1.5KE12CA        | 10.20                                   | 11.40                                      | 12.60 | 1.0  | 5.0                                               | 16.7                                              | 90.0                                    | 0.078                                                |
| 1.5KE13           | 1.5KE13C         | 10.50                                   | 11.70                                      | 14.30 | 1.0  | 5.0                                               | 19.0                                              | 79.0                                    | 0.081                                                |
| 1.5KE13A          | 1.5KE13CA        | 11.10                                   | 12.40                                      | 13.70 | 1.0  | 5.0                                               | 18.2                                              | 82.0                                    | 0.081                                                |
| 1.5KE15           | 1.5KE15C*        | 12.10                                   | 13.50                                      | 16.50 | 1.0  | 5.0                                               | 22.0                                              | 68.0                                    | 0.084                                                |
| 1.5KE15A          | 1.5KE15CA*       | 12.80                                   | 14.30                                      | 15.80 | 1.0  | 5.0                                               | 21.2                                              | 71.0                                    | 0.084                                                |
| 1.5KE16           | 1.5KE16C         | 12.90                                   | 14.40                                      | 17.60 | 1.0  | 5.0                                               | 23.5                                              | 64.0                                    | 0.086                                                |
| 1.5KE16A          | 1.5KE16CA        | 13.60                                   | 15.20                                      | 16.80 | 1.0  | 5.0                                               | 22.5                                              | 67.0                                    | 0.086                                                |
| 1.5KE18*          | 1.5KE18C*        | 14.50                                   | 16.20                                      | 19.80 | 1.0  | 5.0                                               | 26.5                                              | 56.5                                    | 0.088                                                |
| 1.5KE18A*         | 1.5KE18CA*       | 15.30                                   | 17.10                                      | 18.90 | 1.0  | 5.0                                               | 25.2                                              | 59.5                                    | 0.088                                                |
| 1.5KE20*          | 1.5KE20C         | 16.20                                   | 18.00                                      | 22.00 | 1.0  | 5.0                                               | 29.1                                              | 51.5                                    | 0.090                                                |
| 1.5KE20A*         | 1.5KE20CA        | 17.10                                   | 19.00                                      | 21.00 | 1.0  | 5.0                                               | 27.7                                              | 54.0                                    | 0.090                                                |
| 1.5KE22           | 1.5KE22C         | 17.80                                   | 19.80                                      | 24.20 | 1.0  | 5.0                                               | 31.9                                              | 47.0                                    | 0.092                                                |
| 1.5KE22A          | 1.5KE22CA        | 18.80                                   | 20.90                                      | 23.10 | 1.0  | 5.0                                               | 30.6                                              | 49.0                                    | 0.092                                                |
| 1.5KE24*          | 1.5KE24C*        | 19.40                                   | 21.60                                      | 26.40 | 1.0  | 5.0                                               | 34.7                                              | 43.0                                    | 0.094                                                |
| 1.5KE24A*         | 1.5KE24CA*       | 20.50                                   | 22.80                                      | 25.20 | 1.0  | 5.0                                               | 33.2                                              | 45.0                                    | 0.094                                                |
| 1.5KE27*          | 1.5KE27C*        | 21.80                                   | 24.30                                      | 29.70 | 1.0  | 5.0                                               | 39.1                                              | 38.5                                    | 0.096                                                |
| 1.5KE27A*         | 1.5KE27CA*       | 23.10                                   | 25.70                                      | 28.40 | 1.0  | 5.0                                               | 37.5                                              | 40.0                                    | 0.096                                                |
| 1.5KE30           | 1.5KE30C         | 24.30                                   | 27.00                                      | 33.00 | 1.0  | 5.0                                               | 43.5                                              | 34.5                                    | 0.097                                                |
| 1.5KE30A          | 1.5KE30CA        | 25.60                                   | 28.50                                      | 31.50 | 1.0  | 5.0                                               | 41.4                                              | 36.0                                    | 0.097                                                |
| 1.5KE33*          | 1.5KE33C         | 26.80                                   | 29.70                                      | 36.30 | 1.0  | 5.0                                               | 47.7                                              | 31.5                                    | 0.098                                                |
| 1.5KE33A*         | 1.5KE33CA        | 28.20                                   | 31.40                                      | 34.70 | 1.0  | 5.0                                               | 45.7                                              | 33.0                                    | 0.098                                                |
| 1.5KE36           | 1.5KE36C         | 29.10                                   | 32.40                                      | 39.60 | 1.0  | 5.0                                               | 52.0                                              | 29.0                                    | 0.099                                                |
| 1.5KE36A          | 1.5KE36CA        | 30.80                                   | 34.20                                      | 37.80 | 1.0  | 5.0                                               | 49.9                                              | 30.0                                    | 0.099                                                |
| 1.5KE39*          | 1.5KE39C         | 31.60                                   | 35.10                                      | 42.90 | 1.0  | 5.0                                               | 56.4                                              | 26.5                                    | 0.100                                                |
| 1.5KE39A*         | 1.5KE39CA        | 33.30                                   | 37.10                                      | 41.00 | 1.0  | 5.0                                               | 53.9                                              | 28.0                                    | 0.100                                                |
| 1.5KE43           | 1.5KE43C         | 34.80                                   | 38.70                                      | 47.30 | 1.0  | 5.0                                               | 61.9                                              | 24.0                                    | 0.101                                                |
| 1.5KE43A          | 1.5KE43CA        | 36.80                                   | 40.90                                      | 45.20 | 1.0  | 5.0                                               | 59.3                                              | 25.3                                    | 0.101                                                |
| 1.5KE47           | 1.5KE47C         | 38.10                                   | 42.30                                      | 51.70 | 1.0  | 5.0                                               | 67.8                                              | 22.2                                    | 0.101                                                |
| 1.5KE47A          | 1.5KE47CA        | 40.20                                   | 44.70                                      | 49.40 | 1.0  | 5.0                                               | 64.8                                              | 23.2                                    | 0.101                                                |
| 1.5KE51*          | 1.5KE51C         | 41.30                                   | 45.90                                      | 56.10 | 1.0  | 5.0                                               | 73.5                                              | 20.4                                    | 0.102                                                |
| 1.5KE51A          | 1.5KE51CA        | 43.60                                   | 48.50                                      | 53.60 | 1.0  | 5.0                                               | 70.1                                              | 21.4                                    | 0.102                                                |

Suffix 'C' denotes Bi-directional device. Suffix 'A' denotes 5% tolerance device, no suffix denotes a 10% tolerance device.

1. For Bi-directional devices having  $V_R$  of 10 volts and below, the  $I_R$  limit is doubled.

2.  $V_F = 3.5$  Volts max. for devices of  $V_R < 100V$ , and  $V_F = 5.0$  Volts max for devices of  $V_R > 100V$ .  $I_F = 100A$ , 300  $\mu S$  square wave.

\* Preferred voltages.

## 1.5KE6.8 - 1.5KE440CA series

### ELECTRICAL SPECIFICATION @ Tamb 25°C

| Part Number (Uni) | Part Number (Bi) | Reverse Stand off Voltage $V_R$ (Volts) | Breakdown Voltage $V_{BR}$ (Volts) @ $I_T$ |        |      | Maximum Reverse Leakage $I_R$ @ $V_R$ ( $\mu A$ ) | Maximum Clamping Voltage $V_C$ @ $I_{PP}$ (Volts) | Maximum Peak Pulse Current $I_{PP}$ (A) | Max Voltage Temperature Variation of $V_{BR}$ (%/°C) |
|-------------------|------------------|-----------------------------------------|--------------------------------------------|--------|------|---------------------------------------------------|---------------------------------------------------|-----------------------------------------|------------------------------------------------------|
|                   |                  |                                         | MIN                                        | MAX    | (mA) |                                                   |                                                   |                                         |                                                      |
| 1.5KE56           | 1.5KE56C         | 45.4                                    | 50.40                                      | 61.60  | 1.0  | 5.0                                               | 80.5                                              | 18.6                                    | 0.103                                                |
| 1.5KE56A          | 1.5KE56CA        | 47.8                                    | 53.20                                      | 58.80  | 1.0  | 5.0                                               | 77.0                                              | 19.5                                    | 0.103                                                |
| 1.5KE62           | 1.5KE62C         | 50.2                                    | 55.80                                      | 68.20  | 1.0  | 5.0                                               | 89.0                                              | 16.9                                    | 0.104                                                |
| 1.5KE62A          | 1.5KE62CA        | 53.0                                    | 58.90                                      | 65.10  | 1.0  | 5.0                                               | 85.0                                              | 17.7                                    | 0.104                                                |
| 1.5KE68           | 1.5KE68C         | 55.1                                    | 61.20                                      | 74.80  | 1.0  | 5.0                                               | 98.0                                              | 15.3                                    | 0.104                                                |
| 1.5KE68A          | 1.5KE68CA        | 58.1                                    | 64.60                                      | 71.40  | 1.0  | 5.0                                               | 92.0                                              | 16.3                                    | 0.104                                                |
| 1.5KE75           | 1.5KE75C*        | 60.7                                    | 67.50                                      | 82.50  | 1.0  | 5.0                                               | 108.0                                             | 13.9                                    | 0.105                                                |
| 1.5KE75A          | 1.5KE75CA*       | 64.1                                    | 71.30                                      | 78.80  | 1.0  | 5.0                                               | 103.0                                             | 14.6                                    | 0.105                                                |
| 1.5KE82           | 1.5KE82C         | 66.4                                    | 73.80                                      | 90.20  | 1.0  | 5.0                                               | 118.0                                             | 12.7                                    | 0.105                                                |
| 1.5KE82A          | 1.5KE82CA        | 70.1                                    | 77.90                                      | 86.10  | 1.0  | 5.0                                               | 113.0                                             | 13.3                                    | 0.105                                                |
| 1.5KE91           | 1.5KE91C         | 73.7                                    | 81.90                                      | 100.00 | 1.0  | 5.0                                               | 131.0                                             | 11.4                                    | 0.106                                                |
| 1.5KE91A          | 1.5KE91CA        | 77.8                                    | 86.50                                      | 95.50  | 1.0  | 5.0                                               | 125.0                                             | 12.0                                    | 0.106                                                |
| 1.5KE100          | 1.5KE100C        | 81.0                                    | 90.00                                      | 110.00 | 1.0  | 5.0                                               | 144.0                                             | 10.4                                    | 0.106                                                |
| 1.5KE100A         | 1.5KE100CA       | 85.5                                    | 95.00                                      | 105.00 | 1.0  | 5.0                                               | 137.0                                             | 11.0                                    | 0.106                                                |
| 1.5KE110          | 1.5KE110C        | 89.2                                    | 99.00                                      | 121.00 | 1.0  | 5.0                                               | 158.0                                             | 9.5                                     | 0.107                                                |
| 1.5KE110A         | 1.5KE110CA       | 94.0                                    | 105.00                                     | 116.00 | 1.0  | 5.0                                               | 152.0                                             | 9.9                                     | 0.107                                                |
| 1.5KE120*         | 1.5KE120C*       | 97.2                                    | 108.00                                     | 132.00 | 1.0  | 5.0                                               | 173.0                                             | 8.7                                     | 0.107                                                |
| 1.5KE120A*        | 1.5KE120CA*      | 102.0                                   | 114.00                                     | 126.00 | 1.0  | 5.0                                               | 165.0                                             | 9.1                                     | 0.107                                                |
| 1.5KE130          | 1.5KE130C        | 105.0                                   | 117.00                                     | 143.00 | 1.0  | 5.0                                               | 187.0                                             | 8.0                                     | 0.107                                                |
| 1.5KE130A         | 1.5KE130CA       | 111.0                                   | 124.00                                     | 137.00 | 1.0  | 5.0                                               | 179.0                                             | 8.4                                     | 0.107                                                |
| 1.5KE150          | 1.5KE150C        | 121.0                                   | 135.00                                     | 165.00 | 1.0  | 5.0                                               | 215.0                                             | 7.0                                     | 0.108                                                |
| 1.5KE150A         | 1.5KE150CA       | 128.0                                   | 143.00                                     | 158.00 | 1.0  | 5.0                                               | 207.0                                             | 7.2                                     | 0.108                                                |
| 1.5KE160          | 1.5KE160CC       | 130.0                                   | 144.00                                     | 176.00 | 1.0  | 5.0                                               | 230.0                                             | 6.5                                     | 0.108                                                |
| 1.5KE160A         | 1.5KE160CA       | 136.0                                   | 152.00                                     | 168.00 | 1.0  | 5.0                                               | 219.0                                             | 6.8                                     | 0.108                                                |
| 1.5KE170          | 1.5KE170C        | 138.0                                   | 153.00                                     | 187.00 | 1.0  | 5.0                                               | 244.0                                             | 6.2                                     | 0.108                                                |
| 1.5KE170A         | 1.5KE170CA       | 145.0                                   | 162.00                                     | 179.00 | 1.0  | 5.0                                               | 234.0                                             | 6.4                                     | 0.108                                                |
| 1.5KE180          | 1.5KE180C        | 146.0                                   | 162.00                                     | 198.00 | 1.0  | 5.0                                               | 258.0                                             | 5.8                                     | 0.108                                                |
| 1.5KE180A         | 1.5KE180CA       | 154.0                                   | 171.00                                     | 189.00 | 1.0  | 5.0                                               | 246.0                                             | 6.1                                     | 0.108                                                |
| 1.5KE200*         | 1.5KE200C*       | 162.0                                   | 180.00                                     | 220.00 | 1.0  | 5.0                                               | 287.0                                             | 5.2                                     | 0.108                                                |
| 1.5KE200A*        | 1.5KE200CA*      | 171.0                                   | 190.00                                     | 210.00 | 1.0  | 5.0                                               | 274.0                                             | 5.5                                     | 0.108                                                |
| 1.5KE220          | 1.5KE220C        | 175.0                                   | 198.00                                     | 242.00 | 1.0  | 5.0                                               | 344.0                                             | 4.3                                     | 0.108                                                |
| 1.5KE220A         | 1.5KE220CA       | 185.0                                   | 209.00                                     | 231.00 | 1.0  | 5.0                                               | 328.0                                             | 4.6                                     | 0.108                                                |
| 1.5KE250          | 1.5KE250C        | 202.0                                   | 225.00                                     | 275.00 | 1.0  | 5.0                                               | 360.0                                             | 5.0                                     | 0.110                                                |
| 1.5KE250A         | 1.5KE250CA       | 214.0                                   | 237.00                                     | 263.00 | 1.0  | 5.0                                               | 344.0                                             | 4.4                                     | 0.110                                                |
| 1.5KE300          | 1.5KE300C*       | 243.0                                   | 270.00                                     | 330.00 | 1.0  | 5.0                                               | 430.0                                             | 3.5                                     | 0.110                                                |
| 1.5KE300A         | 1.5KE300CA*      | 256.0                                   | 285.00                                     | 315.00 | 1.0  | 5.0                                               | 414.0                                             | 3.6                                     | 0.110                                                |
| 1.5KE350*         | 1.5KE350C        | 284.0                                   | 315.00                                     | 385.00 | 1.0  | 5.0                                               | 504.0                                             | 3.0                                     | 0.110                                                |
| 1.5KE350A*        | 1.5KE350CA       | 300.0                                   | 332.00                                     | 368.00 | 1.0  | 5.0                                               | 482.0                                             | 3.1                                     | 0.110                                                |
| 1.5KE400          | 1.5KE400C*       | 324.0                                   | 360.00                                     | 440.00 | 1.0  | 5.0                                               | 574.0                                             | 2.6                                     | 0.110                                                |
| 1.5KE400A         | 1.5KE400CA*      | 342.0                                   | 380.00                                     | 420.00 | 1.0  | 5.0                                               | 548.0                                             | 2.8                                     | 0.110                                                |
| 1.5KE440          | 1.5KE440C        | 356.0                                   | 396.00                                     | 484.00 | 1.0  | 5.0                                               | 631.0                                             | 2.4                                     | 0.110                                                |
| 1.5KE440A         | 1.5KE440CA       | 376.0                                   | 418.00                                     | 462.00 | 1.0  | 5.0                                               | 602.0                                             | 2.5                                     | 0.110                                                |

Suffix 'C' denotes Bi-directional device. Suffix 'A' denotes 5% tolerance device, no suffix denotes a 10% tolerance device.

1. For Bi-directional devices having  $V_R$  of 10 volts and below, the  $I_R$  limit is doubled.

2.  $V_F = 3.5$  Volts max. for devices of  $V_R < 100V$ , and  $V_F = 5.0$  Volts max for devices of  $V_R > 100V$ .  $I_F = 100A$ , 300  $\mu s$  square wave.

\* Preferred voltages.