



## P4KE6.8 THRU P4KE440CA

### TRANSIENT VOLTAGE SUPPRESSOR

**BREAKDOWN VOLTAGE: 6.8-440V**  
**PEAK PULSE POWER: 400W**

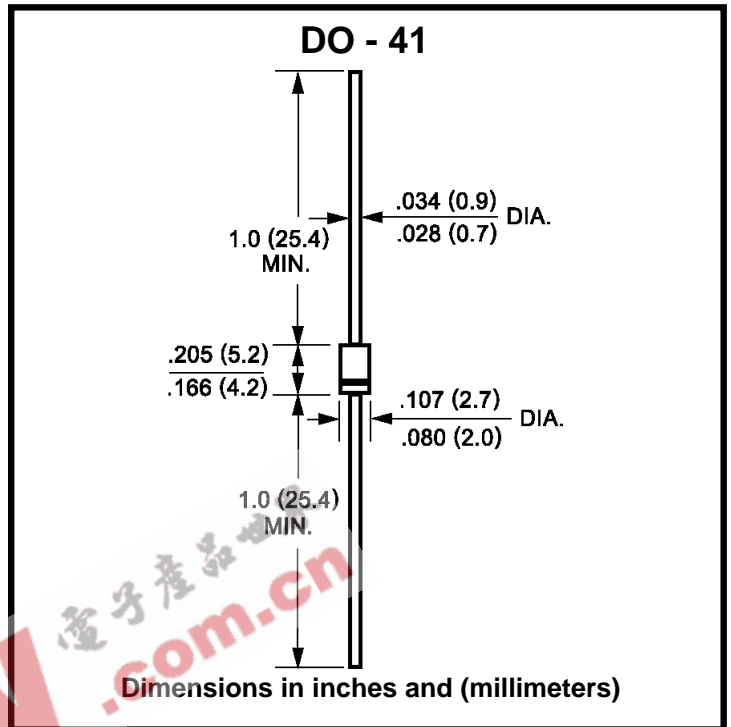
**TECHNICAL  
SPECIFICATION**

#### FEATURES

- 400W peak pulse power capability
- Excellent clamping capability
- Low incremental surge resistance
- Fast response time:  
typically less than 1.0ps from 0V to  $V_{BR}$   
for unidirectional and 5.0nS for bidirectional types.
- High temperature soldering guaranteed:  
265°C/10S/9.5mm lead length at 5 lbs tension

#### MECHANICAL DATA

- Terminal: Plated axial leads solderable per MIL-STD 202E, method 208C
- Case: Molded with UL-94 Class V-O recognized flame retardant epoxy
- Polarity: Color band denotes cathode except for unidirectional types.
- Mounting position: Any



#### MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

(Ratings at 25°C ambient temperature unless otherwise specified)

| RATINGS                                                                       | SYMBOL                            | VALUE        | UNITS |
|-------------------------------------------------------------------------------|-----------------------------------|--------------|-------|
| Peak power dissipation (Note 1)                                               | P <sub>ppm</sub>                  | Minimum 400  | W     |
| Peak pulse reverse current (Note 1)                                           | I <sub>ppm</sub>                  | See Table    | A     |
| Steady state power dissipation (Note 2)                                       | P <sub>m(av)</sub>                | 1.0          | W     |
| Peak forward surge current (Note 3)                                           | I <sub>FSM</sub>                  | 40           | A     |
| Maximum instantaneous forward voltage at 50A for unidirectional only (Note 4) | V <sub>F</sub>                    | 3.5/6.5      | V     |
| Operating junction and storage temperature range                              | T <sub>STG</sub> , T <sub>J</sub> | -55 to + 175 | °C    |

Notes:

1. 10/1000μS waveform non-repetitive current pulse, and derated above T<sub>a</sub>=25°C
2. T<sub>I</sub>=75°C, lead length 9.5mm, Mounted on copper pad area of (40×40mm)
3. Measured on 8.3ms single half sine-wave or equivalent square wave, duty cycle=4 pulses per minute maximum.
4. V<sub>F</sub>=3.5V max. for devices of V<sub>(BR)</sub> ≤ 200V, and V<sub>F</sub>=5.0V max. for devices of V<sub>(BR)</sub> >200V

#### DEVICES FOR BIDIRECTIONAL APPLICATIONS

1. Suffix 'A' denotes 5% tolerance device, no suffix 'A' denotes 10% tolerance device.
2. For bidirectional use 'C' or 'CA' suffix for types P4KE7.5 thru types P4KE440A (e.g. P4KE7.5C, P4KE440CA), for unidirectional don't use 'C' suffix after types.
3. For bidirectional devices having V<sub>WM</sub> of 10 volts and less, the I<sub>D</sub> limit is doubled.
4. Electrical characteristics apply in both directions.

# ELECTRICAL CHARACTERISTICS

( at  $T_A=25^{\circ}\text{C}$  unless otherwise noted )

| Device Type | Breakdown Voltage $V_{(BR)}$ (Volts) (NOTE 1) |      | Test Current $I_T$ (mA) | Stand-off Voltage $V_{WM}$ (Volts) | Maximum Reverse Leakage at $V_{WM}$ $I_D$ ( $\mu\text{A}$ ) (NOTE 3) | Maximum Peak Pulse Reverse Current $I_{ppm}$ (Amps) (NOTE 2) | Maximum Clamping Voltage at $I_{ppm}$ $V_C$ (Volts) | Maximum Temperature Coefficient of $V_{(BR)}$ ( $\%/^{\circ}\text{C}$ ) |
|-------------|-----------------------------------------------|------|-------------------------|------------------------------------|----------------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------|-------------------------------------------------------------------------|
|             | MIN                                           | MAX  |                         |                                    |                                                                      |                                                              |                                                     |                                                                         |
| *P4KE6.8    | 6.12                                          | 7.48 | 10.0                    | 5.50                               | 1000.0                                                               | 38.0                                                         | 10.8                                                | 0.057                                                                   |
| *P4KE6.8A   | 6.45                                          | 7.14 | 10.0                    | 5.80                               | 1000.0                                                               | 40.0                                                         | 10.5                                                | 0.057                                                                   |
| P4KE7.5     | 6.75                                          | 8.25 | 10.0                    | 6.05                               | 500.0                                                                | 36.0                                                         | 11.7                                                | 0.061                                                                   |
| P4KE7.5A    | 7.13                                          | 7.88 | 10.0                    | 6.40                               | 500.0                                                                | 37.0                                                         | 11.3                                                | 0.061                                                                   |
| P4KE8.2     | 7.38                                          | 9.02 | 10.0                    | 6.63                               | 200.0                                                                | 33.0                                                         | 12.5                                                | 0.065                                                                   |
| P4KE8.2A    | 7.79                                          | 8.61 | 10.0                    | 7.02                               | 200.0                                                                | 35.0                                                         | 12.1                                                | 0.065                                                                   |
| P4KE9.1     | 8.19                                          | 10.0 | 1.0                     | 7.37                               | 50.0                                                                 | 30.0                                                         | 13.8                                                | 0.068                                                                   |
| P4KE9.1A    | 8.65                                          | 9.55 | 1.0                     | 7.78                               | 50.0                                                                 | 31.0                                                         | 13.4                                                | 0.068                                                                   |
| P4KE10      | 9.00                                          | 11.0 | 1.0                     | 8.10                               | 10.0                                                                 | 28.0                                                         | 15.0                                                | 0.073                                                                   |
| P4KE10A     | 9.50                                          | 10.5 | 1.0                     | 8.55                               | 10.0                                                                 | 29.0                                                         | 14.5                                                | 0.073                                                                   |
| P4KE11      | 9.90                                          | 12.1 | 1.0                     | 8.92                               | 5.0                                                                  | 26.0                                                         | 16.2                                                | 0.075                                                                   |
| P4KE11A     | 10.5                                          | 11.6 | 1.0                     | 9.40                               | 5.0                                                                  | 27.0                                                         | 15.6                                                | 0.075                                                                   |
| P4KE12      | 10.8                                          | 13.2 | 1.0                     | 9.72                               | 5.0                                                                  | 24.0                                                         | 17.3                                                | 0.078                                                                   |
| P4KE12A     | 11.4                                          | 12.6 | 1.0                     | 10.2                               | 5.0                                                                  | 25.0                                                         | 16.7                                                | 0.078                                                                   |
| P4KE13      | 11.7                                          | 14.3 | 1.0                     | 10.5                               | 5.0                                                                  | 22.0                                                         | 19.0                                                | 0.081                                                                   |
| P4KE13A     | 12.4                                          | 13.7 | 1.0                     | 11.1                               | 5.0                                                                  | 23.0                                                         | 18.2                                                | 0.081                                                                   |
| P4KE15      | 13.5                                          | 16.5 | 1.0                     | 12.1                               | 5.0                                                                  | 19.0                                                         | 22.0                                                | 0.084                                                                   |
| P4KE15A     | 14.3                                          | 15.8 | 1.0                     | 12.8                               | 5.0                                                                  | 20.0                                                         | 21.2                                                | 0.084                                                                   |
| P4KE16      | 14.4                                          | 17.6 | 1.0                     | 12.9                               | 5.0                                                                  | 18.0                                                         | 23.5                                                | 0.086                                                                   |
| P4KE16A     | 15.2                                          | 16.8 | 1.0                     | 13.6                               | 5.0                                                                  | 19.0                                                         | 22.5                                                | 0.086                                                                   |
| P4KE18      | 16.2                                          | 19.8 | 1.0                     | 14.5                               | 5.0                                                                  | 16.0                                                         | 26.5                                                | 0.088                                                                   |
| P4KE18A     | 17.1                                          | 18.9 | 1.0                     | 15.3                               | 5.0                                                                  | 17.0                                                         | 25.2                                                | 0.088                                                                   |
| P4KE20      | 18.0                                          | 22.0 | 1.0                     | 16.2                               | 5.0                                                                  | 14.0                                                         | 29.1                                                | 0.090                                                                   |
| P4KE20A     | 19.0                                          | 21.0 | 1.0                     | 17.1                               | 5.0                                                                  | 15.0                                                         | 27.7                                                | 0.090                                                                   |
| P4KE22      | 19.8                                          | 24.2 | 1.0                     | 17.8                               | 5.0                                                                  | 13.0                                                         | 31.9                                                | 0.092                                                                   |
| P4KE22A     | 20.9                                          | 23.1 | 1.0                     | 18.8                               | 5.0                                                                  | 14.0                                                         | 30.6                                                | 0.092                                                                   |
| P4KE24      | 21.6                                          | 26.4 | 1.0                     | 19.4                               | 5.0                                                                  | 12.0                                                         | 34.7                                                | 0.094                                                                   |
| P4KE24A     | 22.8                                          | 25.2 | 1.0                     | 20.5                               | 5.0                                                                  | 13.0                                                         | 33.2                                                | 0.094                                                                   |
| P4KE27      | 24.3                                          | 29.7 | 1.0                     | 21.8                               | 5.0                                                                  | 11.0                                                         | 39.1                                                | 0.096                                                                   |
| P4KE27A     | 25.7                                          | 28.4 | 1.0                     | 23.1                               | 5.0                                                                  | 11.2                                                         | 37.5                                                | 0.096                                                                   |
| P4KE30      | 27.0                                          | 33.0 | 1.0                     | 24.3                               | 5.0                                                                  | 10.0                                                         | 43.5                                                | 0.097                                                                   |
| P4KE30A     | 28.5                                          | 31.5 | 1.0                     | 25.6                               | 5.0                                                                  | 10.0                                                         | 41.4                                                | 0.097                                                                   |
| P4KE33      | 29.7                                          | 36.3 | 1.0                     | 26.8                               | 5.0                                                                  | 9.0                                                          | 47.7                                                | 0.098                                                                   |
| P4KE33A     | 31.4                                          | 34.7 | 1.0                     | 28.2                               | 5.0                                                                  | 9.0                                                          | 45.7                                                | 0.098                                                                   |
| P4KE36      | 32.4                                          | 39.6 | 1.0                     | 29.1                               | 5.0                                                                  | 8.0                                                          | 52.0                                                | 0.099                                                                   |
| P4KE36A     | 34.2                                          | 37.8 | 1.0                     | 30.8                               | 5.0                                                                  | 8.4                                                          | 49.9                                                | 0.099                                                                   |
| P4KE39      | 35.1                                          | 42.9 | 1.0                     | 31.6                               | 5.0                                                                  | 7.4                                                          | 56.4                                                | 0.100                                                                   |
| P4KE39A     | 37.1                                          | 41.0 | 1.0                     | 33.3                               | 5.0                                                                  | 7.8                                                          | 53.9                                                | 0.100                                                                   |
| P4KE43      | 38.7                                          | 47.3 | 1.0                     | 34.8                               | 5.0                                                                  | 6.8                                                          | 61.9                                                | 0.101                                                                   |
| P4KE43A     | 40.9                                          | 45.2 | 1.0                     | 36.8                               | 5.0                                                                  | 7.1                                                          | 59.3                                                | 0.101                                                                   |
| P4KE47      | 42.3                                          | 51.7 | 1.0                     | 38.1                               | 5.0                                                                  | 6.2                                                          | 67.8                                                | 0.101                                                                   |
| P4KE47A     | 44.7                                          | 49.4 | 1.0                     | 40.2                               | 5.0                                                                  | 5.0                                                          | 64.8                                                | 0.101                                                                   |
| P4KE51      | 45.9                                          | 56.1 | 1.0                     | 41.3                               | 5.0                                                                  | 5.7                                                          | 73.5                                                | 0.102                                                                   |
| P4KE51A     | 48.5                                          | 53.6 | 1.0                     | 43.6                               | 5.0                                                                  | 6.0                                                          | 70.1                                                | 0.102                                                                   |
| P4KE56      | 50.4                                          | 61.6 | 1.0                     | 45.4                               | 5.0                                                                  | 5.2                                                          | 80.5                                                | 0.103                                                                   |
| P4KE56A     | 53.2                                          | 58.8 | 1.0                     | 47.8                               | 5.0                                                                  | 5.5                                                          | 77.0                                                | 0.103                                                                   |

\* Not available as bidirectional devices

# ELECTRICAL CHARACTERISTICS

( at  $T_A=25^{\circ}\text{C}$  unless otherwise noted )

| Device Type | Breakdown Voltage $V_{(BR)}$ (Volts) (NOTE 1) |      | Test Current $I_T$ (mA) | Stand-off Voltage $V_{WM}$ (Volts) | Maximum Reverse Leakage at $V_{WM}$ $I_D$ ( $\mu\text{A}$ ) (NOTE 3) | Maximum Peak Pulse Reverse Current $I_{ppm}$ (Amps) (NOTE 2) | Maximum Clamping Voltage at $I_{ppm}$ $V_C$ (Volts) | Maximum Temperature Coefficient of $V_{(BR)}$ ( $\%/^{\circ}\text{C}$ ) |
|-------------|-----------------------------------------------|------|-------------------------|------------------------------------|----------------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------|-------------------------------------------------------------------------|
|             | MIN                                           | MAX  |                         |                                    |                                                                      |                                                              |                                                     |                                                                         |
| P4KE62      | 55.8                                          | 68.2 | 1.0                     | 50.2                               | 5.0                                                                  | 4.7                                                          | 89.0                                                | 0.104                                                                   |
| P4KE62A     | 58.9                                          | 65.1 | 1.0                     | 53.0                               | 5.0                                                                  | 5.0                                                          | 85.0                                                | 0.104                                                                   |
| P4KE68      | 61.2                                          | 74.8 | 1.0                     | 55.1                               | 5.0                                                                  | 4.3                                                          | 98.0                                                | 0.104                                                                   |
| P4KE68A     | 64.6                                          | 71.4 | 1.0                     | 58.1                               | 5.0                                                                  | 4.6                                                          | 92.0                                                | 0.104                                                                   |
| P4KE75      | 67.5                                          | 82.5 | 1.0                     | 60.7                               | 5.0                                                                  | 3.9                                                          | 108.0                                               | 0.105                                                                   |
| P4KE75A     | 71.3                                          | 78.8 | 1.0                     | 64.1                               | 5.0                                                                  | 4.1                                                          | 103.0                                               | 0.105                                                                   |
| P4KE82      | 73.8                                          | 90.2 | 1.0                     | 66.4                               | 5.0                                                                  | 3.6                                                          | 118.0                                               | 0.105                                                                   |
| P4KE82A     | 77.9                                          | 86.1 | 1.0                     | 70.1                               | 5.0                                                                  | 3.7                                                          | 113.0                                               | 0.105                                                                   |
| P4KE91      | 81.9                                          | 100  | 1.0                     | 73.7                               | 5.0                                                                  | 3.2                                                          | 131.0                                               | 0.106                                                                   |
| P4KE91A     | 86.5                                          | 95.5 | 1.0                     | 77.8                               | 5.0                                                                  | 3.4                                                          | 125.0                                               | 0.106                                                                   |
| P4KE100     | 90.0                                          | 110  | 1.0                     | 81.0                               | 5.0                                                                  | 2.9                                                          | 144.0                                               | 0.106                                                                   |
| P4KE100A    | 95.0                                          | 105  | 1.0                     | 85.5                               | 5.0                                                                  | 3.1                                                          | 137.0                                               | 0.106                                                                   |
| P4KE110     | 99.0                                          | 121  | 1.0                     | 89.2                               | 5.0                                                                  | 2.7                                                          | 158.0                                               | 0.107                                                                   |
| P4KE110A    | 105                                           | 116  | 1.0                     | 94.0                               | 5.0                                                                  | 2.8                                                          | 152.0                                               | 0.107                                                                   |
| P4KE120     | 108                                           | 132  | 1.0                     | 97.2                               | 5.0                                                                  | 2.4                                                          | 173.0                                               | 0.107                                                                   |
| P4KE120A    | 114                                           | 126  | 1.0                     | 102                                | 5.0                                                                  | 2.5                                                          | 165.0                                               | 0.107                                                                   |
| P4KE130     | 117                                           | 143  | 1.0                     | 105                                | 5.0                                                                  | 2.2                                                          | 187.0                                               | 0.107                                                                   |
| P4KE130A    | 124                                           | 137  | 1.0                     | 111                                | 5.0                                                                  | 2.3                                                          | 179.0                                               | 0.107                                                                   |
| P4KE150     | 135                                           | 165  | 1.0                     | 121                                | 5.0                                                                  | 2.0                                                          | 215.0                                               | 0.108                                                                   |
| P4KE150A    | 143                                           | 158  | 1.0                     | 128                                | 5.0                                                                  | 2.0                                                          | 207.0                                               | 0.108                                                                   |
| P4KE160     | 144                                           | 176  | 1.0                     | 130                                | 5.0                                                                  | 1.8                                                          | 230.0                                               | 0.108                                                                   |
| P4KE160A    | 152                                           | 168  | 1.0                     | 136                                | 5.0                                                                  | 1.9                                                          | 219.0                                               | 0.108                                                                   |
| P4KE170     | 153                                           | 187  | 1.0                     | 138                                | 5.0                                                                  | 1.7                                                          | 244.0                                               | 0.108                                                                   |
| P4KE170A    | 162                                           | 179  | 1.0                     | 145                                | 5.0                                                                  | 1.8                                                          | 234.0                                               | 0.108                                                                   |
| P4KE180     | 162                                           | 198  | 1.0                     | 146                                | 5.0                                                                  | 1.6                                                          | 258.0                                               | 0.108                                                                   |
| P4KE180A    | 171                                           | 189  | 1.0                     | 154                                | 5.0                                                                  | 1.7                                                          | 246.0                                               | 0.108                                                                   |
| P4KE200     | 180                                           | 220  | 1.0                     | 162                                | 5.0                                                                  | 1.5                                                          | 287.0                                               | 0.108                                                                   |
| P4KE200A    | 190                                           | 210  | 1.0                     | 171                                | 5.0                                                                  | 1.53                                                         | 274.0                                               | 0.108                                                                   |
| P4KE220     | 198                                           | 242  | 1.0                     | 175                                | 5.0                                                                  | 1.16                                                         | 344.0                                               | 0.108                                                                   |
| P4KE220A    | 209                                           | 231  | 1.0                     | 185                                | 5.0                                                                  | 1.22                                                         | 328.0                                               | 0.108                                                                   |
| P4KE250     | 225                                           | 275  | 1.0                     | 202                                | 5.0                                                                  | 1.11                                                         | 360.0                                               | 0.110                                                                   |
| P4KE250A    | 237                                           | 263  | 1.0                     | 214                                | 5.0                                                                  | 1.16                                                         | 344.0                                               | 0.110                                                                   |
| P4KE300     | 270                                           | 330  | 1.0                     | 243                                | 5.0                                                                  | 0.93                                                         | 430.0                                               | 0.110                                                                   |
| P4KE300A    | 285                                           | 315  | 1.0                     | 256                                | 5.0                                                                  | 0.97                                                         | 414.0                                               | 0.110                                                                   |
| P4KE350     | 315                                           | 385  | 1.0                     | 284                                | 5.0                                                                  | 0.79                                                         | 504.0                                               | 0.110                                                                   |
| P4KE350A    | 332                                           | 368  | 1.0                     | 300                                | 5.0                                                                  | 0.83                                                         | 482.0                                               | 0.110                                                                   |
| P4KE400     | 360                                           | 440  | 1.0                     | 324                                | 5.0                                                                  | 0.70                                                         | 574.0                                               | 0.110                                                                   |
| P4KE400A    | 380                                           | 420  | 1.0                     | 342                                | 5.0                                                                  | 0.73                                                         | 548.0                                               | 0.110                                                                   |
| P4KE440     | 396                                           | 484  | 1.0                     | 356                                | 5.0                                                                  | 0.66                                                         | 631.0                                               | 0.110                                                                   |
| P4KE440A    | 418                                           | 462  | 1.0                     | 376                                | 5.0                                                                  | 0.69                                                         | 602.0                                               | 0.110                                                                   |

**NOTES:**

1.  $V_{(BR)}$  measured after  $I_T$  applied for 300 $\mu\text{s}$ ,  $I_T$ =square wave pulse or equivalent
2. Surge current waveform and derated
3. For bidirectional types having  $V_{WM}$  of 10 volts and less, the  $I_D$  limit is doubled