



Certificate Number: Q10561

Certificate Number: E17276

# P4KE SERIES

**V<sub>BR</sub> : 6.8 - 440 Volts**  
**P<sub>PK</sub> : 400 Watts**

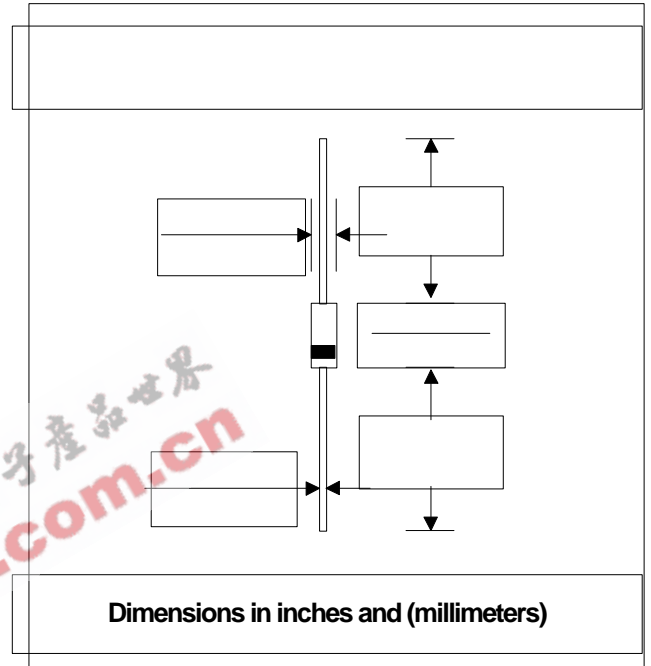
### FEATURES :

- \* 400W surge capability at 1ms
- \* Excellent clamping capability
- \* Low zener impedance
- \* Fast response time : typically less than 1.0 ps from 0 volt to V<sub>BR(min.)</sub>
- \* Typical I<sub>R</sub> less than 1 A above 10V

### MECHANICAL DATA

- \* Case : DO-41 Molded plastic
- \* Epoxy : UL94V-O rate flame retardant
- \* Lead : Axial lead solderable per MIL-STD-202, method 208 guaranteed
- \* Polarity : Color band denotes cathode end except Bipolar.
- \* Mounting position : Any
- \* Weight : 0.339 gram

# TRANSIENT VOLTAGE SUPPRESSOR



### DEVICES FOR BIPOLAR APPLICATIONS

**For bi-directional use C or CA Suffix**  
**Electrical characteristics apply in both directions**

### MAXIMUM RATINGS

|                                                                                                           |                                   |               |       |
|-----------------------------------------------------------------------------------------------------------|-----------------------------------|---------------|-------|
| Peak Power Dissipation at T <sub>a</sub> = 25 °C, T <sub>p</sub> =1ms (Note1)                             | P <sub>PK</sub>                   | Minimum 400   | Watts |
| Steady State Power Dissipation at T <sub>L</sub> = 75 °C<br>Lead Lengths 0.375", (9.5mm) (Note2)          | P <sub>D</sub>                    | 1.0           | Watt  |
| Peak Forward Surge Current, 8.3ms Single Half Sine-Wave Superimposed on Rated Load (JEDEC Method) (Note3) | I <sub>FSM</sub>                  | 40            | Amps. |
| Operating and Storage Temperature Range                                                                   | T <sub>J</sub> , T <sub>STG</sub> | - 65 to + 175 | °C    |

**Note :**



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## ELECTRICAL CHARACTERISTICS

Rating at = 25 °C ambient temperature unless otherwise specified

| TYPE     | Breakdown Voltage @ It<br>( Note 1 ) |      | Working Peak<br>Reverse<br>Voltage<br>VRWM | Maximum<br>Reverse Leakage<br>@ VRWM<br>IR<br>( A ) | Maximum<br>Reverse<br>Current<br>IRSM<br>(A) | Maximum<br>Clamping<br>Voltage @ IRSM<br>VRSM<br>(V) | Maximum<br>Temperature<br>Co-efficient<br>of VBR<br>(% / °C) |       |
|----------|--------------------------------------|------|--------------------------------------------|-----------------------------------------------------|----------------------------------------------|------------------------------------------------------|--------------------------------------------------------------|-------|
|          | VBR (V)                              |      |                                            |                                                     |                                              |                                                      |                                                              | It    |
|          | Min.                                 | Max. | (mA)                                       | (V)                                                 |                                              |                                                      |                                                              |       |
| P4KE6.8  | 6.12                                 | 7.48 | 10                                         | 5.50                                                | 1000                                         | 38.0                                                 | 10.8                                                         | 0.057 |
| P4KE6.8A | 6.45                                 | 7.14 | 10                                         | 5.80                                                | 1000                                         | 40.0                                                 | 10.5                                                         | 0.057 |
| P4KE7.5  | 6.75                                 | 8.25 | 10                                         | 6.05                                                | 500                                          | 36.0                                                 | 11.7                                                         | 0.061 |
| P4KE7.5A | 7.13                                 | 7.88 | 10                                         | 6.40                                                | 500                                          | 37.0                                                 | 11.3                                                         | 0.061 |
| P4KE8.2  | 7.38                                 | 9.02 | 10                                         | 6.63                                                | 200                                          | 33.0                                                 | 12.5                                                         | 0.065 |
| P4KE8.2A | 7.79                                 | 8.61 | 10                                         | 7.02                                                | 200                                          | 35.0                                                 | 12.1                                                         | 0.065 |
| P4KE9.1  | 8.19                                 | 10.0 | 1.0                                        | 7.37                                                | 50                                           | 30.0                                                 | 13.8                                                         | 0.068 |
| P4KE9.1A | 8.65                                 | 9.55 | 1.0                                        | 7.78                                                | 50                                           | 31.0                                                 | 13.4                                                         | 0.068 |
| P4KE10   | 9.00                                 | 11.0 | 1.0                                        | 8.10                                                | 10                                           | 28.0                                                 | 15.0                                                         | 0.073 |
| P4KE10A  | 9.50                                 | 10.5 | 1.0                                        | 8.55                                                | 10                                           | 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 |
| P4KE17   | 15.3                                 | 18.7 | 1.0                                        | 13.7                                                | 5.0                                          | 17.0                                                 | 25.0                                                         | 0.087 |
| P4KE17A  | 16.2                                 | 17.9 | 1.0                                        | 14.5                                                | 5.0                                          | 18.0                                                 | 24.0                                                         | 0.087 |
| 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                                                 | 25.5                                                         | 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                                          | 6.5                                                  | 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 |



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## ELECTRICAL CHARACTERISTICS

Rating at = 25 °C ambient temperature unless otherwise specified

| TYPE     | Breakdown Voltage @ $I_t$<br>( Note 1 ) |      | $I_t$ | Working Peak<br>Reverse<br>Voltage<br>$V_{RWM}$ | Maximum<br>Reverse Leakage<br>@ $V_{RWM}$<br>$I_R$<br>( A ) | Maximum<br>Reverse<br>Current<br>$I_{RSM}$<br>(A) | Maximum<br>Clamping<br>Voltage @ $I_{RSM}$<br>$V_{RSM}$<br>(V) | Maximum<br>Temperature<br>Co-efficient<br>of $V_{BR}$<br>(% / °C) |
|----------|-----------------------------------------|------|-------|-------------------------------------------------|-------------------------------------------------------------|---------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------------------------|
|          | $V_{BR}$ (V)                            |      |       |                                                 |                                                             |                                                   |                                                                |                                                                   |
|          | Min.                                    | Max. | (mA)  | (V)                                             | ( A )                                                       | (A)                                               | (V)                                                            | (% / °C)                                                          |
| 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                                                            | 0.105                                                             |
| P4KE75A  | 71.3                                    | 78.8 | 1.0   | 64.1                                            | 5.0                                                         | 4.1                                               | 103                                                            | 0.105                                                             |
| P4KE82   | 73.8                                    | 90.2 | 1.0   | 66.4                                            | 5.0                                                         | 3.6                                               | 118                                                            | 0.105                                                             |
| P4KE82A  | 77.9                                    | 86.1 | 1.0   | 70.1                                            | 5.0                                                         | 3.7                                               | 113                                                            | 0.105                                                             |
| P4KE91   | 81.9                                    | 100  | 1.0   | 73.7                                            | 5.0                                                         | 3.2                                               | 131                                                            | 0.106                                                             |
| P4KE91A  | 86.5                                    | 95.5 | 1.0   | 77.8                                            | 5.0                                                         | 3.4                                               | 125                                                            | 0.106                                                             |
| P4KE100  | 90.0                                    | 110  | 1.0   | 81.0                                            | 5.0                                                         | 2.9                                               | 144                                                            | 0.106                                                             |
| P4KE100A | 95.0                                    | 105  | 1.0   | 85.5                                            | 5.0                                                         | 3.1                                               | 137                                                            | 0.106                                                             |
| P4KE110  | 99.0                                    | 121  | 1.0   | 89.2                                            | 5.0                                                         | 2.7                                               | 158                                                            | 0.107                                                             |
| P4KE110A | 105                                     | 116  | 1.0   | 94.0                                            | 5.0                                                         | 2.8                                               | 152                                                            | 0.107                                                             |
| P4KE120  | 108                                     | 132  | 1.0   | 97.2                                            | 5.0                                                         | 2.4                                               | 173                                                            | 0.107                                                             |
| P4KE120A | 114                                     | 126  | 1.0   | 102                                             | 5.0                                                         | 2.5                                               | 165                                                            | 0.107                                                             |
| P4KE130  | 117                                     | 143  | 1.0   | 105                                             | 5.0                                                         | 2.2                                               | 187                                                            | 0.107                                                             |
| P4KE130A | 124                                     | 137  | 1.0   | 111                                             | 5.0                                                         | 2.3                                               | 179                                                            | 0.107                                                             |
| P4KE150  | 135                                     | 165  | 1.0   | 121                                             | 5.0                                                         | 2.0                                               | 215                                                            | 0.108                                                             |
| P4KE150A | 143                                     | 158  | 1.0   | 128                                             | 5.0                                                         | 2.0                                               | 207                                                            | 0.108                                                             |
| P4KE160  | 144                                     | 176  | 1.0   | 130                                             | 5.0                                                         | 1.8                                               | 230                                                            | 0.108                                                             |
| P4KE160A | 152                                     | 168  | 1.0   | 136                                             | 5.0                                                         | 1.9                                               | 219                                                            | 0.108                                                             |
| P4KE170  | 153                                     | 187  | 1.0   | 138                                             | 5.0                                                         | 1.7                                               | 244                                                            | 0.108                                                             |
| P4KE170A | 162                                     | 179  | 1.0   | 145                                             | 5.0                                                         | 1.8                                               | 234                                                            | 0.108                                                             |
| P4KE180  | 162                                     | 198  | 1.0   | 146                                             | 5.0                                                         | 1.6                                               | 258                                                            | 0.108                                                             |
| P4KE180A | 171                                     | 189  | 1.0   | 154                                             | 5.0                                                         | 1.7                                               | 246                                                            | 0.108                                                             |
| P4KE200  | 180                                     | 220  | 1.0   | 162                                             | 5.0                                                         | 1.5                                               | 287                                                            | 0.108                                                             |
| P4KE200A | 190                                     | 210  | 1.0   | 171                                             | 5.0                                                         | 1.53                                              | 274                                                            | 0.108                                                             |
| P4KE220  | 198                                     | 242  | 1.0   | 175                                             | 5.0                                                         | 1.16                                              | 344                                                            | 0.108                                                             |
| P4KE220A | 209                                     | 231  | 1.0   | 185                                             | 5.0                                                         | 1.22                                              | 328                                                            | 0.108                                                             |
| P4KE250  | 225                                     | 275  | 1.0   | 202                                             | 5.0                                                         | 1.11                                              | 360                                                            | 0.110                                                             |
| P4KE250A | 237                                     | 263  | 1.0   | 214                                             | 5.0                                                         | 1.16                                              | 344                                                            | 0.110                                                             |
| P4KE300  | 270                                     | 330  | 1.0   | 243                                             | 5.0                                                         | 0.93                                              | 430                                                            | 0.110                                                             |
| P4KE300A | 285                                     | 315  | 1.0   | 256                                             | 5.0                                                         | 0.97                                              | 414                                                            | 0.110                                                             |
| P4KE350  | 315                                     | 385  | 1.0   | 284                                             | 5.0                                                         | 0.79                                              | 504                                                            | 0.110                                                             |
| P4KE350A | 332                                     | 368  | 1.0   | 300                                             | 5.0                                                         | 0.83                                              | 482                                                            | 0.110                                                             |
| P4KE400  | 360                                     | 440  | 1.0   | 324                                             | 5.0                                                         | 0.70                                              | 574                                                            | 0.110                                                             |
| P4KE400A | 380                                     | 420  | 1.0   | 342                                             | 5.0                                                         | 0.73                                              | 548                                                            | 0.110                                                             |
| P4KE440  | 396                                     | 484  | 1.0   | 356                                             | 5.0                                                         | 0.95                                              | 631                                                            | 0.110                                                             |
| P4KE440A | 418                                     | 462  | 1.0   | 376                                             | 5.0                                                         | 1.00                                              | 602                                                            | 0.110                                                             |

- ( 1 )  $V_{BR}$  measured after  $I_t$  applied for 300 s.,  $I_t$  = square wave pulse or equivalent.
- ( 2 )  $V_F = 3.5 V_{max.}$ ,  $I_F = 25$  Amps. ( 6.8 Volts thru 91 Volts )  
 $V_F = 5.0 V_{max.}$ ,  $I_F = 25$  Amps. ( 100 Volts thru 440 Volts ) per 1/2 square or equivalent sine wave.  
 $PW = 8.3$  ms, duty cycle = 4 pulses per minute maximum.
- ( 3 ) For Bipolar types having  $V_R$  of 10 Volts and under, the  $I_R$  limit is doubled.

## RATING AND CHARACTERISTIC CURVES ( P4KE SERIES )

FIG.1 - PULSE DERATING CURVE

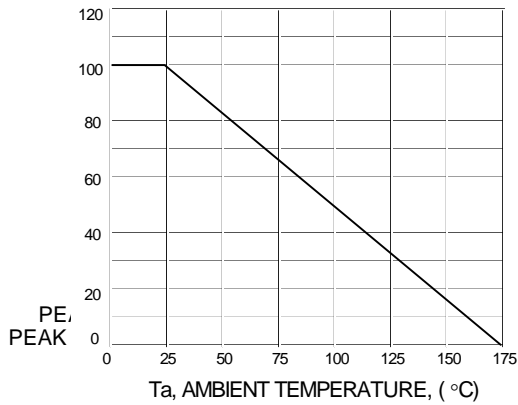


FIG.2 - MAXIMUM NON-REPETITIVE SURGE CURRENT

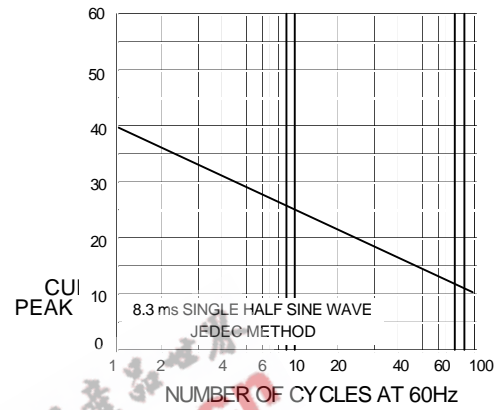


FIG.3 - STEADY STATE POWER DERATING

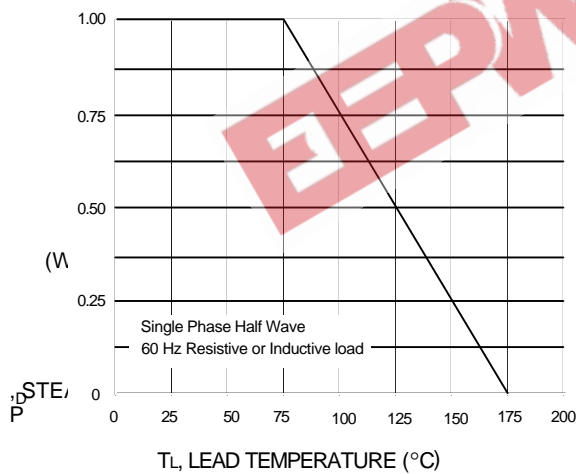


FIG.4 - PULSE RATING CURVE

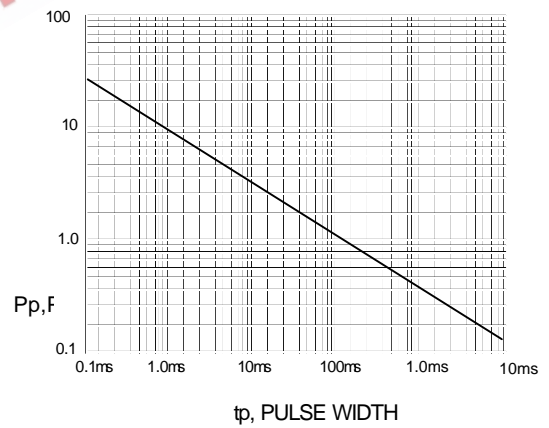


FIG.5 - PULSE WAVEFORM

