



Certificate Number: Q10561

Certificate Number: E17276

# P4KE SERIES

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

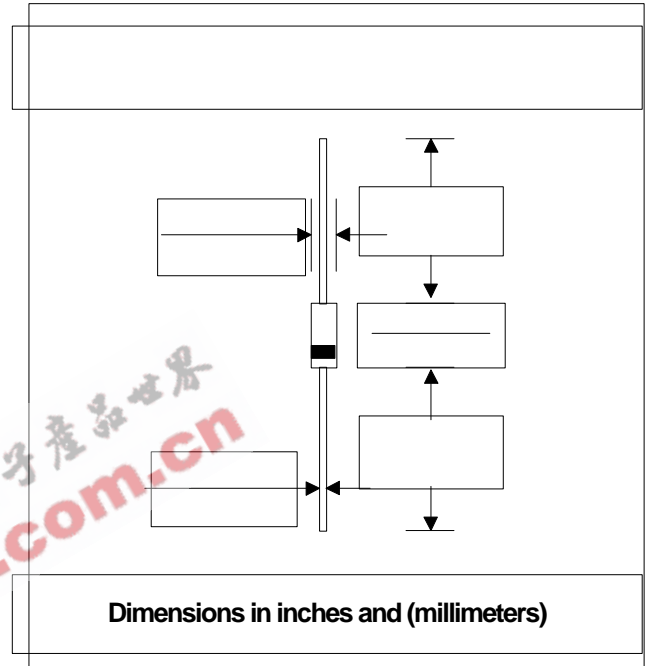
### FEATURES :

- \* 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<br>(mA) |
|          | Min.                                 | Max. | (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 ) |      | 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. | $I_t$<br>(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

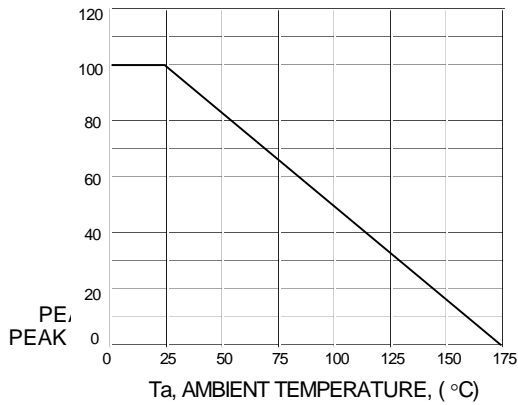


FIG.2 - MAXIMUM NON-REPETITIVE SURGE CURRENT

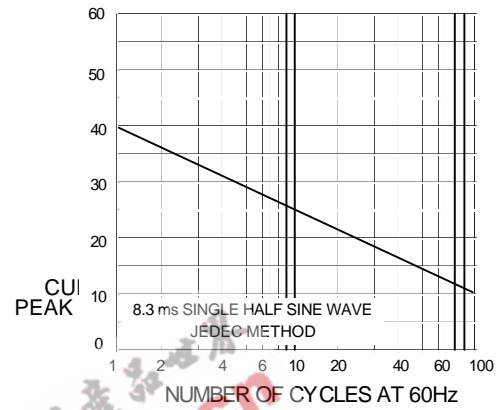


FIG.3 - STEADY STATE POWER DERATING

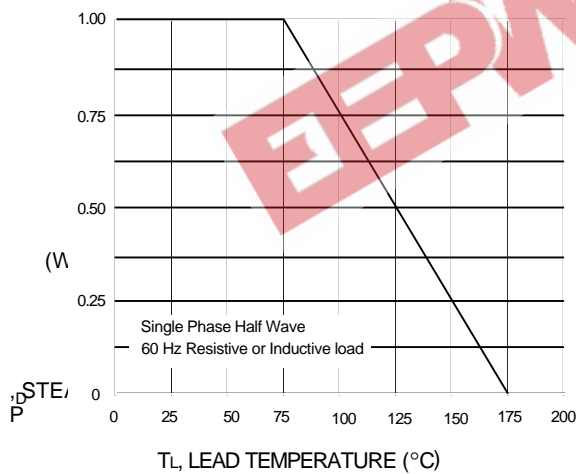


FIG.4 - PULSE RATING CURVE

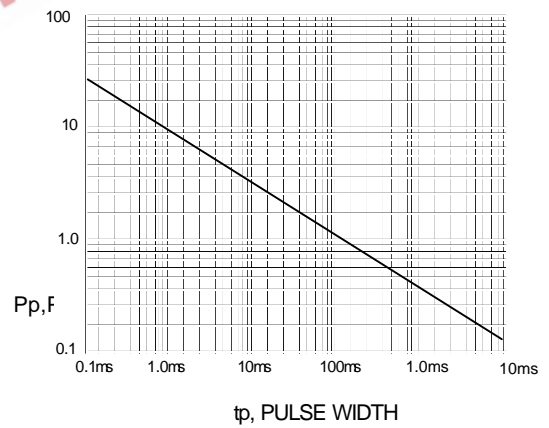


FIG.5 - PULSE WAVEFORM

