

# P6KE SERIES

**V<sub>BR</sub> : 6.8 - 600 Volts**

**P<sub>PK</sub> : 600 Watts**

## FEATURES :

- \* Glass passivated junction chip
- \* 600W 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 1μA above 10V
- \* **Pb / RoHS Free**

## MECHANICAL DATA :

- \* Case : DO-15 Molded plastic
- \* Epoxy : UL94V-0 rate flame retardant
- \* Lead : Axial lead solderable per MIL-STD-202, Method 208 guaranteed
- \* Polarity : Color band denotes cathode end
- \* Mounting position : Any
- \* Weight : 0.4 gram

## DEVICES FOR BIPOLAR APPLICATIONS

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

## MAXIMUM RATINGS

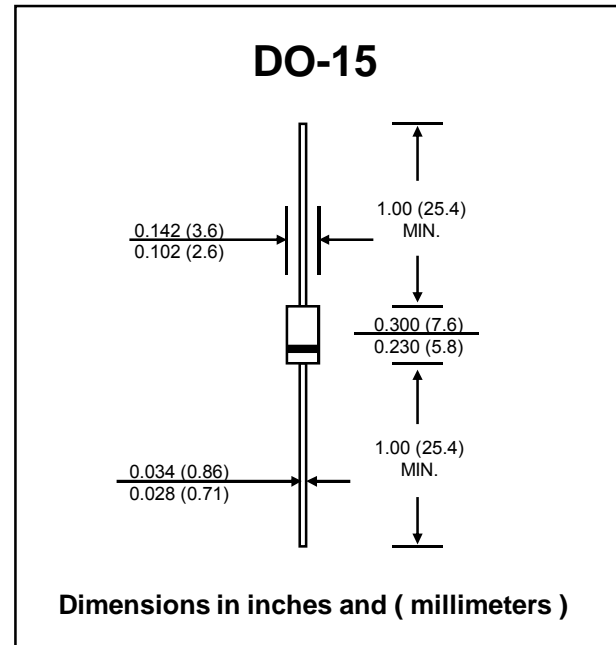
Rating at 25 °C ambient temperature unless otherwise specified.

| Rating   | Symbol                            | Value         | Unit |
|--|-----------------------------------|---------------|------|
| Peak Power Dissipation at Ta = 25 °C, Tp=1ms (Note1)   | P <sub>PK</sub>                   | Minimum 600   | W    |
| Steady State Power Dissipation at TL = 75 °C<br>Lead Lengths 0.375", (9.5mm) (Note 2)  | P <sub>D</sub>                    | 5.0           | W    |
| Peak Forward Surge Current, 8.3ms Single Half<br>Sine-Wave Superimposed on Rated Load<br>(JEDEC Method) (Note 3) Unidirectional only | I <sub>FSM</sub>                  | 100           | A    |
| Operating and Storage Temperature Range  | T <sub>J</sub> , T <sub>STG</sub> | - 65 to + 175 | °C   |

### Notes :

- (1) Non-repetitive Current pulse, per Fig. 5 and derated above Ta = 25 °C per Fig. 1
- (2) Mounted on Copper Leaf area of 1.57 in<sup>2</sup> (40mm<sup>2</sup>).
- (3) 8.3 ms single half sine-wave, duty cycle = 4 pulses per minutes maximum and V<sub>B</sub> >220V, I<sub>FSM</sub> is 50 A.

# TRANSIENT VOLTAGE SUPPRESSOR



## ELECTRICAL CHARACTERISTICS ( Rating at 25 °C ambient temperature unless otherwise specified.)

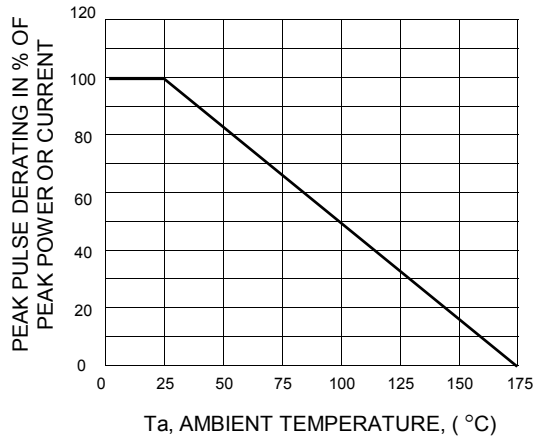
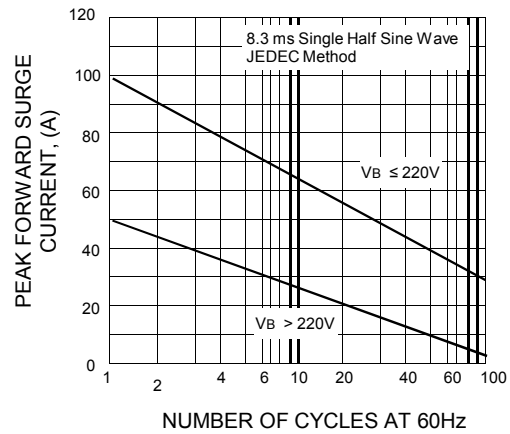
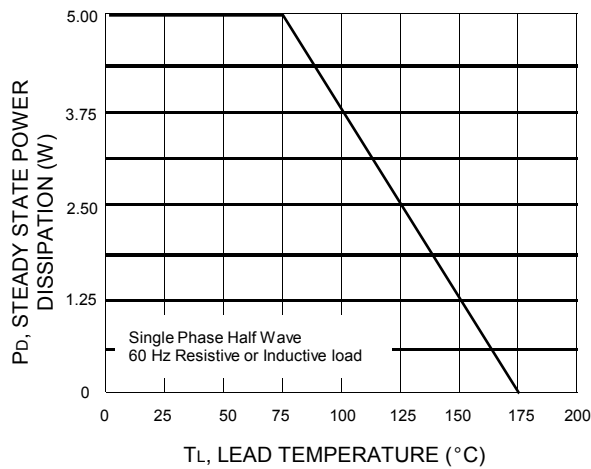
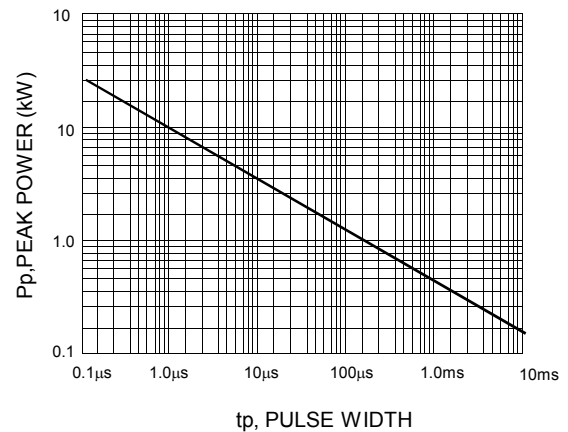
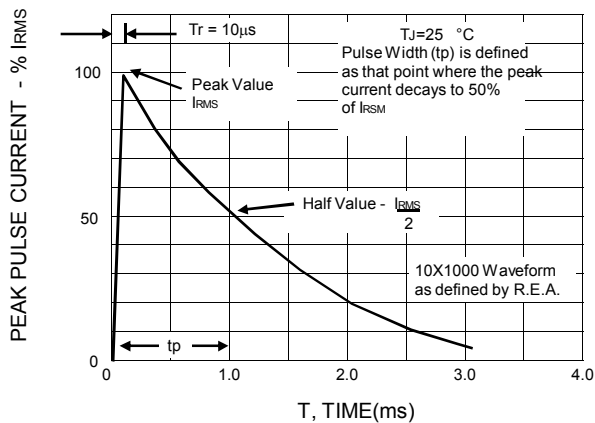
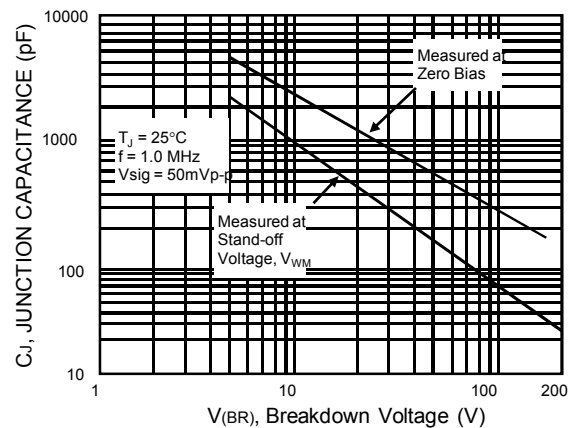
| Type No. | Breakdown Voltage @ It<br>( Note 1 ) |      | Working Peak<br>Reverse<br>Voltage | Maximum<br>Reverse Leakage<br>@ VRWM | Maximum<br>Reverse<br>Current | Maximum<br>Clamping<br>Voltage @ IRSM | Maximum<br>Temperature<br>Co-efficient<br>of VBR |          |
|----------|--------------------------------------|------|------------------------------------|--------------------------------------|-------------------------------|---------------------------------------|--|----------|
|          | VBR (V)                              |      |                                    |                                      |                               |                                       |  | VRWM     |
|          | Min.                                 | Max. | It<br>(mA)                         | (V)                                  | ( $\mu$ A)                    | (A)                                   | (V)  | (% / °C) |
| P6KE6.8  | 6.12                                 | 7.48 | 10                                 | 5.50                                 | 1000                          | 55.5                                  | 10.8   | 0.057    |
| P6KE6.8A | 6.45                                 | 7.14 | 10                                 | 5.80                                 | 1000                          | 57.0                                  | 10.5   | 0.057    |
| P6KE7.5  | 6.75                                 | 8.25 | 10                                 | 6.05                                 | 500                           | 51.0                                  | 11.7   | 0.061    |
| P6KE7.5A | 7.13                                 | 7.88 | 10                                 | 6.40                                 | 500                           | 53.0                                  | 11.3   | 0.061    |
| P6KE8.2  | 7.38                                 | 9.02 | 10                                 | 6.63                                 | 200                           | 48.0                                  | 12.5   | 0.065    |
| P6KE8.2A | 7.79                                 | 8.61 | 10                                 | 7.02                                 | 200                           | 50.0                                  | 12.1   | 0.065    |
| P6KE8.5  | 7.65                                 | 9.35 | 10                                 | 6.89                                 | 200                           | 46.0                                  | 13.0   | 0.067    |
| P6KE8.5A | 8.08                                 | 8.93 | 10                                 | 7.27                                 | 200                           | 47.0                                  | 12.7   | 0.067    |
| P6KE9.1  | 8.19                                 | 10.0 | 1.0                                | 7.37                                 | 150                           | 44.0                                  | 13.8   | 0.068    |
| P6KE9.1A | 8.65                                 | 9.55 | 1.0                                | 7.78                                 | 150                           | 45.0                                  | 13.4   | 0.068    |
| P6KE10   | 9.00                                 | 11.0 | 1.0                                | 8.10                                 | 150                           | 40.0                                  | 15.0   | 0.073    |
| P6KE10A  | 9.50                                 | 10.5 | 1.0                                | 8.55                                 | 150                           | 41.0                                  | 14.5   | 0.073    |
| P6KE11   | 9.90                                 | 12.1 | 1.0                                | 8.92                                 | 150                           | 37.0                                  | 16.2   | 0.075    |
| P6KE11A  | 10.5                                 | 11.6 | 1.0                                | 9.40                                 | 150                           | 38.0                                  | 15.6   | 0.075    |
| P6KE12   | 10.8                                 | 13.2 | 1.0                                | 9.72                                 | 5.0                           | 35.0                                  | 17.3   | 0.078    |
| P6KE12A  | 11.4                                 | 12.6 | 1.0                                | 10.2                                 | 5.0                           | 36.0                                  | 16.7   | 0.078    |
| P6KE13   | 11.7                                 | 14.3 | 1.0                                | 10.5                                 | 5.0                           | 32.0                                  | 19.0   | 0.081    |
| P6KE13A  | 12.4                                 | 13.7 | 1.0                                | 11.1                                 | 5.0                           | 33.0                                  | 18.2   | 0.081    |
| P6KE15   | 13.5                                 | 16.5 | 1.0                                | 12.1                                 | 5.0                           | 27.0                                  | 22.0   | 0.084    |
| P6KE15A  | 14.3                                 | 15.8 | 1.0                                | 12.8                                 | 5.0                           | 28.0                                  | 21.2   | 0.084    |
| P6KE16   | 14.4                                 | 17.6 | 1.0                                | 12.9                                 | 5.0                           | 26.0                                  | 23.5   | 0.086    |
| P6KE16A  | 15.2                                 | 16.8 | 1.0                                | 13.6                                 | 5.0                           | 27.0                                  | 22.5   | 0.086    |
| P6KE18   | 16.2                                 | 19.8 | 1.0                                | 14.5                                 | 5.0                           | 23.0                                  | 26.5   | 0.088    |
| P6KE18A  | 17.1                                 | 18.9 | 1.0                                | 15.3                                 | 5.0                           | 24.0                                  | 25.2   | 0.088    |
| P6KE20   | 18.0                                 | 22.0 | 1.0                                | 16.2                                 | 5.0                           | 21.0                                  | 29.1   | 0.090    |
| P6KE20A  | 19.0                                 | 21.0 | 1.0                                | 17.1                                 | 5.0                           | 22.0                                  | 27.7   | 0.090    |
| P6KE22   | 19.8                                 | 24.2 | 1.0                                | 17.8                                 | 5.0                           | 19.0                                  | 31.9   | 0.092    |
| P6KE22A  | 20.9                                 | 23.1 | 1.0                                | 18.8                                 | 5.0                           | 20.0                                  | 30.6   | 0.092    |
| P6KE24   | 21.6                                 | 26.4 | 1.0                                | 19.4                                 | 5.0                           | 17.0                                  | 34.7   | 0.094    |
| P6KE24A  | 22.8                                 | 25.2 | 1.0                                | 20.5                                 | 5.0                           | 18.0                                  | 33.2   | 0.094    |
| P6KE27   | 24.3                                 | 29.7 | 1.0                                | 21.8                                 | 5.0                           | 15.0                                  | 39.1   | 0.096    |
| P6KE27A  | 25.7                                 | 28.4 | 1.0                                | 23.1                                 | 5.0                           | 16.0                                  | 37.5   | 0.096    |
| P6KE28   | 25.2                                 | 30.8 | 1.0                                | 22.7                                 | 5.0                           | 15.0                                  | 40   | 0.096    |
| P6KE28A  | 26.6                                 | 29.4 | 1.0                                | 23.9                                 | 5.0                           | 15.5                                  | 38.7   | 0.096    |
| P6KE30   | 27.0                                 | 33.0 | 1.0                                | 24.3                                 | 5.0                           | 14.0                                  | 43.5   | 0.097    |
| P6KE30A  | 28.5                                 | 31.5 | 1.0                                | 25.6                                 | 5.0                           | 14.4                                  | 41.4   | 0.097    |
| P6KE33   | 29.7                                 | 36.3 | 1.0                                | 26.8                                 | 5.0                           | 12.6                                  | 47.7   | 0.098    |
| P6KE33A  | 31.4                                 | 34.7 | 1.0                                | 28.2                                 | 5.0                           | 13.2                                  | 45.7   | 0.098    |
| P6KE36   | 32.4                                 | 39.6 | 1.0                                | 29.1                                 | 5.0                           | 11.6                                  | 52.0   | 0.099    |
| P6KE36A  | 34.2                                 | 37.8 | 1.0                                | 30.8                                 | 5.0                           | 12.0                                  | 49.9   | 0.099    |
| P6KE39   | 35.1                                 | 42.9 | 1.0                                | 31.6                                 | 5.0                           | 10.6                                  | 56.4   | 0.100    |
| P6KE39A  | 37.1                                 | 41.0 | 1.0                                | 33.3                                 | 5.0                           | 11.2                                  | 53.9   | 0.100    |
| P6KE43   | 38.7                                 | 47.3 | 1.0                                | 34.8                                 | 5.0                           | 9.6                                   | 61.9   | 0.101    |
| P6KE43A  | 40.9                                 | 45.2 | 1.0                                | 36.8                                 | 5.0                           | 10.1                                  | 59.3   | 0.101    |
| P6KE47   | 42.3                                 | 51.7 | 1.0                                | 38.1                                 | 5.0                           | 8.9                                   | 67.8   | 0.101    |
| P6KE47A  | 44.7                                 | 49.4 | 1.0                                | 40.2                                 | 5.0                           | 9.3                                   | 64.8   | 0.101    |
| P6KE51   | 45.9                                 | 56.1 | 1.0                                | 41.3                                 | 5.0                           | 8.2                                   | 73.5   | 0.102    |
| P6KE51A  | 48.5                                 | 53.6 | 1.0                                | 43.6                                 | 5.0                           | 8.6                                   | 70.1   | 0.102    |
| P6KE56   | 50.4                                 | 61.6 | 1.0                                | 45.4                                 | 5.0                           | 7.4                                   | 80.5   | 0.103    |
| P6KE56A  | 53.2                                 | 58.8 | 1.0                                | 47.8                                 | 5.0                           | 7.8                                   | 77.0   | 0.103    |
| P6KE62   | 55.8                                 | 68.2 | 1.0                                | 50.2                                 | 5.0                           | 6.8                                   | 89.0   | 0.104    |
| P6KE62A  | 58.9                                 | 65.1 | 1.0                                | 53.0                                 | 5.0                           | 7.1                                   | 85.0   | 0.104    |
| P6KE68   | 61.2                                 | 74.8 | 1.0                                | 55.1                                 | 5.0                           | 6.1                                   | 98.0   | 0.104    |
| P6KE68A  | 64.6                                 | 71.4 | 1.0                                | 58.1                                 | 5.0                           | 6.5                                   | 92.0   | 0.104    |

## ELECTRICAL CHARACTERISTICS ( Rating at 25 °C ambient temperature unless otherwise specified.)

| Type No. | Breakdown Voltage @ $I_t$<br>( Note 1 ) |       | Working Peak<br>Reverse<br>Voltage | Maximum<br>Reverse Leakage<br>@ $V_{RWM}$ | Maximum<br>Reverse<br>Current | Maximum<br>Clamping<br>Voltage @ $I_{RSM}$ | Maximum<br>Temperature<br>Co-efficient<br>of $V_{BR}$ |          |
|----------|---|-------|------------------------------------|---|-------------------------------|--|---|----------|
|          | $V_{BR}$ (V)                            |       |                                    |   |                               |  |   | $I_t$    |
|          | Min.                                    | Max.  | (mA)                               | (V)                                       | ( $\mu$ A)                    | (A)  | (V)   | (% / °C) |
| P6KE75   | 67.5                                    | 82.5  | 1.0                                | 60.7                                      | 5.0                           | 5.5  | 108   | 0.105    |
| P6KE75A  | 71.3                                    | 78.8  | 1.0                                | 64.1                                      | 5.0                           | 5.8  | 103   | 0.105    |
| P6KE82   | 73.8                                    | 90.2  | 1.0                                | 66.4                                      | 5.0                           | 5.1  | 118   | 0.105    |
| P6KE82A  | 77.9                                    | 86.1  | 1.0                                | 70.1                                      | 5.0                           | 5.3  | 113   | 0.105    |
| P6KE91   | 81.9                                    | 100.0 | 1.0                                | 73.7                                      | 5.0                           | 4.5  | 131   | 0.106    |
| P6KE91A  | 86.5                                    | 95.5  | 1.0                                | 77.8                                      | 5.0                           | 4.8  | 125   | 0.106    |
| P6KE100  | 90.0                                    | 110.0 | 1.0                                | 81.0                                      | 5.0                           | 4.2  | 144   | 0.106    |
| P6KE100A | 95.0                                    | 105.0 | 1.0                                | 85.5                                      | 5.0                           | 4.4  | 137   | 0.106    |
| P6KE110  | 99.0                                    | 121.0 | 1.0                                | 89.2                                      | 5.0                           | 3.8  | 158   | 0.107    |
| P6KE110A | 105.0                                   | 116.0 | 1.0                                | 94.0                                      | 5.0                           | 4.0  | 152   | 0.107    |
| P6KE120  | 108.0                                   | 132.0 | 1.0                                | 97.2                                      | 5.0                           | 3.5  | 173   | 0.107    |
| P6KE120A | 114.0                                   | 126.0 | 1.0                                | 102                                       | 5.0                           | 3.6  | 165   | 0.107    |
| P6KE130  | 117.0                                   | 143.0 | 1.0                                | 106                                       | 5.0                           | 3.2  | 187   | 0.107    |
| P6KE130A | 124.0                                   | 137.0 | 1.0                                | 111                                       | 5.0                           | 3.3  | 179   | 0.107    |
| P6KE150  | 135.0                                   | 165.0 | 1.0                                | 121                                       | 5.0                           | 2.8  | 215   | 0.108    |
| P6KE150A | 143.0                                   | 158.0 | 1.0                                | 128                                       | 5.0                           | 2.9  | 207   | 0.108    |
| P6KE160  | 144.0                                   | 176.0 | 1.0                                | 130                                       | 5.0                           | 2.6  | 230   | 0.108    |
| P6KE160A | 152.0                                   | 168.0 | 1.0                                | 136                                       | 5.0                           | 2.7  | 219   | 0.108    |
| P6KE170  | 153.0                                   | 187.0 | 1.0                                | 138                                       | 5.0                           | 2.5  | 244   | 0.108    |
| P6KE170A | 162.0                                   | 179.0 | 1.0                                | 145                                       | 5.0                           | 2.6  | 234   | 0.108    |
| P6KE180  | 162.0                                   | 198.0 | 1.0                                | 146                                       | 5.0                           | 2.3  | 258   | 0.108    |
| P6KE180A | 171.0                                   | 189.0 | 1.0                                | 154                                       | 5.0                           | 2.4  | 246   | 0.108    |
| P6KE200  | 180.0                                   | 220.0 | 1.0                                | 162                                       | 5.0                           | 2.1  | 287   | 0.108    |
| P6KE200A | 190.0                                   | 210.0 | 1.0                                | 171                                       | 5.0                           | 2.2  | 274   | 0.108    |
| P6KE220  | 198.0                                   | 242.0 | 1.0                                | 175                                       | 5.0                           | 1.75                                       | 344   | 0.108    |
| P6KE220A | 209.0                                   | 231.0 | 1.0                                | 185                                       | 5.0                           | 1.83                                       | 328   | 0.108    |
| P6KE250  | 225.0                                   | 275.0 | 1.0                                | 202                                       | 5.0                           | 1.67                                       | 360   | 0.110    |
| P6KE250A | 237.0                                   | 263.0 | 1.0                                | 214                                       | 5.0                           | 1.75                                       | 344   | 0.110    |
| P6KE300  | 270.0                                   | 330.0 | 1.0                                | 243                                       | 5.0                           | 1.40                                       | 430   | 0.110    |
| P6KE300A | 285.0                                   | 315.0 | 1.0                                | 256                                       | 5.0                           | 1.45                                       | 414   | 0.110    |
| P6KE320  | 288.0                                   | 352.0 | 1.0                                | 259                                       | 5.0                           | 1.31                                       | 460   | 0.110    |
| P6KE320A | 303.0                                   | 337.0 | 1.0                                | 272                                       | 5.0                           | 1.35                                       | 445   | 0.110    |
| P6KE350  | 315.0                                   | 385.0 | 1.0                                | 284                                       | 5.0                           | 1.20                                       | 504   | 0.110    |
| P6KE350A | 332.0                                   | 368.0 | 1.0                                | 300                                       | 5.0                           | 1.25                                       | 482   | 0.110    |
| P6KE400  | 360.0                                   | 440.0 | 1.0                                | 324                                       | 5.0                           | 1.05                                       | 574   | 0.110    |
| P6KE400A | 380.0                                   | 420.0 | 1.0                                | 342                                       | 5.0                           | 1.10                                       | 548   | 0.110    |
| P6KE440  | 396.0                                   | 484.0 | 1.0                                | 356                                       | 5.0                           | 0.95                                       | 631   | 0.110    |
| P6KE440A | 418.0                                   | 462.0 | 1.0                                | 376                                       | 5.0                           | 1.00                                       | 602   | 0.110    |
| P6KE480  | 432.0                                   | 528.0 | 1.0                                | 389                                       | 5.0                           | 0.88                                       | 686   | 0.110    |
| P6KE480A | 456.0                                   | 504.0 | 1.0                                | 408                                       | 5.0                           | 0.90                                       | 658   | 0.110    |
| P6KE510  | 459.0                                   | 561.0 | 1.0                                | 413                                       | 5.0                           | 0.82                                       | 729   | 0.110    |
| P6KE510A | 485.0                                   | 535.0 | 1.0                                | 434                                       | 5.0                           | 0.86                                       | 698   | 0.110    |
| P6KE530  | 477.0                                   | 583.0 | 1.0                                | 457                                       | 5.0                           | 0.76                                       | 798   | 0.110    |
| P6KE530A | 503.5                                   | 556.5 | 1.0                                | 477                                       | 5.0                           | 0.80                                       | 725   | 0.110    |
| P6KE540  | 486.0                                   | 594.0 | 1.0                                | 437                                       | 5.0                           | 0.78                                       | 772   | 0.110    |
| P6KE540A | 513.0                                   | 567.0 | 1.0                                | 459                                       | 5.0                           | 0.81                                       | 740   | 0.110    |
| P6KE550  | 495.0                                   | 605.0 | 1.0                                | 470                                       | 5.0                           | 0.76                                       | 836   | 0.110    |
| P6KE550A | 522.5                                   | 577.5 | 1.0                                | 495                                       | 5.0                           | 0.80                                       | 760   | 0.110    |
| P6KE600  | 540.0                                   | 660.0 | 1.0                                | 490                                       | 5.0                           | 0.71                                       | 911   | 0.110    |
| P6KE600A | 570.0                                   | 630.0 | 1.0                                | 512                                       | 5.0                           | 0.75                                       | 828   | 0.110    |

- Notes : ( 1 )  $V_{BR}$  measured after  $I_t$  applied for 300  $\mu$ s.,  $I_t$  = square wave pulse or equivalent.  
 ( 2 )  $V_F = 3.5 V_{max.}$ ,  $I_F = 50$  Amps. ( 6.8 Volts thru 91 Volts );  $V_F = 5.0 V_{max.}$ ,  $I_F = 50$  Amps. ( 100 Volts thru 440 Volts )  
 add  $V_F = 6.5 V_{max.}$ ,  $I_F = 50$  Amps ( 480 Volts thru 600 Volts).  $PW = 8.3$  ms, duty cycle = 4 pulses per minute maximum.  
 ( 3 ) For Bipolar types moving  $V_R$  of 10 Volts and under, the  $I_R$  limit is doubled.  
 ( 4 ) "6KE" will be omitted in marking on the diode.

## RATING AND CHARACTERISTIC CURVES ( P6KE SERIES )

**FIG.1 - PULSE DERATING CURVE**

**FIG.2 - MAXIMUM NON-REPETITIVE SURGE CURRENT (Unidirectional only)**

**FIG.3 - STEADY STATE POWER DERATING**

**FIG.4 - PULSE RATING CURVE**

**FIG.5 - PULSE WAVEFORM**

**FIG.6 - TYPICAL JUNCTION CAPACITANCE UNI-DIRECTIONAL**


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