

Microsemi Corp.
The diode experts

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**P4KE6.8 thru
P4KE400**

Features

- ECONOMICAL SERIES
- AVAILABLE IN BOTH UNIDIRECTIONAL AND BIDIRECTIONAL CONSTRUCTION
- 6.8 TO 400 VOLTS AVAILABLE
- 400 WATTS PEAK PULSE POWER DISSIPATION
- QUICK RESPONSE

Maximum Ratings

Peak Pulse Power Dissipation at 25°C: 400 Watts

Steady State Power Dissipation: 1.0 Watt at $T_L = +75^\circ\text{C}$ at 3/8" Lead Length

t_{clamping} (0 volts to V_{BR} Min.): Unidirectional $< 1 \times 10^{-12}$ seconds;

Bidirectional $< 5 \times 10^{-9}$ seconds.

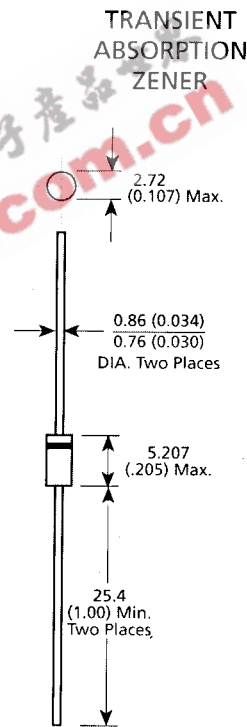
Operating and Storage Temperature: -65° to $+175^\circ\text{C}$

Application

This TAZ is an economical molded product frequently used for automotive applications to protect voltage sensitive components from destruction or partial degradation. The response time for unipolar clamping action is virtually instantaneous (1×10^{-12} seconds). They have a peak pulse power rating of 400 watts for 1 ms as depicted in Figures 1 and 2. Microsemi also offers various other TAZ devices to meet higher and lower power demands and special applications.

Electrical Characteristics at 25°C

| TYPE NUMBER | RATED STAND-OFF VOLTAGE V_{WM} | BREAKDOWN VOLTAGE V_{BR} | | I_{T} mA | MAXIMUM CLAMPING VOLTAGE $V_{\text{C MAX}}$ @ I_{pp} | MAXIMUM REVERSE LEAKAGE CURRENT I_{D} @ V_{WM} | MAXIMUM PEAK PULSE CURRENT I_{pp} | MAXIMUM TEMPERATURE COEFFICIENT OF $-V_{\text{BR}}$ |
|-------------|--------------------------------------------|--------------------------------------|------------------|----------------------|---------------------------------------------------------------------|------------------------------------------------------------------------|-----------------------------------------------|-----------------------------------------------------|
| | | MIN. | MAX. | | | | | |
| | V | V _{DC} | V _{ADC} | | V | μADC | A | % / °C |
| P4KE6.8 | 5.50 | 6.12 | 7.48 | 10 | 10.8 | 500 | 37 | .057 |
| P4KE6.8A | 5.80 | 6.45 | 7.14 | 10 | 10.5 | 500 | 38 | .057 |
| P4KE7.5 | 6.05 | 6.75 | 8.25 | 10 | 11.7 | 200 | 34 | .061 |
| P4KE7.5A | 6.40 | 7.13 | 7.88 | 10 | 11.3 | 200 | 35 | .061 |
| P4KE8.2 | 6.63 | 7.38 | 9.02 | 10 | 12.5 | 100 | 32 | .065 |
| P4KE8.2A | 7.02 | 7.79 | 8.61 | 10 | 12.1 | 100 | 33 | .065 |
| P4KE9.1 | 7.37 | 8.19 | 10.0 | 1 | 13.8 | 20 | 29 | .068 |
| P4KE9.1A | 7.78 | 8.65 | 9.55 | 1 | 13.4 | 20 | 30 | .068 |
| P4KE10 | 8.10 | 9.00 | 11.0 | 1 | 15.0 | 20 | 27 | .073 |
| P4KE10A | 8.55 | 9.50 | 10.5 | 1 | 14.5 | 5 | 28 | .073 |
| P4KE11 | 8.92 | 9.90 | 12.1 | 1 | 16.2 | 2 | 25 | .075 |
| P4KE11A | 9.40 | 10.5 | 11.6 | 1 | 15.6 | 2 | 26 | .075 |
| P4KE12 | 9.72 | 10.8 | 13.2 | 1 | 17.3 | 2 | 23 | .078 |
| P4KE12A | 10.2 | 11.4 | 12.6 | 1 | 16.7 | 2 | 24 | .078 |
| P4KE13 | 10.5 | 11.7 | 14.3 | 1 | 19.0 | 2 | 21 | .081 |
| P4KE13A | 11.1 | 12.4 | 13.7 | 1 | 18.2 | 2 | 22 | .081 |
| P4KE15 | 12.1 | 13.5 | 16.5 | 1 | 22.0 | 2 | 18 | .084 |
| P4KE15A | 12.8 | 14.3 | 15.8 | 1 | 21.2 | 2 | 19 | .084 |
| P4KE16 | 12.9 | 14.4 | 17.6 | 1 | 23.5 | 2 | 17 | .086 |
| P4KE16A | 13.6 | 15.2 | 16.8 | 1 | 22.5 | 2 | 18 | .086 |
| P4KE18 | 14.5 | 16.2 | 19.8 | 1 | 26.5 | 2 | 15 | .088 |
| P4KE18A | 15.3 | 17.1 | 18.0 | 1 | 25.2 | 2 | 16 | .088 |
| P4KE20 | 16.2 | 18.0 | 22.0 | 1 | 29.1 | 2 | 14 | .090 |
| P4KE20A | 17.1 | 19.0 | 21.0 | 1 | 27.7 | 2 | 14.5 | .090 |
| P4KE22 | 17.8 | 19.8 | 24.2 | 1 | 31.9 | 2 | 12.5 | .092 |
| P4KE22A | 18.8 | 20.9 | 23.1 | 1 | 30.6 | 2 | 13 | .092 |
| P4KE24 | 19.4 | 21.6 | 26.4 | 1 | 34.7 | 2 | 11.5 | .094 |
| P4KE24A | 20.5 | 22.8 | 25.2 | 1 | 33.2 | 2 | 12 | .094 |
| P4KE27 | 21.8 | 24.3 | 29.7 | 1 | 39.1 | 2 | 10 | .096 |
| P4KE27A | 23.1 | 25.7 | 28.4 | 1 | 37.5 | 2 | 11 | .096 |
| P4KE30 | 24.3 | 27.0 | 33.0 | 1 | 43.5 | 2 | 9.0 | .097 |
| P4KE30A | 25.6 | 28.5 | 31.5 | 1 | 41.4 | 2 | 9.5 | .097 |
| P4KE33 | 26.8 | 29.7 | 36.3 | 1 | 47.7 | 2 | 8.5 | .098 |
| P4KE33A | 28.2 | 31.4 | 34.7 | 1 | 45.7 | 2 | 9.0 | .098 |
| P4KE35 | 29.1 | 32.4 | 39.6 | 1 | 52.0 | 2 | 7.5 | .099 |
| P4KE36A | 30.8 | 34.2 | 37.8 | 1 | 49.9 | 2 | 8.0 | .099 |



NOTE: Cathode indicated by band.
All dimensions in millimeters (inches)

Mechanical Characteristics

CASE: Void Free Transfer
Molded Thermosetting
Plastic.

FINISH: Plated Copper
Readily Solderable.

POLARITY: Band Denotes
Cathode. Bidirectional Not
Marked.

WEIGHT: 0.7 Gram (Appx.).

MOUNTING POSITION:
Any.

P4KE6.8 thru P4KE400

Electrical Characteristics at 25°C

| TYPE NUMBER | RATED STAND-OFF VOLTAGE V_{WM} | BREAKDOWN VOLTAGE $V_{(BR)}$ | | I_T mA | MAXIMUM CLAMPING VOLTAGE V_C MAX. @ I_{pp} | MAXIMUM REVERSE LEAKAGE CURRENT I_D @ V_{WM} | MAXIMUM PEAK PULSE CURRENT I_{pp} | MAXIMUM TEMPERATURE COEFFICIENT OF $-V_{(BR)}$ |
|-------------|-------------------------------------|---------------------------------|-------|-------------|------------------------------------------------------|--------------------------------------------------------|----------------------------------------|------------------------------------------------|
| | | MIN. | MAX. | | | | | |
| | V | VDC | VDC | | V | μ ADC | A | % / °C |
| P4KE39 | 31.6 | 35.1 | 42.9 | 1 | 56.4 | 2 | 7.0 | -.100 |
| P4KE39A | 33.3 | 37.1 | 41.0 | 1 | 53.9 | 2 | 7.5 | .100 |
| P4KE43 | 34.8 | 38.7 | 47.3 | 1 | 61.9 | 2 | 6.5 | -.101 |
| P4KE43A | 36.8 | 40.9 | 45.2 | 1 | 59.3 | 2 | 7.0 | .101 |
| P4KE47 | 38.1 | 42.3 | 51.7 | 1 | 67.8 | 2 | 5.9 | -.101 |
| P4KE47A | 40.2 | 44.7 | 49.4 | 1 | 64.8 | 2 | 6.2 | .101 |
| P4KE51 | 41.3 | 45.9 | 56.1 | 1 | 73.5 | 2 | 5.4 | -.102 |
| P4KE51A | 43.6 | 48.5 | 53.6 | 1 | 70.1 | 2 | 5.7 | .102 |
| P4KE56 | 45.4 | 50.4 | 61.6 | 1 | 80.5 | 2 | 5.0 | -.103 |
| P4KE56A | 47.8 | 53.2 | 58.8 | 1 | 77.0 | 2 | 5.2 | .103 |
| P4KE62 | 50.2 | 55.8 | 68.2 | 1 | 89.0 | 2 | 4.5 | -.104 |
| P4KE62A | 53.0 | 58.9 | 65.1 | 1 | 85.0 | 2 | 4.7 | .104 |
| P4KE68 | 55.1 | 61.2 | 74.8 | 1 | 98.0 | 2 | 4.1 | -.104 |
| P4KE68A | 58.1 | 64.6 | 71.4 | 1 | 92.0 | 2 | 4.4 | .104 |
| P4KE75 | 60.7 | 67.5 | 82.5 | 1 | 108.0 | 2 | 3.7 | -.105 |
| P4KE75A | 64.1 | 71.3 | 78.8 | 1 | 103.0 | 2 | 3.9 | .105 |
| P4KE82 | 66.4 | 73.8 | 90.2 | 1 | 118.0 | 2 | 3.4 | -.105 |
| P4KE82A | 70.1 | 77.9 | 86.1 | 1 | 113.0 | 2 | 3.5 | .105 |
| P4KE91 | 73.7 | 81.9 | 100.0 | 1 | 131.0 | 2 | 3.1 | -.106 |
| P4KE91A | 77.8 | 86.5 | 95.5 | 1 | 125.0 | 2 | 3.2 | .106 |
| P4KE100 | 81.0 | 90.0 | 110.0 | 1 | 144.0 | 2 | 2.8 | -.106 |
| P4KE100A | 85.5 | 95.0 | 105.0 | 1 | 137.0 | 2 | 2.9 | .106 |
| P4KE110 | 89.2 | 99.0 | 121.0 | 1 | 158.0 | 2 | 2.5 | -.107 |
| P4KE110A | 94.0 | 105.0 | 116.0 | 1 | 152.0 | 2 | 2.6 | .107 |
| P4KE120 | 97.2 | 108.0 | 132.0 | 1 | 173.0 | 2 | 2.3 | -.107 |
| P4KE120A | 102.0 | 114.0 | 126.0 | 1 | 165.0 | 2 | 2.4 | .107 |
| P4KE130 | 105.0 | 117.0 | 143.0 | 1 | 187.0 | 2 | 2.1 | -.107 |
| P4KE130A | 111.0 | 124.0 | 137.0 | 1 | 179.0 | 2 | 2.2 | .107 |
| P4KE150 | 121.0 | 135.0 | 165.0 | 1 | 215.0 | 2 | 1.9 | -.108 |
| P4KE150A | 128.0 | 143.0 | 158.0 | 1 | 207.0 | 2 | 1.95 | .108 |
| P4KE160 | 130.0 | 144.0 | 176.0 | 1 | 230.0 | 2 | 1.7 | -.108 |
| P4KE160A | 136.0 | 152.0 | 168.0 | 1 | 219.0 | 2 | 1.8 | .108 |
| P4KE170 | 138.0 | 153.0 | 187.0 | 1 | 244.0 | 2 | 1.6 | -.108 |
| P4KE170A | 145.0 | 162.0 | 179.0 | 1 | 234.0 | 2 | 1.7 | .108 |
| P4KE180 | 146.0 | 162.0 | 198.0 | 1 | 258.0 | 2 | 1.5 | -.108 |
| P4KE180A | 154.0 | 171.0 | 189.0 | 1 | 246.0 | 2 | 1.6 | .108 |
| P4KE200 | 162.0 | 180.0 | 220.0 | 1 | 287.0 | 2 | 1.4 | -.108 |
| P4KE200A | 171.0 | 190.0 | 210.0 | 1 | 274.0 | 2 | 1.5 | .108 |
| P4KE220 | 175.0 | 198.0 | 242.0 | 1 | 344.0 | 2 | 1.1 | -.110 |
| P4KE220A | 185.0 | 209.0 | 231.0 | 1 | 328.0 | 2 | 1.0 | .110 |
| P4KE250 | 202.0 | 225.0 | 275.0 | 1 | 360.0 | 2 | 1.0 | -.110 |
| P4KE250A | 214.0 | 237.0 | 263.0 | 1 | 344.0 | 2 | 1.0 | .110 |
| P4KE300 | 243.0 | 270.0 | 330.0 | 1 | 430.0 | 2 | 1.0 | -.110 |
| P4KE300A | 256.0 | 285.0 | 315.0 | 1 | 414.0 | 2 | 1.0 | .110 |
| P4KE350 | 284.0 | 315.0 | 385.0 | 1 | 504.0 | 2 | 1.0 | -.110 |
| P4KE350A | 300.0 | 333.0 | 368.0 | 1 | 482.0 | 2 | 1.0 | .110 |
| P4KE400 | 324.0 | 360.0 | 440.0 | 1 | 574.0 | 2 | 1.0 | -.110 |
| P4KE400A | 342.0 | 380.0 | 420.0 | 1 | 548.0 | 2 | 1.0 | .110 |

Forward Voltage (V_f) @ 30 amps peak, 8.3 ms sine wave equal to 3.5 volts maximum for P4KE6.8 to 200. (Excluding Bidirectional)
 For bidirectional construction, indicate a C or CA suffix after part number, i.e. P4KE170CA.

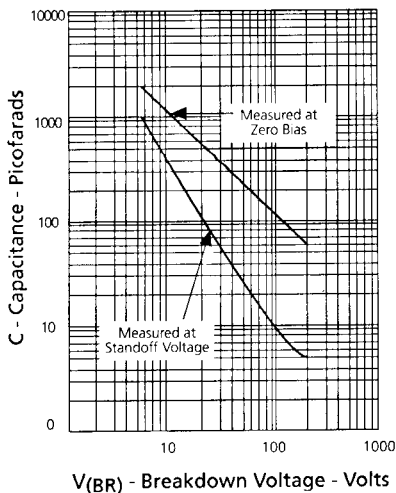


FIGURE 3
P4KE Typical Capacitance vs Breakdown Voltage (Unipolar)

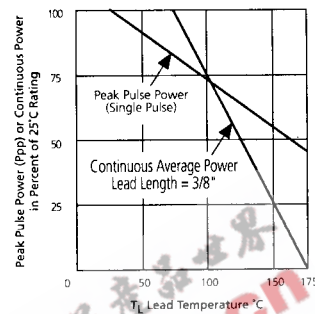


FIGURE 1
Derating Curve

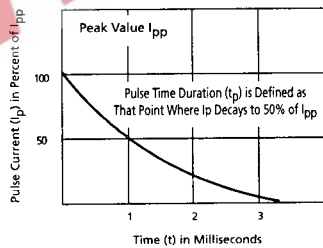


FIGURE 2
Pulse Waveform For Exponential Surge

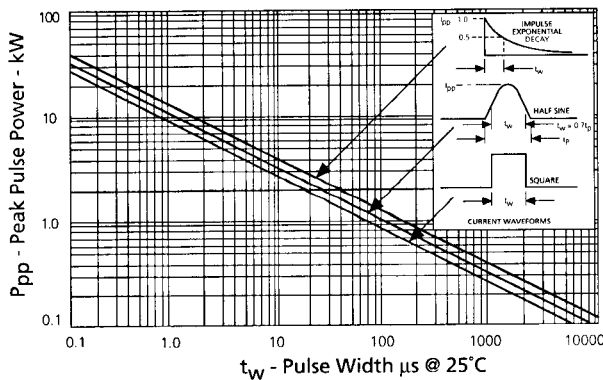


FIGURE 4
Peak Pulse Power vs Pulse Time

Symbols and Abbreviations

- V_{WM} = Rated Stand-Off Voltage
- P_{pp} = Peak Pulse Power
- $V_{(BR)}$ = Breakdown Voltage
- I_D = Reverse Leakage
- I_{pp} = Peak Pulse Current
- V_C (MAX) = Maximum Clamping Voltage
- I_T = Test Current