

**DESCRIPTION**

These Microsemi 30 kW Transient Voltage Suppressors (TVSs) are designed for applications requiring protection of voltage-sensitive electronic devices that may be damaged by harsh or severe voltage transients including lightning per IEC61000-4-5 and class levels with various source impedances described herein. This series is available in 33 to 400 volt standoff voltages ( $V_{WM}$ ) in both unidirectional and bi-directional with either 5% or 10% tolerances of the Breakdown Voltage ( $V_{BR}$ ). Microsemi also offers numerous other TVS products to meet higher or lower power demands and special applications

**APPEARANCE**



**IMPORTANT:** For the most current data, consult MICROSEMI's website: <http://www.microsemi.com>

**FEATURES**

- Available in both Unidirectional and Bidirectional construction (Bidirectional with C or CA suffix)
- Selections for 33 to 400 volt standoff voltages  $V_{WM}$
- Suppresses transients up to 30 kW @ 10/1000  $\mu$ s and 200 kW @ 8/20  $\mu$ s (see Figure 1)
- Fast response
- Options for screening in accordance with MIL-PRF-19500 for JAN, JANTX, JANTXV, and JANS are available by adding MQ, MX, MV, or MSP prefixes respectively to part numbers.
- Moisture classification is Level 1 with no dry pack required per IPC/JEDEC J-STD-020B

**APPLICATIONS / BENEFITS**

- Protection from switching transients and induced RF
- Protection from ESD, and EFT per IEC 61000-4-2 and IEC 61000-4-4
- Secondary lightning protection per IEC61000-4-5 with 42 Ohms source impedance:
  - Class 1,2,3,4: 30KP33A - 30KP400A or CA
  - Class 5: 30KP33A - 30KP400A or CA (short distance)
  - Class 5: 30KP33A - 30KP220A or CA (long distance)
- Secondary lightning protection per IEC61000-4-5 with 12 Ohms source impedance:
  - Class 1,2, 3: 30KP33A to 30KP400A or CA
  - Class 4: 30KP33A to 30KP220A or CA
- Secondary lightning protection per IEC61000-4-5 with 2 Ohms source impedance:
  - Class 2: 30KP33A to 30KP400A or CA
  - Class 3: 30KP33 to 30KP220A or CA
  - Class 4: 30KP33 to 30KP110A or CA

**MAXIMUM RATINGS**

- Peak Pulse Power dissipation at 25°C: 30,000 watts at 10/1000  $\mu$ s (also see Figures 1 and 2)
- Impulse repetition rate (duty factor): 0.05%
- $t_{clamping}$  (0 volts to  $V_{(BR)}$  min.): < 100 ps theoretical for unidirectional and < 5 ns for bidirectional
- Operating & Storage temperature: -65°C to +150°C
- Thermal resistance: 17.5°C/W junction to lead, or 77.5°C/W junction to ambient when mounted on FR4 PC board with 4 mm<sup>2</sup> copper pads (1oz) and track width 1 mm, length 25 mm
- Steady-State Power dissipation: 7 watts at  $T_L = 27.5^\circ\text{C}$ , or 1.61 watts at  $T_A = 25^\circ\text{C}$  when mounted on FR4 PC board described for thermal resistance
- Forward Surge: 250 Amps 8.3 ms half-sine wave
- Solder temperatures: 260°C for 10 s (maximum)

**MECHANICAL AND PACKAGING**

- CASE: Void-free transfer molded thermosetting epoxy body meeting UL94V-0
- FINISH: Tin-Lead plated readily solderable per MIL-STD-750, method 2026
- MARKING: Body marked with part number
- POLARITY: Band denotes cathode. Bidirectional not marked for polarity
- WEIGHT: 1.8 grams.
- TAPE & REEL option: Standard per EIA-296 for axial package (add "TR" suffix to part number)
- See package dimension on last page

**ELECTRICAL CHARACTERISTICS**

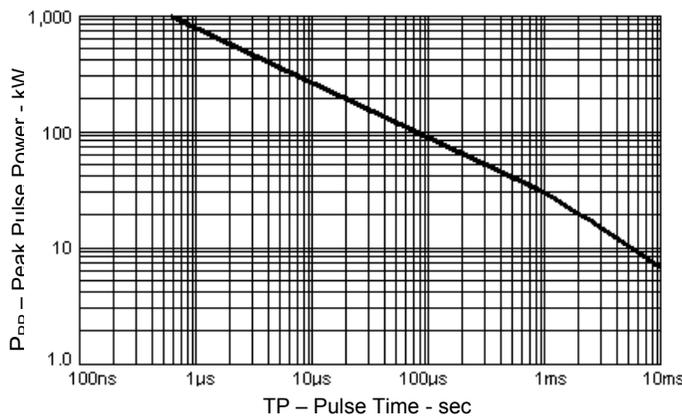
| Part Number | Rated Stand-off Voltage $V_{WM}$ | Breakdown Voltage $V_{(BR)}$ Volts @ $I_{(BR)}$ |    | Maximum Clamping @ $I_{PP}$ 10/1000 $\mu$ s $V_C$ | Maximum Reverse Leakage @ $V_{WM}$ $I_D$ | Maximum Peak Pulse Current $I_{PP}$ | Maximum $V_{(BR)}$ temperature Coefficient $\alpha_{VZ}$ |
|-------------|----------------------------------|---|----|---|--|-------------------------------------|--|
|             | VOLTS                            | VOLTS   | mA | VOLTS   | $\mu$ Amps                               | Amps                                | mV/ $^{\circ}$ C   |
| 30KP33      | 33                               | 36.7-44.9                                       | 50 | 64.6  | 5000                                     | 496                                 | 42   |
| 30KP33A     | 33                               | 36.7-40.6                                       | 50 | 58.6  | 5000                                     | 548                                 | 38   |
| 30KP36      | 36                               | 40.0-48.9                                       | 50 | 68.2  | 5000                                     | 454                                 | 46   |
| 30KP36A     | 36                               | 40.0-44.2                                       | 50 | 61.8  | 5000                                     | 502                                 | 41   |
| 30KP40      | 40                               | 44.4-54.3                                       | 20 | 75.8  | 1500                                     | 412                                 | 51   |
| 30KP40A     | 40                               | 44.4-49.1                                       | 20 | 68.6  | 1500                                     | 456                                 | 46   |
| 30KP43      | 43                               | 47.8-58.4                                       | 10 | 79.0  | 500                                      | 380                                 | 55   |
| 30KP43A     | 43                               | 47.8-52.8                                       | 10 | 71.0  | 500                                      | 430                                 | 50   |
| 30KP45      | 45                               | 50.0-61.1                                       | 5  | 80.7  | 150                                      | 372                                 | 57   |
| 30KP45A     | 45                               | 50.0-55.3                                       | 5  | 73.0  | 150                                      | 410                                 | 52   |
| 30KP48      | 48                               | 53.3-65.1                                       | 5  | 85.9  | 150                                      | 350                                 | 62   |
| 30KP48A     | 48                               | 53.3-58.9                                       | 5  | 77.7  | 150                                      | 386                                 | 56   |
| 30KP51      | 51                               | 56.7-69.3                                       | 5  | 91.5  | 50                                       | 328                                 | 66   |
| 30KP51A     | 51                               | 56.7-62.7                                       | 5  | 82.8  | 50                                       | 362                                 | 60   |
| 30KP54      | 54                               | 60.0-73.3                                       | 5  | 96.8  | 25                                       | 310                                 | 70   |
| 30KP54A     | 54                               | 60.0-66.3                                       | 5  | 87.5  | 25                                       | 342                                 | 63   |
| 30KP58      | 58                               | 64.4-78.7                                       | 5  | 104   | 15                                       | 288                                 | 76   |
| 30KP58A     | 58                               | 64.4-71.2                                       | 5  | 94.0  | 15                                       | 320                                 | 68   |
| 30KP60      | 60                               | 66.7-81.5                                       | 5  | 107   | 15                                       | 280                                 | 78   |
| 30KP60A     | 60                               | 66.7-73.7                                       | 5  | 97.3  | 15                                       | 304                                 | 71   |
| 30KP64      | 64                               | 71.1-86.9                                       | 5  | 115   | 10                                       | 260                                 | 84   |
| 30KP64A     | 64                               | 71.1-78.6                                       | 5  | 104   | 10                                       | 288                                 | 76   |
| 30KP70      | 70                               | 77.8-95.1                                       | 5  | 126   | 10                                       | 238                                 | 92   |
| 30KP70A     | 70                               | 77.8-86.0                                       | 5  | 114   | 10                                       | 264                                 | 83   |
| 30KP75      | 75                               | 83.3-102.0                                      | 5  | 135   | 10                                       | 222                                 | 100  |
| 30KP75A     | 75                               | 83.3-92.1                                       | 5  | 122   | 10                                       | 246                                 | 89   |
| 30KP78      | 78                               | 86.7-106.0                                      | 5  | 140   | 10                                       | 214                                 | 104  |
| 30KP78A     | 78                               | 86.7-95.8                                       | 5  | 126   | 10                                       | 238                                 | 93   |
| 30KP85      | 85                               | 94.4-115  | 5  | 152   | 10                                       | 198                                 | 113  |
| 30KP85A     | 85                               | 94.4-104  | 5  | 137   | 10                                       | 218                                 | 102  |
| 30KP90      | 90                               | 100-122   | 5  | 160   | 10                                       | 188                                 | 120  |
| 30KP90A     | 90                               | 100-111   | 5  | 146   | 10                                       | 206                                 | 109  |
| 30KP100     | 100                              | 111-136   | 5  | 179   | 10                                       | 168                                 | 134  |
| 30KP100A    | 100                              | 111-123   | 5  | 162   | 10                                       | 186                                 | 121  |
| 30KP110     | 110                              | 122-149   | 5  | 196   | 10                                       | 154                                 | 147  |
| 30KP110A    | 110                              | 122-135   | 5  | 178   | 10                                       | 168                                 | 133  |
| 30KP120     | 120                              | 133-163   | 5  | 214   | 10                                       | 140                                 | 161  |
| 30KP120A    | 120                              | 133-147   | 5  | 193   | 10                                       | 156                                 | 145  |
| 30KP130     | 130                              | 144-176   | 5  | 231   | 10                                       | 130                                 | 174  |
| 30KP130A    | 130                              | 144-159   | 5  | 209   | 10                                       | 142                                 | 157  |
| 30KP150     | 150                              | 167-204   | 5  | 268   | 10                                       | 112                                 | 202  |
| 30KP150A    | 150                              | 167-185   | 5  | 243   | 10                                       | 124                                 | 183  |
| 30KP160     | 160                              | 178-218   | 5  | 287   | 10                                       | 104                                 | 216  |
| 30KP160A    | 160                              | 178-197   | 5  | 259   | 10                                       | 116                                 | 195  |
| 30KP170     | 170                              | 189-231   | 5  | 304   | 10                                       | 98                                  | 229  |
| 30KP170A    | 170                              | 189-209   | 5  | 275   | 10                                       | 110                                 | 207  |
| 30KP180     | 180                              | 200-244   | 5  | 321   | 10                                       | 94                                  | 242  |
| 30KP180A    | 180                              | 200-221   | 5  | 291   | 10                                       | 104                                 | 219  |
| 30KP200     | 200                              | 222-271   | 5  | 356   | 10                                       | 84                                  | 269  |
| 30KP200A    | 200                              | 222-245   | 5  | 322   | 10                                       | 94                                  | 243  |
| 30KP220     | 220                              | 245-299   | 5  | 393   | 10                                       | 76                                  | 297  |
| 30KP220A    | 220                              | 245-271   | 5  | 356   | 10                                       | 84                                  | 269  |
| 30KP250A    | 250                              | 278-308   | 5  | 403   | 10                                       | 74                                  | 306  |
| 30KP260A    | 260                              | 289-320   | 5  | 419   | 10                                       | 71                                  | 318  |
| 30KP280A    | 280                              | 311-345   | 5  | 451   | 10                                       | 66                                  | 344  |
| 30KP300A    | 300                              | 333-369   | 5  | 483   | 10                                       | 62                                  | 368  |
| 30KP350A    | 350                              | 389-431   | 5  | 564   | 10                                       | 53                                  | 430  |
| 30KP400A    | 400                              | 444-492   | 5  | 644   | 10                                       | 46                                  | 490  |

NOTE: For bidirectional construction, indicate a C or CA suffix after the part number.

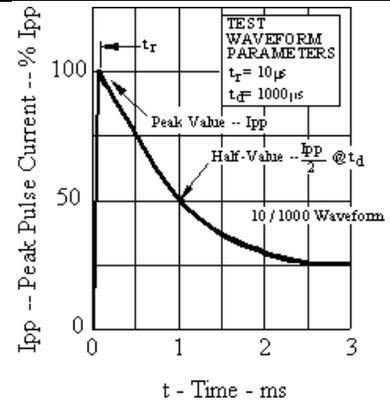
**SYMBOLS & DEFINITIONS**

| Symbol    | Definition   |
|-----------|--|
| $V_{BR}$  | Minimum Breakdown Voltage: The minimum voltage the device will exhibit at a specified current.                   |
| $V_{RWM}$ | Working Peak Reverse Voltage: The maximum peak voltage that can be applied over the operating temperature range. |
| $V_F$     | Maximum Forward Voltage: The maximum forward voltage the device will exhibit at a specified current.             |
| $I_R$     | Maximum Leakage Current: The maximum leakage current that will flow at the specified voltage and temperature.    |
| C         | Capacitance: The capacitance of the TVS as defined @ 0 volts at a frequency of 1 MHz and stated in picofarads.   |

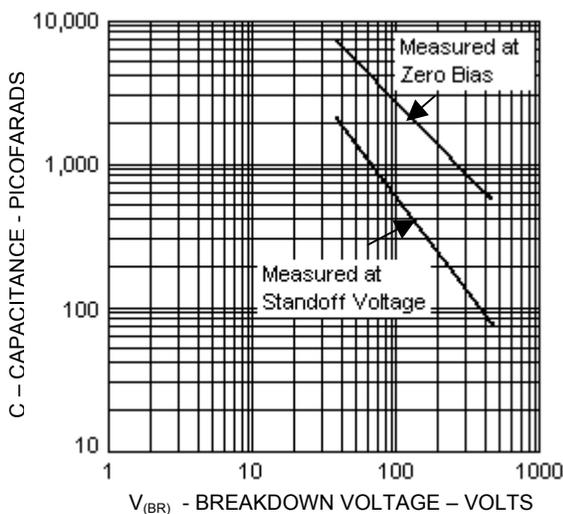
**OUTLINE AND CIRCUIT**



**FIGURE 1**  
Peak Pulse Power vs. Pulse Time



**FIGURE 2**  
Pulse Wave Form



**FIGURE 3**  
Typical Capacitance vs. Breakdown Voltage

**DIMENSIONS**

