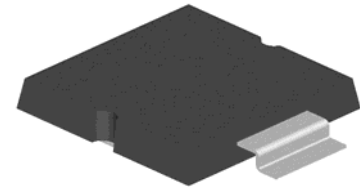


DESCRIPTION

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 10 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.

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

APPEARANCE



FEATURES

- Available in both Unidirectional and Bidirectional construction (Bidirectional with C or CA suffix)
- Selections for 10 to 400 volt Standoff Voltages V_{WM}
- Suppresses transients up to 30 kW @ 10/1000 μ s and 200 kW @ 8/20 μ s (see Figure 1)
- Fast response
- Optional 100% **screening for avionics grade** is available by adding MA prefix to part number for added 100% temperature cycle -55°C to +125°C (10X) as well as surge (3X) and 24 hours HTRB with post test V_Z & I_R (in the operating direction for unidirectional or both directions for bidirectional)
- Options for screening in accordance with MIL-PRF-19500 for JAN, JANTX, and JANTXV are available by adding MQ, MX, or MV prefixes respectively to part numbers.
- Moisture classification is Level 1 with no dry pack required per IPC/JEDEC J-STD-020B
- RoHS Compliant devices available by adding an "e3" suffix

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: PLAD30KP10 - PLAD30KP400A or CA
Class 5: PLAD30KP10 - PLAD30KP400A or CA (short distance)
Class 5: PLAD30KP10 - PLAD30KP220A or CA (long distance)
- Secondary lightning protection per IEC61000-4-5 with 12 Ohms source impedance:
Class 1,2, 3: PLAD30KP10 to PLAD30KP400A or CA
Class 4: PLAD30KP10 to PLAD30KP220A or CA
- Secondary lightning protection per IEC61000-4-5 with 2 Ohms source impedance:
Class 2: PLAD30KP10 to PLAD30KP400A or CA
Class 3: PLAD30KP10 to PLAD30KP220A or CA
Class 4: PLAD30KP10 to PLAD30KP110A or CA

MAXIMUM RATINGS

- Peak Pulse Power dissipation at 25°C: 30,000 watts at 10/1000 μ 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: 0.5°C/W junction to case, or 50°C/W junction to ambient when mounted on FR4 PC board with recommended mounting pad with 1 oz Cu (see last page)
- Steady-State Power dissipation: 250 watts at $T_c = 25^\circ\text{C}$, or 2.5 watts at $T_A = 25^\circ\text{C}$ when mounted on FR4 PC board as described for thermal resistance above
- Forward Surge: 1500 Amps (theoretical) at 8.3 ms half-sine wave for unidirectional devices only
- 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 or RoHS Compliant annealed matte-Tin plating readily solderable per MIL-STD-750, method 2026
- MARKING: Body marked with part number
- POLARITY: For unidirectional devices, the cathode is on the metal backside (package bottom)
- WEIGHT: 1.7-2.0 grams (approximate)
- TAPE & REEL option: Standard per EIA-296 for axial package (add "TR" suffix to part number)
- See package dimension on last page

ELECTRICAL CHARACTERISTICS

| MICROSEMI PART NUMBER (Note 2) | REVERSE STAND-OFF VOLTAGE V_{WM} (Note 1) | BREAKDOWN VOLTAGE $V_{(BR)}$ | | MAXIMUM CLAMPING VOLTAGE V_C @ I_{PP} | MAXIMUM STANDBY CURRENT I_D @ V_{WM} | MAXIMUM PEAK PULSE CURRENT I_{PP} (FIG. 3) | MAXIMUM TEMPERATURE COEFFICIENT OF $V_{(BR)}$ $\alpha_{V(BR)}$ mV/ °C |
|--------------------------------------|---|------------------------------------|-----------------------|---|--|---|--|
| | | $V_{(BR)}$ VOLTS | @ $I_{(BR)}$ mA | | | | |
| PLAD30KP10 | 10 | 12.8 – 14.6 | 150 | 19.2 | 15,000 | 1560 | 8.0 |
| PLAD30KP10A | 10 | 12.8 – 14.0 | 150 | 18.4 | 15,000 | 1629 | 8.0 |
| PLAD30KP11 | 11 | 13.0 – 15.5 | 150 | 22.4 | 15,000 | 1490 | 8.0 |
| PLAD30P11A | 11 | 13.0 – 14.5 | 150 | 19.2 | 15,000 | 1560 | 8.0 |
| PLAD30KP12 | 12 | 13.3 – 16.3 | 150 | 22.8 | 15,000 | 1317 | 8.0 |
| PLAD30KP12A | 12 | 13.3 – 14.7 | 150 | 20.6 | 15,000 | 1455 | 8.0 |
| PLAD30KP13 | 13 | 14.4 – 17.6 | 150 | 24.6 | 6000 | 1221 | 8.0 |
| PLAD30KP13A | 13 | 14.4 – 15.9 | 150 | 22.4 | 6000 | 1341 | 8.0 |
| PLAD30KP14 | 14 | 15.6 – 19.1 | 150 | 26.6 | 3000 | 1134 | 10 |
| PLAD30KP14A | 14 | 15.6 – 17.2 | 150 | 24.0 | 3000 | 1251 | 10 |
| PLAD30KP15 | 15 | 16.7 – 20.4 | 5 | 28.6 | 750 | 1350 | 12 |
| PLAD30KP15A | 15 | 16.7 – 18.5 | 5 | 25.8 | 750 | 1164 | 12 |
| PLAD30KP16 | 16 | 17.8 – 21.8 | 5 | 30.0 | 450 | 999 | 13 |
| PLAD30KP16A | 16 | 17.8 – 19.7 | 5 | 27.2 | 450 | 1101 | 12 |
| PLAD30KP17 | 17 | 18.9 – 23.1 | 5 | 31.8 | 150 | 942 | 15 |
| PLAD30KP17A | 17 | 18.9 – 20.9 | 5 | 28.8 | 150 | 1041 | 14 |
| PLAD30KP18 | 18 | 20.0 – 24.4 | 5 | 33.8 | 120 | 885 | 17 |
| PLAD30KP18A | 18 | 20.0 – 22.1 | 5 | 30.8 | 60 | 975 | 16 |
| PLAD30KP20 | 20 | 22.2 – 27.1 | 5 | 37.6 | 45 | 798 | 19 |
| PLAD30KP20A | 20 | 22.2 – 24.5 | 5 | 34.0 | 45 | 882 | 18 |
| PLAD30KP22 | 22 | 24.4 – 29.8 | 5 | 40.2 | 10 | 747 | 22 |
| PLAD30KP22A | 22 | 24.4 – 26.9 | 5 | 36.4 | 10 | 822 | 20 |
| PLAD30KP24 | 24 | 26.7 – 32.6 | 5 | 44.0 | 10 | 681 | 24 |
| PLAD30KP24A | 24 | 26.7 – 29.5 | 5 | 39.8 | 10 | 753 | 22 |
| PLAD30KP26 | 26 | 28.9 – 35.3 | 5 | 47.6 | 10 | 630 | 27 |
| PLAD30KP26A | 26 | 28.9 – 31.9 | 5 | 43.0 | 10 | 696 | 24 |
| PLAD30KP28 | 28 | 31.1 – 38.0 | 5 | 51.6 | 10 | 582 | 29 |
| PLAD30KP28A | 28 | 31.1 – 34.4 | 5 | 46.4 | 10 | 645 | 26 |
| PLAD30KP30 | 30 | 33.3 – 40.7 | 5 | 53.8 | 10 | 564 | 36 |
| PLAD30KP30A | 30 | 33.3 – 36.8 | 5 | 48.8 | 10 | 618 | 30 |
| PLAD30KP33 | 33 | 36.7 – 44.9 | 5 | 59.0 | 10 | 510 | 37 |
| PLAD30KP33A | 33 | 36.7 – 40.6 | 5 | 53.3 | 10 | 564 | 35 |
| PLAD30KP36 | 36 | 40.0 – 48.9 | 5 | 64.3 | 10 | 468 | 40 |
| PLAD30KP36A | 36 | 40.0 – 44.2 | 5 | 58.1 | 10 | 516 | 38 |
| PLAD30KP40 | 40 | 44.4 – 54.3 | 5 | 71.4 | 10 | 420 | 48 |
| PLAD30KP40A | 40 | 44.4 – 49.1 | 5 | 64.5 | 10 | 468 | 44 |
| PLAD30KP43 | 43 | 47.8 – 58.4 | 5 | 76.7 | 10 | 390 | 53 |
| PLAD30KP43A | 43 | 47.8 – 52.8 | 5 | 69.4 | 10 | 432 | 50 |
| PLAD30KP45 | 45 | 50.0 – 61.1 | 5 | 80.3 | 10 | 372 | 54 |
| PLAD30KP45A | 45 | 50.0 – 55.3 | 5 | 72.7 | 10 | 414 | 51 |
| PLAD30KP48 | 48 | 53.3 – 65.1 | 5 | 85.5 | 10 | 348 | 60 |
| PLAD30KP48A | 48 | 53.3 – 58.9 | 5 | 77.4 | 10 | 390 | 54 |
| PLAD30KP51 | 51 | 56.7 – 69.3 | 5 | 91.1 | 10 | 330 | 65 |
| PLAD30KP51A | 51 | 56.7 – 62.7 | 5 | 82.4 | 10 | 366 | 58 |
| PLAD30KP54 | 54 | 60.0 – 73.3 | 5 | 96.3 | 10 | 312 | 68 |
| PLAD30KP54A | 54 | 60.0 – 66.3 | 5 | 87.1 | 10 | 342 | 64 |
| PLAD30KP58 | 58 | 64.4 – 78.7 | 5 | 103.0 | 10 | 294 | 75 |
| PLAD30KP58A | 58 | 64.4 – 71.2 | 5 | 93.6 | 10 | 318 | 70 |
| PLAD30KP60 | 60 | 66.7 – 81.5 | 5 | 107.0 | 10 | 282 | 80 |
| PLAD30KP60A | 60 | 66.7 – 73.7 | 5 | 96.8 | 10 | 312 | 72 |
| PLAD30KP64 | 64 | 71.1 – 86.9 | 5 | 114.0 | 10 | 264 | 85 |
| PLAD30KP64A | 64 | 71.1 – 78.6 | 5 | 103.0 | 10 | 294 | 75 |

| MICROSEMI PART NUMBER (Note 2) | REVERSE STAND- OFF VOLTAGE V_{WM} (Note 1) | BREAKDOWN VOLTAGE $V_{(BR)}$ | | MAXIMUM CLAMPING VOLTAGE V_C @ I_{PP} | MAXIMUM STANDBY CURRENT I_D @ V_{WM} | MAXIMUM PEAK PULSE CURRENT I_{PP} (FIG. 3) | MAXIMUM TEMPERATURE COEFFICIENT OF $V_{(BR)}$ |
|--------------------------------------|---|------------------------------------|-----------------------|---|--|---|--|
| | | $V_{(BR)}$ VOLTS | @ $I_{(BR)}$ mA | | | | |
| PLAD30KP70 | 70 | 77.8 – 95.1 | 5 | 125 | 10 | 240 | 93 |
| PLAD30KP70A | 70 | 77.8 – 86.0 | 5 | 113 | 10 | 264 | 84 |
| PLAD30KP75 | 75 | 83.3 – 102.0 | 5 | 134 | 10 | 222 | 100 |
| PLAD30KP75A | 75 | 83.3 – 92.1 | 5 | 121 | 10 | 246 | 90 |
| PLAD30KP78 | 78 | 86.7 – 106.0 | 5 | 139 | 10 | 216 | 104 |
| PLAD30KP78A | 78 | 86.7 – 95.8 | 5 | 126 | 10 | 240 | 95 |
| PLAD30KP85 | 85 | 94.4 – 115.0 | 5 | 151 | 10 | 198 | 115 |
| PLAD30KP85A | 85 | 94.4 – 104.0 | 5 | 137 | 10 | 216 | 104 |
| PLAD30KP90 | 90 | 100 – 122 | 5 | 160 | 10 | 186 | 120 |
| PLAD30KP90A | 90 | 100 – 111 | 5 | 146 | 10 | 204 | 109 |
| PLAD30KP100 | 100 | 111 – 136 | 5 | 179 | 10 | 168 | 134 |
| PLAD30KP100A | 100 | 111 – 123 | 5 | 162 | 10 | 186 | 122 |
| PLAD30KP110 | 110 | 122 – 149 | 5 | 196 | 10 | 156 | 147 |
| PLAD30KP110A | 110 | 122 – 135 | 5 | 177 | 10 | 168 | 132 |
| PLAD30KP120 | 120 | 133 – 163 | 5 | 214 | 10 | 140 | 161 |
| PLAD30KP120A | 120 | 133 – 147 | 5 | 193 | 10 | 156 | 145 |
| PLAD30KP130 | 130 | 144 – 176 | 5 | 231 | 10 | 130 | 174 |
| PLAD30KP130A | 130 | 144 – 159 | 5 | 209 | 10 | 142 | 157 |
| PLAD30KP150 | 150 | 167 – 204 | 5 | 268 | 10 | 112 | 202 |
| PLAD30KP150A | 150 | 167 – 185 | 5 | 243 | 10 | 124 | 183 |
| PLAD30KP160 | 160 | 178 – 218 | 5 | 287 | 10 | 104 | 216 |
| PLAD30KP160A | 160 | 178 – 197 | 5 | 259 | 10 | 116 | 195 |
| PLAD30KP170 | 170 | 189 – 231 | 5 | 304 | 10 | 98 | 229 |
| PLAD30KP170A | 170 | 189 – 209 | 5 | 275 | 10 | 110 | 207 |
| PLAD30KP180 | 180 | 200 – 244 | 5 | 321 | 10 | 94 | 242 |
| PLAD30KP180A | 180 | 200 – 221 | 5 | 291 | 10 | 104 | 219 |
| PLAD30KP200 | 200 | 222 – 271 | 5 | 356 | 10 | 84 | 269 |
| PLAD30KP200A | 200 | 222 – 245 | 5 | 322 | 10 | 94 | 243 |
| PLAD30KP220 | 220 | 245 – 299 | 5 | 293 | 10 | 76 | 297 |
| PLAD30KP220A | 220 | 245 – 271 | 5 | 356 | 10 | 84 | 269 |
| PLAD30KP250 | 250 | 278 – 308 | 5 | 403 | 10 | 74 | 306 |
| PLAD30KP260A | 260 | 289 – 320 | 5 | 419 | 10 | 71 | 318 |
| PLAD30KP280A | 280 | 311 – 345 | 5 | 451 | 10 | 66 | 344 |
| PLAD30KP300A | 300 | 333 – 369 | 5 | 483 | 10 | 62 | 368 |
| PLAD30KP350A | 350 | 389 – 431 | 5 | 564 | 10 | 53 | 430 |
| PLAD30KP400A | 400 | 444 – 492 | 5 | 644 | 10 | 46 | 490 |

NOTE 1: Transient Voltage Suppressors are normally selected with reverse “Stand Off Voltage” V_{WM} which should be equal to or greater than the dc or continuous peak operating voltage level.

NOTE 2: For bidirectional construction, indicate a C or CA suffix after the part number.

SYMBOLS & DEFINITIONS

| Symbol | Definition | Symbol | Definition |
|------------|---------------------------------|------------|----------------------------------|
| V_{WM} | Working Peak (Standoff) Voltage | I_{PP} | Peak Pulse Current |
| P_{PP} | Peak Pulse Power | V_C | Clamping Voltage |
| $V_{(BR)}$ | Breakdown Voltage | $I_{(BR)}$ | Breakdown Current for $V_{(BR)}$ |
| I_D | Standby Current | | |

GRAPHS

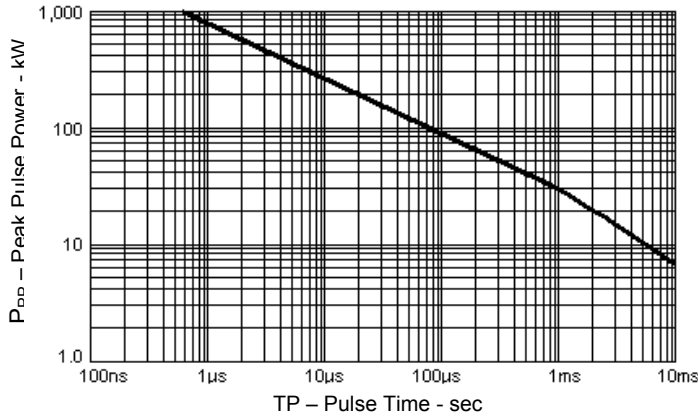


FIGURE 1
Peak Pulse Power vs. Pulse Time

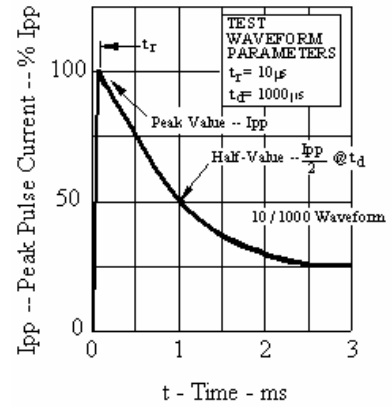


FIGURE 2
Pulse Wave Form

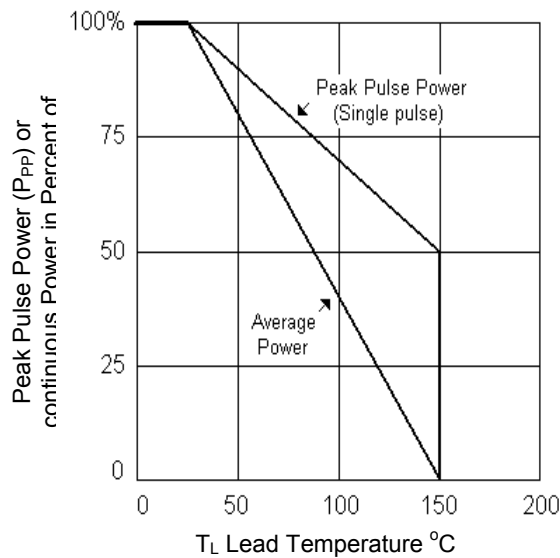


FIGURE 3
Derating Curve

PACKAGE AND MOUNTING PAD DIMENSIONS Inches [mm]

