

# Silicon Avalanche Diodes

## 600 Watt Axial Transient Voltage Suppressors

### P6KE Series



Protect sensitive electronics against voltage transients induced by inductive load switching and lightning. Ideal for the protection of I/O interfaces, Vcc bus, and other integrated circuits.

#### FEATURES

- Breakdown voltage range 6.8 to 440 Volts
- Uni-directional and Bi-directional
- Glass passivated junction
- Excellent clamping capability
- 100% surge tested
- UL recognised

#### MAXIMUM RATING

- Peak Pulse Power (Ppk): 600 Watts (10 x 1000µs)@25°C (see diagram on page 3 for wave form)
- 1.5 watt steady state
- Response time:  $1 \times 10^{-12}$  seconds (theoretical)
- Forward surge rating: 100 Amps, 8.3ms half sine wave, (uni-directional devices only)
- Operating & storage temperature: -55°C to +150°C

#### MECHANICAL CHARACTERISTICS

- Case: DO-15, Molded plastic over glass passivated junction
- Terminals: Axial leads, solderable per MIL-STD-202" Method 208
- Solderable leads = 230°C for 10 seconds (1.59mm from case)
- Marking: cathode band, (positive terminal, uni-directional devices only), device code, logo
- Weight: 1.2 grammes (approx)

**Agency Approvals:** Recognized under the Components Program of Underwriters Laboratories.

**Agency File Number:** E128662

#### ORDERING INFORMATION



B = Bulk (1000 pcs)

T = Tape and reeled (5000 pcs)



All dimensions in mm

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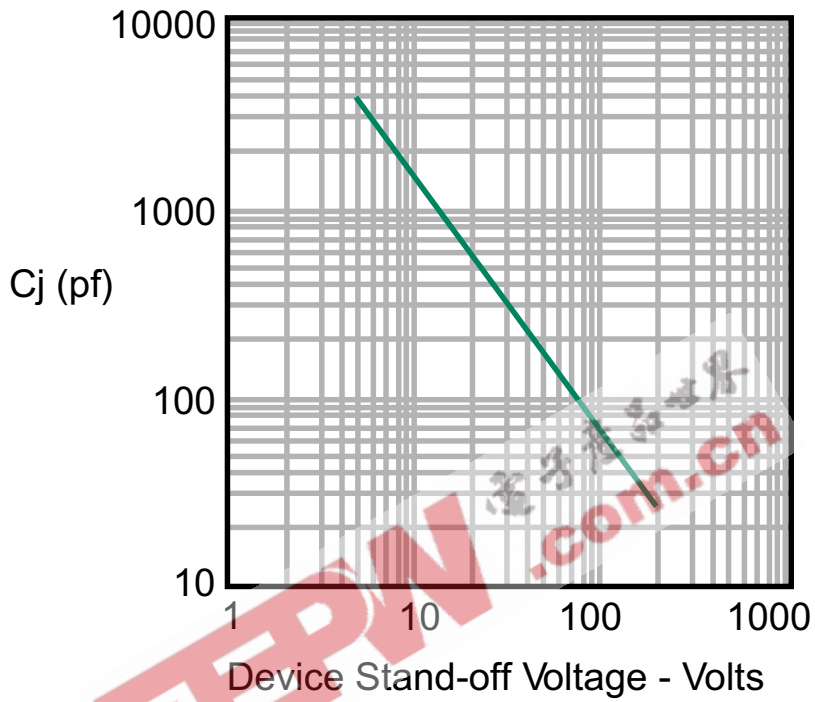


Figure 1 - Capacitance vs. Stand-off Voltage



Figure 2 - Peak Pulse Power vs. Pulse Time

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#### ELECTRICAL SPECIFICATION @ Tamb 25°C

| Part Number (Uni) | Part Number (Bi) | Reverse Stand off Voltage $V_R$ (Volts) | Breakdown Voltage $V_{BR}$ (Volts) @ $I_T$ |       |      | Maximum Reverse Leakage $I_R$ @ $V_R$ ( $\mu A$ ) | Maximum Clamping Voltage $V_C$ @ $I_{PP}$ (Volts) | Maximum Peak Pulse Current $I_{PP}$ (A) | Max Voltage Temperature Variation of $V_{BR}$ (mV/°C) |
|-------------------|------------------|---|--|-------|------|---|---|---|---|
|                   |                  |   | MIN  | MAX   | (mA) |   |   |   |   |
| PP6KE6.8*         | PP6KE6.8C*       | 5.50                                    | 6.12                                       | 7.48  | 10.0 | 1000.0  | 10.8  | 56.0                                    | 0.057   |
| P6KE6.8A*         | P6KE6.8CA*       | 5.80                                    | 6.45                                       | 7.14  | 10.0 | 1000.0  | 10.5  | 57.0                                    | 0.057   |
| P6KE7.5*          | P6KE7.5C*        | 6.05                                    | 6.75                                       | 8.25  | 10.0 | 500.0   | 11.7  | 51.0                                    | 0.061   |
| P6KE7.5A*         | P6KE7.5CA*       | 6.40                                    | 7.13                                       | 7.88  | 10.0 | 500.0   | 11.3  | 53.0                                    | 0.061   |
| P6KE8.2           | P6KE8.2C         | 6.63                                    | 7.38                                       | 9.02  | 10.0 | 200.0   | 12.5  | 48.0                                    | 0.065   |
| P6KE8.2A          | P6KE8.2CA        | 7.02                                    | 7.79                                       | 8.61  | 10.0 | 200.0   | 12.1  | 50.0                                    | 0.065   |
| P6KE9.1           | P6KE9.1C         | 7.37                                    | 8.19                                       | 10.00 | 1.0  | 50.0  | 13.8  | 44.0                                    | 0.068   |
| P6KE9.1A          | P6KE9.1CA        | 7.78                                    | 8.65                                       | 9.55  | 1.0  | 50.0  | 13.4  | 45.0                                    | 0.068   |
| P6KE10            | P6KE10C          | 8.10                                    | 9.00                                       | 11.00 | 1.0  | 10.0  | 15.0  | 40.0                                    | 0.073   |
| P6KE10A           | P6KE10CA         | 8.55                                    | 9.50                                       | 10.50 | 1.0  | 10.0  | 14.5  | 41.0                                    | 0.073   |
| P6KE11            | P6KE11C          | 8.92                                    | 9.90                                       | 12.10 | 1.0  | 5.0   | 16.2  | 37.0                                    | 0.075   |
| P6KE11A           | P6KE11CA         | 9.40                                    | 10.50                                      | 11.60 | 1.0  | 5.0   | 15.6  | 38.0                                    | 0.075   |
| P6KE12*           | P6KE12C*         | 9.72                                    | 10.80                                      | 13.20 | 1.0  | 5.0   | 17.3  | 35.0                                    | 0.078   |
| P6KE12A*          | P6KE12CA*        | 10.20                                   | 11.40                                      | 12.60 | 1.0  | 5.0   | 16.7  | 36.0                                    | 0.078   |
| P6KE13            | P6KE13C          | 10.50                                   | 11.70                                      | 14.30 | 1.0  | 5.0   | 19.0  | 32.0                                    | 0.081   |
| P6KE13A           | P6KE13CA         | 11.10                                   | 12.40                                      | 13.70 | 1.0  | 5.0   | 18.2  | 33.0                                    | 0.081   |
| P6KE15            | P6KE15C*         | 12.10                                   | 13.50                                      | 16.50 | 1.0  | 5.0   | 22.0  | 27.0                                    | 0.084   |
| P6KE15A           | P6KE15CA*        | 12.80                                   | 14.30                                      | 15.80 | 1.0  | 5.0   | 21.2  | 28.0                                    | 0.084   |
| P6KE16            | P6KE16C          | 12.90                                   | 14.40                                      | 17.60 | 1.0  | 5.0   | 23.5  | 26.0                                    | 0.086   |
| P6KE16A           | P6KE16CA         | 13.60                                   | 15.20                                      | 16.80 | 1.0  | 5.0   | 22.5  | 27.0                                    | 0.086   |
| P6KE18*           | P6KE18C*         | 14.50                                   | 16.20                                      | 19.80 | 1.0  | 5.0   | 26.5  | 23.0                                    | 0.088   |
| P6KE18A*          | P6KE18CA*        | 15.30                                   | 17.10                                      | 18.90 | 1.0  | 5.0   | 25.2  | 24.0                                    | 0.088   |
| P6KE20            | P6KE20C*         | 16.20                                   | 18.00                                      | 22.00 | 1.0  | 5.0   | 29.1  | 21.0                                    | 0.090   |
| P6KE20A           | P6KE20CA*        | 17.10                                   | 19.00                                      | 21.00 | 1.0  | 5.0   | 27.7  | 22.0                                    | 0.090   |
| P6KE22            | P6KE22C          | 17.80                                   | 19.80                                      | 24.20 | 1.0  | 5.0   | 31.9  | 19.0                                    | 0.092   |
| P6KE22A           | P6KE22CA         | 18.80                                   | 20.90                                      | 23.10 | 1.0  | 5.0   | 30.6  | 20.0                                    | 0.092   |
| P6KE24            | P6KE24C          | 19.40                                   | 21.60                                      | 26.40 | 1.0  | 5.0   | 34.7  | 17.0                                    | 0.094   |
| P6KE24A           | P6KE24CA         | 20.50                                   | 22.80                                      | 25.20 | 1.0  | 5.0   | 33.2  | 18.0                                    | 0.094   |
| P6KE27*           | P6KE27C          | 21.80                                   | 24.30                                      | 29.70 | 1.0  | 5.0   | 39.1  | 15.0                                    | 0.096   |
| P6KE27A*          | P6KE27CA         | 23.10                                   | 25.70                                      | 28.40 | 1.0  | 5.0   | 37.5  | 16.0                                    | 0.096   |
| P6KE30*           | P6KE30C*         | 24.30                                   | 27.00                                      | 33.00 | 1.0  | 5.0   | 43.5  | 14.0                                    | 0.097   |
| P6KE30A*          | P6KE30CA*        | 25.60                                   | 28.50                                      | 31.50 | 1.0  | 5.0   | 41.4  | 14.4                                    | 0.097   |

Suffix 'C' denotes Bi-directional device. Suffix 'A' denotes 5% tolerance device, no suffix denotes a 10% tolerance device.

1. For Bi-directional devices having  $V_R$  of 10 volts and below, the  $I_R$  limit is doubled.

2.  $V_F = 3.5$  Volts max. for devices of  $V_R < 100V$ , and  $V_F = 5.0$  Volts max for devices of  $V_R > 100V$ .  $I_F = 50A$ , 300  $\mu S$  square wave.

\* Preferred voltages.

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#### ELECTRICAL SPECIFICATION @ Tamb 25°C

| Part Number (Uni) | Part Number (Bi) | Reverse Stand off Voltage $V_R$ (Volts) | Breakdown Voltage $V_{BR}$ (Volts) @ $I_T$ |       |      | Maximum Reverse Leakage $I_R$ @ $V_R$ ( $\mu A$ ) | Maximum Clamping Voltage $V_C$ @ $I_{PP}$ (Volts) | Maximum Peak Pulse Current $I_{PP}$ (A) | Max Voltage Temperature Variation of $V_{BR}$ (mV/°C) |
|-------------------|------------------|---|--|-------|------|---|---|---|---|
|                   |                  |   | MIN  | MAX   | (mA) |   |   |   |   |
| P6KE33*           | P6KE33C          | 26.80                                   | 29.70                                      | 36.30 | 1.0  | 5.0   | 47.7  | 12.6                                    | 0.098   |
| P6KE33A*          | P6KE33CA         | 28.20                                   | 31.40                                      | 34.70 | 1.0  | 5.0   | 45.7  | 13.2                                    | 0.098   |
| P6KE36*           | P6KE36C          | 29.10                                   | 32.40                                      | 39.60 | 1.0  | 5.0   | 52.0  | 11.6                                    | 0.099   |
| P6KE36A*          | P6KE36CA         | 30.80                                   | 34.20                                      | 37.80 | 1.0  | 5.0   | 49.9  | 12.0                                    | 0.099   |
| P6KE39            | P6KE39C          | 31.60                                   | 35.10                                      | 42.90 | 1.0  | 5.0   | 56.4  | 10.5                                    | 0.100   |
| P6KE39A           | P6KE39CA         | 33.30                                   | 37.10                                      | 41.00 | 1.0  | 5.0   | 53.9  | 11.2                                    | 0.100   |
| P6KE43            | P6KE43C          | 34.80                                   | 38.70                                      | 47.30 | 1.0  | 5.0   | 61.9  | 9.6                                     | 0.101   |
| P6KE43A           | P6KE43CA         | 36.80                                   | 40.90                                      | 45.20 | 1.0  | 5.0   | 59.3  | 10.1                                    | 0.101   |
| P6KE47            | P6KE47C          | 38.10                                   | 42.30                                      | 51.70 | 1.0  | 5.0   | 67.8  | 8.9                                     | 0.101   |
| P6KE47A           | P6KE47CA         | 40.20                                   | 44.70                                      | 49.40 | 1.0  | 5.0   | 64.8  | 9.3                                     | 0.101   |
| P6KE51            | P6KE51C*         | 41.30                                   | 45.90                                      | 56.10 | 1.0  | 5.0   | 73.5  | 8.2                                     | 0.102   |
| P6KE51A           | P6KE51CA*        | 43.60                                   | 48.50                                      | 53.60 | 1.0  | 5.0   | 70.1  | 8.6                                     | 0.102   |
| P6KE56            | P6KE56C          | 45.4                                    | 50.4                                       | 61.6  | 1.0  | 5.0   | 80.5  | 7.40                                    | 0.103   |
| P6KE56A           | P6KE56CA         | 47.8                                    | 53.2                                       | 58.8  | 1.0  | 5.0   | 77.0  | 7.80                                    | 0.103   |
| P6KE62            | P6KE62C          | 50.2                                    | 55.8                                       | 68.2  | 1.0  | 5.0   | 89.0  | 6.80                                    | 0.104   |
| P6KE62A           | P6KE62CA         | 53.0                                    | 58.9                                       | 65.1  | 1.0  | 5.0   | 85.0  | 7.10                                    | 0.104   |
| P6KE68            | P6KE68C*         | 55.1                                    | 61.2                                       | 74.8  | 1.0  | 5.0   | 98.0  | 6.10                                    | 0.104   |
| P6KE68A           | P6KE68CA*        | 58.1                                    | 64.6                                       | 71.4  | 1.0  | 5.0   | 92.0  | 6.50                                    | 0.104   |
| P6KE75            | P6KE75C          | 60.7                                    | 67.5                                       | 82.5  | 1.0  | 5.0   | 108.0   | 5.50                                    | 0.105   |
| P6KE75A           | P6KE75CA         | 64.1                                    | 71.3                                       | 78.8  | 1.0  | 5.0   | 103.0   | 5.80                                    | 0.105   |
| P6KE82            | P6KE82C          | 66.4                                    | 73.8                                       | 90.2  | 1.0  | 5.0   | 118.0   | 5.10                                    | 0.105   |
| P6KE82A           | P6KE82CA         | 70.1                                    | 77.9                                       | 86.1  | 1.0  | 5.0   | 113.0   | 5.30                                    | 0.105   |
| P6KE91            | P6KE91C          | 73.7                                    | 81.9                                       | 100.0 | 1.0  | 5.0   | 131.0   | 4.50                                    | 0.106   |
| P6KE91A           | P6KE91CA         | 77.8                                    | 86.5                                       | 95.5  | 1.0  | 5.0   | 125.0   | 4.80                                    | 0.106   |
| P6KE100           | P6KE100C         | 81.0                                    | 90.0                                       | 110.0 | 1.0  | 5.0   | 144.0   | 4.20                                    | 0.106   |
| P6KE100A          | P6KE100CA        | 85.5                                    | 95.0                                       | 105.0 | 1.0  | 5.0   | 137.0   | 4.40                                    | 0.106   |
| P6KE110           | P6KE110C         | 89.2                                    | 99.0                                       | 121.0 | 1.0  | 5.0   | 158.0   | 3.80                                    | 0.107   |
| P6KE110A          | P6KE110CA        | 94.0                                    | 105.0                                      | 116.0 | 1.0  | 5.0   | 152.0   | 4.00                                    | 0.107   |
| P6KE120           | P6KE120C         | 97.2                                    | 108.0                                      | 132.0 | 1.0  | 5.0   | 173.0   | 3.50                                    | 0.107   |
| P6KE120A          | P6KE120CA        | 102.0                                   | 114.0                                      | 126.0 | 1.0  | 5.0   | 165.0   | 3.60                                    | 0.107   |
| P6KE130           | P6KE130C         | 105.0                                   | 117.0                                      | 143.0 | 1.0  | 5.0   | 187.0   | 3.20                                    | 0.107   |
| P6KE130A          | P6KE130CA        | 111.0                                   | 124.0                                      | 137.0 | 1.0  | 5.0   | 179.0   | 3.30                                    | 0.107   |
| P6KE150           | P6KE150C         | 121.0                                   | 135.0                                      | 165.0 | 1.0  | 5.0   | 215.0   | 2.80                                    | 0.108   |
| P6KE150A          | P6KE150CA        | 128.0                                   | 143.0                                      | 158.0 | 1.0  | 5.0   | 207.0   | 2.90                                    | 0.108   |
| P6KE160           | P6KE160C         | 130.0                                   | 144.0                                      | 176.0 | 1.0  | 5.0   | 230.0   | 2.60                                    | 0.108   |
| P6KE160A          | P6KE160CA        | 136.0                                   | 152.0                                      | 168.0 | 1.0  | 5.0   | 219.0   | 2.70                                    | 0.108   |

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|-------------------|------------------|---|--|-------|------|---|---|---|---|
|                   |                  |   | MIN  | MAX   | (mA) |   |   |   |   |
| P6KE170           | P6KE170C         | 138.0                                   | 153.0                                      | 187.0 | 1.0  | 5.0   | 244.0   | 2.50                                    | 0.108   |
| P6KE170A          | P6KE170CA        | 145.0                                   | 162.0                                      | 179.0 | 1.0  | 5.0   | 234.0   | 2.60                                    | 0.108   |
| P6KE180           | P6KE180C         | 146.0                                   | 162.0                                      | 198.0 | 1.0  | 5.0   | 258.0   | 2.30                                    | 0.108   |
| P6KE180A          | P6KE180CA        | 154.0                                   | 171.0                                      | 189.0 | 1.0  | 5.0   | 246.0   | 2.40                                    | 0.108   |
| P6KE200           | P6KE200C         | 162.0                                   | 180.0                                      | 220.0 | 1.0  | 5.0   | 287.0   | 2.10                                    | 0.108   |
| P6KE200A          | P6KE200CA        | 171.0                                   | 190.0                                      | 210.0 | 1.0  | 5.0   | 274.0   | 2.20                                    | 0.108   |
| P6KE220           | P6KE220C*        | 175.0                                   | 198.0                                      | 242.0 | 1.0  | 5.0   | 344.0   | 1.75                                    | 0.108   |
| P6KE220A          | P6KE220CA        | 185.0                                   | 209.0                                      | 231.0 | 1.0  | 5.0   | 328.0   | 1.83                                    | 0.108   |
| P6KE250           | P6KE250C         | 202.0                                   | 225.0                                      | 275.0 | 1.0  | 5.0   | 360.0   | 1.67                                    | 0.110   |
| P6KE250A          | P6KE250CA        | 214.0                                   | 237.0                                      | 263.0 | 1.0  | 5.0   | 344.0   | 1.75                                    | 0.110   |
| P6KE300           | P6KE300C         | 243.0                                   | 270.0                                      | 330.0 | 1.0  | 5.0   | 430.0   | 1.40                                    | 0.110   |
| P6KE300A          | P6KE300CA        | 256.0                                   | 285.0                                      | 315.0 | 1.0  | 5.0   | 414.0   | 1.45                                    | 0.110   |
| P6KE350           | P6KE350C         | 284.0                                   | 315.0                                      | 385.0 | 1.0  | 5.0   | 504.0   | 1.20                                    | 0.110   |
| P6KE350A          | P6KE350CA        | 300.0                                   | 332.0                                      | 368.0 | 1.0  | 5.0   | 482.0   | 1.25                                    | 0.110   |
| P6KE400           | P6KE400C         | 324.0                                   | 360.0                                      | 440.0 | 1.0  | 5.0   | 574.0   | 1.05                                    | 0.110   |
| P6KE400A          | P6KE400CA        | 342.0                                   | 380.0                                      | 420.0 | 1.0  | 5.0   | 548.0   | 1.10                                    | 0.110   |
| P6KE440           | P6KE440C         | 356.0                                   | 396.0                                      | 484.0 | 1.0  | 5.0   | 631.0   | 0.95                                    | 0.110   |
| P6KE440A          | P6KE440CA        | 376.0                                   | 418.0                                      | 462.0 | 1.0  | 5.0   | 602.0   | 1.00                                    | 0.110   |

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