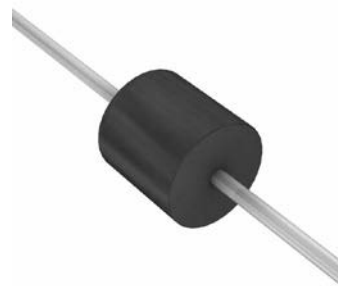


Power TVS in DO-15

Features

- 600Watts peak pulse power (10/1000μs)
- Class passivated junction
- High accuracy, 5% tolerance
- Uni and Bidirectional unit
- Low clamping voltage
- Low Leakage current
- Very fast response time



Mechanical Data

- **Case:** DO-15 (plastic package).
Lead free; RoHS compliant
- **Molding Compound Flammability Rating:**
UL 94 V-0
- **Terminals:** High temperature soldering guaranteed:
260 °C/10 sec. at terminals

Applications

- Computers
- Telecom systems
- Industrial equipments
- Consumer electronic applications
- Other VCC bus and I/O interfaces

Absolute Maximum Ratings

Ratings at 25 °C, ambient temperature unless otherwise specified

| Parameter | Symbols | Value | Unit |
|---|-----------------------------------|----------------|------|
| Peak power dissipation with a 10/1000us waveform ⁽¹⁾ (Fig. 1) | P _{PPM} | 600 | W |
| Peak pulse current with a 10/1000us waveform ⁽¹⁾ | I _{PPM} | See Next Table | A |
| Steady state power dissipation at T _L =75°C, lead lengths 0.375" (9.5mm) ⁽²⁾ | P _{M(AV)} | 5.0 | W |
| Peak forward surge current 8.3ms single half sine-wave ⁽³⁾ | I _{FSM} | 100 | A |
| Maximum instantaneous forward voltage @ 50A for unidirectional only ⁽⁴⁾ | V _F | 3.5/5.0 | V |
| Typical thermal resistance junction-to-lead | R _{θJL} | 20 | °C/W |
| Typical thermal resistance junction-to-ambient | R _{θJA} | 75 | °C/W |
| Operating junction and storage temperature range | T _J , T _{STG} | -55 to +150 | °C |

Notes:1.Non-repetitive current pulse, per Fig.3 and derated above T_A=25°C per Fig. 2

2. Mounted on copper pad area of 1.6 x 1.6" (40 x 40mm) per Fig. 5

3. Meas ed on 8.3ms single half sine-wave or equivalent square wave, duty cycle = 4 pulses per minute maximum

4. V_F=3.5 V for devices of V_(BR) < 220V, and V_F=5.0 Volt max. for devices of V_(BR)>220V

Electrical Characteristics

(T_A=25°C, Unless otherwise specified.)

| Part Number | Direction | Breakdown voltage V _(BR) (Volts) ⁽¹⁾ | | Test current at I _T (mA) | Stand-off voltage V _{WM} (Volts) | Maximum reverse leakage at V _{WM} I _D ⁽³⁾ (uA) | Maximum peak pulse current I _{PPM} ⁽²⁾ (A) | Maximum clamping voltage at I _{PPM} V _C (Volts) | Maximum temperature coefficient of V _{BR} (% /°C) |
|-------------|-----------|---|------|--|--|--|---|--|---|
| | | Min. | Max. | | | | | | |
| P6KE6.8A | Uni-Dir | 6.45 | 7.14 | 10 | 5.80 | 1000 | 57.1 | 10.5 | 0.057 |
| P6KE6.8CA | Bi-Dir | 6.45 | 7.14 | 10 | 5.80 | 1000 | 57.1 | 10.5 | 0.057 |
| P6KE7.5A | Uni-Dir | 7.13 | 7.88 | 10 | 6.40 | 500 | 53.1 | 11.3 | 0.061 |
| P6KE7.5CA | Bi-Dir | 7.13 | 7.88 | 10 | 6.40 | 500 | 53.1 | 11.3 | 0.061 |
| P6KE8.2A | Uni-Dir | 7.79 | 8.61 | 10 | 7.02 | 200 | 49.6 | 12.1 | 0.065 |
| P6KE8.2CA | Bi-Dir | 7.79 | 8.61 | 10 | 7.02 | 200 | 49.6 | 12.1 | 0.065 |
| P6KE9.1A | Uni-Dir | 8.65 | 9.55 | 1.0 | 7.78 | 50 | 44.8 | 13.4 | 0.068 |
| P6KE9.1CA | Bi-Dir | 8.65 | 9.55 | 1.0 | 7.78 | 50 | 44.8 | 13.4 | 0.068 |
| P6KE10A | Uni-Dir | 9.50 | 10.5 | 1.0 | 8.55 | 10 | 41.4 | 14.5 | 0.073 |
| P6KE10CA | Bi-Dir | 9.50 | 10.5 | 1.0 | 8.55 | 10 | 41.4 | 14.5 | 0.073 |
| P6KE11A | Uni-Dir | 10.5 | 11.6 | 1.0 | 9.40 | 5.0 | 38.5 | 15.6 | 0.075 |
| P6KE11CA | Bi-Dir | 10.5 | 11.6 | 1.0 | 9.40 | 5.0 | 38.5 | 15.6 | 0.075 |
| P6KE12A | Uni-Dir | 11.4 | 12.6 | 1.0 | 10.2 | 5.0 | 35.9 | 16.7 | 0.078 |
| P6KE12CA | Bi-Dir | 11.4 | 12.6 | 1.0 | 10.2 | 5.0 | 35.9 | 16.7 | 0.078 |
| P6KE13A | Uni-Dir | 12.4 | 13.7 | 1.0 | 11.1 | 5.0 | 33.0 | 18.2 | 0.081 |
| P6KE13CA | Bi-Dir | 12.4 | 13.7 | 1.0 | 11.1 | 5.0 | 33.0 | 18.2 | 0.081 |
| P6KE15A | Uni-Dir | 14.3 | 15.8 | 1.0 | 12.8 | 1.0 | 28.3 | 21.2 | 0.084 |
| P6KE15CA | Bi-Dir | 14.3 | 15.8 | 1.0 | 12.8 | 1.0 | 28.3 | 21.2 | 0.084 |
| P6KE16A | Uni-Dir | 15.2 | 16.8 | 1.0 | 13.6 | 1.0 | 26.7 | 22.5 | 0.086 |
| P6KE16CA | Bi-Dir | 15.2 | 16.8 | 1.0 | 13.6 | 1.0 | 26.7 | 22.5 | 0.086 |
| P6KE18A | Uni-Dir | 17.1 | 18.9 | 1.0 | 15.3 | 1.0 | 23.8 | 25.2 | 0.088 |
| P6KE18CA | Bi-Dir | 17.1 | 18.9 | 1.0 | 15.3 | 1.0 | 23.8 | 25.2 | 0.088 |
| P6KE20A | Uni-Dir | 19.0 | 21.0 | 1.0 | 17.1 | 1.0 | 21.7 | 27.7 | 0.090 |
| P6KE20CA | Bi-Dir | 19.0 | 21.0 | 1.0 | 17.1 | 1.0 | 21.7 | 27.7 | 0.090 |
| P6KE22A | Uni-Dir | 20.9 | 23.1 | 1.0 | 18.8 | 1.0 | 19.6 | 30.6 | 0.092 |
| P6KE22CA | Bi-Dir | 20.9 | 23.1 | 1.0 | 18.8 | 1.0 | 19.6 | 30.6 | 0.092 |
| P6KE24A | Uni-Dir | 22.8 | 25.2 | 1.0 | 20.5 | 1.0 | 18.1 | 33.2 | 0.094 |
| P6KE24CA | Bi-Dir | 22.8 | 25.2 | 1.0 | 20.5 | 1.0 | 18.1 | 33.2 | 0.094 |
| P6KE27A | Uni-Dir | 25.7 | 28.4 | 1.0 | 23.1 | 1.0 | 16.0 | 37.5 | 0.096 |
| P6KE27CA | Bi-Dir | 25.7 | 28.4 | 1.0 | 23.1 | 1.0 | 16.0 | 37.5 | 0.096 |
| P6KE30A | Uni-Dir | 28.5 | 31.5 | 1.0 | 25.6 | 1.0 | 14.5 | 41.4 | 0.097 |
| P6KE30CA | Bi-Dir | 28.5 | 31.5 | 1.0 | 25.6 | 1.0 | 14.5 | 41.4 | 0.097 |
| P6KE33A | Uni-Dir | 31.4 | 34.7 | 1.0 | 28.2 | 1.0 | 13.1 | 45.7 | 0.098 |
| P6KE33CA | Bi-Dir | 31.4 | 34.7 | 1.0 | 28.2 | 1.0 | 13.1 | 45.7 | 0.098 |
| P6KE36A | Uni-Dir | 34.2 | 37.8 | 1.0 | 30.8 | 1.0 | 12.0 | 49.9 | 0.099 |
| P6KE36CA | Bi-Dir | 34.2 | 37.8 | 1.0 | 30.8 | 1.0 | 12.0 | 49.9 | 0.099 |
| P6KE39A | Uni-Dir | 37.1 | 41.0 | 1.0 | 33.3 | 1.0 | 11.1 | 53.9 | 0.100 |
| P6KE39CA | Bi-Dir | 37.1 | 41.0 | 1.0 | 33.3 | 1.0 | 11.1 | 53.9 | 0.100 |
| P6KE43A | Uni-Dir | 40.9 | 45.2 | 1.0 | 36.8 | 1.0 | 10.1 | 59.3 | 0.101 |
| P6KE43CA | Bi-Dir | 40.9 | 45.2 | 1.0 | 36.8 | 1.0 | 10.1 | 59.3 | 0.101 |
| P6KE47A | Uni-Dir | 44.7 | 49.4 | 1.0 | 40.2 | 1.0 | 9.3 | 64.8 | 0.101 |

| Part Number | Direction | Breakdown voltage V_{BR} (Volts) ⁽¹⁾ | | Test current at I_T (mA) | Stand-off voltage V_{WM} (Volts) | Maximum reverse leakage at V_{WM} $I_D^{(3)}$ (uA) | Maximum peak pulse current $I_{PPM}^{(2)}$ (A) | Maximum clamping voltage at I_{PPM} V_C (Volts) | Maximum temperature coefficient of V_{BR} (%/°C) |
|-------------|-----------|---|------|----------------------------|------------------------------------|--|--|---|--|
| | | Min. | Max. | | | | | | |
| P6KE47CA | Bi-Dir | 44.7 | 49.4 | 1.0 | 40.2 | 1.0 | 9.3 | 64.8 | 0.101 |
| P6KE51A | Uni-Dir | 48.5 | 53.6 | 1.0 | 43.6 | 1.0 | 8.6 | 70.1 | 0.102 |
| P6KE51CA | Bi-Dir | 48.5 | 53.6 | 1.0 | 43.6 | 1.0 | 8.6 | 70.1 | 0.102 |
| P6KE56A | Uni-Dir | 53.2 | 58.8 | 1.0 | 47.8 | 1.0 | 7.8 | 77.0 | 0.103 |
| P6KE56CA | Bi-Dir | 53.2 | 58.8 | 1.0 | 47.8 | 1.0 | 7.8 | 77.0 | 0.103 |
| P6KE62A | Uni-Dir | 58.9 | 65.1 | 1.0 | 53.0 | 1.0 | 7.1 | 85.0 | 0.104 |
| P6KE62CA | Bi-Dir | 58.9 | 65.1 | 1.0 | 53.0 | 1.0 | 7.1 | 85.0 | 0.104 |
| P6KE68A | Uni-Dir | 64.6 | 71.4 | 1.0 | 58.1 | 1.0 | 6.5 | 92.0 | 0.104 |
| P6KE68CA | Bi-Dir | 64.6 | 71.4 | 1.0 | 58.1 | 1.0 | 6.5 | 92.0 | 0.104 |
| P6KE75A | Uni-Dir | 71.3 | 78.8 | 1.0 | 64.1 | 1.0 | 5.8 | 103 | 0.105 |
| P6KE75CA | Bi-Dir | 71.3 | 78.8 | 1.0 | 64.1 | 1.0 | 5.8 | 103 | 0.105 |
| P6KE82A | Uni-Dir | 77.9 | 86.1 | 1.0 | 70.1 | 1.0 | 5.3 | 113 | 0.105 |
| P6KE82CA | Bi-Dir | 77.9 | 86.1 | 1.0 | 70.1 | 1.0 | 5.3 | 113 | 0.105 |
| P6KE91A | Uni-Dir | 86.5 | 95.5 | 1.0 | 77.8 | 1.0 | 4.8 | 125 | 0.106 |
| P6KE91CA | Bi-Dir | 86.5 | 95.5 | 1.0 | 77.8 | 1.0 | 4.8 | 125 | 0.106 |
| P6KE100A | Uni-Dir | 95.0 | 105 | 1.0 | 85.5 | 1.0 | 4.4 | 137 | 0.106 |
| P6KE100CA | Bi-Dir | 95.0 | 105 | 1.0 | 85.5 | 1.0 | 4.4 | 137 | 0.106 |
| P6KE110A | Uni-Dir | 105 | 116 | 1.0 | 94.0 | 1.0 | 3.9 | 152 | 0.107 |
| P6KE110CA | Bi-Dir | 105 | 116 | 1.0 | 94.0 | 1.0 | 3.9 | 152 | 0.107 |
| P6KE120A | Uni-Dir | 114 | 126 | 1.0 | 102 | 1.0 | 3.6 | 165 | 0.107 |
| P6KE120CA | Bi-Dir | 114 | 126 | 1.0 | 102 | 1.0 | 3.6 | 165 | 0.107 |
| P6KE130A | Uni-Dir | 124 | 137 | 1.0 | 111 | 1.0 | 3.4 | 179 | 0.107 |
| P6KE130CA | Bi-Dir | 124 | 137 | 1.0 | 111 | 1.0 | 3.4 | 179 | 0.107 |
| P6KE150A | Uni-Dir | 143 | 158 | 1.0 | 128 | 1.0 | 2.9 | 207 | 0.108 |
| P6KE150CA | Bi-Dir | 143 | 158 | 1.0 | 128 | 1.0 | 2.9 | 207 | 0.108 |
| P6KE160A | Uni-Dir | 152 | 168 | 1.0 | 136 | 1.0 | 2.7 | 219 | 0.108 |
| P6KE160CA | Bi-Dir | 152 | 168 | 1.0 | 136 | 1.0 | 2.7 | 219 | 0.108 |
| P6KE170A | Uni-Dir | 162 | 179 | 1.0 | 145 | 1.0 | 2.6 | 234 | 0.108 |
| P6KE170CA | Bi-Dir | 162 | 179 | 1.0 | 145 | 1.0 | 2.6 | 234 | 0.108 |
| P6KE180A | Uni-Dir | 171 | 189 | 1.0 | 154 | 1.0 | 2.4 | 246 | 0.108 |
| P6KE180CA | Bi-Dir | 171 | 189 | 1.0 | 154 | 1.0 | 2.4 | 246 | 0.108 |
| P6KE200A | Uni-Dir | 190 | 210 | 1.0 | 171 | 1.0 | 2.2 | 274 | 0.108 |
| P6KE200CA | Bi-Dir | 190 | 210 | 1.0 | 171 | 1.0 | 2.2 | 274 | 0.108 |
| P6KE220A | Uni-Dir | 209 | 231 | 1.0 | 185 | 1.0 | 1.8 | 328 | 0.108 |
| P6KE220CA | Bi-Dir | 209 | 231 | 1.0 | 185 | 1.0 | 1.8 | 328 | 0.108 |
| P6KE250A | Uni-Dir | 237 | 263 | 1.0 | 214 | 1.0 | 1.7 | 344 | 0.110 |
| P6KE250CA | Bi-Dir | 237 | 263 | 1.0 | 214 | 1.0 | 1.7 | 344 | 0.110 |
| P6KE300A | Uni-Dir | 285 | 315 | 1.0 | 256 | 1.0 | 1.4 | 414 | 0.110 |
| P6KE300CA | Bi-Dir | 285 | 315 | 1.0 | 256 | 1.0 | 1.4 | 414 | 0.110 |
| P6KE350A | Uni-Dir | 333 | 368 | 1.0 | 300 | 1.0 | 1.2 | 482 | 0.110 |
| P6KE350CA | Bi-Dir | 333 | 368 | 1.0 | 300 | 1.0 | 1.2 | 482 | 0.110 |
| P6KE400A | Uni-Dir | 380 | 420 | 1.0 | 342 | 1.0 | 1.1 | 548 | 0.110 |
| P6KE400CA | Bi-Dir | 380 | 420 | 1.0 | 342 | 1.0 | 1.1 | 548 | 0.110 |
| P6KE440A | Uni-Dir | 418 | 462 | 1.0 | 376 | 1.0 | 1.0 | 602 | 0.110 |
| P6KE440CA | Bi-Dir | 418 | 462 | 1.0 | 376 | 1.0 | 1.0 | 602 | 0.110 |

| Part Number | Direction | Breakdown voltage $V_{(BR)}$ (Volts) ⁽¹⁾ | | Test current at I_T (mA) | Stand-off voltage V_{WM} (Volts) | Maximum reverse leakage at V_{WM} $I_D^{(3)}$ (uA) | Maximum peak pulse current $I_{PPM}^{(2)}$ (A) | Maximum clamping voltage at I_{PPM} V_C (Volts) | Maximum temperature coefficient of V_{BR} (%/°C) |
|-------------|-----------|---|-------|----------------------------|------------------------------------|--|--|---|--|
| | | Min. | Max. | | | | | | |
| P6KE480A | Uni-Dir | 456 | 504 | 1.0 | 408 | 1.0 | 0.9 | 658 | 0.110 |
| P6KE480CA | Bi-Dir | 456 | 504 | 1.0 | 408 | 1.0 | 0.9 | 658 | 0.110 |
| P6KE510A | Uni-Dir | 485 | 535 | 1.0 | 434 | 1.0 | 0.9 | 698 | 0.110 |
| P6KE510CA | Bi-Dir | 485 | 535 | 1.0 | 434 | 1.0 | 0.9 | 698 | 0.110 |
| P6KE530A | Uni-Dir | 503.5 | 556.5 | 1.0 | 450 | 1.0 | 0.8 | 725 | 0.110 |
| P6KE530CA | Bi-Dir | 503.5 | 556.5 | 1.0 | 450 | 1.0 | 0.8 | 725 | 0.110 |
| P6KE540A | Uni-Dir | 513 | 567 | 1.0 | 459 | 1.0 | 0.8 | 740 | 0.110 |
| P6KE540CA | Bi-Dir | 513 | 567 | 1.0 | 459 | 1.0 | 0.8 | 740 | 0.110 |
| P6KE550A | Uni-Dir | 522.5 | 577.5 | 1.0 | 467 | 1.0 | 0.8 | 760 | 0.110 |
| P6KE550CA | Bi-Dir | 522.5 | 577.5 | 1.0 | 467 | 1.0 | 0.8 | 760 | 0.110 |

- Notes: 1. $V_{(BR)}$ measured after I_T applied for 300us, I_T =square wave pulse or equivalent
 2. Surge current waveform per Fig. 3 and derate per Fig. 2
 3. For bidirectional types with V_{WM} of 10 volts and less, the I_D limit is doubled
 4. All terms and symbols are consistent with ANSI/IEEE C62.35
 5. For parts without A, the V_{BR} is $\pm 10\%$

Typical Characteristics ($T_{amb} = 25^\circ\text{C}$ unless otherwise specified)

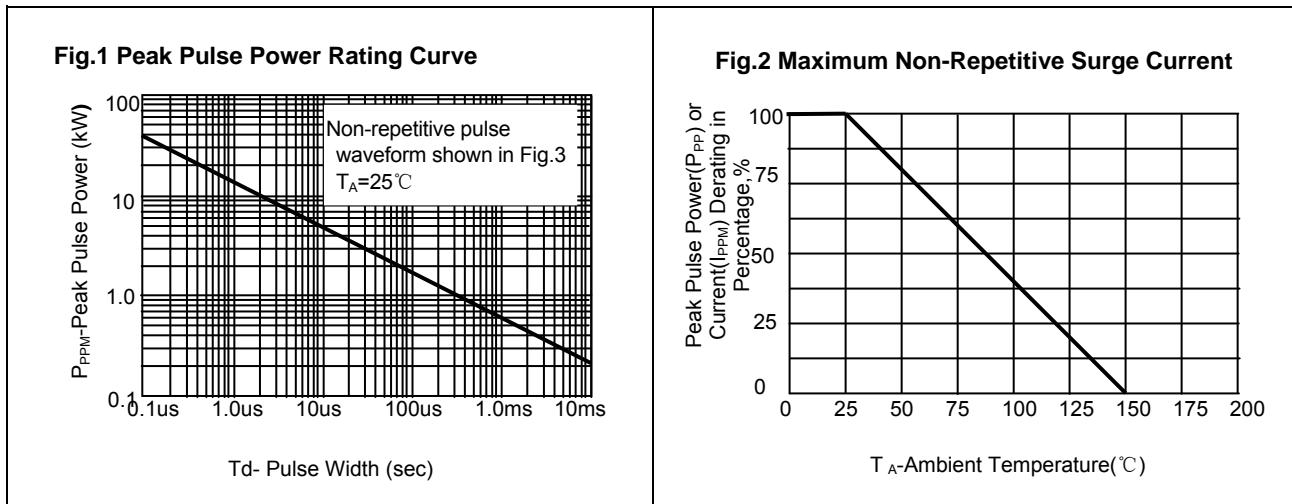


Fig.3 Typical Forward Characteristics

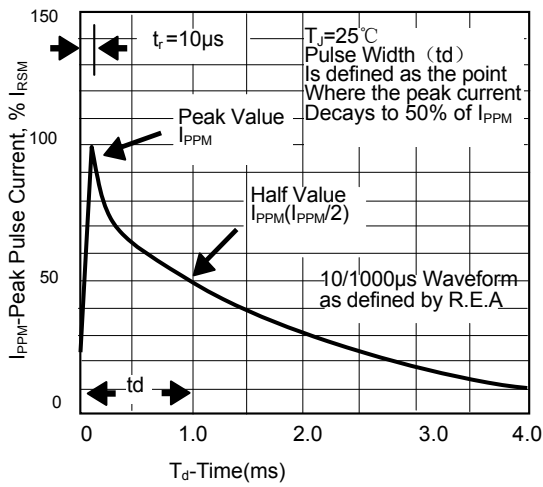


Fig.4 Typ. Junction Capacitance Uni-Directional



Fig.5 Steady State Power Derating Curve

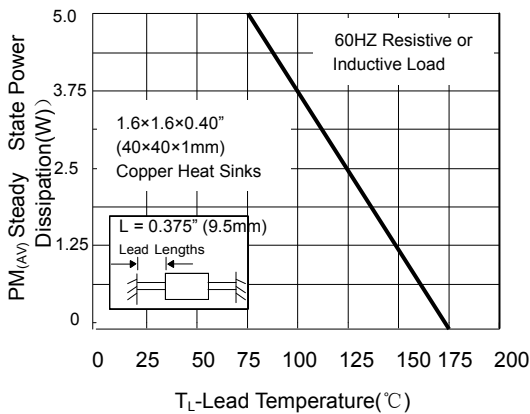


Fig.6 Max. Non-Repetitive Forward Surge Curren Uni-Directional Only

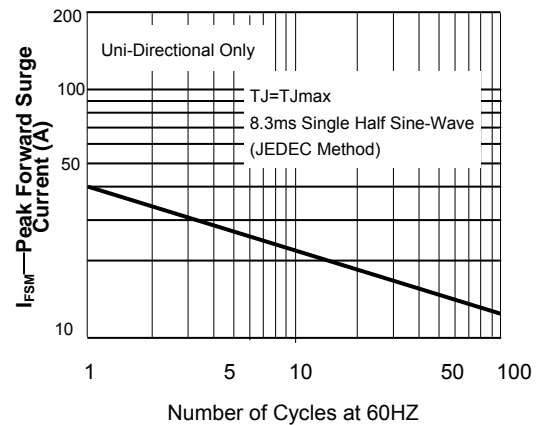
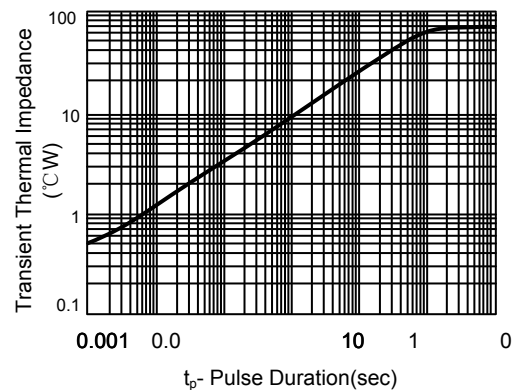


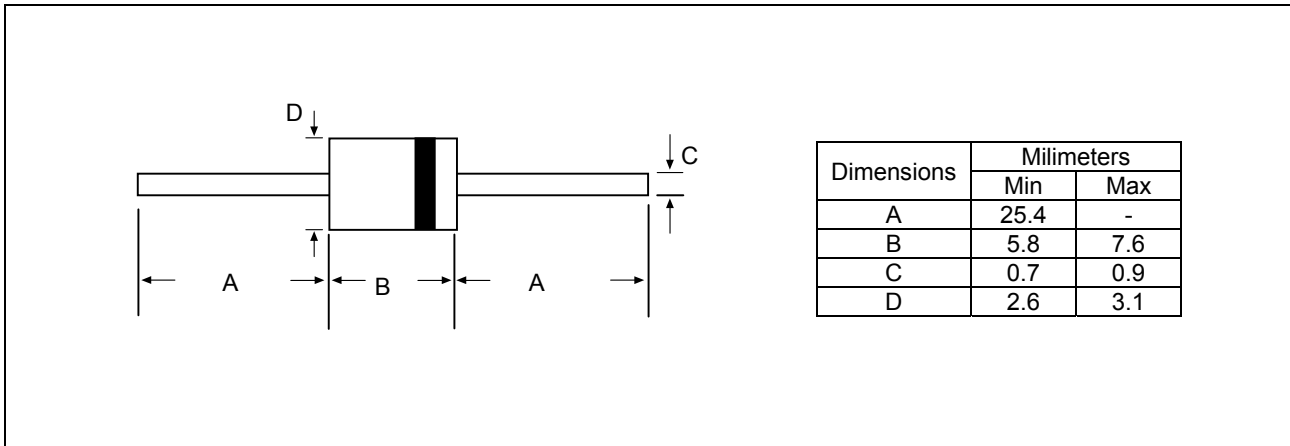
Fig.7 Typical Reverse Leakage Characteristics



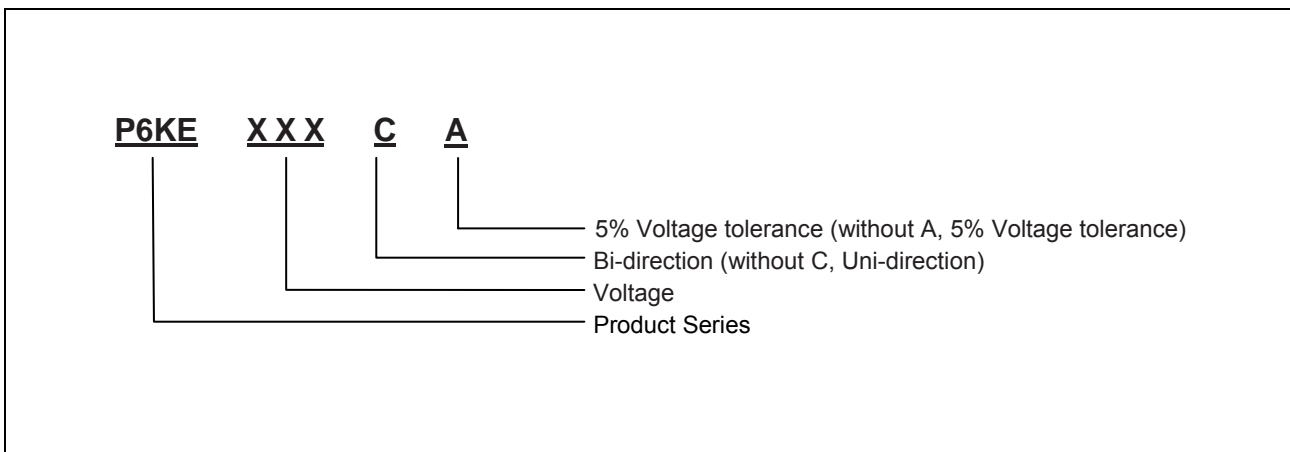
Fig.8 Typ. Transient Thermal Impedance



Package Dimensions



Part number system



Ordering information

| Order code | Package | Packaging option | Base quantity | Packaging specification |
|-------------|---------|------------------|---------------|-------------------------|
| P6KExxA(CA) | DO-15 | Tape and BOX | 3000pcs | EIA STD RS-481 |

Reision history

| Date | Revision | Changes |
|-------------|----------|-----------------|
| 23-May-2012 | 1.0 | Initial release |

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