

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

Notes:1.Non-repetitive current pulse, per Fig.3 and derated above T<sub>A</sub>=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<sub>F</sub>=3.5 V for devices of V<sub>(BR)</sub> < 220V, and V<sub>F</sub>=5.0 Volt max. for devices of V<sub>(BR)</sub>>220V

## Electrical Characteristics

(T<sub>A</sub>=25°C, Unless otherwise specified.)

| Part Number | Direction | Breakdown voltage<br>V <sub>(BR)</sub> (Volts) <sup>(1)</sup> |      | Test current at<br>I <sub>T</sub> (mA) | Stand-off voltage<br>V <sub>WM</sub> (Volts) | Maximum reverse leakage at V <sub>WM</sub><br>I <sub>D</sub> <sup>(3)</sup> (uA) | Maximum peak pulse current<br>I <sub>PPM</sub> <sup>(2)</sup> (A) | Maximum clamping voltage at I <sub>PPM</sub><br>V <sub>C</sub> (Volts) | Maximum temperature coefficient of V <sub>BR</sub><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) <sup>(1)</sup> |      | 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  |

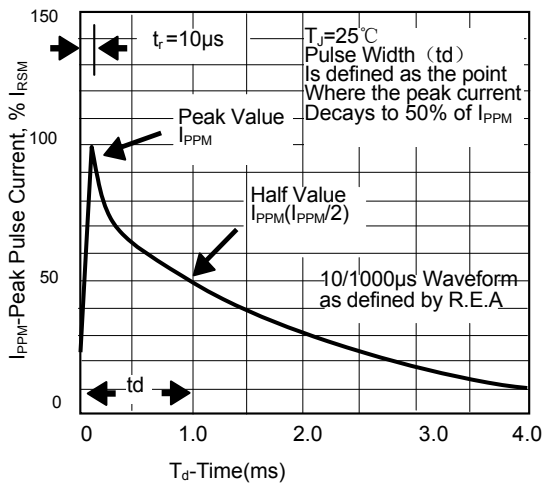
| Part Number | Direction | Breakdown voltage $V_{(BR)}$ (Volts) <sup>(1)</sup> |       | Test current at $I_T$ (mA) | Stand-off voltage $V_{WM}$ (Volts) | Maximum reverse leakage at $V_{WM}$ $I_D^{(3)}$ (uA) | Maximum peak pulse current $I_{PPM}^{(2)}$ (A) | Maximum clamping voltage at $I_{PPM}$ $V_C$ (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)



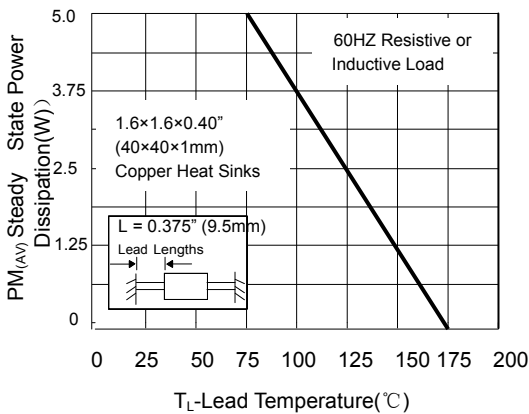
**Fig.3 Typical Forward Characteristics**



**Fig.4 Typ. Junction Capacitance Uni-Directional**



**Fig.5 Steady State Power Derating Curve**



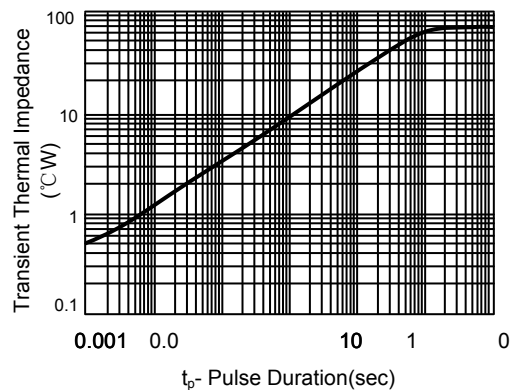
**Fig.6 Max. Non-Repetitive Forward Surge Curren Uni-Directional Only**



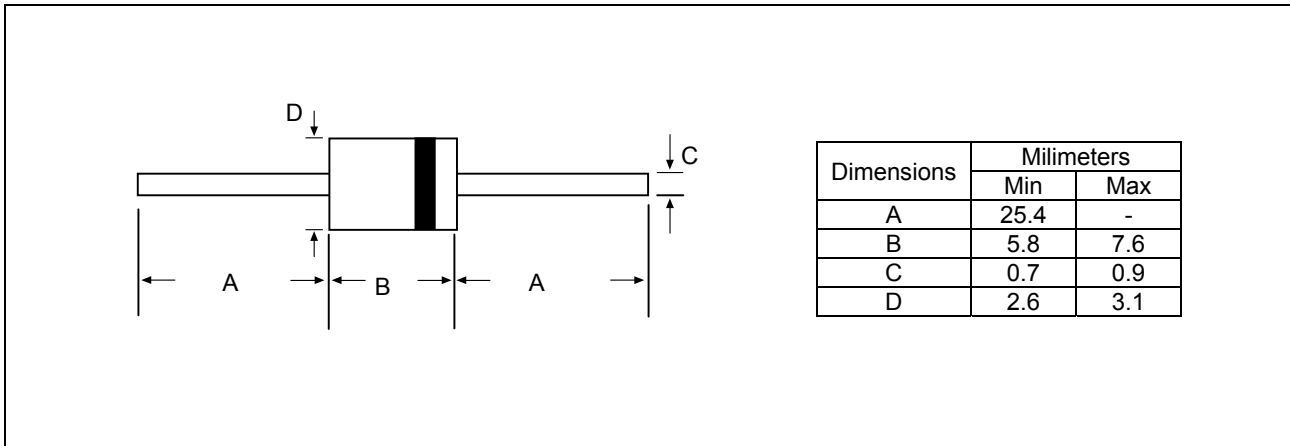
**Fig.7 Typical Reverse Leakage Characteristics**



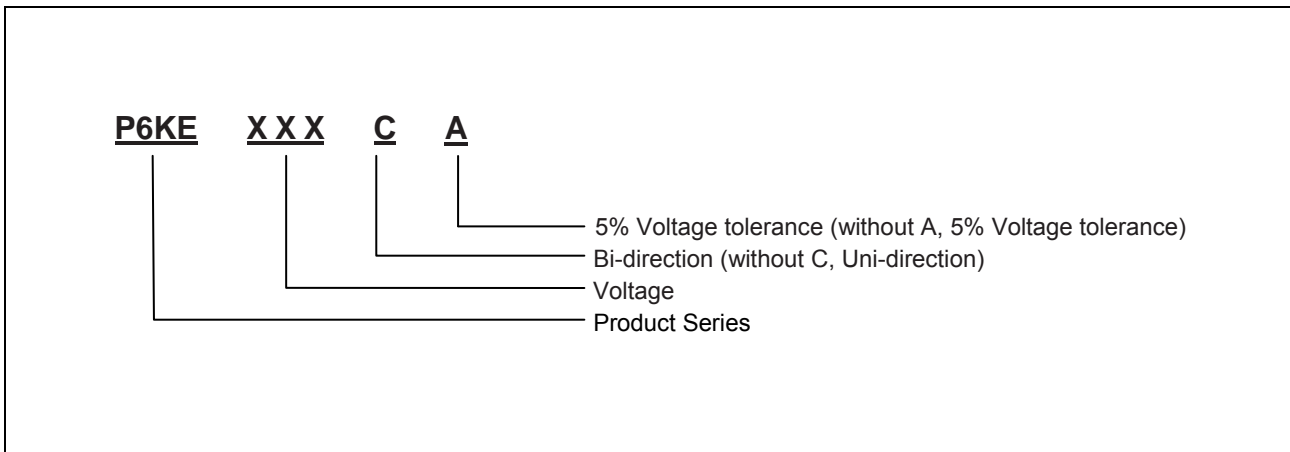
**Fig.8 Typ. Transient Thermal Impedance**



## 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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