



Transient Voltage Suppressors
Peak Pulse Power 600W Breakdown Voltage 6.8V to 550V

P6KE6.8 thru P6KE550CA



Descriptions

The P6KE TVS series is a low cost commercial product for use in applications where large voltage transients can permanently damage voltage sensitive components.

The P6KE series device types are designed in a small package size where power and space is a consideration. They are characterized by their high surge capability, extremely fast response time, and low impedance, RON. Because of the unpredictable nature of transients, and the variation of the impedance with respect to these transients, impedance is not specified as a parametric value. However, a minimum voltage at low current conditions (BV) and a maximum clamping voltage (Vc) at a maximum peak pulse current is specified.

In some instances, the thermal effect (see Vc clamping voltage) may be responsible for 50% to 70% of the observed voltage differential when subjected to high current pulses for several duty cycles, thus making a maximum impedance specification insignificant.

In case of a severe current overload or abnormal transient beyond the maximum ratings, the Transient Voltage Suppressor will initially fail 'short' thus tripping the system's circuit breaker or fuse while protecting the entire circuit. Curves depicting clamping voltage vs. various current pulses are available from the factory. Extended power curves vs. pulse time are also available.

Features

- Plastic package has the UL flammability classification 94V-0
- Glass passivated junction
- 600W peak pulse power capability with a 10/1000 μ s waveform, repetition rate (duty cycle) : 0.01%
- Excellent clamping capability
- Low incremental surge resistance
- Very fast response time
- High temperature soldering guaranteed : 265°C/10 seconds, 0.375"(9.5mm) lead length, 5lbs. (2.3kg) tension

Mechanical Characteristics:

- Case: JEDEC DO-204AC(DO-15) molded plastic body over passivated junction
- Terminals: Tin plated axial leads, solderable per MIL-STD-750, method 2026
- Polarity: For unidirectional types, the color band denotes the cathode, which is positive with respect to the anode under normal TVS operation
- Mounting position: Any
- Weight : 0.015oz., 0.4grams

Devices for bidirectional applications

For bi-directional devices, use suffix C or CA for types P6KE6.8 through P6KE440 (e.g. P6KE6.8C or P6KE6.8CA). Electrical characteristics apply in both directions.



Maximum Ratings and Characteristics($T_A=25^{\circ}C$, unless otherwise noted)

| Parameter | Symbol | Value | Unit |
|--|----------------------------------|----------------------|---------------|
| Peak power dissipation with a 10/1000 μ s waveform (Fig. 1) | PPPM | Minimum 600 (Note 1) | W |
| Peak pulse current with a 10/1000 μ s waveform (Note 1) | IPPM | See next table | A |
| Steady state power dissipation at $T_L=75^{\circ}C$, lead length 0.375" (0.95mm) (Note 2) | PM(AV) | 5 | W |
| Peak forward surge current, 8.3ms single half sine wave (Note 3) | IFSM | 100 | A |
| Maximum instantaneous forward voltage at 50A for unidirectional only (Note 4) | V _F | 3.5/5.0 | V |
| Typical thermal resistance, junction-to-lead | R θ JL | 20 | $^{\circ}C/W$ |
| Typical thermal resistance, junction-to-ambient | R θ JA | 75 | $^{\circ}C/W$ |
| Operating junction and storage temperature range | T _J ;T _{STG} | -55 ~ +150 | $^{\circ}C$ |

- Notes : 1.Non-repetitive current pulse, per Fig. 3 and derated above $T_A=25^{\circ}C$ per Fig. 2
 2.Mounted on copper pad area of 1.6"×1.6" (40mm×40mm) per Fig. 5
 3.Measured on 8.3ms single half sine-wave or equivalent square wave, duty cycle=4 pulses per minute maximum
 4.V_F=3.5V for devices of V(BR)<220V, and V_F=5V maximum for devices of V(BR)>220V

Electrical Characteristics (Ratings at 25 $^{\circ}C$ ambient temperature, unless otherwise noted)

| Device | Breakdown Voltage V(BR) (V) ¹ | | Test current at I _T (mA) | Standoff voltage V _{WM} (V) | Maximum reverse leakage at V _{WM} I _D ³ (μ A) | Maximum peak pulse Current I _{PPM} ² (A) | Maximum clamping voltage at I _{PPM} V _C (V) | Maximum temperature coefficient of V(BR) (%/ $^{\circ}C$) |
|----------|--|------|-------------------------------------|--------------------------------------|---|--|---|--|
| | Min | Max | | | | | | |
| P6KE6.8 | 6.12 | 7.48 | 10 | 5.50 | 1000 | 55.6 | 10.8 | 0.057 |
| P6KE6.8A | 6.45 | 7.14 | 10 | 5.80 | 1000 | 57.1 | 10.5 | 0.057 |
| P6KE7.5 | 6.75 | 8.25 | 10 | 6.05 | 500 | 51.3 | 11.7 | 0.061 |
| P6KE7.5A | 7.13 | 7.88 | 10 | 6.40 | 500 | 53.1 | 11.3 | 0.061 |
| P6KE8.2 | 7.38 | 9.02 | 10 | 6.63 | 200 | 48.0 | 12.5 | 0.065 |
| P6KE8.2A | 7.79 | 8.61 | 10 | 7.02 | 200 | 49.6 | 12.1 | 0.065 |
| P6KE9.1 | 8.19 | 10.0 | 1.0 | 7.37 | 50 | 43.5 | 13.8 | 0.068 |
| P6KE9.1A | 8.65 | 9.55 | 1.0 | 7.78 | 50 | 44.8 | 13.4 | 0.068 |
| P6KE10 | 9.00 | 11.0 | 1.0 | 8.10 | 10 | 40.0 | 15.0 | 0.073 |
| P6KE10A | 9.50 | 10.5 | 1.0 | 8.55 | 10 | 41.4 | 14.5 | 0.073 |
| P6KE11 | 9.90 | 12.1 | 1.0 | 8.92 | 5.0 | 37.0 | 16.2 | 0.075 |
| P6KE11A | 10.5 | 11.6 | 1.0 | 9.40 | 5.0 | 38.5 | 15.6 | 0.075 |
| P6KE12 | 10.8 | 13.2 | 1.0 | 9.72 | 5.0 | 34.7 | 17.3 | 0.076 |
| P6KE12A | 11.4 | 12.6 | 1.0 | 10.2 | 5.0 | 35.9 | 16.7 | 0.078 |
| P6KE13 | 11.7 | 14.3 | 1.0 | 10.5 | 5.0 | 31.6 | 19.0 | 0.081 |
| P6KE13A | 12.4 | 13.7 | 1.0 | 11.1 | 5.0 | 33.0 | 18.2 | 0.081 |
| P6KE15 | 13.5 | 16.5 | 1.0 | 12.1 | 1.0 | 27.3 | 22.0 | 0.084 |
| P6KE15A | 14.3 | 15.8 | 1.0 | 12.8 | 1.0 | 28.3 | 21.2 | 0.084 |
| P6KE16 | 14.4 | 17.6 | 1.0 | 12.9 | 1.0 | 25.5 | 23.5 | 0.086 |
| P6KE16A | 15.2 | 16.8 | 1.0 | 13.6 | 1.0 | 26.7 | 22.5 | 0.086 |



Electrical Characteristics(Cont.)

| Device | Breakdown Voltage $V_{(BR)}$ (V) ¹ | | Test current at I_r (mA) | Standoff voltage V_{WM} (V) | Maximum reverse leakage at V_{WM} I_{D^3} (μ A) | Maximum peak pulse Current I_{PPM^2} (A) | Maximum clamping voltage at I_{PPM} V_c (V) | Maximum temperature coefficient of $V_{(BR)}$ (%/°C) |
|----------|---|------|-------------------------------------|--|---|--|--|--|
| | Min | Max | | | | | | |
| P6KE18 | 16.2 | 19.8 | 1.0 | 14.5 | 1.0 | 22.6 | 26.5 | 0.088 |
| P6KE18A | 17.1 | 18.9 | 1.0 | 15.3 | 1.0 | 23.8 | 25.2 | 0.088 |
| P6KE20 | 18.0 | 22.0 | 1.0 | 16.2 | 1.0 | 20.6 | 29.1 | 0.090 |
| P6KE20A | 19.0 | 21.0 | 1.0 | 17.1 | 1.0 | 21.7 | 27.7 | 0.090 |
| P6KE22 | 19.8 | 24.2 | 1.0 | 17.8 | 1.0 | 18.8 | 31.9 | 0.092 |
| P6KE22A | 20.9 | 23.1 | 1.0 | 18.8 | 1.0 | 19.6 | 30.6 | 0.092 |
| P6KE24 | 21.6 | 26.4 | 1.0 | 19.4 | 1.0 | 17.3 | 34.7 | 0.094 |
| P6KE24A | 22.8 | 25.2 | 1.0 | 20.5 | 1.0 | 18.1 | 33.2 | 0.094 |
| P6KE27 | 24.3 | 29.7 | 1.0 | 21.8 | 1.0 | 15.3 | 29.1 | 0.096 |
| P6KE27A | 25.7 | 28.4 | 1.0 | 23.1 | 1.0 | 16.0 | 37.5 | 0.096 |
| P6KE30 | 27.0 | 33.0 | 1.0 | 24.3 | 1.0 | 13.8 | 43.5 | 0.097 |
| P6KE30A | 28.5 | 31.5 | 1.0 | 25.6 | 1.0 | 14.5 | 41.4 | 0.097 |
| P6KE33 | 29.7 | 36.3 | 1.0 | 26.8 | 1.0 | 12.6 | 47.7 | 0.098 |
| P6KE33A | 31.4 | 34.7 | 1.0 | 28.2 | 1.0 | 13.1 | 45.7 | 0.098 |
| P6KE36 | 32.4 | 39.6 | 1.0 | 29.1 | 1.0 | 11.5 | 52.0 | 0.099 |
| P6KE36A | 34.2 | 37.8 | 1.0 | 30.8 | 1.0 | 12.0 | 49.9 | 0.099 |
| P6KE39 | 35.1 | 42.9 | 1.0 | 31.6 | 1.0 | 10.6 | 56.4 | 0.100 |
| P6KE39A | 37.1 | 41.0 | 1.0 | 33.3 | 1.0 | 11.1 | 53.9 | 0.100 |
| P6KE43 | 38.7 | 47.3 | 1.0 | 34.8 | 1.0 | 9.7 | 61.9 | 0.101 |
| P6KE43A | 40.9 | 45.2 | 1.0 | 36.8 | 1.0 | 10.1 | 59.3 | 0.101 |
| P6KE47 | 42.3 | 51.7 | 1.0 | 38.1 | 1.0 | 8.8 | 67.8 | 0.101 |
| P6KE47A | 44.7 | 49.4 | 1.0 | 40.2 | 1.0 | 9.3 | 64.8 | 0.101 |
| P6KE51 | 45.9 | 56.1 | 1.0 | 41.3 | 1.0 | 8.2 | 73.5 | 0.102 |
| P6KE51A | 48.5 | 53.6 | 1.0 | 43.6 | 1.0 | 8.6 | 70.1 | 0.102 |
| P6KE56 | 50.4 | 61.6 | 1.0 | 45.4 | 1.0 | 7.5 | 80.5 | 0.103 |
| P6KE56A | 53.2 | 58.8 | 1.0 | 47.8 | 1.0 | 7.8 | 77.0 | 0.103 |
| P6KE62 | 55.8 | 68.2 | 1.0 | 50.2 | 1.0 | 6.7 | 89.0 | 0.104 |
| P6KE62A | 58.9 | 65.1 | 1.0 | 53.0 | 1.0 | 7.1 | 85.0 | 0.104 |
| P6KE68 | 61.2 | 74.8 | 1.0 | 55.1 | 1.0 | 6.1 | 98.0 | 0.104 |
| P6KE68A | 64.6 | 71.4 | 1.0 | 58.1 | 1.0 | 6.5 | 92.0 | 0.104 |
| P6KE75 | 67.5 | 82.5 | 1.0 | 60.7 | 1.0 | 5.6 | 108 | 0.105 |
| P6KE75A | 71.3 | 78.8 | 1.0 | 64.1 | 1.0 | 5.8 | 103 | 0.105 |
| P6KE82 | 73.8 | 90.2 | 1.0 | 66.4 | 1.0 | 5.1 | 118 | 0.105 |
| P6KE82A | 77.9 | 86.1 | 1.0 | 70.1 | 1.0 | 5.3 | 113 | 0.105 |
| P6KE91 | 81.9 | 100 | 1.0 | 73.7 | 1.0 | 4.6 | 131 | 0.106 |
| P6KE91A | 86.5 | 95.5 | 1.0 | 77.8 | 1.0 | 4.8 | 125 | 0.106 |
| P6KE100 | 90.0 | 110 | 1.0 | 81.0 | 1.0 | 4.2 | 144 | 0.106 |
| P6KE100A | 95.0 | 105 | 1.0 | 85.5 | 1.0 | 4.4 | 137 | 0.106 |

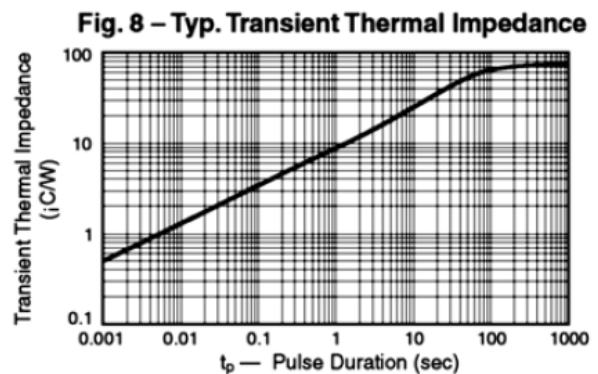
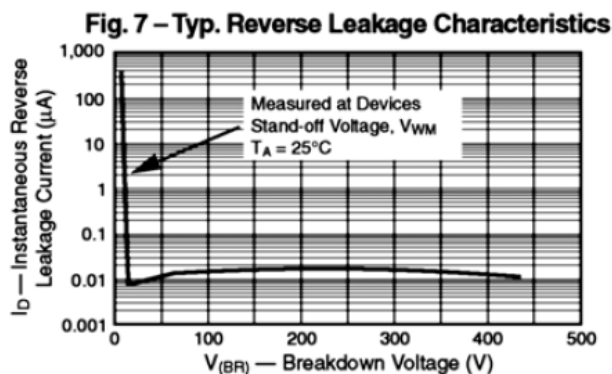
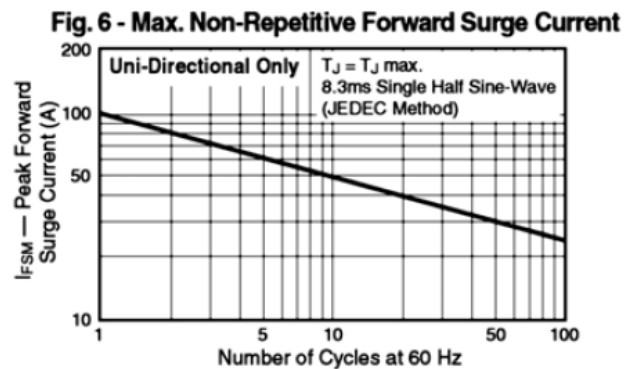
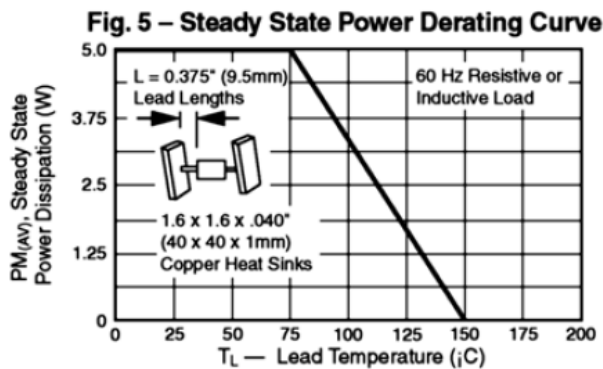
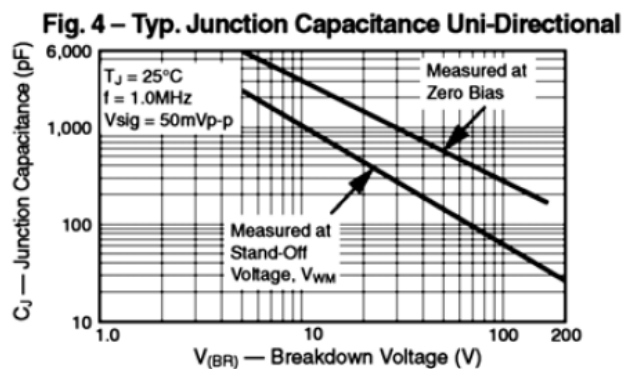
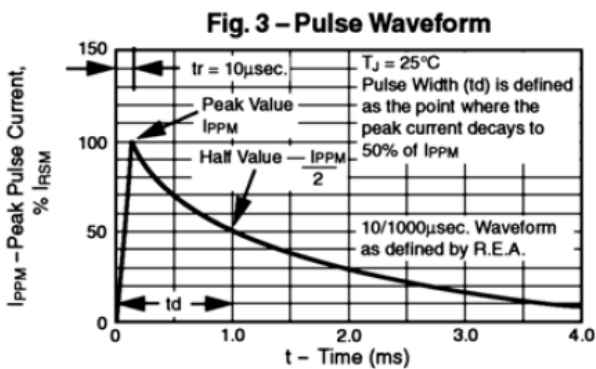
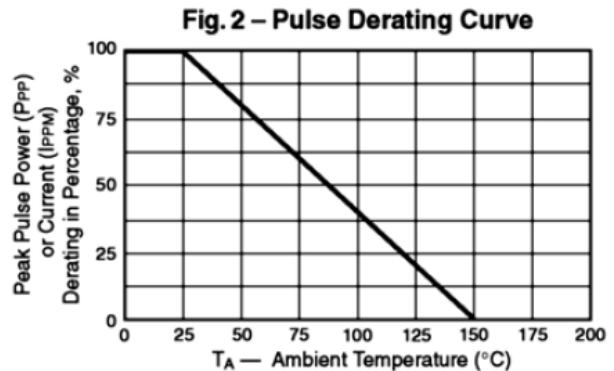
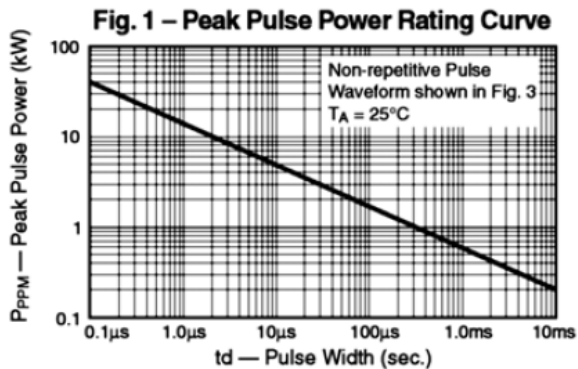


Electrical Characteristics(Cont.)

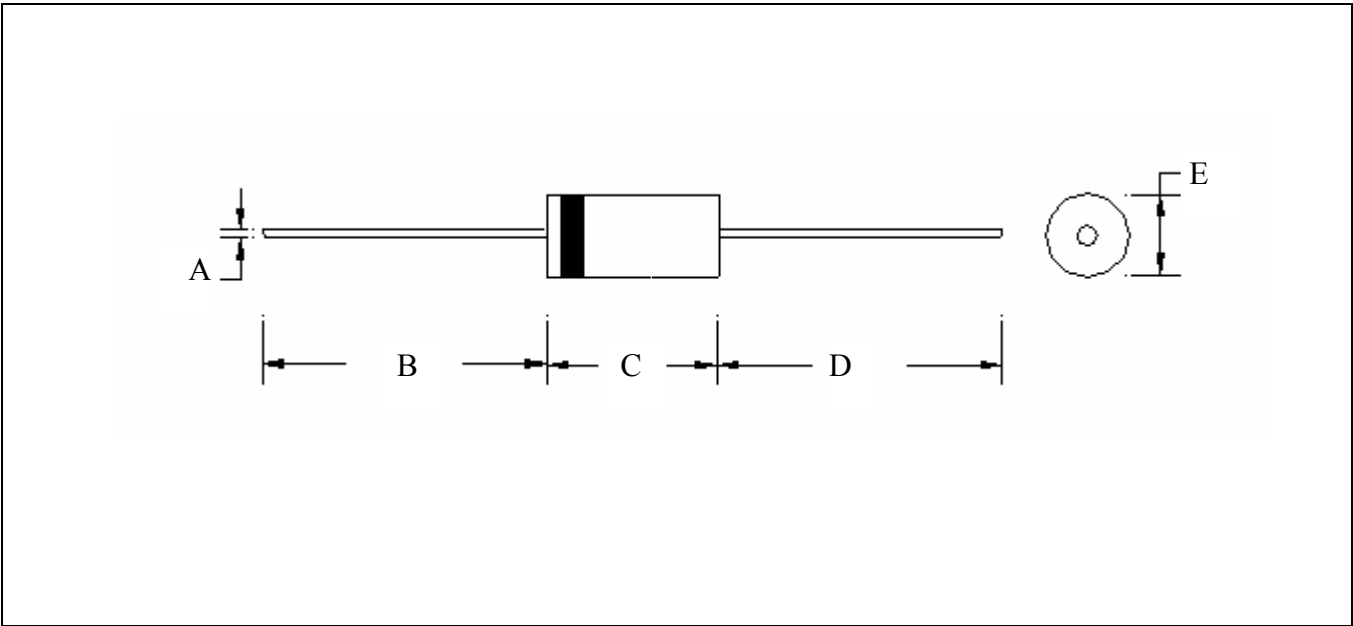
| Device | Breakdown Voltage $V_{(BR)}$ (V) ¹ | | Test current at I_T (mA) | Standoff voltage V_{WM} (V) | Maximum reverse leakage at V_{WM} I_D^3 (μ A) | Maximum peak pulse Current I_{PPM}^2 (A) | Maximum clamping voltage at I_{PPM} V_C (V) | Maximum temperature coefficient of $V_{(BR)}$ (%/°C) |
|----------|---|-------|----------------------------------|--|---|--|--|--|
| | Min | Max | | | | | | |
| P6KE110 | 99.0 | 121 | 1.0 | 89.2 | 1.0 | 3.8 | 158 | 0.107 |
| P6KE110A | 105 | 116 | 1.0 | 94.0 | 1.0 | 3.9 | 152 | 0.107 |
| P6KE120 | 108 | 132 | 1.0 | 97.2 | 1.0 | 3.5 | 173 | 0.107 |
| P6KE120A | 114 | 126 | 1.0 | 102 | 1.0 | 3.6 | 165 | 0.107 |
| P6KE130 | 117 | 143 | 1.0 | 105 | 1.0 | 3.2 | 187 | 0.107 |
| P6KE130A | 124 | 137 | 1.0 | 111 | 1.0 | 3.4 | 179 | 0.107 |
| P6KE150 | 135 | 165 | 1.0 | 121 | 1.0 | 2.8 | 215 | 0.108 |
| P6KE150A | 143 | 158 | 1.0 | 128 | 1.0 | 2.9 | 207 | 0.108 |
| P6KE160 | 144 | 176 | 1.0 | 130 | 1.0 | 2.6 | 230 | 0.108 |
| P6KE160A | 152 | 168 | 1.0 | 136 | 1.0 | 2.7 | 219 | 0.108 |
| P6KE170 | 153 | 187 | 1.0 | 138 | 1.0 | 2.5 | 244 | 0.108 |
| P6KE170A | 162 | 179 | 1.0 | 145 | 1.0 | 2.6 | 234 | 0.108 |
| P6KE180 | 162 | 198 | 1.0 | 146 | 1.0 | 2.3 | 258 | 0.108 |
| P6KE180A | 171 | 189 | 1.0 | 154 | 1.0 | 2.4 | 246 | 0.108 |
| P6KE200 | 180 | 220 | 1.0 | 162 | 1.0 | 2.1 | 287 | 0.108 |
| P6KE200A | 190 | 210 | 1.0 | 171 | 1.0 | 2.2 | 274 | 0.108 |
| P6KE220 | 198 | 242 | 1.0 | 175 | 1.0 | 1.7 | 344 | 0.108 |
| P6KE220A | 209 | 231 | 1.0 | 185 | 1.0 | 1.8 | 328 | 0.108 |
| P6KE250 | 225 | 275 | 1.0 | 202 | 1.0 | 1.7 | 360 | 0.110 |
| P6KE250A | 237 | 263 | 1.0 | 214 | 1.0 | 1.7 | 344 | 0.110 |
| P6KE300 | 270 | 330 | 1.0 | 243 | 1.0 | 1.4 | 430 | 0.110 |
| P6KE300A | 285 | 315 | 1.0 | 256 | 1.0 | 1.4 | 414 | 0.110 |
| P6KE350 | 315 | 385 | 1.0 | 284 | 1.0 | 1.2 | 504 | 0.110 |
| P6KE350A | 333 | 368 | 1.0 | 300 | 1.0 | 1.2 | 482 | 0.110 |
| P6KE400 | 360 | 440 | 1.0 | 324 | 1.0 | 1.0 | 574 | 0.110 |
| P6KE400A | 380 | 420 | 1.0 | 342 | 1.0 | 1.1 | 548 | 0.110 |
| P6KE440 | 396 | 484 | 1.0 | 356 | 1.0 | 0.95 | 631 | 0.110 |
| P6KE440A | 418 | 462 | 1.0 | 376 | 1.0 | 1.0 | 602 | 0.110 |
| P6KE480A | 456 | 504 | 1.0 | 408 | 1.0 | 0.9 | 658 | 0.110 |
| P6KE510A | 485 | 535 | 1.0 | 434 | 1.0 | 0.9 | 698 | 0.110 |
| P6KE530A | 503.5 | 556.5 | 1.0 | 450 | 1.0 | 0.8 | 725 | 0.110 |
| P6KE540A | 513 | 567 | 1.0 | 459 | 1.0 | 0.8 | 740 | 0.110 |
| P6KE550A | 522.5 | 577.5 | 1.0 | 467 | 1.0 | 0.8 | 760 | 0.110 |

- Note: 1. $V_{(BR)}$ measured after I_T applied for 300 μ s, 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%.

Characteristic Curves



DO-204AC(DO-15) Dimension



*:Typical

| DIM | Inches | | Millimeters | | DIM | Inches | | Millimeters | |
|-----|--------|--------|-------------|-------|-----|--------|--------|-------------|-------|
| | Min. | Max. | Min. | Max. | | Min. | Max. | Min. | Max. |
| A | φ0.028 | φ0.034 | φ0.70 | φ0.90 | D | 1.000 | - | 24.50 | - |
| B | 1.000 | - | 24.50 | - | E | φ0.104 | φ0.140 | φ2.60 | φ3.60 |
| C | 0.2300 | 0.3000 | 5.80 | 7.60 | | | | | |

Notes : 1.Controlling dimension : millimeters.
 2.Maximum lead thickness includes lead finish thickness, and minimum lead thickness is the minimum thickness of base material.
 3.If there is any question with packing specification or packing method, please contact your local CYStek sales office.

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