

## 600W, 6.8V - 440V Transient Voltage Suppressor

### FEATURES

- Excellent clamping capability
- Low dynamic impedance
- 600W surge capability at 10 / 1000  $\mu$ s waveform
- Fast response time: Typically less than 1.0ps from 0 volt to  $V_{BR}$  for unidirectional and 5.0ns for bidirectional
- Typical  $I_R$  less than 1 $\mu$ A above 10V
- UL recognized file # E-326243
- Compliant to RoHS Directive 2011/65/EU and in accordance to WEEE 2002/96/EC
- Halogen-free according to IEC 61249-2-21



**DO-204AC (DO-15)**

### MECHANICAL DATA

**Case:** DO-204AC (DO-15)

Molding compound: UL flammability classification rating 94V-0

Part No. with suffix "H" means AEC-Q101 qualified

Packing code with suffix "G" means green compound (halogen-free)

**Terminal:** Pure tin plated leads, solderable per JESD22-B102

Meet JESD 201 class 2 whisker test

**Weight:** 0.4g (approximately)

| MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS ( $T_A=25^{\circ}\text{C}$ unless otherwise noted) |           |              |                    |
|---------------------------------------------------------------------------------------------------|-----------|--------------|--------------------|
| PARAMETER                                                                                         | SYMBOL    | VALUE        | UNIT               |
| Peak power dissipation at $T_A=25^{\circ}\text{C}$ , $T_p=1\text{ms}$ (Note 1)                    | $P_{PK}$  | 600          | W                  |
| Steady state power dissipation at $T_L=75^{\circ}\text{C}$ lead lengths .375", 9.5mm (Note 2)     | $P_D$     | 5            | W                  |
| Peak forward surge current, 8.3 ms single half sine-wave superimposed on rated load (Note 3)      | $I_{FSM}$ | 100          | A                  |
| Operating junction temperature range                                                              | $T_J$     | - 55 to +175 | $^{\circ}\text{C}$ |
| Storage temperature range                                                                         | $T_{STG}$ | - 55 to +175 | $^{\circ}\text{C}$ |

Note 1: Non-repetitive current pulse per fig. 3 and derated above  $T_A=25^{\circ}\text{C}$  per fig. 2

Note 2: Mounted on 5 x 5 mm copper pads to each terminal

Note 3: 8.3ms single half sine-wave or equivalent square wave, duty cycle=4 pulses per minute maximum

### Devices for Bipolar Applications

1. For bidirectional use C or CA suffix for types P6KE6.8 - types P6KE440
2. Electrical characteristics apply in both directions

| ORDERING INFORMATION |                 |              |                     |         |                        |
|----------------------|-----------------|--------------|---------------------|---------|------------------------|
| PART NO.             | PART NO. SUFFIX | PACKING CODE | PACKING CODE SUFFIX | PACKAGE | PACKING                |
| P6KExxxx<br>(Note 1) | H               | A0           | G                   | DO-15   | 1,500 / Ammo box       |
|                      |                 | R0           |                     | DO-15   | 3,500 / 13" Paper reel |
|                      |                 | B0           |                     | DO-15   | 1,000 / Bulk packing   |

Note 1: "xxxx" defines voltage from 6.8V (P6KE6.8) to 440V (P6KE440)

| EXAMPLE          |          |                 |              |                     |                                      |
|------------------|----------|-----------------|--------------|---------------------|--------------------------------------|
| EXAMPLE PART NO. | PART NO. | PART NO. SUFFIX | PACKING CODE | PACKING CODE SUFFIX | DESCRIPTION                          |
| P6KE56AHA0G      | P6KE56A  | H               | A0           | G                   | AEC-Q101 qualified<br>Green compound |

## RATINGS AND CHARACTERISTICS CURVES

( $T_A=25^\circ\text{C}$  unless otherwise noted)

FIG. 1 PEAK PULSE POWER RATING CURVE

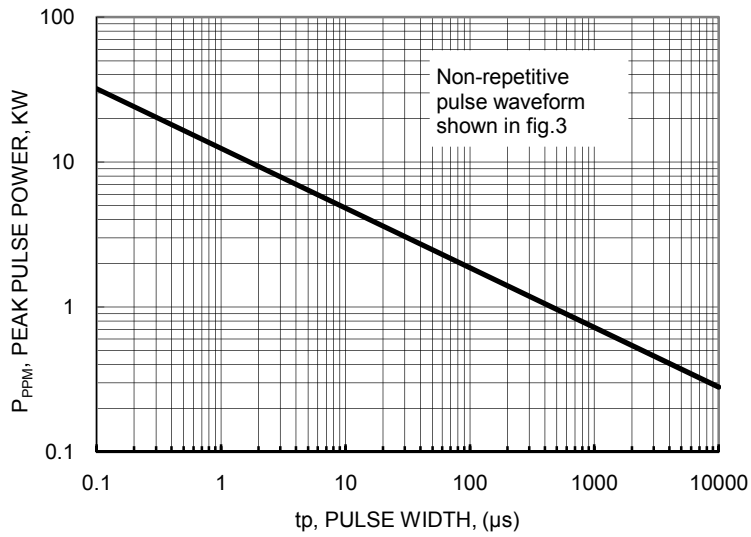


FIG. 2 PULSE DERATING CURVE

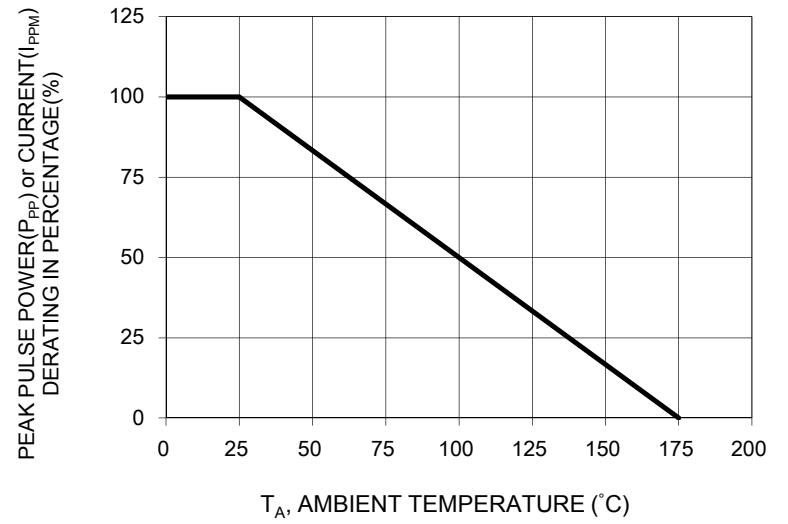


FIG. 3 CLAMPING POWER PULSE WAVEFORM

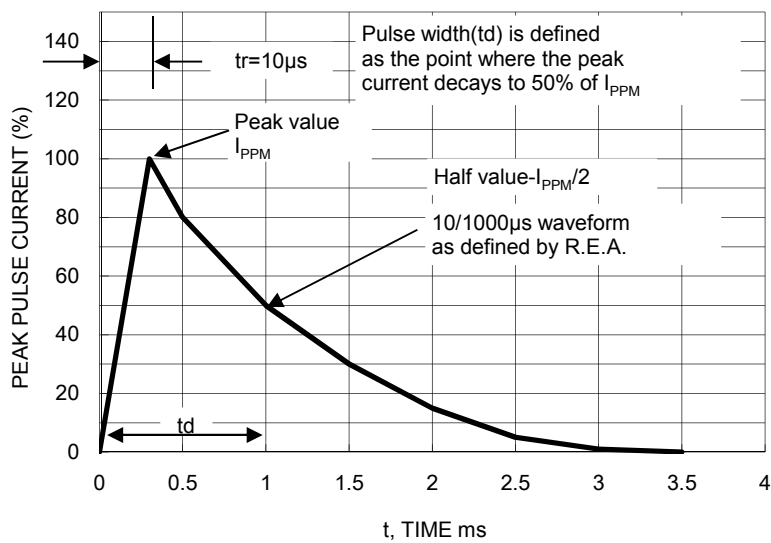


FIG. 4 MAXIMUM NON-REPETITIVE FORWARD SURGE CURRENT UNIDIRECTIONAL ONLY

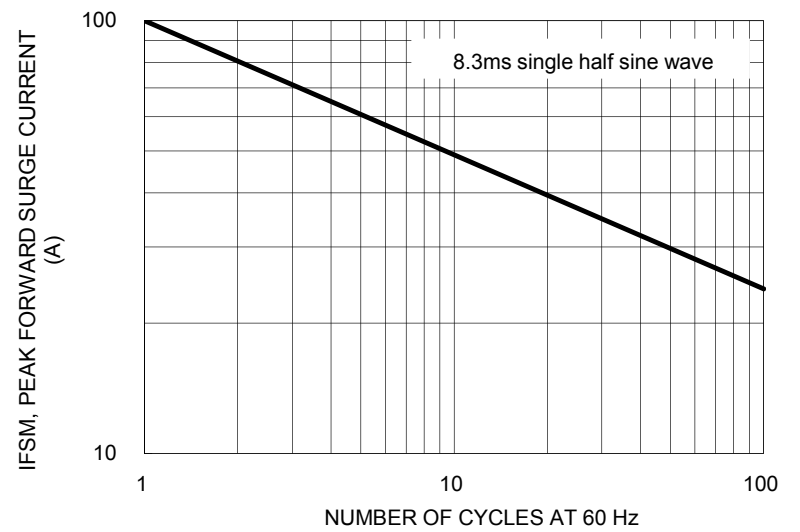
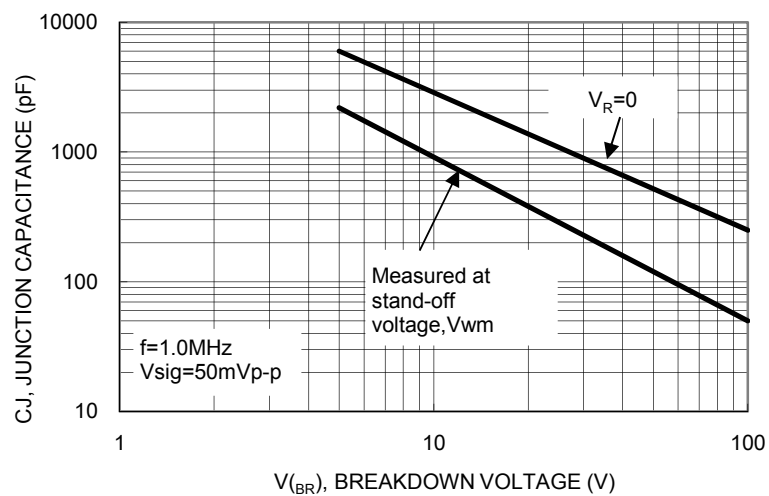


FIG. 5 TYPICAL JUNCTION CAPACITANCE



| General Part Number | Nominal Voltage | Breakdown Voltage (Note 1) |       | Test Current | Stand-Off Voltage | Maximum Reverse Leakage @ $V_{WM}$ | Maximum Peak Surge Current | Maximum Clamping Voltage @ $I_{PPM}$ | Maximum Temperature Coefficient |
|---------------------|-----------------|----------------------------|-------|--------------|-------------------|------------------------------------|----------------------------|--------------------------------------|---------------------------------|
|                     |                 | $V_{BR}$                   |       | $I_T$        | $V_{WM}$          | $I_R$                              | $I_{PPM}$                  | $V_C$                                | of $V_{BR}$                     |
|                     | (V)             | (V)                        |       | (mA)         | (V)               | ( $\mu A$ )                        | (A)                        | (V)                                  | (%/°C)                          |
|                     |                 | Min                        | Max   |              |                   |                                    | (Note 2)                   |                                      |                                 |
| P6KE6.8             | 6.8             | 6.12                       | 7.48  | 10           | 5.50              | 1000                               | 58.0                       | 10.8                                 | 0.057                           |
| P6KE6.8A            | 6.8             | 6.46                       | 7.14  | 10           | 5.80              | 1000                               | 60.0                       | 10.5                                 | 0.057                           |
| P6KE7.5             | 7.5             | 6.75                       | 8.25  | 10           | 6.05              | 500                                | 53.0                       | 11.7                                 | 0.061                           |
| P6KE7.5A            | 7.5             | 7.13                       | 7.88  | 10           | 6.40              | 500                                | 55.0                       | 11.3                                 | 0.061                           |
| P6KE8.2             | 8.2             | 7.38                       | 9.02  | 10           | 6.63              | 200                                | 50.0                       | 12.5                                 | 0.065                           |
| P6KE8.2A            | 8.2             | 7.79                       | 8.61  | 10           | 7.02              | 200                                | 52.0                       | 12.1                                 | 0.065                           |
| P6KE9.1             | 9.1             | 8.19                       | 10.00 | 1            | 7.37              | 50                                 | 45.0                       | 13.8                                 | 0.068                           |
| P6KE9.1A            | 9.1             | 8.65                       | 9.55  | 1            | 7.78              | 50                                 | 47.0                       | 13.4                                 | 0.068                           |
| P6KE10              | 10              | 9.00                       | 11.00 | 1            | 8.10              | 10                                 | 42.0                       | 15.0                                 | 0.073                           |
| P6KE10A             | 10              | 9.50                       | 10.5  | 1            | 8.55              | 10                                 | 43.0                       | 14.5                                 | 0.073                           |
| P6KE11              | 11              | 9.90                       | 12.1  | 1            | 8.92              | 1                                  | 38.0                       | 16.2                                 | 0.075                           |
| P6KE11A             | 11              | 10.5                       | 11.6  | 1            | 9.40              | 1                                  | 40.0                       | 15.6                                 | 0.075                           |
| P6KE12              | 12              | 10.8                       | 13.2  | 1            | 9.72              | 1                                  | 36.0                       | 17.3                                 | 0.078                           |
| P6KE12A             | 12              | 11.4                       | 12.6  | 1            | 10.2              | 1                                  | 37.0                       | 16.7                                 | 0.078                           |
| P6KE13              | 13              | 11.7                       | 14.3  | 1            | 10.5              | 1                                  | 33.0                       | 19.0                                 | 0.081                           |
| P6KE13A             | 13              | 12.4                       | 13.7  | 1            | 11.1              | 1                                  | 34.0                       | 18.2                                 | 0.081                           |
| P6KE15              | 15              | 13.5                       | 16.5  | 1            | 12.1              | 1                                  | 28.0                       | 22.0                                 | 0.084                           |
| P6KE15A             | 15              | 14.3                       | 15.8  | 1            | 12.8              | 1                                  | 29.0                       | 21.2                                 | 0.084                           |
| P6KE16              | 16              | 14.4                       | 17.6  | 1            | 12.9              | 1                                  | 26.0                       | 23.5                                 | 0.086                           |
| P6KE16A             | 16              | 15.2                       | 16.8  | 1            | 13.6              | 1                                  | 28.0                       | 22.5                                 | 0.086                           |
| P6KE18              | 18              | 16.2                       | 19.8  | 1            | 14.5              | 1                                  | 23.0                       | 26.5                                 | 0.088                           |
| P6KE18A             | 18              | 17.1                       | 18.9  | 1            | 15.3              | 1                                  | 25.0                       | 25.5                                 | 0.088                           |
| P6KE20              | 20              | 18.0                       | 22.0  | 1            | 16.2              | 1                                  | 21.0                       | 29.1                                 | 0.090                           |
| P6KE20A             | 20              | 19.0                       | 21.0  | 1            | 17.1              | 1                                  | 22.0                       | 27.7                                 | 0.090                           |
| P6KE22              | 22              | 19.8                       | 24.2  | 1            | 17.8              | 1                                  | 19.0                       | 31.9                                 | 0.092                           |
| P6KE22A             | 22              | 20.9                       | 23.1  | 1            | 18.8              | 1                                  | 20.0                       | 30.6                                 | 0.092                           |
| P6KE24              | 24              | 21.6                       | 26.4  | 1            | 19.4              | 1                                  | 18.0                       | 34.7                                 | 0.094                           |
| P6KE24A             | 24              | 22.8                       | 25.2  | 1            | 20.5              | 1                                  | 19.0                       | 33.2                                 | 0.094                           |
| P6KE27              | 27              | 24.3                       | 29.7  | 1            | 21.8              | 1                                  | 16.0                       | 39.1                                 | 0.096                           |
| P6KE27A             | 27              | 25.7                       | 28.4  | 1            | 23.1              | 1                                  | 16.8                       | 37.5                                 | 0.096                           |
| P6KE30              | 30              | 27.0                       | 33.0  | 1            | 24.3              | 1                                  | 14.0                       | 43.5                                 | 0.097                           |
| P6KE30A             | 30              | 28.5                       | 31.5  | 1            | 25.6              | 1                                  | 15.0                       | 41.4                                 | 0.097                           |
| P6KE33              | 33              | 29.7                       | 36.3  | 1            | 26.8              | 1                                  | 13.0                       | 47.7                                 | 0.098                           |
| P6KE33A             | 33              | 31.4                       | 34.7  | 1            | 28.2              | 1                                  | 13.8                       | 45.7                                 | 0.098                           |
| P6KE36              | 36              | 32.4                       | 39.6  | 1            | 29.1              | 1                                  | 12.0                       | 52.0                                 | 0.099                           |
| P6KE36A             | 36              | 34.2                       | 37.8  | 1            | 30.8              | 1                                  | 12.6                       | 49.9                                 | 0.099                           |
| P6KE39              | 39              | 35.1                       | 42.9  | 1            | 31.6              | 1                                  | 11.1                       | 56.4                                 | 0.100                           |
| P6KE39A             | 39              | 37.1                       | 41.0  | 1            | 33.3              | 1                                  | 11.6                       | 53.9                                 | 0.100                           |
| P6KE43              | 43              | 38.7                       | 47.3  | 1            | 34.8              | 1                                  | 10.0                       | 61.9                                 | 0.101                           |
| P6KE43A             | 43              | 40.9                       | 45.2  | 1            | 36.8              | 1                                  | 10.6                       | 59.3                                 | 0.101                           |
| P6KE47              | 47              | 42.3                       | 51.7  | 1            | 38.1              | 1                                  | 9.2                        | 67.8                                 | 0.101                           |
| P6KE47A             | 47              | 44.7                       | 49.4  | 1            | 40.2              | 1                                  | 9.7                        | 64.8                                 | 0.101                           |
| P6KE51              | 51              | 45.9                       | 56.1  | 1            | 41.3              | 1                                  | 8.5                        | 73.5                                 | 0.102                           |
| P6KE51A             | 51              | 48.5                       | 53.6  | 1            | 43.6              | 1                                  | 8.9                        | 70.1                                 | 0.102                           |
| P6KE56              | 56              | 50.4                       | 61.6  | 1            | 45.4              | 1                                  | 7.8                        | 80.5                                 | 0.103                           |
| P6KE56A             | 56              | 53.2                       | 58.8  | 1            | 47.8              | 1                                  | 8.1                        | 77.0                                 | 0.103                           |
| P6KE62              | 62              | 55.8                       | 68.2  | 1            | 50.2              | 1                                  | 7.0                        | 89.0                                 | 0.104                           |
| P6KE62A             | 62              | 58.9                       | 65.1  | 1            | 53.0              | 1                                  | 7.4                        | 85.0                                 | 0.104                           |

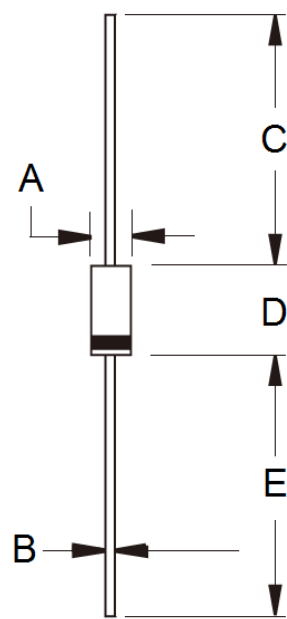
| General Part Number | Nominal Voltage | Breakdown Voltage (Note 1) |      | Test Current | Stand-Off Voltage | Maximum Reverse Leakage @ $V_{WM}$ | Maximum Peak Surge Current | Maximum Clamping Voltage @ $I_{PPM}$ | Maximum Temperature Coefficient |
|---------------------|-----------------|----------------------------|------|--------------|-------------------|------------------------------------|----------------------------|--------------------------------------|---------------------------------|
|                     |                 | $V_{BR}$                   |      | $I_T$        | $V_{WM}$          | $I_R$                              | $I_{PPM}$                  | $V_C$                                | of $V_{BR}$                     |
|                     | (V)             | (V)                        |      | (mA)         | (V)               | ( $\mu A$ )                        | (A)                        | (V)                                  | (%/°C)                          |
|                     |                 | Min                        | Max  |              |                   |                                    | (Note 2)                   |                                      |                                 |
| P6KE68              | 68              | 61.2                       | 74.8 | 1            | 55.1              | 1                                  | 6.4                        | 98.0                                 | 0.104                           |
| P6KE68A             | 68              | 64.6                       | 71.4 | 1            | 58.1              | 1                                  | 6.8                        | 92.0                                 | 0.104                           |
| P6KE75              | 75              | 67.5                       | 82.5 | 1            | 60.7              | 1                                  | 5.8                        | 108                                  | 0.105                           |
| P6KE75A             | 75              | 71.3                       | 78.8 | 1            | 64.1              | 1                                  | 6.1                        | 103                                  | 0.105                           |
| P6KE82              | 82              | 73.8                       | 90.2 | 1            | 66.4              | 1                                  | 5.3                        | 118                                  | 0.105                           |
| P6KE82A             | 82              | 77.9                       | 86.1 | 1            | 70.1              | 1                                  | 5.5                        | 113                                  | 0.105                           |
| P6KE91              | 91              | 81.9                       | 100  | 1            | 73.7              | 1                                  | 4.8                        | 131                                  | 0.106                           |
| P6KE91A             | 91              | 86.5                       | 95.5 | 1            | 77.8              | 1                                  | 5.0                        | 125                                  | 0.106                           |
| P6KE100             | 100             | 90                         | 110  | 1            | 81.0              | 1                                  | 4.3                        | 144                                  | 0.106                           |
| P6KE100A            | 100             | 95                         | 105  | 1            | 85.5              | 1                                  | 4.5                        | 137                                  | 0.106                           |
| P6KE110             | 110             | 99                         | 121  | 1            | 89.2              | 1                                  | 3.9                        | 158                                  | 0.107                           |
| P6KE110A            | 110             | 105                        | 116  | 1            | 94.0              | 1                                  | 4.1                        | 152                                  | 0.107                           |
| P6KE120             | 120             | 108                        | 132  | 1            | 97.2              | 1                                  | 3.6                        | 173                                  | 0.107                           |
| P6KE120A            | 120             | 114                        | 126  | 1            | 102               | 1                                  | 3.8                        | 165                                  | 0.107                           |
| P6KE130             | 130             | 117                        | 143  | 1            | 105               | 1                                  | 3.3                        | 187                                  | 0.107                           |
| P6KE130A            | 130             | 124                        | 137  | 1            | 111               | 1                                  | 3.5                        | 179                                  | 0.107                           |
| P6KE150             | 150             | 135                        | 165  | 1            | 121               | 1                                  | 2.9                        | 215                                  | 0.108                           |
| P6KE150A            | 150             | 143                        | 158  | 1            | 128               | 1                                  | 3.0                        | 207                                  | 0.108                           |
| P6KE160             | 160             | 144                        | 176  | 1            | 130               | 1                                  | 2.7                        | 230                                  | 0.108                           |
| P6KE160A            | 160             | 152                        | 168  | 1            | 136               | 1                                  | 2.8                        | 219                                  | 0.108                           |
| P6KE170             | 170             | 153                        | 187  | 1            | 138               | 1                                  | 2.5                        | 244                                  | 0.108                           |
| P6KE170A            | 170             | 162                        | 179  | 1            | 145               | 1                                  | 2.6                        | 234                                  | 0.108                           |
| P6KE180             | 180             | 162                        | 198  | 1            | 146               | 1                                  | 2.4                        | 258                                  | 0.108                           |
| P6KE180A            | 180             | 171                        | 189  | 1            | 154               | 1                                  | 2.5                        | 246                                  | 0.108                           |
| P6KE200             | 200             | 180                        | 220  | 1            | 162               | 1                                  | 2.1                        | 287                                  | 0.108                           |
| P6KE200A            | 200             | 190                        | 210  | 1            | 171               | 1                                  | 2.2                        | 274                                  | 0.108                           |
| P6KE220             | 220             | 198                        | 242  | 1            | 175               | 1                                  | 1.8                        | 344                                  | 0.108                           |
| P6KE220A            | 220             | 209                        | 231  | 1            | 185               | 1                                  | 1.9                        | 328                                  | 0.108                           |
| P6KE250             | 250             | 225                        | 275  | 1            | 202               | 1                                  | 1.7                        | 360                                  | 0.110                           |
| P6KE250A            | 250             | 237                        | 263  | 1            | 214               | 1                                  | 1.8                        | 344                                  | 0.110                           |
| P6KE300             | 300             | 270                        | 330  | 1            | 243               | 1                                  | 1.4                        | 430                                  | 0.110                           |
| P6KE300A            | 300             | 285                        | 315  | 1            | 256               | 1                                  | 1.5                        | 414                                  | 0.110                           |
| P6KE350             | 350             | 315                        | 385  | 1            | 284               | 1                                  | 1.2                        | 504                                  | 0.110                           |
| P6KE350A            | 350             | 332                        | 368  | 1            | 300               | 1                                  | 1.3                        | 482                                  | 0.110                           |
| P6KE400             | 400             | 360                        | 440  | 1            | 324               | 1                                  | 1.0                        | 574                                  | 0.110                           |
| P6KE400A            | 400             | 380                        | 420  | 1            | 342               | 1                                  | 1.1                        | 548                                  | 0.110                           |
| P6KE440             | 440             | 396                        | 484  | 1            | 356               | 1                                  | 1.0                        | 631                                  | 0.110                           |
| P6KE440A            | 440             | 418                        | 462  | 1            | 376               | 1                                  | 1.04                       | 602                                  | 0.110                           |

Notes:

1.  $V_{BR}$  measure after  $I_T$  applied for 300 $\mu s$ ,  $I_T$ =square wave pulse or equivalent.
2. Surge current waveform per figure. 3 and derate per figure. 2.
3. For bipolar types having  $V_{WM}$  of 10 volts and under, the  $I_R$  limit is doubled.
4. All terms and symbols are consistent with ANSI/IEEE C62.35.

PACKAGE OUTLINE DIMENSIONS

DO-204AC (DO-15)



| DIM. | Unit (mm) |      | Unit (inch) |       |
|------|-----------|------|-------------|-------|
|      | Min       | Max  | Min         | Max   |
| A    | 2.60      | 3.60 | 0.102       | 0.142 |
| B    | 0.70      | 0.90 | 0.028       | 0.035 |
| C    | 25.40     | -    | 1.000       | -     |
| D    | 5.80      | 7.60 | 0.228       | 0.299 |
| E    | 25.40     | -    | 1.000       | -     |

MARKING DIAGRAM



P/N = Specific Device Code  
G = Green Compound  
YWW = Date Code  
F = Factory Code

Note: Cathode band for uni-directional products only

### Notice

Specifications of the products displayed herein are subject to change without notice. TSC or anyone on its behalf, assumes no responsibility or liability for any errors or inaccuracies.

Information contained herein is intended to provide a product description only. No license, express or implied, to any intellectual property rights is granted by this document. Except as provided in TSC's terms and conditions of sale for such products, TSC assumes no liability whatsoever, and disclaims any express or implied warranty, relating to sale and/or use of TSC products including liability or warranties relating to fitness for a particular purpose, merchantability, or infringement of any patent, copyright, or other intellectual property right.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications. Customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify TSC for any damages resulting from such improper use or sale.