

**GPP TRANSIENT VOLTAGE SUPPRESSOR  
400 WATT PEAK POWER 1.0 WATT STEADY STATE**

**FEATURES**

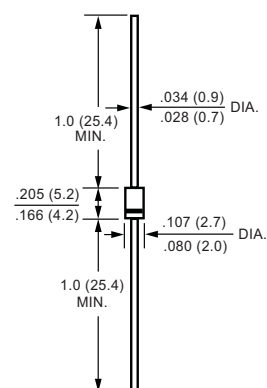
- \* Plastic package has underwriters laboratory
- \* Glass passivated chip construction
- \* 400 watt surge capability at 1ms
- \* Excellent clamping capability
- \* Low zener impedance
- \* Fast response time

**MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS**

Ratings at 25 °C ambient temperature unless otherwise specified.  
Single phase, half wave, 60 Hz, resistive or inductive load,  
For capacitive load, derate current by 20%.



**DO-41**



**DEVICES FOR BIPOLAR APPLICATIONS**

For Bidirectional use C or CA suffix for types P4KE6.8 thru P4KE440

Electrical characteristics apply in both direction

MAXIMUM RATINGS (At TA = 25°C unless otherwise noted)

| RATINGS                                                                                                        | SYMBOL           | VALUE        | UNITS               |
|----------------------------------------------------------------------------------------------------------------|------------------|--------------|---------------------|
| Peak Power Dissipation at TA = 25°C, TP = 1mS ( Note 1 )                                                       | PPPM             | Minimum 400  | Watts               |
| Steady State Power Dissipation at TL = 75°C lead lengths, .375" ( 9.5 mm ) ( Note 2 )                          | PM(AV)           | 1.0          | Watts               |
| Peak Forward Surge Current, 8.3ms single half sine wave-superimposed on rated load( JEDEC METHOD ) ( NoteS 2 ) | IFSM             | 40           | Amps                |
| Maximum Instantaneous Forward Current at 25A for unidirectional only ( Note 3 )                                | VF               | 3.5/6.5      | Volts               |
| Operating and Storage Temperature Range                                                                        | TJ, TSTG         | -55 to + 150 | °C                  |
| Typical Current Squared Time                                                                                   | I <sup>2</sup> t | 6.64         | A <sup>2</sup> /Sec |

NOTES : 1. Non-repetitive current pulse, per Fig.3 and derated above TA = 25°C per Fig.2.  
2. Mounted on 1.6 X 1.6" ( 40 X 40mm ) per Fig. 5  
3. VF = 3.0V max. for devices of V(BR) ≤ 220V and VF = 6.5 Volts max. for devices of V(BR) > 220V.  
4. "Fully ROHS compliant", "100% Sn plating (Pb-free)".

2016-09  
REV:A

## RATING AND CHARACTERISTIC CURVES( P4KE6.8 THRU P4KE440CA)

FIG. 1 - PEAK PULSE POWER RATING CURVE

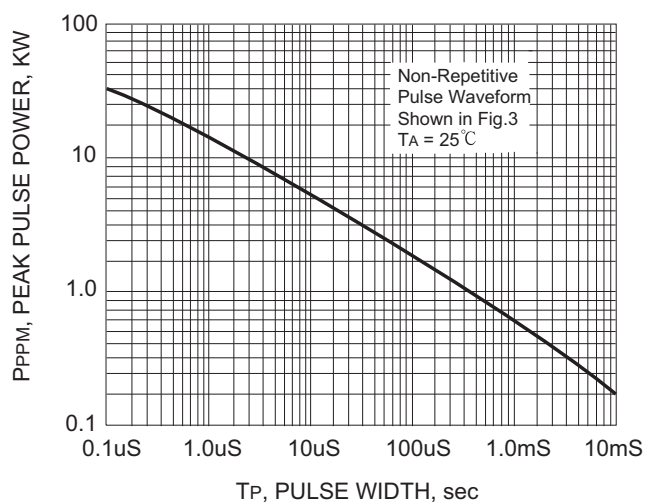


FIG. 2 - PULSE DERATING CURVE

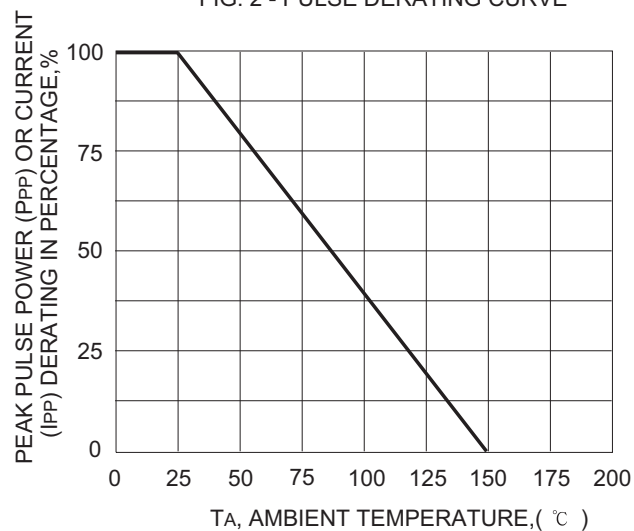


FIG. 3 - PULSE WAVEFORM

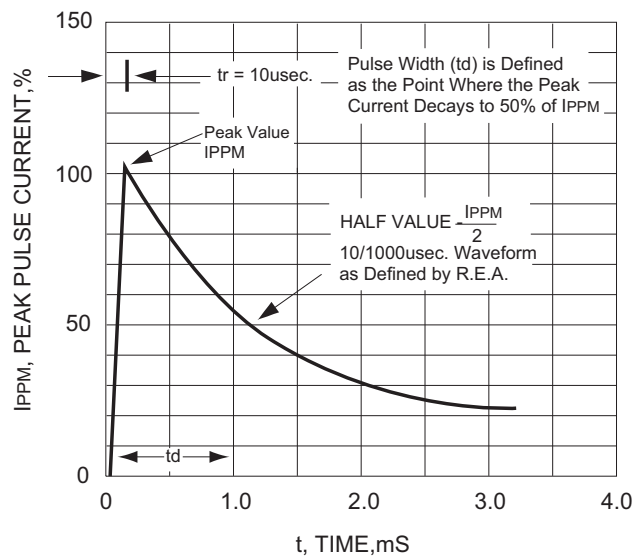
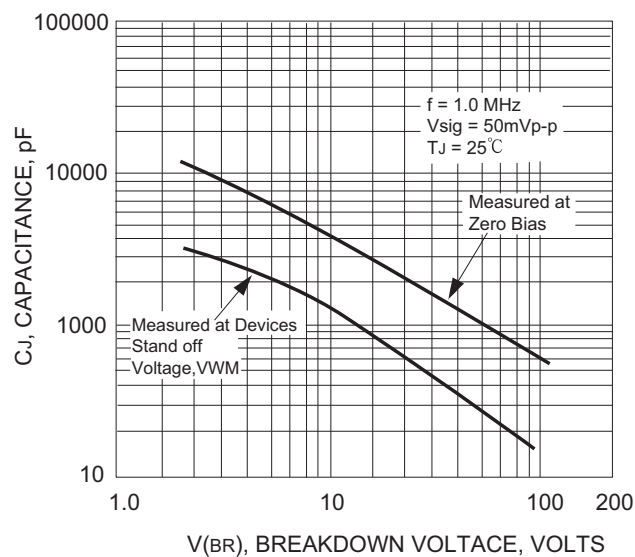


FIG. 4 - TYPICAL JUNCTION CAPACITANCE



## RATING AND CHARACTERISTIC CURVES( P4KE6.8 THRU P4KE440CA)

FIG. 5 - STEADY STATE POWER DERATING CURVE

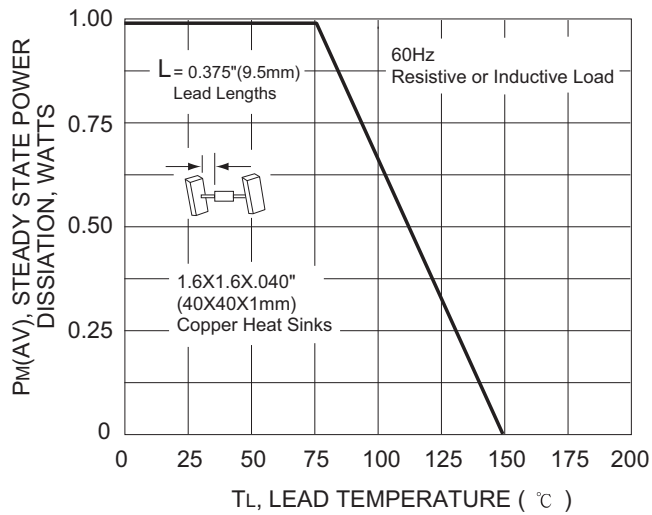


FIG. 6 - MAXIMUM NON-REPETITIVE FORWARD SURGE CURRENT UNIDIRECTIONAL

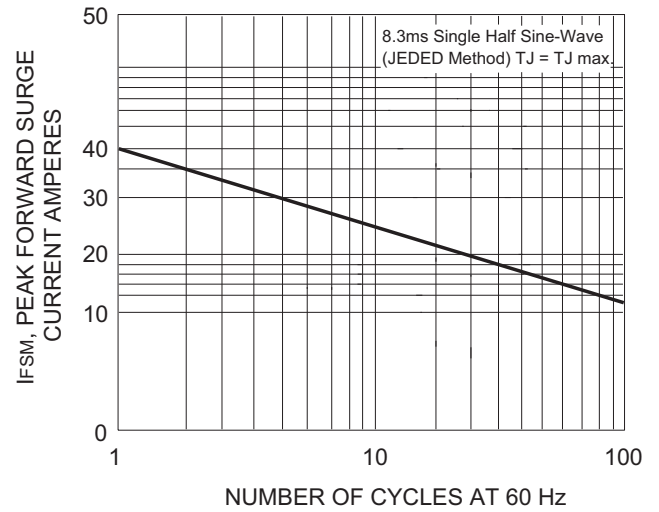
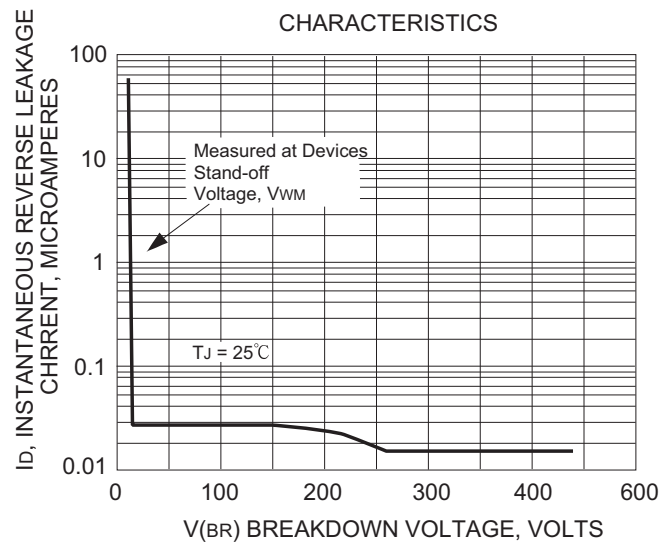


FIG. 7 - TYPICAL REVERSE LEAKAGE CHARACTERISTICS



# TRANSIENT VOLTAGE SUPPRESSORS

## 400W SERIES TVS DIODES / DO-41 ( CASE 7 ) 400W

| TYPE     | Breakdown Voltage          |      |                         | Reverse Stand off Voltage<br>V <sub>WM</sub><br>(Volts) | Maximum Reverse Leakage at V <sub>WM</sub><br>I <sub>D</sub> (uA) | Maximum Peak Pulse Current<br>I <sub>PPM</sub><br>(Amps) | Maximum Clamping Voltage at I <sub>PPM</sub><br>V <sub>C</sub> (Volts) |
|----------|----------------------------|------|-------------------------|---------------------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------------|------------------------------------------------------------------------|
|          | V <sub>BR</sub><br>(Volts) |      | @I <sub>T</sub><br>(mA) |                                                         |                                                                   |                                                          |                                                                        |
|          | MIN.                       | MAX. |                         |                                                         |                                                                   |                                                          |                                                                        |
| P4KE6.8  | 6.12                       | 7.48 | 10                      | 5.50                                                    | 1000                                                              | 37                                                       | 10.8                                                                   |
| P4KE6.8A | 6.45                       | 7.14 | 10                      | 5.80                                                    | 1000                                                              | 38.1                                                     | 10.5                                                                   |
| P4KE7.5  | 6.75                       | 8.25 | 10                      | 6.05                                                    | 500                                                               | 34.2                                                     | 11.7                                                                   |
| P4KE7.5A | 7.13                       | 7.88 | 10                      | 6.40                                                    | 500                                                               | 35.4                                                     | 11.3                                                                   |
| P4KE8.2  | 7.38                       | 9.02 | 10                      | 6.63                                                    | 200                                                               | 32                                                       | 12.5                                                                   |
| P4KE8.2A | 7.79                       | 8.61 | 10                      | 7.02                                                    | 200                                                               | 33.1                                                     | 12.1                                                                   |
| P4KE9.1  | 8.19                       | 10.0 | 1.0                     | 7.37                                                    | 50                                                                | 29                                                       | 13.8                                                                   |
| P4KE9.1A | 8.65                       | 9.55 | 1.0                     | 7.78                                                    | 50                                                                | 29.9                                                     | 13.4                                                                   |
| P4KE10   | 9.00                       | 11.0 | 1.0                     | 8.10                                                    | 10                                                                | 26.7                                                     | 15.0                                                                   |
| P4KE10A  | 9.50                       | 10.5 | 1.0                     | 8.55                                                    | 10                                                                | 27.6                                                     | 14.5                                                                   |
| P4KE11   | 9.90                       | 12.1 | 1.0                     | 8.92                                                    | 5.0                                                               | 24.7                                                     | 16.2                                                                   |
| P4KE11A  | 10.5                       | 11.6 | 1.0                     | 9.40                                                    | 5.0                                                               | 25.6                                                     | 15.6                                                                   |
| P4KE12   | 10.8                       | 13.2 | 1.0                     | 9.72                                                    | 5.0                                                               | 23.1                                                     | 17.3                                                                   |
| P4KE12A  | 11.4                       | 12.6 | 1.0                     | 10.2                                                    | 5.0                                                               | 24                                                       | 16.7                                                                   |
| P4KE13   | 11.7                       | 14.3 | 1.0                     | 10.5                                                    | 5.0                                                               | 21.1                                                     | 19.0                                                                   |
| P4KE13A  | 12.4                       | 13.7 | 1.0                     | 11.1                                                    | 5.0                                                               | 22                                                       | 18.2                                                                   |
| P4KE15   | 13.5                       | 16.5 | 1.0                     | 12.1                                                    | 5.0                                                               | 18.2                                                     | 22.0                                                                   |
| P4KE15A  | 14.3                       | 15.8 | 1.0                     | 12.8                                                    | 5.0                                                               | 18.9                                                     | 21.2                                                                   |
| P4KE16   | 14.4                       | 17.6 | 1.0                     | 12.9                                                    | 5.0                                                               | 17                                                       | 23.5                                                                   |
| P4KE16A  | 15.2                       | 16.8 | 1.0                     | 13.6                                                    | 5.0                                                               | 17.8                                                     | 22.5                                                                   |
| P4KE18   | 16.2                       | 19.8 | 1.0                     | 14.5                                                    | 5.0                                                               | 15.1                                                     | 26.5                                                                   |
| P4KE18A  | 17.1                       | 18.9 | 1.0                     | 15.3                                                    | 5.0                                                               | 15.9                                                     | 25.2                                                                   |
| P4KE20   | 18.0                       | 22.0 | 1.0                     | 16.2                                                    | 5.0                                                               | 13.7                                                     | 29.1                                                                   |
| P4KE20A  | 19.0                       | 21.0 | 1.0                     | 17.1                                                    | 5.0                                                               | 14.4                                                     | 27.7                                                                   |
| P4KE22   | 19.8                       | 24.2 | 1.0                     | 17.8                                                    | 5.0                                                               | 12.5                                                     | 31.9                                                                   |
| P4KE22A  | 20.9                       | 23.1 | 1.0                     | 18.8                                                    | 5.0                                                               | 13.1                                                     | 30.6                                                                   |
| P4KE24   | 21.6                       | 26.4 | 1.0                     | 19.4                                                    | 5.0                                                               | 11.5                                                     | 34.7                                                                   |
| P4KE24A  | 22.8                       | 25.2 | 1.0                     | 20.5                                                    | 5.0                                                               | 12                                                       | 33.2                                                                   |
| P4KE27   | 24.3                       | 29.7 | 1.0                     | 21.8                                                    | 5.0                                                               | 10.2                                                     | 39.1                                                                   |
| P4KE27A  | 25.7                       | 28.4 | 1.0                     | 23.1                                                    | 5.0                                                               | 10.7                                                     | 37.5                                                                   |
| P4KE30   | 27.0                       | 33.0 | 1.0                     | 24.3                                                    | 5.0                                                               | 9.2                                                      | 43.5                                                                   |
| P4KE30A  | 28.5                       | 31.5 | 1.0                     | 25.6                                                    | 5.0                                                               | 9.7                                                      | 41.4                                                                   |
| P4KE33   | 29.7                       | 36.3 | 1.0                     | 26.8                                                    | 5.0                                                               | 8.4                                                      | 47.7                                                                   |
| P4KE33A  | 31.4                       | 34.7 | 1.0                     | 28.2                                                    | 5.0                                                               | 8.8                                                      | 45.7                                                                   |
| P4KE36   | 32.4                       | 39.6 | 1.0                     | 29.1                                                    | 5.0                                                               | 7.7                                                      | 52.0                                                                   |
| P4KE36A  | 34.2                       | 37.8 | 1.0                     | 30.8                                                    | 5.0                                                               | 8.0                                                      | 49.9                                                                   |
| P4KE39   | 35.1                       | 42.9 | 1.0                     | 31.6                                                    | 5.0                                                               | 7.1                                                      | 56.4                                                                   |
| P4KE39A  | 37.1                       | 41.0 | 1.0                     | 33.3                                                    | 5.0                                                               | 7.4                                                      | 53.9                                                                   |
| P4KE43   | 38.7                       | 47.3 | 1.0                     | 34.8                                                    | 5.0                                                               | 6.5                                                      | 61.9                                                                   |
| P4KE43A  | 40.9                       | 45.2 | 1.0                     | 36.8                                                    | 5.0                                                               | 6.7                                                      | 59.3                                                                   |
| P4KE47   | 42.3                       | 51.7 | 1.0                     | 38.1                                                    | 5.0                                                               | 5.9                                                      | 67.8                                                                   |
| P4KE47A  | 44.7                       | 49.4 | 1.0                     | 40.2                                                    | 5.0                                                               | 6.2                                                      | 64.8                                                                   |
| P4KE51   | 45.9                       | 56.1 | 1.0                     | 41.3                                                    | 5.0                                                               | 5.4                                                      | 73.5                                                                   |
| P4KE51A  | 48.5                       | 53.6 | 1.0                     | 43.6                                                    | 5.0                                                               | 5.7                                                      | 70.1                                                                   |
| P4KE56   | 50.4                       | 61.6 | 1.0                     | 45.4                                                    | 5.0                                                               | 5.0                                                      | 80.5                                                                   |
| P4KE56A  | 53.2                       | 58.8 | 1.0                     | 47.8                                                    | 5.0                                                               | 5.2                                                      | 77.0                                                                   |

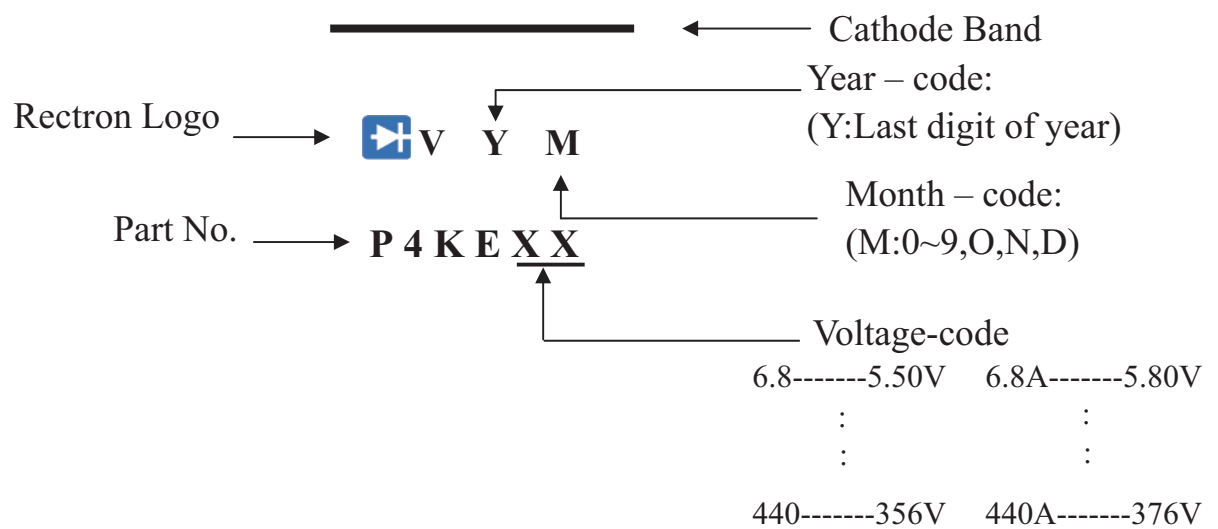
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|----------|----------------------------|------|-------------------------|---------------------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------------|------------------------------------------------------------------------|
|          | V <sub>BR</sub><br>(Volts) |      | @I <sub>T</sub><br>(mA) |                                                         |                                                                   |                                                          |                                                                        |
|          | MIN.                       | MAX. |                         |                                                         |                                                                   |                                                          |                                                                        |
| P4KE62   | 55.8                       | 68.2 | 1.0                     | 50.2                                                    | 5.0                                                               | 4.5                                                      | 89.0                                                                   |
| P4KE62A  | 58.9                       | 65.1 | 1.0                     | 53.0                                                    | 5.0                                                               | 4.7                                                      | 85.0                                                                   |
| P4KE68   | 61.2                       | 74.8 | 1.0                     | 55.1                                                    | 5.0                                                               | 4.1                                                      | 98.0                                                                   |
| P4KE68A  | 64.6                       | 71.4 | 1.0                     | 58.1                                                    | 5.0                                                               | 4.3                                                      | 92.0                                                                   |
| P4KE75   | 67.5                       | 82.5 | 1.0                     | 60.7                                                    | 5.0                                                               | 3.7                                                      | 108                                                                    |
| P4KE75A  | 71.3                       | 78.8 | 1.0                     | 64.1                                                    | 5.0                                                               | 3.9                                                      | 103                                                                    |
| P4KE82   | 73.8                       | 90.2 | 1.0                     | 66.4                                                    | 5.0                                                               | 3.4                                                      | 118                                                                    |
| P4KE82A  | 77.9                       | 86.1 | 1.0                     | 70.1                                                    | 5.0                                                               | 3.5                                                      | 113                                                                    |
| P4KE91   | 81.9                       | 100  | 1.0                     | 73.7                                                    | 5.0                                                               | 3.1                                                      | 131                                                                    |
| P4KE91A  | 86.5                       | 95.5 | 1.0                     | 77.8                                                    | 5.0                                                               | 3.2                                                      | 125                                                                    |
| P4KE100  | 90.0                       | 110  | 1.0                     | 81.0                                                    | 5.0                                                               | 2.8                                                      | 144                                                                    |
| P4KE100A | 95.0                       | 105  | 1.0                     | 85.5                                                    | 5.0                                                               | 2.9                                                      | 137                                                                    |
| P4KE110  | 99.0                       | 121  | 1.0                     | 89.2                                                    | 5.0                                                               | 2.5                                                      | 158                                                                    |
| P4KE110A | 105                        | 116  | 1.0                     | 94.0                                                    | 5.0                                                               | 2.6                                                      | 152                                                                    |
| P4KE120  | 108                        | 132  | 1.0                     | 97.2                                                    | 5.0                                                               | 2.3                                                      | 173                                                                    |
| P4KE120A | 114                        | 126  | 1.0                     | 102                                                     | 5.0                                                               | 2.4                                                      | 165                                                                    |
| P4KE130  | 117                        | 143  | 1.0                     | 105                                                     | 5.0                                                               | 2.1                                                      | 187                                                                    |
| P4KE130A | 124                        | 137  | 1.0                     | 111                                                     | 5.0                                                               | 2.2                                                      | 179                                                                    |
| P4KE150  | 135                        | 165  | 1.0                     | 121                                                     | 5.0                                                               | 1.9                                                      | 215                                                                    |
| P4KE150A | 143                        | 158  | 1.0                     | 128                                                     | 5.0                                                               | 1.9                                                      | 207                                                                    |
| P4KE160  | 144                        | 176  | 1.0                     | 130                                                     | 5.0                                                               | 1.7                                                      | 230                                                                    |
| P4KE160A | 152                        | 168  | 1.0                     | 136                                                     | 5.0                                                               | 1.8                                                      | 219                                                                    |
| P4KE170  | 153                        | 187  | 1.0                     | 138                                                     | 5.0                                                               | 1.6                                                      | 244                                                                    |
| P4KE170A | 162                        | 179  | 1.0                     | 145                                                     | 5.0                                                               | 1.7                                                      | 234                                                                    |
| P4KE180  | 162                        | 198  | 1.0                     | 146                                                     | 5.0                                                               | 1.6                                                      | 258                                                                    |
| P4KE180A | 171                        | 189  | 1.0                     | 154                                                     | 5.0                                                               | 1.6                                                      | 246                                                                    |
| P4KE200  | 180                        | 220  | 1.0                     | 162                                                     | 5.0                                                               | 1.4                                                      | 287                                                                    |
| P4KE200A | 190                        | 210  | 1.0                     | 171                                                     | 5.0                                                               | 1.5                                                      | 274                                                                    |
| P4KE220  | 198                        | 242  | 1.0                     | 175                                                     | 5.0                                                               | 1.2                                                      | 344                                                                    |
| P4KE220A | 209                        | 231  | 1.0                     | 185                                                     | 5.0                                                               | 1.2                                                      | 328                                                                    |
| P4KE250  | 225                        | 275  | 1.0                     | 202                                                     | 5.0                                                               | 1.1                                                      | 360                                                                    |
| P4KE250A | 237                        | 263  | 1.0                     | 214                                                     | 5.0                                                               | 1.2                                                      | 344                                                                    |
| P4KE300  | 270                        | 330  | 1.0                     | 243                                                     | 5.0                                                               | 0.93                                                     | 430                                                                    |
| P4KE300A | 285                        | 315  | 1.0                     | 256                                                     | 5.0                                                               | 1.00                                                     | 414                                                                    |
| P4KE350  | 315                        | 385  | 1.0                     | 284                                                     | 5.0                                                               | 0.79                                                     | 504                                                                    |
| P4KE350A | 333                        | 368  | 1.0                     | 300                                                     | 5.0                                                               | 0.83                                                     | 482                                                                    |
| P4KE400  | 360                        | 440  | 1.0                     | 324                                                     | 5.0                                                               | 0.70                                                     | 574                                                                    |
| P4KE400A | 380                        | 420  | 1.0                     | 342                                                     | 5.0                                                               | 0.73                                                     | 548                                                                    |
| P4KE440  | 396                        | 484  | 1.0                     | 356                                                     | 5.0                                                               | 0.63                                                     | 631                                                                    |
| P4KE440A | 418                        | 462  | 1.0                     | 376                                                     | 5.0                                                               | 0.66                                                     | 602                                                                    |

- Notes :
1. V<sub>BR</sub> measured after I<sub>T</sub> applied for 300ms. I<sub>T</sub> = square pulse or equivalent.
  2. For bidirectional use C or CA suffixs for all types (ex. P4KE6.8C,P4KE440CA)  
electrical characteristics apply in both directions.
  3. For bidirectional types having V<sub>WM</sub> of 10 volts and less, the I<sub>D</sub> limit is doubled.

## Marking Description



## PACKAGING OF DIODE AND BRIDGE RECTIFIERS

### BULK PACK

| PACKAGE | PACKING CODE | EA PER BOX | INNER BOX SIZE<br>(mm) | CARTON SIZE<br>(mm) | EA PER CARTON | GROSS<br>WEIGHT(Kg) |
|---------|--------------|------------|------------------------|---------------------|---------------|---------------------|
| DO-41   | -B           | 1,000      | 194*75*21              | 415*220*255         | 50,000        | 16.2                |

### REEL PACK

| PACKAGE | PACKING<br>CODE | EA PER<br>REEL | EA PER<br>INNER<br>BOX | COMPONENT<br>SPACE<br>(mm) | TAPE SPACE<br>(mm) | REEL DIA<br>(mm) | CARTON SIZE<br>(mm) | EA PER<br>CARTON | GROSS<br>WEIGHT(Kg) |
|---------|-----------------|----------------|------------------------|----------------------------|--------------------|------------------|---------------------|------------------|---------------------|
| DO-41   | -T              | 5,000          | 5,000                  | 5.0                        | 52                 | 330              | 355*350*335         | 20,000           | 10.49               |

### AMMO PACK

| PACKAGE | PACKING<br>CODE | REEL<br>( EA ) | COMPONENT<br>SPACE(mm) | TAPE SPACE<br>(mm) | BOX SIZE<br>(mm) | CARTON<br>SIZE(mm) | CARTON<br>( EA ) | GROSS<br>WEIGHT (Kg) |
|---------|-----------------|----------------|------------------------|--------------------|------------------|--------------------|------------------|----------------------|
| DO-41   | -F              | 3,000          | 5.0                    | 52                 | 255*73*100       | 400*268*225        | 30,000           | 13.0                 |
| DO-41   | -E              | 3,000          | 5.0                    | 26                 | 256*48*94        | 365*270*217        | 42,000           | 12.41                |

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[P4KE75A-T](#) [P4KE10CA-T](#) [P4KE24A-T](#) [P4KE9.1A-T](#) [P4KE6.8CA-T](#) [P4KE91C-T](#) [P4KE51A-T](#) [P4KE6.8C-T](#)  
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[T](#) [P4KE400C-T](#) [P4KE170CA-T](#) [P4KE120-T](#) [P4KE39-T](#) [P4KE56CA-T](#) [P4KE22CA-T](#) [P4KE9.1-T](#) [P4KE51-T](#)  
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[P4KE43-T](#) [P4KE220C-T](#) [P4KE120C-T](#) [P4KE170A-T](#) [P4KE47CA-T](#) [P4KE75-T](#) [P4KE180CA-T](#) [P4KE24-T](#)  
[P4KE22A-T](#) [P4KE47C-T](#) [P4KE10-T](#) [P4KE18-T](#) [P4KE68C-T](#) [P4KE400CA-T](#) [P4KE200CA-T](#) [P4KE300CA-T](#)  
[P4KE100CA-T](#) [P4KE13C-T](#) [P4KE36C-T](#) [P4KE250CA-T](#) [P4KE350CA-T](#) [P4KE150CA-T](#) [P4KE100C-T](#) [P4KE150A-T](#)  
[P4KE7.5-T](#) [P4KE18C-T](#)