

# R5KPxxCA SERIES

# BI-DIRECTION TRANSIENT VOLTAGE SUPPRESSOR

**V<sub>RM</sub> : 5.0 - 180 Volts**

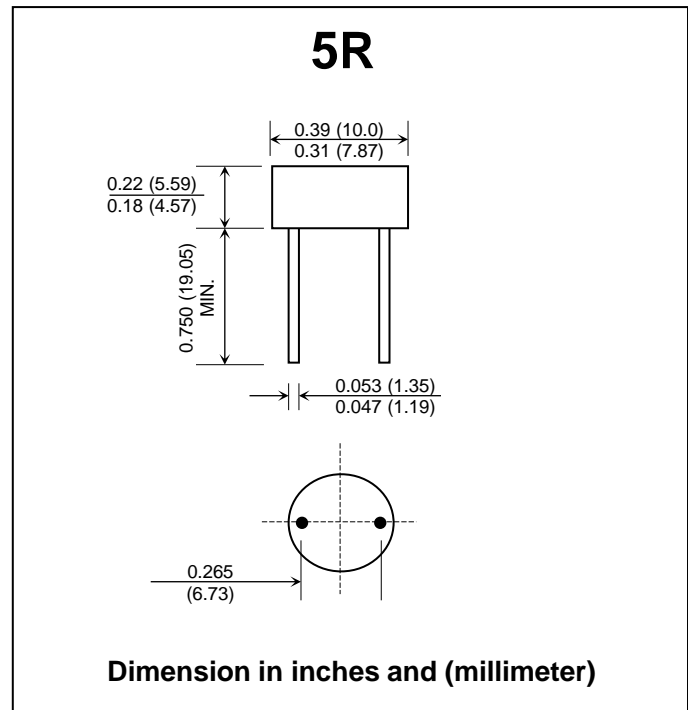
**P<sub>PK</sub> : 5000 Watts**

## FEATURES :

- \* Glass passivated junction chip
- \* 5000W Peak Pulse Power
- \* Excellent clamping capability
- \* Low incremental surge resistance
- \* Fast response time : typically less than 1.0 ps from 0 volt to V<sub>BR(min.)</sub>
- \* Typical I<sub>R</sub> less than 1μA above 10V
- \* **Pb / RoHS Free**

## MECHANICAL DATA

- \* Case : Void-free molded plastic body
- \* Epoxy : UL94V-0 rate flame retardant
- \* Lead : Axial lead solderable per MIL-STD-202, Method 208 guaranteed
- \* Polarity : Color band denotes cathode end
- \* Mounting position : Any
- \* Weight : 2.1 grams



## DEVICES FOR BIPOLAR APPLICATIONS

Electrical characteristics apply in both directions

## MAXIMUM RATINGS ( Rating at 25 °C ambient temperature unless otherwise specified.)

| Rating  | Symbol                            | Value         | Unit |
|---|-----------------------------------|---------------|------|
| Peak Pulse Power Dissipation at $t_p = 1\text{ms}$<br>(Note 1, Fig. 4)                            | P <sub>PK</sub>                   | Minimum 5000  | W    |
| Steady State Power Dissipation at T <sub>L</sub> = 75 °C<br>Lead Lengths 0.375", (9.5mm) (Note 2) | P <sub>D</sub>                    | 8.0           | W    |
| Operating and Storage Temperature Range   | T <sub>J</sub> , T <sub>STG</sub> | - 55 to + 150 | °C   |

### Notes:

- (1) Non-repetitive Current pulse, per Fig. 2 and derated above Ta = 25 °C per Fig. 1
- (2) Mounted on Copper Leaf area of 0.79 in<sup>2</sup> (20mm<sup>2</sup>).

## ELECTRICAL CHARACTERISTICS (Rating at 25 °C ambient temperature unless otherwise specified)

| TYPE      | Breakdown Voltage @ $I_T$<br>( Note 1 ) |      | Reverse<br>Stand off<br>Voltage | Maximum<br>Reverse Leakage<br>@ $V_{RM}$ | Maximum<br>Peak Pulse<br>Current | Maximum<br>Clamping<br>Voltage @ $I_{PPM}$ | Maximum<br>Temperature<br>Coefficient<br>of $V_{BR}$<br>(%/°C) |       |
|-----------|---|------|---------------------------------|--|----------------------------------|--|--|-------|
|           | $V_{BR}$ (V)                            |      |                                 |  |                                  |  |  | $I_T$ |
|           | Min.                                    | Max. | (mA)                            | (V)                                      | ( $\mu$ A)                       | (A)  |  | (V)   |
| R5KP5.0C  | 6.40                                    | 7.30 | 50                              | 5.0                                      | 5000                             | 520  | 9.60   | 0.057 |
| R5KP5.0CA | 6.40                                    | 7.00 | 50                              | 5.0                                      | 5000                             | 543  | 9.20   | 0.057 |
| R5KP6.0C  | 6.67                                    | 8.15 | 50                              | 6.0                                      | 5000                             | 439  | 11.4   | 0.061 |
| R5KP6.0CA | 6.67                                    | 7.37 | 50                              | 6.0                                      | 5000                             | 485  | 10.3   | 0.061 |
| R5KP6.5C  | 7.22                                    | 8.82 | 50                              | 6.5                                      | 2000                             | 407  | 12.3   | 0.065 |
| R5KP6.5CA | 7.22                                    | 7.98 | 50                              | 6.5                                      | 2000                             | 447  | 11.2   | 0.065 |
| R5KP7.0C  | 7.78                                    | 9.51 | 50                              | 7.0                                      | 1000                             | 378  | 13.3   | 0.068 |
| R5KP7.0CA | 7.78                                    | 8.60 | 50                              | 7.0                                      | 1000                             | 417  | 12.0   | 0.068 |
| R5KP7.5C  | 8.33                                    | 10.2 | 5.0                             | 7.5                                      | 250                              | 350  | 14.3   | 0.073 |
| R5KP7.5CA | 8.33                                    | 9.21 | 5.0                             | 7.5                                      | 250                              | 388  | 12.9   | 0.073 |
| R5KP8.0C  | 8.89                                    | 10.9 | 5.0                             | 8.0                                      | 150                              | 333  | 15.0   | 0.075 |
| R5KP8.0CA | 8.89                                    | 9.83 | 5.0                             | 8.0                                      | 150                              | 367  | 13.6   | 0.075 |
| R5KP8.5C  | 9.44                                    | 11.5 | 5.0                             | 8.5                                      | 50                               | 314  | 15.9   | 0.078 |
| R5KP8.5CA | 9.44                                    | 10.4 | 5.0                             | 8.5                                      | 50                               | 347  | 14.4   | 0.078 |
| R5KP9.0C  | 10.0                                    | 12.2 | 5.0                             | 9.0                                      | 20                               | 295  | 16.9   | 0.081 |
| R5KP9.0CA | 10.0                                    | 11.1 | 5.0                             | 9.0                                      | 20                               | 325  | 15.4   | 0.081 |
| R5KP10C   | 11.1                                    | 13.6 | 5.0                             | 10                                       | 15                               | 266  | 18.8   | 0.084 |
| R5KP10CA  | 11.1                                    | 12.3 | 5.0                             | 10                                       | 15                               | 294  | 17.0   | 0.084 |
| R5KP11C   | 12.2                                    | 14.9 | 5.0                             | 11                                       | 10                               | 249  | 20.1   | 0.086 |
| R5KP11CA  | 12.2                                    | 13.5 | 5.0                             | 11                                       | 10                               | 274  | 18.2   | 0.086 |
| R5KP12C   | 13.3                                    | 16.3 | 5.0                             | 12                                       | 10                               | 227  | 22.0   | 0.088 |
| R5KP12CA  | 13.3                                    | 14.7 | 5.0                             | 12                                       | 10                               | 251  | 19.9   | 0.088 |
| R5KP13C   | 14.4                                    | 17.6 | 5.0                             | 13                                       | 10                               | 210  | 23.8   | 0.090 |
| R5KP13CA  | 14.4                                    | 15.9 | 5.0                             | 13                                       | 10                               | 232  | 21.5   | 0.090 |
| R5KP14C   | 15.6                                    | 19.1 | 5.0                             | 14                                       | 10                               | 194  | 25.8   | 0.092 |
| R5KP14CA  | 15.6                                    | 17.2 | 5.0                             | 14                                       | 10                               | 215  | 23.2   | 0.092 |
| R5KP15C   | 16.7                                    | 20.4 | 5.0                             | 15                                       | 10                               | 188  | 26.9   | 0.094 |
| R5KP15CA  | 16.7                                    | 18.5 | 5.0                             | 15                                       | 10                               | 206  | 24.4   | 0.094 |
| R5KP16C   | 17.8                                    | 21.8 | 5.0                             | 16                                       | 10                               | 176  | 28.8   | 0.096 |
| R5KP16CA  | 17.8                                    | 19.7 | 5.0                             | 16                                       | 10                               | 192  | 26.0   | 0.096 |
| R5KP17C   | 18.9                                    | 23.1 | 5.0                             | 17                                       | 10                               | 164  | 30.5   | 0.097 |
| R5KP17CA  | 18.9                                    | 20.9 | 5.0                             | 17                                       | 10                               | 181  | 27.6   | 0.097 |
| R5KP18C   | 20.0                                    | 24.4 | 5.0                             | 18                                       | 10                               | 155  | 32.2   | 0.098 |
| R5KP18CA  | 20.0                                    | 22.1 | 5.0                             | 18                                       | 10                               | 172  | 29.2   | 0.098 |
| R5KP20C   | 22.2                                    | 27.1 | 5.0                             | 20                                       | 10                               | 139  | 35.8   | 0.099 |
| R5KP20CA  | 22.2                                    | 24.5 | 5.0                             | 20                                       | 10                               | 154  | 32.4   | 0.099 |
| R5KP22C   | 24.4                                    | 29.8 | 5.0                             | 22                                       | 10                               | 127  | 39.4   | 0.100 |
| R5KP22CA  | 24.4                                    | 26.9 | 5.0                             | 22                                       | 10                               | 141  | 35.5   | 0.100 |
| R5KP24C   | 26.7                                    | 32.6 | 5.0                             | 24                                       | 10                               | 116  | 43.0   | 0.101 |
| R5KP24CA  | 26.7                                    | 29.5 | 5.0                             | 24                                       | 10                               | 128  | 38.9   | 0.101 |
| R5KP26C   | 28.9                                    | 35.3 | 5.0                             | 26                                       | 10                               | 107  | 46.6   | 0.101 |
| R5KP26CA  | 28.9                                    | 31.9 | 5.0                             | 26                                       | 10                               | 119  | 42.1   | 0.101 |
| R5KP28C   | 31.1                                    | 38.0 | 5.0                             | 28                                       | 10                               | 99   | 50.1   | 0.102 |
| R5KP28CA  | 31.1                                    | 34.4 | 5.0                             | 28                                       | 10                               | 110  | 45.4   | 0.102 |
| R5KP30C   | 33.3                                    | 40.7 | 5.0                             | 30                                       | 10                               | 93   | 53.5   | 0.103 |
| R5KP30CA  | 33.3                                    | 36.8 | 5.0                             | 30                                       | 10                               | 103  | 48.4   | 0.103 |
| R5KP33C   | 36.7                                    | 44.9 | 5.0                             | 33                                       | 10                               | 85   | 59.0   | 0.104 |
| R5KP33CA  | 36.7                                    | 40.6 | 5.0                             | 33                                       | 10                               | 94   | 53.3   | 0.104 |

## ELECTRICAL CHARACTERISTICS (Rating at 25 °C ambient temperature unless otherwise specified)

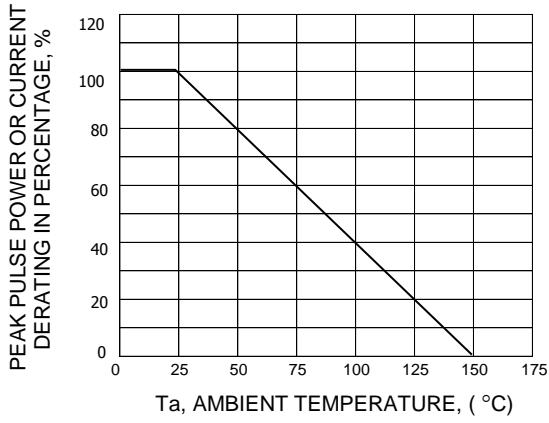
| TYPE      | Breakdown Voltage @ $I_T$<br>( Note 1 ) |      | Reverse<br>Stand off<br>Voltage | Maximum<br>Reverse Leakage<br>@ $V_{RM}$ | Maximum<br>Peak Pulse<br>Current | Maximum<br>Clamping<br>Voltage @ $I_{PPM}$ | Maximum<br>Temperature<br>Coefficient<br>of $V_{BR}$<br>(%/°C) |               |
|-----------|---|------|---------------------------------|--|----------------------------------|--|--|---------------|
|           | $V_{BR}$ (V)                            |      |                                 |  |                                  |  |  | $I_T$<br>(mA) |
|           | Min.                                    | Max. |                                 |  |                                  |  |  |               |
| R5KP36C   | 40.0                                    | 48.9 | 5.0                             | 36                                       | 10                               | 78   | 64.3   | 0.104         |
| R5KP36CA  | 40.0                                    | 44.2 | 5.0                             | 36                                       | 10                               | 86   | 58.1   | 0.104         |
| R5KP40C   | 44.4                                    | 54.3 | 5.0                             | 40                                       | 10                               | 70   | 71.4   | 0.105         |
| R5KP40CA  | 44.4                                    | 49.1 | 5.0                             | 40                                       | 10                               | 78   | 64.5   | 0.105         |
| R5KP43C   | 47.8                                    | 58.4 | 5.0                             | 43                                       | 10                               | 65   | 76.7   | 0.105         |
| R5KP43CA  | 47.8                                    | 52.8 | 5.0                             | 43                                       | 10                               | 72   | 69.4   | 0.105         |
| R5KP45C   | 50.0                                    | 61.1 | 5.0                             | 45                                       | 10                               | 62   | 80.3   | 0.106         |
| R5KP45CA  | 50.0                                    | 55.3 | 5.0                             | 45                                       | 10                               | 69   | 72.7   | 0.106         |
| R5KP48C   | 53.3                                    | 65.2 | 5.0                             | 48                                       | 10                               | 58   | 85.5   | 0.106         |
| R5KP48CA  | 53.3                                    | 58.9 | 5.0                             | 48                                       | 10                               | 65   | 77.4   | 0.106         |
| R5KP51C   | 56.7                                    | 69.3 | 5.0                             | 51                                       | 10                               | 55   | 91.1   | 0.107         |
| R5KP51CA  | 56.7                                    | 62.7 | 5.0                             | 51                                       | 10                               | 61   | 82.4   | 0.107         |
| R5KP54C   | 60.0                                    | 73.3 | 5.0                             | 54                                       | 10                               | 52   | 96.3   | 0.107         |
| R5KP54CA  | 60.0                                    | 66.3 | 5.0                             | 54                                       | 10                               | 57   | 87.1   | 0.107         |
| R5KP56C   | 62.2                                    | 76.1 | 5.0                             | 56                                       | 10                               | 50   | 100  | 0.107         |
| R5KP56CA  | 62.2                                    | 68.8 | 5.0                             | 56                                       | 10                               | 55   | 91   | 0.107         |
| R5KP58C   | 64.4                                    | 78.7 | 5.0                             | 58                                       | 10                               | 49   | 103  | 0.107         |
| R5KP58CA  | 64.4                                    | 71.2 | 5.0                             | 58                                       | 10                               | 53   | 94   | 0.107         |
| R5KP60C   | 66.7                                    | 81.5 | 5.0                             | 60                                       | 10                               | 47   | 107  | 0.108         |
| R5KP60CA  | 66.7                                    | 73.7 | 5.0                             | 60                                       | 10                               | 52   | 97   | 0.108         |
| R5KP64C   | 71.1                                    | 96.9 | 5.0                             | 64                                       | 10                               | 44   | 114  | 0.108         |
| R5KP64CA  | 71.1                                    | 78.6 | 5.0                             | 64                                       | 10                               | 49   | 103  | 0.108         |
| R5KP70C   | 77.6                                    | 95.1 | 5.0                             | 70                                       | 10                               | 40   | 125  | 0.108         |
| R5KP70CA  | 77.6                                    | 86.0 | 5.0                             | 70                                       | 10                               | 44   | 113  | 0.108         |
| R5KP75C   | 83.3                                    | 102  | 5.0                             | 75                                       | 10                               | 37   | 134  | 0.108         |
| R5KP75CA  | 83.3                                    | 92.1 | 5.0                             | 75                                       | 10                               | 41   | 121  | 0.108         |
| R5KP78C   | 86.7                                    | 106  | 5.0                             | 78                                       | 10                               | 36   | 139  | 0.108         |
| R5KP78CA  | 86.7                                    | 95.8 | 5.0                             | 78                                       | 10                               | 40   | 126  | 0.108         |
| R5KP85C   | 94.4                                    | 115  | 5.0                             | 85                                       | 10                               | 33   | 151  | 0.108         |
| R5KP85CA  | 94.4                                    | 104  | 5.0                             | 85                                       | 10                               | 36   | 137  | 0.110         |
| R5KP90C   | 100                                     | 122  | 5.0                             | 90                                       | 10                               | 31   | 160  | 0.110         |
| R5KP90CA  | 100                                     | 111  | 5.0                             | 90                                       | 10                               | 34   | 146  | 0.110         |
| R5KP100C  | 111                                     | 136  | 5.0                             | 100                                      | 10                               | 28   | 179  | 0.110         |
| R5KP100CA | 111                                     | 123  | 5.0                             | 100                                      | 10                               | 31   | 162  | 0.110         |
| R5KP110C  | 122                                     | 149  | 5.0                             | 110                                      | 10                               | 26   | 196  | 0.112         |
| R5KP110CA | 122                                     | 135  | 5.0                             | 110                                      | 10                               | 28   | 177  | 0.112         |
| R5KP120C  | 133                                     | 163  | 5.0                             | 120                                      | 10                               | 24   | 211  | 0.112         |
| R5KP120CA | 133                                     | 147  | 5.0                             | 120                                      | 10                               | 26   | 194  | 0.112         |
| R5KP150C  | 167                                     | 204  | 5.0                             | 150                                      | 10                               | 19   | 263  | 0.112         |
| R5KP150CA | 167                                     | 184  | 5.0                             | 150                                      | 10                               | 21   | 242  | 0.112         |
| R5KP160C  | 178                                     | 217  | 5.0                             | 160                                      | 10                               | 18   | 281  | 0.114         |
| R5KP160CA | 178                                     | 196  | 5.0                             | 160                                      | 10                               | 19   | 258  | 0.114         |
| R5KP170C  | 189                                     | 231  | 5.0                             | 170                                      | 10                               | 17   | 298  | 0.114         |
| R5KP170CA | 189                                     | 209  | 5.0                             | 170                                      | 10                               | 18   | 274  | 0.114         |
| R5KP180C  | 200                                     | 244  | 5.0                             | 180                                      | 10                               | 16   | 316  | 0.114         |
| R5KP180CA | 200                                     | 221  | 5.0                             | 180                                      | 10                               | 17   | 290  | 0.114         |

**Notes:**

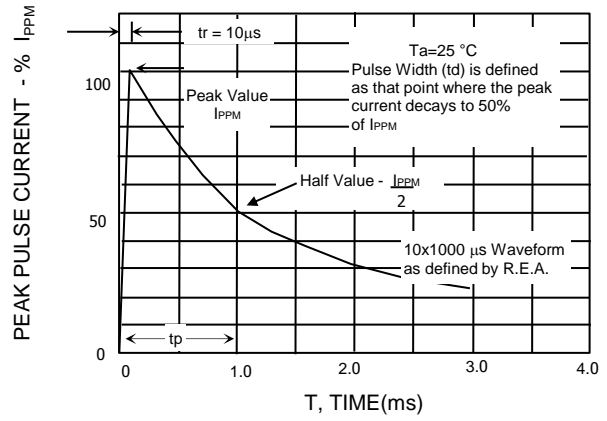
- (1)  $V_{BR}$  measured after  $I_T$  applied for 300  $\mu$ s.,  $I_T$  = square wave pulse or equivalent.
- (3) For Bi-directional devices having  $V_R$  of 10 Volts and under the  $I_R$  limit is doubled.

**RATING AND CHARACTERISTIC CURVES ( R5KPxxCA SERIES )**

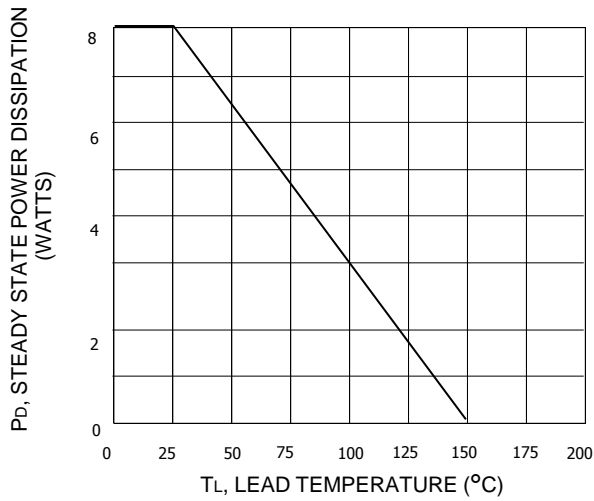
**FIG.1 - PULSE DERATING CURVE**



**FIG.2 - PULSE WAVEFORM**



**FIG.3 - STEADY STATE POWER DERATING**



**FIG.4 - PEAK PULSE POWER RATING CURVE**

