

## Features

- Junction passivation optimized design passivated anisotropic rectifier technology
- 5000W peak pulse power capability at 10×1000μs waveform.
- Very fast response time
- Meets MSL-1, per J-STD-020, LF maximum peak of 260°C
- AEC-Q101 qualified
- Compliant to RoHS directive 2002/96/EC

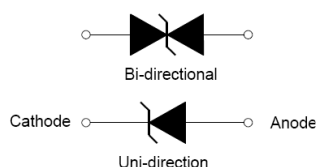
## Mechanical Characteristics

- Case:P-600
- Molding compound meets UL 94V-0 flammability rating
- Base P/NHE3-RoHS compliant,AEC-Q101 qualified
- Terminals:Matte tin plated leads,solderable per
- J-STD-002 and JESD22-B102

## Schematic And Configuration



P- 600



Symbol

### Primary Characteristics

|                    |            |
|--------------------|------------|
| $V_{RWM}$          | 5V to 250V |
| $P_{PPM}$          | 5000 W     |
| $P_M(AV)$          | 8.0 W      |
| $I_{FSM}$          | 400A       |
| $T_J \text{ max.}$ | 175°C      |

## Absolute Maximum Ratings (T<sub>a</sub>=25°C, RH=45%-75%, unless otherwise noted)

| Parameter                                                                       | Symbol                            | Value       | Unit |
|---------------------------------------------------------------------------------|-----------------------------------|-------------|------|
| Operating junction and storage temperature range                                | T <sub>J</sub> , T <sub>STG</sub> | -55 to +175 | °C   |
| Peak pulse power dissipation on 10/1000μs waveform                              | P <sub>PP</sub>                   | 5000        | W    |
| Steady state power dissipation at T <sub>L</sub> =75°C                          | P <sub>M(AV)</sub>                | 8.0         | W    |
| Maximum instantaneous forward voltage at 100A for unidirectional only           | V <sub>F</sub>                    | 5.0         | V    |
| Peak forward surge current, 8.3ms single half sine-wave for unidirectional only | I <sub>FSM</sub>                  | 400         | A    |
| Typical thermal resistance junction to lead                                     | R <sub>θJL</sub>                  | 8.0         | °C/W |
| Typical thermal resistance junction to ambient                                  | R <sub>θJA</sub>                  | 40          | °C/W |

### Notes:

Measured on 8.3ms single half sine wave or equivalent square wave for unidirectional device only, duty cycle=4 per minute maximum

**Electrical Characteristics** (Ta=25°C, unless otherwise noted)

| Part Number |          | V <sub>R</sub> | I <sub>R</sub> @V <sub>R</sub> | V <sub>BR</sub> @I <sub>T</sub> |        | I <sub>T</sub> | V <sub>C</sub> @I <sub>PP</sub> | I <sub>PP</sub> <sup>①</sup> |
|-------------|----------|----------------|--------------------------------|---------------------------------|--------|----------------|---------------------------------|------------------------------|
| Uni-Polar   | Bi-Polar | V              | μA                             | min(V)                          | max(V) | mA             | max(V)                          | A                            |
| 5KP5.0A     | 5KP5.0CA | 5.0            | 5000                           | 6.40                            | 7.00   | 50             | 9.2                             | 544.0                        |
| 5KP6.0A     | 5KP6.0CA | 6.0            | 5000                           | 6.67                            | 7.37   | 50             | 10.3                            | 486.0                        |
| 5KP6.5A     | 5KP6.5CA | 6.5            | 2000                           | 7.22                            | 7.98   | 50             | 11.2                            | 448.0                        |
| 5KP7.0A     | 5KP7.0CA | 7.0            | 1000                           | 7.78                            | 8.60   | 50             | 12.0                            | 417.0                        |
| 5KP7.5A     | 5KP7.5CA | 7.5            | 250                            | 8.33                            | 9.21   | 5              | 12.9                            | 388.0                        |
| 5KP8.0A     | 5KP8.0CA | 8.0            | 150                            | 8.89                            | 9.83   | 5              | 13.6                            | 367.0                        |
| 5KP8.5A     | 5KP8.5CA | 8.5            | 50                             | 9.44                            | 10.40  | 5              | 14.4                            | 347.0                        |
| 5KP9.0A     | 5KP9.0CA | 9.0            | 20                             | 10.00                           | 11.10  | 5              | 15.4                            | 325.0                        |
| 5KP10A      | 5KP10CA  | 10.0           | 15                             | 11.10                           | 12.30  | 5              | 17.0                            | 294.0                        |
| 5KP11A      | 5KP11CA  | 11.0           | 5                              | 12.20                           | 13.50  | 5              | 18.2                            | 275.0                        |
| 5KP12A      | 5KP12CA  | 12.0           | 2                              | 13.30                           | 14.70  | 5              | 19.9                            | 252.0                        |
| 5KP13A      | 5KP13CA  | 13.0           | 2                              | 14.40                           | 15.90  | 5              | 21.5                            | 233.0                        |
| 5KP14A      | 5KP14CA  | 14.0           | 1                              | 15.60                           | 17.20  | 5              | 23.2                            | 216.0                        |
| 5KP15A      | 5KP15CA  | 15.0           | 1                              | 16.70                           | 18.50  | 5              | 24.4                            | 205.0                        |
| 5KP16A      | 5KP16CA  | 16.0           | 1                              | 17.80                           | 19.70  | 5              | 26.0                            | 193.0                        |
| 5KP17A      | 5KP17CA  | 17.0           | 1                              | 18.90                           | 20.90  | 5              | 27.6                            | 181.0                        |
| 5KP18A      | 5KP18CA  | 18.0           | 1                              | 20.00                           | 22.10  | 5              | 29.2                            | 172.0                        |
| 5KP20A      | 5KP20CA  | 20.0           | 1                              | 22.20                           | 24.50  | 5              | 32.4                            | 155.0                        |
| 5KP22A      | 5KP22CA  | 22.0           | 1                              | 24.40                           | 26.90  | 5              | 35.5                            | 141.0                        |
| 5KP24A      | 5KP24CA  | 24.0           | 1                              | 26.70                           | 29.50  | 5              | 38.9                            | 129.0                        |
| 5KP26A      | 5KP26CA  | 26.0           | 1                              | 28.90                           | 31.90  | 5              | 42.1                            | 119.0                        |
| 5KP28A      | 5KP28CA  | 28.0           | 1                              | 31.10                           | 34.40  | 5              | 45.4                            | 110.0                        |
| 5KP30A      | 5KP30CA  | 30.0           | 1                              | 33.30                           | 36.80  | 5              | 48.4                            | 103.0                        |
| 5KP33A      | 5KP33CA  | 33.0           | 1                              | 36.70                           | 40.60  | 5              | 53.3                            | 93.9                         |
| 5KP36A      | 5KP36CA  | 36.0           | 1                              | 40.00                           | 44.20  | 5              | 58.1                            | 86.1                         |
| 5KP40A      | 5KP40CA  | 40.0           | 1                              | 44.40                           | 49.10  | 5              | 64.5                            | 77.6                         |
| 5KP43A      | 5KP43CA  | 43.0           | 1                              | 47.80                           | 52.80  | 5              | 69.4                            | 72.1                         |
| 5KP45A      | 5KP45CA  | 45.0           | 1                              | 50.00                           | 55.30  | 5              | 72.7                            | 68.8                         |
| 5KP48A      | 5KP48CA  | 48.0           | 1                              | 53.30                           | 58.90  | 5              | 77.4                            | 64.7                         |
| 5KP51A      | 5KP51CA  | 51.0           | 1                              | 56.70                           | 62.70  | 5              | 82.4                            | 60.7                         |

**Electrical Characteristics** (Ta=25°C, unless otherwise noted)

| Part Number |          | V <sub>R</sub> | I <sub>R</sub> @V <sub>R</sub> | V <sub>BR</sub> @I <sub>T</sub> |        | I <sub>T</sub> | V <sub>C</sub> @I <sub>PP</sub> | I <sub>PP</sub> <sup>①</sup> |
|-------------|----------|----------------|--------------------------------|---------------------------------|--------|----------------|---------------------------------|------------------------------|
| Uni-Polar   | Bi-Polar | V              | μA                             | min(V)                          | max(V) | mA             | max(V)                          | A                            |
| 5KP54A      | 5KP54CA  | 54.0           | 1                              | 60.00                           | 66.30  | 5              | 87.1                            | 57.5                         |
| 5KP58A      | 5KP58CA  | 58.0           | 1                              | 64.40                           | 71.20  | 5              | 93.6                            | 53.5                         |
| 5KP60A      | 5KP60CA  | 60.0           | 1                              | 66.70                           | 73.70  | 5              | 96.8                            | 51.7                         |
| 5KP64A      | 5KP64CA  | 64.0           | 1                              | 71.10                           | 78.60  | 5              | 103.0                           | 48.6                         |
| 5KP70A      | 5KP70CA  | 70.0           | 1                              | 77.80                           | 86.00  | 5              | 113.0                           | 44.3                         |
| 5KP75A      | 5KP75CA  | 75.0           | 1                              | 83.30                           | 92.10  | 5              | 121.0                           | 41.4                         |
| 5KP78A      | 5KP78CA  | 78.0           | 1                              | 86.70                           | 95.80  | 5              | 126.0                           | 39.7                         |
| 5KP85A      | 5KP85CA  | 85.0           | 1                              | 94.40                           | 104.0  | 5              | 137.0                           | 36.5                         |
| 5KP90A      | 5KP90CA  | 90.0           | 1                              | 100.0                           | 111.0  | 5              | 146.0                           | 34.3                         |
| 5KP100A     | 5KP100CA | 100.0          | 1                              | 111.0                           | 123.0  | 5              | 162.0                           | 30.9                         |
| 5KP110A     | 5KP110CA | 110.0          | 1                              | 122.0                           | 135.0  | 5              | 177.0                           | 28.3                         |
| 5KP120A     | 5KP120CA | 120.0          | 1                              | 133.0                           | 147.0  | 5              | 193.0                           | 26.0                         |
| 5KP130A     | 5KP130CA | 130.0          | 1                              | 144.0                           | 159.0  | 5              | 209.0                           | 24.0                         |
| 5KP150A     | 5KP150CA | 150.0          | 1                              | 167.0                           | 185.0  | 5              | 243.0                           | 20.6                         |
| 5KP160A     | 5KP160CA | 160.0          | 1                              | 178.0                           | 197.0  | 5              | 259.0                           | 19.3                         |
| 5KP170A     | 5KP170CA | 170.0          | 1                              | 189.0                           | 209.0  | 5              | 275.0                           | 18.2                         |
| 5KP180A     | 5KP180CA | 180.0          | 1                              | 201.0                           | 222.0  | 5              | 292.0                           | 17.5                         |
| 5KP190A     | 5KP190CA | 190.0          | 1                              | 211.0                           | 233.0  | 5              | 310.0                           | 16.5                         |
| 5KP200A     | 5KP200CA | 200.0          | 1                              | 224.0                           | 247.0  | 5              | 329.2                           | 15.5                         |
| 5KP210A     | 5KP210CA | 210.0          | 1                              | 237.0                           | 263.0  | 5              | 349.5                           | 14.6                         |
| 5KP220A     | 5KP220CA | 220.0          | 1                              | 246.0                           | 272.0  | 5              | 371.1                           | 13.7                         |
| 5KP250A     | 5KP250CA | 250.0          | 1                              | 277.0                           | 306.0  | 5              | 425.0                           | 12.0                         |

① Surge waveform: 10/1000μs

V<sub>R</sub>: Stand-off voltage -- Maximum voltage that can be appliedV<sub>BR</sub>: Breakdown voltageV<sub>C</sub>: Clamping voltage -- Peak voltage measured across the suppressor at a specified I<sub>PP</sub>I<sub>R</sub>: Reverse leakage current

Ratings And Characteristics Curves (T<sub>A</sub>=25°C, unless otherwise noted)

FIG.1:V- I curve characteristics (Uni-directional)

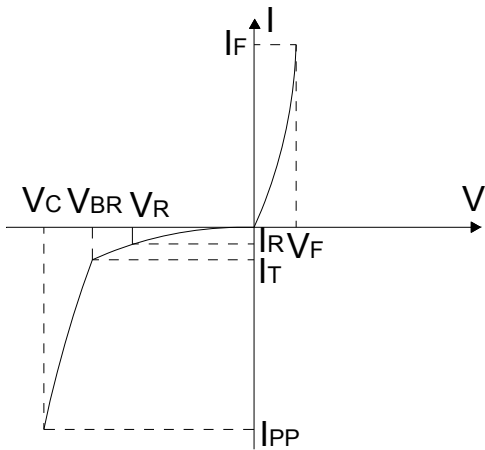


FIG.2:V- I curve characteristics (Bi-directional)

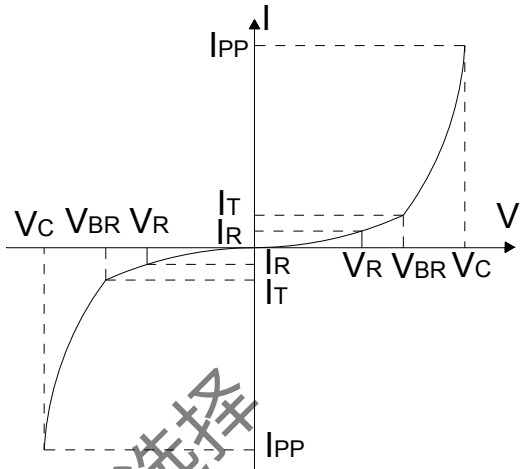


FIG.3: Pulse waveform

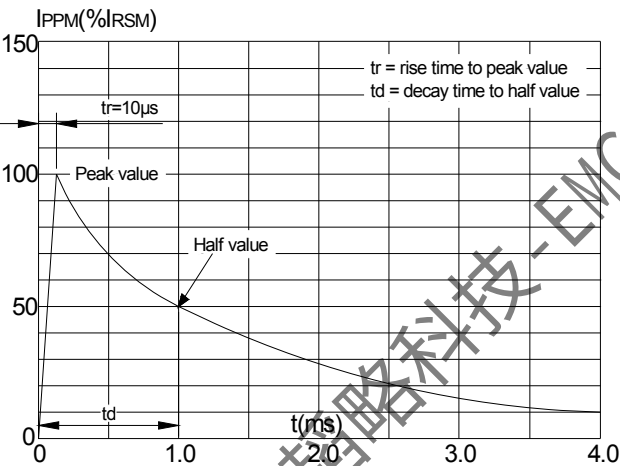
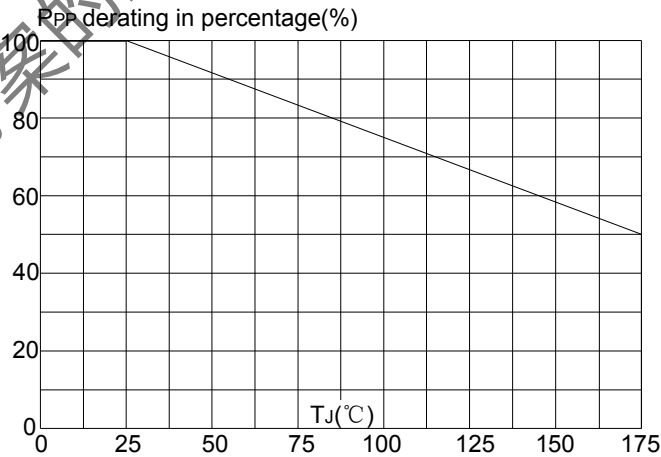


FIG.4: Pulse derating curve

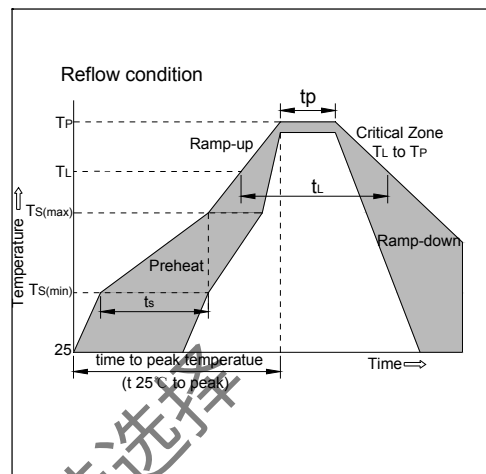


Ordering Information

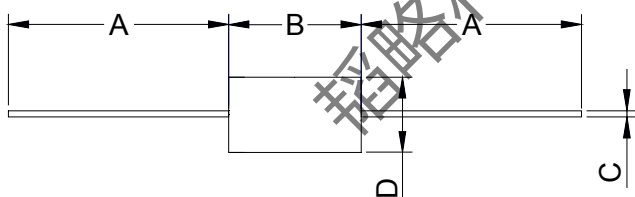
|                 |    |                                                     |
|-----------------|----|-----------------------------------------------------|
| 5KP             | XX | (CA)A                                               |
| 5000W@10/1000US | VR | bi-directional polarity<br>uni-directional polarity |

## Soldering Parameters

| Reflow Condition                                       |                                   | Pb-Free assembly<br>(see figure at right) |
|--------------------------------------------------------|-----------------------------------|-------------------------------------------|
| Pre Heat                                               | -Temperature Min ( $T_{s(min)}$ ) | +150°C                                    |
|                                                        | -Temperature Max( $T_{s(max)}$ )  | +200°C                                    |
|                                                        | -Time (Min to Max) (ts)           | 60-180 secs.                              |
| Average ramp up rate (Liquidus Temp ( $T_L$ ) to peak) |                                   | 3°C/sec. Max                              |
| $T_{s(max)}$ to $T_L$ - Ramp-up Rate                   |                                   | 3°C/sec. Max                              |
| Reflow                                                 | -Temperature( $T_L$ )(Liquidus)   | +217°C                                    |
|                                                        | -Temperature( $t_L$ )             | 60-150 secs.                              |
| Peak Temp ( $T_p$ )                                    |                                   | +260(+0/-5)°C                             |
| Time within 5°C of actual Peak Temp ( $t_p$ )          |                                   | 20-40secs.                                |
| Ramp-down Rate                                         |                                   | 6°C/sec. Max                              |
| Time 25°C to Peak Temp ( $T_p$ )                       |                                   | 8 min. Max                                |
| Do not exceed                                          |                                   | +260°C                                    |



## Package Mechanical Data



| Ref. | Dimensions  |      |        |       |
|------|-------------|------|--------|-------|
|      | Millimeters |      | Inches |       |
|      | Min.        | Max. | Min.   | Max.  |
| A    | 25.40       | -    | 1.000  | -     |
| B    | 8.60        | 9.40 | 0.339  | 0.370 |
| C    | 1.20        | 1.40 | 0.047  | 0.055 |
| D    | 8.60        | 9.10 | 0.339  | 0.358 |

## Contact Information

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