



## 5,000 Watt Transient Voltage Suppressor (TVS) Protection Device



### DESCRIPTION

This RoHS compliant transient voltage suppressor series 5KP5.0e3 - 5KP250CAe3 provides a range of standoff voltage options from 5.0 to 250V in both unidirectional and bidirectional options. Clamping action is almost instantaneous. As a result, they provide effective protection from ESD and EFT per IEC61000-4-2 and IEC61000-4-4, as well as transients caused by inductive switching and RFI. They also protect from secondary lightning effects per 61000-4-5 at the class levels specified below.

**Important:** For the latest information, visit our website <http://www.microsemi.com>.

### FEATURES

- Available in both unidirectional and bidirectional configurations
- Moisture classification is level 1 with no dry pack required per IPC/JEDEC J-STD-020B
- RoHS compliant

### APPLICATIONS / BENEFITS

- Selections for 5.0 to 250 volts stand-off voltage ( $V_{WM}$ )
- Economical TVS series for thru-hole mounting
- Pico- to nano-second response time
- Protection from transients caused by inductive switching and RFI
- Compliant to IEC 61000-4-2 and IEC 61000-4-4 for ESD and EFT protection respectively
- Secondary lightning protection per IEC61000-4-5 with 42 ohms source impedance:
  - Class 1, 2, 3, 4: 5KP5.0 to 5KP110CA
  - Class 5: 5KP5.0 to 5KP110CA (short distance)
  - Class 5: 5KP5.0 to 5KP36CA (long distance)
- Secondary lightning protection per IEC61000-4-5 with 12 ohms source impedance:
  - Class 1 & 2: 5KP5.0 to 5KP110CA
  - Class 3: 5KP5.0 to 5KP78CA
  - Class 4: 5KP5.0 to 5KP40CA
- Secondary lightning protection per IEC61000-4-5 with 2 ohms source impedance:
  - Class 2: 5KP5.0 to 5KP70CA
  - Class 3: 5KP5.0 to 5KP36CA
  - Class 4: 5KP5.0 to 5KP18CA



**P600 Package**

Also available in:

**Case 5A (DO-204AR)  
package**

(hirel plastic axial-leaded)

 [M5KP5.0A – M5KP110CA](#)

**DO-13 package**

(metal axial-leaded)

 [LC6.5A – LC170A](#)

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**MAXIMUM RATINGS @ 25 °C unless otherwise noted**

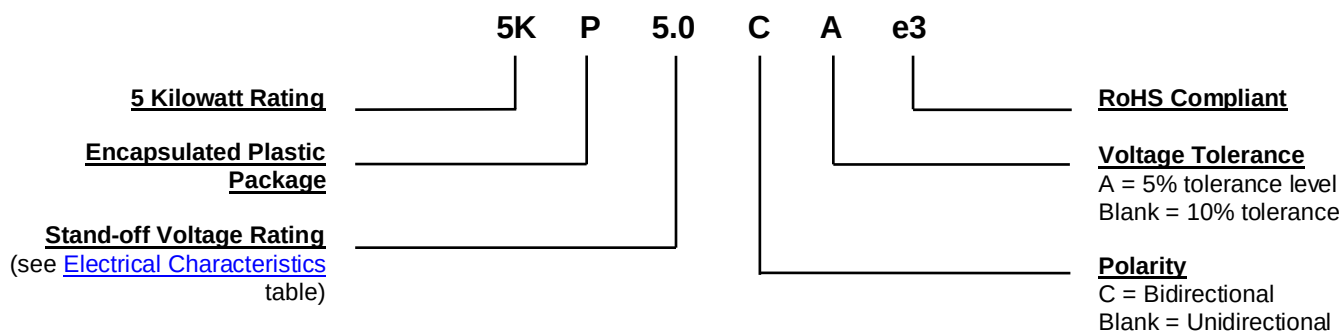
| Parameters/Test Conditions                                                                   | Symbol              | Value       | Unit |
|----------------------------------------------------------------------------------------------|---------------------|-------------|------|
| Junction and Storage Temperature                                                             | $T_J$ and $T_{STG}$ | -55 to +175 | °C   |
| Thermal Resistance, Junction to Lead @ 0.375 inch (9.5 mm) lead length from body             | $R_{\theta JL}$     | 8.0         | °C/W |
| Thermal Resistance, Junction to Ambient                                                      | $R_{\theta JA}$     | 40          | °C/W |
| Peak Pulse Power Dissipation 10/1000 $\mu$ s                                                 | $P_{PP}$            | 5000        | W    |
| Rated Average Power Dissipation @ $T_L = 75$ °C 0.375 inch (9.5 mm) from body <sup>(1)</sup> | $P_{M(AV)}$         | 8.0         | W    |
| Surge Peak Forward Current <sup>(2)</sup>                                                    | $I_{FSM}$           | 500         | A    |
| Solder Temperature @ 10 s                                                                    |                     | 260         | °C   |

**Notes:** 1. When mounted as shown in [Figure 5](#)

2. Measured on 8.3ms single half sine-wave or equivalent square wave, duty cycle = 4 pulses per minute maximum

**MECHANICAL and PACKAGING**

- CASE: Void-free transfer molded thermosetting epoxy body meeting UL94V-0
- TERMINALS: RoHS compliant annealed matte-tin plating. Solderable per MIL-STD-750, method 2026.
- MARKING: Manufacturer, date code, part number, polarity and tolerance suffixes
- POLARITY: For unidirectional types the color band denotes the cathode, which is positive with respect to the anode under normal TVS operation.
- TAPE & REEL option: Standard per EIA-296 (add "TR" suffix to part number). Consult factory for quantities.
- WEIGHT: Approximately 2.1 grams
- See [Package Dimensions](#) on last page.

**PART NOMENCLATURE**


| SYMBOLS & DEFINITIONS |                                                                                                                                                                                                                                                                                                                                                       |
|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Symbol                | Definition                                                                                                                                                                                                                                                                                                                                            |
| $\alpha_{V(BR)}$      | Temperature Coefficient of Breakdown Voltage: The change in breakdown voltage divided by the change in temperature that caused it expressed in $\%/^{\circ}\text{C}$ or $\text{mV}/^{\circ}\text{C}$ .                                                                                                                                                |
| $I_D$                 | Standby Current: The current through the device at rated stand-off voltage.                                                                                                                                                                                                                                                                           |
| $I_{PP}$              | Peak Impulse Current: The maximum rated random recurring peak impulse current or nonrepetitive peak impulse current that may be applied to a device. A random recurring or nonrepetitive transient current is usually due to an external cause, and it is assumed that its effect will have completely disappeared before the next transient arrives. |
| $P_{PP}$              | Peak Pulse Power. The rated random recurring peak impulse power or rated nonrepetitive peak impulse power. The impulse power is the maximum-rated value of the product of $I_{PP}$ and $V_C$ .                                                                                                                                                        |
| $V_{(BR)}$            | Breakdown Voltage: The voltage across the device at a specified current $I_{(BR)}$ in the breakdown region.                                                                                                                                                                                                                                           |
| $V_C$                 | Clamping Voltage: The voltage across the device in a region of low differential resistance during the application of an impulse current ( $I_{PP}$ ) for a specified waveform.                                                                                                                                                                        |
| $V_{WM}$              | Working Standoff Voltage: The maximum-rated value of dc or repetitive peak positive cathode-to-anode voltage that may be continuously applied over the standard operating temperature.                                                                                                                                                                |

**ELECTRICAL CHARACTERISTICS @ 25 °C unless otherwise stated**

| DEVICE NUMBER                 | BREAKDOWN VOLTAGE <sup>(1)</sup><br>V <sub>(BR)</sub> @ I <sub>T</sub> |             | TEST CURRENT<br>I <sub>T</sub> | WORKING STAND-OFF VOLTAGE<br>V <sub>WM</sub> | MAXIMUM STANDBY CURRENT <sup>(3)</sup><br>I <sub>D</sub> @ V <sub>WM</sub> | MAXIMUM PEAK PULSE CURRENT <sup>(2)</sup><br>I <sub>PP</sub> | MAXIMUM CLAMPING VOLTAGE<br>V <sub>C</sub> @ I <sub>PP</sub> | MAXIMUM TEMPERATURE COEFFICIENT OF V <sub>(BR)</sub><br>α <sub>V(BR)</sub> |
|-------------------------------|------------------------------------------------------------------------|-------------|--------------------------------|----------------------------------------------|----------------------------------------------------------------------------|--------------------------------------------------------------|--------------------------------------------------------------|----------------------------------------------------------------------------|
|                               | Min                                                                    | Max         |                                |                                              |                                                                            |                                                              |                                                              |                                                                            |
|                               | Volts                                                                  | mA          |                                |                                              |                                                                            |                                                              |                                                              |                                                                            |
| 5KP5.0e3 / 5KP5.0Ce3          | 6.40                                                                   | 7.30        | 50                             | 5.0                                          | 5000                                                                       | 521                                                          | 9.6                                                          | 0.057                                                                      |
| <b>5KP5.0Ae3 / 5KP5.0CAe3</b> | <b>6.40</b>                                                            | <b>7.00</b> | <b>50</b>                      | <b>5.0</b>                                   | <b>5000</b>                                                                | <b>543</b>                                                   | <b>9.2</b>                                                   | <b>0.057</b>                                                               |
| 5KP6.0e3 / 5KP6.0Ce3          | 6.67                                                                   | 8.15        | 50                             | 6.0                                          | 5000                                                                       | 439                                                          | 11.4                                                         | 0.061                                                                      |
| <b>5KP6.0Ae3 / 5KP6.0CAe3</b> | <b>6.67</b>                                                            | <b>7.37</b> | <b>50</b>                      | <b>6.0</b>                                   | <b>5000</b>                                                                | <b>485</b>                                                   | <b>10.3</b>                                                  | <b>0.061</b>                                                               |
| 5KP6.5e3 / 5KP6.5Ce3          | 7.22                                                                   | 8.82        | 50                             | 6.5                                          | 2000                                                                       | 407                                                          | 12.3                                                         | 0.065                                                                      |
| <b>5KP6.5Ae3 / 5KP6.5CAe3</b> | <b>7.22</b>                                                            | <b>7.98</b> | <b>50</b>                      | <b>6.5</b>                                   | <b>2000</b>                                                                | <b>446</b>                                                   | <b>11.2</b>                                                  | <b>0.065</b>                                                               |
| 5KP7.0e3 / 5KP7.0Ce3          | 7.78                                                                   | 9.51        | 50                             | 7.0                                          | 1000                                                                       | 376                                                          | 13.3                                                         | 0.068                                                                      |
| <b>5KP7.0Ae3 / 5KP7.0CAe3</b> | <b>7.78</b>                                                            | <b>8.60</b> | <b>50</b>                      | <b>7.0</b>                                   | <b>1000</b>                                                                | <b>417</b>                                                   | <b>12.0</b>                                                  | <b>0.068</b>                                                               |
| 5KP7.5e3 / 5KP7.5Ce3          | 8.33                                                                   | 10.2        | 5                              | 7.5                                          | 250                                                                        | 350                                                          | 14.3                                                         | 0.073                                                                      |
| <b>5KP7.5Ae3 / 5KP7.5CAe3</b> | <b>8.33</b>                                                            | <b>9.21</b> | <b>5</b>                       | <b>7.5</b>                                   | <b>250</b>                                                                 | <b>388</b>                                                   | <b>12.9</b>                                                  | <b>0.073</b>                                                               |
| 5KP8.0e3 / 5KP8.0Ce3          | 8.89                                                                   | 10.9        | 5                              | 8.0                                          | 150                                                                        | 333                                                          | 15.0                                                         | 0.075                                                                      |
| <b>5KP8.0Ae3 / 5KP8.0CAe3</b> | <b>8.89</b>                                                            | <b>9.83</b> | <b>5</b>                       | <b>8.0</b>                                   | <b>150</b>                                                                 | <b>368</b>                                                   | <b>13.6</b>                                                  | <b>0.075</b>                                                               |
| 5KP8.5e3 / 5KP8.5Ce3          | 9.44                                                                   | 11.5        | 5                              | 8.5                                          | 50                                                                         | 314                                                          | 15.9                                                         | 0.078                                                                      |
| <b>5KP8.5Ae3 / 5KP8.5CAe3</b> | <b>9.44</b>                                                            | <b>10.4</b> | <b>5</b>                       | <b>8.5</b>                                   | <b>50</b>                                                                  | <b>347</b>                                                   | <b>14.4</b>                                                  | <b>0.078</b>                                                               |
| 5KP9.0e3 / 5KP9.0Ce3          | 10.0                                                                   | 12.2        | 5                              | 9.0                                          | 20                                                                         | 296                                                          | 16.9                                                         | 0.081                                                                      |
| <b>5KP9.0Ae3 / 5KP9.0CAe3</b> | <b>10.0</b>                                                            | <b>11.1</b> | <b>5</b>                       | <b>9.0</b>                                   | <b>20</b>                                                                  | <b>325</b>                                                   | <b>15.4</b>                                                  | <b>0.081</b>                                                               |
| 5KP10e3 / 5KP10Ce3            | 11.1                                                                   | 13.6        | 5                              | 10                                           | 15                                                                         | 266                                                          | 18.8                                                         | 0.084                                                                      |
| <b>5KP10Ae3 / 5KP10CAe3</b>   | <b>11.1</b>                                                            | <b>12.3</b> | <b>5</b>                       | <b>10</b>                                    | <b>15</b>                                                                  | <b>294</b>                                                   | <b>17.0</b>                                                  | <b>0.084</b>                                                               |
| 5KP11e3 / 5KP11Ce3            | 12.2                                                                   | 14.9        | 5                              | 11                                           | 10                                                                         | 249                                                          | 20.1                                                         | 0.086                                                                      |
| <b>5KP11Ae3 / 5KP11CAe3</b>   | <b>12.2</b>                                                            | <b>13.5</b> | <b>5</b>                       | <b>11</b>                                    | <b>10</b>                                                                  | <b>275</b>                                                   | <b>18.2</b>                                                  | <b>0.086</b>                                                               |
| 5KP12e3 / 5KP12Ce3            | 13.3                                                                   | 16.3        | 5                              | 12                                           | 5                                                                          | 227                                                          | 22.0                                                         | 0.088                                                                      |
| <b>5KP12Ae3 / 5KP12CAe3</b>   | <b>13.3</b>                                                            | <b>14.7</b> | <b>5</b>                       | <b>12</b>                                    | <b>5</b>                                                                   | <b>251</b>                                                   | <b>19.9</b>                                                  | <b>0.088</b>                                                               |
| 5KP13e3 / 5KP13Ce3            | 14.4                                                                   | 17.6        | 5                              | 13                                           | 2                                                                          | 210                                                          | 23.8                                                         | 0.090                                                                      |
| <b>5KP13Ae3 / 5KP13CAe3</b>   | <b>14.4</b>                                                            | <b>15.9</b> | <b>5</b>                       | <b>13</b>                                    | <b>2</b>                                                                   | <b>233</b>                                                   | <b>21.5</b>                                                  | <b>0.090</b>                                                               |
| 5KP14e3 / 5KP14Ce3            | 15.6                                                                   | 19.1        | 5                              | 14                                           | 2                                                                          | 194                                                          | 25.8                                                         | 0.092                                                                      |
| <b>5KP14Ae3 / 5KP14CAe3</b>   | <b>15.6</b>                                                            | <b>17.2</b> | <b>5</b>                       | <b>14</b>                                    | <b>2</b>                                                                   | <b>216</b>                                                   | <b>23.2</b>                                                  | <b>0.092</b>                                                               |
| 5KP15e3 / 5KP15Ce3            | 16.7                                                                   | 20.4        | 5                              | 15                                           | 2                                                                          | 186                                                          | 26.9                                                         | 0.094                                                                      |
| <b>5KP15Ae3 / 5KP15CAe3</b>   | <b>16.7</b>                                                            | <b>18.5</b> | <b>5</b>                       | <b>15</b>                                    | <b>2</b>                                                                   | <b>205</b>                                                   | <b>24.4</b>                                                  | <b>0.094</b>                                                               |
| 5KP16e3 / 5KP16Ce3            | 17.8                                                                   | 21.8        | 5                              | 16                                           | 2                                                                          | 174                                                          | 28.8                                                         | 0.096                                                                      |
| <b>5KP16Ae3 / 5KP16CAe3</b>   | <b>17.8</b>                                                            | <b>19.7</b> | <b>5</b>                       | <b>16</b>                                    | <b>2</b>                                                                   | <b>192</b>                                                   | <b>26.0</b>                                                  | <b>0.096</b>                                                               |
| 5KP17e3 / 5KP17Ce3            | 18.9                                                                   | 23.1        | 5                              | 17                                           | 2                                                                          | 164                                                          | 30.5                                                         | 0.097                                                                      |
| <b>5KP17Ae3 / 5KP17CAe3</b>   | <b>18.9</b>                                                            | <b>20.9</b> | <b>5</b>                       | <b>17</b>                                    | <b>2</b>                                                                   | <b>181</b>                                                   | <b>27.6</b>                                                  | <b>0.097</b>                                                               |
| 5KP18e3 / 5KP18Ce3            | 20.0                                                                   | 24.4        | 5                              | 18                                           | 2                                                                          | 155                                                          | 32.2                                                         | 0.098                                                                      |
| <b>5KP18Ae3 / 5KP18CAe3</b>   | <b>20.0</b>                                                            | <b>22.1</b> | <b>5</b>                       | <b>18</b>                                    | <b>2</b>                                                                   | <b>171</b>                                                   | <b>29.2</b>                                                  | <b>0.098</b>                                                               |
| 5KP20e3 / 5KP20Ce3            | 22.2                                                                   | 27.1        | 5                              | 20                                           | 2                                                                          | 140                                                          | 35.8                                                         | 0.099                                                                      |
| <b>5KP20Ae3 / 5KP20CAe3</b>   | <b>22.2</b>                                                            | <b>24.5</b> | <b>5</b>                       | <b>20</b>                                    | <b>2</b>                                                                   | <b>154</b>                                                   | <b>32.4</b>                                                  | <b>0.099</b>                                                               |
| 5KP22e3 / 5KP22Ce3            | 24.4                                                                   | 29.8        | 5                              | 22                                           | 2                                                                          | 127                                                          | 39.4                                                         | 0.100                                                                      |
| <b>5KP22Ae3 / 5KP22CAe3</b>   | <b>24.4</b>                                                            | <b>26.9</b> | <b>5</b>                       | <b>22</b>                                    | <b>2</b>                                                                   | <b>141</b>                                                   | <b>35.5</b>                                                  | <b>0.100</b>                                                               |
| 5KP24e3 / 5KP24Ce3            | 26.7                                                                   | 32.6        | 5                              | 24                                           | 2                                                                          | 116                                                          | 43.0                                                         | 0.101                                                                      |
| <b>5KP24Ae3 / 5KP24CAe3</b>   | <b>26.7</b>                                                            | <b>29.5</b> | <b>5</b>                       | <b>24</b>                                    | <b>2</b>                                                                   | <b>129</b>                                                   | <b>38.9</b>                                                  | <b>0.101</b>                                                               |

Continued on next page

**ELECTRICAL CHARACTERISTICS @ 25 °C unless otherwise stated (continued)**

| DEVICE NUMBER                 | BREAKDOWN VOLTAGE <sup>(1)</sup><br>V <sub>(BR)</sub> @ I <sub>T</sub> |             | TEST CURRENT<br>I <sub>T</sub> | STAND-OFF VOLTAGE<br>V <sub>WM</sub> | MAXIMUM STANDBY CURRENT <sup>(3)</sup><br>I <sub>b</sub> @ V <sub>WM</sub> | MAXIMUM PEAK PULSE CURRENT <sup>(2)</sup><br>I <sub>PP</sub> | MAXIMUM CLAMPING VOLTAGE<br>V <sub>C</sub> @ I <sub>PP</sub> | MAXIMUM TEMPERATURE COEFFICIENT OF V <sub>(BR)</sub><br>α <sub>V(BR)</sub> |
|-------------------------------|------------------------------------------------------------------------|-------------|--------------------------------|--------------------------------------|----------------------------------------------------------------------------|--------------------------------------------------------------|--------------------------------------------------------------|----------------------------------------------------------------------------|
|                               | Min                                                                    | Max         |                                |                                      |                                                                            |                                                              |                                                              |                                                                            |
|                               | Volts                                                                  | mA          |                                |                                      | μA                                                                         | Amps                                                         | Volts                                                        | %/°C                                                                       |
| 5KP26e3 / 5KP26Ce3            | 28.9                                                                   | 35.3        | 5                              | 26                                   | 2                                                                          | 107                                                          | 46.6                                                         | 0.101                                                                      |
| <b>5KP26Ae3 / 5KP26CAe3</b>   | <b>28.9</b>                                                            | <b>31.9</b> | <b>5</b>                       | <b>26</b>                            | <b>2</b>                                                                   | <b>119</b>                                                   | <b>42.1</b>                                                  | <b>0.101</b>                                                               |
| 5KP28e3 / 5KP28Ce3            | 31.1                                                                   | 38.0        | 5                              | 28                                   | 2                                                                          | 100                                                          | 50.0                                                         | 0.102                                                                      |
| <b>5KP28Ae3 / 5KP28CAe3</b>   | <b>31.1</b>                                                            | <b>34.4</b> | <b>5</b>                       | <b>28</b>                            | <b>2</b>                                                                   | <b>110</b>                                                   | <b>45.4</b>                                                  | <b>0.102</b>                                                               |
| 5KP30e3 / 5KP30Ce3            | 33.3                                                                   | 40.7        | 5                              | 30                                   | 2                                                                          | 93.5                                                         | 53.5                                                         | 0.103                                                                      |
| <b>5KP30Ae3 / 5KP30CAe3</b>   | <b>33.3</b>                                                            | <b>36.8</b> | <b>5</b>                       | <b>30</b>                            | <b>2</b>                                                                   | <b>103</b>                                                   | <b>48.4</b>                                                  | <b>0.103</b>                                                               |
| 5KP33e3 / 5KP33Ce3            | 36.7                                                                   | 44.9        | 5                              | 33                                   | 2                                                                          | 84.7                                                         | 59.0                                                         | 0.104                                                                      |
| <b>5KP33Ae3 / 5KP33CAe3</b>   | <b>36.7</b>                                                            | <b>40.6</b> | <b>5</b>                       | <b>33</b>                            | <b>2</b>                                                                   | <b>93.8</b>                                                  | <b>53.3</b>                                                  | <b>0.104</b>                                                               |
| 5KP36e3 / 5KP36Ce3            | 40.0                                                                   | 48.9        | 5                              | 36                                   | 2                                                                          | 77.8                                                         | 64.3                                                         | 0.104                                                                      |
| <b>5KP36Ae3 / 5KP36CAe3</b>   | <b>40.0</b>                                                            | <b>44.2</b> | <b>5</b>                       | <b>36</b>                            | <b>2</b>                                                                   | <b>86.1</b>                                                  | <b>58.1</b>                                                  | <b>0.104</b>                                                               |
| 5KP40e3 / 5KP40Ce3            | 44.4                                                                   | 54.3        | 5                              | 40                                   | 2                                                                          | 70.0                                                         | 71.4                                                         | 0.105                                                                      |
| <b>5KP40Ae3 / 5KP40CAe3</b>   | <b>44.4</b>                                                            | <b>49.1</b> | <b>5</b>                       | <b>40</b>                            | <b>2</b>                                                                   | <b>77.5</b>                                                  | <b>64.5</b>                                                  | <b>0.105</b>                                                               |
| 5KP43e3 / 5KP43Ce3            | 47.8                                                                   | 58.4        | 5                              | 43                                   | 2                                                                          | 65.2                                                         | 76.7                                                         | 0.105                                                                      |
| <b>5KP43Ae3 / 5KP43CAe3</b>   | <b>47.8</b>                                                            | <b>52.8</b> | <b>5</b>                       | <b>43</b>                            | <b>2</b>                                                                   | <b>72.0</b>                                                  | <b>69.4</b>                                                  | <b>0.105</b>                                                               |
| 5KP45e3 / 5KP45Ce3            | 50.0                                                                   | 61.1        | 5                              | 45                                   | 2                                                                          | 62.3                                                         | 80.3                                                         | 0.106                                                                      |
| <b>5KP45Ae3 / 5KP45CAe3</b>   | <b>50.0</b>                                                            | <b>55.3</b> | <b>5</b>                       | <b>45</b>                            | <b>2</b>                                                                   | <b>68.8</b>                                                  | <b>72.7</b>                                                  | <b>0.106</b>                                                               |
| 5KP48e3 / 5KP48Ce3            | 53.3                                                                   | 65.2        | 5                              | 48                                   | 2                                                                          | 58.5                                                         | 85.5                                                         | 0.106                                                                      |
| <b>5KP48Ae3 / 5KP48CAe3</b>   | <b>53.3</b>                                                            | <b>58.9</b> | <b>5</b>                       | <b>48</b>                            | <b>2</b>                                                                   | <b>64.6</b>                                                  | <b>77.4</b>                                                  | <b>0.106</b>                                                               |
| 5KP51e3 / 5KP51Ce3            | 56.7                                                                   | 69.3        | 5                              | 51                                   | 2                                                                          | 54.9                                                         | 91.1                                                         | 0.107                                                                      |
| <b>5KP51Ae3 / 5KP51CAe3</b>   | <b>56.7</b>                                                            | <b>62.7</b> | <b>5</b>                       | <b>51</b>                            | <b>2</b>                                                                   | <b>60.7</b>                                                  | <b>82.4</b>                                                  | <b>0.107</b>                                                               |
| 5KP54e3 / 5KP54Ce3            | 60.0                                                                   | 73.3        | 5                              | 54                                   | 2                                                                          | 51.9                                                         | 96.3                                                         | 0.107                                                                      |
| <b>5KP54Ae3 / 5KP54CAe3</b>   | <b>60.0</b>                                                            | <b>66.3</b> | <b>5</b>                       | <b>54</b>                            | <b>2</b>                                                                   | <b>57.4</b>                                                  | <b>87.1</b>                                                  | <b>0.107</b>                                                               |
| 5KP58e3 / 5KP58Ce3            | 64.4                                                                   | 78.7        | 5                              | 58                                   | 2                                                                          | 48.5                                                         | 103                                                          | 0.107                                                                      |
| <b>5KP58Ae3 / 5KP58CAe3</b>   | <b>64.4</b>                                                            | <b>71.2</b> | <b>5</b>                       | <b>58</b>                            | <b>2</b>                                                                   | <b>53.4</b>                                                  | <b>94</b>                                                    | <b>0.107</b>                                                               |
| 5KP60e3 / 5KP60Ce3            | 66.7                                                                   | 81.5        | 5                              | 60                                   | 2                                                                          | 46.7                                                         | 107                                                          | 0.108                                                                      |
| <b>5KP60Ae3 / 5KP60CAe3</b>   | <b>66.7</b>                                                            | <b>73.7</b> | <b>5</b>                       | <b>60</b>                            | <b>2</b>                                                                   | <b>51.7</b>                                                  | <b>97</b>                                                    | <b>0.108</b>                                                               |
| 5KP64e3 / 5KP64Ce3            | 71.1                                                                   | 86.9        | 5                              | 64                                   | 2                                                                          | 43.9                                                         | 114                                                          | 0.108                                                                      |
| <b>5KP64Ae3 / 5KP64CAe3</b>   | <b>71.1</b>                                                            | <b>78.6</b> | <b>5</b>                       | <b>64</b>                            | <b>2</b>                                                                   | <b>48.5</b>                                                  | <b>103</b>                                                   | <b>0.108</b>                                                               |
| 5KP70e3 / 5KP70Ce3            | 77.8                                                                   | 95.1        | 5                              | 70                                   | 2                                                                          | 40.0                                                         | 125                                                          | 0.108                                                                      |
| <b>5KP70Ae3 / 5KP70CAe3</b>   | <b>77.8</b>                                                            | <b>86.0</b> | <b>5</b>                       | <b>70</b>                            | <b>2</b>                                                                   | <b>44.2</b>                                                  | <b>113</b>                                                   | <b>0.108</b>                                                               |
| 5KP75e3 / 5KP75Ce3            | 83.3                                                                   | 102         | 5                              | 75                                   | 2                                                                          | 37.3                                                         | 134                                                          | 0.108                                                                      |
| <b>5KP75Ae3 / 5KP75CAe3</b>   | <b>83.3</b>                                                            | <b>92.1</b> | <b>5</b>                       | <b>75</b>                            | <b>2</b>                                                                   | <b>41.3</b>                                                  | <b>121</b>                                                   | <b>0.108</b>                                                               |
| 5KP78e3 / 5KP78Ce3            | 86.7                                                                   | 106         | 5                              | 78                                   | 2                                                                          | 36.0                                                         | 139                                                          | 0.108                                                                      |
| <b>5KP78Ae3 / 5KP78CAe3</b>   | <b>86.7</b>                                                            | <b>95.8</b> | <b>5</b>                       | <b>78</b>                            | <b>2</b>                                                                   | <b>39.7</b>                                                  | <b>126</b>                                                   | <b>0.108</b>                                                               |
| 5KP85e3 / 5KP85Ce3            | 94.4                                                                   | 115         | 5                              | 85                                   | 2                                                                          | 33.1                                                         | 151                                                          | 0.108                                                                      |
| <b>5KP85Ae3 / 5KP85CAe3</b>   | <b>94.4</b>                                                            | <b>104</b>  | <b>5</b>                       | <b>85</b>                            | <b>2</b>                                                                   | <b>36.5</b>                                                  | <b>137</b>                                                   | <b>0.108</b>                                                               |
| 5KP90e3 / 5KP90Ce3            | 100                                                                    | 122         | 5                              | 90                                   | 2                                                                          | 31.3                                                         | 160                                                          | 0.110                                                                      |
| <b>5KP90Ae3 / 5KP90CAe3</b>   | <b>100</b>                                                             | <b>111</b>  | <b>5</b>                       | <b>90</b>                            | <b>2</b>                                                                   | <b>34.2</b>                                                  | <b>146</b>                                                   | <b>0.110</b>                                                               |
| 5KP100e3 / 5KP100Ce3          | 111                                                                    | 136         | 5                              | 100                                  | 2                                                                          | 27.9                                                         | 179                                                          | 0.110                                                                      |
| <b>5KP100Ae3 / 5KP100CAe3</b> | <b>111</b>                                                             | <b>123</b>  | <b>5</b>                       | <b>100</b>                           | <b>2</b>                                                                   | <b>30.9</b>                                                  | <b>162</b>                                                   | <b>0.110</b>                                                               |

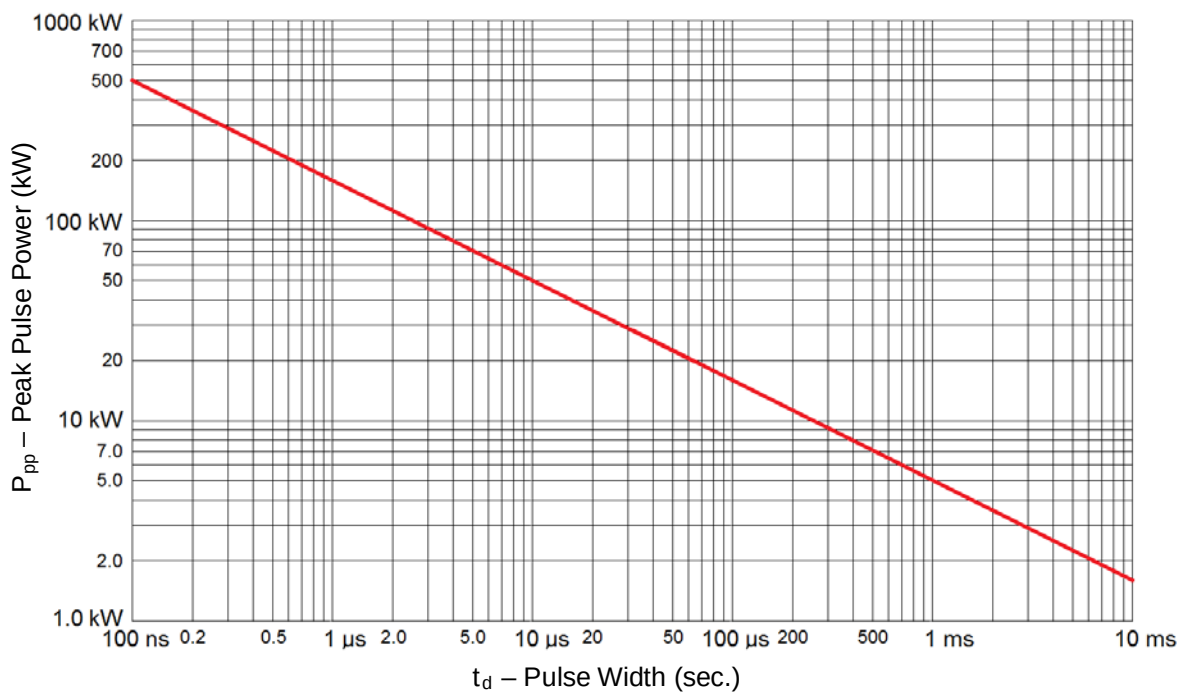
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**ELECTRICAL CHARACTERISTICS @ 25 °C unless otherwise stated (continued)**

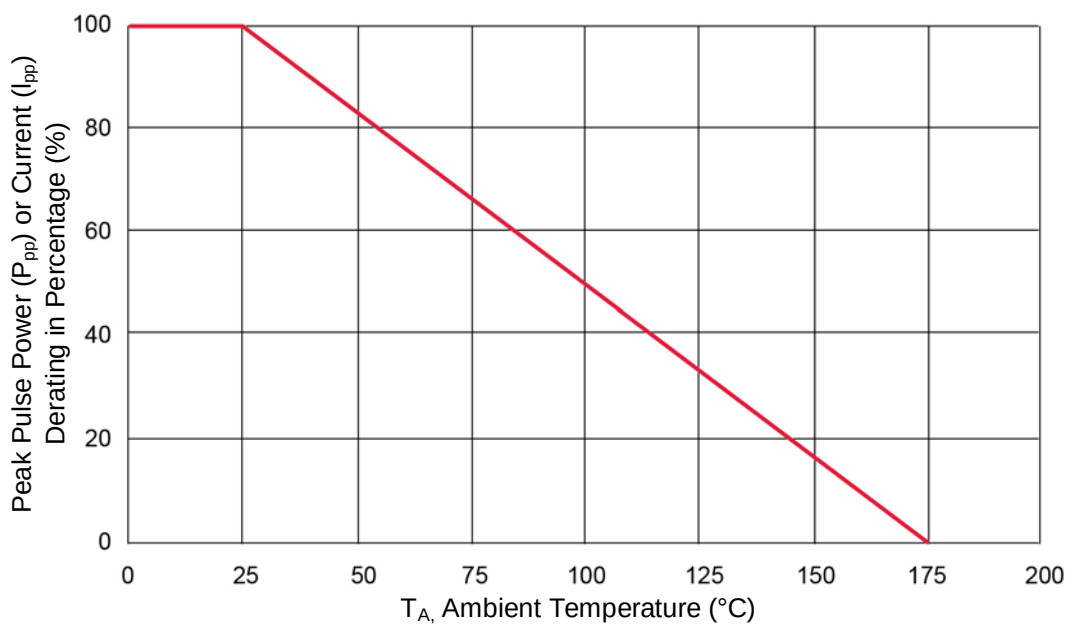
| DEVICE NUMBER                 | BREAKDOWN VOLTAGE <sup>(1)</sup><br>$V_{(BR)}$ @ $I_T$ |            | TEST CURRENT<br>$I_T$ | STAND-OFF VOLTAGE<br>$V_{WM}$ | MAXIMUM STANDBY CURRENT <sup>(3)</sup><br>$I_D$ @ $V_{WM}$ | MAXIMUM PEAK PULSE CURRENT <sup>(2)</sup><br>$I_{PP}$ | MAXIMUM CLAMPING VOLTAGE<br>$V_C$ @ $I_{PP}$ | MAXIMUM TEMPERATURE COEFFICIENT OF $V_{(BR)}$<br>$\alpha_{V(BR)}$ |
|-------------------------------|--------------------------------------------------------|------------|-----------------------|-------------------------------|------------------------------------------------------------|-------------------------------------------------------|----------------------------------------------|-------------------------------------------------------------------|
|                               | Min                                                    | Max        |                       |                               |                                                            |                                                       |                                              |                                                                   |
|                               | Volts                                                  | mA         |                       |                               | $\mu A$                                                    | Amps                                                  | Volts                                        | %/°C                                                              |
| 5KP110e3 / 5KP110Ce3          | 122                                                    | 149        | 5                     | 110                           | 2                                                          | 25.5                                                  | 196                                          | 0.110                                                             |
| <b>5KP110Ae3 / 5KP110CAe3</b> | <b>122</b>                                             | <b>135</b> | <b>5</b>              | <b>110</b>                    | <b>2</b>                                                   | <b>28.2</b>                                           | <b>177</b>                                   | <b>0.110</b>                                                      |
| 5KP120e3 / 5KP120Ce3          | 133                                                    | 162        | 5                     | 120                           | 2                                                          | 23.5                                                  | 213                                          | 0.110                                                             |
| <b>5KP120Ae3 / 5KP120CAe3</b> | <b>133</b>                                             | <b>147</b> | <b>5</b>              | <b>120</b>                    | <b>2</b>                                                   | <b>26.4</b>                                           | <b>193</b>                                   | <b>0.110</b>                                                      |
| 5KP130e3 / 5KP130Ce3          | 144                                                    | 175        | 5                     | 130                           | 2                                                          | 21.6                                                  | 231                                          | 0.110                                                             |
| <b>5KP130Ae3 / 5KP130CAe3</b> | <b>144</b>                                             | <b>159</b> | <b>5</b>              | <b>130</b>                    | <b>2</b>                                                   | <b>24.4</b>                                           | <b>209</b>                                   | <b>0.110</b>                                                      |
| 5KP150e3 / 5KP150Ce3          | 167                                                    | 204        | 5                     | 150                           | 2                                                          | 18.7                                                  | 268                                          | 0.110                                                             |
| <b>5KP150Ae3 / 5KP150CAe3</b> | <b>167</b>                                             | <b>185</b> | <b>5</b>              | <b>150</b>                    | <b>2</b>                                                   | <b>21.0</b>                                           | <b>243</b>                                   | <b>0.110</b>                                                      |
| 5KP160e3 / 5KP160Ce3          | 178                                                    | 217        | 5                     | 160                           | 2                                                          | 17.4                                                  | 287                                          | 0.110                                                             |
| <b>5KP160Ae3 / 5KP160CAe3</b> | <b>178</b>                                             | <b>197</b> | <b>5</b>              | <b>160</b>                    | <b>2</b>                                                   | <b>19.7</b>                                           | <b>259</b>                                   | <b>0.110</b>                                                      |
| 5KP170e3 / 5KP170Ce3          | 189                                                    | 231        | 5                     | 170                           | 2                                                          | 16.4                                                  | 304                                          | 0.110                                                             |
| <b>5KP170Ae3 / 5KP170CAe3</b> | <b>189</b>                                             | <b>209</b> | <b>5</b>              | <b>170</b>                    | <b>2</b>                                                   | <b>18.5</b>                                           | <b>275</b>                                   | <b>0.110</b>                                                      |
| 5KP180e3 / 5KP180Ce3          | 200                                                    | 244        | 5                     | 180                           | 2                                                          | 15.5                                                  | 323                                          | 0.110                                                             |
| <b>5KP180Ae3 / 5KP180CAe3</b> | <b>200</b>                                             | <b>221</b> | <b>5</b>              | <b>180</b>                    | <b>2</b>                                                   | <b>17.5</b>                                           | <b>292</b>                                   | <b>0.110</b>                                                      |
| 5KP190e3 / 5KP190Ce3          | 211                                                    | 258        | 5                     | 190                           | 2                                                          | 14.6                                                  | 343                                          | 0.110                                                             |
| <b>5KP190Ae3 / 5KP190CAe3</b> | <b>211</b>                                             | <b>233</b> | <b>5</b>              | <b>190</b>                    | <b>2</b>                                                   | <b>16.5</b>                                           | <b>310</b>                                   | <b>0.110</b>                                                      |
| 5KP200e3 / 5KP200Ce3          | 222                                                    | 271        | 5                     | 200                           | 2                                                          | 13.7                                                  | 364                                          | 0.110                                                             |
| <b>5KP200Ae3 / 5KP200CAe3</b> | <b>222</b>                                             | <b>246</b> | <b>5</b>              | <b>200</b>                    | <b>2</b>                                                   | <b>15.5</b>                                           | <b>329</b>                                   | <b>0.110</b>                                                      |
| 5KP210e3 / 5KP210Ce3          | 233                                                    | 284        | 5                     | 210                           | 2                                                          | 12.9                                                  | 386                                          | 0.110                                                             |
| <b>5KP210Ae3 / 5KP210CAe3</b> | <b>233</b>                                             | <b>258</b> | <b>5</b>              | <b>210</b>                    | <b>2</b>                                                   | <b>14.6</b>                                           | <b>349</b>                                   | <b>0.110</b>                                                      |
| 5KP220e3 / 5KP220Ce3          | 244                                                    | 298        | 5                     | 220                           | 2                                                          | 12.2                                                  | 410                                          | 0.110                                                             |
| <b>5KP220Ae3 / 5KP220CAe3</b> | <b>244</b>                                             | <b>270</b> | <b>5</b>              | <b>220</b>                    | <b>2</b>                                                   | <b>13.7</b>                                           | <b>371</b>                                   | <b>0.110</b>                                                      |
| 5KP250e3 / 5KP250Ce3          | 277                                                    | 338        | 5                     | 250                           | 2                                                          | 10.6                                                  | 470                                          | 0.110                                                             |
| <b>5KP250Ae3 / 5KP250CAe3</b> | <b>277</b>                                             | <b>306</b> | <b>5</b>              | <b>250</b>                    | <b>2</b>                                                   | <b>12.0</b>                                           | <b>425</b>                                   | <b>0.110</b>                                                      |

**NOTES:**

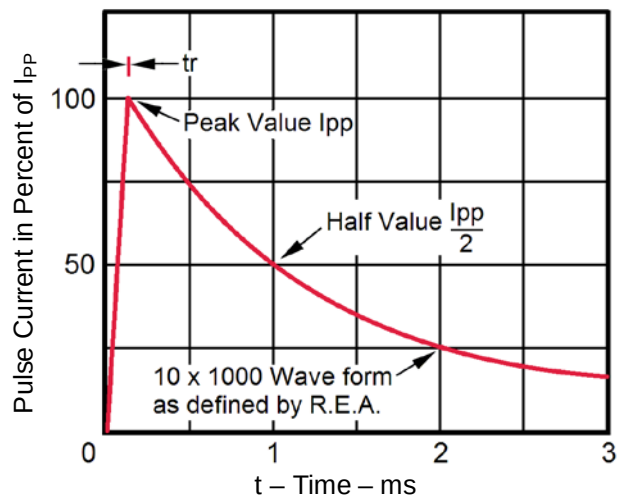
- (1)  $V_{(BR)}$  measured after  $I_T$  applied for 300  $\mu s$ ,  $I_T$  = square wave pulse or equivalent
- (2) Surge current waveform per [Figure 3](#) and derated per [Figure 2](#)
- (3) For bidirectional types with  $V_{WM}$  of 30 volts and less, the  $I_D$  limit is doubled

**GRAPHS**


**FIGURE 1**  
Peak Pulse Power Rating Curve



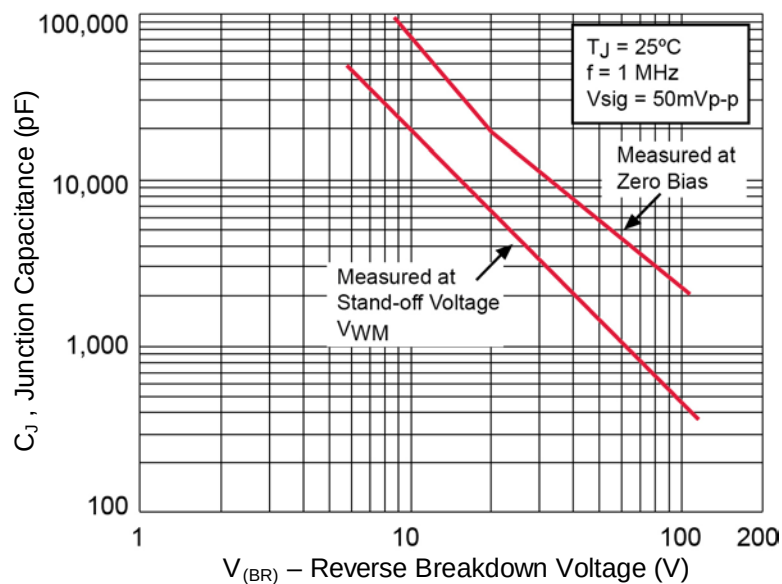
**FIGURE 2**  
Pulse Derating Curve

**GRAPHS (continued)**


Test waveform parameters:  $t_r=10\ \mu s$ ,  $t_p=1000\ \mu s$

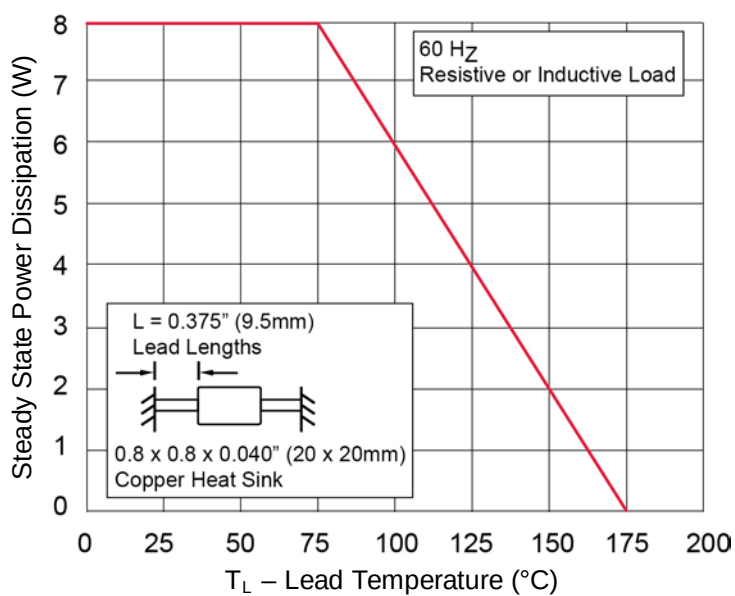
**FIGURE 3**

Pulse Waveform for 10/1000  $\mu s$  Exponential Surge

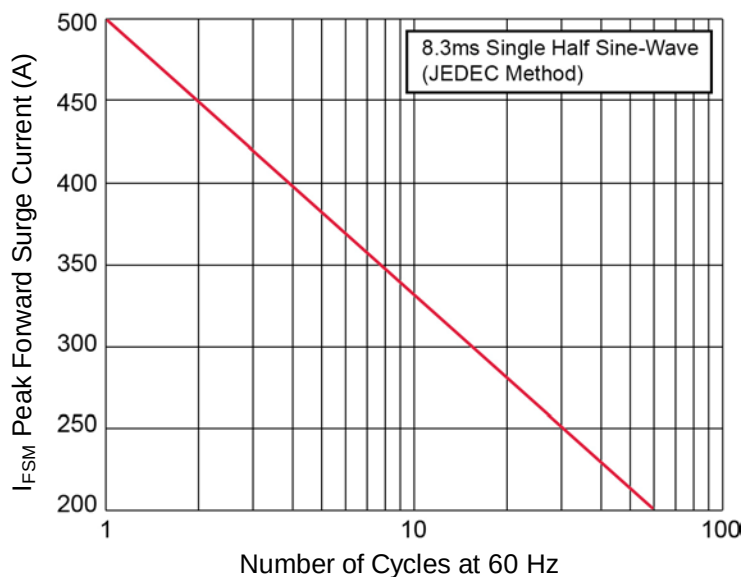

**FIGURE 4**

Typical Junction Capacitance

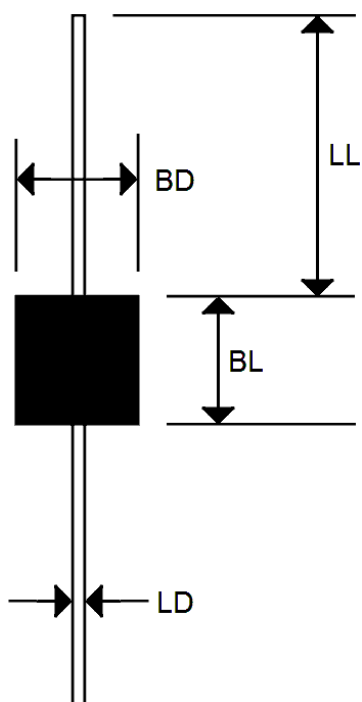


**GRAPHS (continued)**


**FIGURE 5**  
Steady State Power Derating Curve



**FIGURE 6**  
Maximum Non-repetitive Forward Surge Current

**PACKAGE DIMENSIONS**


| Dim | Dimensions |       |             |       |
|-----|------------|-------|-------------|-------|
|     | Inch       |       | Millimeters |       |
|     | Min        | Max   | Min         | Max   |
| LL  | 0.750      | -     | 19.05       | -     |
| BL  | 0.340      | 0.360 | 8.645       | 9.135 |
| BD  | 0.340      | 0.360 | 8.645       | 9.135 |
| LD  | 0.047      | 0.053 | 1.194       | 1.346 |

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[5KP36CAE3/TR13](#) [5KP11CE3/TR13](#) [5KP22CAE3/TR13](#) [5KP8.0E3/TR13](#) [5KP15CAE3/TR13](#) [5KP7.5CE3/TR13](#)  
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[5KP6.0E3/TR13](#) [5KP8.5CAE3/TR13](#) [5KP17CE3/TR13](#) [5KP14CE3/TR13](#) [5KP33CAE3/TR13](#) [5KP14E3/TR13](#)  
[5KP18E3/TR13](#) [5KP54AE3/TR13](#) [5KP78E3/TR13](#) [5KP20AE3/TR13](#) [5KP5.0E3/TR13](#) [5KP11CAE3/TR13](#)  
[5KP110CAE3/TR13](#) [5KP28CE3/TR13](#) [5KP75AE3/TR13](#) [5KP7.0AE3/TR13](#) [5KP58CE3/TR13](#) [5KP90CE3/TR13](#)  
[5KP36E3/TR13](#) [5KP75CAE3/TR13](#) [5KP100CAE3/TR13](#) [5KP6.5CAE3/TR13](#) [5KP64CAE3/TR13](#) [5KP75CE3/TR13](#)  
[5KP51CAE3/TR13](#) [5KP7.0CAE3/TR13](#) [5KP48AE3/TR13](#) [5KP22E3/TR13](#) [5KP70CE3/TR13](#) [5KP64AE3/TR13](#)  
[5KP17CAE3/TR13](#) [5KP12CE3/TR13](#) [5KP17AE3/TR13](#) [5KP16CAE3/TR13](#) [5KP18CAE3/TR13](#) [5KP13CAE3/TR13](#)  
[5KP43CE3/TR13](#) [5KP6.5CE3/TR13](#) [5KP30CE3/TR13](#) [5KP90CAE3/TR13](#) [5KP6.0CAE3/TR13](#) [5KP15AE3/TR13](#)  
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