


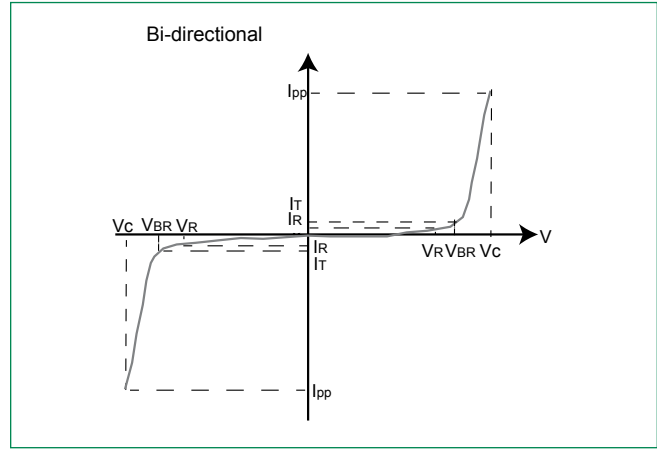
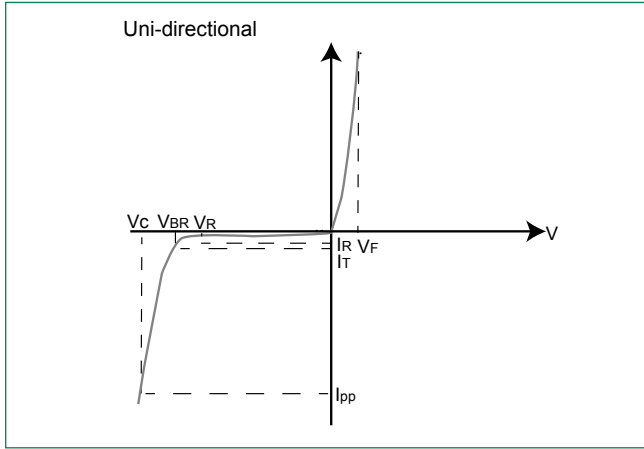
Electrical Characteristics (T_A=25°C unless otherwise noted)

| Part Number (Uni) | Part Number (Bi) | Reverse Stand off Voltage V _R (Volts) | Breakdown Voltage V _{BR} (Volts) @ I _T | | Test Current I _T (mA) | Maximum Clamping Voltage V _C @ I _{PP} (V) | Maximum Peak Pulse Current I _{PP} (A) | Maximum Reverse Leakage I _R @ V _R (μA) | Agency Recognition  |
|-------------------|------------------|--|--|--------|----------------------------------|---|--|--|--|
| | | | Min | Max | | | | | |
| 5KP5.0A | 5KP5.0CA | 5.0 | 6.40 | 7.00 | 50 | 9.2 | 554.3 | 5000 | X |
| 5KP6.0A | 5KP6.0CA | 6.0 | 6.67 | 7.37 | 50 | 10.3 | 495.1 | 5000 | X |
| 5KP6.5A | 5KP6.5CA | 6.5 | 7.22 | 7.98 | 50 | 11.2 | 455.4 | 2000 | X |
| 5KP7.0A | 5KP7.0CA | 7.0 | 7.78 | 8.60 | 50 | 12.0 | 425.0 | 1000 | X |
| 5KP7.5A | 5KP7.5CA | 7.5 | 8.33 | 9.21 | 5 | 12.9 | 395.3 | 250 | X |
| 5KP8.0A | 5KP8.0CA | 8.0 | 8.89 | 9.83 | 5 | 13.6 | 375.0 | 150 | X |
| 5KP8.5A | 5KP8.5CA | 8.5 | 9.44 | 10.40 | 5 | 14.4 | 354.2 | 50 | X |
| 5KP9.0A | 5KP9.0CA | 9.0 | 10.00 | 11.10 | 5 | 15.4 | 331.2 | 20 | X |
| 5KP10A | 5KP10CA | 10.0 | 11.10 | 12.30 | 5 | 17.0 | 300.0 | 15 | X |
| 5KP11A | 5KP11CA | 11.0 | 12.20 | 13.50 | 5 | 18.2 | 280.2 | 2 | X |
| 5KP12A | 5KP12CA | 12.0 | 13.30 | 14.70 | 5 | 19.9 | 256.3 | 2 | X |
| 5KP13A | 5KP13CA | 13.0 | 14.40 | 15.90 | 5 | 21.5 | 237.2 | 2 | X |
| 5KP14A | 5KP14CA | 14.0 | 15.60 | 17.20 | 5 | 23.2 | 219.8 | 2 | X |
| 5KP15A | 5KP15CA | 15.0 | 16.70 | 18.50 | 5 | 24.4 | 209.0 | 2 | X |
| 5KP16A | 5KP16CA | 16.0 | 17.80 | 19.70 | 5 | 26.0 | 196.2 | 2 | X |
| 5KP17A | 5KP17CA | 17.0 | 18.90 | 20.90 | 5 | 27.6 | 184.8 | 2 | X |
| 5KP18A | 5KP18CA | 18.0 | 20.00 | 22.10 | 5 | 29.2 | 174.7 | 2 | X |
| 5KP20A | 5KP20CA | 20.0 | 22.20 | 24.50 | 5 | 32.4 | 157.4 | 2 | X |
| 5KP22A | 5KP22CA | 22.0 | 24.00 | 26.90 | 5 | 35.5 | 143.7 | 2 | X |
| 5KP24A | 5KP24CA | 24.0 | 26.70 | 29.50 | 5 | 38.9 | 131.1 | 2 | X |
| 5KP26A | 5KP26CA | 26.0 | 28.90 | 31.90 | 5 | 42.1 | 121.1 | 2 | X |
| 5KP28A | 5KP28CA | 28.0 | 31.10 | 34.40 | 5 | 45.4 | 112.3 | 2 | X |
| 5KP30A | 5KP30CA | 30.0 | 33.30 | 36.80 | 5 | 48.4 | 105.4 | 2 | X |
| 5KP33A | 5KP33CA | 33.0 | 36.70 | 40.60 | 5 | 53.3 | 95.7 | 2 | X |
| 5KP36A | 5KP36CA | 36.0 | 40.00 | 44.20 | 5 | 58.1 | 87.8 | 2 | X |
| 5KP40A | 5KP40CA | 40.0 | 44.40 | 49.10 | 5 | 64.5 | 79.1 | 2 | X |
| 5KP43A | 5KP43CA | 43.0 | 47.80 | 52.80 | 5 | 69.4 | 73.5 | 2 | X |
| 5KP45A | 5KP45CA | 45.0 | 50.00 | 55.30 | 5 | 72.7 | 70.2 | 2 | X |
| 5KP48A | 5KP48CA | 48.0 | 53.30 | 58.90 | 5 | 77.4 | 65.9 | 2 | X |
| 5KP51A | 5KP51CA | 51.0 | 56.70 | 62.70 | 5 | 82.4 | 61.9 | 2 | X |
| 5KP54A | 5KP54CA | 54.0 | 60.00 | 66.30 | 5 | 87.1 | 58.6 | 2 | X |
| 5KP58A | 5KP58CA | 58.0 | 64.40 | 71.20 | 5 | 93.6 | 54.5 | 2 | X |
| 5KP60A | 5KP60CA | 60.0 | 66.70 | 73.70 | 5 | 96.8 | 52.7 | 2 | X |
| 5KP64A | 5KP64CA | 64.0 | 71.10 | 78.60 | 5 | 103.0 | 49.5 | 2 | X |
| 5KP70A | 5KP70CA | 70.0 | 77.80 | 86.00 | 5 | 113.0 | 45.1 | 2 | X |
| 5KP75A | 5KP75CA | 75.0 | 83.30 | 92.10 | 5 | 121.0 | 42.1 | 2 | X |
| 5KP78A | 5KP78CA | 78.0 | 86.70 | 95.80 | 5 | 126.0 | 40.5 | 2 | X |
| 5KP85A | 5KP85CA | 85.0 | 94.40 | 104.00 | 5 | 137.0 | 37.2 | 2 | X |
| 5KP90A | 5KP90CA | 90.0 | 100.00 | 111.00 | 5 | 146.0 | 34.9 | 2 | X |
| 5KP100A | 5KP100CA | 100.0 | 110.00 | 123.00 | 5 | 162.0 | 31.5 | 2 | X |
| 5KP110A | 5KP110CA | 110.0 | 122.00 | 135.00 | 5 | 177.0 | 28.8 | 2 | X |
| 5KP120A | 5KP120CA | 120.0 | 133.00 | 147.00 | 5 | 193.0 | 26.4 | 2 | X |
| 5KP130A | 5KP130CA | 130.0 | 144.00 | 159.00 | 5 | 209.0 | 24.4 | 2 | X |
| 5KP150A | 5KP150CA | 150.0 | 167.00 | 185.00 | 5 | 243.0 | 21.0 | 2 | X |
| 5KP160A | 5KP160CA | 160.0 | 178.00 | 197.00 | 5 | 259.0 | 19.7 | 2 | X |
| 5KP170A | 5KP170CA | 170.0 | 189.00 | 209.00 | 5 | 275.0 | 18.5 | 2 | X |
| 5KP180A | 5KP180CA | 180.0 | 200.00 | 221.00 | 5 | 292.0 | 17.5 | 2 | X |
| 5KP190A | 5KP190CA | 190.0 | 211.00 | 233.00 | 5 | 310.0 | 16.5 | 2 | - |
| 5KP200A | 5KP200CA | 200.0 | 222.00 | 246.00 | 5 | 329.2 | 15.5 | 2 | X |
| 5KP210A | 5KP210CA | 210.0 | 233.00 | 258.00 | 5 | 349.5 | 14.6 | 2 | - |
| 5KP220A | 5KP220CA | 220.0 | 244.00 | 270.00 | 5 | 371.1 | 13.7 | 2 | X |
| 5KP250A | 5KP250CA | 250.0 | 277.00 | 306.00 | 5 | 425.0 | 12.0 | 2 | X |

For bidirectional type having V_R of 10 volts and less, the I_R limit is double.

For parts without A, the V_{BR} is ± 10% and V_C is 5% higher than with A parts, the parts without A are currently available, but not recommended for new designs. The parts with A are preferred.

I-V Curve Characteristics



- P_{PPM} **Peak Pulse Power Dissipation** – Max power dissipation
- V_R **Stand-off Voltage** – Maximum voltage that can be applied to the TVS without operation
- V_{BR} **Breakdown Voltage** – Maximum voltage that flows through the TVS at a specified test current (I_T)
- V_C **Clamping Voltage** – Peak voltage measured across the TVS at a specified I_{ppm} (peak impulse current)
- I_R **Reverse Leakage Current** – Current measured at V_R
- V_F **Forward Voltage Drop for Uni-directional**

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

Figure 1 - TVS Transients Clamping Waveform

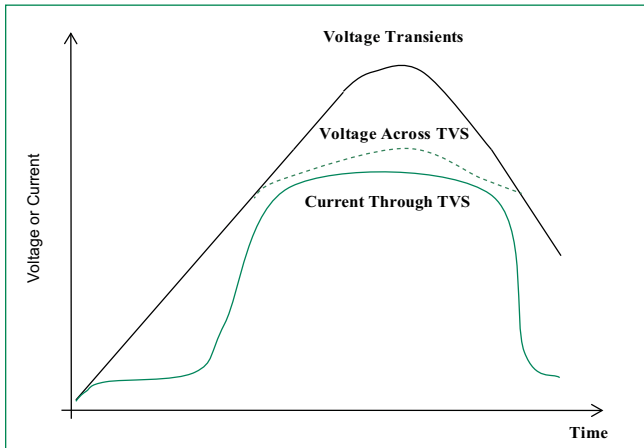
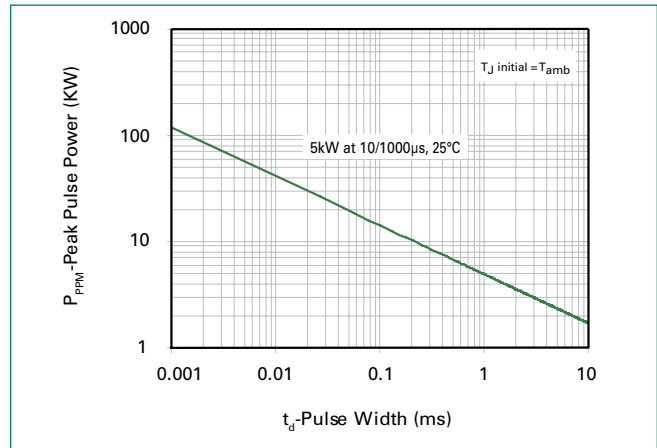


Figure 2 - Peak Pulse Power Rating Curve



Ratings and Characteristic Curves ($T_A=25^\circ\text{C}$ unless otherwise noted) (Continued)

Figure 3 - Peak Pulse Power Derating Curve

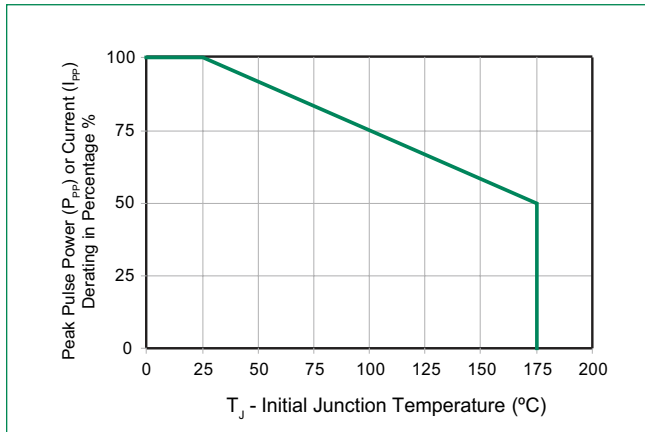


Figure 4 - Pulse Waveform

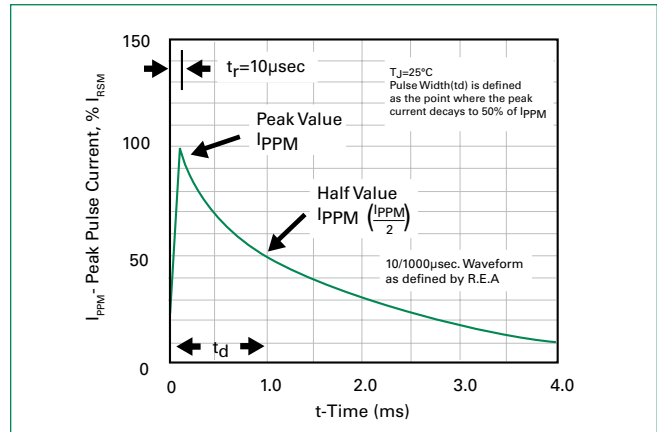


Figure 5 - Typical Junction Capacitance

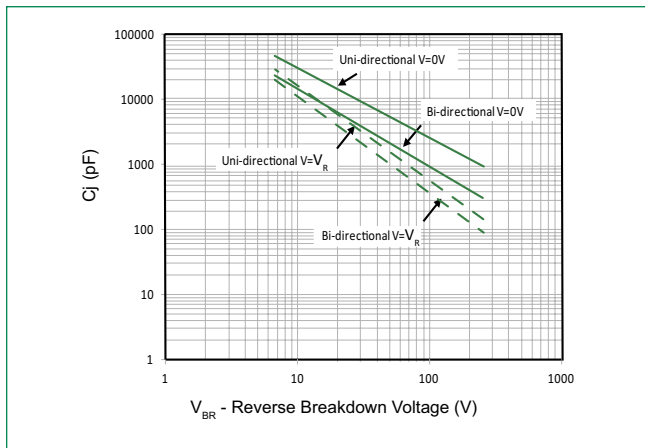


Figure 6 - Typical Transient Thermal Impedance

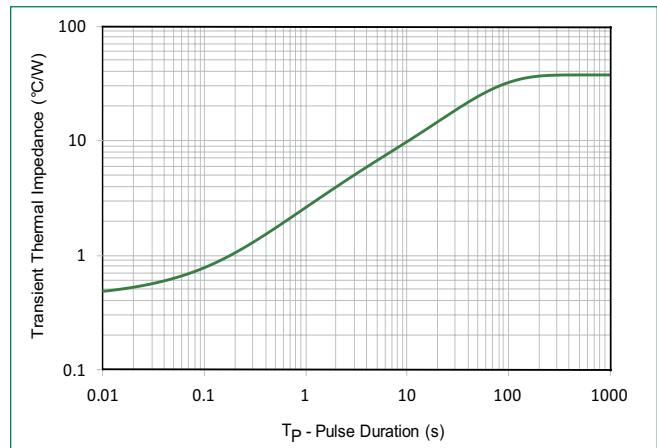


Figure 7 - Maximum Non-Repetitive Peak Forward Surge Current Uni-Directional Only

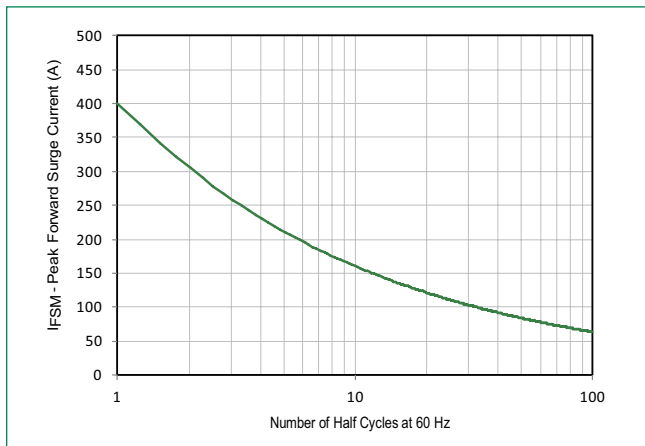
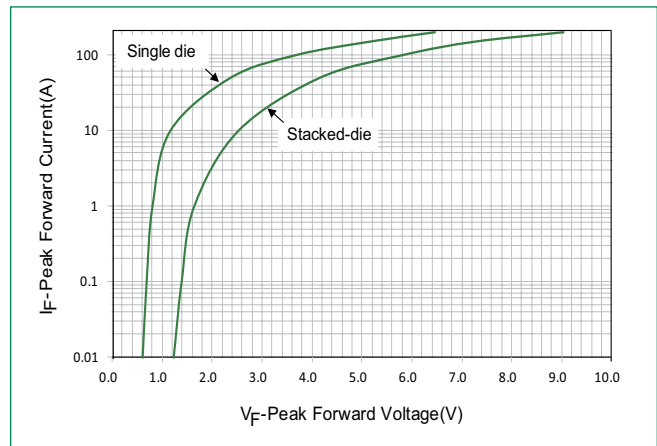
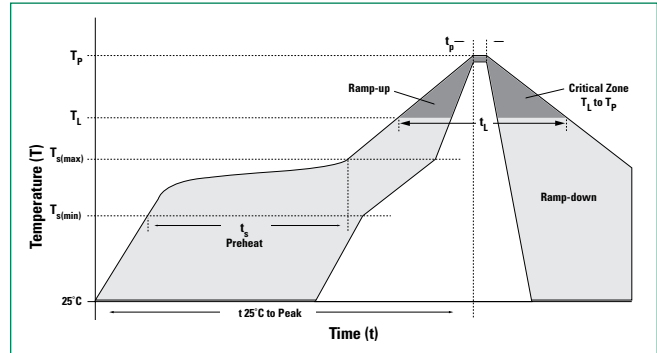


Figure 8 - Peak Forward Voltage Drop vs Peak Forward Current (Typical Values)



Soldering Parameters

| | | |
|---|------------------------------------|-------------------------|
| Reflow Condition | | Lead-free assembly |
| Pre Heat | - Temperature Min ($T_{s(min)}$) | 150°C |
| | - Temperature Max ($T_{s(max)}$) | 200°C |
| | - Time (min to max) (t_s) | 60 – 180 secs |
| Average ramp up rate (Liquidus Temp (T_A) to peak | | 3°C/second max |
| $T_{s(max)}$ to T_A - Ramp-up Rate | | 3°C/second max |
| Reflow | - Temperature (T_A) (Liquidus) | 217°C |
| | - Time (min to max) (t_s) | 60 – 150 seconds |
| Peak Temperature (T_p) | | 260 ^{+0/-5} °C |
| Time within 5°C of actual peak Temperature (t_p) | | 20 – 40 seconds |
| Ramp-down Rate | | 6°C/second max |
| Time 25°C to peak Temperature (T_p) | | 8 minutes Max. |
| Do not exceed | | 260°C |



Flow/Wave Soldering (Solder Dipping)

| | |
|---------------------------|------------|
| Peak Temperature : | 265°C |
| Dipping Time : | 10 seconds |
| Soldering : | 1 time |

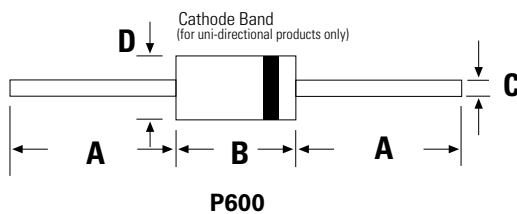
Physical Specifications

| | |
|-----------------|--|
| Weight | 0.07oz., 2.1g |
| Case | P600 molded plastic body over passivated junction. |
| Polarity | Color band denotes the cathode except Bipolar. |
| Terminal | Matte Tin axial leads, solderable per JESD22-B102. |

Environmental Specifications

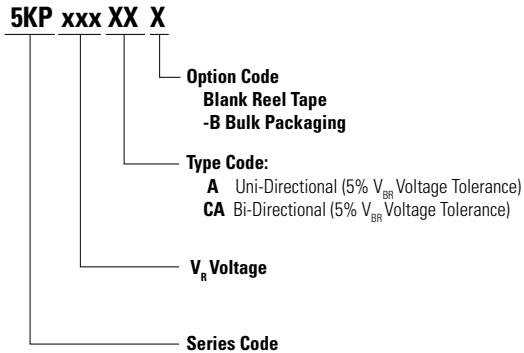
| | |
|----------------------------|-------------|
| High Temp. Storage | JESD22-A103 |
| HTRB | JESD22-A108 |
| Temperature Cycling | JESD22-A104 |
| H3TRB | JESD22-A101 |
| RSH | JESD22-B106 |

Dimensions

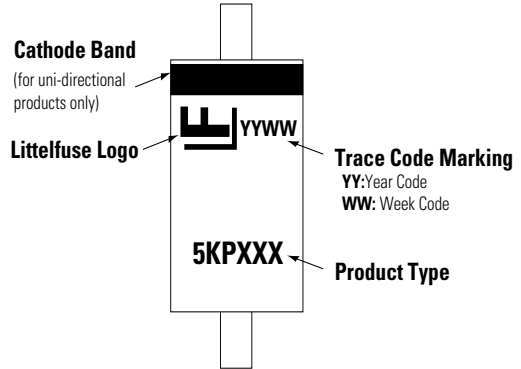


| Dimensions | Inches | | Millimeters | |
|------------|--------|-------|-------------|------|
| | Min | Max | Min | Max |
| A | 1.000 | - | 25.40 | - |
| B | 0.340 | 0.360 | 8.60 | 9.10 |
| C | 0.048 | 0.054 | 1.22 | 1.36 |
| D | 0.340 | 0.360 | 8.60 | 9.10 |

Part Numbering System



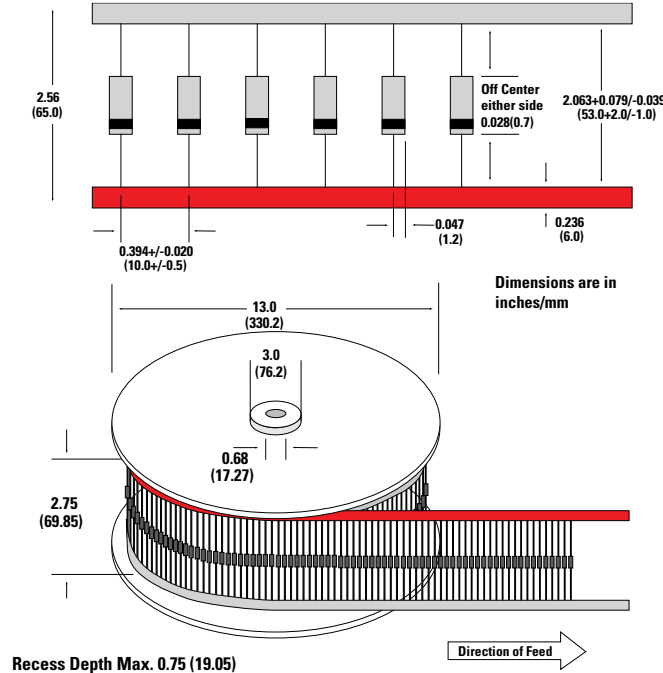
Part Marking System



Packing Options

| Part Number | Component Package | Quantity | Packaging Option | Packaging Specification |
|-------------|-------------------|----------|------------------|-------------------------|
| 5KPxxxXX | P600 | 800 | Tape & Reel | EIA STD RS-296 |
| 5KPxxxXX-B | P600 | 100 | BULK | Littelfuse Spec. |

Tape and Reel Specification



Mouser Electronics

Authorized Distributor

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Littelfuse:

[5KP210A](#) [5KP210C](#) [5KP210CA](#) [5KP22](#) [5KP33CA-B](#) [5KP8.0A](#) [5KP90C](#) [5KP15C](#) [5KP160C](#) [5KP190](#) [5KP8.5C](#)
[5KP13C](#) [5KP28A](#) [5KP5.0](#) [5KP6.5CA](#) [5KP13](#) [5KP40CA](#) [5KP54A](#) [5KP58A](#) [5KP75CA](#) [5KP180C](#) [5KP26CA-B](#)
[5KP7.0C](#) [5KP12C](#) [5KP170](#) [5KP18](#) [5KP22C](#) [5KP51-B](#) [5KP7.0](#) [5KP64A](#) [5KP7.5CA](#) [5KP13CA](#) [5KP150](#) [5KP43C](#)
[5KP7.0CA](#) [5KP70CA](#) [5KP78A](#) [5KP100CA](#) [5KP160CA](#) [5KP190A](#) [5KP8.0CA](#) [5KP220CA](#) [5KP78](#) [5KP14CA-B](#)
[5KP200CA](#) [5KP45](#) [5KP15CA-B](#) [5KP220C](#) [5KP7.5A](#) [5KP210](#) [5KP36CA-B](#) [5KP58CA-B](#) [5KP110](#) [5KP40C](#) [5KP60C](#)
[5KP75C](#) [5KP85CA](#) [5KP17](#) [5KP18A](#) [5KP36CA](#) [5KP51CA](#) [5KP7.5C](#) [5KP9.0](#) [5KP9.0CA](#) [5KP30C](#) [5KP90CA](#)
[5KP120A](#) [5KP20A](#) [5KP24](#) [5KP26CA](#) [5KP54C](#) [5KP6.0CA](#) [5KP64](#) [5KP160A](#) [5KP58C](#) [5KP6.0C](#) [5KP6.5C](#) [5KP85C](#)
[5KP110-B](#) [5KP17CA](#) [5KP180](#) [5KP18A-B](#) [5KP70A-B](#) [5KP8.5](#) [5KP110CA](#) [5KP24C](#) [5KP40](#) [5KP6.0A](#) [5KP26C](#)
[5KP5.0CA](#) [5KP64CA](#) [5KP85CA-B](#) [5KP90A](#) [5KP130CA](#) [5KP15CA](#) [5KP200](#) [5KP58](#) [5KP48C](#) [5KP6.5A](#) [5KP64C](#)