

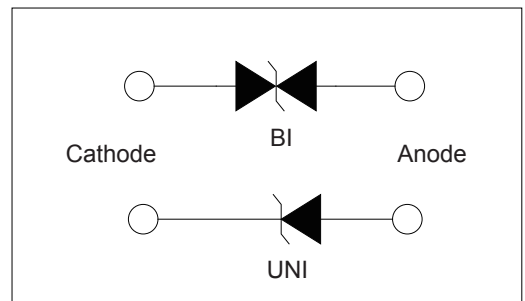
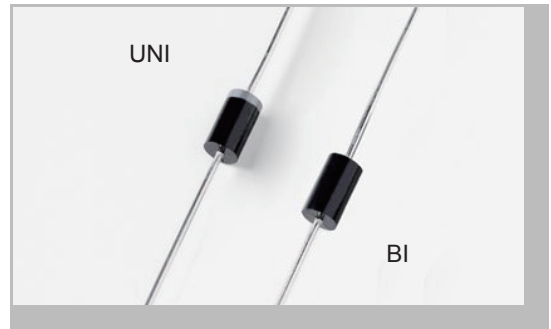
Transient Voltage Suppressors

5KP Series

Transient Voltage Suppressors - 5KP Series

Features

1. Halogen-free
2. Rohs compliant
3. Typical maximum temperature coefficient
4. $\Delta V_{BR} = 0.1\% \times V_{BR} @ 25^\circ\text{C} \times \Delta T$
5. Glass passivated Chip junction in P800 package
6. 5000W peak pulse capadility at 10x1000 μs waveform, repetition rate (duty cycles):0.01%
7. Fast response time: typically less than 1.0ps from 0 Volts to BV min
8. Excellent clamping capability
9. Low incremental surge resistance
10. Typical IR less than 5 μA above 11V
11. High temperature soldering guaranteed: 260 $^\circ\text{C}$ /40 seconds / 0.375", (9.5mm) lead length, 5lbs., (2.3kg)tension
12. Plastic package has underwriters laboratory flammability classification 94v-0



Applications

TVS devices are ideal for the protection of I/O interfaces, VCC bus and other vulnerable circuits used in telecom, computer, industrial and consumer electronic applications.

Mechanical Characteristics

| Rating | Symbol | Value | Units |
|---|-----------------|--|---------------------------|
| Peak Pulse Power Dissipation by 10x1000 μs test waveform (Fig.1)(Note 1) | P_{PPM} | 5000 | Watts |
| Steady State Power Dissipation on infinite heat sink at TL=75 $^\circ\text{C}$ (Fig. 5) | P_D | 8 | Watts |
| Peak Forward Surge Current, 8.3ms Single Half Sine Wave Unidirectional only (Note 2) | I_{FSM} | 400 | Amps |
| Maximum Instantaneous Forward Voltage at 25A for Unidirectional only (Note 3) | V_F | 3.5/5.0 | V |
| Operating junction and Storage Temperature Range. | T_J, T_{STG} | -55 $^\circ\text{C}$ to 175 $^\circ\text{C}$ | $^\circ\text{C}$ |
| Typical Thermal Resistance Junction to Lead | $R_{\theta JL}$ | 8.0 | $^\circ\text{C}/\text{W}$ |
| Typical Thermal Resistance Junction to Ambient | $R_{\theta JA}$ | 40 | $^\circ\text{C}/\text{W}$ |

Notes:

1. Non-repetitive current pulse , per Fig. 3 and derated above $T_A = 25^\circ\text{C}$ per Fig. 2.
2. Measured on 8.3ms single half sine wave or equivalent square wave, duty cycle=4 perminute maximum.
3. $V_F < 3.5\text{V}$ for devices of $V_{BR} < 200\text{V}$ and $V_F < 5.0\text{V}$ for devices of $V_{BR} > 201\text{V}$.

Electrical Characteristics

| Type Number | | Reverse Stand-Off Voltage $V_{RWM}(V)$ | Breakdown Voltage @ I_T | | Test Current $I_T(mA)$ | Maximum Clamping Voltage @ I_{PP} $V_C(V)$ | Peak Pulse Current $I_{PP}(A)$ | Reverse Leakage @ V_{RWM} $I_R(\mu A)$ |
|-------------|----------|---|---------------------------|------------------|---------------------------|---|-----------------------------------|---|
| (UNI) | (BI) | | $V_{BR MIN.}(V)$ | $V_{BR MAX.}(V)$ | | | | |
| 5KP5.0A | 5KP5.0CA | 5.0 | 6.40 | 7.00 | 50 | 9.2 | 554.3 | 5000 |
| 5KP6.0A | 5KP6.0CA | 6.0 | 6.67 | 7.37 | 50 | 10.3 | 495.1 | 5000 |
| 5KP6.5A | 5KP6.5CA | 6.5 | 7.22 | 7.98 | 50 | 11.2 | 445.4 | 2000 |
| 5KP7.0A | 5KP7.0CA | 7.0 | 7.78 | 8.60 | 50 | 12.0 | 425.0 | 1000 |
| 5KP7.5A | 5KP7.5CA | 7.5 | 8.33 | 9.21 | 5 | 12.9 | 395.3 | 250 |
| 5KP8.0A | 5KP8.0CA | 8.0 | 8.89 | 9.83 | 5 | 13.6 | 375.0 | 150 |
| 5KP8.5A | 5KP8.5CA | 8.5 | 9.44 | 10.40 | 5 | 14.4 | 354.2 | 50 |
| 5KP9.0A | 5KP9.0CA | 9.0 | 10.00 | 11.10 | 5 | 15.4 | 331.2 | 20 |
| 5KP10A | 5KP10CA | 10.0 | 11.10 | 12.30 | 5 | 17.0 | 300.0 | 15 |
| 5KP11A | 5KP11CA | 11.0 | 12.20 | 13.50 | 5 | 18.2 | 280.2 | 5 |
| 5KP12A | 5KP12CA | 12.0 | 13.30 | 14.70 | 5 | 19.9 | 256.3 | 5 |
| 5KP13A | 5KP13CA | 13.0 | 14.40 | 15.90 | 5 | 21.5 | 237.2 | 5 |
| 5KP14A | 5KP14CA | 14.0 | 15.60 | 17.20 | 5 | 23.2 | 219.8 | 5 |
| 5KP15A | 5KP15CA | 15.0 | 16.70 | 18.50 | 5 | 24.4 | 209.0 | 5 |
| 5KP16A | 5KP16CA | 16.0 | 17.80 | 19.70 | 5 | 26.0 | 196.2 | 5 |
| 5KP17A | 5KP17CA | 17.0 | 18.90 | 20.90 | 5 | 27.6 | 184.8 | 5 |
| 5KP18A | 5KP18CA | 18.0 | 20.00 | 22.10 | 5 | 29.2 | 174.7 | 5 |
| 5KP20A | 5KP20CA | 20.0 | 22.20 | 24.50 | 5 | 32.4 | 157.4 | 5 |
| 5KP22A | 5KP22CA | 22.0 | 24.00 | 26.90 | 5 | 35.5 | 143.7 | 5 |
| 5KP24A | 5KP24CA | 24.0 | 26.70 | 29.50 | 5 | 38.9 | 131.1 | 5 |
| 5KP26A | 5KP26CA | 26.0 | 28.90 | 31.90 | 5 | 42.1 | 121.1 | 5 |
| 5KP28A | 5KP28CA | 28.0 | 31.10 | 34.40 | 5 | 45.4 | 112.3 | 5 |
| 5KP30A | 5KP30CA | 30.0 | 33.30 | 36.80 | 5 | 48.4 | 105.4 | 5 |
| 5KP33A | 5KP33CA | 33.0 | 36.70 | 40.60 | 5 | 53.3 | 95.7 | 5 |
| 5KP36A | 5KP36CA | 36.0 | 40.00 | 44.20 | 5 | 58.1 | 87.8 | 5 |
| 5KP40A | 5KP40CA | 40.0 | 44.40 | 49.10 | 5 | 64.5 | 79.1 | 5 |
| 5KP43A | 5KP43CA | 43.0 | 47.80 | 52.80 | 5 | 73.5 | 73.5 | 5 |
| 5KP45A | 5KP45CA | 45.0 | 50.00 | 55.30 | 5 | 72.7 | 70.2 | 5 |
| 5KP48A | 5KP48CA | 48.0 | 53.30 | 58.90 | 5 | 77.4 | 65.9 | 5 |
| 5KP51A | 5KP51CA | 51.0 | 56.70 | 62.70 | 5 | 82.4 | 61.9 | 5 |
| 5KP54A | 5KP54CA | 54.0 | 60.00 | 66.30 | 5 | 87.1 | 58.6 | 5 |
| 5KP58A | 5KP58CA | 58.0 | 64.40 | 71.20 | 5 | 93.6 | 54.5 | 5 |
| 5KP60A | 5KP60CA | 60.0 | 66.70 | 73.70 | 5 | 96.8 | 52.7 | 5 |
| 5KP64A | 5KP64CA | 64.0 | 71.10 | 78.60 | 5 | 103.0 | 49.5 | 5 |
| 5KP70A | 5KP70CA | 70.0 | 77.80 | 86.00 | 5 | 113.0 | 45.1 | 5 |
| 5KP75A | 5KP75CA | 75.0 | 83.30 | 92.10 | 5 | 121.0 | 42.1 | 5 |
| 5KP78A | 5KP78CA | 78.0 | 86.70 | 95.80 | 5 | 126.0 | 40.5 | 5 |
| 5KP85A | 5KP85CA | 85.0 | 94.40 | 104.00 | 5 | 137.0 | 37.2 | 5 |
| 5KP90A | 5KP90CA | 90.0 | 100.00 | 111.00 | 5 | 146.0 | 34.9 | 5 |
| 5KP100A | 5KP100CA | 100.0 | 111.00 | 123.00 | 5 | 162.0 | 31.5 | 5 |
| 5KP110A | 5KP110CA | 110.0 | 122.00 | 135.00 | 5 | 177.0 | 28.8 | 5 |
| 5KP120A | 5KP120CA | 120.0 | 133.00 | 147.00 | 5 | 193.0 | 26.4 | 5 |
| 5KP130A | 5KP130CA | 130.0 | 144.00 | 159.00 | 5 | 209.0 | 24.4 | 5 |
| 5KP150A | 5KP150CA | 150.0 | 167.00 | 185.00 | 5 | 243.0 | 21.0 | 5 |
| 5KP160A | 5KP160CA | 160.0 | 178.00 | 197.00 | 5 | 259.0 | 19.7 | 5 |
| 5KP170A | 5KP170CA | 170.0 | 189.00 | 209.00 | 5 | 275.0 | 18.5 | 5 |
| 5KP180A | 5KP180CA | 180.0 | 200.00 | 221.00 | 5 | 292.0 | 17.5 | 5 |
| 5KP190A | 5KP190CA | 190.0 | 211.00 | 233.00 | 5 | 310.0 | 16.5 | 5 |

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 $\pm 10\%$ and V_C is 5% higher than with A parts

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Ratings and Characteristic Curves

Figure 1 - Peak Pulse Power Rating Curve

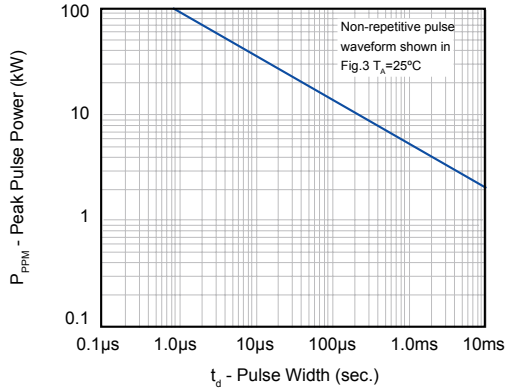


Figure 2 - Pulse Derating Curve

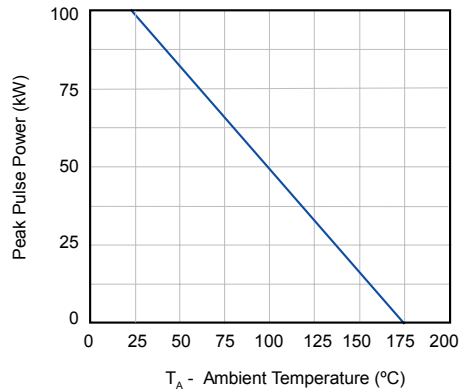


Figure 3 - Pulse Waveform

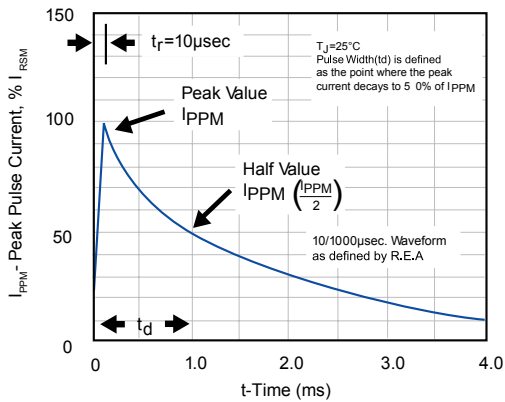


Figure 4 - Typical Junction Capacitance

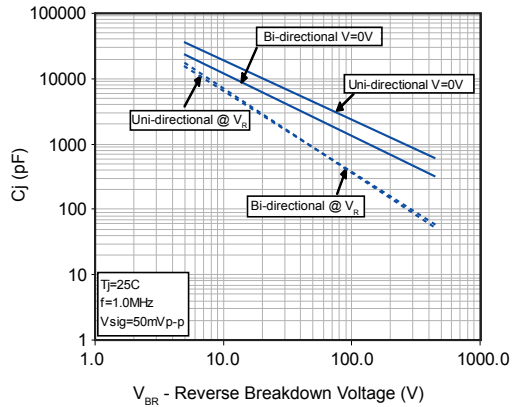


Figure 5 - Steady State Power Derating Curve

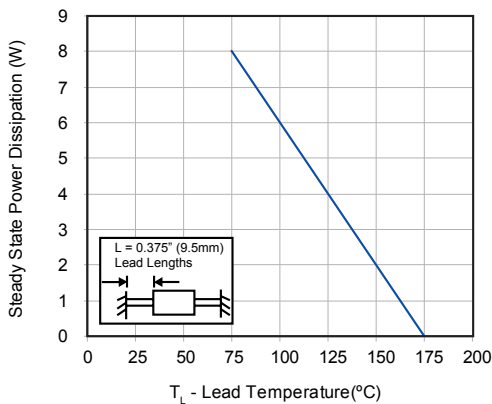
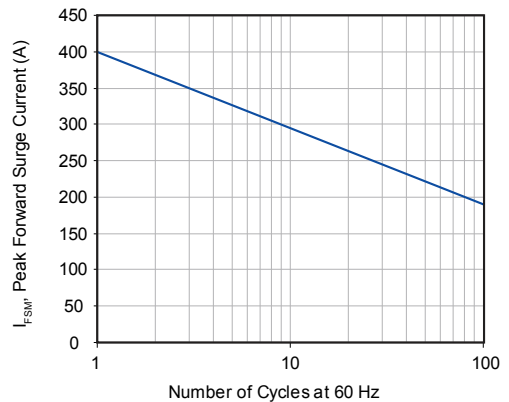


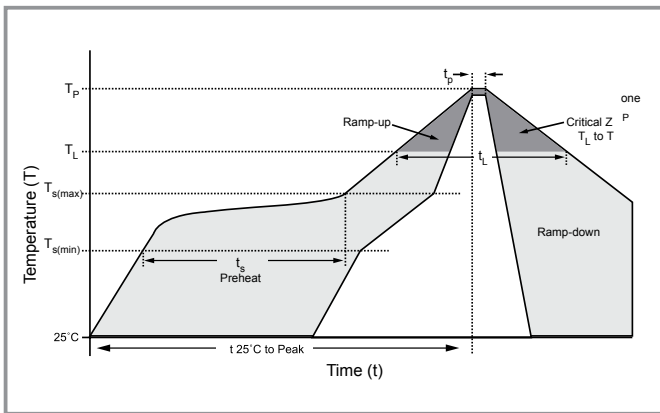
Figure 6 - Maximum Non-Repetitive Peak Forward Surge Current



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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_L) to peak) | | 3°C/second max |
| $T_{s(max)}$ to T_L - Ramp-up Rate | | 3°C/second max |
| Reflow | - Temperature (T_L) (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 | | 280°C |



Physical Specifications

| | |
|----------|--|
| Weight | 0.045oz., 1.2g |
| Case | JEDEC DO-201 molded plastic body over passivated junction. |
| Polarity | Color band denotes the cathode except Bipolar. |
| Termina | Matte Tin axial leads, solderable per JESD22-B102D. |

Environmental Specifications

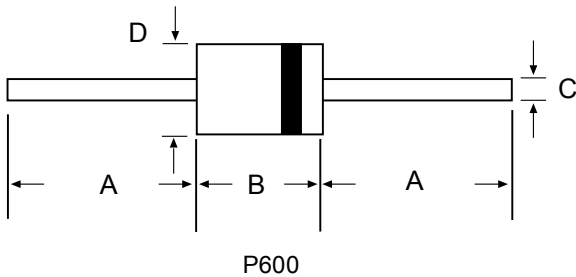
| | |
|--------------------|--------------|
| Temperature Cycle | JESD22-A104 |
| Pressure Cooker | JESD 22-A102 |
| High Temp. Storage | JESD22-A103 |
| HTRB | JESD22-A108 |
| Thermal Shock | JESD22-A106 |

Flow/Wave Soldering

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

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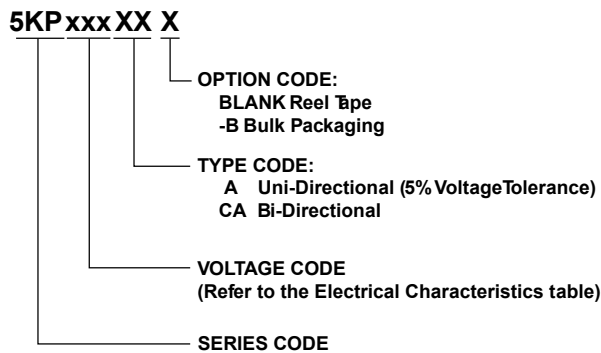
Dimensions



Unit:mm

| DIM | Inches | | Millimeters | |
|-----|--------|-------|-------------|------|
| | Min | Max | Min | Max |
| A | 1.000 | - | 25.40 | - |
| B | 0.340 | 0.360 | 8.60 | 9.10 |
| C | 0.048 | 0.052 | 1.22 | 1.32 |
| D | 0.340 | 0.360 | 8.60 | 9.10 |

Part Numbering System



Packaging

| Part Number | Component Package | Quantity | Packaging Option | Packaging Specification |
|-------------|-------------------|----------|------------------|-------------------------|
| 5KPxxxXX | P600 | 400 | Tape & Reel | ELA STD RS-296E |
| 5KPxxxXX-B | P600 | 100 | BULK | Concord Packing Spec |

Warehouse Storage Conditions of Products

- Storage Conditions:
 1. Storage Temperature: -10°C~+40°C
 2. Relative Humidity: ≤75%RH
 3. Keep away from corrosive atmosphere and sunlight.
- Period of Storage: 1 year

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