

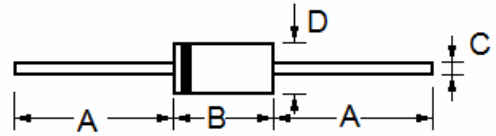


## SURFACE MOUNT TRANSIENT VOLTAGE SUPPRESSORS

### 1.5KE6.8 - 1.5KE180A

#### FEATURES

- Peak power dissipation 1500W @10 x 1000 us Pulse
- Excellent clamping capability.
- Fast response time: typically less than 1 ns.
- Typical IR less than 1uA above 10V.
- Plastic material has UL flammability classification 94V-O
- RoHS compliant in lead-free versions



DO-201

#### MECHANICAL CHARACTERISTICS

- CASE: JEDEC DO-201 Molded Plastic over glass passivated junction.
- Mounting Position: Any
- Polarity: by cathode band denotes uni-directional device.
- Terminal: Solder plated, solderable per MIL-STD-750, Method 2026

| Dim | Millimeters |      | Inches |       |
|-----|-------------|------|--------|-------|
|     | Min         | Max  | Min    | Max   |
| A   | 25.4        | ---  | 1.000  | ---   |
| B   | 7.2         | 9.5  | 0.285  | 0.375 |
| C   | 0.96        | 1.07 | 0.038  | 0.042 |
| D   | 4.8         | 5.3  | 0.188  | 0.210 |

#### MAXIMUM RATINGS AND CHARACTERISTICS

| Parameter  | Symbol    | Value       | Units |
|--|-----------|-------------|-------|
| Peak Pulse Power Dissipation on 10/1000 us Waveform (Note 1, 2, FIG.1)   | $P_{PPM}$ | Min 1500    | W     |
| Peak Pulse Current of on 10/1000us Waveform (Note 1, FIG.3)  | $I_{PPM}$ | See Table 1 | Amps  |
| Peak Forward Surge Current, 8.3ms Single Half Sine-wave Superimposed on Rated Load, (JEDEC Method) (Note 2. 3) | $I_{FSM}$ | 200         | Amps  |
| Operating Junction Temperature Range   | $T_J$     | -55 to 150  | °C    |
| Storage Temperature Range  | $T_{STG}$ | -55 to 150  | °C    |

#### Notes

1. Non-repetitive current pulse, per Fig.3 and derated above  $T_A=25^\circ\text{C}$  per Fig.2.
2. Mounted on  $5.0\text{mm}^2$  (0.03mm thick) Copper Pads to each terminal.
3. 8.3 ms single half sine-wave, or equivalent square wave, Duty cycle=4 pluses per minute maximum.



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### 1.5KE6.8 - 1.5KE180A

ELECTRICAL SPECIFICATION  $T_A=25\text{ }^\circ\text{C}$

| Type Number |            | Reverse Stand-Off Voltage | Breakdown Voltage Min. @ $I_T$ | Breakdown Voltage Max. @ $I_T$ | Test Current | Maximum Clamping Voltage @ $I_{PP}$ | Peak Pulse Current | Reverse Leakage @ $V_{RMW}$ |
|-------------|------------|---------------------------|--------------------------------|--------------------------------|--------------|-------------------------------------|--------------------|-----------------------------|
| (Uni)       | (Bi)       | $V_{RMW}(V)$              | $V_{BR\ MIN}(V)$               | $V_{BR\ MAX}(V)$               | $I_T\ (mA)$  | $V_C(V)$                            | $I_{PP}(A)$        | $I_R(\mu A)$                |
| 1.5KE6.8    | 1.5KE6.8C  | 5.50                      | 6.12                           | 7.48                           | 10           | 10.8                                | 140.7              | 1000.0                      |
| 1.5KE6.8A   | 1.5KE6.8CA | 5.80                      | 6.45                           | 7.14                           | 10           | 10.5                                | 144.8              | 1000.0                      |
| 1.5KE7.5    | 1.5KE7.5C  | 6.05                      | 6.75                           | 8.25                           | 10           | 11.7                                | 129.9              | 500.0                       |
| 1.5KE7.5A   | 1.5KE7.5CA | 6.40                      | 7.13                           | 7.88                           | 10           | 11.3                                | 134.5              | 500.0                       |
| 1.5KE8.2    | 1.5KE8.2C  | 6.63                      | 7.38                           | 9.02                           | 10           | 12.5                                | 121.6              | 200.0                       |
| 1.5KE8.2A   | 1.5KE8.2CA | 7.02                      | 7.79                           | 8.61                           | 10           | 12.1                                | 125.6              | 200.0                       |
| 1.5KE9.1    | 1.5KE9.1C  | 7.37                      | 8.19                           | 10.0                           | 1.0          | 13.8                                | 110.1              | 50.0                        |
| 1.5KE9.1A   | 1.5KE9.1CA | 7.78                      | 8.65                           | 9.55                           | 1.0          | 13.4                                | 113.4              | 50.0                        |
| 1.5KE10     | 1.5KE10C   | 8.10                      | 9.00                           | 11.0                           | 1.0          | 15.0                                | 101.3              | 10.0                        |
| 1.5KE10A    | 1.5KE10CA  | 8.55                      | 9.50                           | 10.5                           | 1.0          | 14.5                                | 104.8              | 10.0                        |
| 1.5KE11     | 1.5KE11C   | 8.92                      | 9.90                           | 12.1                           | 1.0          | 16.2                                | 93.8               | 5.0                         |
| 1.5KE11A    | 1.5KE11CA  | 9.40                      | 10.5                           | 11.6                           | 1.0          | 15.6                                | 97.4               | 5.0                         |
| 1.5KE12     | 1.5KE12C   | 9.72                      | 10.8                           | 13.2                           | 1.0          | 17.3                                | 87.9               | 5.0                         |
| 1.5KE12A    | 1.5KE12CA  | 10.2                      | 11.4                           | 12.6                           | 1.0          | 16.7                                | 91.0               | 5.0                         |
| 1.5KE13     | 1.5KE13C   | 10.5                      | 11.7                           | 14.3                           | 1.0          | 19.0                                | 80.0               | 5.0                         |
| 1.5KE13A    | 1.5KE13CA  | 11.1                      | 12.4                           | 13.7                           | 1.0          | 18.2                                | 83.5               | 5.0                         |
| 1.5KE15     | 1.5KE15C   | 12.1                      | 13.5                           | 16.5                           | 1.0          | 22.0                                | 69.1               | 5.0                         |
| 1.5KE15A    | 1.5KE15CA  | 12.8                      | 14.3                           | 15.8                           | 1.0          | 21.2                                | 71.7               | 5.0                         |
| 1.5KE16     | 1.5KE16C   | 12.9                      | 14.4                           | 17.6                           | 1.0          | 23.5                                | 64.7               | 5.0                         |
| 1.5KE16A    | 1.5KE16CA  | 13.6                      | 15.2                           | 16.8                           | 1.0          | 22.5                                | 67.6               | 5.0                         |
| 1.5KE18     | 1.5KE18C   | 14.5                      | 16.2                           | 19.8                           | 1.0          | 26.5                                | 57.4               | 5.0                         |
| 1.5KE18A    | 1.5KE18CA  | 15.3                      | 17.1                           | 18.9                           | 1.0          | 25.2                                | 60.3               | 5.0                         |
| 1.5KE20     | 1.5KE20C   | 16.2                      | 18.0                           | 22.0                           | 1.0          | 29.1                                | 52.2               | 5.0                         |
| 1.5KE20A    | 1.5KE20CA  | 17.1                      | 19.0                           | 21.0                           | 1.0          | 27.7                                | 54.9               | 5.0                         |
| 1.5KE22     | 1.5KE22C   | 17.8                      | 19.8                           | 24.2                           | 1.0          | 31.9                                | 47.6               | 5.0                         |
| 1.5KE22A    | 1.5KE22CA  | 18.8                      | 20.9                           | 23.1                           | 1.0          | 30.6                                | 49.7               | 5.0                         |
| 1.5KE24     | 1.5KE24C   | 19.4                      | 21.6                           | 26.4                           | 1.0          | 34.7                                | 43.8               | 5.0                         |
| 1.5KE24A    | 1.5KE24CA  | 20.5                      | 22.8                           | 25.2                           | 1.0          | 33.2                                | 45.8               | 5.0                         |
| 1.5KE27     | 1.5KE27C   | 21.8                      | 24.3                           | 29.7                           | 1.0          | 39.1                                | 38.9               | 5.0                         |
| 1.5KE27A    | 1.5KE27CA  | 23.1                      | 25.7                           | 28.4                           | 1.0          | 37.5                                | 40.5               | 5.0                         |
| 1.5KE30     | 1.5KE30C   | 24.3                      | 27.0                           | 33.0                           | 1.0          | 43.5                                | 34.9               | 5.0                         |
| 1.5KE30A    | 1.5KE30CA  | 25.6                      | 28.5                           | 31.5                           | 1.0          | 41.4                                | 36.7               | 5.0                         |
| 1.5KE33     | 1.5KE33C   | 26.8                      | 29.7                           | 36.3                           | 1.0          | 47.7                                | 31.9               | 5.0                         |
| 1.5KE33A    | 1.5KE33CA  | 28.2                      | 31.4                           | 34.7                           | 1.0          | 45.7                                | 33.3               | 5.0                         |
| 1.5KE36     | 1.5KE36C   | 29.1                      | 32.4                           | 39.6                           | 1.0          | 52.0                                | 29.2               | 5.0                         |
| 1.5KE36A    | 1.5KE36CA  | 30.8                      | 34.2                           | 37.8                           | 1.0          | 49.9                                | 30.5               | 5.0                         |

For Bi-directional type having VRWM of 10 Volts and less, the IR limit is double



## SURFACE MOUNT TRANSIENT VOLTAGE SUPPRESSORS

### 1.5KE6.8 - 1.5KE180A

| Type Number |            | Reverse Stand-Off Voltage | Breakdown Voltage Min. @I <sub>T</sub> | Breakdown Voltage Max. @ I <sub>T</sub> | Test Current        | Maximum Clamping Voltage @I <sub>PP</sub> | Peak Pulse Current  | Reverse Leakage @V <sub>RMW</sub> |
|-------------|------------|---------------------------|--|---|---------------------|---|---------------------|-----------------------------------|
| (Uni)       | (Bi)       | V <sub>RMW</sub> (V)      | V <sub>BR MIN</sub> (V)                | V <sub>BR MAX</sub> (V)                 | I <sub>T</sub> (mA) | V <sub>C</sub> (V)                        | I <sub>PP</sub> (A) | I <sub>R</sub> (uA)               |
| 1.5KE39     | 1.5KE39C   | 31.6                      | 35.1                                   | 42.9                                    | 1.0                 | 56.4                                      | 27.0                | 5.0                               |
| 1.5KE39A    | 1.5KE39CA  | 33.3                      | 37.1                                   | 41.0                                    | 1.0                 | 53.9                                      | 28.2                | 5.0                               |
| 1.5KE43     | 1.5KE43C   | 34.8                      | 38.7                                   | 47.3                                    | 1.0                 | 61.9                                      | 24.6                | 5.0                               |
| 1.5KE43A    | 1.5KE43CA  | 36.8                      | 40.9                                   | 45.2                                    | 1.0                 | 59.3                                      | 25.6                | 5.0                               |
| 1.5KE47     | 1.5KE47C   | 38.1                      | 42.3                                   | 51.7                                    | 1.0                 | 67.8                                      | 22.4                | 5.0                               |
| 1.5KE47A    | 1.5KE47CA  | 40.2                      | 44.7                                   | 49.4                                    | 1.0                 | 64.8                                      | 23.5                | 5.0                               |
| 1.5KE51     | 1.5KE51C   | 41.3                      | 45.9                                   | 56.1                                    | 1.0                 | 73.5                                      | 20.7                | 5.0                               |
| 1.5KE51A    | 1.5KE51CA  | 43.6                      | 48.5                                   | 53.6                                    | 1.0                 | 70.1                                      | 21.7                | 5.0                               |
| 1.5KE56     | 1.5KE56C   | 45.4                      | 50.4                                   | 61.6                                    | 1.0                 | 80.5                                      | 18.9                | 5.0                               |
| 1.5KE56A    | 1.5KE56CA  | 47.8                      | 53.2                                   | 58.8                                    | 1.0                 | 77.0                                      | 19.7                | 5.0                               |
| 1.5KE62     | 1.5KE62C   | 50.2                      | 55.8                                   | 68.2                                    | 1.0                 | 89.0                                      | 17.1                | 5.0                               |
| 1.5KE62A    | 1.5KE62CA  | 53.0                      | 58.9                                   | 65.1                                    | 1.0                 | 85.0                                      | 17.9                | 5.0                               |
| 1.5KE68     | 1.5KE68C   | 55.1                      | 61.2                                   | 74.8                                    | 1.0                 | 98.0                                      | 13.5                | 5.0                               |
| 1.5KE68A    | 1.5KE68CA  | 58.1                      | 64.6                                   | 71.4                                    | 1.0                 | 92.0                                      | 16.5                | 5.0                               |
| 1.5KE75     | 1.5KE75C   | 60.7                      | 67.5                                   | 82.5                                    | 1.0                 | 108                                       | 14.1                | 5.0                               |
| 1.5KE75A    | 1.5KE75CA  | 64.1                      | 71.3                                   | 78.8                                    | 1.0                 | 103                                       | 14.8                | 5.0                               |
| 1.5KE82     | 1.5KE82C   | 66.4                      | 73.8                                   | 90.2                                    | 1.0                 | 118                                       | 12.9                | 5.0                               |
| 1.5KE82A    | 1.5KE82CA  | 70.1                      | 77.9                                   | 86.1                                    | 1.0                 | 113                                       | 13.5                | 5.0                               |
| 1.5KE91     | 1.5KE91C   | 73.7                      | 81.9                                   | 100                                     | 1.0                 | 131                                       | 11.6                | 5.0                               |
| 1.5KE91A    | 1.5KE91CA  | 77.8                      | 86.5                                   | 95.5                                    | 1.0                 | 125                                       | 12.2                | 5.0                               |
| 1.5KE100    | 1.5KE100C  | 81.0                      | 90.0                                   | 110                                     | 1.0                 | 144                                       | 10.6                | 5.0                               |
| 1.5KE100A   | 1.5KE100CA | 85.5                      | 95.0                                   | 105                                     | 1.0                 | 137                                       | 11.1                | 5.0                               |
| 1.5KE110    | 1.5KE110C  | 89.2                      | 99.0                                   | 121                                     | 1.0                 | 158                                       | 9.6                 | 5.0                               |
| 1.5KE110A   | 1.5KE110CA | 94.0                      | 105                                    | 116                                     | 1.0                 | 152                                       | 10.0                | 5.0                               |
| 1.5KE120    | 1.5KE120C  | 97.2                      | 108                                    | 132                                     | 1.0                 | 173                                       | 8.7                 | 5.0                               |
| 1.5KE120A   | 1.5KE120CA | 102                       | 114                                    | 126                                     | 1.0                 | 165                                       | 9.2                 | 5.0                               |
| 1.5KE130    | 1.5KE130C  | 105                       | 117                                    | 143                                     | 1.0                 | 187                                       | 8.1                 | 5.0                               |
| 1.5KE130A   | 1.5KE130CA | 111                       | 124                                    | 137                                     | 1.0                 | 179                                       | 8.5                 | 5.0                               |
| 1.5KE150    | 1.5KE150C  | 121                       | 135                                    | 165                                     | 1.0                 | 215                                       | 7.1                 | 5.0                               |
| 1.5KE150A   | 1.5KE150CA | 128                       | 143                                    | 158                                     | 1.0                 | 207                                       | 7.3                 | 5.0                               |
| 1.5KE160    | 1.5KE160C  | 130                       | 144                                    | 176                                     | 1.0                 | 230                                       | 6.6                 | 5.0                               |
| 1.5KE160A   | 1.5KE160CA | 136                       | 152                                    | 168                                     | 1.0                 | 219                                       | 6.9                 | 5.0                               |
| 1.5KE170    | 1.5KE170C  | 138                       | 153                                    | 187                                     | 1.0                 | 244                                       | 6.2                 | 5.0                               |
| 1.5KE170A   | 1.5KE170CA | 145                       | 162                                    | 179                                     | 1.0                 | 234                                       | 6.5                 | 5.0                               |
| 1.5KE180    | 1.5KE180C  | 146                       | 162                                    | 198                                     | 1.0                 | 258                                       | 5.9                 | 5.0                               |
| 1.5KE180A   | 1.5KE180CA | 154                       | 171                                    | 189                                     | 1.0                 | 246                                       | 6.2                 | 5.0                               |

For Bi-directional type having VRWM of 10 Volts and less, the IR limit is double



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### 1.5KE6.8 - 1.5KE180A

| Type Number |            | Reverse Stand-Off Voltage | Breakdown Voltage Min. @I <sub>T</sub> | Breakdown Voltage Max. @ I <sub>T</sub> | Test Current        | Maximum Clamping Voltage @I <sub>PP</sub> | Peak Pulse Current  | Reverse Leakage @V <sub>RMW</sub> |
|-------------|------------|---------------------------|--|---|---------------------|---|---------------------|-----------------------------------|
| (Uni)       | (Bi)       | V <sub>RMW</sub> (V)      | V <sub>BR MIN</sub> (V)                | V <sub>BR MAX</sub> (V)                 | I <sub>T</sub> (mA) | V <sub>C</sub> (V)                        | I <sub>PP</sub> (A) | I <sub>R</sub> (uA)               |
| 1.5KE200    | 1.5KE200C  | 162                       | 180                                    | 220                                     | 1.0                 | 287                                       | 5.3                 | 5.0                               |
| 1.5KE200A   | 1.5KE200CA | 171                       | 190                                    | 210                                     | 1.0                 | 274                                       | 5.5                 | 5.0                               |
| 1.5KE220    | 1.5KE220C  | 175                       | 198                                    | 242                                     | 1.0                 | 344                                       | 4.4                 | 5.0                               |
| 1.5KE220A   | 1.5KE220CA | 185                       | 209                                    | 231                                     | 1.0                 | 328                                       | 4.6                 | 5.0                               |
| 1.5KE250    | 1.5KE250C  | 202                       | 225                                    | 275                                     | 1.0                 | 360                                       | 4.2                 | 5.0                               |
| 1.5KE250A   | 1.5KE250CA | 214                       | 237                                    | 263                                     | 1.0                 | 344                                       | 4.4                 | 5.0                               |
| 1.5KE300    | 1.5KE300C  | 243                       | 270                                    | 330                                     | 1.0                 | 430                                       | 3.5                 | 5.0                               |
| 1.5KE300A   | 1.5KE300CA | 256                       | 285                                    | 315                                     | 1.0                 | 414                                       | 3.7                 | 5.0                               |
| 1.5KE350    | 1.5KE350C  | 284                       | 315                                    | 385                                     | 1.0                 | 504                                       | 3.0                 | 5.0                               |
| 1.5KE350A   | 1.5KE350CA | 300                       | 333                                    | 368                                     | 1.0                 | 482                                       | 3.2                 | 5.0                               |
| 1.5KE400    | 1.5KE400C  | 324                       | 360                                    | 440                                     | 1.0                 | 574                                       | 2.6                 | 5.0                               |
| 1.5KE400A   | 1.5KE400CA | 342                       | 380                                    | 420                                     | 1.0                 | 548                                       | 2.8                 | 5.0                               |
| 1.5KE440    | 1.5KE440C  | 356                       | 396                                    | 484                                     | 1.0                 | 631                                       | 2.4                 | 5.0                               |
| 1.5KE440A   | 1.5KE440CA | 376                       | 418                                    | 462                                     | 1.0                 | 600                                       | 2.5                 | 5.0                               |

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# SURFACE MOUNT TRANSIENT VOLTAGE SUPPRESSORS

## 1.5KE6.8 - 1.5KE180A

RATINGS AND CHARACTERISTIC CURVES  $T_A=25^\circ\text{C}$  UNLESS OTHERWISE NOTED

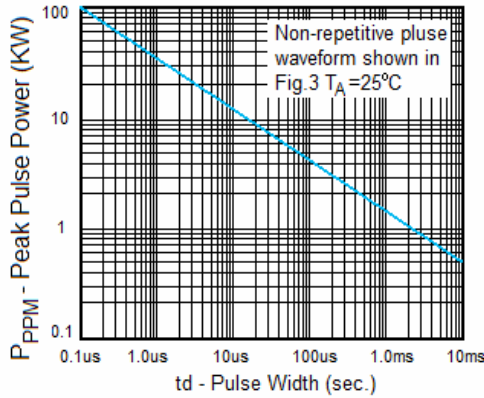


Fig. 1 Peak Pulse Power Rating

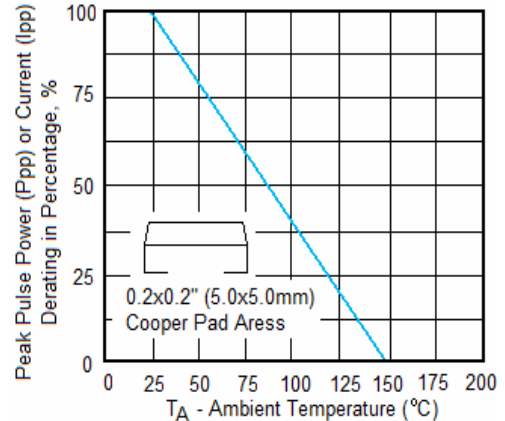


Fig. 2 Pulse Derating Curve

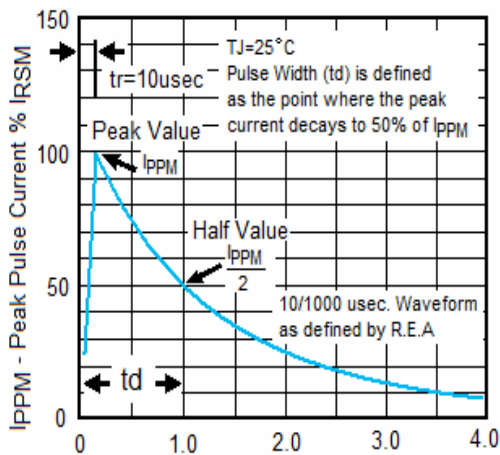


Fig. 3 Pulse Waveform

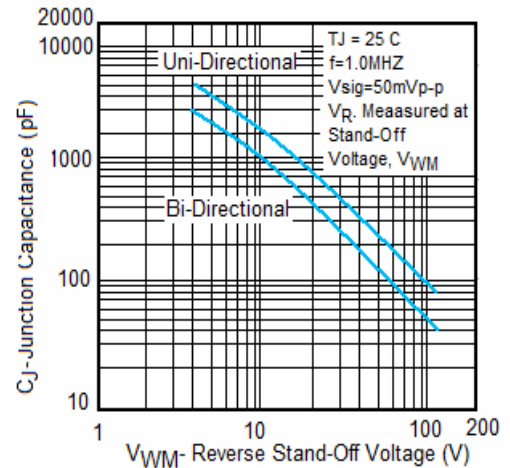


Fig. 4- Typical Junction Capacitance