



GLASS PASSIVATED JUNCTION TRANSIENT VOLTAGE SUPPRESSORS

1.5KE6.8 THRU 1.5KE440CA(GPP)

Breakdown Voltage 6.8 to 440 Volts

1.5KE6.8J THRU 1.5KE440CAJ(OPEN JUNCTION)

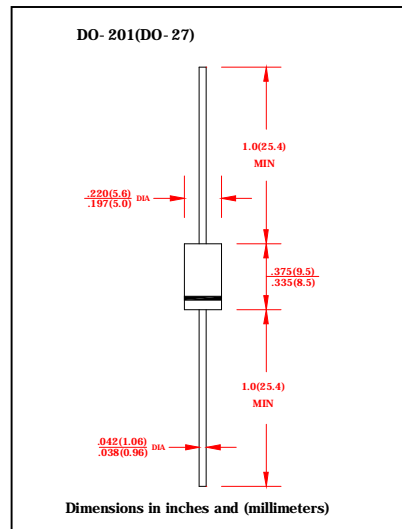
Peak Pulse Power 1500 Watts

FEATURES

- Plastic package has Underwriters Laboratory Flammability Classification 94V-O
- Glass passivated junction or silastic guard junction (open junction)
- 1500W peak pulse power capability with a 10/1000 μ s Waveform, repetition rate (duty cycle): 0.05%
- Excellent clamping capability
- Low incremental surge resistance
- Fast response time: typically less than 1.0ps from 0 Volts to $V_{(BR)}$ for unidirectional and 5.0ns for bidirectional types
- Devices with $V_{(BR)} \geq 10V$, I_D are typically less than 1.0 μ A
- High temperature soldering guaranteed:
265°C/10 seconds, 0.375" (9.5mm) lead length, 51bs.(2.3kg) tension

MECHANICAL DATA

- Cass: molded plastic body over passivated junction
- Terminals: plated axial leads, solderable per MIL-STD-750, Method 2026
- Polarity: Color bands denotes positive end (cathode) except for bidirectional
- Mounting Position: any
- Weight: 0.045 ounces, 1.2 grams



DEVICES FOR BIDIRECTIONAL APPLICATIONS

- For bidirectional use C or CA suffix for types 1.5KE6.8 thru types 1.5K440 (e.g. 1.5KE6.8C, 1.5KE440CA).Electrical Characteristics apply in both directions.
- Suffix A denotes $\pm 5\%$ tolerance device, No suffix A denotes $\pm 10\%$ tolerance device

MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

- Ratings at 25°C ambient temperature unless otherwise specified

| Ratings | Symbols | Value | Unit |
|---|----------------|-------------|------------|
| Peak Pulse power dissipation with a 10/1000 μ s waveform (NOTE1) | PPPM | Minimum 400 | Watts |
| Peak Pulse current with a 10/1000 μ s waveform (NOTE1,FIG.1) | IPPM | See Table 1 | Amps |
| Steady Stage Power Dissipation at $T_L=75^\circ C$ Lead lengths 0.375"(9.5mm)(Note2) | $P_{M(AV)}$ | 5.0 | Watts |
| Peak forward surge current, 8.3ms single half sine-wave superimposed on rated load (JEDEC Method) unidirectional only | I_{FSM} | 200.0 | Amps |
| Maximum instantaneous forward voltage at 100.0A for unidirectional only (NOTE 3) | V_F | 3.5/5.0 | Volts |
| Operating Junction and Storage Temperature Range | T_J, T_{STG} | 50 to +150 | $^\circ C$ |

Notes:

1. Non-repetitive current pulse, per Fig.3 and derated above $T_A=25^\circ C$ per Fig.2
2. Mounted on copper pads ares of 0.8 \times 0.8"(20 \times 20mm) per Fig 5.
3. $V_F=3.5$ V for devices of $V_{(BR)} \leq 200V$, and $V_F=5.0$ Volts max. for devices of $V_{(BR)} > 200v$



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Electrical Characteristic at (T_A = 25°C unless otherwise noted) TABLE1

| Device Type | Breakdown Voltage V _(BR) (Volts) (Note 1) | | Test Current at I _r (mA) | Stand-off Voltage V _{WM} (Volts) | Maximum Reverse Leakage at V _{WM} I _D (μ A) | Maximum Peak Pulse Current I _{PPM} (Note 2) (Amps) | Maximum Clamping Voltage at I _{PPM} V _c (Volts) | Maximum Temperature Coefficient of V _(BR) (%/°C) |
|-------------|--|------|-------------------------------------|---|---|---|---|---|
| | MIN | MAX | | | | | | |
| 1.5KE6.8/J | 6.12 | 7.48 | 10 | 5.5 | 1000 | 139 | 10.8 | 0.057 |
| 1.5KE6.8A/J | 6.45 | 7.14 | 10 | 5.8 | 1000 | 143 | 10.5 | 0.057 |
| 1.5KE7.5/J | 6.75 | 8.25 | 10 | 6.05 | 500 | 128 | 11.7 | 0.061 |
| 1.5KE7.5A/J | 7.13 | 7.88 | 10 | 6.4 | 500 | 133 | 11.3 | 0.061 |
| 1.5KE8.2/J | 7.38 | 9.02 | 10 | 6.63 | 200 | 120 | 12.5 | 0.065 |
| 1.5KE8.2A/J | 7.79 | 8.61 | 10 | 7.02 | 200 | 124 | 12.1 | 0.065 |
| 1.5KE9.1/J | 8.19 | 10 | 1 | 7.37 | 50 | 109 | 13.8 | 0.068 |
| 1.5KE9.1A/J | 7.65 | 9.55 | 1 | 7.78 | 50 | 112 | 13.4 | 0.068 |
| 1.5KE10/J | 9 | 11 | 1 | 8.1 | 10 | 100 | 15 | 0.073 |
| 1.5KE10A/J | 9.5 | 10.5 | 1 | 8.55 | 10 | 103 | 14.5 | 0.073 |
| 1.5KE11/J | 9.9 | 12.1 | 1 | 8.92 | 5 | 92.6 | 16.2 | 0.075 |
| 1.5KE11A/J | 10.5 | 11.6 | 1 | 9.4 | 5 | 96.2 | 15.6 | 0.075 |
| 1.5KE12/J | 10.8 | 13.2 | 1 | 9.372 | 5 | 86.7 | 17.3 | 0.076 |
| 1.5KE12A/J | 11.4 | 12.6 | 1 | 10.2 | 5 | 89.8 | 16.7 | 0.078 |
| 1.5KE13/J | 11.7 | 14.3 | 1 | 10.5 | 5 | 78.9 | 19 | 0.081 |
| 1.5KE13A/J | 12.4 | 13.7 | 1 | 11.1 | 5 | 82.4 | 18.2 | 0.081 |
| 1.5KE15/J | 13.5 | 16.5 | 1 | 12.1 | 5 | 68.2 | 22 | 0.084 |
| 1.5KE15A/J | 14.3 | 15.8 | 1 | 12.8 | 5 | 70.8 | 21.2 | 0.084 |
| 1.5KE16/J | 14.4 | 17.6 | 1 | 12.9 | 5 | 63.8 | 23.5 | 0.086 |
| 1.5KE16A/J | 15.2 | 16.8 | 1 | 13.6 | 5 | 66.7 | 22.5 | 0.086 |
| 1.5KE18/J | 16.2 | 19.8 | 1 | 14.5 | 5 | 56.6 | 26.5 | 0.088 |
| 1.5KE18A/J | 17.1 | 18.9 | 1 | 15.3 | 5 | 59.5 | 25.2 | 0.089 |
| 1.5KE20/J | 18 | 22 | 1 | 16.2 | 5 | 51.5 | 29.1 | 0.09 |
| 1.5KE20A/J | 19 | 21 | 1 | 17.1 | 5 | 54.2 | 27.7 | 0.09 |
| 1.5KE22/J | 19.8 | 24.2 | 1 | 17.8 | 5 | 47 | 31.9 | 0.092 |
| 1.5KE22A/J | 20.9 | 23.1 | 1 | 18.8 | 5 | 49 | 30.6 | 0.092 |
| 1.5KE24/J | 21.6 | 26.4 | 1 | 19.4 | 5 | 43.2 | 34.7 | 0.094 |
| 1.5KE24A/J | 22.8 | 25.2 | 1 | 20.5 | 5 | 45.2 | 33.2 | 0.094 |
| 1.5KE27/J | 24.3 | 29.7 | 1 | 21.8 | 5 | 38.4 | 39.1 | 0.096 |
| 1.5KE27A/J | 25.7 | 28.4 | 1 | 23.1 | 5 | 40 | 37.5 | 0.096 |
| 1.5KE30/J | 27 | 33 | 1 | 24.3 | 5 | 34.5 | 43.5 | 0.097 |
| 1.5KE30A/J | 28.5 | 31.5 | 1 | 25.6 | 5 | 36.2 | 41.4 | 0.097 |
| 1.5KE33/J | 29.7 | 36.3 | 1 | 26.8 | 5 | 31.4 | 47.7 | 0.098 |
| 1.5KE33A/J | 31.4 | 34.7 | 1 | 28.2 | 5 | 32.8 | 45.7 | 0.098 |
| 1.5KE36/J | 32.4 | 39.6 | 1 | 29.1 | 5 | 28.8 | 52 | 0.099 |
| 1.5KE36A/J | 34.2 | 37.8 | 1 | 30.8 | 5 | 30.1 | 49.9 | 0.099 |
| 1.5KE39/J | 35.1 | 42.9 | 1 | 31.6 | 5 | 26.6 | 56.4 | 0.1 |
| 1.5KE39A/J | 37.1 | 41 | 1 | 33.3 | 5 | 27.8 | 53.9 | 0.1 |
| 1.5KE43/J | 38.7 | 47.3 | 1 | 34.8 | 5 | 24.2 | 61.9 | 0.101 |
| 1.5KE43A/J | 40.9 | 45.2 | 1 | 36.8 | 5 | 25.3 | 59.3 | 0.101 |
| 1.5KE47/J | 42.3 | 51.7 | 1 | 38.1 | 5 | 22.1 | 67.8 | 0.101 |
| 1.5KE47A/J | 44.7 | 49.4 | 1 | 40.2 | 5 | 23.1 | 64.8 | 0.101 |
| 1.5KE51/J | 45.7 | 56.1 | 1 | 41.3 | 5 | 20.4 | 73.5 | 0.102 |
| 1.5KE51A/J | 48.5 | 43.6 | 1 | 43.6 | 5 | 21.4 | 70.1 | 0.102 |
| 1.5KE56/J | 50.4 | 61.6 | 1 | 45.4 | 5 | 18.6 | 80.5 | 0.103 |
| 1.5KE56A/J | 53.2 | 58.8 | 1 | 47.8 | 5 | 19.5 | 77 | 0.103 |
| 1.5KE62/J | 55.8 | 68.8 | 1 | 50.2 | 5 | 16.9 | 89 | 0.104 |
| 1.5KE62A/J | 58.9 | 65.1 | 1 | 53 | 5 | 17.6 | 85 | 0.104 |



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Electrical Characteristic at (T_A =25°C unless otherwise noted) TABLE 1 (Cont'd)

| Device Type | Breakdown Voltage V _(BR) (Volts) (Note 1) | | Test Current at I _r (mA) | Stand-off Voltage V _{WM} (Volts) | Maximum Reverse Leakage at V _{WM} I _D (μ A) (Note3) | Maximum Peak Pulse Current I _{PPM} (Note 2) (Amps) | Maximum Clamping Voltage at I _{PPM} V _c (Volts) | Maximum Temperature Coefficient of V _(BR) (%/°C) |
|-------------|--|------|-------------------------------------|---|---|---|---|---|
| | MIN | MAX | | | | | | |
| 1.5KE68/J | 61.2 | 74.8 | 1 | 55.1 | 5 | 15.3 | 98 | 0.104 |
| 1.5KE68A/J | 64.6 | 71.4 | 1 | 58.1 | 5 | 16.3 | 92 | 0.104 |
| 1.5KE75/J | 67.5 | 82.5 | 1 | 60.7 | 5 | 13.9 | 105 | 0.105 |
| 1.5KE75A/J | 71.3 | 78.8 | 1 | 64.1 | 5 | 14.6 | 103 | 0.105 |
| 1.5KE82/J | 73.8 | 90.2 | 1 | 66.4 | 5 | 12.7 | 118 | 0.105 |
| 1.5KE82A/J | 77.9 | 86.1 | 1 | 70.1 | 5 | 13.3 | 113 | 0.105 |
| 1.5KE91/J | 81.9 | 100 | 1 | 73.7 | 5 | 11.5 | 131 | 0.106 |
| 1.5KE91A/J | 86.5 | 95.5 | 1 | 77.8 | 5 | 12 | 125 | 0.106 |
| 1.5KE100/J | 90 | 110 | 1 | 81 | 5 | 10.4 | 144 | 0.106 |
| 1.5KE100A/J | 95 | 105 | 1 | 85.5 | 5 | 10.9 | 137 | 0.106 |
| 1.5KE110/J | 99 | 121 | 1 | 89.2 | 5 | 9.5 | 158 | 0.107 |
| 1.5KE110A/J | 105 | 116 | 1 | 94 | 5 | 9.9 | 152 | 0.107 |
| 1.5KE120/J | 108 | 132 | 1 | 97.2 | 5 | 8.7 | 173 | 0.107 |
| 1.5KE120A/J | 114 | 126 | 1 | 102 | 5 | 9.1 | 165 | 0.107 |
| 1.5KE130/J | 117 | 143 | 1 | 105 | 5 | 8 | 187 | 0.107 |
| 1.5KE130A/J | 124 | 137 | 1 | 111 | 5 | 8.4 | 179 | 0.107 |
| 1.5KE150/J | 135 | 165 | 1 | 121 | 5 | 7 | 215 | 0.108 |
| 1.5KE150A/J | 143 | 159 | 1 | 128 | 5 | 7.2 | 207 | 0.108 |
| 1.5KE160/J | 144 | 175 | 1 | 130 | 5 | 6.5 | 230 | 0.108 |
| 1.5KE160A/J | 152 | 167 | 1 | 136 | 5 | 6.8 | 219 | 0.108 |
| 1.5KE170/J | 153 | 187 | 1 | 138 | 5 | 6.1 | 244 | 0.108 |
| 1.5KE170A/J | 162 | 179 | 1 | 145 | 5 | 6.4 | 234 | 0.108 |
| 1.5KE180/J | 162 | 197 | 1 | 146 | 5 | 5.8 | 258 | 0.108 |
| 1.5KE180A/J | 171 | 189 | 1 | 154 | 5 | 6.1 | 246 | 0.108 |
| 1.5KE200/J | 180 | 220 | 1 | 162 | 5 | 5.2 | 287 | 0.108 |
| 1.5KE200A/J | 190 | 210 | 1 | 171 | 5 | 5.5 | 274 | 0.108 |
| 1.5KE220/J | 198 | 242 | 1 | 175 | 5 | 4.4 | 344 | 0.108 |
| 1.5KE220A/J | 209 | 231 | 1 | 185 | 5 | 4.6 | 328 | 0.108 |
| 1.5KE250/J | 25 | 275 | 1 | 202 | 5 | 4.2 | 360 | 0.11 |
| 1.5KE250A/J | 237 | 267 | 1 | 214 | 5 | 4.4 | 344 | 0.11 |
| 1.5KE300/J | 270 | 330 | 1 | 243 | 5 | 3.5 | 430 | 0.11 |
| 1.5KE300A/J | 285 | 315 | 1 | 245 | 5 | 3.6 | 414 | 0.11 |
| 1.5KE350/J | 315 | 385 | 1 | 284 | 5 | 3 | 504 | 0.11 |
| 1.5KE350A/J | 332 | 368 | 1 | 300 | 5 | 3.1 | 482 | 0.11 |
| 1.5KE400/J | 360 | 440 | 1 | 324 | 5 | 2.6 | 574 | 0.11 |
| 1.5KE400A/J | 380 | 420 | 1 | 342 | 5 | 2.7 | 548 | 0.11 |
| 1.5KE440/J | 396 | 484 | 1 | 356 | 5 | 2.4 | 631 | 0.11 |
| 1.5KE440A/J | 418 | 462 | 1 | 376 | 5 | 2.5 | 602 | 0.11 |

Notes:/

- (1) V_(BR) measured after I_r applied for 300ms I_r =square wave pulse or equivalent
- (2) Surge current waveform per Figure 3 and derate per Fig.2
- (3) All terms and symbols are consistent with ANSI/IEEE C62.35
- (4) For bidirectional type having V_{WM} of 10 volts and less, the I_D limit is doubled



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RATING AND CHARACTERISTIC CURVES 1.5KE6.8/J THRU 1.5KE440CA/J





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FIG.7- INCREMENTAL CLAMPING VOLTAGE CURVE UNIDIRECTIONAL



FIG.8- INCREMENTAL CLAMPING VOLTAGE CURVE UNIDIRECTIONAL



FIG.9- INCREMENTAL CLAMPING VOLTAGE CURVE BIDIRECTIONAL



FIG.10- INCREMENTAL CLAMPING VOLTAGE CURVE BIDIRECTIONAL





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FIG.11- INSTANTANEOUS FORWARD VOLTAGE CHARACTERISTICS CURVE



FIG.12- BREAKDOWN VOLTAGE TEMPERATURE COEFFICIENT CURVE

