

# 1.5KE6.8 THRU 1.5KE440CA

GLASS PASSIVATED JUNCTION TRANSIENT VOLTAGE SUPPRESSOR

Reverse Voltage – 6.8 to 440 Volts Peak Pulse Power 1500 Watts

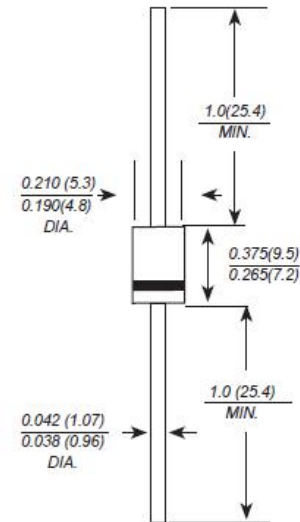
## FEATURES

- ◆ 1500W peak pulse power capability
- ◆ Excellent clamping capability
- ◆ Low incremental surge resistance
- ◆ Fast response time: typically less than 1.0ps from 0v to  $V_{BR}$  for unidirectional and 5.0ns for bi-directional types
- ◆ High temperature soldering guaranteed: 265°C /10S/9.5mm lead length at 5 lbs tension

## Mechanical Data

- ◆ Case: JEDEC DO-201AD molded plastic body over passivated junction
- ◆ Terminals: Plated axial leads, solderable per MIL-STD 750 method 2026
- ◆ Polarity: Color band denotes cathode except for Bi-directional types
- ◆ Mounting position: Any
- ◆ Weight: 0.04 ounce, 1.10 grams

## DO-201AD



Dimensions in inches and (millimeters)

## DEVICES FOR BI-DIRECTIONAL APPLICATIONS

For bi-directional use C or CA suffix for types 1.5KE6.8 thru types 1.5KE440 (e.g. 1.5KE6.8CA, 1.5KE440CA). Electrical characteristics apply in both directions.

## MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

Rating at 25°C ambient temperature unless otherwise specified.

| PARAMETER  | SYMBOL         | VALUE        | UNIT  |
|--|----------------|--------------|-------|
| Peak power dissipation (Note 1)  | $P_{PPM}$      | Minimum 1500 | Watts |
| Peak pulse reverse current (Note 1, Fig.1)                                     | $I_{PPM}$      | See Table 1  | Amps  |
| Steady state power dissipation (Note 2)  | $P_{M(AV)}$    | 5.0          | Watts |
| Peak forward surge current (Note 3)  | $I_{FSM}$      | 200          | Amps  |
| Maximum instantaneous forward voltage at 100A for unidirectional only (Note 4) | $V_F$          | 3.5/5.0      | Volts |
| Operating junction and storage temperature range                               | $T_{STG}, T_J$ | -55 to + 175 | °C    |

## Note:

1. 1.10/1000ms waveform non-repetitive current pulse, per Fig.3 and derated above  $T_a=25^\circ\text{C}$  per Fig.2
2.  $T_L=75^\circ\text{C}$ , lead lengths 9.5mm, Mounted on copper pad area of (20x20mm) Fig.5
3. Measured on 8.3ms single half sine-wave or equivalent square wave, duty cycle=4 pulses per minute maximum
4.  $V_F=3.5\text{V}$  max. for devices of  $V_{(BR)} \leq 200\text{V}$ , and  $V_F=5.0\text{V}$  max. for devices of  $V_{(BR)} > 200\text{V}$

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**ELECTRICAL CHARACTERISTICS (at T<sub>A</sub>=25°C unless otherwise noted)**

| Device Type | Breakdown Voltage V <sub>(BR)</sub> (Volts)(NOTES 1) |      | Test Current I <sub>T</sub> (mA) | Stand-off Voltage V <sub>WM</sub> (Volts) | Maximum Reverse Leakage at V <sub>WM</sub> I <sub>D</sub> (NOTE3)(mA) | Maximum Peak Puls Reverse Current I <sub>PPM</sub> (NOTE2) (Amps) | Maximum Clamping Voltage at I <sub>PPM</sub> V <sub>c</sub> (Volts) | Maximum Temperature Coefficient of V <sub>(BR)</sub> (%/°C) |
|-------------|--|------|----------------------------------|---|---|---|---|---|
|             | MIN  | MAX  |                                  |   |   |   |   |   |
| 1.5KE6.8    | 6.12   | 7.48 | 10.0                             | 5.50                                      | 1000.0  | 139   | 10.8  | 0.057   |
| 1.5KE6.8A   | 6.45   | 7.14 | 10.0                             | 5.80                                      | 1000.0  | 143   | 10.5  | 0.057   |
| 1.5KE7.5    | 6.75   | 8.25 | 10.0                             | 6.05                                      | 500.0   | 128   | 11.7  | 0.061   |
| 1.5KE7.5A   | 7.13   | 7.88 | 10.0                             | 6.40                                      | 500.0   | 133   | 11.3  | 0.061   |
| 1.5KE8.2    | 7.38   | 9.02 | 10.0                             | 6.63                                      | 200.0   | 120   | 12.5  | 0.065   |
| 1.5KE8.2A   | 7.79   | 8.61 | 10.0                             | 7.02                                      | 200.0   | 124   | 12.1  | 0.065   |
| 1.5KE9.1    | 8.19   | 10.0 | 1.0                              | 7.37                                      | 50.0  | 109   | 13.8  | 0.068   |
| 1.5KE9.1A   | 8.65   | 9.55 | 1.0                              | 7.78                                      | 50.0  | 112   | 13.4  | 0.068   |
| 1.5KE10     | 9.00   | 11.0 | 1.0                              | 8.10                                      | 10.0  | 100   | 15.0  | 0.073   |
| 1.5KE10A    | 9.50   | 10.5 | 1.0                              | 8.55                                      | 10.0  | 103   | 14.5  | 0.073   |
| 1.5KE11     | 9.90   | 12.1 | 1.0                              | 8.92                                      | 5.0   | 92.6  | 16.2  | 0.075   |
| 1.5KE11A    | 10.5   | 11.6 | 1.0                              | 9.40                                      | 5.0   | 96.2  | 15.6  | 0.075   |
| 1.5KE12     | 10.8   | 13.2 | 1.0                              | 9.72                                      | 5.0   | 86.7  | 17.3  | 0.078   |
| 1.5KE12A    | 11.4   | 12.6 | 1.0                              | 10.2                                      | 5.0   | 89.8  | 16.7  | 0.078   |
| 1.5KE13     | 11.7   | 14.3 | 1.0                              | 10.5                                      | 5.0   | 78.9  | 19.0  | 0.081   |
| 1.5KE13A    | 12.4   | 13.7 | 1.0                              | 11.1                                      | 5.0   | 82.4  | 18.2  | 0.081   |
| 1.5KE15     | 13.5   | 16.5 | 1.0                              | 12.1                                      | 5.0   | 68.2  | 22.0  | 0.084   |
| 1.5KE15A    | 14.3   | 15.8 | 1.0                              | 12.8                                      | 5.0   | 70.8  | 21.2  | 0.084   |
| 1.5KE16     | 14.4   | 17.6 | 1.0                              | 12.9                                      | 5.0   | 63.8  | 23.5  | 0.086   |
| 1.5KE16A    | 15.2   | 16.8 | 1.0                              | 13.6                                      | 5.0   | 66.7  | 22.5  | 0.086   |
| 1.5KE18     | 16.2   | 19.8 | 1.0                              | 14.5                                      | 5.0   | 56.6  | 26.5  | 0.088   |
| 1.5KE18A    | 17.1   | 18.9 | 1.0                              | 15.3                                      | 5.0   | 59.5  | 25.5  | 0.088   |
| 1.5KE20     | 18.0   | 22.0 | 1.0                              | 16.2                                      | 5.0   | 51.5  | 29.1  | 0.090   |
| 1.5KE20A    | 19.0   | 21.0 | 1.0                              | 17.1                                      | 5.0   | 54.2  | 27.7  | 0.090   |
| 1.5KE22     | 19.8   | 24.2 | 1.0                              | 17.8                                      | 5.0   | 47.0  | 31.9  | 0.092   |
| 1.5KE22A    | 20.9   | 23.1 | 1.0                              | 18.8                                      | 5.0   | 49.0  | 30.6  | 0.092   |
| 1.5KE24     | 21.6   | 26.4 | 1.0                              | 19.4                                      | 5.0   | 43.2  | 34.7  | 0.094   |
| 1.5KE24A    | 22.8   | 25.2 | 1.0                              | 20.5                                      | 5.0   | 45.2  | 33.2  | 0.094   |
| 1.5KE27     | 24.3   | 29.7 | 1.0                              | 21.8                                      | 5.0   | 38.4  | 39.1  | 0.096   |
| 1.5KE27A    | 25.7   | 28.4 | 1.0                              | 23.1                                      | 5.0   | 40.0  | 37.5  | 0.096   |
| 1.5KE30     | 27.0   | 33.0 | 1.0                              | 24.3                                      | 5.0   | 34.5  | 43.5  | 0.097   |
| 1.5KE30A    | 28.5   | 31.5 | 1.0                              | 25.6                                      | 50.   | 36.2  | 41.4  | 0.097   |
| 1.5KE33     | 29.7   | 36.3 | 1.0                              | 26.8                                      | 5.0   | 31.4  | 47.7  | 0.098   |
| 1.5KE33A    | 31.4   | 34.7 | 1.0                              | 28.2                                      | 5.0   | 32.8  | 45.7  | 0.098   |
| 1.5KE36     | 32.4   | 39.6 | 1.0                              | 29.1                                      | 5.0   | 28.8  | 52.0  | 0.099   |
| 1.5KE36A    | 34.2   | 37.8 | 1.0                              | 30.8                                      | 5.0   | 30.1  | 49.9  | 0.099   |
| 1.5KE39     | 35.1   | 42.9 | 1.0                              | 31.6                                      | 5.0   | 26.6  | 56.4  | 0.100   |
| 1.5KE39A    | 37.1   | 41.0 | 1.0                              | 33.3                                      | 5.0   | 27.8  | 53.9  | 0.100   |
| 1.5KE43     | 38.7   | 47.3 | 1.0                              | 34.8                                      | 5.0   | 24.2  | 61.9  | 0.101   |
| 1.5KE43A    | 40.9   | 45.2 | 1.0                              | 36.8                                      | 5.0   | 25.3  | 59.3  | 0.101   |
| 1.5KE47     | 42.3   | 51.7 | 1.0                              | 38.1                                      | 5.0   | 22.1  | 67.8  | 0.101   |
| 1.5KE47A    | 44.7   | 49.4 | 1.0                              | 40.2                                      | 5.0   | 23.1  | 64.8  | 0.101   |
| 1.5KE51     | 45.9   | 56.1 | 1.0                              | 41.3                                      | 5.0   | 20.4  | 73.5  | 0.102   |
| 1.5KE51A    | 48.5   | 53.6 | 1.0                              | 43.6                                      | 5.0   | 21.4  | 70.1  | 0.102   |
| 1.5KE56     | 50.4   | 61.6 | 1.0                              | 45.4                                      | 5.0   | 18.6  | 80.5  | 0.103   |
| 1.5KE56A    | 53.2   | 58.8 | 1.0                              | 47.8                                      | 5.0   | 19.5  | 77.0  | 0.103   |

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| Device Type | Breakdown Voltage $V_{(BR)}$ (Volts)(NOTES 1) |      | Test Current $I_T$ (mA) | Stand-off Voltage $V_{WM}$ (Volts) | Maximum Reverse Leakage at $V_{WM}$ $I_D$ (NOTE3)(mA) | Maximum Peak Puls Reverse Current $I_{PPM}$ (NOTE2) (Amps) | Maximum Clamping Voltage at $I_{PPM}$ $V_c$ (Volts) | Maximum Temperature Coefficient of $V_{(BR)}$ (%/ $^{\circ}\text{C}$ ) |
|-------------|---|------|-------------------------|------------------------------------|---|--|---|--|
|             | MIN   | MAX  |                         |                                    |   |  |   |  |
| 1.5KE62     | 55.8  | 66.8 | 1.0                     | 50.2                               | 5.0   | 16.9   | 89.0  | 0.104  |
| 1.5KE62A    | 58.9  | 65.1 | 1.0                     | 53.0                               | 5.0   | 17.6   | 85.0  | 0.104  |
| 1.5KE68     | 61.2  | 74.8 | 1.0                     | 55.1                               | 5.0   | 15.3   | 98.0  | 0.104  |
| 1.5KE68A    | 64.6  | 71.4 | 1.0                     | 58.1                               | 5.0   | 16.3   | 92.0  | 0.104  |
| 1.5KE75     | 67.5  | 82.5 | 1.0                     | 60.7                               | 5.0   | 13.9   | 108   | 0.105  |
| 1.5KE75A    | 71.3  | 78.8 | 1.0                     | 64.1                               | 5.0   | 14.6   | 103   | 0.105  |
| 1.5KE82     | 73.8  | 90.2 | 1.0                     | 66.4                               | 5.0   | 12.7   | 118   | 0.105  |
| 1.5KE82A    | 77.9  | 86.1 | 1.0                     | 70.1                               | 5.0   | 13.3   | 113   | 0.105  |
| 1.5KE91     | 81.9  | 100  | 1.0                     | 73.7                               | 5.0   | 11.5   | 131   | 0.106  |
| 1.5KE91A    | 86.5  | 95.5 | 1.0                     | 77.8                               | 5.0   | 12.0   | 125   | 0.106  |
| 1.5KE100    | 90.0  | 110  | 1.0                     | 81.0                               | 5.0   | 10.4   | 144   | 0.106  |
| 1.5KE100A   | 95.0  | 105  | 1.0                     | 85.5                               | 5.0   | 10.9   | 137   | 0.106  |
| 1.5KE110    | 99.0  | 121  | 1.0                     | 89.2                               | 5.0   | 9.5  | 158   | 0.107  |
| 1.5KE110A   | 105   | 116  | 1.0                     | 94.0                               | 5.0   | 9.9  | 152   | 0.107  |
| 1.5KE120    | 108   | 132  | 1.0                     | 97.2                               | 5.0   | 8.7  | 173   | 0.107  |
| 1.5KE120A   | 114   | 126  | 1.0                     | 102                                | 5.0   | 9.1  | 165   | 0.107  |
| 1.5KE130    | 117   | 143  | 1.0                     | 105                                | 5.0   | 8.0  | 187   | 0.107  |
| 1.5KE130A   | 124   | 137  | 1.0                     | 111                                | 5.0   | 8.4  | 179   | 0.107  |
| 1.5KE150    | 135   | 165  | 1.0                     | 121                                | 5.0   | 7.0  | 215   | 0.108  |
| 1.5KE150A   | 143   | 158  | 1.0                     | 128                                | 5.0   | 7.2  | 207   | 0.108  |
| 1.5KE160    | 144   | 176  | 1.0                     | 130                                | 5.0   | 6.5  | 230   | 0.108  |
| 1.5KE160A   | 152   | 168  | 1.0                     | 136                                | 5.0   | 6.8  | 219   | 0.108  |
| 1.5KE170    | 153   | 187  | 1.0                     | 138                                | 5.0   | 6.1  | 244   | 0.108  |
| 1.5KE170A   | 162   | 179  | 1.0                     | 145                                | 5.0   | 6.4  | 234   | 0.108  |
| 1.5KE180    | 162   | 198  | 1.0                     | 146                                | 5.0   | 5.8  | 258   | 0.108  |
| 1.5KE180A   | 171   | 189  | 1.0                     | 154                                | 5.0   | 6.1  | 246   | 0.108  |
| 1.5KE200    | 180   | 220  | 1.0                     | 162                                | 5.0   | 5.2  | 287   | 0.108  |
| 1.5KE200A   | 190   | 210  | 1.0                     | 171                                | 5.0   | 5.5  | 274   | 0.108  |
| 1.5KE220    | 198   | 242  | 1.0                     | 175                                | 5.0   | 4.4  | 344   | 0.108  |
| 1.5KE220A   | 209   | 231  | 1.0                     | 185                                | 5.0   | 4.6  | 328   | 0.108  |
| 1.5KE250    | 225   | 275  | 1.0                     | 202                                | 5.0   | 4.2  | 360   | 0.110  |
| 1.5KE250A   | 237   | 263  | 1.0                     | 214                                | 5.0   | 4.4  | 344   | 0.110  |
| 1.5KE300    | 270   | 330  | 1.0                     | 243                                | 5.0   | 3.5  | 430   | 0.110  |
| 1.5KE300A   | 285   | 315  | 1.0                     | 256                                | 5.0   | 3.6  | 414   | 0.110  |
| 1.5KE350    | 315   | 385  | 1.0                     | 284                                | 5.0   | 3.0  | 504   | 0.110  |
| 1.5KE350A   | 332   | 368  | 1.0                     | 300                                | 5.0   | 3.1  | 482   | 0.110  |
| 1.5KE400    | 360   | 440  | 1.0                     | 324                                | 5.0   | 2.6  | 574   | 0.110  |
| 1.5KE400A   | 380   | 420  | 1.0                     | 342                                | 5.0   | 2.7  | 548   | 0.110  |
| 1.5KE440    | 396   | 484  | 1.0                     | 356                                | 5.0   | 2.4  | 631   | 0.110  |
| 1.5KE440A   | 418   | 462  | 1.0                     | 376                                | 5.0   | 2.5  | 602   | 0.110  |

1.  $V_{(BR)}$  measured after  $I_T$  applied for 300ms,  $I_T$ =square wave pulse or equivalent

2. Surge current waveform per Fig.3 and derated per Fig.2

3. For bidirectional types having  $V_{WM}$  of 10 volts and less, the  $I_D$  limit is doubled

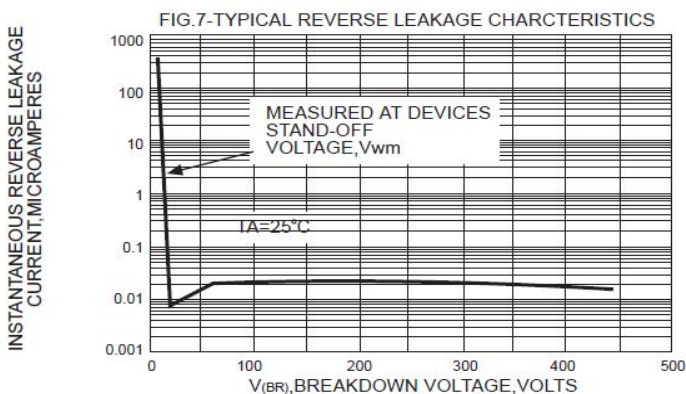
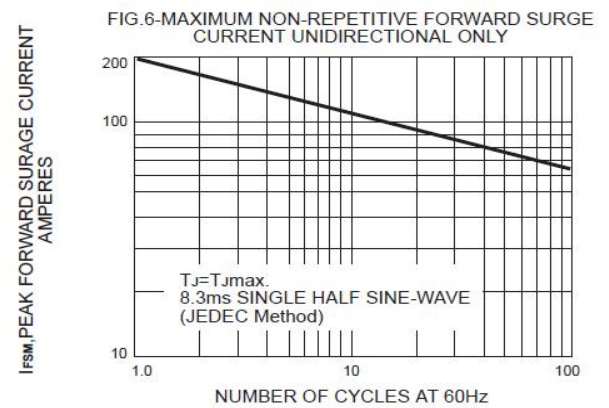
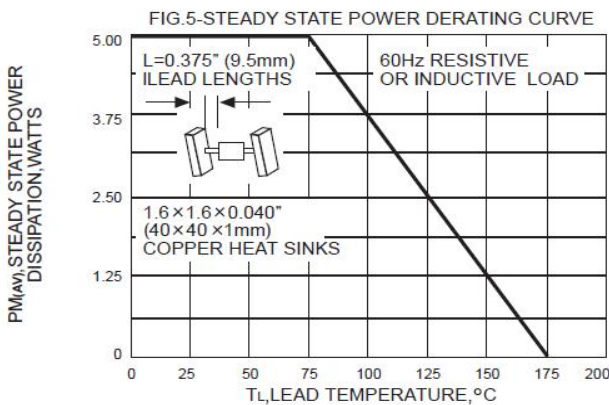
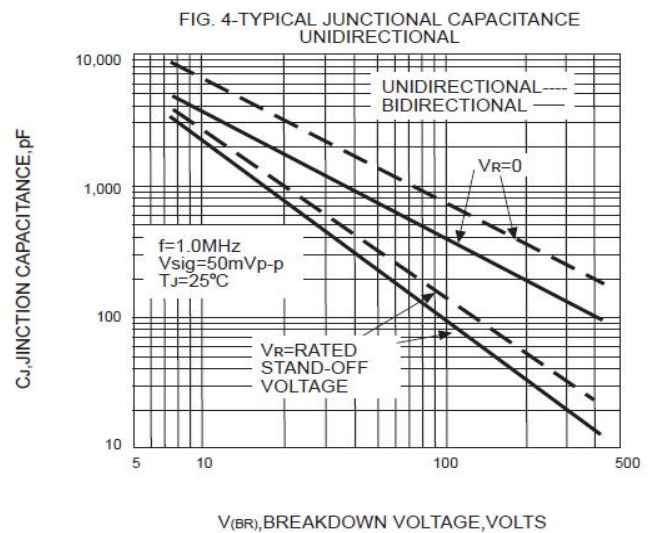
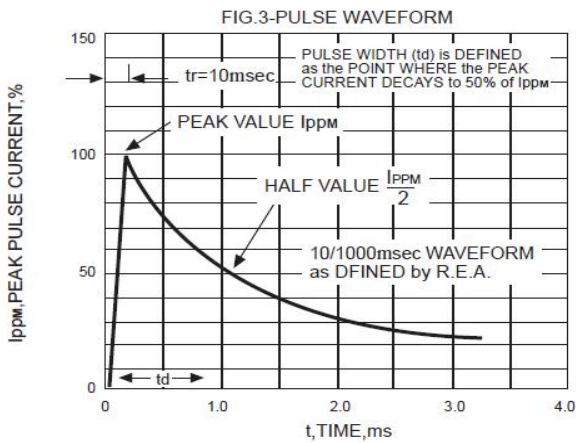
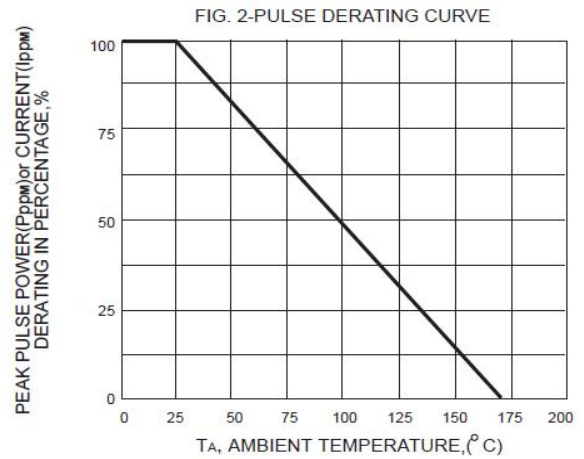
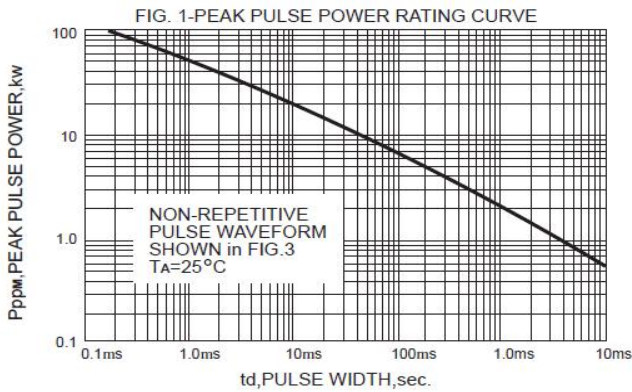
4. All items and symbols are consistent with ANSI/IEEE C62.35

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