



Continental Device India Pvt. Limited

An IATF 16949, ISO9001 and ISO 14001 Certified Company



## 1500W PEAK POWER TRANSIENT VOLTAGE SUPPRESSORS



DO-201AD

**1.5KE6.8A/CA~1.5KE440A/CA**

**DO-201AD Leaded  
Plastic Package  
RoHS compliant**

### FEATURES:

1. Breakdown voltage range: 6.8V ~ 440V
2. Peak Power Dissipation 1500W @ 10 X 1000us pulse
3. Excellent Clamping Capability
4. Fast Response Time : Typically Less than 1ns
5. Typical IR Less than 1uA above 10V
6. RoHS Compliant in Lead Free Versions

### ABSOLUTE MAXIMUM RATINGS (Ta = 25 °C Unless otherwise specified)

| PARAMETER                                                                                       | SYMBOL           | VALUE       | UNIT |
|-------------------------------------------------------------------------------------------------|------------------|-------------|------|
| Peak Pulse Power Dissipation on 10/1000 us Waveform (Note 1, 2 Fig.1)                           | P <sub>PPM</sub> | Min 1500    | W    |
| Peak Pulse Current of on 10/1000us Waveform (Note 1, Fig.2)                                     | I <sub>PPM</sub> | Specified   | A    |
| Peak Forward Surge Current, 8.3ms single Half Sine Wave Superimposed on Rated Load, (Note 2, 3) | I <sub>FSM</sub> | 200         | A    |
| Operating Junction Temperature Range                                                            | T <sub>J</sub>   | -55 to +150 | °C   |
| Storage Temperature Range                                                                       | T <sub>STG</sub> | -55 to +150 | °C   |

#### Notes:

1. Non-repetitive Current Pulse, per Fig3 and Derated above T<sub>A</sub> = 25°C per Fig 2.
2. Mounted on 5.0mm<sup>2</sup> (0.03mm thick ) Copper Pads to Each Terminal.
3. 8.5ms Single Half Sine wave or Equivalent Square Wave, Duty Cycle = 4 pulses per minute maximum.

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# **ELECTRICAL CHARACTERISTICS at (Ta = 25 °C Unless otherwise specified)**

| 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)               |
| 1.5KE6.8A   | 1.5KE6.8CA | 5.80                      | 6.45                                   | 7.14                                   | 10                  | 10.5                                      | 144.8               | 1000.0                            |
| 1.5KE7.5A   | 1.5KE7.5CA | 6.40                      | 7.13                                   | 7.88                                   | 10                  | 11.3                                      | 134.5               | 500.0                             |
| 1.5KE8.2A   | 1.5KE8.2CA | 7.02                      | 7.79                                   | 8.61                                   | 10                  | 12.1                                      | 125.6               | 200.0                             |
| 1.5KE9.1A   | 1.5KE9.1CA | 7.78                      | 8.65                                   | 9.55                                   | 1.0                 | 13.4                                      | 113.4               | 50.0                              |
| 1.5KE10A    | 1.5KE10CA  | 8.55                      | 9.50                                   | 10.5                                   | 1.0                 | 14.5                                      | 104.8               | 10.0                              |
| 1.5KE11A    | 1.5KE11CA  | 9.40                      | 10.5                                   | 11.6                                   | 1.0                 | 15.6                                      | 97.4                | 5.0                               |
| 1.5KE12A    | 1.5KE12CA  | 10.2                      | 11.4                                   | 12.6                                   | 1.0                 | 16.7                                      | 91.0                | 5.0                               |
| 1.5KE13A    | 1.5KE13CA  | 11.1                      | 12.4                                   | 13.7                                   | 1.0                 | 18.2                                      | 83.5                | 5.0                               |
| 1.5KE15A    | 1.5KE15CA  | 12.8                      | 14.3                                   | 15.8                                   | 1.0                 | 21.2                                      | 71.7                | 5.0                               |
| 1.5KE16A    | 1.5KE16CA  | 13.6                      | 15.2                                   | 16.8                                   | 1.0                 | 22.5                                      | 67.6                | 5.0                               |
| 1.5KE18A    | 1.5KE18CA  | 15.3                      | 17.1                                   | 18.9                                   | 1.0                 | 25.2                                      | 60.3                | 5.0                               |
| 1.5KE20A    | 1.5KE20CA  | 17.1                      | 19.0                                   | 21.0                                   | 1.0                 | 27.7                                      | 54.9                | 5.0                               |
| 1.5KE22A    | 1.5KE22CA  | 18.8                      | 20.9                                   | 23.1                                   | 1.0                 | 30.6                                      | 49.7                | 5.0                               |
| 1.5KE24A    | 1.5KE24CA  | 20.5                      | 22.8                                   | 25.2                                   | 1.0                 | 33.2                                      | 45.8                | 5.0                               |
| 1.5KE27A    | 1.5KE27CA  | 23.1                      | 25.7                                   | 28.4                                   | 1.0                 | 37.5                                      | 40.5                | 5.0                               |
| 1.5KE30A    | 1.5KE30CA  | 25.6                      | 28.5                                   | 31.5                                   | 1.0                 | 41.4                                      | 36.7                | 5.0                               |
| 1.5KE33A    | 1.5KE33CA  | 28.2                      | 31.4                                   | 34.7                                   | 1.0                 | 45.7                                      | 33.3                | 5.0                               |
| 1.5KE36A    | 1.5KE36CA  | 30.8                      | 34.2                                   | 37.8                                   | 1.0                 | 49.9                                      | 30.5                | 5.0                               |
| 1.5KE39A    | 1.5KE39CA  | 33.3                      | 37.1                                   | 41.0                                   | 1.0                 | 53.9                                      | 28.2                | 5.0                               |
| 1.5KE43A    | 1.5KE43CA  | 36.8                      | 40.9                                   | 45.2                                   | 1.0                 | 59.3                                      | 25.6                | 5.0                               |
| 1.5KE47A    | 1.5KE47CA  | 40.2                      | 44.7                                   | 49.4                                   | 1.0                 | 64.8                                      | 23.5                | 5.0                               |
| 1.5KE51A    | 1.5KE51CA  | 43.6                      | 48.5                                   | 53.6                                   | 1.0                 | 70.1                                      | 21.7                | 5.0                               |
| 1.5KE56A    | 1.5KE56CA  | 47.8                      | 53.2                                   | 58.8                                   | 1.0                 | 77.0                                      | 19.7                | 5.0                               |
| 1.5KE62A    | 1.5KE62CA  | 53.0                      | 58.9                                   | 65.1                                   | 1.0                 | 85.0                                      | 17.9                | 5.0                               |
| 1.5KE68A    | 1.5KE68CA  | 58.1                      | 64.6                                   | 71.4                                   | 1.0                 | 92.0                                      | 16.5                | 5.0                               |
| 1.5KE75A    | 1.5KE75CA  | 64.1                      | 71.3                                   | 78.8                                   | 1.0                 | 103                                       | 14.8                | 5.0                               |
| 1.5KE82A    | 1.5KE82CA  | 70.1                      | 77.9                                   | 86.1                                   | 1.0                 | 113                                       | 13.5                | 5.0                               |
| 1.5KE91A    | 1.5KE91CA  | 77.8                      | 86.5                                   | 95.5                                   | 1.0                 | 125                                       | 12.2                | 5.0                               |
| 1.5KE100A   | 1.5KE100CA | 85.5                      | 95.0                                   | 105                                    | 1.0                 | 137                                       | 11.1                | 5.0                               |
| 1.5KE110A   | 1.5KE110CA | 94.0                      | 105                                    | 116                                    | 1.0                 | 152                                       | 10.0                | 5.0                               |
| 1.5KE120A   | 1.5KE120CA | 102                       | 114                                    | 126                                    | 1.0                 | 165                                       | 9.2                 | 5.0                               |
| 1.5KE130A   | 1.5KE130CA | 111                       | 124                                    | 137                                    | 1.0                 | 179                                       | 8.5                 | 5.0                               |
| 1.5KE150A   | 1.5KE150CA | 128                       | 143                                    | 158                                    | 1.0                 | 207                                       | 7.3                 | 5.0                               |
| 1.5KE160A   | 1.5KE160CA | 136                       | 152                                    | 168                                    | 1.0                 | 219                                       | 6.9                 | 5.0                               |
| 1.5KE170A   | 1.5KE170CA | 145                       | 162                                    | 179                                    | 1.0                 | 234                                       | 6.5                 | 5.0                               |

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| 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)               |
| 1.5KE180A   | 1.5KE180CA | 154                       | 171                                    | 189                                     | 1.0                 | 246                                       | 6.2                 | 5.0                               |
| 1.5KE200A   | 1.5KE200CA | 171                       | 190                                    | 210                                     | 1.0                 | 274                                       | 5.5                 | 5.0                               |
| 1.5KE220A   | 1.5KE220CA | 185                       | 209                                    | 231                                     | 1.0                 | 328                                       | 4.6                 | 5.0                               |
| 1.5KE250A   | 1.5KE250CA | 214                       | 237                                    | 263                                     | 1.0                 | 344                                       | 4.4                 | 5.0                               |
| 1.5KE300A   | 1.5KE300CA | 256                       | 285                                    | 315                                     | 1.0                 | 414                                       | 3.7                 | 5.0                               |
| 1.5KE350A   | 1.5KE350CA | 300                       | 333                                    | 368                                     | 1.0                 | 482                                       | 3.2                 | 5.0                               |
| 1.5KE400A   | 1.5KE400CA | 342                       | 380                                    | 420                                     | 1.0                 | 548                                       | 2.8                 | 5.0                               |
| 1.5KE440A   | 1.5KE440CA | 376                       | 418                                    | 462                                     | 1.0                 | 600                                       | 2.5                 | 5.0                               |

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## TYPICAL CHARACTERISTICS CURVES

Fig 1: Peak Pulse Power Rating

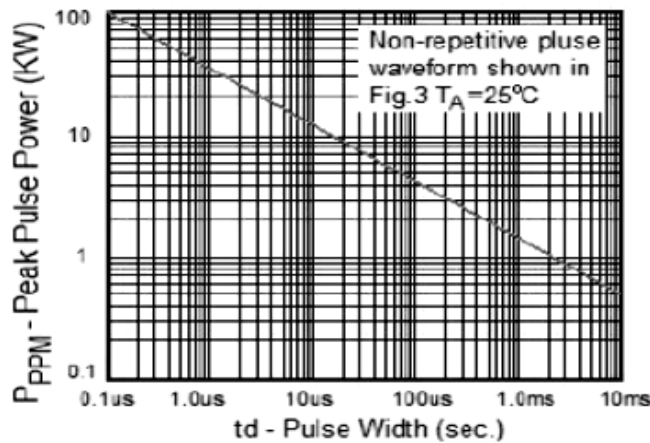


Fig 3: Pulse Derating Curves

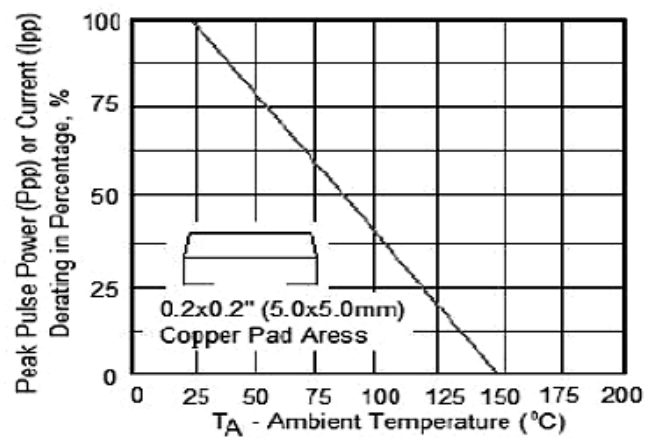


Fig 2: Pulse Waveform

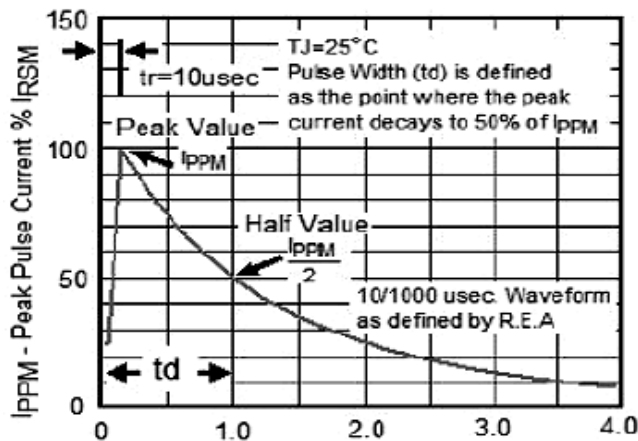
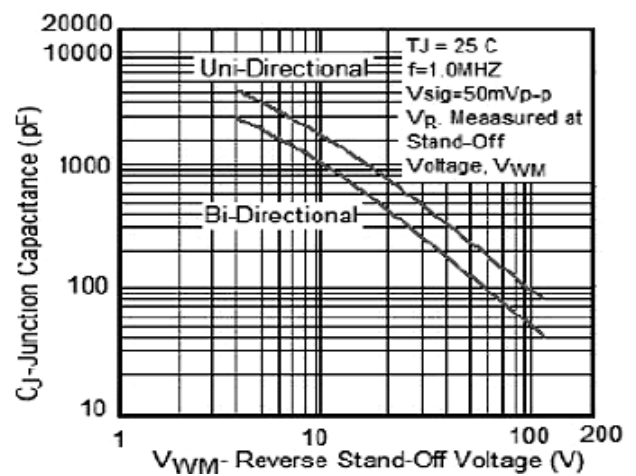


Fig 4: Typical Junction Capacitance





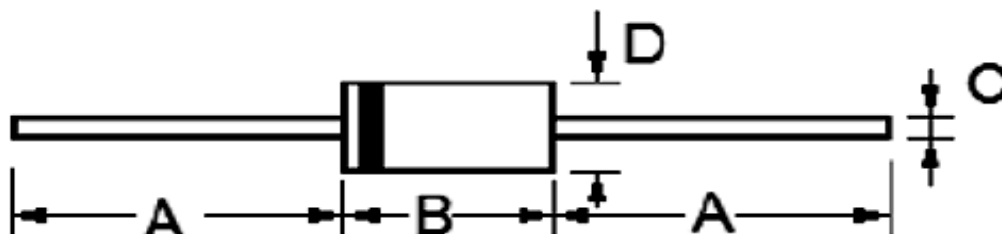
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## PACKAGE DETAIL

### DO-201AD PACKAGE



| 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 |

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### **Recommended Product Storage Environment for Discrete Semiconductor Devices**

This storage environment assumes that the Diodes and transistors are packed properly inside the original packing supplied by CDIL.

- Temperature 5 °C to 30 °C
- Humidity between 40 to 70 %RH
- Air should be clean.
- Avoid harmful gas or dust.
- Avoid outdoor exposure or storage in areas subject to rain or water spraying .
- Avoid storage in areas subject to corrosive gas or dust. Product shall not be stored in areas exposed to direct sunlight.
- Avoid rapid change of temperature.
- Avoid condensation.
- Mechanical stress such as vibration and impact shall be avoided.
- The product shall not be placed directly on the floor.
- The product shall be stored on a plane area. They should not be turned upside down. They should not be placed against the wall.

#### **Shelf Life of CDIL Products**

The shelf life of products is the period from product manufacture to shipment to customers. The product can be unconditionally shipped within this period. The period is defined as 2 years.

If products are stored longer than the shelf life of 2 years the products shall be subjected to quality check as per CDIL quality procedure.

The products are further warranted for another one year after the date of shipment subject to the above conditions in CDIL original packing.

#### **Floor Life of CDIL Products and MSL Level**

When the products are opened from the original packing, the floor life will start.

For this, the following JEDEC table may be referred:

| JEDEC MSL Level |                    |                 |
|-----------------|--------------------|-----------------|
| Level           | Time               | Condition       |
| 1               | Unlimited          | ≤30 °C / 85% RH |
| 2               | 1 Year             | ≤30 °C / 60% RH |
| 2a              | 4 Weeks            | ≤30 °C / 60% RH |
| 3               | 168 Hours          | ≤30 °C / 60% RH |
| 4               | 72 Hours           | ≤30 °C / 60% RH |
| 5               | 48 Hours           | ≤30 °C / 60% RH |
| 5a              | 24 Hours           | ≤30 °C / 60% RH |
| 6               | Time on Label(TOL) | ≤30 °C / 60% RH |

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## Customer Notes

### Component Disposal Instructions

1. CDIL Semiconductor Devices are RoHS compliant, customers are requested to please dispose as per prevailing Environmental Legislation of their Country.
2. In Europe, please dispose as per EU Directive 2002/96/EC on Waste Electrical and Electronic Equipment (WEEE).

### Disclaimer

The product information and the selection guides facilitate selection of the CDIL's Semiconductor Device(s) best suited for application in your product(s) as per your requirement. It is recommended that you completely review our Data Sheet(s) so as to confirm that the Device(s) meet functionality parameters for your application. The information furnished in the Data Sheet and on the CDIL Web Site/CD are believed to be accurate and reliable. CDIL however, does not assume responsibility for inaccuracies or incomplete information. Furthermore, CDIL does not assume liability whatsoever, arising out of the application or use of any CDIL product; neither does it convey any license under its patent rights nor rights of others. These products are not designed for use in life saving/support appliances or systems. CDIL customers selling these products (either as individual Semiconductor Devices or incorporated in their end products), in any life saving/support appliances or systems or applications do so at their own risk and CDIL will not be responsible for any damages resulting from such sale(s).

CDIL strives for continuous improvement and reserves the right to change the specifications of its products without prior notice.



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