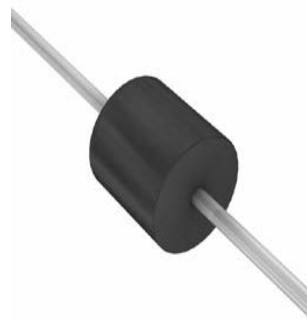


## Power TVS in DO-201AD

### Features

- 1500Watts peak pulse power (10/1000μs)
- Class passivated junction
- High accuracy, 5% tolerance
- Uni and Bidirectional unit
- Low clamping voltage
- Low Leakage current
- Very fast response time



### Mechanical Data

- **Case:** DO-201AD (plastic package).  
Lead free; RoHS compliant
- **Molding Compound Flammability Rating:**  
UL 94 V-0
- **Terminals:** High temperature soldering guaranteed:  
260 °C/10 sec. at terminals

### Applications

- Computers
- Telecom systems
- Industrial equipments
- Consumer electronic applications
- Other VCC bus and I/O interfaces

### Absolute Maximum Ratings

Ratings at 25 °C, ambient temperature unless otherwise specified

| Parameter                                                                                             | Symbols                           | Value          | Unit |
|-------------------------------------------------------------------------------------------------------|-----------------------------------|----------------|------|
| Peak power dissipation with a 10/1000us waveform <sup>(1)</sup><br>(Fig. 1)                           | P <sub>PPM</sub>                  | 1500           | W    |
| Peak pulse current with a 10/1000us waveform <sup>(1)</sup>                                           | I <sub>PPM</sub>                  | See Next Table | A    |
| Steady state power dissipation<br>at T <sub>L</sub> =75°C, lead lengths 0.375" (9.5mm) <sup>(2)</sup> | P <sub>M(AV)</sub>                | 6.5            | W    |
| Peak forward surge current 8.3ms single half sine-wave <sup>(3)</sup>                                 | I <sub>FSM</sub>                  | 200            | A    |
| Maximum instantaneous forward voltage @ 50A for<br>unidirectional only <sup>(4)</sup>                 | V <sub>F</sub>                    | 3.5/5.0        | V    |
| Typical thermal resistance junction-to-lead                                                           | R <sub>θJL</sub>                  | 20             | °C/W |
| Typical thermal resistance junction-to-ambient                                                        | R <sub>θJA</sub>                  | 75             | °C/W |
| Operating junction and storage temperature range                                                      | T <sub>J</sub> , T <sub>STG</sub> | -55 to +150    | °C   |

Notes:1.Non-repetitive current pulse, per Fig.3 and derated above T<sub>A</sub>=25°C per Fig. 2

2. Mounted on copper pad area of 1.6 x 1.6" (40 x 40mm) per Fig. 5

3. Meas ed on 8.3ms single half sine-wave or equivalent square wave, duty cycle = 4 pulses per minute maximum

4. V<sub>F</sub>=3.5 V for devices of V<sub>(BR)</sub> < 220V, and V<sub>F</sub>=5.0 Volt max. for devices of V<sub>(BR)</sub>>220V

### Electrical Characteristics

(T<sub>A</sub>=25°C, Unless otherwise specified.)

| Device type |            | Breakdown voltage<br>V <sub>BR</sub> (Volts) <sup>(1)</sup> |      | Test current at<br>I <sub>T</sub> (mA) | Stand-off voltage<br>V <sub>WM</sub> (Volts) | Maximum reverse leakage<br>at V <sub>WM</sub><br>I <sub>D</sub> <sup>(4)</sup> (μA) | Maximum peak pulse current<br>I <sub>PPM</sub> <sup>(2)</sup> (A) | Maximum clamping voltage<br>at I <sub>PPM</sub><br>V <sub>C</sub> (Volts) | Maximum temperature coefficient<br>of V <sub>BR</sub><br>(% /°C) |
|-------------|------------|-------------------------------------------------------------|------|----------------------------------------|----------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------|
| UNI         | BI         | Min.                                                        | Max. |                                        |                                              |                                                                                     |                                                                   |                                                                           |                                                                  |
| 1.5KE6.8A   | 1.5KE6.8CA | 6.45                                                        | 7.14 | 10                                     | 5.80                                         | 1000                                                                                | 143                                                               | 10.5                                                                      | 0.057                                                            |
| 1.5KE7.5A   | 1.5KE7.5CA | 7.13                                                        | 7.88 | 10                                     | 6.40                                         | 500                                                                                 | 133                                                               | 11.3                                                                      | 0.061                                                            |
| 1.5KE8.2A   | 1.5KE8.2CA | 7.79                                                        | 8.61 | 10                                     | 7.02                                         | 200                                                                                 | 124                                                               | 12.1                                                                      | 0.065                                                            |
| 1.5KE9.1A   | 1.5KE9.1CA | 8.65                                                        | 9.55 | 1.0                                    | 7.78                                         | 50                                                                                  | 112                                                               | 13.4                                                                      | 0.068                                                            |
| 1.5KE10A    | 1.5KE10CA  | 9.50                                                        | 10.5 | 1.0                                    | 8.55                                         | 10                                                                                  | 103                                                               | 14.5                                                                      | 0.073                                                            |
| 1.5KE11A    | 1.5KE11CA  | 10.5                                                        | 11.6 | 1.0                                    | 9.40                                         | 5.0                                                                                 | 96.2                                                              | 15.6                                                                      | 0.075                                                            |
| 1.5KE12A    | 1.5KE12CA  | 11.4                                                        | 12.6 | 1.0                                    | 10.2                                         | 5.0                                                                                 | 89.8                                                              | 16.7                                                                      | 0.078                                                            |
| 1.5KE13A    | 1.5KE13CA  | 12.4                                                        | 13.7 | 1.0                                    | 11.1                                         | 5.0                                                                                 | 82.4                                                              | 18.2                                                                      | 0.081                                                            |
| 1.5KE15A    | 1.5KE15CA  | 14.3                                                        | 15.8 | 1.0                                    | 12.8                                         | 1.0                                                                                 | 70.8                                                              | 21.2                                                                      | 0.084                                                            |
| 1.5KE16A    | 1.5KE16CA  | 15.2                                                        | 16.8 | 1.0                                    | 13.6                                         | 1.0                                                                                 | 66.7                                                              | 22.5                                                                      | 0.086                                                            |
| 1.5KE18A    | 1.5KE18CA  | 17.1                                                        | 18.9 | 1.0                                    | 15.3                                         | 1.0                                                                                 | 59.5                                                              | 25.2                                                                      | 0.088                                                            |
| 1.5KE20A    | 1.5KE20CA  | 19.0                                                        | 21.0 | 1.0                                    | 17.1                                         | 1.0                                                                                 | 54.2                                                              | 27.7                                                                      | 0.090                                                            |
| 1.5KE22A    | 1.5KE22CA  | 20.9                                                        | 23.1 | 1.0                                    | 18.8                                         | 1.0                                                                                 | 49.0                                                              | 30.6                                                                      | 0.092                                                            |
| 1.5KE24A    | 1.5KE24CA  | 22.8                                                        | 25.2 | 1.0                                    | 20.5                                         | 1.0                                                                                 | 45.2                                                              | 33.2                                                                      | 0.094                                                            |
| 1.5KE27A    | 1.5KE27CA  | 25.7                                                        | 28.4 | 1.0                                    | 23.1                                         | 1.0                                                                                 | 40.0                                                              | 37.5                                                                      | 0.096                                                            |
| 1.5KE30A    | 1.5KE30CA  | 28.5                                                        | 31.5 | 1.0                                    | 25.6                                         | 1.0                                                                                 | 36.2                                                              | 41.4                                                                      | 0.097                                                            |
| 1.5KE33A    | 1.5KE33CA  | 31.4                                                        | 34.7 | 1.0                                    | 28.2                                         | 1.0                                                                                 | 32.8                                                              | 45.7                                                                      | 0.098                                                            |
| 1.5KE36A    | 1.5KE36CA  | 34.2                                                        | 37.8 | 1.0                                    | 30.8                                         | 1.0                                                                                 | 30.1                                                              | 49.9                                                                      | 0.099                                                            |
| 1.5KE39A    | 1.5KE39CA  | 37.1                                                        | 41.0 | 1.0                                    | 33.3                                         | 1.0                                                                                 | 27.8                                                              | 53.9                                                                      | 0.100                                                            |
| 1.5KE43A    | 1.5KE43CA  | 40.9                                                        | 45.2 | 1.0                                    | 36.8                                         | 1.0                                                                                 | 25.3                                                              | 59.3                                                                      | 0.101                                                            |
| 1.5KE47A    | 1.5KE47CA  | 44.7                                                        | 49.4 | 1.0                                    | 40.2                                         | 1.0                                                                                 | 23.1                                                              | 64.8                                                                      | 0.101                                                            |
| 1.5KE51A    | 1.5KE51CA  | 48.5                                                        | 53.6 | 1.0                                    | 43.6                                         | 1.0                                                                                 | 21.4                                                              | 70.1                                                                      | 0.102                                                            |
| 1.5KE56A    | 1.5KE56CA  | 53.2                                                        | 58.8 | 1.0                                    | 47.8                                         | 1.0                                                                                 | 19.5                                                              | 77.0                                                                      | 0.103                                                            |
| 1.5KE62A    | 1.5KE62CA  | 58.9                                                        | 65.1 | 1.0                                    | 53.0                                         | 1.0                                                                                 | 17.6                                                              | 85.0                                                                      | 0.104                                                            |
| 1.5KE68A    | 1.5KE68CA  | 64.6                                                        | 71.4 | 1.0                                    | 58.1                                         | 1.0                                                                                 | 16.3                                                              | 92.0                                                                      | 0.104                                                            |
| 1.5KE75A    | 1.5KE75CA  | 71.3                                                        | 78.8 | 1.0                                    | 64.1                                         | 1.0                                                                                 | 14.6                                                              | 104                                                                       | 0.105                                                            |
| 1.5KE82A    | 1.5KE82CA  | 77.9                                                        | 86.1 | 1.0                                    | 70.1                                         | 1.0                                                                                 | 13.3                                                              | 113                                                                       | 0.105                                                            |
| 1.5KE91A    | 1.5KE91CA  | 86.5                                                        | 95.5 | 1.0                                    | 77.8                                         | 1.0                                                                                 | 12.0                                                              | 125                                                                       | 0.106                                                            |
| 1.5KE100A   | 1.5KE100CA | 95.0                                                        | 105  | 1.0                                    | 85.5                                         | 1.0                                                                                 | 10.9                                                              | 137                                                                       | 0.106                                                            |
| 1.5KE110A   | 1.5KE110CA | 105                                                         | 116  | 1.0                                    | 94.0                                         | 1.0                                                                                 | 9.9                                                               | 152                                                                       | 0.107                                                            |
| 1.5KE120A   | 1.5KE120CA | 114                                                         | 126  | 1.0                                    | 102                                          | 1.0                                                                                 | 9.1                                                               | 165                                                                       | 0.107                                                            |
| 1.5KE130A   | 1.5KE130CA | 124                                                         | 137  | 1.0                                    | 111                                          | 1.0                                                                                 | 8.4                                                               | 179                                                                       | 0.107                                                            |
| 1.5KE150A   | 1.5KE150CA | 143                                                         | 158  | 1.0                                    | 128                                          | 1.0                                                                                 | 7.2                                                               | 207                                                                       | 0.106                                                            |
| 1.5KE160A   | 1.5KE160CA | 152                                                         | 168  | 1.0                                    | 136                                          | 1.0                                                                                 | 6.8                                                               | 219                                                                       | 0.108                                                            |
| 1.5KE170A   | 1.5KE170CA | 162                                                         | 179  | 1.0                                    | 145                                          | 1.0                                                                                 | 6.4                                                               | 234                                                                       | 0.108                                                            |
| 1.5KE180A   | 1.5KE180CA | 171                                                         | 189  | 1.0                                    | 154                                          | 1.0                                                                                 | 6.1                                                               | 246                                                                       | 0.108                                                            |

| Device type |            | Breakdown voltage<br>$V_{(BR)}$ (Volts) <sup>(1)</sup> |       | Test current at $I_T$ (mA) | Stand-off voltage $V_{WM}$ (Volts) | Maximum reverse leakage at $V_{WM}$<br>$I_D^{(4)}$ ( $\mu A$ ) | Maximum peak pulse current<br>$I_{PPM}^{(2)}$ (A) | Maximum clamping voltage at $I_{PPM}$<br>$V_C$ (Volts) | Maximum temperature coefficient of $V_{BR}$<br>(% / $^{\circ}C$ ) |
|-------------|------------|--------------------------------------------------------|-------|----------------------------|------------------------------------|----------------------------------------------------------------|---------------------------------------------------|--------------------------------------------------------|-------------------------------------------------------------------|
| UNI         | BI         | Min.                                                   | Max.  |                            |                                    |                                                                |                                                   |                                                        |                                                                   |
| 1.5KE200A   | 1.5KE200CA | 190                                                    | 210   | 1.0                        | 171                                | 1.0                                                            | 5.5                                               | 274                                                    | 0.108                                                             |
| 1.5KE220A   | 1.5KE220CA | 209                                                    | 231   | 1.0                        | 185                                | 1.0                                                            | 4.6                                               | 328                                                    | 0.108                                                             |
| 1.5KE250A   | 1.5KE250CA | 237                                                    | 263   | 1.0                        | 214                                | 1.0                                                            | 4.4                                               | 344                                                    | 0.110                                                             |
| 1.5KE300A   | 1.5KE300CA | 285                                                    | 315   | 1.0                        | 256                                | 1.0                                                            | 3.6                                               | 414                                                    | 0.110                                                             |
| 1.5KE350A   | 1.5KE350CA | 333                                                    | 368   | 1.0                        | 300                                | 1.0                                                            | 3.1                                               | 482                                                    | 0.110                                                             |
| 1.5KE400A   | 1.5KE400CA | 380                                                    | 420   | 1.0                        | 342                                | 1.0                                                            | 2.7                                               | 548                                                    | 0.110                                                             |
| 1.5KE440A   | 1.5KE440CA | 418                                                    | 462   | 1.0                        | 376                                | 1.0                                                            | 2.5                                               | 602                                                    | 0.110                                                             |
| 1.5KE480A   | 1.5KE480CA | 456                                                    | 504   | 1.0                        | 408                                | 1.0                                                            | 2.3                                               | 658                                                    | 0.110                                                             |
| 1.5KE510A   | 1.5KE510CA | 485                                                    | 535   | 1.0                        | 434                                | 1.0                                                            | 2.1                                               | 698                                                    | 0.110                                                             |
| 1.5KE530A   | 1.5KE530CA | 503.5                                                  | 556.5 | 1.0                        | 450                                | 1.0                                                            | 2.1                                               | 725                                                    | 0.110                                                             |
| 1.5KE540A   | 1.5KE540CA | 513                                                    | 567   | 1.0                        | 459                                | 1.0                                                            | 2.0                                               | 740                                                    | 0.110                                                             |
| 1.5KE550A   | 1.5KE550CA | 522.5                                                  | 577.5 | 1.0                        | 467                                | 1.0                                                            | 2.0                                               | 760                                                    | 0.110                                                             |

Notes: 1.  $V_{(BR)}$  measured after  $I_T$  applied for 300 $\mu s$ ,  $I_T$ =square wave pulse or equivalent

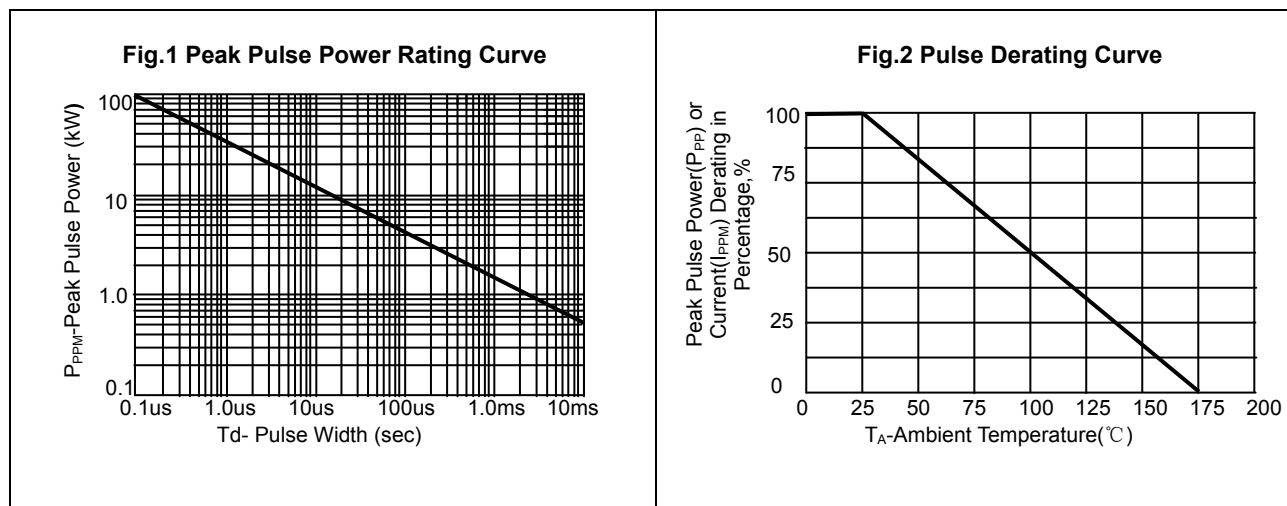
2. Surge current waveform per Fig. 3 and derate per Fig. 2

3. For bidirectional types with  $V_R$  of 10 volts and less, the  $I_D$  limit is doubled

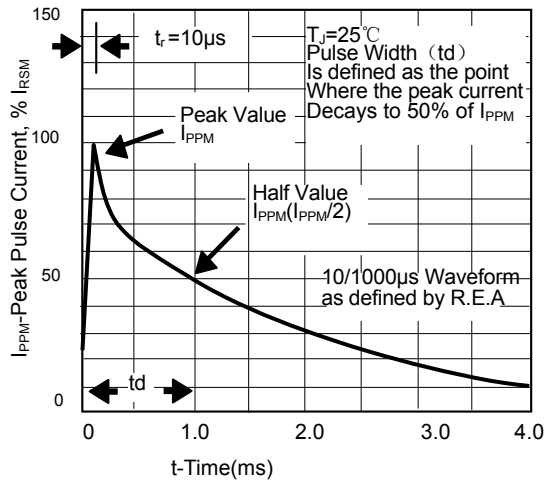
4. All terms and symbols are consistent with ANSI/IEEE CA62.35

5. For parts without A, the  $V_{BR}$  is  $\pm 10\%$

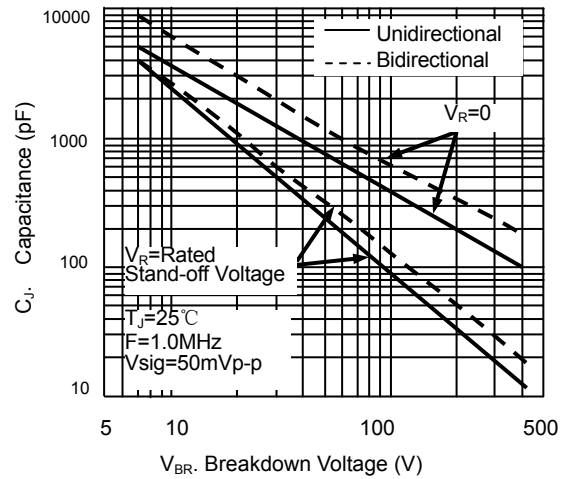
### Typical Characteristics ( $T_{amb} = 25^{\circ}C$ unless otherwise specified)



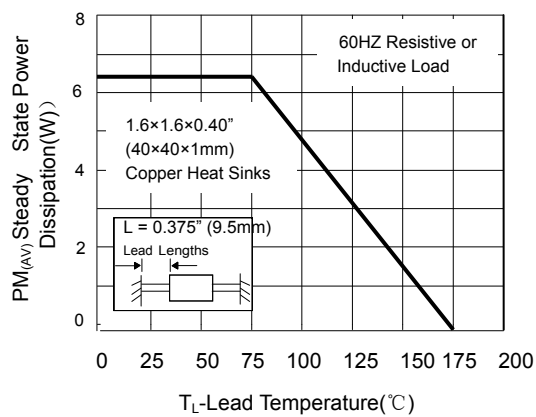
**Fig.3 Pulse Waveform**



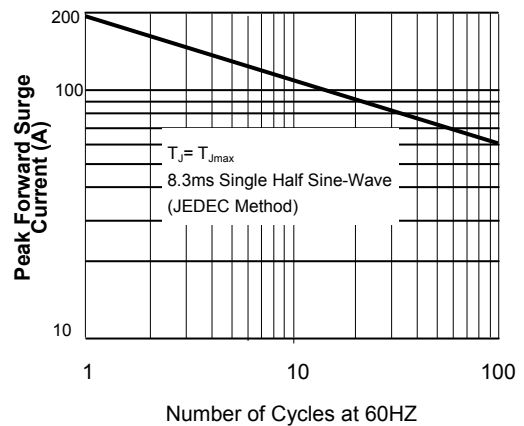
**Fig.4 Typical Junction Capacitance**



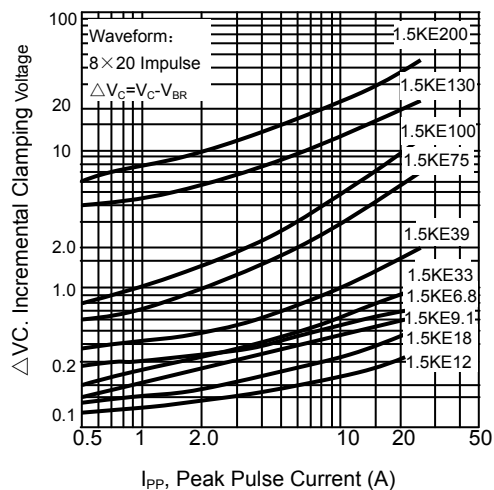
**Fig.5 Steady State Power Derating Curve**



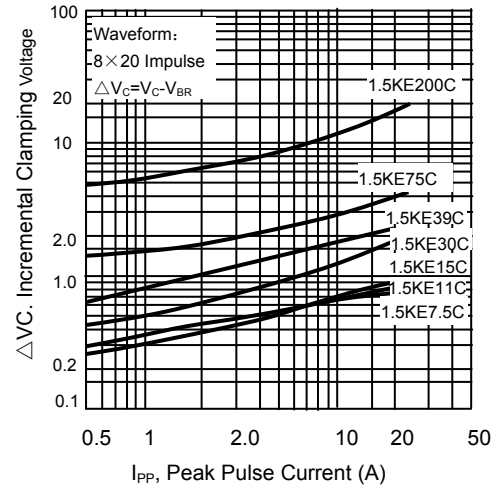
**Fig.6 Max. Non-Repetitive Peak Forward Surge Current Unidirectional Only**



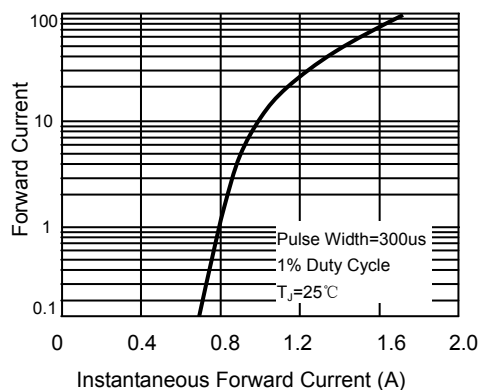
**Fig.7 Incremental Clamping Voltage Curve (Unidirectional)**



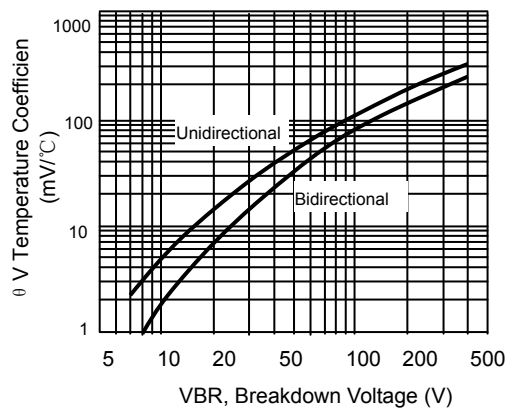
**Fig.8 Incremental Clamping Voltage Curve (Bidirectional)**



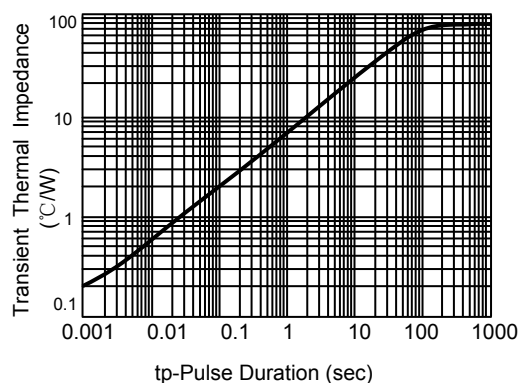
**Fig.9 Instantaneous Forward Voltage Characteristics Curve**



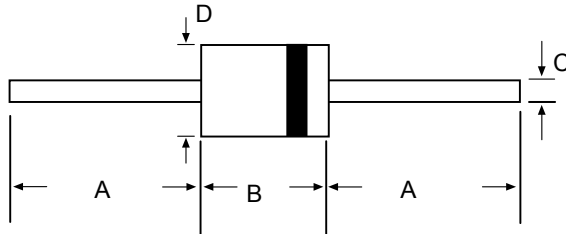
**Fig.10 Breakdown Voltage Temperature Coefficient Curve**



**Fig.11 Typical Transient Thermal Impedance Thermal Impedance**

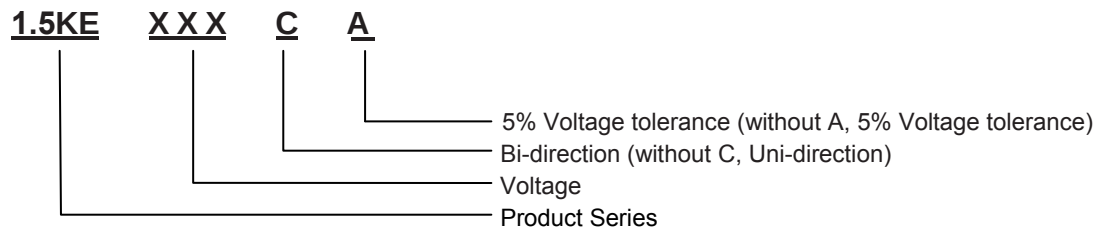


## Package Dimensions



| Dimensions | Milimeters |     |
|------------|------------|-----|
|            | Min        | Max |
| A          | 25.4       | -   |
| B          | 7.2        | 9.5 |
| C          | 1.2        | 1.3 |
| D          | 4.8        | 5.3 |

## Part number system



## Ordering information

| Order code   | Package  | Packaging option | Base quantity | Packaging specification |
|--------------|----------|------------------|---------------|-------------------------|
| 1.5KExxA(CA) | DO-201AD | Tape and BOX     | 1000pcs       | EIA STD RS-481          |

## Revision history

| Date        | Revision | Changes         |
|-------------|----------|-----------------|
| 23-May-2012 | 1.0      | Initial release |

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