Elektronische Bauelemente

# 1.5KE Series

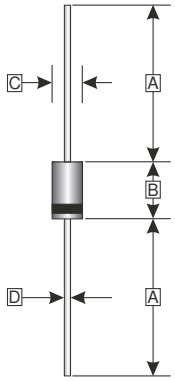
**Voltage 6.8V ~ 550V**
**1500W Peak Power TVS**

A suffix of "-C" specifies halogen & RoHS compliant

## FEATURES

- Plastic package has Underwriters Laboratory Flammability Classification 94V-0
- Glass passivated junction
- 1500W peak pulse power capability on 10/1000us waveform, repetition rate (duty cycle): 0.05%
- Excellent clamping capability
- Low incremental surge resistance
- Very fast response time
- High temperature soldering guaranteed: 265°C/10s 0.375" (9.5mm) lead length, 5lbs. (2.3kg) tension

**DO-27**




| REF. | Millimeter | |
|---|---|---|
| | Min. | Max. |
| A | 25.4 (TYP) | |
| B | 7.20 | 9.50 |
| C | 4.80 | 5.60 |
| D | 0.96 | 1.32 |

## MECHANICAL DATA

- Case: DO-27
- Terminals: Plated axial leads, solderable per MIL-STD-750, method 2026
- Polarity: For uni-directional types the color band denotes the cathode, which is positive with respect to the anode under normal TVS operation
- Mounting position: Any

## ORDER INFORMATION

| Part Number | Type |
|---|---|
| 1.5KE Series | Lead (Pb)-free |
| 1.5KE Series-C | Lead (Pb)-free and Halogen-free |

## MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS ($T_A$=25°C unless otherwise specified)

| Parameter | | Symbol | Rating | Unit |
|---|---|---|---|---|
| Peak Power Dissipation [1] @10/1000us waveform (Flg.1) | | $P_{PP}$ | Minimum 1500 | W |
| Peak Pulse Current [1] @10/1000us waveform | | $I_{PP}$ | (See Next Table.) | A |
| Steady State Power Dissipation [2] | $T_L$=75°C | $P_D$ | 6.5 | W |
| Peak Forward Surge Current [3] @8.3ms single half sine-wave uni-directional only | | $I_{FSM}$ | 200 | A |
| Maximum Instantaneous Forward Voltage [4] @100A for uni-directional only | | $V_F$ | 3.5/5 | V |
| Operating Junction and Storage Temperature Range | | $T_J$, $T_{STG}$ | -55 ~150 | °C |
| **Thermal Resistance Ratings** | | | | |
| Thermal Resistance Junction-Ambient | | $R_{\theta JA}$ | 75 | °C/W |

Notes:
1. Non-repetitive current pulse, per Fig. 3 and derated above $T_A$=25°C per Fig. 2.
2. Mounted on copper pad area of 1.6" X 1.6" (40mm X 40mm) per Fig. 5.
3. Measured on 8.3ms single half sine-wave or equivalent square wave, duty cycle=4 pulses per minute maximum.
4. $V_F$=3.5V for devices of $V_{BR}$<220V, and $V_F$=5V max. for devices of $V_{BR}$>220V.

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# 1.5KE Series

**Voltage 6.8V ~ 550V**
**1500W Peak Power TVS**

## ELECTRICAL CHARACTERISTIC ($T_A$=25°C unless otherwise specified)

| Part Number | | Reverse Stand-Off Voltage | Breakdown Voltage $V_{BR}$ @$I_T$ | | Test Current | Maximum Clamping Voltage $V_C$ @$I_{PP}$ | Peak Pulse Current | Reverse Leakage $I_R$ @$V_{RWM}$ | Maximum Temperature Coefficient Of $V_{BR}$ |
|---|---|---|---|---|---|---|---|---|---|
| | | | Min. | Max. | | | | | |
| Directional | | $V_{RWM}$ | $V_{BR}$ | | $I_T$ | $V_C$ | $I_{PP}$ | $I_R$ | - |
| Uni | Bi | V | V | | mA | V | A | uA | %/°C |
| 1.5KE6.8A | 1.5KE6.8CA | 5.8 | 6.45 | 7.14 | 10 | 10.5 | 143 | 1000 | 0.057 |
| 1.5KE7.5A | 1.5KE7.5CA | 6.4 | 7.13 | 7.88 | 10 | 11.3 | 133 | 500 | 0.061 |
| 1.5KE8.2A | 1.5KE8.2CA | 7.02 | 7.79 | 8.61 | 10 | 12.1 | 124 | 200 | 0.065 |
| 1.5KE9.1A | 1.5KE9.1CA | 7.78 | 8.65 | 9.55 | 1 | 13.4 | 112 | 50 | 0.068 |
| 1.5KE10A | 1.5KE10CA | 8.55 | 9.5 | 10.5 | 1 | 14.5 | 103 | 10 | 0.073 |
| 1.5KE11A | 1.5KE11CA | 9.4 | 10.5 | 11.6 | 1 | 15.6 | 96.2 | 5 | 0.075 |
| 1.5KE12A | 1.5KE12CA | 10.2 | 11.4 | 12.6 | 1 | 16.7 | 89.8 | 5 | 0.078 |
| 1.5KE13A | 1.5KE13CA | 11.1 | 12.4 | 13.7 | 1 | 18.2 | 82.4 | 5 | 0.081 |
| 1.5KE15A | 1.5KE15CA | 12.8 | 14.3 | 15.8 | 1 | 21.2 | 70.8 | 1 | 0.084 |
| 1.5KE16A | 1.5KE16CA | 13.6 | 15.2 | 16.8 | 1 | 22.5 | 66.7 | 1 | 0.086 |
| 1.5KE18A | 1.5KE18CA | 15.3 | 17.1 | 18.9 | 1 | 25.2 | 59.5 | 1 | 0.088 |
| 1.5KE20A | 1.5KE20CA | 17.1 | 19 | 21 | 1 | 27.7 | 54.2 | 1 | 0.090 |
| 1.5KE22A | 1.5KE22CA | 18.8 | 20.9 | 23.1 | 1 | 30.6 | 49 | 1 | 0.092 |
| 1.5KE24A | 1.5KE24CA | 20.5 | 22.8 | 25.2 | 1 | 33.2 | 45.2 | 1 | 0.094 |
| 1.5KE27A | 1.5KE27CA | 23.1 | 25.7 | 28.4 | 1 | 37.5 | 40 | 1 | 0.096 |
| 1.5KE30A | 1.5KE30CA | 25.6 | 28.5 | 31.5 | 1 | 41.4 | 36.2 | 1 | 0.097 |
| 1.5KE33A | 1.5KE33CA | 28.2 | 31.4 | 34.7 | 1 | 45.7 | 32.8 | 1 | 0.098 |
| 1.5KE36A | 1.5KE36CA | 30.8 | 34.2 | 37.8 | 1 | 49.9 | 30.1 | 1 | 0.099 |
| 1.5KE39A | 1.5KE39CA | 33.3 | 37.1 | 41 | 1 | 53.9 | 27.8 | 1 | 0.100 |
| 1.5KE43A | 1.5KE43CA | 36.8 | 40.9 | 45.2 | 1 | 59.3 | 25.3 | 1 | 0.101 |
| 1.5KE47A | 1.5KE47CA | 40.2 | 44.7 | 49.4 | 1 | 64.8 | 23.1 | 1 | 0.101 |
| 1.5KE51A | 1.5KE51CA | 43.6 | 48.5 | 53.6 | 1 | 70.1 | 21.4 | 1 | 0.102 |
| 1.5KE56A | 1.5KE56CA | 47.8 | 53.2 | 58.8 | 1 | 77 | 19.5 | 1 | 0.103 |
| 1.5KE62A | 1.5KE62CA | 53 | 58.9 | 65.1 | 1 | 85 | 17.6 | 1 | 0.104 |
| 1.5KE68A | 1.5KE68CA | 58.1 | 64.6 | 71.4 | 1 | 92 | 16.3 | 1 | 0.104 |
| 1.5KE75A | 1.5KE75CA | 64.1 | 71.3 | 78.8 | 1 | 104 | 14.6 | 1 | 0.105 |
| 1.5KE82A | 1.5KE82CA | 70.1 | 77.9 | 86.1 | 1 | 113 | 13.3 | 1 | 0.105 |
| 1.5KE91A | 1.5KE91CA | 77.8 | 86.5 | 95.5 | 1 | 125 | 12 | 1 | 0.106 |
| 1.5KE100A | 1.5KE100CA | 85.5 | 95 | 105 | 1 | 137 | 10.9 | 1 | 0.106 |
| 1.5KE110A | 1.5KE110CA | 94 | 105 | 116 | 1 | 152 | 9.9 | 1 | 0.107 |
| 1.5KE120A | 1.5KE120CA | 102 | 114 | 126 | 1 | 165 | 9.1 | 1 | 0.107 |

## ELECTRICAL CHARACTERISTIC ($T_A$=25°C unless otherwise specified)

| Part Number | | Reverse Stand-Off Voltage | Breakdown Voltage $V_{BR}$ @$I_T$ | | Test Current | Maximum Clamping Voltage $V_C$ @$I_{PP}$ | Peak Pulse Current | Reverse Leakage $I_R$ @$V_{RWM}$ | Maximum Temperature Coefficient Of $V_{BR}$ |
|---|---|---|---|---|---|---|---|---|---|
| | | | Min. | Max. | | | | | |
| Directional | | $V_{RWM}$ | $V_{BR}$ | | $I_T$ | $V_C$ | $I_{PP}$ | $I_R$ | - |
| Uni | Bi | V | V | | mA | V | A | uA | %/°C |
| 1.5KE130A | 1.5KE130CA | 111 | 124 | 137 | 1 | 179 | 8.4 | 1 | 0.107 |
| 1.5KE150A | 1.5KE150CA | 128 | 143 | 158 | 1 | 207 | 7.2 | 1 | 0.106 |
| 1.5KE160A | 1.5KE160CA | 136 | 152 | 168 | 1 | 219 | 6.8 | 1 | 0.108 |
| 1.5KE170A | 1.5KE170CA | 145 | 162 | 179 | 1 | 234 | 6.4 | 1 | 0.108 |
| 1.5KE180A | 1.5KE180CA | 154 | 171 | 189 | 1 | 246 | 6.1 | 1 | 0.108 |
| 1.5KE200A | 1.5KE200CA | 171 | 190 | 210 | 1 | 274 | 5.5 | 1 | 0.108 |
| 1.5KE220A | 1.5KE220CA | 185 | 209 | 231 | 1 | 328 | 4.6 | 1 | 0.108 |
| 1.5KE250A | 1.5KE250CA | 214 | 237 | 263 | 1 | 344 | 4.4 | 1 | 0.110 |
| 1.5KE300A | 1.5KE300CA | 256 | 285 | 315 | 1 | 414 | 3.6 | 1 | 0.110 |
| 1.5KE350A | 1.5KE350CA | 300 | 333 | 368 | 1 | 482 | 3.1 | 1 | 0.110 |
| 1.5KE400A | 1.5KE400CA | 342 | 380 | 420 | 1 | 548 | 2.7 | 1 | 0.110 |
| 1.5KE440A | 1.5KE440CA | 376 | 418 | 462 | 1 | 602 | 2.5 | 1 | 0.110 |
| 1.5KE480A | 1.5KE480CA | 408 | 456 | 504 | 1 | 658 | 2.3 | 1 | 0.110 |
| 1.5KE510A | 1.5KE510CA | 434 | 485 | 535 | 1 | 698 | 2.1 | 1 | 0.110 |
| 1.5KE530A | 1.5KE530CA | 450 | 503.5 | 556.5 | 1 | 725 | 2.1 | 1 | 0.110 |
| 1.5KE540A | 1.5KE540CA | 459 | 513 | 567 | 1 | 740 | 2.0 | 1 | 0.110 |
| 1.5KE550A | 1.5KE550CA | 467 | 522.5 | 577.5 | 1 | 760 | 2.0 | 1 | 0.110 |

Notes:

1. $V_{BR}$ measured after $I_T$ applied for 300us, $I_T$=square wave pulse or equivalent.
2. Surge current waveform per Fig. 3 and derate per Fig. 2.
3. All terms and symbols are consistent with ANSI/IEEE C62.35.
4. For Bi-directional types with $V_R$ 10 Volts and less the $I_D$ limit is doubled.

## TYPICAL CHARACTERISTICS

**Fig. 1 – Peak Pulse Power Rating Curve**

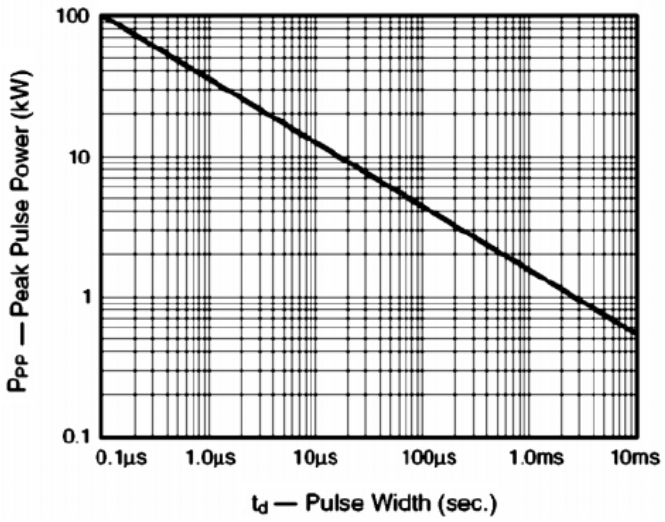



**Fig. 2 – Pulse Derating Curve**

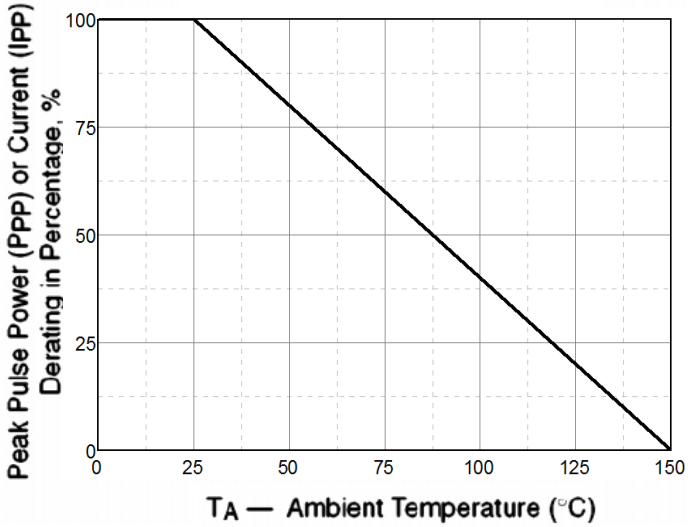



**Fig. 3 – Pulse Waveform**

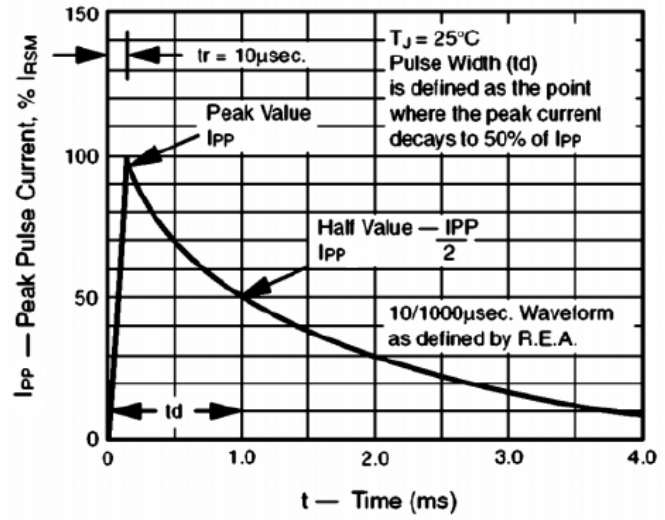



**Fig. 4 - Typical Junction Capacitance**

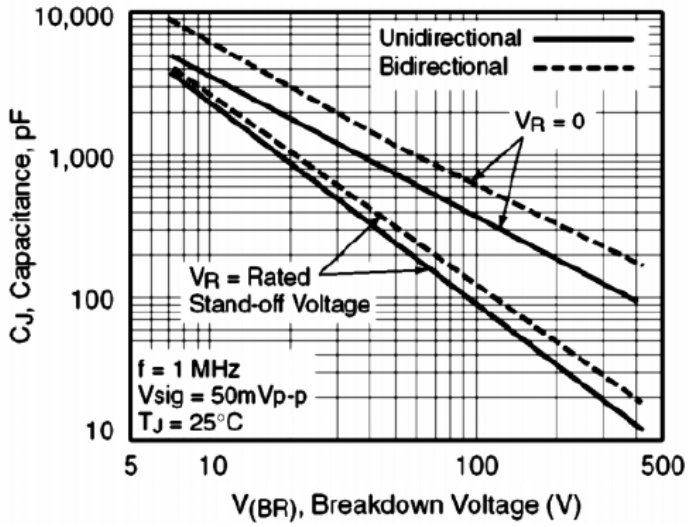



**Fig. 5 – Steady State Power Derating Curve**

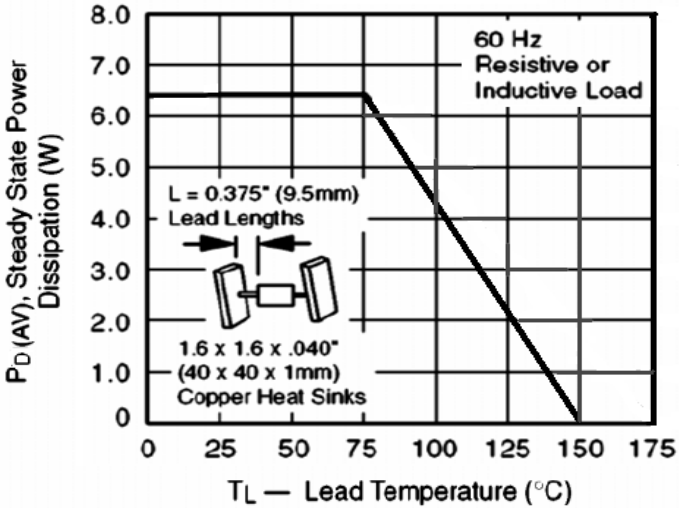
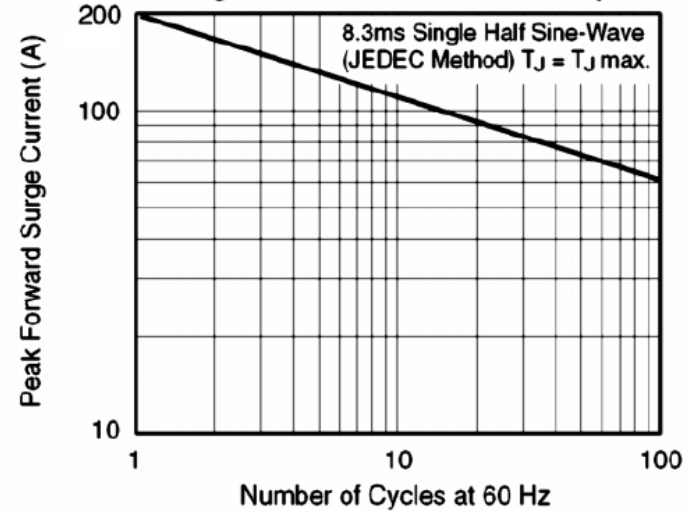



**Fig. 6 - Maximum Non-repetitive Peak Forward Surge Current Unidirectional Only**



## TYPICAL CHARACTERISTICS

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

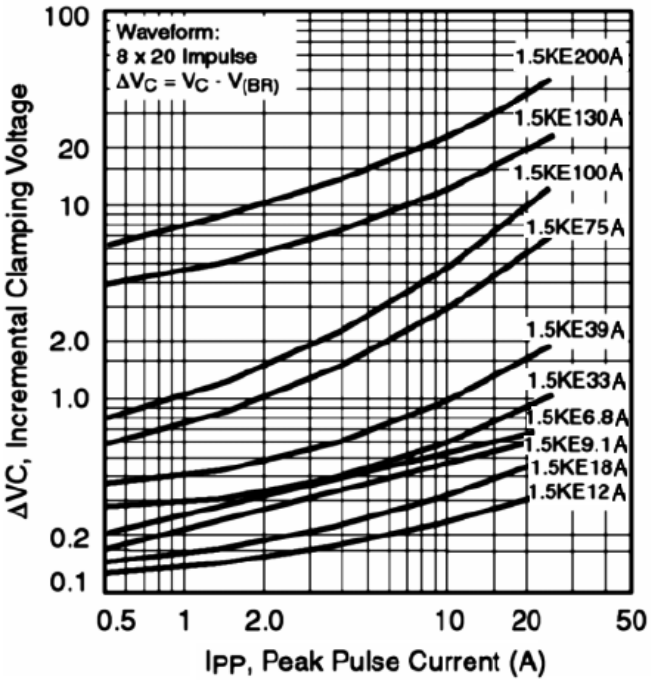



**Fig. 8 – Incremental Clamping Voltage Curve (Unidirectional)**

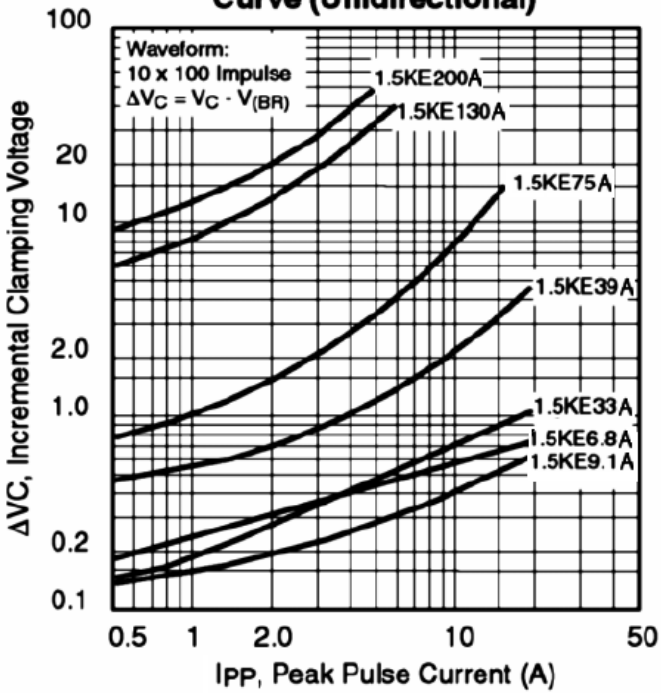



**Fig. 9 – Incremental Clamping Voltage Curve (Bidirectional)**

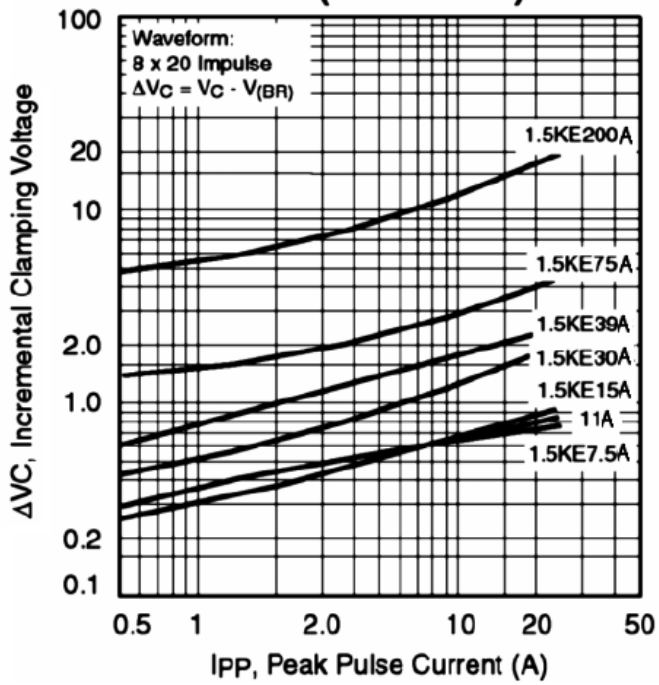
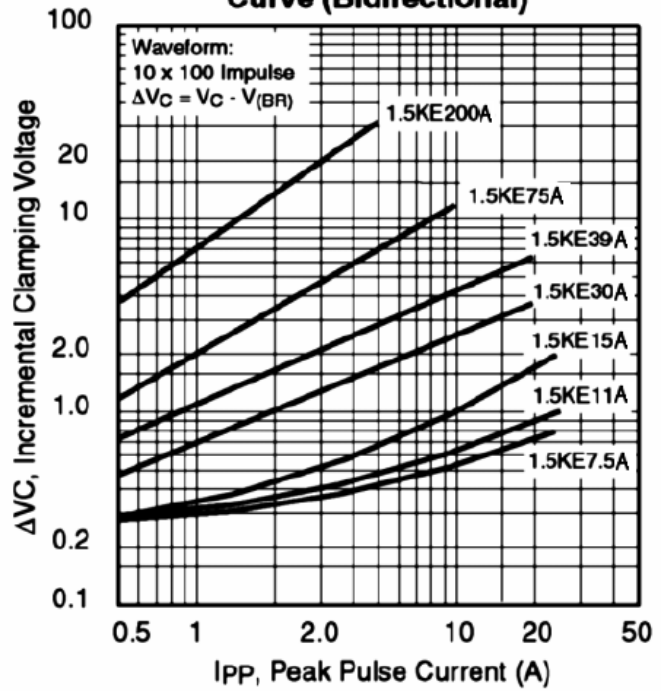



**Fig. 10 – Incremental Clamping Voltage Curve (Bidirectional)**



## TYPICAL CHARACTERISTICS

**Fig. 11 – Instantaneous Forward Voltage Characteristics Curve**

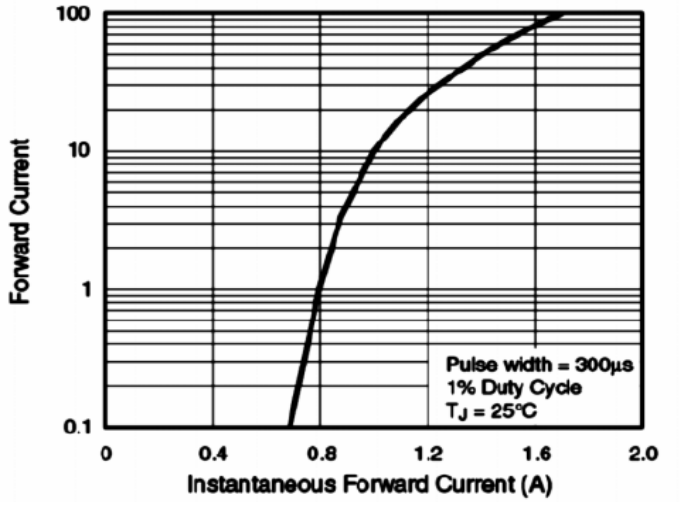



**Fig. 12 – Breakdown Voltage Temperature Coefficient Curve**

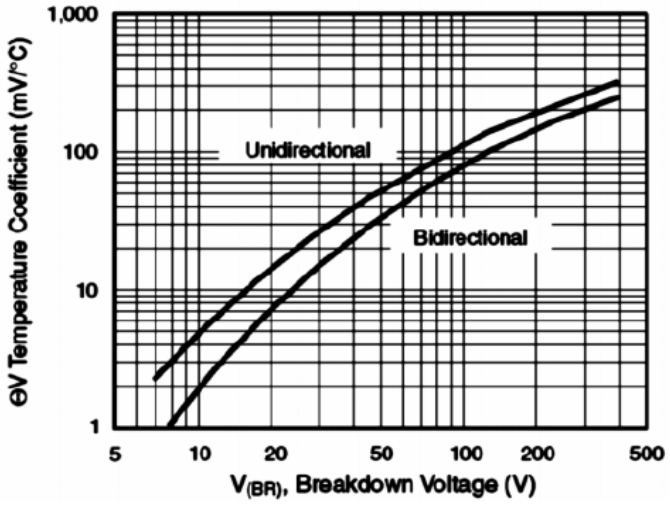



**Fig. 13 – Typical Transient Thermal Impedance**