

# DATA SHEET

## TRANSIENT VOLTAGE SUPPRESSORS

### AC/DC POWER SUPPLY

1.5KE series

RoHS compliant & Halogen free



Product specification— April 29, 2019 V.0



## Transient Voltage Suppressors (TVS) Data Sheet

### Features

- Glass passivated junction
- Low zener impedance
- Excellent clamping capability
- 1500W peak pulse power capability at 10/1000 $\mu$ s waveform, repetition rate (duty cycle): 0.01%
- Fast response time
- Typical  $I_R$  less than 1 $\mu$ A above 12V.
- High Temperature soldering guaranteed: 265 $^{\circ}$ C/10 seconds/.375", (9.5mm) lead length, 5lbs (2.3kg) tension
- Plastic package has underwriters laboratory flammability 94V-0
- Meets MSL level 1, per J-STD-020.
- Safety certification: UL: E244458



### Mechanical Data

- Case: JEDEC DO-201 Moulded plastic
- Terminal: Axial leads, solderable per MIL-STD-750, Method 2026
- Polarity: Color band denotes cathode except bi-directional models
- Mounting Position: Any
- Weight: 0.97g

### Applications

- I/O interface
- AC/DC power supply
- Low frequency signal transmission line (RS232, RS485, etc.)

### Maximum Ratings and Characteristics

Ratings at 25 $^{\circ}$ C ambient temperature unless otherwise specified.

| Rating  | Symbol          | Value        | Units          |
|---|-----------------|--------------|----------------|
| Peak pulse power dissipation at 10/1000 $\mu$ s waveform (Note1, Fig.1)   | $P_{PPM}$       | Minimum 1500 | Watts          |
| Peak pulse current of at 10/1000 $\mu$ s waveform (Note 1, Fig.3)   | $I_{PPM}$       | See Table    | Amps           |
| Steady state power dissipation at $T_L=75^{\circ}$ C (Fig.5)  | $P_{M(AV)}$     | 6.5          | Watts          |
| Peak forward surge current, 8.3ms single half sine-wave superimposed on rated load, (JEDEC Method) (Note2, Fig.6) | $I_{FSM}$       | 200          | Amps           |
| Operating junction and Storage Temperature Range.   | $T_J, T_{STG}$  | -55 to +175  | $^{\circ}$ C   |
| Typical thermal resistance junction to lead   | $R_{\theta JL}$ | 15           | $^{\circ}$ C/W |
| Typical thermal resistance junction to ambient  | $R_{\theta JA}$ | 75           | $^{\circ}$ C/W |

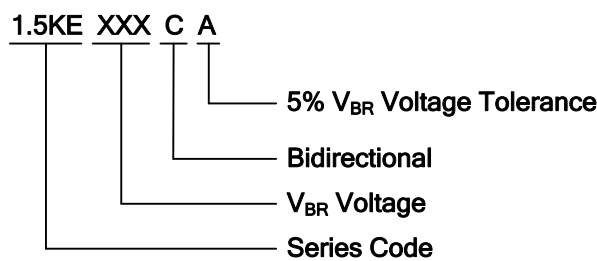
Notes: 1. Non-repetitive current pulse, per Fig.3 and derated above  $T_A=25^{\circ}$ C per Fig.2.

2. 8.3ms single half sine-wave, or equivalent square wave, duty cycle=4 pulses per minutes maximum.

**Dimensions (DO-201)**

|   | Symbol | Millimeters |       | Inches |      |
|---|--------|-------------|-------|--------|------|
|   |        | Min.        | Max.  | Min.   | Max. |
| L | 25.40  | -           | 1.000 | -      |      |
| T | 7.20   | 9.50        | 0.285 | 0.375  |      |
| d | 4.80   | 5.30        | 0.190 | 0.210  |      |
| s | 0.96   | 1.07        | 0.038 | 0.042  |      |

**Part Number Code**



**Ordering Code for different package**

Box package: Add suffix “/B” at the end of the part number, such as 1.5KE100CA/B

Reel package: Add suffix “/TR13” at the end of the part number, such as 1.5KE75A/TR13

**Electrical Characteristics ( $T_A=25^{\circ}C$ )**

| Part Number    |               | Reverse Stand-Off Voltage | Breakdown Voltage @ $I_T$ | Test Current | Maximum Clamping Voltage @ $I_{PP}$ | Peak Pulse Current | Reverse Leakage @ $V_{RWM}$ |
|----------------|---------------|---------------------------|---------------------------|--------------|-------------------------------------|--------------------|-----------------------------|
| Unidirectional | Bidirectional | $V_{RWM}(V)$              | $V_{BR}(V)$               | $I_T(mA)$    | $V_C(V)$                            | $I_{PP}(A)$        | $I_R(\mu A)$                |
| 1.5KE6.8A      | 1.5KE6.8CA    | 5.80                      | 6.45~7.14                 | 10           | 10.5                                | 144.8              | 1000                        |
| 1.5KE7.5A      | 1.5KE7.5CA    | 6.40                      | 7.13~7.88                 | 10           | 11.3                                | 134.5              | 500                         |
| 1.5KE8.2A      | 1.5KE8.2CA    | 7.02                      | 7.79~8.61                 | 10           | 12.1                                | 125.6              | 200                         |
| 1.5KE9.1A      | 1.5KE9.1CA    | 7.78                      | 8.65~9.55                 | 1            | 13.4                                | 113.4              | 50                          |
| 1.5KE10A       | 1.5KE10CA     | 8.55                      | 9.50~10.50                | 1            | 14.5                                | 104.8              | 10                          |
| 1.5KE11A       | 1.5KE11CA     | 9.40                      | 10.50~11.60               | 1            | 15.6                                | 97.4               | 5                           |
| 1.5KE12A       | 1.5KE12CA     | 10.20                     | 11.40~12.60               | 1            | 16.7                                | 91.0               | 5                           |
| 1.5KE13A       | 1.5KE13CA     | 11.10                     | 12.40~13.70               | 1            | 18.2                                | 83.5               | 1                           |
| 1.5KE15A       | 1.5KE15CA     | 12.80                     | 14.30~15.80               | 1            | 21.2                                | 71.7               | 1                           |
| 1.5KE16A       | 1.5KE16CA     | 13.60                     | 15.20~16.80               | 1            | 22.5                                | 67.6               | 1                           |
| 1.5KE18A       | 1.5KE18CA     | 15.30                     | 17.10~18.90               | 1            | 25.2                                | 60.3               | 1                           |

**Transient Voltage Suppressors** 1.5KE**Electrical Characteristics (T<sub>A</sub>=25°C)**

| Part Number    |               | Reverse Stand-Off Voltage | Breakdown Voltage @I <sub>T</sub> | Test Current        | Maximum Clamping Voltage @I <sub>PP</sub> | Peak Pulse Current  | Reverse Leakage @V <sub>RWM</sub> |
|----------------|---------------|---------------------------|-----------------------------------|---------------------|---|---------------------|-----------------------------------|
| Unidirectional | Bidirectional | V <sub>RWM</sub> (V)      | V <sub>BR</sub> (V)               | I <sub>T</sub> (mA) | V <sub>C</sub> (V)                        | I <sub>PP</sub> (A) | I <sub>R</sub> (μA)               |
| 1.5KE20A       | 1.5KE20CA     | 17.10                     | 19.00~21.00                       | 1                   | 27.7                                      | 54.9                | 1                                 |
| 1.5KE22A       | 1.5KE22CA     | 18.80                     | 20.90~23.10                       | 1                   | 30.6                                      | 49.7                | 1                                 |
| 1.5KE24A       | 1.5KE24CA     | 20.50                     | 22.80~25.20                       | 1                   | 33.2                                      | 45.8                | 1                                 |
| 1.5KE27A       | 1.5KE27CA     | 23.10                     | 25.70~28.40                       | 1                   | 37.5                                      | 40.5                | 1                                 |
| 1.5KE30A       | 1.5KE30CA     | 25.60                     | 28.50~31.50                       | 1                   | 41.4                                      | 36.7                | 1                                 |
| 1.5KE33A       | 1.5KE33CA     | 28.20                     | 31.40~34.70                       | 1                   | 45.7                                      | 33.3                | 1                                 |
| 1.5KE36A       | 1.5KE36CA     | 30.80                     | 34.20~37.80                       | 1                   | 49.9                                      | 30.5                | 1                                 |
| 1.5KE39A       | 1.5KE39CA     | 33.30                     | 37.10~41.00                       | 1                   | 53.9                                      | 28.2                | 1                                 |

**Electrical Characteristics (T<sub>A</sub>=25°C)**

| Part Number    |               | Reverse Stand-Off Voltage | Breakdown Voltage @I <sub>T</sub> | Test Current        | Maximum Clamping Voltage @I <sub>PP</sub> | Peak Pulse Current  | Reverse Leakage @V <sub>RWM</sub> |
|----------------|---------------|---------------------------|-----------------------------------|---------------------|---|---------------------|-----------------------------------|
| Unidirectional | Bidirectional | V <sub>RWM</sub> (V)      | V <sub>BR</sub> (V)               | I <sub>T</sub> (mA) | V <sub>C</sub> (V)                        | I <sub>PP</sub> (A) | I <sub>R</sub> (μA)               |
| 1.5KE43A       | 1.5KE43CA     | 36.80                     | 40.90~45.20                       | 1                   | 59.3                                      | 25.6                | 1                                 |
| 1.5KE47A       | 1.5KE47CA     | 40.20                     | 44.70~49.40                       | 1                   | 64.8                                      | 23.5                | 1                                 |
| 1.5KE51A       | 1.5KE51CA     | 43.60                     | 48.50~53.60                       | 1                   | 70.1                                      | 21.7                | 1                                 |
| 1.5KE56A       | 1.5KE56CA     | 47.80                     | 53.20~58.80                       | 1                   | 77.0                                      | 19.7                | 1                                 |
| 1.5KE62A       | 1.5KE62CA     | 53.00                     | 58.90~65.10                       | 1                   | 85.0                                      | 17.9                | 1                                 |
| 1.5KE68A       | 1.5KE68CA     | 58.10                     | 64.60~71.40                       | 1                   | 92.0                                      | 16.5                | 1                                 |
| 1.5KE75A       | 1.5KE75CA     | 64.10                     | 71.30~78.80                       | 1                   | 103.0                                     | 14.8                | 1                                 |
| 1.5KE82A       | 1.5KE82CA     | 70.10                     | 77.90~86.10                       | 1                   | 113.0                                     | 13.5                | 1                                 |
| 1.5KE91A       | 1.5KE91CA     | 77.80                     | 86.50~95.50                       | 1                   | 125.0                                     | 12.2                | 1                                 |
| 1.5KE100A      | 1.5KE100CA    | 85.50                     | 95.00~105.00                      | 1                   | 137.0                                     | 11.1                | 1                                 |
| 1.5KE110A      | 1.5KE110CA    | 94.00                     | 105.00~116.00                     | 1                   | 152.0                                     | 10.0                | 1                                 |
| 1.5KE120A      | 1.5KE120CA    | 102.00                    | 114.00~126.00                     | 1                   | 165.0                                     | 9.2                 | 1                                 |
| 1.5KE130A      | 1.5KE130CA    | 111.00                    | 124.00~137.00                     | 1                   | 179.0                                     | 8.5                 | 1                                 |
| 1.5KE150A      | 1.5KE150CA    | 128.00                    | 143.00~158.00                     | 1                   | 207.0                                     | 7.3                 | 1                                 |
| 1.5KE160A      | 1.5KE160CA    | 136.00                    | 152.00~168.00                     | 1                   | 219.0                                     | 6.9                 | 1                                 |
| 1.5KE170A      | 1.5KE170CA    | 145.00                    | 162.00~179.00                     | 1                   | 234.0                                     | 6.5                 | 1                                 |

**Transient Voltage Suppressors**

1.5KE

| Part Number    |               | Reverse Stand-Off Voltage | Breakdown Voltage @ $I_T$ | Test Current | Maximum Clamping Voltage @ $I_{PP}$ | Peak Pulse Current | Reverse Leakage @ $V_{RWM}$ |
|----------------|---------------|---------------------------|---------------------------|--------------|-------------------------------------|--------------------|-----------------------------|
| Unidirectional | Bidirectional | $V_{RWM}(V)$              | $V_{BR}(V)$               | $I_T(mA)$    | $V_C(V)$                            | $I_{PP}(A)$        | $I_R(\mu A)$                |
| 1.5KE180A      | 1.5KE180CA    | 154.00                    | 171.00~189.00             | 1            | 246.0                               | 6.2                | 1                           |
| 1.5KE200A      | 1.5KE200CA    | 171.00                    | 190.00~210.00             | 1            | 274.0                               | 5.5                | 1                           |
| 1.5KE220A      | 1.5KE220CA    | 185.00                    | 209.00~231.00             | 1            | 328.0                               | 4.6                | 1                           |
| 1.5KE250A      | 1.5KE250CA    | 214.00                    | 237.00~263.00             | 1            | 344.0                               | 4.4                | 1                           |
| 1.5KE300A      | 1.5KE300CA    | 256.00                    | 285.00~315.00             | 1            | 414.0                               | 3.7                | 1                           |
| 1.5KE350A      | 1.5KE350CA    | 300.00                    | 332.00~368.00             | 1            | 482.0                               | 3.2                | 1                           |
| 1.5KE400A      | 1.5KE400CA    | 342.00                    | 380.00~420.00             | 1            | 548.0                               | 2.8                | 1                           |
| 1.5KE440A      | 1.5KE440CA    | 376.00                    | 418.00~462.00             | 1            | 602.0                               | 2.5                | 1                           |
| 1.5KE480A      | 1.5KE480CA    | 408.00                    | 456.00~504.00             | 1            | 658.0                               | 2.3                | 1                           |
| 1.5KE510A      | 1.5KE510CA    | 434.00                    | 485.00~535.00             | 1            | 698.0                               | 2.1                | 1                           |
| 1.5KE530A      | 1.5KE530CA    | 450.00                    | 503.50~556.50             | 1            | 725.0                               | 2.1                | 1                           |
| 1.5KE540A      | 1.5KE540CA    | 459.00                    | 513.00~567.00             | 1            | 740.0                               | 2.0                | 1                           |
| 1.5KE550A      | 1.5KE550CA    | 467.00                    | 522.50~577.50             | 1            | 760.0                               | 2.0                | 1                           |

Notes: For bidirectional type having  $V_{RWM}$  of 10V and less, the  $I_R$  limit is double.

**Ratings and Characteristic Curves ( $T_A=25^\circ\text{C}$  unless otherwise noted)**

Figure 1. Peak Pulse Power Rating Curve

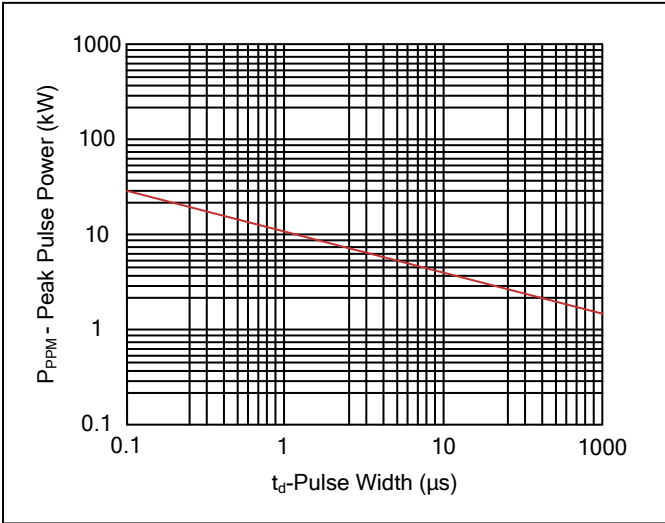


Figure 2. Pulse Derating Curve

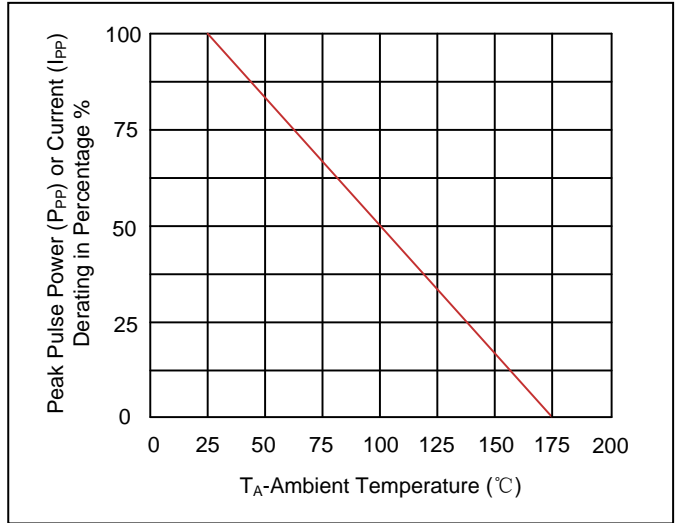


Figure 3. Pulse Waveform

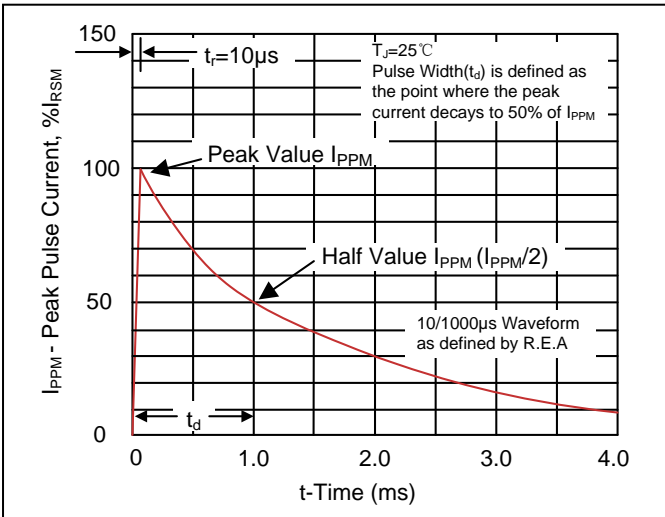


Figure 4. Typical Junction Capacitance

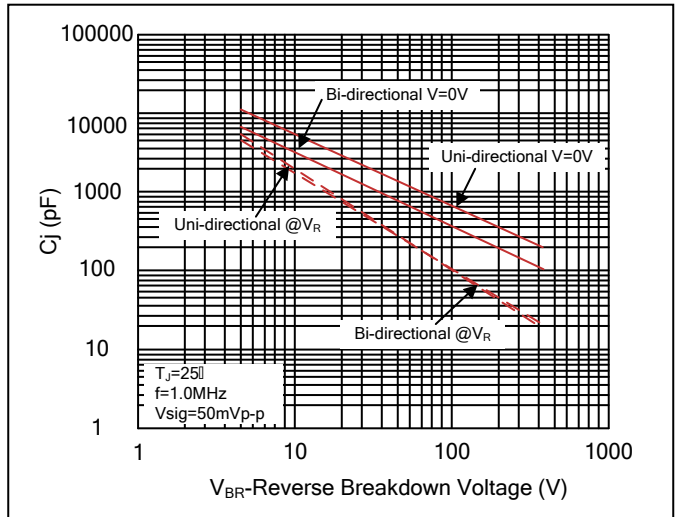


Figure 5. Steady State Power Dissipation Derating Curve

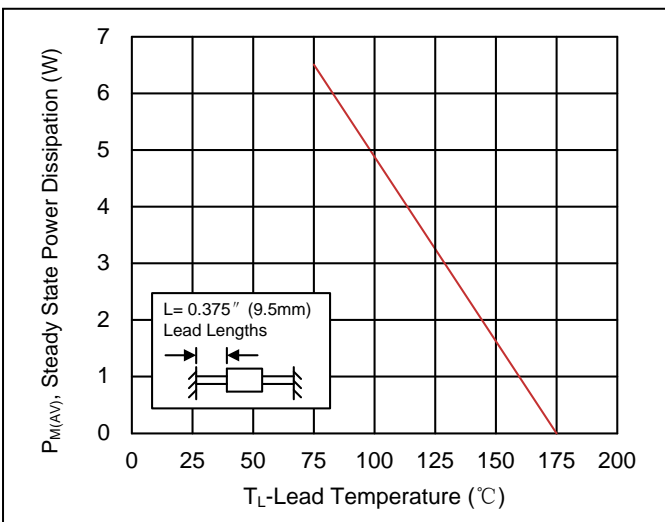
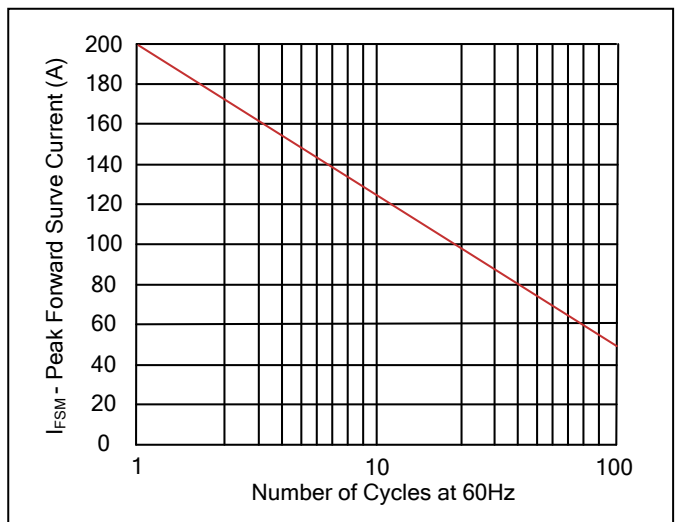


Figure 6. Maximum Non-Repetitive Forward Surge Current Uni-Directional Only



**Recommended Soldering Conditions**

Wave Soldering



| Item             | Conditions |
|------------------|------------|
| Peak Temperature | 265°C      |
| Dipping Time     | 10 seconds |
| Soldering        | 1 time     |

**Marking Code**



**Packaging**

| Tape  | Symbol    | Dimension (mm) |
|---|-----------|----------------|
|    | A         | 10.0±0.5       |
|   | B         | 53.0±1.0       |
|   | Z         | 1.2Max.        |
|   | T         | 6.0±0.4        |
|   | E         | 0.8Max.        |
|   | L1-L2     | 1.0Max.        |
|   | L         | 250.0±5.0      |
|   | W         | 75.0±5.0       |
|   | H         | 114.0±5.0      |
|   | Quantity: | 1000PCS        |
|  | D         | 330.0±3.0      |
|   | D0        | 16.4±2.0       |
|   | D1        | 86.0±2.0       |
|   | W1        | 76.0±3.0       |
|   | Quantity: | 1200PCS        |



Компания «Life Electronics» занимается поставками электронных компонентов импортного и отечественного производства от производителей и со складов крупных дистрибьюторов Европы, Америки и Азии.

С конца 2013 года компания активно расширяет линейку поставок компонентов по направлению коаксиальный кабель, кварцевые генераторы и конденсаторы (керамические, пленочные, электролитические), за счёт заключения дистрибьюторских договоров

Мы предлагаем:

- Конкурентоспособные цены и скидки постоянным клиентам.
- Специальные условия для постоянных клиентов.
- Подбор аналогов.
- Поставку компонентов в любых объемах, удовлетворяющих вашим потребностям.
- Приемлемые сроки поставки, возможна ускоренная поставка.
- Доставку товара в любую точку России и стран СНГ.
- Комплексную поставку.
- Работу по проектам и поставку образцов.
- Формирование склада под заказчика.
- Сертификаты соответствия на поставляемую продукцию (по желанию клиента).
- Тестирование поставляемой продукции.
- Поставку компонентов, требующих военную и космическую приемку.
- Входной контроль качества.
- Наличие сертификата ISO.

В составе нашей компании организован Конструкторский отдел, призванный помогать разработчикам, и инженерам.

Конструкторский отдел помогает осуществить:

- Регистрацию проекта у производителя компонентов.
- Техническую поддержку проекта.
- Защиту от снятия компонента с производства.
- Оценку стоимости проекта по компонентам.
- Изготовление тестовой платы монтаж и пусконаладочные работы.



Тел: +7 (812) 336 43 04 (многоканальный)

Email: [org@lifeelectronics.ru](mailto:org@lifeelectronics.ru)