

DATA SHEET

TRANSIENT VOLTAGE SUPPRESSORS

AC/DC POWER SUPPLY

1.5KE-AT series

RoHS compliant & Halogen free



Product specification— June 30, 2023 V.3



Transient Voltage Suppressors (TVS) Data Sheet

Features

- Glass passivated junction
- Low zener impedance
- Excellent clamping capability
- 1500W peak pulse power capability at 10/1000 μ s waveform, repetition rate (duty cycle): 0.01%
- Fast response time
- Typical I_R less than 1 μ 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
- AEC-Q101 qualified
- IEC61000-4-2 ESD 30KV Air, 30KV contact compliance



Mechanical Data

- Case: JEDEC DO-201 Moulded plastic
- Terminal: Plated 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 μ s waveform (Note1, Fig.1) | P_{PPM} | Minimum 1500 | Watts |
| Peak pulse current of at 10/1000 μ 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 +150 | $^{\circ}$ 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 | |

Electrical Characteristics (T_A=25°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 (μA) |
| 1.5KE6.8A-AT | 1.5KE6.8CA-AT | 5.80 | 6.45~7.14 | 10 | 10.5 | 144.8 | 1000 |
| 1.5KE7.5A-AT | 1.5KE7.5CA-AT | 6.40 | 7.13~7.88 | 10 | 11.3 | 134.5 | 500 |
| 1.5KE8.2A-AT | 1.5KE8.2CA-AT | 7.02 | 7.79~8.61 | 10 | 12.1 | 125.6 | 200 |
| 1.5KE9.1A-AT | 1.5KE9.1CA-AT | 7.78 | 8.65~9.55 | 1 | 13.4 | 113.4 | 50 |
| 1.5KE10A-AT | 1.5KE10CA-AT | 8.55 | 9.50~10.50 | 1 | 14.5 | 104.8 | 10 |
| 1.5KE11A-AT | 1.5KE11CA-AT | 9.40 | 10.50~11.60 | 1 | 15.6 | 97.4 | 5 |
| 1.5KE12A-AT | 1.5KE12CA-AT | 10.20 | 11.40~12.60 | 1 | 16.7 | 91.0 | 5 |
| 1.5KE13A-AT | 1.5KE13CA-AT | 11.10 | 12.40~13.70 | 1 | 18.2 | 83.5 | 1 |
| 1.5KE15A-AT | 1.5KE15CA-AT | 12.80 | 14.30~15.80 | 1 | 21.2 | 71.7 | 1 |
| 1.5KE16A-AT | 1.5KE16CA-AT | 13.60 | 15.20~16.80 | 1 | 22.5 | 67.6 | 1 |
| 1.5KE18A-AT | 1.5KE18CA-AT | 15.30 | 17.10~18.90 | 1 | 25.2 | 60.3 | 1 |
| 1.5KE20A-AT | 1.5KE20CA-AT | 17.10 | 19.00~21.00 | 1 | 27.7 | 54.9 | 1 |
| 1.5KE22A-AT | 1.5KE22CA-AT | 18.80 | 20.90~23.10 | 1 | 30.6 | 49.7 | 1 |
| 1.5KE24A-AT | 1.5KE24CA-AT | 20.50 | 22.80~25.20 | 1 | 33.2 | 45.8 | 1 |
| 1.5KE27A-AT | 1.5KE27CA-AT | 23.10 | 25.70~28.40 | 1 | 37.5 | 40.5 | 1 |
| 1.5KE30A-AT | 1.5KE30CA-AT | 25.60 | 28.50~31.50 | 1 | 41.4 | 36.7 | 1 |
| 1.5KE33A-AT | 1.5KE33CA-AT | 28.20 | 31.40~34.70 | 1 | 45.7 | 33.3 | 1 |
| 1.5KE36A-AT | 1.5KE36CA-AT | 30.80 | 34.20~37.80 | 1 | 49.9 | 30.5 | 1 |
| 1.5KE39A-AT | 1.5KE39CA-AT | 33.30 | 37.10~41.00 | 1 | 53.9 | 28.2 | 1 |

Transient Voltage Suppressors

1.5KE-AT

Electrical Characteristics (T_A=25°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 (μA) |
| 1.5KE43A-AT | 1.5KE43CA-AT | 36.80 | 40.90~45.20 | 1 | 59.3 | 25.6 | 1 |
| 1.5KE47A-AT | 1.5KE47CA-AT | 40.20 | 44.70~49.40 | 1 | 64.8 | 23.5 | 1 |
| 1.5KE51A-AT | 1.5KE51CA-AT | 43.60 | 48.50~53.60 | 1 | 70.1 | 21.7 | 1 |
| 1.5KE56A-AT | 1.5KE56CA-AT | 47.80 | 53.20~58.80 | 1 | 77.0 | 19.7 | 1 |
| 1.5KE62A-AT | 1.5KE62CA-AT | 53.00 | 58.90~65.10 | 1 | 85.0 | 17.9 | 1 |
| 1.5KE68A-AT | 1.5KE68CA-AT | 58.10 | 64.60~71.40 | 1 | 92.0 | 16.5 | 1 |
| 1.5KE75A-AT | 1.5KE75CA-AT | 64.10 | 71.30~78.80 | 1 | 103.0 | 14.8 | 1 |
| 1.5KE82A-AT | 1.5KE82CA-AT | 70.10 | 77.90~86.10 | 1 | 113.0 | 13.5 | 1 |
| 1.5KE91A-AT | 1.5KE91CA-AT | 77.80 | 86.50~95.50 | 1 | 125.0 | 12.2 | 1 |
| 1.5KE100A-AT | 1.5KE100CA-AT | 85.50 | 95.00~105.00 | 1 | 137.0 | 11.1 | 1 |
| 1.5KE110A-AT | 1.5KE110CA-AT | 94.00 | 105.00~116.00 | 1 | 152.0 | 10.0 | 1 |
| 1.5KE120A-AT | 1.5KE120CA-AT | 102.00 | 114.00~126.00 | 1 | 165.0 | 9.2 | 1 |
| 1.5KE130A-AT | 1.5KE130CA-AT | 111.00 | 124.00~137.00 | 1 | 179.0 | 8.5 | 1 |
| 1.5KE150A-AT | 1.5KE150CA-AT | 128.00 | 143.00~158.00 | 1 | 207.0 | 7.3 | 1 |
| 1.5KE160A-AT | 1.5KE160CA-AT | 136.00 | 152.00~168.00 | 1 | 219.0 | 6.9 | 1 |
| 1.5KE170A-AT | 1.5KE170CA-AT | 145.00 | 162.00~179.00 | 1 | 234.0 | 6.5 | 1 |
| 1.5KE180A-AT | 1.5KE180CA-AT | 154.00 | 171.00~189.00 | 1 | 246.0 | 6.2 | 1 |
| 1.5KE200A-AT | 1.5KE200CA-AT | 171.00 | 190.00~210.00 | 1 | 274.0 | 5.5 | 1 |
| 1.5KE220A-AT | 1.5KE220CA-AT | 185.00 | 209.00~231.00 | 1 | 328.0 | 4.6 | 1 |
| 1.5KE250A-AT | 1.5KE250CA-AT | 214.00 | 237.00~263.00 | 1 | 344.0 | 4.4 | 1 |
| 1.5KE300A-AT | 1.5KE300CA-AT | 256.00 | 285.00~315.00 | 1 | 414.0 | 3.7 | 1 |
| 1.5KE350A-AT | 1.5KE350CA-AT | 300.00 | 332.00~368.00 | 1 | 482.0 | 3.2 | 1 |
| 1.5KE400A-AT | 1.5KE400CA-AT | 342.00 | 380.00~420.00 | 1 | 548.0 | 2.8 | 1 |
| 1.5KE440A-AT | 1.5KE440CA-AT | 376.00 | 418.00~462.00 | 1 | 602.0 | 2.5 | 1 |
| 1.5KE480A-AT | 1.5KE480CA-AT | 408.00 | 456.00~504.00 | 1 | 658.0 | 2.3 | 1 |
| 1.5KE510A-AT | 1.5KE510CA-AT | 434.00 | 485.00~535.00 | 1 | 698.0 | 2.1 | 1 |
| 1.5KE530A-AT | 1.5KE530CA-AT | 450.00 | 503.50~556.50 | 1 | 725.0 | 2.1 | 1 |
| 1.5KE540A-AT | 1.5KE540CA-AT | 459.00 | 513.00~567.00 | 1 | 740.0 | 2.0 | 1 |
| 1.5KE550A-AT | 1.5KE550CA-AT | 467.00 | 522.50~577.50 | 1 | 760.0 | 2.0 | 1 |
| 1.5KE600A-AT | 1.5KE600CA-AT | 510.00 | 570.00~630.00 | 1 | 828.0 | 1.8 | 1 |

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

Figure 1. Peak Pulse Power Rating Curve

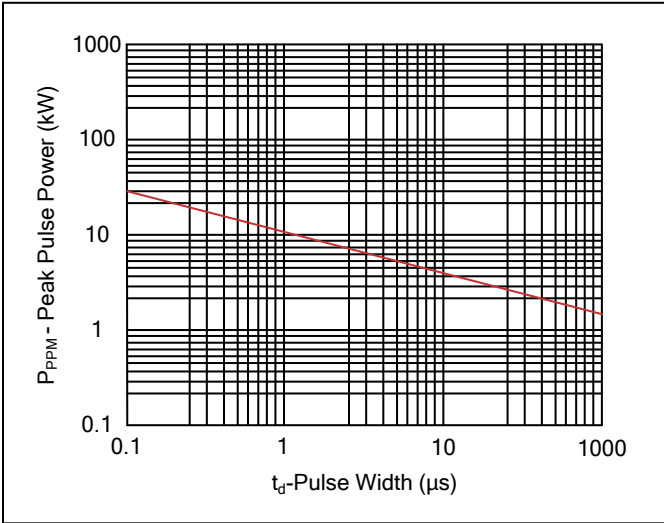


Figure 2. Pulse Derating Curve

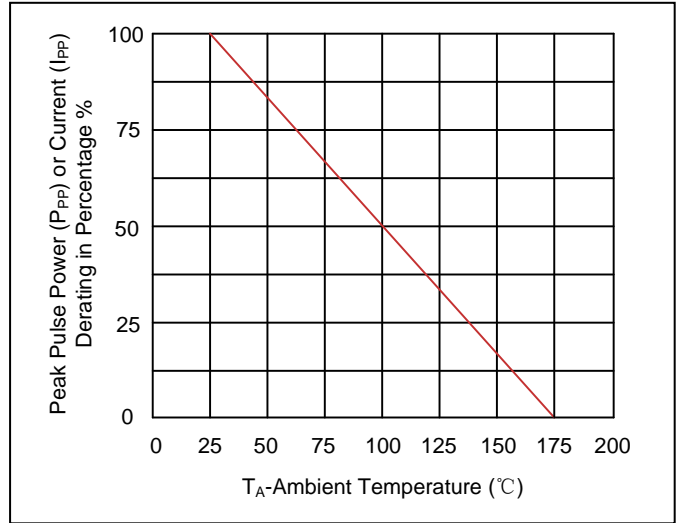


Figure 3. Pulse Waveform

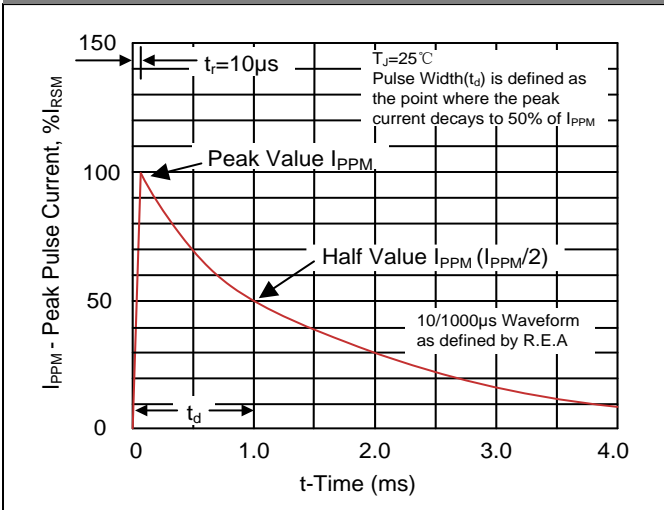


Figure 4. Typical Junction Capacitance

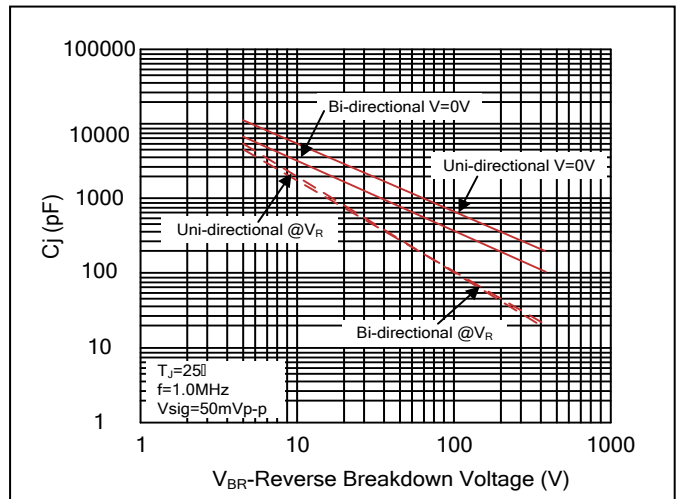


Figure 5. Steady State Power Dissipation Derating Curve

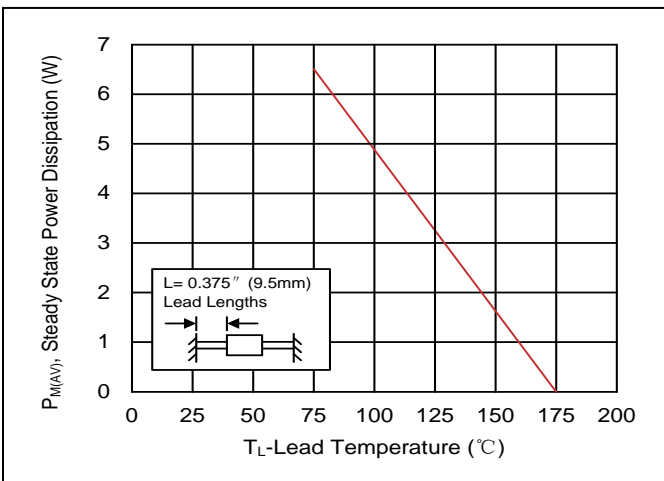
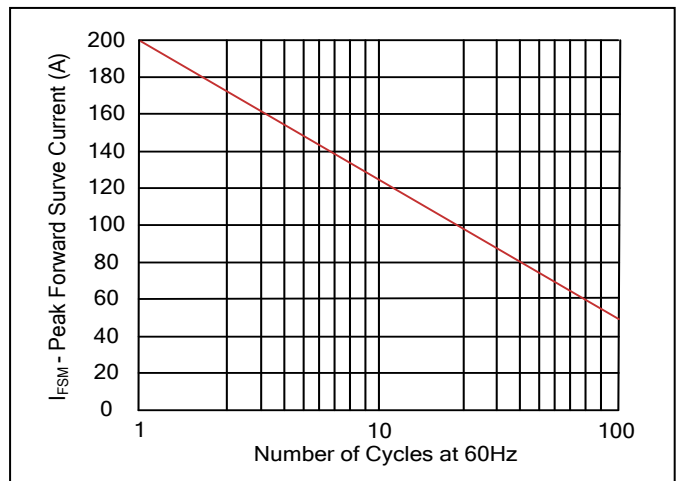
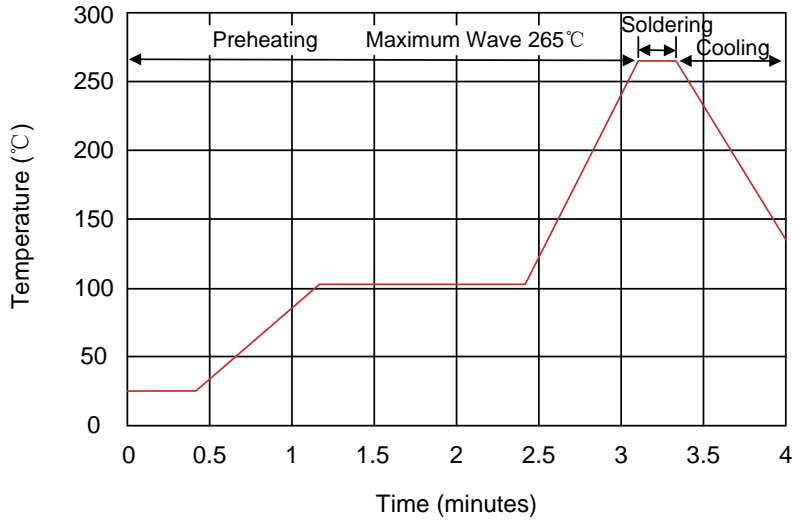


Figure 6. Maximum Non-Repetitive Forward Surge Current Uni-Directional Only



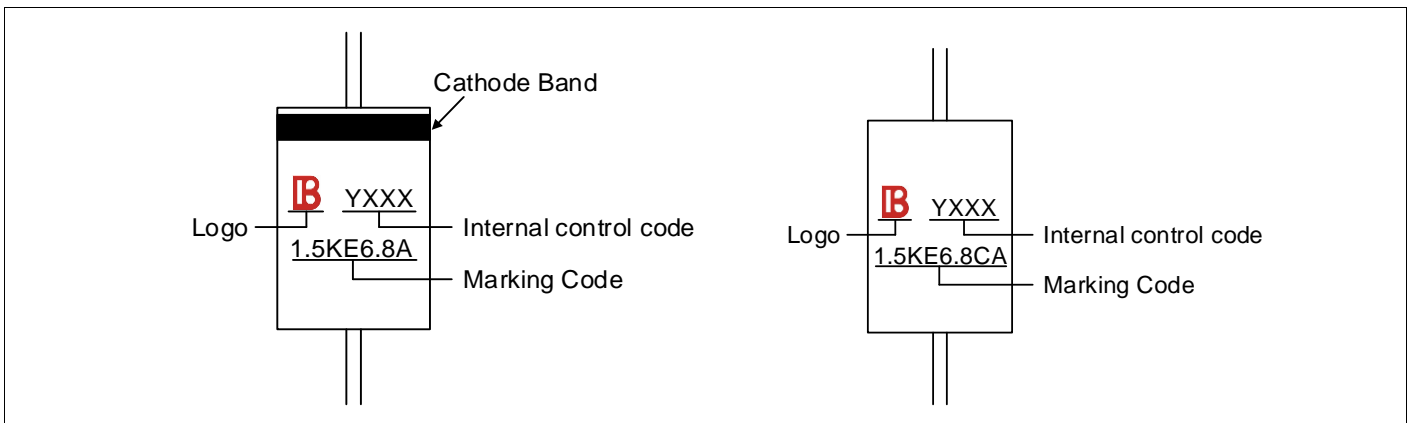
Recommended Soldering Conditions

Wave Soldering

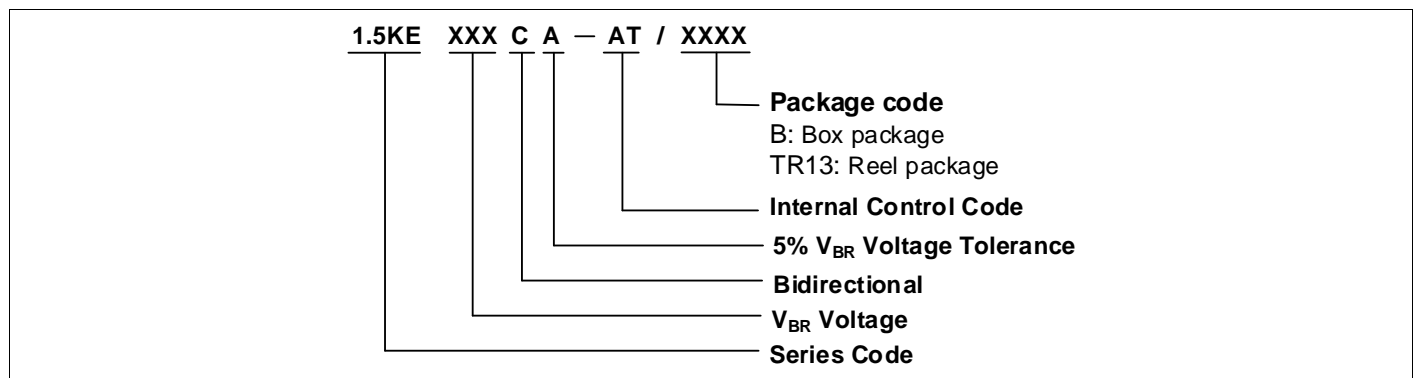


| Item | Conditions |
|------------------|------------|
| Peak Temperature | 265°C |
| Dipping Time | 10 seconds |
| Soldering | 1 time |

Marking Code



Part Number Code

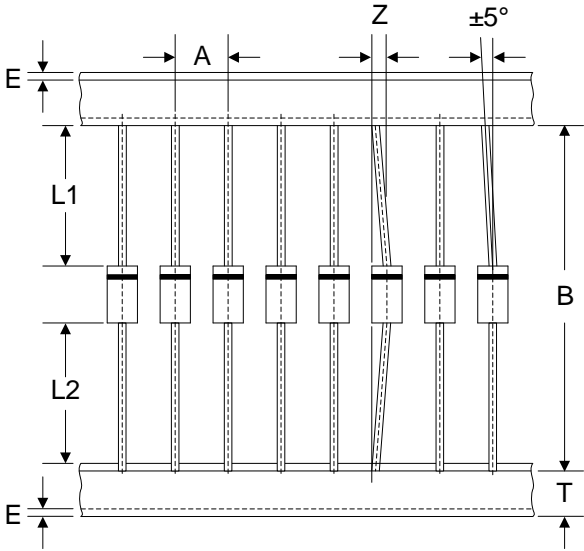
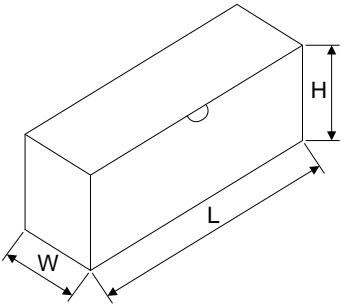
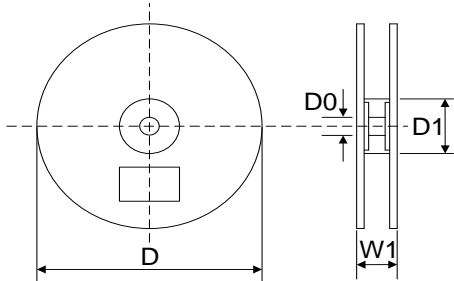


Ordering Code for Different Package

Box package: Add suffix "/B" at the end of the part number, such as 1.5KEXXXCA-AT/B

Reel package: Add suffix "/TR13" at the end of the part number, such as 1.5KEXXXCA-AT/TR13

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. | |
| | <p data-bbox="108 1093 159 1122">Box</p>  | L | 250.0±5.0 |
| | | W | 75.0±5.0 |
| | | H | 114.0±5.0 |
| | | Quantity: 1000PCS | |
| <p data-bbox="108 1491 167 1520">Reel</p>  | D | 330.0±3.0 | |
| | D0 | 16.4±2.0 | |
| | D1 | 86.0±2.0 | |
| | W1 | 76.0±3.0 | |
| | Quantity: 1200PCS | | |

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