

## Description

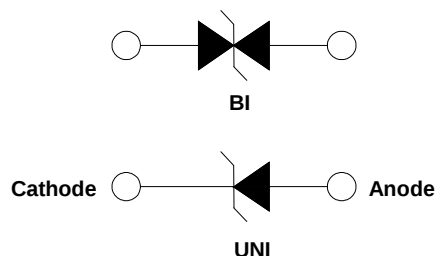
The 1.5KE series is designed specifically to protect sensitive electronic equipment from voltage transients induced by lightning and other transient voltage events.

## Features

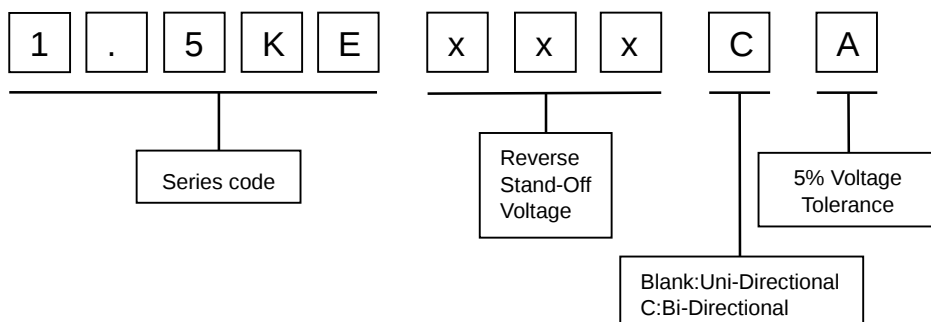
- I Fast response time
- I Matte tin lead-free Plated
- I Low incremental surge resistance
- I Halogen free and RoHS compliant
- I Typical  $I_R$  less than  $1\mu A$  above 12V
- I Compatible with industrial standard package DO-201
- I For surface mounted applications to optimize board space
- I 1500W peak pulse power capability with at 10/1000 $\mu s$  waveform, repetition rate (duty cycle): 0.01%
- I High temperature soldering guaranteed: 260°C/ 10 seconds



## Electrical symbol



## Part Number Code



## Mechanical Characteristics

| Rating                                                                               | Symbol         | Value      | Units      |
|--------------------------------------------------------------------------------------|----------------|------------|------------|
| Peak Pulse Power Dissipation by 10x1000 $\mu s$ test Waveform (Note1) (Fig. 2)       | $P_{PP}$       | 1500       | W          |
| Steady State Power Dissipation on infinite heat sink at $T_L = 75^\circ C$ (Fig. 6)  | $P_D$          | 5.0        | W          |
| Peak Forward Surge Current, 8.3ms Single Half Sine-Wave Unidirectional only (Note 2) | $I_{FSM}$      | 100        | A          |
| Maximum instantaneous forward voltage at 50 A for unidirectional only                | $V_F$          | 3.5/6.5    | V          |
| Operating junction and Storage Temperature Range.                                    | $T_J, T_{STG}$ | -55 to 150 | $^\circ C$ |

1. Non-repetitive current pulse, per Fig. 4 and derated above  $T_A = 25^\circ C$  per Fig. 3.

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



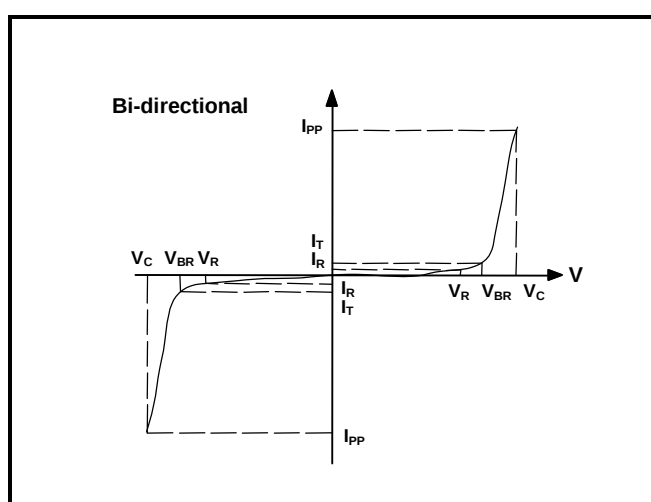
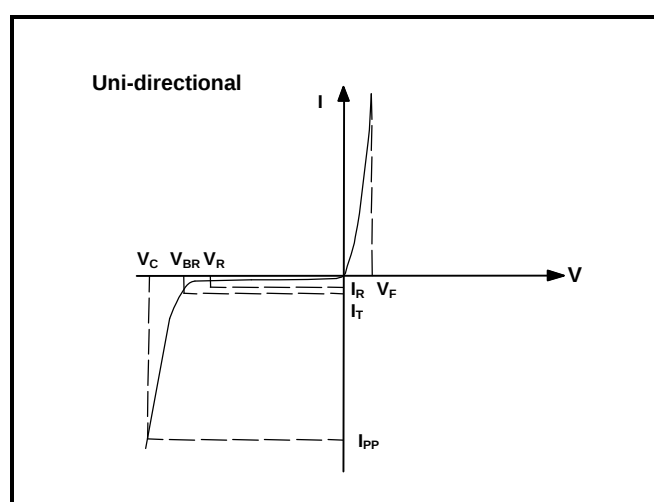
**Electrical Characteristics**

| Type Number |            | Reverse Stand-Off Voltage | Breakdown Voltage               |        | Test Current   | Max. Clamping Voltage 10/1000µs | Max. Peak Pulse Current 10/1000µs | Reverse Leakage                  |
|-------------|------------|---------------------------|---------------------------------|--------|----------------|---------------------------------|-----------------------------------|----------------------------------|
|             |            | V <sub>RWM</sub>          | V <sub>BR</sub> @I <sub>T</sub> |        | I <sub>T</sub> | V <sub>C</sub> @I <sub>PP</sub> | I <sub>PP</sub>                   | I <sub>R</sub> @V <sub>RWM</sub> |
|             |            |                           | Min                             | Max    |                |                                 |                                   |                                  |
| UNI         | BI         | V                         | V                               | V      | mA             | V                               | A                                 | µA                               |
| 1.5KE6.8A   | 1.5KE6.8CA | 5.8                       | 6.45                            | 7.14   | 10             | 10.5                            | 143.0                             | 1000                             |
| 1.5KE7.5A   | 1.5KE7.5CA | 6.4                       | 7.13                            | 7.88   | 10             | 11.3                            | 132.0                             | 500                              |
| 1.5KE8.2A   | 1.5KE8.2CA | 7.0                       | 7.79                            | 8.61   | 10             | 12.1                            | 124.0                             | 200                              |
| 1.5KE9.1A   | 1.5KE9.1CA | 7.8                       | 8.6                             | 9.55   | 1              | 13.4                            | 112.0                             | 50                               |
| 1.5KE10A    | 1.5KE10CA  | 8.6                       | 9.50                            | 10.50  | 1              | 14.5                            | 103.0                             | 10                               |
| 1.5KE11A    | 1.5KE11CA  | 9.4                       | 10.50                           | 11.60  | 1              | 15.6                            | 96.0                              | 5                                |
| 1.5KE12A    | 1.5KE12CA  | 10.2                      | 11.40                           | 12.60  | 1              | 16.7                            | 90.0                              | 5                                |
| 1.5KE13A    | 1.5KE13CA  | 11.1                      | 12.40                           | 13.70  | 1              | 18.2                            | 82.0                              | 1                                |
| 1.5KE15A    | 1.5KE15CA  | 12.8                      | 14.30                           | 15.80  | 1              | 21.2                            | 71.0                              | 1                                |
| 1.5KE16A    | 1.5KE16CA  | 13.6                      | 15.20                           | 16.80  | 1              | 22.5                            | 67.0                              | 1                                |
| 1.5KE18A    | 1.5KE18CA  | 15.3                      | 17.10                           | 18.90  | 1              | 25.2                            | 59.5                              | 1                                |
| 1.5KE20A    | 1.5KE20CA  | 17.1                      | 19.00                           | 21.00  | 1              | 27.7                            | 54.0                              | 1                                |
| 1.5KE22A    | 1.5KE22CA  | 18.8                      | 20.90                           | 23.10  | 1              | 30.6                            | 49.0                              | 1                                |
| 1.5KE24A    | 1.5KE24CA  | 20.5                      | 22.80                           | 25.20  | 1              | 33.2                            | 45.0                              | 1                                |
| 1.5KE27A    | 1.5KE27CA  | 23.1                      | 25.70                           | 28.40  | 1              | 37.5                            | 40.0                              | 1                                |
| 1.5KE30A    | 1.5KE30CA  | 25.6                      | 28.50                           | 31.50  | 1              | 41.4                            | 36.0                              | 1                                |
| 1.5KE33A    | 1.5KE33CA  | 28.2                      | 31.40                           | 34.70  | 1              | 45.7                            | 33.0                              | 1                                |
| 1.5KE36A    | 1.5KE36CA  | 30.8                      | 34.20                           | 37.80  | 1              | 49.9                            | 30.0                              | 1                                |
| 1.5KE39A    | 1.5KE39CA  | 33.3                      | 37.10                           | 41.00  | 1              | 53.9                            | 28.0                              | 1                                |
| 1.5KE43A    | 1.5KE43CA  | 36.8                      | 40.90                           | 45.20  | 1              | 59.3                            | 25.3                              | 1                                |
| 1.5KE47A    | 1.5KE47CA  | 40.2                      | 44.70                           | 49.40  | 1              | 64.8                            | 23.2                              | 1                                |
| 1.5KE51A    | 1.5KE51CA  | 43.6                      | 48.50                           | 53.60  | 1              | 70.1                            | 21.4                              | 1                                |
| 1.5KE56A    | 1.5KE56CA  | 47.8                      | 53.20                           | 58.80  | 1              | 77.0                            | 19.5                              | 1                                |
| 1.5KE62A    | 1.5KE62CA  | 53.0                      | 58.90                           | 65.10  | 1              | 85.0                            | 17.7                              | 1                                |
| 1.5KE68A    | 1.5KE68CA  | 58.1                      | 64.60                           | 71.40  | 1              | 92.0                            | 16.3                              | 1                                |
| 1.5KE75A    | 1.5KE75CA  | 64.1                      | 71.30                           | 78.80  | 1              | 103.0                           | 14.6                              | 1                                |
| 1.5KE82A    | 1.5KE82CA  | 70.1                      | 77.90                           | 86.10  | 1              | 113.0                           | 13.3                              | 1                                |
| 1.5KE91A    | 1.5KE91CA  | 77.8                      | 86.50                           | 95.50  | 1              | 125.0                           | 12.0                              | 1                                |
| 1.5KE100A   | 1.5KE100CA | 85.5                      | 95.00                           | 105.00 | 1              | 137.0                           | 11.0                              | 1                                |
| 1.5KE110A   | 1.5KE110CA | 94.0                      | 105.00                          | 116.00 | 1              | 152.0                           | 9.9                               | 1                                |



**Electrical Characteristics**

| Type Number |            | Reverse Stand-Off Voltage | Breakdown Voltage |        | Test Current | Max. Clamping Voltage<br>10/1000 $\mu$ s | Max. Peak Pulse Current<br>10/1000 $\mu$ s | Reverse Leakage |
|-------------|------------|---------------------------|-------------------|--------|--------------|------------------------------------------|--------------------------------------------|-----------------|
|             |            | $V_{RWM}$                 | $V_{BR} @ I_T$    |        | $I_T$        | $V_C @ I_{PP}$                           | $I_{PP}$                                   | $I_R @ V_{RWM}$ |
|             |            |                           | Min               | Max    |              |                                          |                                            |                 |
| UNI         | BI         | V                         | V                 | V      | mA           | V                                        | A                                          | $\mu$ A         |
| 1.5KE120A   | 1.5KE120CA | 102.0                     | 114.00            | 126.00 | 1            | 165.0                                    | 9.1                                        | 1               |
| 1.5KE130A   | 1.5KE130CA | 111.0                     | 124.00            | 137.00 | 1            | 179.0                                    | 8.4                                        | 1               |
| 1.5KE150A   | 1.5KE150CA | 128.0                     | 143.00            | 158.00 | 1            | 207.0                                    | 7.2                                        | 1               |
| 1.5KE160A   | 1.5KE160CA | 136.0                     | 152.00            | 168.00 | 1            | 219.0                                    | 6.8                                        | 1               |
| 1.5KE170A   | 1.5KE170CA | 145.0                     | 162.00            | 179.00 | 1            | 234.0                                    | 6.4                                        | 1               |
| 1.5KE180A   | 1.5KE180CA | 154.0                     | 171.00            | 189.00 | 1            | 246.0                                    | 6.1                                        | 1               |
| 1.5KE200A   | 1.5KE200CA | 171.0                     | 190.00            | 210.00 | 1            | 274.0                                    | 5.5                                        | 1               |
| 1.5KE220A   | 1.5KE220CA | 185.0                     | 209.00            | 231.00 | 1            | 328.0                                    | 4.6                                        | 1               |
| 1.5KE250A   | 1.5KE250CA | 214.0                     | 237.00            | 263.00 | 1            | 344.0                                    | 4.4                                        | 1               |
| 1.5KE300A   | 1.5KE300CA | 256.0                     | 285.00            | 315.00 | 1            | 414.0                                    | 3.6                                        | 1               |
| 1.5KE350A   | 1.5KE350CA | 300.0                     | 332.00            | 368.00 | 1            | 482.0                                    | 3.1                                        | 1               |
| 1.5KE400A   | 1.5KE400CA | 342.0                     | 380.00            | 420.00 | 1            | 548.0                                    | 2.8                                        | 1               |
| 1.5KE440A   | 1.5KE440CA | 376.0                     | 418.00            | 462.00 | 1            | 602.0                                    | 2.5                                        | 1               |
| 1.5KE480A   | 1.5KE480CA | 408.0                     | 456.00            | 504.00 | 1            | 658.0                                    | 2.3                                        | 1               |

**I-V Curve Characteristics**


$P_{PPM}$  Peak Pulse Power Dissipation -- Max power dissipation

$V_R$  Stand-off Voltage -- Maximum voltage that can be applied to the TVS without operation

$V_{BR}$  Breakdown Voltage -- Maximum voltage that flows though the TVS at a specified test current ( $I_T$ )

$V_C$  Clamping Voltage -- Peak voltage measured across the TVS at a specified  $I_{ppm}$  (peak impulse current)

$I_R$  Reverse Leakage Current -- Current measured at  $V_R$

$V_F$  Forward Voltage Drop for Uni-directional



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

Figure 1 - TVS Transients Clamping Waveform

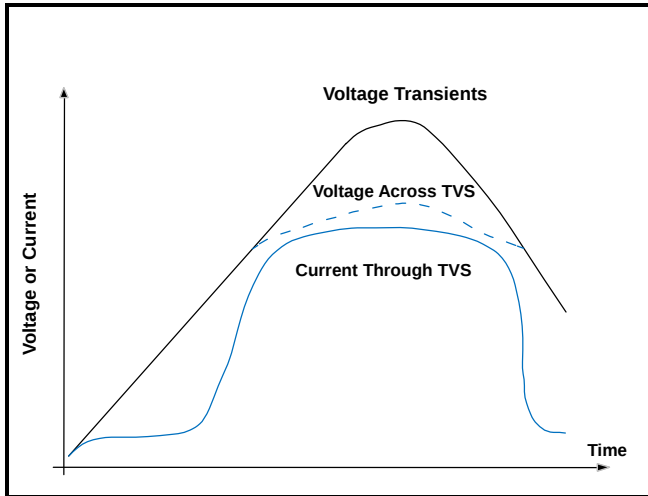


Figure 2 - Peak Pulse Power Rating Curve

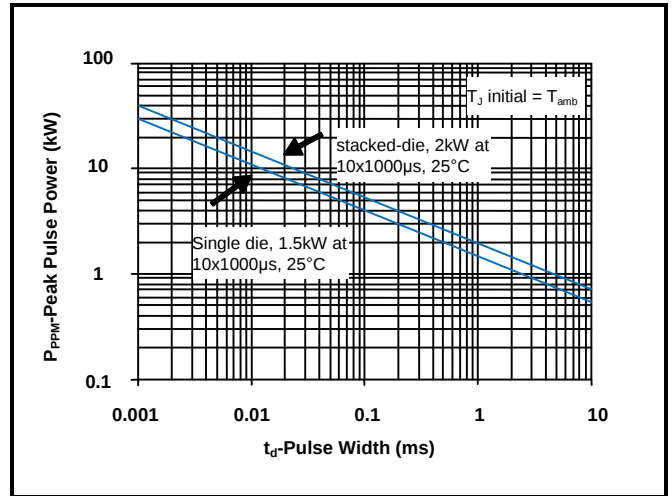


Figure 3 - Pulse Derating Curve

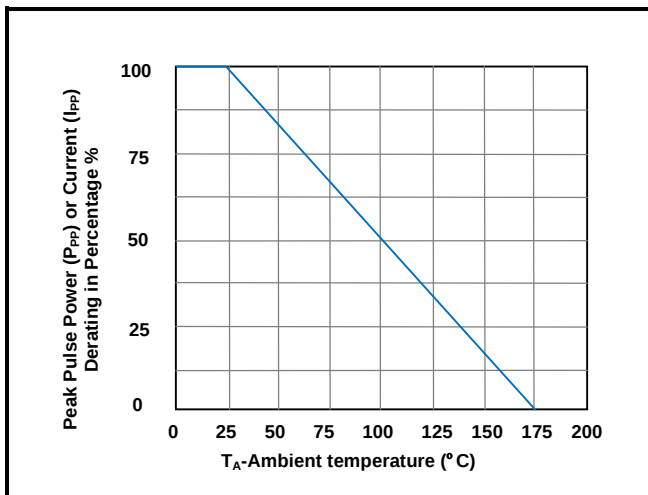


Figure 4 - Pulse Waveform

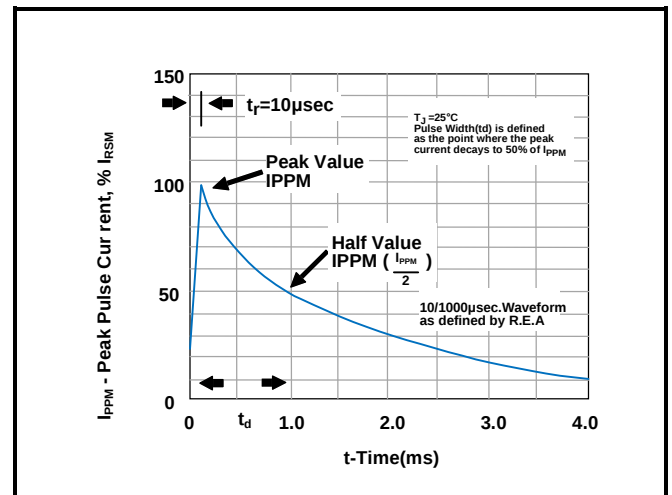


Figure 5 - Typical Junction Capacitance

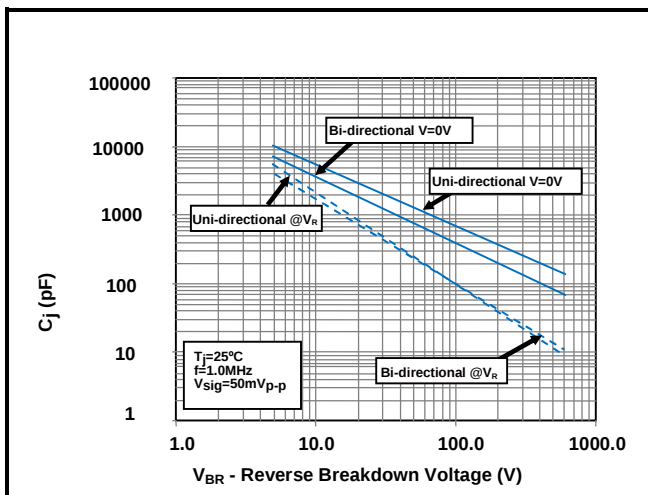


Figure 6 - Steady State Power Derating Curve

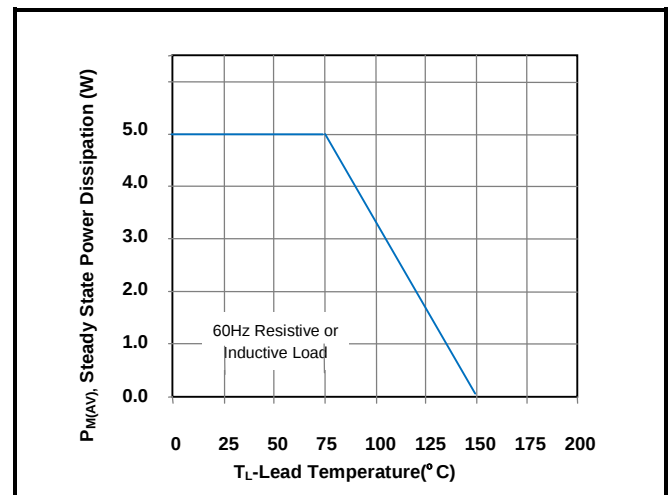
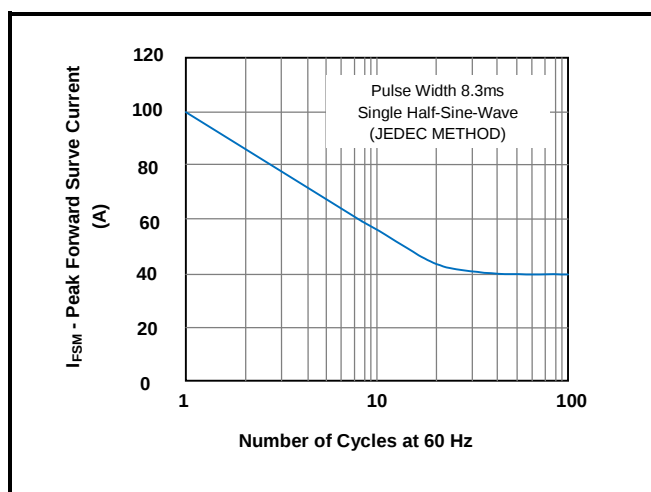
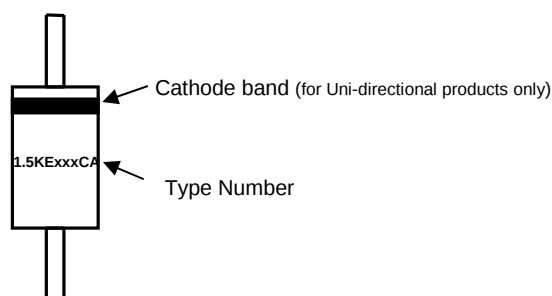


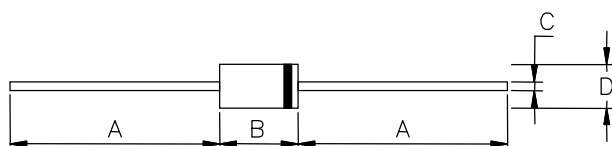
Figure 7 - Maximum Non-Repetitive Surge Current



## Part Marking System



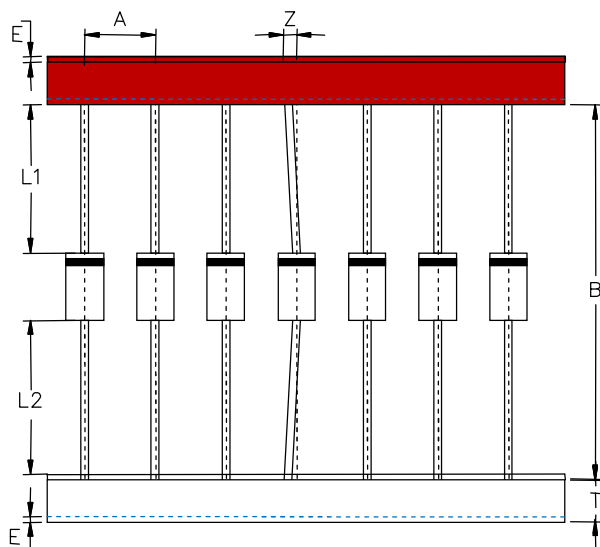
## Dimensions



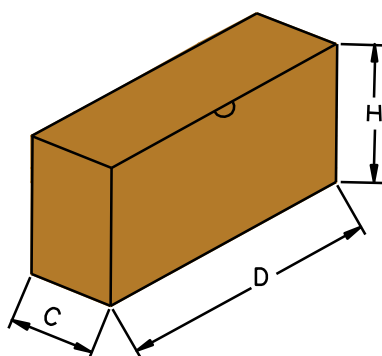
| DIM | Millimeters |      | Inches |       |
|-----|-------------|------|--------|-------|
|     | Min         | Max  | Min    | Max   |
| A   | 25.40       | -    | 1.000  | -     |
| B   | 7.20        | 9.50 | 0.283  | 0.374 |
| C   | 0.90        | 1.30 | 0.035  | 0.051 |
| D   | 4.80        | 5.50 | 0.189  | 0.217 |



Packaging Information



| Symbol | Millimeters | Inches      |
|--------|-------------|-------------|
| A      | 10±0.5      | 0.394±0.019 |
| B      | 53.0±1.0    | 2.087±0.039 |
| Z      | 1.2Max      | 0.047 Max   |
| T      | 6.0±0.5     | 0.236±0.019 |
| E      | 0.8Max      | 0.031 Max   |
| L1-L2  | 1.0Max      | 0.039 Max   |



| Symbol   | Millimeters         | Inches      |
|----------|---------------------|-------------|
| D        | 250.0±5.0           | 9.843±0.197 |
| C        | 75.0±5.0            | 2.953±0.197 |
| H        | 114.0±5.0           | 4.488±0.197 |
| Quantity | 1000PCS / inner box |             |

