

# LTKAK6 Series

## SMT0-218 - 6KA



### Agency Approvals

| Agency | Agency File Number |
|--------|--------------------|
|        | E128662            |

### Maximum Ratings and Thermal Characteristics

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

| Parameter                                      | Symbol                | Value      | Unit               |
|--|-----------------------|------------|--------------------|
| Operating Junction                             | $T_J$                 | -55 to 125 | $^\circ\text{C}$   |
| Storage Temperature Range                      | $T_{\text{STG}}$      | -55 to 150 |                    |
| Current Rating <sup>1</sup>                    | $I_{\text{PP}}$       | 6          | kA                 |
| Typical Thermal Resistance Junction to Lead    | $R_{\theta\text{JL}}$ | 10         | $^\circ\text{C/W}$ |
| Typical Thermal Resistance Junction to Ambient | $R_{\theta\text{JA}}$ | 50         | $^\circ\text{C/W}$ |

**Note:**

1. Rated min  $I_{\text{PP}}$  measured with 8/20 $\mu\text{s}$  pulse.

### Description

The LTKAK6 series offers superior clamping characteristics over standard S.A.D. technologies by virtue of the Littelfuse Foldbak™ technology, which provides a clamping voltage lower than the avalanche voltage (but above the rated working voltage). Therefore, any voltage rise due to increased current conduction is contained to a minimum, providing the best possible protection level. This LTKAK6 series can be combined in series or parallel solutions to offer various clamping levels and surge withstand options.

The LTKAK6 SMT package provides a more compact PCB layout than typical through-hole AK TVS components.

### Features

- High Power TVS designed in a surface mount and compact SMT0-218 package
- Patent pending package design
- Foldbak™ Technology for superior clamping characteristics
- Tube or tape and reel pack options available
- Ideal for automatic pick and place assembly and reflow process to reduce the manufacturing cost and increase the soldering quality as compared to axial leaded packages
- Low clamping and slope resistance.
- Sharp breakdown voltage.
- Meet MSL level1, per J-STD-020, LF maximum peak of 245 $^\circ\text{C}$
- Pb-free E3 means 2nd level interconnect is Pb-free and the terminal finish material is tin(Sn) (IPC/JEDEC J-STD-609A.01)
- UL Recognized compound meeting flammability rating V-0

### Functional Diagram



Bi-directional

### Electrical Characteristics ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

| Part Numbers | Standoff Voltage ( $V_{\text{SO}}$ ) (V) | Max. Reverse Leakage ( $I_{\text{R}}$ ) @ $V_{\text{SO}}$ ( $\mu\text{A}$ ) | Reverse Breakdown Voltage ( $V_{\text{BR}}$ ) @ $I_{\text{T}}$ |           | Test Current $I_{\text{T}}$ (mA) | Max. Clamping Voltage $V_{\text{C}}$ @ ( $I_{\text{PP}}$ ) (Volts) | Max. Temp Coefficient of $V_{\text{BR}}$ (%/ $^\circ\text{C}$ ) | Max. Capacitance 0V Bias 10kHz (nF) |
|--------------|--|---|--|-----------|----------------------------------|--|---|-------------------------------------|
|              |  |   | Min Volts  | Max Volts |                                  |  |   |                                     |
| LTKAK6-058C  | 58                                       | 10  | 64   | 70        | 10                               | 110  | 0.1   | 6.5                                 |
| LTKAK6-066C  | 66                                       | 10  | 72   | 80        | 10                               | 120  | 0.1   | 5.5                                 |
| LTKAK6-076C  | 76                                       | 10  | 85   | 95        | 10                               | 140  | 0.1   | 4.5                                 |

Note: Using 8/20 waveshape as defined in IEC 61000-4-5 2<sup>nd</sup> edition.

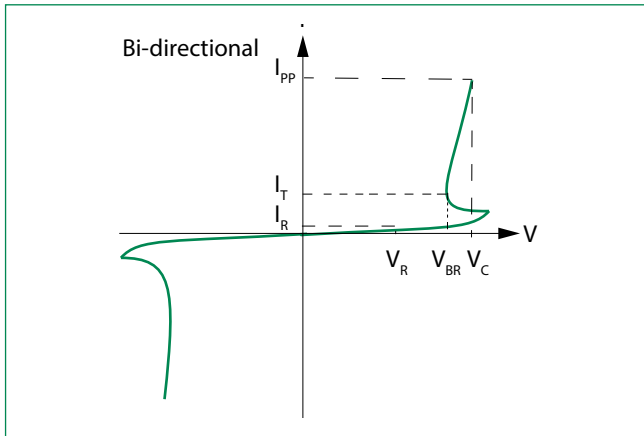
### Surge Ratings

| Part Numbers | Max Peak Pulse Current ( $I_{\text{PP}}$ ) |                             |       |                              |
|--------------|--|-----------------------------|-------|------------------------------|
|              | (80/20 $\mu\text{s}$ ) (A)                 | (10/350 $\mu\text{s}$ ) (A) |       | (10/1000 $\mu\text{s}$ ) (A) |
|              | Min  | Min                         | Typ   | Min                          |
| LTKAK6-058C  | 6,000                                      | 900                         | 1,100 | 430                          |
| LTKAK6-066C  | 6,000                                      | 900                         | 1,100 | 430                          |
| LTKAK6-076C  | 6,000                                      | 900                         | 1,100 | 430                          |

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### I-V Curve Characteristics



**P<sub>PPM</sub> Peak Pulse Power Dissipation --**

Max power dissipation

**V<sub>R</sub> Stand-off Voltage --**

Maximum voltage that can be applied to the TVS without operation

**V<sub>BR</sub> Breakdown Voltage --**

Maximum voltage that flows through the TVS at a specified test current (I<sub>T</sub>)

**V<sub>C</sub> Clamping Voltage --**

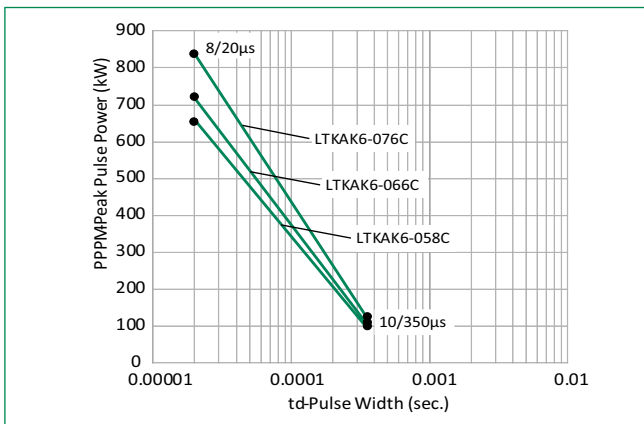
Peak voltage measured across the TVS at a specified I<sub>ppm</sub> (peak impulse current)

**I<sub>R</sub> Reverse Leakage Current --**

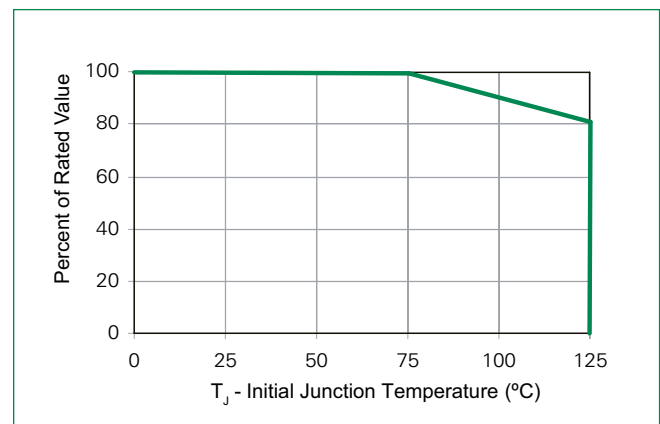
Current measured at V<sub>R</sub>

### Ratings and Characteristic Curves (T<sub>A</sub>=25°C unless otherwise noted)

#### Typical Peak Pulse Power Rating Curve

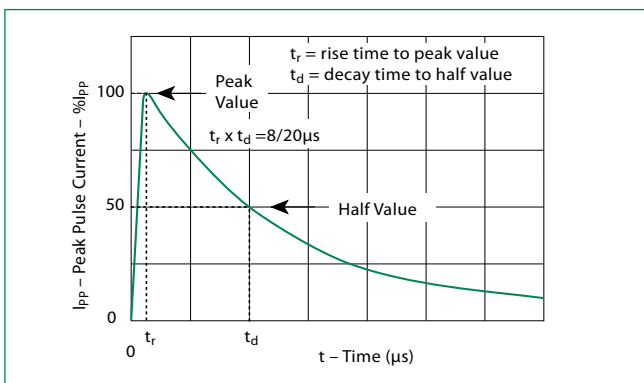


#### Peak Power Derating



Please contact Littelfuse for reliability or FIT/MTBF data, the performance is subject to vary and depends on the end customers' application condition.

#### Pulse Waveform

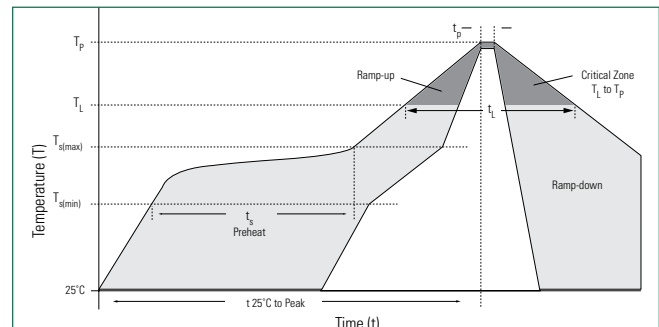


# LTKAK6 Series

## SMT0-218 - 6KA

### Soldering Parameters

|   |                                    |                         |
|---|------------------------------------|-------------------------|
| <b>Reflow Condition</b>   |                                    | Lead-free assembly      |
| <b>Pre Heat</b>   | - Temperature Min ( $T_{s(min)}$ ) | 150°C                   |
|   | - Temperature Max ( $T_{s(max)}$ ) | 200°C                   |
|   | - Time (min to max) ( $t_p$ )      | 60 – 180 secs           |
| <b>Average ramp up rate (Liquidus Temp (<math>T_A</math>) to peak</b> |                                    | 3°C/second max          |
| <b><math>T_{s(max)}</math> to <math>T_A</math> - Ramp-up Rate</b>     |                                    | 3°C/second max          |
| <b>Reflow</b>   | - Temperature ( $T_A$ ) (Liquidus) | 217°C                   |
|   | - Time (min to max) ( $t_p$ )      | 60 – 150 seconds        |
| <b>Peak Temperature (<math>T_p</math>)</b>                            |                                    | 245 <sup>+0/-5</sup> °C |
| <b>Time within 5°C of actual peak Temperature (<math>t_p</math>)</b>  |                                    | 30 seconds Max          |
| <b>Ramp-down Rate</b>   |                                    | 6°C/second max          |
| <b>Time 25°C to peak Temperature (<math>T_p</math>)</b>               |                                    | 8 minutes Max.          |
| <b>Do not exceed</b>  |                                    | 245°C                   |



### Flow/Wave Soldering (Solder Dipping)

|                           |            |
|---------------------------|------------|
| <b>Peak Temperature :</b> | 260°C      |
| <b>Dipping Time :</b>     | 10 seconds |
| <b>Soldering :</b>        | 1 time     |

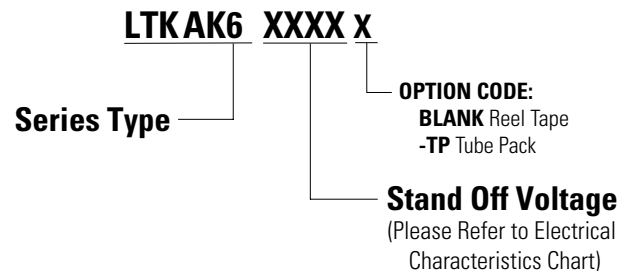
### Physical Specifications

|                 |  |
|-----------------|--|
| <b>Weight</b>   | Contact manufacturer                                   |
| <b>Case</b>     | Epoxy encapsulated                                     |
| <b>Terminal</b> | Tin plated lead, solderable per MIL-STD-202 Method 208 |

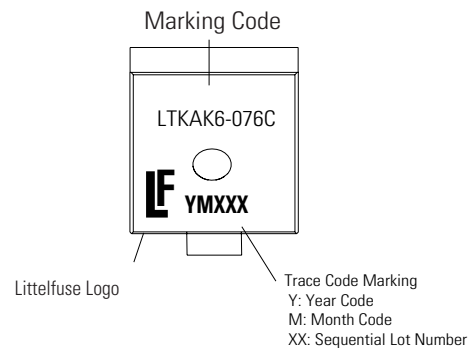
### Physical Specifications

|                          |                          |
|--------------------------|--------------------------|
| <b>High Temp Storage</b> | JESD22-A103              |
| <b>HTRB</b>              | JESD22-A108              |
| <b>MSL</b>               | JESDEC-J-STD020, Level 1 |
| <b>H3TRB</b>             | JESD22-A101              |
| <b>RSH</b>               | JESD22-B106              |

### Part Numbering System



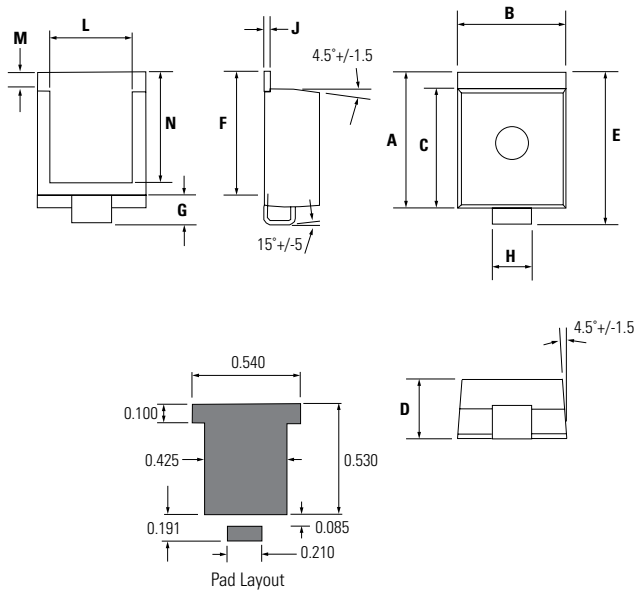
### Part Marking System



# LTKAK6 Series

## SMT0-218 - 6KA

### Dimensions – SMT0-218

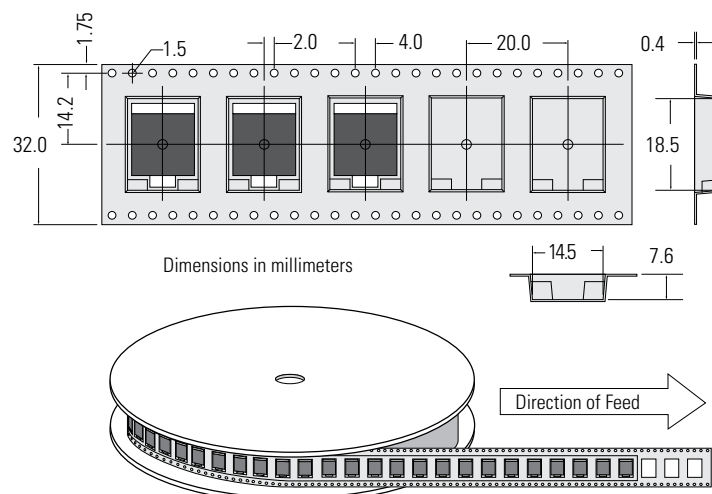


| Dimension | Inches |       | Millimeters |       |
|-----------|--------|-------|-------------|-------|
|           | Min    | Max   | Min         | Max   |
| <b>A</b>  | 0.621  | 0.655 | 15.78       | 16.63 |
| <b>B</b>  | 0.529  | 0.594 | 13.43       | 15.09 |
| <b>C</b>  | 0.544  | 0.561 | 13.83       | 14.24 |
| <b>D</b>  | 0.273  | 0.285 | 6.94        | 7.24  |
| <b>E</b>  | 0.702  | 0.737 | 17.82       | 18.72 |
| <b>F</b>  | 0.567  | 0.587 | 14.40       | 14.90 |
| <b>G</b>  | 0.087  | 0.126 | 2.20        | 3.20  |
| <b>H</b>  | 0.193  | 0.222 | 4.89        | 5.65  |
| <b>J</b>  | 0.028  | 0.033 | 0.72        | 0.85  |
| <b>L</b>  | 0.400  | 0.440 | 10.17       | 11.17 |
| <b>M</b>  | 0.073  | 0.112 | 1.85        | 2.85  |
| <b>N</b>  | 0.510  | 0.533 | 12.95       | 13.55 |

### Packaging

| Part Number    | Weight | Packing Mode                | Base Quantity |
|----------------|--------|-----------------------------|---------------|
| LTKAK6-xxxC    | 4.34g  | Tape & Reel – 32mm/13" tape | 400           |
| LTKAK6-xxxC-TP | 4.34g  | Tube Pack                   | 100(25/Tube)  |

### Tape and Reel Specification



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