

## LTKAK10 Series



### Description

The LTKAK10 series offer 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. They can also be connected in series and/or parallel to create various capability and flexible protection solutions.

The LTKAK10 SMT package provides a more compact PCB layout than typical through-hole AK TVS components.

### Agency Approvals

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

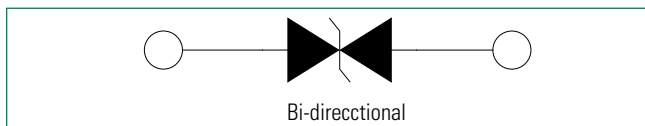
### Maximum Ratings and Thermal Characteristics (T<sub>A</sub> = 25°C unless otherwise noted)

| Parameter                                      | Symbol           | Value      | Unit |
|------------------------------------------------|------------------|------------|------|
| Operating Junction                             | T <sub>J</sub>   | -55 to 125 | °C   |
| Storage Temperature Range                      | T <sub>STG</sub> | -55 to 150 |      |
| Current Rating <sup>1</sup>                    | I <sub>PP</sub>  | 10         | kA   |
| Typical Thermal Resistance Junction to Lead    | R <sub>θJL</sub> | 10         | °C/W |
| Typical Thermal Resistance Junction to Ambient | R <sub>θJA</sub> | 50         | °C/W |

**Note:**

1. Rated min I<sub>PP</sub> measured with 8/20μs pulse.

### Functional Diagram



### Features

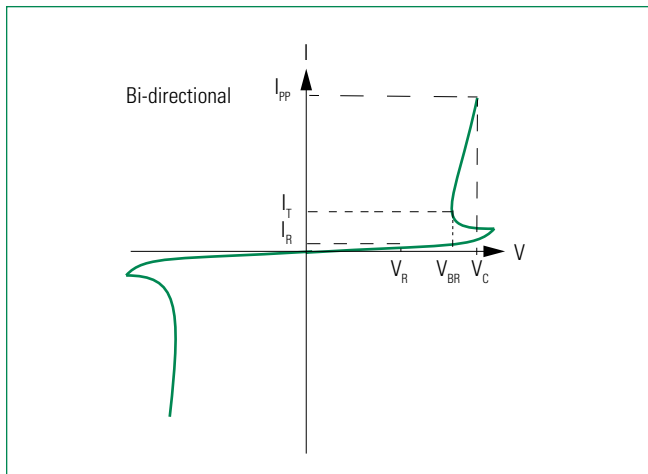
- High Power TVS designed in a surface mount compact SMT0-218 package
- Patent pending package design
- Foldbak technology for superior clamping factor
- Tube or tape and reel pack options available
- Ideal for automatic pick and place assembly and reflow process to reduce the manufacturing cost and increase the soldering quality as compared to axial leaded packages
- Bi-directional
- Meet MSL level 1, per J-STD-020, LF maximum peak of 245°C
- Halogen free and RoHS compliant
- 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

### Electrical Characteristics

| Part Numbers | Standoff Voltage (V <sub>SO</sub> ) (V) | Max. Reverse Leakage (I <sub>R</sub> ) @ V <sub>SO</sub> (μA) | Reverse Breakdown Voltage (V <sub>BR</sub> ) @ I <sub>T</sub> |           | Test Current I <sub>T</sub> | Max. Clamping Voltage V <sub>CL</sub> @ Peak Pulse Current (I <sub>PP</sub> ) |                       |                              |                                | Max. Temp Coefficient of V <sub>BR</sub> (%/°C) | Max. Capacitance 0V Bias 10kHz (nF) | Agency Approval |     |
|--------------|-----------------------------------------|---------------------------------------------------------------|---------------------------------------------------------------|-----------|-----------------------------|-------------------------------------------------------------------------------|-----------------------|------------------------------|--------------------------------|-------------------------------------------------|-------------------------------------|-----------------|-----|
|              |                                         |                                                               | Min Volts                                                     | Max Volts |                             | (mA)                                                                          | V <sub>CL</sub> Volts | I <sub>PP</sub> (8/20μs) (A) | I <sub>PP</sub> (10/350μs) (A) |                                                 |                                     |                 |     |
|              |                                         |                                                               |                                                               |           |                             |                                                                               |                       | min                          | min                            |                                                 |                                     |                 | typ |
| LTKAK10-058C | 58                                      | 10                                                            | 64                                                            | 70        | 10                          | 110                                                                           | 10,000                | 1,400                        | 1,700                          | 0.1                                             | 8.5                                 | x               |     |
| LTKAK10-066C | 66                                      | 10                                                            | 72                                                            | 80        | 10                          | 120                                                                           | 10,000                | 1,400                        | 1,700                          | 0.1                                             | 7.5                                 | x               |     |
| LTKAK10-076C | 76                                      | 10                                                            | 85                                                            | 95        | 10                          | 140                                                                           | 10,000                | 1,400                        | 1,700                          | 0.1                                             | 6.5                                 | x               |     |
| LTKAK10-086C | 86                                      | 10                                                            | 95                                                            | 105       | 10                          | 157                                                                           | 10,000                | 1,000                        | 1,200                          | 0.1                                             | 6.5                                 | x               |     |

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

## 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 through the TVS at a specified test current ( $I_T$ )

### $V_C$ Clamping Voltage –

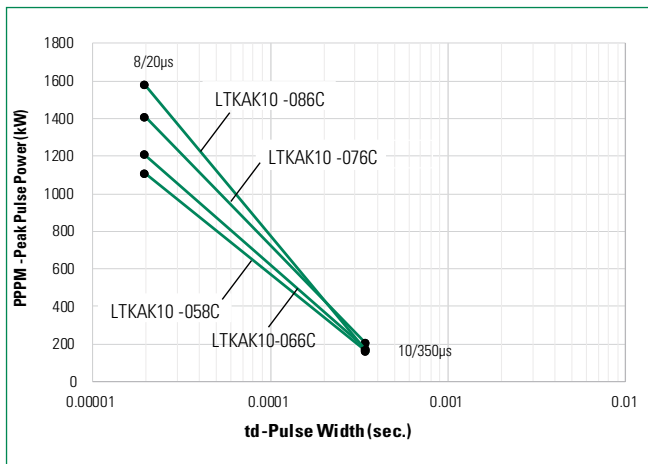
Peak voltage measured across the TVS at a specified  $I_{ppm}$  (peak impulse current)

### $I_R$ Reverse Leakage Current –

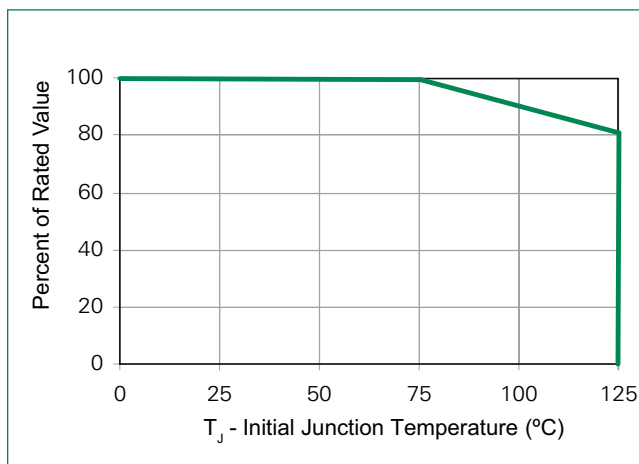
Current measured at  $V_R$

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

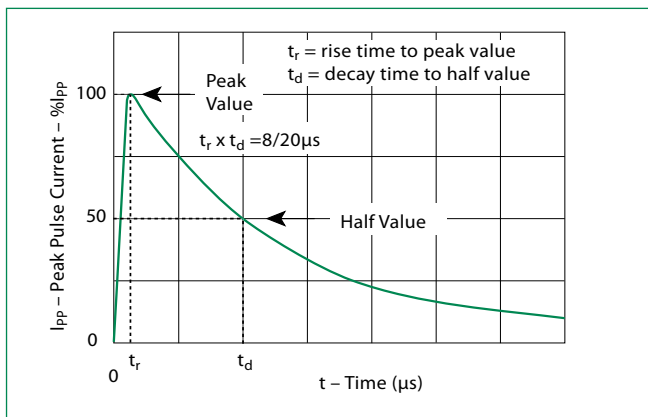
### Typical Peak Pulse Power Rating Curve



### Peak Power Derating



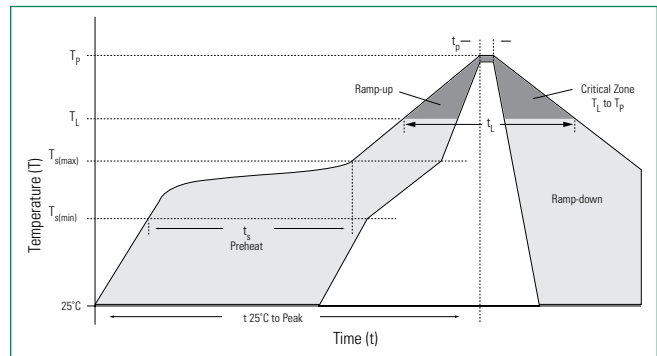
## Pulse Waveform



Please contact Littelfuse for reliability or FIT/MTBF data, the component's performance is dependent on the application's environmental conditions such as elevated ambient temperatures.

## 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) ( $t_s$ )      | 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) ( $t_s$ )      | 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              |
| <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     |

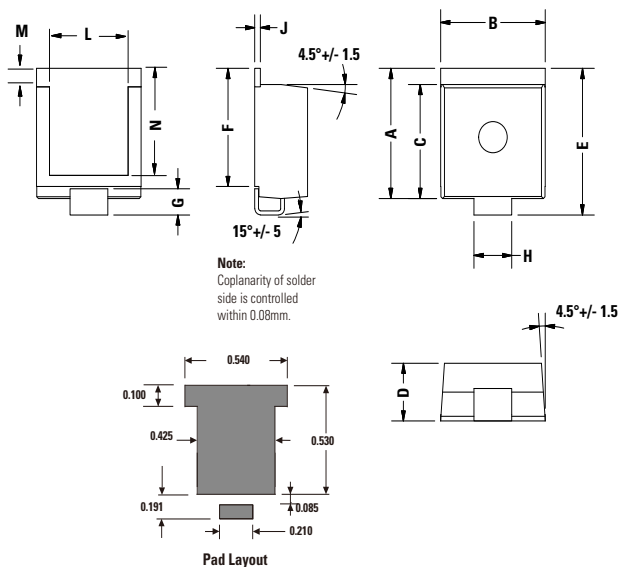
## Physical Specifications

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

## Environmental Specifications

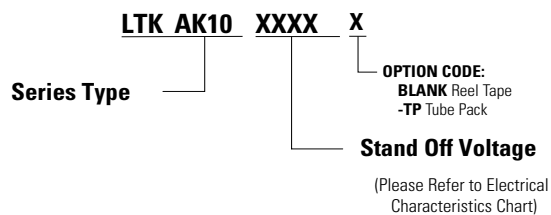
|                           |                           |
|---------------------------|---------------------------|
| <b>High Temp. Storage</b> | JESD22-A103               |
| <b>HTRB</b>               | JESD22-A108               |
| <b>MSL</b>                | JESDEC-J-STD-020, Level 1 |
| <b>H3TRB</b>              | JESD22-A101               |
| <b>RSH</b>                | JESD22-B106               |

## Dimensions — SMT0-218 Tab

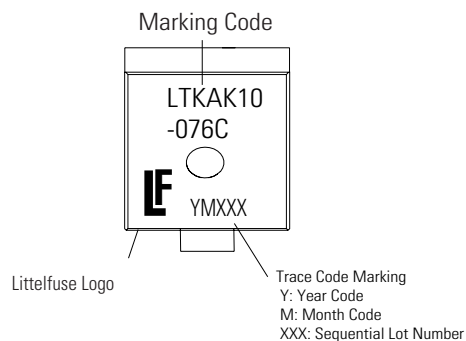


| Dimension | Inches |       | Millimeters |       |
|-----------|--------|-------|-------------|-------|
|           | Min    | Max   | Min         | Max   |
| <b>A</b>  | 0.621  | 0.655 | 15.78       | 16.63 |
| <b>B</b>  | 0.529  | 0.594 | 13.43       | 15.09 |
| <b>C</b>  | 0.544  | 0.561 | 13.83       | 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 |

### Part Numbering System



### Part Marking System



### Packaging

| Part Number     | Weight | Packing Mode                | Base Quantity |
|-----------------|--------|-----------------------------|---------------|
| LTKAK10-xxxC    | 4.34g  | Tape & Reel – 32mm/13" tape | 400           |
| LTKAK10-xxxC-TP | 4.34g  | Tube Pack                   | 100(25/Tube)  |

### Tape and Reel Specification

