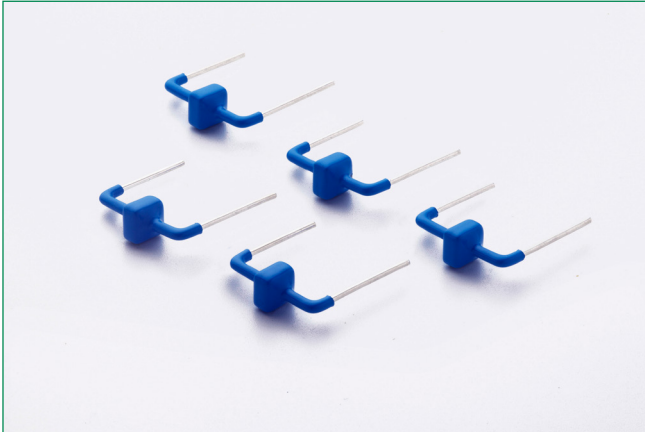


# AK3 Series

## Axial Leaded – 3kA



### Additional Information



Resources



Accessories



Samples

### Maximum Ratings and Thermal Characteristics

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

| Parameter                            | Symbol    | Value      | Unit             |
|--------------------------------------|-----------|------------|------------------|
| Operating Storage Temperature Range  | $T_{STG}$ | -55 to 150 | $^\circ\text{C}$ |
| Operating Junction Temperature Range | $T_J$     | -55 to 125 | $^\circ\text{C}$ |
| Current Rating <sup>1</sup>          | $I_{PP}$  | 3          | kA               |

**Note:**

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

### Description

The AK3 series of high power TVS diode is specially designed for meeting severe surge test environment of both AC and DC line protection applications. It features a very fast response and ultra low clamping characteristics over traditional metal oxide varistor (MOV) solutions. They can be connected in series and / or parallel to create a very high surge current protection solution.

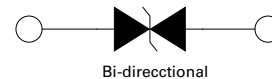
### Features & Benefits

- Very low clamping voltage
- Ultra compact: less than one-tenth the size of traditional solutions
- Sharp breakdown voltage
- Low slope resistance
- Bi-directional
- Foldbak™ technology for superior clamping factor
- Symmetric in leads width for easier soldering during assembly.
- IEC 61000-4-2 ESD 15kV(Air), 8kV (Contact)
- ESD protection of data lines in accordance with IEC 61000-4-2
- EFT protection of data lines in accordance with IEC 61000-4-4
- Halogen-free
- RoHS compliant
- Glass passivated junction
- Pb-free E4 means 2nd level interconnect is Pb-free and the terminal finish material is Silver

### Agency Approvals

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

### Functional Diagram



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

| Part Numbers | Part Marking | Standoff Voltage ( $V_{SO}$ ) Volts | Max. Reverse Leakage ( $I_R$ ) @ $V_{SO}$ $\mu\text{A}$ | Typical $I_R$ @ $85^\circ\text{C}$ ( $\mu\text{A}$ ) | Reverse Breakdown Voltage ( $V_{BR}$ ) @ $I_T$ |           | Test Current $I_T$ (mA) | Max. Clamping Voltage $V_{CL}$ @ $I_{PB}$ Peak Pulse Current ( $I_{PP}$ ) (Note 1) |               | Max. Temp Coefficient OF $V_{BR}$ (%/ $^\circ\text{C}$ ) | Max. Capacitance 0 Bias 10kHz (nF) | Agency Approval |
|--------------|--------------|-------------------------------------|---|--|--|-----------|-------------------------|--|---------------|--|------------------------------------|-----------------|
|              |              |                                     |   |  | Min Volts                                      | Max Volts |                         | $V_{CL}$ Volts   | $I_{PP}$ Amps |  |                                    |                 |
| AK3 - 015C   | 3 - 015C     | 15                                  | 10  | 15   | 16   | 19        | 10                      | 28   | 3,000         | 0.1  | 12.0                               | X               |
| AK3 - 030C   | 3 - 030C     | 30                                  | 10  | 15   | 32   | 37        | 10                      | 90   | 3,000         | 0.1  | 11.0                               | X               |
| AK3 - 038C   | 3 - 038C     | 38                                  | 10  | 15   | 40   | 46        | 10                      | 95   | 3,000         | 0.1  | 10.0                               | -               |
| AK3 - 058C   | 3 - 058C     | 58                                  | 10  | 15   | 64   | 70        | 10                      | 110  | 3,000         | 0.1  | 6.0                                | X               |
| AK3 - 066C   | 3 - 066C     | 66                                  | 10  | 15   | 72   | 80        | 10                      | 120  | 3,000         | 0.1  | 6.0                                | X               |
| AK3 - 076C   | 3 - 076C     | 76                                  | 10  | 15   | 85   | 95        | 10                      | 140  | 3,000         | 0.1  | 6.0                                | X               |
| AK3 - 150C   | 3 - 150C     | 150                                 | 10  | 15   | 158  | 194       | 10                      | 230  | 3,000         | 0.1  | 2.6                                | X               |
| AK3 - 170C   | 3 - 170C     | 170                                 | 10  | 15   | 179  | 220       | 10                      | 260  | 3,000         | 0.1  | 2.4                                | X               |
| AK3 - 190C   | 3 - 190C     | 190                                 | 10  | 15   | 200  | 245       | 10                      | 290  | 3,000         | 0.1  | 2.4                                | X               |
| AK3 - 208C   | 3 - 208C     | 208                                 | 10  | 15   | 223  | 246       | 10                      | 306  | 3,000         | 0.1  | 2.4                                | X               |
| AK3 - 380C   | 3 - 380C     | 380                                 | 10  | 15   | 401  | 443       | 10                      | 520  | 3,000         | 0.1  | 2.0                                | X               |
| AK3 - 430C   | 3 - 430C     | 430                                 | 10  | 15   | 440  | 490       | 10                      | 625  | 3,000         | 0.1  | 2.0                                | X               |

Note: 1. Using 8/20 $\mu\text{s}$  wave shape as defined in IEC 61000-4-5.

# AK3 Series

## Axial Leaded – 3kA

### Physical Specifications

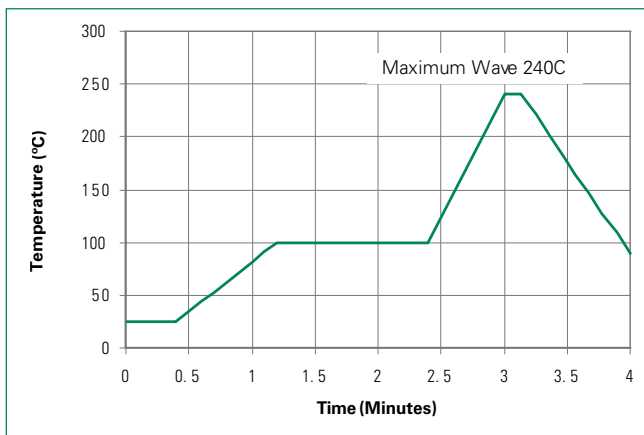
|                 |   |
|-----------------|---|
| <b>Weight</b>   | Contact manufacturer  |
| <b>Case</b>     | Epoxy encapsulated  |
| <b>Terminal</b> | Silver plated leads, solderable per MIL-STD-750 Method 2026 |

### Flow/Wave Soldering (Solder Dipping)

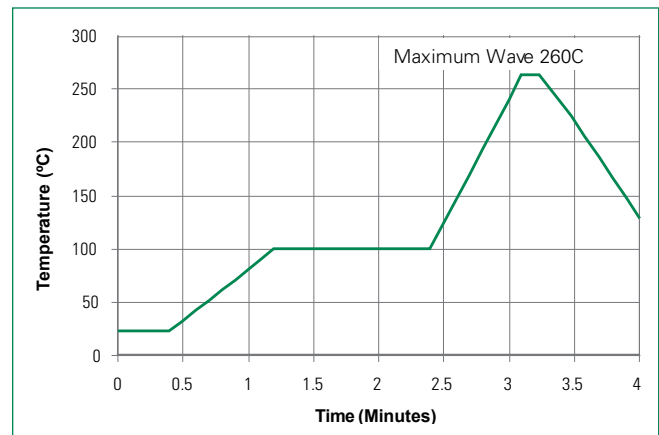
|                           |            |
|---------------------------|------------|
| <b>Peak Temperature :</b> | 265°C      |
| <b>Dipping Time :</b>     | 10 seconds |
| <b>Soldering :</b>        | 1 time     |

### Wave Solder Profile

**Figure 1:**  
Non Lead-free Profile

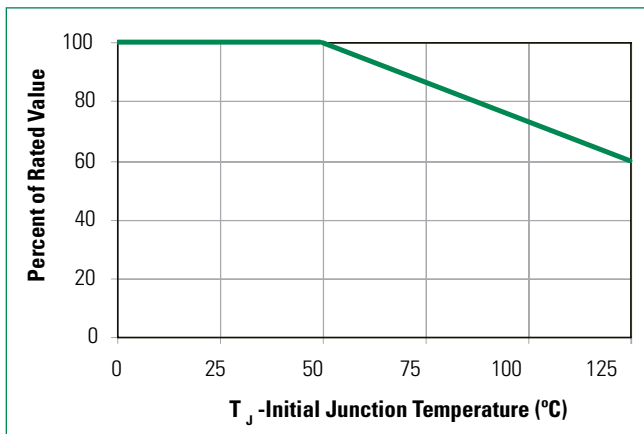


**Figure 2:**  
Lead-free Profile

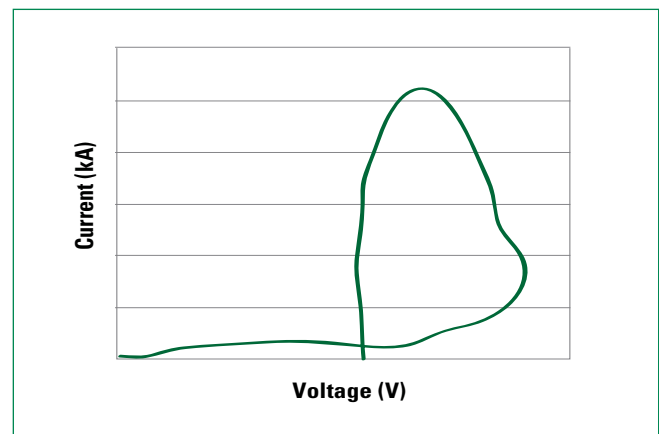


### Ratings and Characteristic Curves ( $T_A=25^\circ\text{C}$ unless otherwise noted)

**Figure 3:**  
Peak Power Derating



**Figure 4:**  
Surge Response

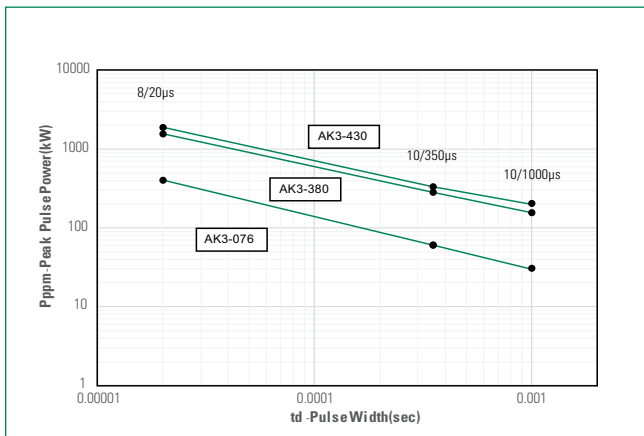


# AK3 Series

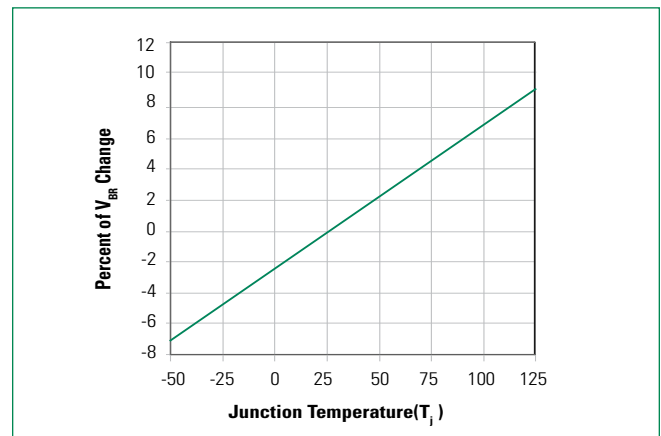
## Axial Leaded – 3kA

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

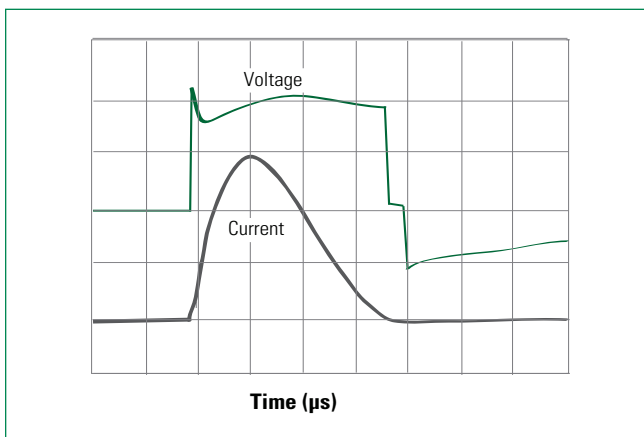
**Figure 5:**  
Typical Peak Pulse Power Rating Curve



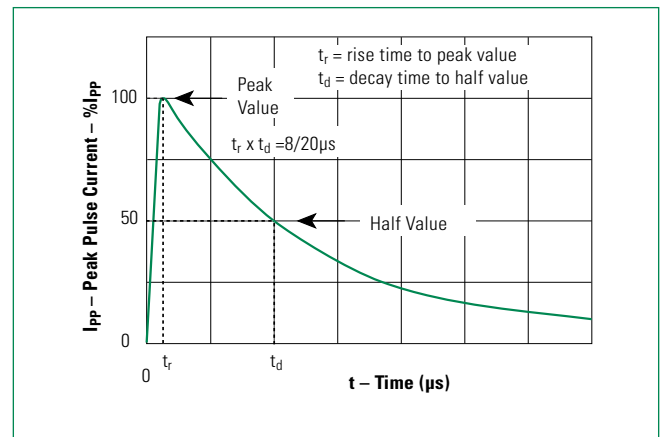
**Figure 6:**  
Typical  $V_{BR}$  Vs Junction Temperature



**Figure 7:**  
Surge Response (8/20 Surge current waveform)



**Figure 8:**  
Pulse Waveform

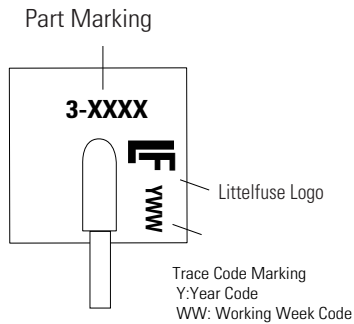


**Note:** The power dissipation causes a change in avalanche voltage during the surge and the avalanche voltage eventually returns to the original value when the transient has passed.

# AK3 Series

## Axial Leaded – 3kA

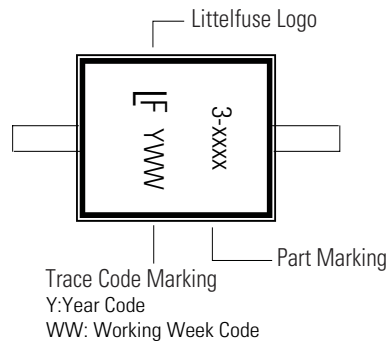
### Part Marking System



Apply to P/N listed below:

AK3-015C  
AK3-030C  
AK3-038C  
AK3-058C  
AK3-066C  
AK3-076C

Type 1- Side View

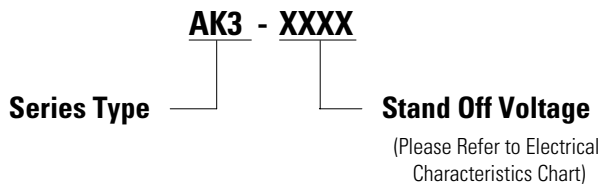


Apply to P/N listed below:

AK3-150C  
AK3-170C  
AK3-190C  
AK3-208C  
AK3-380C  
AK3-430C

Type 2 - Top View

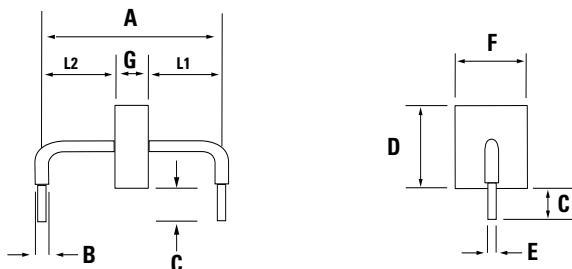
### Part Numbering System



### Packing Options

| Part Number | Component Package | Quantity  | Packaging Option |
|-------------|-------------------|-----------|------------------|
| AK3-XXXX    | AK Package        | 56pcs/Box | Bulk             |
| AK3-XXXX-12 | AK Package        | 12pcs/Box | Bulk             |

### Dimensions



| Dimensions | Inches                | Millimeters   |
|------------|-----------------------|---|
| A          | 0.951 +/- 0.040       | 24.15 +/- 1.00  |
| B          | 0.094 +/- 0.024       | 2.40 +/- 0.60   |
| C          | 0.236 +/- 0.039       | 6.00 +/- 1.00   |
| C          | -208C 0.145 +/- 0.040 | 3.68 +/- 1.00   |
| D          | 0.433 max.            | 11.0 max.   |
| E          | 0.050 +/- 0.002       | 1.27 +/- 0.05   |
| F          | 0.374 max.            | 9.50 max.   |
| G          | -015C                 | 0.093 +/- 0.039   |
|            | -030C/-038C/-066C     | 0.130 +/- 0.047   |
|            | -058C/-076C           | 0.168 +/- 0.047   |
|            | -150C                 | 0.383 +/- 0.047   |
|            | -170C/-190C           | 0.420 +/- 0.047   |
|            | -208C                 | 0.358 +/- 0.047   |
|            | -380C                 | 0.547 +/- 0.047   |
| L1         | -430C                 | 0.583 +/- 0.047   |
|            | -208C                 | 0.296 +/- 0.047   |
| L2         | -208C                 | L1 = L2 tolerance +/- 0.047 inch (+/- 1.20 mm)<br>= A - (G+L1) tolerance +/- 0.047 inch (+/- 1.20 mm) |
|            | -208C                 | L1 = L2 tolerance +/- 0.047 inch (+/- 1.20 mm)  |

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