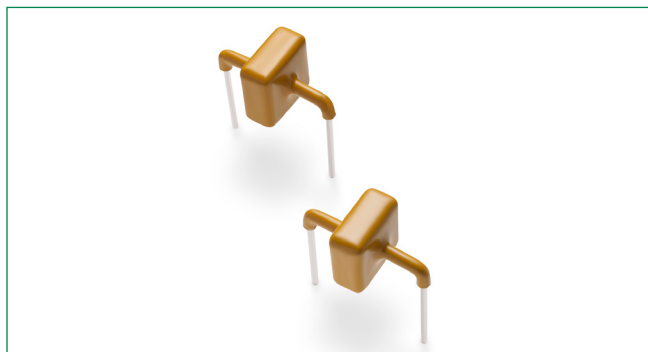


### AK15-Y Series



#### Agency Approvals

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

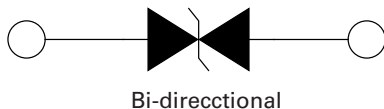
#### Maximum Ratings and Thermal Characteristics (T<sub>A</sub>=25°C unless otherwise noted)

| Parameter                            | Symbol           | Value      | Unit |
|--------------------------------------|------------------|------------|------|
| Operating Storage Temperature Range  | T <sub>STG</sub> | -55 to 150 | °C   |
| Operating Junction Temperature Range | T <sub>J</sub>   | -55 to 125 | °C   |
| Current Rating <sup>1</sup>          | I <sub>PP</sub>  | 15         | kA   |

**Note:**

1. Rated I<sub>PP</sub> measured with 8/20 pulse as defined in IEC 61000-4-5 2<sup>nd</sup> edition.

#### Functional Diagram



#### Descriptions

The AK15-Y 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 as compared to MOVs (Metal Oxide Varistors). It accomplishes this by virtue of the Littelfuse Foldback™ 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 maintained at a minimum magnitude, providing the best possible protection level. These AK components can be connected in series and / or parallel to create a very high surge current protection solution.

#### Features

- No wear-out nor degrade surge rating over multiple transient events as long as within surge capability
- Ultra high power rating
- Very low clamping voltage
- Both reflow and wave soldering capable
- Ultra compact: less than one-tenth the size of traditional discrete solutions
- Sharp breakdown voltage
- Low slope resistance
- Bi-directional
- Foldback technology for superior clamping factor
- Symmetric lead width for easy soldering during assembly
- IEC 61000-4-2 ESD 15 kV (air), 8 kV (contact) rating
- Lightning, 15 kA (8/20 as defined in IEC 61000-4-5 2<sup>nd</sup> Edition)
- EFT protection of data lines in accordance with IEC 61000-4-4
- Halogen-free and RoHS compliant
- Glass passivated junction
- Pb-free E4 means 2<sup>nd</sup> level interconnect is Pb-free and the terminal finish material is silver (IPC/JEDEC J-STD-609A.01)

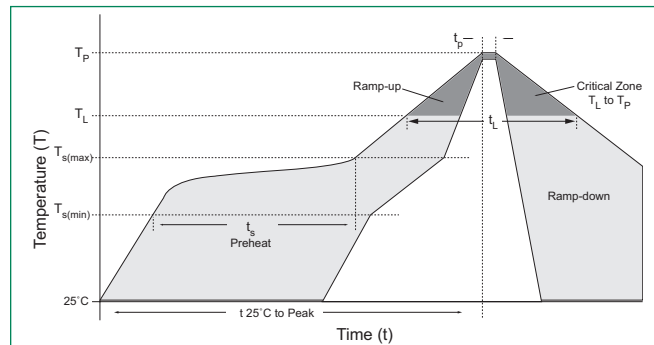
#### Electrical Characteristics (T<sub>A</sub>=25°C unless otherwise noted)

| Part Numbers | Part Marking | Standoff Voltage (V <sub>SO</sub> ) Volts | Max. Reverse Leakage (I <sub>R</sub> ) @ V <sub>SO</sub> (μA) | Typical I <sub>R</sub> @ 85°C (μA) | Reverse Breakdown Voltage (V <sub>BR</sub> ) @ I <sub>T</sub> |           | Test Current I <sub>T</sub> (mA) | 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 |                                  | V <sub>CL</sub> Volts                                                         | I <sub>PP</sub> (8/20μs) (A) | I <sub>PP</sub> (10/350μs) (A) |                                                 |                                     |                                                                                                       |
| AK15-058C-Y  | 15-058C      | 58                                        | 10                                                            | 15                                 | 64                                                            | 70        | 10                               | 110                                                                           | 15,000                       | 2,000                          | 0.1                                             | 16                                  | X                                                                                                     |
| AK15-066C-Y  | 15-066C      | 66                                        | 10                                                            | 15                                 | 72                                                            | 80        | 10                               | 120                                                                           | 15,000                       | 2,000                          | 0.1                                             | 12                                  | X                                                                                                     |
| AK15-076C-Y  | 15-076C      | 76                                        | 10                                                            | 15                                 | 85                                                            | 95        | 10                               | 150                                                                           | 15,000                       | 2,000                          | 0.1                                             | 12                                  | X                                                                                                     |
| AK15-190C-Y  | 15-190C      | 190                                       | 10                                                            | 15                                 | 200                                                           | 245       | 10                               | 290                                                                           | 15,000                       | 1,500                          | 0.1                                             | 5                                   | X                                                                                                     |

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

### Soldering Parameters

| Reflow Condition                                       |                                    | Lead-free assembly      |
|--------------------------------------------------------|------------------------------------|-------------------------|
| Pre Heat                                               | - Temperature Min ( $T_{s(min)}$ ) | 150°C                   |
|                                                        | - Temperature Max ( $T_{s(max)}$ ) | 200°C                   |
|                                                        | - Time (min to max) ( $t_s$ )      | 60 – 120 secs           |
| Average ramp up rate (Liquidus Temp ( $T_L$ ) to peak) |                                    | 3°C/second max          |
| $T_{s(max)}$ to $T_L$ - Ramp-up Rate                   |                                    | 3°C/second max          |
| Reflow                                                 | - Temperature ( $T_L$ ) (Liquidus) | 217°C                   |
|                                                        | - Time (min to max) ( $t_s$ )      | 60 – 150 seconds        |
| Peak Temperature ( $T_p$ )                             |                                    | 260 <sup>+0/-5</sup> °C |
| Time within 5°C of actual peak Temperature ( $t_p$ )   |                                    | 30 seconds max          |
| Ramp-down Rate                                         |                                    | 6°C/second max          |
| Time 25°C to peak Temperature ( $T_p$ )                |                                    | 8 minutes max.          |
| Do not exceed                                          |                                    | 260°C                   |

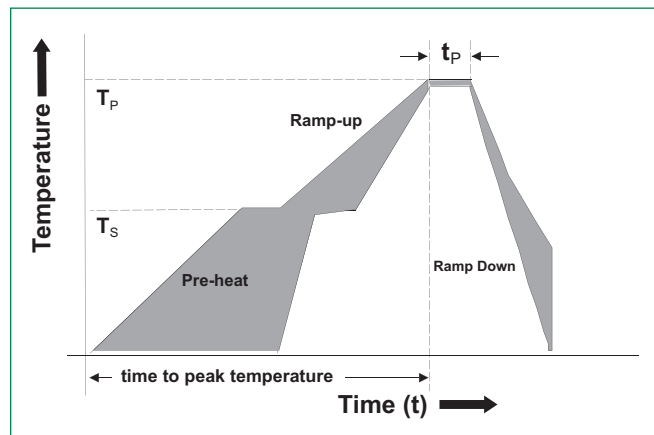


### Physical Specifications

|                 |                                                             |
|-----------------|-------------------------------------------------------------|
| <b>Weight</b>   | Contact manufacturer                                        |
| <b>Case</b>     | UL Recognized compound meeting flammability rating V-0      |
| <b>Terminal</b> | Silver plated leads, solderable per MIL-STD-750 Method 2026 |

### Flow Soldering (Solder Dipping)

| Wave soldering condition                            |                       | Pb - Free assembly      |
|-----------------------------------------------------|-----------------------|-------------------------|
| Pre Heat                                            | - Temperature Min     | 140°C                   |
|                                                     | - Temperature Max     | 160°C                   |
|                                                     | Time to Pre-Heat Temp | 60-150 seconds          |
| Average ramp up rate to Pre-Heat Temp               |                       | 5°C/second max          |
| Peak Temperature                                    |                       | 260 <sup>+0/-5</sup> °C |
| Average ramp up rate (Tpre-heat to T <sub>p</sub> ) |                       | 5°C/second max          |
| Time within actual peak Temperature Max             |                       | 6 seconds               |
| Ramp-down Rate                                      |                       | 5°C/second max          |



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

Figure 1- Peak Power Derating

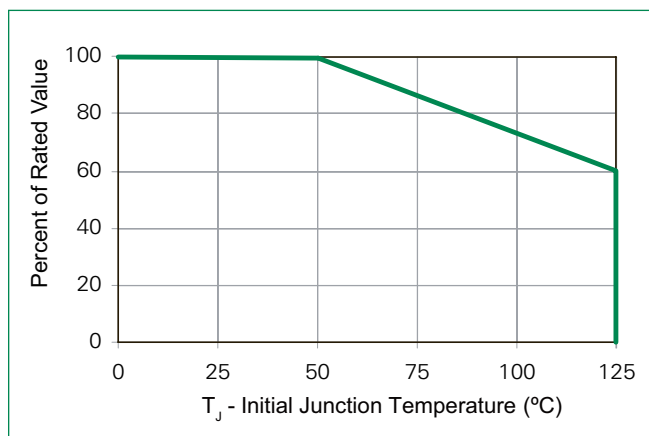
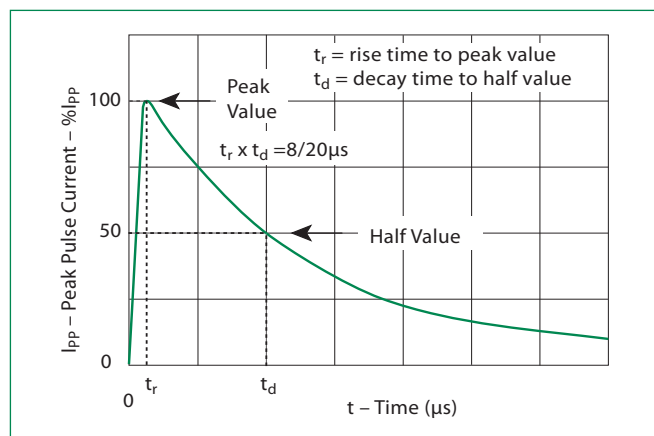
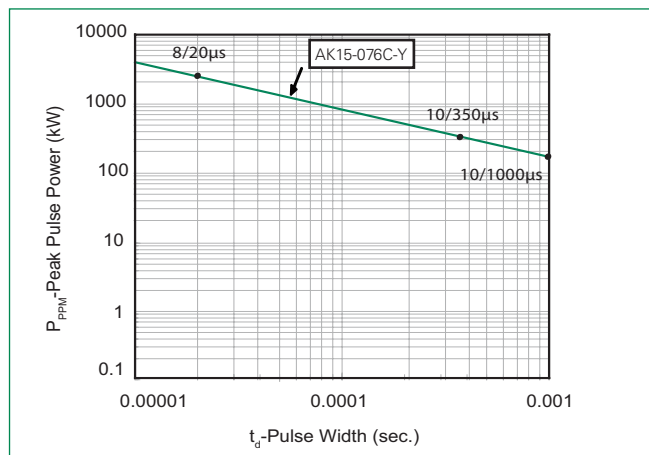


Figure 2 - Pulse Waveform

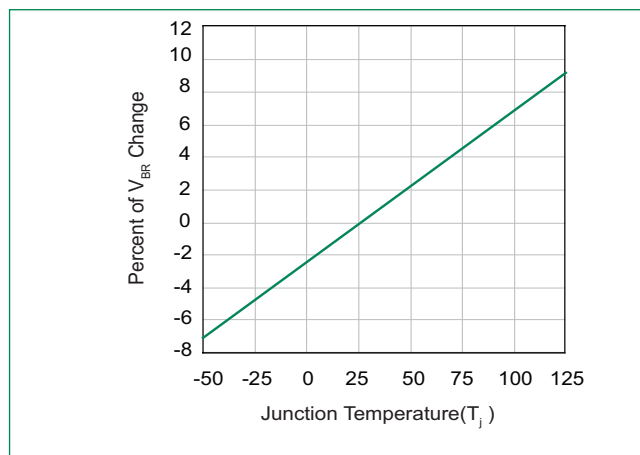


### Ratings and Characteristic Curves ( $T_A=25^\circ\text{C}$ unless otherwise noted) (Continued)

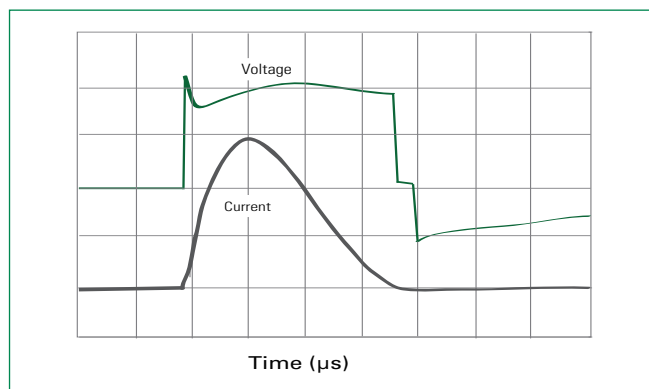
**Figure 3 - Typical Peak Pulse Power Rating Curve**



**Figure 4 - Typical  $V_{BR}$  Vs Junction Temperature**

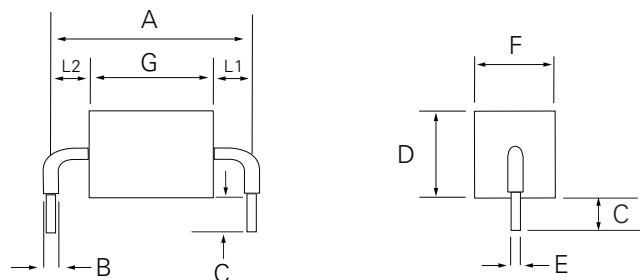


**Figure 5 - Surge Response (8/20 Surge current waveform)**



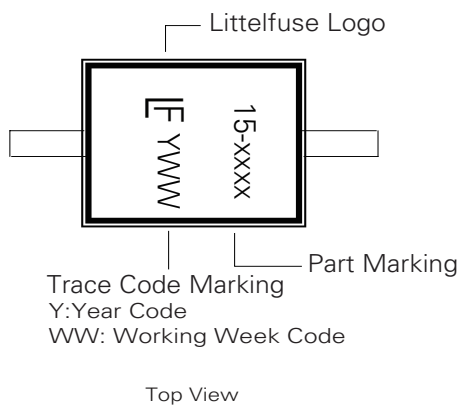
Note: The power dissipation causes a change in avalanche voltage during the surge and the avalanche voltage eventually returns to the original value when the transient has passed.

### Dimensions

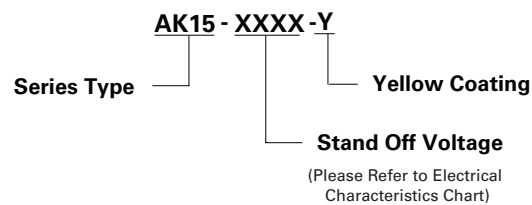


| Dimensions      | Inches                                  | Millimeters |
|-----------------|-----------------------------------------|-------------|
| A               | 0.95±0.03                               | 24.15±0.8   |
| B               | 0.095±0.024                             | 2.4±0.60    |
| C               | 0.236±0.04                              | 6.00±1.0    |
| D               | 0.630±0.055                             | 16.0±1.4    |
| E               | 0.050±0.002                             | 1.27±0.05   |
| F               | 0.571±0.055                             | 14.5±1.4    |
| G - 058C-Y      | 0.292±0.047                             | 7.41±1.20   |
| G - 066C/076C-Y | 0.351±0.047                             | 8.91±1.20   |
| G - 190C-Y      | 0.362±0.04                              | 9.2±1.00    |
| L1/L2           | L1= L2 tolerance +/- 0.04 inch (1.0 mm) |             |

### Part Marking System



### Part Numbering System



### Packing Options

| Part Number   | Component Package | Quantity  | Packaging Option |
|---------------|-------------------|-----------|------------------|
| AK15-XXXX-Y   | AK Package        | 56pcs/Box | Bulk             |
| AK15-XXXX-Y12 | AK Package        | 12pcs/Box | Bulk             |

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