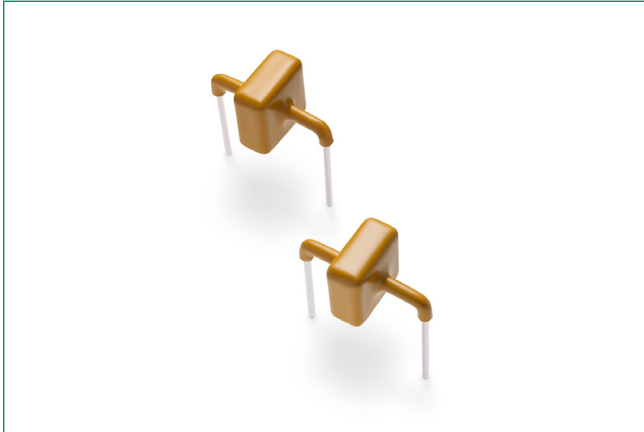


AK6-Y Series

Axial Leaded – 6kA



Agency Recognitions

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

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 ¹ | I_{PP} | 6 | kA |

Note:

1. Rated I_{PP} measured with 8/20 μs pulse.

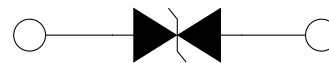
Description

The AK6-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 & Benefits

- Recognized to UL 497B as an Isolated Loop Circuit Protector
- Both reflow and wave soldering capable
- Very low clamping voltage
- 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 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 and RoHS compliant
- Glass passivated junction
- Pb-free E4 means 2nd level interconnect is Pb-free and the terminal finish material is silver

Functional Diagram



Bi-directional

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} μA | Typical I_R @ 85°C (μA) | Reverse Breakdown Voltage (V_{BR}) @ I_T | | Test Current I_T (mA) | Max. Clamping Voltage V_{CL} @ I_{PP} 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 | | | |
| AK6-030C-Y | 6-030C | 30 | 10 | 15 | 32 | 37 | 10 | 90 | 6,000 | 0.1 | 11.0 | X |
| AK6-058C-Y | 6-058C | 58 | 10 | 15 | 64 | 70 | 10 | 110 | 6,000 | 0.1 | 8.0 | X |
| AK6-066C-Y | 6-066C | 66 | 10 | 15 | 72 | 80 | 10 | 120 | 6,000 | 0.1 | 6.0 | X |
| AK6-076C-Y | 6-076C | 76 | 10 | 15 | 85 | 95 | 10 | 140 | 6,000 | 0.1 | 6.5 | X |
| AK6-170C-Y | 6-170C | 170 | 10 | 15 | 180 | 220 | 10 | 260 | 6,000 | 0.1 | 2.8 | X |
| AK6-190C-Y | 6-190C | 190 | 10 | 15 | 200 | 245 | 10 | 290 | 6,000 | 0.1 | 2.5 | X |
| AK6-240C-Y | 6-240C | 240 | 10 | 15 | 250 | 285 | 10 | 340 | 6,000 | 0.1 | 2.0 | X |
| AK6-270C-Y | 6-270C | 270 | 10 | 15 | 280 | 320 | 10 | 380 | 6,000 | 0.1 | 1.6 | X |
| AK6-380C-Y | 6-380C | 380 | 10 | 15 | 401 | 443 | 10 | 520 | 6,000 | 0.1 | 1.4 | X |
| AK6-430C-Y | 6-430C | 430 | 10 | 15 | 440 | 490 | 10 | 625 | 6,000 | 0.1 | 1.0 | X |

Note: Using 8/20 μs wave shape as defined in IEC 61000-4-5.

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Figure 1 - Peak Power Derating

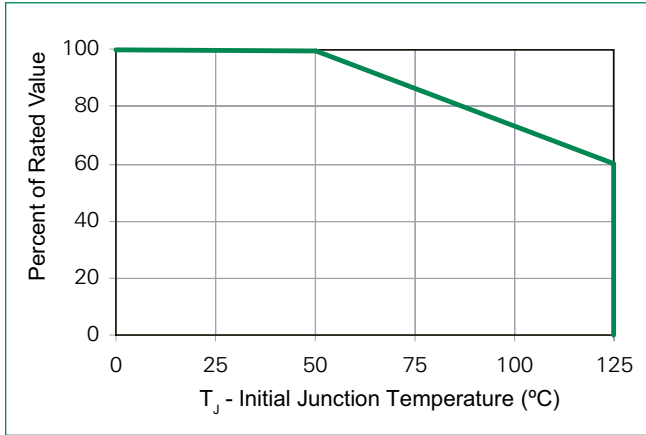


Figure 2 - Pulse Waveform

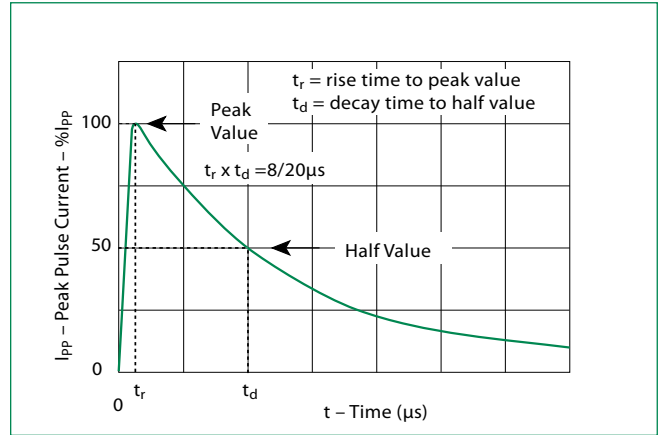


Figure 3 - Typical Peak Pulse Power Rating Curve

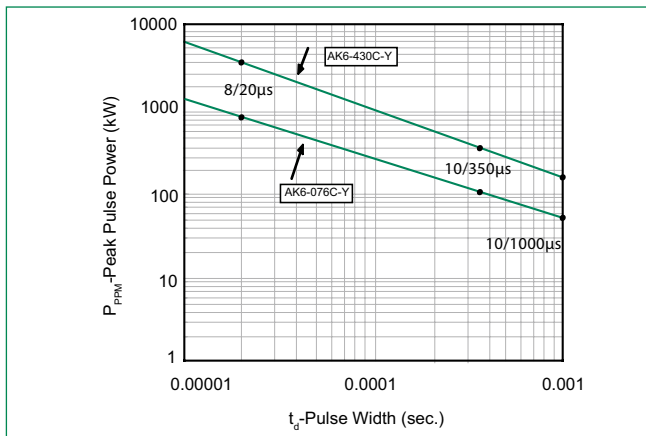


Figure 4 - Typical VBR Vs Junction Temperature

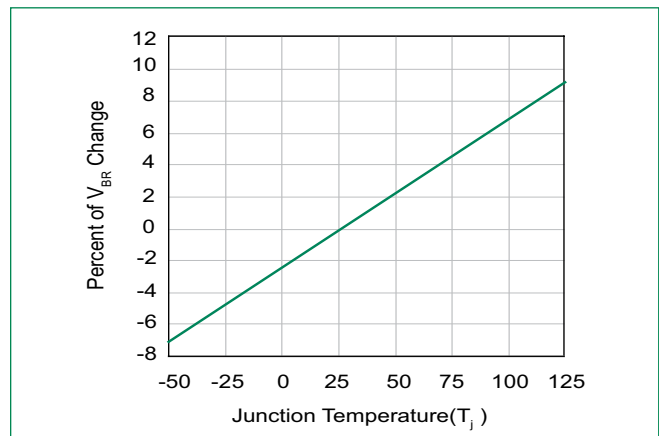
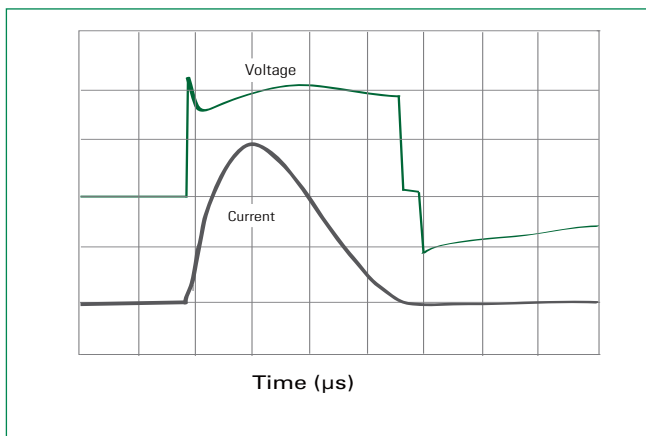


Figure 5 - Surge Response (8/20 Surge current waveform)



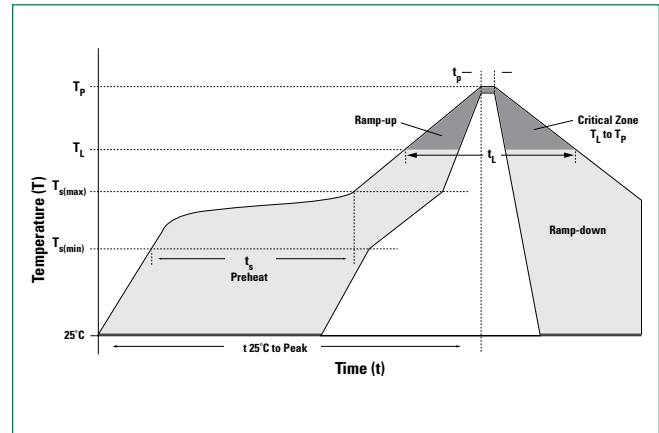
Note: The power dissipation causes a change in avalanche voltage during the surge and the avalanche voltage eventually returns to the original value when the transient has passed.

AK6-Y Series

Axial Leaded – 6kA

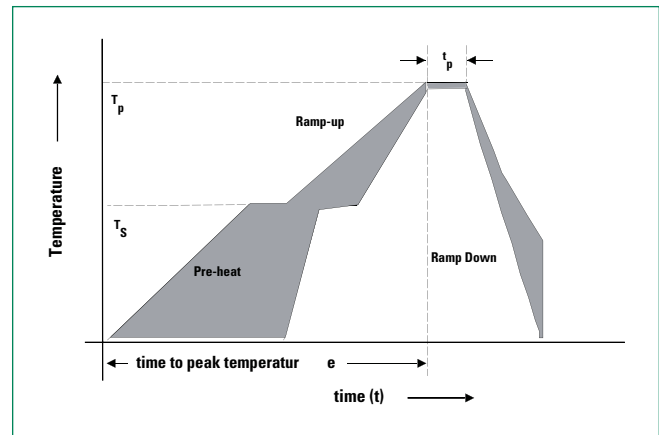
Soldering Parameters

| | | |
|--|------------------------------------|-------------------------|
| 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_A - 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 ^{+0/-5} °C |
| Time within 5°C of actual peak Temperature (t_p) | | 30 seconds |
| Ramp-down Rate | | 6°C/second max |
| Time 25°C to peak Temperature (T_p) | | 8 minutes Max. |
| Do not exceed | | 260°C |



Flow Soldering (Solder Dipping)

| | | |
|--|------------------------------------|-------------------------|
| Reflow Condition | | Lead-free assembly |
| Pre Heat | - Temperature Min ($T_{s(min)}$) | 140°C |
| | - Temperature Max ($T_{s(max)}$) | 160°C |
| | - Time to Pre-Heat Temp | 60 – 150 secs |
| Average ramp up rate to Pre-Heat Temp | | 5°C/second max |
| Peak Temperature (T_p) | | 260 ^{+0/-5} °C |
| Average ramp up rate (pre-heat to T_p) | | 5°C/second max |
| Time within actual peak Temperature Max | | 6 seconds |
| Ramp-down Rate | | 5°C/second max |

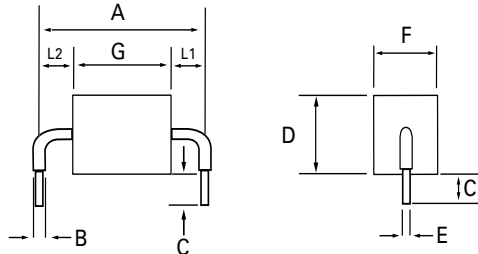


Physical Specifications

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

AK6-Y Series

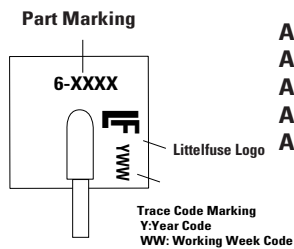
Axial Leaded – 6kA



Dimensions

| Dimensions | Inches | Millimeters |
|-----------------------------|---|----------------|
| A | 0.950 +/- 0.040 | 24.15 +/- 1.00 |
| B | 0.095 +/- 0.024 | 2.4 +/- 0.60 |
| C | 0.236 +/- 0.040 | 6.00 +/- 1.00 |
| D | 0.570 max. | 14.48 max. |
| E | 0.050 +/- 0.002 | 1.270 +/- 0.05 |
| F | 0.500 max. | 12.70 max. |
| G - 030C-Y | 0.161 +/- 0.040 | 4.10 +/- 1.00 |
| G - 058C-Y/066C-Y 076C-Y | 0.189 +/- 0.040 | 4.8 +/- 1.00 |
| G - 170C-Y/190C-Y | 0.320 +/- 0.040 | 8.13 +/- 1.00 |
| G - 240C-Y | 0.370 +/- 0.040 | 9.4 +/- 1.00 |
| G - 380C-Y/430C-Y | 0.543 +/- 0.040 | 13.8 +/- 1.00 |
| L1/L2 | L1= L2 tolerance +/- 0.04 inch (1.0 mm) | |

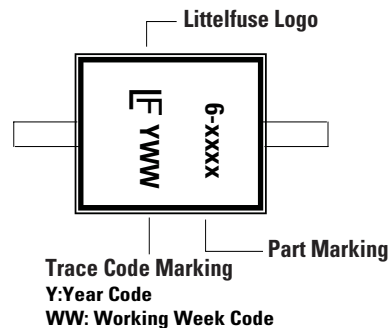
Part Marking System



Type 1- Side View

Apply to P/N listed below:

AK6-030C-Y
AK6-058C-Y
AK6-066C-Y
AK6-076C-Y

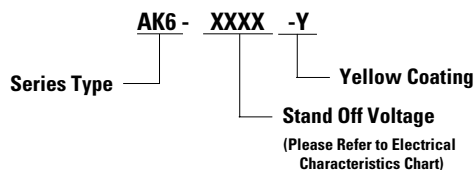


Type 2 - Top View

Apply to P/N listed below:

AK6-170C-Y
AK6-190C-Y
AK6-240C-Y
AK6-380C-Y
AK6-430C-Y

Part Numbering System



Packing Options

| Part Number | Component Package | Quantity | Packaging Option |
|---------------|-------------------|-----------|------------------|
| AK6-XXXX-Y | AK Package | 56pcs/Box | Bulk |
| AK6-XXXX-Y-12 | AK Package | 12pcs/Box | Bulk |

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