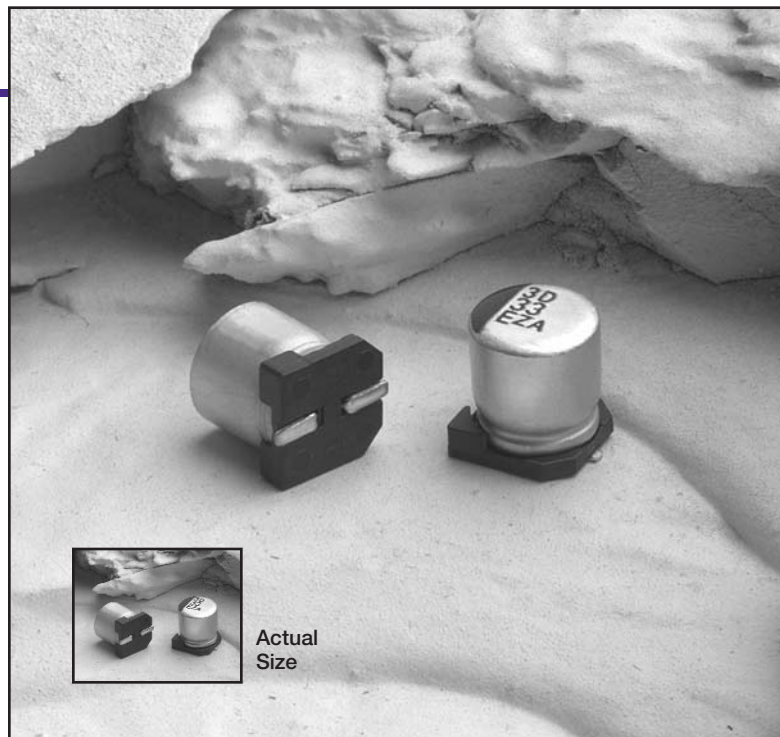


# MZA Series

**NEW SERIES**  
Engineering Bulletin Oct 03



- **Surface Mount**
- **Lowest Impedance**
- **Lead-Free Construction**
- **Solvent Proof**
- **+105°C Maximum Temperature**



The MZA series is United Chemi-Con's lowest impedance vertical surface mount capacitor series. These low impedance capacitors are also constructed of lead-free materials and can withstand high temperature, lead-free alloy reflow soldering. The MZA series has a wide temperature range of  $-55^{\circ}\text{C}$  to  $+105^{\circ}\text{C}$  with a rated lifetime of 2,000 hours at  $+105^{\circ}\text{C}$ . Available in low profile case sizes ranging from  $\varnothing 4 \times 5.8\text{mm}$  to  $\varnothing 10 \times 10\text{mm}$ , the MZA series is suitable for general purpose applications where miniaturization and Pb-free requirements exist.

The MZA series capacitors are solvent proof. Refer to the Mini-Glossary for cleaning guidelines and recommended cleaning agents that are compatible with United Chemi-Con products.

## Summary of Specifications

- **Surface mount terminals.**
- **Capacitance range: 4.7 to 1,500 $\mu\text{F}$ .**
- **Voltage range: 6.3 to 50VDC.**
- **Category temperature range:  $-55^{\circ}\text{C}$  to  $+105^{\circ}\text{C}$ .**
- **Leakage current: 0.01CV or 3 $\mu\text{A}$ , whichever is greater, after 2 minutes at  $+20^{\circ}\text{C}$ .**
- **Standard capacitance tolerance:  $\pm 20\%$**
- **Nominal case size (D  $\times$  L): 4  $\times$  5.8mm to 10  $\times$  10mm.**
- **Rated lifetime: 2,000 hours at  $+105^{\circ}\text{C}$ .**

## MZA Specifications

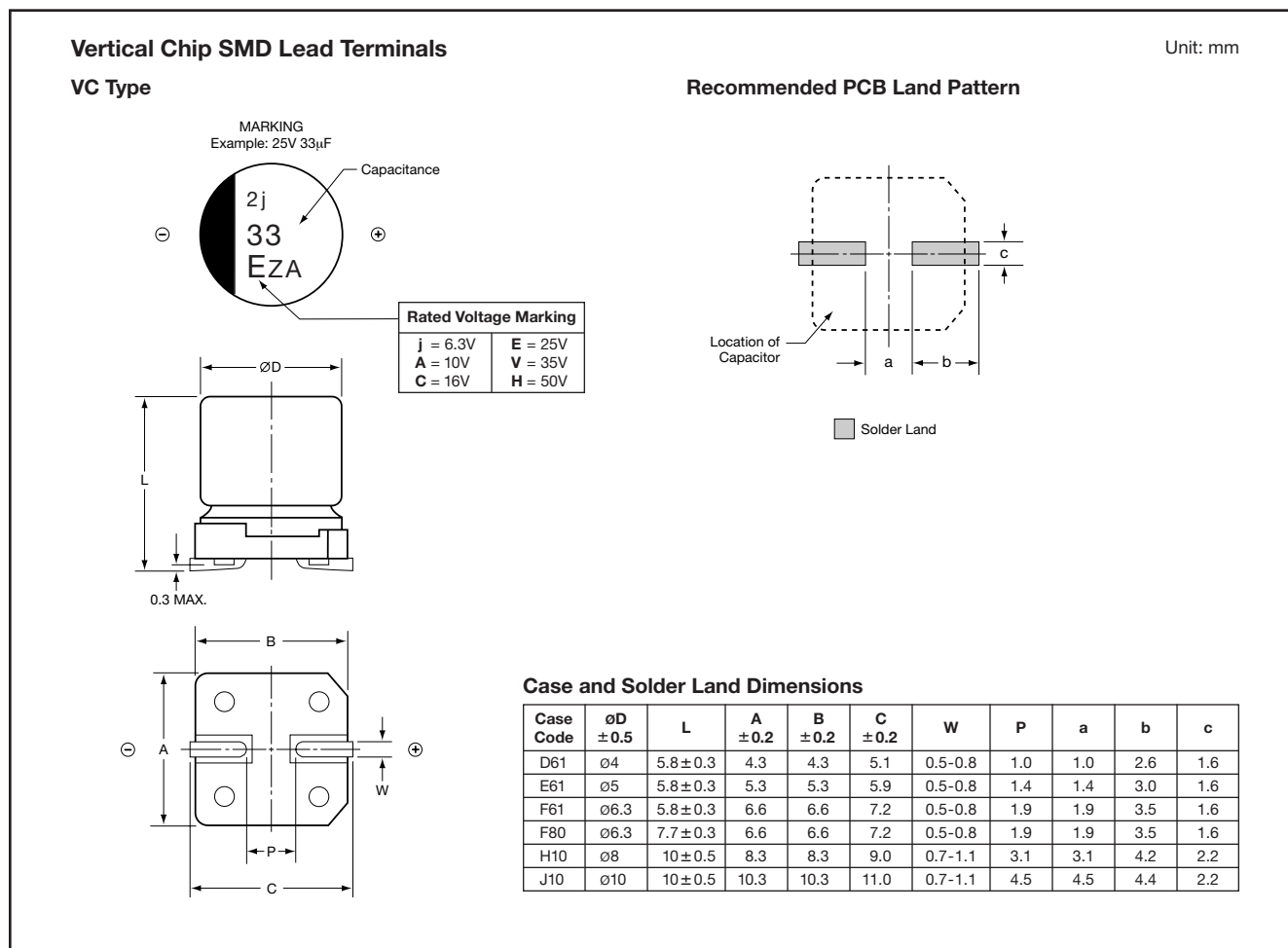
| Item                            | Characteristics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                   |      |      |      |      |    |    |                       |      |      |      |      |      |      |                       |   |   |   |   |   |   |                       |   |   |   |   |   |   |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|------|------|------|------|----|----|-----------------------|------|------|------|------|------|------|-----------------------|---|---|---|---|---|---|-----------------------|---|---|---|---|---|---|
| Category Temperature Range      | – 55 to +105°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                   |      |      |      |      |    |    |                       |      |      |      |      |      |      |                       |   |   |   |   |   |   |                       |   |   |   |   |   |   |
| Rated Voltage Range             | 6.3 to 50VDC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                   |      |      |      |      |    |    |                       |      |      |      |      |      |      |                       |   |   |   |   |   |   |                       |   |   |   |   |   |   |
| Capacitance Range               | 4.7 to 1,500μF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                   |      |      |      |      |    |    |                       |      |      |      |      |      |      |                       |   |   |   |   |   |   |                       |   |   |   |   |   |   |
| Capacitance Tolerance           | ± 20% (M) at +20°C, 120Hz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                   |      |      |      |      |    |    |                       |      |      |      |      |      |      |                       |   |   |   |   |   |   |                       |   |   |   |   |   |   |
| Leakage Current                 | I = 0.01CV or 3μA, whichever is greater, after 2 minutes at +20°C.<br>Where I = Max. leakage current (μA), C = Nominal capacitance (μF) and V = Rated voltage (V)                                                                                                                                                                                                                                                                                                                                                                                                |                   |      |      |      |      |    |    |                       |      |      |      |      |      |      |                       |   |   |   |   |   |   |                       |   |   |   |   |   |   |
| Dissipation Factor (Tan δ)      | At +20°C, 120Hz <table><tr><td>Rated Voltage (V)</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td></tr><tr><td>Tan δ (DF)</td><td>0.26</td><td>0.19</td><td>0.16</td><td>0.14</td><td>0.12</td><td>0.10</td></tr></table>                                                                                                                                                                                                                                                                                                                  | Rated Voltage (V) | 6.3  | 10   | 16   | 25   | 35 | 50 | Tan δ (DF)            | 0.26 | 0.19 | 0.16 | 0.14 | 0.12 | 0.10 |                       |   |   |   |   |   |   |                       |   |   |   |   |   |   |
| Rated Voltage (V)               | 6.3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 10                | 16   | 25   | 35   | 50   |    |    |                       |      |      |      |      |      |      |                       |   |   |   |   |   |   |                       |   |   |   |   |   |   |
| Tan δ (DF)                      | 0.26                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 0.19              | 0.16 | 0.14 | 0.12 | 0.10 |    |    |                       |      |      |      |      |      |      |                       |   |   |   |   |   |   |                       |   |   |   |   |   |   |
| Low Temperature Characteristics | At 120Hz, impedance (Z) ratio between the – 25°C, – 40°C or – 55°C value and +20°C value shall not exceed the values given below. <table><tr><td>Rated Voltage (V)</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td></tr><tr><td>Z (–25°C) / Z (+20°C)</td><td>2</td><td>2</td><td>2</td><td>2</td><td>2</td><td>2</td></tr><tr><td>Z (–40°C) / Z (+20°C)</td><td>3</td><td>3</td><td>3</td><td>3</td><td>3</td><td>3</td></tr><tr><td>Z (–55°C) / Z (+20°C)</td><td>4</td><td>4</td><td>4</td><td>3</td><td>3</td><td>3</td></tr></table> | Rated Voltage (V) | 6.3  | 10   | 16   | 25   | 35 | 50 | Z (–25°C) / Z (+20°C) | 2    | 2    | 2    | 2    | 2    | 2    | Z (–40°C) / Z (+20°C) | 3 | 3 | 3 | 3 | 3 | 3 | Z (–55°C) / Z (+20°C) | 4 | 4 | 4 | 3 | 3 | 3 |
| Rated Voltage (V)               | 6.3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 10                | 16   | 25   | 35   | 50   |    |    |                       |      |      |      |      |      |      |                       |   |   |   |   |   |   |                       |   |   |   |   |   |   |
| Z (–25°C) / Z (+20°C)           | 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2                 | 2    | 2    | 2    | 2    |    |    |                       |      |      |      |      |      |      |                       |   |   |   |   |   |   |                       |   |   |   |   |   |   |
| Z (–40°C) / Z (+20°C)           | 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 3                 | 3    | 3    | 3    | 3    |    |    |                       |      |      |      |      |      |      |                       |   |   |   |   |   |   |                       |   |   |   |   |   |   |
| Z (–55°C) / Z (+20°C)           | 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 4                 | 4    | 3    | 3    | 3    |    |    |                       |      |      |      |      |      |      |                       |   |   |   |   |   |   |                       |   |   |   |   |   |   |
| Endurance (Load Life)           | The following specifications shall be satisfied when the capacitors are restored to +20°C after subjecting them to the DC rated voltage for 2,000 hours at +105°C.<br><br>Capacitance change: ≤ ± 30% of initial measured value<br>Tan δ (DF) : ≤ 200% of initial specified value<br>Leakage current : ≤ initial specified value                                                                                                                                                                                                                                 |                   |      |      |      |      |    |    |                       |      |      |      |      |      |      |                       |   |   |   |   |   |   |                       |   |   |   |   |   |   |
| Shelf Life                      | The following specifications shall be satisfied when the capacitors are restored to +20°C after exposing them for 1,000 hours at +105°C without voltage applied. The rated voltage shall be applied to the capacitors for a minimum of 30 minutes, at least 24 hours and not more than 48 hours before the measurements.<br><br>Capacitance change: ≤ ± 30% of initial measured value<br>Tan δ (DF) : ≤ 300% of initial specified value<br>Leakage current : ≤ initial specified value                                                                           |                   |      |      |      |      |    |    |                       |      |      |      |      |      |      |                       |   |   |   |   |   |   |                       |   |   |   |   |   |   |

## Part Numbering System for MZA Series

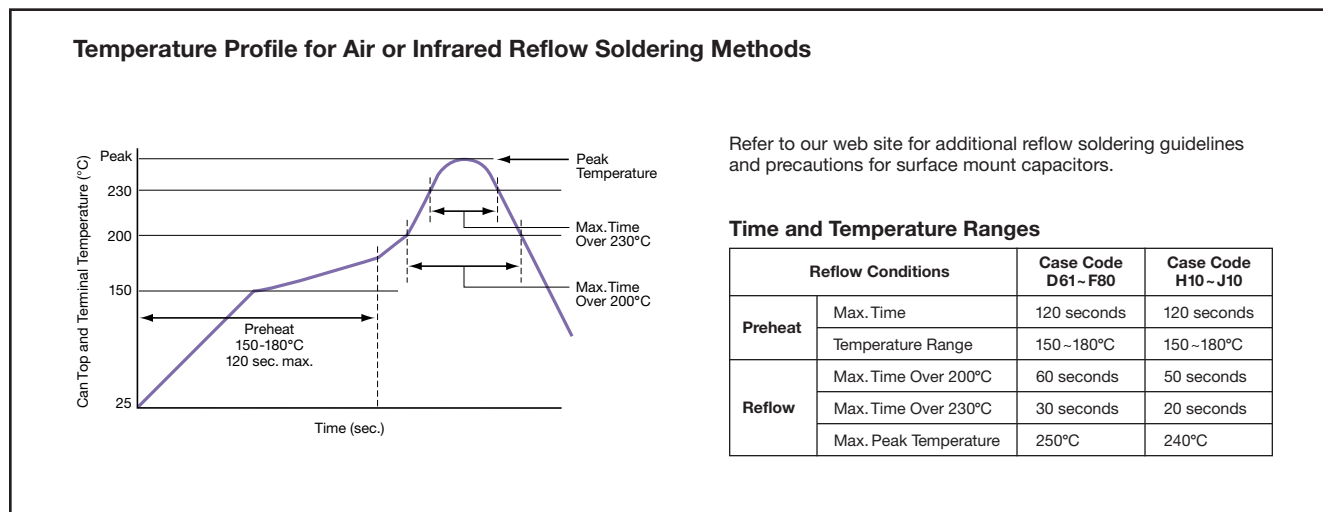
When ordering, always specify complete catalog number for MZA Series.

|            |           |           |            |          |            |           |                                                                                                                                                                                                                                                                                                                                       |
|------------|-----------|-----------|------------|----------|------------|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>MZA</b> | <b>25</b> | <b>VC</b> | <b>33R</b> | <b>M</b> | <b>E61</b> | <b>TP</b> |                                                                                                                                                                                                                                                                                                                                       |
|            |           |           |            |          |            |           | Packaging: TP = Standard Taping. Refer to our web site for taping and reel specifications.                                                                                                                                                                                                                                            |
|            |           |           |            |          |            |           | Case Code: See Case Sizes in Tables.                                                                                                                                                                                                                                                                                                  |
|            |           |           |            |          |            |           | Capacitance Tolerance: M = ± 20%                                                                                                                                                                                                                                                                                                      |
|            |           |           |            |          |            |           | Capacitance Value: Expressed in Microfarads. The first two digits are significant figures, and the third digit indicates the number of zeros for capacitance of 100μF or more. R indicates the decimal point for capacitance less than 100μF (e.g. R33 = .33μF; 3R3 = 3.3μF; 33R = 33μF; 331 = 330μF; 332 = 3,300μF; 333 = 33,000μF). |
|            |           |           |            |          |            |           | Lead Configuration: VC = Vertical Chip, 2 SMD Terminals.                                                                                                                                                                                                                                                                              |
|            |           |           |            |          |            |           | DC Rated Voltage: Expressed in Volts (e.g. 25 = 25WVDC).                                                                                                                                                                                                                                                                              |
|            |           |           |            |          |            |           | Series Name: Indicates Basic Capacitor Design.                                                                                                                                                                                                                                                                                        |

## Diagram of Dimensions



## Recommended Reflow Soldering Conditions



## Standard Voltage Ratings - Surface Mount

| Rated Voltage (WVDC)              | Capacitance (μF) | Catalog Part Number | Nominal Case Size* D × L (mm) | Case Code | Maximum Impedance (Ω) at +20°C, 100kHz | Rated Ripple Current (mA rms) at +105°C, 100kHz |
|-----------------------------------|------------------|---------------------|-------------------------------|-----------|----------------------------------------|-------------------------------------------------|
| <b>6.3 Volts</b><br>8 Volts Surge | 22               | MZA6.3VC22RMD61TP   | 4 × 5.8                       | D61       | 1.35                                   | 90                                              |
|                                   | 47               | MZA6.3VC47RMD61TP   | 4 × 5.8                       | D61       | 1.35                                   | 90                                              |
|                                   | 47               | MZA6.3VC47RME61TP   | 5 × 5.8                       | E61       | 0.70                                   | 160                                             |
|                                   | 100              | MZA6.3VC101ME61TP   | 5 × 5.8                       | E61       | 0.70                                   | 160                                             |
|                                   | 100              | MZA6.3VC101MF61TP   | 6.3 × 5.8                     | F61       | 0.36                                   | 240                                             |
|                                   | 220              | MZA6.3VC221MF61TP   | 6.3 × 5.8                     | F61       | 0.36                                   | 240                                             |
|                                   | 330              | MZA6.3VC331MF80TP   | 6.3 × 7.7                     | F80       | 0.34                                   | 280                                             |
|                                   | 470              | MZA6.3VC471MH10TP   | 8 × 10                        | H10       | 0.16                                   | 600                                             |
|                                   | 1,000            | MZA6.3VC102MH10TP   | 8 × 10                        | H10       | 0.16                                   | 600                                             |
|                                   | 1,500            | MZA6.3VC152MJ10TP   | 10 × 10                       | J10       | 0.08                                   | 850                                             |
| <b>10 Volts</b><br>13 Volts Surge | 22               | MZA10VC22RMD61TP    | 4 × 5.8                       | D61       | 1.35                                   | 90                                              |
|                                   | 33               | MZA10VC33RMD61TP    | 4 × 5.8                       | D61       | 1.35                                   | 90                                              |
|                                   | 33               | MZA10VC33RME61TP    | 5 × 5.8                       | E61       | 0.70                                   | 160                                             |
|                                   | 220              | MZA10VC221MF80TP    | 6.3 × 7.7                     | F80       | 0.34                                   | 280                                             |
|                                   | 330              | MZA10VC331MH10TP    | 8 × 10                        | H10       | 0.16                                   | 600                                             |
|                                   | 470              | MZA10VC471MH10TP    | 8 × 10                        | H10       | 0.16                                   | 600                                             |
|                                   | 680              | MZA10VC681MH10TP    | 8 × 10                        | H10       | 0.16                                   | 600                                             |
|                                   | 1,000            | MZA10VC102MJ10TP    | 10 × 10                       | J10       | 0.08                                   | 850                                             |
| <b>16 Volts</b><br>20 Volts Surge | 10               | MZA16VC10RMD61TP    | 4 × 5.8                       | D61       | 1.35                                   | 90                                              |
|                                   | 22               | MZA16VC22RMD61TP    | 4 × 5.8                       | D61       | 1.35                                   | 90                                              |
|                                   | 22               | MZA16VC22RME61TP    | 5 × 5.8                       | E61       | 0.70                                   | 160                                             |
|                                   | 47               | MZA16VC47RME61TP    | 5 × 5.8                       | E61       | 0.70                                   | 160                                             |
|                                   | 47               | MZA16VC47RMF61TP    | 6.3 × 5.8                     | F61       | 0.36                                   | 240                                             |
|                                   | 100              | MZA16VC101MF61TP    | 6.3 × 5.8                     | F61       | 0.36                                   | 240                                             |
|                                   | 220              | MZA16VC221MF80TP    | 6.3 × 7.7                     | F80       | 0.34                                   | 280                                             |
|                                   | 330              | MZA16VC331MH10TP    | 8 × 10                        | H10       | 0.16                                   | 600                                             |
|                                   | 470              | MZA16VC471MH10TP    | 8 × 10                        | H10       | 0.16                                   | 600                                             |
|                                   | 680              | MZA16VC681MJ10TP    | 10 × 10                       | J10       | 0.08                                   | 850                                             |
| <b>25 Volts</b><br>32 Volts Surge | 10               | MZA25VC10RMD61TP    | 4 × 5.8                       | D61       | 1.35                                   | 90                                              |
|                                   | 22               | MZA25VC22RME61TP    | 5 × 5.8                       | E61       | 0.70                                   | 160                                             |
|                                   | 33               | MZA25VC33RME61TP    | 5 × 5.8                       | E61       | 0.70                                   | 160                                             |
|                                   | 33               | MZA25VC33RMF61TP    | 6.3 × 5.8                     | F61       | 0.36                                   | 240                                             |
|                                   | 47               | MZA25VC47RMF61TP    | 6.3 × 5.8                     | F61       | 0.36                                   | 240                                             |
|                                   | 100              | MZA25VC101MF80TP    | 6.3 × 7.7                     | F80       | 0.34                                   | 280                                             |
|                                   | 220              | MZA25VC221MH10TP    | 8 × 10                        | H10       | 0.16                                   | 600                                             |
|                                   | 330              | MZA25VC331MH10TP    | 8 × 10                        | H10       | 0.16                                   | 600                                             |
|                                   | 470              | MZA25VC471MJ10TP    | 10 × 10                       | J10       | 0.08                                   | 850                                             |
| <b>35 Volts</b><br>44 Volts Surge | 4.7              | MZA35VC4R7MD61TP    | 4 × 5.8                       | D61       | 1.35                                   | 90                                              |
|                                   | 10               | MZA35VC10RMD61TP    | 4 × 5.8                       | D61       | 1.35                                   | 90                                              |
|                                   | 10               | MZA35VC10RME61TP    | 5 × 5.8                       | E61       | 0.70                                   | 160                                             |
|                                   | 22               | MZA35VC22RME61TP    | 5 × 5.8                       | E61       | 0.70                                   | 160                                             |
|                                   | 33               | MZA35VC33RMF61TP    | 6.3 × 5.8                     | F61       | 0.36                                   | 240                                             |
|                                   | 47               | MZA35VC47RMF61TP    | 6.3 × 5.8                     | F61       | 0.36                                   | 240                                             |
|                                   | 100              | MZA35VC101MF80TP    | 6.3 × 7.7                     | F80       | 0.34                                   | 280                                             |
|                                   | 100              | MZA35VC101MH10TP    | 8 × 10                        | H10       | 0.16                                   | 600                                             |
|                                   | 220              | MZA35VC221MH10TP    | 8 × 10                        | H10       | 0.16                                   | 600                                             |
|                                   | 330              | MZA35VC331MJ10TP    | 10 × 10                       | J10       | 0.08                                   | 850                                             |
| <b>50 Volts</b><br>63 Volts Surge | 4.7              | MZA50VC4R7MD61TP    | 4 × 5.8                       | D61       | 2.90                                   | 60                                              |
|                                   | 10               | MZA50VC10RME61TP    | 5 × 5.8                       | E61       | 1.52                                   | 85                                              |
|                                   | 10               | MZA50VC10RMF61TP    | 6.3 × 5.8                     | F61       | 0.88                                   | 165                                             |
|                                   | 22               | MZA50VC22RMF61TP    | 6.3 × 5.8                     | F61       | 0.88                                   | 165                                             |
|                                   | 33               | MZA50VC33RMF80TP    | 6.3 × 7.7                     | F80       | 0.68                                   | 195                                             |
|                                   | 47               | MZA50VC47RMF80TP    | 6.3 × 7.7                     | F80       | 0.68                                   | 195                                             |
|                                   | 100              | MZA50VC101MH10TP    | 8 × 10                        | H10       | 0.34                                   | 350                                             |
|                                   | 220              | MZA50VC221MJ10TP    | 10 × 10                       | J10       | 0.18                                   | 670                                             |

\* Refer to diagrams for detailed case size dimensions.