# U92X Series

UNITED CHEMI-CON

- Snap Mount
- Specific Design For Higher Ripple Current
- 350 to 500VDC Voltage Range
- RoHS Compliant
- +85°C Maximum Temperature
- 15,000 Hours Lifetime at +85°C


The U92X series is a longest life series specifically designed for higher ripple current capability. The U92X capacitors have an endurance rating of 15,000 hours at +85°C with the rated ripple current applied. All U92X series capacitors are RoHS compliant and offered in a variety of sizes, with or without a PPE end disk, and encased in a standard PVC sleeve or optional PET sleeve. UL746C compliant exterior insulation material for sleeve and end disk is also available. Snap-in terminals (2, 4 or 5-pin configurations) are available as standard or optional styles depending on case size. Straight standoff terminals (5-pin configuration) are an option for 40, 45 and 50mm can diameters.

## Summary of Specifications

- **PC board snap-in or straight standoff terminals available as standard or optional styles depending on pin styles and case size.**
- **Capacitance range: 150 to 3,300µF.**
- **Voltage range: 350 to 500VDC.**
- **Category temperature range: −40°C to +85°C.**
- **Leakage current: $3\sqrt{CV}$ (µA) or 3mA, whichever is smaller, after 5 minutes at +25°C.**
- **Standard capacitance tolerance: ±20%**
- **Nominal case size (D×L): 30×40mm to 50×105mm.**
- **Rated lifetime: 15,000 hours at +85°C with the rated ripple current applied.**

# U92X Series

## U92X Specifications - Snap Mount

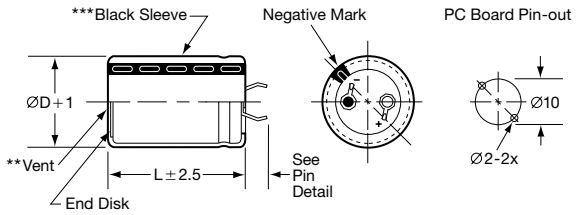
<table>
<tr><th>Item</th><th>Characteristics</th></tr>
<tr><td>Category Temperature Range</td><td>−40 to +85°C</td></tr>
<tr><td>Rated Voltage Range</td><td>350 to 500VDC</td></tr>
<tr><td>Capacitance Range</td><td>150 to 3,300μF at +25°C, 120Hz</td></tr>
<tr><td>Capacitance Tolerance</td><td>±20% (M) at +25°C, 120Hz</td></tr>
<tr><td>Leakage Current</td><td>$I = 3\sqrt{CV}$ (μA) or 3mA, whichever is smaller, after 5 minutes at +25°C.<br>Where I = Max. leakage current (μA), C = Nominal capacitance (μF) and V = Rated voltage (V)</td></tr>
<tr><td>Dissipation Factor (Tan δ)</td><td>At +25°C, 120Hz<br><table><tr><td>Rated Voltage (V)</td><td>350-400</td><td>420-500</td></tr><tr><td>Tan δ (DF) Max.</td><td>0.15</td><td>0.20</td></tr></table></td></tr>
<tr><td>Low Temperature Characteristics</td><td>At 120Hz, impedance (Z) ratio between the −40°C value and +25°C value shall not exceed the values given below.<br><table><tr><td>Rated Voltage (V)</td><td>350-400</td><td>420-500</td></tr><tr><td>Z(−40°C)/Z(+25°C)</td><td>4</td><td>8</td></tr></table></td></tr>
<tr><td>Rated Ripple Current Multipliers</td><td>Ambient Temperature (°C)<br><table><tr><td>+45°C</td><td>+65°C</td><td>+85°C</td></tr><tr><td>2.82</td><td>1.73</td><td>1.00</td></tr></table><br>Frequency (Hz)<br><table><tr><td>DC Rated Voltage</td><td>50Hz</td><td>120Hz</td><td>300Hz</td><td>1kHz</td><td>10kHz</td><td>100kHz</td></tr><tr><td>350-450V</td><td>0.77</td><td>1.00</td><td>1.16</td><td>1.30</td><td>1.41</td><td>1.43</td></tr><tr><td>500V</td><td>0.70</td><td>1.00</td><td>1.16</td><td>1.30</td><td>1.41</td><td>1.43</td></tr></table></td></tr>
<tr><td>Endurance (Load Life)</td><td>The following specifications shall be satisfied when the capacitors are restored to +25°C after subjecting them to DC voltage for 15,000 hours at +85°C with the rated ripple current applied. The sum of the DC voltage and peak AC voltage must not exceed the full rated voltage of the capacitors.<br>Capacitance change: ≤ ±20% of initial measured value<br>Tan δ (DF) : ≤ 200% of initial specified value<br>Leakage current : ≤ initial specified value</td></tr>
<tr><td>Shelf Life</td><td>The following specifications shall be satisfied when the capacitors are restored to +25°C after exposing them for 1,000 hours at +85°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>Capacitance change: ≤ ±20% of initial measured value<br>Tan δ (DF) : ≤ 150% of initial specified value<br>Leakage current : ≤ initial specified value</td></tr>
<tr><td>Custom Designs</td><td>Custom CV values per case size and termination type may be available upon request. Contact appropriate representative with specific requirements.</td></tr>
</table>

# U92X Series

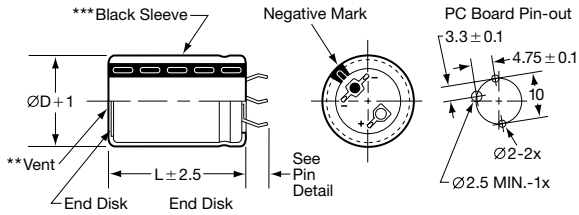
## Diagram of Dimensions - Snap Mount

### Snap Mount

#### VSN Snap-in Ø30 and Ø35 standard
#### VNN Snap-in Ø30 and Ø35 optional



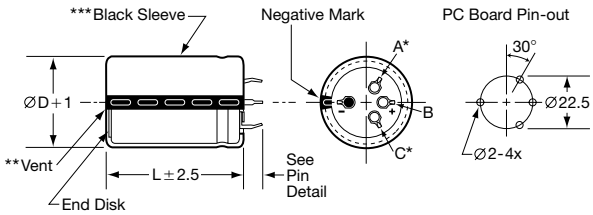

#### VEN Snap-in Ø30 and Ø35 optional



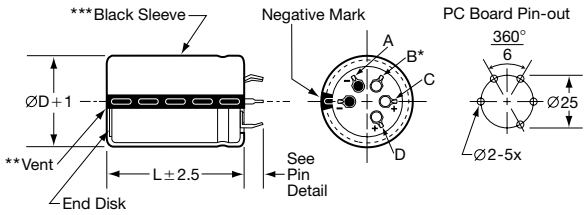

### Snap Mount

Unit: mm

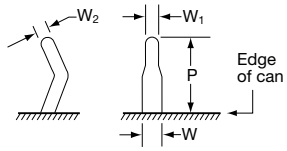
#### VND Snap-in Ø35 and Ø40 standard; Ø45 optional
#### VSD Snap-in Ø35 and Ø40 optional




#### VNT Snap-in Ø45 and Ø50 standard




#### VS, VE & VN Snap-in Pin Dimensions




| Type | P | W | W1 | W2 |
|---|---|---|---|---|
| VSN Ø30 | 4.0±0.5 | 1.5±0.2 | 0.8±0.1 | 0.8±0.1 |
| VSN Ø35 | 3.5±0.5 | | | |
| VNN Ø30-Ø35 | 5.8±1.0 | | | |
| VEN Ø30-Ø35 | 4.0±0.5 | | | |
| VSD Ø35-Ø40 | 3.5±1.0 | | | |
| VND Ø35-Ø45 | 5.8±1.0 | | | |
| VNT Ø45-Ø50 | 5.8±1.0 | | | |

### CAUTION:

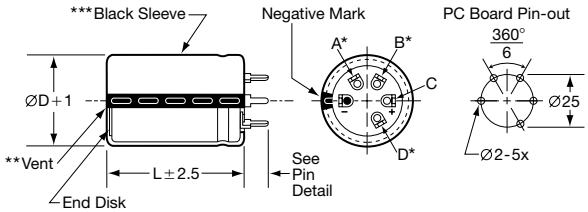
*Use the blank terminals for mechanical support only. The blank terminals must not be connected to a solder trace on the PC board but be electrically isolated from the negative and positive terminals.

**The vent may be located either on the bottom or side of the can.

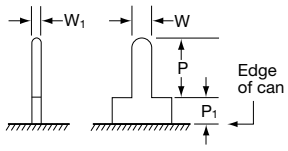
***The black sleeve with gray stripe negative pin indicator is standard. Also note in some cases, the sleeve color may change slightly due to the operating conditions, however, the discoloration will not impair capacitor function.

### Straight Pin Mount

#### VQT Straight Standoff Ø40, Ø45 and Ø50 optional




#### VQ Straight Standoff Pin Dimensions

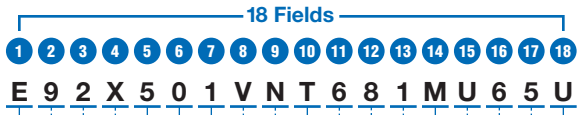



| Type | P | P1 | W | W1 |
|---|---|---|---|---|
| Standoff Pin (VQ) | 3.75±1.0 | 2.0 max. | 1.5±0.1 | 0.7±0.2 |

# U92X Series

## Part Numbering System for U92X Series

When ordering, always specify complete 18-field global part number.




**9 Supplement Code.** Field 18.
All construction options listed have Sn100% terminal plating.
U = PVC sleeve with PPE end disk.
M = PVC sleeve without end disk.
4 = UL746C compliant insulation for sleeve with end disk.
*Other sleeve materials available as options upon request.*

**8 Case Size.** Fields 15, 16 and 17.
The single letter diameter code is inserted in field 15.
R = Ø30mm
A = Ø35mm
B = Ø40mm
U = Ø45mm
C = Ø50mm

The double digit length code is inserted in fields 16 and 17.
40 = 40mm
50 = 50mm
65 = 65mm
80 = 80mm
A0 = 100mm
A5 = 105mm

**7 Capacitance Tolerance.** Field 14.
M = ±20%

**6 Capacitance.** Fields 11, 12 and 13.
Expressed in Microfarads. The first two digits are significant figures inserted in fields 11 and 12, and the third digit inserted in field 13 indicates the number of zeros for capacitance of 10μF or more. R indicates the decimal point for capacitance less than 10μF (e.g. 6R8 = 6.8μF; 680 = 68μF; 681 = 680μF; 682 = 6,800μF; 683 = 68,000μF).

**5 Dummy Terminals.** Field 10.
N = No dummy terminals.
D = 2 dummy terminals.
T = 3 dummy terminals.

**4 Terminal Type.** Fields 8 and 9.
VS = Snap-in pins, 4.0mm in length (Ø30 VSN); 3.5mm in length (Ø35 VSN, Ø35 or Ø40 VSD).
VN = Snap-in pins, 5.8mm in length.
VE = Snap-in pins, polarized, Ø30 or Ø35 option.
VQ = Straight standoff pins.

**3 DC Rated Voltage.** Fields 5, 6 and 7.
Expressed in Volts. The first two digits are significant figures inserted in fields 5 and 6, and the third digit inserted in field 7 indicates the number of zeros for rated voltage of 10VDC or more. R indicates the decimal point for rated voltage less than 10VDC (e.g. 5R0 = 5.0VDC; 500 = 50VDC; 501 = 500VDC).

Rule Exception: Coding for rated voltage 385VDC = 3J1.

**2 Series Name.** Fields 2, 3 and 4.
Enter the 3-letter/digit series name in fields 2, 3 and 4. If the series name is only 2 letters/digits, place a dash in field 4. For a series name with more than 3 letters/digits, refer to the individual series for the appropriate 3-field series name.

**1 Capacitor Type.** Field 1.
Aluminum Electrolytic Capacitor (Polar).

# U92X Series

## Standard Voltage Ratings - Snap Mount

| Rated Voltage (WVDC) | Capacitance (µF) | Global Part Number† | Nominal Case Size* D×L (mm) | Case Size Code | Maximum ESR (Ω) at +25°C, 120Hz | Rated Ripple Current (A rms) at +85°C, 120Hz |
|---|---|---|---|---|---|---|
| **350 Volts 400 Volts Surge** | 330 | E92X351VSN331MR40U | 30 × 40 | R40 | 0.302 | 2.1 |
| | 470 | E92X351VSN471MR50U | 30 × 50 | R50 | 0.212 | 2.8 |
| | 680 | E92X351VSN681MR65U | 30 × 65 | R65 | 0.146 | 3.7 |
| | 470 | E92X351VSN471MA40U | 35 × 40 | A40 | 0.195 | 3.1 |
| | 680 | E92X351VSN681MA50U | 35 × 50 | A50 | 0.135 | 4.2 |
| | 1,000 | E92X351VSN102MA65U | 35 × 65 | A65 | 0.092 | 5.4 |
| | 1,200 | E92X351VND122MA80U | 35 × 80 | A80 | 0.076 | 6.4 |
| | 1,500 | E92X351VND152MAA0U | 35 × 100 | AA0 | 0.061 | 7.9 |
| | 820 | E92X351VND821MB50U | 40 × 50 | B50 | 0.121 | 4.6 |
| | 1,200 | E92X351VND122MB65U | 40 × 65 | B65 | 0.083 | 6.0 |
| | 1,500 | E92X351VND152MB80U | 40 × 80 | B80 | 0.066 | 7.3 |
| | 1,800 | E92X351VND182MBA0U | 40 × 100 | BA0 | 0.055 | 8.7 |
| | 1,000 | E92X351VNT102MU50U | 45 × 50 | U50 | 0.107 | 5.2 |
| | 1,500 | E92X351VNT152MU65U | 45 × 65 | U65 | 0.072 | 6.9 |
| | 1,800 | E92X351VNT182MU80U | 45 × 80 | U80 | 0.060 | 8.2 |
| | 2,700 | E92X351VNT272MUA5U | 45 × 105 | UA5 | 0.040 | 11.1 |
| | 1,200 | E92X351VNT122MC50U | 50 × 50 | C50 | 0.103 | 5.4 |
| | 1,800 | E92X351VNT182MC65U | 50 × 65 | C65 | 0.069 | 7.3 |
| | 2,200 | E92X351VNT222MC80U | 50 × 80 | C80 | 0.056 | 8.8 |
| | 3,300 | E92X351VNT332MCA5U | 50 × 105 | CA5 | 0.037 | 12.2 |
| **385 Volts 435 Volts Surge** | 270 | E92X3J1VSN271MR40U | 30 × 40 | R40 | 0.339 | 2.0 |
| | 390 | E92X3J1VSN391MR50U | 30 × 50 | R50 | 0.235 | 2.6 |
| | 560 | E92X3J1VSN561MR65U | 30 × 65 | R65 | 0.164 | 3.5 |
| | 390 | E92X3J1VSN391MA40U | 35 × 40 | A40 | 0.225 | 2.9 |
| | 560 | E92X3J1VSN561MA50U | 35 × 50 | A50 | 0.156 | 3.9 |
| | 820 | E92X3J1VSN821MA65U | 35 × 65 | A65 | 0.107 | 5.0 |
| | 1,000 | E92X3J1VND102MA80U | 35 × 80 | A80 | 0.088 | 5.9 |
| | 1,200 | E92X3J1VND122MAA0U | 35 × 100 | AA0 | 0.073 | 7.2 |
| | 680 | E92X3J1VND681MB50U | 40 × 50 | B50 | 0.135 | 4.4 |
| | 1,000 | E92X3J1VND102MB65U | 40 × 65 | B65 | 0.092 | 5.8 |
| | 1,200 | E92X3J1VND122MB80U | 40 × 80 | B80 | 0.076 | 6.8 |
| | 1,800 | E92X3J1VND182MBA0U | 40 × 100 | BA0 | 0.051 | 9.0 |
| | 1,000 | E92X3J1VNT102MU50U | 45 × 50 | U50 | 0.100 | 5.4 |
| | 1,200 | E92X3J1VNT122MU65U | 45 × 65 | U65 | 0.083 | 6.4 |
| | 1,500 | E92X3J1VNT152MU80U | 45 × 80 | U80 | 0.066 | 7.7 |
| | 2,200 | E92X3J1VNT222MUA5U | 45 × 105 | UA5 | 0.045 | 10.4 |
| | 1,200 | E92X3J1VNT122MC50U | 50 × 50 | C50 | 0.096 | 5.7 |
| | 1,500 | E92X3J1VNT152MC65U | 50 × 65 | C65 | 0.077 | 6.9 |
| | 2,200 | E92X3J1VNT222MC80U | 50 × 80 | C80 | 0.052 | 9.1 |
| | 2,700 | E92X3J1VNT272MCA5U | 50 × 105 | CA5 | 0.043 | 11.4 |
| **400 Volts 450 Volts Surge** | 270 | E92X401VSN271MR40U | 30 × 40 | R40 | 0.339 | 2.0 |
| | 390 | E92X401VSN391MR50U | 30 × 50 | R50 | 0.235 | 2.6 |
| | 470 | E92X401VSN471MR65U | 30 × 65 | R65 | 0.195 | 3.2 |
| | 390 | E92X401VSN391MA40U | 35 × 40 | A40 | 0.225 | 2.9 |
| | 560 | E92X401VSN561MA50U | 35 × 50 | A50 | 0.156 | 3.9 |
| | 680 | E92X401VSN681MA65U | 35 × 65 | A65 | 0.129 | 4.6 |
| | 1,000 | E92X401VND102MA80U | 35 × 80 | A80 | 0.088 | 5.9 |
| | 1,200 | E92X401VND122MAA0U | 35 × 100 | AA0 | 0.073 | 7.2 |
| | 680 | E92X401VND681MB50U | 40 × 50 | B50 | 0.135 | 4.4 |
| | 1,000 | E92X401VND102MB65U | 40 × 65 | B65 | 0.092 | 5.8 |
| | 1,200 | E92X401VND122MB80U | 40 × 80 | B80 | 0.076 | 6.8 |
| | 1,500 | E92X401VND152MBA0U | 40 × 100 | BA0 | 0.061 | 8.2 |
| | 820 | E92X401VNT821MU50U | 45 × 50 | U50 | 0.121 | 4.9 |
| | 1,200 | E92X401VNT122MU65U | 45 × 65 | U65 | 0.083 | 6.4 |

**†For construction and terminal options, refer to the part numbering system for descriptions and codes.**
*** Refer to diagram of dimensions for detailed case size specifications.**

# U92X Series

## Standard Voltage Ratings - Snap Mount

| Rated Voltage (WVDC) | Capacitance (µF) | Global Part Number† | Nominal Case Size* D×L (mm) | Case Size Code | Maximum ESR (Ω) at +25°C, 120Hz | Rated Ripple Current (A rms) at +85°C, 120Hz |
|---|---|---|---|---|---|---|
| **400 Volts** 450 Volts Surge | 1,500 | E92X401VNT152MU80U | 45 × 80 | U80 | 0.066 | 7.7 |
| | 2,200 | E92X401VNT222MUA5U | 45 × 105 | UA5 | 0.045 | 10.4 |
| | 1,200 | E92X401VNT122MC50U | 50 × 50 | C50 | 0.093 | 5.6 |
| | 1,500 | E92X401VNT152MC65U | 50 × 65 | C65 | 0.074 | 7.0 |
| | 1,800 | E92X401VNT182MC80U | 50 × 80 | C80 | 0.062 | 8.4 |
| | 2,700 | E92X401VNT272MCA5U | 50 × 105 | CA5 | 0.041 | 11.6 |
| **420 Volts** 470 Volts Surge | 220 | E92X421VSN221MR40U | 30 × 40 | R40 | 0.389 | 1.9 |
| | 330 | E92X421VSN331MR50U | 30 × 50 | R50 | 0.284 | 2.4 |
| | 470 | E92X421VSN471MR65U | 30 × 65 | R65 | 0.202 | 3.2 |
| | 390 | E92X421VSN391MA40U | 35 × 40 | A40 | 0.251 | 2.8 |
| | 470 | E92X421VSN471MA50U | 35 × 50 | A50 | 0.183 | 3.6 |
| | 680 | E92X421VSN681MA65U | 35 × 65 | A65 | 0.130 | 4.6 |
| | 820 | E92X421VND821MA80U | 35 × 80 | A80 | 0.101 | 5.5 |
| | 1,200 | E92X421VND122MAA0U | 35 × 100 | AA0 | 0.078 | 7.0 |
| | 680 | E92X421VND681MB50U | 40 × 50 | B50 | 0.142 | 4.3 |
| | 820 | E92X421VND821MB65U | 40 × 65 | B65 | 0.102 | 5.5 |
| | 1,200 | E92X421VND122MB80U | 40 × 80 | B80 | 0.079 | 6.6 |
| | 1,500 | E92X421VND152MBA0U | 40 × 100 | BA0 | 0.061 | 8.2 |
| | 820 | E92X421VNT821MU50U | 45 × 50 | U50 | 0.124 | 4.8 |
| | 1,000 | E92X421VNT102MU65U | 45 × 65 | U65 | 0.089 | 6.2 |
| | 1,200 | E92X421VNT122MU80U | 45 × 80 | U80 | 0.069 | 7.6 |
| | 1,800 | E92X421VNT182MUA5U | 45 × 105 | UA5 | 0.051 | 9.9 |
| | 1,000 | E92X421VNT102MC50U | 50 × 50 | C50 | 0.109 | 5.2 |
| | 1,200 | E92X421VNT122MC65U | 50 × 65 | C65 | 0.078 | 6.8 |
| | 1,800 | E92X421VNT182MC80U | 50 × 80 | C80 | 0.061 | 8.5 |
| | 2,200 | E92X421VNT222MCA5U | 50 × 105 | CA5 | 0.044 | 11.2 |
| **450 Volts** 500 Volts Surge | 220 | E92X451VSN221MR40U | 30 × 40 | R40 | 0.411 | 1.8 |
| | 330 | E92X451VSN331MR50U | 30 × 50 | R50 | 0.300 | 2.3 |
| | 390 | E92X451VSN391MR65U | 30 × 65 | R65 | 0.213 | 3.1 |
| | 330 | E92X451VSN331MA40U | 35 × 40 | A40 | 0.304 | 2.5 |
| | 470 | E92X451VSN471MA50U | 35 × 50 | A50 | 0.193 | 3.5 |
| | 560 | E92X451VSN561MA65U | 35 × 65 | A65 | 0.138 | 4.4 |
| | 820 | E92X451VND821MA80U | 35 × 80 | A80 | 0.107 | 5.4 |
| | 1,000 | E92X451VND102MAA0U | 35 × 100 | AA0 | 0.082 | 6.8 |
| | 560 | E92X451VND561MB50U | 40 × 50 | B50 | 0.163 | 4.0 |
| | 820 | E92X451VND821MB65U | 40 × 65 | B65 | 0.117 | 5.1 |
| | 1,000 | E92X451VND102MB80U | 40 × 80 | B80 | 0.091 | 6.2 |
| | 1,200 | E92X451VND122MBA0U | 40 × 100 | BA0 | 0.070 | 7.7 |
| | 680 | E92X451VNT681MU50U | 45 × 50 | U50 | 0.137 | 4.6 |
| | 1,000 | E92X451VNT102MU65U | 45 × 65 | U65 | 0.098 | 5.9 |
| | 1,200 | E92X451VNT122MU80U | 45 × 80 | U80 | 0.076 | 7.2 |
| | 1,800 | E92X451VNT182MUA5U | 45 × 105 | UA5 | 0.056 | 9.4 |
| | 820 | E92X451VNT821MC50U | 50 × 50 | C50 | 0.115 | 5.1 |
| | 1,200 | E92X451VNT122MC65U | 50 × 65 | C65 | 0.083 | 6.6 |
| | 1,500 | E92X451VNT152MC80U | 50 × 80 | C80 | 0.064 | 8.2 |
| | 2,200 | E92X451VNT222MCA5U | 50 × 105 | CA5 | 0.047 | 10.8 |
| **500 Volts** 550 Volts Surge | 150 | E92X501VSN151MR40U | 30 × 40 | R40 | 0.557 | 1.6 |
| | 180 | E92X501VSN181MR50U | 30 × 50 | R50 | 0.464 | 1.9 |
| | 270 | E92X501VSN271MR65U | 30 × 65 | R65 | 0.310 | 2.6 |
| | 220 | E92X501VSN221MA40U | 35 × 40 | A40 | 0.362 | 2.3 |
| | 270 | E92X501VSN271MA50U | 35 × 50 | A50 | 0.295 | 2.8 |
| | 390 | E92X501VSN391MA65U | 35 × 65 | A65 | 0.204 | 3.6 |

**†For construction and terminal options, refer to the part numbering system for descriptions and codes.**
*** Refer to diagram of dimensions for detailed case size specifications.**

# U92X Series

## Standard Voltage Ratings - Snap Mount

| Rated Voltage (WVDC) | Capacitance (µF) | Global Part Number† | Nominal Case Size* D×L (mm) | Case Size Code | Maximum ESR (Ω) at +25°C, 120Hz | Rated Ripple Current (A rms) at +85°C, 120Hz |
|---|---|---|---|---|---|---|
| **500 Volts 550 Volts Surge** | 560 | E92X501VND561MA80U | 35 × 80 | A80 | 0.142 | 4.7 |
| | 680 | E92X501VND681MAA0U | 35 × 100 | AA0 | 0.117 | 5.7 |
| | 390 | E92X501VND391MB50U | 40 × 50 | B50 | 0.204 | 3.6 |
| | 560 | E92X501VND561MB65U | 40 × 65 | B65 | 0.142 | 4.6 |
| | 680 | E92X501VND681MB80U | 40 × 80 | B80 | 0.117 | 5.5 |
| | 820 | E92X501VND821MBA0U | 40 × 100 | BA0 | 0.097 | 6.5 |
| | 560 | E92X501VNT561MU50U | 45 × 50 | U50 | 0.156 | 4.3 |
| | 680 | E92X501VNT681MU65U | 45 × 65 | U65 | 0.129 | 5.2 |
| | 1,000 | E92X501VNT102MU80U | 45 × 80 | U80 | 0.088 | 6.7 |
| | 1,200 | E92X501VNT122MUA5U | 45 × 105 | UA5 | 0.073 | 8.2 |
| | 680 | E92X501VNT681MC50U | 50 × 50 | C50 | 0.141 | 4.6 |
| | 1,000 | E92X501VNT102MC65U | 50 × 65 | C65 | 0.096 | 6.2 |
| | 1,200 | E92X501VNT122MC80U | 50 × 80 | C80 | 0.080 | 7.4 |
| | 1,800 | E92X501VNT182MCA5U | 50 × 105 | CA5 | 0.053 | 10.2 |

**†For construction and terminal options, refer to the part numbering system for descriptions and codes.**
***Refer to diagram of dimensions for detailed case size specifications.**