

# U91/U92 Series

## High Ripple Snap Mount Capacitors



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## Welcome to United Chemi-Con...

United Chemi-Con is introducing four new snap mount aluminum electrolytic capacitor series specifically designed for higher ripple current capability. These new series include the U91F, U92F, U92L and U92X which also feature very long life, wide temperature range, high voltage ratings and a variety of case sizes and terminal styles.

The U91F series is a high temperature series with a lifetime rating of 5,000 hours at +105°C. The three U92 series offer a lifetime rating of 5,000 hours for U92F, 10,000 hours for U92L or 15,000 hours for U92X at +85°C. The rated lifetime for all these series is measured with the rated ripple current applied.

All the U91/U92 series capacitors are RoHS compliant and are manufactured with or without an end disk in either a standard Pb-free PVC sleeve or optional PET sleeve. There are two basic types of PC board terminals, snap-in or straight standoffs. All of the new snap-in series offer 2, 3, 4 or 5-pin layouts as either standard or optional configurations depending on case size. Straight standoff terminals, 5-pin configuration, are available as an option for the larger case diameters.

Please contact United Chemi-Con with any questions about these new snap mount capacitors. Custom designs are also available upon request.



## Specifications Guide for U91/U92 High Ripple Snap Mount Capacitors

| Series | Page No. | Terminal Type | Features  | RoHS Compliant | Temperature Range (°C) | Voltage Range (V) | Capacitance Range (µF) | Endurance (Hrs. + R*) |           |
|--------|----------|---------------|---|----------------|------------------------|-------------------|------------------------|-----------------------|-----------|
|        |          |               |   |                |                        |                   |                        | at +85°C              | at +105°C |
| U91F   | 4        | Snap Mount    | Specific High Ripple Design, High Temperature, Long Life, Pin Options | ○              | -25°C ~ +105°C         | 350-500           | 120-2,700              | —                     | 5,000     |
| U92F   | 11       | Snap Mount    | Specific High Ripple Design, Long Life, Pin Options                   | ○              | -25°C ~ +85°C          | 350-500           | 180-3,300              | 5,000                 | —         |
| U92L   | 18       | Snap Mount    | Specific High Ripple Design, Longer Life, Pin Options                 | ○              | -25°C ~ +85°C          | 350-500           | 150-3,300              | 10,000                | —         |
| U92X   | 25       | Snap Mount    | Specific High Ripple Design, Longest Life, Pin Options                | ○              | -25°C ~ +85°C          | 350-500           | 150-3,300              | 15,000                | —         |

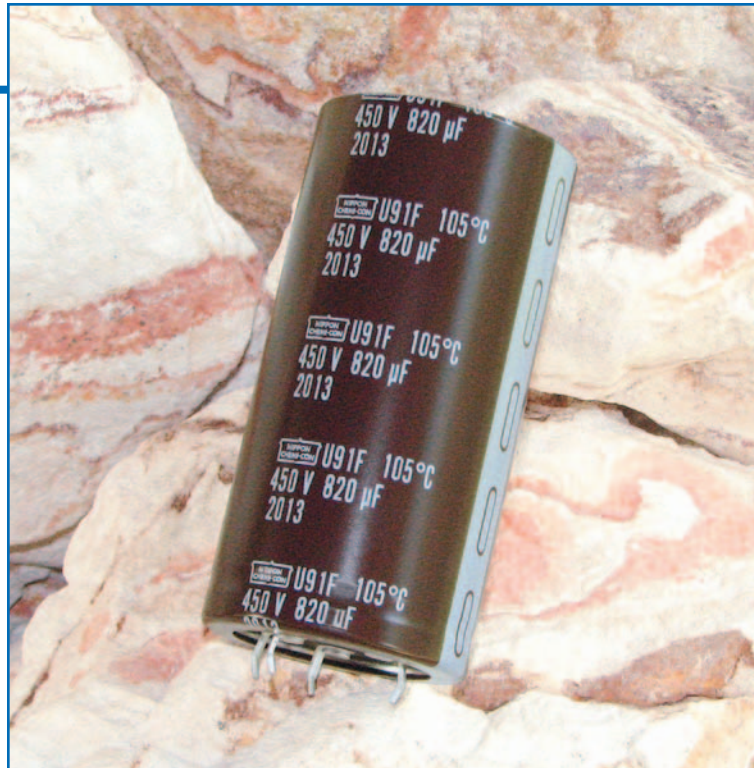
\* +R = With rated ripple current applied.

In the construction of the components described, the full intent of the specification will be met. United Chemi-Con, however, reserves the right to make, from time to time, such departures from the detail specifications as may be required to permit improvements in the design of its products. Components made under military approvals will be in accordance with the approval requirements. The information included herein is believed to be accurate and reliable. However, United Chemi-Con assumes no responsibility for its use, nor for any infringements of patents or other rights of third parties which may result from its use.

# U91F Series



- **Snap Mount**
- **Specific Design For Higher Ripple Current**
- **350 to 500VDC Voltage Range**
- **RoHS Compliant**
- **+105°C Maximum Temperature**
- **5,000 Hours Lifetime at +105°C**



The U91F series is a high temperature snap-in series specifically designed for higher ripple current capability. The U91F capacitors have an endurance rating of 5,000 hours at +105°C with the rated ripple current applied. All the U91F series capacitors are RoHS compliant and available in a variety of sizes, with or without an end disk, and encased in a standard Pb-free PVC sleeve or an optional PET sleeve. 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 the 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: 120 to 2,700µF.**
- **Voltage range: 350 to 500VDC.**
- **Category temperature range: -25°C to +105°C.**
- **Leakage current:  $3\sqrt{CV}$  (µA) or 3mA, whichever is smaller, after 5 minutes at +20°C.**
- **Standard capacitance tolerance: ±20%**
- **Nominal case size (D × L): 30 × 40mm to 50 × 105mm.**
- **Rated lifetime: 5,000 hours at +105°C with the rated ripple current applied.**

## U91F Specifications - Snap Mount

| Item                             | Characteristics  |                   |         |                   |                 |        |      |                  |      |       |       |      |       |        |          |      |      |      |      |      |      |      |      |      |      |      |      |      |
|----------------------------------|--|-------------------|---------|-------------------|-----------------|--------|------|------------------|------|-------|-------|------|-------|--------|----------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Category Temperature Range       | - 25 to +105°C   |                   |         |                   |                 |        |      |                  |      |       |       |      |       |        |          |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Rated Voltage Range              | 350 to 500VDC  |                   |         |                   |                 |        |      |                  |      |       |       |      |       |        |          |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Capacitance Range                | 120 to 2,700μF   |                   |         |                   |                 |        |      |                  |      |       |       |      |       |        |          |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Capacitance Tolerance            | ±20% (M) at +20°C, 120Hz   |                   |         |                   |                 |        |      |                  |      |       |       |      |       |        |          |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Leakage Current                  | $I = 3\sqrt{CV}$ (μA) or 3mA, whichever is smaller, after 5 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<br><table border="1"> <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>   | Rated Voltage (V) | 350-400 | 420-500           | Tan δ (DF) Max. | 0.15   | 0.20 |                  |      |       |       |      |       |        |          |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Rated Voltage (V)                | 350-400  | 420-500           |         |                   |                 |        |      |                  |      |       |       |      |       |        |          |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Tan δ (DF) Max.                  | 0.15   | 0.20              |         |                   |                 |        |      |                  |      |       |       |      |       |        |          |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Low Temperature Characteristics  | At 120Hz, impedance (Z) ratio between the -25°C value and +20°C value shall not exceed the values given below.<br><table border="1"> <tr> <td>Rated Voltage (V)</td> <td>350-500</td> </tr> <tr> <td>Z(-25°C)/Z(+20°C)</td> <td>8</td> </tr> </table>  | Rated Voltage (V) | 350-500 | Z(-25°C)/Z(+20°C) | 8               |        |      |                  |      |       |       |      |       |        |          |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Rated Voltage (V)                | 350-500  |                   |         |                   |                 |        |      |                  |      |       |       |      |       |        |          |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Z(-25°C)/Z(+20°C)                | 8  |                   |         |                   |                 |        |      |                  |      |       |       |      |       |        |          |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Rated Ripple Current Multipliers | Ambient Temperature (°C)<br><table border="1"> <tr> <td>+65°C</td> <td>+85°C</td> <td>+105°C</td> </tr> <tr> <td>2.82</td> <td>1.73</td> <td>1.00</td> </tr> </table><br>Frequency (Hz)<br><table border="1"> <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> | +65°C             | +85°C   | +105°C            | 2.82            | 1.73   | 1.00 | DC Rated Voltage | 50Hz | 120Hz | 300Hz | 1kHz | 10kHz | 100kHz | 350-450V | 0.77 | 1.00 | 1.16 | 1.30 | 1.41 | 1.43 | 500V | 0.70 | 1.00 | 1.16 | 1.30 | 1.41 | 1.43 |
| +65°C                            | +85°C  | +105°C            |         |                   |                 |        |      |                  |      |       |       |      |       |        |          |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 2.82                             | 1.73   | 1.00              |         |                   |                 |        |      |                  |      |       |       |      |       |        |          |      |      |      |      |      |      |      |      |      |      |      |      |      |
| DC Rated Voltage                 | 50Hz   | 120Hz             | 300Hz   | 1kHz              | 10kHz           | 100kHz |      |                  |      |       |       |      |       |        |          |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 350-450V                         | 0.77   | 1.00              | 1.16    | 1.30              | 1.41            | 1.43   |      |                  |      |       |       |      |       |        |          |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 500V                             | 0.70   | 1.00              | 1.16    | 1.30              | 1.41            | 1.43   |      |                  |      |       |       |      |       |        |          |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Endurance (Load Life)            | The following specifications shall be satisfied when the capacitors are restored to +20°C after subjecting them to DC voltage for 5,000 hours at +105°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  |                   |         |                   |                 |        |      |                  |      |       |       |      |       |        |          |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 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>Capacitance change: ≤ ±20% of initial measured value<br>Tan δ (DF) : ≤ 150% of initial specified value<br>Leakage current : ≤ initial specified value  |                   |         |                   |                 |        |      |                  |      |       |       |      |       |        |          |      |      |      |      |      |      |      |      |      |      |      |      |      |

Product specifications are subject to change without notice.

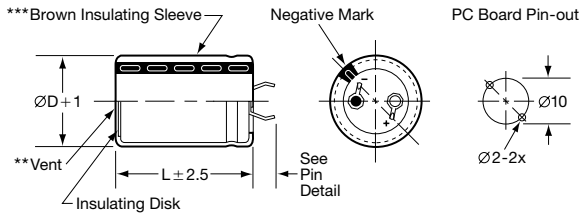
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## Diagram of Dimensions - Snap Mount

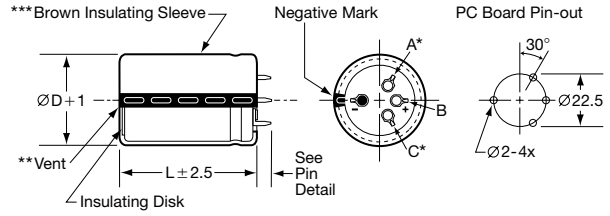
### Snap Mount

Unit: mm

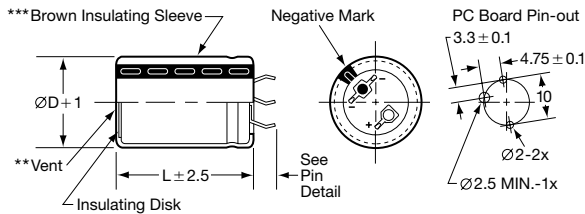
**VSN Snap-in  $\varnothing 30$  and  $\varnothing 35$  standard**  
**VNN Snap-in  $\varnothing 30$  and  $\varnothing 35$  optional**



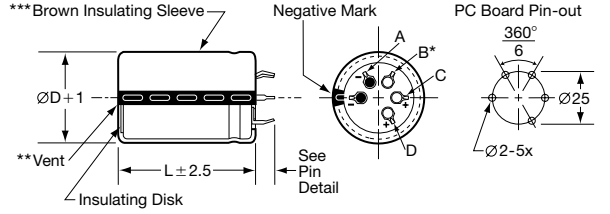
**VND Snap-in  $\varnothing 35$  and  $\varnothing 40$  standard;  $\varnothing 45$  optional**  
**VSD Snap-in  $\varnothing 35$  and  $\varnothing 40$  optional**



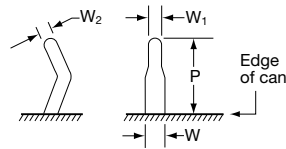
**VEN Snap-in  $\varnothing 30$  and  $\varnothing 35$  optional**



**VNT Snap-in  $\varnothing 45$  and  $\varnothing 50$  standard**



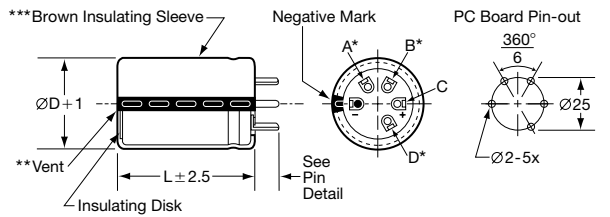
### VS, VE & VN Snap-in Pin Dimensions



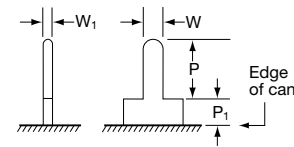
| Type                                  | P         | W         | W <sub>1</sub> | W <sub>2</sub> |
|---------------------------------------|-----------|-----------|----------------|----------------|
| VSN $\varnothing 30$                  | 4.0 ± 0.5 |           |                |                |
| VSN $\varnothing 35$                  | 3.5 ± 0.5 |           |                |                |
| VNN $\varnothing 30 - \varnothing 35$ | 5.8 ± 1.0 |           |                |                |
| VEN $\varnothing 30 - \varnothing 35$ | 4.0 ± 0.5 | 1.5 ± 0.2 | 0.8 ± 0.1      | 0.8 ± 0.1      |
| VSD $\varnothing 35 - \varnothing 40$ | 3.5 ± 1.0 |           |                |                |
| VND $\varnothing 35 - \varnothing 45$ | 5.8 ± 1.0 |           |                |                |
| VNT $\varnothing 45 - \varnothing 50$ | 5.8 ± 1.0 |           |                |                |

### Straight Pin Mount

**VQT Straight Standoff  $\varnothing 40$ ,  $\varnothing 45$  and  $\varnothing 50$  optional**



### VQ Standoff Pin Dimensions



| Type              | P          | P <sub>1</sub> | W         | W <sub>1</sub> |
|-------------------|------------|----------------|-----------|----------------|
| Standoff Pin (VQ) | 3.75 ± 1.0 | 2.0 max.       | 1.5 ± 0.1 | 0.7 ± 0.2      |

### CAUTION:

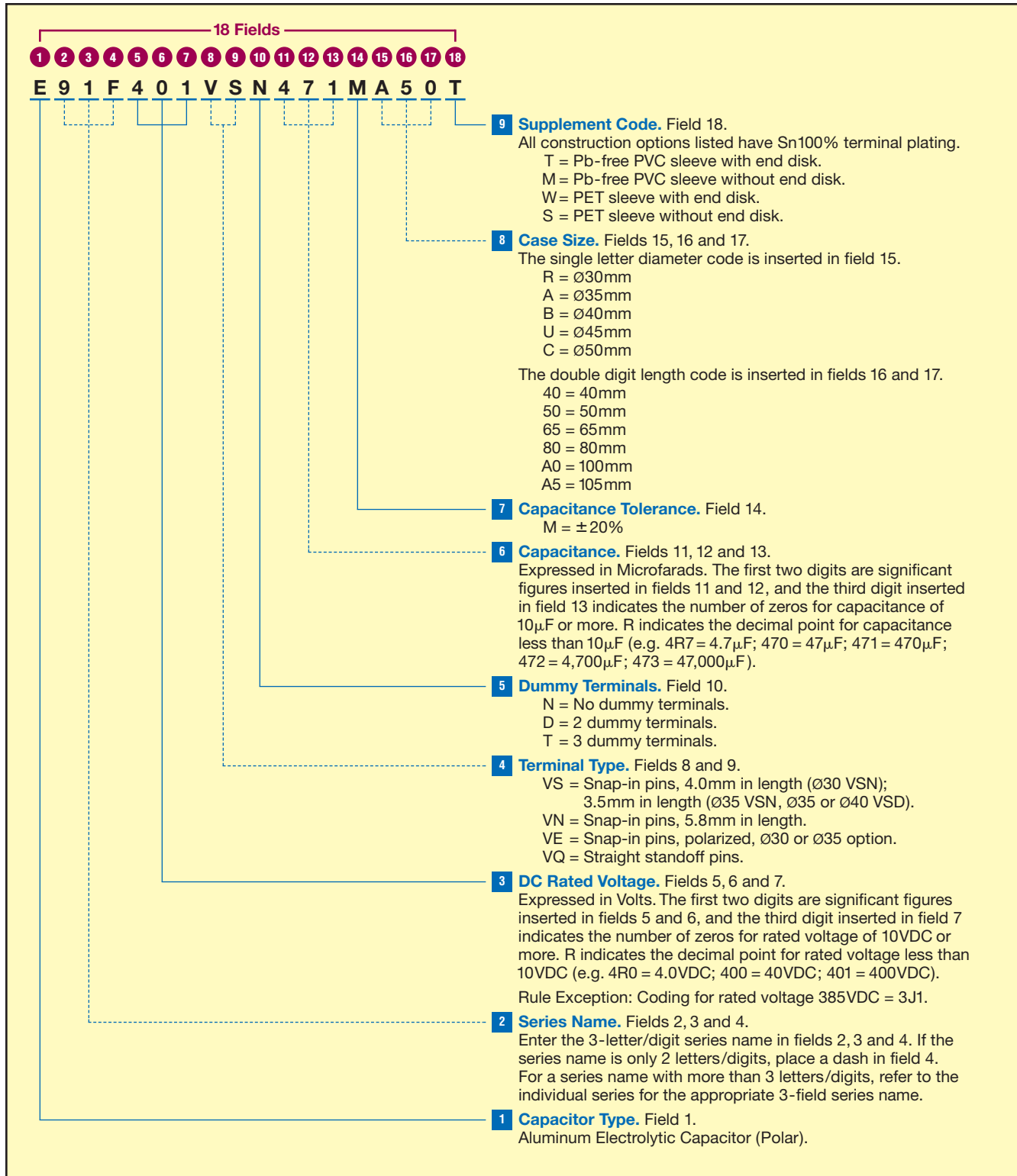
- \* Use the blank terminals for mechanical support only. The blank terminals must not be connected to a solder trace on the PC board but be electrically isolated from the negative and positive terminals.
- \*\* The vent may be located either on the bottom or side of the can.
- \*\*\* The brown sleeve 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.

Product specifications are subject to change without notice.

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## Part Numbering System for U91F Series

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



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## 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 +20°C, 120Hz | Rated Ripple Current (A rms) at +105°C, 120Hz |
|-------------------------------------|--------------------|---------------------|-------------------------------|----------------|---------------------------------|---|
| <b>350 Volts</b><br>400 Volts Surge | 270                | E91F351VSN271MR40T  | 30 × 40                       | R40            | 0.324                           | 1.5   |
|                                     | 390                | E91F351VSN391MR50T  | 30 × 50                       | R50            | 0.225                           | 2.0   |
|                                     | 560                | E91F351VSN561MR65T  | 30 × 65                       | R65            | 0.156                           | 2.6   |
|                                     | 390                | E91F351VSN391MA40T  | 35 × 40                       | A40            | 0.235                           | 2.0   |
|                                     | 560                | E91F351VSN561MA50T  | 35 × 50                       | A50            | 0.164                           | 2.7   |
|                                     | 820                | E91F351VND821MA65T  | 35 × 65                       | A65            | 0.112                           | 3.5   |
|                                     | 1,000              | E91F351VND102MA80T  | 35 × 80                       | A80            | 0.092                           | 4.1   |
|                                     | 1,200              | E91F351VND122MAA0T  | 35 × 100                      | AA0            | 0.076                           | 5.0   |
|                                     | 820                | E91F351VND821MB50T  | 40 × 50                       | B50            | 0.121                           | 3.3   |
|                                     | 1,200              | E91F351VND122MB65T  | 40 × 65                       | B65            | 0.083                           | 4.3   |
|                                     | 1,500              | E91F351VND152MB80T  | 40 × 80                       | B80            | 0.066                           | 5.1   |
|                                     | 1,800              | E91F351VND182MBA0T  | 40 × 100                      | BA0            | 0.055                           | 6.1   |
|                                     | 820                | E91F351VNT821MU50T  | 45 × 50                       | U50            | 0.131                           | 3.3   |
|                                     | 1,200              | E91F351VNT122MU65T  | 45 × 65                       | U65            | 0.090                           | 4.4   |
|                                     | 1,800              | E91F351VNT182MU80T  | 45 × 80                       | U80            | 0.060                           | 5.8   |
|                                     | 2,200              | E91F351VNT222MUA5T  | 45 × 105                      | UA5            | 0.049                           | 7.1   |
|                                     | 1,200              | E91F351VNT122MC50T  | 50 × 50                       | C50            | 0.092                           | 4.1   |
|                                     | 1,800              | E91F351VNT182MC65T  | 50 × 65                       | C65            | 0.066                           | 5.2   |
| 2,200                               | E91F351VNT222MC80T | 50 × 80             | C80                           | 0.054          | 6.3                             |   |
| 2,700                               | E91F351VNT272MCA5T | 50 × 105            | CA5                           | 0.044          | 7.9                             |   |
| <b>385 Volts</b><br>435 Volts Surge | 220                | E91F3J1VSN221MR40T  | 30 × 40                       | R40            | 0.336                           | 1.5   |
|                                     | 330                | E91F3J1VSN331MR50T  | 30 × 50                       | R50            | 0.245                           | 1.9   |
|                                     | 470                | E91F3J1VSN471MR65T  | 30 × 65                       | R65            | 0.174                           | 2.5   |
|                                     | 330                | E91F3J1VSN331MA40T  | 35 × 40                       | A40            | 0.237                           | 2.0   |
|                                     | 470                | E91F3J1VSN471MA50T  | 35 × 50                       | A50            | 0.173                           | 2.6   |
|                                     | 680                | E91F3J1VND681MA65T  | 35 × 65                       | A65            | 0.123                           | 3.3   |
|                                     | 1,000              | E91F3J1VND102MA80T  | 35 × 80                       | A80            | 0.095                           | 4.0   |
|                                     | 1,200              | E91F3J1VND122MAA0T  | 35 × 100                      | AA0            | 0.073                           | 5.1   |
|                                     | 680                | E91F3J1VND681MB50T  | 40 × 50                       | B50            | 0.135                           | 3.1   |
|                                     | 1,000              | E91F3J1VND102MB65T  | 40 × 65                       | B65            | 0.096                           | 4.0   |
|                                     | 1,200              | E91F3J1VND122MB80T  | 40 × 80                       | B80            | 0.075                           | 4.8   |
|                                     | 1,500              | E91F3J1VND152MBA0T  | 40 × 100                      | BA0            | 0.058                           | 6.0   |
|                                     | 820                | E91F3J1VNT821MU50T  | 45 × 50                       | U50            | 0.118                           | 3.5   |
|                                     | 1,200              | E91F3J1VNT122MU65T  | 45 × 65                       | U65            | 0.084                           | 4.5   |
|                                     | 1,500              | E91F3J1VNT152MU80T  | 45 × 80                       | U80            | 0.065                           | 5.5   |
|                                     | 1,800              | E91F3J1VNT182MUA5T  | 45 × 105                      | UA5            | 0.047                           | 7.2   |
|                                     | 1,000              | E91F3J1VNT102MC50T  | 50 × 50                       | C50            | 0.094                           | 4.1   |
|                                     | 1,500              | E91F3J1VNT152MC65T  | 50 × 65                       | C65            | 0.073                           | 5.0   |
| 1,800                               | E91F3J1VNT182MC80T | 50 × 80             | C80                           | 0.056          | 6.2                             |   |
| 2,700                               | E91F3J1VNT272MCA5T | 50 × 105            | CA5                           | 0.041          | 8.2                             |   |
| <b>400 Volts</b><br>450 Volts Surge | 220                | E91F401VSN221MR40T  | 30 × 40                       | R40            | 0.380                           | 1.4   |
|                                     | 330                | E91F401VSN331MR50T  | 30 × 50                       | R50            | 0.253                           | 1.8   |
|                                     | 390                | E91F401VSN391MR65T  | 30 × 65                       | R65            | 0.214                           | 2.2   |
|                                     | 330                | E91F401VSN331MA40T  | 35 × 40                       | A40            | 0.265                           | 1.9   |
|                                     | 470                | E91F401VSN471MA50T  | 35 × 50                       | A50            | 0.186                           | 2.5   |
|                                     | 680                | E91F401VND681MA65T  | 35 × 65                       | A65            | 0.129                           | 3.2   |
|                                     | 820                | E91F401VND821MA80T  | 35 × 80                       | A80            | 0.107                           | 3.8   |
|                                     | 1,000              | E91F401VND102MAA0T  | 35 × 100                      | AA0            | 0.088                           | 4.7   |
|                                     | 560                | E91F401VND561MB50T  | 40 × 50                       | B50            | 0.164                           | 2.8   |
|                                     | 820                | E91F401VND821MB65T  | 40 × 65                       | B65            | 0.112                           | 3.7   |
|                                     | 1,200              | E91F401VND122MB80T  | 40 × 80                       | B80            | 0.076                           | 4.8   |
|                                     | 1,500              | E91F401VND152MBA0T  | 40 × 100                      | BA0            | 0.061                           | 5.8   |
|                                     | 680                | E91F401VNT681MU50T  | 45 × 50                       | U50            | 0.146                           | 3.1   |
|                                     | 1,000              | E91F401VNT102MU65T  | 45 × 65                       | U65            | 0.100                           | 4.1   |

† 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.

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## 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 +20°C, 120Hz | Rated Ripple Current (A rms) at +105°C, 120Hz |
|-------------------------------------|--------------------|---------------------|-------------------------------|----------------|---------------------------------|---|
| <b>400 Volts</b><br>450 Volts Surge | 1,200              | E91F401VNT122MU80T  | 45 × 80                       | U80            | 0.083                           | 4.9   |
|                                     | 1,800              | E91F401VNT182MUA5T  | 45 × 105                      | UA5            | 0.055                           | 6.7   |
|                                     | 1,000              | E91F401VNT102MC50T  | 50 × 50                       | C50            | 0.101                           | 3.9   |
|                                     | 1,200              | E91F401VNT122MC65T  | 50 × 65                       | C65            | 0.093                           | 4.4   |
|                                     | 1,800              | E91F401VNT182MC80T  | 50 × 80                       | C80            | 0.062                           | 5.9   |
|                                     | 2,200              | E91F401VNT222MCA5T  | 50 × 105                      | CA5            | 0.051                           | 7.4   |
| <b>420 Volts</b><br>470 Volts Surge | 180                | E91F421VSN181MR40T  | 30 × 40                       | R40            | 0.442                           | 1.3   |
|                                     | 270                | E91F421VSN271MR50T  | 30 × 50                       | R50            | 0.295                           | 1.7   |
|                                     | 390                | E91F421VSN391MR65T  | 30 × 65                       | R65            | 0.204                           | 2.3   |
|                                     | 270                | E91F421VSN2711MA40T | 35 × 40                       | A40            | 0.310                           | 1.8   |
|                                     | 390                | E91F421VSN391MA50T  | 35 × 50                       | A50            | 0.214                           | 2.3   |
|                                     | 560                | E91F421VND561MA65T  | 35 × 65                       | A65            | 0.149                           | 3.0   |
|                                     | 680                | E91F421VND681MA80T  | 35 × 80                       | A80            | 0.123                           | 3.5   |
|                                     | 820                | E91F421VND821MAA0T  | 35 × 100                      | AA0            | 0.102                           | 4.3   |
|                                     | 560                | E91F421VND561MB50T  | 40 × 50                       | B50            | 0.156                           | 2.9   |
|                                     | 820                | E91F421VND821MB65T  | 40 × 65                       | B65            | 0.107                           | 3.8   |
|                                     | 1,000              | E91F421VND102MB80T  | 40 × 80                       | B80            | 0.088                           | 4.5   |
|                                     | 1,200              | E91F421VND122MBA0T  | 40 × 100                      | BA0            | 0.073                           | 5.3   |
|                                     | 680                | E91F421VNT681MU50T  | 45 × 50                       | U50            | 0.141                           | 3.2   |
|                                     | 1,000              | E91F421VNT102MU65T  | 45 × 65                       | U65            | 0.096                           | 4.2   |
|                                     | 1,200              | E91F421VNT122MU80T  | 45 × 80                       | U80            | 0.080                           | 5.0   |
|                                     | 1,700              | E91F421VNT172MUA5T  | 45 × 105                      | UA5            | 0.056                           | 6.6   |
|                                     | 820                | E91F421VNT821MC50T  | 50 × 50                       | C50            | 0.126                           | 3.5   |
|                                     | 1,200              | E91F421VNT122MC65T  | 50 × 65                       | C65            | 0.086                           | 4.6   |
| 1,500                               | E91F421VNT152MC80T | 50 × 80             | C80                           | 0.069          | 5.6                             |   |
| 2,200                               | E91F421VNT222MCA5T | 50 × 105            | CA5                           | 0.047          | 7.7                             |   |
| <b>450 Volts</b><br>500 Volts Surge | 180                | E91F451VSN181MR40T  | 30 × 40                       | R40            | 0.442                           | 1.3   |
|                                     | 220                | E91F451VSN221MR50T  | 30 × 50                       | R50            | 0.362                           | 1.5   |
|                                     | 330                | E91F451VSN331MR65T  | 30 × 65                       | R65            | 0.241                           | 2.1   |
|                                     | 270                | E91F451VSN271MA40T  | 35 × 40                       | A40            | 0.310                           | 1.8   |
|                                     | 390                | E91F451VSN391MA50T  | 35 × 50                       | A50            | 0.214                           | 2.3   |
|                                     | 470                | E91F451VND471MA65T  | 35 × 65                       | A65            | 0.178                           | 2.8   |
|                                     | 680                | E91F451VND681MA80T  | 35 × 80                       | A80            | 0.123                           | 3.5   |
|                                     | 820                | E91F451VND821MAA0T  | 35 × 100                      | AA0            | 0.102                           | 4.3   |
|                                     | 470                | E91F451VND471MB50T  | 40 × 50                       | B50            | 0.178                           | 2.7   |
|                                     | 680                | E91F451VND681MB65T  | 40 × 65                       | B65            | 0.123                           | 3.5   |
|                                     | 820                | E91F451VND821MB80T  | 40 × 80                       | B80            | 0.102                           | 4.1   |
|                                     | 1,200              | E91F451VND122MBA0T  | 40 × 100                      | BA0            | 0.070                           | 5.5   |
|                                     | 680                | E91F451VNT681MU50T  | 45 × 50                       | U50            | 0.135                           | 3.3   |
|                                     | 820                | E91F451VNT821MU65T  | 45 × 65                       | U65            | 0.112                           | 3.9   |
|                                     | 1,000              | E91F451VNT102MU80T  | 45 × 80                       | U80            | 0.092                           | 4.7   |
|                                     | 1,500              | E91F451VNT152MUA5T  | 45 × 105                      | UA5            | 0.061                           | 6.4   |
|                                     | 820                | E91F451VNT821MC50T  | 50 × 50                       | C50            | 0.121                           | 3.6   |
|                                     | 1,000              | E91F451VNT102MC65T  | 50 × 65                       | C65            | 0.100                           | 4.3   |
| 1,500                               | E91F451VNT152MC80T | 50 × 80             | C80                           | 0.066          | 5.7                             |   |
| 1,800                               | E91F451VNT182MCA5T | 50 × 105            | CA5                           | 0.055          | 7.1                             |   |
| <b>500 Volts</b><br>550 Volts Surge | 120                | E91F501VSN121MR40T  | 30 × 40                       | R40            | 0.663                           | 1.0   |
|                                     | 180                | E91F501VSN181MR50T  | 30 × 50                       | R50            | 0.442                           | 1.4   |
|                                     | 270                | E91F501VSN271MR65T  | 30 × 65                       | R65            | 0.295                           | 1.9   |
|                                     | 180                | E91F501VSN181MA40T  | 35 × 40                       | A40            | 0.442                           | 1.5   |
|                                     | 270                | E91F501VSN271MA50T  | 35 × 50                       | A50            | 0.295                           | 2.0   |
|                                     | 390                | E91F501VND391MA65T  | 35 × 65                       | A65            | 0.204                           | 2.6   |

† 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.

Product specifications are subject to change without notice.

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## 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 +20°C, 120Hz | Rated Ripple Current (A rms) at +105°C, 120Hz |
|--------------------------------------|------------------|---------------------|-------------------------------|----------------|---------------------------------|---|
| <b>500 Volts<br/>550 Volts Surge</b> | 470              | E91F501VND471MA80T  | 35 × 80                       | A80            | 0.169                           | 3.0   |
|                                      | 560              | E91F501VND561MAA0T  | 35 × 100                      | AA0            | 0.142                           | 3.7   |
|                                      | 330              | E91F501VND331MB50T  | 40 × 50                       | B50            | 0.253                           | 2.3   |
|                                      | 470              | E91F501VND471MB65T  | 40 × 65                       | B65            | 0.178                           | 2.9   |
|                                      | 680              | E91F501VND681MB80T  | 40 × 80                       | B80            | 0.123                           | 3.8   |
|                                      | 820              | E91F501VND821MBA0T  | 40 × 100                      | BA0            | 0.102                           | 4.5   |
|                                      | 390              | E91F501VNT391MU50T  | 45 × 50                       | U50            | 0.225                           | 2.5   |
|                                      | 560              | E91F501VNT561MU65T  | 45 × 65                       | U65            | 0.156                           | 3.3   |
|                                      | 820              | E91F501VNT821MU80T  | 45 × 80                       | U80            | 0.107                           | 4.3   |
|                                      | 1,000            | E91F501VNT102MUA5T  | 45 × 105                      | UA5            | 0.088                           | 5.3   |
|                                      | 560              | E91F501VNT561MC50T  | 50 × 50                       | C50            | 0.164                           | 3.1   |
|                                      | 820              | E91F501VNT821MC65T  | 50 × 65                       | C65            | 0.112                           | 4.0   |
|                                      | 1,000            | E91F501VNT102MC80T  | 50 × 80                       | C80            | 0.092                           | 4.9   |
|                                      | 1,200            | E91F501VNT122MCA5T  | 50 × 105                      | CA5            | 0.076                           | 6.0   |

† 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.

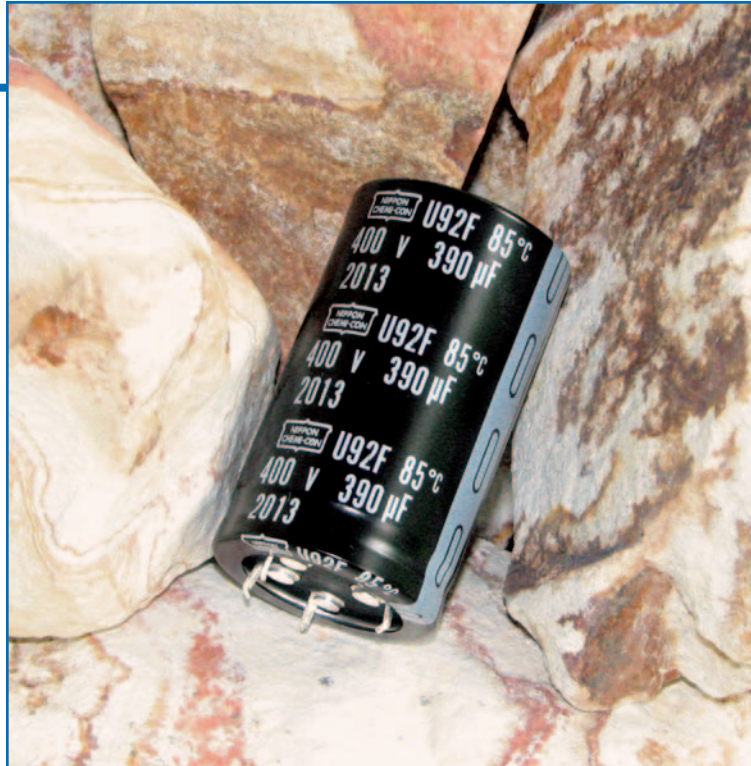
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# U92F Series



- Snap Mount
- Specific Design For Higher Ripple Current
- 350 to 500VDC Voltage Range
- RoHS Compliant
- +85°C Maximum Temperature
- 5,000 Hours Lifetime at +85°C



The U92F series is a specifically designed series for higher ripple current capability. The U92F capacitors have an endurance rating of 5,000 hours at +85°C with the rated ripple current applied. All U92F series capacitors are RoHS compliant and available in a variety of sizes, with or without an end disk, and encased in a PET sleeve or standard Pb-free PVC sleeve. 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: 180 to 3,300µF.
- Voltage range: 350 to 500VDC.
- Category temperature range: -25°C to +85°C.
- Leakage current:  $3\sqrt{CV}$  (µA) or 3mA, whichever is smaller, after 5 minutes at +20°C.
- Standard capacitance tolerance: ±20%
- Nominal case size (D×L): 30×40mm to 50×105mm.
- Rated lifetime: 5,000 hours at +85°C with the rated ripple current applied.

## U92F Specifications - Snap Mount

| Item                             | Characteristics   |                   |         |                   |                 |        |      |                  |      |       |       |      |       |        |          |      |      |      |      |      |      |      |      |      |      |      |      |      |
|----------------------------------|---|-------------------|---------|-------------------|-----------------|--------|------|------------------|------|-------|-------|------|-------|--------|----------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Category Temperature Range       | - 25 to +85°C   |                   |         |                   |                 |        |      |                  |      |       |       |      |       |        |          |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Rated Voltage Range              | 350 to 500VDC   |                   |         |                   |                 |        |      |                  |      |       |       |      |       |        |          |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Capacitance Range                | 180 to 3,300μF  |                   |         |                   |                 |        |      |                  |      |       |       |      |       |        |          |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Capacitance Tolerance            | ±20% (M) at +20°C, 120Hz  |                   |         |                   |                 |        |      |                  |      |       |       |      |       |        |          |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Leakage Current                  | $I = 3\sqrt{CV}$ (μA) or 3mA, whichever is smaller, after 5 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<br><table border="1"> <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>  | Rated Voltage (V) | 350-400 | 420-500           | Tan δ (DF) Max. | 0.15   | 0.20 |                  |      |       |       |      |       |        |          |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Rated Voltage (V)                | 350-400   | 420-500           |         |                   |                 |        |      |                  |      |       |       |      |       |        |          |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Tan δ (DF) Max.                  | 0.15  | 0.20              |         |                   |                 |        |      |                  |      |       |       |      |       |        |          |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Low Temperature Characteristics  | At 120Hz, impedance (Z) ratio between the -25°C value and +20°C value shall not exceed the values given below.<br><table border="1"> <tr> <td>Rated Voltage (V)</td> <td>350-500</td> </tr> <tr> <td>Z(-25°C)/Z(+20°C)</td> <td>8</td> </tr> </table>   | Rated Voltage (V) | 350-500 | Z(-25°C)/Z(+20°C) | 8               |        |      |                  |      |       |       |      |       |        |          |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Rated Voltage (V)                | 350-500   |                   |         |                   |                 |        |      |                  |      |       |       |      |       |        |          |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Z(-25°C)/Z(+20°C)                | 8   |                   |         |                   |                 |        |      |                  |      |       |       |      |       |        |          |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Rated Ripple Current Multipliers | Ambient Temperature (°C)<br><table border="1"> <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 border="1"> <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> | +45°C             | +65°C   | +85°C             | 2.82            | 1.73   | 1.00 | DC Rated Voltage | 50Hz | 120Hz | 300Hz | 1kHz | 10kHz | 100kHz | 350-450V | 0.77 | 1.00 | 1.16 | 1.30 | 1.41 | 1.43 | 500V | 0.70 | 1.00 | 1.16 | 1.30 | 1.41 | 1.43 |
| +45°C                            | +65°C   | +85°C             |         |                   |                 |        |      |                  |      |       |       |      |       |        |          |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 2.82                             | 1.73  | 1.00              |         |                   |                 |        |      |                  |      |       |       |      |       |        |          |      |      |      |      |      |      |      |      |      |      |      |      |      |
| DC Rated Voltage                 | 50Hz  | 120Hz             | 300Hz   | 1kHz              | 10kHz           | 100kHz |      |                  |      |       |       |      |       |        |          |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 350-450V                         | 0.77  | 1.00              | 1.16    | 1.30              | 1.41            | 1.43   |      |                  |      |       |       |      |       |        |          |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 500V                             | 0.70  | 1.00              | 1.16    | 1.30              | 1.41            | 1.43   |      |                  |      |       |       |      |       |        |          |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Endurance (Load Life)            | The following specifications shall be satisfied when the capacitors are restored to +20°C after subjecting them to DC voltage for 5,000 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  |                   |         |                   |                 |        |      |                  |      |       |       |      |       |        |          |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Shelf Life                       | The following specifications shall be satisfied when the capacitors are restored to +20°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  |                   |         |                   |                 |        |      |                  |      |       |       |      |       |        |          |      |      |      |      |      |      |      |      |      |      |      |      |      |

Product specifications are subject to change without notice.

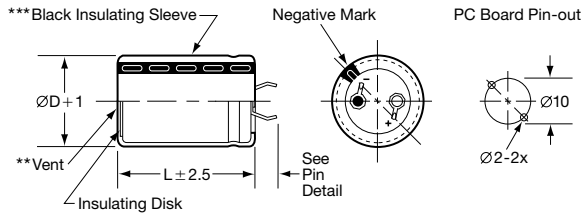
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## Diagram of Dimensions - Snap Mount

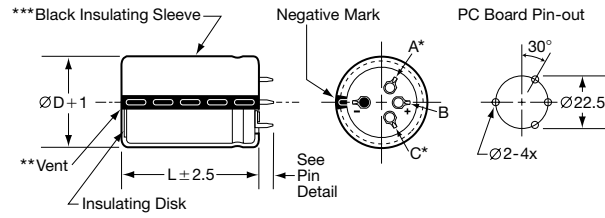
### Snap Mount

Unit: mm

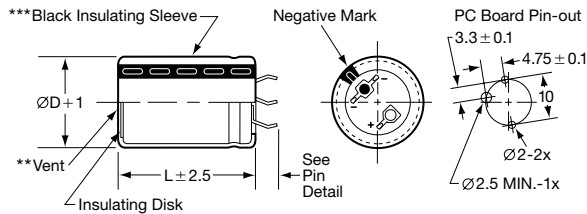
#### VSN Snap-in $\varnothing 30$ and $\varnothing 35$ standard VNN Snap-in $\varnothing 30$ and $\varnothing 35$ optional



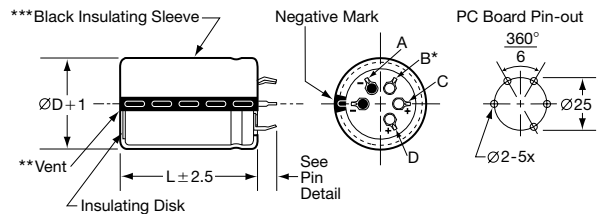
#### VND Snap-in $\varnothing 35$ and $\varnothing 40$ standard; $\varnothing 45$ optional VSD Snap-in $\varnothing 35$ and $\varnothing 40$ optional



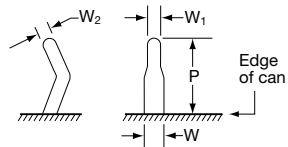
#### VEN Snap-in $\varnothing 30$ and $\varnothing 35$ optional



#### VNT Snap-in $\varnothing 45$ and $\varnothing 50$ standard



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



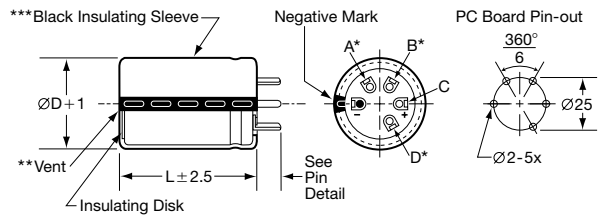
| Type                                | P             | W             | W <sub>1</sub> | W <sub>2</sub> |
|-------------------------------------|---------------|---------------|----------------|----------------|
| VSN $\varnothing 30$                | $4.0 \pm 0.5$ |               |                |                |
| VSN $\varnothing 35$                | $3.5 \pm 0.5$ |               |                |                |
| VNN $\varnothing 30-\varnothing 35$ | $5.8 \pm 1.0$ |               |                |                |
| VEN $\varnothing 30-\varnothing 35$ | $4.0 \pm 0.5$ | $1.5 \pm 0.2$ | $0.8 \pm 0.1$  | $0.8 \pm 0.1$  |
| VSD $\varnothing 35-\varnothing 40$ | $3.5 \pm 1.0$ |               |                |                |
| VND $\varnothing 35-\varnothing 45$ | $5.8 \pm 1.0$ |               |                |                |
| VNT $\varnothing 45-\varnothing 50$ | $5.8 \pm 1.0$ |               |                |                |

#### CAUTION:

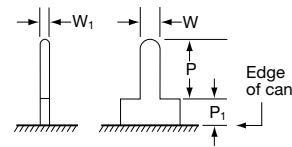
- \* Use the blank terminals for mechanical support only. The blank terminals must not be connected to a solder trace on the PC board but be electrically isolated from the negative and positive terminals.
- \*\* The vent may be located either on the bottom or side of the can.
- \*\*\* The black sleeve 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 $\varnothing 40$ , $\varnothing 45$ and $\varnothing 50$ optional



#### VQ Standoff Pin Dimensions



| Type              | P              | P <sub>1</sub> | W             | W <sub>1</sub> |
|-------------------|----------------|----------------|---------------|----------------|
| Standoff Pin (VQ) | $3.75 \pm 1.0$ | 2.0 max.       | $1.5 \pm 0.1$ | $0.7 \pm 0.2$  |

## Part Numbering System for U92F Series

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

**18 Fields**

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

E 9 2 F 4 0 1 V S N 5 6 1 M R 6 5 T

- Capacitor Type.** Field 1.  
Aluminum Electrolytic Capacitor (Polar).
- 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.
- 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. 4R0 = 4.0VDC; 400 = 40VDC; 401 = 400VDC).  
Rule Exception: Coding for rated voltage 385VDC = 3J1.
- 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.
- Dummy Terminals.** Field 10.  
N = No dummy terminals.  
D = 2 dummy terminals.  
T = 3 dummy terminals.
- 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. 5R6 = 5.6µF; 560 = 56µF; 561 = 560µF; 562 = 5,600µF; 563 = 56,000µF).
- Capacitance Tolerance.** Field 14.  
M = ±20%
- 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
- Supplement Code.** Field 18.  
All construction options listed have Sn100% terminal plating.  
T = Pb-free PVC sleeve with end disk.  
M = Pb-free PVC sleeve without end disk.  
W = PET sleeve with end disk.  
S = PET sleeve without end disk.

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## 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 +20°C, 120Hz | Rated Ripple Current (A rms) at +85°C, 120Hz |
|--------------------------------------|--------------------|---------------------|-------------------------------|----------------|---------------------------------|--|
| <b>350 Volts<br/>400 Volts Surge</b> | 330                | E92F351VSN331MR40T  | 30 × 40                       | R40            | 0.338                           | 2.0  |
|                                      | 470                | E92F351VSN471MR50T  | 30 × 50                       | R50            | 0.237                           | 2.6  |
|                                      | 680                | E92F351VSN681MR65T  | 30 × 65                       | R65            | 0.164                           | 3.5  |
|                                      | 560                | E92F351VSN561MA40T  | 35 × 40                       | A40            | 0.192                           | 3.2  |
|                                      | 680                | E92F351VSN681MA50T  | 35 × 50                       | A50            | 0.158                           | 3.8  |
|                                      | 1,000              | E92F351VND102MA65T  | 35 × 65                       | A65            | 0.107                           | 5.0  |
|                                      | 1,200              | E92F351VND122MA80T  | 35 × 80                       | A80            | 0.090                           | 5.9  |
|                                      | 1,800              | E92F351VND182MAA0T  | 35 × 100                      | AA0            | 0.060                           | 8.0  |
|                                      | 820                | E92F351VND821MB50T  | 40 × 50                       | B50            | 0.126                           | 4.5  |
|                                      | 1,200              | E92F351VND122MB65T  | 40 × 65                       | B65            | 0.086                           | 5.9  |
|                                      | 1,500              | E92F351VND152MB80T  | 40 × 80                       | B80            | 0.069                           | 7.1  |
|                                      | 2,200              | E92F351VND222MBA0T  | 40 × 100                      | BA0            | 0.047                           | 9.4  |
|                                      | 1,200              | E92F351VNT122MU50T  | 45 × 50                       | U50            | 0.093                           | 5.6  |
|                                      | 1,500              | E92F351VNT152MU65T  | 45 × 65                       | U65            | 0.074                           | 6.8  |
|                                      | 2,200              | E92F351VNT222MU80T  | 45 × 80                       | U80            | 0.051                           | 8.9  |
|                                      | 2,700              | E92F351VNT272MUA5T  | 45 × 105                      | UA5            | 0.041                           | 10.9   |
|                                      | 1,500              | E92F351VNT152MC50T  | 50 × 50                       | C50            | 0.082                           | 6.2  |
|                                      | 2,200              | E92F351VNT222MC65T  | 50 × 65                       | C65            | 0.056                           | 8.1  |
| 2,700                                | E92F351VNT272MC80T | 50 × 80             | C80                           | 0.046          | 9.8                             |  |
| 3,300                                | E92F351VNT332MCA5T | 50 × 105            | CA5                           | 0.037          | 12.2                            |  |
| <b>385 Volts<br/>435 Volts Surge</b> | 330                | E92F3J1VSN331MR40T  | 30 × 40                       | R40            | 0.302                           | 2.1  |
|                                      | 390                | E92F3J1VSN391MR50T  | 30 × 50                       | R50            | 0.255                           | 2.5  |
|                                      | 560                | E92F3J1VSN561MR65T  | 30 × 65                       | R65            | 0.178                           | 3.4  |
|                                      | 470                | E92F3J1VSN471MA40T  | 35 × 40                       | A40            | 0.195                           | 3.1  |
|                                      | 560                | E92F3J1VSN561MA50T  | 35 × 50                       | A50            | 0.164                           | 3.8  |
|                                      | 820                | E92F3J1VND821MA65T  | 35 × 65                       | A65            | 0.112                           | 4.9  |
|                                      | 1,200              | E92F3J1VND122MA80T  | 35 × 80                       | A80            | 0.076                           | 6.4  |
|                                      | 1,500              | E92F3J1VND152MAA0T  | 35 × 100                      | AA0            | 0.061                           | 7.9  |
|                                      | 820                | E92F3J1VND821MB50T  | 40 × 50                       | B50            | 0.121                           | 4.6  |
|                                      | 1,200              | E92F3J1VND122MB65T  | 40 × 65                       | B65            | 0.083                           | 6.0  |
|                                      | 1,500              | E92F3J1VND152MB80T  | 40 × 80                       | B80            | 0.066                           | 7.3  |
|                                      | 1,800              | E92F3J1VND182MBA0T  | 40 × 100                      | BA0            | 0.055                           | 8.7  |
|                                      | 1,000              | E92F3J1VNT102MU50T  | 45 × 50                       | U50            | 0.111                           | 5.1  |
|                                      | 1,500              | E92F3J1VNT152MU65T  | 45 × 65                       | U65            | 0.074                           | 6.8  |
|                                      | 1,800              | E92F3J1VNT182MU80T  | 45 × 80                       | U80            | 0.062                           | 8.0  |
|                                      | 2,200              | E92F3J1VNT222MUA5T  | 45 × 105                      | UA5            | 0.051                           | 9.9  |
|                                      | 1,200              | E92F3J1VNT122MC50T  | 50 × 50                       | C50            | 0.103                           | 5.5  |
|                                      | 1,800              | E92F3J1VNT182MC65T  | 50 × 65                       | C65            | 0.069                           | 7.3  |
| 2,200                                | E92F3J1VNT222MC80T | 50 × 80             | C80                           | 0.056          | 8.8                             |  |
| 3,300                                | E92F3J1VNT332MCA5T | 50 × 105            | CA5                           | 0.037          | 12.2                            |  |
| <b>400 Volts<br/>450 Volts Surge</b> | 270                | E92F401VSN271MR40T  | 30 × 40                       | R40            | 0.339                           | 2.0  |
|                                      | 390                | E92F401VSN391MR50T  | 30 × 50                       | R50            | 0.235                           | 2.6  |
|                                      | 560                | E92F401VSN561MR65T  | 30 × 65                       | R65            | 0.164                           | 3.5  |
|                                      | 390                | E92F401VSN391MA40T  | 35 × 40                       | A40            | 0.225                           | 2.9  |
|                                      | 560                | E92F401VSN561MA50T  | 35 × 50                       | A50            | 0.156                           | 3.9  |
|                                      | 820                | E92F401VND821MA65T  | 35 × 65                       | A65            | 0.107                           | 5.0  |
|                                      | 1,000              | E92F401VND102MA80T  | 35 × 80                       | A80            | 0.088                           | 5.9  |
|                                      | 1,200              | E92F401VND122MAA0T  | 35 × 100                      | AA0            | 0.073                           | 7.2  |
|                                      | 680                | E92F401VND681MB50T  | 40 × 50                       | B50            | 0.141                           | 4.3  |
|                                      | 1,000              | E92F401VND102MB65T  | 40 × 65                       | B65            | 0.096                           | 5.6  |
|                                      | 1,200              | E92F401VND122MB80T  | 40 × 80                       | B80            | 0.080                           | 6.6  |
|                                      | 1,800              | E92F401VND182MBA0T  | 40 × 100                      | BA0            | 0.053                           | 8.8  |
|                                      | 1,000              | E92F401VNT102MU50T  | 45 × 50                       | U50            | 0.100                           | 5.4  |
|                                      | 1,200              | E92F401VNT122MU65T  | 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.

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## 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 +20°C, 120Hz | Rated Ripple Current (A rms) at +85°C, 120Hz |
|-------------------------------------|--------------------|---------------------|-------------------------------|----------------|---------------------------------|--|
| <b>400 Volts</b><br>450 Volts Surge | 1,800              | E92F401VNT182MU80T  | 45 × 80                       | U80            | 0.055                           | 8.5  |
|                                     | 2,200              | E92F401VNT222MUA5T  | 45 × 105                      | UA5            | 0.045                           | 10.4   |
|                                     | 1,200              | E92F401VNT122MC50T  | 50 × 50                       | C50            | 0.093                           | 5.6  |
|                                     | 1,800              | E92F401VNT182MC65T  | 50 × 65                       | C65            | 0.062                           | 7.7  |
|                                     | 2,200              | E92F401VNT222MC80T  | 50 × 80                       | C80            | 0.051                           | 9.3  |
|                                     | 2,700              | E92F401VNT272MCA5T  | 50 × 105                      | CA5            | 0.041                           | 11.6   |
| <b>420 Volts</b><br>470 Volts Surge | 220                | E92F421VSN221MR40T  | 30 × 40                       | R40            | 0.331                           | 2.0  |
|                                     | 330                | E92F421VSN331MR50T  | 30 × 50                       | R50            | 0.241                           | 2.6  |
|                                     | 470                | E92F421VSN471MR65T  | 30 × 65                       | R65            | 0.172                           | 3.5  |
|                                     | 390                | E92F421VSN391MA40T  | 35 × 40                       | A40            | 0.213                           | 3.0  |
|                                     | 560                | E92F421VSN561MA50T  | 35 × 50                       | A50            | 0.155                           | 3.9  |
|                                     | 680                | E92F421VND681MA65T  | 35 × 65                       | A65            | 0.110                           | 5.0  |
|                                     | 1,000              | E92F421VND102MA80T  | 35 × 80                       | A80            | 0.086                           | 6.0  |
|                                     | 1,200              | E92F421VND122MAA0T  | 35 × 100                      | AA0            | 0.066                           | 7.6  |
|                                     | 560                | E92F421VND561MB50T  | 40 × 50                       | B50            | 0.131                           | 4.4  |
|                                     | 820                | E92F421VND821MB65T  | 40 × 65                       | B65            | 0.094                           | 5.7  |
|                                     | 1,200              | E92F421VND122MB80T  | 40 × 80                       | B80            | 0.073                           | 6.9  |
|                                     | 1,500              | E92F421VND152MBA0T  | 40 × 100                      | BA0            | 0.057                           | 8.6  |
|                                     | 820                | E92F421VNT821MU50T  | 45 × 50                       | U50            | 0.110                           | 5.1  |
|                                     | 1,200              | E92F421VNT122MU65T  | 45 × 65                       | U65            | 0.079                           | 6.6  |
|                                     | 1,500              | E92F421VNT152MU80T  | 45 × 80                       | U80            | 0.062                           | 8.0  |
|                                     | 1,800              | E92F421VNT182MUA5T  | 45 × 105                      | UA5            | 0.045                           | 10.5   |
|                                     | 1,000              | E92F421VNT102MC50T  | 50 × 50                       | C50            | 0.093                           | 5.6  |
|                                     | 1,500              | E92F421VNT152MC65T  | 50 × 65                       | C65            | 0.067                           | 7.4  |
| 1,800                               | E92F421VNT182MC80T | 50 × 80             | C80                           | 0.052          | 9.1                             |  |
| 2,700                               | E92F421VNT272MCA5T | 50 × 105            | CA5                           | 0.038          | 12.1                            |  |
| <b>450 Volts</b><br>500 Volts Surge | 220                | E92F451VSN221MR40T  | 30 × 40                       | R40            | 0.340                           | 2.0  |
|                                     | 330                | E92F451VSN331MR50T  | 30 × 50                       | R50            | 0.248                           | 2.6  |
|                                     | 390                | E92F451VSN391MR65T  | 30 × 65                       | R65            | 0.177                           | 3.4  |
|                                     | 390                | E92F451VSN391MA40T  | 35 × 40                       | A40            | 0.249                           | 2.8  |
|                                     | 470                | E92F451VSN471MA50T  | 35 × 50                       | A50            | 0.159                           | 3.8  |
|                                     | 680                | E92F451VND681MA65T  | 35 × 65                       | A65            | 0.113                           | 4.9  |
|                                     | 820                | E92F451VND821MA80T  | 35 × 80                       | A80            | 0.088                           | 5.9  |
|                                     | 1,000              | E92F451VND102MAA0T  | 35 × 100                      | AA0            | 0.068                           | 7.5  |
|                                     | 560                | E92F451VND561MB50T  | 40 × 50                       | B50            | 0.135                           | 4.4  |
|                                     | 820                | E92F451VND821MB65T  | 40 × 65                       | B65            | 0.097                           | 5.6  |
|                                     | 1,000              | E92F451VND102MB80T  | 40 × 80                       | B80            | 0.075                           | 6.8  |
|                                     | 1,200              | E92F451VND122MBA0T  | 40 × 100                      | BA0            | 0.058                           | 8.4  |
|                                     | 680                | E92F451VNT681MU50T  | 45 × 50                       | U50            | 0.114                           | 5.0  |
|                                     | 1,000              | E92F451VNT102MU65T  | 45 × 65                       | U65            | 0.081                           | 6.5  |
|                                     | 1,200              | E92F451VNT122MU80T  | 45 × 80                       | U80            | 0.063                           | 7.9  |
|                                     | 1,800              | E92F451VNT182MUA5T  | 45 × 105                      | UA5            | 0.046                           | 10.3   |
|                                     | 820                | E92F451VNT821MC50T  | 50 × 50                       | C50            | 0.093                           | 5.6  |
|                                     | 1,200              | E92F451VNT122MC65T  | 50 × 65                       | C65            | 0.066                           | 7.4  |
| 1,500                               | E92F451VNT152MC80T | 50 × 80             | C80                           | 0.052          | 9.2                             |  |
| 2,200                               | E92F451VNT222MCA5T | 50 × 105            | CA5                           | 0.038          | 12.1                            |  |
| <b>500 Volts</b><br>550 Volts Surge | 180                | E92F501VSN181MR40T  | 30 × 40                       | R40            | 0.464                           | 1.7  |
|                                     | 220                | E92F501VSN221MR50T  | 30 × 50                       | R50            | 0.380                           | 2.1  |
|                                     | 330                | E92F501VSN331MR65T  | 30 × 65                       | R65            | 0.253                           | 2.8  |
|                                     | 270                | E92F501VSN271MA40T  | 35 × 40                       | A40            | 0.295                           | 2.6  |
|                                     | 330                | E92F501VSN331MA50T  | 35 × 50                       | A50            | 0.241                           | 3.1  |
|                                     | 470                | E92F501VND471MA65T  | 35 × 65                       | A65            | 0.169                           | 4.0  |

† 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.

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## 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 +20°C, 120Hz | Rated Ripple Current (A rms) at +85°C, 120Hz |
|--------------------------------------|------------------|---------------------|-------------------------------|----------------|---------------------------------|--|
| <b>500 Volts<br/>550 Volts Surge</b> | 560              | E92F501VND561MA80T  | 35 × 80                       | A80            | 0.142                           | 4.7  |
|                                      | 820              | E92F501VND821MAA0T  | 35 × 100                      | AA0            | 0.097                           | 6.2  |
|                                      | 470              | E92F501VND471MB50T  | 40 × 50                       | B50            | 0.178                           | 3.8  |
|                                      | 680              | E92F501VND681MB65T  | 40 × 65                       | B65            | 0.123                           | 5.0  |
|                                      | 820              | E92F501VND821MB80T  | 40 × 80                       | B80            | 0.102                           | 5.8  |
|                                      | 1,200            | E92F501VND122MBA0T  | 40 × 100                      | BA0            | 0.070                           | 7.7  |
|                                      | 560              | E92F501VNT561MU50T  | 45 × 50                       | U50            | 0.164                           | 4.2  |
|                                      | 820              | E92F501VNT821MU65T  | 45 × 65                       | U65            | 0.112                           | 5.5  |
|                                      | 1,200            | E92F501VNT122MU80T  | 45 × 80                       | U80            | 0.076                           | 7.2  |
|                                      | 1,500            | E92F501VNT152MUA5T  | 45 × 105                      | UA5            | 0.061                           | 9.0  |
|                                      | 820              | E92F501VNT821MC50T  | 50 × 50                       | C50            | 0.121                           | 4.9  |
|                                      | 1,200            | E92F501VNT122MC65T  | 50 × 65                       | C65            | 0.083                           | 6.6  |
|                                      | 1,500            | E92F501VNT152MC80T  | 50 × 80                       | C80            | 0.066                           | 8.1  |
|                                      | 1,800            | E92F501VNT182MCA5T  | 50 × 105                      | CA5            | 0.055                           | 10.0   |

† 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.

# U92L Series



- **Snap Mount**
- **Specific Design For Higher Ripple Current**
- **350 to 500VDC Voltage Range**
- **RoHS Compliant**
- **+85°C Maximum Temperature**
- **10,000 Hours Lifetime at +85°C**



The U92L series is a longer life series specifically designed for higher ripple current capability. The U92L capacitors have an endurance rating of 10,000 hours at +85°C with the rated ripple current applied. All U92L series capacitors are RoHS compliant and available in a variety of sizes, with or without an end disk, and encased in a PET sleeve or standard Pb-free PVC sleeve. 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: -25°C to +85°C.**
- **Leakage current:  $3\sqrt{CV}$  (µA) or 3mA, whichever is smaller, after 5 minutes at +20°C.**
- **Standard capacitance tolerance: ±20%**
- **Nominal case size (D×L): 30×40mm to 50×105mm.**
- **Rated lifetime: 10,000 hours at +85°C with the rated ripple current applied.**

## U92L Specifications - Snap Mount

| Item                             | Characteristics   |                   |         |                   |                 |        |      |                  |      |       |       |      |       |        |          |      |      |      |      |      |      |      |      |      |      |      |      |      |
|----------------------------------|---|-------------------|---------|-------------------|-----------------|--------|------|------------------|------|-------|-------|------|-------|--------|----------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Category Temperature Range       | - 25 to +85°C   |                   |         |                   |                 |        |      |                  |      |       |       |      |       |        |          |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Rated Voltage Range              | 350 to 500VDC   |                   |         |                   |                 |        |      |                  |      |       |       |      |       |        |          |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Capacitance Range                | 150 to 3,300μF  |                   |         |                   |                 |        |      |                  |      |       |       |      |       |        |          |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Capacitance Tolerance            | ±20% (M) at +20°C, 120Hz  |                   |         |                   |                 |        |      |                  |      |       |       |      |       |        |          |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Leakage Current                  | $I = 3\sqrt{CV}$ (μA) or 3mA, whichever is smaller, after 5 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<br><table border="1"> <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>  | Rated Voltage (V) | 350-400 | 420-500           | Tan δ (DF) Max. | 0.15   | 0.20 |                  |      |       |       |      |       |        |          |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Rated Voltage (V)                | 350-400   | 420-500           |         |                   |                 |        |      |                  |      |       |       |      |       |        |          |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Tan δ (DF) Max.                  | 0.15  | 0.20              |         |                   |                 |        |      |                  |      |       |       |      |       |        |          |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Low Temperature Characteristics  | At 120Hz, impedance (Z) ratio between the -25°C value and +20°C value shall not exceed the values given below.<br><table border="1"> <tr> <td>Rated Voltage (V)</td> <td>350-500</td> </tr> <tr> <td>Z(-25°C)/Z(+20°C)</td> <td>8</td> </tr> </table>   | Rated Voltage (V) | 350-500 | Z(-25°C)/Z(+20°C) | 8               |        |      |                  |      |       |       |      |       |        |          |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Rated Voltage (V)                | 350-500   |                   |         |                   |                 |        |      |                  |      |       |       |      |       |        |          |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Z(-25°C)/Z(+20°C)                | 8   |                   |         |                   |                 |        |      |                  |      |       |       |      |       |        |          |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Rated Ripple Current Multipliers | Ambient Temperature (°C)<br><table border="1"> <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 border="1"> <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> | +45°C             | +65°C   | +85°C             | 2.82            | 1.73   | 1.00 | DC Rated Voltage | 50Hz | 120Hz | 300Hz | 1kHz | 10kHz | 100kHz | 350-450V | 0.77 | 1.00 | 1.16 | 1.30 | 1.41 | 1.43 | 500V | 0.70 | 1.00 | 1.16 | 1.30 | 1.41 | 1.43 |
| +45°C                            | +65°C   | +85°C             |         |                   |                 |        |      |                  |      |       |       |      |       |        |          |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 2.82                             | 1.73  | 1.00              |         |                   |                 |        |      |                  |      |       |       |      |       |        |          |      |      |      |      |      |      |      |      |      |      |      |      |      |
| DC Rated Voltage                 | 50Hz  | 120Hz             | 300Hz   | 1kHz              | 10kHz           | 100kHz |      |                  |      |       |       |      |       |        |          |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 350-450V                         | 0.77  | 1.00              | 1.16    | 1.30              | 1.41            | 1.43   |      |                  |      |       |       |      |       |        |          |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 500V                             | 0.70  | 1.00              | 1.16    | 1.30              | 1.41            | 1.43   |      |                  |      |       |       |      |       |        |          |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Endurance (Load Life)            | The following specifications shall be satisfied when the capacitors are restored to +20°C after subjecting them to DC voltage for 10,000 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   |                   |         |                   |                 |        |      |                  |      |       |       |      |       |        |          |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Shelf Life                       | The following specifications shall be satisfied when the capacitors are restored to +20°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  |                   |         |                   |                 |        |      |                  |      |       |       |      |       |        |          |      |      |      |      |      |      |      |      |      |      |      |      |      |

Product specifications are subject to change without notice.

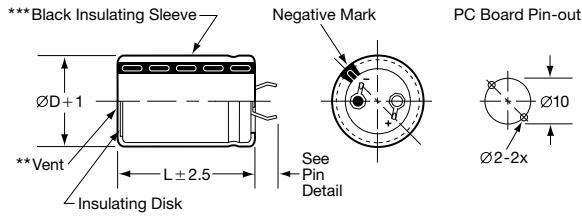
Ask for UCC product bulletins and review specifications before purchase and/or use. Please use our products based on parameters specified in our bulletins.

## Diagram of Dimensions - Snap Mount

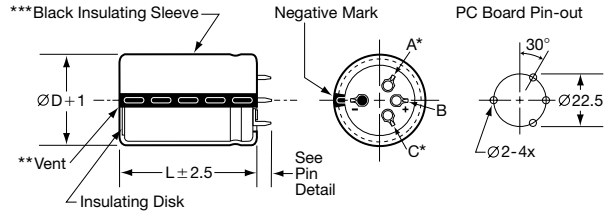
### Snap Mount

Unit: mm

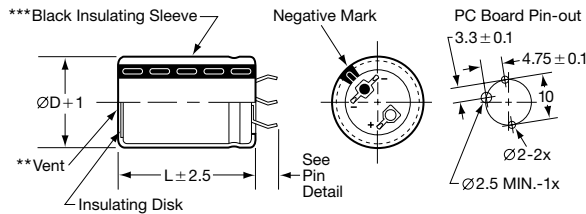
**VSN Snap-in  $\varnothing 30$  and  $\varnothing 35$  standard**  
**VNN Snap-in  $\varnothing 30$  and  $\varnothing 35$  optional**



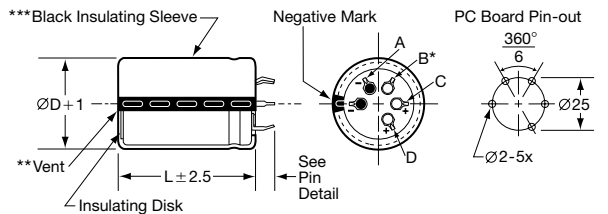
**VND Snap-in  $\varnothing 35$  and  $\varnothing 40$  standard;  $\varnothing 45$  optional**  
**VSD Snap-in  $\varnothing 35$  and  $\varnothing 40$  optional**



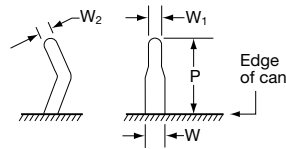
**VEN Snap-in  $\varnothing 30$  and  $\varnothing 35$  optional**



**VNT Snap-in  $\varnothing 45$  and  $\varnothing 50$  standard**



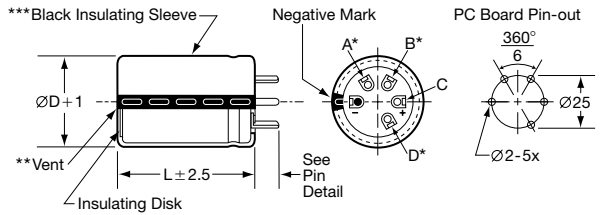
### VS, VE & VN Snap-in Pin Dimensions



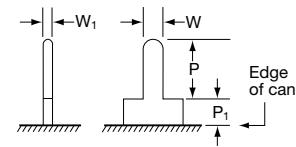
| Type                                    | P         | W         | W <sub>1</sub> | W <sub>2</sub> |
|---|-----------|-----------|----------------|----------------|
| VSN $\varnothing 30$                    | 4.0 ± 0.5 |           |                |                |
| VSN $\varnothing 35$                    | 3.5 ± 0.5 |           |                |                |
| VNN $\varnothing 30$ - $\varnothing 35$ | 5.8 ± 1.0 |           |                |                |
| VEN $\varnothing 30$ - $\varnothing 35$ | 4.0 ± 0.5 | 1.5 ± 0.2 | 0.8 ± 0.1      | 0.8 ± 0.1      |
| VSD $\varnothing 35$ - $\varnothing 40$ | 3.5 ± 1.0 |           |                |                |
| VND $\varnothing 35$ - $\varnothing 45$ | 5.8 ± 1.0 |           |                |                |
| VNT $\varnothing 45$ - $\varnothing 50$ | 5.8 ± 1.0 |           |                |                |

### Straight Pin Mount

**VQT Straight Standoff  $\varnothing 40$ ,  $\varnothing 45$  and  $\varnothing 50$  optional**



### VQ Standoff Pin Dimensions



| Type              | P          | P <sub>1</sub> | W         | W <sub>1</sub> |
|-------------------|------------|----------------|-----------|----------------|
| Standoff Pin (VQ) | 3.75 ± 1.0 | 2.0 max.       | 1.5 ± 0.1 | 0.7 ± 0.2      |

### 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.

Product specifications are subject to change without notice.

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## Part Numbering System for U92L Series

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

**18 Fields**

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

**E 9 2 L 4 5 1 V S N 4 7 1 M A 5 0 T**

- 9 Supplement Code.** Field 18.  
All construction options listed have Sn100% terminal plating.  
T = Pb-free PVC sleeve with end disk.  
M = Pb-free PVC sleeve without end disk.  
W = PET sleeve with end disk.  
S = PET sleeve without end disk.
- 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. 4R7 = 4.7µF; 470 = 47µF; 471 = 470µF; 472 = 4,700µF; 473 = 47,000µF).
- 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. 4R5 = 4.5VDC; 450 = 45VDC; 451 = 450VDC).  
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).

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## 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 +20°C, 120Hz | Rated Ripple Current (A rms) at +85°C, 120Hz |
|--------------------------------------|--------------------|---------------------|-------------------------------|----------------|---------------------------------|--|
| <b>350 Volts<br/>400 Volts Surge</b> | 330                | E92L351VSN331MR40T  | 30 × 40                       | R40            | 0.314                           | 2.1  |
|                                      | 470                | E92L351VSN471MR50T  | 30 × 50                       | R50            | 0.220                           | 2.7  |
|                                      | 680                | E92L351VSN681MR65T  | 30 × 65                       | R65            | 0.152                           | 3.7  |
|                                      | 470                | E92L351VSN471MA40T  | 35 × 40                       | A40            | 0.212                           | 3.0  |
|                                      | 680                | E92L351VSN681MA50T  | 35 × 50                       | A50            | 0.146                           | 4.0  |
|                                      | 1,000              | E92L351VND102MA65T  | 35 × 65                       | A65            | 0.100                           | 5.2  |
|                                      | 1,200              | E92L351VND122MA80T  | 35 × 80                       | A80            | 0.083                           | 6.1  |
|                                      | 1,500              | E92L351VND152MAA0T  | 35 × 100                      | AA0            | 0.066                           | 7.6  |
|                                      | 820                | E92L351VND821MB50T  | 40 × 50                       | B50            | 0.126                           | 4.5  |
|                                      | 1,200              | E92L351VND122MB65T  | 40 × 65                       | B65            | 0.086                           | 5.9  |
|                                      | 1,500              | E92L351VND152MB80T  | 40 × 80                       | B80            | 0.069                           | 7.1  |
|                                      | 2,200              | E92L351VND222MBA0T  | 40 × 100                      | BA0            | 0.047                           | 9.4  |
|                                      | 1,200              | E92L351VNT122MU50T  | 45 × 50                       | U50            | 0.096                           | 5.5  |
|                                      | 1,500              | E92L351VNT152MU65T  | 45 × 65                       | U65            | 0.077                           | 6.7  |
|                                      | 2,200              | E92L351VNT222MU80T  | 45 × 80                       | U80            | 0.052                           | 8.7  |
|                                      | 2,700              | E92L351VNT272MUA5T  | 45 × 105                      | UA5            | 0.043                           | 10.7   |
|                                      | 1,500              | E92L351VNT152MC50T  | 50 × 50                       | C50            | 0.088                           | 5.8  |
| 2,200                                | E92L351VNT222MC65T | 50 × 65             | C65                           | 0.060          | 7.8                             |  |
| 2,700                                | E92L351VNT272MC80T | 50 × 80             | C80                           | 0.049          | 9.5                             |  |
| 3,300                                | E92L351VNT332MCA5T | 50 × 105            | CA5                           | 0.040          | 11.8                            |  |
| <b>385 Volts<br/>435 Volts Surge</b> | 270                | E92L3J1VSN271MR40T  | 30 × 40                       | R40            | 0.369                           | 1.9  |
|                                      | 390                | E92L3J1VSN391MR50T  | 30 × 50                       | R50            | 0.255                           | 2.5  |
|                                      | 560                | E92L3J1VSN561MR65T  | 30 × 65                       | R65            | 0.178                           | 3.4  |
|                                      | 470                | E92L3J1VSN471MA40T  | 35 × 40                       | A40            | 0.203                           | 3.1  |
|                                      | 560                | E92L3J1VSN561MA50T  | 35 × 50                       | A50            | 0.171                           | 3.7  |
|                                      | 820                | E92L3J1VND821MA65T  | 35 × 65                       | A65            | 0.117                           | 4.8  |
|                                      | 1,200              | E92L3J1VND122MA80T  | 35 × 80                       | A80            | 0.080                           | 6.2  |
|                                      | 1,500              | E92L3J1VND152MAA0T  | 35 × 100                      | AA0            | 0.064                           | 7.7  |
|                                      | 820                | E92L3J1VND821MB50T  | 40 × 50                       | B50            | 0.121                           | 4.6  |
|                                      | 1,200              | E92L3J1VND122MB65T  | 40 × 65                       | B65            | 0.083                           | 6.0  |
|                                      | 1,500              | E92L3J1VND152MB80T  | 40 × 80                       | B80            | 0.066                           | 7.3  |
|                                      | 1,800              | E92L3J1VND182MBA0T  | 40 × 100                      | BA0            | 0.055                           | 8.7  |
|                                      | 1,000              | E92L3J1VNT102MU50T  | 45 × 50                       | U50            | 0.107                           | 5.2  |
|                                      | 1,200              | E92L3J1VNT122MU65T  | 45 × 65                       | U65            | 0.090                           | 6.2  |
|                                      | 1,800              | E92L3J1VNT182MU80T  | 45 × 80                       | U80            | 0.060                           | 8.2  |
|                                      | 2,200              | E92L3J1VNT222MUA5T  | 45 × 105                      | UA5            | 0.049                           | 10.0   |
|                                      | 1,200              | E92L3J1VNT122MC50T  | 50 × 50                       | C50            | 0.103                           | 5.5  |
| 1,800                                | E92L3J1VNT182MC65T | 50 × 65             | C65                           | 0.069          | 7.3                             |  |
| 2,200                                | E92L3J1VNT222MC80T | 50 × 80             | C80                           | 0.056          | 8.8                             |  |
| 2,700                                | E92L3J1VNT272MCA5T | 50 × 105            | CA5                           | 0.046          | 11.0                            |  |
| <b>400 Volts<br/>450 Volts Surge</b> | 270                | E92L401VSN271MR40T  | 30 × 40                       | R40            | 0.354                           | 1.9  |
|                                      | 390                | E92L401VSN391MR50T  | 30 × 50                       | R50            | 0.245                           | 2.6  |
|                                      | 560                | E92L401VSN561MR65T  | 30 × 65                       | R65            | 0.171                           | 3.5  |
|                                      | 390                | E92L401VSN391MA40T  | 35 × 40                       | A40            | 0.235                           | 2.9  |
|                                      | 560                | E92L401VSN561MA50T  | 35 × 50                       | A50            | 0.164                           | 3.8  |
|                                      | 820                | E92L401VND821MA65T  | 35 × 65                       | A65            | 0.112                           | 4.9  |
|                                      | 1,000              | E92L401VND102MA80T  | 35 × 80                       | A80            | 0.092                           | 5.8  |
|                                      | 1,200              | E92L401VND122MAA0T  | 35 × 100                      | AA0            | 0.076                           | 7.0  |
|                                      | 680                | E92L401VND681MB50T  | 40 × 50                       | B50            | 0.146                           | 4.2  |
|                                      | 1,000              | E92L401VND102MB65T  | 40 × 65                       | B65            | 0.100                           | 5.5  |
|                                      | 1,200              | E92L401VND122MB80T  | 40 × 80                       | B80            | 0.083                           | 6.5  |
|                                      | 1,800              | E92L401VND182MBA0T  | 40 × 100                      | BA0            | 0.055                           | 8.7  |
|                                      | 1,000              | E92L401VNT102MU50T  | 45 × 50                       | U50            | 0.107                           | 5.2  |
|                                      | 1,200              | E92L401VNT122MU65T  | 45 × 65                       | U65            | 0.090                           | 6.2  |

† 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.

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## 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 +20°C, 120Hz | Rated Ripple Current (A rms) at +85°C, 120Hz |
|----------------------|------------------|---------------------|-------------------------------|----------------|---------------------------------|--|
|----------------------|------------------|---------------------|-------------------------------|----------------|---------------------------------|--|

|                                      |       |                    |          |     |       |      |
|--------------------------------------|-------|--------------------|----------|-----|-------|------|
| <b>400 Volts<br/>450 Volts Surge</b> | 1,500 | E92L401VNT152MU80T | 45 × 80  | U80 | 0.072 | 7.5  |
|                                      | 2,200 | E92L401VNT222MUA5T | 45 × 105 | UA5 | 0.049 | 10.0 |
|                                      | 1,200 | E92L401VNT122MC50T | 50 × 50  | C50 | 0.100 | 5.4  |
|                                      | 1,500 | E92L401VNT152MC65T | 50 × 65  | C65 | 0.080 | 6.8  |
|                                      | 2,200 | E92L401VNT222MC80T | 50 × 80  | C80 | 0.054 | 9.0  |
|                                      | 2,700 | E92L401VNT272MCA5T | 50 × 105 | CA5 | 0.044 | 11.2 |

|                                      |                    |                    |          |       |       |     |
|--------------------------------------|--------------------|--------------------|----------|-------|-------|-----|
| <b>420 Volts<br/>470 Volts Surge</b> | 220                | E92L421VSN221MR40T | 30 × 40  | R40   | 0.408 | 1.8 |
|                                      | 330                | E92L421VSN331MR50T | 30 × 50  | R50   | 0.298 | 2.3 |
|                                      | 470                | E92L421VSN471MR65T | 30 × 65  | R65   | 0.212 | 3.1 |
|                                      | 390                | E92L421VSN391MA40T | 35 × 40  | A40   | 0.264 | 2.7 |
|                                      | 560                | E92L421VSN561MA50T | 35 × 50  | A50   | 0.193 | 3.5 |
|                                      | 680                | E92L421VND681MA65T | 35 × 65  | A65   | 0.137 | 4.4 |
|                                      | 820                | E92L421VND821MA80T | 35 × 80  | A80   | 0.106 | 5.4 |
|                                      | 1,200              | E92L421VND122MAA0T | 35 × 100 | AA0   | 0.082 | 6.8 |
|                                      | 680                | E92L421VND681MB50T | 40 × 50  | B50   | 0.150 | 4.2 |
|                                      | 820                | E92L421VND821MB65T | 40 × 65  | B65   | 0.107 | 5.3 |
|                                      | 1,200              | E92L421VND122MB80T | 40 × 80  | B80   | 0.084 | 6.5 |
|                                      | 1,500              | E92L421VND152MBA0T | 40 × 100 | BA0   | 0.065 | 8.0 |
|                                      | 820                | E92L421VNT821MU50T | 45 × 50  | U50   | 0.130 | 4.7 |
|                                      | 1,200              | E92L421VNT122MU65T | 45 × 65  | U65   | 0.093 | 6.1 |
|                                      | 1,500              | E92L421VNT152MU80T | 45 × 80  | U80   | 0.073 | 7.4 |
|                                      | 1,800              | E92L421VNT182MUA5T | 45 × 105 | UA5   | 0.053 | 9.6 |
|                                      | 1,000              | E92L421VNT102MC50T | 50 × 50  | C50   | 0.113 | 5.1 |
|                                      | 1,500              | E92L421VNT152MC65T | 50 × 65  | C65   | 0.081 | 6.7 |
| 1,800                                | E92L421VNT182MC80T | 50 × 80            | C80      | 0.063 | 8.3   |     |
| 2,200                                | E92L421VNT222MCA5T | 50 × 105           | CA5      | 0.046 | 10.9  |     |

|                                      |                    |                    |          |       |       |     |
|--------------------------------------|--------------------|--------------------|----------|-------|-------|-----|
| <b>450 Volts<br/>500 Volts Surge</b> | 220                | E92L451VSN221MR40T | 30 × 40  | R40   | 0.428 | 1.8 |
|                                      | 330                | E92L451VSN331MR50T | 30 × 50  | R50   | 0.312 | 2.3 |
|                                      | 390                | E92L451VSN391MR65T | 30 × 65  | R65   | 0.222 | 3.0 |
|                                      | 330                | E92L451VSN331MA40T | 35 × 40  | A40   | 0.318 | 2.5 |
|                                      | 470                | E92L451VSN471MA50T | 35 × 50  | A50   | 0.202 | 3.4 |
|                                      | 680                | E92L451VND681MA65T | 35 × 65  | A65   | 0.143 | 4.3 |
|                                      | 820                | E92L451VND821MA80T | 35 × 80  | A80   | 0.111 | 5.3 |
|                                      | 1,000              | E92L451VND102MAA0T | 35 × 100 | AA0   | 0.086 | 6.6 |
|                                      | 560                | E92L451VND561MB50T | 40 × 50  | B50   | 0.170 | 3.9 |
|                                      | 820                | E92L451VND821MB65T | 40 × 65  | B65   | 0.122 | 5.0 |
|                                      | 1,000              | E92L451VND102MB80T | 40 × 80  | B80   | 0.095 | 6.1 |
|                                      | 1,200              | E92L451VND122MBA0T | 40 × 100 | BA0   | 0.073 | 7.5 |
|                                      | 680                | E92L451VNT681MU50T | 45 × 50  | U50   | 0.142 | 4.5 |
|                                      | 1,000              | E92L451VNT102MU65T | 45 × 65  | U65   | 0.102 | 5.8 |
|                                      | 1,200              | E92L451VNT122MU80T | 45 × 80  | U80   | 0.079 | 7.1 |
|                                      | 1,800              | E92L451VNT182MUA5T | 45 × 105 | UA5   | 0.058 | 9.2 |
|                                      | 820                | E92L451VNT821MC50T | 50 × 50  | C50   | 0.120 | 5.0 |
|                                      | 1,200              | E92L451VNT122MC65T | 50 × 65  | C65   | 0.086 | 6.5 |
| 1,500                                | E92L451VNT152MC80T | 50 × 80            | C80      | 0.067 | 8.1   |     |
| 2,200                                | E92L451VNT222MCA5T | 50 × 105           | CA5      | 0.049 | 10.6  |     |

|                                      |     |                    |         |     |       |     |
|--------------------------------------|-----|--------------------|---------|-----|-------|-----|
| <b>500 Volts<br/>550 Volts Surge</b> | 150 | E92L501VSN151MR40T | 30 × 40 | R40 | 0.557 | 1.6 |
|                                      | 220 | E92L501VSN221MR50T | 30 × 50 | R50 | 0.380 | 2.1 |
|                                      | 270 | E92L501VSN271MR65T | 30 × 65 | R65 | 0.310 | 2.6 |
|                                      | 220 | E92L501VSN221MA40T | 35 × 40 | A40 | 0.380 | 2.3 |
|                                      | 330 | E92L501VSN331MA50T | 35 × 50 | A50 | 0.253 | 3.0 |
|                                      | 390 | E92L501VND391MA65T | 35 × 65 | A65 | 0.214 | 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.

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## 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 +20°C, 120Hz | Rated Ripple Current (A rms) at +85°C, 120Hz |
|--------------------------------------|------------------|---------------------|-------------------------------|----------------|---------------------------------|--|
| <b>500 Volts<br/>550 Volts Surge</b> | 560              | E92L501VND561MA80T  | 35 × 80                       | A80            | 0.149                           | 4.6  |
|                                      | 680              | E92L501VND681MAA0T  | 35 × 100                      | AA0            | 0.123                           | 5.6  |
|                                      | 390              | E92L501VND391MB50T  | 40 × 50                       | B50            | 0.225                           | 3.4  |
|                                      | 560              | E92L501VND561MB65T  | 40 × 65                       | B65            | 0.156                           | 4.4  |
|                                      | 680              | E92L501VND681MB80T  | 40 × 80                       | B80            | 0.129                           | 5.2  |
|                                      | 1,000            | E92L501VND102MBA0T  | 40 × 100                      | BA0            | 0.088                           | 6.9  |
|                                      | 560              | E92L501VNT561MU50T  | 45 × 50                       | U50            | 0.164                           | 4.2  |
|                                      | 820              | E92L501VNT821MU65T  | 45 × 65                       | U65            | 0.112                           | 5.5  |
|                                      | 1,000            | E92L501VNT102MU80T  | 45 × 80                       | U80            | 0.092                           | 6.6  |
|                                      | 1,500            | E92L501VNT152MUA5T  | 45 × 105                      | UA5            | 0.061                           | 9.0  |
|                                      | 680              | E92L501VNT681MC50T  | 50 × 50                       | C50            | 0.146                           | 4.5  |
|                                      | 1,000            | E92L501VNT102MC65T  | 50 × 65                       | C65            | 0.100                           | 6.1  |
|                                      | 1,200            | E92L501VNT122MC80T  | 50 × 80                       | C80            | 0.083                           | 7.2  |
|                                      | 1,800            | E92L501VNT182MCA5T  | 50 × 105                      | CA5            | 0.055                           | 10.0   |

† 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.

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# U92X Series



- 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 available in a variety of sizes, with or without an end disk, and encased in a PET sleeve or standard Pb-free PVC sleeve. 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: -25°C to +85°C.
- Leakage current:  $3\sqrt{CV}$  (µA) or 3mA, whichever is smaller, after 5 minutes at +20°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 Specifications - Snap Mount

| Item                             | Characteristics   |                   |         |                   |                 |        |      |                  |      |       |       |      |       |        |          |      |      |      |      |      |      |      |      |      |      |      |      |      |
|----------------------------------|---|-------------------|---------|-------------------|-----------------|--------|------|------------------|------|-------|-------|------|-------|--------|----------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Category Temperature Range       | - 25 to +85°C   |                   |         |                   |                 |        |      |                  |      |       |       |      |       |        |          |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Rated Voltage Range              | 350 to 500VDC   |                   |         |                   |                 |        |      |                  |      |       |       |      |       |        |          |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Capacitance Range                | 150 to 3,300μF  |                   |         |                   |                 |        |      |                  |      |       |       |      |       |        |          |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Capacitance Tolerance            | ±20% (M) at +20°C, 120Hz  |                   |         |                   |                 |        |      |                  |      |       |       |      |       |        |          |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Leakage Current                  | $I = 3\sqrt{CV}$ (μA) or 3mA, whichever is smaller, after 5 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<br><table border="1"> <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>  | Rated Voltage (V) | 350-400 | 420-500           | Tan δ (DF) Max. | 0.15   | 0.20 |                  |      |       |       |      |       |        |          |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Rated Voltage (V)                | 350-400   | 420-500           |         |                   |                 |        |      |                  |      |       |       |      |       |        |          |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Tan δ (DF) Max.                  | 0.15  | 0.20              |         |                   |                 |        |      |                  |      |       |       |      |       |        |          |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Low Temperature Characteristics  | At 120Hz, impedance (Z) ratio between the -25°C value and +20°C value shall not exceed the values given below.<br><table border="1"> <tr> <td>Rated Voltage (V)</td> <td>350-500</td> </tr> <tr> <td>Z(-25°C)/Z(+20°C)</td> <td>8</td> </tr> </table>   | Rated Voltage (V) | 350-500 | Z(-25°C)/Z(+20°C) | 8               |        |      |                  |      |       |       |      |       |        |          |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Rated Voltage (V)                | 350-500   |                   |         |                   |                 |        |      |                  |      |       |       |      |       |        |          |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Z(-25°C)/Z(+20°C)                | 8   |                   |         |                   |                 |        |      |                  |      |       |       |      |       |        |          |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Rated Ripple Current Multipliers | Ambient Temperature (°C)<br><table border="1"> <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 border="1"> <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> | +45°C             | +65°C   | +85°C             | 2.82            | 1.73   | 1.00 | DC Rated Voltage | 50Hz | 120Hz | 300Hz | 1kHz | 10kHz | 100kHz | 350-450V | 0.77 | 1.00 | 1.16 | 1.30 | 1.41 | 1.43 | 500V | 0.70 | 1.00 | 1.16 | 1.30 | 1.41 | 1.43 |
| +45°C                            | +65°C   | +85°C             |         |                   |                 |        |      |                  |      |       |       |      |       |        |          |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 2.82                             | 1.73  | 1.00              |         |                   |                 |        |      |                  |      |       |       |      |       |        |          |      |      |      |      |      |      |      |      |      |      |      |      |      |
| DC Rated Voltage                 | 50Hz  | 120Hz             | 300Hz   | 1kHz              | 10kHz           | 100kHz |      |                  |      |       |       |      |       |        |          |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 350-450V                         | 0.77  | 1.00              | 1.16    | 1.30              | 1.41            | 1.43   |      |                  |      |       |       |      |       |        |          |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 500V                             | 0.70  | 1.00              | 1.16    | 1.30              | 1.41            | 1.43   |      |                  |      |       |       |      |       |        |          |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Endurance (Load Life)            | The following specifications shall be satisfied when the capacitors are restored to +20°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   |                   |         |                   |                 |        |      |                  |      |       |       |      |       |        |          |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Shelf Life                       | The following specifications shall be satisfied when the capacitors are restored to +20°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  |                   |         |                   |                 |        |      |                  |      |       |       |      |       |        |          |      |      |      |      |      |      |      |      |      |      |      |      |      |

Product specifications are subject to change without notice.

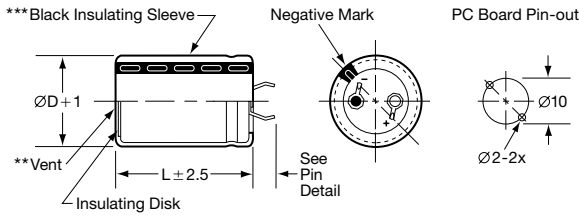
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## Diagram of Dimensions - Snap Mount

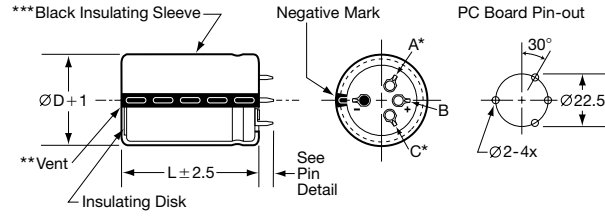
### Snap Mount

Unit: mm

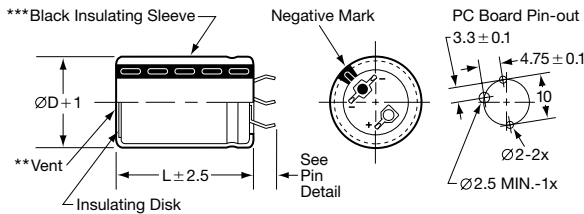
#### VSN Snap-in $\varnothing 30$ and $\varnothing 35$ standard VNN Snap-in $\varnothing 30$ and $\varnothing 35$ optional



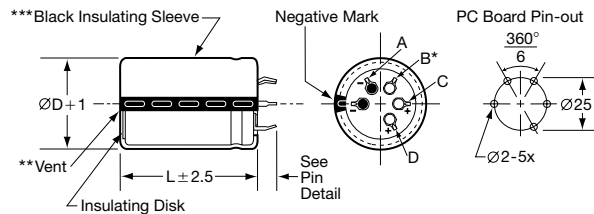
#### VND Snap-in $\varnothing 35$ and $\varnothing 40$ standard; $\varnothing 45$ optional VSD Snap-in $\varnothing 35$ and $\varnothing 40$ optional



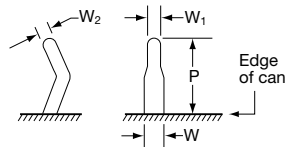
#### VEN Snap-in $\varnothing 30$ and $\varnothing 35$ optional



#### VNT Snap-in $\varnothing 45$ and $\varnothing 50$ standard



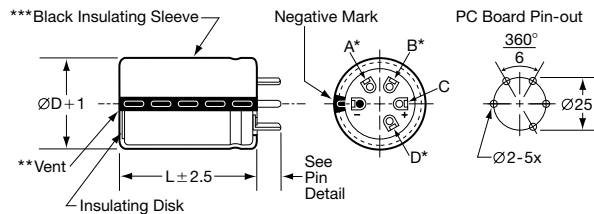
#### VS, VE & VN Snap-in Pin Dimensions



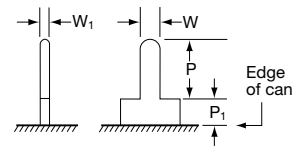
| Type                                    | P         | W         | W <sub>1</sub> | W <sub>2</sub> |
|---|-----------|-----------|----------------|----------------|
| VSN $\varnothing 30$                    | 4.0 ± 0.5 |           |                |                |
| VSN $\varnothing 35$                    | 3.5 ± 0.5 |           |                |                |
| VNN $\varnothing 30$ - $\varnothing 35$ | 5.8 ± 1.0 |           |                |                |
| VEN $\varnothing 30$ - $\varnothing 35$ | 4.0 ± 0.5 | 1.5 ± 0.2 | 0.8 ± 0.1      | 0.8 ± 0.1      |
| VSD $\varnothing 35$ - $\varnothing 40$ | 3.5 ± 1.0 |           |                |                |
| VND $\varnothing 35$ - $\varnothing 45$ | 5.8 ± 1.0 |           |                |                |
| VNT $\varnothing 45$ - $\varnothing 50$ | 5.8 ± 1.0 |           |                |                |

### Straight Pin Mount

#### VQT Straight Standoff $\varnothing 40$ , $\varnothing 45$ and $\varnothing 50$ optional



#### VQ Standoff Pin Dimensions



| Type              | P          | P <sub>1</sub> | W         | W <sub>1</sub> |
|-------------------|------------|----------------|-----------|----------------|
| Standoff Pin (VQ) | 3.75 ± 1.0 | 2.0 max.       | 1.5 ± 0.1 | 0.7 ± 0.2      |

#### 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.

## Part Numbering System for U92X Series

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

**18 Fields**

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

**E 9 2 X 5 0 1 V N T 6 8 1 M U 6 5 T**

- Capacitor Type.** Field 1.  
Aluminum Electrolytic Capacitor (Polar).
- 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.
- 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.
- 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.
- Dummy Terminals.** Field 10.  
N = No dummy terminals.  
D = 2 dummy terminals.  
T = 3 dummy terminals.
- 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).
- Capacitance Tolerance.** Field 14.  
M = ±20%
- 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
- Supplement Code.** Field 18.  
All construction options listed have Sn100% terminal plating.  
T = Pb-free PVC sleeve with end disk.  
M = Pb-free PVC sleeve without end disk.  
W = PET sleeve with end disk.  
S = PET sleeve without end disk.

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## 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 +20°C, 120Hz | Rated Ripple Current (A rms) at +85°C, 120Hz |
|--------------------------------------|--------------------|---------------------|-------------------------------|----------------|---------------------------------|--|
| <b>350 Volts<br/>400 Volts Surge</b> | 330                | E92X351VSN331MR40T  | 30 × 40                       | R40            | 0.302                           | 2.1  |
|                                      | 470                | E92X351VSN471MR50T  | 30 × 50                       | R50            | 0.212                           | 2.8  |
|                                      | 680                | E92X351VSN681MR65T  | 30 × 65                       | R65            | 0.146                           | 3.7  |
|                                      | 470                | E92X351VSN471MA40T  | 35 × 40                       | A40            | 0.195                           | 3.1  |
|                                      | 680                | E92X351VSN681MA50T  | 35 × 50                       | A50            | 0.135                           | 4.2  |
|                                      | 1,000              | E92X351VND102MA65T  | 35 × 65                       | A65            | 0.092                           | 5.4  |
|                                      | 1,200              | E92X351VND122MA80T  | 35 × 80                       | A80            | 0.076                           | 6.4  |
|                                      | 1,500              | E92X351VND152MAA0T  | 35 × 100                      | AA0            | 0.061                           | 7.9  |
|                                      | 820                | E92X351VND821MB50T  | 40 × 50                       | B50            | 0.121                           | 4.6  |
|                                      | 1,200              | E92X351VND122MB65T  | 40 × 65                       | B65            | 0.083                           | 6.0  |
|                                      | 1,500              | E92X351VND152MB80T  | 40 × 80                       | B80            | 0.066                           | 7.3  |
|                                      | 1,800              | E92X351VND182MBA0T  | 40 × 100                      | BA0            | 0.055                           | 8.7  |
|                                      | 1,000              | E92X351VNT102MU50T  | 45 × 50                       | U50            | 0.107                           | 5.2  |
|                                      | 1,500              | E92X351VNT152MU65T  | 45 × 65                       | U65            | 0.072                           | 6.9  |
|                                      | 1,800              | E92X351VNT182MU80T  | 45 × 80                       | U80            | 0.060                           | 8.2  |
|                                      | 2,700              | E92X351VNT272MUA5T  | 45 × 105                      | UA5            | 0.040                           | 11.1   |
|                                      | 1,200              | E92X351VNT122MC50T  | 50 × 50                       | C50            | 0.103                           | 5.4  |
|                                      | 1,800              | E92X351VNT182MC65T  | 50 × 65                       | C65            | 0.069                           | 7.3  |
| 2,200                                | E92X351VNT222MC80T | 50 × 80             | C80                           | 0.056          | 8.8                             |  |
| 3,300                                | E92X351VNT332MCA5T | 50 × 105            | CA5                           | 0.037          | 12.2                            |  |
| <b>385 Volts<br/>435 Volts Surge</b> | 270                | E92X3J1VSN271MR40T  | 30 × 40                       | R40            | 0.339                           | 2.0  |
|                                      | 390                | E92X3J1VSN391MR50T  | 30 × 50                       | R50            | 0.235                           | 2.6  |
|                                      | 560                | E92X3J1VSN561MR65T  | 30 × 65                       | R65            | 0.164                           | 3.5  |
|                                      | 390                | E92X3J1VSN391MA40T  | 35 × 40                       | A40            | 0.225                           | 2.9  |
|                                      | 560                | E92X3J1VSN561MA50T  | 35 × 50                       | A50            | 0.156                           | 3.9  |
|                                      | 820                | E92X3J1VND821MA65T  | 35 × 65                       | A65            | 0.107                           | 5.0  |
|                                      | 1,000              | E92X3J1VND102MA80T  | 35 × 80                       | A80            | 0.088                           | 5.9  |
|                                      | 1,200              | E92X3J1VND122MAA0T  | 35 × 100                      | AA0            | 0.073                           | 7.2  |
|                                      | 680                | E92X3J1VND681MB50T  | 40 × 50                       | B50            | 0.135                           | 4.4  |
|                                      | 1,000              | E92X3J1VND102MB65T  | 40 × 65                       | B65            | 0.092                           | 5.8  |
|                                      | 1,200              | E92X3J1VND122MB80T  | 40 × 80                       | B80            | 0.076                           | 6.8  |
|                                      | 1,800              | E92X3J1VND182MBA0T  | 40 × 100                      | BA0            | 0.051                           | 9.0  |
|                                      | 1,000              | E92X3J1VNT102MU50T  | 45 × 50                       | U50            | 0.100                           | 5.4  |
|                                      | 1,200              | E92X3J1VNT122MU65T  | 45 × 65                       | U65            | 0.083                           | 6.4  |
|                                      | 1,500              | E92X3J1VNT152MU80T  | 45 × 80                       | U80            | 0.066                           | 7.7  |
|                                      | 2,200              | E92X3J1VNT222MUA5T  | 45 × 105                      | UA5            | 0.045                           | 10.4   |
|                                      | 1,200              | E92X3J1VNT122MC50T  | 50 × 50                       | C50            | 0.096                           | 5.7  |
|                                      | 1,500              | E92X3J1VNT152MC65T  | 50 × 65                       | C65            | 0.077                           | 6.9  |
| 2,200                                | E92X3J1VNT222MC80T | 50 × 80             | C80                           | 0.052          | 9.1                             |  |
| 2,700                                | E92X3J1VNT272MCA5T | 50 × 105            | CA5                           | 0.043          | 11.4                            |  |
| <b>400 Volts<br/>450 Volts Surge</b> | 270                | E92X401VSN271MR40T  | 30 × 40                       | R40            | 0.339                           | 2.0  |
|                                      | 390                | E92X401VSN391MR50T  | 30 × 50                       | R50            | 0.235                           | 2.6  |
|                                      | 470                | E92X401VSN471MR65T  | 30 × 65                       | R65            | 0.195                           | 3.2  |
|                                      | 390                | E92X401VSN391MA40T  | 35 × 40                       | A40            | 0.225                           | 2.9  |
|                                      | 560                | E92X401VSN561MA50T  | 35 × 50                       | A50            | 0.156                           | 3.9  |
|                                      | 680                | E92X401VND681MA65T  | 35 × 65                       | A65            | 0.129                           | 4.6  |
|                                      | 1,000              | E92X401VND102MA80T  | 35 × 80                       | A80            | 0.088                           | 5.9  |
|                                      | 1,200              | E92X401VND122MAA0T  | 35 × 100                      | AA0            | 0.073                           | 7.2  |
|                                      | 680                | E92X401VND681MB50T  | 40 × 50                       | B50            | 0.135                           | 4.4  |
|                                      | 1,000              | E92X401VND102MB65T  | 40 × 65                       | B65            | 0.092                           | 5.8  |
|                                      | 1,200              | E92X401VND122MB80T  | 40 × 80                       | B80            | 0.076                           | 6.8  |
|                                      | 1,500              | E92X401VND152MBA0T  | 40 × 100                      | BA0            | 0.061                           | 8.2  |
|                                      | 820                | E92X401VNT821MU50T  | 45 × 50                       | U50            | 0.121                           | 4.9  |
|                                      | 1,200              | E92X401VNT122MU65T  | 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.

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## Standard Voltage Ratings - Snap Mount

| Rated Voltage (VWDC)                | Capacitance (µF)   | Global Part Number† | Nominal Case Size* D × L (mm) | Case Size Code | Maximum ESR (Ω) at +20°C, 120Hz | Rated Ripple Current (A rms) at +85°C, 120Hz |
|-------------------------------------|--------------------|---------------------|-------------------------------|----------------|---------------------------------|--|
| <b>400 Volts</b><br>450 Volts Surge | 1,500              | E92X401VNT152MU80T  | 45 × 80                       | U80            | 0.066                           | 7.7  |
|                                     | 2,200              | E92X401VNT222MUA5T  | 45 × 105                      | UA5            | 0.045                           | 10.4   |
|                                     | 1,200              | E92X401VNT122MC50T  | 50 × 50                       | C50            | 0.093                           | 5.6  |
|                                     | 1,500              | E92X401VNT152MC65T  | 50 × 65                       | C65            | 0.074                           | 7.0  |
|                                     | 1,800              | E92X401VNT182MC80T  | 50 × 80                       | C80            | 0.062                           | 8.4  |
|                                     | 2,700              | E92X401VNT272MCA5T  | 50 × 105                      | CA5            | 0.041                           | 11.6   |
| <b>420 Volts</b><br>470 Volts Surge | 220                | E92X421VSN221MR40T  | 30 × 40                       | R40            | 0.389                           | 1.9  |
|                                     | 330                | E92X421VSN331MR50T  | 30 × 50                       | R50            | 0.284                           | 2.4  |
|                                     | 470                | E92X421VSN471MR65T  | 30 × 65                       | R65            | 0.202                           | 3.2  |
|                                     | 390                | E92X421VSN391MA40T  | 35 × 40                       | A40            | 0.251                           | 2.8  |
|                                     | 470                | E92X421VSN471MA50T  | 35 × 50                       | A50            | 0.183                           | 3.6  |
|                                     | 680                | E92X421VND681MA65T  | 35 × 65                       | A65            | 0.130                           | 4.6  |
|                                     | 820                | E92X421VND821MA80T  | 35 × 80                       | A80            | 0.101                           | 5.5  |
|                                     | 1,200              | E92X421VND122MAA0T  | 35 × 100                      | AA0            | 0.078                           | 7.0  |
|                                     | 680                | E92X421VND681MB50T  | 40 × 50                       | B50            | 0.142                           | 4.3  |
|                                     | 820                | E92X421VND821MB65T  | 40 × 65                       | B65            | 0.102                           | 5.5  |
|                                     | 1,200              | E92X421VND122MB80T  | 40 × 80                       | B80            | 0.079                           | 6.6  |
|                                     | 1,500              | E92X421VND152MBA0T  | 40 × 100                      | BA0            | 0.061                           | 8.2  |
|                                     | 820                | E92X421VNT821MU50T  | 45 × 50                       | U50            | 0.124                           | 4.8  |
|                                     | 1,000              | E92X421VNT102MU65T  | 45 × 65                       | U65            | 0.089                           | 6.2  |
|                                     | 1,200              | E92X421VNT122MU80T  | 45 × 80                       | U80            | 0.069                           | 7.6  |
|                                     | 1,800              | E92X421VNT182MUA5T  | 45 × 105                      | UA5            | 0.051                           | 9.9  |
|                                     | 1,000              | E92X421VNT102MC50T  | 50 × 50                       | C50            | 0.109                           | 5.2  |
|                                     | 1,200              | E92X421VNT122MC65T  | 50 × 65                       | C65            | 0.078                           | 6.8  |
| 1,800                               | E92X421VNT182MC80T | 50 × 80             | C80                           | 0.061          | 8.5                             |  |
| 2,200                               | E92X421VNT222MCA5T | 50 × 105            | CA5                           | 0.044          | 11.2                            |  |
| <b>450 Volts</b><br>500 Volts Surge | 220                | E92X451VSN221MR40T  | 30 × 40                       | R40            | 0.411                           | 1.8  |
|                                     | 330                | E92X451VSN331MR50T  | 30 × 50                       | R50            | 0.300                           | 2.3  |
|                                     | 390                | E92X451VSN391MR65T  | 30 × 65                       | R65            | 0.213                           | 3.1  |
|                                     | 330                | E92X451VSN331MA40T  | 35 × 40                       | A40            | 0.304                           | 2.5  |
|                                     | 470                | E92X451VSN471MA50T  | 35 × 50                       | A50            | 0.193                           | 3.5  |
|                                     | 560                | E92X451VND561MA65T  | 35 × 65                       | A65            | 0.138                           | 4.4  |
|                                     | 820                | E92X451VND821MA80T  | 35 × 80                       | A80            | 0.107                           | 5.4  |
|                                     | 1,000              | E92X451VND102MAA0T  | 35 × 100                      | AA0            | 0.082                           | 6.8  |
|                                     | 560                | E92X451VND561MB50T  | 40 × 50                       | B50            | 0.163                           | 4.0  |
|                                     | 820                | E92X451VND821MB65T  | 40 × 65                       | B65            | 0.117                           | 5.1  |
|                                     | 1,000              | E92X451VND102MB80T  | 40 × 80                       | B80            | 0.091                           | 6.2  |
|                                     | 1,200              | E92X451VND122MBA0T  | 40 × 100                      | BA0            | 0.070                           | 7.7  |
|                                     | 680                | E92X451VNT681MU50T  | 45 × 50                       | U50            | 0.137                           | 4.6  |
|                                     | 1,000              | E92X451VNT102MU65T  | 45 × 65                       | U65            | 0.098                           | 5.9  |
|                                     | 1,200              | E92X451VNT122MU80T  | 45 × 80                       | U80            | 0.076                           | 7.2  |
|                                     | 1,800              | E92X451VNT182MUA5T  | 45 × 105                      | UA5            | 0.056                           | 9.4  |
|                                     | 820                | E92X451VNT821MC50T  | 50 × 50                       | C50            | 0.115                           | 5.1  |
|                                     | 1,200              | E92X451VNT122MC65T  | 50 × 65                       | C65            | 0.083                           | 6.6  |
| 1,500                               | E92X451VNT152MC80T | 50 × 80             | C80                           | 0.064          | 8.2                             |  |
| 2,200                               | E92X451VNT222MCA5T | 50 × 105            | CA5                           | 0.047          | 10.8                            |  |
| <b>500 Volts</b><br>550 Volts Surge | 150                | E92X501VSN151MR40T  | 30 × 40                       | R40            | 0.557                           | 1.6  |
|                                     | 180                | E92X501VSN181MR50T  | 30 × 50                       | R50            | 0.464                           | 1.9  |
|                                     | 270                | E92X501VSN271MR65T  | 30 × 65                       | R65            | 0.310                           | 2.6  |
|                                     | 220                | E92X501VSN221MA40T  | 35 × 40                       | A40            | 0.362                           | 2.3  |
|                                     | 270                | E92X501VSN271MA50T  | 35 × 50                       | A50            | 0.295                           | 2.8  |
|                                     | 390                | E92X501VND391MA65T  | 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.

Product specifications are subject to change without notice.

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## 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 +20°C, 120Hz | Rated Ripple Current (A rms) at +85°C, 120Hz |
|--------------------------------------|------------------|---------------------|-------------------------------|----------------|---------------------------------|--|
| <b>500 Volts<br/>550 Volts Surge</b> | 560              | E92X501VND561MA80T  | 35 × 80                       | A80            | 0.142                           | 4.7  |
|                                      | 680              | E92X501VND681MAA0T  | 35 × 100                      | AA0            | 0.117                           | 5.7  |
|                                      | 390              | E92X501VND391MB50T  | 40 × 50                       | B50            | 0.204                           | 3.6  |
|                                      | 560              | E92X501VND561MB65T  | 40 × 65                       | B65            | 0.142                           | 4.6  |
|                                      | 680              | E92X501VND681MB80T  | 40 × 80                       | B80            | 0.117                           | 5.5  |
|                                      | 820              | E92X501VND821MBA0T  | 40 × 100                      | BA0            | 0.097                           | 6.5  |
|                                      | 560              | E92X501VNT561MU50T  | 45 × 50                       | U50            | 0.156                           | 4.3  |
|                                      | 680              | E92X501VNT681MU65T  | 45 × 65                       | U65            | 0.129                           | 5.2  |
|                                      | 1,000            | E92X501VNT102MU80T  | 45 × 80                       | U80            | 0.088                           | 6.7  |
|                                      | 1,200            | E92X501VNT122MUA5T  | 45 × 105                      | UA5            | 0.073                           | 8.2  |
|                                      | 680              | E92X501VNT681MC50T  | 50 × 50                       | C50            | 0.141                           | 4.6  |
|                                      | 1,000            | E92X501VNT102MC65T  | 50 × 65                       | C65            | 0.096                           | 6.2  |
|                                      | 1,200            | E92X501VNT122MC80T  | 50 × 80                       | C80            | 0.080                           | 7.4  |
|                                      | 1,800            | E92X501VNT182MCA5T  | 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.

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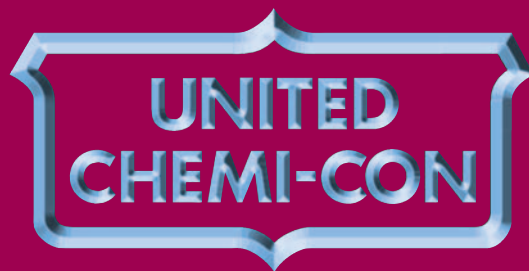
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