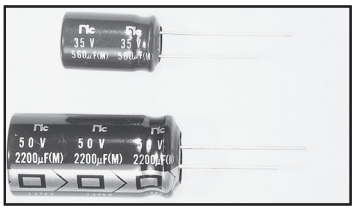
REDUCED SIZE, LOW IMPEDANCE, RADIAL LEADS, POLARIZED ALUMINUM ELECTROLYTIC CAPACITORS

**RoHS Compliant**
includes all homogeneous materials

*See Part Number System for Details



## FEATURES

- FURTHER REDUCED SIZING
- LOW IMPEDANCE AT HIGH FREQUENCY
- IDEALLY FOR SWITCHERS AND CONVERTERS
- MEETS THE REQUIREMENTS OF AEC-Q200*

*Contact NIC for availability

## CHARACTERISTICS

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Rated Voltage Range | 6.3 ~ 50Vdc | | | | | | |
| Capacitance Range | 2.2 ~ 15,000µF | | | | | | |
| Operating Temperature Range | -55 ~ +105°C | | | | | | |
| Capacitance Tolerance | ±20%(M) | | | | | | |
| Max. Leakage Current After 2 minutes At +20°C | 0.01CV or 3µA, whichever is greater | | | | | | |
| Max. Tan δ @ 120Hz/+20°C | W.V. (Vdc) | 6.3 | 10 | 16 | 25 | 35 | 50 |
| | S.V. (Vdc) | 8 | 13 | 20 | 32 | 44 | 63 |
| | C ≤ 1,000µF | 0.28 | 0.24 | 0.20 | 0.16 | 0.14 | 0.12 |
| | C = 2,200µF | 0.30 | 0.26 | 0.22 | 0.18 | 0.16 | 0.14 |
| | C = 3,300µF | 0.32 | 0.28 | 0.24 | 0.20 | 0.18 | - |
| | C = 4,700µF | 0.34 | 0.30 | 0.26 | 0.22 | - | - |
| | C = 6,800µF | 0.38 | 0.34 | 0.30 | - | - | - |
| | C = 10,000µF | 0.56 | 0.42 | - | - | - | - |
| | C = 15,000µF | 0.56 | - | - | - | - | - |
| Low Temperature Stability Impedance Ratio @ 120Hz | Z-40°C/Z+20°C | 3 | 3 | 2 | 2 | 2 | 2 |
| | Z-55°C/Z+20°C | 6 | 5 | 4 | 4 | 3 | 3 |
| Load Life Test at Rated W.V. +105°C 1,000 Hours = 8ϕ or less +105°C 2,000 Hours = 10ϕ +105°C 3,000 Hours = 12.5ϕ up | Capacitance Change | Within ±25% of initial measured value | | | | | |
| | Tan δ | Less than 200% of specified maximum value | | | | | |
| | Leakage Current | Less than specified maximum value | | | | | |

## STANDARD PRODUCT AND CASE SIZE TABLE D ϕ x L (mm)

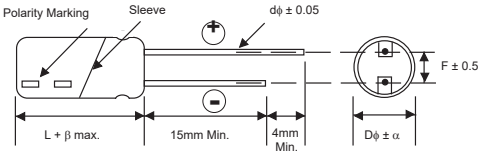
| Cap. (µF) | Code | Working Voltage (Vdc) | | | | | |
|---|---|---|---|---|---|---|---|
| | | 6.3 | 10 | 16 | 25 | 35 | 50 |
| 2.2 | 2R2 | - | - | - | - | - | 5x11 |
| 3.3 | 3R3 | - | - | - | - | - | 5x11 |
| 4.7 | 4R7 | - | - | - | - | - | 5x11 |
| 10 | 100 | - | - | - | - | - | 5x11 |
| 22 | 220 | - | - | - | - | - | 5x11 |
| 33 | 330 | - | - | - | - | 5x11 | 5x11 |
| 47 | 470 | - | - | - | - | 5x11 | 6.3x11 |
| 100 | 101 | - | - | 5x11 | 6.3x11 | 6.3x11 | 8x11.5 |
| 220 | 221 | 5x11 | 6.3x11 | 6.3x11 | 8x11.5 | 8x11.5 | 10x12.5 |
| 330 | 331 | 6.3x11 | 6.3x11 | 8x11.5 | 8x11.5 | 10x12.5 | 10x16 |
| 470 | 471 | 6.3x11 | 8x11.5 | 8x11.5 | 10x12.5 | 10x16 | 10x20 |
| 1000 | 102 | 8x11.5 | 10x12.5 | 10x16 | 10x20 | 12.5x20 | 12.5x25 |
| 2200 | 222 | 10x16 | 10x20 | 12.5x20 | 12.5x25 | 16x25 | 16x31.5 |
| 3300 | 332 | 10x20 | 12.5x20 | 12.5x25 | 16x25 | 16x35.5 | - |
| 4700 | 472 | 12.5x20 | 12.5x25 | 16x25 | 16x31.5 | - | - |
| 6800 | 682 | 12.5x25 | 16x25 | 16x31.5 | - | - | - |
| 10000 | 103 | 16x25 | 16x31.5 | - | - | - | - |
| 15000 | 153 | 16x35.5 | - | - | - | - | - |

## LEADSPACE AND DIAMETER (mm)

| Case Dia. (Dϕ) | 5 | 6.3 | 8 | 10 | 12.5 | 16 |
|---|---|---|---|---|---|---|
| Lead Dia. (dϕ) | 0.5 | 0.5 | 0.6 | 0.6 | 0.6 | 0.8 |
| Lead Spacing (F) | 2.0 | 2.5 | 3.5 | 5.0 | 5.0 | 7.5 |
| Dim. α | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |

β = L < 20mm = 1.5mm, L ≥ 20mm = 2.0mm

### DIMENSIONS (mm)




**Drawing is representative of parts as supplied in bulk or straight lead format, please see taping specification for details on taped format packaging.**

## STANDARD PRODUCT, SPECIFICATIONS AND CASE SIZES D ϕ x L (mm)

| Part Number | Cap. (µF) | W.V. (Vdc) | Max. Tanδ | Max. LC (µA) | Max. Impedance 100KHz/20°C | Max. Ripple Current at 10KHz~200KHz/105°C (mA rms) | Load Life Hours @ +105°C |
|---|---|---|---|---|---|---|---|
| NRSY221M6.3V5x11F | 220 | 6.3 | 0.28 | 13.86 | 0.50 | 180 | 1000 |
| NRSY331M6.3V6.3x11F | 330 | | 0.28 | 20.79 | 0.30 | 280 | 1000 |
| NRSY471M6.3V6.3x11F | 470 | | 0.28 | 29.61 | 0.24 | 280 | 1000 |
| NRSY102M6.3V8x11.5F | 1000 | | 0.28 | 63 | 0.15 | 560 | 1000 |
| NRSY222M6.3V10x16F | 2200 | | 0.30 | 138.6 | 0.066 | 950 | 2000 |
| NRSY332M6.3V10x20F | 3300 | | 0.32 | 207.9 | 0.047 | 1150 | 2000 |
| NRSY472M6.3V12.5x20F | 4700 | | 0.34 | 296.1 | 0.042 | 1460 | 3000 |
| NRSY682M6.3V12.5x25F | 6800 | | 0.38 | 428.4 | 0.031 | 1780 | 3000 |
| NRSY103M6.3V16x25F | 10000 | | 0.56 | 630 | 0.026 | 2000 | 3000 |
| NRSY153M6.3V16x35.5F | 15000 | | 0.56 | 945 | 0.022 | 2200 | 3000 |
| NRSY221M10V6.3x11F | 220 | 10 | 0.24 | 22 | 0.30 | 280 | 1000 |
| NRSY331M10V6.3x11F | 330 | | 0.24 | 33 | 0.24 | 280 | 1000 |
| NRSY471M10V8x11.5F | 470 | | 0.24 | 47 | 0.16 | 410 | 1000 |
| NRSY102M10V10x12.5F | 1000 | | 0.24 | 100 | 0.086 | 710 | 2000 |
| NRSY222M10V10x20F | 2200 | | 0.26 | 220 | 0.047 | 1150 | 2000 |
| NRSY332M10V12.5x20F | 3300 | | 0.28 | 330 | 0.042 | 1460 | 3000 |
| NRSY472M10V12.5x25F | 4700 | | 0.30 | 470 | 0.031 | 1780 | 3000 |
| NRSY682M10V16x25F | 6800 | | 0.34 | 680 | 0.026 | 2000 | 3000 |
| NRSY103M10V16x31.5F | 10000 | | 0.42 | 1000 | 0.022 | 2200 | 3000 |
| NRSY101M16V5x11F | 100 | 16 | 0.20 | 16 | 0.50 | 180 | 1000 |
| NRSY221M16V6.3x11F | 220 | | 0.20 | 35.2 | 0.24 | 280 | 1000 |
| NRSY331M16V8x11.5F | 330 | | 0.20 | 52.8 | 0.16 | 410 | 1000 |
| NRSY471M16V8x11.5F | 470 | | 0.20 | 75.2 | 0.15 | 560 | 1000 |
| NRSY102M16V10x16F | 1000 | | 0.20 | 160 | 0.06 | 950 | 2000 |
| NRSY222M16V12.5x20F | 2200 | | 0.22 | 352 | 0.042 | 1460 | 3000 |
| NRSY332M16V12.5x25F | 3300 | | 0.24 | 528 | 0.040 | 1650 | 3000 |
| NRSY472M16V16x25F | 4700 | | 0.26 | 752 | 0.026 | 2000 | 3000 |
| NRSY682M16V16x31.5F | 6800 | | 0.30 | 1088 | 0.022 | 2200 | 3000 |
| NRSY101M25V6.3x11F | 100 | 25 | 0.16 | 25 | 0.30 | 280 | 1000 |
| NRSY221M25V8x11.5F | 220 | | 0.16 | 55 | 0.16 | 410 | 1000 |
| NRSY331M25V8x11.5F | 330 | | 0.16 | 82.5 | 0.15 | 510 | 1000 |
| NRSY471M25V10x12.5F | 470 | | 0.16 | 117.5 | 0.086 | 710 | 2000 |
| NRSY102M25V10x20F | 1000 | | 0.16 | 250 | 0.047 | 1150 | 2000 |
| NRSY222M25V12.5x25F | 2200 | | 0.18 | 550 | 0.040 | 1650 | 3000 |
| NRSY332M25V16x25F | 3300 | | 0.20 | 825 | 0.026 | 2000 | 3000 |
| NRSY472M25V16x31.5F | 4700 | | 0.22 | 1175 | 0.022 | 2200 | 3000 |
| NRSY330M35V5x11F | 33 | 35 | 0.14 | 11.55 | 0.72 | 180 | 1000 |
| NRSY470M35V5x11F | 47 | | 0.14 | 16.45 | 0.50 | 180 | 1000 |
| NRSY101M35V6.3x11F | 100 | | 0.14 | 35 | 0.24 | 280 | 1000 |
| NRSY221M35V8x11.5F | 220 | | 0.14 | 77 | 0.15 | 560 | 1000 |
| NRSY331M35V10x12.5F | 330 | | 0.14 | 115.5 | 0.086 | 710 | 2000 |
| NRSY471M35V10x16F | 470 | | 0.14 | 164.5 | 0.066 | 950 | 2000 |
| NRSY102M35V12.5x20F | 1000 | | 0.14 | 350 | 0.042 | 1460 | 3000 |
| NRSY222M35V16x25F | 2200 | | 0.16 | 770 | 0.026 | 2000 | 3000 |
| NRSY332M35V16x35.5F | 3300 | | 0.18 | 1155 | 0.022 | 2200 | 3000 |

For Automotive Applications see part number system

### PART NUMBER SYSTEM

NRSY 102 M 16V 10X25 TB Y F

- F — RoHS Compliant
- Y — Optional: For automotive equipment, sourced to special production and inspection at IATF-16949 certified production site
- TB = Tape & Box*
- 10X25 — Case Size (Dϕ x L)
- 16V — Working Voltage (Vdc)
- M — Tolerance Code (M=20%)
- 102 — Capacitance Code: First 2 characters significant, third character is multiplier
- NRSY — Series

*see taping specifications for details

| Part Number | Cap. (µF) | W.V. (Vdc) | Max. Tanδ | Max. LC (µA) | Max. Impedance 100KHz/20°C | Max. Ripple Current at 10KHz~200KHz/105°C (mA rms) | Load Life Hours @ +105°C |
|---|---|---|---|---|---|---|---|
| NRSY2R2M50V5x11F | 2.2 | 50 | 0.12 | 3.0 | 3.00 | 45 | 1000 |
| NRSY3R3M50V5x11F | 3.3 | | 0.12 | 3.0 | 2.70 | 55 | 1000 |
| NRSY4R7M50V5x11F | 4.7 | | 0.12 | 3.0 | 2.00 | 90 | 1000 |
| NRSY100M50V5x11F | 10 | | 0.12 | 5.0 | 1.70 | 110 | 1000 |
| NRSY220M50V5x11F | 22 | | 0.12 | 11 | 1.20 | 120 | 1000 |
| NRSY330M50V5x11F | 33 | | 0.12 | 16.5 | 0.95 | 130 | 1000 |
| NRSY470M50V6.3x11F | 47 | | 0.12 | 23.5 | 0.56 | 190 | 1000 |
| NRSY101M50V8x11.5F | 100 | | 0.12 | 50 | 0.35 | 320 | 1000 |
| NRSY221M50V10x12.5F | 220 | | 0.12 | 110 | 0.16 | 520 | 2000 |
| NRSY331M50V10x16F | 330 | | 0.12 | 165 | 0.12 | 670 | 2000 |
| NRSY471M50V10x20F | 470 | | 0.12 | 235 | 0.088 | 820 | 2000 |
| NRSY102M50V12.5x25F | 1000 | | 0.12 | 500 | 0.053 | 1200 | 3000 |
| NRSY222M50V16x31.5F | 2200 | | 0.14 | 1100 | 0.029 | 1750 | 3000 |

For Automotive Applications see part number system

## RIPPLE CURRENT CORRECTION FACTOR

| Frequency (Hz) | 100 < f < 1K | 1K < f < 10K | 10K < f |
|---|---|---|---|
| 22 < C < 100 | 0.55 | 0.8 | 1.0 |
| 100 < C < 1000 | 0.7 | 0.9 | 1.0 |
| 1000 < C | 0.9 | 0.95 | 1.0 |

**PRECAUTIONS**

Please review the notes on correct use, safety and precautions found at
**https://www.niccomp.com/resource/files/aluminum/AlumApplInfoCautions.pdf**
If in doubt or uncertainty, please review your specific application - process details with NIC's technical support personnel: **tpmg@niccomp.com**