

Miniature Aluminum Electrolytic Capacitors

NRSK Series

ULTRA LOW IMPEDANCE AT HIGH FREQUENCY, RADIAL LEADS,
POLARIZED ALUMINUM ELECTROLYTIC CAPACITORS

FEATURES

- VERY LOW IMPEDANCE
- LONG LIFE AT 105°C (Up to 4000 hrs)
- HIGH STABILITY AT LOW TEMPERATURE
- IDEALLY SUITED FOR USE IN SWITCHING POWER SUPPLIES & CONVERTORS

RoHS Compliant
includes all homogeneous materials

*See Part Number System for Details



CHARACTERISTICS

| | | | | | |
|---|---------------------------|---|------|------|------|
| Rated Voltage Range | 6.3 ~ 25 | | | | |
| Rated Capacitance Range | 470 ~ 3,300 μ F | | | | |
| Operating Temp. Range | -40°C ~ +105°C | | | | |
| Capacitance Tolerance | \pm 20% (M) | | | | |
| Max. Leakage Current After 2 Minutes @ 20°C | 0.03CV | | | | |
| Surge Voltage Ratings | W.V. | 6.3 | 10 | 16 | 25 |
| | S.V. | 8 | 13 | 20 | 32 |
| Maximum Tan δ (see specifications table for values above 1,800 μ F) | Tan δ @ 20°C/120Hz | 0.22 | 0.19 | 0.16 | 0.14 |
| Low Temperature Stability (Impedance Ratio @ 120Hz) | Z -25°C/Z +20°C | 2 | 2 | 2 | 2 |
| | Z -40°C/Z +20°C | 3 | 3 | 3 | 3 |
| Load Life Test @ Rated W.V. & 105°C 2,000 hours for 8x11.5, 8x16, 10x12.5 and 10x16 3,000 hours for 8x20 4,000 hours for 10x20, 10x23 | Capacitance Change | Within \pm 25% of initial measured value | | | |
| | Tan δ | Less than 200% of the specified maximum value | | | |
| | Leakage Current | Less than specified maximum value | | | |

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

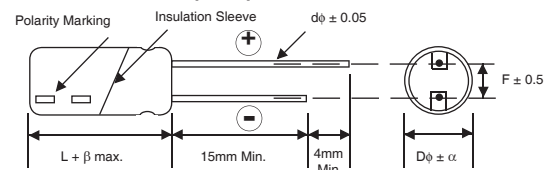
| Cap (μ F) | Code | Working Voltage (Vdc) | | | |
|----------------|------|-----------------------|---------|---------|---------|
| | | 6.3 | 10 | 16 | 25 |
| 220 | 221 | - | - | - | 8x11.5 |
| 330 | 331 | - | - | - | 8x11.5 |
| | | - | - | - | 10x12.5 |
| 470 | 471 | - | - | - | 8x20 |
| | | - | - | - | 10x12.5 |
| | | - | - | 8x11.5 | 10x16 |
| 680 | 681 | - | 8x11.5 | 8x16 | 10x16 |
| | | - | | 10x12.5 | 10x20 |
| 820 | 821 | 8x11.5 | - | - | - |
| 1000 | 102 | 8x11.5 | 8x16 | 8x20 | 10x23 |
| | | | 10x12.5 | 10x16 | |
| 1200 | 122 | 8x16 | - | - | - |
| 1500 | 152 | 8x20 | 8x20 | 10x20 | - |
| | | 10x12.5 | 10x16 | | |
| 1800 | 182 | 10x16 | 10x20 | 10x23 | - |
| 2200 | 222 | 10x20 | 10x23 | - | - |
| 3300 | 332 | 10x23 | - | - | - |

DIAMETER AND LEADSPACE (mm)

| Case Dia. (D ϕ) | 8 | 10 |
|-----------------------|-----|-----|
| Lead Dia. (d ϕ) | 0.6 | 0.6 |
| Lead Spacing (F) | 3.5 | 5.0 |
| Dim. α | 0.5 | 0.5 |

$\beta = L \leq 16\text{mm} = 1.5\text{mm}, L \geq 20\text{mm} = 2.0\text{mm}$

DIMENSIONS (mm)



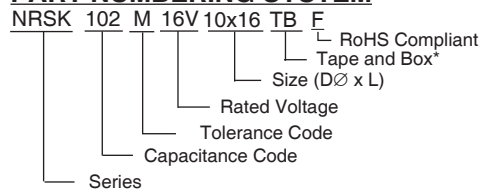
Drawing is representative of parts as supplied in bulk or straight lead format, please see taping specification for details on taped format packaging.



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

| Part Number | Cap. (μ F) | W.V. (Vdc) | Dissipation Factor +20°C/120Hz | Ripple Current Rating (mA) +105°C/100KHz | Max. ESR (Ω) +20°C/100KHz | Load Life Hours @ +105°C | |
|----------------------|-----------------|------------|--------------------------------|--|------------------------------------|--------------------------|-------|
| NRSK821M6.3V8X11.5F | 820 | 6.3 | 0.22 | 1140 | 0.036 | 2,000 | |
| NRSK102M6.3V8X11.5F | 1000 | | 0.22 | 1140 | 0.030 | 2,000 | |
| NRSK122M6.3V8X16F | 1200 | | 0.22 | 1490 | 0.028 | 2,000 | |
| NRSK152M6.3V8X20F | 1500 | | 0.22 | 1870 | 0.019 | 3,000 | |
| NRSK152M6.3V10X12.5F | 1500 | | 0.22 | 1540 | 0.026 | 2,000 | |
| NRSK152M6.3V10X16F | 1500 | | 0.22 | 2000 | 0.018 | 2,000 | |
| NRSK182M6.3V8X20F | 1800 | | 0.22 | 1950 | 0.016 | 3,000 | |
| NRSK182M6.3V10X16F | 1800 | | 0.22 | 2000 | 0.019 | 2,000 | |
| NRSK222M6.3V10X20F | 2200 | | 0.24 | 2550 | 0.013 | 4,000 | |
| NRSK332M6.3V10X23F | 3300 | | 0.26 | 2800 | 0.012 | 4,000 | |
| NRSK471M10V8X11.5F | 470 | | 10 | 0.19 | 1140 | 0.030 | 2,000 |
| NRSK681M10V8X11.5F | 680 | 0.19 | | 1140 | 0.036 | 2,000 | |
| NRSK102M10V8X16F | 1000 | 0.19 | | 1490 | 0.028 | 2,000 | |
| NRSK102M10V10X12.5F | 1000 | 0.19 | | 1540 | 0.026 | 2,000 | |
| NRSK122M10V8X20F | 1200 | 0.19 | | 1870 | 0.019 | 3,000 | |
| NRSK152M10V8X20F | 1500 | 0.19 | | 1870 | 0.019 | 3,000 | |
| NRSK152M10V10X16F | 1500 | 0.19 | | 2000 | 0.019 | 2,000 | |
| NRSK182M10V10X20V | 1800 | 0.19 | | 2550 | 0.013 | 4,000 | |
| NRSK222M10V10X23 | 2200 | 0.21 | | 2800 | 0.012 | 4,000 | |
| NRSK331M16V8X11.5F | 330 | 16 | | 0.16 | 1140 | 0.030 | 2,000 |
| NRSK471M16V8X11.5F | 470 | | | 0.16 | 1140 | 0.036 | 2,000 |
| NRSK681M16V8X16F | 680 | | 0.16 | 1490 | 0.028 | 2,000 | |
| NRSK681M16V10X12.5F | 680 | | 0.16 | 1540 | 0.026 | 2,000 | |
| NRSK102M16V8X20F | 1000 | | 0.16 | 1870 | 0.019 | 3,000 | |
| NRSK102M16V10X16F | 1000 | | 0.16 | 2000 | 0.019 | 2,000 | |
| NRSK152M16V10X20F | 1500 | | 0.16 | 2550 | 0.013 | 4,000 | |
| NRSK182M16V10X23F | 1800 | | 0.16 | 2800 | 0.012 | 4,000 | |
| NRSK221M25V8X11.5F | 220 | | 25 | 0.14 | 1110 | 0.030 | 2,000 |
| NRSK331M25V8X11.5F | 330 | | | 0.14 | 1080 | 0.032 | 2,000 |
| NRSK331M25V10X12.5F | 330 | | | 0.14 | 1440 | 0.025 | 2,000 |
| NRSK471M25V8X20F | 470 | 0.14 | | 1820 | 0.018 | 3,000 | |
| NRSK471M25V10X12.5F | 470 | 0.14 | | 1390 | 0.027 | 2,000 | |
| NRSK471M25V10X16F | 470 | 0.14 | | 1920 | 0.020 | 2,000 | |
| NRSK681M25V10X16F | 680 | 0.14 | | 1830 | 0.022 | 2,000 | |
| NRSK681M25V10X20F | 680 | 0.14 | | 2180 | 0.016 | 4,000 | |
| NRSK102M25V10X23F | 1000 | 0.14 | | 2180 | 0.016 | 4,000 | |

PART NUMBERING SYSTEM



*see tape specification for details

PRECAUTIONS

Please review the notes on correct use, safety and precautions found on pages T10 & T11 of NIC's Electrolytic Capacitor catalog.
 Also found at www.niccomp.com/precautions
 If in doubt or uncertainty, please review your specific application - process details with NIC's technical support personnel: tpmg@niccomp.com

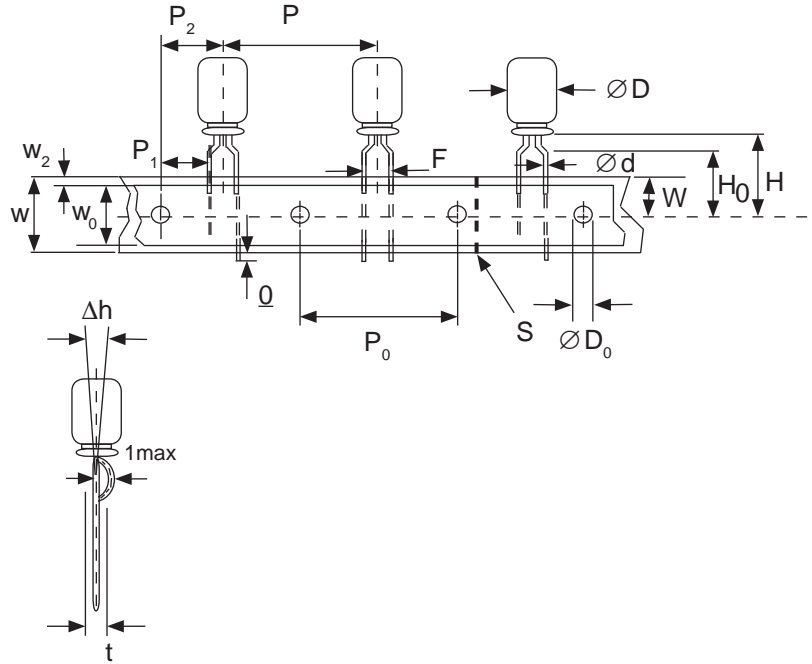


Miniature Aluminum Electrolytic Capacitors Taping Specifications

STANDARD RADIAL TAPING (5mm LEAD SPACING, FORMED LEADS) TB

Taping Dimensions (mm)

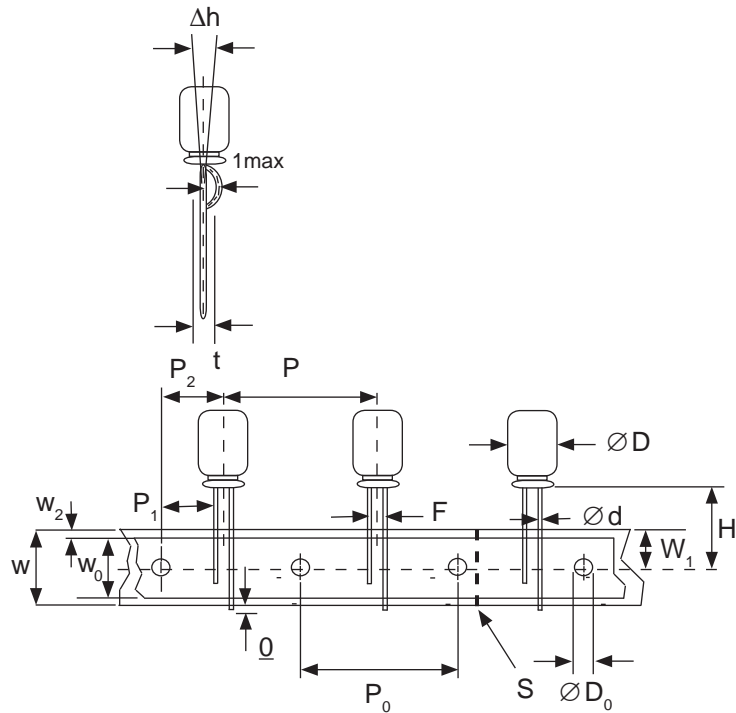
| Case Dia. (D ϕ) | 4 | 5 | 6.3 | 8 |
|-----------------------|------------------------------------|------------|------|------------------------------------|
| Case Size | 4x5 4x7 | 5x5 5x7 | 5x11 | 6.3x5 6.3x7 6.3x11 8x11.5 |
| d ϕ \pm 0.05 | 0.45 | 0.45 | 0.5 | 0.45 |
| H \pm 0.75 | 17.5 | 17.5 | 18.5 | 17.5 |
| F +0.8 ~ -0.2 | 5.0 -0.2 ~ +0.8 | | | |
| P | 12.7 \pm 1.0 | | | |
| P ₀ | 12.7 \pm 0.2 | | | |
| P ₁ | 3.85 \pm 0.5 (at end of tape) | | | |
| P ₂ | 6.35 \pm 1.0 | | | |
| W | 18.0 \pm 0.5 | | | |
| W ₀ | 11.5 min. | | | |
| W ₁ | 9.0 \pm 0.5 | | | |
| W ₂ | 0 ~ 2.5 | | | |
| H ₀ | 16.0 \pm 0.5 | | | |
| l | 1.0 max. | | | |
| D ₀ ϕ | 4.0 \pm 0.2 | | | |
| Δ h | 0 \pm 1.0 (at top of can) | | | |
| t | 0.7 \pm 0.2 (not including lead) | | | |



STANDARD RADIAL TAPING (5mm LEAD SPACING, STRAIGHT LEADS) TB

Taping Dimensions (mm)

| Case Dia. (D ϕ) | 10 | 12.5 |
|-----------------------|------------------------------------|------|
| Case Size | All | All |
| d ϕ \pm 0.05 | 0.6 | 0.6 |
| H \pm 0.75 | 19.0 | 19.0 |
| F +0.8 ~ -0.2 | 5.0 | 5.0 |
| P \pm 1.0 | 25.4* | |
| P ₀ | 12.7 \pm 0.2 | |
| P ₁ | 3.85 | |
| P ₂ | 6.35 \pm 1.0 | |
| W | 18.0 \pm 0.5 | |
| W ₀ | 11.5 min | |
| W ₁ | 9.0 \pm 0.5 | |
| W ₂ | 0 ~ 2.5 | |
| H ₀ | 16.0 \pm 0.5 | |
| l | 1.0 max. | |
| D ₀ ϕ | 4.0 \pm 0.2 | |
| Δ h | 0 \pm 1.0 (at top of can) | |
| t | 0.7 \pm 0.2 (not including lead) | |



*Optional Taping Specifications

10mm diameter available with P dim. = 12.7mm
(P/N Suffix: TB12.7MMP)

12.5mm diameter available with P dim. = 15mm, P₁ = 5.0mm,
P₀ = 15.0mm & P₂ = 7.5mm (P/N Suffix: TB15MMP)

NOTE: ANODE (+) LEAD FEEDS OFF FIRST.
FOR OPTION OF NEGATIVE (-) LEAD FIRST,
SPECIFY "TBN".

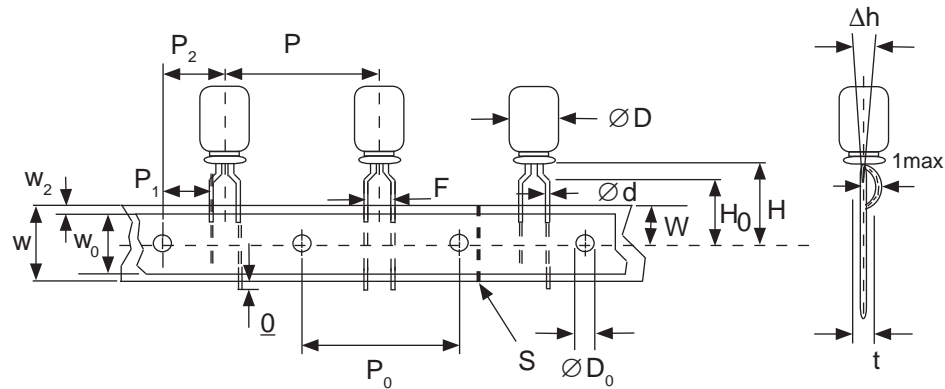


Miniature Aluminum Electrolytic Capacitors Taping Specifications

SPECIAL RADIAL TAPING (2.5mm LEAD SPACING, FORMED LEADS) TBF1

Taping Dimensions (mm)

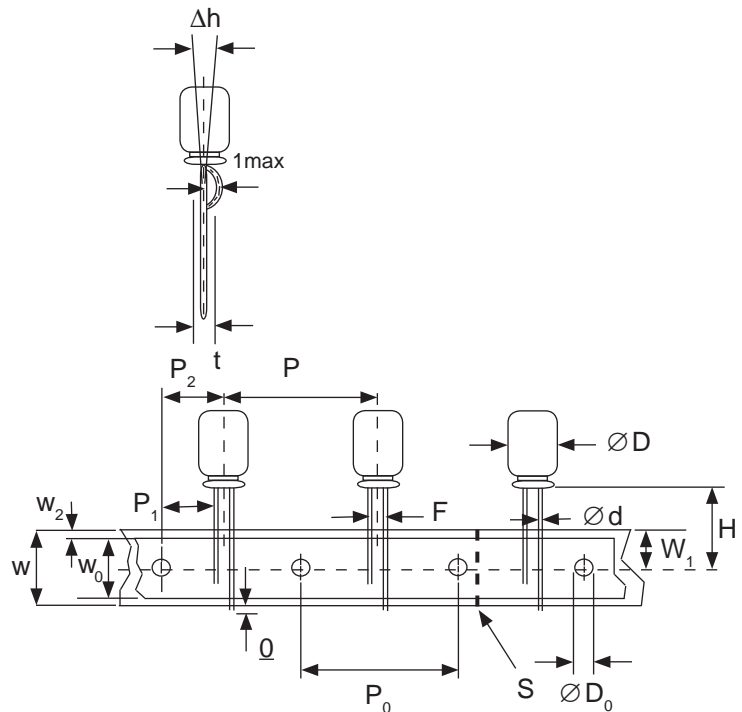
| Case Dia. (D ϕ) | 4 | | 5 | |
|--------------------------|-----------------|------------|------|--|
| Case Size Dim. | 4x5 4x7 | 5x5 5x7 | 5x11 | |
| d ϕ \pm 0.05 | 0.45 | 0.45 | 0.5 | |
| H \pm 0.75 | 17.5 | 17.5 | 18.5 | |
| H ₀ \pm 0.5 | 16.0 | - | - | |
| F | 2.5 -0.2 ~ +0.8 | | | |
| P | 12.7 \pm 1.0 | | | |
| P ₀ | 12.7 \pm 0.2 | | | |
| P ₁ | 5.1 \pm 0.5 | | | |
| P ₂ | 6.35 \pm 1.0 | | | |
| W | 18.0 \pm 0.5 | | | |
| W ₀ | 11.5 min. | | | |
| W ₁ | 9.0 \pm 0.5 | | | |
| W ₂ | 0 ~ 1.5 | | | |
| l | 1.0 max. | | | |
| D ₀ ϕ | 4.0 \pm 0.2 | | | |
| Δ h | 0 \pm 1.0 | | | |
| t | 0.7 \pm 0.2 | | | |



SPECIAL STRAIGHT LEAD TAPING TBST

Taping Dimensions (mm)

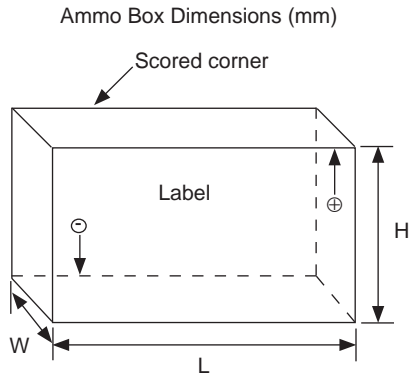
| Case Dia. (D ϕ) | 4 | | | 5 | | | 6.3 | | 8 | |
|-----------------------|------------------------------------|------------|------|-----|----------------|--------|-----|--------|---|--|
| Case Size Dim. | 4x5 4x7 | 5x5 5x7 | 5x11 | | 6.3x5 6.3x7 | 6.3x11 | | 8x11.5 | | |
| d ϕ \pm 0.05 | 0.45 | 0.45 | 0.5 | | 0.45 | 0.5 | | 0.6 | | |
| H \pm 0.75 | 17.5 | 17.5 | 18.5 | | 17.5 | 18.5 | | 20.0 | | |
| F +0.8 ~ -0.2 | 2.0* | 2.0 | 2.0 | | 2.5 | 2.5 | | 3.5 | | |
| P \pm 1.0 | 12.7 \pm 0.2 | | | | | | | | | |
| P ₀ | 12.7 \pm 0.2 | | | | | | | | | |
| P ₁ | 5.1 | 5.1 | 5.1 | 5.1 | 5.1 | 5.1 | 4.6 | | | |
| P ₂ | 6.35 \pm 1.0 | | | | | | | | | |
| W | 18.0 \pm 0.5 | | | | | | | | | |
| W ₀ | 11.5 min. | | | | | | | | | |
| W ₁ | 9.0 \pm 0.5 | | | | | | | | | |
| W ₂ | 0 ~ 2.5 | | | | | | | | | |
| H ₀ | 16.0 \pm 0.5 | | | | | | | | | |
| l | 1.0 max. | | | | | | | | | |
| D ₀ ϕ | 4.0 \pm 0.2 | | | | | | | | | |
| Δ h | 0 \pm 1.0 (at top of can) | | | | | | | | | |
| t | 0.7 \pm 0.2 (not including lead) | | | | | | | | | |



* Parts with 4mm diameter are taped with a slight flare in the lead and a 2.0mm lead-space.



RADIAL TAPED PACKAGING



Ammo Box (Tape & Box) TB, TBF1, TBST

Size of box and component quantity

| Case Dia (D ϕ) or Case Size | Q'ty per Box (pcs) | Dim. L | Dim. H | Dim. W |
|-----------------------------------|--------------------|--------|--------|--------|
| 4x5, 4x7 | 2,000 | 331 | 175 | 43 |
| 5x5, 5x7 | 2,000 | 331 | 220 | 43 |
| 5x11 | 2,000 | 340 | 255 | 55 |
| 6.3x5, 6.3x7 | 2,000 | 331 | 280 | 43 |
| 6.3x11 | 2,000 | 331 | 280 | 48 |
| 8x11.5, 8x12.5 | 1,000 | 335 | 235 | 53 |
| 10x12.5* | 500 | 335 | 190 | 53 |
| 10x16* | 500 | 335 | 300 | 53 |
| 10x20* | 500 | 335 | 300 | 55 |
| 12.x20* | 500 | 335 | 300 | 55 |
| 12.5x25* | 500 | 335 | 300 | 61 |

*Special Taping Consult Factory For Availability