

# Miniature Aluminum Electrolytic Capacitors

NRWP Series

RADIAL LEADS, POLARIZED, NEW FURTHER REDUCED CASE SIZING,  
FROM NRWS WIDE TEMPERATURE RANGE

**New Expanded  
High Voltage  
(Up to 450V)**



EXTENDED TEMPERATURE  
**NRWS** → **NRWP**  
(today's standard) (reduced sizes)

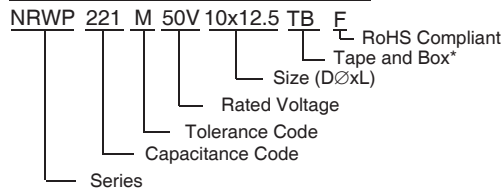
**RoHS  
Compliant**  
includes all homogeneous materials

\*See Part Number System for Details

## CHARACTERISTICS

|   |                       |  |     |     |     |     |     |     |     |
|---|-----------------------|--|-----|-----|-----|-----|-----|-----|-----|
| Rated Voltage Range                               |                       | 6.3 ~ 450VDC   |     |     |     |     |     |     |     |
| Capacitance Range                                 |                       | 0.47 ~ 33,000 $\mu$ F  |     |     |     |     |     |     |     |
| Operating Temperature Range                       | 6.3 ~ 100Vdc          | -55°C ~ +105°C   |     |     |     |     |     |     |     |
|   | 160 ~ 400Vdc          | -40°C ~ +105°C   |     |     |     |     |     |     |     |
|   | 450Vdc                | -25°C ~ +105°C   |     |     |     |     |     |     |     |
| Capacitance Tolerance                             |                       | $\pm 20\%$ (M)   |     |     |     |     |     |     |     |
| Maximum Leakage Current                           | 6.3 ~ 100Vdc          | 0.01CV or 3 $\mu$ A whichever is greater (after 2 minutes)   |     |     |     |     |     |     |     |
|   | 160 ~ 450Vdc          | For CV's $\leq 1000$ LC = 0.1CV + 40 $\mu$ A (after 1 minute), 0.03CV + 15 $\mu$ A (after 5 minutes) |     |     |     |     |     |     |     |
|   |                       | For CV's > 1000 LC = 0.04CV + 100 $\mu$ A (after 1 minute), 0.02CV + 25 $\mu$ A (after 5 minutes)    |     |     |     |     |     |     |     |
| Max. Tan $\delta$ at 120Hz/20°C                   | W.V. (Vdc)            | 6.3  | 10  | 16  | 25  | 35  | 50  | 63  | 100 |
|   | S.V. (Vdc)            | 8  | 13  | 20  | 32  | 44  | 63  | 79  | 125 |
| All Part Numbers                                  |                       | See specifications tables  |     |     |     |     |     |     |     |
| Low Temperature Stability Impedance Ratio @ 120Hz | W.V. (Vdc)            | 6.3  | 10  | 16  | 25  | 35  | 50  | 63  | 100 |
|   | Z-25°C/Z+20°C         | 5  | 4   | 3   | 2   | 2   | 2   | 2   | 2   |
|   | Z-40°C/Z+20°C         | 10   | 8   | 6   | 4   | 3   | 3   | 3   | 3   |
|   | W.V. (Vdc)            | 160  | 200 | 250 | 350 | 400 | 450 | N/A |     |
|   | Z-25°C/Z+20°C         | 3  | 3   | 4   | 6   | 6   | 7   |     |     |
|   | Z-40°C/Z+20°C         | 4  | 4   | 8   | 8   | 10  | -   |     |     |
| Load Life Test @ 105°C                            | Duration              | $\phi D \leq 8$ : 1,000 hours, $\phi D \geq 10$ : 2,000 hours  |     |     |     |     |     |     |     |
|   | $\Delta$ Capacitance  | Within $\pm 25\%$ of initial measured value  |     |     |     |     |     |     |     |
|   | $\Delta$ Tan $\delta$ | Less than 200% of specified value  |     |     |     |     |     |     |     |
|   | $\Delta$ LC           | Less than specified value  |     |     |     |     |     |     |     |

## PART NUMBERING SYSTEM

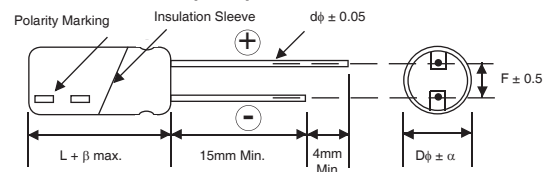


\*see tape specification for details

## LEAD SPACING AND DIAMETER (mm)

|                       |     |     |     |     |      |     |     |
|-----------------------|-----|-----|-----|-----|------|-----|-----|
| Case Dia. (D $\phi$ ) | 5   | 6.3 | 8   | 10  | 12.5 | 16  | 18  |
| Lead Dia. (D $\phi$ ) | 0.5 | 0.5 | 0.6 | 0.6 | 0.6  | 0.8 | 0.8 |
| Lead Spacing (F)      | 2.0 | 2.5 | 3.5 | 5.0 | 5.0  | 7.5 | 7.5 |
| Dim. $\alpha$         | 0.5 | 0.5 | 0.5 | 0.5 | 0.5  | 0.5 | 0.5 |

## DIMENSIONS (mm)



$\beta = D < 16\text{mm} = 1.5\text{mm}$ ,  $L \geq 16\text{mm} = 2.0\text{mm}$   
 $\beta$  for all 160V ~ 450V parts = 2.0mm

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



### STANDARD VALUES, SPECIFICATIONS AND CASE SIZES (mm)

| Part Number          | Cap. (μF) | W.V. (Vdc) | Dissipation Factor +20°C/120Hz | Ripple Current Rating (mA) +105°C/120Hz | Max. ESR (Ω) +20°C/120Hz | Load Life Hours @+105°C |
|----------------------|-----------|------------|--------------------------------|---|--------------------------|-------------------------|
| NRWP101M6.3V5X11F    | 100       | 6.3        | 0.28                           | 96                                      | 4.64                     | 1,000                   |
| NRWP221M6.3V5X11F    | 220       |            | 0.28                           | 160                                     | 2.11                     | 1,000                   |
| NRWP331M6.3V6.3X11F  | 330       |            | 0.28                           | 210                                     | 1.41                     | 1,000                   |
| NRWP471M6.3V6.3X11F  | 470       |            | 0.28                           | 275                                     | 0.99                     | 1,000                   |
| NRWP681M6.3V6.3X11F  | 680       |            | 0.28                           | 285                                     | 0.68                     | 1,000                   |
| NRWP102M6.3V8X11.5F  | 1,000     |            | 0.28                           | 460                                     | 0.46                     | 1,000                   |
| NRWP222M6.3V10X16F   | 2,200     |            | 0.30                           | 775                                     | 0.23                     | 2,000                   |
| NRWP332M6.3V10X20F   | 3,300     |            | 0.32                           | 985                                     | 0.16                     | 2,000                   |
| NRWP472M6.3V12.5X20F | 4,700     |            | 0.34                           | 1150                                    | 0.12                     | 2,000                   |
| NRWP682M6.3V12.5X25F | 6,800     |            | 0.38                           | 1480                                    | 0.09                     | 2,000                   |
| NRWP103M6.3V16X25F   | 10,000    |            | 0.46                           | 1700                                    | 0.08                     | 2,000                   |
| NRWP153M6.3V16X31.5F | 15,000    |            | 0.56                           | 2090                                    | 0.06                     | 2,000                   |
| NRWP223M6.3V18X31.5F | 22,000    |            | 0.70                           | 2280                                    | 0.05                     | 2,000                   |
| NRWP333M6.3V18X40F   | 33,000    |            | 0.92                           | 2350                                    | 0.05                     | 2,000                   |
| NRWP101M10V5X11F     | 100       | 10         | 0.24                           | 105                                     | 3.98                     | 1,000                   |
| NRWP221M10V5X11F     | 220       |            | 0.24                           | 165                                     | 1.81                     | 1,000                   |
| NRWP331M10V6.3X11F   | 330       |            | 0.24                           | 235                                     | 1.21                     | 1,000                   |
| NRWP471M10V6.3X11F   | 470       |            | 0.24                           | 295                                     | 0.85                     | 1,000                   |
| NRWP681M10V8X11.5F   | 680       |            | 0.24                           | 430                                     | 0.59                     | 1,000                   |
| NRWP102M10V8X11.5F   | 1,000     |            | 0.24                           | 500                                     | 0.40                     | 1,000                   |
| NRWP222M10V10X16F    | 2,200     |            | 0.26                           | 860                                     | 0.20                     | 2,000                   |
| NRWP332M10V10X20F    | 3,300     |            | 0.28                           | 1100                                    | 0.14                     | 2,000                   |
| NRWP472M10V12.5X20F  | 4,700     |            | 0.30                           | 1350                                    | 0.11                     | 2,000                   |
| NRWP682M10V16X25F    | 6,800     |            | 0.34                           | 1700                                    | 0.08                     | 2,000                   |
| NRWP103M10V16X25F    | 10,000    |            | 0.42                           | 1950                                    | 0.07                     | 2,000                   |
| NRWP153M10V16X35.5F  | 15,000    |            | 0.52                           | 2090                                    | 0.06                     | 2,000                   |
| NRWP223M10V18X35.5F  | 22,000    |            | 0.66                           | 2180                                    | 0.05                     | 2,000                   |
| NRWP470M16V5X11F     | 47        |            | 16                             | 0.20                                    | 80                       | 7.06                    |
| NRWP101M16V5X11F     | 100       | 0.20       |                                | 130                                     | 3.32                     | 1,000                   |
| NRWP221M16V6.3X11F   | 220       | 0.20       |                                | 220                                     | 1.51                     | 1,000                   |
| NRWP331M16V6.3X11F   | 330       | 0.20       |                                | 270                                     | 1.01                     | 1,000                   |
| NRWP471M16V8X11.5F   | 470       | 0.20       |                                | 375                                     | 0.71                     | 1,000                   |
| NRWP681M16V8X11.5F   | 680       | 0.20       |                                | 480                                     | 0.49                     | 1,000                   |
| NRWP102M16V10X12.5F  | 1,000     | 0.20       |                                | 640                                     | 0.33                     | 2,000                   |
| NRWP222M16V10X20F    | 2,200     | 0.22       |                                | 1050                                    | 0.17                     | 2,000                   |
| NRWP332M16V12.5X20F  | 3,300     | 0.24       |                                | 1300                                    | 0.12                     | 2,000                   |
| NRWP472M16V12.5X25F  | 4,700     | 0.26       |                                | 1650                                    | 0.09                     | 2,000                   |
| NRWP682M16V16X25F    | 6,800     | 0.30       |                                | 1900                                    | 0.07                     | 2,000                   |
| NRWP103M16V16X31.5F  | 10,000    | 0.38       |                                | 1950                                    | 0.06                     | 2,000                   |
| NRWP153M16V18X35.5F  | 15,000    | 0.48       |                                | 2070                                    | 0.05                     | 2,000                   |
| NRWP330M25V5X11F     | 33        | 25         |                                | 0.16                                    | 69                       | 8.04                    |
| NRWP470M25V5X11F     | 47        |            | 0.16                           | 84                                      | 5.65                     | 1,000                   |
| NRWP101M25V5X11F     | 100       |            | 0.16                           | 135                                     | 2.65                     | 1,000                   |
| NRWP221M25V6.3X11F   | 220       |            | 0.16                           | 240                                     | 1.21                     | 1,000                   |
| NRWP331M25V8X11.5F   | 330       |            | 0.16                           | 335                                     | 0.80                     | 1,000                   |
| NRWP471M25V8X11.5F   | 470       |            | 0.16                           | 440                                     | 0.56                     | 1,000                   |
| NRWP681M25V10X12.5F  | 680       |            | 0.16                           | 630                                     | 0.39                     | 2,000                   |
| NRWP102M25V10X16F    | 1,000     |            | 0.16                           | 740                                     | 0.27                     | 2,000                   |
| NRWP222M25V12.5X20F  | 2,200     |            | 0.18                           | 1090                                    | 0.14                     | 2,000                   |
| NRWP332M25V16X25F    | 3,300     |            | 0.20                           | 1500                                    | 0.10                     | 2,000                   |
| NRWP472M25V16X25F    | 4,700     |            | 0.22                           | 1800                                    | 0.08                     | 2,000                   |
| NRWP682M25V16X35.5F  | 6,800     |            | 0.26                           | 1910                                    | 0.06                     | 2,000                   |
| NRWP103M25V18X35.5F  | 10,000    |            | 0.34                           | 2050                                    | 0.06                     | 2,000                   |
| NRWP220M35V5X11F     | 22        |            | 35                             | 0.14                                    | 64                       | 10.56                   |
| NRWP330M35V5X11F     | 33        | 0.14       |                                | 77                                      | 7.04                     | 1,000                   |
| NRWP470M35V5X11F     | 47        | 0.14       |                                | 100                                     | 4.94                     | 1,000                   |
| NRWP101M35V6.3X11F   | 100       | 0.14       |                                | 170                                     | 2.32                     | 1,000                   |
| NRWP221M35V8X11.5F   | 220       | 0.14       |                                | 300                                     | 1.06                     | 1,000                   |
| NRWP331M35V10X12.5F  | 330       | 0.14       |                                | 400                                     | 0.70                     | 2,000                   |
| NRWP471M35V10X12.5F  | 470       | 0.14       |                                | 525                                     | 0.49                     | 2,000                   |
| NRWP681M35V10X16F    | 680       | 0.14       |                                | 760                                     | 0.34                     | 2,000                   |

Represents New Value



## STANDARD VALUES, SPECIFICATIONS AND CASE SIZES (mm)

| Part Number          | Cap. (µF) | W.V. (Vdc) | Dissipation Factor +20°C/120Hz | Ripple Current Rating (mA) +105°C/120Hz | Max. ESR (Ω) +20°C/120Hz | Load Life Hours @+105°C |       |
|----------------------|-----------|------------|--------------------------------|---|--------------------------|-------------------------|-------|
| NRWP102M35V10X20F    | 1,000     | 35         | 0.14                           | 865                                     | 0.23                     | 2,000                   |       |
| NRWP222M35V16X25F    | 2,200     |            | 0.16                           | 1370                                    | 0.12                     | 2,000                   |       |
| NRWP332M35V16X25F    | 3,300     |            | 0.18                           | 1680                                    | 0.09                     | 2,000                   |       |
| NRWP472M35V16X35.5F  | 4,700     |            | 0.20                           | 1870                                    | 0.07                     | 2,000                   |       |
| NRWP682M35V18X35.5F  | 6,800     |            | 0.24                           | 1920                                    | 0.06                     | 2,000                   |       |
| NRWPR47M50V5X11F     | 0.47      | 50         | 0.12                           | 7                                       | 423.50                   | 1,000                   |       |
| NRWP1R0M50V5X11F     | 1.0       |            | 0.12                           | 13                                      | 199.04                   | 1,000                   |       |
| NRWP2R2M50V5X11F     | 2.2       |            | 0.12                           | 20                                      | 90.47                    | 1,000                   |       |
| NRWP3R3M50V5X11F     | 3.3       |            | 0.12                           | 25                                      | 60.32                    | 1,000                   |       |
| NRWP4R7M50V5X11F     | 4.7       |            | 0.12                           | 32                                      | 42.35                    | 1,000                   |       |
| NRWP100M50V5X11F     | 10        |            | 0.12                           | 47                                      | 19.90                    | 1,000                   |       |
| NRWP220M50V5X11F     | 22        |            | 0.12                           | 70                                      | 9.05                     | 1,000                   |       |
| NRWP330M50V5X11F     | 33        |            | 0.12                           | 94                                      | 6.03                     | 1,000                   |       |
| NRWP470M50V6.3X11F   | 47        |            | 0.12                           | 115                                     | 4.23                     | 1,000                   |       |
| NRWP101M50V8X11.5F   | 100       |            | 0.12                           | 200                                     | 1.99                     | 1,000                   |       |
| NRWP221M50V10X12.5F  | 220       |            | 0.12                           | 360                                     | 0.90                     | 2,000                   |       |
| NRWP331M50V10X16F    | 330       |            | 0.12                           | 470                                     | 0.60                     | 2,000                   |       |
| NRWP471M50V10X20F    | 470       |            | 0.12                           | 600                                     | 0.42                     | 2,000                   |       |
| NRWP681M50V12.5X20F  | 680       |            | 0.12                           | 980                                     | 0.29                     | 2,000                   |       |
| NRWP102M50V12.5X25F  | 1,000     |            | 0.12                           | 1060                                    | 0.20                     | 2,000                   |       |
| NRWP222M50V16X31.5F  | 2,200     |            | 0.14                           | 1600                                    | 0.11                     | 2,000                   |       |
| NRWP332M50V18X35.5F  | 3,300     |            | 0.16                           | 1780                                    | 0.08                     | 2,000                   |       |
| NRWP100M63V5X11F     | 10        |            | 63                             | 0.10                                    | 48                       | 16.59                   | 1,000 |
| NRWP220M63V5X11F     | 22        |            |                                | 0.10                                    | 80                       | 7.54                    | 1,000 |
| NRWP330M63V6.3X11F   | 33        | 0.10       |                                | 100                                     | 5.03                     | 1,000                   |       |
| NRWP470M63V6.3X11F   | 47        | 0.10       |                                | 140                                     | 3.53                     | 1,000                   |       |
| NRWP101M63V8x11.5F   | 100       | 0.10       |                                | 230                                     | 1.66                     | 1,000                   |       |
| NRWP221M63V10x16F    | 220       | 0.10       |                                | 390                                     | 0.75                     | 2,000                   |       |
| NRWP331M63V10x20F    | 330       | 0.10       |                                | 540                                     | 0.50                     | 2,000                   |       |
| NRWP471M63V12.5x20F  | 470       | 0.10       |                                | 700                                     | 0.35                     | 2,000                   |       |
| NRWP681M63V12.5x25F  | 680       | 0.10       |                                | 800                                     | 0.24                     | 2,000                   |       |
| NRWP102M63V16x25F    | 1,000     | 0.10       |                                | 1200                                    | 0.17                     | 2,000                   |       |
| NRWP222M63V18x31.5F  | 2,200     | 0.12       |                                | 1400                                    | 0.09                     | 2,000                   |       |
| NRWPR47M100V5X11F    | 0.47      | 100        |                                | 0.08                                    | 8                        | 282.33                  | 1,000 |
| NRWP1R0M100V5X11F    | 1.0       |            |                                | 0.08                                    | 15                       | 132.70                  | 1,000 |
| NRWP2R2M100V5X11F    | 2.2       |            | 0.08                           | 21                                      | 60.32                    | 1,000                   |       |
| NRWP3R3M100V5X11F    | 3.3       |            | 0.08                           | 30                                      | 40.21                    | 1,000                   |       |
| NRWP4R7M100V5X11F    | 4.7       |            | 0.08                           | 35                                      | 28.23                    | 1,000                   |       |
| NRWP100M100V5X11F    | 10        |            | 0.08                           | 60                                      | 13.27                    | 1,000                   |       |
| NRWP220M100V6.3X11F  | 22        |            | 0.08                           | 98                                      | 6.03                     | 1,000                   |       |
| NRWP330M100V8x11.5F  | 33        |            | 0.08                           | 140                                     | 4.02                     | 1,000                   |       |
| NRWP470M100V8x11.5F  | 47        |            | 0.08                           | 185                                     | 2.82                     | 1,000                   |       |
| NRWP101M100V10x16F   | 100       |            | 0.08                           | 290                                     | 1.33                     | 2,000                   |       |
| NRWP221M100V12.5x20F | 220       |            | 0.08                           | 560                                     | 0.60                     | 2,000                   |       |
| NRWP331M100V12.5x25F | 330       |            | 0.08                           | 690                                     | 0.40                     | 2,000                   |       |
| NRWP471M100V16x25F   | 470       |            | 0.08                           | 880                                     | 0.28                     | 2,000                   |       |
| NRWP681M100V16x31.5F | 680       |            | 0.08                           | 900                                     | 0.20                     | 2,000                   |       |
| NRWP102M100V18x35.5F | 1,000     |            | 0.08                           | 985                                     | 0.13                     | 2,000                   |       |
| NRWP4R7M160V6.3X11F  | 4.7       |            | 160                            | 0.20                                    | 43                       | 70.58                   | 1,000 |
| NRWP100M160V8X11.5F  | 10        |            |                                | 0.20                                    | 77                       | 33.17                   | 1,000 |
| NRWP220M160V10X12.5F | 22        |            |                                | 0.20                                    | 92                       | 15.08                   | 2,000 |
| NRWP330M160V10X16F   | 33        |            |                                | 0.20                                    | 125                      | 10.05                   | 2,000 |
| NRWP470M160V10X20F   | 47        | 0.20       |                                | 150                                     | 7.06                     | 2,000                   |       |
| NRWP101M160V12.5X25F | 100       | 0.20       |                                | 320                                     | 3.32                     | 2,000                   |       |
| NRWP221M160V16X31.5F | 220       | 0.20       |                                | 410                                     | 1.51                     | 2,000                   |       |
| NRWP331M160V18X31.5F | 330       | 0.20       |                                | 570                                     | 1.01                     | 2,000                   |       |
| NRWP471M160V18X40F   | 470       | 0.20       |                                | 855                                     | 0.71                     | 2,000                   |       |

Represents New Value

### 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](http://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](mailto:tpmg@niccomp.com)



## STANDARD VALUES, SPECIFICATIONS AND CASE SIZES (mm)

| Part Number          | Cap. (μF) | W.V. (Vdc) | Dissipation Factor +20°C/120Hz | Ripple Current Rating (mA) +105°C/120Hz | Max. ESR (Ω) +20°C/120Hz | Load Life Hours @+105°C |       |
|----------------------|-----------|------------|--------------------------------|---|--------------------------|-------------------------|-------|
| NRWP3R3M200V6.3X11F  | 3.3       | 200        | 0.20                           | 36                                      | 100.53                   | 1,000                   |       |
| NRWP4R7M200V6.3X11F  | 4.7       |            | 0.20                           | 40                                      | 70.58                    | 1,000                   |       |
| NRWP100M200V8X11.5F  | 10        |            | 0.20                           | 57                                      | 33.17                    | 1,000                   |       |
| NRWP220M200V10X16F   | 22        |            | 0.20                           | 105                                     | 15.08                    | 2,000                   |       |
| NRWP330M200V10X20F   | 33        |            | 0.20                           | 140                                     | 10.05                    | 2,000                   |       |
| NRWP470M200V10X20F   | 47        |            | 0.20                           | 195                                     | 7.06                     | 2,000                   |       |
| NRWP101M200V16X25F   | 100       |            | 0.20                           | 340                                     | 3.32                     | 2,000                   |       |
| NRWP221M200V16X35.5F | 220       |            | 0.20                           | 580                                     | 1.51                     | 2,000                   |       |
| NRWP331M200V18X40F   | 330       |            | 0.20                           | 675                                     | 1.01                     | 2,000                   |       |
| NRWPR47M250V6.3X11F  | 0.47      | 250        | 0.20                           | 8                                       | 705.83                   | 1,000                   |       |
| NRWP1R0M250V6.3X11F  | 1.0       |            | 0.20                           | 16                                      | 331.74                   | 1,000                   |       |
| NRWP2R2M250V6.3X11F  | 2.2       |            | 0.20                           | 30                                      | 150.79                   | 1,000                   |       |
| NRWP3R3M250V6.3X11F  | 3.3       |            | 0.20                           | 30                                      | 100.53                   | 1,000                   |       |
| NRWP4R7M250V8X11.5F  | 4.7       |            | 0.20                           | 45                                      | 70.58                    | 2,000                   |       |
| NRWP100M250V10X12.5F | 10        |            | 0.20                           | 90                                      | 33.17                    | 2,000                   |       |
| NRWP220M250V10X16F   | 22        |            | 0.20                           | 105                                     | 15.08                    | 2,000                   |       |
| NRWP330M250V10X20F   | 33        |            | 0.20                           | 140                                     | 10.05                    | 2,000                   |       |
| NRWP470M250V12.5X20F | 47        |            | 0.20                           | 190                                     | 7.06                     | 2,000                   |       |
| NRWP101M250V16X25F   | 100       |            | 0.20                           | 310                                     | 3.32                     | 2,000                   |       |
| NRWP221M250V18X35.5F | 220       |            | 0.20                           | 485                                     | 1.51                     | 2,000                   |       |
| NRWPR47M350V6.3X11F  | 0.47      |            | 350                            | 0.20                                    | 8                        | 705.83                  | 1,000 |
| NRWP1R0M350V6.3X11F  | 1.0       |            |                                | 0.20                                    | 16                       | 331.74                  | 1,000 |
| NRWP2R2M350V6.3X11F  | 2.2       |            |                                | 0.20                                    | 25                       | 150.79                  | 1,000 |
| NRWP3R3M350V8X11.5F  | 3.3       | 0.20       |                                | 30                                      | 100.53                   | 1,000                   |       |
| NRWP4R7M350V8X11.5F  | 4.7       | 0.20       |                                | 45                                      | 70.58                    | 1,000                   |       |
| NRWP100M350V10X16F   | 10        | 0.20       |                                | 95                                      | 33.17                    | 2,000                   |       |
| NRWP220M350V12.5X20F | 22        | 0.20       |                                | 175                                     | 15.08                    | 2,000                   |       |
| NRWP330M350V12.5X25F | 33        | 0.20       |                                | 220                                     | 10.05                    | 2,000                   |       |
| NRWP470M350V16X25F   | 47        | 0.20       |                                | 260                                     | 7.06                     | 2,000                   |       |
| NRWP101M350V18X31.5F | 100       | 0.20       |                                | 370                                     | 3.32                     | 2,000                   |       |
| NRWP1R0M400V6.3X11F  | 1.0       | 400        |                                | 0.25                                    | 16                       | 414.68                  | 1,000 |
| NRWP2R2M400V8X11.5F  | 2.2       |            |                                | 0.25                                    | 31                       | 188.49                  | 1,000 |
| NRWP3R3M400V8X11.5F  | 3.3       |            |                                | 0.25                                    | 34                       | 125.66                  | 1,000 |
| NRWP4R7M400V10X12.5F | 4.7       |            |                                | 0.25                                    | 42                       | 88.23                   | 2,000 |
| NRWP100M400V10X16F   | 10        |            | 0.25                           | 64                                      | 41.47                    | 2,000                   |       |
| NRWP220M400V12.5X20F | 22        |            | 0.25                           | 140                                     | 18.85                    | 2,000                   |       |
| NRWP330M400V16X25F   | 33        |            | 0.25                           | 170                                     | 12.57                    | 2,000                   |       |
| NRWP470M400V16X25F   | 47        |            | 0.25                           | 200                                     | 8.82                     | 2,000                   |       |
| NRWP101M400V18X35.5F | 100       |            | 0.25                           | 310                                     | 4.15                     | 2,000                   |       |
| NRWP1R0M450V6.3X11F  | 1.0       |            | 450                            | 0.25                                    | 15                       | 414.68                  | 1,000 |
| NRWP2R2M450V8X11.5F  | 2.2       | 0.25       |                                | 20                                      | 188.49                   | 1,000                   |       |
| NRWP3R3M450V10X12.5F | 3.3       | 0.25       |                                | 33                                      | 125.66                   | 2,000                   |       |
| NRWP4R7M450V10X12.5F | 4.7       | 0.25       |                                | 35                                      | 88.23                    | 2,000                   |       |
| NRWP100M450V10X20F   | 10        | 0.25       |                                | 37                                      | 41.47                    | 2,000                   |       |
| NRWP220M450V12.5X25F | 22        | 0.25       |                                | 100                                     | 18.85                    | 2,000                   |       |
| NRWP330M450V16X25F   | 33        | 0.25       |                                | 125                                     | 12.57                    | 2,000                   |       |
| NRWP470M450V16X31.5F | 47        | 0.25       |                                | 155                                     | 8.82                     | 2,000                   |       |
| NRWP101M450V18X40F   | 100       | 0.25       |                                | 200                                     | 4.15                     | 2,000                   |       |

Represents New Value

## RIPPLE CURRENT FREQUENCY CORRECTION FACTOR

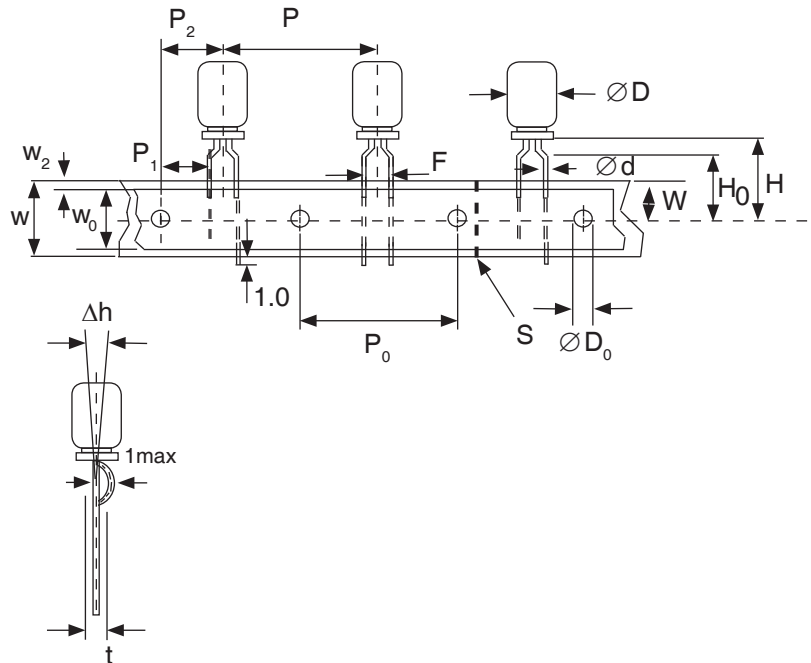
| Cap. (μF)      | 60Hz | 120Hz | 500Hz | 1KHz | 10KHz ~ up |
|----------------|------|-------|-------|------|------------|
| 0.47 ~ 1.0     | 0.50 | 1.00  | 1.20  | 1.30 | 1.50       |
| 2.2 ~ 4.7      | 0.65 | 1.00  | 1.20  | 1.30 | 1.50       |
| 10 ~ 47        | 0.80 | 1.00  | 1.20  | 1.30 | 1.50       |
| 100 ~ 1,000    | 0.80 | 1.00  | 1.10  | 1.15 | 1.20       |
| 2,200 ~ 33,000 | 0.80 | 1.00  | 1.05  | 1.10 | 1.15       |



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

Taping Dimensions (mm)

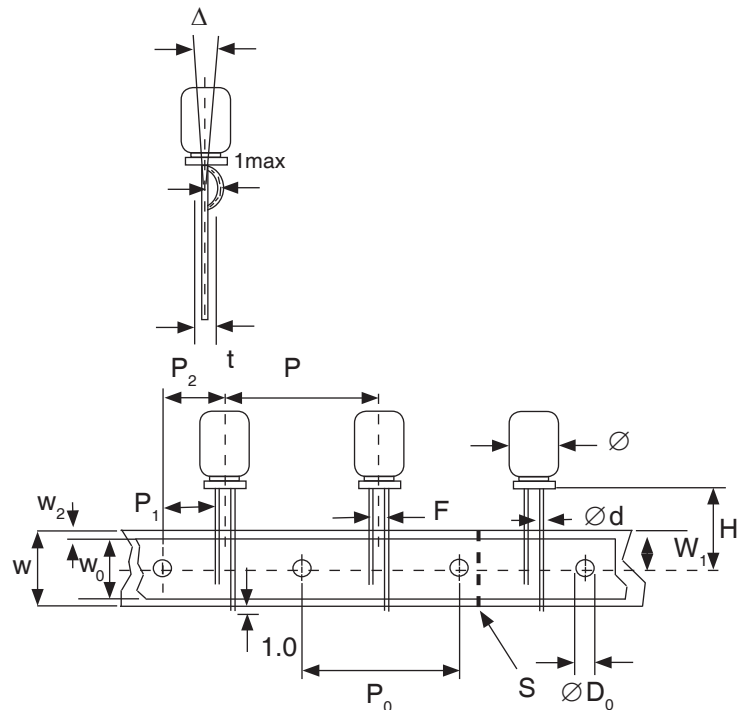
| Case Dia. (D $\phi$ ) | 5                                  | 6.3    | 8      |
|-----------------------|------------------------------------|--------|--------|
| Case Size Dim.        | 5x11                               | 6.3x11 | 8x11.5 |
| d $\phi$ $\pm$ 0.05   | 0.5                                | 0.5    | 0.6    |
| H $\pm$ 0.75          | 18.5                               | 18.5   | 20.0   |
| F +0.8 ~ -0.2         | 5.0 -0.2 ~ +0.8                    |        |        |
| P                     | 12.7 $\pm$ 1.0                     |        |        |
| P <sub>0</sub>        | 12.7 $\pm$ 0.2                     |        |        |
| P <sub>1</sub>        | 3.85 $\pm$ 0.5 (at end of tape)    |        |        |
| P <sub>2</sub>        | 6.35 $\pm$ 1.0                     |        |        |
| W                     | 18.0 $\pm$ 0.5                     |        |        |
| W <sub>0</sub>        | 11.5 min.                          |        |        |
| W <sub>1</sub>        | 9.0 $\pm$ 0.5                      |        |        |
| W <sub>2</sub>        | 0 ~ 2.5                            |        |        |
| H <sub>0</sub>        | 16.0 $\pm$ 0.5                     |        |        |
| l                     | 1.0 max.                           |        |        |
| D <sub>0</sub> $\phi$ | 4.0 $\pm$ 0.2                      |        |        |
| $\Delta$ 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 $\phi$ )  | 10                                 | 12.5 |
|--|------------------------------------|------|
| Case Size Dim.   | All                                | All  |
| d $\phi$ $\pm$ 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 <sub>0</sub>   | 12.7 $\pm$ 0.2                     |      |
| P <sub>1</sub>   | 3.85                               |      |
| P <sub>2</sub>   | 6.35 $\pm$ 1.0                     |      |
| W  | 18.0 $\pm$ 0.5                     |      |
| W <sub>0</sub>   | 11.5 min                           |      |
| W <sub>1</sub>   | 9.0 $\pm$ 0.5                      |      |
| W <sub>2</sub>   | 0 ~ 2.5                            |      |
| H <sub>0</sub>   | 16.0 $\pm$ 0.5                     |      |
| l  | 1.0 max.                           |      |
| D <sub>0</sub> $\phi$  | 4.0 $\pm$ 0.2                      |      |
| $\Delta$ 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, P <sub>1</sub> = 5.0mm, P <sub>0</sub> = 15.0mm & P <sub>2</sub> = 7.5mm (P/N Suffix: TB15MMP) |                                    |      |

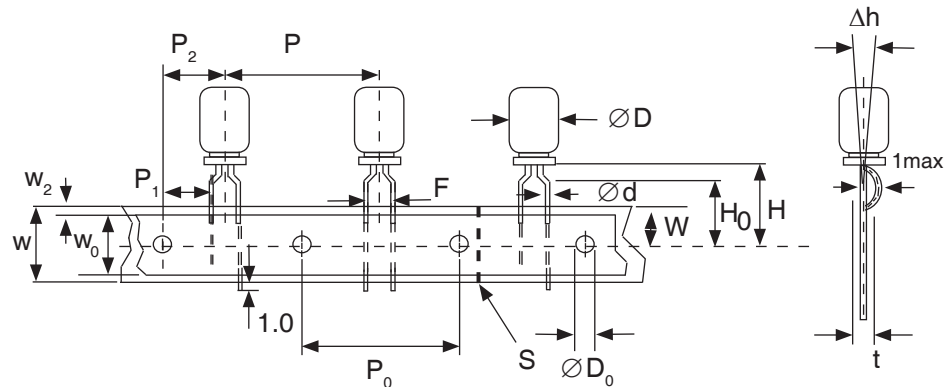


**NOTE:** ANODE (+) LEAD FEEDS OFF FIRST. FOR OPTION OF NEGATIVE (-) LEAD FIRST, SPECIFY "TBN".



Taping Dimensions (mm)

|                          |                 |
|--------------------------|-----------------|
| Case Dia. (D $\phi$ )    | 5               |
| Case Size Dim.           | 5x11            |
| d $\phi$ $\pm$ 0.05      | 0.5             |
| H $\pm$ 0.75             | 18.5            |
| H <sub>0</sub> $\pm$ 0.5 | -               |
| F                        | 2.5 -0.2 ~ +0.8 |
| P                        | 12.7 $\pm$ 1.0  |
| P <sub>0</sub>           | 12.7 $\pm$ 0.2  |
| P <sub>1</sub>           | 5.1 $\pm$ 0.5   |
| P <sub>2</sub>           | 6.35 $\pm$ 1.0  |
| W                        | 18.0 $\pm$ 0.5  |
| W <sub>0</sub>           | 11.5 min.       |
| W <sub>1</sub>           | 9.0 $\pm$ 0.5   |
| W <sub>2</sub>           | 0 ~ 1.5         |
| l                        | 1.0 max.        |
| D <sub>0</sub> $\phi$    | 4.0 $\pm$ 0.2   |
| $\Delta$ h               | 0 $\pm$ 1.0     |
| t                        | 0.7 $\pm$ 0.2   |

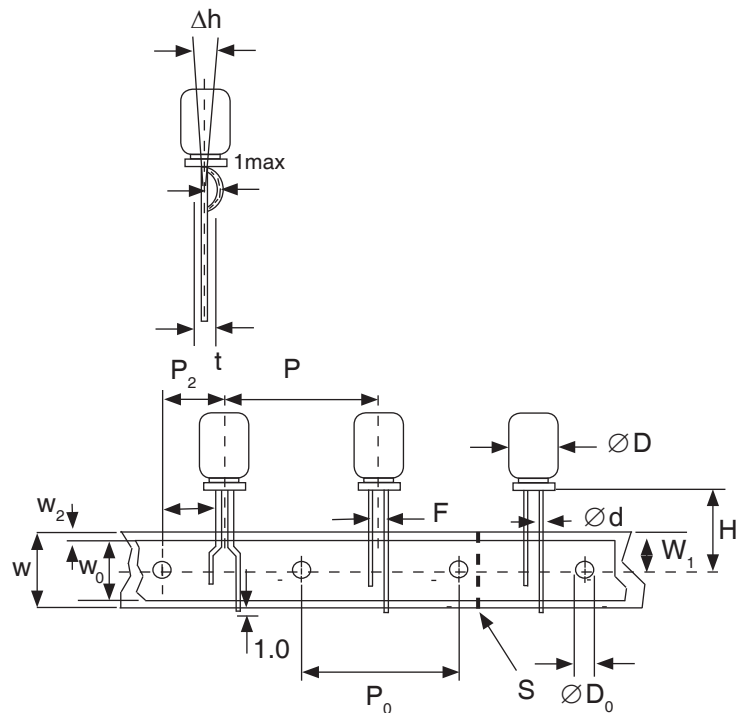


### SPECIAL STRAIGHT LEAD TAPING TBST\*

Taping Dimensions (mm)

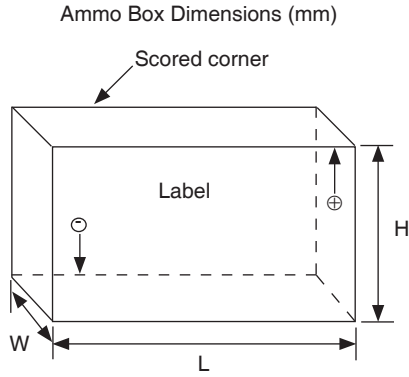
| Case Dia. (D $\phi$ ) | 5                                  | 6.3    | 8      |
|-----------------------|------------------------------------|--------|--------|
| Case Size Dim.        | 5x11                               | 6.3x11 | 8x11.5 |
| d $\phi$ $\pm$ 0.05   | 0.5                                | 0.5    | 0.6    |
| H $\pm$ 0.75          | 18.5                               | 18.5   | 20.0   |
| F +0.8 ~ -0.2         | 2.0                                | 2.5    | 3.5    |
| P $\pm$ 1.0           | 12.7 $\pm$ 0.2                     |        |        |
| P <sub>0</sub>        | 12.7 $\pm$ 0.2                     |        |        |
| P <sub>1</sub>        | 5.1                                | 5.1    | 4.6    |
| P <sub>2</sub>        | 6.35 $\pm$ 1.0                     |        |        |
| W                     | 18.0 $\pm$ 0.5                     |        |        |
| W <sub>0</sub>        | 11.5 min.                          |        |        |
| W <sub>1</sub>        | 9.0 $\pm$ 0.5                      |        |        |
| W <sub>2</sub>        | 0 ~ 2.5                            |        |        |
| H <sub>0</sub>        | 16.0 $\pm$ 0.5                     |        |        |
| l                     | 1.0 max.                           |        |        |
| D <sub>0</sub> $\phi$ | 4.0 $\pm$ 0.2                      |        |        |
| $\Delta$ 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.



\*Straight leads will extend from the based of the component to the edge of the carrier. The section of lead below the adhesive tape may be straight or formed.





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

Size of box and component quantity

| Case Dia (D $\phi$ ) or Case Size | Qty per Box (pcs) | Dim. L | Dim. H | Dim. W |
|-----------------------------------|-------------------|--------|--------|--------|
| 5x11                              | 2,000             | 340    | 255    | 55     |
| 6.3x11                            | 2,000             | 331    | 280    | 48     |
| 8x11.5                            | 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