

# Miniature Aluminum Electrolytic Capacitors

NRWX Series

+125°C WIDE TEMPERATURE RANGE, RADIAL LEADS, POLARIZED

## FEATURES

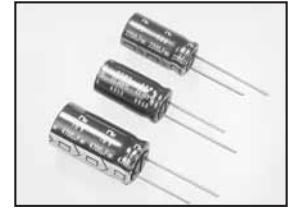
- -55°C ~ +125°C EXTENDED OPERATING TEMPERATURE RANGE
- LOW IMPEDANCE AND HIGH RIPPLE CURRENT AT HIGH FREQUENCY

## CHARACTERISTICS

Rated Voltage Range	10 ~ 50Vdc					
Capacitance Range	1.0 ~ 4,700μF					
Operating Temperature Range	-55 ~ +125°C					
Capacitance Tolerance	±20% (M)					
Max. Leakage Current @ 20°C	0.01CV or 3μA, whichever is greater after 2 minutes					
Max. Tan δ @ 120Hz/20°C (add 0.02 for every 1,000μF for values above 1,000μF)	W.V. (Vdc)	10	16	25	35	50
	Tan δ	0.20	0.16	0.14	0.12	0.10
Low Temperature Stability Impedance Ratio @ 120Hz	Z-25°C/Z+20°C	2	2	2	2	2
	Z-40°C/Z+20°C	4	3	3	3	3
Load Life Test at Rated W.V. +125°C 2,000 Hours: ≥10mm Dia +125°C 1,000 Hours: 8mm Dia	Capacitance Change	Within ±25% of initial measured value				
	Tan δ	Less than 200% of specified maximum value				
	Leakage Current	Less than specified maximum value				

**RoHS Compliant**  
includes all homogeneous materials

\*See Part Number System for Details



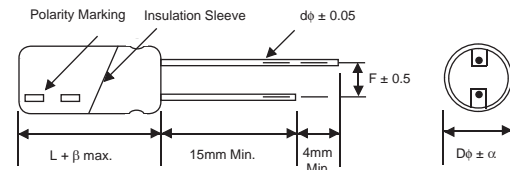
## STANDARD PRODUCT AND CASE SIZE D φ x L (mm)

Cap. (μF)	Code	Working Voltage (VDC)				
		10	16	25	35	50
1.0	1R0	-	-	-	-	8x11.5
2.2	2R2	-	-	-	-	8x11.5
3.3	3R3	-	-	-	-	8x11.5
4.7	4R7	-	-	-	-	8x11.5
10	10	-	-	-	-	8x11.5
22	220	-	-	-	-	8x11.5
33	330	-	-	-	-	8x12.5
47	470	-	-	-	8x12.5	8x12.5
100	101	-	8x11.5	8x12.5	10x12.5	10x12.5
220	221	8x12.5	10x12.5	10x12.5	10x16	10x20
330	331	10x12.5	10x12.5	10x16	10x20	12.5x20
470	471	10x12.5	10x16	10x20	12.5x20	12.5x25
1000	102	10x20	12.5x20	12.5x25	16x25	16x31.5
2200	222	12.5x25	16x25	16x31.5	-	-
3300	332	16x25	16x31.5	-	-	-
4700	472	16x31.5	-	-	-	-

## DIAMETER AND LEADSPACE (mm)

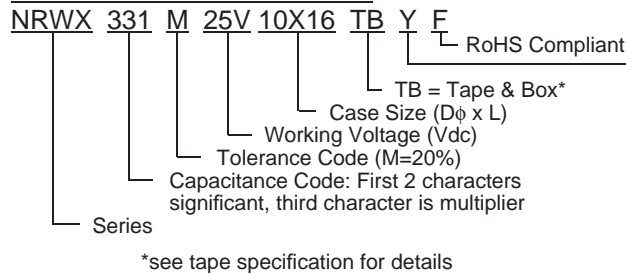
Case Dia. (Dφ)	8	10	12.5	16
Lead Dia. (dφ)	0.6	0.6	0.8	0.8
Lead Spacing (F)	3.5	5.0	5.0	7.5
Dim. α	0.5		1.0	

$$\beta = L < 20\text{mm} = 1.5\text{mm}, L > 20\text{mm} = 2.0\text{mm}$$



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

## PART NUMBERING SYSTEM



Optional: For automotive equipment, sourced to special production and inspection at TS-16949 certified production site

## 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) +125°C/100KHz	Max. ESR (Ω) +20°C/100KHz	Load Life Hours @+125°C
NRWX221M10V8x12.5F	220	10	0.20	280	0.26	1,000
NRWX331M10V10x12.5F	330		0.20	350	0.20	2,000
NRWX471M10V10x12.5F	470		0.20	380	0.17	2,000
NRWX102M10V10x20F	1000		0.20	580	0.12	2,000
NRWX222M10V12.5x25F	2200		0.20	1050	0.05	2,000
NRWX332M10V16x25F	3300		0.20	1150	0.04	2,000
NRWX472M10V16x31.5F	4700		0.20	1500	0.03	2,000
NRWX101M16V8x11.5F	100	16	0.16	250	0.39	1,000
NRWX221M16V10x12.5F	220		0.16	350	0.20	2,000
NRWX331M16V10x12.5F	330		0.16	380	0.17	2,000
NRWX471M16V10x16F	470		0.16	490	0.15	2,000
NRWX102M16V12.5x20F	1000		0.16	770	0.07	2,000
NRWX222M16V16x25F	2200		0.16	1150	0.04	2,000
NRWX332M16V16x31.5F	3300		0.16	1500	0.03	2,000
NRWX101M25V8x12.5F	100	25	0.14	280	0.26	1,000
NRWX221M25V10x12.5F	220		0.14	380	0.17	2,000
NRWX331M25V10x16F	330		0.14	480	0.15	2,000
NRWX471M25V10x20F	470		0.14	580	0.12	2,000
NRWX102M25V12.5x25F	1000		0.14	1050	0.05	2,000
NRWX222M25V16x31.5F	2200		0.14	1500	0.03	2,000
NRWX470M35V8x12.5F	47		35	0.12	230	0.45
NRWX101M35V10x12.5F	100	0.12		315	0.35	2,000
NRWX221M35V10x16F	220	0.12		420	0.29	2,000
NRWX331M35V10x20F	330	0.12		580	0.20	2,000
NRWX471M35V12.5x20F	470	0.12		630	0.12	2,000
NRWX102M35V16x25F	1000	0.12		980	0.06	2,000
NRWX1R0M50V8x11.5F	1.0	50		0.10	28	2.0
NRWX2R2M50V8x11.5F	2.2		0.10	42	1.8	1,000
NRWX3R3M50V8x11.5F	3.3		0.10	49	1.5	1,000
NRWX4R7M50V8x11.5F	4.7		0.10	70	1.15	1,000
NRWX100M50V8x11.5F	10		0.10	150	0.95	1,000
NRWX220M50V8x11.5F	22		0.10	210	0.65	1,000
NRWX330M50V8x12.5F	33		0.10	230	0.45	1,000
NRWX470M50V8x12.5F	47		0.10	230	0.45	1,000
NRWX101M50V10x12.5F	100		0.10	315	0.35	2,000
NRWX221M50V10x20F	220		0.10	560	0.20	2,000
NRWX331M50V12.5x20F	330		0.10	630	0.12	2,000
NRWX471M50V12.5x25F	470		0.10	770	0.10	2,000
NRWX102M50V16x31.5F	1000		0.10	1200	0.045	2,000

For Automotive Applications see part number system

### RIPPLE CURRENT CORRECTION FACTOR

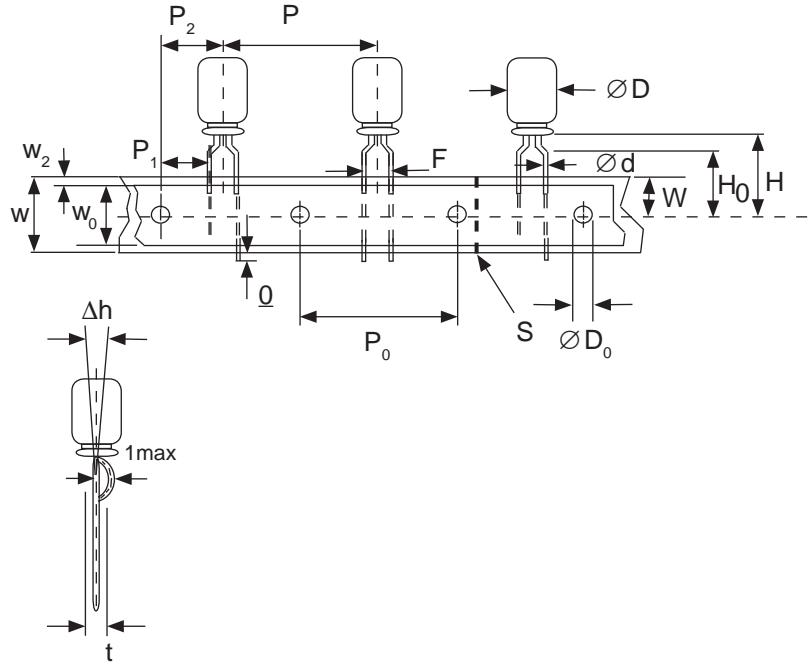
Frequency (Hz)	100Hz ~ <1KHz	1KHz ~ <10KHz	≥ 10K
C < 4.7μF	0.4	0.7	1.0
4.7μF ≤ C < 100μF	0.50	0.73	0.92
100μF ≤ C < 1000μF	0.55	0.77	0.94
1000μF ≤ C	0.60	0.80	0.96

# Miniature Aluminum Electrolytic Capacitors Taping Specifications

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

Taping Dimensions (mm)

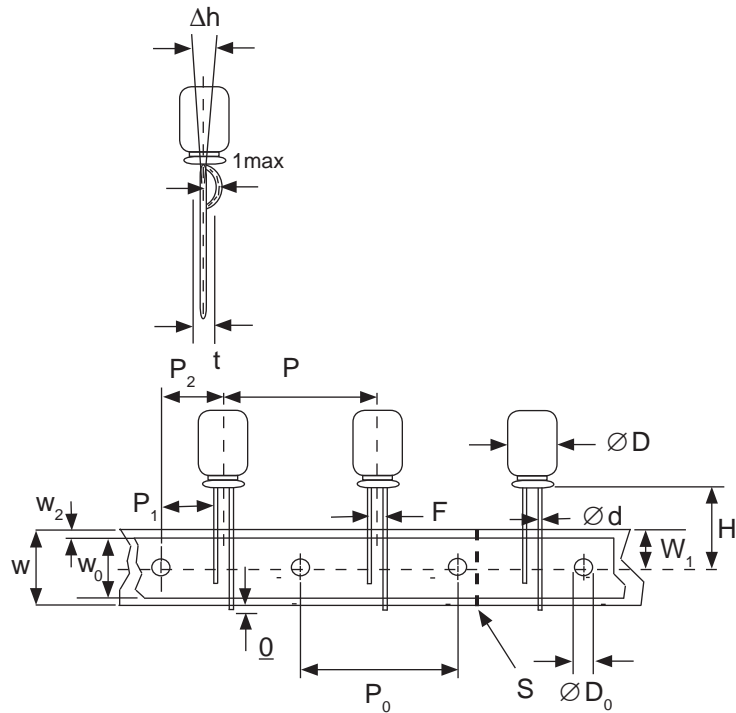
Case Dia. (D $\phi$ )	4	5	6.3	8
Case Size	4x5 4x7	5x5 5x7	5x11	6.3x5 6.3x7 6.3x11 8x11.5
d $\phi$ $\pm$ 0.05	0.45	0.45	0.5	0.45
H $\pm$ 0.75	17.5	17.5	18.5	17.5
F +0.8 ~ -0.2	5.0 -0.2 ~ +0.8			
P	12.7 $\pm$ 1.0			
P <sub>0</sub>	12.7 $\pm$ 0.2			
P <sub>1</sub>	3.85 $\pm$ 0.5 (at end of tape)			
P <sub>2</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	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".

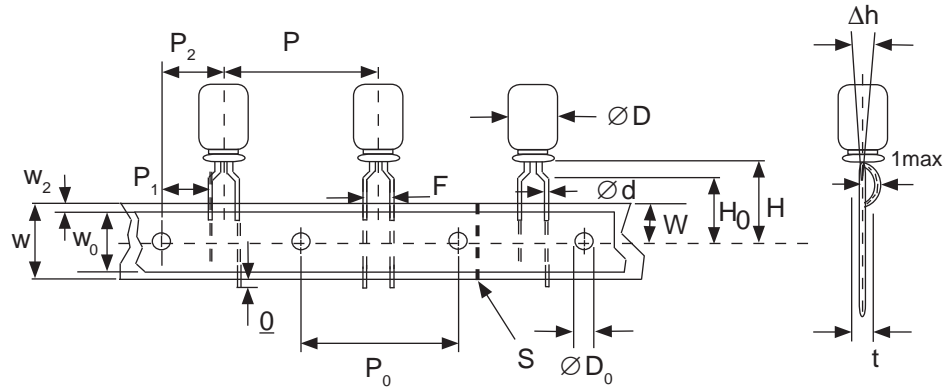


# Miniature Aluminum Electrolytic Capacitors Taping Specifications

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

Taping Dimensions (mm)

Case Dia. (D $\phi$ )	4		5	
Case Size Dim.	4x5 4x7	5x5 5x7	5x11	
d $\phi$ $\pm$ 0.05	0.45	0.45	0.5	
H $\pm$ 0.75	17.5	17.5	18.5	
H <sub>0</sub> $\pm$ 0.5	16.0	-	-	
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			

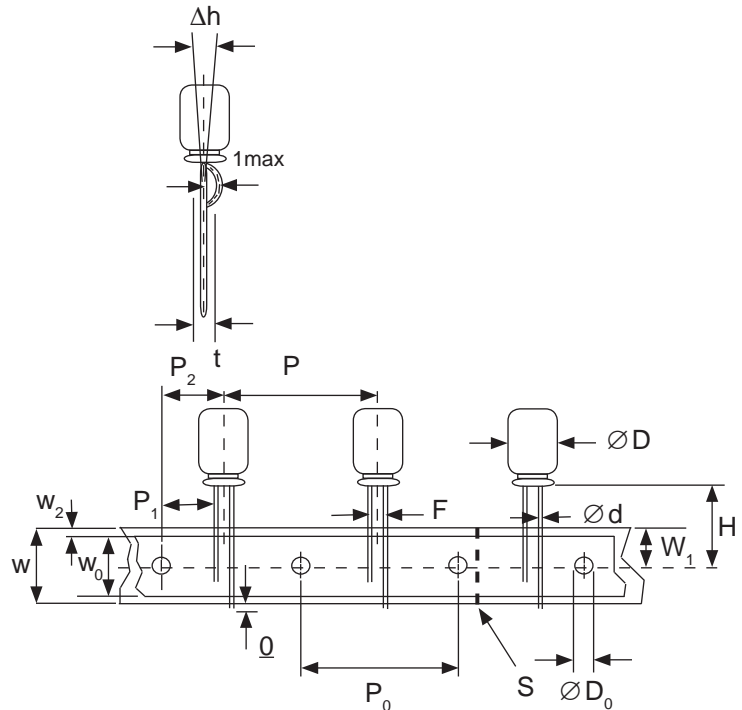


## SPECIAL STRAIGHT LEAD TAPING TBST

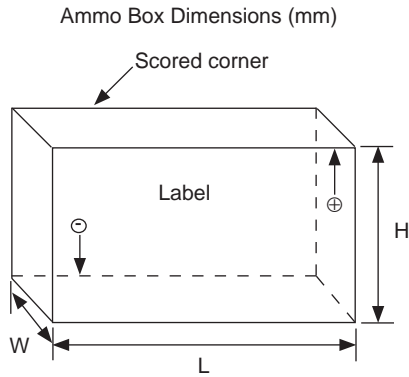
Taping Dimensions (mm)

Case Dia. (D $\phi$ )	4			5			6.3		8	
Case Size Dim.	4x5 4x7	5x5 5x7	5x11		6.3x5 6.3x7	6.3x11	8x11.5			
d $\phi$ $\pm$ 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 <sub>0</sub>	12.7 $\pm$ 0.2									
P <sub>1</sub>	5.1	5.1	5.1	5.1	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.



## RADIAL TAPED PACKAGING



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

Size of box and component quantity

Case Dia (D $\phi$ ) 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