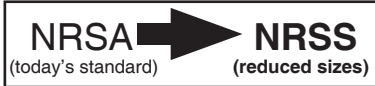
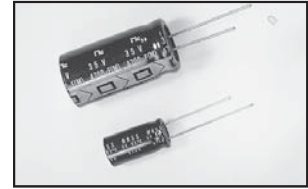


# Miniature Aluminum Electrolytic Capacitors

NRSS Series

RADIAL LEADS, POLARIZED, NEW REDUCED CASE SIZING (FURTHER REDUCED FROM NRSA SERIES) EXPANDED TAPING AVAILABILITY

**RoHS Compliant**  
includes all homogeneous materials



\*See Part Number System for Details

## CHARACTERISTICS

Rated Voltage Range	6.3 ~ 100Vdc									
Capacitance Range	10 ~ 10,000 $\mu$ F									
Operating Temperature Range	-40 ~ +85°C									
Capacitance Tolerance	$\pm$ 20%(M)									
Max. Leakage Current @ +20°C	After 1 min.	0.03CV or 4 $\mu$ A, whichever is greater								
	After 2 min.	0.01CV or 3 $\mu$ A, whichever is greater								
Max. Tan $\delta$ @ 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	
	C $\leq$ 1,000 $\mu$ F	0.28	0.24	0.20	0.18	0.14	0.12	0.10	0.08	
	C = 2,200 $\mu$ F	0.30	0.26	0.22	0.18	0.18	0.14	-	-	
	C = 3,300 $\mu$ F	0.32	0.28	0.24	0.20	0.18	0.18	-	-	
	C = 4,700 $\mu$ F	0.34	0.30	0.26	0.22	0.20	-	-	-	
	C = 6,800 $\mu$ F	0.36	0.32	0.28	0.24	-	-	-	-	
Low Temperature Stability Impedance Ratio @ 120Hz	Z-25°C/Z+20°C	5	4	3	2	2	2	2	2	
	Z-40°C/Z+20°C	12	10	8	5	4	4	4	4	
Load Life Test at Rated W.V. +85°C 2,000 Hours	Capacitance Change	Within $\pm$ 20% of initial measured value								
	Tan $\delta$	Less than 200% of specified maximum value								
	Leakage Current	Less than specified maximum value								
Shelf Life Test 85°C 1,000 Hours No Load	Capacitance Change	Within $\pm$ 20% of initial measured value								
	Tan $\delta$	Less than 200% of specified maximum value								
	Leakage Current	Less than specified maximum value								

## STANDARD PRODUCT AND CASE SIZE TABLE D $\phi$ x L (mm)

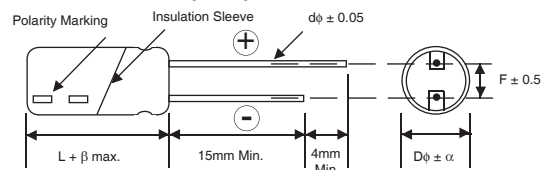
Cap. ( $\mu$ F)	Code	Working Voltage (Vdc)							
		6.3	10	16	25	35	50	63	100
10	100	-	-	-	-	-	-	-	6.3x11
22	220	-	-	-	-	-	-	5x11	8x11.5
33	330	-	-	-	-	See NRSA	5x11	See NRSA	8x12.5
47	470	-	-	-	See NRSA	5x11	See NRSA	6.3x11	10x12.5
100	101	-	-	5x11	See NRSA	6.3x11	See NRSA	8x11.5	10x20
150	151	-	-	-	6.3x11	-	-	-	-
220	221	-	5x11	6.3x11	See NRSA	8x11.5	10x12.5	10x16	12.5x25
330	331	-	6.3x11	See NRSA	8x11.5	10x12.5	10x16	10x20	12.5x25
470	471	6.3x11	6.3x11	8x11.5	10x12.5	10x16	10x20	12.5x20	16x25
1,000	102	8x11.5	10x12.5	10x16	10x20	12.5x20	12.5x25	16x25	-
2,200	222	10x16	10x20	12.5x20	12.5x25	16x25	16x31.5	-	-
3,300	332	10x20	12.5x20	12.5x25	16x25	16x31.5	18x35.5	-	-
4,700	472	12.5x20	12.5x25	16x25	16x31.5	18x35.5	-	-	-
6,800	682	12.5x25	16x25	16x31.5	18x35.5	-	-	-	-
10,000	103	16x25	16x31.5	18x35.5	-	-	-	-	-

## LEAD SPACING AND DIAMETER (mm)

Case Dia. (D $\phi$ )	5	6.3	8	10	12.5	16	18	22
Lead Dia (d $\phi$ )	0.5	0.5	0.6	0.6	0.6	0.8	0.8	0.8
Lead Spacing (F)	2.0	2.5	3.5	5.0	5.0	7.5	7.5	10
Dim. $\alpha$	0.5	0.5	0.5	0.5	0.5	0.5	0.5	1.0

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

## 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.

## 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 PRODUCT, SPECIFICATIONS AND CASE SIZES D $\phi$ x L (mm)

Part Number	Cap. ( $\mu$ F)	W.V. (Vdc)	Dissipation Factor +20°C/120Hz	Ripple Current Rating (mA) +85°C/120Hz	Max. ESR ( $\Omega$ ) +20°C/120Hz	Load Life Hours @ +85°C
NRSS471M6.3V6.3x11F	470	6.3	0.28	320	0.99	2,000
NRSS102M6.3V8x11.5F	1,000		0.28	540	0.46	2,000
NRSS222M6.3V10x16F	2,200		0.30	900	0.23	2,000
NRSS332M6.3V10x20F	3,300		0.32	1050	0.16	2,000
NRSS472M6.3V12.5x20F	4,700		0.34	1350	0.12	2,000
NRSS682M6.3V12.5x25F	6,800		0.36	1600	0.088	2,000
NRSS103M6.3V16x25F	10,000		0.38	2000	0.063	2,000
NRSS221M10V5x11F	220	10	0.24	220	1.81	2,000
NRSS331M10V6.3x11F	330		0.24	290	1.21	2,000
NRSS471M10V6.3x11F	470		0.24	350	0.85	2,000
NRSS102M10V10x12.5F	1,000		0.24	620	0.40	2,000
NRSS222M10V10x20F	2,200		0.26	970	0.20	2,000
NRSS332M10V12.5x20F	3,300		0.28	1250	0.14	2,000
NRSS472M10V12.5x25F	4,700		0.30	1500	0.11	2,000
NRSS682M10V16x25F	6,800		0.32	1850	0.078	2,000
NRSS103M10V16x31.5F	10,000		0.34	2350	0.056	2,000
NRSS101M16V5x11F	100		16	0.20	160	3.32
NRSS221M16V6.3x11F	220	0.20		260	1.51	2,000
NRSS471M16V8x11.5F	470	0.20		440	0.71	2,000
NRSS102M16V10x16F	1,000	0.20		710	0.33	2,000
NRSS222M16V12.5x20F	2,200	0.22		1150	0.16	2,000
NRSS332M16V12.5x25F	3,300	0.24		1400	0.12	2,000
NRSS472M16V16x25F	4,700	0.26		1700	0.092	2,000
NRSS682M16V16x31.5F	6,800	0.28		2150	0.068	2,000
NRSS103M16V18x35.5F	10,000	0.30		2700	0.050	2,000
NRSS151M25V6.3x11F	150	25		0.16	220	1.76
NRSS331M25V8x11.5F	330		0.18	390	0.80	2,000
NRSS471M25V10x12.5F	470		0.18	520	0.56	2,000
NRSS102M25V10x20F	1,000		0.18	830	0.27	2,000
NRSS222M25V12.5x25F	2,200		0.18	1300	0.14	2,000
NRSS332M25V16x25F	3,300		0.20	1650	0.10	2,000
NRSS472M25V16x31.5F	4,700		0.22	2050	0.078	2,000
NRSS682M25V18x35.5F	6,800		0.24	2550	0.059	2,000
NRSS470M35V5x11F	47	35	0.14	130	4.94	2,000
NRSS101M35V6.3x11F	100		0.14	210	2.32	2,000
NRSS221M35V8x11.5F	220		0.14	350	1.06	2,000
NRSS331M35V10x12.5F	330		0.14	470	0.70	2,000
NRSS471M35V10x16F	470		0.14	580	0.49	2,000
NRSS102M35V12.5x20F	1,000		0.14	1000	0.23	2,000
NRSS222M35V16x25F	2,200		0.18	1550	0.12	2,000
NRSS332M35V16x31.5F	3,300		0.18	1950	0.090	2,000
NRSS472M35V18x35.5F	4,700		0.20	2400	0.071	2,000
NRSS330M50V5x11F	33		50	0.12	120	6.03
NRSS221M50V10x12.5F	220	0.12		410	3.53	2,000
NRSS331M50V10x16F	330	0.12		520	1.66	2,000
NRSS471M50V10x20F	470	0.12		650	0.75	2,000
NRSS102M50V12.5x25F	1,000	0.12		1100	0.50	2,000
NRSS222M50V16x31.5F	2,200	0.14		1700	0.35	2,000
NRSS332M50V18x35.5F	3,300	0.18		2200	0.17	2,000
NRSS220M63V5x11F	22	63	0.10	100	7.54	2,000
NRSS470M63V6.3x11F	47		0.10	170	3.53	2,000
NRSS101M63V8x11.5F	100		0.10	270	1.66	2,000
NRSS221M63V10x16F	220		0.10	470	0.75	2,000
NRSS331M63V10x20F	330		0.10	710	0.50	2,000
NRSS471M63V12.5x20F	470		0.10	900	0.35	2,000
NRSS102M63V16x25F	1,000		0.10	1300	0.17	2,000

### RIPPLE CURRENT FREQUENCY CORRECTION FACTOR

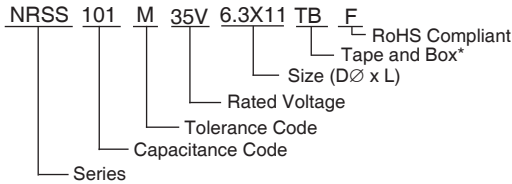
Frequency (Hz)	50	120	300	1K	10K
~ 47 $\mu$ F	0.75	1.00	1.35	1.57	2.00
100 ~ 470 $\mu$ F	0.80	1.00	1.23	1.34	1.50
1,000 $\mu$ F ~	0.85	1.00	1.10	1.13	1.15



## STANDARD PRODUCT, SPECIFICATIONS AND CASE SIZES D $\phi$ x L (mm)

Part Number	Cap. ( $\mu$ F)	W.V. (Vdc)	Dissipation Factor +20°C/120Hz	Ripple Current Rating (mA) +85°C/120Hz	Max. ESR ( $\Omega$ ) +20°C/120Hz	Load Life Hours @ +85°C
NRSS100M100V6.3x11F	10	100	0.08	85	13.3	2,000
NRSS220M100V8x11.5F	22		0.08	130	6.03	2,000
NRSS330M100V8x12.5F	33		0.08	180	4.02	2,000
NRSS470M100V10x12.5F	47		0.08	230	2.82	2,000
NRSS101M100V10x20F	100		0.08	370	1.33	2,000
NRSS221M100V12.5x25F	220		0.08	620	0.60	2,000
NRSS331M100V12.5x25F	330		0.08	760	0.40	2,000
NRSS471M100V16x25F	470		0.08	1000	0.28	2,000

### PART NUMBERING SYSTEM



\*see taping specifications for details

# 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".

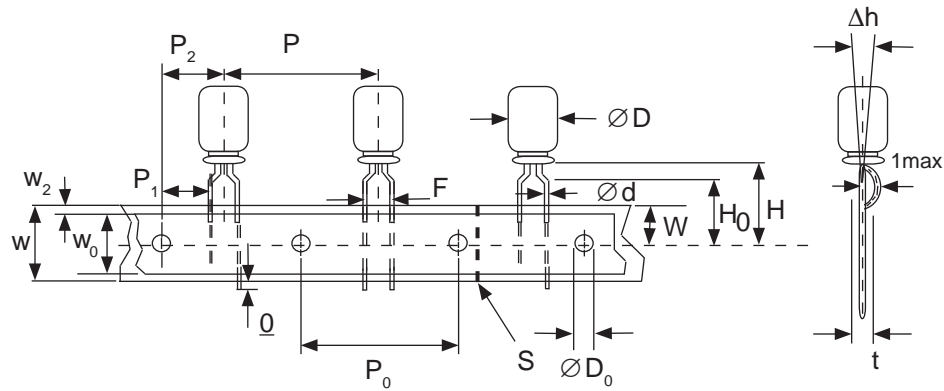


# Miniature Aluminum Electrolytic Capacitors Taping Specifications

## 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			

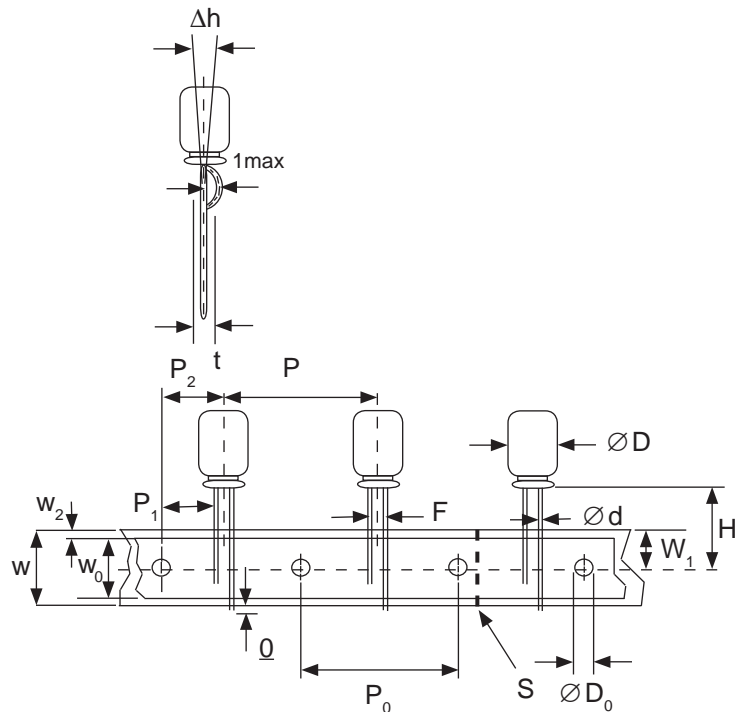


## SPECIAL STRAIGHT LEAD TAPING TBST

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