

Miniature Aluminum Electrolytic Capacitors

NLE-L Series

LOW LEAKAGE CURRENT AND LONG LIFE ALUMINUM
ELECTROLYTIC CAPACITORS, POLARIZED, RADIAL LEADS

FEATURES

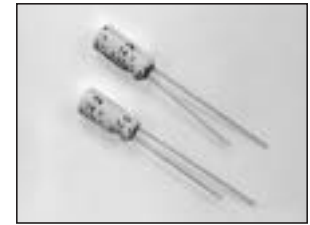
- LOW LEAKAGE CURRENT & LOW NOISE
- AVAILABLE BULK OR TAPED (TB) PACKAGING
- NEW REDUCED SIZES (Alternate Sizes on Request)

RoHS

Compliant

includes all homogeneous materials

*See Part Number System for Details



CHARACTERISTICS

Rated Voltage Range	10 ~ 50Vdc					
Capacitance Range	0.1 ~ 2200μF					
Operating Temperature Range	-40 ~ +85°C					
Capacitance Tolerance	±20%(M)					
Max. Leakage Current After 2 minutes At +20°C	0.002CV or 0.4μA, whichever is greater					
Surge Voltage & Max. Tan δ @ 120Hz/+20°C	W.V. (Vdc)	10	16	25	35	50
	S.V. (Vdc)	13	20	32	44	63
	Tan δ	0.16	0.13	0.12	0.10	0.08
Low Temperature Stability (Impedance Ratio @ 120Hz)	Z-25°C/Z+20°C	2	1.5	1.5	1.5	1.5
	Z-40°C/Z+20°C	5	4	3	3	3
Load Life Test at Rated W.V. & +85°C 2,000 Hours for 5 ~ 10mm diameter 4,000 Hours for 12.5mm & up	Capacitance Change	Within ±20% of initial measured value				
	Tan δ	Less than 200% of specified maximum value				
	Leakage Current	Less than specified maximum value				

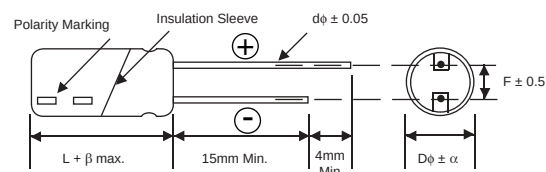
STANDARD PRODUCT AND CASE SIZE TABLE Dφ x L (mm)

Cap. (μF)		Working Voltage (Vdc)				
		10	16	25	35	50
0.1	R10	-	-	-	-	5x11
0.22	R22	-	-	-	-	5x11
0.33	R33	-	-	-	-	5x11
0.47	R47	-	-	-	-	5x11
1.0	1R0	-	-	-	-	5x11
2.2	2R2	-	-	-	-	5x11
3.3	3R3	-	-	-	-	5x11
4.7	4R7	-	-	5x11	5x11	5x11
10	100	-	5x11	5x11	5x11	5x11
22	220	-	5x11	5x11	6.3x11	6.3x11
33	330	-	5x11	6.3x11	6.3x11	8x11.5
47	470	5x11	6.3x11	6.3x11	8x11.5	8x11.5
100	101	6.3x11	8x11.5	8x11.5	10x12.5	10x16
220	221	8x11.5	10x12.5	10x16	10x20	12.5x20
330	331	10x12.5	10x16	10x20	12.5x25	12.5x25
470	471	10x16	10x16	12.5x20	12.5x25	16x25
1000	102	12.5x20	12.5x20	16x25	16x25	-
2200	222	16x25	16x25	-	-	-

LEAD SPACING 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

DIMENSIONS (mm)



Drawing is representative of parts as supplied in bulk or straight lead format, please see taping specifications 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
If in doubt or uncertainty, please review your specific application - process details with NIC's technical support personnel: tpmg@niccomp.com



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

Part Number	Cap. (μF)	W.V. (Vdc)	Dissipation Factor +20°C/120Hz	Ripple Current Rating (mA) +85°C/120Hz	Max. ESR (Ω) +20°C/120Hz	Load Life Hours @ +85°C
NLE-L470M10V5x11F	47	10	0.16	110	5.29	2,000
NLE-L101M10V6.3x11F	100		0.16	180	2.49	2,000
NLE-L221M10V8x11.5F	220		0.16	300	1.13	2,000
NLE-L331M10V10x12.5F	330		0.16	400	0.76	2,000
NLE-L471M10V10x16F	470		0.16	500	0.53	2,000
NLE-L102M10V12.5x20F	1000		0.16	800	0.25	4,000
NLE-L222M10V16x25F	2200		0.16	1200	0.12	4,000
NLE-L100M16V5x11F	10	16	0.13	65	19.9	2,000
NLE-L220M16V5x11F	22		0.13	95	9.05	2,000
NLE-L330M16V5x11F	33		0.13	100	6.03	2,000
NLE-L470M16V6.3x11F	47		0.13	140	4.23	2,000
NLE-L101M16V8x11.5F	100		0.13	230	1.99	2,000
NLE-L221M16V10x12.5F	220		0.13	350	0.91	2,000
NLE-L331M16V10x16F	330		0.13	450	0.61	2,000
NLE-L471M16V10x16F	470		0.13	550	0.43	2,000
NLE-L102M16V12.5x20F	1000		0.13	900	0.20	4,000
NLE-L222M16V16x25F	2200		0.13	1300	0.09	4,000
NLE-L4R7M25V5x11F	4.7	25	0.12	45	26.2	2,000
NLE-L100M25V5x11F	10		0.12	65	13.3	2,000
NLE-L220M25V5x11F	22		0.12	100	6.03	2,000
NLE-L330M25V6.3x11F	33		0.12	140	4.02	2,000
NLE-L470M25V6.3x11F	47		0.12	170	2.82	2,000
NLE-L101M25V8x11.5F	100		0.12	280	1.33	2,000
NLE-L221M25V10x16F	220		0.12	400	0.61	2,000
NLE-L331M25V10x20F	330		0.12	500	0.41	2,000
NLE-L471M25V12.5x20F	470		0.12	650	0.29	4,000
NLE-L102M25V16x25F	1000		0.12	1000	0.14	4,000
NLE-L4R7M35V5x11F	4.7	35	0.10	45	28.2	2,000
NLE-L100M35V5x11F	10		0.10	70	13.3	2,000
NLE-L220M35V6.3x11F	22		0.10	110	6.03	2,000
NLE-L330M35V6.3x11F	33		0.10	140	4.02	2,000
NLE-L470M35V8x11.5F	47		0.10	190	2.82	2,000
NLE-L101M35V10x12.5F	100		0.10	300	1.33	2,000
NLE-L221M35V10x20F	220		0.10	450	0.41	2,000
NLE-L331M35V12.5x25F	330		0.10	550	0.41	4,000
NLE-L471M35V12.5x25F	470		0.10	700	0.29	4,000
NLE-L102M35V16x25F	1000		0.10	1100	0.14	4,000
NLE-LR10M50V5x11F	0.1	50	0.08	1.5	1326	2,000
NLE-LR22M50V5x11F	0.22		0.08	2.5	603	2,000
NLE-LR33M50V5x11F	0.33		0.08	3.5	402	2,000
NLE-LR47M50V5x11F	0.47		0.08	5.0	282	2,000
NLE-L1R0M50V5x11F	1.0		0.08	11	133	2,000
NLE-L2R2M50V5x11F	2.2		0.08	23	60.3	2,000
NLE-L3R3M50V5x11F	3.3		0.08	40	40.2	2,000
NLE-L4R7M50V5x11F	4.7		0.08	45	28.2	2,000
NLE-L100M50V5x11F	10		0.08	70	13.3	2,000
NLE-L220M50V6.3x11F	22		0.08	110	6.03	2,000
NLE-L330M50V8x11.5F	33		0.08	170	4.02	2,000
NLE-L470M50V8x11.5F	47		0.08	200	2.82	2,000
NLE-L101M50V10x16F	100		0.08	350	1.33	2,000
NLE-L221M50V12.5x20F	220		0.08	500	0.41	4,000
NLE-L331M50V12.5x25F	330		0.08	600	0.41	4,000
NLE-L471M50V16x25F	470		0.08	800	0.29	4,000

PART NUMBER SYSTEM

NLE-L 1R0 M 50V 5x11 F
 └─ Series └─ Capacitance Code └─ Tolerance Code └─ Rated Voltage └─ Size (D ϕ x L) └─ RoHS Compliant

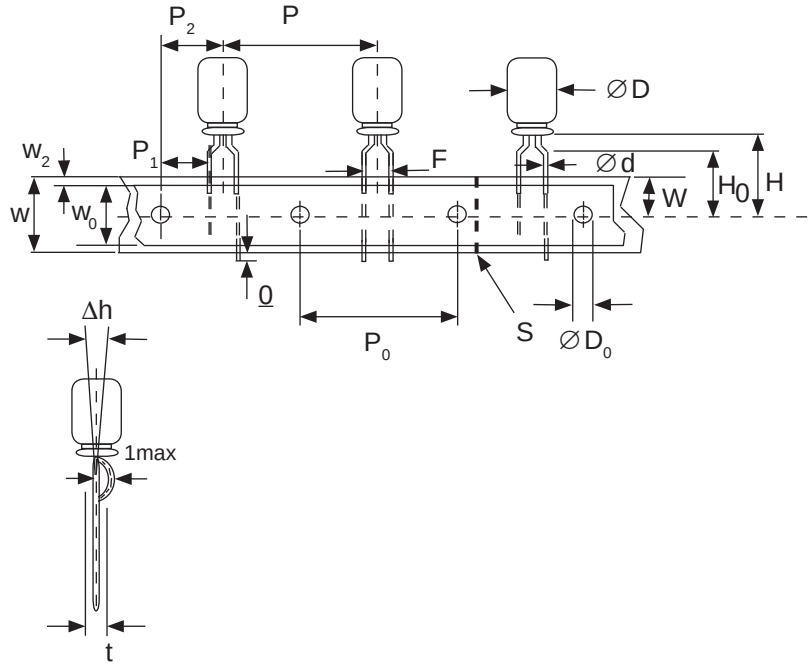


Miniature Aluminum Electrolytic Capacitors Taping Specifications

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

Taping Dimensions (mm)

Case Dia. (D ϕ)	4	5	6.3	8
Case Size	4x5	5x5	6.3x5	8x5
Dim.	4x7	5x7	6.3x7	8x11.5
d ϕ ± 0.05	0.45	0.45	0.45	0.6
H ± 0.75	17.5	17.5	17.5	20.0
F $+0.8 \sim -0.2$	5.0 $-0.2 \sim +0.8$			
P	12.7 ± 1.0			
P ₀	12.7 ± 0.2			
P ₁	3.85 ± 0.5 (at end of tape)			
P ₂	6.35 ± 1.0			
W	18.0 ± 0.5			
W ₀	11.5 min.			
W ₁	9.0 ± 0.5			
W ₂	0 ~ 2.5			
H ₀	16.0 ± 0.5			
l	1.0 max.			
D ₀ ϕ	4.0 ± 0.2			
Δh	0 ± 1.0 (at top of can)			
t	0.7 ± 0.2 (not including lead)			



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

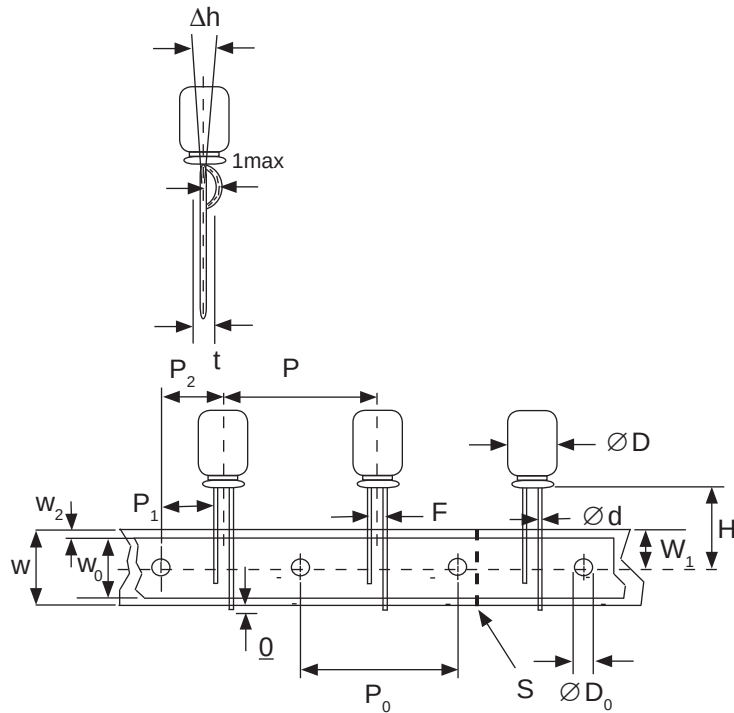
Taping Dimensions (mm)

Case Dia. (D ϕ)	10	12.5
Case Size	All	All
Dim.	All	All
d ϕ ± 0.05	0.6	0.6
H ± 0.75	19.0	19.0
F $+0.8 \sim -0.2$	5.0	5.0
P ± 1.0	25.4*	
P ₀	12.7 ± 0.2	
P ₁	3.85	
P ₂	6.35 ± 1.0	
W	18.0 ± 0.5	
W ₀	11.5 min	
W ₁	9.0 ± 0.5	
W ₂	0 ~ 2.5	
H ₀	16.0 ± 0.5	
l	1.0 max.	
D ₀ ϕ	4.0 ± 0.2	
Δh	0 ± 1.0 (at top of can)	
t	0.7 ± 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".

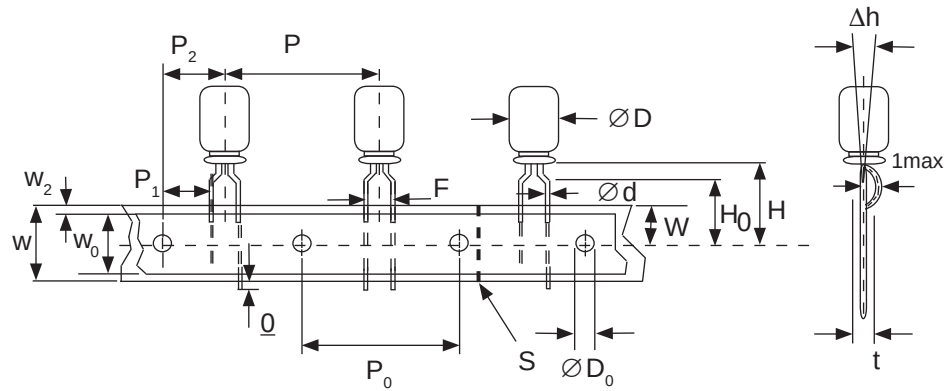


Miniature Aluminum Electrolytic Capacitors Taping Specifications

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

Taping Dimensions (mm)

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

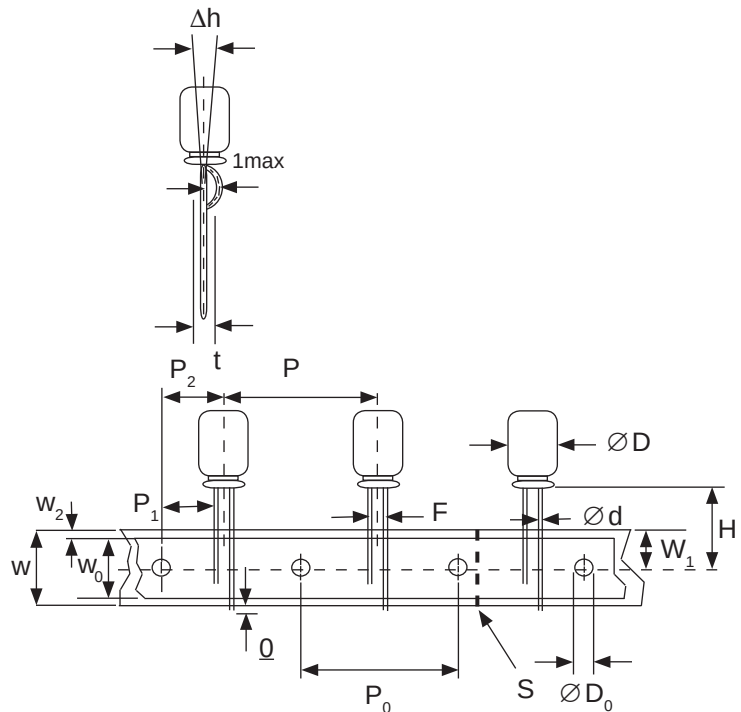


SPECIAL STRAIGHT LEAD TAPING TBST

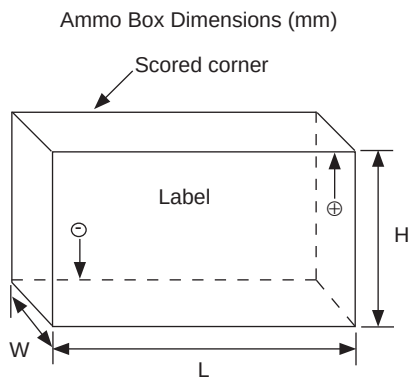
Taping Dimensions (mm)

Case Dia. (D ϕ)	4	5		6.3		8
Case Size	4x5	5x5	5x11	6.3x5	6.3x11	8x11.5
Dim.	4x7	5x7		6.3x7		
d $\phi \pm 0.05$	0.45	0.45	0.5	0.45	0.5	0.6
H ± 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 ± 1.0	12.7 ± 0.2					
P ₀	12.7 ± 0.2					
P ₁	5.1	5.1	5.1	5.1	5.1	4.6
P ₂	6.35 ± 1.0					
W	18.0 ± 0.5					
W ₀	11.5 min.					
W ₁	9.0 ± 0.5					
W ₂	0 ~ 2.5					
H ₀	16.0 ± 0.5					
l	1.0 max.					
D ₀ ϕ	4.0 ± 0.2					
Δh	0 ± 1.0 (at top of can)					
t	0.7 ± 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