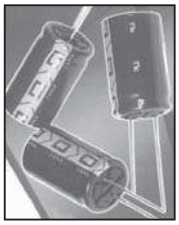
Miniature Aluminum Electrolytic Capacitors

NRWPC Series

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



REDUCED SIZE
NRWS ➡ NRWPC
(today's standard) (reduced sizes)

RoHS Compliant
includes all homogeneous materials

*See Part Number System for Details

CHARACTERISTICS

Rated Voltage Range		160 ~ 450VDC					
Capacitance Range		0.47 ~ 560µF					
Operating Temperature Range		-25°C ~ +105°C					
Capacitance Tolerance		±20% (M)					
Maximum Leakage Current		0.01CV + 10µA (after 2 minutes)					
Max. Tan δ at 120Hz/20°C	W.V. (Vdc)	160	200	250	350	400	450
	S.V. (Vdc)	200	250	300	400	450	500
	Tan δ	0.15			0.20		
Low Temperature Stability Impedance Ratio @ 120Hz	W.V. (Vdc)	160	200	250	350	400	450
	Z-25°C/Z+20°C	5	5	5	6	7	7
Load Life Test @ 105°C	Duration	2,000 hours					
	Δ Capacitance	Within ±20% of initial measured value					
	Δ Tan δ	Less than 200% of specified value					
	Δ LC	Less than specified value					

PART NUMBERING SYSTEM

NRWPC 331 M 200V 10x12.5 TB F

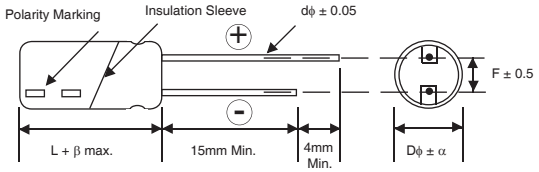
- F — RoHS Compliant
- TB — Tape and Box*
- 10x12.5 — Size (DØxL)
- 200V — Rated Voltage
- M — Tolerance Code
- 331 — Capacitance Code
- NRWPC — Series

*see tape specification for details

LEAD SPACING AND DIAMETER (mm)

Case Dia. (Dϕ)	5	6.3	8	10	12.5	16	18
Lead Dia. (Dϕ)	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. α	0.5						1.0
Dim. B	1.5					2.0	

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**
If in doubt or uncertainty, please review your specific application - process details with NIC's technical support personnel: **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
NRWPCR47M160V5X11F	0.47	160	0.15	13	529.37	2,000
NRWPC1R0M160V5X11F	1.0		0.15	18	248.81	2,000
NRWPC2R2M160V6.3X11F	2.2		0.15	27	113.09	2,000
NRWPC3R3M160V6.3X11F	3.3		0.15	28	75.40	2,000
NRWPC4R7M160V6.3X11F	4.7		0.15	32	52.94	2,000
NRWPC6R8M160V8X12F	6.8		0.15	38	36.59	2,000
NRWPC100M160V8X12F	10		0.15	55	24.88	2,000
NRWPC150M160V10X12F	15		0.15	70	16.59	2,000
NRWPC220M160V10X20F	22		0.15	140	11.31	2,000
NRWPC330M160V10X20F	33		0.15	145	7.54	2,000
NRWPC470M160V12.5X20F	47		0.15	195	5.29	2,000
NRWPC560M160V12.5X20F	56		0.15	215	4.44	2,000
NRWPC680M160V12.5X25F	68		0.15	270	3.66	2,000
NRWPC820M160V12.5X25F	82		0.15	290	3.03	2,000
NRWPC101M160V16X25F	100		0.15	340	2.49	2,000
NRWPC121M160V16X25F	120		0.15	360	2.07	2,000
NRWPC151M160V16X32F	150		0.15	435	1.66	2,000
NRWPC181M160V16X36F	180		0.15	450	1.38	2,000
NRWPC221M160V16X36F	220		0.15	500	1.13	2,000
NRWPC331M160V18X36F	330		0.15	600	0.75	2,000
NRWPC471M160V18X45F	470		0.15	740	0.53	2,000
NRWPC561M160V18X51F	560		0.15	800	0.44	2,000
NRWPCR47M200V5X11F	0.47	200	0.15	13	529.37	2,000
NRWPC1R0M200V5X11F	1.0		0.15	15	248.81	2,000
NRWPC2R2M200V6.3X11F	2.2		0.15	27	113.09	2,000
NRWPC3R3M200V6.3X11F	3.3		0.15	28	75.40	2,000
NRWPC4R7M200V8X12F	4.7		0.15	36	52.94	2,000
NRWPC6R8M200V8X12F	6.8		0.15	40	36.59	2,000
NRWPC100M200V10X12F	10		0.15	60	24.88	2,000
NRWPC150M200V10X16F	15		0.15	75	16.59	2,000
NRWPC220M200V10X20F	22		0.15	150	11.31	2,000
NRWPC330M200V12.5x20F	33		0.15	160	7.54	2,000
NRWPC470M200V12.5x20F	47		0.15	195	5.29	2,000
NRWPC560M200V12.5x20F	56		0.15	215	4.44	2,000
NRWPC680M200V12.5x25F	68		0.15	250	3.66	2,000
NRWPC820M200V16x25F	82		0.15	270	3.03	2,000
NRWPC101M200V16x25F	100		0.15	320	2.49	2,000
NRWPC121M200V16x32F	120		0.15	340	2.07	2,000
NRWPC151M200V16x32F	150		0.15	360	1.66	2,000
NRWPC181M200V16x36F	180		0.15	400	1.38	2,000
NRWPC221M200V16x36F	220		0.15	500	1.13	2,000
NRWPC331M200V18x36F	330		0.15	610	0.75	2,000
NRWPC471M200V18x45F	470		0.15	750	0.53	2,000
NRWPC561M200V18x51F	560		0.15	805	0.44	2,000
NRWPCR47M250V5x11F	0.47	250	0.15	13	529.37	2,000
NRWPC1R0M250V6.3x11F	1.0		0.15	18	248.81	2,000
NRWPC2R2M250V6.3x11F	2.2		0.15	23	113.09	2,000
NRWPC3R3M250V8x12F	3.3		0.15	30	75.40	2,000
NRWPC4R7M250V8x12F	4.7		0.15	39	52.94	2,000
NRWPC6R8M250V10x12F	6.8		0.15	42	36.59	2,000
NRWPC100M250V10x16F	10		0.15	75	24.88	2,000
NRWPC150M250V10x16F	15		0.15	85	16.59	2,000
NRWPC220M250V12.5x20F	22		0.15	160	11.31	2,000
NRWPC330M250V12.5x20F	33		0.15	165	7.54	2,000
NRWPC470M250V12.5x25F	47		0.15	195	5.29	2,000
NRWPC560M250V12.5x25F	56		0.15	215	4.44	2,000
NRWPC680M250V16x25F	68		0.15	240	3.66	2,000
NRWPC820M250V16x25F	82		0.15	280	3.03	2,000
NRWPC101M250V16x32F	100		0.15	310	2.49	2,000
NRWPC121M250V16x32F	120		0.15	330	2.07	2,000
NRWPC151M250V16x36F	150		0.15	460	1.66	2,000

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
NRWPC181M250V18×36F	180	250	0.15	470	1.38	2,000
NRWPC221M250V18×36F	220		0.15	485	1.13	2,000
NRWPC331M250V18×45F	330		0.15	610	0.75	2,000
NRWPCR47M350V5×11F	0.47	350	0.2	11	705.83	2,000
NRWPC1R0M350V6.3×11F	1.0		0.2	15	331.74	2,000
NRWPC2R2M350V8×12F	2.2		0.2	23	150.79	2,000
NRWPC3R3M350V8×12F	3.3		0.2	30	100.53	2,000
NRWPC4R7M350V10×12F	4.7		0.2	40	70.58	2,000
NRWPC6R8M350V10×16F	6.8		0.2	42	48.79	2,000
NRWPC100M350V10×20F	10		0.2	70	33.17	2,000
NRWPC150M350V12.5×20F	15		0.2	140	22.12	2,000
NRWPC220M350V12.5×25F	22		0.2	145	15.08	2,000
NRWPC330M350V16×25F	33		0.2	165	10.05	2,000
NRWPC470M350V16×25F	47		0.2	200	7.06	2,000
NRWPC560M350V16×32F	56		0.2	230	5.92	2,000
NRWPC680M350V16×36F	68		0.2	240	4.88	2,000
NRWPC820M350V18×32F	82		0.2	280	4.05	2,000
NRWPC101M350V18×32F	100		0.2	320	3.32	2,000
NRWPC121M350V18×36F	120		0.2	365	2.76	2,000
NRWPC151M350V18×40F	150		0.2	400	2.21	2,000
NRWPC181M350V18×45F	180		0.2	460	1.84	2,000
NRWPCR47M400V6.3×11F	0.47	400	0.2	15	705.83	2,000
NRWPC1R0M400V6.3×11F	1.0		0.2	14	331.74	2,000
NRWPC2R2M400V8×12F	2.2		0.2	25	150.79	2,000
NRWPC3R3M400V8×12F	3.3		0.2	30	100.53	2,000
NRWPC4R7M400V10×16F	4.7		0.2	42	70.58	2,000
NRWPC6R8M400V10×16F	6.8		0.2	45	48.79	2,000
NRWPC100M400V10×20F	10		0.2	70	33.17	2,000
NRWPC150M400V12.5×20F	15		0.2	90	22.12	2,000
NRWPC220M400V12.5×25F	22		0.2	140	15.08	2,000
NRWPC330M400V16×25F	33		0.2	165	10.05	2,000
NRWPC470M400V16×25F	47		0.2	200	7.06	2,000
NRWPC560M400V16×32F	56		0.2	210	5.92	2,000
NRWPC680M400V16×36F	68		0.2	240	4.88	2,000
NRWPC820M400V18×32F	82		0.2	270	4.05	2,000
NRWPC101M400V18×32F	100		0.2	310	3.32	2,000
NRWPC121M400V18×36F	120		0.2	340	2.76	2,000
NRWPC151M400V18×40F	150		0.2	375	2.21	2,000
NRWPC181M400V18×45F	180		0.2	410	1.84	2,000
NRWPCR47M450V6.3×11F	0.47	450	0.2	16	705.83	2,000
NRWPC1R0M450V8×12F	1.0		0.2	21	331.74	2,000
NRWPC2R2M450V8×12F	2.2		0.2	22	150.79	2,000
NRWPC3R3M450V10×12F	3.3		0.2	30	100.53	2,000
NRWPC4R7M450V10×16F	4.7		0.2	36	70.58	2,000
NRWPC6R8M450V10×20F	6.8		0.2	40	48.79	2,000
NRWPC100M450V12.5×20F	10		0.2	75	33.17	2,000
NRWPC150M450V12.5×25F	15		0.2	80	22.12	2,000
NRWPC220M450V16×25F	220		0.2	105	15.08	2,000
NRWPC330M450V16×32F	330		0.2	130	10.05	2,000
NRWPC470M450V18×32F	470		0.2	160	7.06	2,000
NRWPC560M450V18×32F	560		0.2	170	5.92	2,000
NRWPC680M450V18×36F	680		0.2	190	4.88	2,000
NRWPC820M450V18×40F	820		0.2	200	4.05	2,000
NRWPC101M450V18×40F	101		0.2	215	3.32	2,000
NRWPC121M450V18×45F	121		0.2	230	2.76	2,000

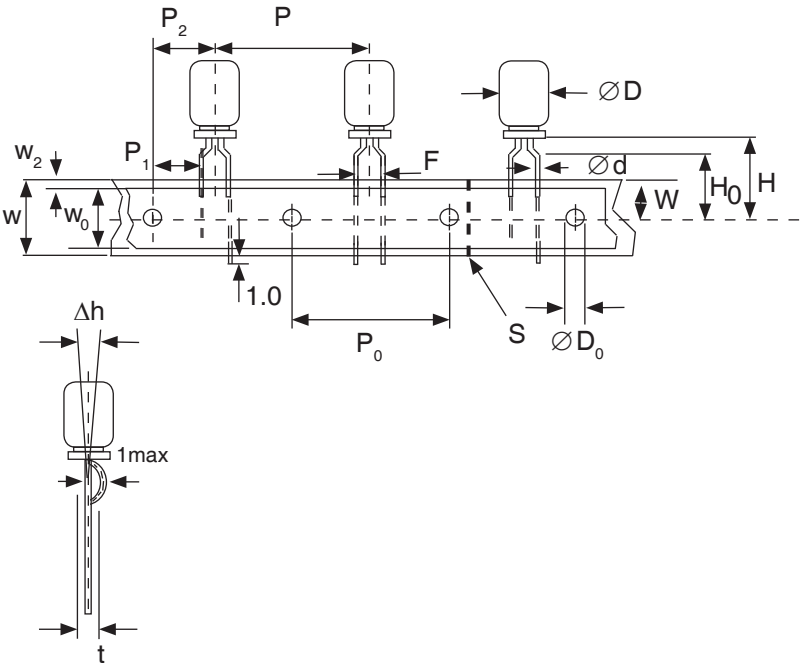
RIPPLE CURRENT FREQUENCY CORRECTION FACTOR

Voltage	Cap. (µF)	60Hz	120Hz	1KHz	10KHz	100KHz
160 ~ 250V	0.47 ~ 68	0.75	1.00	1.57	2.00	2.00
	100 ~ 560	0.80	1.00	1.34	1.40	1.50
350 ~ 450V	0.47 ~ 180	0.80	1.00	1.40	1.40	1.40

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

Taping Dimensions (mm)

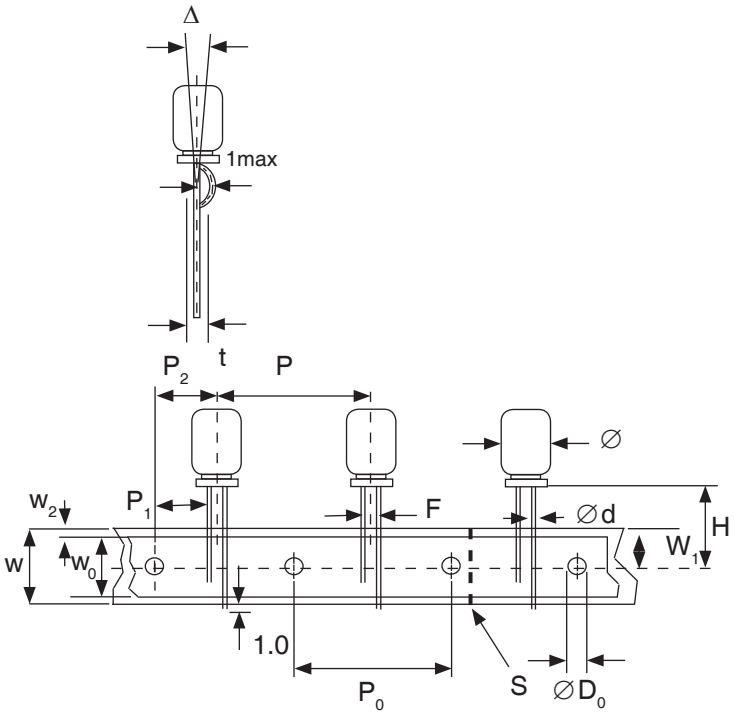
Case Dia. (Dϕ)	5	6.3	8
Case Size Dim.	5x11	6.3x11	8x12
dϕ ±0.05	0.5	0.5	0.6
H ±0.75	18.5	18.5	20.0
F +0.8 ~ -0.2	5.0 -02 ~ +0.8		
P	12.7 ±1.0		
P_0	12.7 ±0.2		
P_1	3.85 ±0.5 (at end of tape)		
P_2	6.35 ±1.0		
W	18.0 ±0.5		
W_0	11.5 min.		
W_1	9.0 ±0.5		
W_2	0 ~ 2.5		
H_0	16.0 ±0.5		
I	1.0 max.		
$D_0\phi$	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)

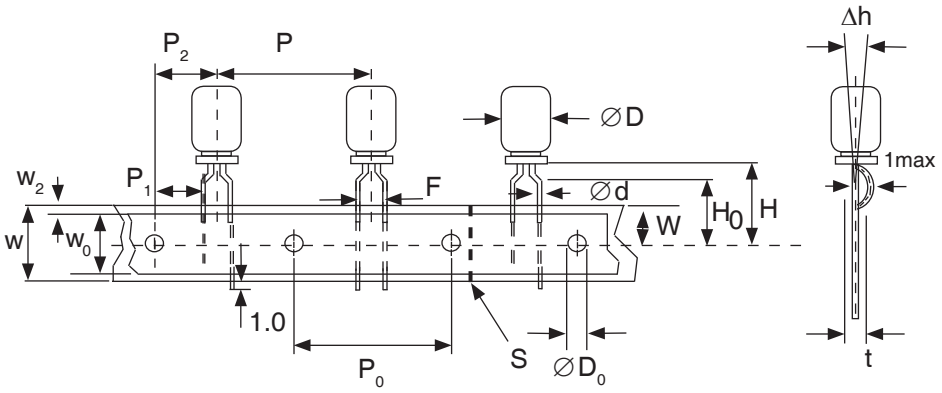
Case Dia. (Dϕ)	10	12.5
Case Size Dim.	All	All
dϕ ±0.05	0.6	0.6
H ±0.75	19.0	19.0
F +0.8 ~ -0.2	5.0	5.0
P ±1.0	25.4*	
P_0	12.7 ±0.2	
P_1	3.85	
P_2	6.35 ±1.0	
W	18.0 ±0.5	
W_0	11.5 min	
W_1	9.0 ±0.5	
W_2	0 ~ 2.5	
H_0	16.0 ±0.5	
I	1.0 max.	
$D_0\phi$	4.0 ±0.2	
Δh	0 ±1.0 (at top of can)	
t	0.7 ±0.2 (not 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, P_1 = 5.0mm, P_0 = 15.0mm & P_2 = 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. (Dϕ)	5
Case Size Dim.	5x11
dϕ ±0.05	0.5
H ±0.75	18.5
H_0 ±0.5	-
F	2.5 -02 ~ +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
I	1.0 max.
$D_0\phi$	4.0 ±0.2
Δh	0 ±1.0
t	0.7 ±0.2

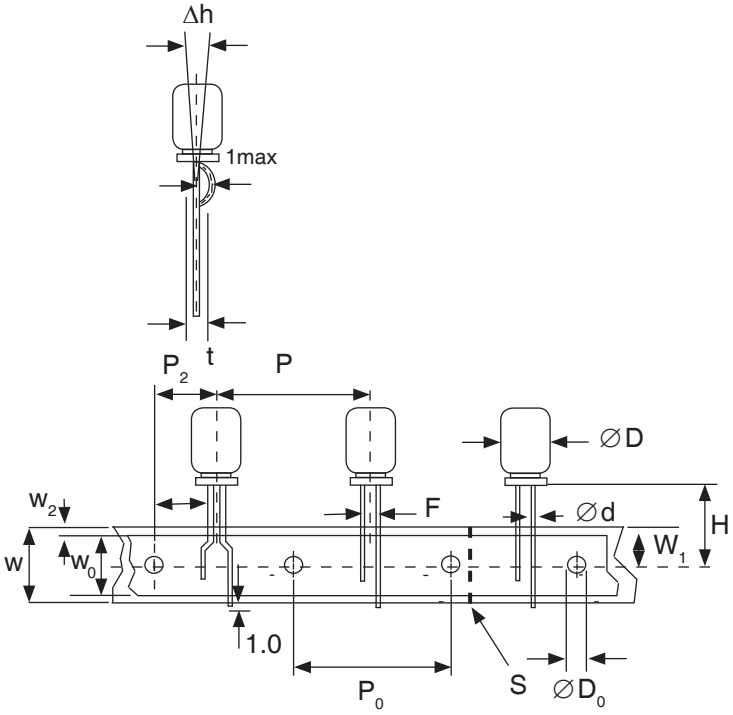


SPECIAL STRAIGHT LEAD TAPING TBST*

Taping Dimensions (mm)

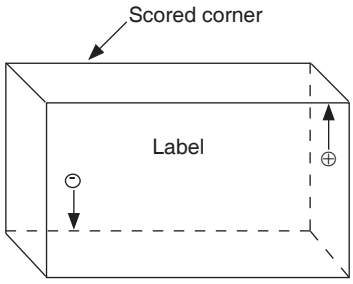
Case Dia. (Dϕ)	5	6.3	8
Case Size Dim.	5x11	6.3x11	8x12
dϕ ±0.05	0.5	0.5	0.6
H ±0.75	18.5	18.5	20.0
F +0.8 ~ -0.2	2.0	2.5	3.5
P ±1.0	12.7 ±0.2		
P_0	12.7 ±0.2		
P_1	5.1	5.1	4.6
P_2	6.35 ±1.0		
W	18.0 ±0.5		
W_0	11.5 min.		
W_1	9.0 ±0.5		
W_2	0 ~ 2.5		
H_0	16.0 ±0.5		
I	1.0 max.		
$D_0\phi$	4.0 ±0.2		
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.



*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 Dimensions (mm)



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

Box Quantity

Case Dia (Dϕ) or Case Size	Q'ty per Box (pcs)
5x11	2,000
6.3x11	2,000
8x12	1,000
10x12	500
10x20	500
12.5x20	500
12.5x25	500