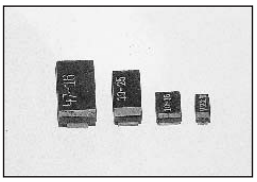
Tantalum Chip Capacitors

NTC-T Series



FEATURES

- **EXPANDED VALUE RANGE & REDUCED CASE SIZES**
- MOLDED CONSTRUCTION FOR HIGH SOLDERING HEAT RESISTANCE
- ELEVEN CASE SIZES (J, P, A2, A, B2, B, C2, C, V, D AND E)
- BOTH FLOW AND REFLOW SOLDERING APPLICABLE
- TAPE & REEL PACKAGING COMPATIBLE WITH AUTOMATIC PICK & PLACE EQUIPMENT

RoHS Compliant
includes all homogeneous materials

*See Part Number System for Details

SPECIFICATIONS & PERFORMANCE CHARACTERISTICS

Capacitance Range	0.1µF to 680µF								
Capacitance Tolerance	±20% (M), ±10% (K)								
Rated Voltage Range @ 85°C (Vdc)	2.5	4.0	6.3	10	16	20	25	35	50
Surge Voltage Rating @ 85°C (Vdc)	3.3	5.2	8.0	13	20	28	33	46	85
Derated Voltage @ 125°C (Vdc)	1.8	2.5	4.0	6.3	10	13	16	22	32
Operating Temperature Range	-55°C to +85°C (to +125°C with Derating)								
Dissipation Factor	See Case Size and Specifications Table								
Leakage Current @ +25°C (After 5 Minutes at Rated Voltage)	Not More Than 0.01CV or 0.5µA, whichever is greater								
Capacitance Change With Temperature	-55°C			+85°C			+125°C		
A2, A, B2, B, C, D & E Case Size	ΔC - 12%			ΔC ± 12%			ΔC ± 12%		
J & P Case Size	ΔC - 20%			ΔC ± 20%			ΔC ± 20%		
Resistance to Soldering Heat (+260°C for 5 Seconds)	ΔC ± 5%* Max, LC = Less than initial specification. DF = Less than initial specification								
Moisture Resistance (500 hours; 90~95% RH @ 40°C)	ΔC ± 5%* Max, LC = Less than initial specification. DF = 150% of initial specification								
Temperature Cycling (5 cycles; -55°C ~ +125°C)	ΔC ± 5%* Max, LC = Less than initial specification. DF = Less than initial specification								
Load Life (at Rated Voltage) (2,000 hours @ 85°C)	ΔC ± 10%* Max, LC = 125% of initial specification. DF = Less than initial specification								
Base Failure Rate (1.0Ω/Volt)	1%/1000 hours at 60% confidence level (+85°C)								

***±12% ~ ±15% for extended values, ±20% for J & P case size values**

RIPPLE CURRENT CORRECTION FACTOR:

Ambient Temperature	25°C	+55°C	+85°C	+105°C	+125°C
Correction Factor	1.0	0.90	0.80	0.40	0.15

RIPPLE CURRENT/VOLTAGE RATINGS:

$$I\text{max.} = \sqrt{\frac{Pd}{ESR}} \qquad V\text{ max.} = Z \bullet \sqrt{\frac{Pd}{ESR}}$$

Imax. = Ripple Current rating (Arms)

Pd = Power dissipation (watt)

ESR = Equivalent series resistance (ohm)

V max. = Ripple voltage rating (Vrms)

Z = The capacitors impedance (ohm) = $\sqrt{(ESR)^2+(XL-XC)^2}$

POWER DISSIPATION @ 25°C (FREE AIR) & EQUIVALENT SERIES INDUCTANCE (ESL)

Case Code	Pd Max. (W)	ESL (nH)
P	0.025	1.00
A2	0.050	1.20
A	0.070	1.20
B2	0.070	1.50
B	0.080	1.50
C2	0.090	
C	0.110	2.70
V	0.125	
D	0.150	3.00
E	0.165	3.00

PART NUMBER SYSTEM

NTC-T 106 M 16 TR B F

- F — RoHS Compliant
- B — Case Code
- TR — Packaging: TR=Tape/Reel
- 16 — Voltage
- M — Tolerance Code: K=±10%, M=± 20%
- 106 — Capacitance Code
- NTC-T — Series

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 AND EXTENDED PRODUCT SPECIFICATIONS TABLE

*Extended Case Sizes
Chart show Case Size, Max. Tan δ @ 120Hz/+20°C, Max. ESR @ 100KHz/+20°C

Cap (µF)	Code	Working Voltage (Vdc)								
		2.5	4.0	6.3	10	16	20	25	35	50
0.1	104	-	-	-	-	-	A2*6%/40Ω	-	A 4%/18Ω	-
0.15	154	-	-	-	-	-	A2*6%/35Ω	-	A 4%/18Ω	-
0.22	224	-	-	-	-	-	A2*6%/35Ω	-	A 4%/18Ω	B 4%/14Ω
0.33	334	-	-	-	-	P 10%/40Ω	A2*6%/30Ω	-	A 4%/15Ω	B 4%/10Ω
0.47	474	-	-	-	-	P 10%/35Ω	A2*6%/27Ω	A 4%/14Ω	A*6%/12Ω B 4%/8.0Ω	B 4%/9.0Ω
0.68	684	-	-	-	P 10%/25Ω	P 10%/25Ω A2*6%/25Ω	A2*6%/15Ω A 4%/12Ω	A*6%/10Ω	A*6%/9.0Ω B 4%/5.4Ω	C 4%/7.0Ω
1.0	105	-	-	P 10%/25Ω	P 10%/25Ω A2*8%/25Ω	J 10%/30Ω P 20%/25Ω A1*6%/16Ω A 4%/10Ω	A2*6%/13Ω A*6%/9.0Ω	P 6%/8.0Ω A2 6%/13Ω A*6%/8.0Ω	A2 6%/13Ω A*6%/8.0Ω B 4%/4.8Ω	C 4%/5.5Ω
1.5	155	-	P 10%/25Ω	P 10%/25Ω A2*8%/25Ω	J 20%/30Ω P 20%/25Ω A2*8%/20Ω A 4%/8.0Ω	J 10%/25Ω A2*6%/13Ω A 4%/8.0Ω	A2*6%/13Ω A*6%/6.5Ω	A*6%/8.0Ω B 4%/4.6Ω	A*6%/8.0Ω B*6%/4.0Ω C 4%/3.0Ω	C 4%/4.0Ω
2.2	225	P 10%/25Ω	P 10%/25Ω A2*8%/25Ω	J 20%/20Ω P 20%/20Ω A2*8%/18Ω A 4%/8.0Ω	J 20%/30Ω P 20%/20Ω A2*8%/12Ω A 4%/7.0Ω	P 10%/19Ω A2*6%/13Ω A*6%/6.0Ω	P 10%/8.0Ω A2 6%/7.0Ω A*6%/6.0Ω B 4%/3.5Ω	A*6%/8.0Ω B*6%/4.0Ω	A 6%/5Ω B*6%/4.2Ω C 4%/3.0Ω	D 4%/1.8Ω
3.3	335	P 10%/25Ω	P 20%/20Ω A2*8%/18Ω A 4%/8.0Ω	J 20%/20Ω P 20%/13Ω A2*8%/9.0Ω A 4%/7.5Ω	J 20%/25Ω P 20%/20Ω A2*8%/12Ω A*8%/5.5Ω	P 10%/8.0Ω A2 8%/7.0Ω A*6%/5.0Ω B 4%/3.5Ω	A2 8%/5.0Ω A*6%/5.0Ω B2 6%/3.9Ω B*6%/3.0Ω	A 6%/7.0Ω B*6%/3.5Ω C 4%/2.5Ω	B2 6%/3.0Ω B*6%/4.0Ω C 4%/2.5Ω D 4%/2.0Ω	D 4%/1.4Ω
4.7	475	P 20%/20Ω A2*8%/18Ω	P 20%/12Ω A2*8%/10Ω A 4%/7.5Ω	J 20%/15Ω P 20%/12Ω A2*8%/7.5Ω A*8%/6.0Ω	J 20%/10Ω P 20%/10Ω A2*8%/8.0Ω A*8%/5.0Ω B 4%/3.5Ω	A2 8%/4.5Ω A*6%/5.0Ω B*6%/3.0Ω	A2 15%/5.0Ω A*6%/5.0Ω B2 6%/3.0Ω B*6%/3.0Ω C 4%/2.4Ω	B2 6%/3.0Ω B*6%/3.0Ω C 4%/2.4Ω	C*6%/2.2Ω D 4%/1.5Ω	D 4%/1.4Ω
6.8	685	P 20%/20Ω A2*8%/16Ω	J 20%/15Ω P 20%/12Ω A2*8%/8.0Ω A*8%/6.0Ω	J 20%/7.0Ω P 20%/12Ω A2*8%/7.5Ω A*8%/5.0Ω B 6%/3.5Ω	A2 8%/8.0Ω A*8%/4.5Ω B 8%/3.0Ω	A2*6%/5.0Ω A*6%/5.0Ω B2 6%/5.0Ω B*6%/2.5Ω C 6%/1.9Ω	B2 6%/3.0Ω B*6%/2.8Ω C 6%/1.9Ω	B 6%/2.5Ω C*6%/1.9Ω D 6%/1.4Ω	C*6%/1.9Ω D 6%/1.3Ω	-
10	106	J 20%/12Ω P 20%/12Ω A2*8%/15Ω	J 20%/12Ω P 20%/12Ω A2*12%/8.0Ω A*8%/5.0Ω B 6%/3.5Ω	J 20%/8.0Ω P 20%/12Ω A2*8%/10Ω A*8%/4.0Ω B 6%/3.0Ω	P 20%/6.0Ω A2 8%/5.0Ω A*8%/3.2Ω B2*8%/3.2Ω B*8%/2.5Ω C 6%/1.8Ω	A 8%/5.0Ω B2 8%/4.0Ω B*6%/2.4Ω C 6%/1.8Ω	B*6%/2.5Ω C*6%/1.8Ω D 6%/1.3Ω	C2 6%/2.0Ω C*6%/1.8Ω D 6%/1.2Ω	C 6%/1.5Ω D 6%/1.0Ω E*6%/1.0Ω	-
15	156	J 20%/8.0Ω A2*12%/10Ω A*8%/5.0Ω	P 20%/ A2*12%/8.0Ω A*8%/4.0Ω B*8%/3.0Ω	P 20%/5.0Ω A2 12%/4.0Ω A*8%/3.5Ω B2*8%/3.5Ω B*8%/2.5Ω C 6%/1.8Ω	A2 20%/3.0Ω B2*8%/2.5Ω C 6%/1.8Ω	A 12%/5.0Ω B2*6%/2.5Ω C*6%/1.8Ω D 6%/1.8Ω	C*6%/1.7Ω D 6%/0.8Ω	C 6%/1.5Ω D*6%/1.0Ω	D*6%0.9Ω	-
22	226	P 20%/4.0Ω A2*12%/10Ω A*8%/4.0Ω	P 20%/5.0Ω A2 12%/4.0Ω A*8%/3.5Ω B2*8%/3.5Ω B*8%/2.8Ω C 6%/1.8Ω	P 20%/4.0Ω A2 12%/2.8Ω A*10%/4.5Ω B2*12%/4.5Ω B*8%/2.3Ω C 6%/1.8Ω	A 12%/2.5Ω B2 12%/4.0Ω B*8%/2.4Ω C*8%/1.8Ω D 6%/1.5Ω	B2 10%/2.2Ω B*6%/2.5Ω C*6%/1.6Ω D 6%/0.8Ω	C2 6%/1.4Ω C*6%/1.5Ω D*6%/0.8Ω	D*6%/0.8Ω	-	-
33	336	P 20%/5.0Ω A2 12%/4.0Ω A*8%/3.5Ω B2*8%/3.5Ω B*8%/3.0Ω	P 20%/4.0Ω A2 8%/4.5Ω A*10%/4.5Ω B212%/4.5Ω B*8%/2.4Ω C 6%/1.8Ω	A2 18%/3.0Ω A 12%/5.0Ω B2 12%/1.7Ω B*8%/2.0Ω C*8%/1.8Ω D 6%/1.5Ω	B2 12%/1.7Ω B*8%/2.0Ω C*8%/1.6Ω D 6%/0.8Ω	B 8%/1.4Ω C2 6%/1.4Ω C*6%/1.2Ω D*6%/0.8Ω	D*6%/0.8Ω	D 6%/0.7Ω	-	-

Highlighting Denotes New Values

STANDARD AND EXTENDED PRODUCT SPECIFICATIONS TABLE

*Extended Case Sizes

Chart Shows Case Sizes, Max. Tan δ @120Hz/20°C, Max. ESR @ 100KHz/20°C

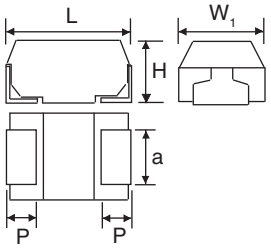
Cap (µF)	Code	Working Voltage (Vdc)						
		2.5	4.0	6.3	10	16	20	25
47	476	P 30%/6.0Ω A2 12%/4.5Ω A*12%/4.5Ω B2*12%/4.5Ω B*8%/2.4Ω	P 30%/3.0Ω A2 15%/4.5Ω A 12%/5.0Ω B2 12%/3.0Ω B*8%/2.0Ω C*8%/1.8Ω D 6%/1.2Ω	A 12%/2.0Ω B2 12%/3.0Ω B*8%/2.0Ω C*8%/1.6Ω D 6%/0.8Ω	B 8%/3.0Ω C2 8%/1.0Ω C*8%/1.6Ω D*8%/0.8Ω	C*6%/1.2Ω D*6%/0.8Ω	D*6%0.8Ω	
68	686	A 18%/3.0Ω B*8%/2.0Ω	A 12%/2.5Ω B2 15%/3.0Ω B*8%/2.0Ω C*8%/1.6Ω D 6%/0.8Ω	A 30%/2.0Ω B2 20%/2.0Ω B*10%/1.8Ω C2 10%/0.8Ω C*8%1.2Ω D*8%/0.8Ω	B 12%/0.9Ω C2 10%/1.0Ω C*8%/1.2Ω D*8%/0.8Ω	C 6%/0.7Ω D*6%/0.7Ω	-	
100	107	A 30%/2.0Ω B2 18%/2.0Ω B*8%/2.0Ω	A 30%/2.0Ω B2 20%/1.3Ω B*12%/2.0Ω C2 10%/0.8Ω C*8%/1.2Ω D*8%/0.8Ω	B2 20%/1.3Ω B 12%/1.2Ω C2 10%/0.8Ω C*10%/0.9Ω D*8%/0.8Ω	C2 10%/0.8Ω C 10%/1.2Ω V 8%/0.5Ω D*8%/0.7Ω	D*10%/1.0Ω	-	-
150	157	A 30%/2.0Ω B2 20%/1.0Ω B*16%/5.0Ω C2 12%/0.8Ω	B 18%/2.0Ω C2 10%/0.8Ω C*10%/1.0Ω D*8%/0.7Ω	B 12%/1.0Ω C 10%/1.2Ω D*8%/0.7Ω	V 8%/0.5Ω D*10%/0.7Ω	D*6%/0.9Ω	-	-
220	227	B2 30%/1.0Ω B 18%/2.0Ω C2 12%/0.8Ω C*12%/1.0Ω	B 18%/0.5Ω C 12%/1.2Ω D*8%/0.7Ω	C 14%/1.2Ω V 12%/0.5Ω D*12%/0.8Ω	D 12%/1.0Ω E*8%/0.9Ω	-	-	-
330	337	B 25%/0.6Ω C 16%/1.2Ω	C 14%/1.2Ω V 12%/0.5Ω D*14%/0.7Ω	V 14%/0.5Ω D 14%/1.0Ω	-	-	-	-
470	477	B 35%/0.6Ω C 18%/1.2Ω D*14%/0.7Ω	D 16%/1.0Ω	D 20%/0.3Ω	-	-	-	-
680	687		D 24*/0.3Ω	-	-	-	-	-

Highlighting Denotes New Values

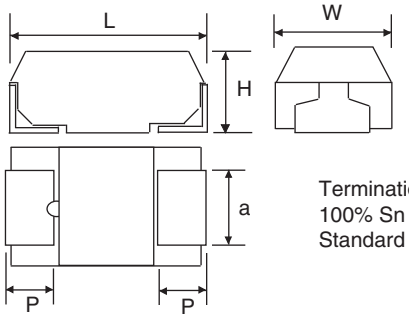
DIMENSIONS (mm)

Case Code	Metric Code	English Code	L	W	H	P	a
J	1608	0603	1.6 ± 0.1	0.8 ± 0.1	0.8 ± 0.1	0.3 ± 0.15	0.6 ± 0.1
P	2012	0805	2.0 ± 0.2	1.25 ± 0.2	1.2 MAX.	0.5 ± 0.2	0.9 ± 0.1
A2	3216	1206	3.2 ± 0.2	1.6 ± 0.2	1.2 MAX.	0.8 ± 0.3	1.2 ± 0.1
A	3216	1206	3.2 ± 0.2	1.6 ± 0.2	1.6 ± 0.2	0.8 ± 0.3	1.2 ± 0.1
B2	3528	1411	3.5 ± 0.2	2.8 ± 0.2	1.2 MAX.	0.8 ± 0.3	2.3 ± 0.1
B	3528	1411	3.5 ± 0.2	2.8 ± 0.2	1.9 ± 0.2	0.8 ± 0.3	2.2 ± 0.1
C2	6032	2412	6.0 ± 0.3	3.2 ± 0.3	1.5 MAX.	1.3 ± 0.3	2.2 ± 0.1
C	6032	2412	6.0 ± 0.3	3.2 ± 0.3	2.6 ± 0.3	1.3 ± 0.3	2.2 ± 0.1
V	7343	2916	7.3 ± 0.2	4.3 ± 0.2	2.0 MAX.	1.3 ± 0.3	2.4 ± 0.1
D	7343	2916	7.3 ± 0.2	4.3 ± 0.2	2.9 ± 0.3	1.3 ± 0.3	2.4 ± 0.1
E	7343H	2917	7.3 ± 0.2	4.3 ± 0.2	4.1 ± 0.2	1.3 ± 0.3	2.4 ± 0.1

J, P, A, A2, C, V, D & E CASE SIZE



B & B2 CASE SIZE



Terminations:
100% Sn (Lead-Free)
Standard

CAPACITANCE CODES

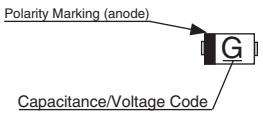
Cap. (µF)	STD EIA Code	EIA Code 198D	Code for P Case Size	Code for J Case Size				
				2.5Vdc	4Vdc	6.3Vdc	10Vdc	16Vdc
0.1	104	A5	-	-	-	-	-	C
0.15	154	E5	-	-	-	-	-	-
0.22	224	J5	-	-	-	-	-	-
0.33	334	N5	N	-	-	-	-	-
0.47	474	S5	S	-	-	-	-	-
0.68	684	W5	W	-	-	-	-	-
1.0	105	A6	A	-	-	-	-	-
1.5	155	E6	E	-	-	-	A	-
2.2	225	J6	J	-	-	ſ	A	-
3.3	335	N6	N	-	-	J	-	-
4.7	475	S6	S	-	-	J	A	-
6.8	685	W6	W	-	G	ſ	-	-
10	106	A7	A	e	G	ſ	-	-
22	226	J7	J	-		-	-	-
33	336	N7	N	-	-	-	-	-
47	476	S7	S	-	-	-	-	-

VOLTAGE CODES

Vottage	Code
2.5	e
4	G
6.3	J
10	A
16	C
20	D
25	E
35	V
50	H

COMPONENT MARKING

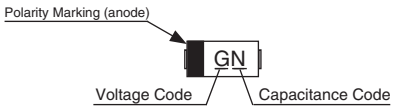
J Case Size



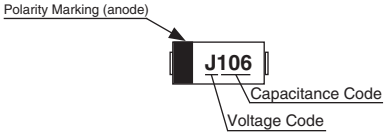
PRODUCTION CODE

Year	Month											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
2005	A	B	C	D	E	F	G	H	J	K	L	M
2006	N	P	Q	R	S	T	U	V	W	X	Y	Z
2007	a	b	c	d	e	f	g	h	j	k	l	m
2008	n	p	q	r	s	t	u	v	w	x	y	z

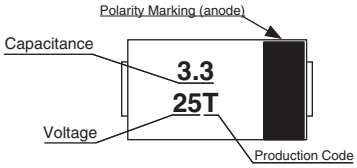
P Case Size



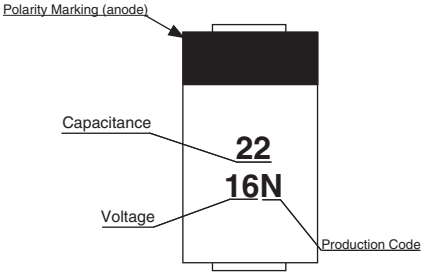
A & A2 Case Size



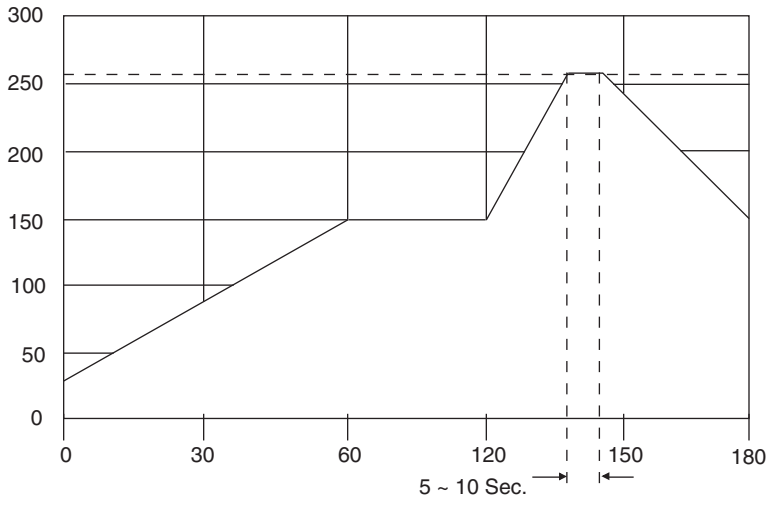
B, B2 & D1 Case Size
2.5V marked 2, 6.3V marked 6



C, V & D Case Size
2.5V marked 2, 6.3V marked 6

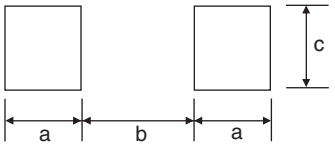


Flow/Reflow Soldering
Maximum Temperature/Time: Flow 260°C/5 Sec.
Reflow 260°C/10 Sec.



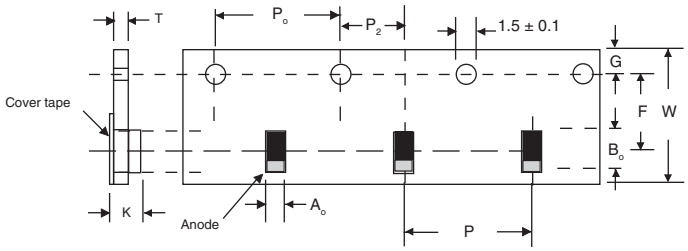
RECOMMENDED LAND PATTERN DIMENSIONS (mm)

Case Size	a	b	c
J	0.90	0.70	1.00
P	1.05	0.50	1.20
A & A2	1.35	1.10	1.50
B & B2	1.35	1.40	2.70
C	2.00	2.90	2.70
D	2.05	4.10	2.90
D	2.05	4.10	2.90



TAPE DIMENSIONS (mm)

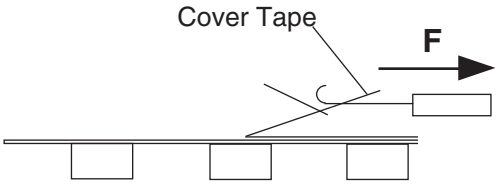
Metric Code	Case Code	A_0±0.2	B_0±0.2	W ±0.3	F ± 0.05	P_0±0.1	P_0±0.1	P_0±0.05	G ±0.1	K ±0.2	T	7" Reel
1608	J	1.0	1.8	8.0	3.5	4.0	2.0	2.0	1.75	1.1	0.2	4000
2012	P	1.4	2.2	8.0	3.5	4.0	4.0	2.0	1.75	1.4	0.2	3000
3216	A2	1.0	3.5	8.0	3.5	4.0	4.0	2.0	1.75	1.4	0.2	3000
3216	A	1.9	3.5	8.0	3.5	4.0	4.0	2.0	1.75	1.9	0.2	2000
3528	B2	3.2	3.8	8.0	3.5	4.0	4.0	2.0	1.75	1.4	0.2	3000
3528	B	3.2	3.8	8.0	3.5	4.0	4.0	2.0	1.75	2.1	0.2	2000
6032	C	3.7	6.4	12.0	5.65	4.0	8.0	2.0	1.5	3.0	0.3	500
7343	D	4.8	7.7	12.0	5.65	4.0	8.0	2.0	1.5	3.3	0.3	500
7343H	E	4.7	7.7	12.0	5.5	4.0	8.0	2.0	1.5	4.5	0.6	500



Cover tape peel-off specification

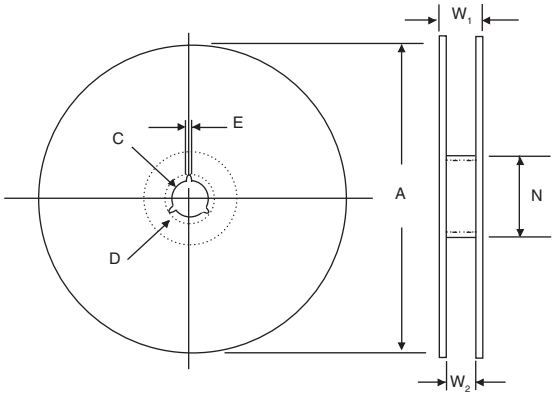
1. Peel-off speed : 300 mm/min.
2. Peel-off force : F = 30 - 75g
3. Peel-off angle : Θ = 0 - 15°

Peel-off speed
(F) = 50mm/Sec.



REEL DIMENSIONS (mm)

Tape Width	A	C	D	E	N	W_1	W_2
8mm	178 ±2.0	13 ±0.5	21 ±0.5	2.0 ±0.5	50 min.	10 ±2.0	14.5 max.
12mm	178 ±2.0	13 ±0.5	21 ±0.5	2.0 ±0.5	50 min.	14.5 ±2.0	18.5 max.



Low ESR Tantalum Chip Capacitors

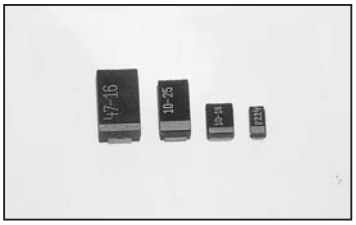
NTC-L Series

FEATURES

- Low ESR and High Ripple Current Ratings
- Values from 10µF to 470µF
- Suitable for Flow and Reflow Soldering Processes
- Available in EIA B, C and D Case Sizes

RoHS Compliant
includes all homogeneous materials

*See Part Number System for Details



SPECIFICATIONS

Capacitance Range	10µF to 470µF		
Capacitance Tolerance	±20% (M), ±10% (K)		
Operating Temperature Range	-55°C ~ +125°C (derating above 85°C)		
Dissipation Factor @ 120Hz/25°C	10µF~68µF 6% max.	100µF~150µF 8% max.	220µF~470µF 10% max.*
Capacitance Change Versus Temperature	-55°C	+85°C	+125°C
	ΔC -10%	ΔC +10%	ΔC +12%
Soldering Heat Resistance (+260°C for 5~10 sec.)	ΔC +10% Max., Leakage Current and Dissipation Factor will be less than value specified below.		
Moisture Resistance (500 hours; 90~95% RH @ 40°C			
Load Life Test @at Rated Voltage 2,000 hours @ 85°C			
Base Failure Rate (1.0Ω/Volt)	1%/1000 hours at 60% confidence level (+85°C)		

PART NUMBER SYSTEM

NTC-L 106 K 16 TR B F

- F: RoHS Compliant
- B: Case Code
- TR: Packaging: TR=Tape/Reel
- 16: Voltage
- K: Tolerance Code: K=±10%, M=±20%
- 106: Capacitance Code
- NTC-L: Series

STANDARD RATINGS AND CASE SIZE

Rated Voltage @ 85°C		6.3Vdc	10Vdc	16Vdc	20Vdc	25Vdc	35Vdc
Surge Voltage @ 85°C		8	13	20	26	32	45
Derated Voltage @125°C		4	6.3	10	13	16	22
Capacitance (µF)	Code	Case Size	Case Size	Case Size	Case Size	Case Size	Case Size
10	106	B	B	B	C	D	D
15	156	B	B	C	C	D	D
22	226	B	C	C	D	D	D
33	336	C	C	D	D	D	-
47	476	C	D	D	D	-	-
68	686	D	D	D	-	-	-
100	107	D	D	D	-	-	-
150	157	D	D	-	-	-	-
220	227	D	D	-	-	-	-
330	337	D	D(*18%)	-	-	-	-
470	477	D (*18%)	-	-	-	-	-

MAXIMUM ESR (ohms) @ 25°C/100Khz

Capacitance (µF)	6.3Vdc	10Vdc	16Vdc	20Vdc	25Vdc	35Vdc
10	0.70	0.70	0.60	0.60	0.30	0.30
15	0.60	0.60	0.50	0.50	0.30	0.30
22	0.50	0.50	0.40	0.35	0.30	0.50
33	0.35	0.35	0.25	0.30	0.30	-
47	0.35	0.25	0.20	0.20	-	-
68	0.20	0.20	0.15	-	-	-
100	0.15	0.10	0.10	-	-	-
150	0.10	0.10	-	-	-	-
220	0.10	0.10	-	-	-	-
330	0.10	0.20	-	-	-	-
470	0.20	-	-	-	-	-

MAXIMUM RIPPLE CURRENT @ 25°C (mA) @100Khz

Capacitance (µF)	6.3Vdc	10Vdc	16Vdc	20Vdc	25Vdc	35Vdc
10	370	370	400	400	630	630
15	400	400	440	440	630	630
22	440	440	500	580	630	490
33	530	530	690	630	640	-
47	530	690	770	830	-	-
68	770	770	890	-	-	-
100	890	1,100	1,100	-	-	-
150	1,100	1,100	-	-	-	-
220	1,100	1,100	-	-	-	-
330	1,100	770	-	-	-	-
470	770	-	-	-	-	-

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

Low ESR Tantalum Chip Capacitors

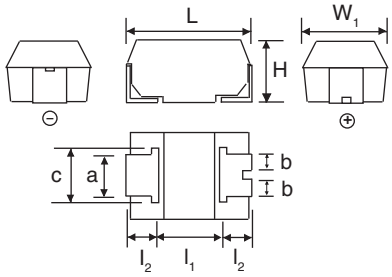
NTC-L Series

MAXIMUM LEAKAGE CURRENT @25°C (μA)

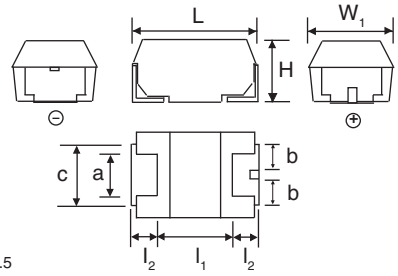
Capacitance (μF)	6.3Vdc	10Vdc	16Vdc	20Vdc	25Vdc	35Vdc
10	0.7	1.0	1.6	2.0	2.5	3.5
15	1.0	1.5	2.4	3.0	3.8	5.3
22	1.4	2.2	3.5	4.4	5.5	7.7
33	2.1	3.3	5.3	6.6	8.3	-
47	3.0	4.7	7.5	9.4	-	-
68	4.3	6.8	11	-	-	-
100	6.3	1.	16	-	-	-
150	9.5	15	-	-	-	-
220	14	22	-	-	-	-
330	20.8	33	-	-	-	-
470	32.9	-	-	-	-	-

CASE DIMENSIONS (mm)

Case Code	L ±0.2	W ±0.2	HL ±0.2	l_1 ±0.2	l_2 ±0.2	a ±0.2	b ±0.2	c ±0.2
B	3.4	2.6	1.9	1.4	0.8	2.0	0.7	2.2
C	5.8	3.2	2.5	2.4	1.3	2.2	0.7	2.4
D	7.3	4.3±0.3	2.8	3.8	1.3	2.4	1.2	3.3



B and C Case Size

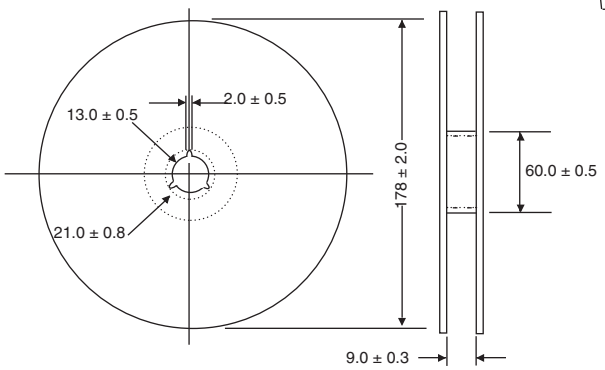


D Case Size

Terminations:
100% Sn (Lead-Free)
Standard

TAPING SPECIFICATIONS (mm)

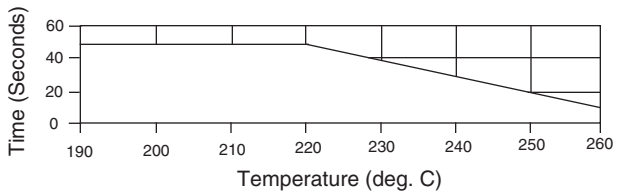
Case Code	A ±0.1	B ±0.1	C ±03	D ±0.1	E ±0.1	F ±0.1	G ±0.1	H ±0.1	J ±0.1	K max.	t max.	Reel Qty
B	3.1	3.8	8.0	3.5	1.75	4.0	2.0	4.0	1.5	2.5	0.2	2000
C	3.7	6.3	12.0	5.5	1.75	8.0	2.0	4.0	1.5	3.0	0.3	500
D	4.8	7.7	12.0	5.5	1.75	8.0	2.0	4.0	1.5	3.4	0.3	500



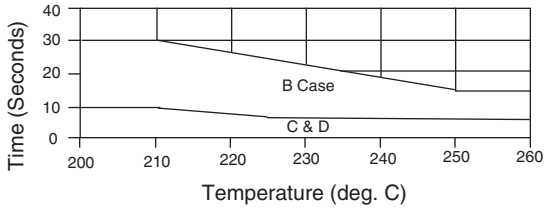
RECOMMENDED SOLDERING PROFILES

Note: To avoid thermal shock a preheating stage, 130°C ~ 160°C for 1 minute, should be incorporated into the soldering process

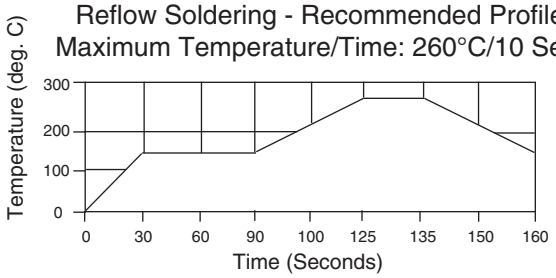
Reflow Soldering - Permitted Temperature/Time Range



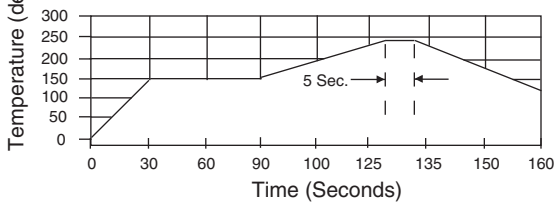
Flow Soldering - Permitted Temperature/Time Range



Reflow Soldering - Recommended Profile Maximum Temperature/Time: 260°C/10 Sec.



Flow Soldering - Recommended Profile Maximum Temperature/Time: 245°C/5 Sec.



Surface Mount Polymer-Tantalum Capacitor

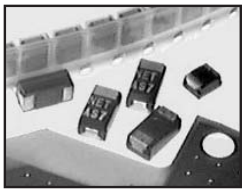
NTP Series

FEATURES

- Ultra Low ESR and High Ripple Current Ratings
- Values from 2.2µF to 1,000µF
- Suitable for Reflow Soldering
- Available in EIA J, P, A2, A, B2, B, C2, C, V and D Case Sizes

RoHS Compliant
includes all homogeneous materials

*See Part Number System for Details



CHARACTERISTICS

Capacitance Range	2.2µF to 1000µF	
Capacitance Tolerance	±20% (M)	
Rated Voltage Range @ 85°C (Vdc)	2.5Vdc ~ 16Vdc*	
Operating Temperature Range	-55°C ~ +105°C (derating above +85°C)	
Dissipation Factor	See Specifications Table	
Leakage Current @ +25°C (After 5 Minutes at Rated Voltage)	Not More Than 0.1CV or 3µA, whichever is greater	
Capacitance Change With Temperature	-55°C	+105°C
	ΔC - 20%	ΔC -+50%
Resistance to Soldering Heat (+240°C for 5 ~ 10 Seconds)	ΔC ± 20% Max, LC = 130% of initial measured value DF = Less than initial specification	
Moisture Resistance (500 hours; 90~95% RH @ 40°C)	ΔC +30% ~ -20% Max, LC = Less than specified value DF = less than specified value	
Load Life at Rated Voltage (1,000 hours @ 85°C)	ΔC +30% Max, LC = Less than specified value DF = 150% of specified value	
Base Failure Rate	1%/1000 hours at +85°C	

* It is recommended that the applied voltage be less than 80% of the rated voltage

CASE SIZES AND MAXIMUM DISSIPATION FACTOR

Rated Voltage @ +85°C		2.5	4.0	6.3	10	16
Surge Voltage @ +85°C		3.3	5.2	8.0	13	20
Derated Voltage @ 105°C		2.0	3.3	5.0	8.0	12.8
Capacitance (µF)	Code	Case Size	Case Size	Case Size	Case Size	Case Size
2.2	225	-	-	J (4%)	J (4%)	-
3.3	335	-	-	J (4%) P (6%)	A (6%)	A (6%)
4.7	475	-	-	J (4%) P (6%)	A2/A (6%)	B (8%)
6.8	685	-	-	P/A (6%)	A2/A (6%) B (8%)	B (8%)
10	106	-	J (4%) P/A (6%)	P/A2/A (6%)	A2/A (6%) B (8%)	B (8%)
15	156	-	-	A2/A (6%) B (8%)	A (6%) B (8%) C (9%)	-
22	226	P (6%)	P/A2 (6%) B (8%)	A2/A (6%) B2/B (8%)	A (6%) B2/B (8%) C (9%)	-
33	336	A2 (6%)	A2/A (6%)	A (6%) B2/B (8%)	A (6%) B2/B (8%) C2/C (9%)	V (10%)
47	476	A2 (6%)	A (6%) B2 (8%)	A (6%) B2/B (8%) C2/C (9%)	B2/B (8%) C2/C (9%) V/D (10%)	V/D (10%)
68	686	-	A (6%) C2/C (9%)	B2/B (8%) C2/C (9%)	C2/C (9%) V/D (10%)	-
100	107	B2 (8%)	B2/B (8%) C2 (9%)	B (8%) C2/C (9%)	C2/C (9%) V/D (10%)	-
150	157	-	B (8%) C (9%)	B (8%) C2/C (9%) V/D (10%)	C (9%) V/D (10%)	-
220	227	B (8%)	B (8%) C (9%) V/D (10%)	V/D (10%)	D (10%)	-
330	337	C (9%) V (10%)	C (9%) V/D (10%)	D (10%)	-	-
470	477	V (10%)	D (10%)	-	-	-
680	687	D (10 %)	D (10%)	-	-	-
1000	108	D (10%)	-	-	-	-

PART NUMBER SYSTEM

NTP 107 M 10 TR D(55) F

- F — RoHS Compliant
- D(55) — ESR
- TR — Case Code (TR=Tape/Reel)
- 10 — Voltage
- M — Tolerance Code
- 107 — Capacitance Code
- NTP — Series

MAX. ESR (mΩ) @ 20°C/100KHz AND RIPPLE CURRENT (mArms) @20°C/100KHz

NIC Part Number	Capacitance Value (µF)	Working Voltage (Vdc)	Dissipation Factor @ +20°C/120Hz	ESR (mΩ) @+20°C/100KHz	Ripple Current Rating (mA) @ +20°C/100KHz
NTP226M2.5TRP(200)F	22	2.5	0.06	200	354
NTP336M2.5TRA2(150)F	33		0.06	150	632
NTP476M2.5TRA2(150)F	47		0.06	150	632
NTP107M2.5TRB2(70)F	100		0.08	70	1035
NTP227M2.5TRB(45)F	220		0.08	45	1374
NTP227M2.5TRB(35)F	220		0.08	35	1558
NTP227M2.5TRB(25)F	220		0.08	25	1844
NTP337M2.5TRC(55)F	330		0.10	55	1414
NTP337M2.5TRC(45)F	330		0.10	45	1563
NTP337M2.5TRC(25)F	330		0.10	25	2345
NTP337M2.5TRC(18)F	330		0.10	18	2472
NTP337M2.5TRV(25)F	330		0.10	25	2236
NTP337M2.5TRV(15)F	330		0.10	15	2887
NTP337M2.5TRV(12)F	330		0.10	12	3227
NTP477M2.5TRV(15)F	470		0.10	15	2887
NTP477M2.5TRV(12)F	470		0.10	12	3227
NTP687M2.5TRD(25)F	680		0.10	25	2449
NTP687M2.5TRD(15)F	680		0.10	15	3162
NTP687M2.5TRD(12)F	680		0.10	12	3536
NTP107M2.5TRD(25)F	1000		0.10	25	2449
NTP107M2.5TRD(15)F	1000		0.10	15	3162
NTP106M4TRJ(300)F	10	4.0	0.04	300	183
NTP106M4TRP(200)F	10		0.06	200	354
NTP106M4TRA(200)F	10		0.06	200	612
NTP226M4TRP(200)F	22		0.06	200	354
NTP226M4TRA2(200)F	22		0.06	200	548
NTP226M4TRB(150)F	22		0.08	150	753
NTP336M4TRA2(150)F	33		0.06	150	632
NTP336M4TRA(180)F	33		0.06	180	645
NTP476M4TRA(180)F	47		0.06	180	645
NTP476M4TRB2(70)F	47		0.08	70	1035
NTP686M4TRA(180)F	68		0.06	180	645
NTP686M4TRC2(55)F	68		0.08	55	1279
NTP686M4TRC(100)F	68		0.09	100	1049
NTP107M4TRB2(70)F	100		0.08	70	1035
NTP107M4TRB(70)F	100		0.08	70	1102
NTP107M4TRB(45)F	100		0.08	45	1374
NTP107M4TRB(35)F	100		0.08	35	1558
NTP107M4TRC2(55)F	100		0.09	55	1279
NTP157M4TRB(45)F	150		0.08	45	1374
NTP157M4TRB(35)F	150		0.08	35	1558
NTP157M4TRB(25)F	150		0.08	25	1844
NTP157M4TRC(100)F	150		0.09	100	1049
NTP227M4TRB(45)F	220		0.08	45	1374
NTP227M4TRC(55)F	220		0.09	55	1414
NTP227M4TRC(45)F	220		0.09	45	1563
NTP227M4TRC(25)F	220		0.09	25	2098
NTP227M4TRC(18)F	220		0.09	18	2472
NTP227M4TRV(45)F	220		0.10	45	1667
NTP227M4TRV(25)F	220		0.10	25	2236
NTP227M4TRV(18)F	220		0.10	18	2635
NTP227M4TRV(15)F	220		0.10	15	2887
NTP227M4TRV(12)F	220		0.10	12	3227
NTP227M4TRD(55)F	220		0.10	55	1651
NTP227M4TRD(40)F	220		0.10	40	1936
NTP227M4TRD(25)F	220		0.10	25	2449
NTP227M4TRD(15)F	220		0.10	15	3162
NTP227M4TRD(12)F	220		0.10	12	3536
NTP337M4TRC(55)F	330		0.10	55	1414
NTP337M4TRV(45)F	330		0.10	45	1667

MAX. ESR (mΩ) @ 20°C/100KHz AND RIPPLE CURRENT (mArms) @20°C/100KHz

NIC Part Number	Capacitance Value (µF)	Working Voltage (Vdc)	Dissipation Factor @ +20°C/120Hz	ESR (mΩ) @+20°C/100KHz	Ripple Current Rating (mA) @ +20°C/100KHz
NTP337M4TRV(25)F	330	4.0	0.10	25	2236
NTP337M4TRV(12)F	330		0.10	12	3227
NTP337M4TRD(40)F	330		0.10	40	1936
NTP337M4TRD(25)F	330		0.10	25	2449
NTP337M4TRD(15)F	330		0.10	15	3162
NTP477M4TRD(25)F	470		0.10	25	2449
NTP477M4TRD(18)F	470		0.10	18	2887
NTP477M4TRD(15)F	470		0.10	15	3162
NTP477M4TRD(12)F	470		0.10	12	3536
NTP687M4TRD(25)F	680		0.10	25	2449
NTP687M4TRD(15)F	680		0.10	15	3162
NTP687M4TRD(12)F	680		0.10	12	3536
NTP225M6.3TRJ(500)F	2.2	6.3	0.04	500	141
NTP335M6.3TRJ(500)F	3.3		0.04	400	141
NTP335M6.3TRP(300)F	3.3		0.06	300	289
NTP475M6.3TRJ(500)F	4.7		0.04	500	141
NTP475M6.3TRP(300)F	4.7		0.06	300	289
NTP685M6.3TRP(300)F	6.8		0.06	300	289
NTP685M6.3TRA(300)F	6.8		0.06	300	500
NTP106M6.3TRP(200)F	10		0.06	200	354
NTP106M6.3TRA2(200)F	10		0.06	200	548
NTP106M6.3TRA(200)F	10		0.06	200	612
NTP156M6.3TRA2(200)F	15		0.06	200	548
NTP156M6.3TRA(200)F	15		0.06	200	612
NTP156M6.3TRB(150)F	15		0.08	150	753
NTP226M6.3TRA2(200)F	22		0.06	200	548
NTP226M6.3TRA(180)F	22		0.06	180	645
NTP226M6.3TRB2(70)F	22		0.08	70	1035
NTP226M6.3TRB(150)F	22		0.08	150	753
NTP336M6.3TRA(180)F	33		0.06	180	645
NTP336M6.3TRB2(70)F	33		0.08	70	1035
NTP336M6.3TRB(150)F	33		0.08	150	753
NTP476M6.3TRA(180)F	47		0.06	180	645
NTP476M6.3TRB2(70)F	47		0.08	70	1035
NTP476M6.3TRB2(55)F	47		0.08	55	1168
NTP476M6.3TRB(150)F	47		0.08	150	753
NTP476M6.3TRB(70)F	47		0.08	70	1102
NTP476M6.3TRC2(70)F	47		0.09	70	1134
NTP476M6.3TRC(100)F	47		0.09	100	1049
NTP686M6.3TRB2(70)F	68		0.08	70	1035
NTP686M6.3TRB(70)F	68		0.08	70	1102
NTP686M6.3TRB(55)F	68		0.08	55	1243
NTP686M6.3TRC2(55)F	68		0.09	55	1279
NTP686M6.3TRC(100)F	68		0.09	100	1049
NTP107M6.3TRB(70)F	100		0.08	70	1102
NTP107M6.3TRB(45)F	100		0.08	45	1374
NTP107M6.3TRB(35)F	100		0.08	35	1558
NTP107M6.3TRB(25)F	100		0.08	25	1844
NTP107M6.3TRC2(70)F	100		0.09	70	1134
NTP107M6.3TRC2(55)F	100		0.09	55	1279
NTP107M6.3TRC(100)F	100		0.09	100	1049
NTP107M6.3TRC(55)F	100		0.09	55	1414
NTP157M6.3TRB(45)F	150		0.08	45	1374
NTP157M6.3TRC2(55)F	150		0.09	55	1279
NTP157M6.3TRC(100)F	150		0.09	100	1049
NTP157M6.3TRC(55)F	150		0.09	55	1414
NTP157M6.3TRC(45)F	150		0.09	45	1563
NTP157M6.3TRC(25)F	150		0.09	25	2098
NTP157M6.3TRV(45)F	150		0.10	45	1667
NTP157M6.3TRV(25)F	150		0.10	25	2236
NTP157M6.3TRV(18)F	150		0.10	18	2635

MAX. ESR (mΩ) @ 20°C/100KHz AND RIPPLE CURRENT (mArms) @20°C/100KHz

NIC Part Number	Capacitance Value (µF)	Working Voltage (Vdc)	Dissipation Factor @ +20°C/120Hz	ESR (mΩ) @+20°C/100KHz	Ripple Current Rating (mA) @ +20°C/100KHz
NTP157M6.3TRD(55)F	150	6.3	0.10	55	1651
NTP157M6.3TRD(40)F	150		0.10	40	1936
NTP157M6.3TRD(25)F	150		0.10	25	2449
NTP227M6.3TRV(45)F	220		0.10	45	1667
NTP227M6.3TRV(25)F	220		0.10	25	2236
NTP227M6.3TRV(15)F	220		0.10	15	2887
NTP227M6.3TRV(12)F	220		0.10	12	3227
NTP227M6.3TRD(55)F	220		0.10	55	1651
NTP227M6.3TRD(40)F	220		0.10	40	1936
NTP337M6.3TRD(40)F	330		0.10	40	1936
NTP337M6.3TRD(25)F	330		0.10	25	2449
NTP337M6.3TRD(18)F	330		0.10	18	2887
NTP225M10TRJ(500)F	2.2	10	0.04	500	141
NTP335M10TRA(300F	3.3		0.06	300	500
NTP475M10TRA2(300)F	4.7		0.06	300	447
NTP475M10TRA(300)F	4.7		0.06	300	500
NTP685M10TRA2(300)F	6.8		0.06	300	447
NTP6.8M10TRA(300)F	6.8		0.06	300	500
NTP685M10TRB(200)F	6.8		0.08	200	652
NTP106M10TRA2(200)F	10		0.06	200	548
NTP106M10TRA(200)F	10		0.06	200	612
NTP106M10TRB(200)F	10		0.08	200	652
NTP156M10TRA(180)F	15		0.06	180	645
NTP156M10TRB(150)F	15		0.08	150	753
NTP156M10TRC(200)F	15		0.09	200	742
NTP226M10TRA(180)F	22		0.06	180	645
NTP226M10TRB2(70)F	22		0.08	70	1035
NTP226M10TRB(150)F	22		0.08	150	753
NTP226M10TRC(150)F	22		0.09	150	856
NTP336M10TRA(180)F	33		0.06	180	645
NTP336M10TRB2(70)F	33		0.08	70	1035
NTP336M10TRB(150)F	33		0.08	150	753
NTP336M10TRC2(70)F	33		0.09	70	1134
NTP336M10TRC(100)F	33		0.09	100	1049
NTP476M10TRB2(70)F	47		0.08	70	1035
NTP476M10TRB(70)F	47		0.08	70	1102
NTP476M10TRC2(70)F	47		0.09	70	1134
NTP476M10TRC(100)F	47		0.09	100	1049
NTP476M10TRC(55)F	47		0.09	55	1414
NTP476M10TRV(60)F	47		0.10	60	1443
NTP476M10TRD(100)F	47		0.10	100	1225
NTP686M10TRC2(55)F	68		0.09	55	1279
NTP686M10TRC(100)F	68		0.09	100	1049
NTP686M10TRC(55)F	68		0.09	55	1414
NTP686M10TRV(60)F	68		0.10	60	1443
NTP686M10TRD(100)F	68		0.10	100	1225
NTP107M10TRV(45)F	100		0.10	45	1667
NTP107M10TRV(25)F	100		0.10	25	2236
NTP107M10TRC2(70)F	100		0.09	70	1134
NTP107M10TRC2(55)F	100		0.09	55	1279
NTP107M10TRC(100)F	100		0.09	100	1049
NTP107M10TRC(55)F	100		0.09	55	1414
NTP107M10TRD(55)F	100		0.10	55	1651
NTP157M10TRC(55)F	150		0.09	55	1414
NTP157M10TRV(45)F	150		0.10	45	1667
NTP157M10TRV(40)F	150		0.10	40	1768
NTP157M10TRD(55)F	150		0.10	55	1651
NTP157M10TRD(40)F	150		0.10	40	1936
NTP227M10TRD(55)F	220		0.10	55	1651
NTP227M10TRD(40)F	220		0.10	40	1936
NTP227M10TRD(25)F	220		0.10	25	2449

MAX. ESR (mΩ) @ 20°C/100KHz AND RIPPLE CURRENT (mArms) @20°C/100KHz

NIC Part Number	Capacitance Value (µF)	Working Voltage (Vdc)	Dissipation Factor @ +20°C/120Hz	ESR (mΩ) @+20°C/100KHz	Ripple Current Rating (mA) @ +20°C/100KHz
NTP335M16TRA(800)F	3.3	16	0.06	800	306
NTP475M16TRB(200)F	4.7		0.08	200	652
NTP685M16TRB(200)F	6.8		0.08	200	652
NTP106M16TRB(100)F	10		0.08	100	922
NTP336M16TRV(70)F	33		0.10	70	1336
NTP477M16TRV(70)F	47		0.10	70	1336
NTP477M16TRD(70)F	47		0.10	70	1464

RIPPLE CURRENT TEMPERATURE DERATING

20°C	85°C	105°C
1.0	0.9	0.6

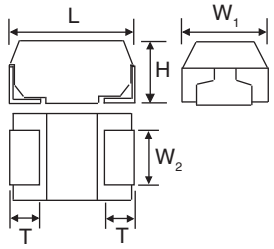
CASE DIMENSIONS (mm)

Case Size	EIA Code	L	H	W_1	W_2	T
J	0603	1.6 ± 0.1	0.8 ± 0.1	0.8 ± 0.1	0.6 ± 0.1	0.3 ± 0.15
P	2012	2.0 ± 0.2	1.1 ± 0.1	1.25 ± 0.2	0.9 ± 0.1	0.5 ± 0.1
A2	3216L	3.2 ± 0.2	1.1 ± 0.1	1.6 ± 0.2	1.2 ± 0.1	0.8 ± 0.2
A	3216	3.2 ± 0.2	1.6 ± 0.2	1.6 ± 0.2	1.2 ± 0.1	0.8 ± 0.2
B2	3528L	3.5 ± 0.2	1.1 ± 0.1	2.8 ± 0.2	2.2 ± 0.1	0.8 ± 0.2
B	3528	3.5 ± 0.2	1.9 ± 0.2	2.8 ± 0.2	2.2 ± 0.1	0.8 ± 0.2
C2	6032L	6.0 ± 0.2	1.4 ± 0.1	3.2 ± 0.2	2.2 ± 0.1	1.3 ± 0.2
C	6032	6.0 ± 0.2	2.5 ± 0.3	3.2 ± 0.2	2.2 ± 0.1	1.3 ± 0.2
V	7343	7.3 ± 0.2	1.9 ± 0.1	4.3 ± 0.2	2.4 ± 0.1	1.3 ± 0.2
D	7343	7.3 ± 0.2	2.8 ± 0.2	4.3 ± 0.2	2.4 ± 0.1	1.3 ± 0.2

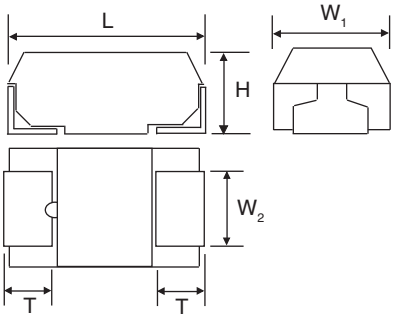
Polarity Indicator

Silver Band Denotes Anode Termination

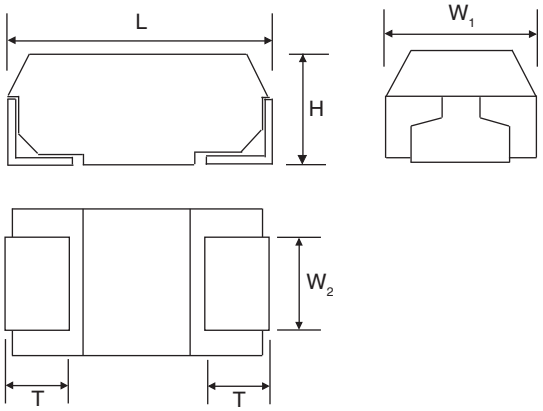
"J, P, A2, A" Case Size



"B2, B" Case Size



"C , C2, V & D" Case Size

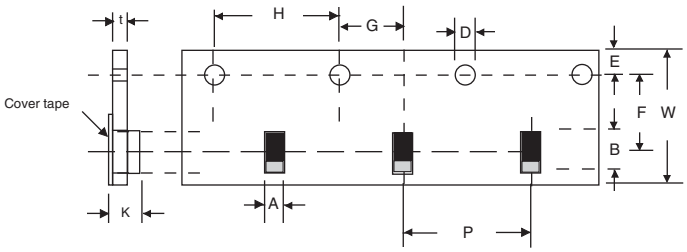


Surface Mount Polymer-Tantalum Capacitor

NTP Series

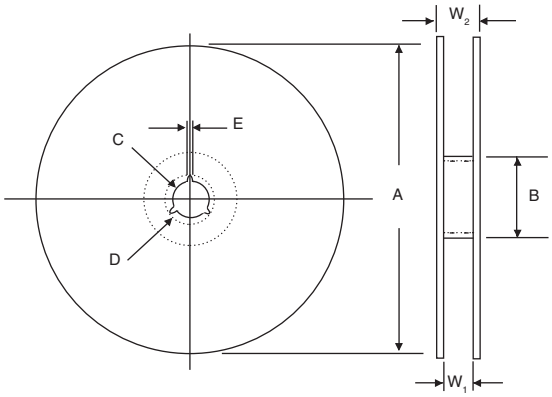
TAPE SPECIFICATIONS (mm)

Case Size	A ±0.2	B ±0.2	C ±0.3	D ±0.1	E ±0.1	F ±0.1	G ±0.05	H ±0.1	J +0.1	K ±0.2	t max.	Reel Qty
J	1.0	1.8	8.0	3.5	1.75	4.0	2.0	4.0	ϕ1.5	1.1	0.2	4000
P	1.4	2.2								1.4		3000
A2	1.9	3.5								1.4		3000
A	1.9									1.9		2000
B2	3.2	3.8								1.4		3000
B	3.3									2.1		2000
C2	3.7	6.4	12.0	5.5		8.0				1.7	0.3	1000
C	3.7									3.0	0.3	500
V	4.8	7.7								2.1	0.4	1000
D	4.8	7.7								3.3	0.3	500



REEL SPECIFICATIONS (mm)

Tape Width	A ± 2.0	B min.	C ± 0.5	D ± 0.5	E ± 0.5	W_1 ± 1.0	W_2 max.
8mm	ϕ178	ϕ50	ϕ13	ϕ21	2.0	10	14.5
12mm						14.5	18.5

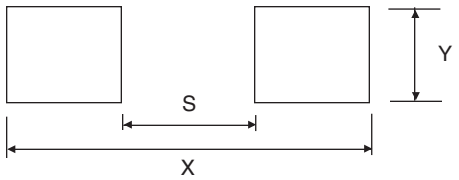


RECOMMENDED PEAK TEMPERATURE/TIME

Maximum Time	Peak Soldering Temperature
5 Seconds	250°C
10 Seconds	240°C
20 Seconds	230°C

RECOMMENDED LAND PATTERN (mm)

Case Size	S max.	X min.	Y min.
J	0.7	2.5	1.0
P	0.5	2.6	1.2
A2	1.1	3.8	1.5
A	1.1	3.8	1.5
B	1.4	4.1	2.7
C2	2.9	6.9	2.7
C	2.9	6.9	2.7
D	4.1	8.2	2.9



PRECAUTIONS

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Resin Dipped, Solid Tantalum Capacitors

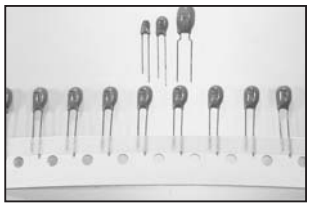
NDTM Series

FEATURES

- FLUIDIZED BED PROCESS
- NEW REDUCED SIZES
- FLAME RETARDANT COATING
- LOW LEAKAGE CURRENT AND IMPEDANCE
- EXCEPTIONAL TEMPERATURE STABILITY

RoHS Compliant
includes all homogeneous materials

*See Part Number System for Details



SPECIFICATIONS

Capacitance Range	0.1µF ~ 330µF						
Capacitance Tolerance	±20% (M), ±10% (K)						
Temperature Range:	-55°C ~ +85°C (+125°C with Derating)						
Rated Voltage Range (Vdc) +85°C	6.3	10	16	20	25	35	50
Derated Voltage (Vdc) +125°C	4	6.3	10	13	16	23	33
Surge Voltage (Vdc) +85°C	8	13	20	26	33	46	65
Derated Surge Voltage (Vdc) +125°C	5	9	12	16	21	28	40
Dissipation Factor: (120Hz, +25°C Tan δ	Capacitance Range			Tan δ			
	0.1 ~ 1.5µF			Less than 4%			
	2.2 ~ 6.8µF			Less than 6%			
	10 ~ 68µF			Less than 8%			
	100 ~ 330µF			Less than 10%			
Reliability:	1%/1000 hours at +85°C with 0.1Ω/V series impedance, 60% confidence level						

Maximum Leakage Current (µA) @ 25°C after 3 minutes							
Cap. (µF)	Rated Voltage (Vdc)						
	6.3V	10V	16V	20V	25V	35V	50V
0.1	-	-	-	-	-	0.5	0.5
0.15	-	-	-	-	-	0.5	0.5
0.22	-	-	-	-	-	0.5	0.5
0.33	-	-	-	-	-	0.5	0.5
0.47	-	-	-	-	-	0.5	0.5
0.68	-	-	-	-	-	0.5	0.5
1.0	-	-	-	0.5	0.5	0.5	0.5
1.5	-	-	0.5	0.5	0.5	0.5	0.5
2.2	-	0.5	0.5	0.5	0.5	0.6	0.8
3.3	0.5	0.5	0.5	0.5	0.6	0.9	1.3
4.7	0.5	0.5	0.6	0.7	0.9	1.3	1.8
6.8	0.5	0.5	0.6	0.7	0.9	1.3	1.8
10	0.5	0.8	1.2	1.6	2.0	2.8	4.0
15	0.8	1.2	1.9	2.4	3.0	4.2	6.0
22	1.1	1.7	2.8	3.5	4.4	6.1	8.8
33	1.7	2.6	4.2	5.2	6.6	9.2	-
47	2.4	3.7	6.0	7.5	9.4	10.0	-
68	3.4	5.4	8.7	10.8	13.5	-	-
100	5.0	8.0	12.8	16.0	-	-	-
150	7.6	12.0	19.2	-	-	-	-
220	11.0	17.6	20.0	-	-	-	-
330	16.6	20.0	-	-	-	-	-

Maximum ESR @ 100KHz and 25°C							
Cap. (µF)	Rated Voltage (Vdc)						
	6.3V	10V	16V	20V	25V	35V	50V
0.1	-	-	-	-	-	26.0	26.0
0.15	-	-	-	-	-	21.0	21.0
0.22	-	-	-	-	-	17.0	17.0
0.33	-	-	-	-	-	15.0	15.0
0.47	-	-	-	-	-	13.0	13.0
0.68	-	-	-	-	-	10.0	10.0
1.0	-	-	-	10.0	10.0	8.0	8.0
1.5	-	-	10.0	9.0	8.0	6.0	6.0
2.2	-	13.0	8.0	7.0	6.0	5.0	3.5
3.3	13.0	10.0	6.0	5.5	5.0	4.0	3.0
4.7	10.0	8.0	5.0	4.5	4.0	3.0	2.5
6.8	8.0	6.0	4.0	3.6	3.1	2.5	2.0
10	6.0	5.0	3.2	2.9	2.5	2.0	1.6
15	5.0	3.7	2.5	2.4	2.0	1.6	1.2
22	3.7	2.7	2.0	1.8	1.5	1.3	1.0
33	3.0	2.1	1.6	1.4	1.2	1.0	-
47	2.0	1.7	1.3	1.2	1.0	0.8	-
68	1.8	1.3	1.0	0.9	0.6	-	-
100	1.6	1.0	0.8	0.6	-	-	-
150	0.9	0.8	0.6	-	-	-	-
220	0.9	0.6	0.5	-	-	-	-
330	0.7	0.5	-	-	-	-	-

PRECAUTIONS

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If in doubt or uncertainty, please review your specific application - process details with NIC's technical support personnel: tpmg@niccomp.com

DIMENSIONS (mm)

Diameter	Figure and Part #	Lead Spacing	Lead Length	Lead Diameter (d)
4.5 ~ 8.0	1 Standard	2.5 ± 0.5	16 ± 4.0	0.5 ± 0.05
4.5 ~ 8.0	2 Optional (F2) Style	5.0 ± 1.0	16 ± 4.0	0.5 ± 0.05
8.5 ~ 10.0	2 Standard	5.0 ± 1.0	16 ± 4.0	0.5 ± 0.05

OUTLINE DRAWINGS AND DIMENSIONS

MARKING: (Note: μ represents decimal point for values below 1μF)

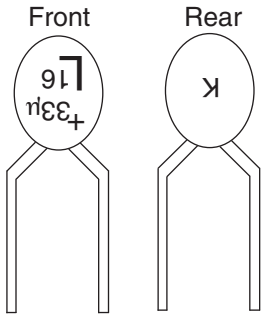


FIG. 1

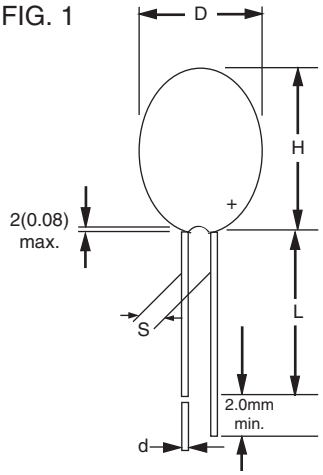
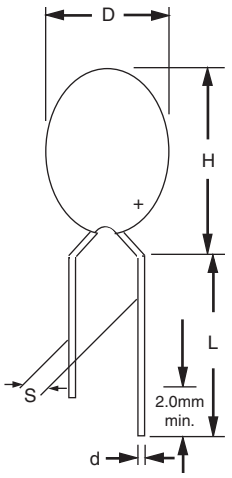


FIG. 2



STANDARD PRODUCTS AND CASE SIZE TABLE Dϕ X H (mm)

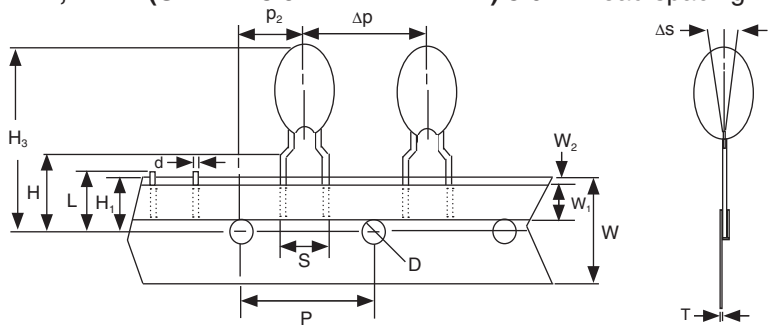
Maximum Leakage Current (μA) @ 25°C after 3 minutes								
Cap. (μF)	Code	Rated Voltage (Vdc)						
		6.3V	10V	16V	20V	25V	35V	50V
0.1	104	-	-	-	-	-	4.5x7.0	4.5x7.0
0.15	154	-	-	-	-	-	4.5x7.0	4.5x7.0
0.22	224	-	-	-	-	-	4.5x7.0	4.5x7.0
0.33	334	-	-	-	-	-	4.5x7.0	4.5x7.0
0.47	474	-	-	-	-	-	4.5x7.0	4.5x7.0
0.68	684	-	-	-	-	-	4.5x7.0	4.5x7.5
1.0	105	-	-	-	4.5x7.0	4.5x7.0	4.5x7.0	5.0x8.5
1.5	155	-	-	4.5x7.0	4.5x7.0	4.5x7.0	4.5x7.0	5.0x9.0
2.2	225	-	4.5x7.0	4.5x7.0	4.5x7.0	4.5x7.0	4.5x7.5	5.5x9.0
3.3	335	4.5x7.0	4.5x7.0	4.5x7.0	4.5x7.5	4.5x7.5	5.0x8.5	6.0x10.0
4.7	475	4.5x7.0	4.5x7.0	4.5x7.5	5.0x8.5	5.0x8.5	5.5x9.0	6.5x10.0
6.8	685	4.5x7.0	4.5x7.5	5.0x8.5	5.0x9.0	5.0x9.0	6.0x10.0	7.0x10.5
10	106	4.5x7.5	5.0x8.5	5.0x9.0	5.5x9.0	5.5x9.0	6.0x10.0	8.0x13
15	156	5.0x8.5	5.0x9.0	5.5x9.0	6.0x10.0	6.0x10.0	7.0x10.5	8.5x14.0
22	226	5.0x9.0	5.5x9.0	6.0x10.0	7.0x10.5	7.0x10.5	8.5x14.0	9.0x14.0
33	336	5.5x9.0	6.0x10.0	6.0x10.0	8.0x13.0	8.0x13.0	9.0x14.5	-
47	476	6.0x10.0	6.5x10.0	8.0x13.0	8.5x14.0	9.0x14.5	90x16.0	-
68	686	6.5x10.0	7.0x10.5	9.0x14.0	9.0x16.0	9.0x16.0	-	-
100	107	7.0x10.5	8.5x14.0	9.0x16.0	9.0x16.0	-	-	-
150	157	8.5x14.0	9.0x16.0	9.0x16.0	-	-	-	-
220	227	9.0x14.5	10.0x17.0	10.0x18.5	-	-	-	-
330	337	10.0x17.0	10.0x18.5	-	-	-	-	-

PART NUMBER SYSTEM

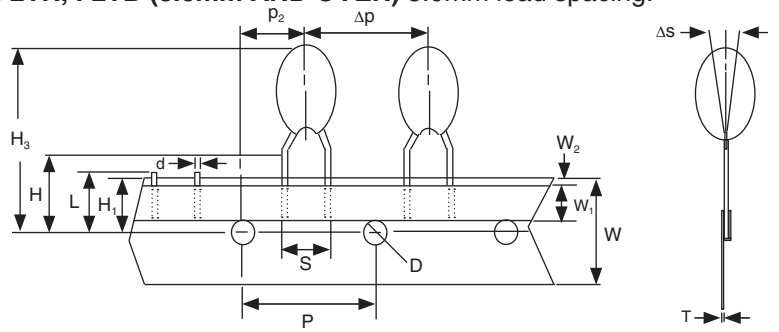
NDTM 106 K 16 F1 TR F

- F — RoHS compliant
- TR — Tape and Reel (optional)
- F1 — Special Lead Forming
- 16 — Working Voltage
- K — Tolerance Code M=20%, K=10%
- 106 — Capacitance Code in pF, first 2 digits are significant, third digit is no. of zeros
- NDTM — Series

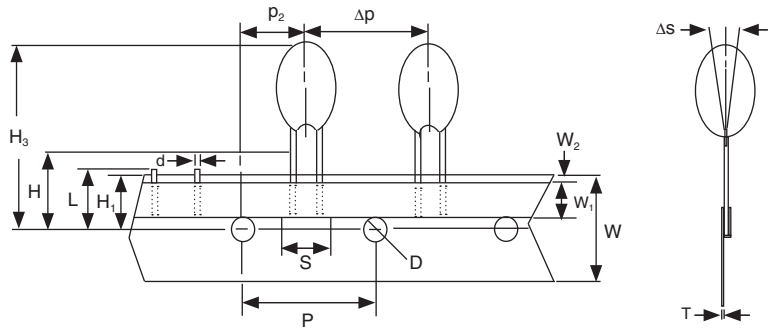
F2TR, F2TB (UNDER 8.0mm DIAMETER) 5.0mm lead spacing.



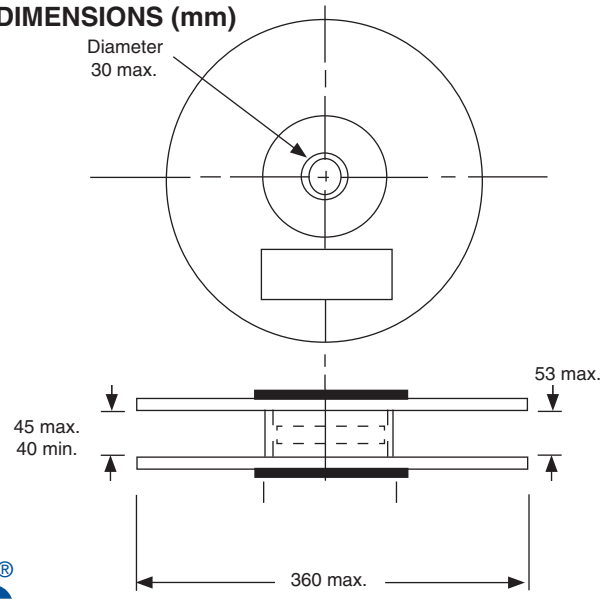
F2TR, F2TB (8.0mm AND OVER) 5.0mm lead spacing.



F1TR, F1TB 2.5mm lead spacing.



REEL DIMENSIONS (mm)



TAPING DIMENSIONS (mm)

Code	Dimensions
P	12.7 ± 0.3
P_1	5.5 ± 1.0
P_2	6.35 ± 0.4
ΔP	±1.0
d	0.5 ± 0.05
S	F2TR, F2TB = 5.0 F1TR, F1TB = 2.5
Δh	±2.0
D	4.0 ± 0.2
W	$18^{+1.0}_{-0.5}$
W_1	6.0 min.
W_2	1.0 max.
H	16.0 ± 0.5 19.0 ± 1.0
H_1	9.0 ± 0.5
H_2	18.0
H_3	32.25
L	11.0 max.
T	0.7 ± 0.2

Parts with diameters up to 9.0mm are available packaged on tape. Larger diameter parts are bulk only.

PACKAGING QUANTITIES

Case Size	Reel	Ammo
4.5 x 7.0	1000 ~ 1500	3000
4.5 x 7.5	1000 ~ 1250	3000
5.0 x 8.5	1000 ~ 1250	3000
5.0 x 9.0	1000 ~ 1250	3000
5.5 x 9.0	1000	2500
6.0 x 10.0	1000	2500
6.5 x 10.0	750	2500
7.0 x 10.5	750	2500
8.0 x 13.0	750	-
8.5 x 14.0	750	-
9.0 x 14.0	500	-
9.0 x 14.5	500	-