

### FEATURES

- Ultra Low ESR and High Ripple Current Ratings
- Values from 3.3 $\mu$ F to 1,000 $\mu$ F
- Suitable for Reflow Soldering
- Available in A, B2, B, C, V and D Case Sizes



### CHARACTERISTICS

Capacitance Range	3.3 $\mu$ F to 1000 $\mu$ F	
Capacitance Tolerance	$\pm$ 20% (M)	
Rated Voltage Range @ 85°C (Vdc)	2.5Vdc ~ 25Vdc*	
Operating Temperature Range	-55°C ~ +105°C (voltage derating above +85°C, see table below)	
Dissipation Factor	See Specifications Table	
Leakage Current @ +25°C (After 5 Minutes at Rated Voltage)	Not More Than 0.1CV or 3 $\mu$ A, whichever is greater	
Capacitance Change With Temperature	-55°C	+105°C
	$\Delta$ C - 20%	$\Delta$ C +50%
Resistance to Soldering Heat (+240°C for 5 ~ 10 Seconds)	$\Delta$ C $\pm$ 20% Max, LC = Less than initial specification DF = 130% of initial measured value	
Moisture Resistance (500 hours; 90-95% RH @ 40°C)	$\Delta$ C +30% ~ -20% Max, LC = Less than initial specification DF = 130% of initial measured value	
Load Life at Rated Voltage (1,000 hours @ 85°C)	$\Delta$ C +30% Max, LC = Less than initial specification DF = 150% of initial measured value	
Base Failure Rate	1%/1000 hours at +85°C and rated voltage	

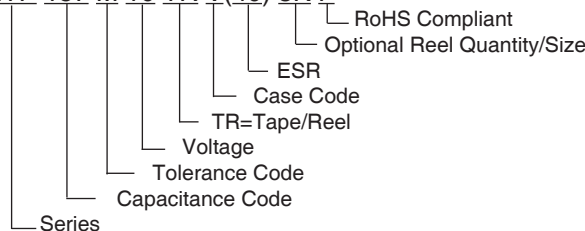
\* It is recommended that the applied voltage be less than 80% of the rated voltage

### STANDARD VALUES AND CASE SIZES

Rated Voltage @ +85°C	2.5	4.0	6.3	10	16	20	25	
Surge Voltage @ +85°C	3.3	5.2	8.0	13	20	23	29	
Derated Voltage @ 105°C	2.0	3.3	5.0	8.0	12.8	16	20	
Capacitance ( $\mu$ F)	Code	Case Size	Case Size	Case Size	Case Size	Case Size	Case Size	Case Size
3.3	335	-	-	-	A	-	-	-
4.7	475	-	-	-	A	B	-	-
6.8	685	-	-	-	-	-	-	B
10	106	-	-	A	A, B	B	-	-
15	156	-	-	-	-	-	-	V
22	226	-	-	B2	B2, B, C	-	V	-
33	336	-	A	A, B2, B	A, B2, B	V	-	-
47	476	-	A, B2	A, B2, B	B2, B, C	V, D	-	-
68	686	-	A	B, C	C, V, D	-	-	-
100	107	-	A, B2, B	A, B, C, V	C, V, D	-	-	-
150	157	-	B, C	B, C, V, D	C, V, D	-	-	-
220	227	A, B	B, C, V, D	B, V, D	D	-	-	-
330	337	B, C, V	C, V, D	V, D	-	-	-	-
470	477	V	D	-	-	-	-	-
680	687	D	D	-	-	-	-	-
1000	108	D	-	-	-	-	-	-

### PART NUMBER SYSTEM

NTP 157 M 10 TR V(40) 3K F



## 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	
NTP227M2.5TRA(45)F	220	2.5	0.08	45	1291	
NTP227M2.5TRA(35)F	220		0.08	35	1464	
NTP227M2.5TRA(25)F	220		0.08	25	1732	
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	
NTP227M2.5TRB(21)F	220		0.08	21	2011	
NTP227M2.5TRB(15)F	220		0.08	15	2380	
NTP337M2.5TRB(45)F	330		0.08	45	1374	
NTP337M2.5TRB(35)F	330		0.08	35	1558	
NTP337M2.5TRB(21)F	330		0.08	21	2011	
NTP337M2.5TRB(15)F	330		0.08	15	2380	
NTP337M2.5TRC(55)F	330		0.08	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	
NTP337M2.5TRV(9)F	330		0.10	9	3726	
NTP477M2.5TRV(15)F	470		0.10	15	2887	
NTP477M2.5TRV(12)F	470		0.10	12	3227	
NTP477M2.5TRV(7)F	470		0.10	7	5300	
NTP477M2.5TRV(6)F	470		0.10	6	4546	
NTP687M2.5TRD(25)F	680		0.10	25	2449	
NTP687M2.5TRD(15)F	680		0.10	15	3162	
NTP108M2.5TRD(25)F	1000		0.10	25	2449	
NTP108M2.5TRD(15)F	1000		0.10	15	3162	
NTP336M4TRA(180)F	33		4.0	0.06	180	645
NTP336M4TRA(70)F	33			0.08	70	1300
NTP476M4TRA(180)F	47			0.06	180	645
NTP476M4TRA(80)F	47			0.08	80	1200
NTP476M4TRB2(70)F	47			0.08	70	1035
NTP686M4TRA(180)F	68	0.06		180	645	
NTP107M4TRA(100)F	100	0.06		100	866	
NTP107M4TRA(45)F	100	0.08		45	1291	
NTP107M4TRA(35)F	100	0.08		35	1464	
NTP107M4TRB2(70)F	100	0.08		70	1035	
NTP107M4TRB(70)F	100	0.08		70	1102	
NTP107M4TRB(45)F	100	0.08		100	1374	
NTP107M4TRB(35)F	100	0.08		35	1558	
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	
NTP227M4TRB(35)F	220	0.08		35	1558	
NTP227M4TRB(25)F	220	0.08		25	1844	
NTP227M4TRB(15)F	220	0.08		15	2380	
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	1561	
NTP227M4TRD(40)F	220	0.10		40	1936	
NTP227M4TRD(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	
NTP227M4TRD(15)F	220	4.0	0.10	15	3162	
NTP227M4TRD(12)F	220		0.10	12	3536	
NTP337M4TRC(55)F	330		0.10	55	1414	
NTP337M4TRC(45)F	330		0.08	45	1900	
NTP337M4TRV(45)F	330		0.10	45	1667	
NTP337M4TRV(25)F	330		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	
NTP477M4TRD(10)F	470		0.10	10	3873	
NTP687M4TRD(25)F	680		0.10	25	2449	
NTP687M4TRD(15)F	680		0.10	15	3162	
NTP687M4TRD(12)F	680		0.10	12	3536	
NTP106M6.3TRA(200)F	10		6.3	0.06	200	612
NTP226M6.3TRB2(70)F	22			0.08	70	1035
NTP336M6.3TRA(180)F	33	0.06		180	645	
NTP336M6.3TRA(120)F	33	0.08		120	1000	
NTP336M6.3TRB2(70)F	33	0.08		70	1035	
NTP336M6.3TRB(150)F	33	0.08		150	753	
NTP336M6.3TRB(70)F	33	0.08		70	1300	
NTP336M6.3TRB(40)F	33	0.08		40	1800	
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	
NTP686M6.3TRB(70)F	68	0.08		70	1102	
NTP686M6.3TRB(55)F	68	0.08		55	1243	
NTP686M6.3TRB(40)F	68	0.08		40	1800	
NTP686M6.3TRC(100)F	68	0.09		100	1049	
NTP107M6.3TRA(35)F	100	0.08		35	1500	
NTP107M6.3TRA(70)F	100	0.08		70	1035	
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	
NTP107M6.3TRC(100)F	100	0.09		100	1049	
NTP107M6.3TRC(55)F	100	0.09		55	1414	
NTP107M6.3TRC(45)F	100	0.08		45	1900	
NTP107M6.3TRV(15)F	100	0.10		15	2886	
NTP157M6.3TRB(45)F	150	0.08		45	1374	
NTP157M6.3TRB(35)F	150	0.08		35	1558	
NTP157M6.3TRB(25)F	150	0.08		25	1844	
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	
NTP157M6.3TRV(15)F	150	0.10		15	2886	
NTP157M6.3TRV(12)F	150	0.10		12	3227	
NTP157M6.3TRD(55)F	150	0.10		55	1651	
NTP157M6.3TRD(40)F	150	0.10	40	1936		
NTP157M6.3TRD(25)F	150	0.10	25	2449		
NTP227M6.3TRB(35)F	220	0.08	35	1558		



## 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	
NTP227M6.3TRB(25)F	220	6.3	0.08	25	1844	
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	
NTP337M6.3TRV(45)F	330		0.10	45	1667	
NTP337M6.3TRV(25)F	330		0.10	25	2236	
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	
NTP335M10TRA(300)F	3.3		10	0.06	300	500
NTP475M10TRA(300)F	4.7			0.06	300	500
NTP106M10TRA(200)F	10			0.06	200	612
NTP106M10TRA(80)F	10	0.08		80	1200	
NTP106M10TRB(200)F	10	0.08		200	652	
NTP156M10TRA(180)F	15	0.06		180	645	
NTP156M10TRA(80)F	15	0.08		80	1200	
NTP226M10TRB2(70)F	22	0.08		70	1035	
NTP226M10TRB(150)F	22	0.08		150	753	
NTP336M10TRA(200)F	33	0.06		200	612	
NTP336M10TRA(70)F						
NTP336M10TRB2(70)F	33	0.08		70	1035	
NTP336M10TRB(150)F	33	0.08		150	753	
NTP476M10TRB2(70)F	47	0.08		70	1035	
NTP476M10TRB(70)F	47	0.08		70	1102	
NTP476M10TRC(100)F	47	0.09		100	1049	
NTP686M10TRC(100)F	68	0.09		100	1049	
NTP686M10TRC(55)F	69	0.09		55	1414	
NTP686M10TRC(45)F	68	0.08		45	1900	
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	
NTP107M10TRC(100)F	100	0.09		100	1049	
NTP107M10TRC(55)F	100	0.09		55	1414	
NTP107M10TRC(45)F	100	0.08		45	1900	
NTP107M10TRC(25)F	100	0.08		25	2600	
NTP107M10TRD(55)F	100	0.10		55	1651	
NTP157M10TRC(55)F	150	0.09		55	1414	
NTP157M10TRV(40)F	150	0.10		40	1768	
NTP157M10TRV(45)F	150	0.10		45	1667	
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		
NTP475M16TRB(200)F	4.7	16	0.08	200	652	
NTP106M16TRB(100)F	10		0.08	100	922	
NTP336M16TRV(70)F	33		0.10	70	1336	
NTP476M16TRV(70)F	47		0.10	70	1336	
NTP476M16TRV(45)F	47		0.01	45	2000	
NTP476M16TRD(70)F	47		0.10	70	1464	
NTP686M16TRD(55)F	68		0.10	55	1651	
NTP686M16TRD(50)F	68		0.10	50	2100	
NTP226M20TRV(90)F	22		20	0.10	90	1179
NTP685M25TRB(100)F	6.8		25	0.08	100	922
NTP156M25TRV(90)F	15	0.10		90	1179	



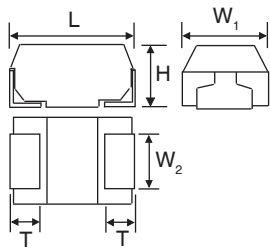
## CASE DIMENSIONS (mm)

Case Size	EIA Code	L	H	W <sub>1</sub>	W <sub>2</sub>	T
A	3216	3.2 ± 0.2	1.6 ± 0.2	1.6 ± 0.2	1.2 ± 0.1	0.8 ± 0.3
B2	3528L	3.5 ± 0.2	1.1 ± 0.1	2.8 ± 0.2	2.2 ± 0.1	0.8 ± 0.3
B	3528	3.5 ± 0.2	1.9 ± 0.2	2.8 ± 0.2	2.2 ± 0.1	0.8 ± 0.3
C	6032	6.0 ± 0.3	2.5 ± 0.3	3.2 ± 0.3	2.2 ± 0.1	1.3 ± 0.3
V	7343	7.3 ± 0.3	1.9 ± 0.1	4.3 ± 0.3	2.4 ± 0.1	1.3 ± 0.3
D	7343	7.3 ± 0.3	2.8 ± 0.3	4.3 ± 0.3	2.4 ± 0.1	1.3 ± 0.3

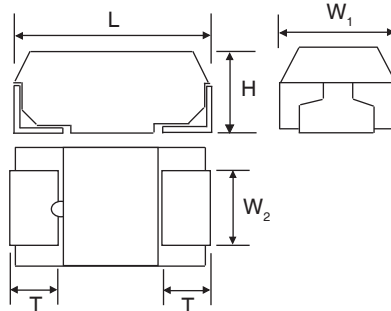
## RIPPLE CURRENT TEMPERATURE DERATING

20°C	85°C	105°C
1.0	0.9	0.6

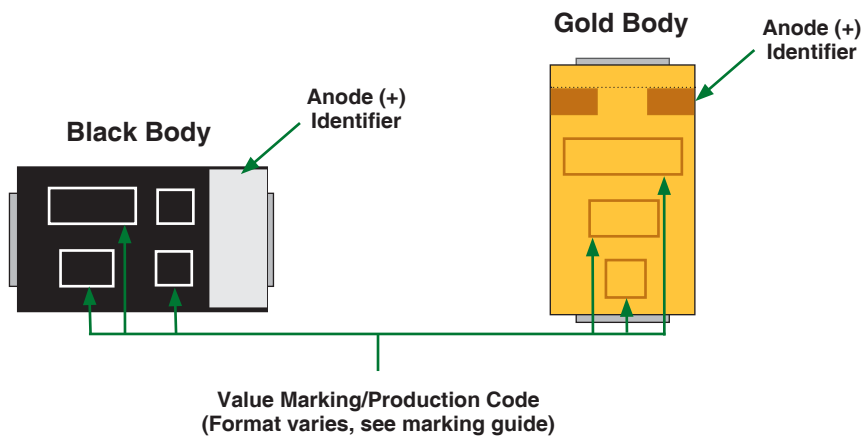
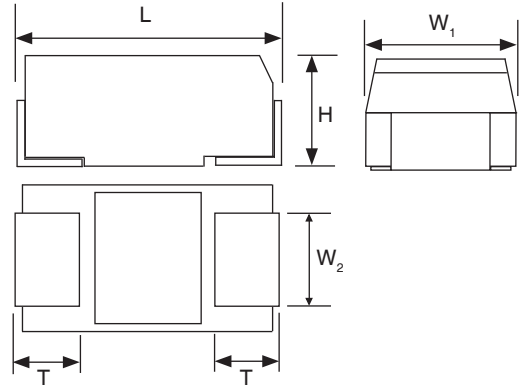
"A" Case Size



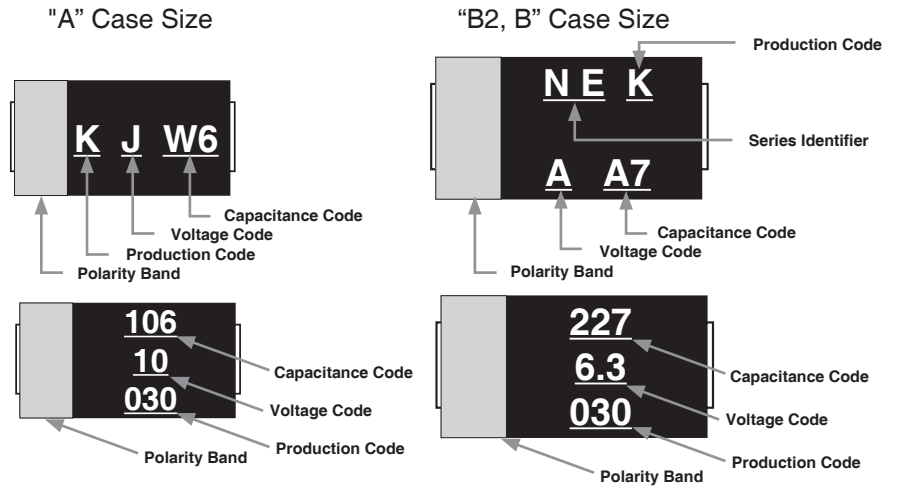
"B2, B" Case Size



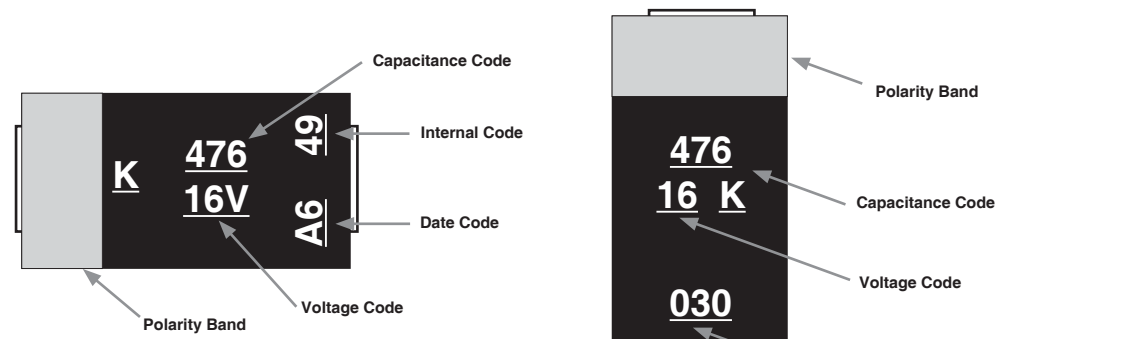
"C, V, D" Case Size



## COMPONENT MARKING



## "C, V & D" Case Size

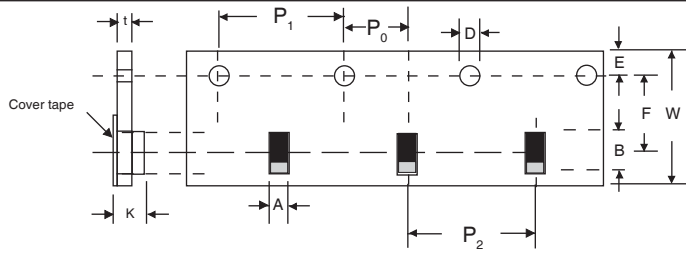


Date Code		
Year	Month	
A = 2010	1 = Jan	7 = Jul
B = 2011	2 = Feb	8 = Aug
C = 2012	3 = Mar	9 = Sep
D = 2013	4 = Apr	O = Oct
E = 2014	5 = May	N = Nov
F = 2015	6 = Jun	D = Dec

Date Code		
Example	Year	Week#
030	0 = 2010	30
105	1 = 2011	5
332	3 = 2013	32
448	4 = 2014	48

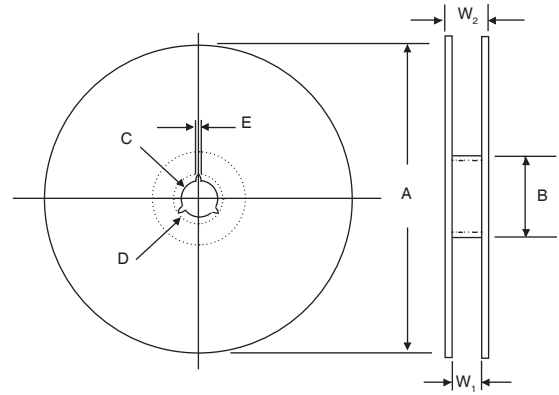
## TAPE SPECIFICATIONS (mm)

Case Size	A ±0.2	B ±0.2	D ±0.1	E ±0.1	F ±0.1	P <sub>1</sub> ±0.05	P <sub>1</sub> ±0.1	P <sub>2</sub> ±0.1	K ±0.2	t max.	W ±0.3	Reel Qty		
												180mm Reel (Std.)	330mm Reel (Opt.)	
A	1.9	3.5	φ1.5	1.75	3.5	2.0	4.0	4.0	1.9	0.2	8.0	2000	9,000	
B2	3.2	3.8							5.5			1.4	3000	10,000
B	3.3											2.1	2000	5,000
C	3.7	6.4			5.5				3.0	0.3		500	2,500	
V	4.8	7.7								2.1		0.4	1000	3,000
D	4.8	7.7										3.3	0.3	500



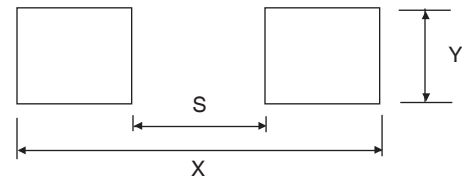
### REEL SPECIFICATIONS (mm)

Tape Width	A ± 2.0	B min.	C ± 0.5	D ± 0.5	E ± 0.5	W <sub>1</sub> ± 1.0	W <sub>2</sub> max.
8mm	φ180	φ50	φ13	φ21	2.0	10	14.5
12mm						14.5	18.5
8mm	φ330	φ80				10	14.5
12mm						14.5	18.5



### RECOMMENDED LAND PATTERN (mm)

Case Size	S max.	X min.	Y min.
A2	1.1	3.8	1.5
A	1.1	3.8	1.5
B	1.4	4.1	2.7
C	2.9	6.9	2.7
D	4.1	8.2	2.9



### RECOMMENDED PEAK TEMPERATURE/TIME

Maximum Time	Peak Soldering Temperature
5 Seconds	260°C*
10 Seconds	240°C
20 Seconds	230°C

\*Notes regarding peak reflow temperature:

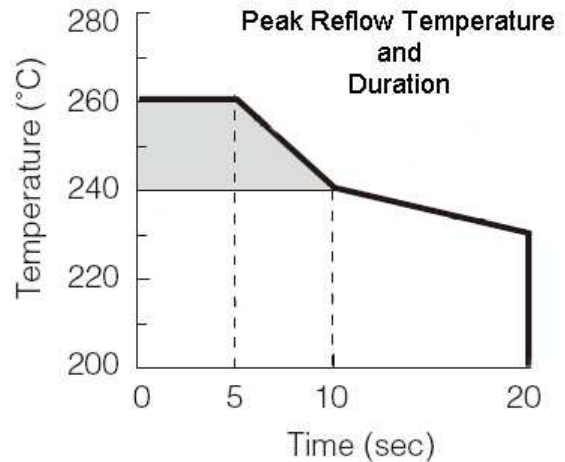
1. NTP parts are moisture sensitive (MSL 3) and are shipped in moisture control bags. After opening the bag capacitors should be stored at +30°C, relative humidity of 60% maximum and soldered within 168 hours.

2. The parts should be soldered using the minimum amount of heat required.

3. If the time after opening the bag exceeds 168 hours components should be baked using the following conditions:

Temperature.....50°C  
Time.....96 hours

4. If the above storage or baking conditions are not followed the peak soldering temperature should be limited to +240°C.



### PRECAUTIONS

Please review the notes on correct use, safety and precautions found on our website at [www.nicomp.com/tantpc](http://www.nicomp.com/tantpc)  
If in doubt or uncertainty, please review your specific application - process details with NIC's technical support personnel: [tpmg@nicomp.com](mailto:tpmg@nicomp.com)

