

### FEATURES

- Ultra Low ESR and High Ripple Current Ratings
- High Capacitance (up to 680μF)
- Low Profile (2.8mm height)
- D Case Size (7.3mm x 4.3mm)

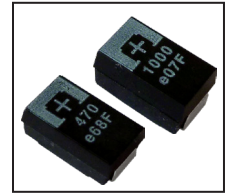
### CHARACTERISTICS

Capacitance Range	150μF to 680μF
Capacitance Tolerance	±20% (M)
Rated Voltage Range @ 105°C (Vdc)	4.0Vdc ~ 10Vdc
Operating Temperature Range	-55°C ~ +105°C
Dissipation Factor	See Specifications Table
Leakage Current @ +25°C (After 5 Minutes at Rated Voltage)	
Capacitance Change With Temperature	-55°C ΔC ±20%
Resistance to Soldering Heat (+260°C for 5 Seconds)	ΔC ±10% of initial measured value, LC = Less than 300% of specified max. value, DF = Less than 200% of specified max. value
Moisture Resistance (500 hours; 90~95% RH @ +60°C)	ΔC -20% ~ +40% Max, LC = <300% of specified max. value DF = 150% of specified max. value
Load Life at Rated Voltage (2,000 hours @ 105°C)	ΔC ±20% Max, LC = Less than specified max. value DF = 150% of specified max. value
Base Failure Rate	0.5%/1000 hours at +105°C and rated voltage

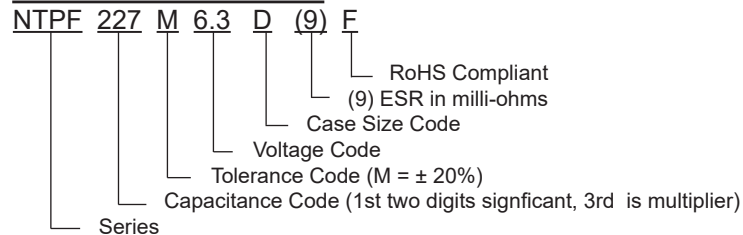
\* Parts with rated voltage ≥10V recommended derating is 80% of the rated voltage.  
For parts with rated voltage <10V recommended derating is 90% of the rated voltage.

### STANDARD VALUES AND CASE SIZES

Rated Voltage @ +105°C		4.0	6.3	10
Surge Voltage @ +105°C		4.6	7.2	12
Capacitance (μF)	Code	Case Size	Case Size	Case Size
150	157	-	-	D
220	227	-	D	-
330	337	D	D	-
470	477	D	D9	-
680	687	D9	-	-



### PART NUMBER SYSTEM



### PRECAUTIONS

Please review the notes on correct use, safety and precautions found at <https://www.niccomp.com/resource/files/aluminum/AlumApplInfoCautions.pdf>  
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)

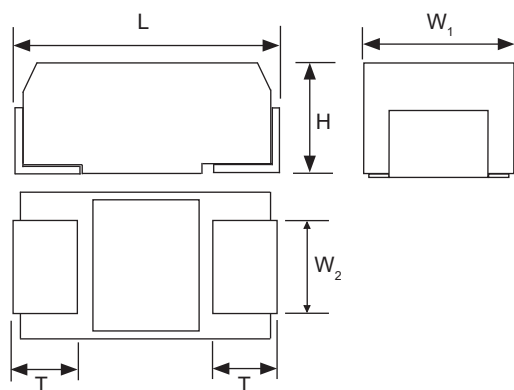


### STANDARD PART NUMBERS AND SPECIFICATIONS

NIC Part Number	Cap. Value (μF)	Rated Voltage (Vdc) +105°C	Leakage Current (μA) after 5 minutes	DF @ +20°C & 120Hz	ESR (mΩ) @ +20°C & 100KHz	Ripple Current Rating (mA) 100KHz ~ 500KHz		
						≤+45°C	>+45°C ~ ≤85°C	>+85°C ~ ≤105°C
NTPF337M4D(12)F	330	4.0	132.0	0.10	12	4000	2800	1000
NTPF477M4D(10)F	470		188.0	0.10	10	4400	3080	1100
NTPF687M4D9(10)F	680		272.0	0.10	10	4400	2200	1100
NTPF227M6.3D(12)F	220	6.3	138.6	0.10	12	4000	2800	1000
NTPF337M6.3D(9)F	330		207.9	0.10	9	3900	2730	975
NTPF477M6.3D9(10)F	470		296.1	0.10	10	4400	2200	1100
NTPF157M10D(15)F	150	10	150.0	0.10	15	3600	2520	900

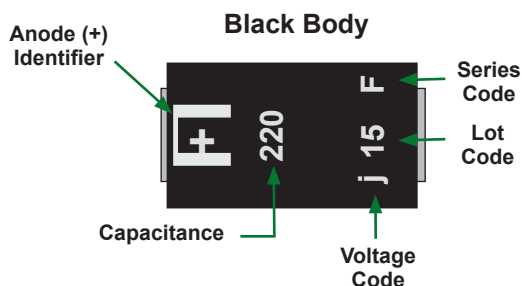
### CASE DIMENSIONS (mm)

Case Size	L	H	W <sub>1</sub>	W <sub>2</sub>	T
D	7.3 ± 0.3	2.8 ± 0.2	4.3 ± 0.2	2.4 ± 0.1	1.3 ± 0.2
D9	7.3 ± 0.3	3.8 ± 0.2	4.3 ± 0.2	2.4 ± 0.1	1.3 ± 0.2



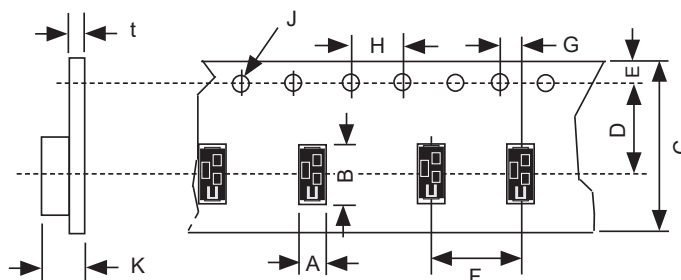
### VOLTAGE CODES

g	j	A
4.0V	6.3V	10V



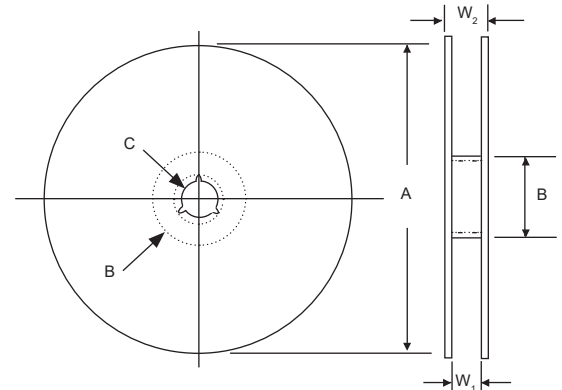
### CARRIER DIMENSIONS AND REEL QUANTITIES

Case Size	A ±0.1	B ±0.1	C ±0.3	D ±0.1	E ±0.1	F ±0.1	G ±0.1	H ±0.1	J -0/+0.1	K ±0.2	t ±0.1	Reel Qty 330mm Reel
D	4.5	7.7	12.0	5.5	1.75	8.0	2.0	4.0	φ1.5	3.2	0.30	2,500
D9	4.5	7.7	12.0	5.5	1.75	8.0	2.0	4.0	φ1.5	4.2	0.30	2,000



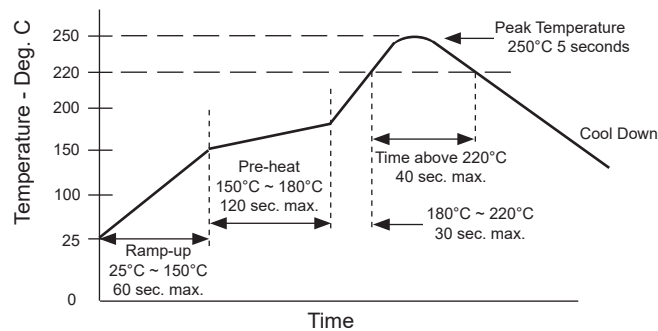
### REEL SPECIFICATIONS (mm)

Tape Width	A ±2.0	B ±2.0	C ±0.2	W <sub>1</sub> ±0.5	W <sub>2</sub> ±1.0
12mm	φ330	φ80	φ13	13.5	17.5

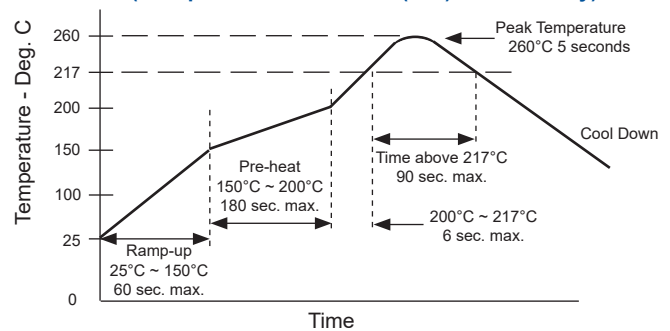


### MAXIMUM OF 2 REFLOW PASSES UNDER BELOW CONDITIONS

#### 250°C REFLOW TEMPERATURES/DURATIONS

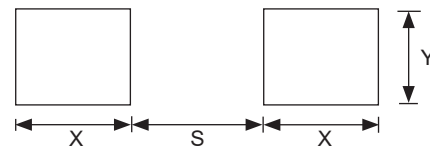


#### 260°C REFLOW TEMPERATURES/DURATIONS (Exception: NTPF157M10D(15F) is 250°C only)



### RECOMMENDED LAND PATTERN (mm)

Case Size	S max.	X min.	Y min.
D, D9	3.7	2.4	2.9



1. NTPF parts are moisture sensitive 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 timeframe shown in the tables below.

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

#### 250°C PEAK REFLOW TEMPERATURE

Case Size	Time	Conditions	MSL
All Sizes	4 weeks	<30°C/60% RH	2a

#### 260°C PEAK REFLOW TEMPERATURE

Case Size	Time	Conditions	MSL
All Sizes	168 hours	<30°C/60% RH	3

**SEE ADDITIONAL STORAGE & HANDLING NOTES ON PAGE 4**

## NOTES ON STORAGE & HANDLING

It is necessary to set-up a proper storage and manufacturing environment to prevent problems at the time of soldering (degradation of solder ability or moisture absorption into the molding resin) when NTPF Series products are stored. Storage of NTPF Series product should be within the sealed moisture barrier packaging under the following conditions:

1. The storage period should be no greater than 18 months.
2. Storage temperature and humidity should be 15°C to 35°C, 45% to 75% RH
3. Components should not be stored in places exposed to direct sunlight.
4. Components packaging (moisture barrier bag) should not be unsealed until just before they components are to be soldered.
5. If there is a remainder of unsealed components they should be resealed within the moisture barrier packaging with a packaging of desiccant and used within the time period described in the tables below.

Moisture sensitivity levels (IPC/JEDEC STANDARD J-STD-020D)

1. Peak temperature 250°C lead free reflow

MSL	Time	Conditions	Case Size
2a	4 weeks	≤30°C/60% RH	D, D9
3	168 hours		

2. Peak temperature 260°C lead free reflow

MSL	Time	Conditions	Case Size
3	168 hours	≤30°C/60% RH	D, D9