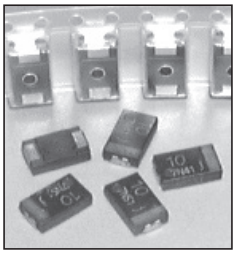
NSP Series
Surface Mount Solid Specialty Polymer Aluminum Capacitors

FEATURES

- NEW “X”, “Y”, "Z", "U" & "V" TYPE HIGH RIPPLE CURRENT/VERY LOW ESR
- REPLACES MULTIPLE TANTALUM CHIPS IN HIGH CURRENT POWER SUPPLIES AND VOLTAGE REGULATORS
- FITS EIA (7343) “D” AND “E” TANTALUM CHIP LAND PATTERNS
- Pb-FREE AND COMPATIBLE WITH REFLOW SOLDERING

EXTENDED LOAD LIFE
HIGH RIPPLE CURRENT
ULTRA LOW ESR

LOW ESR COMPONENT
SOLID POLYMER ELECTROLYTE
For Performance Data
see www.LowESR.com



CHARACTERISTICS (Note 1)

Rated Working Range	2.0 ~ 6.3VDC		
Rated Capacitance Range	68 ~ 560µF		
Operating Temperature Range	-55 ~ +105°C		
Capacitance Tolerance	± 20% (M)		
Max. Leakage Current (µA) After 2 Minutes (+20°C)	All Case Sizes		See Standard Products and Specifications Tables
Max. Tan δ, 120Hz, +20°C			
High Temperature Load Life 2,000 Hours @ 105°C at Rated Working Voltage	Capacitance Change		Within ±20% of initial measured value
	Tan δ		Less than 200% specified max. value
	Leakage Current		Less than 300% specified max. value
Damp Heat Test 500 Hours @ +60°C at 90% RH	Capacitance Change	6.3V	Within -20%/+50% of initial measured value
		4V	Within -20%/+60% of initial measured value
		2V, 2.5V	Within -20%/+70% of initial measured value
	Tan δ		Less than 200% of specified max. value
	Leakage Current		Less than specified max. value

Note 1: Specifications that apply to "Not Recommended" parts begin on page 5.

STANDARD PRODUCTS AND SPECIFICATIONS

NIC Part Number	WV (Vdc)	Cap. (µF)	Max. LC (µA)	Tan δ	Max. Ripple Current +45°C & 100KHz (mArms)	Max. ESR +20°C & 100KHz (Ω)	Height H
NSP181M2D6ZATRF	2.0	180	36.0	0.06	6,300	0.009	1.9±0.1
NSP221M2D6ATRF		220	44.0	0.06	5,100	0.015	1.9±0.1
NSP221M2D6ZATRF		220	44.0	0.06	6,300	0.009	1.9±0.1
NSP221M2DYATRF		220	44.0	0.06	7500	0.006	1.0 max.
NSP221M2DUATRF		220	44.0	0.06	8500	0.0045	1.0 max.
NSP221M2D5YATRF		220	44.0	0.06	7500	0.006	1.1±0.1
NSP271M2D6XATRF		270	54.0	0.06	5,600	0.012	1.9±0.1
NSP271M2D6ZATRF		270	54.0	0.06	6,300	0.009	1.9±0.1
NSP271M2D6YATRF		270	54.0	0.06	7,500	0.006	1.9±0.1
NSP271M2D6UATRF		270	54.0	0.06	8,500	0.0045	1.9±0.1
NSP331M2D6ATRF		330	66.0	0.06	5,100	0.015	1.9±0.1
NSP331M2D6XATRF		330	66.0	0.06	5,600	0.012	1.9±0.1
NSP331M2D6ZATRF		330	66.0	0.06	6,300	0.009	1.9±0.1
NSP331M2D1YATRF		330	66.0	0.06	7,500	0.006	1.4±0.1
NSP331M2D6YATRF		330	66.0	0.06	7,500	0.006	1.9±0.1
NSP331M2D6UATRF		330	66.0	0.06	8,500	0.0045	1.9±0.1
NSP331M2D6VATRF		330	66.0	0.06	10,200	0.003	1.9±0.1
NSP391M2D6ATRF		390	78.0	0.06	5,100	0.015	1.9±0.1
NSP391M2D6ZATRF		390	78.0	0.06	6,300	0.009	1.9±0.1
NSP391M2D6YATRF		390	78.0	0.06	7,500	0.006	1.9±0.1
NSP391M2D6UATRF		390	78.0	0.06	8,500	0.0045	1.9±0.1
NSP471M2D6ATRF		470	94.0	0.06	5,100	0.015	1.9±0.1
NSP471M2D6ZATRF		470	94.0	0.06	6,300	0.009	1.9±0.1
NSP471M2D6YATRF		470	94.0	0.06	7,500	0.006	1.9±0.1
NSP471M2D6UATRF		470	94.0	0.06	8,500	0.0045	1.9±0.1
NSP471M2D6VATRF		470	94.0	0.06	10,200	0.003	1.9±0.1
NSP561M2D6ATRF		560	112.0	0.06	5,100	0.015	1.9±0.1
NSP561M2D6UATRF		560	112.0	0.06	8,500	0.0045	1.9±0.1
NSP561M2D6VATRF		560	112.0	0.06	10,200	0.003	1.9±0.1
NSP151M2.5D6ZATRF	2.5	150	37.5	0.06	6,300	0.009	1.9±0.1
NSP181M2.5D6ZATRF		180	45.0	0.06	6,300	0.009	1.9±0.1
NSP181M2.5DYATRF		180	45.0	0.06	7500	0.006	1.0 max.
NSP181M2.5DUATRF		180	45.0	0.06	8500	0.0045	1.0 max.
NSP181M2.5D5YATRF		180	45.0	0.06	7500	0.006	1.1±0.1
NSP221M2.5D6ATRF		220	55.0	0.06	5,100	0.015	1.9±0.1
NSP221M2.5D6ZATRF		220	55.0	0.06	6,300	0.009	1.9±0.1

STANDARD PRODUCTS AND SPECIFICATIONS

NIC Part Number	WV (Vdc)	Cap. (µF)	Max. LC (µA)	Tan δ	Max. Ripple Current +45°C & 100KHz (mArms)	Max. ESR +20°C & 100KHz (Ω)	Height H
NSP221M2.5D6YATRF	2.5	220	55.0	0.06	7,000	0.007	1.9±0.1
NSP271M2.5D6YATRF		270	67.5	0.06	7,000	0.007	1.9±0.1
NSP271M2.5D1YATRF		270	67.5	0.06	7,500	0.006	1.4±0.1
NSP331M2.5D6ATRF		330	82.5	0.06	5,100	0.015	1.9±0.1
NSP331M2.5D6ZATRF		330	82.5	0.06	6,300	0.009	1.9±0.1
NSP331M2.5D6YATRF		330	82.5	0.06	7,500	0.006	1.9±0.1
NSP331M2.5D6UATRF		330	82.5	0.06	8,500	0.0045	1.9±0.1
NSP391M2.5D6ATRF		390	97.5	0.06	5,100	0.015	1.9±0.1
NSP391M2.5D6ZATRF		390	97.5	0.06	6,300	0.009	1.9±0.1
NSP391M2.5D6YATRF		390	97.5	0.06	7,500	0.006	1.9±0.1
NSP391M2.5D6UATRF		390	97.5	0.06	8,500	0.0045	1.9±0.1
NSP471M2.5D6ATRF		470	117.5	0.06	5,100	0.015	1.9±0.1
NSP471M2.5D6ZATRF		470	117.5	0.06	6,300	0.009	1.9±0.1
NSP471M2.5D6YATRF		470	117.5	0.06	7,500	0.006	1.9±0.1
NSP471M2.5D6UATRF		470	117.5	0.06	8,500	0.0045	1.9±0.1
NSP471M2.5D6VATRF		470	117.5	0.06	10,200	0.003	1.9±0.1
NSP820M4D6ZATRF	4.0	82	32.8	0.06	6,300	0.009	1.9±0.1
NSP101M4D6ZATRF		100	40.0	0.06	6,300	0.009	1.9±0.1
NSP121M4D5ATRF		120	48.0	0.06	5100	0.015	1.1±0.1
NSP121M4DZATRF		120	48.0	0.06	6,300	0.009	1.0 max.
NSP151M4D6ATRF		150	60.0	0.06	5,100	0.015	1.9±0.1
NSP151M4D6ZATRF		150	60.0	0.06	6,300	0.009	1.9±0.1
NSP151M4D6YATRF		150	60.0	0.06	7,000	0.007	1.9±0.1
NSP181M4D1ATRF		180	72.0	0.06	5,100	0.015	1.4±0.1
NSP181M4D6ATRF		180	72.0	0.06	5,100	0.015	1.9±0.1
NSP181M4D6XATRF		180	72.0	0.06	5,600	0.012	1.9±0.1
NSP181M4D6ZATRF		180	72.0	0.06	6,300	0.009	1.9±0.1
NSP221M4D6ATRF		220	88.0	0.06	5,100	0.015	1.9±0.1
NSP221M4D6XATRF		220	88.0	0.06	5,600	0.012	1.9±0.1
NSP221M4D6ZATRF		220	88.0	0.06	6,300	0.009	1.9±0.1
NSP271M4D6ATRF		270	108.0	0.06	5,100	0.015	1.9±0.1
NSP271M4D6ZATRF		270	108.0	0.06	6,300	0.009	1.9±0.1
NSP331M4D6ATRF		330	132.0	0.06	5,100	0.015	1.9±0.1
NSP680M6.3D5ATRF	6.3	68	42.8	0.06	5,100	0.015	1.1±0.1
NSP680M6.3DZATRF		68	42.8	0.06	6,300	0.009	1.0 max.
NSP101M6.3D1ATRF		100	63.0	0.06	5,100	0.015	1.4±0.1
NSP101M6.3D6ATRF		100	63.0	0.06	5,100	0.015	1.9±0.1
NSP121M6.3D6ATRF		120	75.6	0.06	5,100	0.015	1.9±0.1
NSP121M6.3D6ZATRF		120	75.6	0.06	7,000	0.007	1.9±0.1
NSP151M6.3D6ATRF		150	94.5	0.06	5,100	0.015	1.9±0.1
NSP151M6.3D6XATRF		150	94.5	0.06	5,600	0.012	1.9±0.1
NSP151M6.3D6ZATRF		150	94.5	0.06	6,300	0.009	1.9±0.1
NSP181M6.3D6ATRF		180	113.4	0.06	5,100	0.015	1.9±0.1
NSP181M6.3D6ZATRF		180	113.4	0.06	6,300	0.009	1.9±0.1
NSP221M6.3D6ATRF		220	138.6	0.06	5,100	0.015	1.9±0.1
NSP221M6.3D6ZATRF		220	138.6	0.06	6,300	0.009	1.9±0.1

RIPPLE CURRENT TEMPERATURE CORRECTION FACTORS

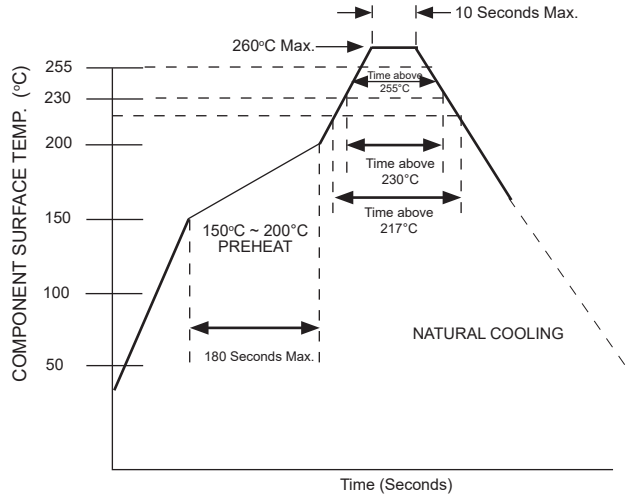
Case Code	≤ +45°C	>+45°C ~ ≤+85°C	>+85°C ~ +105°C
All	1.0	0.7	0.25

PART NUMBERING SYSTEM

NSP 151 M 6.3 D6 Z A TR 500 F

- F — RoHS Compliant
- 500 = 500 piece reel
- TR — Tape and Reel
- A — Peak Reflow Temperature Code (A = +260°C)
- Z — Optional Performance Code
- D6 — Case Size Code (D, D1, D5, D6)
- 6.3 — Working Voltage
- M — Tolerance Code M=20%, K=10%
- 151 — Capacitance Code in µF, first 2 digits are significant, third digits no. of zeros
- NSP — Series

RECOMMENDED 260°C REFLOW SOLDERING PROFILE



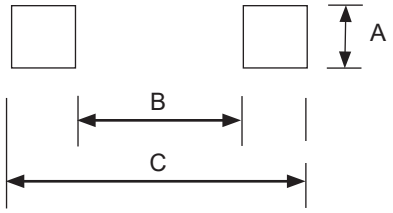
Item	Maximum Duration
Peak Temperature +260°C	10 seconds max.
Time above +255°C	30 seconds max.
Time above +230°C	130 seconds max.
Time above +217°C	150 seconds max.

Notes: Compliant to IPC/J-STD-020D standard
1. SAC alloy (+217°C) reflow soldering compatible
2. Soldering heat limits apply to the top surface of component
3. If you have concerns about your reflow soldering profile review them with NIC to insure compatible [tpmg@niccomp.com]
4. Three reflow passes are allowed (cooling down period to room temperature between each pass).

Storage Conditions:
Temperature: +5°C ~ +30°C
Humidity: <60% RH
Packaging: Moisture barrier bag
Storage Time: Parts should be soldered within 2 years of the production date and/or within 7 days of opening the moisture barrier bag.

RECOMMENDED LAND PATTERNS (mm)

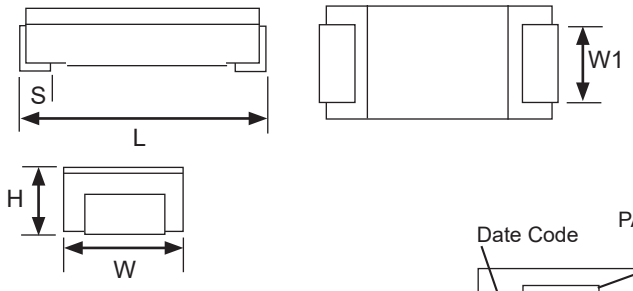
Case Code	A	B	C
D, D1, D5, D6	2.8	4.0	8.8



Please note the NSP series will fit on standard "D" and "E" size (7343) tantalum chip capacitor land patterns

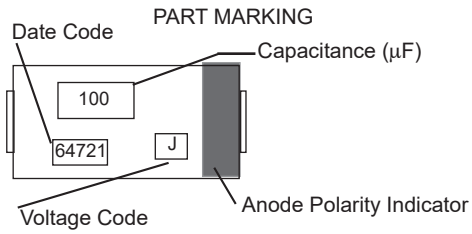
DIMENSIONS (mm)

Case Code	L ±0.2	W ±0.2	H	W1 ±0.1	S ±0.3
D, D1, D5, D6	7.3	4.3	see values table	2.4	1.3



VOLTAGE CODES

Voltage	Code
2.0Vdc	d
2.5Vdc	e
4.0Vdc	g
6.3Vdc	j

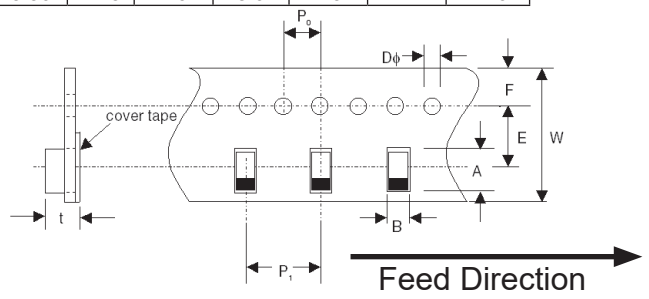


PRECAUTIONS

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**

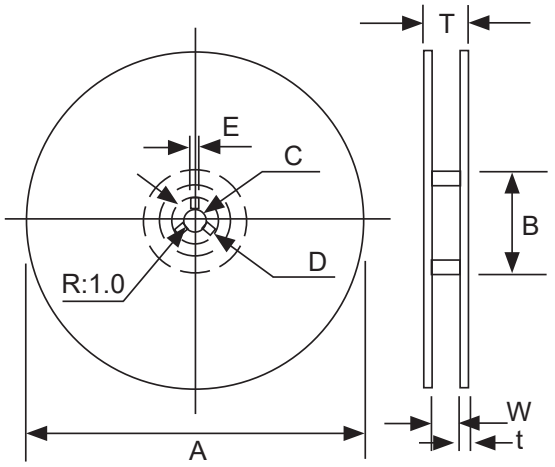
CARRIER TAPE DIMENSIONS (mm)

Case Code	A±0.2	B±0.2	Dϕ	E±0.1	F±0.1	P_o±0.1	P_1±0.1	t±0.2		W±0.3
								D, D5	D1, D6	
D, D1, D5, D6	7.6	4.5	1.5 $^{+0.1}$	5.50	1.75	4.0	8.0	1.5	2.4	12.0



REEL DIMENSIONS (mm)

A±2.0	B±1.0	C±0.5	D±0.8	E±0.5	T±1.0	t	W±1.0
330	80	13.0	21.0	2.0	20.0	3.0	14



Case Code	Reel Quantity
D, D1, D5, D6	3,500