

Stacked Film Capacitor Chips

NSWC Series

FEATURES

- STACKED METALLIZED POLYETHYLENE NAPHTHALATE (PEN) FILM
- STANDARD EIA 1206, 1210, 1913, 2416, 2820, 3022 AND 3925 SIZES
- WIDE TEMPERATURE RANGE UP TO +105°C (16Vdc & 50Vdc)
- HIGH HEAT AND MOISTURE RESISTANT
- VERY STABLE TEMPERATURE, FREQUENCY, VOLTAGE, BIAS AND DIELECTRIC ABSORPTION CHARACTERISTICS
- REFLOW SOLDERING ONLY
- TAPE AND REEL PACKAGING

**NSWC IS
RECOMMENDED
FOR NEW DESIGNS**



**RoHS
Compliant**

includes all homogeneous materials

*See Part Number System for Details

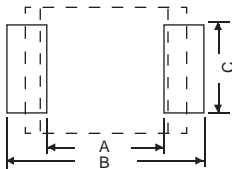
SPECIFICATIONS	Case Sizes						
	1206	1210	1913	2416	2820	3022	3925
Capacitance Range	0.001 ~ 0.0047μF	0.00561 ~ 0.01μF	0.012 ~ 0.22μF	0.1 ~ 0.47μF	0.18 ~ 0.33μF	0.39 ~ 0.47μF	0.56 ~ 1.0μF
Voltage Ratings	16Vdc, 50Vdc, 100Vdc						
Capacitance Tolerance	16V and 50V ±5% (J), 100V 0.001 ~ 0.01μF 5% (J) only, 0.012 ~ 0.15μF 5% (J) or 10% (K), 0.18 ~ 1.0μF 10% (K) only						
Temperature Range	-55°C ~ +105°C (16Vdc, 50Vdc and 100V 0.012μF ~ 0.01μF) -55°C ~ +125°C (100Vdc, 0.012μF ~ 1.0μF with derating above +85°C)						
Dissipation factor (20°C)	1.0% max. @ 1KHz						
Insulation resistance (20°C)	3 Gigohms or 1000Ω/F whichever is lower (16Vdc parts measured at 10Vdc)						
Dielectric Withstanding Voltage	150% of Rated Voltage 60 Seconds 175% of Rated Voltage for 5 Seconds (except 100Vdc parts)						
Temperature Characteristic	±3% ΔC Maximum Over Temperature Range						
Dielectric Absorption	0.05 ~ 0.10% Typical						

ENVIRONMENTAL CHARACTERISTICS

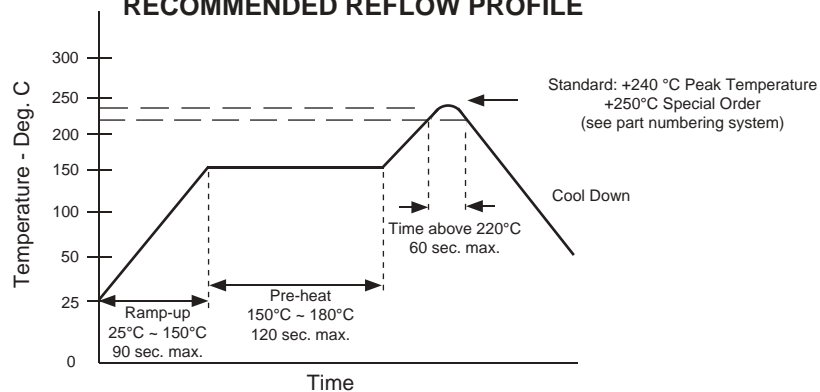
Life Test At +105°C 1,000 Hours at 125% of Rated Voltage (125°C for 100Vdc, 0.012μF ~ 1.0μF)	Capacitance Change	Within +1%/-6% of Initial Value	
	Dissipation Factor	1.1% Maximum	
	Insulation Resistance	1 Gigohm Minimum or 300Ω/F whichever is lower	
Resistance to Soldering Heat: +240°C Peak	Capacitance Change	Within ±5% of Initial Value	
	Dissipation Factor	1.1% Maximum	
	Insulation Resistance	1 Gigohm Minimum or 300Ω/F whichever is lower	
Humidity Load Life (90% ~ 95% RH) (1) 1,000 Hours, +40°C (500 Hours for 100Vdc, 0.012μF ~ 1.0μF) (2) 500 Hours, +60°C	Capacitance Change	(1) +8%/-5%	(2) ±10% of Initial Value
	Dissipation Factor	(1) 1.5% Max.	(2) 2.0% Max.
	Insulation Resistance	(1) 100 Megohm Min. or 30Ω/F (2) 10 Megohm Min. or 3Ω/F whichever is lower	
Solderability with 25% Wt Rosin-Methanol Flux	90% Minimum Coverage After 2.5 Second Dip Into 245°C Solder Pot		

RECOMMENDED LAND PATTERN (mm)

EIA Size	A	B	C
1206	1.8	3.6	1.4
1210	1.8	3.6	2.3
1913	2.6	6.6	3.0
2416	3.8	7.8	3.8
2820	4.5	9.0	4.6
3022	5.1	9.7	5.0
3925	7.2	11.9	5.7



RECOMMENDED REFLOW PROFILE



PART NUMBER SYSTEM

NSWC 104 J 50 TR D4 N E

- NSWC: Series
- 104: Capacitance in pF, 1st two digits are significant, 3rd digit is no. of zeros
- J: Tolerance Code: J=±5%
- 50: Voltage
- TR: Tape & Reel
- D4: Size Code
- N: Optional High Temp. Reflow (+250°C)*
- E: RoHS Compliant

*Special packaging and handling required.



STANDARD PRODUCTS AND SIZE CODE

Cap.	Code	Working Voltage (Vdc)			EIA Code
		16	50	100	
0.001	102			B2	
0.0012	122			B2	
0.0015	152			B2	
0.0018	182			B2	
0.0022	222			B2	
0.0027	272			B2	
0.0033	332			B3	
0.0039	392			B3	
0.0047	472			B3	
0.0056	562			C2	
0.0068	682			C2	
0.0082	822			C3	
0.010	103			C3	
0.012	123			D1	
0.015	153			D1	
0.018	183			D1	
0.022	223			D1	
0.027	273			D1	
0.033	333			D1	
0.039	393			D1	
0.047	473			D2	
0.056	563		D2	D2	
0.068	683		D2	D3	
0.082	823		D3	D4	
0.1	104			D4	E1
0.12	124	D1		E1	E3
0.15	154	D2		E2	E4
0.18	184	D2		E3	G1
0.22	224	D3		E4	G2
0.27	274			E1	G3
0.33	334			E2	G5
0.39	394			E3	Q1
0.47	474			E4	Q2
0.56	564				R1
0.68	684				R3
0.82	824				R6
1.0	105				R8

Fig. 1 16V & 50V, 100V D1~R8

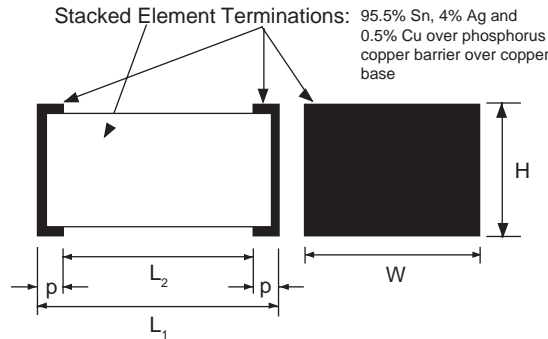
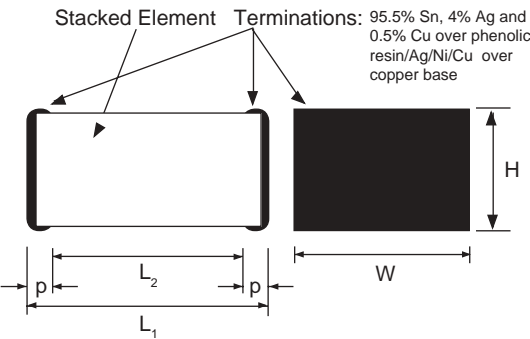


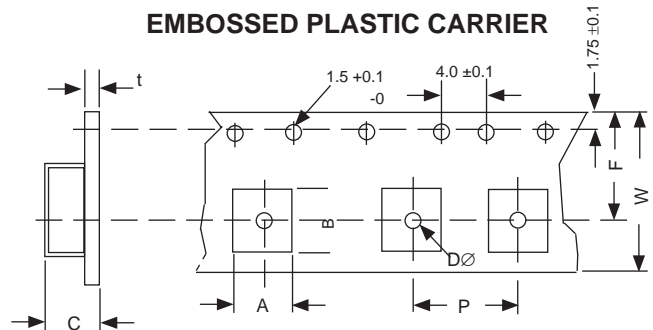
Fig. 2 (100V B2~C3)



DIMENSION (mm) AND CASE CODE

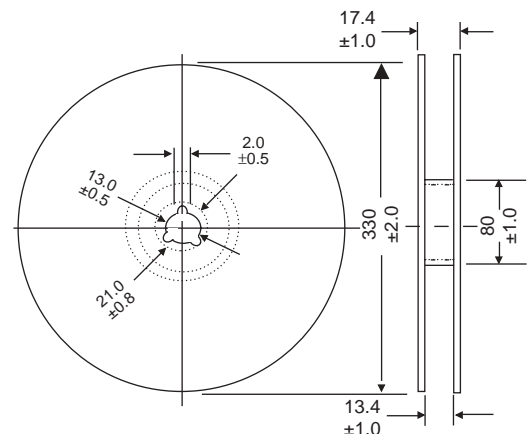
Case Code	Length L ±0.2	Width W	Height H ±0.3	P	EIA Code
B2	3.2	1.6 ± 0.2	1.1	0.65 ±0.3 (Fig. 1)	1206
B3			1.5		
C2			1.5		
C3			2.1		
D1	4.8	3.3 ± 0.3	1.4	0.35 ±0.2 (Fig. 2)	1913
D2			2.0		
D3			2.4		
D4			2.8		
E1	6.0	4.1 ± 0.3	1.8	0.35 ±0.2 (Fig. 2)	2416
E2			2.0		
E3			2.4		
E4			2.8		
G1	7.1	5.0 ± 0.4	2.0	0.35 ±0.2 (Fig. 2)	2820
G2			2.4		
G3			2.9		
G5			3.5		
Q1	7.7	5.5 ± 0.4	3.4	0.35 ±0.2 (Fig. 2)	3022
Q2			4.0		
R1	9.8	6.3 ± 0.4	3.0	0.35 ±0.2 (Fig. 2)	3925
R3			3.6		
R6			4.3		
R8			5.1		

EMBOSED PLASTIC CARRIER



TAPE DIMENSIONS (mm)

Case Code	A±0.1	B±0.1	C±0.2	t	W±0.3	F	P±0.1	D±0.2/-0	Qty/Reel
B2	1.9	3.5	1.5	0.25	8.0	3.5	4.0	1.0	3,000
B3			1.9						2,000
C2			1.9						2,000
C3	2.8		2.5	0.3 ±0.05	12.0	5.5 ±0.05	8.0	1.5	2,000
D1			2.0						3,000
D2	3.8	5.1	2.6	0.3 ±0.05	12.0	5.5 ±0.05	8.0	1.5	3,000
D3, D4			3.4						2,000
E1, E2			2.7						3,000
E3, E4	4.6	6.3	3.5	0.343 ±0.013	16.0	7.5 ±0.1	12.0	1.5	2,000
G1 ~ G5			4.7						1,500
Q1, Q2	6.91	8.43	5.685	0.343 ±0.013	16.0	7.5 ±0.1	12.0	1.5	1,000
R1 ~ R8	8.94	10.54	5.795						1,000



Stacked Film Capacitor Chips

NSWC Series
(High Voltage)

FEATURES

- STACKED METALLIZED POLYETHYLENE NAPHTHALATE (PEN) FILM
- STANDARD EIA 1913, 2416 and 2420 SIZES
- HIGH HEAT AND MOISTURE RESISTANT
- VERY STABLE TEMPERATURE, FREQUENCY, VOLTAGE, BIAS AND DIELECTRIC ABSORPTION CHARACTERISTICS
- REFLOW SOLDERING ONLY
- TAPE AND REEL PACKAGING

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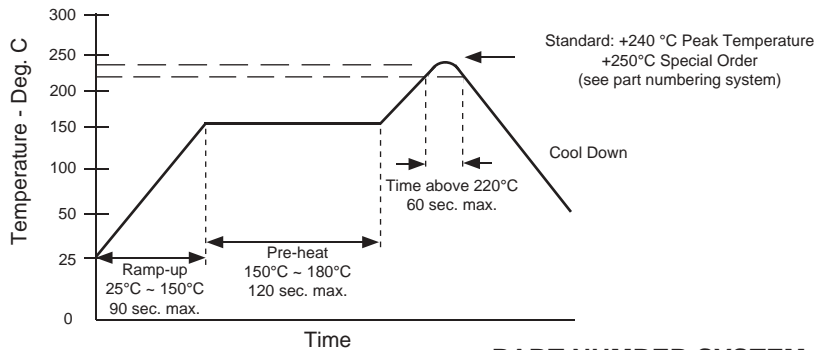
*See Part Number System for Details

SPECIFICATIONS	Case Sizes		
	1913	2416	2420
Capacitance Range	0.001 ~ 0.015 μ F	0.012 ~ 0.068 μ F	0.027 ~ 0.12 μ F
Voltage Ratings	250Vdc		
Capacitance Tolerance	\pm 5%(J)		
Temperature Range	-55°C ~ +85°C		
Dissipation Factor	1.0% max. @ 1KHz		
Insulation Resistance (20°C) Through 2K Ohm Resistor	3 Gigohms @ 100Vdc		
Dielectric Withstanding Voltage	150% of Rated Voltage		
Temperature Characteristic	\pm 3% Δ C Maximum Over Temperature Range		
Dielectric Absorption	0.05 ~ 0.10% Typical		

ENVIRONMENTAL CHARACTERISTICS

Life Test At +85°C 1,000 Hours at 125% of Rated Voltage	Capacitance Change	Within \pm 1%/-6% of Initial Value
	Dissipation Factor	1.1% Maximum
	Insulation Resistance	1 Gig Ω Minimum
Resistance to Soldering Heat: +240°C Peak	Capacitance Change	Within \pm 5% of Initial Value
	Dissipation Factor	1.1% Maximum
	Insulation Resistance	1 Gig Ω Minimum or 300 Ω /F whichever is lower
Humidity Load Life (90 ~ 95% RH) 1,000 Hours, +40°C	Capacitance Change	(1) +8%/-5%
	Dissipation Factor	(1) \pm 1.5%
	Insulation Resistance	(1) 100Meg Ω
Resistance to Soldering Heat 240°C for 5 seconds	Capacitance Change	Within \pm 5%
	Dissipation Factor	Maximum 1.1%
	Insulation Resistance	1Gig Ω
Solderability with 25% Wt Rosin-Methanol Flux	95% Minimum Coverage After 2.5 Second Dip into 245°C Solder Pot	

RECOMMENDED REFLOW PROFILE



RECOMMENDED LAND PATTERN (mm)

EIA Size	A	B	C
1913	2.6	6.6	3.0
2416	3.8	7.8	3.8
2420	3.8	7.8	4.6

PART NUMBER SYSTEM

NSWC 822 J 250 TR D1 N E

- Series
- Capacitance in pF, 1st two digits are significant, 3rd digit is no. of zeros
- Tolerance Code: J= \pm 5%
- Voltage
- Tape & Reel
- Size Code
- Optional High Temp. Reflow (+250°C)*
- RoHS Compliant

*Special packaging and handling required.

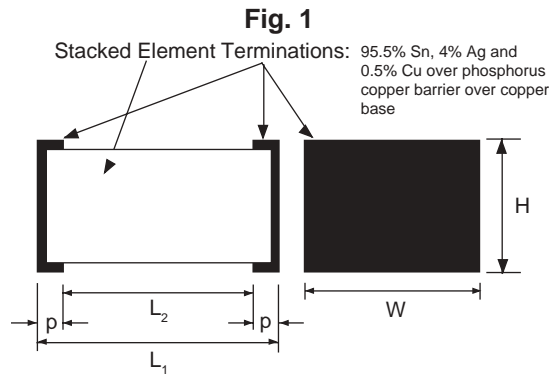


Stacked Film Capacitor Chips

NSWC Series
High Voltage

STANDARD PRODUCTS AND SIZE CODE

Cap.	Code	Working Voltage (Vdc)
		250
0.001	102	D1
0.0012	122	D1
0.0015	152	D1
0.0022	222	D1
0.0027	272	D1
0.0033	332	D1
0.0039	392	D1
0.0047	472	D1
0.0056	562	D1
0.0068	682	D1
0.0082	822	D1
0.010	103	D1
0.012	123	D1
0.015	153	D1
0.018	183	D2
0.022	223	D2
0.027	273	D3
0.033	333	D4
0.039	393	E2
0.047	473	E3
0.056	563	E4
0.068	683	E5
0.082	823	F2
0.10	104	F4
0.12	124	F5



DIMENSION (mm) AND CASE CODE

Case Code	Length $L \pm 0.2$	Width W	Height $H \pm 0.3$	p	EIA Code
D1	4.8	3.3 ± 0.3	1.4	0.35 ± 0.2	1913
D2			2.0		
D3			2.4		
D4			2.8		
E2	6.0	4.1 ± 0.3	2.0		2416
E3			2.4		
E4			2.8		
E5			3.2		
F1			3.0		
F2	6.0	5.0 ± 0.4	3.2		2420
F3			3.6		
F4			3.8		
F5			4.5		

TAPE DIMENSIONS (mm)

Case Code	$A \pm 0.1$	$B \pm 0.1$	$C \pm 0.2$	t	$W \pm 0.3$	F	$P \pm 0.1$	$D \pm 0.2 / -0$	Qty/Reel
D1	3.8	5.1	2.0	0.3 ± 0.05	12.0	5.5 ± 0.05	8.0	1.5	3,000
D2			2.6						3,000
D3, D4			3.4						2,000
E1, E2	2.7	3,000							
E3, E4	4.6	6.3	3.5					-	2,000
F1 ~ F5	5.5	6.3	4.7	-	1,500				

