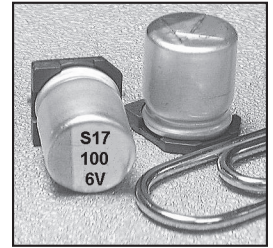


- CYLINDRICAL V-CHIP CONSTRUCTION FOR SURFACE MOUNTING
- EXTENDED LOAD LIFE (3,000 ~ 5,000 HOURS)
- AVAILABLE WITH WIDE TERMINATION & ANTI-VIBRATION SKIRT
- ULTRA LOW ESR, HIGH RIPPLE CURRENT
- CAPACITANCE VALUES UP TO 1000 μ F
- 6.3x6.3mm ~ 10x10.8mm CASE SIZES
- REFLOW SOLDERING RATED TO +260°C (see reflow specifications)
- MEETS THE REQUIREMENTS OF AEC-Q200*

*Contact NIC for supporting test data

RoHS Compliant
includes all homogeneous materials

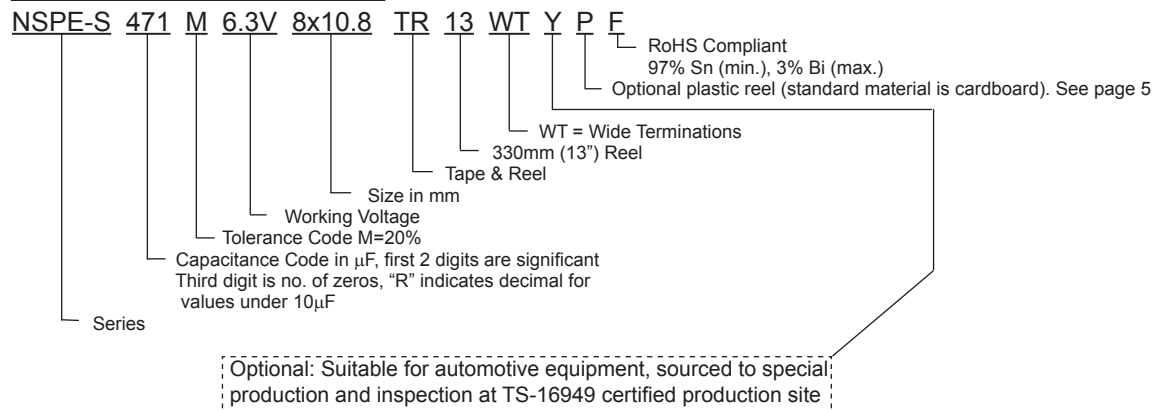


*See Part Number System for Details

CHARACTERISTICS

Rated Voltage Range	6.3 ~ 16Vdc			
Rated Capacitance Range	10 ~ 1000 μ F			
Operating Temp. Range	-55 ~ +105°C			
Capacitance Tolerance	±20% (M)			
Max. Leakage Current After 2 Minutes @ 20°C	See Specifications Tables			
Working and Surge Voltage Ratings	W.V. (Vdc)	6.3	10	16
	S.V. (Vdc)	8.2	13	20
Tan δ @ 120Hz/20°C		0.18	0.16	0.14
Impedance Ratio	Z -55°C/Z +20°C	1 ~ 2.5		
	Z +105°C/Z +20°C	0.6 ~ 1.0		
Load Life Test @ 105°C 6.3mm Dia. = 3,000 Hours 8mm ~ 10mm Dia. parts = 5,000 Hours	Capacitance Change	Within ±30% of initial measured value		
	Tan δ and ESR	Less than 200% of specified max. value		
	Leakage Current	Less than specified max. value		

PART NUMBER SYSTEM



STANDARD PRODUCTS AND CASE SIZES D ϕ x L (mm)

PART NUMBER	Cap. (μ F)	Working Voltage	Case Size (D X L) mm	Max. Leakage Current (μ A) After 2 minutes*	Max. ESR (m Ω) AT 100kHz/20°C	Max. Ripple Current (mA rms) AT 100kHz/105°C
NSPE-S101M6.3V6.3X6.3TR13F	100	6.3	6.3X6.3	126	36	1630
NSPE-S151M6.3V6.3X6.3TR13F	150		6.3X6.3	189	36	1630
NSPE-S221M6.3V6.3X8TR13F	220		6.3X8	278	32	2020
NSPE-S221M6.3V8X10.8TR13F			8X10.8	278	16	3150
NSPE-S331M6.3V8X10.8TR13F	330		8X10.8	416	16	3150
NSPE-S391M6.3V8X10.8TR13F	390		8X10.8	492	16	3150
NSPE-S471M6.3V8X10.8TR13F	470		8X10.8	593	16	3150
NSPE-S561M6.3V8X10.8TR13F	560		8X10.8	706	16	3150
NSPE-S681M6.3V10X10.8TR13F	680		10X10.8	857	15	3890
NSPE-S821M6.3V10X10.8TR13F	820		10X10.8	1034	15	3890
NSPE-S102M6.3V10X10.8TR13F	1000		10X10.8	1260	15	3890

For Automotive Applications See Part Numbering System

*Please review typical leakage current performance, as shown on NIC load life endurance test report.



STANDARD PRODUCTS AND CASE SIZES D ϕ x L (mm)

PART NUMBER	Cap. (μF)	Working Voltage	Case Size (D X L) mm	Max. Leakage Current (μA) After 2 minutes*	Max. ESR (mΩ) AT 100kHz/20°C	Max. Ripple Current (mA rms) AT 100kHz/105°C
NSPE-S330M10V6.3X6.3TR13F	33	10	6.3X6.3	100	40	1510
NSPE-S470M10V6.3X6.3TR13F	47		6.3X6.3	100	40	1510
NSPE-S680M10V6.3X6.3TR13F	68		6.3X6.3	136	40	1510
NSPE-S101M10V6.3X8TR13F	100		6.3X8	200	35	1910
NSPE-S101M10V8X10.8TR13F			8x10.8	200	18	2800
NSPE-S151M10V6.3X8TR13F	150		6.3x8	300	35	1910
NSPE-S151M10V8X10.8TR13F			8X10.8	300	18	2800
NSPE-S221M10V8X10.8TR13F	220		8X10.8	440	18	2800
NSPE-S331M10V8X10.8TR13F	330		8X10.8	660	18	2800
NSPE-S471M10V10X10.8TR13F	470		10X10.8	940	16	3650
NSPE-S561M10V10X10.8TR13F	560		10X10.8	1120	16	3650
NSPE-S100M16V6.3X6.3TR13F	10	16	6.3X6.3	100	54	1130
NSPE-S220M16V6.3X6.3TR13F	22		6.3X6.3	100	54	1130
NSPE-S330M16V6.3X6.3TR13F	33		6.3X6.3	106	54	1130
NSPE-S470M16V6.3X8TR13F	47		6.3X8	151	45	1480
NSPE-S470M16V8X10.8TR13F	47		8X10.8	151	22	2290
NSPE-S680M16V8X10.8TR13F	68		8X10.8	218	22	2290
NSPE-S101M16V8X10.8TR13F	100		8X10.8	320	22	2290
NSPE-S151M16V10X10.8TR13F	150		10X10.8	480	20	2920

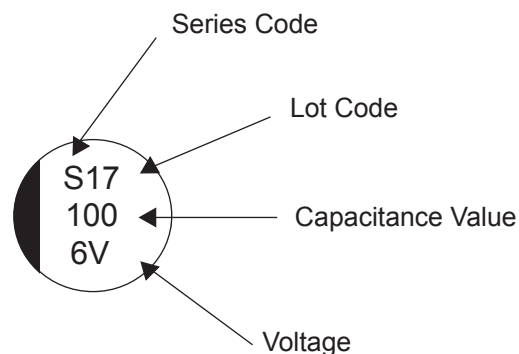
For Automotive Applications See Part Numbering System

*Please review typical leakage current performance, as shown on NIC load life endurance test report.

RIPPLE CURRENT FREQUENCY CORRECTION FACTORS

Cap. μF	100Hz	1KHz	10KHz	100KHz
C ≤ 10	0.03	0.20	0.50	1.00
> 10	0.05	0.20	0.50	1.00

Part Marking



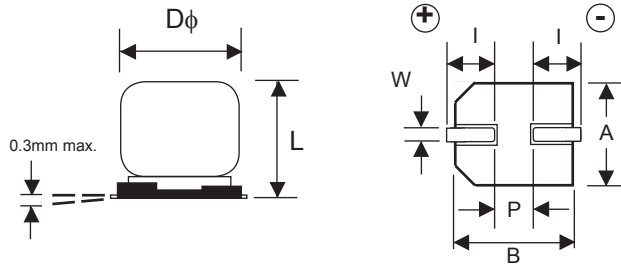
PRECAUTIONS

Please review the notes on correct use, safety and precautions 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



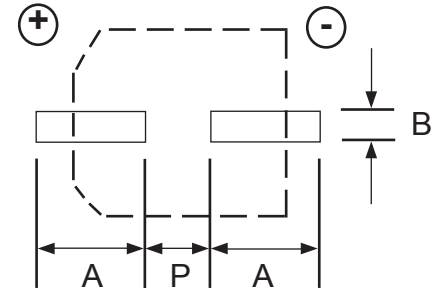
DIMENSIONS (mm)

Case Size	D ϕ ± 0.5	L max.	A, B ± 0.2	W	I ± 0.2	P ± 0.2
6.3x6.3	6.3	6.3	6.6	0.5 ~ 0.8	2.5	2.2
6.3x8	6.3	8.0	6.6	0.5 ~ 0.8	2.5	2.2
8x10.8	8.0	10.8	8.3	0.7 ~ 1.0	2.9	3.2
10x10.8	10	10.8	10.3	1.0 ~ 1.4	3.2	4.6



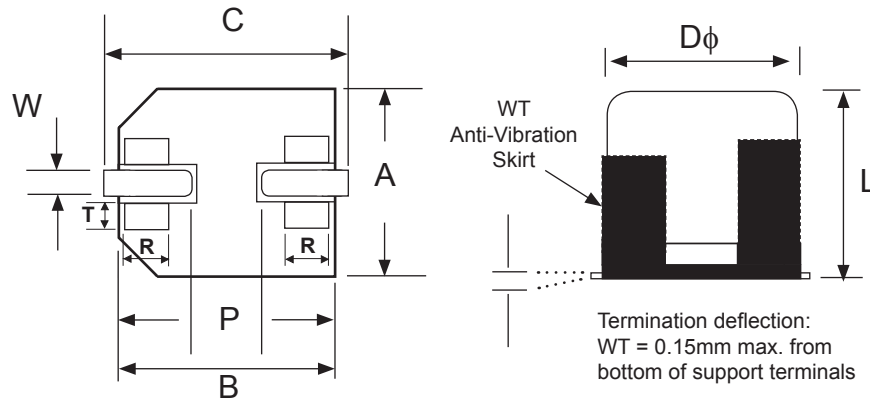
LAND PATTERN DIM. (mm)

Case Dia.	A	B	P
6.3	3.5	1.8	2.1
8	4.1	2.1	2.8
10	4.4	2.5	4.3



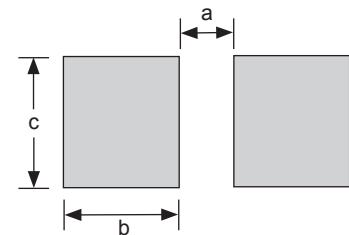
WIDE TERMINATION DIM. (mm)

Case Size	D ϕ ± 0.5	L ± 0.5	A, B	C ± 0.2	P ± 0.2	W	R	T
8 x 10.8WT	8.0	10.5	8.3 ± 0.2	9.0	3.2	0.7 ~ 1.0	(0.7)	(1.3)
10 x 10.8WT	10.0	10.5	10.3 ± 0.2	11.0	4.6	1.0 ~ 1.4	(0.7)	(1.3)



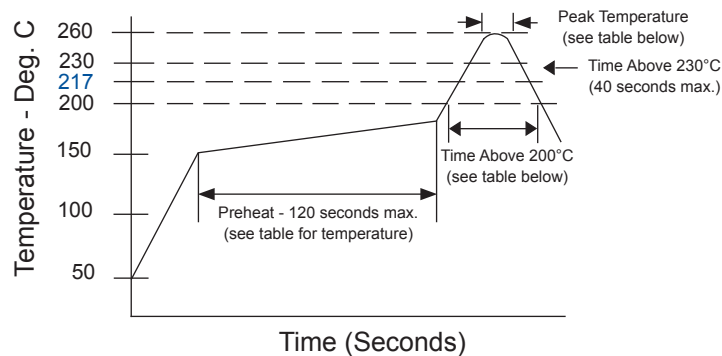
WIDE TERMINATION LAND PATTERN DIM. (mm)

Case Size	a	b	c
8x10.8	2.5	4.5	4.7
10x10.8	3.8	4.8	4.7



WT (Wide Terminations) Anti-Vibration Test	
Test Method	Direction: X, Y, Z axis Frequency & Duration: 5 to 2000Hz reciprocation for 20 minutes, 2 hours each direction Peak to Peak Amplitude: 5mm Peak Acceleration: 30G Sweep Type: Log
Δ Capacitance	Within $\pm 10\%$ of initial value
Tangent of Loss	\leq Specified value
Leakage Current	\leq Specified value

RECOMMENDED REFLOW SOLDERING PROFILE



PEAK TEMPERATURES AND DURATIONS

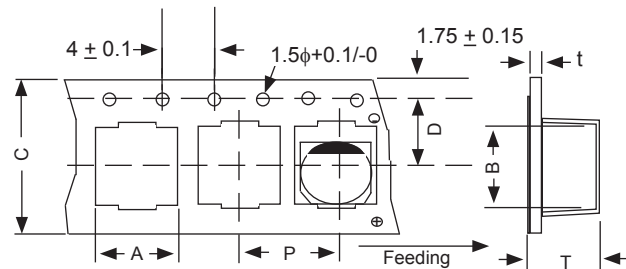
Diameter	Preheat (120 sec. max.)	Time above 200°C	Time above 217°C	Time above 230°C	Peak Temperature	Number of Reflow Passes
6.3 ~ 10mm	150°C ~ 190°C	100 sec. max.	80 sec. max.	40 sec. max.	250°C/5 sec.	2x*
	150°C ~ 180°C	60 sec. max.	50 sec. max.	40 sec. max.	260°C/instantaneous	1x

*Two reflow passes are permissible with a cool down to room temperature required between the first and second pass.

TAPING SPECIFICATIONS (mm)

- Both Leader and Trailer tape: Minimum 40mm (1.57") empty carrier tape pockets.
- Leader tape: Approximately 20cm of cover tape at leader.
- Connection: Maximum 3 connections (slices) per reel.

Case Size	A ±0.5	B ±0.5	C ±0.3	D ±0.1	P ±0.1	T ±0.2	t max.
6.3x6.3	7.0	7.0	16.0	7.5	12.0	6.5	0.4
6.3x8	7.0	7.0	16.0	7.5	12.0	8.2	0.4
8x10.8	8.7	8.7	24.0	11.5	16.0	11.1	0.4
10x10.8	10.7	10.7	24.0	11.5	16.0	11.2	0.4

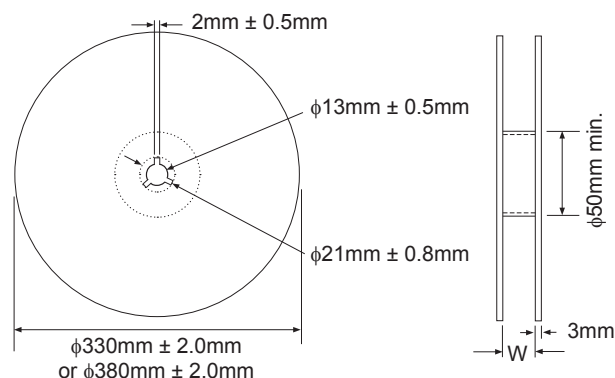


TR13 330mm (13") CARDBOARD REEL

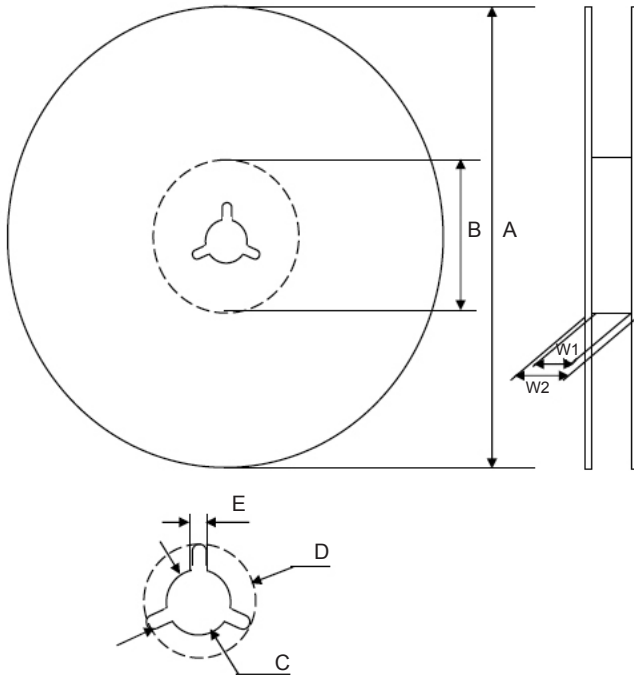
TR15 380mm (15") CARDBOARD REEL

(See page 5 for plastic reel dimensions)

Case Size	W ±1.0	Qty per Reel	
		13" (330mm)	15" (380mm)
6.3x6.3	18	800	1,000
6.3x8	18	500	900
8x10.8	26	300	500
10x10.8	26	300	500



Optional V-Chip 13" (330mm) Plastic Reels (TR13PF suffix)



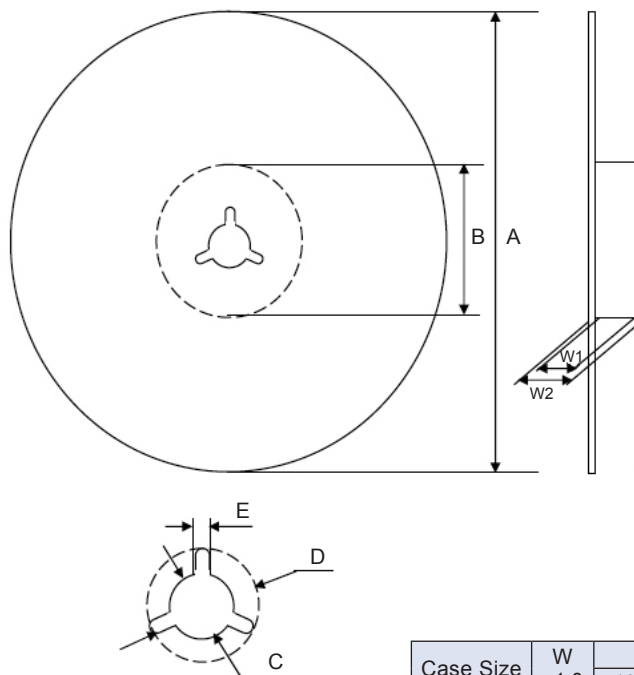
Dimensions (mm)

Case Size	Tape Width	W1	W2
6.3x6.3, 6.3x8	16.0	16.4 ~ 18.4	19.5 ~ 24.0
8x10.5, 10x10.5	24.0	24.4 ~ 26.4	27.5 ~ 32.0

Case Size	Tape Width	A	B	C	D	E
6.3x6.3, 6.3x8	16.0	$\phi 330$	$\phi 50 \sim 105$	$\phi 13$	$\phi 21$	2.0
8x10.5, 10x10.5	24.0	± 2.0		± 0.5	± 1.0	± 0.5

Color
Black or Blue

Optional V-Chip 15" (380mm) Plastic Reels (TR15PF suffix)



Dimensions (mm)

Case Size	Tape Width	W1	W2
6.3x6.3, 6.3x8	16.0	16.5 ~ 18.0	19.5 ~ 24.0
8x10.5, 10x10.5	24.0	24.5 ~ 26.0	27.5 ~ 32.0

Case Size	Tape Width	A	B	C	D	E
6.3x6.3, 6.3x8	16.0	$\phi 380$	$\phi 80 \sim 105$	$\phi 13$	$\phi 21$	2.0
8x10.5, 10x10.5	24.0	± 2		± 0.5	± 1.0	± 0.5

Color
Black or Blue

Case Size	W ± 1.0	Qty per Reel	
		13" (330mm)	15" (380mm)
6.3x6.3	18	800	1,000
6.3x8	18	500	900
8x10.8	26	300	500
10x10.8	26	300	500

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[NRLM102M100V25X25F](#) [NACZ331M35V10X10.5TR13F](#) [NRLM223M50V 35X50F](#) [NAZT221M50V10X10.5LBF](#) [NACK102M10V
10X10.5TR13F](#)