

FEATURES

- CYLINDRICAL LEADLESS TYPE FOR SURFACE MOUNTING
- SUPER LOW ESR & HIGH RIPPLE CURRENT
- CAPACITANCE VALUES UP TO 820 μ F
- 6.3x6.3mm ~ 10x10.8mm CASE SIZES
- COMPATIBLE WITH REFLOW SOLDERING

CHARACTERISTICS

Rated Voltage Range	4 ~ 16 Vdc				
Rated Capacitance Range	22 ~ 820 μ F				
Operating Temp. Range	-55 ~ +105°C				
Capacitance Tolerance	$\pm 20\%$ (M)				
Max. Leakage Current After 2 Minutes @ 20°C	Less than 0.1CV or 50 μ A whichever is greater				
Working and Surge Voltage Ratings	W.V. (Vdc)	4	6.3	10	16
	S.V. (Vdc)	4.6	7.2	11.5	18.4
Tan δ @ 120Hz/20°C	All Case Sizes	0.24	0.22	0.20	0.18
Impedance Ration	Z -55°C / Z + 20°C	2.5			
	Z +105°C / Z + 20°C	1.0			
Load LifeTest @ 105°C 6.3mm Dia. and all 4Vdc parts 1,000 Hours 8mm ~ 10mm Dia. parts 2,000 Hours	Capacitance Change	Within $\pm 20\%$ of initial measured value			
	Tan δ	Less than 200% of specified max. value			
	Leakage Current	Less than specified max. value			

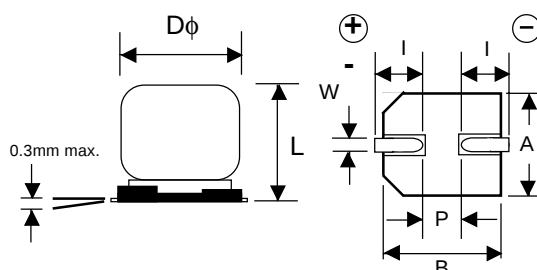
LOW ESR COMPONENT
HYBRID ELECTROLYTE
For Performance Data
see www.LowESR.com



SURFACE MOUNT

STANDARD PRODUCTS AND CASE SIZES (mm)

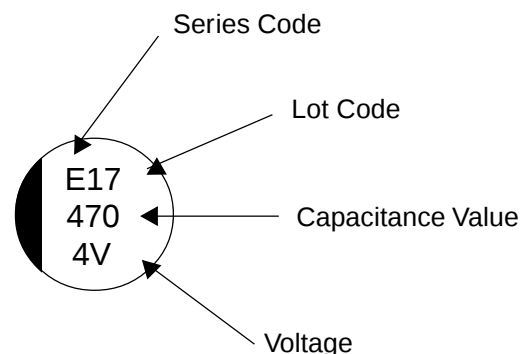
Cap (μ F)	Code	Working Voltage (Vdc)			
		4.0	6.3	10	16
22	220	-	-	6.3x6.3	6.3x6.3
33	330	-	-	6.3x6.3	-
47	470	-	-	6.3x6.3	8x10.8
100	101	-	6.3x6.3	8x10.8	8x10.8
150	151	-	-	8x10.8	10x10.8
220	221	-	8x10.8	8x10.8	-
330	331	-	8x10.8	8x10.8	-
390	391	-	8x10.8	10x10.8	-
470	471	8x10.8	10x10.8	10x10.8	-
560	561	-	10x10.8	-	-
680	681	10x10.8	-	-	-
820	821	10x10.8	-	-	-



SEE PAGE 38
For Case Size Data
SEE PAGE 39
For Taping/Packaging Data

Part Marking

NSPE	471	M	4V	8x10.8	TR	13	E
Series	Capacitance Code in μ F, first 2 digits are significant Third digit is no. of zeros, "R" indicates decimal for values under 10 μ F	Tolerance Code M=20%	Working Voltage	Size in mm	Tape & Reel	330mm (13") Reel	Lead Free Finish Optional 97% Sn (min.), 3% Bi (max.)



CASE DIMENSIONS (mm)

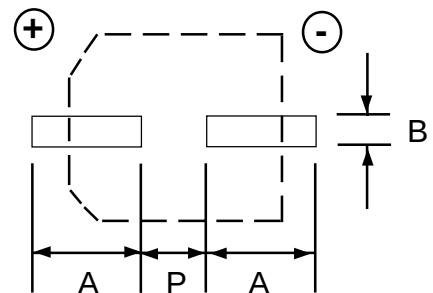
D ϕ $\pm$ 0.5	L max.	A $\pm$ 0.2	W	l $\pm$ 0.2	P $\pm$ 0.2
6.3	6.3	6.6	0.5~0.8	2.55	2.2
8.0	10.8	8.3	0.7~1.0	2.9	3.2
10	10.8	10.3	1.1~1.4	3.2	4.6

STANDARD VALUES AND SPECIFICATIONS

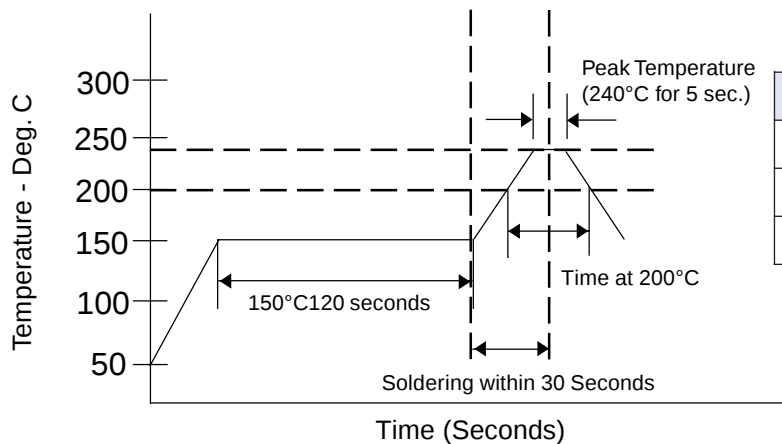
Voltage (Vdc)	Cap. (μ F)	Max. ESR ($m\Omega$) 20°C/100KHz	Ripple Current (mA) 105°C/100KHz
4	470	30	1,550
	680	25	2,090
	820	23	2,180
6.3	100	50	1,120
	220	30	1,550
	330	30	1,550
	390	30	1,550
	470	25	2,090
	560	25	2,090
10	22	60	1,020
	33	60	1,020
	47	60	1,020
	100	30	1,550
	150	30	1,550
	220	30	1,550
	330	30	1,550
	390	25	2,090
	470	25	2,090
16	22	70	900
	47	45	1,200
	100	45	1,200
	150	40	1,810

LAND PATTERN (mm)

Case Dia.	A	B	P
6.3	3.5	1.6	1.9
8	4.2	2.2	3.1
10	4.4	2.2	4.5



RECOMMENDED REFLOW SOLDERING PROFILE



Maximum Time Above +200°C	Peak Soldering Temperature
30 Seconds	240°C
40 Seconds	230°C
50 Seconds	220°C