

### FEATURES

- CYLINDRICAL V-CHIP CONSTRUCTION FOR SURFACE MOUNTING
- VERY LOW IMPEDANCE & HIGH RIPPLE CURRENT AT 100K Hz
- SUITABLE FOR DC-DC CONVERTER, DC-AC INVERTER, ETC.
- NEW EXPANDED CV RANGE, UP TO 6800μF
- **NEW HIGH TEMPERATURE REFLOW "M1" VERSION**
- DESIGNED FOR AUTOMATIC MOUNTING AND REFLOW SOLDERING

**RoHS Compliant**  
includes all homogeneous materials

\*See Part Number System for Details



### CHARACTERISTICS

Rated Voltage Rating	6.3 ~ 50Vdc							
Rated Capacitance Range	4.7 ~ 6800μF							
Operating Temp. Range	-55 ~ +105°C							
Capacitance Tolerance	±20% (M), ±10%(K)*							
Max. Leakage Current After 2 Minutes @ 20°C	0.01CV Or 3μA, whichever is greater							
Tan δ @ 120Hz/20°C	W.V. (Vdc)		6.3	10	16	25	35	50
	S.V. (Vdc)		8.0	13	20	32	44	63
	φ4 ~ φ6.3mm Dia.		0.24	0.20	0.16	0.14	0.12	0.10
	φ8 ~ φ16mm Dia.	C ≤ 1000μF	0.28	0.24	0.20	0.16	0.14	0.14
		C = 1500μF	0.29	0.25	0.21	-	0.14	-
		C = 2200μF	0.30	0.26	-	0.18	-	-
		C = 3300μF	0.32	-	0.24	-	-	-
C = 4700μF		0.34	0.30	-	-	-	-	
C = 6800μF	0.38	-	-	-	-	-		
Low Temperature Stability Impedance Ratio @ 120Hz	W.V. (Vdc)		6.3	10	16	25	35	50
	Z-40°C/Z+20°C		3	2	2	2	2	2
	Z-55°C/Z+20°C		5	4	4	3	3	3
Load Life Test @ 105°C 4 ~ 6mm Dia. 1,000 hours 8 ~ 12.5mm Dia. 2,000 hours	Capacitance Change		Within ±25% of initial measured value					
	Tan δ		Less than ±200% of the specified maximum value					
	Leakage Current		Less than the specified maximum value					

**LOW IMPEDANCE AT HIGH FREQUENCY**  
INDUSTRY STANDARD  
STYLE FOR SWITCHERS AND CONVERTERS

**LOW ESR COMPONENT**  
LIQUID ELECTROLYTE  
For Performance Data  
see [www.LowESR.com](http://www.LowESR.com)

\* Optional ± 10% (K) Tolerance available on most values. Contact factory for availability.

### MAXIMUM PERMISSIBLE RIPPLE CURRENT (mA rms AT 100KHz AND 105°C)

Cap (μF)	Working Voltage (Vdc)					
	6.3	10	16	25	35	50
4.7	-	-	-	-	80	60
10	-	-	-	80	150	165
15	-	-	80	150	150	-
22	-	80	150	150	150	165
27	80	-	-	-	-	-
33	-	150	-	230	230	195
47	150	-	230	230	230	195
56	150	-	-	230	-	-
68	-	230	230	230	280	300
100	230	-	230	280	450	300
120	-	230	-	-	-	-
150	230	230	280	450	450	450
220	230	280	280	450	450	450
330	280	450	450	450	670	620
390	-	-	-	-	-	620
470	450	450	450	670	900	790
680	450	-	670	-	900	-
1000	450	670	-	900	-	790
1500	670	-	900	-	1250	-
2200	-	900	-	1250	-	-
3300	900	-	1250	-	-	-
4700	-	1250	-	-	-	-
6800	1250	-	-	-	-	-

### MAXIMUM IMPEDANCE (Ω AT 100KHz AND 20°C)

Cap (μF)	Working Voltage (Vdc)					
	6.3	10	16	25	35	50
4.7	-	-	-	-	1.80	2.90
10	-	-	-	1.80	0.76	0.88
15	-	-	1.80	0.76	0.76	-
22	-	1.80	0.76	0.76	0.76	0.88
27	1.80	-	-	-	-	-
33	-	0.76	-	0.44	0.44	0.75
47	0.76	-	0.44	0.44	0.44	0.75
56	0.76	-	-	0.44	-	-
68	-	0.44	0.44	0.44	0.34	0.40
100	0.44	-	0.44	0.34	0.17	0.40
120	-	0.44	-	-	-	-
150	0.44	0.44	0.34	0.17	0.17	0.22
220	0.44	0.34	0.34	0.17	0.17	0.22
330	0.34	0.17	0.17	0.17	0.09	0.14
390	-	-	-	-	-	0.14
470	0.17	0.17	0.17	0.09	0.066	0.078
680	0.17	-	0.09	-	0.066	-
1000	0.17	0.09	-	0.066	-	0.078
1500	0.09	-	0.066	-	0.052	-
2200	-	0.066	-	0.052	-	-
3300	0.066	-	0.052	-	-	-
4700	-	0.052	-	-	-	-
6800	0.052	-	-	-	-	-

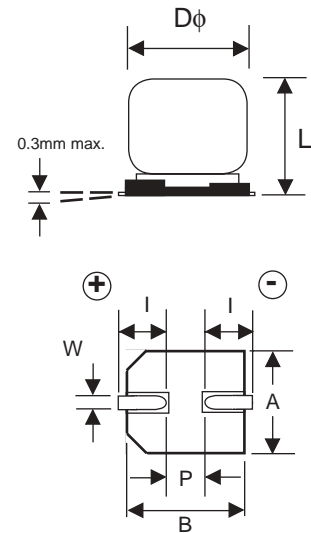
### PRECAUTIONS

Please review the notes on correct use, safety and precautions found on pages T10 & T11 of NIC's Electrolytic Capacitor catalog.  
Also found at [www.niccomp.com/precautions](http://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](mailto:tpmg@niccomp.com)



## STANDARD PRODUCT AND CASE SIZE TABLE D $\phi$ x L (mm)

Cap ( $\mu$ F)	Code	Working Voltage (Vdc)					
		6.3	10	16	25	35	50
4.7	4R7	-	-	-	-	4x6.3	4x6.3
10	100	-	-	-	4x6.3*	5x6.3*	6.3x6.3*
15	150	-	-	4x6.3	6x6.3	5x6.3*	-
22	220	-	4x6.3	5x6.3*	5x6.3	5x6.3*	6.3x6.3*
27	270	4x6.3*	-	-	-	-	-
33	330	-	5x6.3	-	6.3x6.3	6.3x6.3*	6.3x8*
47	470	5x6.3	-	6.3x6.3	6.3x6.3	6.3x6.3*	6.3x8*
56	560	5x6.3*	-	-	6.3x6.3	-	-
68	680	-	6.3x6.3	6.3x6.3*	6.3x6.3	6.3x8*	8x10.5*
100	101	6.3x6.3*	-	6.3x6.3*	6.3x8*	8x10.5	8x10.5*
120	121	-	6.3x6.3	-	-	-	-
150	151	6.3x6.3	6.3x6.3	6.3x8*	8x10.5*	8x10.5* 10x8	10x10.5*
220	221	6.3x6.3	6.3x8	6.3x8*	8x10.5* 10x8	8x10.5	10x10.5
330	331	6.3x8*	8x10.5	8x10.5* 10x8	8x10.5	10x10.5	12.5x14
390	391	-	-	-	-	-	12.5x14
470	471	8x10.5	8x10.5 10x8	8x10.5	10x10.5*	12.5x14	16x17
680	681	8x10.5 10x8*	-	10x10.5	-	12.5x14	-
1000	102	8x10.5*	10x10.5	-	12.5x14	-	16x17
1500	152	10x10.5*	-	12.5x14	-	16x17	-
2200	222	-	12.5x14	-	16x17	-	-
3300	332	12.5x14	-	16x17	-	-	-
4700	472	-	16x17	-	-	-	-
6800	682	16x17	-	-	-	-	-



\*Values available in optional 10% tolerance

Denotes New Value

## DIMENSIONS (mm)

Case Size	$\phi$ D $\pm$ 0.5	L max.	A $\pm$ 0.2	B $\pm$ 0.2	I $\pm$ 0.3	W	P $\pm$ 0.3
4x6.3	4.0	6.3	4.3	4.3	1.8	0.5~0.8	1.0
5x6.3	5.0	6.3	5.3	5.3	2.2	0.5~0.8	1.4
6.3x6.3	6.3	6.3	6.6	6.6	2.5	0.5~0.8	2.2
6.3x8	6.3	8.0	6.6	6.6	2.5	0.5~0.8	2.2
8x10.5	8.0	10.5	8.3	8.3	2.9	0.7~1.0	3.2
10x8	10.0	8.0	10.3	10.3	3.2	1.1~1.4	4.6
10x10.5	10.0	10.5	10.3	10.3	3.2	1.1~1.4	4.6
12.5x14	12.5	14.0	12.8	12.8	4.5	1.1~1.4	4.6
16x17	16.0	17.0	16.3	16.3	5.0	1.8~2.1	7.0

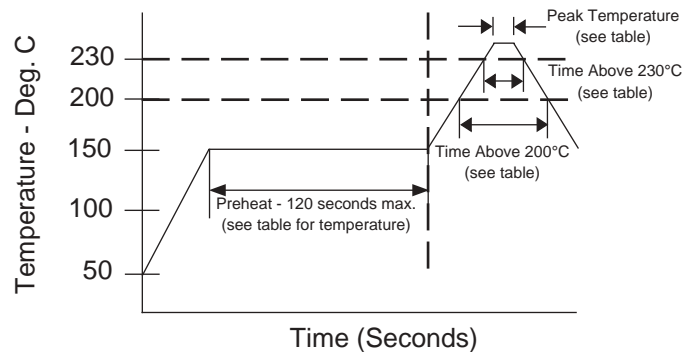
### PEAK REFLOW SOLDERING TEMPERATURES AND DURATIONS (STANDARD VERSION)

Case Size	Preheat: 150°C ~ 180°C	Max. Soldering Temperature	Max. Exposure Time at Max. Soldering Temperature	Max. Exposure Time Above +200°C	Multiple Reflow Exposure
4x6.3	120 seconds max.	+250°C	5 seconds	70 seconds	2 times max.
5x6.3	120 seconds max.	+250°C	5 seconds	70 seconds	2 times max.
6.3x6.3	120 seconds max.	+250°C	5 seconds	70 seconds	2 times max.
6.3x8	120 seconds max.	+250°C	5 seconds	70 seconds	2 times max.
8x10.5	120 seconds max.	+245°C	5 seconds	60 seconds	2 times max.
10x8	120 seconds max.	+240°C	5 seconds	50 seconds	2 times max.
10x10.5	120 seconds max.	+240°C	5 seconds	50 seconds	2 times max.
12.5x14	120 seconds max.	+240°C	5 seconds	50 seconds	2 times max.
16x17	120 seconds max.	+230°C	5 seconds	30 seconds	2 times max.

### PEAK REFLOW SOLDERING TEMPERATURES AND DURATIONS (M1 VERSION)

Case Size	Preheat: 150°C ~ 180°C	Max. Soldering Temperature	Max. Exposure Time at Max. Soldering Temperature	Max. Exposure Time Above +200°C	Max. Exposure Time Above +230°C	Multiple Reflow Exposure
4x6.3	120 seconds max.	+255°C	5 seconds	60 seconds	30 seconds	2 times max.
5x6.3	120 seconds max.	+255°C	5 seconds	60 seconds	30 seconds	2 times max.
6.3x6.3	120 seconds max.	+255°C	5 seconds	60 seconds	30 seconds	2 times max.
6.3x8	120 seconds max.	+255°C	5 seconds	60 seconds	30 seconds	2 times max.
8x10.5	120 seconds max.	+255°C	5 seconds	60 seconds	30 seconds	2 times max.
10x8	120 seconds max.	+250°C	5 seconds	60 seconds	30 seconds	2 times max.
10x10.5	120 seconds max.	+250°C	5 seconds	60 seconds <td 30 seconds	2 times max.	

### RECOMMENDED REFLOW SOLDERING PROFILE



### PART NUMBER SYSTEM

NACZ 101 M 16V 6.3x6.3 TR 13 M1 F

- NACZ: Series
- 101: Capacitance Code in  $\mu\text{F}$ , first 2 digits are significant, Third digit is no. of zeros, "R" indicates decimal for values under  $10\mu\text{F}$
- M: Tolerance Code M=20%, K=10%
- 16V: Working Voltage
- 6.3x6.3: Size in mm
- TR: Tape & Reel
- 13: 330mm (13") Reel
- M1: M1 denotes high temp. reflow version
- F: RoHS Compliant 97% Sn (min.), 3% Bi (max.)