

### FEATURES

- CYLINDRICAL V-CHIP CONSTRUCTION FOR SURFACE MOUNTING
- EXTENDED TEMPERATURE & LOAD LIFE (1,000 ~ 2,000 HOURS @ +125°C)
- SUITABLE FOR DC-DC CONVERTER, DC-AC INVERTER, ETC.
- DESIGNED FOR AUTOMATIC MOUNTING AND REFLOW SOLDERING

SAC Alloy Compatible  
230°C ~ 260°C



**RoHS Compliant**  
includes all homogeneous materials

### CHARACTERISTICS

Rated Voltage Rating	6.3 ~ 100Vdc							
Rated Capacitance Range	2.2 ~ 4,700µF							
Operating Temp. Range	-40 ~ +125°C							
Capacitance Tolerance	±20% (M)							
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	100
	S.V. (Vdc)	8.0	13	20	32	44	63	125
	Tan δ	0.30	0.24	0.20	0.16	0.14	0.14	0.10
Low Temperature Stability Impedance Ratio @ 120Hz	W.V. (Vdc)	6.3	10	16	25	35	50	100
	Z-25°C/Z+20°C	4	3	2	2	2	2	2
	Z-40°C/Z+20°C	8	6	4	3	3	3	3
Load Life Test @ 125°C 6.3mm Dia. = 1,000 hours 6.3V ~ 50V = 2,000 hours 100V = 1,500 hours	Capacitance Change	Within ±30% of initial measured value						
	Tan δ	Less than ±300% of the specified maximum value						
	Leakage Current	Less than the specified maximum value						

\*See Part Number System for Details

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

### STANDARD VALUES AND CASE SIZES (mm)

Cap (µF)	Code	Working Voltage (Vdc)							
		6.3	10	16	25	35	50		
2.2	2R2	-	-	-	-	-	-	6.3x6.3	-
3.3	3R3	-	-	-	-	-	-	6.3x6.3	-
4.7	4R7	-	-	-	-	6.3x6.3	6.3x6.3	6.3x6.3	-
10	100	-	-	-	-	6.3x6.3	6.3x6.3	6.3x6.3	8x10.5
15	150	-	-	-	-	6.3x6.3	6.3x6.3	6.3x6.3	8x10.5
22	220	-	-	-	-	6.3x6.3	6.3x6.3	6.3x6.3	8x10.5
33	330	-	-	-	6.3x6.3	6.3x8	6.3x8	6.3x8	10x10.5
							8x10.5		
47	470	-	-	-	-	-	6.3x8	6.3x8	12.5x14
							8x10.5		
100	101	6.3x6.3	6.3x8	8x10.5	-	-	6.3x8	6.3x8	16x17
							8x10.5		
220	221	6.3x8	6.3x8	8x10.5	-	-	8x10.5	8x10.5	-
			8x10.5						
330	331	8x10.5	8x10.5	10x10.5	-	-	10x10.5	10x10.5	-
							12.5x14		
470	471	8x10.5	10x10.5	12.5x14	12.5x14	-	12.5x14	12.5x14	-
							16x17		
680	681	10x10.5	12.5x14	12.5x14	12.5x14	12.5x14	16x17	16x17	-
1000	102	12.5x14	12.5x14	12.5x14	16x17	16x17	16x17	-	-
1500	152	12.5x14	12.5x14	16x17	16x17	-	-	-	-
2200	222	12.5x14	16x17	16x17	-	-	-	-	-
3300	332	16x17	16x17	-	-	-	-	-	-
4700	472	16x17	-	-	-	-	-	-	-

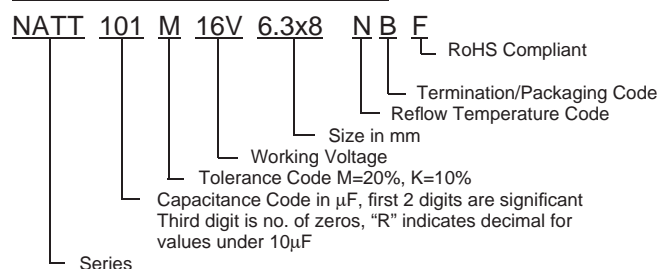
### PEAK REFLOW TEMPERATURE CODES

Code	Peak Reflow Temperature
L	250°C
K	245°C
J	240°C
H	235°C

### TERMINATION FINISH & PACKAGING OPTIONS CODES

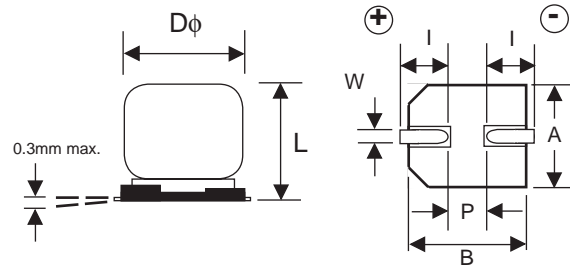
Code	Finish & Reel Size
B	Sn-Bi Finish & 13" Reel
LB	Sn-Bi Finish & 15" Reel
S	100% Sn Finish & 13" Reel
LS	100% Sn Finish & 15" Reel

### PART NUMBER SYSTEM



### DIMENSIONS (mm) AND REEL QUANTITIES

Case Size	$\phi D \pm 0.5$	L max.	A $\pm 0.2$	B $\pm 0.2$	I $\pm 0.3$	W	P $\pm 0.3$	Qty/Reel
6.3x6.3	6.3	6.3	6.6	6.6	2.5	0.5~0.8	2.2	800
6.3x8	6.3	8.0	6.6	6.6	2.5	0.5~0.8	2.2	500
8x10.5	8.0	10.5	8.3	8.3	2.9	0.7~1.0	3.2	300
10x10.5	10.0	10.5	10.3	10.3	3.2	1.1~1.4	4.6	300
12.5x14	12.5	14.0	12.8	12.8	4.5	1.1~1.4	4.6	200
16x17	16.0	17.0	16.3	16.3	5.5	1.8~2.1	7.0	125



### STANDARD VALUES, CASE SIZES AND SPECIFICATIONS

NIC Part Number	Cap. ( $\mu F$ )	W.V. (Vdc)	Dissipation Factor (Tan $\delta$ )	Max. Impedance ( $\Omega$ ) 100KHz, +20°C	Max. Ripple Current (mA) +125°C, 100KHz	Load Life Hours @ +125°C
NATT101M6.3V6.3X6.3LBF	100	6.3	0.30	1.60	70	1,000
NATT221M6.3V6.3X8LBF	220		0.30	0.90	100	1,000
NATT331M6.3V8X10.5KBF	330		0.30	0.40	160	2,000
NATT471M6.3V8X10.5KBF	470		0.30	0.40	160	2,000
NATT681M6.3V10X10.5JBF	680		0.30	0.30	220	2,000
NATT102M6.3V12.5X14JBF	1000		0.30	0.12	550	2,000
NATT152M6.3V12.5X14JBF	1500		0.30	0.12	550	2,000
NATT222M6.3V12.5X14JBF	2200		0.30	0.12	550	2,000
NATT332M6.3V16X17HSF	3300		0.30	0.08	900	2,000
NATT472M6.3V16X17HSF	4700		0.30	0.08	900	2,000
NATT470M10V6.3X6.3LBF	47	10	0.24	1.60	70	1,000
NATT101M10V6.3X8LBF	100		0.24	0.90	100	1,000
NATT221M10V6.3X8LBF	220		0.24	0.90	100	1,000
NATT221M10V8X10.5KBF	220		0.24	0.40	160	2,000
NATT331M10V8X10.5KBF	330		0.24	0.40	160	2,000
NATT471M10V10X10.5JBF	470		0.24	0.30	220	2,000
NATT681M10V12.5X14JBF	680		0.24	0.12	550	2,000
NATT102M10V12.5X14JBF	1000		0.24	0.12	550	2,000
NATT152M10V12.5X14JBF	1500		0.24	0.12	550	2,000
NATT222M10V16X17HSF	2200		0.24	0.08	900	2,000
NATT332M10V16X17HSF	3300	0.24	0.08	900	2,000	
NATT470M16V6.3X6.3LBF	47	16	0.20	1.60	70	1,000
NATT101M16V8X10.5KBF	100		0.20	0.40	160	2,000
NATT221M16V8X10.5KBF	220		0.20	0.40	160	2,000
NATT331M16V10X10.5JBF	330		0.20	0.30	220	2,000
NATT471M16V12.5X14JBF	470		0.20	0.12	550	2,000
NATT681M16V12.5X14JBF	680		0.20	0.12	550	2,000
NATT102M16V12.5X14JBF	1000		0.20	0.12	550	2,000
NATT152M16V16X17HSF	1500		0.20	0.08	900	2,000
NATT222M16V16X17HSF	2200		0.20	0.08	900	2,000
NATT330M25V6.3X6.3LBF	33		25	0.16	1.60	70
NATT470M25V6.3X8LBF	47	0.16		0.90	100	1,000
NATT101M25V6.3X8LBF	100	0.16		0.90	100	1,000
NATT101M25V8X10.5KBF	100	0.16		0.40	160	2,000
NATT221M25V8X10.5KBF	220	0.16		0.40	160	2,000
NATT221M25V10X10.5JBF	220	0.16		0.30	220	2,000
NATT331M25V10X10.5JBF	330	0.16		0.30	220	2,000
NATT331M25V12.5X14JBF	330	0.16		0.12	550	2,000
NATT471M25V12.5X14JBF	470	0.16		0.12	550	2,000
NATT681M25V12.5X14JBF	680	0.16		0.12	550	2,000
NATT102M25V16X17HSF	1000	0.16	0.08	900	2,000	
NATT152M25V16X17HSF	1500	0.16	0.08	900	2,000	

### 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 VALUES, CASE SIZES AND SPECIFICATIONS

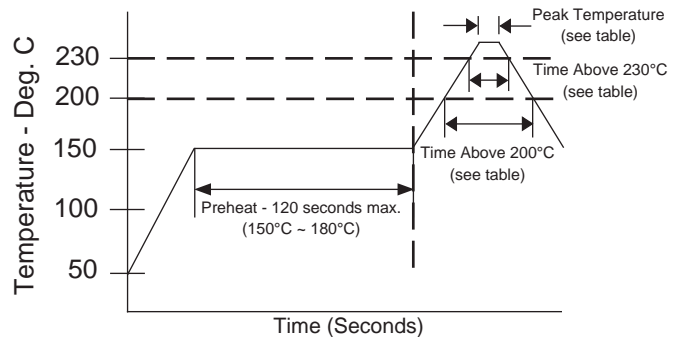
NIC Part Number	Cap. (μF)	W.V. (Vdc)	Dissipation Factor (Tan δ)	Max. Impedance (Ω) 100KHz, +20°C	Max. Ripple Current (mA) +125°C, 100KHz	Load Life Hours @ +125°C
NATT4R7M35V6.3X6.3LBF	4.7	35	0.14	2.00	60	1,000
NATT100M35V6.3X6.3LBF	10		0.14	1.60	70	1,000
NATT220M35V6.3X6.3LBF	22		0.14	1.60	70	1,000
NATT330M35V6.3X8LBF	33		0.14	0.90	100	1,000
NATT470M35V6.3X8LBF	47		0.14	0.90	100	1,000
NATT470M35V8X10.5KBF	47		0.14	0.40	160	2,000
NATT101M35V8X10.5KBF	100		0.14	0.40	160	2,000
NATT101M35V10X10.5JBF	100		0.14	0.30	220	2,000
NATT221M35V10X10.5JBF	220		0.14	0.30	220	2,000
NATT221M35V12.5X14JBF	220		0.14	0.12	550	2,000
NATT331M35V12.5X14JBF	330		0.14	0.12	550	2,000
NATT471M35V12.5X14JBF	470		0.14	0.12	550	2,000
NATT471M35V16X17HSF	470		0.14	0.08	900	2,000
NATT681M35V16X17HSF	680		0.14	0.08	900	2,000
NATT102M35V16X17HSF	1000	0.14	0.08	900	2,000	
NATT2R2M50V6.3X6.3LBF	2.2	50	0.14	3.50	45	1,000
NATT3R3M50V6.3X6.3LBF	3.3		0.14	3.50	45	1,000
NATT4R7M50V6.3X6.3LBF	4.7		0.14	3.50	45	1,000
NATT100M50V6.3X6.3LBF	10		0.14	2.80	50	1,000
NATT220M50V6.3X8LBF	22		0.14	2.00	80	1,000
NATT330M50V6.3X8LBF	33		0.14	2.00	80	1,000
NATT330M50V8X10.5KBF	33		0.14	0.70	140	2,000
NATT470M50V8X10.5KBF	47		0.14	0.70	140	2,000
NATT470M50V10X10.5JBF	47		0.14	0.50	240	2,000
NATT101M50V10X10.5JBF	100		0.14	0.50	240	2,000
NATT101M50V12.5X14JBF	100		0.14	0.23	490	2,000
NATT221M50V12.5X14JBF	220		0.14	0.23	490	2,000
NATT331M50V12.5X14JBF	330		0.14	0.23	490	2,000
NATT331M50V16X17HSF	330		0.14	0.15	800	2,000
NATT471M50V16X17HSF	470	0.14	0.15	800	2,000	
NATT681M50V16X17HSF	680	0.14	0.15	800	2,000	
NATT100M100V8X10.5JBF	10	100	0.10	1.00	70	1,500
NATT220M100V8X10.5JBF	22		0.10	1.00	70	1,500
NATT330M100V10X10.5JBF	33		0.10	0.80	115	1,500
NATT470M100V12.5X14HBF	47		0.10	0.33	350	1,500
NATT101M100V16X17HSF	100		0.10	0.24	500	1,500
NATT101M100V16X17HSF	100		0.10	0.24	500	1,500

### PEAK REFLOW TEMPERATURE & DURATION (6.3 ~ 50V)

Diameter	Time above 200°C	Time above 230°C	Peak Temperature 5 seconds
6.3mm φ	70 sec. max.	40 sec. max.	250°C
8mm φ	60 sec. max.	30 sec. max.	245°C
10mm, 12.5mm φ	50 sec. max.	20 sec. max.	240°C
16mm φ	50 sec. max.	15 sec. max.	235°C

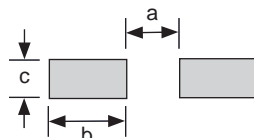
### PEAK REFLOW TEMPERATURE & DURATION (100V)

Diameter	Time above 200°C	Time above 230°C	Peak Temperature 5 seconds
8mm, 10mm φ	60 sec. max.	30 sec. max.	240°C
12.5mm φ	50 sec. max.	20 sec. max.	235°C
16mm φ	45 sec. max.	10 sec. max.	235°C



### RECOMMENDED LAND PATTERN DIMENSIONS (mm)

Case Size	a	b	c
6x3x6.3 6.3x8	2.1	3.5	1.8
8x10.5	2.8	4.1	2.1
10x10.5	4.3	4.4	2.5
12.5x14	4.3	5.8	2.5
16x17	6.6	6.5	5.0



Review & Compare Reflow Soldering Heat Limits  
V-chip SMT Aluminum Electrolytic Capacitors  
[www.niccomp.com/RSL](http://www.niccomp.com/RSL)