

# +85°C Standard Axial Lead Aluminum Electrolytic Capacitors



For all general purpose applications

## FEATURES

- High ripple current ratings
- Wide voltage range: 10 WVDC to 450 WVDC
- Wide capacitance range: 0.47  $\mu\text{F}$  to 22,000  $\mu\text{F}$
- Solvent tolerant end seals standard ( $\leq 250$  WVDC)

## SPECIFICATIONS

Capacitance Tolerance		$\pm 20\%$ at 120Hz, 20°C													
Operating Temperature Range		-40°C to +85°C												-25°C to +85°C	
Dissipation Factor 120Hz, 20°C	WVDC	10	16	25	35	50	63	80	100	160	250	350	450		
	$\tan \delta$	.20	.16	.14	.12	.10	.09	.09	.08	.20	.20	.20	.25		
Note: For above D.F. specifications, add .02 for every 1,000 $\mu\text{f}$ above 1,000 $\mu\text{f}$															
Impedance Ratio (Max.) @120Hz	WVDC	10	16	25	35	50	63	80	100	160	250	350	450		
	-25°C/20°C	3	2	2	2	2	2	2	2	3	3	3	5		
	-40°C/20°C	8	6	4	3	3	3	3	3	6	6	6	-		
Leakage Current	WVDC	$\leq 100$ WVDC							100 < WVDC $\leq 450$						
	Time	1 minute				2 minutes				1 minute					
		.03 CV or 4 $\mu\text{A}$				.01 CV or 3 $\mu\text{A}$				CV $\leq 1000$ .04 CV + 100 $\mu\text{A}$		CV > 1000 0.1 CV + 40 $\mu\text{A}$			
whichever is greater															
Load Life	2,000 hours at 85°C with rated WVDC														
	Capacitance change Dissipation factor Leakage current						< 20% of initial measured value < 200% of initial specified value < Initial specified value								
Shelf life	1,000 hours at 85°C with no voltage applied. Units will meet load life specification.														
Ripple Current Multipliers	Capacitance ( $\mu\text{F}$ )	Frequency (Hz)						Temperature (°C)							
		50	120	400	1k	10k	50k +	+85	+70	+60	+30				
	C $\leq 10$	0.8	1.0	1.3	1.45	1.65	1.7	1.0	1.3	1.5	1.8				
	10 < C $\leq 100$	0.8	1.0	1.23	1.36	1.48	1.53	1.0	1.3	1.5	1.8				
	100 < C $\leq 1000$	0.8	1.0	1.16	1.25	1.35	1.38	1.0	1.3	1.5	1.8				
C > 1000	0.8	1.0	1.11	1.17	1.25	1.28	1.0	1.3	1.5	1.8					

## SPECIAL ORDER OPTIONS

(See Pages 33 thru 37)

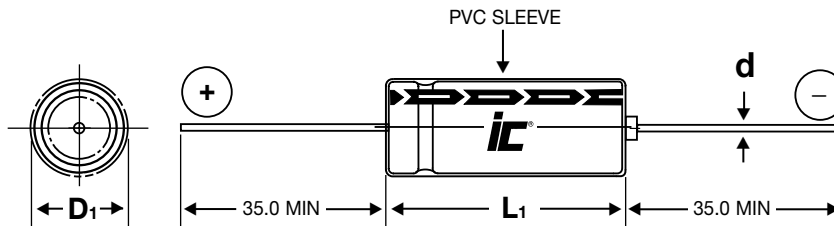
- Special tolerances:  $\pm 10\%$  (K), -10% + 30% (Q)
- Tape and Reel
- Epoxy end seal
- Polyester sleeve

## PHYSICAL DIMENSIONS

WVDC (SV) (μF)	10 (13)	16 (20)	25 (32)	35 (44)	50 (63)	63 (79)	80 (100)	100 (125)	160 (200)	250 (300)	350 (400)	450 (500)
0.47								5x12.5				
1.0					5x12.5			5x12.5	6.3x12.5		6.3x16	8x16
2.2					5x12.5			5x12.5	6.3x16	8x16	8x16	10x20
3.3					5x12.5			5x12.5	8x16	8x16	8x20	8x20
4.7					5x12.5			5x12.5	8x16	8x20	8x20	10x25
10				5x12.5	5x12.5	5x12.5		6.3x12.5	8x20	10x20	12.5x25	12.5x25
15					5x12.5							
22		5x12.5		5x12.5	6.3x12.5			8x16	10x25	12.5x25	12.5x30	16x30
33			5x12.5		6.3x16			8x16	12.5x25	12.5x30	16x31.5	16x40
47		5x12.5	6.3x12.5	6.3x16	6.3x16	8x16		8x20	12.5x30	16x30	16x40	22x40
68		6.3x16		8x16		8x20						
100	6.3x12.5		6.3x13	8x16	8x16	8x20		10x25	16x30	16x40	18x40	22x50
150			8x16	8x20	10x16	10x20		12.5x25				
220		8x16	8x16	8x20	10x20	10x25		12.5x25	22x40	22x40		
330		8x16	8x20		10x25	12.5x25		12.5x30				
470	8x16	8x20	10x20	10x25	12.5x25	12.5x30		16x30				
1,000	10x20	10x25	12.5x25	12.5x25	16x30	16x30	16x40	18x40				
1,500			12.5x25	16x31	16x40							
2,200	12.5x25	12.5x30	16x30	16x30	16x40	18x40	22x50	25x50				
3,300	12.5x30	16x30	16x30	16x40	22x40	22x50						
4,700	16x30	16x31.5	16x40	22x40	22x50	25x50						
6,800		16x40	18x40	22x50								
10,000	18x40	18x40	22x50	25x50								
15,000		22x50	22x50									
22,000		22x50										

Convert to inches, divide by 25.4

DxL (mm)



LEAD INFORMATION VS. CASE DIAMETER

D	5.0	6.3	8.0	10.0	12.5	16.0	18.0	22.0	25.0
d	0.6	0.6	0.6	0.6	0.6	0.8	0.8	0.8	0.8
B	0.5	0.5	0.5	0.5	0.8	0.5	0.5	1.0	1.0

D<sub>1</sub>=D+B Max.  
 D ≤ 18 & V ≤ 100, L<sub>1</sub> = L+1.0 mm  
 D ≤ 18 & V > 100, L<sub>1</sub> = L+2.0 mm  
 D > 18 L<sub>1</sub> = L+2.0 mm

NOTE: Case Vent is standard on all diameter ≥ 8.0mm

## STANDARD PART LISTING

Capacitance ( $\mu$ F)	WVDC	IC <sup>®</sup> PART NUMBER	Maximum ESR $\Omega$ 120Hz,+20°C	Maximum RMS Ripple Current (mA) 120Hz,+85°C	Dimension D x L (mm)
0.47	100	474TTA100M	705.474	12	5x12.5
1.0	50	105TTA050M	165.66	12	5x12.5
1.0	100	105TTA100M	331.573	21	5x12.5
1.0	160	105TTA160M	331.573	14	6.3x12.5
1.0	350	105TTA350M	331.573	15	6.3x16
1.0	450	105TTA450M	414.66	16	8x16
2.2	50	225TTA050M	75.58	24	5x12.5
2.2	100	225TTA100M	150.719	28	5x12.5
2.2	160	225TTA160M	150.715	23	6.3x16
2.2	250	225TTA250M	150.715	27	8x16
2.2	350	225TTA350M	150.715	27	8x16
2.2	450	225TTA450M	188.394	31	10x20
3.3	50	335TTA050M	50.238	30	5x12.5
3.3	100	335TTA100M	100.477	35	5x12.5
3.3	160	335TTA160M	100.477	33	8x16
3.3	250	335TTA250M	100.477	35	8x16
3.3	350	335TTA350M	100.477	37	8x20
3.3	450	335TTA450M	125.596	38	8x20
4.7	50	475TTA050M	35.274	36	5x12.5
4.7	100	475TTA100M	70.547	42	5x12.5
4.7	160	475TTA160M	70.547	39	8x16
4.7	250	475TTA250M	70.547	45	8x20
4.7	350	475TTA350M	70.547	50	8x20
4.7	450	475TTA450M	88.184	50	10x25
10	35	106TTA035M	19.894	47	5x12.5
10	50	106TTA050M	16.579	52	5x12.5
10	63	106TTA063M	16.579	56	5x12.5
10	100	106TTA100M	33.157	68	6.3x12.5
10	160	106TTA160M	33.157	63	8x20
10	250	106TTA250M	33.157	70	10x20
10	350	106TTA350M	33.157	90	12.5x25
10	450	106TTA450M	41.447	85	12.5x25
15	50	156TTA050M	11.052	70	5x12.5
22	16	226TTA016M	12.011	62	5x12.5
22	35	226TTA035M	9.043	72	5x12.5
22	50	226TTA050M	7.536	90	6.3x12.5
22	100	226TTA100M	15.072	145	8x16
22	160	226TTA160M	15.072	130	10x25

Capacitance ( $\mu$ F)	WVDC	IC <sup>®</sup> PART NUMBER	Maximum ESR $\Omega$ 120Hz,+20°C	Maximum RMS Ripple Current (mA) 120Hz,+85°C	Dimension D x L (mm)
22	250	226TTA250M	15.072	140	12.5x25
22	350	226TTA350M	15.072	150	12.5x30
22	450	226TTA450M	18.839	150	16x30
33	25	336TTA025M	7.536	85	5x12.5
33	50	336TTA050M	5.024	115	6.3x16
33	100	336TTA100M	10.048	150	8x16
33	160	336TTA160M	10.048	170	12.5x25
33	250	336TTA250M	10.048	190	12.5x30
33	350	336TTA350M	10.048	210	16x31.5
33	450	336TTA450M	12.56	230	16x40
47	16	476TTA016M	5.947	95	5x12.5
47	25	476TTA025M	5.291	125	6.3x12.5
47	35	476TTA035M	4.233	125	6.3x16
47	50	476TTA050M	3.527	145	6.3x16
47	63	476TTA063M	3.527	170	8x16
47	100	476TTA100M	7.055	192	8x20
47	160	476TTA160M	5.197	225	12.5x30
47	250	476TTA250M	7.055	255	16x30
47	350	476TTA350M	7.055	290	16x40
47	450	476TTA450M	8.818	300	22x40
68	16	686TTA016M	4.145	150	6.3x16
68	35	686TTA035M	2.926	200	8x16
68	63	686TTA063M	2.438	250	8x20
100	10	107TTA010M	3.316	150	6.3x12.5
100	25	107TTA025M	2.487	160	6.3x13
100	35	107TTA035M	1.989	210	8x16
100	50	107TTA050M	1.658	230	8x16
100	63	107TTA063M	1.658	265	8x20
100	100	107TTA100M	3.316	345	10x25
100	160	107TTA160M	3.316	420	16x30
100	250	107TTA250M	3.316	430	16x40
100	350	107TTA350M	3.316	400	18x40
100	450	107TTA450M	4.145	500	22x50
150	25	157TTA025M	1.658	260	8x16
150	35	157TTA035M	1.326	270	8x20
150	50	157TTA050M	1.105	285	10x16
150	63	157TTA063M	1.105	310	10x20
150	100	157TTA100M	2.211	515	12.5x25

## STANDARD PART LISTING

Capacitance ( $\mu$ F)	VVDC	iC <sup>®</sup> PART NUMBER	Maximum	Maximum RMS	Dimension D x L (mm)
			ESR $\Omega$ 120Hz,+20°C	Ripple Current (mA) 120Hz,+85°C	
220	16	227TTA016M	1.281	260	8x16
220	25	227TTA025M	1.13	290	8x16
220	35	227TTA035M	0.904	345	8x20
220	50	227TTA050M	0.754	440	10x20
220	63	227TTA063M	0.754	490	10x25
220	100	227TTA100M	1.005	560	12.5x25
220	160	227TTA160M	1.507	660	22x40
220	250	227TTA250M	1.507	680	22x40
330	16	337TTA016M	0.854	320	8x16
330	25	337TTA025M	0.754	385	8x20
330	50	337TTA050M	0.502	565	10x25
330	63	337TTA063M	0.502	660	12.5x25
330	100	337TTA100M	1.005	770	12.5x30
470	10	477TTA010M	0.706	370	8x16
470	16	477TTA016M	0.5997	450	8x20
470	25	477TTA025M	0.529	560	10x20
470	35	477TTA035M	0.423	640	10x25
470	50	477TTA050M	0.353	740	12.5x25
470	63	477TTA063M	0.353	845	12.5x30
470	100	477TTA100M	0.706	970	16x30
1,000	10	108TTA010M	0.332	665	10x20
1,000	16	108TTA016M	0.282	785	10x25
1,000	25	108TTA025M	0.249	935	12.5x25
1,000	35	108TTA035M	0.199	1050	12.5x25
1,000	50	108TTA050M	0.166	1255	16x30
1,000	63	108TTA063M	0.166	1330	16x30
1,000	80	108TTA080M	0.149	1500	16x40
1,000	100	108TTA100M	0.332	1650	18x40
1,500	25	158TTA025M	0.188	1150	12.5x25
1,500	35	158TTA035M	0.155	1280	16x31
1,500	50	158TTA050M	0.133	1480	16x40

Capacitance ( $\mu$ F)	VVDC	iC <sup>®</sup> PART NUMBER	Maximum	Maximum RMS	Dimension D x L (mm)
			ESR $\Omega$ 120Hz,+20°C	Ripple Current (mA) 120Hz,+85°C	
2,200	10	228TTA010M	0.181	1120	12.5x25
2,200	16	228TTA016M	0.158	1280	12.5x30
2,200	25	228TTA025M	0.143	1480	16x30
2,200	35	228TTA035M	0.121	1580	16x30
2,200	50	228TTA050M	0.106	1920	16x40
2,200	63	228TTA063M	0.098	2158	18x40
2,200	80	228TTA080M	0.106	2260	22x50
2,200	100	228TTA100M	0.181	2590	25x50
3,300	10	338TTA010M	0.131	1435	12.5x30
3,300	16	338TTA016M	0.116	1610	16x30
3,300	25	338TTA025M	0.106	1910	16x30
3,300	35	338TTA035M	0.09	2050	16x40
3,300	50	338TTA050M	0.08	2350	22x40
3,300	63	338TTA063M	0.08	2450	22x50
4,700	10	478TTA010M	0.099	1730	16x30
4,700	16	478TTA016M	0.088	2060	16x31.5
4,700	25	478TTA025M	0.081	2170	16x40
4,700	35	478TTA035M	0.064	2470	22x40
4,700	50	478TTA050M	0.064	2645	22x50
4,700	63	478TTA063M	0.064	3090	25x50
6,800	16	688TTA016M	0.071	2300	16x40
6,800	25	688TTA025M	0.066	2560	18x40
6,800	35	688TTA035M	0.059	2720	22x50
10,000	10	109TTA010M	0.033	2340	18x40
10,000	16	109TTA016M	0.058	2680	18x40
10,000	25	109TTA025M	0.063	2900	22x50
10,000	35	109TTA035M	0.05	3500	25x50
15,000	16	159TTA016M	0.05	2890	22x50
15,000	25	159TTA025M	0.048	3700	22x50
22,000	16	229TTA016M	0.045	3600	22x50