

# TMA

## +105°C Standard Axial Lead Aluminum Electrolytic Capacitors



For long life/Extended Temperature Applications

### FEATURES

- High ripple current ratings
- Wide capacitance range: 0.47  $\mu$ F to 22,000  $\mu$ F
- Voltage range: 6.3 WVDC to 450 WVDC
- Solvent tolerant end seals standard ( $\leq 250$  WVDC)

### SPECIFICATIONS

Capacitance Tolerance		$\pm 20\%$ at 120Hz, 20°C													
Operating Temperature Range		-40°C to +105°C													-25°C to +105°C
Dissipation Factor 120Hz, 20°C (Max)	WVDC	6.3	10	16	25	35	50	63	100	160	200	250	350	400	450
	tan $\delta$	.28	.24	.20	.16	.14	.12	.10	.09	.20	.20	.20	.20	.25	.25
Note: For above D.F. specifications, add .02 for every 1,000 $\mu$ F above 1,000 $\mu$ F															
Impedance Ratio (Max.) @120Hz	WVDC	6	10	16	25	35	50	63	100	160	200	250	350	400	450
	-25°C/20°C	5	4	3	2	2	2	2	2	3	3	3	3	3	5
	-40°C/20°C	12	10	8	6	5	4	4	4	6	6	6	6	6	-
Leakage Current	WVDC	$\leq 100$ WVDC							100 < WVDC $\leq 450$						
	Time	1 minute							1 minute						
		.03 CV or 4 $\mu$ A whichever is greater							CV $\leq 1000$ .01 CV + 40 $\mu$ A			CV > 1000 .04 CV + 100 $\mu$ A			
Load Life	1,000 hours at 105°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 105°C with no voltage applied. Units will meet load life specification.														
Ripple Current Multipliers	Capacitance ( $\mu$ F)	Frequency (Hz)					Temperature (C°)								
		50	120	400	1k	10k	+105	+85	+70						
	C $\leq$ 47	.75	1.0	1.35	1.57	2.0	1.0	1.4	1.62						
	100 $\leq$ C $\leq$ 470	.8	1.0	1.23	1.34	1.5	1.0	1.4	1.62						
C $>$ 470	.85	1.0	1.10	1.13	1.15	1.0	1.4	1.62							

Aluminum Electrolytic

### SPECIAL ORDER OPTIONS

(See Pages 33 thru 37)

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



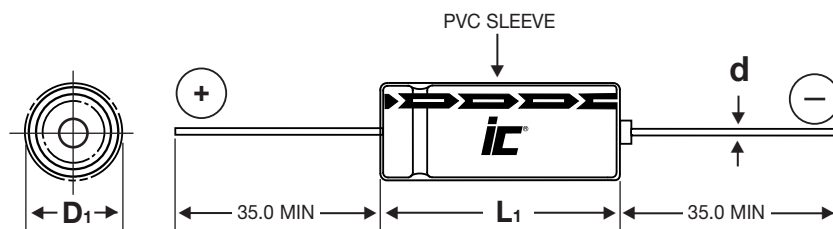
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## PHYSICAL DIMENSIONS

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

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
d	0.6	0.5	0.6	0.6	0.6	0.8	0.8	0.8
B	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5

D<sub>1</sub>=D+B Max.  
L<sub>1</sub>=L+2 Max.

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

## STANDARD PARTS LISTING

Capacitance (μF)	WVDC	IC <sup>®</sup> PART NUMBER	Maximum ESR Ω 120Hz, +25°C	Maximum RMS Ripple Current (mA) 120Hz, +105°C	Dimension D x L (mm)
0.47	100	474TMA100M	317.46	10	5x12.5
1	50	105TMA050M	198.94	10	5x12.5
1	100	105TMA100M	149.21	15	5x12.5
1	200	105TMA200M	331.6	9	6.3x12.5
1	350	105TMA350M	331.57	10	6.3x16
1	400	105TMA400M	414.47	11	8x16
1	450	105TMA450M	414.5	11	8x16
2.2	50	225TMA050M	90.43	20	5x12.5
2.2	100	225TMA100M	67.82	23	5x12.5
2.2	200	225TMA200M	150.71	16	6.3x16
2.2	350	225TMA350M	150.71	19	8x16
2.2	400	225TMA400M	188.39	19	8x20
2.2	450	225TMA450M	188.39	22	10x20
3.3	50	335TMA050M	60.29	25	5x12.5
3.3	100	335TMA100M	45.21	30	6.3x12.5
3.3	250	335TMA250M	100.48	23	8x16
3.3	350	335TMA350M	100.48	26	8x20
3.3	400	335TMA400M	125.60	27	10x20
3.3	450	335TMA450M	125.60	27	10x20
4.7	63	475TMA063M	35.27	32	5x12.5
4.7	100	475TMA100M	31.75	36	6.3x12.5
4.7	200	475TMA200M	70.55	27	8x16
4.7	250	475TMA250M	70.55	32	8x20
4.7	350	475TMA350M	70.55	35	10x20
4.7	400	475TMA400M	88.18	32	10x20
4.7	450	475TMA450M	88.18	35	10x25
10	35	106TMA035M	23.21	40	5x12.5
10	50	106TMA050M	19.89	41	5x12.5
10	63	106TMA063M	35.27	49	6.3x12.5
10	100	106TMA100M	14.92	58	6.3x16
10	160	106TMA160M	33.16	43	8x20
10	200	106TMA200M	33.16	50	10x20
10	250	106TMA250M	33.16	50	10x20
10	350	106TMA350M	33.16	64	12.5x25
10	400	106TMA400M	41.45	60	12.5x25
10	450	106TMA450M	41.45	60	12.5x30
22	25	226TMA025M	12.06	52	5x12.5
22	35	226TMA035M	10.55	61	6.3x12.5
22	63	226TMA063M	7.54	81	6.3x16
22	100	226TMA100M	6.78	95	8x16
22	160	226TMA160M	15.07	85	10x25

Capacitance (μF)	WVDC	IC <sup>®</sup> PART NUMBER	Maximum ESR Ω 120Hz, +25°C	Maximum RMS Ripple Current (mA) 120Hz, +105°C	Dimension D x L (mm)
22	250	226TMA250M	15.07	100	12.5x25
22	350	226TMA350M	15.07	120	16x30
22	400	226TMA400M	18.84	105	16x30
22	450	226TMA450M	18.84	105	16x40
33	16	336TMA016M	10.05	57	5x12.5
33	25	336TMA025M	98.04	70	6.3x12.5
33	63	336TMA063M	5.02	100	6.3x16
33	100	336TMA100M	4.52	130	8x20
33	160	336TMA160M	10.05	120	12.5x25
33	200	336TMA200M	10.05	135	12.5x25
33	250	336TMA250M	10.05	135	12.5x30
33	350	336TMA350M	10.05	150	16x30
33	400	336TMA400M	12.56	155	16x40
33	450	336TMA450M	12.56	160	18x40
47	10	476TMA010M	8.47	62	5x12.5
47	16	476TMA016M	7.05	75	6.3x12.5
47	50	476TMA050M	4.23	110	6.3x16
47	63	476TMA063M	3.53	130	8x16
47	100	476TMA100M	3.17	155	8x20
47	160	476TMA160M	7.05	155	12.5x30
47	200	476TMA200M	7.05	155	12.5x30
47	250	476TMA250M	7.05	175	16x30
47	350	476TMA350M	7.05	205	16x40
47	400	476TMA400M	8.82	200	18x40
47	450	476TMA450M	8.82	210	22x40
100	6.3	107TMA6R3M	4.64	93	6.3x12.5
100	25	107TMA025M	2.65	140	6.3x16
100	50	107TMA050M	1.99	175	8x16
100	63	107TMA063M	1.66	215	8x20
100	100	107TMA100M	1.49	280	10x25
100	160	107TMA160M	3.32	300	16x40
100	200	107TMA200M	3.32	300	16x40
100	250	107TMA250M	3.32	300	16x40
100	350	107TMA350M	3.32	350	22x40
100	400	107TMA400M	4.14	330	22x50
220	10	227TMA010M	1.81	170	6.3x16
220	25	227TMA025M	1.21	225	8x16
220	35	227TMA035M	1.06	265	8x20
220	50	227TMA050M	0.9	325	10x20
220	63	227TMA063M	0.75	390	10x25
220	100	227TMA100M	0.68	485	12.5x30

## STANDARD PARTS LISTING

Capacitance (µF)	WVDC	IC <sup>®</sup> PART NUMBER	Maximum ESR Ω 120Hz, +25°C	Maximum RMS Ripple Current (mA) 120Hz, +105°C	Dimension D x L (mm)
220	160	227TMA160M	1.51	520	22x40
220	200	227TMA200M	1.51	520	22x40
220	250	227TMA250M	1.51	550	22x50
330	16	337TMA016M	1	250	8x16
330	25	337TMA025M	0.8	305	8x20
330	35	337TMA035M	0.7	365	10x20
330	50	337TMA050M	0.6	435	10x25
330	63	337TMA063M	0.5	520	12.5x25
330	100	337TMA100M	0.45	600	16x30
470	10	477TMA010M	0.85	270	8x16
470	16	477TMA016M	0.71	325	8x20
470	25	477TMA025M	0.56	410	10x20
470	35	477TMA035M	0.49	480	10x25
470	50	477TMA050M	0.42	565	12.5x25
470	63	477TMA063M	0.35	670	12.5x30
470	100	477TMA100M	0.32	870	16x40
1000	10	108TMA010M	0.4	485	10x20
1000	16	108TMA016M	0.33	585	10x25
1000	25	108TMA025M	0.27	715	12.5x25
1000	35	108TMA035M	0.23	830	12.5x30
1000	50	108TMA050M	0.2	905	16x30
1000	63	108TMA063M	0.17	1070	16x30
1000	100	108TMA100M	0.15	1360	22x40
2200	10	228TMA010M	0.21	835	12.5x25
2200	16	228TMA016M	0.18	980	12.5x30
2200	25	228TMA025M	0.15	1100	16x30
2200	35	228TMA035M	0.14	1250	16x30
2200	50	228TMA050M	0.12	1500	18x40

Capacitance (µF)	WVDC	IC <sup>®</sup> PART NUMBER	Maximum ESR Ω 120Hz, +25°C	Maximum RMS Ripple Current (mA) 120Hz, +105°C	Dimension D x L (mm)
2200	63	228TMA063M	0.11	1740	22x40
3300	6.3	338TMA6R3M	0.17	920	12.5x25
3300	10	338TMA010M	0.15	1070	12.5x30
3300	16	338TMA016M	0.13	1160	16x30
3300	25	338TMA025M	0.11	1370	16x30
3300	35	338TMA035M	0.1	1640	16x40
3300	50	338TMA 050M	0.09	1850	22x40
3300	63	338TMA063M	0.08	2180	22x50
4700	6.3	478TMA6R3M	0.13	1160	12.5x30
4700	10	478TMA010M	0.11	1240	16x30
4700	16	478TMA016M	0.1	1440	16x30
4700	25	478TMA025M	0.08	1750	18x40
4700	35	478TMA035M	0.08	1970	22x40
4700	50	478TMA050M	0.07	2290	22x50
6800	10	688TMA010M	0.09	1560	16x30
6800	16	688TMA016M	0.08	1820	16x40
6800	25	688TMA025M	0.07	2080	22x40
6800	35	688TMA035M	0.06	2390	22x50
10000	6.3	109TMA6R3M	0.08	1790	16x40
10000	10	109TMA010M	0.07	1850	18x40
10000	16	109TMA016M	0.06	2090	22x40
10000	25	109TMA025M	0.06	2430	22x50
15000	6.3	159TMA6R3M	0.06	1960	18x40
15000	10	159TMA010M	0.06	2180	22x40
15000	16	159TMA016M	0.05	2510	22x50
22000	6.3	229TMA6R3M	0.05	2280	22x40
22000	10	229TMA010M	0.05	2590	22x50