

TTA

+85°C Standard Axial Lead Aluminum Electrolytic Capacitors



For all general purpose applications

FEATURES

- High ripple current ratings
- Wide capacitance range: 0.47 μ F to 22,000 μ F
- Wide voltage range: 10 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 +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 μ f above 1,000 μ 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 μ A | | | | .01 CV or 3 μ A | | | | CV \leq 1000 .04 CV + 100 μ A | | CV > 1000 0.1 CV + 40 μ 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 (μ 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)

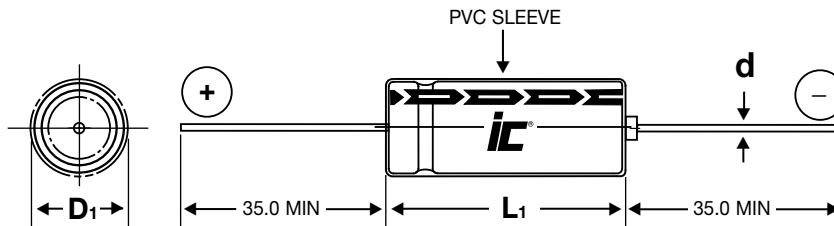
- Special tolerances: $\pm 10\%$ (K), -10% + 30% (Q)
- Tape and Reel
- Epoxy end seal
- Polyester sleeve

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 |

D₁=D+B Max.
 D ≤ 18 & V ≤ 100, L₁ = L+1.0 mm
 D ≤ 18 & V > 100, L₁ = L+2.0 mm
 D > 18 L₁ = L+2.0 mm

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

STANDARD PART LISTING

| Capacitance (μ F) | WVDC | IC [®] PART NUMBER | Maximum ESR Ω 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 (μ F) | WVDC | IC [®] PART NUMBER | Maximum ESR Ω 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 (μ F) | WVDC | ic [®] PART NUMBER | Maximum ESR Ω 120Hz,+20°C | Maximum RMS Ripple Current (mA) 120Hz,+85°C | Dimension D x L (mm) |
|---------------------------|------|--------------------------------|---|--|----------------------------|
| 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 (μ F) | WVDC | ic [®] PART NUMBER | Maximum ESR Ω 120Hz,+20°C | Maximum RMS Ripple Current (mA) 120Hz,+85°C | Dimension D x L (mm) |
|---------------------------|------|--------------------------------|---|--|----------------------------|
| 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 |