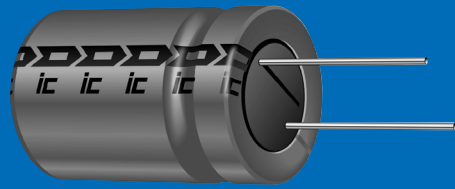


# FXM

## +105°C Low Profile Radial Lead Aluminum Electrolytic Capacitors



For all general purpose applications

### FEATURES

- Low Profile
- Extended Life
- Voltage Range: 6.3 WVDC to 400 WVDC
- Capacitance Range: 0.1  $\mu$ F to 10,000  $\mu$ F

### SPECIFICATIONS

|  |  |   |                |     |      |   |   |                  |     |                      |     |     |     |
|--|--|---|----------------|-----|------|---|---|------------------|-----|----------------------|-----|-----|-----|
| Capacitance Tolerance  |  | $\pm 20\%$ at 120Hz, 25°C                   |                |     |      |   |   |                  |     |                      |     |     |     |
| Operating Temperature Range  |  | -55°C to + 105°C                            |                |     |      |   |   |                  |     | -40°C to + 105°C     |     |     |     |
| Dissipation Factor<br>120Hz, 20  | WVDC   | 6.3   | 10             | 16  | 25   | 35  | 50  | 63               | 100 | 160                  | 200 | 250 | 400 |
|  | $\tan \delta$  | .28   | .24            | .20 | .16  | .14   | .12   | .1               | .08 | .2                   | .2  | .2  | .25 |
| Note: For above D.F. specifications, add .02 for every 1,000 $\mu$ F above 1,000 $\mu$ F |  |   |                |     |      |   |   |                  |     |                      |     |     |     |
| Impedance Ratio<br>(Max.) @120Hz   | WVDC   | 6.3   | 10             | 16  | 25   | 35  | 50  | 63               | 100 | 160                  | 200 | 250 | 400 |
|  | -25°C/20°C   | 5   | 4              | 3   | 2    | 2   | 2   | 2                | 2   | 4                    | 4   | 4   | 4   |
|  | -40°C/20°C   | 10  | 8              | 6   | 4    | 3   | 3   | 3                | 3   | 15                   | 15  | 15  | 10  |
| Leakage Current  | WVDC   | $\leq 100$ WVDC                             |                |     |      | $\leq 100$ WVDC                             |   |                  |     | $\geq 160$ WVDC      |     |     |     |
|  | Time   | 1 minute                                    |                |     |      | 2 minutes                                   |   |                  |     | 1 minute             |     |     |     |
|  |  | .03 CV or 4 $\mu$ A<br>whichever is greater |                |     |      | .01 CV or 3 $\mu$ A<br>whichever is greater |   |                  |     | .04 CV + 100 $\mu$ A |     |     |     |
| Load Life  | 1000 hours at +105°C with rated WVDC   |   |                |     |      |   |   |                  |     |                      |     |     |     |
|  | Capacitance change<br>Dissipation factor<br>Leakage current                                |   |                |     |      |   | $\leq 20\%$ of initial measured value<br>$\leq 200\%$ of initial specified value<br>$\leq 100\%$ of specified value |                  |     |                      |     |     |     |
| Shelf Life   | 1,000 hours at +105°C with no voltage applied.<br>Units will meet load life specifications |   |                |     |      |   |   |                  |     |                      |     |     |     |
| Ripple Current Multipliers   | WVDC   | Capacitance<br>( $\mu$ F)                   | Frequency (Hz) |     |      |   |   | Temperature (°C) |     |                      |     |     |     |
|  |  |   | 50             | 120 | 300  | 1K  | 10K   | +105             | +85 | +60                  |     |     |     |
|  | 6.3 to 100   | $C \leq 47$                                 | .75            | 1.0 | 1.35 | 1.57  | 2.0   | 1.0              | 1.4 | 1.75                 |     |     |     |
|  | 6.3 to 100   | $47 < C \leq 470$                           | .8             | 1.0 | 1.23 | 1.34  | 1.5   | 1.0              | 1.4 | 1.75                 |     |     |     |
|  | 6.3 to 100   | $C > 470$                                   | .85            | 1.0 | 1.10 | 1.13  | 1.15  | 1.0              | 1.4 | 1.75                 |     |     |     |
|  | 160 to 400   | $10 \leq C \leq 150$                        | .8             | 1.0 | 1.25 | 1.40  | 1.6   | 1.0              | 1.4 | 1.75                 |     |     |     |

Aluminum Electrolytic

### SPECIAL ORDER OPTIONS

(See pages 33 thru 37)

- Special tolerances:  $\pm 10\%$  (K),  $-10\% + 30\%$  (Q)
- Tape and Reel/Ammo-Pack
- Cut, Formed, Cut and Formed, and Snap In Leads



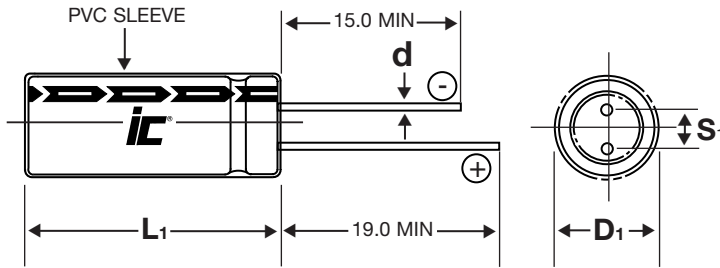
ILLINOIS CAPACITOR, INC. 3757 W. Touhy Ave., Lincolnwood, IL 60712 • (847) 675-1760 • Fax (847) 673-2850 • www.illcap.com

## PHYSICAL DIMENSIONS

| WVDC (SV)<br>(μF) | 6.3 (7.9) | 10 (13) | 16 (20)   | 25 (32) | 35 (44)   | 50 (63)   | 63 (79)   | 100 (125) | 160 (200) | 200 (250) | 250 (300) | 400 (450) |
|-------------------|-----------|---------|-----------|---------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| 0.1               |           |         |           |         |           | 5x9       |           | 5x9       |           |           |           |           |
| 0.22              |           |         |           |         |           | 5x9       |           | 5x9       |           |           |           |           |
| 0.33              |           |         |           |         |           | 5x9       |           | 5x9       |           |           |           |           |
| 0.47              |           |         |           |         |           | 5x9       |           | 5x9       |           |           |           |           |
| 1                 |           |         |           |         |           | 5x9       |           | 5x9       |           |           |           |           |
| 2.2               |           |         |           |         |           | 5x9       |           | 5x9       |           |           |           |           |
| 3.3               |           |         |           |         |           | 5x9       |           | 5x9       |           |           |           |           |
| 4.7               |           |         |           |         |           | 5x9       |           | 5x9       |           |           |           |           |
| 10                |           |         |           |         |           | 5x9       | 5x9       | 6.3x9     |           |           |           | 16x15     |
| 22                |           |         |           |         |           | 5x9       | 6.3x9     | 8x9       |           |           | 16x15     | 18x15     |
| 33                |           |         |           |         | 5x9       | 6.3x9     | 6.3x9     | 10x9      |           | 16x15     | 18x15     | 18x20     |
| 47                |           |         |           | 5x9     | 6.3x9     | 6.3x9     | 8x9       | 10x12.5   | 16x15     | 18x15     | 18x20     | 18x25     |
| 68                |           |         |           |         |           |           |           |           | 18x15     | 18x20     | 18x20     |           |
| 100               | 5x9       | 6.3x9   | 6.3x9     | 8x9     | 10x9      | 10x12.5   | 12.5x15   | 12.5x15   | 18x20     | 18x25     | 18x25     |           |
| 150               |           |         |           |         |           |           |           |           | 18x25     | 18x25     |           |           |
| 220               | 6.3x9     | 6.3x9   | 8x9       | 10x9    | 10x9      | 10x12.5   | 12.5x12.5 | 16x15     |           |           |           |           |
| 330               | 6.3x9     | 8x9     | 10x9      | 10x9    | 10x12.5   | 12.5x12.5 | 12.5x15   | 18x20     |           |           |           |           |
| 470               | 8x9       | 8x9     | 10x9      | 10x12.5 | 12.5x12.5 | 16x15     | 18x15     | 18x25     |           |           |           |           |
| 1000              | 10x9      | 10x12.5 | 12.5x12.5 | 12.5x15 | 16x15     | 18x20     | 18x25     |           |           |           |           |           |
| 2200              | 12.5x15   | 12.5x15 | 16x15     | 18x15   | 18x20     |           |           |           |           |           |           |           |
| 3300              | 16x15     | 16x15   | 18x15     | 18x20   |           |           |           |           |           |           |           |           |
| 4700              | 16x15     | 18x15   | 18x20     | 18x25   |           |           |           |           |           |           |           |           |
| 6800              | 18x15     | 18x20   | 18x25     |         |           |           |           |           |           |           |           |           |
| 10000             | 18x20     | 18x25   |           |         |           |           |           |           |           |           |           |           |

Convert to inches, divide by 25.4

DxL(mm)



Note: Case Vent is standard on all diameters ≥ 8.0 mm.

### LEAD INFORMATION V.S. CASE DIAMETER

| D | 5.0 | 6.3 | 8.0 | 10.0 | 12.5 | 16.0 | 18.0 |
|---|-----|-----|-----|------|------|------|------|
| S | 2.0 | 2.5 | 3.5 | 5.0  | 5.0  | 7.5  | 7.5  |
| d | 0.5 | 0.5 | 0.6 | 0.6  | 0.6  | 0.8  | 0.8  |
| B | 0.5 | 0.5 | 0.5 | 0.5  | 0.8  | 0.5  | 0.5  |

L<sub>1</sub>=L+1.5mm Max. L≤20mm

L<sub>1</sub>=L+2mm Max. L>20mm

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

S<sub>1</sub>=S±0.5 Max.

## STANDARD PART LISTING

| Capacitance (µF) | WVDC | IC <sup>®</sup> PART NUMBER | Maximum ESR Ω<br>120Hz, +20°C | Maximum RMS Ripple Current (mA)<br>120Hz, +105°C | Dimensions DxL (mm) |
|------------------|------|-----------------------------|-------------------------------|--|---------------------|
| 0.1              | 50   | 104FXM050M                  | 1989.437                      | 1  | 5x9                 |
| 0.1              | 100  | 104FXM100M                  | 1326.291                      | 2  | 5x9                 |
| 0.22             | 50   | 224FXM050M                  | 904.289                       | 2  | 5x9                 |
| 0.22             | 100  | 224FXM100M                  | 602.860                       | 4  | 5x9                 |
| 0.33             | 50   | 334FXM050M                  | 602.860                       | 3  | 5x9                 |
| 0.33             | 100  | 334FXM100M                  | 401.906                       | 7  | 5x9                 |
| 0.47             | 50   | 474FXM050M                  | 423.284                       | 5  | 5x9                 |
| 0.47             | 100  | 474FXM100M                  | 282.190                       | 10   | 5x9                 |
| 1                | 50   | 105FXM050M                  | 198.944                       | 12   | 5x9                 |
| 1                | 100  | 105FXM100M                  | 132.629                       | 15   | 5x9                 |
| 2.2              | 50   | 225FXM050M                  | 90.429                        | 18   | 5x9                 |
| 2.2              | 100  | 225FXM100M                  | 60.286                        | 21   | 5x9                 |
| 3.3              | 50   | 335FXM050M                  | 60.286                        | 25   | 5x9                 |
| 3.3              | 100  | 335FXM100M                  | 40.191                        | 29   | 5x9                 |
| 4.7              | 50   | 475FXM050M                  | 42.328                        | 30   | 5x9                 |
| 4.7              | 100  | 475FXM100M                  | 28.219                        | 32   | 5x9                 |
| 10               | 50   | 106FXM050M                  | 19.894                        | 46   | 5x9                 |
| 10               | 63   | 106FXM063M                  | 16.579                        | 50   | 5x9                 |
| 10               | 100  | 106FXM100M                  | 13.263                        | 55   | 6.3x9               |
| 10               | 400  | 106FXM400M                  | 41.447                        | 100  | 16x15               |
| 22               | 50   | 226FXM050M                  | 9.043                         | 85   | 5x9                 |
| 22               | 63   | 226FXM063M                  | 7.536                         | 80   | 6.3x9               |
| 22               | 100  | 226FXM100M                  | 6.029                         | 95   | 8x9                 |
| 22               | 250  | 226FXM250M                  | 15.071                        | 200  | 16x15               |
| 22               | 400  | 226FXM400M                  | 18.839                        | 200  | 18x15               |
| 33               | 35   | 336FXM035M                  | 7.033                         | 75   | 5x9                 |
| 33               | 50   | 336FXM050M                  | 6.029                         | 85   | 6.3x9               |
| 33               | 63   | 336FXM063M                  | 5.024                         | 95   | 6.3x9               |
| 33               | 100  | 336FXM100M                  | 4.019                         | 120  | 10x9                |
| 33               | 200  | 336FXM200M                  | 10.048                        | 250  | 16x15               |
| 33               | 250  | 336FXM250M                  | 10.048                        | 250  | 18x15               |
| 33               | 400  | 336FXM400M                  | 12.560                        | 250  | 18x20               |
| 47               | 25   | 476FXM025M                  | 5.644                         | 80   | 5x9                 |
| 47               | 35   | 476FXM035M                  | 4.938                         | 95   | 6.3x9               |
| 47               | 50   | 476FXM050M                  | 4.233                         | 100  | 6.3x9               |
| 47               | 63   | 476FXM063M                  | 3.527                         | 125  | 8x9                 |
| 47               | 100  | 476FXM100M                  | 2.822                         | 165  | 10x12.5             |
| 47               | 160  | 476FXM160M                  | 7.055                         | 300  | 16x15               |

| Capacitance (µF) | WVDC | IC <sup>®</sup> PART NUMBER | Maximum ESR Ω<br>120Hz, +20°C | Maximum RMS Ripple Current (mA)<br>120Hz, +105°C | Dimensions DxL (mm) |
|------------------|------|-----------------------------|-------------------------------|--|---------------------|
| 47               | 200  | 476FXM200M                  | 7.055                         | 300  | 18x15               |
| 47               | 250  | 476FXM250M                  | 7.055                         | 300  | 18x20               |
| 47               | 400  | 476FXM400M                  | 8.818                         | 300  | 18x25               |
| 68               | 160  | 686FXM160M                  | 4.876                         | 350  | 18x15               |
| 68               | 200  | 686FXM200M                  | 4.876                         | 350  | 18x20               |
| 68               | 250  | 686FXM250M                  | 4.876                         | 350  | 18x20               |
| 100              | 10   | 107FXM010M                  | 3.979                         | 95   | 5x9                 |
| 100              | 16   | 107FXM016M                  | 3.316                         | 115  | 6.3x9               |
| 100              | 25   | 107FXM025M                  | 2.653                         | 130  | 6.3x9               |
| 100              | 35   | 107FXM035M                  | 2.321                         | 155  | 8x9                 |
| 100              | 50   | 107FXM050M                  | 1.989                         | 170  | 10x9                |
| 100              | 63   | 107FXM063M                  | 1.658                         | 220  | 10x12.5             |
| 100              | 100  | 107FXM100M                  | 1.326                         | 260  | 12.5x15             |
| 100              | 160  | 107FXM160M                  | 3.316                         | 420  | 18x20               |
| 100              | 200  | 107FXM200M                  | 3.316                         | 420  | 18x25               |
| 100              | 250  | 107FXM250M                  | 3.316                         | 420  | 18x25               |
| 150              | 160  | 157FXM160M                  | 2.210                         | 510  | 18x25               |
| 150              | 200  | 157FXM200M                  | 2.210                         | 510  | 18x25               |
| 220              | 6.3  | 227FXM6R3M                  | 2.110                         | 145  | 6.3x9               |
| 220              | 10   | 227FXM010M                  | 1.809                         | 155  | 6.3x9               |
| 220              | 16   | 227FXM016M                  | 1.507                         | 205  | 8x9                 |
| 220              | 25   | 227FXM025M                  | 1.206                         | 220  | 10x9                |
| 220              | 35   | 227FXM035M                  | 1.055                         | 235  | 10x9                |
| 220              | 50   | 227FXM050M                  | 0.904                         | 290  | 10x12.5             |
| 220              | 63   | 227FXM063M                  | 0.754                         | 330  | 12.5x12.5           |
| 220              | 100  | 227FXM100M                  | 0.603                         | 440  | 16x15               |
| 330              | 6.3  | 337FXM6R3M                  | 1.407                         | 180  | 6.3x9               |
| 330              | 10   | 337FXM010M                  | 1.206                         | 210  | 8x9                 |
| 330              | 16   | 337FXM016M                  | 1.005                         | 240  | 10x9                |
| 330              | 25   | 337FXM025M                  | 0.804                         | 270  | 10x9                |
| 330              | 35   | 337FXM035M                  | 0.703                         | 340  | 10x12.5             |
| 330              | 50   | 337FXM050M                  | 0.603                         | 370  | 12.5x12.5           |
| 330              | 63   | 337FXM063M                  | 0.502                         | 430  | 12.5x15             |
| 330              | 100  | 337FXM100M                  | 0.402                         | 590  | 18x20               |
| 470              | 6.3  | 477FXM6R3M                  | 0.988                         | 235  | 8x9                 |
| 470              | 10   | 477FXM010M                  | 0.847                         | 275  | 8x9                 |
| 470              | 16   | 477FXM016M                  | 0.705                         | 290  | 10x9                |
| 470              | 25   | 477FXM025M                  | 0.564                         | 370  | 10x12.5             |

## STANDARD PART LISTING

| Capacitance (μF) | WVDC | IC <sup>®</sup> PART NUMBER | Maximum ESR Ω<br>120Hz, +20°C | Maximum RMS Ripple Current (mA)<br>120Hz, +105°C | Dimensions DxL (mm) |
|------------------|------|-----------------------------|-------------------------------|--|---------------------|
| 470              | 35   | 477FXM035M                  | 0.494                         | 420  | 12.5x12.5           |
| 470              | 50   | 477FXM050M                  | 0.423                         | 540  | 16x15               |
| 470              | 63   | 477FXM063M                  | 0.353                         | 600  | 18x15               |
| 470              | 100  | 477FXM100M                  | 0.282                         | 770  | 18x25               |
| 1000             | 6.3  | 108FXM6R3M                  | 0.464                         | 370  | 10x9                |
| 1000             | 10   | 108FXM010M                  | 0.398                         | 450  | 10x12.5             |
| 1000             | 16   | 108FXM016M                  | 0.332                         | 520  | 12.5x12.5           |
| 1000             | 25   | 108FXM025M                  | 0.265                         | 590  | 12.5x15             |
| 1000             | 35   | 108FXM035M                  | 0.232                         | 720  | 16x15               |
| 1000             | 50   | 108FXM050M                  | 0.199                         | 830  | 18x20               |
| 1000             | 63   | 108FXM063M                  | 0.166                         | 1000   | 18x25               |
| 2200             | 6.3  | 228FXM6R3M                  | 0.241                         | 635  | 12.5x15             |
| 2200             | 10   | 228FXM010M                  | 0.211                         | 690  | 12.5x15             |
| 2200             | 16   | 228FXM016M                  | 0.181                         | 830  | 16x15               |
| 2200             | 25   | 228FXM025M                  | 0.151                         | 970  | 18x15               |

| Capacitance (μF) | WVDC | IC <sup>®</sup> PART NUMBER | Maximum ESR Ω<br>120Hz, +20°C | Maximum RMS Ripple Current (mA)<br>120Hz, +105°C | Dimensions DxL (mm) |
|------------------|------|-----------------------------|-------------------------------|--|---------------------|
| 2200             | 35   | 228FXM035M                  | 0.136                         | 1110   | 18x20               |
| 3300             | 6.3  | 338FXM6R3M                  | 0.171                         | 860  | 16x15               |
| 3300             | 10   | 338FXM010M                  | 0.151                         | 940  | 16x15               |
| 3300             | 16   | 338FXM016M                  | 0.131                         | 1050   | 18x15               |
| 3300             | 25   | 338FXM025M                  | 0.111                         | 1220   | 18x20               |
| 4700             | 6.3  | 478FXM6R3M                  | 0.127                         | 1010   | 16x15               |
| 4700             | 10   | 478FXM010M                  | 0.113                         | 1120   | 18x15               |
| 4700             | 16   | 478FXM016M                  | 0.099                         | 1260   | 18x20               |
| 4700             | 25   | 478FXM025M                  | 0.085                         | 1470   | 18x25               |
| 6800             | 6.3  | 688FXM6R3M                  | 0.098                         | 1200   | 18x15               |
| 6800             | 10   | 688FXM010M                  | 0.088                         | 1330   | 18x20               |
| 6800             | 16   | 688FXM016M                  | 0.078                         | 1560   | 18x25               |
| 10000            | 6.3  | 109FXM6R3M                  | 0.076                         | 1450   | 18x20               |
| 10000            | 10   | 109FXM010M                  | 0.070                         | 1700   | 18x25               |