

# Surface Mount Aluminum Electrolytic Capacitors NACE Series

## FEATURES

- CYLINDRICAL V-CHIP CONSTRUCTION
- LOW COST, GENERAL PURPOSE, 2000 HOURS AT 85°C
- NEW EXPANDED CV RANGE (up to 6800µF)
- ANTI-SOLVENT (2 MINUTES)
- DESIGNED FOR AUTOMATIC MOUNTING AND REFLOW SOLDERING



## CHARACTERISTICS

**RoHS  
Compliant**

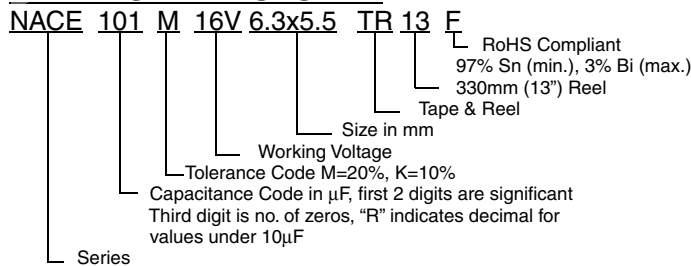
includes all homogeneous materials

\*See Part Number System for Details

|   |                                    |  |      |      |      |      |      |      |      |      |      |
|---|------------------------------------|--|------|------|------|------|------|------|------|------|------|
| Rated Voltage Range                               | 4.0 ~ 100Vdc                       |  |      |      |      |      |      |      |      |      |      |
| Rate Capacitance Range                            | 0.1 ~ 6,800µF                      |  |      |      |      |      |      |      |      |      |      |
| Operating Temp. Range                             | -40°C ~ +85°C                      |  |      |      |      |      |      |      |      |      |      |
| Capacitance Tolerance                             | ±20% (M), ±10%                     |  |      |      |      |      |      |      |      |      |      |
| Max. Leakage Current After 2 Minutes @ 20°C       | 0.01CV or 3µA whichever is greater |  |      |      |      |      |      |      |      |      |      |
| Tan δ @ 120Hz/20°C                                | W.V. (Vdc)                         | 4.0                                    | 6.3  | 10   | 16   | 25   | 35   | 50   | 63   | 100  |      |
|   | 3mm Dia.                           | 0.40                                   | 0.35 | 0.24 | 0.19 | 0.16 | 0.14 | 0.14 | -    | -    |      |
|   | 4 ~ 6.3mm Dia.                     | 0.35                                   | 0.26 | 0.20 | 0.16 | 0.14 | 0.12 | 0.10 | 0.10 | 0.10 |      |
|   | 8x6.5mm Dia.                       | -                                      | 0.25 | 0.26 | 0.20 | 0.16 | 0.14 | 0.12 | -    | 0.10 |      |
|   | 8mm Dia. ~ up                      | C<1000µF                               | 0.40 | 0.30 | 0.24 | 0.20 | 0.16 | 0.14 | 0.12 | 0.12 | 0.10 |
|   |                                    | C<1500µF                               | -    | 0.31 | 0.25 | 0.21 | -    | 0.15 | -    | -    | -    |
|   |                                    | C<2200µF                               | -    | 0.32 | 0.32 | -    | 0.18 | -    | -    | -    | -    |
| C<3300µF  |                                    | -                                      | 0.34 | -    | 0.24 | -    | -    | -    | -    | -    |      |
| C<4700µF  |                                    | -                                      | -    | 0.36 | -    | -    | -    | -    | -    | -    |      |
|   | C<6800µF                           | -                                      | 0.40 | -    | -    | -    | -    | -    | -    | -    |      |
| Low Temperature Stability Impedance Ratio @ 120Hz | W.V. (Vdc)                         | 4.0                                    | 6.3  | 10   | 16   | 25   | 35   | 50   | 63   | 100  |      |
|   | Z-25°C/Z+20°C                      | 7                                      | 3    | 3    | 2    | 2    | 2    | 2    | 2    | 2    |      |
|   | Z-40°C/Z+20°C                      | 15                                     | 8    | 6    | 4    | 4    | 3    | 3    | 3    | 3    |      |
| Load Life Test 85°C 2,000 Hours                   | Capacitance Change                 | Within ± 25% of initial measured value |      |      |      |      |      |      |      |      |      |
|   | Tan δ                              | Less than 200% of specified max. value |      |      |      |      |      |      |      |      |      |
|   | Leakage Current                    | Less than specified max. value         |      |      |      |      |      |      |      |      |      |

\*See standard products and case size table for items available in 10% tolerance

## PART NUMBER SYSTEM



## 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)



# Surface Mount Aluminum Electrolytic Capacitors NACE Series

## MAXIMUM RIPPLE CURRENT (mA rms AT 120Hz AND 85°C)

| Cap (μF) | Working Voltage (Vdc) |      |      |      |      |      |      |     |     |
|----------|-----------------------|------|------|------|------|------|------|-----|-----|
|          | 4.0                   | 6.3  | 10   | 16   | 25   | 35   | 50   | 63  | 100 |
| 0.1      | -                     | -    | -    | -    | -    | -    | 1.0  | 1.0 | -   |
| 0.22     | -                     | -    | -    | -    | -    | -    | 2.3  | 2.3 | -   |
| 0.33     | -                     | -    | -    | -    | -    | -    | 3.5  | 3.5 | -   |
| 0.47     | -                     | -    | -    | -    | -    | -    | 4.0* | 5.0 | -   |
|          |                       |      |      |      |      |      | 5.5  |     |     |
| 1.0      | -                     | -    | -    | -    | -    | -    | 8*   | 10  | 10  |
|          |                       |      |      |      |      |      | 10   |     |     |
| 2.2      | -                     | -    | -    | -    | -    | -    | 8*   | 15  | 20  |
|          |                       |      |      |      |      |      | 15   |     |     |
| 3.3      | -                     | -    | -    | -    | -    | -    | 10*  | 15  | 28* |
|          |                       |      |      |      |      |      | 15   |     | 50† |
| 4.7      | -                     | -    | -    | -    | 12*  | 20   | 23   | 23  | 35  |
|          |                       |      |      |      | 19   |      |      |     |     |
| 10       | -                     | -    | -    | 20*  | 28   | 30   | 34   | 34  | 50  |
|          |                       |      |      | 25   |      |      |      |     |     |
| 15       | -                     | 16*  | -    | -    | -    | -    | -    | -   | -   |
| 22       | 19*                   | 21*  | 35   | 39   | 52   | 54   | 58   | 70  | 120 |
|          |                       | 31   |      |      |      |      | 120† |     |     |
| 33       | 26                    | 39   | 43   | 57   | 63   | 60   | 65†  | 160 | 190 |
|          |                       |      |      |      |      | 130† | 85   |     |     |
| 47       | 34                    | 47   | 59   | 68   | 68   | 70   | 90   | 170 | 330 |
|          |                       |      |      |      |      | 165† |      |     |     |
| 68       | 52                    | 63   | 66   | 75   | 80   | 110  | 120  | -   | -   |
| 100      | 61                    | 71   | 76   | 86   | 91   | 130  | 200  | 280 | -   |
|          |                       |      |      | 200† | 130† |      |      |     |     |
| 150      | 74                    | 78   | 88   | 135  | 200  | 220  | -    | -   | 560 |
| 220      | 82                    | 95   | 150  | 150  | 250  | 270  | 320  | 410 | -   |
|          |                       |      | 250† |      |      |      |      |     |     |
| 330      | 80                    | 150  | 280  | 280  | 310  | 340  | 520  | -   | -   |
|          |                       | 300† |      |      |      |      |      |     |     |
| 470      | 150                   | 300  | 300  | 330  | 430  | 590  | 925  | 700 | -   |
| 680      | -                     | 300  | -    | 450  | -    | 610  | -    | -   | -   |
| 1000     | 330                   | 330  | 450  | -    | 660  | -    | 940  | -   | -   |
| 1500     | -                     | 450  | -    | 710  | -    | 1060 | -    | -   | -   |
| 2200     | -                     | -    | 730  | -    | 1150 | -    | -    | -   | -   |
| 3300     | -                     | 750  | -    | 1200 | -    | -    | -    | -   | -   |
| 4700     | -                     | -    | 1200 | -    | -    | -    | -    | -   | -   |
| 6800     | -                     | 1330 | -    | -    | -    | -    | -    | -   | -   |

\*3x5.5mm Case Size, †8x6.5mm Case Size

## MAXIMUM ESR (Ω AT 120Hz AND 20°C)

| Cap (μF) | Working Voltage (Vdc) |       |       |       |       |       |       |      |      |
|----------|-----------------------|-------|-------|-------|-------|-------|-------|------|------|
|          | 4.0                   | 6.3   | 10    | 16    | 25    | 35    | 50    | 63   | 100  |
| 0.1      | -                     | -     | -     | -     | -     | -     | 1660  | 1660 | -    |
| 0.22     | -                     | -     | -     | -     | -     | -     | 754   | 754  | -    |
| 0.33     | -                     | -     | -     | -     | -     | -     | 503   | 503  | -    |
| 0.47     | -                     | -     | -     | -     | -     | -     | 353   | 353  | -    |
| 1.0      | -                     | -     | -     | -     | -     | -     | 166   | 166  | 166  |
| 2.2      | -                     | -     | -     | -     | -     | -     | 90.4  | 75.4 | 75.4 |
| 3.3      | -                     | -     | -     | -     | -     | -     | 60.3  | 50.3 | 50.3 |
|          |                       |       |       |       |       |       |       |      | 50.3 |
| 4.7      | -                     | -     | -     | -     | -     | -     | 49.4  | 42.3 | 35.3 |
|          |                       |       |       |       |       |       |       |      | 35.3 |
| 10       | -                     | -     | -     | -     | -     | -     | 26.5  | 23.2 | 19.9 |
|          |                       |       |       |       |       |       |       |      | 16.6 |
| 15       | -                     | 33.1  | -     | -     | -     | -     | -     | -    | -    |
| 22       | 30.1                  | 26.5* | 15.1  | 12.1  | 10.6  | 9.05  | 7.54  | 7.54 | 7.54 |
|          |                       | 18.1  |       |       |       |       | 9.05† |      |      |
| 33       | 17.6                  | 12.6  | 10.1  | 8.04  | 7.04  | 6.04  | 5.03  | 6.04 | 5.03 |
|          |                       |       |       |       |       | 7.04† | 6.04† |      |      |
| 47       | 12.4                  | 8.47  | 7.06  | 5.65  | 4.95  | 4.24  | 3.53  | 4.24 | 3.53 |
|          |                       |       |       |       |       | 4.95† |       |      |      |
| 68       | 8.54                  | 5.86  | 4.88  | 3.91  | 3.42  | 2.93  | 2.44  | -    | -    |
| 100      | 5.80                  | 3.98  | 3.32  | 2.66  | 2.32  | 1.99  | 1.99  | 1.99 | -    |
|          |                       |       |       | 3.32† | 2.66† |       |       |      |      |
| 150      | 3.87                  | 2.66  | 2.21  | 1.77  | 1.55  | 1.33  | -     | -    | 1.11 |
| 220      | 2.64                  | 1.96  | 1.51  | 1.21  | 1.21  | 1.06  | 0.91  | 0.91 | -    |
|          |                       |       | 1.99† |       |       |       |       |      |      |
| 330      | 1.76                  | 1.31  | 1.21  | 1.01  | 0.81  | 0.71  | 0.60  | -    | -    |
|          |                       | 1.76† |       |       |       |       |       |      |      |
| 470      | 1.42                  | 1.06  | 0.85  | 0.71  | 0.57  | 0.49  | 0.43  | 0.43 | -    |
| 680      | -                     | 0.59  | -     | 0.49  | -     | 0.34  | -     | -    | -    |
| 1000     | 0.67                  | 0.50  | 0.40  | -     | 0.27  | -     | 0.20  | -    | -    |
| 1500     | -                     | 0.35  | -     | 0.24  | -     | 0.17  | -     | -    | -    |
| 2200     | -                     | -     | 0.24  | -     | 0.14  | -     | -     | -    | -    |
| 3300     | -                     | 0.17  | -     | 0.12  | -     | -     | -     | -    | -    |
| 4700     | -                     | -     | 0.13  | -     | -     | -     | -     | -    | -    |
| 6800     | -                     | 0.10  | -     | -     | -     | -     | -     | -    | -    |

## RIPPLE CURRENT FREQUENCY CORRECTION FACTOR

| Frequency Hz | 100<f≤1K | 1K<f≤10K | 10K<f≤100K | f≥100K |
|--------------|----------|----------|------------|--------|
| C≤4.7μF      | 1.0      | 1.3      | 1.5        | 2.0    |
| 4.7μF<C≤33μF | 1.0      | 1.2      | 1.3        | 1.45   |
| C>33μF       | 1.0      | 1.1      | 1.2        | 1.3    |

# Surface Mount Aluminum Electrolytic Capacitors NACE Series

**STANDARD PRODUCT AND CASE SIZE TABLE DφxL (mm)**

| Cap (μF) | Code | Working Voltage (Vdc) |                 |                 |                   |                |                   |                   |          |                   |
|----------|------|-----------------------|-----------------|-----------------|-------------------|----------------|-------------------|-------------------|----------|-------------------|
|          |      | 4.0                   | 6.3             | 10              | 16                | 25             | 35                | 50                | 63       | 100               |
| 0.1      | R10  | -                     | -               | -               | -                 | -              | -                 | 3X5.5<br>4X5.5*   | 4X5.5*   | -                 |
| 0.22     | R22  | -                     | -               | -               | -                 | -              | -                 | 3X5.5<br>4X5.5*   | 4X5.5*   | -                 |
| 0.33     | R33  | -                     | -               | -               | -                 | -              | -                 | 3X5.5<br>4X5.5*   | 4X5.5*   | -                 |
| 0.47     | R47  | -                     | -               | -               | -                 | -              | -                 | 3X5.5<br>4X5.5*   | 4X5.5*   | -                 |
| 1.0      | 1R0  | -                     | -               | -               | -                 | -              | -                 | 3X5.5<br>4X5.5*   | 4X5.5*   | 4x6.3*            |
| 2.2      | 2R2  | -                     | -               | -               | -                 | -              | 3X5.5             | 4X5.5*            | 4X5.5*   | 6.3x6.3*          |
| 3.3      | 3R3  | -                     | -               | -               | -                 | -              | 3X5.5             | 4X5.5*            | 5X5.5*   | 6.3x6.3*<br>8x6.5 |
| 4.7      | 4R7  | -                     | -               | -               | -                 | 3X5.5<br>4X5.5 | 4X5.5*            | 5X5.5*            | 5X5.5*   | 6.3x6.3*          |
| 10       | 100  | -                     | -               | -               | 3X5.5<br>4X5.5*   | 5X5.5          | 5X5.5*            | 6.3X5.5*          | 6.3X5.5* | 6.3x8*            |
| 15       | 150  | -                     | 3X5.5           | -               | -                 | -              | -                 | -                 | -        | -                 |
| 22       | 220  | 3X5.5                 | 3X5.5<br>4X5.5* | 5X5.5*          | 5X5.5*            | 6.3X5.5        | 6.3X5.5*          | 6.3X6.3*<br>8x6.5 | 6.3X8*   | 8x10.5*           |
| 33       | 330  | 4X5.5*                | 5X5.5*          | 5X5.5*          | 6.3X5.5*          | 6.3X5.5        | 6.3X6.3*<br>8x6.5 | 6.3X8*<br>8x6.5   | 8x10.5*  | 10x10.5*          |
| 47       | 470  | 4X5.5*                | 5X5.5*          | 6.3X5.5         | 6.3X5.5*          | 6.3X6.3        | 6.3X6.3*<br>8x6.5 | 6.3X8*            | 8x10.5*  | 12.5x14           |
| 68       | 680  | 5X5.5*                | 6.3X5.5*        | 6.3X5.5*        | 6.3X5.5*          | 6.3X6.3        | 6.3X8             | 8x10.5*           | -        | -                 |
| 100      | 101  | 5X5.5*                | 6.3X5.5*        | 6.3X5.5*        | 6.3X5.5*<br>8x6.5 | 6.3X8<br>8x6.5 | 6.3X8             | 8x10.5*           | 10x10.5* | -                 |
| 150      | 151  | 6.3X5.5*              | 6.3X5.5*        | 6.3X6.3*        | 6.3X8*            | 8x10.5*        | 8x10.5*<br>10x8*  | -                 | -        | 16x17             |
| 220      | 221  | 6.3X5.5*              | 6.3X6.3*        | 6.3X8*<br>8x6.5 | 6.3X8*            | 8x10.5<br>10x8 | 8x10.5            | 10x10.5           | 12.5x14  | -                 |
| 330      | 331  | 6.3X6.3               | 6.3X8*<br>8x6.5 | 8x10.5*         | 8x10.5<br>10x8    | 8x10.5         | 10x10.5           | 12.5x14           | -        | -                 |
| 470      | 471  | 6.3X8*                | 8x10.5          | 8x10.5<br>10x8  | 8x10.5            | 10x10.5        | 12.5x14           | 16x17             | 16x17    | -                 |
| 680      | 681  | -                     | 10x8*           | -               | 10x10.5*          | -              | 12.5x14           | -                 | -        | -                 |
| 1000     | 102  | 10X8                  | 8x10.5*         | 10x10.5*        | -                 | 12.5x14        | -                 | 16x17             | -        | -                 |
| 1500     | 152  | -                     | 10x10.5*        | -               | 12.5x14           | -              | 16x17             | -                 | -        | -                 |
| 2200     | 222  | -                     | -               | 12.5x14         | -                 | 16x17          | -                 | -                 | -        | -                 |
| 3300     | 332  | -                     | 12.5x14         | -               | 16x17             | -              | -                 | -                 | -        | -                 |
| 4700     | 472  | -                     | -               | 16x17           | -                 | -              | -                 | -                 | -        | -                 |
| 6800     | 682  | -                     | 16x17           | -               | -                 | -              | -                 | -                 | -        | -                 |

\*Items available in optional 10% tolerance



**DIMENSIONS (mm)**

| Case Size | Dφ ±0.5 | L max. | A ±0.2 | B ±0.2 | I ±0.2 | W          | P ±0.2 |
|-----------|---------|--------|--------|--------|--------|------------|--------|
| 3 x 5.5   | 3.0     | 5.5    | 3.3    | 3.3    | 1.5    | 0.45 ~ 0.8 | 0.6    |
| 4 x 5.5   | 4.0     | 5.5    | 4.3    | 4.3    | 1.8    | 0.5 ~ 0.8  | 1.0    |
| 5 x 5.5   | 5.0     | 5.5    | 5.3    | 5.3    | 2.1    | 0.5 ~ 0.8  | 1.4    |
| 6.3 x 5.5 | 6.3     | 5.5    | 6.6    | 6.6    | 2.5    | 0.5 ~ 0.8  | 2.2    |
| 6.3 x 6.3 | 6.3     | 6.3    | 6.6    | 6.6    | 2.5    | 0.5 ~ 0.8  | 2.2    |
| 6.3 x 8   | 6.3     | 8.0    | 6.6    | 6.6    | 2.5    | 0.5 ~ 0.8  | 2.2    |
| 8 x 6.5   | 8.0     | 6.5    | 8.3    | 8.3    | 3.4    | 0.5 ~ 0.8  | 2.2    |
| 8 X 10.5  | 8.0     | 10.5   | 8.3    | 8.3    | 2.9    | 0.7 ~ 1.0  | 3.2    |
| 10 x 8    | 10.0    | 8.0    | 10.3   | 10.3   | 3.2    | 0.7 ~ 1.4  | 4.6    |
| 10 x 10.5 | 10.0    | 10.5   | 10.3   | 10.3   | 3.2    | 0.7 ~ 1.4  | 4.6    |
| 12.5 x 14 | 12.5    | 14.0   | 12.8   | 12.8   | 4.5    | 0.6 ~ 1.4  | 4.6    |
| 16 x 17   | 16.0    | 17.5   | 17.0   | 17.0   | 5.5    | 0.9 ~ 1.5  | 6.7    |