

# Surface Mount Solid Aluminum Electrolytic Capacitors

NPC Series

## FEATURES

- LOW IMPEDANCE & ESR AT HIGH FREQUENCY
- HIGH RIPPLE CURRENT
- REPLACES MULTIPLE TANTALUM CHIPS IN POWER SUPPLIES
- FITS EIA (7343) "D" LAND PATTERNS
- Pb-FREE (GOLD TERMINATION PLATING)
- COMPATIBLE WITH +250°C & +260°C\* REFLOW SOLDERING

\*Refer to product tables for available +260°C values

**RoHS Compliant**  
includes all homogeneous materials

\*See Part Number System for Details



## CHARACTERISTICS

|                                                                                    |                    |                                                                                                   |                                        |
|------------------------------------------------------------------------------------|--------------------|---------------------------------------------------------------------------------------------------|----------------------------------------|
| Rated Working Range                                                                | 2.0 ~ 8VDC         |                                                                                                   |                                        |
| Rated Capacitance Range                                                            | 10 ~ 390μF         |                                                                                                   |                                        |
| Operating Temperature Range                                                        | -55 ~ +105°C       |                                                                                                   |                                        |
| Capacitance Tolerance                                                              | ± 20% (M)          |                                                                                                   |                                        |
| Max. Leakage Current (μA)<br>After 5 Minutes (+20°C)                               | ≤0.04CV            |                                                                                                   |                                        |
| Max. Tan δ, 120Hz, +20°C                                                           | D1, D6             | ≤0.05                                                                                             |                                        |
|                                                                                    | D7, D8             | ≤0.1                                                                                              |                                        |
| High Temperature Load Life<br>2,000 Hours @ 105°C<br>at Rated Working Voltage      | Capacitance Change | Within ±20% of initial measured value                                                             |                                        |
|                                                                                    | Tan δ              | D7, D8 (D1 10μF/6.3V)                                                                             | Less than 150% of specified max. value |
|                                                                                    |                    | D1, D6                                                                                            | Less than 200% of specified max. value |
|                                                                                    | Leakage Current    | Less than specified max. value                                                                    |                                        |
| Moisture Resistance*<br>500 Hours @ +60°C at 90 ~ 95% RH<br>and No Voltage Applied | Capacitance Change | Within -20%/+40% of initial measured value                                                        |                                        |
|                                                                                    | Tan δ              | D7, D8                                                                                            | Less than 150% of specified max. value |
|                                                                                    |                    | D1, D6                                                                                            | Less than 200% of specified max. value |
|                                                                                    | Leakage Current    | Less than 300% of specified max. value<br>Less than 500% of specified max. value for D1 10μF/6.3V |                                        |

\*JEDEC MSL-3

## STANDARD PRODUCTS AND SPECIFICATIONS

| NIC Part Number<br>(+250°C Reflow) | NIC Part Number<br>(+260°C Reflow) | WV<br>(Vdc) | Cap.<br>(μF) | Max. LC<br>(μA) | Tan δ | Max. Ripple Current<br>100KHz @ +105°C | Max. ESR<br>+20°C & 100KHz (Ω) | Height<br>H ± 0.1 |
|------------------------------------|------------------------------------|-------------|--------------|-----------------|-------|----------------------------------------|--------------------------------|-------------------|
| NPC101M2D1ZTRF                     | NPC101M2D1ZATRF                    | 2           | 100          | 8.0             | 0.05  | 3,000                                  | 0.009                          | 1.4               |
| NPC101M2D6XTRF                     | NPC101M2D6XATRF                    |             | 100          | 8.0             | 0.05  | 3,000                                  | 0.013                          | 1.9               |
| NPC101M2D6ZTRF                     | NPC101M2D6ZATRF                    |             | 100          | 8.0             | 0.05  | 3,000                                  | 0.009                          | 1.9               |
| NPC121M2D6ZTRF                     | -                                  |             | 120          | 9.6             | 0.05  | 3,000                                  | 0.009                          | 1.9               |
| NPC151M2D6ZTRF                     | -                                  |             | 150          | 12.0            | 0.05  | 3,000                                  | 0.009                          | 1.9               |
| NPC181M2D6ZTRF                     | -                                  |             | 180          | 14.4            | 0.05  | 3,000                                  | 0.009                          | 1.9               |
| NPC221M2D6ZTRF                     | -                                  |             | 220          | 17.6            | 0.05  | 3,000                                  | 0.009                          | 1.9               |
| NPC221M2D7XTRF                     | NPC221M2D7XATRF                    |             | 220          | 17.6            | 0.10  | 3,500                                  | 0.010                          | 2.7               |
| NPC271M2D8ZTRF                     | -                                  |             | 270          | 21.6            | 0.10  | 3,500                                  | 0.007                          | 2.9               |
| NPC331M2D8ZTRF                     | -                                  |             | 330          | 26.4            | 0.10  | 3,500                                  | 0.007                          | 2.9               |
| NPC391M2D8ZTRF                     | -                                  |             | 390          | 31.2            | 0.10  | 3,500                                  | 0.007                          | 2.9               |
| NPC820M2.5D1ZTRF                   | NPC820M2.5D1ZATRF                  | 2.5         | 82           | 8.2             | 0.05  | 3,000                                  | 0.009                          | 1.4               |
| NPC820M2.5D6XTRF                   | NPC820M2.5D6XATRF                  |             | 82           | 8.2             | 0.05  | 3,000                                  | 0.013                          | 1.9               |
| NPC820M2.5D6ZTRF                   | NPC820M2.5D6ZATRF                  |             | 82           | 8.2             | 0.05  | 3,000                                  | 0.009                          | 1.9               |
| NPC101M2.5D6ZTRF                   | -                                  |             | 100          | 10.0            | 0.05  | 3,000                                  | 0.009                          | 1.9               |
| NPC121M2.5D6ZTRF                   | -                                  |             | 120          | 12.0            | 0.05  | 3,000                                  | 0.009                          | 1.9               |
| NPC151M2.5D6ZTRF                   | -                                  |             | 150          | 15.0            | 0.05  | 3,000                                  | 0.009                          | 1.9               |
| NPC181M2.5D7XTRF                   | NPC181M2.5D7XATRF                  |             | 180          | 18.0            | 0.10  | 3,500                                  | 0.010                          | 2.7               |
| NPC221M2.5D8ZTRF                   | -                                  |             | 220          | 22.0            | 0.10  | 3,500                                  | 0.007                          | 2.9               |
| NPC271M2.5D8ZTRF                   | -                                  |             | 270          | 27.0            | 0.10  | 3,500                                  | 0.007                          | 2.9               |
| NPC331M2.5D8ZTRF                   | -                                  |             | 330          | 33.0            | 0.10  | 3,500                                  | 0.007                          | 2.9               |
| NPC680M4D1ZTRF                     | NPC680M4D1ZATRF                    | 4           | 68           | 10.9            | 0.05  | 3,000                                  | 0.009                          | 1.4               |
| NPC680M4D6XTRF                     | NPC680M4D6XATRF                    |             | 68           | 10.9            | 0.05  | 3,000                                  | 0.013                          | 1.9               |
| NPC680M4D6ZTRF                     | NPC680M4D6ZATRF                    |             | 68           | 10.9            | 0.05  | 3,000                                  | 0.009                          | 1.9               |
| NPC820M4D6XTRF                     | -                                  |             | 82           | 13.1            | 0.05  | 3,000                                  | 0.010                          | 1.9               |
| NPC101M4D6XTRF                     | -                                  |             | 100          | 16.0            | 0.05  | 3,000                                  | 0.010                          | 1.9               |
| NPC121M4D6XTRF                     | -                                  |             | 120          | 19.2            | 0.05  | 3,000                                  | 0.010                          | 1.9               |
| NPC151M4D6XTRF                     | -                                  |             | 150          | 24.0            | 0.05  | 3,000                                  | 0.010                          | 1.9               |
| NPC151M4D7XTRF                     | NPC151M4D7XATRF                    |             | 150          | 24.0            | 0.10  | 3,500                                  | 0.010                          | 2.7               |



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NPC Series

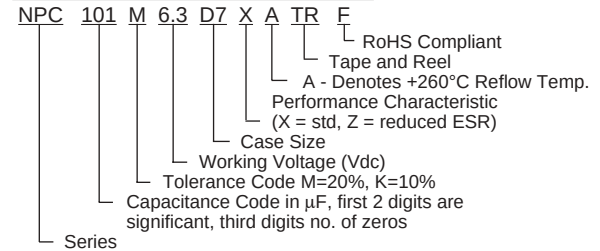
## STANDARD PRODUCTS AND SPECIFICATIONS

| NIC Part Number<br>(+250°C Reflow) | NIC Part Number<br>(+260°C Reflow) | WV<br>(Vdc) | Cap.<br>( $\mu$ F) | Max. LC<br>( $\mu$ A) | Tan $\delta$ | Max. Ripple Current<br>100KHz @ +105°C | Max. ESR<br>+20°C & 100KHz ( $\Omega$ ) | Height<br>H $\pm$ 0.1 |
|------------------------------------|------------------------------------|-------------|--------------------|-----------------------|--------------|----------------------------------------|-----------------------------------------|-----------------------|
| NPC181M4D8ZTRF                     | -                                  | 4.0         | 180                | 28.8                  | 0.10         | 3,500                                  | 0.009                                   | 2.9                   |
| NPC221M4D8ZTRF                     | -                                  |             | 220                | 35.2                  | 0.10         | 3,500                                  | 0.009                                   | 2.9                   |
| NPC271M4D8ZTRF                     | -                                  |             | 270                | 43.2                  | 0.10         | 3,500                                  | 0.009                                   | 2.9                   |
| NPC100M6.3D1TRF                    | -                                  | 6.3         | 10                 | 2.5                   | 0.05         | 1,900                                  | 0.050                                   | 1.4                   |
| NPC330M6.3D6TRF                    | NPC330M6.3D6ATRF                   |             | 33                 | 8.3                   | 0.05         | 3,000                                  | 0.015                                   | 1.9                   |
| NPC470M6.3D1XTRF                   | NPC470M6.3D1XATRF                  |             | 47                 | 11.8                  | 0.05         | 3,000                                  | 0.010                                   | 1.4                   |
| NPC470M6.3D6XTRF                   | NPC470M6.3D6XATRF                  |             | 47                 | 11.8                  | 0.05         | 3,000                                  | 0.013                                   | 1.9                   |
| NPC470M6.3D6ZTRF                   | -                                  |             | 47                 | 11.8                  | 0.05         | 3,000                                  | 0.010                                   | 1.9                   |
| NPC560M6.3D6XTRF                   | -                                  |             | 56                 | 14.1                  | 0.05         | 3,000                                  | 0.010                                   | 1.9                   |
| NPC680M6.3D6XTRF                   | -                                  |             | 68                 | 17.1                  | 0.05         | 3,000                                  | 0.010                                   | 1.9                   |
| NPC820M6.3D6XTRF                   | -                                  |             | 82                 | 20.7                  | 0.05         | 3,000                                  | 0.010                                   | 1.9                   |
| NPC101M6.3D6XTRF                   | -                                  |             | 100                | 25.2                  | 0.05         | 3,000                                  | 0.010                                   | 1.9                   |
| NPC101M6.3D7XTRF                   | NPC101M6.3D7XATRF                  |             | 100                | 25.2                  | 0.10         | 3,500                                  | 0.010                                   | 2.7                   |
| NPC121M6.3D8ZTRF                   | -                                  |             | 120                | 30.2                  | 0.10         | 3,500                                  | 0.009                                   | 2.9                   |
| NPC151M6.3D8ZTRF                   | -                                  |             | 150                | 37.8                  | 0.10         | 3,500                                  | 0.009                                   | 2.9                   |
| NPC150M8D6TRF                      | -                                  | 8           | 15                 | 4.8                   | 0.05         | 3,000                                  | 0.015                                   | 1.9                   |
| NPC330M8D7XTRF                     | -                                  |             | 33                 | 10.6                  | 0.10         | 3,000                                  | 0.013                                   | 2.7                   |

## RIPPLE CURRENT FREQUENCY CORRECTION FACTORS

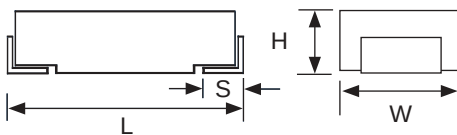
| Frequency         | 1KHz<br>≤f<<br>10KHz | 10KHz<br>≤f<<br>100KHz | 100KHz<br>≤f<<br>1MHz |
|-------------------|----------------------|------------------------|-----------------------|
| Correction Factor | 0.6                  | 0.85                   | 1.0                   |

## PART NUMBERING SYSTEM

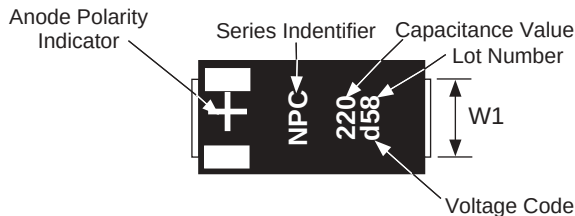
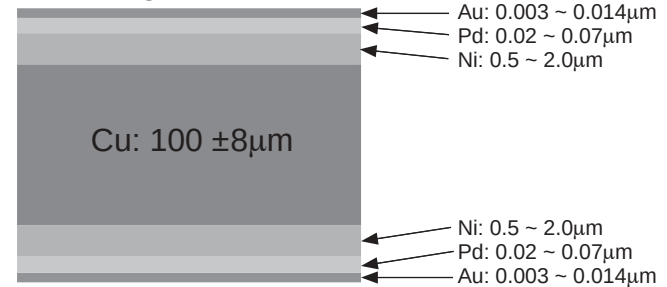


## DIMENSIONS (mm)

| Case Code | L $\pm$ 0.2 | W $\pm$ 0.2 | H $\pm$ 0.1 | W1 $\pm$ 0.1 | S $\pm$ 0.2 |
|-----------|-------------|-------------|-------------|--------------|-------------|
| D1        | 7.3         | 4.3         | 1.4         | 2.4          | 1.3         |
| D6        |             |             | 1.9         |              |             |
| D7        |             |             | 2.7         |              |             |
| D8        |             |             | 2.9         |              |             |



## TERMINATION MATERIAL:



## VOLTAGE CODES

| Voltage | Code |
|---------|------|
| 2.0VDC  | d    |
| 2.5VDC  | e    |
| 4.0VDC  | g    |
| 6.3VDC  | j    |
| 8.0VDC  | k    |

## 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)

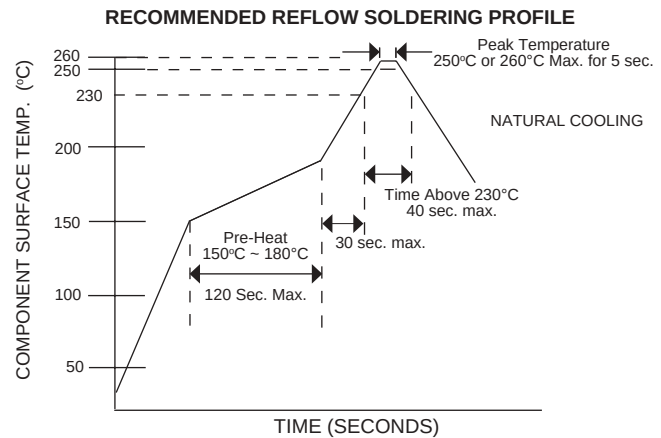
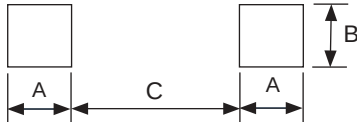


# Surface Mount Solid Aluminum Electrolytic Capacitors

NPC Series

## RECOMMENDED LAND PATTERNS (mm)

| Case Code      | a   | b   | c   |
|----------------|-----|-----|-----|
| D1, D6, D7, D8 | 2.4 | 2.9 | 3.7 |



### APPLICATION NOTES:

1. NPC Series cannot be used in coupling, time-constant or other circuits that are greatly affected by leakage current.
2. NPC parts are polarized so be sure to verify component orientation when mounting components.
3. Do not apply over voltage exceeding the rated voltage.
4. Do not apply ripple current over the specified maximum ripple current rating.

### NOTES ON REFLOW SOLDERING:

1. SAC alloy (+217°C) reflow soldering compatible
2. Soldering heat limits apply to the top surface of component
3. If you have concerns about your reflow soldering profile review them with NIC to insure compatible [tpmg@niccomp.com]

## REEL TAPE DIMENSIONS (mm)

| Case Code | A ±1.0 | B ±0.5 | C ±0.2 | W ±0.5 | t ±0.5 | Reel Quantity |
|-----------|--------|--------|--------|--------|--------|---------------|
| D1, D6    | 330    | 80     | 13     | 13.5   | 2.0    | 3,000         |
| D7, D8    |        |        |        |        |        | 2,000         |

## TAPE DIMENSIONS (mm)

| Case Code | A ±0.1 | B ±0.1 | C ±0.3 | D ±0.05 | E ±0.1 | F ±0.1 | G ±0.05 | H ±0.1 | J -0/+0.1 | K ±0.1 | t ±0.05 |
|-----------|--------|--------|--------|---------|--------|--------|---------|--------|-----------|--------|---------|
| D1        |        |        |        |         |        |        |         |        |           | 1.6    |         |
| D6        |        |        |        |         |        |        |         |        |           | 2.1    |         |
| D7        | 4.55   | 7.65   | 12.0   | 5.5     | 1.75   | 8.0    | 2.0     | 4.0    | 1.5       | 2.9    | 0.3     |
| D8        |        |        |        |         |        |        |         |        |           | 3.1    |         |

