

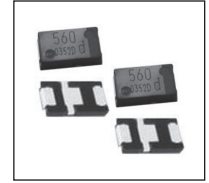
# Surface Mount Specialty Polymer Solid Aluminum Electrolytic Capacitors

NSPL Series

## FEATURES

- LOW ESL WITH THREE TERMINAL CONSTRUCTION
- ULTRA LOW ESR & HIGH RIPPLE CURRENT
- LONG LIFE AT +105°C (2,000 HOURS)
- Pb-FREE AND COMPATIBLE WITH REFLOW SOLDERING

**LOW ESL &  
ULTRA LOW ESR**



## CHARACTERISTICS

|   |                    |  |  |
|---|--------------------|--|--|
| Rated Working Range   | 2.0 ~ 6.3VDC       |  |  |
| Rated Capacitance Range   | 68 ~ 560 $\mu$ F   |  |  |
| Operating Temperature Range   | -55 ~ +105°C       |  |  |
| Capacitance Tolerance   | $\pm$ 20% (M)      |  |  |
| Max. Leakage Current ( $\mu$ A)<br>After 2 Minutes (+20°C)                    | All Case Sizes     | $\leq$ 0.1CV                               |  |
| Max. Tan $\delta$ , 120Hz, +20°C  |                    | 0.06 max.                                  |  |
| High Temperature Load Life<br>2,000 Hours @ 105°C<br>at Rated Working Voltage | Capacitance Change | Within $\pm$ 20% of initial measured value |  |
|   | Tan $\delta$       | Less than 120% specified max. value        |  |
|   | Leakage Current    | Less than 300% specified max. value        |  |
| Damp Heat Test<br>500 Hours @ +60°C at 90% RH<br>and Rated Working Voltage    | Capacitance Change | 6.3V                                       | Within -20%/+50% of initial measured value |
|   |                    | 4V   | Within -20%/+60% of initial measured value |
|   |                    | 2V, 2.5V                                   | Within -20%/+70% of initial measured value |
|   | Tan $\delta$       | Less than 200% of specified max. value     |  |
|   | Leakage Current    | Less than specified max. value             |  |

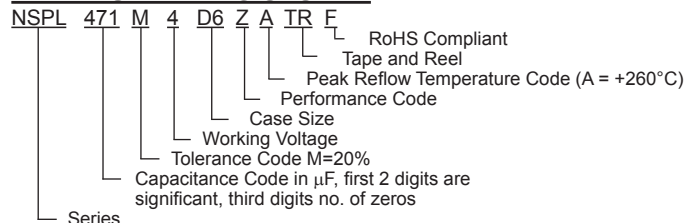
## STANDARD PRODUCTS AND SPECIFICATIONS

| NIC Part Number    | WV<br>(Vdc) | Cap.<br>( $\mu$ F) | Max. LC<br>( $\mu$ A) | Tan $\delta$ | Max. Ripple Current<br>+45°C & 100KHz (mArms) | Max. ESR<br>+20°C & 100KHz ( $\Omega$ ) | Height<br>(H) |
|--------------------|-------------|--------------------|-----------------------|--------------|---|---|---------------|
|                    |             |                    |                       |              |   |   |               |
| NSPL221M2D5YATRF   | 2.0         | 220                | 44                    | 0.06         | 7,500   | 0.006                                   | 1.1 $\pm$ 0.1 |
| NSPL221M2DYATRF    |             | 220                | 44                    | 0.06         | 7,500   | 0.006                                   | 1.0 max.      |
| NSPL221M2DUATRF    |             | 220                | 44                    | 0.06         | 8,500   | 0.0045                                  | 1.0 max.      |
| NSPL331M2D1YATRF   |             | 330                | 66                    | 0.06         | 7,500   | 0.006                                   | 1.4 $\pm$ 0.1 |
| NSPL331M2D6YATRF   |             | 330                | 66                    | 0.06         | 7,500   | 0.006                                   | 1.9 $\pm$ 0.1 |
| NSPL331M2D6UATRF   |             | 330                | 66                    | 0.06         | 8,500   | 0.0045                                  | 1.9 $\pm$ 0.1 |
| NSPL471M2D6YATRF   |             | 470                | 94                    | 0.06         | 7,500   | 0.006                                   | 1.9 $\pm$ 0.1 |
| NSPL471M2D6UATRF   |             | 470                | 94                    | 0.06         | 8,500   | 0.0045                                  | 1.9 $\pm$ 0.1 |
| NSPL471M2D6VATRF   |             | 470                | 94                    | 0.06         | 10,200  | 0.003                                   | 1.9 $\pm$ 0.1 |
| NSPL561M2D6YATRF   |             | 560                | 112                   | 0.06         | 7,500   | 0.006                                   | 1.9 $\pm$ 0.1 |
| NSPL561M2D6UATRF   |             | 560                | 112                   | 0.06         | 8,500   | 0.0045                                  | 1.9 $\pm$ 0.1 |
| NSPL561M2D6VATRF   |             | 560                | 112                   | 0.06         | 10,200  | 0.003                                   | 1.9 $\pm$ 0.1 |
| NSPL181M2.5D5YATRF | 2.5         | 180                | 45                    | 0.06         | 7,500   | 0.006                                   | 1.1 $\pm$ 0.1 |
| NSPL181M2.5DYATRF  |             | 180                | 45                    | 0.06         | 7,500   | 0.006                                   | 1.0 max.      |
| NSPL181M2.5DUATRF  |             | 180                | 45                    | 0.06         | 8,500   | 0.004                                   | 1.0 max.      |
| NSPL271M2.5D1YATRF |             | 270                | 67.5                  | 0.06         | 7,500   | 0.006                                   | 1.4 $\pm$ 0.1 |
| NSPL331M2.5D6YATRF |             | 330                | 82.5                  | 0.06         | 7,500   | 0.006                                   | 1.9 $\pm$ 0.1 |
| NSPL331M2.5D6UATRF |             | 330                | 82.5                  | 0.06         | 8,500   | 0.0045                                  | 1.9 $\pm$ 0.1 |
| NSPL471M2.5D6YATRF |             | 470                | 117.5                 | 0.06         | 7,500   | 0.006                                   | 1.9 $\pm$ 0.1 |
| NSPL471M2.5D6UATRF |             | 470                | 117.5                 | 0.06         | 8,500   | 0.0045                                  | 1.9 $\pm$ 0.1 |
| NSPL471M2.5D6VATRF |             | 470                | 117.5                 | 0.06         | 10,200  | 0.003                                   | 1.9 $\pm$ 0.1 |
| NSPL121M4DZATRF    |             | 4.0                | 120                   | 48           | 0.06  | 6,300                                   | 0.009         |
| NSPL680M6.3DZATRF  | 6.3         | 68                 | 42.8                  | 0.06         | 6,300   | 0.009                                   | 1.0 max.      |

## RIPPLE CURRENT TEMPERATURE CORRECTION FACTORS

| Case Code | $\leq$ +45°C | >+45°C ~ $\leq$ +85°C | >+85°C ~ +105°C |
|-----------|--------------|-----------------------|-----------------|
| All       | 1.0          | 0.7                   | 0.25            |

## PART NUMBERING SYSTEM



# Surface Mount Specialty Polymer Solid Aluminum Electrolytic Capacitors

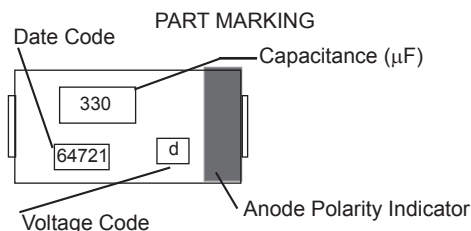
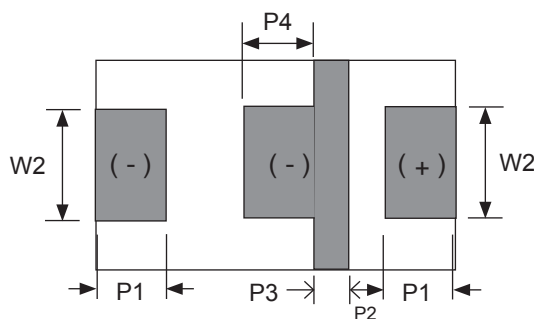
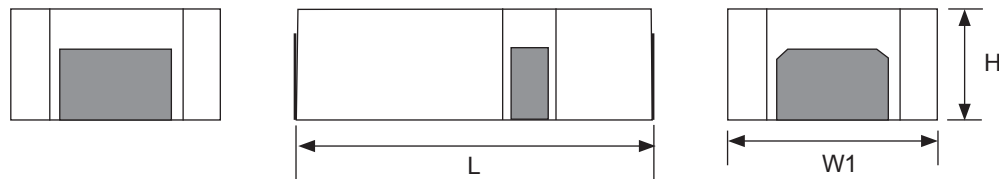
NSPL Series

## DIMENSIONS (mm)

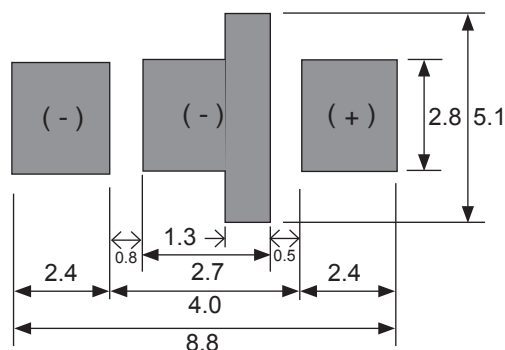
| Case Code     | L ±0.2 | W1 ±0.2 | H                | W2 ±0.1 | P1 ±0.3 | P2 ±0.1 | P3 ±0.2 | P4 ±0.2 |
|---------------|--------|---------|------------------|---------|---------|---------|---------|---------|
| D, D1, D5, D6 | 7.3    | 4.3     | see values table | 2.4     | 1.3     | 1.1     | 0.7     | 1.4     |

## VOLTAGE CODES

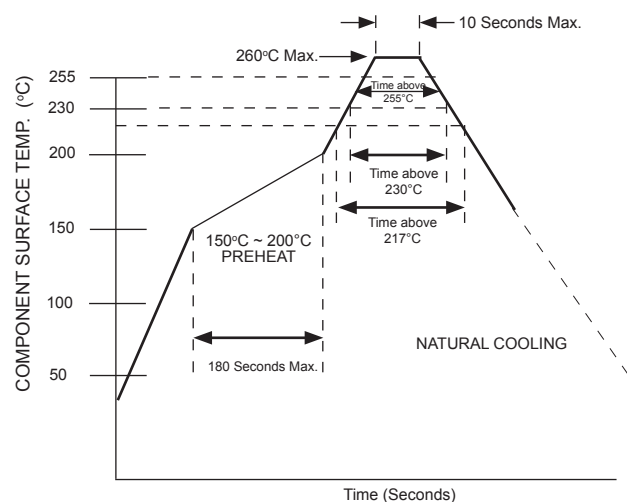
| Voltage | Code |
|---------|------|
| 2.0Vdc  | d    |
| 2.5Vdc  | e    |
| 4.0Vdc  | g    |
| 6.3Vdc  | j    |



## RECOMMENDED LAND PATTERN DIMENSIONS (mm)



## RECOMMENDED 260°C REFLOW SOLDERING PROFILE



| Item                    | Maximum Duration |
|-------------------------|------------------|
| Peak Temperature +260°C | 10 seconds max.  |
| Time above +255°C       | 30 seconds max.  |
| Time above +230°C       | 130 seconds max. |
| Time above +217°C       | 150 seconds max. |

- Notes: Compliant to IPC/J-STD-020D standard
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]
  4. Three reflow passes are allowed (cooling down period to room temperature between each pass).

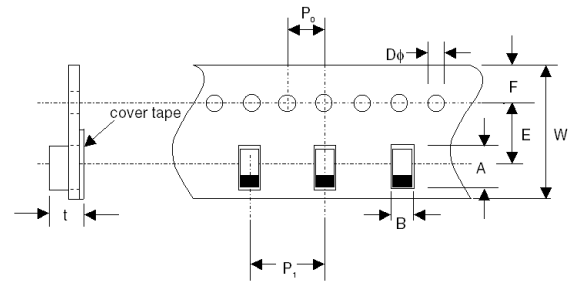
Storage Conditions:  
 Temperature: +5°C ~ +30°C  
 Humidity: <60% RH  
 Packaging: Moisture barrier bag  
 Storage Time: Parts should be soldered within 2 years of the production date and/or within 7 days of opening the moisture barrier bag.

# Surface Mount Specialty Polymer Solid Aluminum Electrolytic Capacitors

NSPL Series

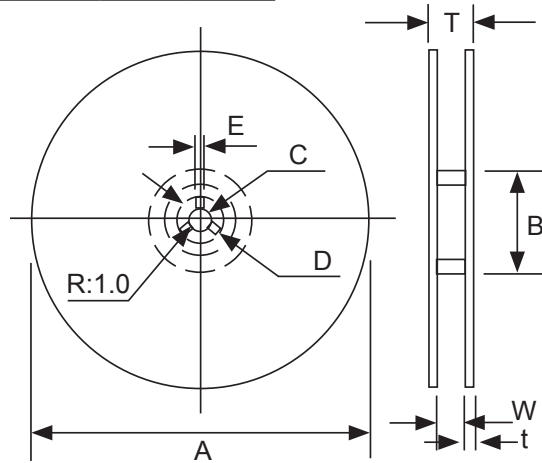
## CARRIER TAPE DIMENSIONS (mm)

| Case Code       | A±0.2 | B±0.2 | Dφ                  | E±0.1 | F±0.1 | P <sub>0</sub> ±0.1 | P <sub>1</sub> ±0.1 | t±0.2             | W±0.3 |
|-----------------|-------|-------|---------------------|-------|-------|---------------------|---------------------|-------------------|-------|
| D, D5<br>D1, D6 | 7.6   | 4.5   | 1.5 <sup>+0.1</sup> | 5.50  | 1.75  | 4.0                 | 8.0                 | $\frac{1.5}{2.4}$ | 12.0  |



## REEL DIMENSIONS (mm)

| A±2.0 | B min. | C±0.5 | D±0.8 | E±0.5 | T±1.0 | t   | W±1.0 |
|-------|--------|-------|-------|-------|-------|-----|-------|
| φ330  | φ80    | φ13.0 | φ21.0 | 2.0   | 20.0  | 3.0 | 14    |



| Case Code | Reel Quantity |
|-----------|---------------|
| All       | 3,500         |