



**THE DATASHEET OF  
SPSX331M0ER-6**



# Type SPSX Solid Polymer Aluminum SMT Capacitors



The solid polymer SPSX aluminum capacitor is an ideal choice for audio/visual equipment, home appliances, computers, measuring equipment and industrial robots. Like the SPCX, the SPSX is a compact component. But SPSX offers a much lower ESR and a higher ripple current rating than the SPCX. The SPSX is a green product and RoHS compliant.



Complies with the EU Directive 2002/95/EC requirement restricting the use of Lead (Pb), Mercury (Hg), Cadmium (Cd), Hexavalent chromium (Cr(VI)), PolyBrominated Biphenyls (PBB) and PolyBrominated Diphenyl Ethers (PBDE).

## Highlights

- A low-profile height of 1.9 mm
- Offered on tape and reel
- Can withstand 260 °C reflow for 10 s
- 4.5 - 9 mΩ ESR @ 100 kHz
- A great value in a small package

## Specifications

**Operating Temperature Range:** -40 °C to +105 °C

**Capacitance Range:** 82 μF to 560 μF

**Operating Working Range:** 2.0, 2.5, 4.0, 6.3 Vdc

**Capacitance Tolerance:** ±20 % (120 Hz @ 20 °C)

**Surge Voltage:**

|       |     |     |     |     |
|-------|-----|-----|-----|-----|
| Vdc   | 2.0 | 2.5 | 4.0 | 6.3 |
| Surge | 2.5 | 3.1 | 5.0 | 8.0 |

**Rated Ripple Current:** See ratings table

### Life Test:

Apply rated voltage at +105 °C ±2 °C for 1000 h

- \* Leakage current: ≤ ratings table values
- \* Capacitance: ±10% of initial measured value
- \* DF: ≤ ratings table values
- \* Appearance: No abnormal change to occur

### Moisture Resistance:

+60 °C ±2 °C @ 90% RH; rated voltage for 500 h

- \* Leakage current: ≤ rating table values
- \* Capacitance: +70%, -20% (2V, 2.5V)  
+60%, -20% (4V)  
+50%, -20% (6.3V)  
of initial measured value
- \* DF: ≤200% of initial specified value
- \* Appearance: No abnormal change to occur

### Shelf Life Test:

+105 °C ±2 °C for 500 h

- Leakage current: ≤ rating table values
- Capacitance: ±10% of initial measured value
- DF: ≤ ratings table values
- Appearance: No abnormal change to occur

### Surge Test:

Test temperature is +15 °C to +35 °C in series with a 1000 Ω resistor with the surge voltage applied for 1000 cycles of 30±5 s (ON) and 5 min 30 s (OFF)

- Leakage current: I ≤ 0.1CV
- Capacitance: ±10% of initial measured value
- DF: ≤ the values in the ratings table
- Appearance: No abnormal change to occur

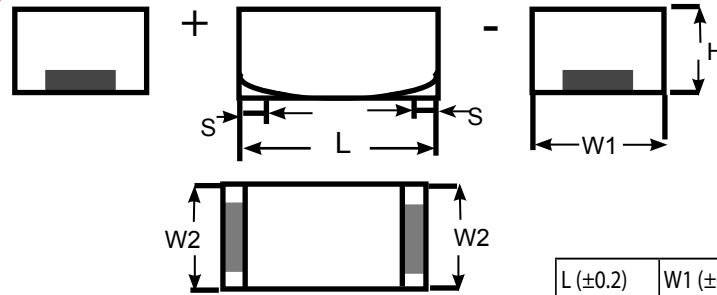
### Vibration:

10 Hz to 2000 Hz to 10 Hz frequency applied one cycle per 20 min at a total amplitude of 1.5 mm. Direction and duration of vibration will be 2 h each in the X,Y and Z planes for total of 6 h with the capacitor soldered in place.

- Appearance; No abnormal change to occur.
- Capacitance: Measured value to be stabilized during test, when measured several times within 30 min before completion of test.

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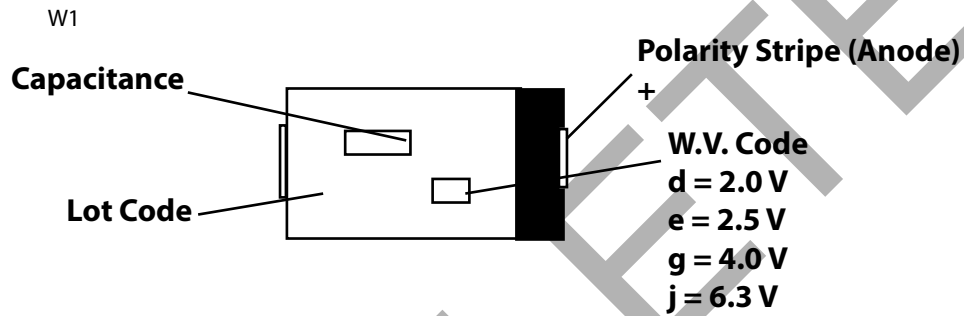
## Outline Drawings



Surface finish of terminal; Tin (Sn)

| L (±0.2) | W1 (±0.2) | W2 (±0.1) | H (±0.2) | S (±0.3) |
|----------|-----------|-----------|----------|----------|
| 7.3 mm   | 4.3 mm    | 2.4 mm    | 1.9 mm   | 1.3 mm   |

## Marking



## Part Numbering System

|                                 |  |   |   |   |   |
|---------------------------------|--|---|---|---|---|
| <b>SPSX</b><br> <br><b>Type</b> | <b>221</b><br> <br><b>Capacitance Code</b><br>820 = 82<br>101 = 100<br>221 = 220 | <b>M</b><br> <br><b>Capacitance Tolerance</b><br>M = ±20% | <b>0E</b><br> <br><b>Voltage Code</b><br>02 = 2.0 Vdc<br>0E = 2.5 VDC<br>04 = 4.0 Vdc<br>06 = 6.3 Vdc | <b>R</b><br> <br><b>Packaging Code</b><br>R = Tape & Reel:<br>3500 pcs/reel<br>B = Bulk | <b>-7</b><br> <br><b>Optional Lower ESR Value at 100 kHz (see tables for available options)</b> |
|---------------------------------|--|---|---|---|---|

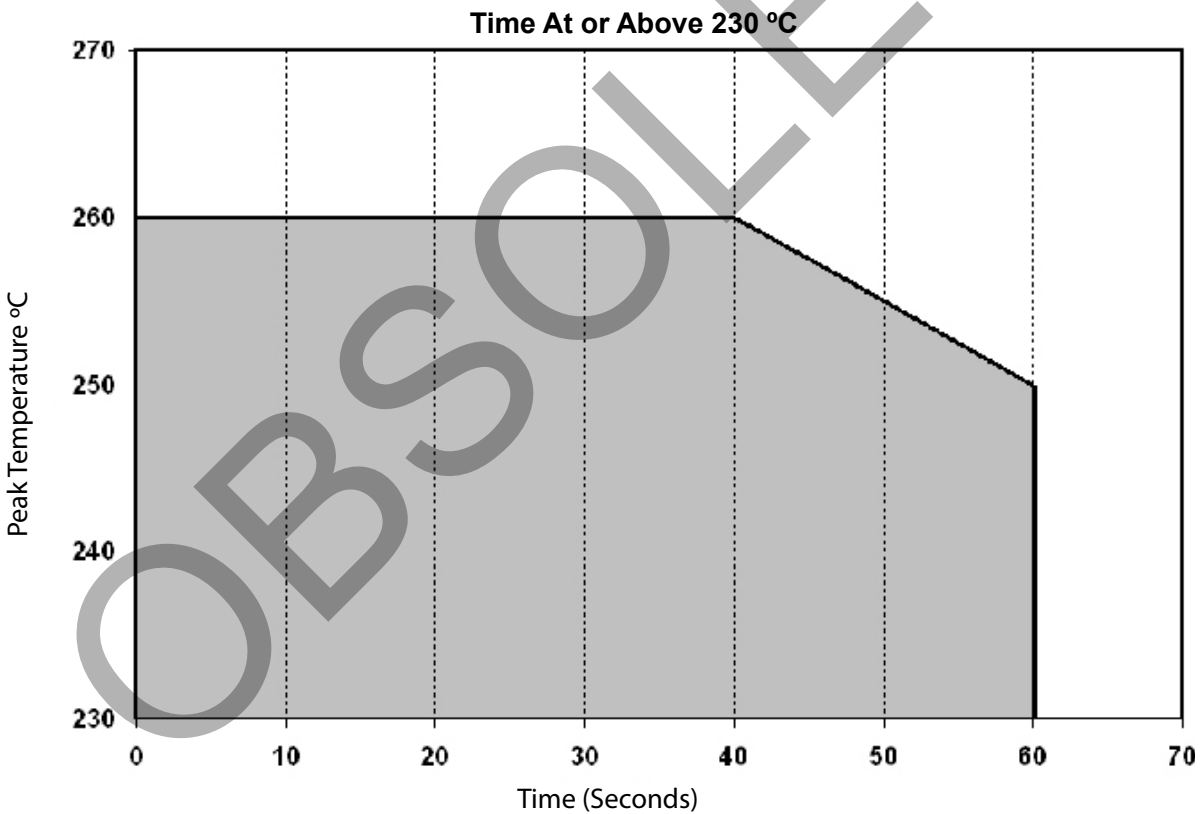
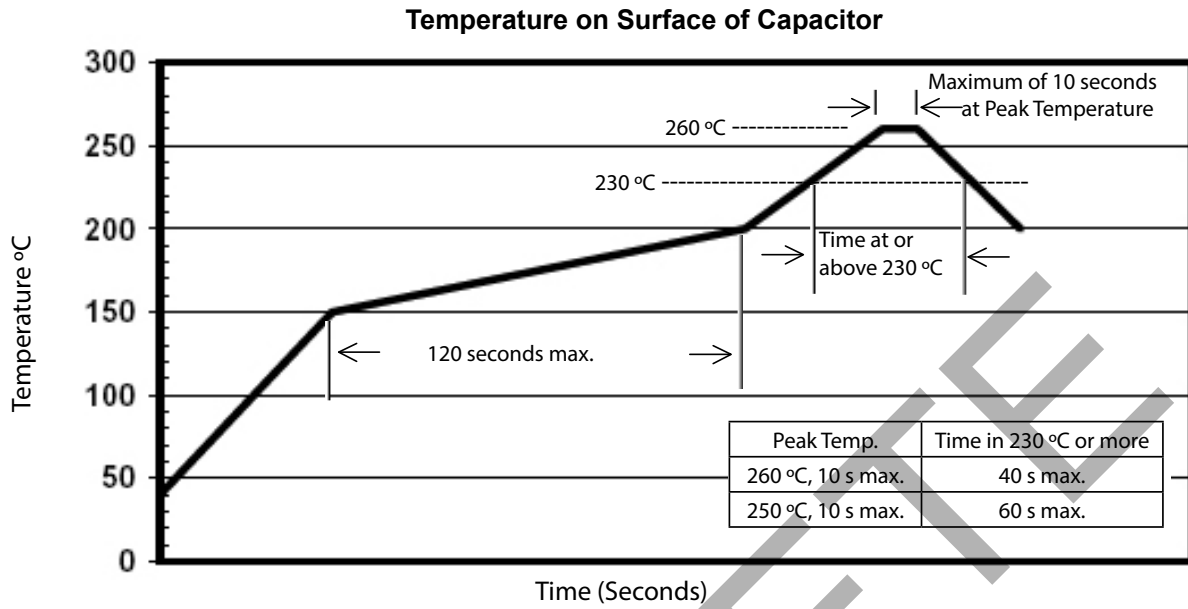
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## Ratings

| Capacitance (μF)               | Catalog Part Number | Max. D.F. @ 120 Hz | Max. DCL (μA) | Max. E.S.R. @ 100kHz/+20°C (mΩ) | Max. Ripple Current @ 100kHz/(+20°C to +105°C) (Arms) |
|--------------------------------|---------------------|--------------------|---------------|---------------------------------|---|
| <b>2.0 Vdc (Surge 2.5 Vdc)</b> |                     |                    |               |                                 |   |
| 180                            | SPSX181M02R         | 0.06               | 36            | 9                               | 3   |
| 220                            | SPSX221M02R         | 0.06               | 44            | 9                               | 3   |
| 270                            | SPSX271M02R         | 0.06               | 54            | 9                               | 3   |
| 270                            | SPSX271M02R-6       | 0.06               | 54            | 6                               | 3.5   |
| 270                            | SPSX271M02R-4       | 0.06               | 54            | 4.5                             | 3.8   |
| 330                            | SPSX331M02R         | 0.06               | 66            | 9                               | 3   |
| 330                            | SPSX331M02R-6       | 0.06               | 66            | 6                               | 3.5   |
| 330                            | SPSX331M02R-4       | 0.06               | 66            | 4.5                             | 3.8   |
| 390                            | SPSX391M02R         | 0.06               | 78            | 9                               | 3   |
| 390                            | SPSX391M02R-6       | 0.06               | 78            | 6                               | 3.5   |
| 390                            | SPSX391M02R-4       | 0.06               | 78            | 4.5                             | 4   |
| 470                            | SPSX471M02R         | 0.06               | 94            | 9                               | 3   |
| 470                            | SPSX471M02R-6       | 0.06               | 94            | 6                               | 3.5   |
| 470                            | SPSX471M02R-4       | 0.06               | 94            | 4.5                             | 4   |
| 560                            | SPSX561M02R-4       | 0.06               | 112           | 4.5                             | 4   |
| <b>2.5 Vdc (Surge 3.1 Vdc)</b> |                     |                    |               |                                 |   |
| 150                            | SPSX151M0ER         | 0.06               | 37.5          | 9                               | 3   |
| 180                            | SPSX181M0ER         | 0.06               | 45            | 9                               | 3   |
| 220                            | SPSX221M0ER         | 0.06               | 55            | 9                               | 3   |
| 220                            | SPSX221M0ER-7       | 0.06               | 55            | 7                               | 3.5   |
| 270                            | SPSX271M0ER-7       | 0.06               | 67.5          | 7                               | 3.5   |
| 330                            | SPSX331M0ER         | 0.06               | 82.5          | 9                               | 3   |
| 330                            | SPSX331M0ER-6       | 0.06               | 82.5          | 6                               | 3.5   |
| 330                            | SPSX331M0ER-4       | 0.06               | 82.5          | 4.5                             | 4   |
| 390                            | SPSX391M0ER         | 0.06               | 97.5          | 9                               | 3   |
| 390                            | SPSX391M0ER-6       | 0.06               | 97.5          | 6                               | 3.5   |
| 390                            | SPSX391M0ER-4       | 0.06               | 97.5          | 4.5                             | 4   |
| 470                            | SPSX471M0ER         | 0.06               | 117.5         | 9                               | 3   |
| 470                            | SPSX471M0ER-6       | 0.06               | 117.5         | 6                               | 3.5   |
| 470                            | SPSX471M0ER-4       | 0.06               | 117.5         | 4.5                             | 4   |
| <b>4.0 Vdc (Surge 5.0 Vdc)</b> |                     |                    |               |                                 |   |
| 82                             | SPSX820M04R         | 0.06               | 32.8          | 9                               | 3   |
| 100                            | SPSX101M04R         | 0.06               | 40            | 9                               | 3   |
| 150                            | SPSX151M04R         | 0.06               | 60            | 9                               | 3   |
| 150                            | SPSX151M04R-7       | 0.06               | 60            | 7                               | 3.5   |
| 180                            | SPSX181M04R         | 0.06               | 72            | 9                               | 3   |
| 220                            | SPSX221M04R         | 0.06               | 88            | 9                               | 3   |
| <b>6.3 Vdc (Surge 8.0 Vdc)</b> |                     |                    |               |                                 |   |
| 120                            | SPSX121M06R-7       | 0.06               | 75.6          | 7                               | 3.5   |
| 150                            | SPSX151M06R         | 0.06               | 94.5          | 9                               | 3   |

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## Reflow Soldering Profile



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