



**THE DATASHEET OF  
SPSX391M02R-4**



# 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

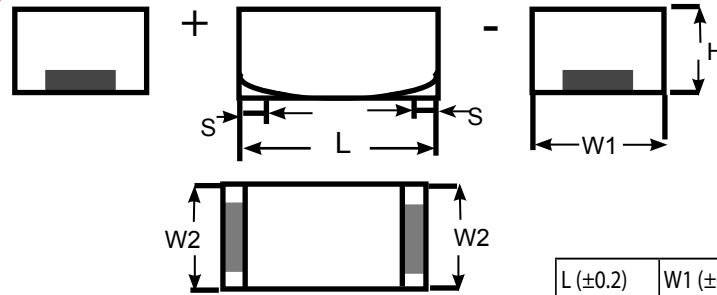
### Vibration:

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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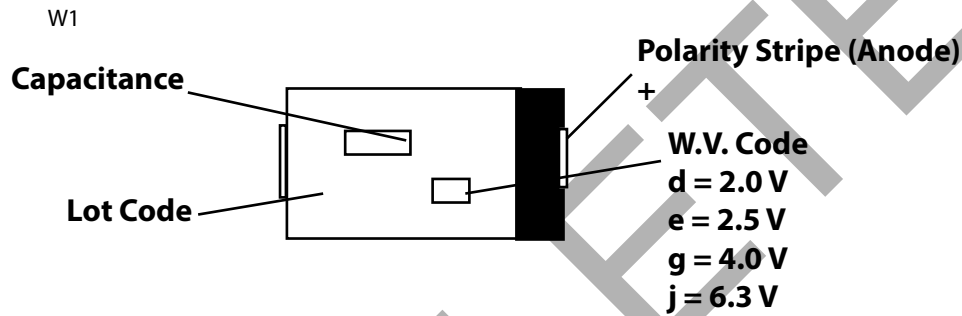
## Outline Drawings



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

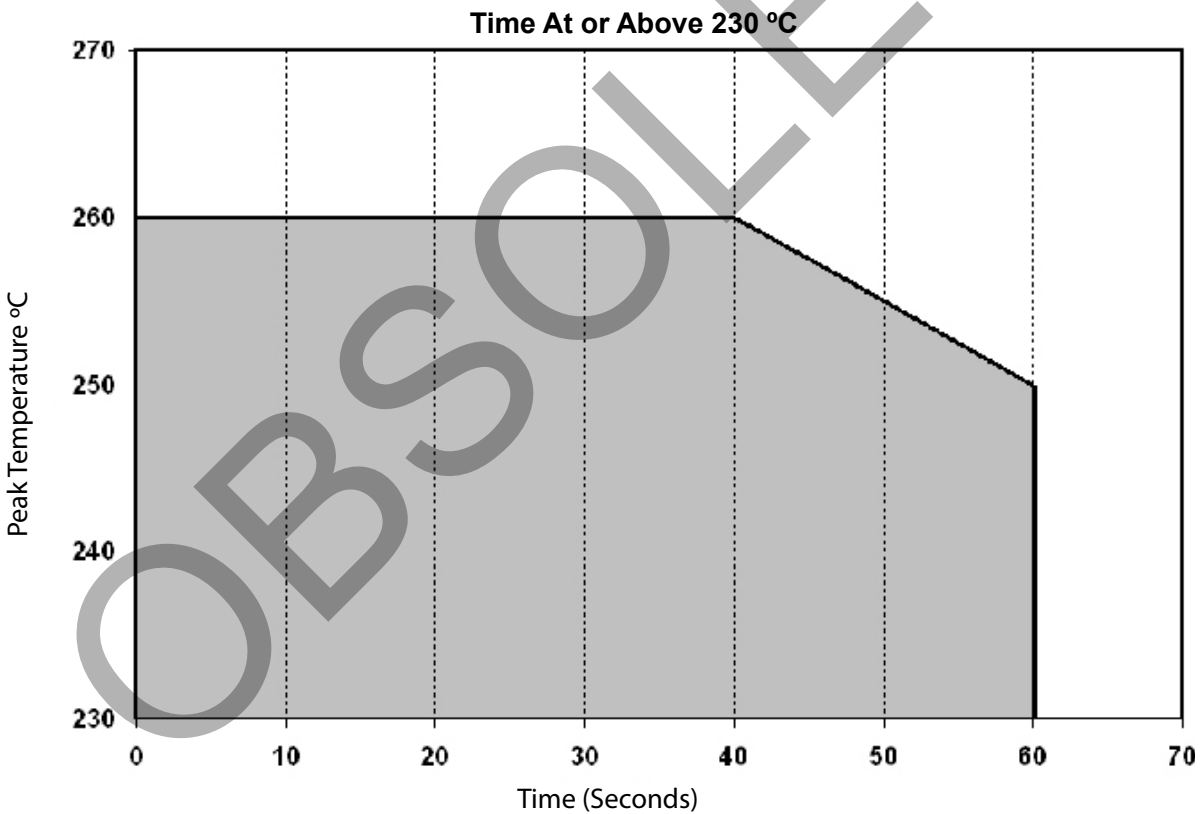
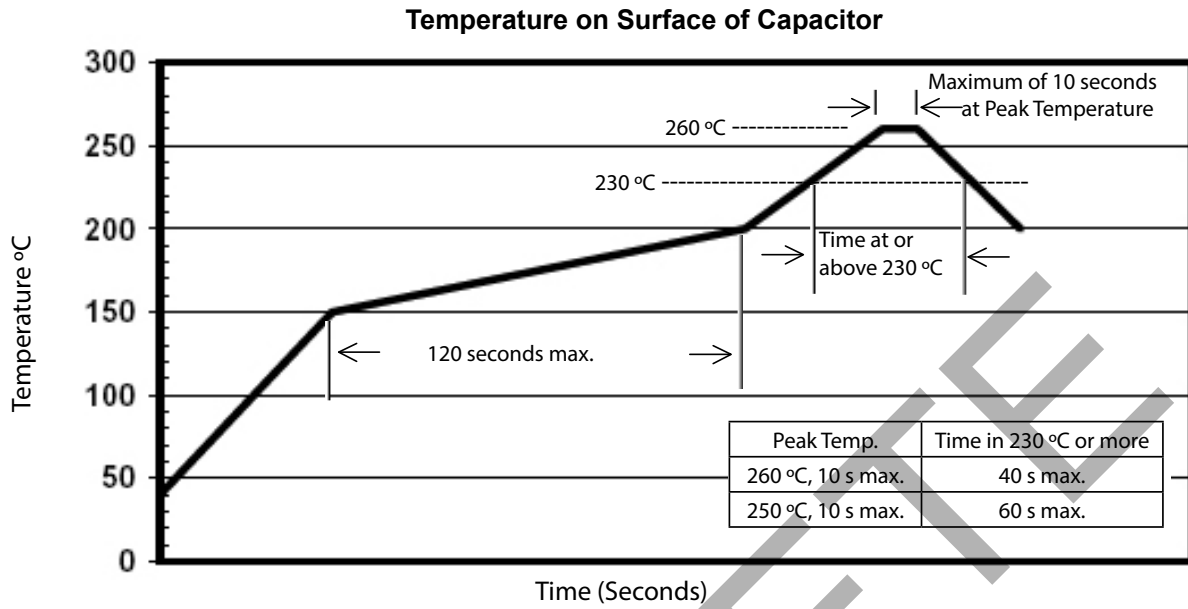
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## Ratings

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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OBSOLETE

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