

# Type AVES -55 °C to +105 °C

## Low Profile SMT Aluminum Electrolytic Capacitors

For Filtering, Bypassing and Power Supply Decoupling



Type AVES Capacitors are rated for 1000 hours at 105 °C with low impedance characteristics. They are ideal for high density PC board packaging. The Type AVES offers a low in-place-cost for a high quality performer. The vertical cylindrical cases facilitate automatic mounting and reflow soldering into the same footprint of like-rated tantalum capacitors except without the need for voltage derating. Type AVES is RoHS compliant.

### Highlights

- +105 °C, Up to 1000 Hours Load Life
- Capacitance Range: 0.1 µF to 100 µF
- Voltage Range: 6.3 Vdc to 50 Vdc

### Specifications

**Operating Temperature:** -55 °C to +105 °C

**Rated Voltage:** 6.3, 10, 16, 25, 35, 50 Vdc

**Capacitance:** 0.1µF to 100 µF

**Capacitance Tolerance:** ±20% @ 120 Hz and +20 °C

**Leakage Current:**  $I = 0.01 CV$  or 3 (µA) whichever is greater after 2 minutes

$C$  = rated capacitance in µF,  $V$  = rated DC working voltage

#### Ripple Current Multiplier:

Freq. (Hz) Vdc	50, 60	120	1 k	10 k up
Under 16	0.8	1.00	1.15	1.25
25 ~ 35	0.8	1.00	1.25	1.40
50	0.8	1.00	1.35	1.50

#### Dissipation Factor: (Tan δ at 120 Hz, 20 °C)

Rated Voltage	6.3	10	16	25	35	50
Tan δ Max	0.30	0.26	0.22	0.16	0.13	0.12

#### Low Temperature Characteristic (at 120 Hz):

Rated Voltage		6.3	10	16	25	35	50
Impedance Ratio	$Z(-25\text{ °C}) / Z(+20\text{ °C})$	4	3	2	2	2	2
	$Z(-40\text{ °C}) / Z(+20\text{ °C})$	8	5	4	3	3	3



#### Load Life Test:

Test Time	1,000 Hours
Capacitance Change	Within ±20% of initial value
Dissipation Factor	Less than 200% of specified value
Leakage Current	Within specified value

\* The above specifications shall be satisfied when the capacitors are restored to 20 °C after the rated voltage is applied for 1,000 hrs at 105 °C

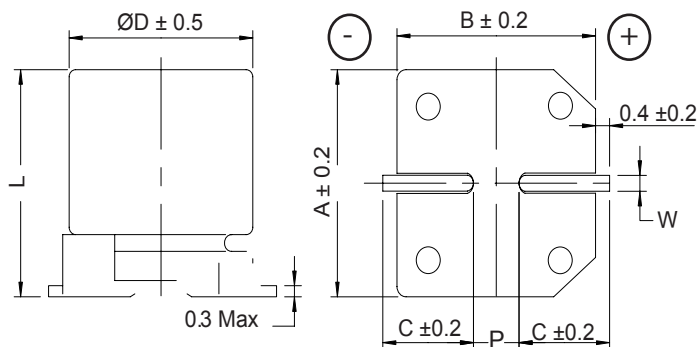
**Shelf Life Test:** Test time: 1000 hours; other items are the same as those for life test.

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).

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### Outline Drawing, Case Code & Dimensions Table



Case Code	$\varnothing D$ (mm)	L (mm)	A (mm)	B (mm)	C (mm)	W (mm)	P $\pm 0.2$ (mm)
B	4.0	5.3 $\pm 0.2$	4.3	4.3	2.0	0.5 to 0.8	1.0
C	5.0	5.3 $\pm 0.2$	5.3	5.3	2.3	0.5 to 0.8	1.5
D	6.3	5.3 $\pm 0.2$	6.6	6.6	2.7	0.5 to 0.8	2.0

### Part Numbering System

AVES	106	M	16	B	12T	- F
<b>Series</b>	<b>Capacitance</b>	<b>Capacitance Tolerance</b>	<b>Voltage</b>	<b>Case Code</b>	<b>Packaging Information</b>	<b>RoHS Compliant</b>
AVES	104 = 0.1 $\mu$ F 105 = 1.0 $\mu$ F 106 = 10.0 $\mu$ F 107 = 100.0 $\mu$ F 108 = 1000.0 $\mu$ F	M = $\pm 20\%$	06 = 6.3 Vdc 10 = 10 Vdc 16 = 16 Vdc 25 = 25 Vdc 50 = 50 Vdc	B = B	12 = Carrier Tape Width (mm) T = Tape & Reel	

### Ratings

Cap ( $\mu$ F)	Catalog Part Number	Max DCL 2 min. ( $\mu$ A)	Max DF 120 Hz 20 °C	Max ESR 120 Hz 20 °C (ohms)	Max Ripple Current 120 Hz 105 °C (mA)	Case Code	Size D x L (mm)	Quantity per Reel (each)
6.3 Vdc ( 8 Vdc Surge)								
22	AVES226M06B12T-F	3.0	0.30	22.6	21	B	4 x 5.3	2000
33	AVES336M06C12T-F	3.0	0.30	15.1	30	C	5 x 5.3	1000
47	AVES476M06C12T-F	3.0	0.30	10.6	46	C	5 x 5.3	1000
100	AVES107M06D16T-F	6.3	0.30	5.0	61	D	6.3 x 5.3	1000
10 Vdc ( 13 Vdc Surge)								
10	AVES106M10B12T-F	3.0	0.26	43.1	15	B	4 x 5.3	2000
22	AVES226M10C12T-F	3.0	0.26	19.6	25	C	5 x 5.3	1000
33	AVES336M10C12T-F	3.3	0.26	13.1	31	C	5 x 5.3	1000
47	AVES476M10D16T-F	4.7	0.26	9.2	43	D	6.3 x 5.3	1000
100	AVES107M10D16T-F	10.0	0.26	4.3	65	D	6.3 x 5.3	1000

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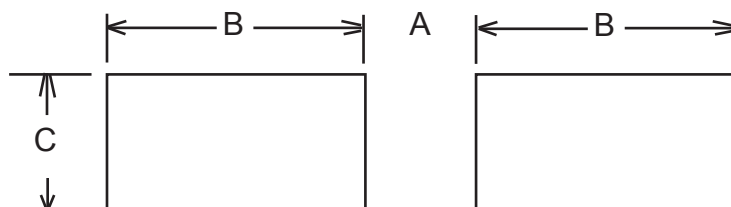
Cap (µF)	Catalog Part Number	Max DCL 2 min. (µA)	Max DF 120 Hz 20 °C	Max ESR 120 Hz 20 °C ( ohms )	Max Ripple Current 120 Hz 105 °C (mA)	Size D x L (mm)	Quantity per Reel (each)
<b>16 Vdc ( 20 Vdc Surge)</b>							
10	AVES106M16B12T-F	3.0	0.22	36.5	16	4 x 5.3	2000
22	AVES226M16C12T-F	3.5	0.22	16.6	28	5 x 5.3	1000
33	AVES336M16D16T-F	5.3	0.22	11.1	40	6.3 x 5.3	1000
47	AVES476M16D16T-F	7.5	0.22	7.8	47	6.3 x 5.3	1000
100	AVES107M16D16T-F	16.0	0.22	3.6	70	6.3 x 5.3	1000
<b>25 Vdc (31 Vdc Surge)</b>							
4.7	AVES475M25B12T-F	3.0	0.16	56.4	12	4 x 5.3	2000
10	AVES106M25C12T-F	3.0	0.16	26.5	21	5 x 5.3	1000
22	AVES226M25D16T-F	5.5	0.16	12.1	36	6.3 x 5.3	1000
33	AVES336M25D16T-F	8.3	0.16	8.0	44	6.3 x 5.3	1000
47	AVES476M25D16T-F	11.8	0.16	5.6	60	6.3 x 5.3	1000
<b>35 Vdc (44 Vdc Surge)</b>							
4.7	AVES475M35B12T-F	3.0	0.13	45.9	14	4 x 5.3	2000
10.0	AVES106M35C12T-F	3.5	0.13	21.6	23	5 x 5.3	1000
22.0	AVES226M35D16T-F	7.7	0.13	9.8	50	6.3 x 5.3	1000
<b>50 Vdc (63 Vdc Surge)</b>							
.10	AVES104M50B12T-F*	3.0	0.12	1989.4	2	4 x 5.3	2000
.22	AVES224M50B12T-F*	3.0	0.12	904.3	3	4 x 5.3	2000
.33	AVES334M50B12T-F*	3.0	0.12	602.8	4	4 x 5.3	2000
.47	AVES474M50B12T-F*	3.0	0.12	423.3	5	4 x 5.3	2000
1.0	AVES105M50B12T-F	3.0	0.12	198.9	7	4 x 5.3	2000
2.2	AVES225M50B12T-F	3.0	0.12	90.4	10	4 x 5.3	2000
3.3	AVES335M50B12T-F	3.0	0.12	60.3	12	4 x 5.3	2000
4.7	AVES475M50C12T-F	3.0	0.12	42.3	17	5 x 5.3	1000
10.0	AVES106M50D16T-F	5.0	0.12	19.9	26	6.3 x 5.3	1000
22.0	AVES226M50D16T-F	11.0	0.12	9.0	51	6.3 x 5.3	1000

\*denotes discontinued part number

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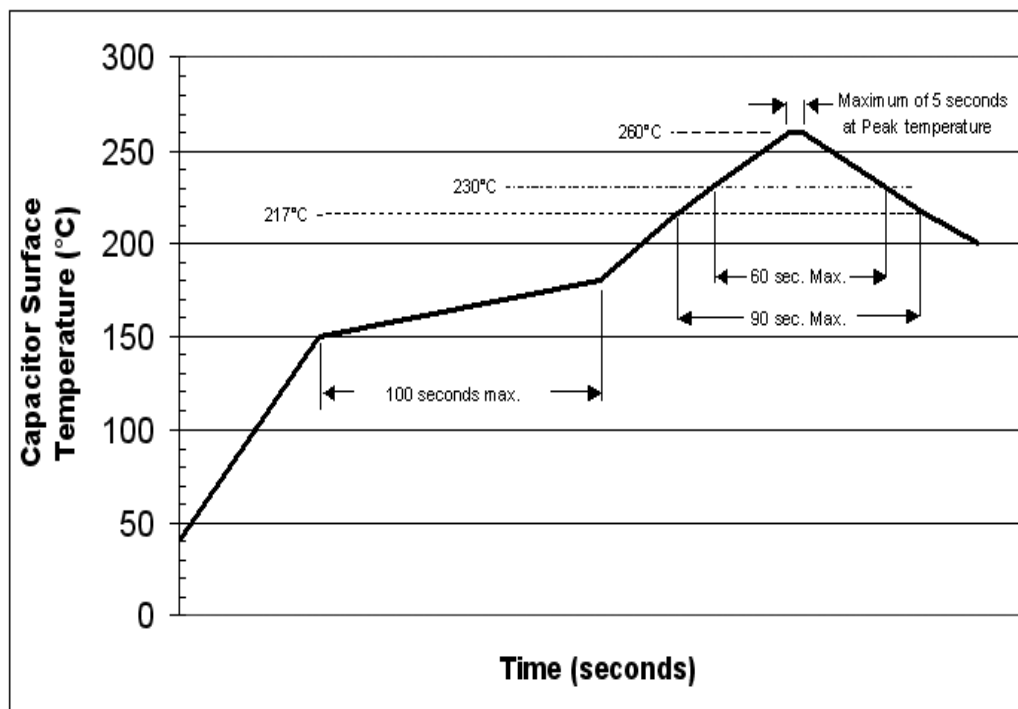
### **Recommended Land Patterns by case size for AVES series**



Case Code	Case Size	Land Dimensions (mm)		
		C	B	A
B	4x5.3	1.6	2.6	1
C	5x5.3	1.6	3	1.4
D	6.3x5.3	1.6	3.5	1.9

## **Recommended Soldering Methods**

Recommended Reflow Soldering Profile:



Parts should be subjected to just one reflow soldering process.

Soldering with a solder iron should be performed with a maximum soldering iron tip temperature of 350±5°C for 3 to 4 seconds.

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