

# Type AVEK $-55\text{ }^{\circ}\text{C}$ to $+105\text{ }^{\circ}\text{C}$ Very Long Life - 5000 Hours - SMT Aluminum Electrolytic Capacitors

For Filtering, Bypassing and Power Supply Decoupling



Type AVEK Capacitors are rated for 5000 hours at  $105\text{ }^{\circ}\text{C}$  with low impedance characteristics. They are ideal for high density PC board packaging. The Type AVEK 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 AVEK is RoHS compliant.

## Highlights

- $+105\text{ }^{\circ}\text{C}$ , Up to 5000 Hours Load Life
- Capacitance Range:  $0.1\text{ }\mu\text{F}$  to  $470\text{ }\mu\text{F}$
- Voltage Range: 6.3 Vdc to 50 Vdc

## Specifications

**Operating Temperature:**  $-55\text{ }^{\circ}\text{C}$  to  $+105\text{ }^{\circ}\text{C}$

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

**Capacitance:**  $0.1\text{ }\mu\text{F}$  to  $470\text{ }\mu\text{F}$

**Capacitance Tolerance:**  $\pm 20\%$  @ 120 Hz and  $+20\text{ }^{\circ}\text{C}$

**Leakage Current:**  $I = 0.01\text{ CV}$  or  $3\text{ }(\mu\text{A})$  whichever is greater after 2 minutes

$C$  = rated capacitance in  $\mu\text{F}$ ,  $V$  = rated DC working voltage

## Ripple Current Multiplier:

Vdc \ Freq. (Hz)	50, 60	120	1 k	10 k up
Under 16	0.8	1	1.15	1.25
25 ~ 35	0.8	1	1.25	1.4
50 ~ 63	0.8	1	1.35	1.5
100	0.7	1	1.35	1.5

## Dissipation Factor: ( $\text{Tan } \delta$ at 120 Hz, $20\text{ }^{\circ}\text{C}$ )

Rated Voltage	6.3	10	16	25	35	50
4 ~ 6.3 $\emptyset$	0.32	0.28	0.24	0.18	0.15	0.14
8 ~ 10 $\emptyset$	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	$Z(-25\text{ }^{\circ}\text{C}) / Z(+20\text{ }^{\circ}\text{C})$	4	3	2	2	2	2
	$Z(-40\text{ }^{\circ}\text{C}) / Z(+20\text{ }^{\circ}\text{C})$	8	5	4	3	3	3

## Load Life Test:

Test Time		2,000 Hours (4 ~ 6.3 $\emptyset$ )	5,000 Hrs (8 ~ 10 $\emptyset$ )
Capacitance Change	6.3 V	Within $\pm 30\%$ of initial value	Within $\pm 30\%$ of initial value
	10 ~ 16 V	Within $\pm 25\%$ of initial value	Within $\pm 30\%$ of initial value
	25 ~ 50 V	Within $\pm 20\%$ of initial value	Within $\pm 30\%$ of initial value
Dissipation Factor	6.3 ~ 16 V	< 300% of specified value	< 300% of specified value
	25 ~ 50 V	< 200% of specified value	< 300% of specified value
Leakage Current		Within specified value	Within specified value

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

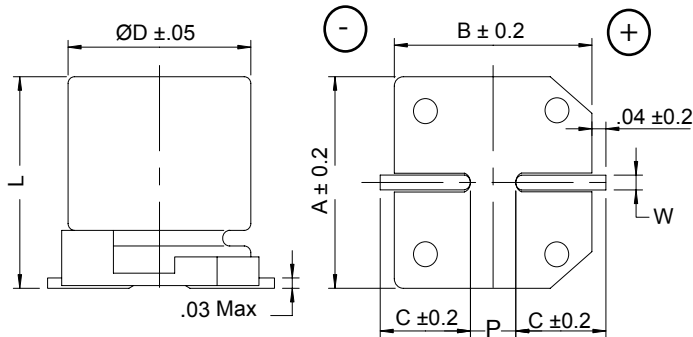


Complies with the EU Directive 2002/95/EC requirement restricting the use of Lead (Pb), Mercury (Hg), Cadmium (Cd), Hexavalent chromium (Cr(VI)), PolyBrominated Biphenyls (PBB) and PolyBrominated Diphenyl Ethers (PBDE).

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### Outline Drawing, Case Code & Dimensions Table



Case Code	Ø D (mm)	L (mm)	A (mm)	B (mm)	C (mm)	W (mm)	P ±0.2 (mm)
B	4.0	5.7 ±0.3	4.3	4.3	2.0	0.5 to 0.8	1.0
C	5.0	5.7 ±0.3	5.3	5.3	2.3	0.5 to 0.8	1.5
D	6.3	5.7 ±0.3	6.3	6.3	2.7	0.5 to 0.8	2.0
F	8.0	10 ±0.5	8.4	8.4	3.0	0.7 to 1.1	3.1
G	10.0	10 ±0.5	10.4	10.4	3.3	0.7 to 1.1	4.7

### Part Numbering System

AVEK	106	M	25	C	12T	-F
Type	Capacitance	Capacitance Tolerance	Voltage Code	Case Code	Packaging Code	RoHS Compliant
AVEK	104 = .1 µF 475 = 4.7 µF 106 = 10.0 µF 227 = 220 µF	M = ±20%	06 = 6.3 Vdc 10 = 10 Vdc 16 = 16 Vdc 25 = 25 Vdc 35 = 35 Vdc 50 = 50 Vdc		12 = Carrier Tape Width (mm) T = Tape & Reel	

### Ratings

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)	Case Code	Size D x L (mm)	Quantity per Reel (each)
<b>6.3 Vdc ( 8 Vdc Surge)</b>								
22	AVEK226M06B12T-F	3.0	0.32	24.1	13	B	4 x 5.7	2000
33	AVEK336M06C12T-F	3.0	0.32	16.1	30	C	5 x 5.7	1000
47	AVEK476M06C12T-F	3.0	0.32	11.3	36	C	5 x 5.7	1000
100	AVEK107M06D16T-F	6.3	0.32	5.3	61	D	6.3 x 5.7	1000
220	AVEK227M06F24T-F	13.9	0.30	2.3	178	F	8 x 10	500
330	AVEK337M06F24T-F	20.8	0.30	1.5	178	F	8 x 10	500
470	AVEK477M06G24T-F	29.6	0.30	1.1	324	G	10 x 10	500
<b>10 Vdc ( 13 Vdc Surge)</b>								
10	AVEK106M10B12T-F	3.0	0.28	46.4	13	B	4 x 5.7	2000
22	AVEK226M10C12T-F	3.0	0.28	21.1	30	C	5 x 5.7	1000
33	AVEK336M10C12T-F	3.3	0.28	14.1	30	C	5 x 5.7	1000
47	AVEK476M10D16T-F	4.7	0.28	9.9	43	D	6.3 x 5.7	1000
100	AVEK107M10F24T-F	10.0	0.26	4.3	178	F	8 x 10	500
220	AVEK227M10F24T-F	22.0	0.26	2.0	178	F	8 x 10	500
330	AVEK337M10G24T-F	33.0	0.26	1.3	324	G	10 x 10	500
470	AVEK477M10G24T-F	47.0	0.26	0.9	324	G	10 x 10	500

# Type AVEK -55 °C to +105 °C

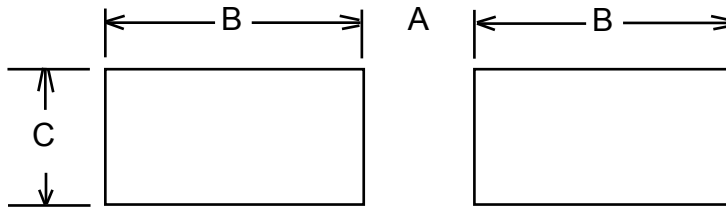
## Very Long Life - 5000 Hours - SMT Aluminum Electrolytic Capacitors

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)
<b>16 Vdc ( 20 Vdc Surge)</b>								
4.7	AVEK475M16B12T-F	3.0	0.24	84.7	13	B	4 x 5.7	2000
10	AVEK106M16B12T-F	3.0	0.24	39.8	16	B	4 x 5.7	2000
22	AVEK226M16C12T-F	3.5	0.24	18.1	30	C	5 x 5.7	1000
33	AVEK336M16D16T-F	5.3	0.24	12.1	40	D	6.3 x 5.7	1000
47	AVEK476M16D16T-F	7.5	0.24	8.5	50	D	6.3 x 5.7	1000
100	AVEK107M16F24T-F	16.0	0.22	3.6	178	F	8 x 10	500
220	AVEK227M16F24T-F	35.2	0.22	1.7	178	F	8 x 10	500
330	AVEK337M16G24T-F	52.8	0.22	1.1	324	G	10 x 10	500
470	AVEK477M16G24T-F	75.2	0.22	0.8	324	G	10 x 10	500
<b>25 Vdc (31 Vdc Surge)</b>								
4.7	AVEK475M25B12T-F	3.0	0.18	63.5	13	B	4 x 5.7	2000
10	AVEK106M25C12T-F	3.0	0.18	29.8	23	C	5 x 5.7	1000
22	AVEK226M25D16T-F	5.5	0.18	13.6	38	D	6.3 x 5.7	1000
33	AVEK336M25D16T-F	8.3	0.18	9.0	48	D	6.3 x 5.7	1000
47	AVEK476M25F24T-F	11.8	0.16	5.6	178	F	8 x 10	500
100	AVEK107M25F24T-F	25.0	0.16	2.7	178	F	8 x 10	500
220	AVEK227M25F24T-F	55.0	0.16	1.2	240	F	8 x 10	500
330	AVEK337M25G24T-F	82.5	0.16	0.8	324	G	10 x 10	500
<b>35 Vdc (44 Vdc Surge)</b>								
4.7	AVEK475M35B12T-F	3.0	0.15	52.9	13	B	4 x 5.7	2000
10	AVEK106M35C12T-F	3.5	0.15	24.9	25	C	5 x 5.7	1000
22	AVEK226M35D16T-F	7.7	0.15	11.3	50	D	6.3 x 5.7	1000
33	AVEK336M35F24T-F	11.6	0.13	6.5	178	F	8 x 10	500
47	AVEK476M35F24T-F	16.5	0.13	4.6	178	F	8 x 10	500
100	AVEK107M35G24T-F	35.0	0.13	2.2	324	G	10 x 10	500
220	AVEK227M35G24T-F	77.0	0.13	1.0	324	G	10 x 10	500
<b>50 Vdc (63 Vdc Surge)</b>								
.10	AVEK104M50B12T-F	3.0	0.14	2321.0	2	B	4 x 5.7	2000
.22	AVEK224M50B12T-F	3.0	0.14	1055.0	3	B	4 x 5.7	2000
.33	AVEK334M50B12T-F	3.0	0.14	703.3	4	B	4 x 5.7	2000
.47	AVEK474M50B12T-F	3.0	0.14	493.8	5	B	4 x 5.7	2000
1.0	AVEK105M50B12T-F	3.0	0.14	232.1	10	B	4 x 5.7	2000
2.2	AVEK225M50B12T-F	3.0	0.14	105.5	16	B	4 x 5.7	2000
3.3	AVEK335M50B12T-F	3.0	0.14	70.3	18	B	4 x 5.7	2000
4.7	AVEK475M50C12T-F	3.0	0.14	49.4	22	C	5 x 5.7	1000
10.0	AVEK106M50D16T-F	5.0	0.14	23.2	30	D	6.3 x 5.7	1000
22.0	AVEK226M50F24T-F	11.0	0.12	9.0	178	F	8 x 10	500
33.0	AVEK336M50F24T-F	16.5	0.12	6.0	178	F	8 x 10	500
47.0	AVEK476M50F24T-F	23.5	0.12	4.2	178	F	8 x 10	500
100.0	AVEK107M50G24T-F	50.0	0.12	2.0	160	G	10 x 10	500

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### Recommended Land Patterns by case size for AVEK series

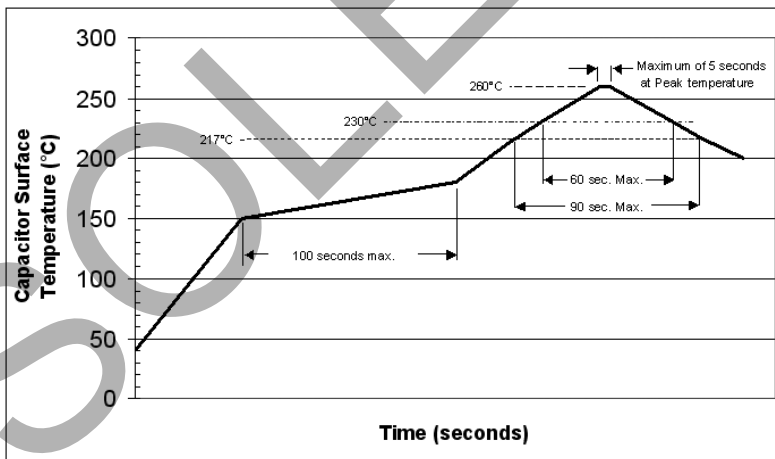


Case Code	Case Size	Land Dimensions (mm)		
		C	B	A
B	4x5.7	1.6	2.6	1.0
C	5x5.7	1.6	3.0	1.4
D	6.3x5.7	1.6	3.5	1.9
F	8x10	2.5	3.5	3.0
G	10x10	2.5	4.0	4.0

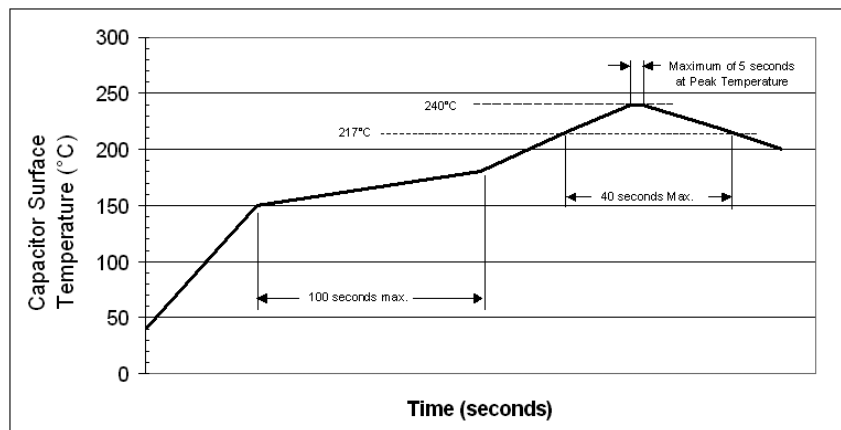
## Recommended Soldering Methods

### Recommended Reflow Soldering Profile:

For case diameters  
4 thru 6.3 mm



For case diameters  
8 and 10 mm



Case sizes 4 thru 6.3 mm dia. should be subjected to just one reflow soldering process.

The 8 and 10 mm dia. case sizes should be subjected to a maximum of two reflow soldering processes.

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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OBSOLETE