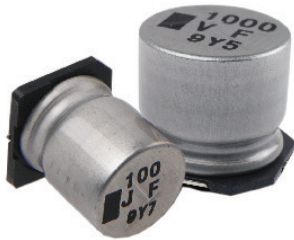


# Type AVE -40 °C to 85 °C General Purpose SMT Capacitors

## Aluminum Electrolytic Capacitors for Filtering and Bypass

Type AVE capacitors are a great value for filter and bypass applications not requiring wide temperature performance or high ripple current. Their vertical cylindrical cases facilitate automatic mounting and reflow soldering and offer a significant savings over tantalum capacitors.



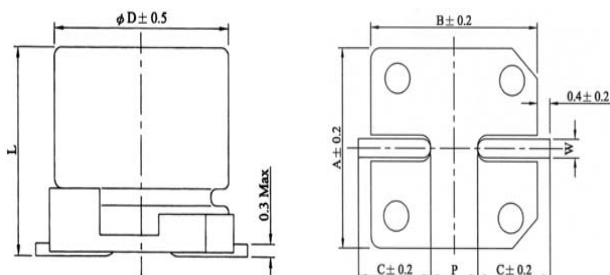
### Highlights

- +85 °C, Up to 2000 Hour Load Life
- Low Impedance
- Voltage Range: 4 Vdc to 100 Vdc

### Specifications

Capacitance Range	0.1 µF to 1500 µF																																										
Capacitance Tolerance	±20% @ 120 Hz and +20 °C																																										
Rated Voltage	4, 6.3, 10, 16, 25, 35, 50, 63 & 100 Vdc																																										
Operating Temperature Range	-40 °C to +85 °C																																										
Leakage Current	0.01 CV or 3 µA @ +20 °C, after two minutes (whichever is greater)																																										
Dissipation Factor	<table border="1"> <tr> <th>4V</th> <th>6.3V</th> <th>10V</th> <th>16V</th> <th>25V</th> <th>35V</th> <th>50V</th> <th>63V</th> <th>100V</th> </tr> <tr> <td>0.42</td> <td>0.28</td> <td>0.24</td> <td>0.20</td> <td>0.14</td> <td>0.12</td> <td>0.10</td> <td>0.10</td> <td>0.10</td> </tr> </table>										4V	6.3V	10V	16V	25V	35V	50V	63V	100V	0.42	0.28	0.24	0.20	0.14	0.12	0.10	0.10	0.10															
4V	6.3V	10V	16V	25V	35V	50V	63V	100V																																			
0.42	0.28	0.24	0.20	0.14	0.12	0.10	0.10	0.10																																			
Low Temperature Characteristics @ 120 Hz	<table border="1"> <tr> <th colspan="2">Rated Voltage (Vdc)</th> <th>4</th> <th>6.3</th> <th>10</th> <th>16</th> <th>25</th> <th>35</th> <th>50</th> <th>63</th> <th>100</th> </tr> <tr> <th>Impedance</th> <td>Z(-25°C)/Z(+20°C)</td> <td>7</td> <td>4</td> <td>3</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> </tr> <tr> <th>Ratio</th> <td>Z(-40°C)/Z(+20°C)</td> <td>15</td> <td>8</td> <td>5</td> <td>4</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> </tr> </table>										Rated Voltage (Vdc)		4	6.3	10	16	25	35	50	63	100	Impedance	Z(-25°C)/Z(+20°C)	7	4	3	2	2	2	2	2	2	Ratio	Z(-40°C)/Z(+20°C)	15	8	5	4	3	3	3	3	3
Rated Voltage (Vdc)		4	6.3	10	16	25	35	50	63	100																																	
Impedance	Z(-25°C)/Z(+20°C)	7	4	3	2	2	2	2	2	2																																	
Ratio	Z(-40°C)/Z(+20°C)	15	8	5	4	3	3	3	3	3																																	
Ripple Current Multipliers	<table border="1"> <tr> <th>Frequency</th> <th>50 Hz</th> <th>120 Hz</th> <th>1 kHz</th> <th>10 kHz up</th> </tr> <tr> <th>Vdc (V)</th> <th colspan="4">Multiplier</th> </tr> <tr> <td>≤ 16</td> <td>0.80</td> <td>1.00</td> <td>1.15</td> <td>1.25</td> </tr> <tr> <td>25 - 35</td> <td>0.80</td> <td>1.00</td> <td>1.25</td> <td>1.40</td> </tr> <tr> <td>50 - 63</td> <td>0.80</td> <td>1.00</td> <td>1.35</td> <td>1.50</td> </tr> <tr> <td>100</td> <td>0.70</td> <td>1.00</td> <td>1.35</td> <td>1.50</td> </tr> </table>										Frequency	50 Hz	120 Hz	1 kHz	10 kHz up	Vdc (V)	Multiplier				≤ 16	0.80	1.00	1.15	1.25	25 - 35	0.80	1.00	1.25	1.40	50 - 63	0.80	1.00	1.35	1.50	100	0.70	1.00	1.35	1.50			
Frequency	50 Hz	120 Hz	1 kHz	10 kHz up																																							
Vdc (V)	Multiplier																																										
≤ 16	0.80	1.00	1.15	1.25																																							
25 - 35	0.80	1.00	1.25	1.40																																							
50 - 63	0.80	1.00	1.35	1.50																																							
100	0.70	1.00	1.35	1.50																																							
Life Test	2000 h @ 85 °C Δ Capacitance ±20% (4 WV: ±30%) DF: ≤ 200% of limit (4 WV: ±30%) DCL: ≤ 100% of limit																																										
Shelf Test	1000 h @ 85 °C Δ Capacitance ±20% (4 WV: ±30%) DF: ≤ 200% of limit (4 WV: ±30%) DCL: ≤ 100% of limit																																										
<b>RoHS Compliant</b>																																											

### Outline Drawing



Case Code	Dimensions in millimeters (mm)						
	D	L	A	B	C	W	P±0.2
<b>A</b>	3	5.3±0.2	3.3	3.3	1.5	.45 ~ 0.75	0.8
<b>B</b>	4	5.3±0.2	4.3	4.3	2.0	0.5 to 0.8	1.0
<b>C</b>	5	5.3±0.2	5.3	5.3	2.3	0.5 to 0.8	1.5
<b>D</b>	6.3	5.3±0.2	6.6	6.6	2.7	0.5 to 0.8	2.0
<b>X</b>	6.3	7.7±0.3	6.6	6.6	2.7	0.5 to 0.8	2.0
<b>E</b>	8	6.5±0.3	8.4	8.4	3.4	0.5 to 0.8	2.3
<b>F</b>	8	10±0.5	8.4	8.4	3.0	0.7 to 1.1	3.1
<b>G</b>	10	10±0.5	10.4	10.4	3.3	0.7 to 1.1	4.7

# Type AVE -40 °C to 85 °C General Purpose SMT Capacitors

## Aluminum Electrolytic Capacitors for Filtering and Bypass

### Part Numbering System

AVE	106	M	16	B	12T	- F
<b>Type</b>	<b>Capacitance</b>	<b>Capacitance</b>	<b>Voltage</b>	<b>Case</b>	<b>Packaging</b>	<b>RoHS</b>
	<b>104</b> = 0.1 $\mu$ F	<b>Tolerance</b>	<b>04</b> = 4 Vdc <b>06</b> = 6.3 Vdc	<b>Code</b>	<b>Information</b>	<b>Compliant</b>
	<b>105</b> = 1.0 $\mu$ F	<b>M</b> = $\pm$ 20%	<b>10</b> = 10 Vdc <b>16</b> = 16 Vdc	<b>B</b> = B	<b>12</b> = Carrier Tape	
	<b>106</b> = 10.0 $\mu$ F		<b>25</b> = 25 Vdc <b>35</b> = 35 Vdc		Width (mm)	
	<b>107</b> = 100.0 $\mu$ F		<b>50</b> = 50 Vdc <b>63</b> = 63 Vdc		<b>T</b> = Tape & Reel	
	<b>108</b> = 1000.0 $\mu$ F		<b>2A</b> = 100 Vdc			

### Ratings

Cap ( $\mu$ F)	Catalog Part Number	Max. DCL 2 min. ( $\mu$ A)	Max. DF @120Hz/20°C	Max. E.S.R. @120Hz/20°C ( $\Omega$ )	Max.	Case Code	Size D x L (mm)	Qty. Per Reel (Each)
					Ripple Current @120Hz/85°C (mA)			
<b>4 Vdc ( 5 Vdc Surge )</b>								
22	AVE226M04A12T-F	3	0.42	31.65	14	A	3x5.3	2000
33	AVE336M04B12T-F	3	0.42	21.10	31	B	4x5.3	2000
47	AVE476M04B12T-F	3	0.42	14.81	37	B	4x5.3	2000
68	AVE686M04C12T-F	3	0.42	10.24	63	C	5x5.3	1000
100	AVE107M04D16T-F	4	0.42	6.96	110	D	6.3x5.3	1000
<b>6.3 Vdc ( 8 Vdc Surge )</b>								
22	AVE226M06B12T-F	3	0.28	21.10	23	B	4x5.3	2000
33	AVE336M06B12T-F	3	0.28	14.07	31	B	4x5.3	2000
47	AVE476M06C12T-F	3	0.28	9.88	52	C	5x5.3	1000
68	AVE686M06D16T-F	4.3	0.28	6.83	89	D	6.3x5.3	1000
100	AVE107M06D16T-F	6.3	0.28	4.64	120	D	6.3x5.3	1000
220	AVE227M06X16T-F	13.9	0.28	2.11	123	X	6.3x7.7	1000
220	AVE227M06E16T-F	13.9	0.28	2.11	155	E	8x6.5	1000
330	AVE337M06X16T-F	20.8	0.28	1.41	139	X	6.3x7.7	1000
330	AVE337M06E16T-F	20.8	0.28	1.41	155	E	8x6.5	1000
470	AVE477M06F24T-F	29.6	0.28	0.99	252	F	8x10	500
1000	AVE108M06G24T-F	63.0	0.28	0.46	458	G	10x10	500
1500	AVE158M06G24T-F	94.5	0.28	0.31	458	G	10x10	500
<b>10 Vdc ( 13 Vdc Surge )</b>								
10	AVE106M10B12T-F	3	0.24	39.79	23	B	4x5.3	2000
22	AVE226M10C12T-F	3	0.24	18.09	39	C	5x5.3	1000
33	AVE336M10C12T-F	3.3	0.24	12.06	48	C	5x5.3	1000
47	AVE476M10D16T-F	4.7	0.24	8.47	67	D	6.3x5.3	1000
68	AVE686M10D16T-F	6.8	0.24	5.85	98	D	6.3x5.3	1000
100	AVE107M10X16T-F	10	0.24	3.98	108	X	6.3x7.7	1000
100	AVE107M10E16T-F	10	0.24	3.98	155	E	8x6.5	1000
220	AVE227M10X16T-F	22	0.24	1.81	130	X	6.3x7.7	1000
220	AVE227M10E16T-F	22	0.24	1.81	155	E	8x6.5	1000
330	AVE337M10F24T-F	33	0.24	1.21	252	F	8x10	500
470	AVE477M10G24T-F	47	0.24	0.85	458	G	10x10	500
1000	AVE108M10G24T-F	100	0.24	0.40	458	G	10x10	500

# Type AVE -40 °C to 85 °C General Purpose SMT Capacitors

## Aluminum Electrolytic Capacitors for Filtering and Bypass

### Ratings

Cap ( $\mu$ F)	Catalog Part Number	Max. DCL 2 min. ( $\mu$ A)	Max. DF @120Hz/20°C	Max. E.S.R. @120Hz/20°C ( $\Omega$ )	Max.	Case Code	Size D x L (mm)	Qty. Per Reel (Each)
					Ripple Current @120Hz/85°C (mA)			
<b>16 Vdc ( 20 Vdc Surge )</b>								
10	AVE106M16A12T-F	3.0	0.2	33.16	14	A	3x5.3	2000
10	AVE106M16B12T-F	3.0	0.2	33.16	26	B	4x5.3	2000
22	AVE226M16C12T-F	3.5	0.2	15.07	44	C	5x5.3	1000
33	AVE336M16D16T-F	5.3	0.2	10.05	63	D	6.3x5.3	1000
47	AVE476M16D16T-F	7.5	0.2	7.05	75	D	6.3x5.3	1000
68	AVE686M16D16T-F	10.9	0.2	4.88	103	D	6.3x5.3	1000
100	AVE107M16X16T-F	16.0	0.2	3.32	108	X	6.3x7.7	1000
100	AVE107M16E16T-F	16.0	0.2	3.32	155	E	8x6.5	1000
220	AVE227M16X16T-F	35.2	0.2	1.51	124	X	6.3x7.7	1000
220	AVE227M16F24T-F	35.2	0.2	1.51	252	F	8x10	500
330	AVE337M16F24T-F	52.8	0.2	1.00	252	F	8x10	500
470	AVE477M16G24T-F	75.2	0.2	0.71	458	G	10x10	500
<b>25 Vdc ( 31 Vdc Surge )</b>								
4.7	AVE475M25B12T-F	3.0	0.14	49.38	19	B	4x5.3	2000
10	AVE106M25C12T-F	3.0	0.14	23.21	32	C	5x5.3	1000
22	AVE226M25D16T-F	5.5	0.14	10.55	55	D	6.3x5.3	1000
33	AVE336M25D16T-F	8.3	0.14	7.03	67	D	6.3x5.3	1000
47	AVE476M25X16T-F	11.8	0.14	4.94	98	X	6.3x7.7	1000
47	AVE476M25E16T-F	11.8	0.14	4.94	155	E	8x6.5	1000
68	AVE686M25X16T-F	17.0	0.14	3.41	109	X	6.3x7.7	1000
68	AVE686M25E16T-F	17.0	0.14	3.41	155	E	8x6.5	1000
100	AVE107M25X16T-F	25.0	0.14	2.32	124	X	6.3x7.7	1000
100	AVE107M25E16T-F	25.0	0.14	2.32	155	E	8x6.5	1000
220	AVE227M25F24T-F	55.0	0.14	1.06	252	F	8x10	500
330	AVE337M25G24T-F	82.5	0.14	0.70	458	G	10x10	500
<b>35 Vdc ( 44 Vdc Surge )</b>								
3.3	AVE335M35A12T-F	3.0	0.12	60.28	8	A	3x5.3	2000
4.7	AVE475M35B12T-F	3.0	0.12	42.33	20	B	4x5.3	2000
10	AVE106M35C12T-F	3.5	0.12	19.89	34	C	5x5.3	1000
22	AVE226M35D16T-F	7.7	0.12	9.04	59	D	6.3x5.3	1000
33	AVE336M35X16T-F	11.6	0.12	6.03	85	X	6.3x7.7	1000
33	AVE336M35E16T-F	11.6	0.12	6.03	155	E	8x6.5	1000
47	AVE476M35X16T-F	16.5	0.12	4.23	98	X	6.3x7.7	1000
47	AVE476M35E16T-F	16.5	0.12	4.23	155	E	8x6.5	1000
68	AVE686M35X16T-F	23.8	0.12	2.93	109	X	6.3x7.7	1000
68	AVE686M35E16T-F	23.8	0.12	2.93	155	E	8x6.5	1000
100	AVE107M35F24T-F	35.0	0.12	1.99	252	F	8x10	500
220	AVE227M35G24T-F	77.0	0.12	0.90	458	G	10x10	500

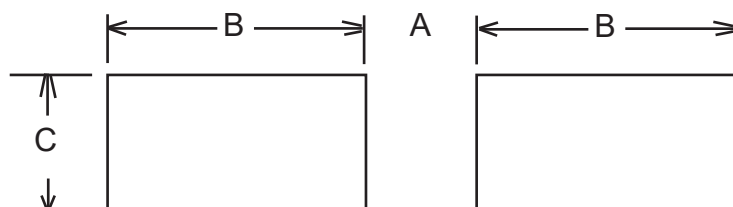
# Type AVE -40 °C to 85 °C General Purpose SMT Capacitors

## Aluminum Electrolytic Capacitors for Filtering and Bypass

Cap ( $\mu$ F)	Catalog Part Number	Max. DCL 2 min. ( $\mu$ A)	Max. DF @120Hz/20°C	Max. E.S.R. @120Hz/20°C ( $\Omega$ )	Max.	Case Code	Size D x L (mm)	Qty. Per Reel (Each)
					Ripple Current @120Hz/85°C (mA)			
<b>50 Vdc ( 63 Vdc Surge )</b>								
.10	AVE104M50B12T-F*	3.0	0.1	1657.83	3	B	4x5.3	2000
.22	AVE224M50B12T-F*	3.0	0.1	753.56	5	B	4x5.3	2000
.33	AVE334M50B12T-F*	3.0	0.1	502.37	6	B	4x5.3	2000
.47	AVE474M50B12T-F*	3.0	0.1	352.73	7	B	4x5.3	2000
1	AVE105M50B12T-F	3.0	0.1	165.78	10	B	4x5.3	2000
2.2	AVE225M50B12T-F	3.0	0.1	75.36	15	B	4x5.3	2000
3.3	AVE335M50B12T-F	3.0	0.1	50.24	19	B	4x5.3	2000
4.7	AVE475M50C12T-F	3.0	0.1	35.27	26	C	5x5.3	1000
10	AVE106M50D16T-F	5.0	0.1	16.58	44	D	6.3x5.3	1000
22	AVE226M50X16T-F	11.0	0.1	7.54	65	X	6.3x7.7	1000
22	AVE226M50E16T-F	11.0	0.1	7.54	155	E	8x6.5	1000
33	AVE336M50X16T-F	16.5	0.1	5.02	82	X	6.3x7.7	1000
33	AVE336M50E16T-F	16.5	0.1	5.02	155	E	8x6.5	1000
47	AVE476M50X16T-F	23.5	0.1	3.53	98	X	6.3x7.7	1000
47	AVE476M50F24T-F	23.5	0.1	3.53	252	F	8x10	500
68	AVE686M50F24T-F	34.0	0.1	2.44	252	F	8x10	500
100	AVE107M50F24T-F	50.0	0.1	1.66	252	F	8x10	500
220	AVE227M50G24T-F	110.0	0.1	0.75	458	G	10x10	500
<b>63 Vdc ( 75 Vdc Surge )</b>								
10	AVE106M63E16T-F	6.3	0.1	16.58	75	E	8x6.5	1000
22	AVE226M63F24T-F	13.9	0.1	7.54	139	F	8x10	500
33	AVE336M63F24T-F	20.8	0.1	5.02	139	F	8x10	500
47	AVE476M63G24T-F	29.6	0.1	3.53	226	G	10x10	500
68	AVE686M63G24T-F	42.8	0.1	2.44	226	G	10x10	500
100	AVE107M63G24T-F	63.0	0.1	1.66	226	G	10x10	500
<b>100 Vdc ( 125 Vdc Surge )</b>								
10	AVE106M2AF24T-F	10	0.1	16.58	94	F	8x10	500
22	AVE226M2AG24T-F	22	0.1	7.54	189	G	10x10	500
33	AVE336M2AG24T-F	33	0.1	5.02	189	G	10x10	500

\*denotes discontinued part

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



Case Code	Case Size	Land Dimensions (mm)		
		C	B	A
A	3x5.3	1.6	2.2	0.8
B	4x5.3	1.6	2.6	1.0
C	5x5.3	1.6	3.0	1.4
D	6.3x5.3	1.6	3.5	1.9
X	6.3x7.7	1.6	3.5	1.9
E	8x6.5	1.6	4.0	2.1
F	8x10	2.5	3.5	3.0
G	10x10	2.5	4.0	4.0

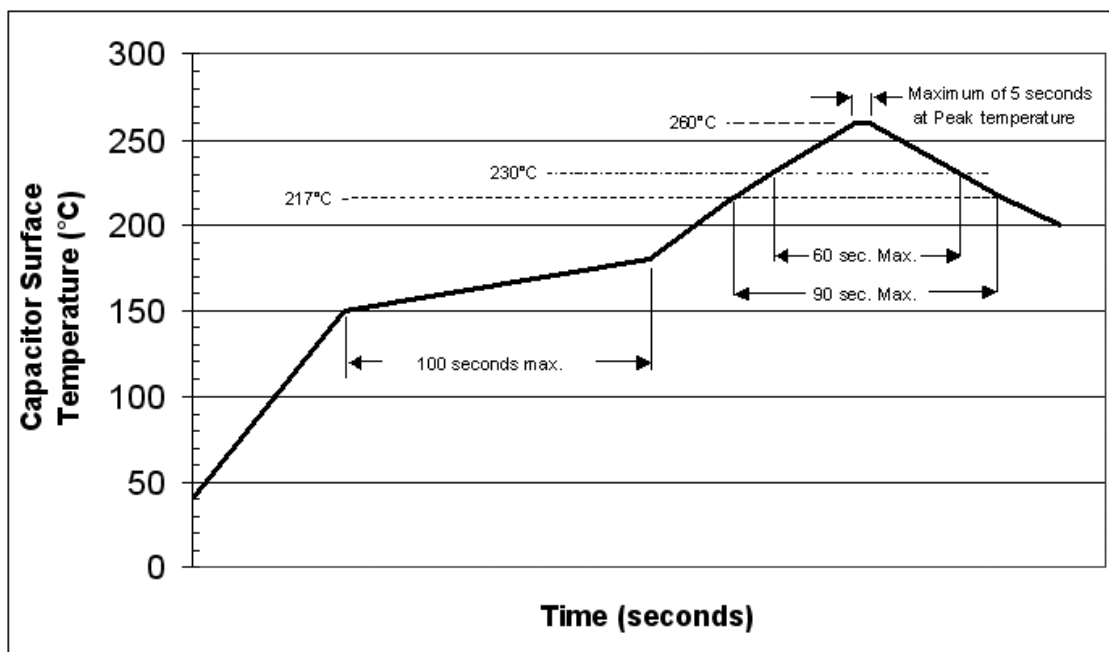
# Type AVE -40 °C to 85 °C General Purpose SMT Capacitors

## Aluminum Electrolytic Capacitors for Filtering and Bypass

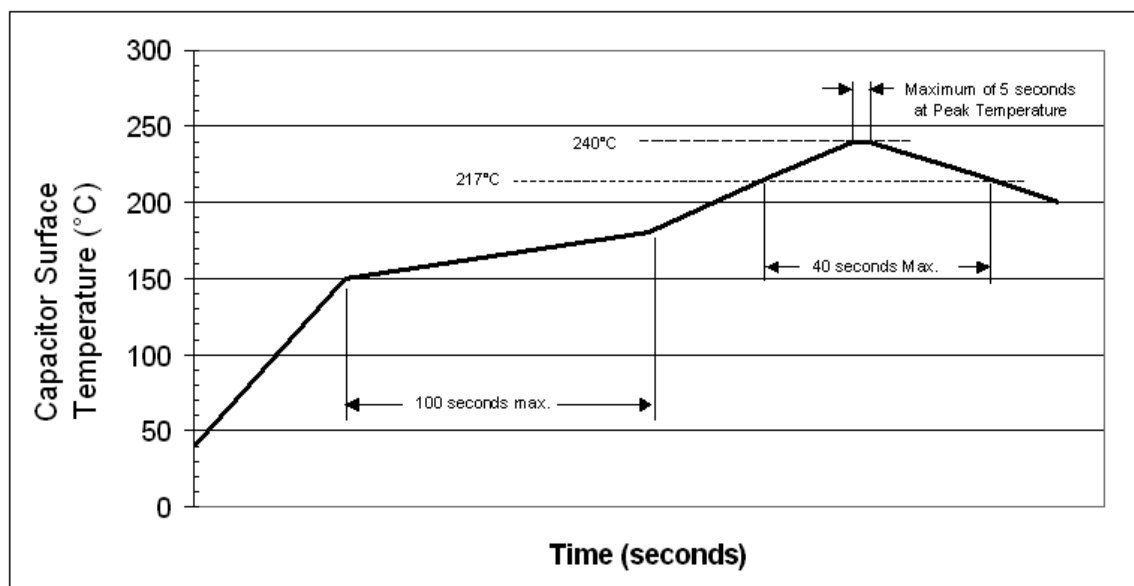
### Recommended Soldering Methods

Recommended Reflow Soldering Profile:

For case diameters  
3 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  $350 \pm 5^\circ\text{C}$  for 3 to 4 seconds.

## Type AVE –40 °C to 85 °C General Purpose SMT Capacitors

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### Aluminum Electrolytic Capacitors for Filtering and Bypass

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