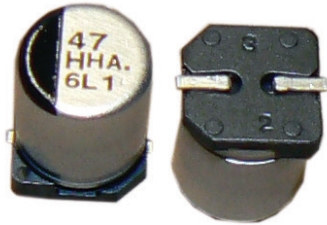


# Type AHA

## SMT Aluminum Electrolytic Capacitors -55 °C to +105 °C - Long Life

### Long Life Filtering, Bypassing, Power Supply Decoupling



Type AHA Capacitors deliver twice the life of many SMT aluminum capacitor types, and they handle high levels of ripple current. The AHA can handle the ripple current of Type AVS at 20 °C higher temperature. The vertical cylindrical cases facilitate automatic mounting and reflow soldering and Type AHA offers a significant cost savings over tantalum capacitors.

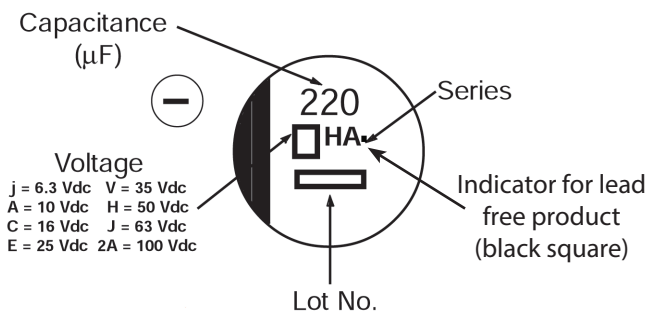
#### Highlights

- +105 °C, Up to 2000 Hour Load Life
- Capacitance Range: 0.1 μF to 1500 μF
- Voltage Range: 6.3 Vdc to 100 Vdc
- AEC-Q200 Compliant

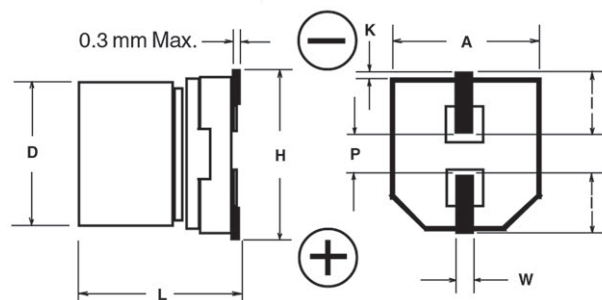
#### Specifications

Capacitance Range	0.1 μF to 1500 μF																											
Capacitance Tolerance	±5%, ±10%, ±20%																											
Rated Voltage	6.3, 10, 16, 25, 35, 50, 63 & 100 Vdc																											
Operating Temperature Range	-55 °C to +105 °C																											
Leakage Current	0.01 CV or 3 μA @ +20°C after two minutes (whichever is greater)																											
Dielectric Withstand Voltage	1.6 x rated voltage for 2 s @ +25 °C ±5 °C																											
Dissipation Factor @ 120 Hz, +25 °C	See Ratings Table																											
Ripple Current Multpliers (Frequency)	<table border="1"> <thead> <tr> <th>50/60 Hz</th> <th>120 Hz</th> <th>1 kHz</th> <th>10 kHz &amp; up</th> </tr> </thead> <tbody> <tr> <td>0.7</td> <td>1</td> <td>1.3</td> <td>1.7</td> </tr> </tbody> </table>	50/60 Hz	120 Hz	1 kHz	10 kHz & up	0.7	1	1.3	1.7																			
50/60 Hz	120 Hz	1 kHz	10 kHz & up																									
0.7	1	1.3	1.7																									
Load Life	1000 h @ +105 °C, 4.0 - 6.3 mm dia. 2000 h @ +105 °C, 8.0 - 10.0 mm dia. Capacitance ±20% DF: < 200% of limit DCL: ≤100% of limit																											
Shelf Life	1000 h @ +105 °C Δ Capacitance ±20% DF: < 200% of limit DCL: ≤100% of limit																											
Maximum Impedance Ratio at 120 Hz	<table border="1"> <thead> <tr> <th>W.V. Vdc</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> </thead> <tbody> <tr> <td>-25 °C /+20 °C</td> <td>4</td> <td>3</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> <td>3</td> <td>3</td> </tr> <tr> <td>-40 °C /+20 °C</td> <td>8</td> <td>6</td> <td>4</td> <td>4</td> <td>3</td> <td>3</td> <td>4</td> <td>4</td> </tr> </tbody> </table>	W.V. Vdc	6.3	10	16	25	35	50	63	100	-25 °C /+20 °C	4	3	2	2	2	2	3	3	-40 °C /+20 °C	8	6	4	4	3	3	4	4
W.V. Vdc	6.3	10	16	25	35	50	63	100																				
-25 °C /+20 °C	4	3	2	2	2	2	3	3																				
-40 °C /+20 °C	8	6	4	4	3	3	4	4																				
<b>RoHS Compliant</b>																												

#### AHA Series Marking



#### Outline Drawing



# Type AHA

## SMT Aluminum Electrolytic Capacitors -55 °C to +105 °C - Long Life

### Case Dimensions

Case									
Code	D ± 0.5	L	A ± 0.2	H (max)	I (ref)	W	P (ref)	K	
B	4	5.4 +.1,-.2	4.3	5.5	1.8	0.65 ± 0.1	1	0.35 + 0.15/-0.20	
C	5	5.4 +.1,-.2	5.3	6.5	2.2	0.65 ± 0.1	1.5	0.35 + 0.15/-0.20	
D	6.3	5.4 +.1,-.2	6.6	7.8	2.6	0.65 ± 0.1	1.8	0.35 + 0.15/-0.20	
X	6.3	7.7 ±.3	6.6	7.8	2.6	0.65 ± 0.1	1.8	0.35 + 0.15/-0.20	
E	8	6.2 ±.3	8.3	9.5	3.4	0.65 ± 0.1	2.2	0.35 + 0.15/-0.20	
F	8	10.2 ±.3	8.3	10	3.4	0.90 ± 0.2	3.1	0.70 ± 0.20	
G	10	10.2 ±.3	10.3	12	3.5	0.90 ± 0.2	4.6	0.70 ± 0.20	

### Ratings

Cap (µF)	Catalog Part Number	Max DCL 2 min. (µA)	Max DF 120 Hz /20 °C	Max ESR 120 Hz /20 °C (Ω)	Max Ripple Current 120 Hz /105 °C (mA)	Case Code	Size D x L (mm)	Quantity per Reel
<b>6.3 Vdc ( 8 Vdc Surge)</b>								
22.0	AHA226M06B12T-F	3.0	0.30	22.6	29	B	4 x 5.4	2000
33.0	AHA336M06B12T-F	3.0	0.35	17.6	29	B	4 x 5.4	2000
47.0	AHA476M06B12T-F	3.0	0.35	12.3	36	B	4 x 5.4	2000
47.0	AHA476M06C12T-F	3.0	0.30	10.6	46	C	5 x 5.4	1000
100.0	AHA107M06C12T-F	6.3	0.35	5.8	47	C	5 x 5.4	1000
100.0	AHA107M06D16T-F	6.3	0.30	5.0	71	D	6.3 x 5.4	1000
220.0	AHA227M06D16T-F	13.9	0.35	2.6	74	D	6.3 x 5.4	1000
330.0	AHA337M06X16T-F	20.8	0.30	1.5	105	X	6.3 x 7.7	900
330.0	AHA337M06F24T-F	20.8	0.35	1.8	230	F	8 x 10.2	500
470.0	AHA477M06F24T-F	29.6	0.35	1.2	300	F	8 x 10.2	500
1000.0	AHA108M06F24T-F	63.0	0.35	0.6	300	F	8 x 10.2	500
1000.0	AHA108M06G24T-F	63.0	0.35	0.6	400	G	10 x 10.2	500
1500.0	AHA158M06G24T-F	94.5	0.35	0.4	480	G	10 x 10.2	500
<b>10 Vdc ( 13 Vdc Surge)</b>								
22.0	AHA226M10B12T-F	3.0	0.30	22.6	28	B	4 x 5.4	2000
33.0	AHA336M10B12T-F	3.3	0.30	15.1	29	B	4 x 5.4	2000
33.0	AHA336M10C12T-F	3.3	0.22	11.1	43	C	5 x 5.4	1000
47.0	AHA476M10C12T-F	4.7	0.30	10.6	43	C	5 x 5.4	1000
100.0	AHA107M10D16T-F	10.0	0.30	5.0	70	D	6.3 x 5.4	1000
100.0	AHA107M10E16T-F	10.0	0.26	4.3	110	E	8 x 6.2	1000
220.0	AHA227M10X16T-F	22.0	0.22	1.7	105	X	6.3 x 7.7	900
220.0	AHA227M10F24T-F	22.0	0.26	2.0	160	F	8 x 10.2	500
470.0	AHA477M10F24T-F	47.0	0.26	0.9	200	F	8 x 10.2	500
470.0	AHA477M10G24T-F	47.0	0.26	0.9	270	G	10 x 10.2	500
1000.0	AHA108M10G24T-F	100.0	0.26	0.4	580	G	10 x 10.2	500
<b>16 Vdc ( 20 Vdc Surge)</b>								
10.0	AHA106M16B12T-F	3.0	0.16	26.5	28	B	4 x 5.4	2000
22.0	AHA226M16B12T-F	3.5	0.26	19.6	28	B	4 x 5.4	2000
22.0	AHA226M16C12T-F	3.5	0.16	12.1	39	C	5 x 5.4	1000
33.0	AHA336M16C12T-F	5.3	0.26	13.1	35	C	5 x 5.4	1000
47.0	AHA476M16C12T-F	7.5	0.26	9.2	39	C	5 x 5.4	1000
47.0	AHA476M16D16T-F	7.5	0.16	5.6	70	D	6.3 x 5.4	1000
100.0	AHA107M16D16T-F	16.0	0.26	4.3	70	D	6.3 x 5.4	1000
220.0	AHA227M16X16T-F	35.2	0.16	1.2	105	X	6.3 x 7.7	900
220.0	AHA227M16F24T-F	35.2	0.20	1.5	150	F	8 x 10.2	500
220.0	AHA227M16G24T-F	35.2	0.20	1.5	210	G	10 x 10.2	500
330.0	AHA337M16F24T-F	52.8	0.20	1.0	170	F	8 x 10.2	500
330.0	AHA337M16G24T-F	52.8	0.20	1.0	230	G	10 x 10.2	500
470.0	AHA477M16F24T-F	75.2	0.20	0.7	190	F	8 x 10.2	500
470.0	AHA477M16G24T-F	75.2	0.20	0.7	340	G	10 x 10.2	500
<b>25 Vdc ( 31 Vdc Surge)</b>								
4.7	AHA475M25B12T-F	3.0	0.14	49.4	22	B	4 x 5.4	2000
10.0	AHA106M25B12T-F	3.0	0.20	33.2	22	B	4 x 5.4	2000
10.0	AHA106M25C12T-F	3.0	0.14	23.2	28	C	5 x 5.4	1000
22.0	AHA226M25C12T-F	5.5	0.20	15.1	35	C	5 x 5.4	1000
22.0	AHA226M25D16T-F	5.5	0.14	10.6	55	D	6.3 x 5.4	1000
33.0	AHA336M25C12T-F	8.3	0.20	10.0	42	C	5 x 5.4	1000
33.0	AHA336M25D16T-F	8.3	0.14	7.0	65	D	6.3 x 5.4	1000
47.0	AHA476M25D16T-F	11.8	0.20	7.1	70	D	6.3 x 5.4	1000
47.0	AHA476M25E16T-F	11.8	0.16	5.6	91	E	8 x 6.2	1000
100.0	AHA107M25E16T-F	25.0	0.16	2.7	91	E	8 x 6.2	1000
100.0	AHA107M25F24T-F	25.0	0.16	2.7	130	F	8 x 10.2	500
220.0	AHA227M25F24T-F	55.0	0.16	1.2	160	F	8 x 10.2	500
220.0	AHA227M25G24T-F	55.0	0.16	1.2	190	G	10 x 10.2	500
330.0	AHA337M25F24T-F	82.5	0.16	0.8	180	F	8 x 10.2	500
330.0	AHA337M25G24T-F	82.5	0.16	0.8	340	G	10 x 10.2	500
470.0	AHA477M25G24T-F	117.5	0.16	0.6	360	G	10 x 10.2	500

# Type AHA

## SMT Aluminum Electrolytic Capacitors -55 °C to +105 °C - Long Life

Cap (µF)	Catalog Part Number	Max DCL 2 min. (µA)	Max DF 120 Hz /20 °C	Max ESR 120 Hz /20 °C (Ω)	Max Ripple Current 120 Hz /105 °C (mA)	Case Code	Size D x L (mm)	Quantity per Reel
<b>35 Vdc (44 Vdc Surge)</b>								
4.7	AHA475M35B12T-F	3.0	0.12	42.3	22	B	4 x 5.4	2000
10.0	AHA106M35B12T-F	3.6	0.16	26.5	22	B	4 x 5.4	2000
10.0	AHA106M35C12T-F	3.6	0.12	19.9	30	C	5 x 5.4	1000
22.0	AHA226M35C12T-F	7.7	0.16	12.1	35	C	5 x 5.4	1000
22.0	AHA226M35D16T-F	7.7	0.12	9.0	60	D	6.3 x 5.4	1000
33.0	AHA336M35D16T-F	11.6	0.16	8.0	42	D	6.3 x 5.4	1000
33.0	AHA336M35E16T-F	11.6	0.14	7.0	84	E	8 x 6.2	1000
47.0	AHA476M35E16T-F	16.5	0.14	4.9	84	E	8 x 6.2	1000
47.0	AHA476M35F24T-F	16.5	0.14	4.9	98	F	8 x 10.2	500
100.0	AHA107M35X16T-F	35.0	0.12	2.0	84	X	6.3 x 7.7	900
100.0	AHA107M35F24T-F	35.0	0.14	2.3	120	F	8 x 10.2	500
100.0	AHA107M35G24T-F	35.0	0.14	2.3	160	G	10 x 10.2	500
220.0	AHA227M35F24T-F	77.0	0.14	1.1	170	F	8 x 10.2	500
220.0	AHA227M35G24T-F	77.0	0.14	1.1	210	G	10 x 10.2	500
330.0	AHA337M35G24T-F	115.5	0.14	0.7	250	G	10 x 10.2	500
<b>50 Vdc (63 Vdc Surge)</b>								
0.10	AHA104M50B12T-F*	3.0	0.12	1990.0	1	B	4 x 5.4	2000
0.22	AHA224M50B12T-F*	3.0	0.12	905.0	2	B	4 x 5.4	2000
0.33	AHA334M50B12T-F*	3.0	0.12	603.0	3	B	4 x 5.4	2000
0.47	AHA474M50B12T-F*	3.0	0.12	424.0	5	B	4 x 5.4	2000
1.0	AHA105M50B12T-F	3.0	0.12	199.0	10	B	4 x 5.4	2000
2.2	AHA225M50B12T-F	3.0	0.12	90.5	16	B	4 x 5.4	2000
3.3	AHA335M50B12T-F	3.0	0.12	60.3	16	B	4 x 5.4	2000
4.7	AHA475M50C12T-F	3.0	0.12	42.4	23	C	5 x 5.4	1000
10.0	AHA106M50D16T-F	5.0	0.12	19.9	35	D	6.3 x 5.4	1000
22.0	AHA226M50E16T-F	11.0	0.12	9.0	70	E	8 x 6.2	1000
33.0	AHA336M50X16T-F	16.5	0.12	6.0	60	X	6.3 x 7.7	900
33.0	AHA336M50E16T-F	16.5	0.12	6.0	70	E	8 x 6.2	1000
33.0	AHA336M50F24T-F	16.5	0.12	6.0	91	F	8 x 10.2	500
47.0	AHA476M50X16T-F	23.5	0.12	4.2	63	X	6.3 x 7.7	900
47.0	AHA476M50F24T-F	23.5	0.12	4.2	95	F	8 x 10.2	500
47.0	AHA476M50G24T-F	23.5	0.12	4.2	100	G	10 x 10.2	500
100.0	AHA107M50F24T-F	50.0	0.12	2.0	110	F	8 x 10.2	500
100.0	AHA107M50G24T-F	50.0	0.12	2.0	120	G	10 x 10.2	500
220.0	AHA227M50G24T-F	110.0	0.12	0.9	150	G	10 x 10.2	500
<b>63 Vdc (75 Vdc Surge)</b>								
10.0	AHA106M63E16T-F	6.3	0.18	29.9	25	E	8 x 6.2	1000
22.0	AHA226M63E16T-F	13.9	0.18	13.6	30	E	8 x 6.2	1000
22.0	AHA226M63F24T-F	13.9	0.18	13.6	30	F	8 x 10.2	500
33.0	AHA336M63G24T-F	20.8	0.18	9.0	45	G	10 x 10.2	500
47.0	AHA476M63F24T-F	29.6	0.18	6.3	50	F	8 x 10.2	500
47.0	AHA476M63G24T-F	29.6	0.18	6.3	50	G	10 x 10.2	500
<b>100 Vdc (125 Vdc Surge)</b>								
3.3	AHA335M2AE16T-F*	3.3	0.18	90.5	30	E	8 x 6.2	1000
4.7	AHA475M2AE16T-F	4.7	0.18	63.5	30	E	8 x 6.2	1000
4.7	AHA475M2AF24T-F*	4.7	0.18	63.5	50	F	8 x 10.2	500
10.0	AHA106M2AF24T-F	10.0	0.18	29.8	55	F	8 x 10.2	500
22.0	AHA226M2AF24T-F	22.0	0.18	13.6	55	F	8 x 10.2	500
22.0	AHA226M2AG24T-F	22.0	0.18	13.6	60	G	10 x 10.2	500
33.0	AHA336M2AG24T-F	33.0	0.18	9.0	65	G	10 x 10.2	500

\* denotes a discontinued part

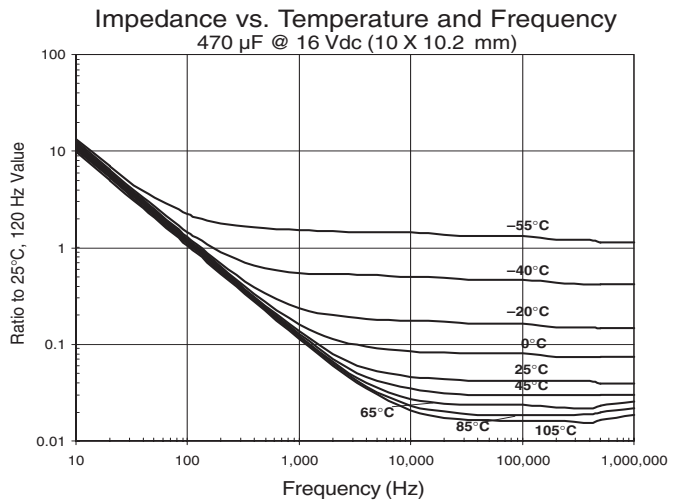
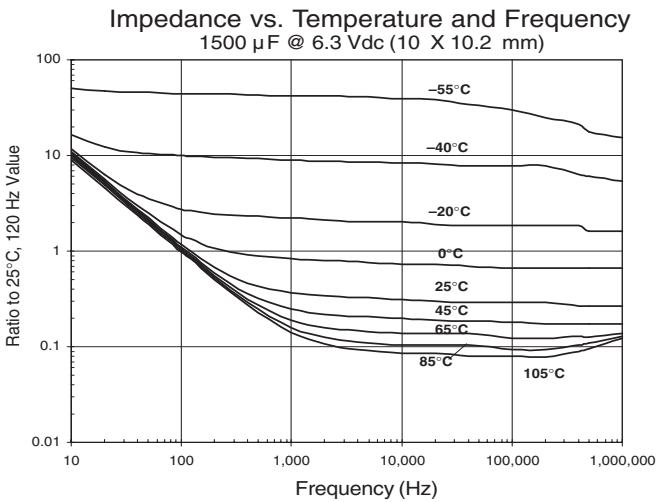
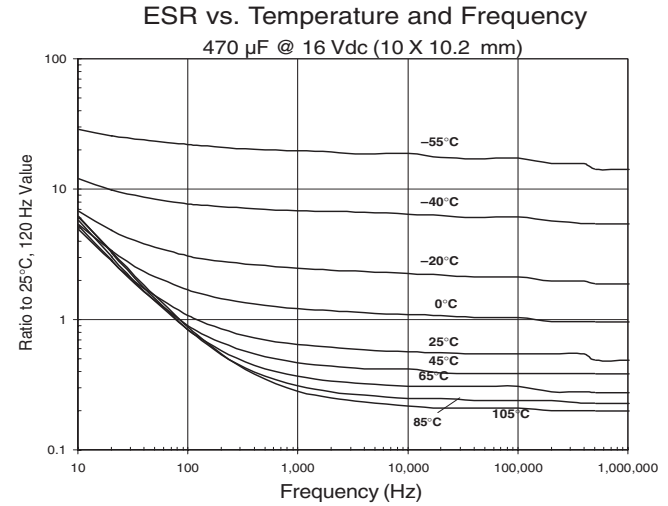
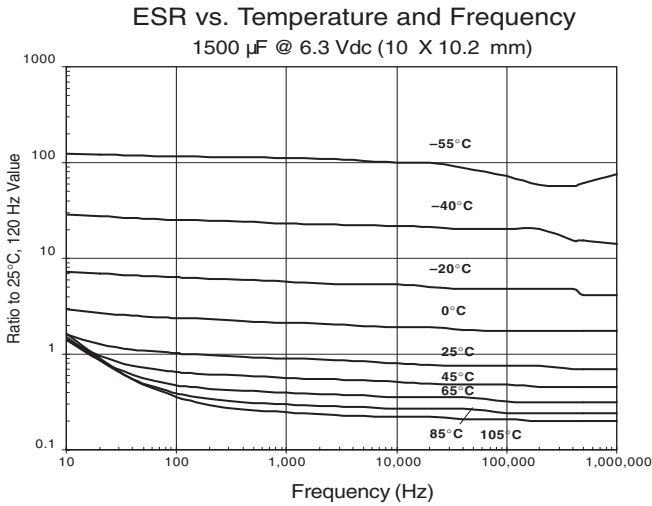
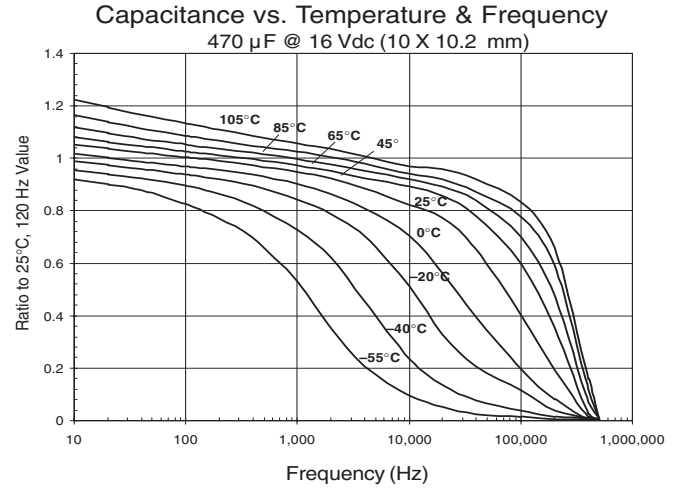
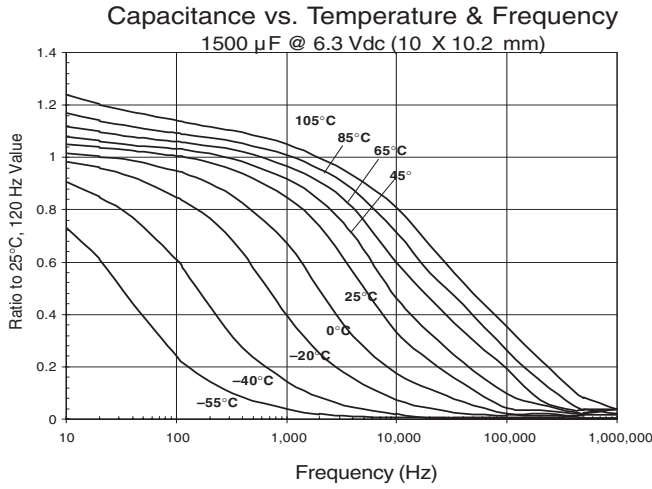
### Part Numbering System

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

# Type AHA

## SMT Aluminum Electrolytic Capacitors -55 °C to +105 °C - Long Life

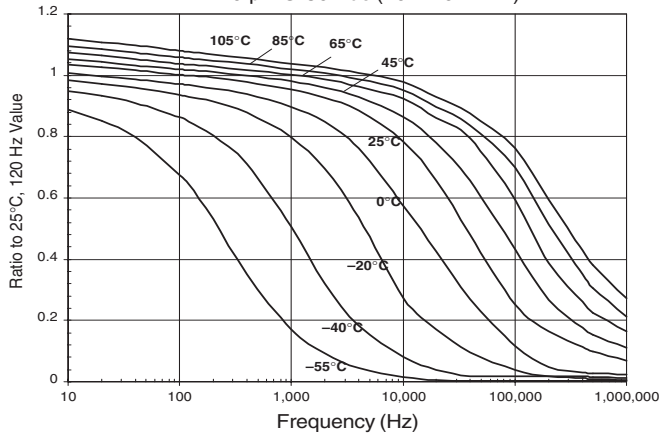
### Typical Performance Curves



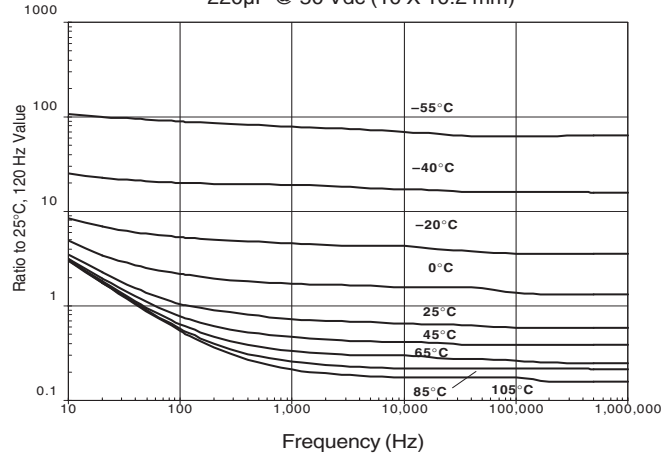
# Type AHA

## SMT Aluminum Electrolytic Capacitors -55 °C to +105 °C - Long Life

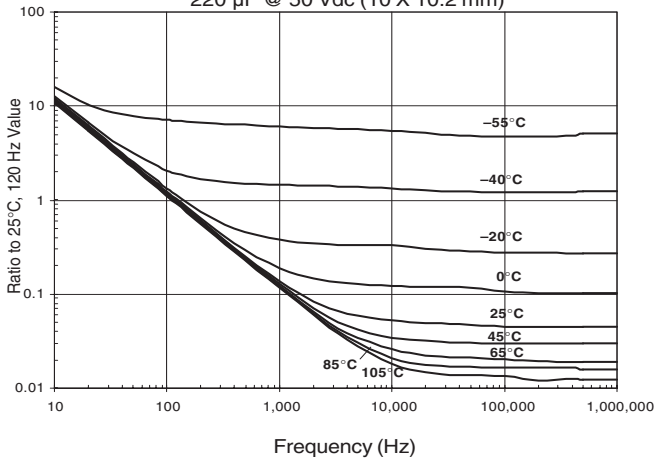
Capacitance vs. Temperature & Frequency  
220  $\mu$ F @ 50 Vdc (10 X 10.2 mm)



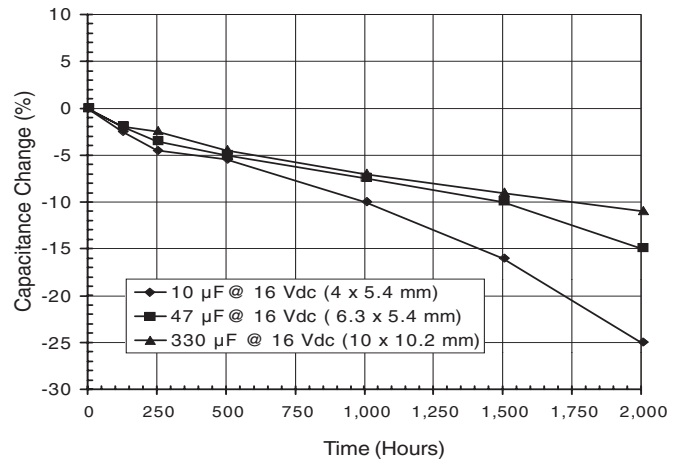
ESR vs. Temperature and Frequency  
220 $\mu$ F @ 50 Vdc (10 X 10.2 mm)



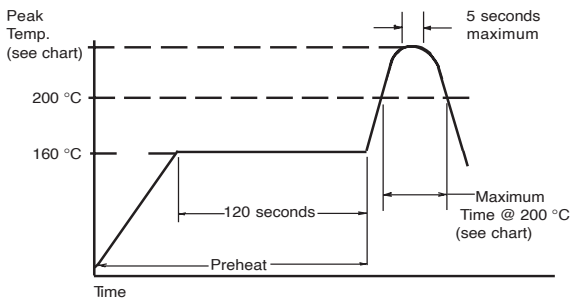
Impedance vs. Temperature and Frequency  
220  $\mu$ F @ 50 Vdc (10 X 10.2 mm)



Capacitance Change vs Time



## Reflow Soldering Temperature Profile for Part Numbers Ending in -F



Case Code	Peak Temperature (°C)	Max. Time at or above 200°C (sec.)	Number of Reflow Processes
B, C, D, X	250	60	1
E, F, G	235	60	1

See SMT application guide for land pattern, tape and reel specifications, and cleaning information.

# Type AHA

## SMT Aluminum Electrolytic Capacitors -55 °C to +105 °C - Long Life

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**Notice and Disclaimer:** All product drawings, descriptions, specifications, statements, information and data (collectively, the "Information") in this datasheet or other publication are subject to change. The customer is responsible for checking, confirming and verifying the extent to which the Information contained in this datasheet or other publication is applicable to an order at the time the order is placed. All Information given herein is believed to be accurate and reliable, but it is presented without any guarantee, warranty, representation or responsibility of any kind, expressed or implied. Statements of suitability for certain applications are based on the knowledge that the Cornell Dubilier company providing such statements ("Cornell Dubilier") has of operating conditions that such Cornell Dubilier company regards as typical for such applications, but are not intended to constitute any guarantee, warranty or representation regarding any such matter – and Cornell Dubilier specifically and expressly disclaims any guarantee, warranty or representation concerning the suitability for a specific customer application, use, storage, transportation, or operating environment. The Information is intended for use only by customers who have the requisite experience and capability to determine the correct products for their application. Any technical advice inferred from this Information or otherwise provided by Cornell Dubilier with reference to the use of any Cornell Dubilier products is given gratis (unless otherwise specified by Cornell Dubilier), and Cornell Dubilier assumes no obligation or liability for the advice given or results obtained. Although Cornell Dubilier strives to apply the most stringent quality and safety standards regarding the design and manufacturing of its products, in light of the current state of the art, isolated component failures may still occur. Accordingly, customer applications which require a high degree of reliability or safety should employ suitable designs or other safeguards (such as installation of protective circuitry or redundancies or other appropriate protective measures) in order to ensure that the failure of an electrical component does not result in a risk of personal injury or property damage. Although all product-related warnings, cautions and notes must be observed, the customer should not assume that all safety measures are indicated in such warnings, cautions and notes, or that other safety measures may not be required.

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