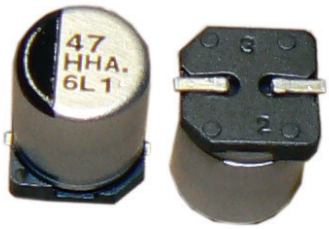
THE DATASHEET OF

AHA476M06B12T-F

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

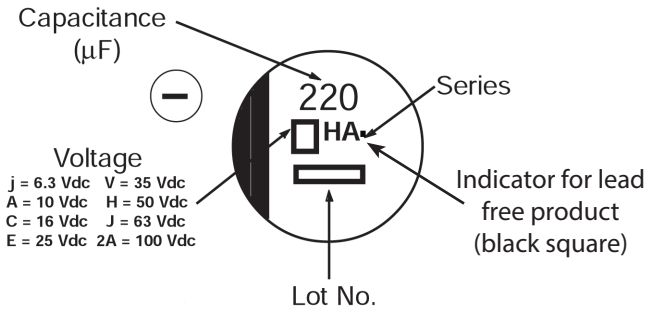
Specifications

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 Mulitpliers (Frequency)	50/60 Hz: 0.7 · 120 Hz: 1 · 1 kHz: 1.3 · 10 kHz & up: 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	See table below

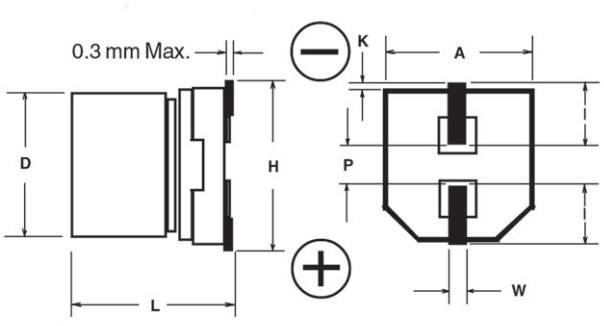
W.V. Vdc	6.3	10	16	25	35	50	63	100
–25 °C /+20 °C	4	3	2	2	2	2	3	3
–40 °C /+20 °C	8	6	4	4	3	3	4	4

RoHS Compliant

AHA Series Marking



Outline Drawing



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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
6.3 Vdc (8 Vdc Surge)								
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
10 Vdc (13 Vdc Surge)								
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
16 Vdc (20 Vdc Surge)								
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
25 Vdc (31 Vdc Surge)								
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

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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 (Ω)	Max Ripple Current 120 Hz /105 °C (mA)	Case Code	Size D x L (mm)	Quantity per Reel
35 Vdc (44 Vdc Surge)								
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
50 Vdc (63 Vdc Surge)								
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
63 Vdc (75 Vdc Surge)								
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
100 Vdc (125 Vdc Surge)								
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

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

Type AHA

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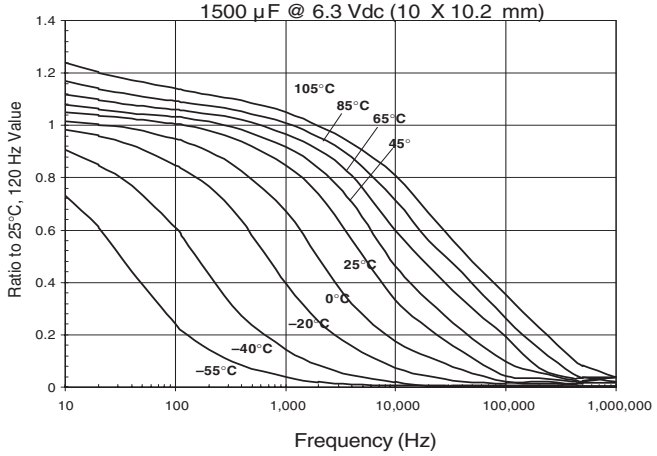
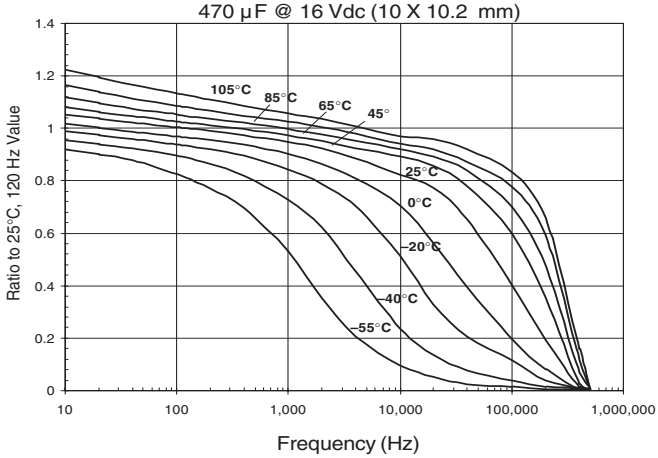
Typical Performance Curves

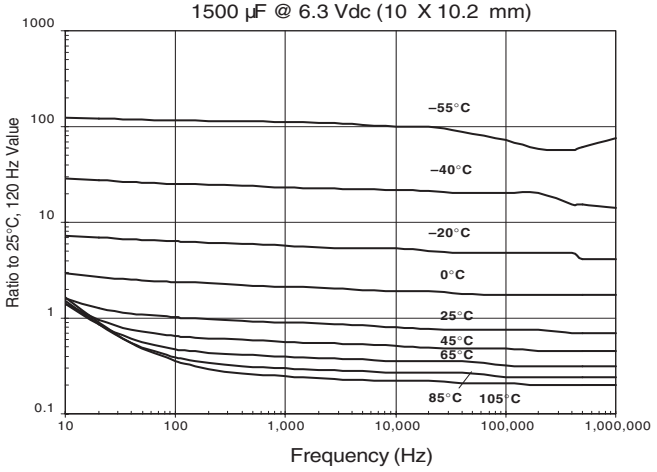
Capacitance vs. Temperature & Frequency
1500 µF @ 6.3 Vdc (10 X 10.2 mm)



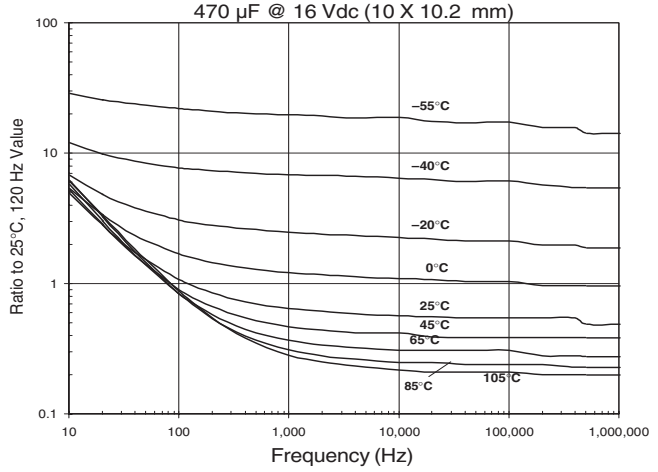
Capacitance vs. Temperature & Frequency
470 µF @ 16 Vdc (10 X 10.2 mm)



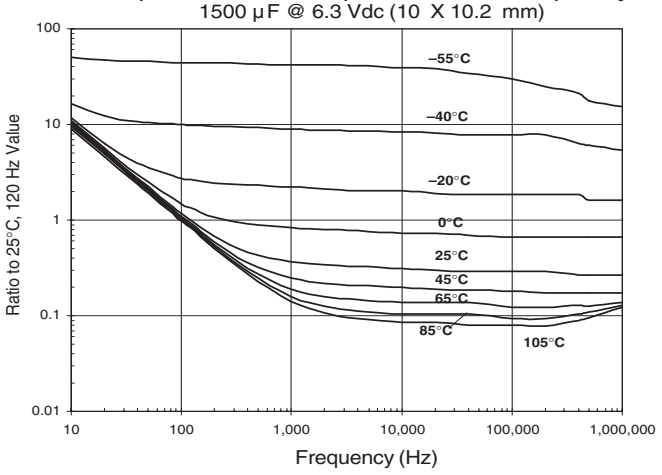
ESR vs. Temperature and Frequency
1500 µF @ 6.3 Vdc (10 X 10.2 mm)



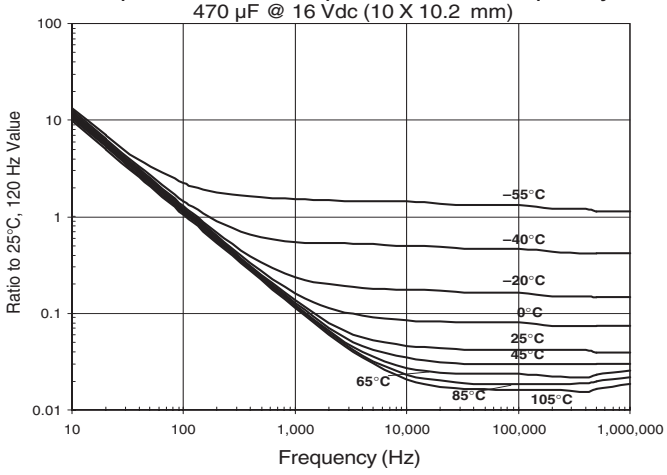
ESR vs. Temperature and Frequency
470 µF @ 16 Vdc (10 X 10.2 mm)



Impedance vs. Temperature and Frequency
1500 µF @ 6.3 Vdc (10 X 10.2 mm)



Impedance vs. Temperature and Frequency
470 µF @ 16 Vdc (10 X 10.2 mm)



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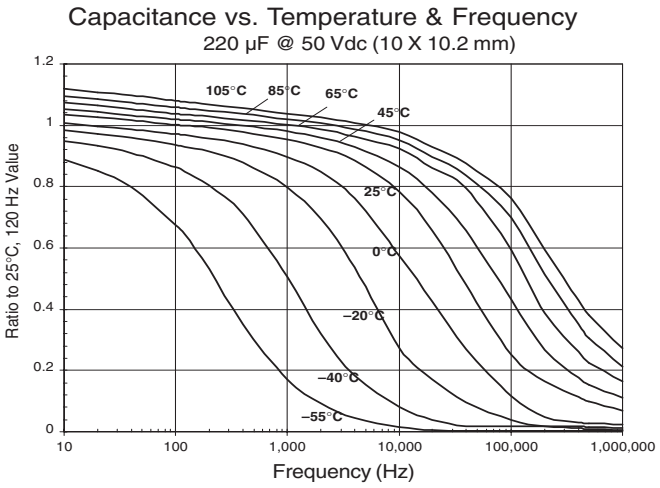
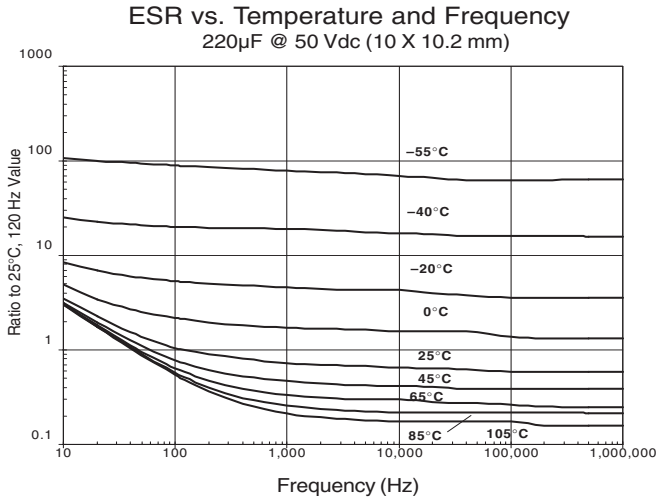
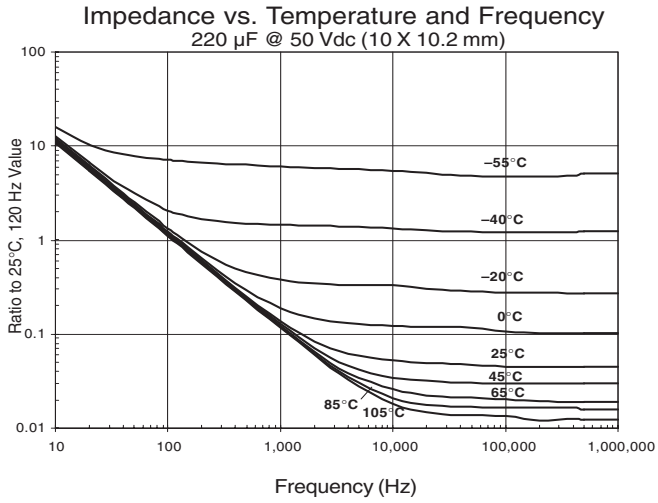
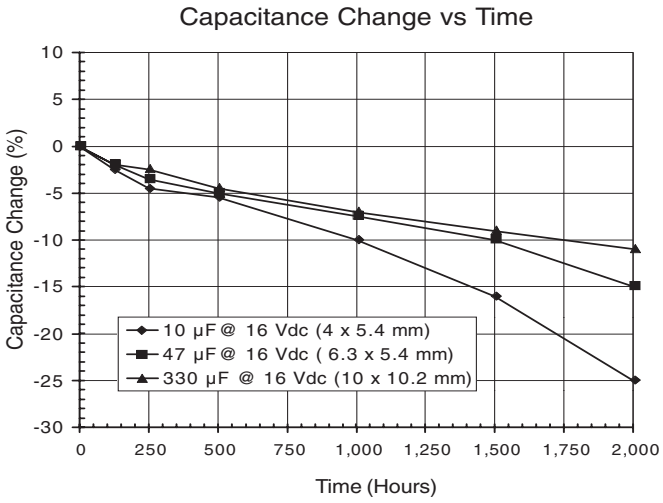
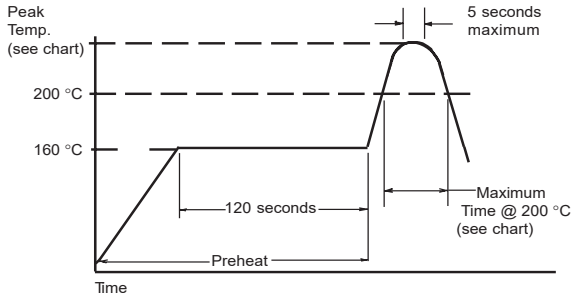








Reflow Soldering Temperature Profile for Part Numbers Ending in –F



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.

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