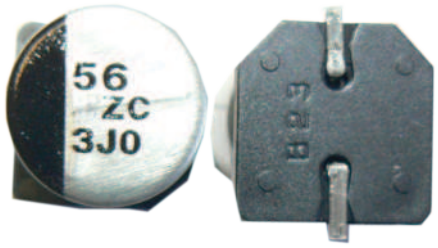
Type HZC -55 ºC to +125 ºC

SMT Hybrid Polymer-Aluminum Electrolytic Capacitors

For filtering, Bypassing and Power Supply Decoupling with Long Life Requirements



Rated for 125°C, type HZC combines the advantages of aluminum electrolytic and aluminum polymer technology. These hybrid capacitors have the ultra-low ESR characteristics of conductive aluminum polymer capacitors packaged in a V-chip, SMT case with high capacitance and voltage ratings that were previously available only in aluminum electrolytic technology. Applications for type 125°C hybrid capacitors include a variety of industrial power conversion, lighting control and automotive applications.

Highlights

- +125 °C, Up to 4,000 Hours Load Life
- Low Leakage Current
- Very Low ESR and High Ripple Current
- 260 °C reflow soldering
- AEC-Q200 Compliant

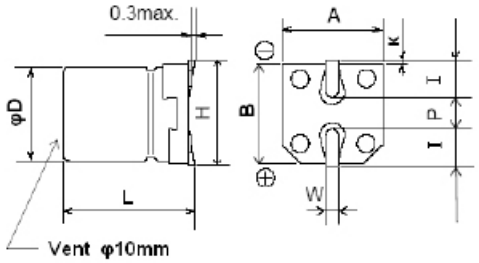
Specifications

Capacitance Range	10 to 330 µF
Capacitance Tolerance	±20% @ 120 Hz/+20 °C
Rated Voltage	25, 35, 50, 63 Vdc
Leakage Current (at 20°C)	I = .01CV or 3 µA max., whichever is greater after 2 minutes I = leakage current in µAmps C = rated capacitance in µF V = rated DC Working voltage in Volts
Low Temperature Characteristics (at 120 Hz)	Z(-25 ºC)/Z(+20 ºC): 2 Z(-55 ºC)/Z(+20 ºC): 2.5
Ripple Current Frequency Multiplier	

Frequency	120 Hz	1000 Hz	10,000 Hz	100 KHz
Correction Factor	0.1	0.3	0.6	1

Regulatory Information

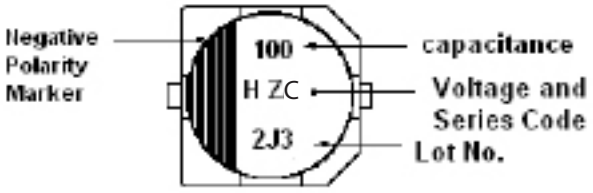
Outline Drawing



mm

Case Code	D (± 0.5)	L (± 0.3)	A (± 0.2)	B (± 0.2)	H (max.)	I (ref.)	W	P (ref.)	K
C	5.0	5.8	5.3	5.3	6.5	2.2	0.65 ± 0.1	1.5	$0.35^{+0.15/-0.20}$
D	6.3	5.8	6.6	6.6	7.8	2.6	0.65 ± 0.1	1.8	$0.35^{+0.15/-0.20}$
X	6.3	7.7	6.6	6.6	7.8	2.6	0.65 ± 0.1	1.8	$0.35^{+0.15/-0.20}$
F	8.0	10.2	8.3	8.3	10.0	3.4	0.90 ± 0.2	3.1	0.70 ± 0.2
G	10.0	10.2	10.3	10.3	12.0	3.5	0.90 ± 0.2	4.6	0.70 ± 0.2

Capacitor Markings



Lot, Number: Year, Line, Month

Voltage Code	Voltage Vdc
E	25
V	35
H	50
J	63

Type HZC -55 ºC to +125 ºC

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Part Numbering System

HZC	227	M	25	F	24T	–F
Type	Capacitance	Capacitance Tolerance	Voltage Code	Case Code	Packaging Code	RoHS Compliant Indicator
	227 = 220 µF	M = ±20%	25 = 25 Vdc	See Ratings Table	24 = Tape carrier width (mm) T = Tape & Reel	

Ratings

Capacitance (µF)	Voltage Rating (Vdc)	CDE Part Number	MAX DCL (µA)	MAX DF @ 120 Hz/20°C	MAX E.S.R. @ 100kHz/+20°C (ohms)	MAX Ripple Current @ 100kHz/+125°C (A rms)	D (mm)	L (mm)	Case Code	QTY/reel
25 Vdc (32 Vdc Surge)										
33	25	HZC336M025C12T-F	8.2	0.14	0.080	0.55	5.0	5.8	C	1000
56	25	HZC566M025D16T-F	14.0	0.14	0.050	0.90	6.3	5.8	D	1000
100	25	HZC107M025X16T-F	25.0	0.14	0.030	1.40	6.3	7.7	X	900
220	25	HZC227M025F24T-F	55.0	0.14	0.027	1.60	8.0	10.2	F	500
330	25	HZC337M025G24T-F	82.5	0.14	0.020	2.00	10.0	10.2	G	500
35 Vdc (44 Vdc Surge)										
22	35	HZC226M035C12T-F	7.7	0.12	0.100	0.55	5.0	5.8	C	1000
47	35	HZC476M035D16T-F	16.4	0.12	0.060	0.90	6.3	5.8	D	1000
68	35	HZC686M035X16T-F	23.8	0.12	0.035	1.40	6.3	7.7	X	900
150	35	HZC157M035F24T-F	52.5	0.12	0.027	1.60	8.0	10.2	F	500
270	35	HZC277M035G24T-F	94.5	0.12	0.020	2.00	10.0	10.2	G	500
50 Vdc (63 Vdc Surge)										
10	50	HZC106M050C12T-F	5.0	0.10	0.120	0.50	5.0	5.8	C	1000
22	50	HZC226M050D16T-F	11.0	0.10	0.080	0.75	6.3	5.8	D	1000
33	50	HZC336M050X16T-F	16.5	0.10	0.040	1.10	6.3	7.7	X	900
68	50	HZC686M050F24T-F	34.0	0.10	0.030	1.25	8.0	10.2	F	500
100	50	HZC107M050G24T-F	50.0	0.10	0.028	1.60	10.0	10.2	G	500
63 Vdc (79 Vdc Surge)										
10	63	HZC106M063D16T-F	6.3	0.08	0.120	0.70	6.3	5.8	D	1000
22	63	HZC226M063X16T-F	13.8	0.08	0.080	0.90	6.3	7.7	X	900
33	63	HZC336M063F24T-F	20.7	0.08	0.040	1.10	8.0	10.2	F	500
56	63	HZC566M063G24T-F	35.2	0.08	0.030	1.40	10.0	10.2	G	500

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SMT Hybrid Polymer-Aluminum Electrolytic Capacitors

Load Life Test

Test	Apply the maximum rated voltage for 4,000 hrs at +125 °C with full rated ripple current. After the test measure the capacitance, DF, DCL and ESR at +20 °C. Also measure the ESR at -40 °C and 100kHz.
ΔC at 120Hz	Capacitance will be within ±30% of the initial measured value
DF at 120 Hz	DF will be ≤ 200% of the initial specified value
DCL after 2 minute charge	Leakage current will be ≤ the initial specified value
ESR at 100kHz/+20 °C	ESR will be ≤ 200% of the initial specified value
Max. ESR at 100kHz/-40 °C after Load Life test	Case Code C : 2.0 Ω; Case Code D : 1.4 Ω; Case Code X : 0.8 Ω; Case Code F : 0.4 Ω; Case Code G : 0.3 Ω

Shelf Life Test

Test	Subject the capacitor to 1000 hrs at +125 °C without voltage. After the test, return the capacitor to room temperature for two hours and then apply rated voltage for 30 minutes. The after test measurements for capacitance, DF, DCL and ESR at +20 °C will meet the following.
ΔC at 120 Hz	Capacitance will be within ±30% of the initial measured value
DF at 120 Hz	DF will be ≤ 200% of the initial specified value
DCL after 2 minute charge	Leakage current will be ≤ the initial specified value
ESR at 100Khz/+20 °C	ESR will be ≤ 200% of the initial specified value

Moisture Resistance Test

Test	Subject the capacitor to 2000 hrs at +85 °C/85%RH with rated voltage. After the test, return the capacitor to room temperature and humidity for two hours. The after test measurements for capacitance, DF, DCL and ESR at +20 °C will meet the following.
ΔC at 120 Hz	Capacitance will be within ±30% of the initial measured value
DF at 120 Hz	DF will be ≤ 200% of the initial specified value
DCL after 2 minute charge	Leakage current will be ≤ the initial specified value
ESR at 100Khz/+20 °C	ESR will be ≤ 200% of the initial specified value

Temperature Cycle Test

Test	Subject the capacitor to 1000 cycles of temperature change from -55 °C to +125 °C using the following sequence and durations.

Step	Temperature	Time at Temperature
1	-55 ºC	30 minutes
2	+20 ºC	3 minutes max
3	+125 ºC	30 minutes
4	+20 ºC	3 minutes max

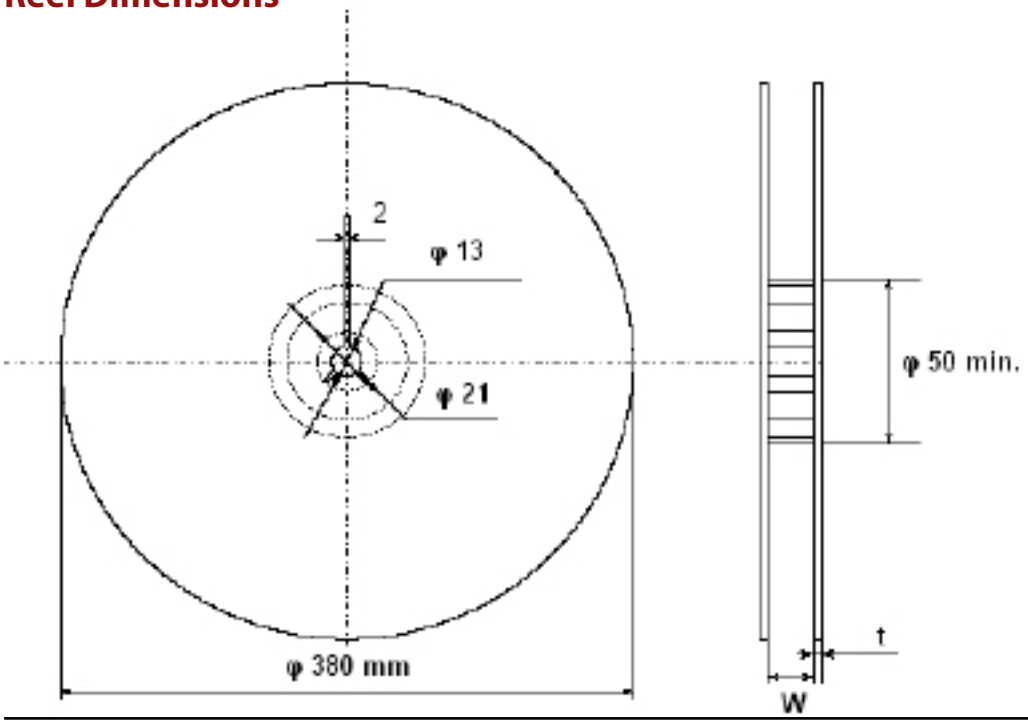
After the test, return the capacitor to +20°C for one to two hours before measurement. The after test measurements for capacitance, DF, and DCL at +20 °C will meet the following;

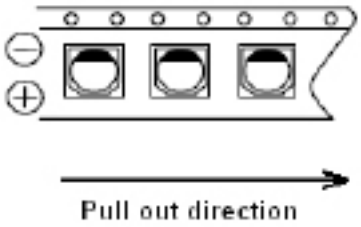
ΔC at 120 Hz	Capacitance will be within ±20% of the initial measured value
DF at 120 Hz	DF will be ≤ 200% of the initial specified value
DCL after 2 minute charge	Leakage current will be ≤ the initial specified value
Appearance	No significant change in appearance

Type HZC -55 ºC to +125 ºC

SMT Hybrid Polymer-Aluminum Electrolytic Capacitors

Reel Dimensions

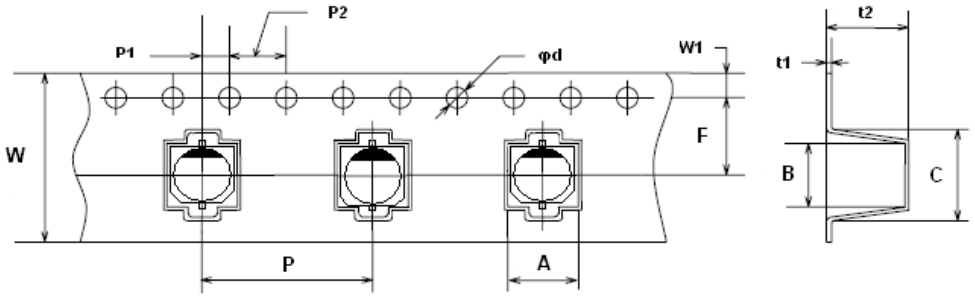




mm

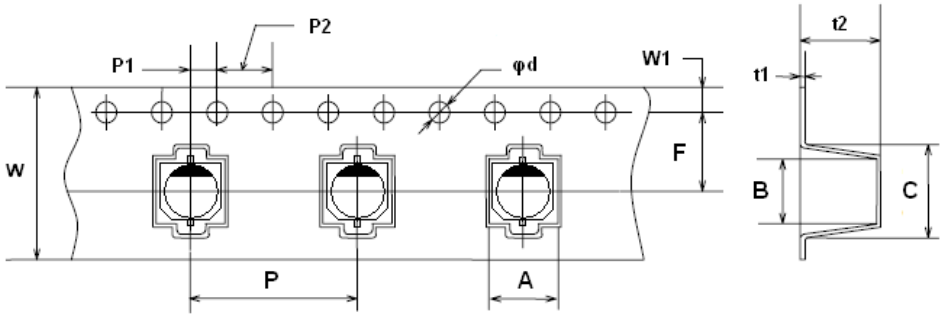
Case Dia.	5	6.3	8	10
W	14	18	26	26
t	3	3	3	3

Tape Dimensions



mm

Case Size (mm)	Case Code	W ± 0.3	A ± 0.2	B +0.3/-0.2	C ± 0.5	F ± 0.1	P ± 0.1	t1	t2 ± 0.2	φd +0.1/-0	P1 ± 0.1	P2 ± 0.1	W1 ± 0.1
5 x 5.8	C	12	5.7	5.7	8.0	5.5	12	0.4	6.4	1.5	2	4	1.75



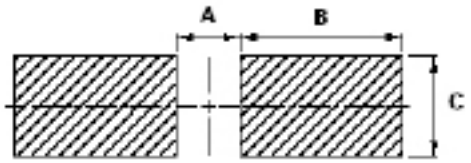
mm

Case Size (mm)	Case Code	W ± 0.3	A ± 0.2	B +0.3/-0.2	C ± 0.5	F ± 0.1	P ± 0.1	t1	t2 ± 0.2	φd +0.1/-0	P1 ± 0.1	P2 ± 0.1	W1 ± 0.1
6.3 x 5.8	D	16	7	7	9.0	7.5	12	0.4	6.4	1.5	2	4	1.75
6.3 x 7.7	X								8.4				
8 x 10.2	F	24	8.7	8.7	12.5	11.5	16	0.4	11				
10 x 10.2	G		10.7	10.7	14.5								

Type HZC -55 ºC to +125 ºC

SMT Hybrid Polymer-Aluminum Electrolytic Capacitors

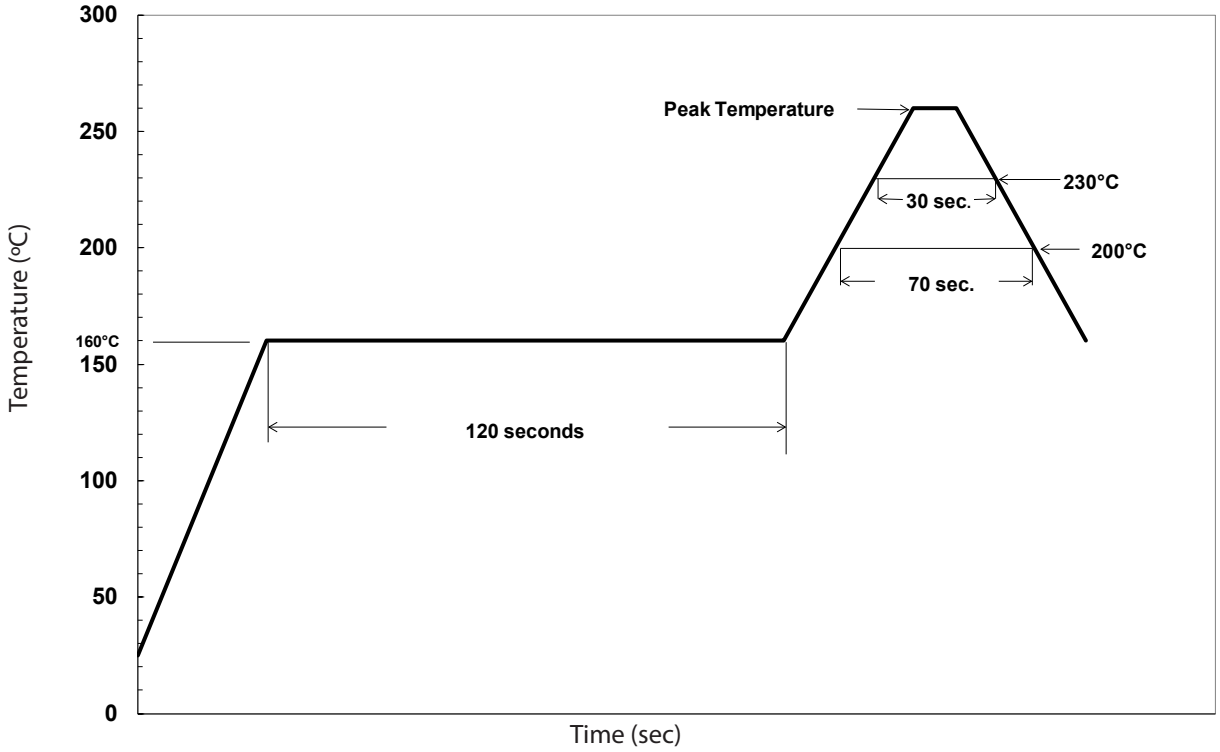
Recommended Land Dimensions



mm

Case Code	D (mm)	A	B	C
C	5	1.5	2.8	1.6
D	6.3	1.8	3.2	1.6
X	6.3	1.8	3.2	1.6
F	8	3.1	4.0	2.0
G	10	4.6	4.1	2.0

Recommended Reflow Soldering



Case Code	Case Dia. (mm)	Peak Temperature	Time at or above 250 °C	Time at or above 230 °C	Time at or above 217 °C	Time at or above 200 °C	Number of Reflow Processes
C	5	260°C	5 seconds	30 seconds	40 seconds	70 seconds	2
D	6.3						
X	6.3						
F	8						1
G	10						

Notes:

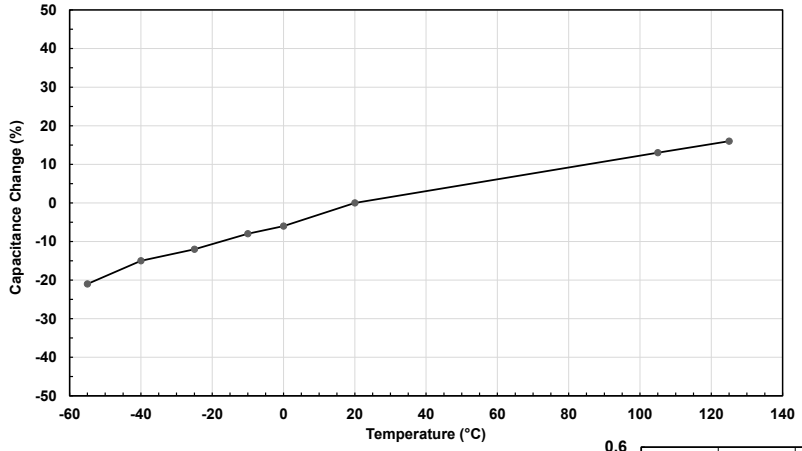
1. For 5mm and 6.3 mm case dia., if the peak temperature does not exceed 255 °C the time at or above 250 °C can increase to 10 seconds.
2. The capacitors in the 8m and 10 mm case dia. can withstand 2 reflow processes, if the peak temperature does not exceed 245 °C and the time at or above 240 °C does not exceed 10 seconds.
3. The 2nd reflow process should be performed after the capacitors have returned to room temperature.
4. Temperature should be measured with a thermal couple placed on the top surface of the capacitor.
5. After reflow soldering, the leakage current, D.F., and e.s.r., will meet the initial specifications, and the capacitance will be within ±10% of the initial measured value when measured at room conditions.

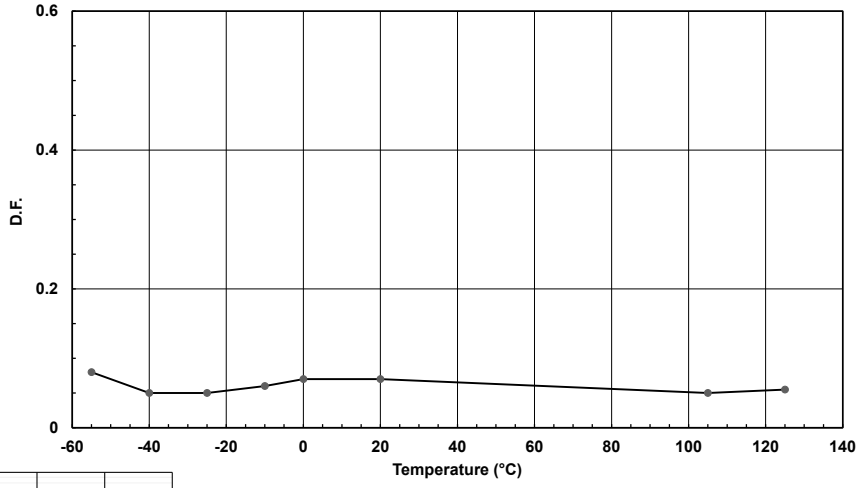
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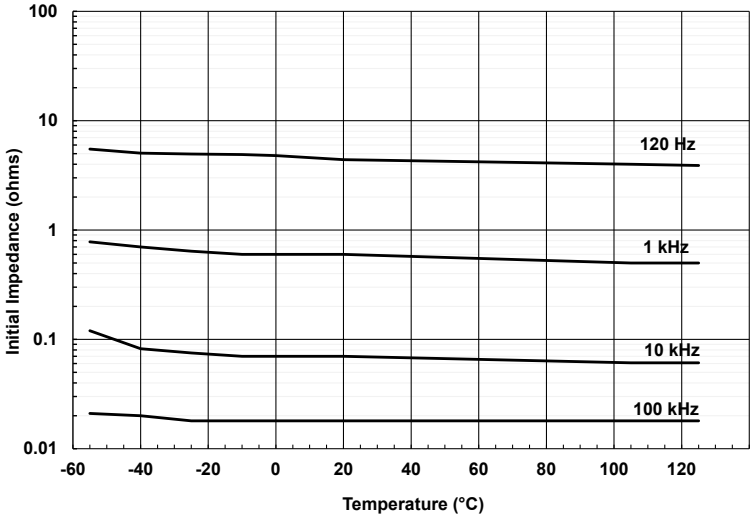
SMT Hybrid Polymer-Aluminum Electrolytic Capacitors

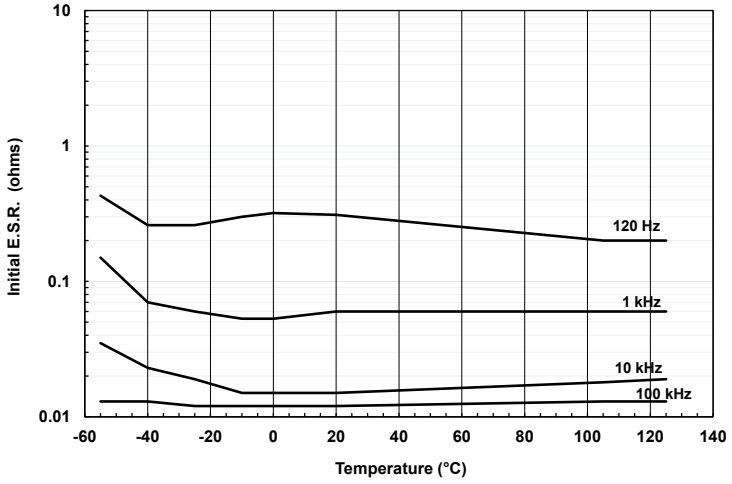
Capacitor Temperature Characteristics

330 µF/25V









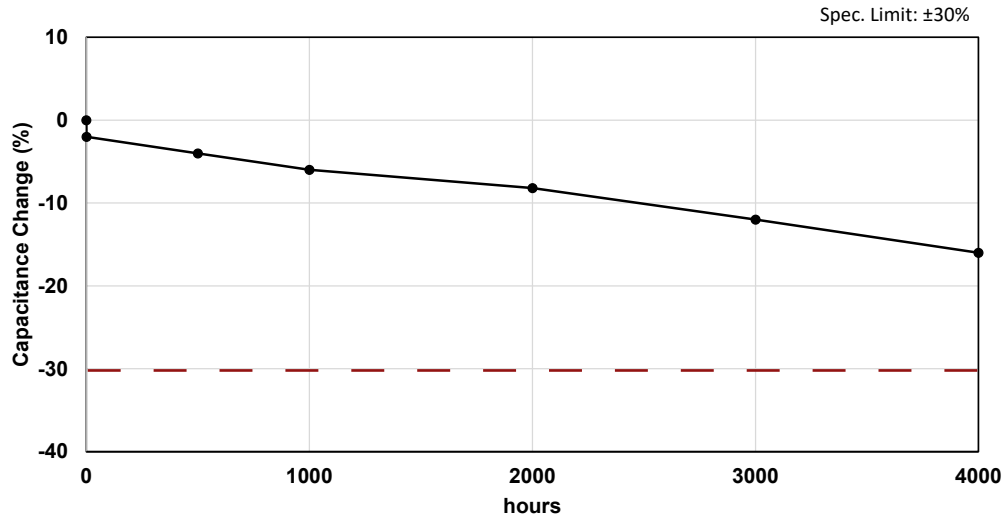
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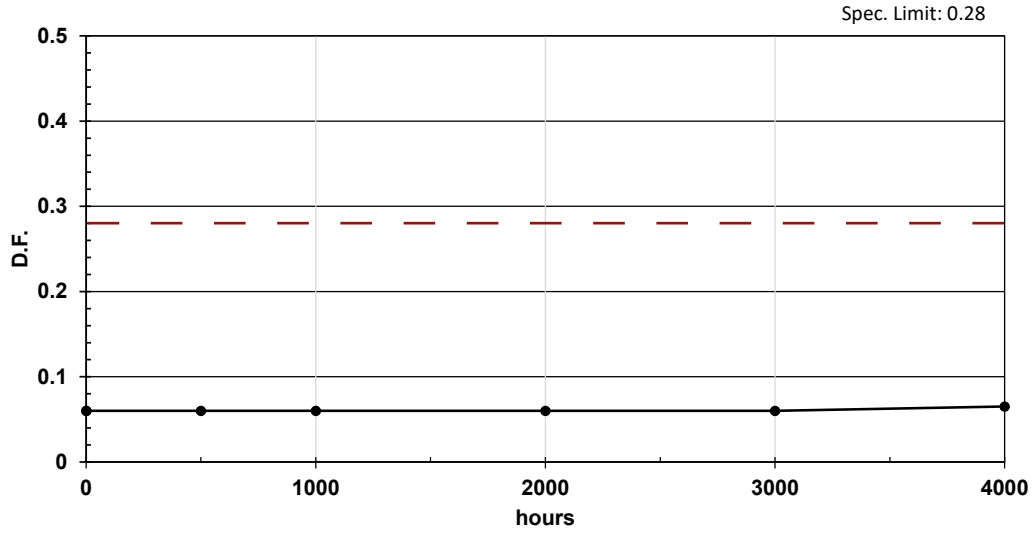
SMT Hybrid Polymer-Aluminum Electrolytic Capacitors

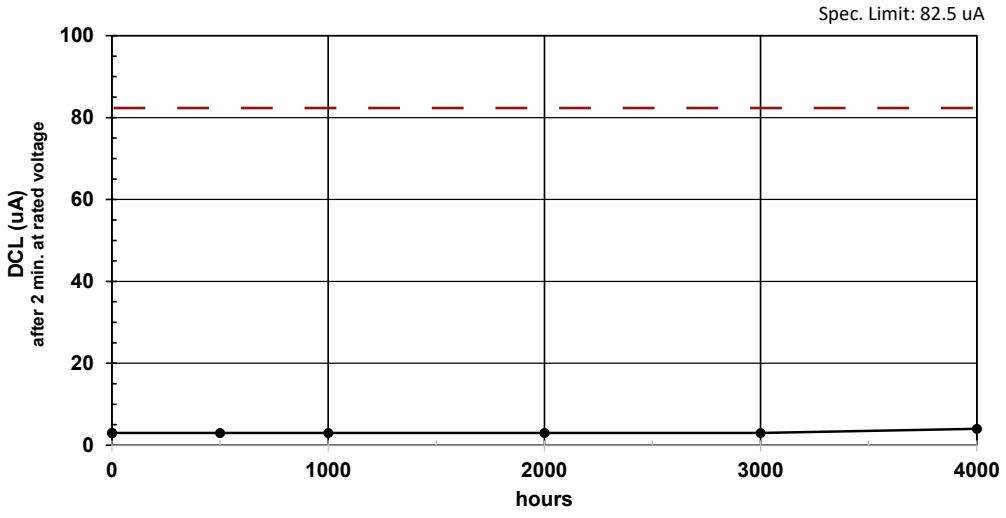
Capacitor Temperature Characteristics

Life Test Results

330 µF/25V at +125 ºC with rated voltage







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