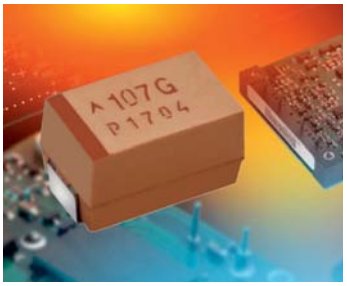
TCJ Series

Tantalum Solid Electrolytic Chip Capacitors with Conductive Polymer Electrode



FEATURES

- Conductive polymer electrode reduces ignition failure mode
- Lower ESR
- 3x reflow 260°C compatible
- CV range: 0.47-470µF / 2.5-125V
- 16 case sizes available

APPLICATIONS

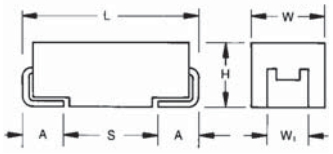
- Smart phone, Tablets, Notebook, LCD TV, Power supplies

Elektra Award 2010

LEAD-FREE

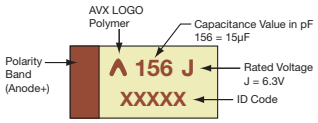
LEAD-FREE COMPATIBLE COMPONENT

RoHS COMPLIANT

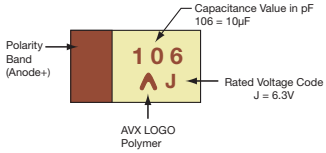


MARKING

A, B, C, D, E, G, H, K, S, T, V, W, Y CASE



N, P, R CASE



CASE DIMENSIONS: millimeters (inches)

Code	EIA Code	EIA Metric	L±0.20 (0.008)	W+0.20 (0.008) -0.10 (0.004)	H+0.20 (0.008) -0.10 (0.004)	W_1±0.20 (0.008)	A+0.30 (0.012) -0.20 (0.008)	S Min.
A	1206	3216-18	3.20 (0.126)	1.60 (0.063)	1.60 (0.063)	1.20 (0.047)	0.80 (0.031)	1.10 (0.043)
B	1210	3528-21	3.50 (0.138)	2.80 (0.110)	1.90 (0.075)	2.20 (0.087)	0.80 (0.031)	1.40 (0.055)
C	2312	6032-28	6.00 (0.236)	3.20 (0.126)	2.60 (0.102)	2.20 (0.087)	1.30 (0.051)	2.90 (0.114)
D	2917	7343-31	7.30 (0.287)	4.30 (0.169)	2.90 (0.114)	2.40 (0.094)	1.30 (0.051)	4.40 (0.173)
E	2917	7343-43	7.30 (0.287)	4.30 (0.169)	4.10 (0.162)	2.40 (0.094)	1.30 (0.051)	4.40 (0.173)
G	1206	3216-15	3.20 (0.126)	1.60 (0.063)	1.50 (0.059) max	1.20 (0.047)	0.80 (0.031)	1.10 (0.043)
H	1210	3528-15	3.50 (0.138)	2.80 (0.110)	1.50 (0.059) max	2.20 (0.087)	0.80 (0.031)	1.40 (0.055)
K	1206	3216-10	3.20 (0.126)	1.60 (0.063)	1.00 (0.039) max	1.20 (0.047)	0.80 (0.031)	1.10 (0.043)
N	0805	2012-10	2.05 (0.081)	1.30 (0.051)	1.00 (0.039) max	1.00 (0.039)	0.50 (0.020)	0.85 (0.033)
P	0805	2012-15	2.05 (0.081)	1.35 (0.050)	1.50 (0.059) max	1.00±0.10 (0.039±0.004)	0.50 (0.020)	0.85 (0.033)
R	0805	2012-12	2.05 (0.081)	1.30 (0.051)	1.20 (0.047) max	1.00±0.10 (0.039±0.004)	0.50 (0.020)	0.85 (0.033)
S	1206	3216-12	3.20 (0.126)	1.60 (0.063)	1.20 (0.047) max	1.20 (0.047)	0.80 (0.031)	1.10 (0.043)
T	1210	3528-12	3.50 (0.138)	2.80 (0.110)	1.20 (0.047) max	2.20 (0.087)	0.80 (0.031)	1.40 (0.055)
V	2924	7361-38	7.30 (0.287)	6.10 (0.240)	3.55 (0.140)	3.10 (0.120)	1.30 (0.051)	4.40 (0.173)
W	2312	6032-15	6.00 (0.236)	3.20 (0.126)	1.50 (0.059) max	2.20 (0.087)	1.30 (0.051)	2.90 (0.114)
Y	2917	7343-20	7.30 (0.287)	4.30 (0.169)	2.00 (0.079) max	2.40 (0.094)	1.30 (0.051)	4.40 (0.173)

W1 dimension applies to the termination width for A dimensional area only.

HOW TO ORDER

TCJ | **A** | **226** | **M** | **004** | **R** | **0300**

Type

Case Size
See table above

Capacitance Code
pF code: 1st two digits represent significant figures, 3rd digit represents multiplier (number of zeros to follow)

Tolerance
M = ±20%

Rated DC Voltage

002 = 2.5Vdc
004 = 4Vdc
006 = 6.3Vdc
010 = 10Vdc
016 = 16Vdc
020 = 20Vdc
025 = 25Vdc
035 = 35Vdc
050 = 50Vdc
063 = 63Vdc
075 = 75Vdc
100 = 100Vdc
125 = 125Vdc

Packaging
R = Pure Tin 7" Reel
S = Pure Tin 13" Reel

ESR in mΩ

TECHNICAL SPECIFICATIONS (Common for all TCJ series)

Technical Data:	All technical data relate to an ambient temperature of +25°C
Capacitance Tolerance:	±20%
Leakage Current DCL:	0.1CV
Reliability:	1% per 1000 hours at 85°C, V_R with 0.1Ω/V series impedance, 60% confidence level
Resistance to soldering heat:	3x260°C peak for max. 10s reflow

TCJ Series

Tantalum Solid Electrolytic Chip Capacitors with Conductive Polymer Electrode

CAPACITANCE AND RATED VOLTAGE RANGE (LETTER DENOTES CASE SIZE)

Cap		Rated Voltage DC (V_R) to 85°C												
µF	Code	2.5V (e)	4V (G)	6.3V (J)	10V (A)	16V (C)	20V (D)	25V (E)	35V (V)	50V (T)	63V (J)	75V (P)	100V (A)	125V (B)
0.47	474										B(400)			
0.68	684									B(400)	B(300)			
1.0	105							N* P(500)	A(250)*	A* B(300)	B(300) C(300)			
1.5	155								B(200)	B(300) C(300)	C(300)			
2.2	225								B(200)	C(300)	C(200)			
3.3	335								B(200)	C(200)	C(200)			D(250)
4.7	475				K(500) R(500)			B(150)	B(200) C(200)	C(200)	C(200) D(120)	D(150)	D(250)	
6.8	685					A(200)		B(90,150)	C(200)	C(200) D(120)	D(120) E(100,150)	D(120)	V(250)	
10	106			A(300) N(250,500) R(500)	A(300)	A(200) B(200) T(150,200)		B(90,150)	B(200) C(200) Y(70)	D(120) E(70,100)	E(100,150)			
15	156		A(300)	A(300)	A(200)	B(150)		B(100,150) Y(70,90,200)*	C(200) D(70,100) W*, Y(70)*	E(70,100)				
22	226		A(300)	A(300), K(400) N(500), R(500) S(400), T(150)	B(300) T(70,150)	B(150)	Y(70)	B(150), C(100) D(60,100) Y(70)	D(70,100) Y(70)*					
33	336		A(300)	A(200) B(70,200) T(150)	B(70,200) C(100) T(70,150)	Y(45,60,70)	Y(70)	D(60,100) Y(60,70,100)	D(70,100) E(55,70)					
47	476		A(200) T(80)	A(200), B(70) K(150,200,400) P(500), R(500) T(55,70,80,120)	B(70) C(100)	Y(45,70)	D(55) Y(70)	D(60,100) E(50)	E(55)					
68	686	A(250)	A(250) B(70) T(80)	B(55,70) C(100) T(200), W(70)	D(45,55) Y(45,55)	D(50) Y(50)	D(55) E(45)	E(50)						
100	107	A(200) B(70)	A(200) B(70) G(300) T(150)	A(70)* B(45,69,70) T(70,200)	D(45,55) Y(25,45,55)	D(50), E(40) Y(50)	D(55) E(45)	E(80)						
150	157	B(70)	B(70), Y(25,45)	B(35,45,69,70) D(15,40) H(200), W(40,70) Y(15,25,40)	D(25,40,45,55) Y(25,40,45,55)	E(40)								
220	227	A(35)* B(35,45,70)	B(35,45,60,70) D(15,40) Y(15,25,40)	B(70,200) D(25,35,40,50) W(100)* Y(25,35,40,50)	D(25,40,50) Y(25,40,50)									
330	337	B(35,45,70) Y(25,40)	D(25,40,50) Y(25,40,50)	D(25,40,50) Y(25,40,50)										
470	477	D(25,40,50) Y(25,40,50)	D(25,40,50) Y(25,40,50)											

Available Ratings, (ESR ratings in mOhms in brackets)
Engineering samples - please contact manufacturer
*Codes under development – subject to change

Note: Voltage ratings are minimum values. AVX reserves the right to supply higher ratings in the same case size, to the same reliability standards.

TCJ Series

Tantalum Solid Electrolytic Chip Capacitors with Conductive Polymer Electrode

RATINGS & PART NUMBER REFERENCE

AVX Part No.	Case Size	Cap (µF)	Rated Voltage (V)	Rated Temp. (°C)	Category Voltage (V)	Category Temp. (°C)	DCL (µA) Max.	DF % Max.	ESR Max. (mΩ) @ 100kHz	MSL	100kHz RMS Current (mA)				Product Category
											25°C	85°C	105°C	125°C	
2.5 Volt @ 85°C															
TCJA686M002#0250	A	68	2.5	85	2	105	17.0	6	250	3	600	400	300	–	105°C
TCJA107M002#0200	A	100	2.5	85	2	105	25.0	6	200	3	700	500	300	–	105°C
TCJB107M002#0070	B	100	2.5	85	1.7	125	25.0	6	70	3	1300	900	600	300	125°C
TCJB157M002#0070	B	150	2.5	85	2	105	37.5	6	70	3	1300	900	600	–	105°C
TCJB227M002#0035	B	220	2.5	85	2	105	55	8	35	3	1900	1300	900	–	105°C
TCJB227M002#0045	B	220	2.5	85	2	105	55	8	45	3	1700	1200	800	–	105°C
TCJB227M002#0070	B	220	2.5	85	2	105	55	8	70	3	1300	900	600	–	105°C
TCJB337M002#0035	B	330	2.5	85	2	105	82.5	8	35	3	1900	1300	900	–	105°C
TCJB337M002#0045	B	330	2.5	85	2	105	82.5	8	45	3	1700	1200	800	–	105°C
TCJB337M002#0070	B	330	2.5	85	2	105	82.5	8	70	3	1300	900	600	–	105°C
TCJY337M002#0025	Y	330	2.5	85	2	105	82.5	6	25	3	2700	1900	1200	–	105°C
TCJY337M002#0040	Y	330	2.5	85	2	105	82.5	6	40	3	2200	1500	1000	–	105°C
TCJD477M002#0025	D	470	2.5	85	2	105	117.5	6	25	3	3000	2100	1400	–	105°C
TCJD477M002#0040	D	470	2.5	85	2	105	117.5	6	40	3	2400	1700	1100	–	105°C
TCJD477M002#0050	D	470	2.5	85	2	105	117.5	6	50	3	2100	1500	900	–	105°C
TCJY477M002#0025	Y	470	2.5	85	2	105	117.5	6	25	3	2700	1900	1200	–	105°C
TCJY477M002#0040	Y	470	2.5	85	2	105	117.5	6	40	3	2200	1500	1000	–	105°C
TCJY477M002#0050	Y	470	2.5	85	2	105	117.5	6	50	3	1900	1300	900	–	105°C
4 Volt @ 85°C															
TCJA156M004#0300	A	15	4	85	2.7	125	6.0	6	300	3	600	400	300	200	125°C
TCJA226M004#0300	A	22	4	85	2.7	125	8.8	6	300	3	600	400	300	200	125°C
TCJA336M004#0300	A	33	4	85	2.7	125	13.2	6	300	3	600	400	300	200	125°C
TCJA476M004#0200	A	47	4	85	3.2	105	18.8	6	200	3	700	500	300	–	105°C
TCJT476M004#0080	T	47	4	85	3.2	105	18.8	8	80	3	1200	800	500	–	105°C
TCJA686M004#0250	A	68	4	85	3.2	105	27.2	6	250	3	600	400	300	–	105°C
TCJB686M004#0070	B	68	4	85	2.7	125	27.2	6	70	3	1300	900	600	300	125°C
TCJT686M004#0080	T	68	4	85	3.2	105	27.2	8	80	3	1100	800	500	–	105°C
TCJA107M004#0200	A	100	4	85	3.2	105	40.0	6	200	3	700	500	300	–	105°C
TCJB107M004#0070	B	100	4	85	2.7	125	40.0	8	70	3	1300	900	600	300	125°C
TCJG107M004#0300	G	100	4	85	3.2	105	40.0	10	300	3	600	400	300	–	105°C
TCJT107M004#0150	T	100	4	85	3.2	105	40.0	8	150	3	800	600	400	–	105°C
TCJB157M004#0070	B	150	4	85	3.2	105	60.0	6	70	3	1300	900	600	–	105°C
TCJY157M004#0025	Y	150	4	85	3.2	105	60.0	6	25	3	2700	1900	1200	–	105°C
TCJY157M004#0045	Y	150	4	85	3.2	105	60.0	6	45	3	2000	1400	900	–	105°C
TCJB227M004#0035	B	220	4	85	3.2	105	88.0	10	35	3	1900	1300	900	–	105°C
TCJB227M004#0045	B	220	4	85	3.2	105	88.0	10	45	3	1700	1200	800	–	105°C
TCJB227M004#0060	B	220	4	85	3.2	105	88.0	10	60	3	1500	1100	700	–	105°C
TCJB227M004#0070	B	220	4	85	3.2	105	88.0	10	70	3	1300	900	600	–	105°C
TCJD227M004#0015	D	220	4	105	4	105	88.0	6	15	3	3700	2600	1700	–	105°C
TCJD227M004#0040	D	220	4	105	4	105	88.0	6	40	3	2300	1600	1000	–	105°C
TCJY227M004#0015	Y	220	4	105	4	105	88.0	6	15	3	3500	2500	1600	–	105°C
TCJY227M004#0025	Y	220	4	85	3.2	105	88.0	6	25	3	2700	1900	1200	–	105°C
TCJY227M004#0040	Y	220	4	85	3.2	105	88.0	6	40	3	2200	1500	1000	–	105°C
TCJD337M004#0025	D	330	4	85	3.2	105	132	6	25	3	3000	2100	1400	–	105°C
TCJD337M004#0040	D	330	4	85	3.2	105	132	6	40	3	2400	1700	1100	–	105°C
TCJD337M004#0050	D	330	4	85	3.2	105	132	6	50	3	2100	1500	900	–	105°C
TCJY337M004#0025	Y	330	4	85	3.2	105	132	6	25	3	2700	1900	1200	–	105°C
TCJY337M004#0040	Y	330	4	85	3.2	105	132	6	40	3	2200	1500	1000	–	105°C
TCJY337M004#0050	Y	330	4	85	3.2	105	132	6	50	3	1900	1300	900	–	105°C
TCJD477M004#0025	D	470	4	85	3.2	105	188	6	25	3	3000	2100	1400	–	105°C
TCJD477M004#0040	D	470	4	85	3.2	105	188	6	40	3	2400	1700	1100	–	105°C
TCJD477M004#0050	D	470	4	85	3.2	105	188	6	50	3	2100	1500	900	–	105°C
TCJY477M004#0025	Y	470	4	85	3.2	105	188	6	25	3	2700	1900	1200	–	105°C
TCJY477M004#0040	Y	470	4	85	3.2	105	188	6	40	3	2200	1500	1000	–	105°C
TCJY477M004#0050	Y	470	4	85	3.2	105	188	6	50	3	1900	1300	900	–	105°C
6.3 Volt @ 85°C															
TCJA106M006#0300	A	10	6.3	85	4	125	6.0	6	300	3	600	400	300	200	125°C
TCJN106M006#0250	N	10	6.3	85	5	105	6.0	6	250	3	600	400	300	–	105°C
TCJN106M006#0500	N	10	6.3	85	5	105	6.0	6	500	3	400	300	200	–	105°C
TCJR106M006#0500	R	10	6.3	85	5	105	6.0	6	500	3	400	300	200	–	105°C
TCJA156M006#0300	A	15	6.3	85	4	125	9.0	6	300	3	600	400	300	200	125°C
TCJA226M006#0300	A	22	6.3	85	4	125	13.2	6	300	3	600	400	300	200	125°C
TCJK226M006#0400	K	22	6.3	85	5	105	13.2	8	400	3	500	400	200	–	105°C
TCJN226M006#0500	N	22	6.3	85	5	105	13.2	10	500	3	400	300	200	–	105°C

Moisture Sensitivity Level (MSL) is defined according to J-STD-020.

All technical data relates to an ambient temperature of +25°C. Capacitance and DF are measured at 120Hz, 0.5RMS with DC bias of 2.2 volts. DCL is measured at rated voltage after 5 minutes.

ESR allowed to move up to 1.25 times catalog limit post mounting.

For typical weight and composition see page 162.

NOTE: AVX reserves the right to supply a higher voltage rating or tighter tolerance part in the same case size, to the same reliability standards.

TCJ Series

Tantalum Solid Electrolytic Chip Capacitors with Conductive Polymer Electrode

RATINGS & PART NUMBER REFERENCE

AVX Part No.	Case Size	Cap (µF)	Rated Voltage (V)	Rated Temp. (°C)	Category Voltage (V)	Category Temp. (°C)	DCL (µA) Max.	DF % Max.	ESR Max. (mΩ) @ 100kHz	MSL	100kHz RMS Current (mA)				Product Category
											25°C	85°C	105°C	125°C	
TCJR226M006#0500	R	22	6.3	85	5	105	13.2	10	500	3	400	300	200	–	105°C.
TCJS226M006#0400	S	22	6.3	85	5	105	13.2	8	400	3	500	400	200	–	105°C
TCJT226M006#0150	T	22	6.3	85	5	105	13.2	6	150	3	800	600	400	–	105°C
TCJA336M006#0200	A	33	6.3	85	5	105	19.8	6	200	3	700	500	300	–	105°C
TCJB336M006#0070	B	33	6.3	85	4	125	19.8	6	70	3	1300	900	600	300	125°C
TCJB336M006#0200	B	33	6.3	85	4	125	19.8	6	200	3	800	600	400	200	125°C
TCJT336M006#0150	T	33	6.3	85	5	105	19.8	8	150	3	800	600	400	–	105°C
TCJA476M006#0200	A	47	6.3	85	5	105	28.2	6	200	3	700	500	300	–	105°C
TCJB476M006#0070	B	47	6.3	85	4	125	28.2	6	70	3	1300	900	600	300	125°C
TCJK476M006#0150	K	47	6.3	85	5	105	28.2	6	150	3	800	600	400	–	105°C
TCJK476M006#0200	K	47	6.3	85	5	105	28.2	6	200	3	700	500	300	–	105°C
TCJK476M006#0400	K	47	6.3	85	5	105	28.2	6	400	3	500	400	200	–	105°C
TCJP476M006#0500	P	47	6.3	85	5	105	28.2	10	500	3	400	300	200	–	105°C
TCJR476M006#0500	R	47	6.3	85	5	105	28.2	10	500	3	400	300	200	–	105°C
TCJT476M006#0055	T	47	6.3	85	5	105	28.2	8	55	3	1300	900	600	–	105°C
TCJT476M006#0070	T	47	6.3	85	5	105	28.2	8	70	3	1200	800	500	–	105°C
TCJT476M006#0080	T	47	6.3	85	5	105	28.2	8	80	3	1100	800	500	–	105°C
TCJT476M006#0120	T	47	6.3	85	5	105	28.2	8	120	3	900	600	400	–	105°C
TCJB686M006#0055	B	68	6.3	85	4	125	40.8	8	55	3	1500	1100	700	400	125°C
TCJB686M006#0070	B	68	6.3	85	4	125	40.8	8	70	3	1300	900	600	300	125°C
TCJC686M006#0100	C	68	6.3	85	4	125	40.8	6	100	3	1300	900	600	300	125°C
TCJT686M006#0200	T	68	6.3	85	5	105	40.8	8	200	3	700	500	300	–	105°C
TCJW686M006#0070	W	68	6.3	85	4	125	40.8	8	70	3	1400	1000	600	400	125°C
TCJB107M006#0045	B	100	6.3	85	5	105	60.0	10	45	3	1700	1200	800	–	105°C
TCJB107M006#0069	B	100	6.3	85	5	105	60.0	10	69	3	1300	900	600	–	105°C
TCJB107M006#0070	B	100	6.3	85	5	105	60.0	10	70	3	1300	900	600	–	105°C
TCJT107M006#0070	T	100	6.3	85	5	105	60.0	10	70	3	1200	800	500	–	105°C
TCJT107M006#0200	T	100	6.3	85	5	105	60.0	10	200	3	700	500	300	–	105°C
TCJB157M006#0035	B	150	6.3	85	5	105	90.0	10	35	3	1900	1300	900	–	105°C
TCJB157M006#0045	B	150	6.3	85	5	105	90.0	10	45	3	1900	1300	900	–	105°C
TCJB157M006#0069	B	150	6.3	85	5	105	90.0	10	69	3	1300	900	600	–	105°C
TCJB157M006#0070	B	150	6.3	85	5	105	90.0	10	70	3	1300	900	600	–	105°C
TCJD157M006#0015	D	150	6.3	105	6	105	90.0	6	15	3	3700	2600	1700	–	105°C
TCJD157M006#0040	D	150	6.3	105	6	105	90.0	6	40	3	2300	1600	1000	–	105°C
TCJH157M006#0200	H	150	6.3	85	5	105	90.0	6	200	3	700	500	300	–	105°C
TCJW157M006#0040	W	150	6.3	85	5	105	90.0	6	40	3	1800	1300	800	–	105°C
TCJW157M006#0070	W	150	6.3	85	5	105	90.0	6	70	3	1400	1000	600	–	105°C
TCJY157M006#0015	Y	150	6.3	105	6	105	90.0	6	15	3	3500	2500	1600	-	105°C
TCJY157M006#0025	Y	150	6.3	85	5	105	90.0	6	25	3	2700	1900	1200	–	105°C
TCJY157M006#0040	Y	150	6.3	85	5	105	90.0	6	40	3	2200	1500	1000	–	105°C
TCJB227M006#0070	B	220	6.3	85	5	105	132.0	10	70	3	1300	900	600	–	105°C
TCJB227M006#0200	B	220	6.3	85	5	105	132.0	10	200	3	800	600	400	–	105°C
TCJD227M006#0025	D	220	6.3	85	5	105	132.0	6	25	3	3000	2100	1400	–	105°C
TCJD227M006#0035	D	220	6.3	85	5	105	132.0	6	35	3	2500	1800	1100	–	105°C
TCJD227M006#0040	D	220	6.3	85	5	105	132.0	6	40	3	2400	1700	1100	–	105°C
TCJD227M006#0050	D	220	6.3	85	5	105	132.0	6	50	3	2100	1500	900	–	105°C
TCJY227M006#0025	Y	220	6.3	85	5	105	132.0	6	25	3	2700	1900	1200	–	105°C
TCJY227M006#0035	Y	220	6.3	85	5	105	132.0	6	35	3	2300	1600	1000	–	105°C
TCJY227M006#0040	Y	220	6.3	85	5	105	132.0	6	40	3	2200	1500	1000	–	105°C
TCJY227M006#0050	Y	220	6.3	85	5	105	132.0	6	50	3	1900	1300	900	–	105°C
TCJD337M006#0025	D	330	6.3	85	5	105	198	6	25	3	3000	2100	1400	–	105°C
TCJD337M006#0040	D	330	6.3	85	5	105	198	6	40	3	2400	1700	1100	–	105°C
TCJD337M006#0050	D	330	6.3	85	5	105	198	6	50	3	2100	1500	900	–	105°C
TCJY337M006#0025	Y	330	6.3	85	5	105	198	12	25	3	2700	1900	1200	–	105°C
TCJY337M006#0040	Y	330	6.3	85	5	105	198	12	40	3	2200	1500	1000	–	105°C
TCJY337M006#0050	Y	330	6.3	85	5	105	198	12	50	3	1900	1300	900	–	105°C
10 Volt @ 85°C															
TCJK475M010#0500	K	4.7	10	85	8	105	4.7	6	500	3	400	300	200	–	105°C
TCJR475M010#0500	R	4.7	10	85	8	105	4.7	6	500	3	400	300	200	–	105°C
TCJA106M010#0300	A	10	10	85	7	125	10.0	6	300	3	600	400	300	200	125°C
TCJA156M010#0200	A	15	10	85	7	125	15.0	6	200	3	700	500	300	200	125°C
TCJB226M010#0300	B	22	10	85	7	125	22.0	6	300	3	600	400	300	200	125°C
TCJT226M010#0070	T	22	10	85	8	105	22.0	6	70	3	1200	800	500	–	105°C
TCJT226M010#0150	T	22	10	85	8	105	22.0	6	150	3	800	600	400	–	105°C
TCJB336M010#0070	B	33	10	85	7	125	33.0	6	70	3	1300	900	600	300	125°C
TCJB336M010#0200	B	33	10	85	7	125	33.0	6	200	3	800	600	400	200	125°C
TCJC336M010#0100	C	33	10	85	7	125	33.0	6	100	3	1300	900	600	300	125°C

Moisture Sensitivity Level (MSL) is defined according to J-STD-020.

All technical data relates to an ambient temperature of +25°C. Capacitance and DF are measured at 120Hz, 0.5RMS with DC bias of 2.2 volts. DCL is measured at rated voltage after 5 minutes.

ESR allowed to move up to 1.25 times catalog limit post mounting.

For typical weight and composition see page 162.

NOTE: AVX reserves the right to supply a higher voltage rating or tighter tolerance part in the same case size, to the same reliability standards.

TCJ Series

Tantalum Solid Electrolytic Chip Capacitors with Conductive Polymer Electrode

RATINGS & PART NUMBER REFERENCE

AVX Part No.	Case Size	Cap (µF)	Rated Voltage (V)	Rated Temp. (°C)	Category Voltage (V)	Category Temp. (°C)	DCL (µA) Max.	DF % Max.	ESR Max. (mΩ) @ 100kHz	MSL	100kHz RMS Current (mA)				Product Category
											25°C	85°C	105°C	125°C	
TCJT336M010#0070	T	33	10	85	8	105	33.0	6	70	3	1200	800	500	–	105°C
TCJT336M010#0150	T	33	10	85	8	105	33.0	6	150	3	800	600	400	–	105°C
TCJB476M010#0070	B	47	10	85	8	105	47.0	6	70	3	1300	900	600	–	105°C
TCJC476M010#0100	C	47	10	85	7	125	47.0	6	100	3	1300	900	600	300	125°C
TCJD686M010#0045	D	68	10	85	8	105	68	6	45	3	2200	1500	1000	–	105°C
TCJD686M010#0055	D	68	10	85	8	105	68	6	55	3	2000	1400	900	–	105°C
TCJY686M010#0045	Y	68	10	85	8	105	68	6	45	3	2000	1400	900	–	105°C
TCJY686M010#0055	Y	68	10	85	8	105	68	6	55	3	1800	1300	800	–	105°C
TCJD107M010#0045	D	100	10	85	8	105	100	6	45	3	2200	1500	1000	–	105°C
TCJD107M010#0055	D	100	10	85	8	105	100	6	55	3	2000	1400	900	–	105°C
TCJY107M010#0025	Y	100	10	85	8	105	100	6	25	3	2700	1900	1200	–	105°C
TCJY107M010#0045	Y	100	10	85	8	105	100	6	45	3	2000	1400	900	–	105°C
TCJY107M010#0055	Y	100	10	85	8	105	100	6	55	3	1800	1300	800	–	105°C
TCJD157M010#0025	D	150	10	85	8	105	150	6	25	3	3000	2100	1400	–	105°C
TCJD157M010#0040	D	150	10	85	8	105	150	6	40	3	2400	1700	1100	–	105°C
TCJD157M010#0045	D	150	10	85	8	105	150	6	45	3	2200	1500	1000	–	105°C
TCJD157M010#0055	D	150	10	85	8	105	150	6	55	3	2000	1400	900	–	105°C
TCJY157M010#0025	Y	150	10	85	8	105	150	6	25	3	2700	1900	1200	–	105°C
TCJY157M010#0040	Y	150	10	85	8	105	150	6	40	3	2200	1500	1000	–	105°C
TCJY157M010#0045	Y	150	10	85	8	105	150	6	45	3	2000	1400	900	–	105°C
TCJY157M010#0055	Y	150	10	85	8	105	150	6	55	3	1800	1300	800	–	105°C
TCJD227M010#0025	D	220	10	85	8	105	220	6	25	3	3000	2100	1400	–	105°C
TCJD227M010#0040	D	220	10	85	8	105	220	6	40	3	2400	1700	1100	–	105°C
TCJD227M010#0050	D	220	10	85	8	105	220	6	50	3	2100	1500	900	–	105°C
TCJY227M010#0025	Y	220	10	85	8	105	220	6	25	3	2700	1900	1200	–	105°C
TCJY227M010#0040	Y	220	10	85	8	105	220	6	40	3	2200	1500	1000	–	105°C
TCJY227M010#0050	Y	220	10	85	8	105	220	6	50	3	1900	1300	900	–	105°C
16 Volt @ 85°C															
TCJA685M016#0200	A	6.8	16	85	10	125	10.9	6	200	3	700	500	300	200	125°C
TCJA106M016#0200	A	10	16	85	10	125	16.0	6	200	3	700	500	300	200	125°C
TCJB106M016#0200	B	10	16	85	10	125	16.0	6	200	3	800	600	400	200	125°C
TCJT106M016#0150	T	10	16	85	10	125	16.0	6	150	3	800	600	400	200	125°C
TCJT106M016#0200	T	10	16	85	10	125	16.0	6	200	3	700	500	300	200	125°C
TCJB156M016#0150	B	15	16	85	10	125	24.0	6	150	3	900	600	400	200	125°C
TCJB226M016#0150	B	22	16	85	10	125	35.2	6	150	3	900	600	400	200	125°C
TCJY336M016#0045	Y	33	16	105	16	105	52.8	6	45	3	2000	1400	900	–	105°C
TCJY336M016#0060	Y	33	16	105	16	105	52.8	6	60	3	1800	1300	800	–	105°C
TCJY336M016#0070	Y	33	16	105	16	105	52.8	6	70	3	1600	1100	700	–	105°C
TCJY476M016#0045	Y	47	16	105	16	105	75.2	6	45	3	2000	1400	900	–	105°C
TCJY476M016#0070	Y	47	16	105	16	105	75.2	6	70	3	1600	1100	700	–	105°C
TCJD686M016#0050	D	68	16	105	16	105	108.8	6	50	3	2100	1500	900	–	105°C
TCJY686M016#0050	Y	68	16	105	16	105	108.8	6	50	3	1900	1300	900	–	105°C
TCJD107M016#0050	D	100	16	105	16	105	160.0	6	50	3	2100	1500	900	–	105°C
TCJE107M016#0040	E	100	16	105	16	105	160.0	6	40	3	2500	1800	1100	–	105°C
TCJY107M016#0050	Y	100	16	105	16	105	160.0	6	50	3	1900	1300	900	–	105°C
TCJE157M016#0040	E	150	16	105	16	105	240.0	6	40	3	2500	1800	1100	–	105°C
20 Volt @ 85°C															
TCJY226M020#0070	Y	22	20	105	20	105	44.0	6	70	3	1600	1100	700	–	105°C
TCJY336M020#0070	Y	33	20	105	20	105	66.0	6	70	3	1600	1100	700	–	105°C
TCJD476M020#0055	D	47	20	105	20	105	94.0	6	55	3	2000	1400	900	–	105°C
TCJY476M020#0070	Y	47	20	105	20	105	94.0	6	70	3	1600	1100	700	–	105°C
TCJD686M020#0055	D	68	20	85	16	105	136.0	6	55	3	2000	1400	900	–	105°C
TCJE686M020#0045	E	68	20	105	20	105	136.0	6	45	3	2400	1700	1100	–	105°C
TCJD107M020#0055	D	100	20	85	16	105	200.0	6	55	3	2000	1400	900	–	105°C
TCJE107M020#0045	E	100	20	85	16	105	200.0	6	45	3	2400	1700	1100	–	105°C
25 Volt @ 85°C															
TCJP105M025#0500	P	1.0	25	105	25	105	2.5	6	500	3	400	300	200	–	105°C
TCJB475M025#0150	B	4.7	25	85	20	105	11.8	6	150	3	900	600	400	–	105°C
TCJB685M025#0090	B	6.8	25	105	25	105	17.0	6	90	3	1100	800	500	–	105°C
TCJB685M025#0150	B	6.8	25	85	20	105	17.0	6	150	3	900	600	400	–	105°C
TCJB106M025#0090	B	10	25	105	25	105	25.0	6	90	3	1100	800	500	–	105°C
TCJB106M025#0150	B	10	25	105	25	105	25.0	6	150	3	900	600	400	–	105°C
TCJB156M025#0100	B	15	25	105	25	105	37.5	6	100	3	1100	800	500	–	105°C
TCJB156M025#0150	B	15	25	105	25	105	37.5	6	150	3	900	600	400	–	105°C
TCJY156M025#0090	Y	15	25	105	25	105	37.5	6	90	3	1400	1000	600	–	105°C

Moisture Sensitivity Level (MSL) is defined according to J-STD-020.

All technical data relates to an ambient temperature of +25°C. Capacitance and DF are measured at 120Hz, 0.5RMS with DC bias of 2.2 volts. DCL is measured at rated voltage after 5 minutes.

ESR allowed to move up to 1.25 times catalog limit post mounting.

For typical weight and composition see page 162.

NOTE: AVX reserves the right to supply a higher voltage rating or tighter tolerance part in the same case size, to the same reliability standards.

TCJ Series

Tantalum Solid Electrolytic Chip Capacitors with Conductive Polymer Electrode

RATINGS & PART NUMBER REFERENCE

AVX Part No.	Case Size	Cap (µF)	Rated Voltage (V)	Rated Temp. (°C)	Category Voltage (V)	Category Temp. (°C)	DCL (µA) Max.	DF % Max.	ESR Max. (mΩ) @ 100kHz	MSL	100kHz RMS Current (mA)				Product Category
											25°C	85°C	105°C	125°C	
TCJB226M025#0150	B	22	25	85	20	105	55.0	6	150	3	900	600	400	–	105°C
TCJC226M025#0100	C	22	25	85	20	105	55.0	6	100	3	1300	900	600	–	105°C
TCJD226M025#0060	D	22	25	85	20	105	55.0	6	60	3	1900	1300	900	–	105°C
TCJD226M025#0100	D	22	25	85	20	105	55.0	6	100	3	1500	1100	700	–	105°C
TCJY226M025#0070	Y	22	25	85	20	105	55.0	6	70	3	1600	1100	700	–	105°C
TCJD336M025#0060	D	33	25	105	25	105	82.5	6	60	3	1900	1300	900	–	105°C
TCJD336M025#0100	D	33	25	105	25	105	82.5	6	100	3	1500	1100	700	–	105°C
TCJY336M025#0060	Y	33	25	105	25	105	82.5	6	60	3	1800	1300	800	–	105°C
TCJY336M025#0070	Y	33	25	105	25	105	82.5	6	70	3	1600	1100	700	–	105°C
TCJY336M025#0100	Y	33	25	105	25	105	82.5	6	100	3	1400	1000	600	–	105°C
TCJD476M025#0060	D	47	25	85	20	105	117.5	6	60	3	1900	1300	900	–	105°C
TCJD476M025#0100	D	47	25	85	20	105	117.5	6	100	3	1500	1100	700	–	105°C
TCJE476M025#0050	E	47	25	85	20	105	117.5	6	50	3	2300	1600	1000	–	105°C
TCJE686M025#0050	E	68	25	85	20	105	170.0	6	50	3	2300	1600	1000	–	105°C
TCJE107M025#0080	E	100	25	105	25	105	250.0	6	80	3	1800	1300	800	–	105°C
35 Volt @ 85°C															
TCJB155M035#0200	B	1.5	35	105	35	105	5.3	6	200	3	800	600	400	–	105°C
TCJB225M035#0200	B	2.2	35	85	28	105	7.7	6	200	3	800	600	400	–	105°C
TCJB335M035#0200	B	3.3	35	85	28	105	11.6	6	200	3	800	600	400	–	105°C
TCJB475M035#0200	B	4.7	35	85	28	105	16.5	6	200	3	800	600	400	–	105°C
TCJC475M035#0200	C	4.7	35	85	28	105	16.5	6	200	3	900	600	400	–	105°C
TCJC685M035#0200	C	6.8	35	85	28	105	23.8	6	200	3	900	600	400	–	105°C
TCJB106M035#0200	B	10	35	85	28	105	35.0	6	200	3	800	600	400	–	105°C
TCJC106M035#0200	C	10	35	85	28	105	35.0	6	200	3	900	600	400	–	105°C
TCJY106M035#0070	Y	10	35	105	35	105	35.0	6	70	3	1600	1100	700	–	105°C
TCJC156M035#0200	C	15	35	85	28	105	52.5	6	200	3	900	600	400	–	105°C
TCJD156M035#0070	D	15	35	85	28	105	52.5	6	70	3	1700	1200	800	–	105°C
TCJD156M035#0100	D	15	35	85	28	105	52.5	6	100	3	1500	1100	700	–	105°C
TCJD226M035#0070	D	22	35	105	35	105	77.0	6	70	3	1700	1200	800	–	105°C
TCJD226M035#0100	D	22	35	105	35	105	77.0	6	100	3	1500	1100	700	–	105°C
TCJD336M035#0070	D	33	35	85	28	105	115.5	6	70	3	1700	1200	800	–	105°C
TCJD336M035#0100	D	33	35	85	28	105	115.5	6	100	3	1500	1100	700	–	105°C
TCJE336M035#0055	E	33	35	85	28	105	115.5	6	55	3	2100	1500	900	–	105°C
TCJE336M035#0070	E	33	35	85	28	105	115.5	6	70	3	1900	1300	900	–	105°C
TCJE476M035#0055	E	47	35	85	28	105	164.5	6	55	3	2100	1500	900	–	105°C
50 Volt @ 85°C															
TCJB684M050#0400	B	0.68	50	85	40	105	3.4	6	400	3	600	400	300	–	105°C
TCJB105M050#0300	B	1.0	50	85	40	105	5.0	6	300	3	600	400	300	–	105°C
TCJB155M050#0300	B	1.5	50	85	40	105	7.5	6	300	3	600	400	300	–	105°C
TCJC155M050#0300	C	1.5	50	85	40	105	7.5	6	300	3	800	600	400	–	105°C
TCJC225M050#0300	C	2.2	50	85	40	105	11.0	6	300	3	800	600	400	–	105°C
TCJC335M050#0200	C	3.3	50	85	40	105	16.5	8	200	3	900	600	400	–	105°C
TCJC475M050#0200	C	4.7	50	85	40	105	23.5	8	200	3	900	600	400	–	105°C
TCJC685M050#0200	C	6.8	50	85	40	105	34.0	8	200	3	900	600	400	–	105°C
TCJD685M050#0120	D	6.8	50	85	40	105	34.0	10	120	3	1400	1000	600	–	105°C
TCJD106M050#0120	D	10	50	85	40	105	50.0	10	120	3	1400	1000	600	–	105°C
TCJE106M050#0070	E	10	50	85	40	105	50.0	6	70	3	1900	1300	900	–	105°C
TCJE106M050#0100	E	10	50	85	40	105	50.0	6	100	3	1600	1100	700	–	105°C
TCJE156M050#0070	E	15	50	85	40	105	75.0	6	70	3	1900	1300	900	–	105°C
TCJE156M050#0100	E	15	50	85	40	105	75.0	6	100	3	1600	1100	700	–	105°C
63 Volt @ 85°C															
TCJB474M063#0400	B	0.47	63	85	50	105	3.0	8	400	3	600	400	300	–	105°C
TCJB684M063#0300	B	0.68	63	85	50	105	4.3	8	300	3	600	400	300	–	105°C
TCJB105M063#0300	B	1.0	63	85	50	105	6.3	8	300	3	600	400	300	–	105°C
TCJC105M063#0300	C	1.0	63	85	50	105	6.3	6	300	3	800	600	400	–	105°C
TCJC155M063#0300	C	1.5	63	85	50	105	9.5	6	300	3	800	600	400	–	105°C
TCJC225M063#0200	C	2.2	63	85	50	105	13.9	6	200	3	900	600	400	–	105°C
TCJC335M063#0200	C	3.3	63	85	50	105	20.8	6	200	3	900	600	400	–	105°C
TCJC475M063#0200	C	4.7	63	85	50	105	29.6	6	200	3	900	600	400	–	105°C
TCJD475M063#0120	D	4.7	63	85	50	105	29.6	6	120	3	1400	1000	600	–	105°C
TCJD685M063#0120	D	6.8	63	85	50	105	42.8	6	120	3	1400	1000	600	–	105°C
TCJE685M063#0100	E	6.8	63	85	50	105	42.8	6	100	3	1600	1100	700	–	105°C
TCJE685M063#0150	E	6.8	63	85	50	105	42.8	6	150	3	1300	900	600	–	105°C
TCJE106M063#0100	E	10	63	85	50	105	63.0	6	100	3	1600	1100	700	–	105°C
TCJE106M063#0150	E	10	63	85	50	105	63.0	6	150	3	1300	900	600	–	105°C

Moisture Sensitivity Level (MSL) is defined according to J-STD-020.

All technical data relates to an ambient temperature of +25°C. Capacitance and DF are measured at 120Hz, 0.5RMS with DC bias of 2.2 volts. DCL is measured at rated voltage after 5 minutes.

ESR allowed to move up to 1.25 times catalog limit post mounting.

For typical weight and composition see page 162.

NOTE: AVX reserves the right to supply a higher voltage rating or tighter tolerance part in the same case size, to the same reliability standards.

TCJ Series

Tantalum Solid Electrolytic Chip Capacitors with Conductive Polymer Electrode

RATINGS & PART NUMBER REFERENCE

AVX Part No.	Case Size	Cap (µF)	Rated Voltage (V)	Rated Temp. (°C)	Category Voltage (V)	Category Temp. (°C)	DCL (µA) Max.	DF % Max.	ESR Max. (mΩ) @ 100kHz	MSL	100kHz RMS Current (mA)				Product Category
											25°C	85°C	105°C	125°C	
75 Volt @ 85°C															
TCJD475M075#0150	D	4.7	75	85	60	105	35.3	6	150	3	1200	800	500	–	105°C
TCJD685M075#0120	D	6.8	75	85	60	105	51.0	6	120	3	1400	1000	600	–	105°C
100 Volt @ 85°C															
TCJD475M100#0250	D	4.7	100	85	80	105	47.0	8	250	3	900	600	400	–	105°C
TCJV685M100#0250	V	6.8	100	85	80	105	68.0	8	250	3	1200	800	500	–	105°C
125 Volt @ 85°C															
TCJD335M125#0250	D	3.3	125	85	100	105	41.2	8	250	3	900	600	400	–	105°C

Moinsture Sensitivity Level (MSL) is defined according to J-STD-020.

All technical data relates to an ambient temperature of +25°C. Capacitance and DF are measured at 120Hz, 0.5RMS with DC bias of 2.2 volts. DCL is measured at rated voltage after 5 minutes.

ESR allowed to move up to 1.25 times catalog limit post mounting.

For typical weight and composition see page 162.

NOTE: AVX reserves the right to supply a higher voltage rating or tighter tolerance part in the same case size, to the same reliability standards.

PRODUCT CATEGORY 125°C

TEST	125°C series (Temperature range -55°C to +125°C)		
	Condition	Characteristics	
Endurance	Determine after application of rated voltage for 2000 +48/-0 hours at 85±2°C and then leaving 1-2 hours at room temperature. Also determine of 125°C temperature, category voltage for 2000 +48/-0 hours and then leaving 1-2 hours at room temperature. Power supply impedance to be ≤3Ω.	Visual examination	no visible damage
		DCL	1.25 x initial limit
		ΔC/C	within +20/-30% of initial value
		DF	1.5 x initial limit
		ESR	2 x initial limit
Storage Life	125°C, 0V, 2000h	Visual examination	no visible damage
		DCL	2 x initial limit
		ΔC/C	within ±20% of initial value
		DF	1.5 x initial limit
		ESR	2 x initial limit
Humidity	Determine after storage without applied voltage at 65±2°C and 95±2% relative humidity for 500 hours and then recovery 1- 2 hours at room temperature.	Visual examination	no visible damage
		DCL	3 x initial limit
		ΔC/C	within +30/-20% of initial value
		DF	1.5 x initial limit
		ESR	2 x initial limit

Temperature Stability

Step	Temperature°C	Duration(min)
1	+20±2	15
2	-55+0/-3	15
3	+20±2	15
4	+85+3/-0	15
5	+125+3/-0	15
6	+20±2	15

	+20°C	-55°C	+20°C	+85°C	+125°C	+20°C
DCL	IL*	n/a	IL*	10 x IL*	12.5xIL*	IL*
ΔC/C	n/a	+0/-20%	±5%	+20/-0%	+30/-0%	±5%
DF	IL*	1.5 x IL*	IL*	1.5 x IL*	2xIL*	IL*

Surge Voltage	Test temperature: 125°C+3/0°C Test voltage: Category voltage at 125°C Surge voltage: 1.3 x category voltage at 125°C Series protection resistance 1000±100Ω Discharge resistance: 1000Ω Number of cycles: 1000x Cycle duration: 6 min; 30 sec charge, 5 min 30 sec discharge	Visual examination	no visible damage
		DCL	initial limit
		ΔC/C	within +20/-30% of initial value
		DF	1.25 x initial limit

*Initial Limit

TCJ Series

Tantalum Solid Electrolytic Chip Capacitors with Conductive Polymer Electrode

PRODUCT CATEGORY 105°C

TEST	105°C series (Temperature range -55ºC to +105ºC)		
	Condition	Characteristics	
Endurance	Determine after application of rated voltage for 2000 +48/-0 hours at 85±2ºC and then leaving 1-2 hours at room temperature. Also determine after application of 105ºC temperature, category voltage for 2000 +48/-0 hours and then leaving 1-2 hours at room temperature. Power supply impedance to be ≤3Ω.	Visual examination	no visible damage
		DCL	1.25 x initial limit
		ΔC/C	within +20/-30% of initial value
		DF	1.5 x initial limit
		ESR	2 x initial limit
Storage Life	105°C, 0V, 2000h	Visual examination	no visible damage
		DCL ($V_R \leq 75V$)	1.25 x initial limit
		DCL ($V_R > 75V$)	2 x initial limit
		ΔC/C	within ±20% of initial value
		DF	1.5 x initial limit
		ESR	2 x initial limit
Humidity	Determine after storage without applied voltage at 65±2ºC and 95±2% relative humidity for 500 hours and then recovery 1- 2 hours at room temperature.	Visual examination	no visible damage
		DCL	3 x initial limit
		ΔC/C	within +30/-20% of initial value
		DF	1.5 x initial limit
		ESR	2 x initial limit

Temperature Stability

Step	Temperature°C	Duration(min)
1	+20±2	15
2	-55+0/-3	15
3	+20±2	15
4	+85+3/-0	15
5	+105+3/-0	15
6	+20±2	15

	+20ºC	-55ºC	+20ºC	+85ºC	+105ºC	+20ºC
DCL	IL*	n/a	IL*	10 x IL*	12.5xIL*	IL*
ΔC/C	n/a	+0/-20%	±5%	+20/-0%	+30/-0%	±5%
DF	IL*	1.5 x IL*	IL*	1.5 x IL*	2xIL*	IL*

Surge Voltage	Test temperature: 105ºC+3/0ºC Test voltage: Category voltage at 105ºC Surge voltage: 1.3 x category voltage at 105ºC Series protection resistance 1000±100Ω Discharge resistance: 1000Ω Number of cycles: 1000x Cycle duration: 6 min; 30 sec charge, 5 min 30 sec discharge	Visual examination	no visible damage
		DCL	initial limit
		ΔC/C	within +20/-30% of initial value
		DF	1.25 x initial limit

*Initial Limit

PRODUCT CATEGORY 85°C

TEST	85°C series (Temperature range -55ºC to +85ºC)		
	Condition	Characteristics	
Endurance	Determine after application of rated voltage for 2000 +48/-0 hours at 85±2ºC and then leaving 1-2 hours at room temperature. Power supply impedance to be ≤3Ω.	Visual examination	no visible damage
		DCL	1.25 x initial limit
		ΔC/C	within +20/-30% of initial value
		DF	1.5 x initial limit
		ESR	2 x initial limit
Storage Life	85°C, 0V, 2000h	Visual examination	no visible damage
		DCL	1.25 x initial limit
		ΔC/C	within ±20% of initial value
		DF	1.5 x initial limit
		ESR	2 x initial limit
Humidity	Determine after storage without applied voltage at 65±2ºC and 95±2% relative humidity for 500 hours and then recovery 1- 2 hours at room temperature.	Visual examination	no visible damage
		DCL	5 x initial limit
		ΔC/C	within +40/-20% of initial value
		DF	1.5 x initial limit
		ESR	2 x initial limit

Temperature Stability

Step	Temperature°C	Duration(min)
1	+20±2	15
2	-55+0/-3	15
3	+20±2	15
4	+85+3/-0	15
5	+20±2	15

	+20ºC	-55ºC	+20ºC	+85ºC	+20ºC
DCL	IL*	n/a	IL*	10 x IL*	IL*
ΔC/C	n/a	+0/-20%	±5%	+20/-0%	±5%
DF	IL*	1.5 x IL*	IL*	1.5 x IL*	IL*

Surge Voltage	Test temperature: 85+3/0ºC Test voltage: Rated voltage Surge voltage: 1.3 x rated voltage Series protection resistance 1000±100Ω. Discharge resistance: 1000Ω Number of cycles: 1000x Cycle duration: 6 min; 30 sec charge, 5 min 30 sec discharge	Visual examination	no visible damage
		DCL	initial limit
		ΔC/C	within +20/-30% of initial value
		DF	1.25 x initial limit

*Initial Limit