

TCJ Series



Conductive Polymer Solid Electrolytic Chip Capacitors



FEATURES

- Conductive polymer electrode
- Benign failure mode under recommended use conditions
- Lower ESR
- 3x reflow 260°C compatible
- CV range: 0.47-470µF / 2.5-125V
- 18 case sizes available

APPLICATIONS

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



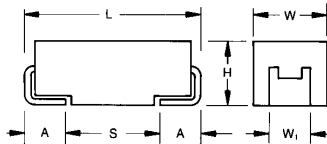
Elektra Award 2010



LEAD-FREE
LEAD-FREE COMPATIBLE
COMPONENT

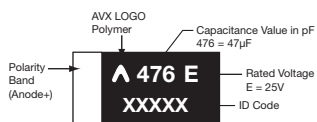
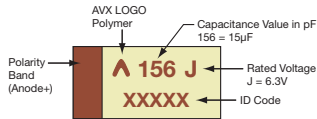


RoHS
COMPLIANT

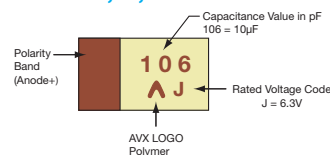


MARKING

A, B, C, D, E, G, H, K, S, T,
U, W, X, Y, 5 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)	W1±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 (0.053)	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)
U	2924	7361-43	7.30 (0.287)	6.10 (0.240)	4.10 (0.162)	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)
X	2917	7343-15	7.30 (0.287)	4.30 (0.169)	1.50 (0.059) max	2.40 (0.094)	1.30 (0.051)	4.40 (0.173)
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)
5	2917	7343-40	7.30 (0.287)	4.30 (0.169)	3.80 (0.150)	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	E
Type	Case Size	Capacitance Code	Tolerance	Rated DC Voltage	Packaging	ESR in mΩ	Additional Character
	See table above	pF code: 1st two digits represent significant figures, 3rd digit represents multiplier (number of zeros to follow)	M = ±20%	002 = 2.5Vdc 004 = 4Vdc 006 = 6.3Vdc 010 = 10Vdc 016 = 16Vdc 020 = 20Vdc 025 = 25Vdc	R = Pure Tin 7" Reel S = Pure Tin 13" Reel		E = Black resin

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

NOTE: Conductive Polymer Capacitors are designed to operate within the limits of the environmental conditions specified for each series. If operated continuously at their maximum temperature and / or humidity limit, or beyond these limits, capacitors may exhibit a parametric shift in capacitance and increases in ESR. These changes may occur earlier if the specified environmental conditions are exceeded. Similarly, their normal operational time period will be significantly extended if their general duty cycle includes operation below maximum temperature within humidity controlled environments. Careful attention should be paid to maximum temperature with associated high humidity environments as well as voltage derating, ripple current and current surges. Please reference the AVX Conductive Polymer Capacitor Guidelines for more information or contact factory for application assistance.



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							P(500)		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(300,500) R(500)			B(100,150)	B(200) C(200)	C(200) X(250) Y(250)	C(200) D(120)	D(150)	D(250)	
6.8	685					A(200)		A(150), B(90,150) T(100,150)	C(200)	C(200) D(120)	D(120) E(100,150)	D(120)		
10	106			A(300) N(200,250,500) R(500)	A(200,300)	A(200) B(100,200) T(100,150,200)	A(150)	A(150) B(90,100,150)	B(200) C(200) Y(70)	D(90,120) E(70,100)	E(100,150)			
15	156		A(300)	A(300)	A(200)	B(150)		B(100,150) Y(90)	B(200), C(200) D(70,100) Y(70,100)	E(70,100)				
22	226		A(300)	A(300), K(400) N(500), R(500) S(400), T(150)	B(300) T(70,150)	A(300) B(150)	B(90,150) Y(70)	B(100,150), C(100) D(60,100) Y(70)	D(70,100) Y(150)					
33	336		A(300)	A(200) B(70,200) T(150)	B(70,200) C(100) T(70,150)	A(200) H(150) Y(45,60,70)	Y(70)	D(60,100) X(70,100) Y(60,70,100)	D(70,100) E(55,70) U(70), Y(100)					
47	476		A(200) T(80)	A(70,100,200), B(70) K(150,200,400) P(500), R(500) T(55,70,80,120)	B(70) C(100) H(100)	X(45,70) Y(45,70)	D(55) X(55,70) Y(70)	D(60,100) E(50) Y(100)	E(55), U(70) Y(100)					
68	686	A(250)	A(250) B(70) T(80)	B(55,70) C(100), H(100) T(200), W(70)	D(45,55) Y(45,55)	D(50) Y(50)	D(55) E(45) Y(50)	D(70) E(50) Y(100)						
100	107	A(200), B(70)	A(200) B(40,70) G(300) T(70,150)	A(100,150) B(40,45,55,70) T(70,200)	D(18,25,45,55,80) Y(18,25,45,55)	D(50), E(40) Y(50)	D(55) E(45) Y(55)	D(55,70) E(80) U(70)						
150	157	B(70)	B(70), D(15) Y(15,25,45)	B(25,35,45,55,70) D(12,15,25,40) H(200), W(40,70) Y(15,25,40)	D(25,40,45,55) Y(25,40,45,55)	D(40,50,70) E(40) Y(40,50,70)		U(70)						
220	227	B(35,45,70)	B(35,45,55,60,70) D(12,15,25,40) Y(15,25,40)	B(70,200) D(12,15,25,35,40,50) H(170) Y(15,25,35,40,50)	D(15,25,40,50) Y(15,25,40,50)	D(50)	U(70)							
330	337	B(35,45,70) Y(25,40)	D(15,25,40,50) Y(15,25,40,50)	D(12,15,18,25,40,50) Y(15,25,40,50)	D(25) 5(35,100)	E(50,70) 5(100)								
470	477	D(12,15,25,40,50) Y(15,25,40,50)	D(10,12,15,25,40,50) Y(15,25,40,50)	D(25) X(50,55,100)		5(100)								

Released ratings, (ESR ratings in mOhms in parentheses)
Engineering samples - please contact AVX

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

RATINGS & PART NUMBER REFERENCE

AVX Part No.	Case Size	Capacitance (µF)	Rated Voltage (V)	Maximum Operating Temperature (°C)	DCL Max. (µA)	DF Max. (%)	ESR Max. @ 100kHz (mΩ)	100kHz RMS Current (mA)				Product Category	MSL
								45°C	85°C	105°C	125°C		
TCJD226M035#0100E	D	22	35	105	77	6	100	1500	1100	700	—	2	3
TCJY226M035#0150E	Y	22	35	105	77	6	150	1100	800	500	—	3	3
TCJD336M035#0070E	D	33	35	105	115.5	6	70	1800	1300	800	—	2	3
TCJD336M035#0100E	D	33	35	105	115.5	6	100	1500	1100	700	—	2	3
TCJE336M035#0055E	E	33	35	105	115.5	6	55	2100	1500	900	—	3	3
TCJE336M035#0070E	E	33	35	105	115.5	6	70	1900	1300	900	—	3	3
TCJU336M035R0070E	U	33	35	125	115.5	12	70	2300	1600	1000	600	1	3
TCJY336M035#0100E	Y	33	35	105	115.5	6	100	1400	1000	600	—	3	3
TCJE476M035#0055E	E	47	35	105	164.5	6	55	2100	1500	900	—	2	3
TCJU476M035R0070E	U	47	35	125	164.5	12	70	2300	1600	1000	600	1	3
TCJY476M035#0100E	Y	47	35	105	164.5	6	100	1400	1000	600	—	3	3
50 Volt @ 85°C													
TCJB684M050#0400	B	0.68	50	105	3.4	6	400	600	400	300	—	3	3
TCJB105M050#0300	B	1.0	50	105	5	6	300	600	400	300	—	3	3
TCJB155M050#0300	B	1.5	50	105	7.5	6	300	600	400	300	—	3	3
TCJC155M050#0300	C	1.5	50	105	7.5	6	300	800	600	400	—	3	3
TCJC225M050#0300	C	2.2	50	105	11	6	300	800	600	400	—	3	3
TCJC335M050#0200	C	3.3	50	105	16.5	8	200	900	600	400	—	3	3
TCJC475M050#0200	C	4.7	50	105	23.5	8	200	900	600	400	—	3	3
TCJX475M050#0250	X	4.7	50	105	23.5	6	250	800	600	400	—	2	5
TCJY475M050#0250E	Y	4.7	50	105	23.5	6	250	900	600	400	—	2	5
TCJC685M050#0200	C	6.8	50	105	34	8	200	900	600	400	—	3	3
TCJD685M050#0120E	D	6.8	50	105	34	10	120	1400	1000	600	—	3	3
TCJD106M050#0090E	D	10	50	105	50	10	90	1600	1100	700	—	3	3
TCJD106M050#0120E	D	10	50	105	50	10	120	1400	1000	600	—	3	3
TCJE106M050#0070E	E	10	50	105	50	6	70	1900	1300	900	—	3	3
TCJE106M050#0100E	E	10	50	105	50	6	100	1600	1100	700	—	3	3
TCJE156M050#0070E	E	15	50	105	75	6	70	1900	1300	900	—	3	3
TCJE156M050#0100E	E	15	50	105	75	6	100	1600	1100	700	—	3	3
63 Volt @ 85°C													
TCJB474M063#0400	B	0.47	63	105	3	8	400	600	400	300	—	3	3
TCJB684M063#0300	B	0.68	63	105	4.3	8	300	600	400	300	—	3	3
TCJB105M063#0300	B	1.0	63	105	6.3	8	300	600	400	300	—	3	3
TCJC105M063#0300	C	1.0	63	105	6.3	6	300	800	600	400	—	3	3
TCJC155M063#0300	C	1.5	63	105	9.5	6	300	800	600	400	—	3	3
TCJC225M063#0200	C	2.2	63	105	13.9	6	200	900	600	400	—	3	3
TCJC335M063#0200	C	3.3	63	105	20.8	6	200	900	600	400	—	3	3
TCJC475M063#0200	C	4.7	63	105	29.6	6	200	900	600	400	—	3	3
TCJD475M063#0120E	D	4.7	63	105	29.6	6	120	1400	1000	600	—	3	3
TCJD685M063#0120E	D	6.8	63	105	42.8	6	120	1400	1000	600	—	3	3
TCJE685M063#0100E	E	6.8	63	105	42.8	6	100	1600	1100	700	—	3	3
TCJE685M063#0150E	E	6.8	63	105	42.8	6	150	1300	900	600	—	3	3
TCJE106M063#0100E	E	10	63	105	63	6	100	1600	1100	700	—	3	3
TCJE106M063#0150E	E	10	63	105	63	6	150	1300	900	600	—	3	3
75 Volt @ 85°C													
TCJD475M075#0150E	D	4.7	75	105	35.3	6	150	1200	800	500	—	3	3
TCJD685M075#0120E	D	6.8	75	105	51	6	120	1400	1000	600	—	3	3
100 Volt @ 85°C													
TCJD475M100#0250E	D	4.7	100	105	47	8	250	900	600	400	—	4	3
125 Volt @ 85°C													
TCJD335M125#0250E	D	3.3	125	105	41.2	8	250	900	600	400	—	4	3

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.

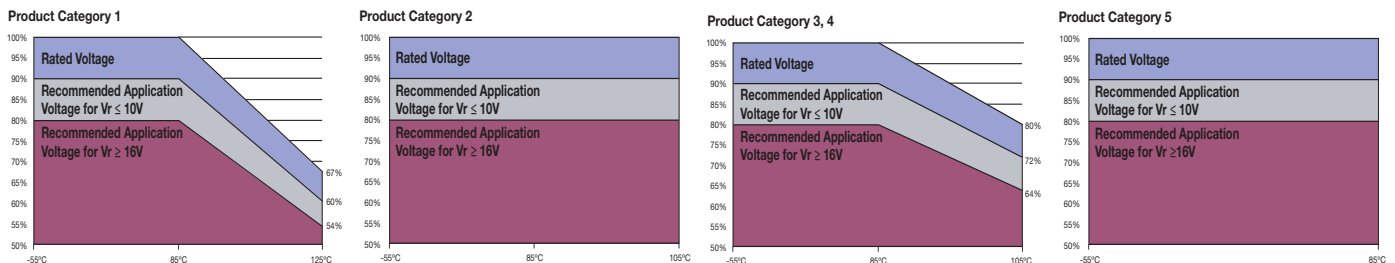
ESR allowed to move up to 1.25 times catalog limit post mounting.

For typical weight and composition see page 270.

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

RECOMMENDED DERATING FACTOR

Voltage and temperature derating as percentage of Vr



PRODUCT CATEGORY 1 (TEMPERATURE RANGE -55°C TO +125°C)

TEST	Condition	Characteristics								
Endurance	Apply rated voltage (Ur) at 85°C and / or 2/3 rated voltage (Ur) at 125°C for 2000 hours through a circuit impedance of $\leq 0.1\Omega/V$. Stabilize at room temperature for 1-2 hours before measuring.	Visual examination	no visible damage							
		DCL	1.25 x initial limit							
		$\Delta C/C$	within +10/-20% of initial value							
		DF	1.5 x initial limit							
		ESR	2 x initial limit							
Storage Life	Store at 125°C, no voltage applied, for 2000 hours. Stabilize at room temperature for 1-2 hours before measuring.	Visual examination	no visible damage							
		DCL	2 x initial limit							
		$\Delta C/C$	within +10/-20% of initial value							
		DF	1.5 x initial limit							
		ESR	2 x initial limit							
Humidity	Store at 65°C and 95% relative humidity for 500 hours, with no applied voltage. Stabilize at room temperature and humidity for 1-2 hours before measuring.	Visual examination	no visible damage							
		DCL	3 x initial limit							
		$\Delta C/C$	within +35/-5% of initial value							
		DF	1.5 x initial limit							
		ESR	2 x initial limit							
Temperature Stability	Step	Temperature°C	Duration(min)							
	1	+20	15							
	2	-55	15							
	3	+20	15							
	4	+85	15							
	5	+125	15							
	6	+20	15							
				DCL	IL*	n/a	IL*	10 x IL*	12.5 x IL*	IL*
				$\Delta C/C$	n/a	+0/-20%	$\pm 5\%$	+20/-0%	+30/-0%	$\pm 5\%$
				DF	IL*	1.5 x IL*	IL*	1.5 x IL*	2 x IL*	IL*
Surge Voltage	Apply 1.3x 2/3x rated voltage (Ur) at 125°C for 1000 cycles of duration 6 min (30 sec charge, 5 min 30 sec discharge) through a charge / discharge resistance of 1000 Ω	Visual examination	no visible damage							
		DCL	initial limit							
		$\Delta C/C$	within +10/-20% of initial value							
		DF	1.25 x initial limit							
		ESR	initial limit							
Mechanical Shock	MIL-STD-202, Method 213, Condition C	Visual examination	no visible damage							
		DCL	initial limit							
		$\Delta C/C$	within $\pm 5\%$ of initial value							
		DF	initial limit							
		ESR	initial limit							
Vibration	MIL-STD-202, Method 204, Condition D	Visual examination	no visible damage							
		DCL	initial limit							
		$\Delta C/C$	within $\pm 5\%$ of initial value							
		DF	initial limit							
		ESR	initial limit							

*Initial Limit

Initial measurement max. 1hr after the removal from dry pack or after pretreatment at 85°C for 24 hours.

PRODUCT CATEGORY 2, 3, 4 (TEMPERATURE RANGE -55°C TO +105°C)

TEST	Condition	Characteristics								
Endurance	Apply rated voltage (Ur) at 85°C for 2000 hours through a circuit impedance of $\leq 0.1\Omega/V$ (all CATEGORIES). And / or apply rated voltage (Ur) (CATEGORY 2) or 0.8x rated voltage (CATEGORY 3, 4) at 105°C for 2000 hours through a circuit impedance of $\leq 0.1\Omega/V$. Always stabilize at room temperature for 1-2 hours before measuring.	Visual examination	no visible damage							
		DCL	1.25 x initial limit							
		$\Delta C/C$	within +10/-20% of initial value							
		DF	1.5 x initial limit							
		ESR	2 x initial limit							
Storage Life	Store at 105°C, no voltage applied, for 2000 hours. Stabilize at room temperature for 1-2 hours before measuring.	Visual examination	no visible damage							
		DCL ($V_R \leq 75V$)	1.25 x initial limit							
		DCL ($V_R > 75V$)	2 x initial limit							
		$\Delta C/C$	within +10/-20% of initial value							
		DF	1.5 x initial limit							
		ESR	2 x initial limit							
Humidity	Store at 65°C and 95% relative humidity for 500 hours, with no applied voltage. Stabilize at room temperature and humidity for 1-2 hours before measuring.	Visual examination	no visible damage							
		DCL	3 x initial limit							
		$\Delta C/C$	within +35/-5% of initial value							
		DF	1.5 x initial limit							
		ESR	2 x initial limit							
Temperature Stability	Step	Temperature°C	Duration(min)		+20°C	-55°C	+20°C	+85°C	+105°C	+20°C
	1	+20	15	DCL	IL*	n/a	IL*	10 x IL*	12.5 x IL*	IL*
	2	-55	15		$\Delta C/C$	n/a	+0/-20%	$\pm 5\%$	+20/-0%	+30/-0%
	3	+20	15	DF		IL*	1.5 x IL*	IL*	1.5 x IL*	2 x IL*
	4	+85	15							
	5	+105	15							
	6	+20	15							
Surge Voltage	Apply 1.3x rated voltage (Ur) at 105°C for CATEGORY 2, or apply 1.3x 0.8x rated voltage (Ur) at 105°C for CATEGORY 3, 4 for 1000 cycles of duration 6 min (30 sec charge, 5 min 30 sec discharge) through a charge / discharge resistance of 1000 Ω	Visual examination	no visible damage							
		DCL	initial limit							
		$\Delta C/C$	within +10/-20% of initial value							
		DF	1.25 x initial limit							
Mechanical Shock	MIL-STD-202, Method 213, Condition C	Visual examination	no visible damage							
		DCL	initial limit							
		$\Delta C/C$	within $\pm 5\%$ of initial value							
		DF	initial limit							
		ESR	initial limit							
Vibration	MIL-STD-202, Method 204, Condition D	Visual examination	no visible damage							
		DCL	initial limit							
		$\Delta C/C$	within $\pm 5\%$ of initial value							
		DF	initial limit							
		ESR	initial limit							

*Initial Limit

Initial measurement max. 1hr after the removal from dry pack or after pretreatment at 85°C for 24 hours.

TCJ Series



Conductive Polymer Solid Electrolytic Chip Capacitors

PRODUCT CATEGORY 5 (TEMPERATURE RANGE -55°C TO +85°C)

TEST	Condition			Characteristics					
Endurance	Apply rated voltage (Ur) at 85°C for 2000 hours through a circuit impedance of $\leq 0.1\Omega/V$. Stabilize at room temperature for 1-2 hours before measuring.			Visual examination	no visible damage				
				DCL	1.25 x initial limit				
				$\Delta C/C$	within +10/-20% of initial value				
				DF	1.5 x initial limit				
				ESR	2 x initial limit				
Storage Life	Store at 85°C, no voltage applied, for 2000 hours. Stabilize at room temperature for 1-2 hours before measuring.			Visual examination	no visible damage				
				DCL	1.25 x initial limit				
				$\Delta C/C$	within +10/-20% of initial value				
				DF	1.5 x initial limit				
				ESR	2 x initial limit				
Humidity	Store at 65°C and 95% relative humidity for 500 hours, with no applied voltage. Stabilize at room temperature and humidity for 1-2 hours before measuring.			Visual examination	no visible damage				
				DCL	5 x initial limit				
				$\Delta C/C$	within +35/-5% of initial value				
				DF	1.5 x initial limit				
				ESR	2 x initial limit				
Temperature Stability	Step	Temperature°C	Duration(min)						
	1	+20	15		+20°C	-55°C	+20°C	+85°C	+20°C
	2	-55	15	DCL	IL*	n/a	IL*	10 x IL*	IL*
	3	+20	15	$\Delta C/C$	n/a	+0/-20%	±5%	+20/-0%	±5%
	4	+85	15	DF	IL*	1.5 x IL*	IL*	1.5 x IL*	IL*
	5	+20	15						
Surge Voltage	Apply 1.3x rated voltage (Ur) at 85°C for 1000 cycles of duration 6 min (30 sec charge, 5 min 30 sec discharge) through a charge / discharge resistance of 1000 Ω			Visual examination	no visible damage				
				DCL	initial limit				
				$\Delta C/C$	within +10/-20% of initial value				
				DF	1.25 x initial limit				
Mechanical Shock	MIL-STD-202, Method 213, Condition C			Visual examination	no visible damage				
				DCL	initial limit				
				$\Delta C/C$	within ±5% of initial value				
				DF	initial limit				
				ESR	initial limit				
Vibration	MIL-STD-202, Method 204, Condition D			Visual examination	no visible damage				
				DCL	initial limit				
				$\Delta C/C$	within ±5% of initial value				
				DF	initial limit				
				ESR	initial limit				

*Initial Limit

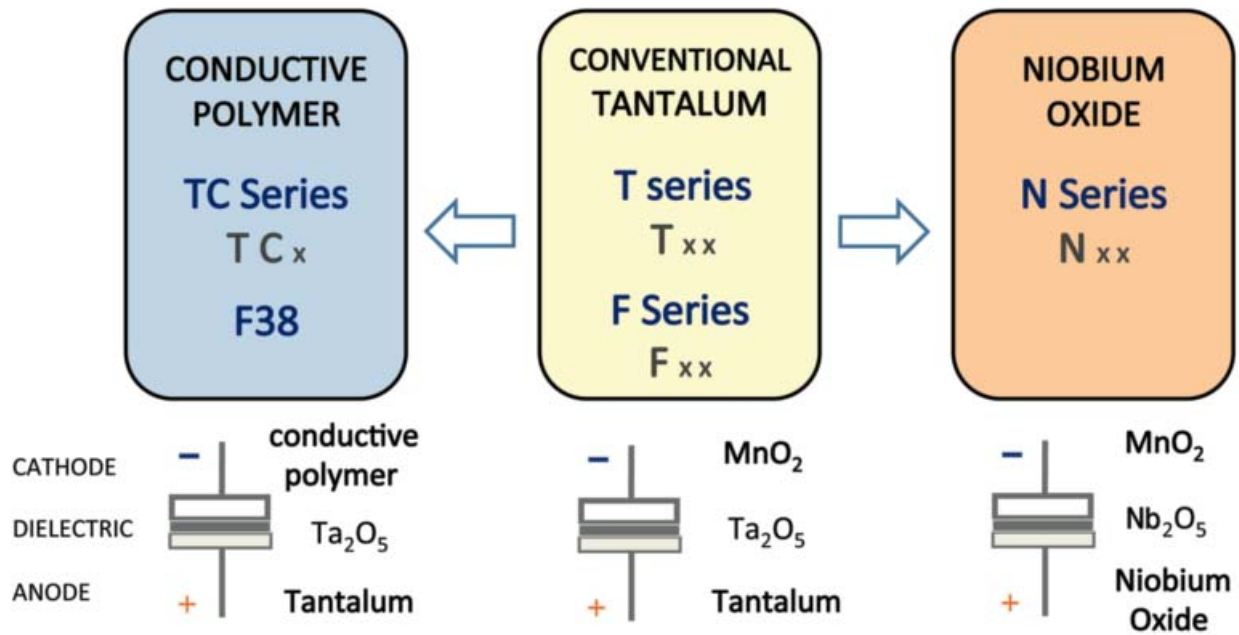
Initial measurement max. 1hr after the removal from dry pack or after pretreatment at 85°C for 24 hours.

TCJ Series

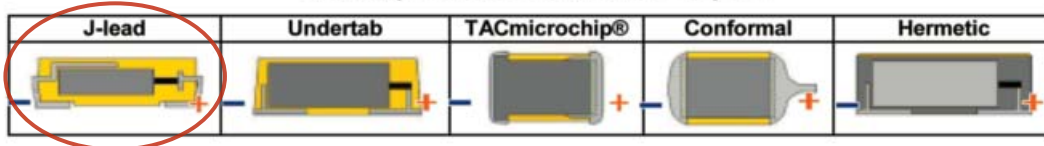


Conductive Polymer Solid Electrolytic Chip Capacitors

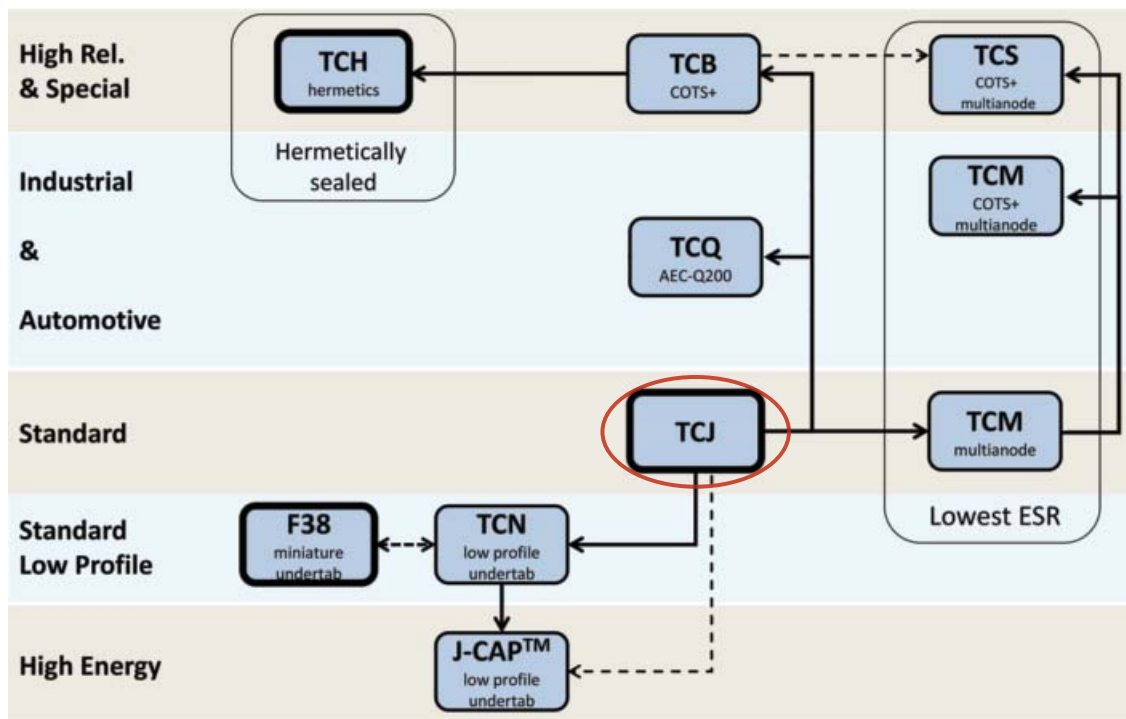
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