

TCJ Series

Conductive Polymer Solid Electrolytic Chip Capacitors



FEATURES

- Conductive Polymer Electrode
- Lower ESR
- 3x reflow cycles according to J-STD-020
- 100% Surge Current Tested
- CV Range: 0.47-680µF / 2.5-125V
- 17 Case Sizes Available

APPLICATIONS

- Smart Phone, Tablets, Notebook, LCD TV, Power Supplies



Elektra Award 2010

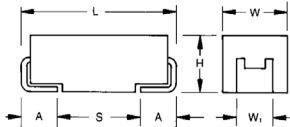


LEAD-FREE

LEAD-FREE COMPATIBLE COMPONENT



RoHS COMPLIANT



CASE DIMENSIONS:

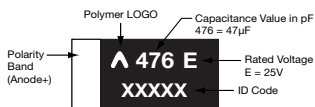
millimeters (inches)

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)
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 (0.20)	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 (0.122)	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)

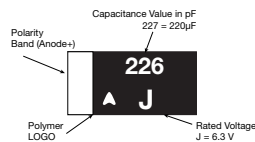
W₁ dimension applies to the termination width for A dimensional area only.

MARKING

A, B, C, D, E, H, K, S, T, U, W, X, Y, 5 CASE



N, P, R CASE



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 035 = 35Vdc 050 = 50Vdc 063 = 63Vdc 075 = 75Vdc 100 = 100Vdc 125 = 125Vdc	R = Leadfree 7" Reel S = Leadfree 13" Reel		E = Black resin (It is possible to order PN without "E" as identical product)

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
Resistance to soldering heat:	3x reflow cycles according to J-STD-020

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 KYOCERA AVX Conductive Polymer Capacitor Guidelines for more information or contact factory for application assistance.

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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)	B(300) C(300)	C(200)			
3.3	335								A(500) B(200)	B(300) C(200)	C(200)			D(250)
4.7	475				K(300,500) R(500)			A(500) B(100,150)	B(150,200) C(200)	C(200) X(250) Y(250)	C(200) D(120)	D(150)	D(250)	
6.8	685					A(200)	A(150), B(150)	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) B(100,150)	A(150) B(90,100,150) T(100)	B(150,200) C(200) Y(70)	D(90,120) E(70,100)	E(100,150)			
15	156		A(300)	A(300)	A(200) B(100,200)	A(250), B(90,150)	B(90,150)	B(100,150) Y(90)	B(200) C(200) D(70,100) Y(70,100)	D(150) E(70,100)	E(150)			
22	226		A(300)	A(300), B(70), K(400) S(400), T(150)	A(250), B(70,300) T(70,150)	A(300) B(70,150)	B(90,150) X(100) Y(70)	B(100,150) C(100) D(60,100) X(100), Y(70)	D(70,100) Y(150)	D(90), E(75), E(150)				
33	336		A(300)	A(200) B(70,200) T(150)	A(250), B(70,200) C(100) T(70,150)	A(200), B(90,150) H(150) Y(45,60,70)	X(100) Y(70)	D(60,100) X(70,100) Y(40,60,70,100)	D(70,100) E(55,70) U(70) Y(100)					
47	476		A(200) T(80)	A(70,100,200) B(55,70) T(55,70,80,120)	B(70) C(100) H(100)	D(45,70), H(150) 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(55,100), 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(55,70)	A(200) B(40,70) T(70,150)	A(100,150) B(40,45,55,70) C(70,100) T(200), W(70)	D(18,25,45,55,80) Y(18,25,45,55)	D(50) E(40) Y(50)	C(70) D(55) E(45) Y(55)	D(55,70) E(40,60,80) U(70)						
150	157	B(70)	B(70) D(15) Y(15,25,45)	B(35,45,55,70) D(12,15,25,40) H(70,200), W(70) Y(15,25,40)	D(25,40,45,55) Y(25,40,45,55)	C(70) D(40,50,70) E(25,40) Y(40,50,70)	E(50)	U(70)	U(100)					
220	227	B(35,45,70)	B(35,45,60,70) D(12,15,25,40) Y(15,25,40)	B(70,200) D(12,15,25,35,40,50) H(170) Y(15,18,25,35,40,50)	D(15,25,40,50) Y(15,25,40,50)	D(35,50) E(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) E(25, 50) 5(35,100)	E(35, 50,70), U(50,70), 5(100)								
470	477	D(12,15,25,40,50) Y(15,25,40,50)	D(12,15,25,40,50) Y(15,25,40,50)	D(25, 45) E(25, 50) X(35,50,100)	E(25, 50)	5(100)								
680	687			E(25, 50)										

Released ratings, (ESR ratings in mOhms in parentheses)

Engineering samples - please contact KYOCERA AVX

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

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RATINGS & PART NUMBER REFERENCE

Part Number	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		
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
TCJE156M063#0150E	E	15	63	105	94.5	8	150	1300	900	600	–	2	3
75 Volt													
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													
TCJD475M100#0250E	D	4.7	100	105	47	8	250	900	600	400	–	4	3
125 Volt													
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 253.

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

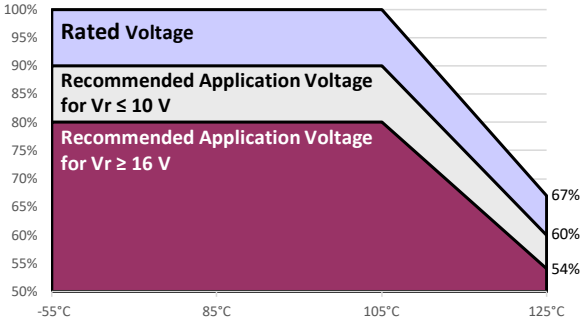
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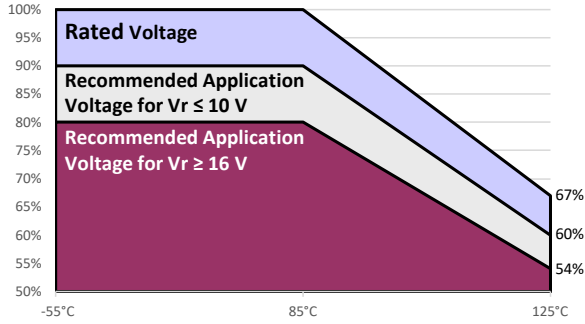
RECOMMENDED DERATING FACTOR

Voltage and temperature derating as percentage of Vr

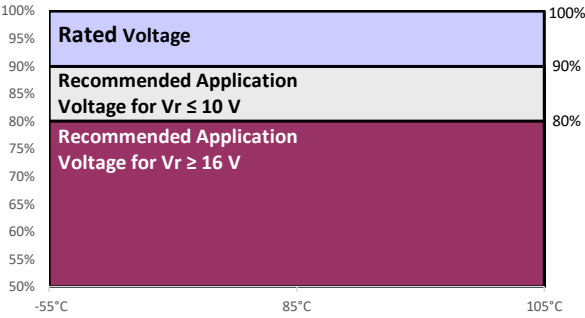
Product Category 0



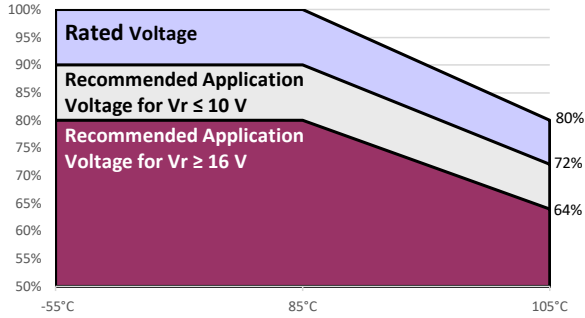
Product Category 1



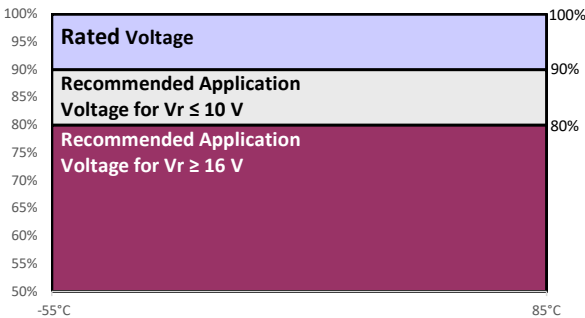
Product Category 2



Product Category 3, 4



Product Category 5



TCJ Series

Conductive Polymer Solid Electrolytic Chip Capacitors



PRODUCT CATEGORY 0, 1 (TEMPERATURE RANGE -55°C TO +125°C)

TEST	Condition			Characteristics							
Endurance	Apply rated voltage (Ur) at 85°C (CATEGORY 1) or 105°C (CATEGORY 0) or 2/3 rated voltage (Ur) at 125°C (all CATEGORIES) 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)		+20°C	-55°C	+20°C	+85°C	+125°C	+20°C	
	1	+20	15	DCL	IL*	n/a	IL*	10 x IL*	12.5 x IL*	IL*	
	2	-55	15								
	3	+20	15	$\Delta C/C$	n/a	+0/-20%	$\pm 5\%$	+20/-0%	+30/-0%	$\pm 5\%$	
	4	+85	15	DF	IL*	1.5 x IL*	IL*	1.5 x IL*	2 x IL*	IL*	
	5	+125	15								
6	+20	15									
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	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	1.25 x 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	1.25 x 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 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								
	3	+20	15	$\Delta C/C$	n/a	+0/-20%	$\pm 5\%$	+20/-0%	+30/-0%	$\pm 5\%$	
	4	+85	15								
	5	+105	15	DF	IL*	1.5 x IL*	IL*	1.5 x IL*	2 x IL*	IL*	
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						
				ESR	2 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	1.25 x 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	1.25 x 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)		+20°C	-55°C	+20°C	+85°C	+20°C	
	1	+20	15	DCL	IL*	n/a	IL*	10 x IL*	IL*	
	2	-55	15	$\Delta C/C$	n/a	+0/-20%	$\pm 5\%$	+20/-0%	$\pm 5\%$	
	3	+20	15	DF	IL*	1.5 x IL*	IL*	1.5 x IL*	IL*	
	4	+85	15							
	5	+125	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 $\pm 5\%$ of initial value					
				DF	initial limit					
				ESR	1.25 x 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	1.25 x initial limit					

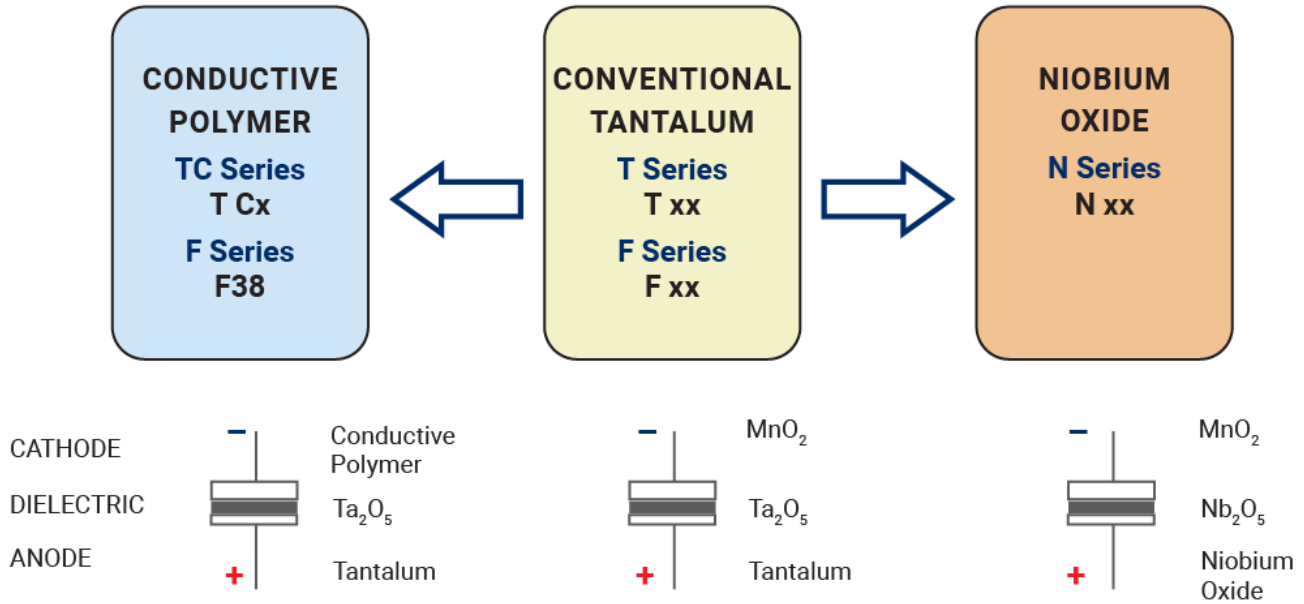
*Initial Limit

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

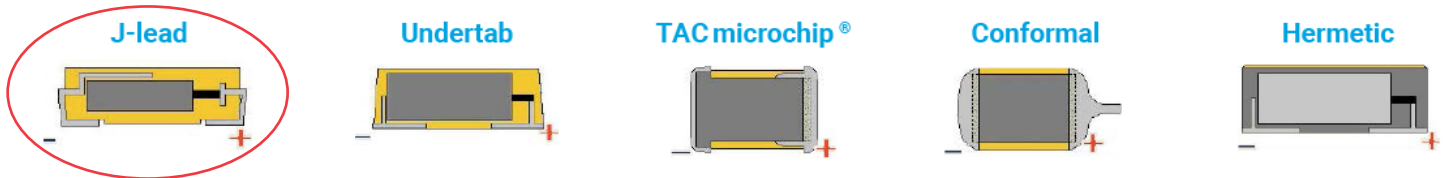
TCJ Series

Conductive Polymer Solid Electrolytic Chip Capacitors

SOLID ELECTROLYTIC CAPACITOR ROADMAP



FIVE CAPACITOR CONSTRUCTION STYLES



SERIES LINE UP : Conductive Polymer

