TMJ Tantalum

SMD S1gma™ Series Capacitors

The S1gma™ series is offering a next generation of statistical screening and process control enhancement of tantalum capacitors for professional applications with improved reliability and extremely low DCL needs.

LEAD-FREE COMPATIBLE COMPONENT

RoHS COMPLIANT

SnPb termination option is not RoHS compliant.

FEATURES

- -55 to +125°C Operation Temperature
- Basic Reliability Better than 0.5%/1000 hours
- 100% Surge Current Tested
- (2x Improvement Over Commercial Series)
- Improved DCL Limits 0.001CV* and 0.005CV

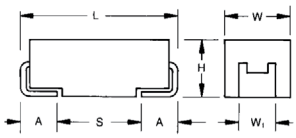
S1gma™ Prime – Utilizes 3 S1gma™ electrical screening to remove possible maverick parts from the distribution.

S1gma™ Premium – S1gma™ Prime, with addition of capability statistical screening utilizing the KYOCERA AVX patented Q-Process to effectively remove components that may experience excessive parametric shifts or instability in operational life.

S1gma™ Pro Custom – A custom option where specific parameter limits and screening methods can be agreed based on 3 S1gma™ and Q-Process statistical screening based on capability techniques.

*selected codes, 0.001CV limit is available with S1gma™ Premium and Pro Custom options only

TMJ CONSTRUCTION



APPLICATIONS

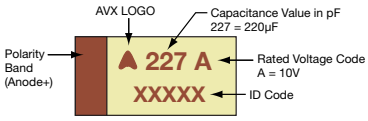
- Wireless Battery Operated Sensors
- TPM
- Automotive
- Avionics
- Safety Systems
- Energy Harvesting

For additional information on Q-process please consult the KYOCERA AVX technical publication "Reaching the Highest Reliability for Tantalum Capacitors"

(see the link: http://www.avx.com/docs/techinfo/Qprocess.pdf)

MARKING

A, B, C, D, E, U 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)
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_1 dimension applies to the termination width for A dimensional area only.

HOW TO ORDER

TMJ	D	227	K	006	#	C	^	A
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** K = ±10%	**Rated DC Voltage** 006 = 6.3Vdc 010 = 10Vdc 016 = 16Vdc 020 = 20Vdc 025 = 25Vdc 035 = 35Vdc 050 = 50Vdc	**Packaging** R = Pure Tin 7" Reel H = Tin Lead 7" Reel (Contact Manufacturer) Non RoHS	**ESR Range** C = Standard L = Low ESR	**Suffix** QX = S1gma™ Prime QY = S1gma™ Premium xx = S1gma™ Pro Custom	**DCL** A = 0.001CV C = 0.005CV

TECHNICAL SPECIFICATIONS

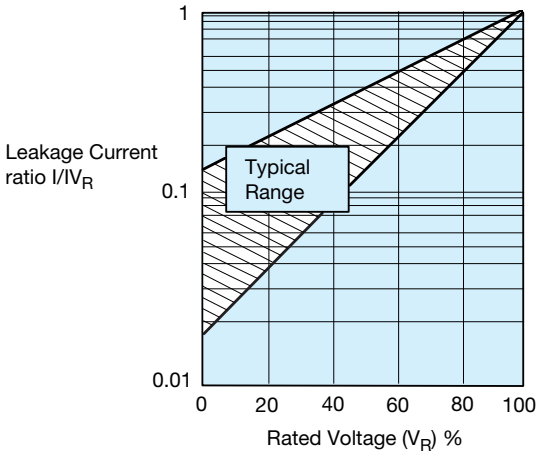
Technical Data:	All technical data relate to an ambient temperature of +25°C							
Capacitance Range:	0.22 µF to 680 µF							
Capacitance Tolerance:	±10%							
Leakage Current DCL:	(A) 0.001CV, (C) 0.005CV							
Rated Voltage (V_R)	≤ +85°C:	6.3	10	16	20	25	35	50
Category Voltage (V_C)	≤ +125°C:	4	7	10	13	17	23	33
Surge Voltage (V_S)	≤ +85°C:	8	13	20	26	32	46	65
Surge Voltage (V_S)	≤ +125°C:	5	8	13	16	20	28	40
Temperature Range:	-55°C to +125°C							
Reliability:	0.5% per 1000 hours at 85°C, V_R with 0.1Ω/V series impedance, 60% confidence level							
	AEC-Q200 per request							

CAPACITANCE AND RATED VOLTAGE RANGE (LETTER DENOTES CASE SIZE)

Capacitance		Rated voltage (V_R) to 85°C (Voltage Code)						
µF	Code	6.3V (J)	10V (A)	16V (C)	20V (D)	25V (E)	35V (V)	50V (T)
0.22	224							A
0.33	334						A	A
0.47	474						A	B
0.68	684						A	B
1.0	105					A	B	C
1.5	155				A	A	B	C
2.2	225			A	A	B	B	C
3.3	335			A	A	B	B	C
4.7	475		A	A	B	B	C	D
6.8	685		A	B	B	C	C	D
10	106	A	A	B	C	C	C	E
15	156	A	B	B	C	C	D	U
22	226	B	B	C	C	D	D	U
33	336	B	C	C	D	D	E	
47	476	C	C	D	D	D	U	
68	686	C	C	D	E	U		
100	107	C	D	E	E	U		
150	157	D	D	E	U			
220	227	D	E	U				
330	337	E	E					
470	477	E	U					
680	687	U						

Released ratings
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.

LEAKAGE CURRENT vs. RATED VOLTAGE



RATINGS & PART NUMBER REFERENCE

Part Number	Case Size	Capacitance (µF)	Rated Voltage (V)	Rated Temperature (°C)	Category Voltage (V)	Category Temperature (°C)	DCL Max. (µA)	DF Max. (%)	ESR Max. @ 100kHz (mΩ)	100kHz RMS Current (mA)			MSL
										25°C	85°C	125°C	
6.3 Volt @ 85°C													
TMJA106K006#CQYA	A	10	6.3	85	4	125	0.1	6	1500	224	201	89	3
TMJA106K006#C^C	A	10	6.3	85	4	125	0.3	6	1500	224	201	89	3
TMJA156K006#CQYA	A	15	6.3	85	4	125	0.1	6	1500	224	201	89	3
TMJA156K006#C^C	A	15	6.3	85	4	125	0.45	6	1500	224	201	89	3
TMJB226K006#C^C	B	22	6.3	85	4	125	0.66	6	600	376	339	151	3
TMJB336K006#C^C	B	33	6.3	85	4	125	0.99	6	600	376	339	151	3
TMJC476K006#CQYA	C	47	6.3	85	4	125	0.28	6	300	606	545	242	3
TMJC476K006#C^C	C	47	6.3	85	4	125	1.41	6	300	606	545	242	3
TMJC686K006#CQYA	C	68	6.3	85	4	125	0.41	6	300	606	545	242	3
TMJC686K006#C^C	C	68	6.3	85	4	125	2.04	6	300	606	545	242	3
TMJC107K006#CQYA	C	100	6.3	85	4	125	0.60	6	300	606	545	242	3
TMJC107K006#C^C	C	100	6.3	85	4	125	3	6	300	606	545	242	3
TMJD157K006#CQYA	D	150	6.3	85	4	125	0.90	6	200	866	779	346	3
TMJD157K006#C^C	D	150	6.3	85	4	125	4.5	6	200	866	779	346	3
TMJD227K006#CQYA	D	220	6.3	85	4	125	1.32	8	200	866	779	346	3
TMJD227K006#C^C	D	220	6.3	85	4	125	6.6	8	200	866	779	346	3
TMJE337K006#C^C	E	330	6.3	85	4	125	9.9	8	200	908	817	363	3
TMJE477K006#CQYA	E	470	6.3	85	4	125	2.82	8	200	908	817	363	3
TMJE477K006#C^C	E	470	6.3	85	4	125	14.1	8	200	908	817	363	3
TMJU687K006#C^C	U	680	6.3	85	4	125	20.4	12	250	812	731	325	3
10 Volt @ 85°C													
TMJA475K010#CQXC	A	4.7	10	85	7	125	0.24	6	2000	194	174	77	3
TMJA685K010#CQYA	A	6.8	10	85	7	125	0.1	6	2000	194	174	77	3
TMJA685K010#C^C	A	6.8	10	85	7	125	0.34	6	2000	194	174	77	3
TMJA106K010#CQYA	A	10	10	85	7	125	0.10	6	2000	194	174	77	3
TMJA106K010#C^C	A	10	10	85	7	125	0.5	6	2000	194	174	77	3
TMJB156K010#C^C	B	15	10	85	7	125	0.75	6	700	348	314	139	3
TMJB226K010#C^C	B	22	10	85	7	125	1.1	6	700	348	314	139	3
TMJC336K010#C^C	C	33	10	85	7	125	1.65	6	300	606	545	242	3
TMJC476K010#C^C	C	47	10	85	7	125	2.35	6	300	606	545	242	3
TMJC686K010#C^C	C	68	10	85	7	125	3.4	6	300	606	545	242	3
TMJD107K010#C^C	D	100	10	85	7	125	5.00	6	150	1000	900	400	3
TMJD157K010#C^C	D	150	10	85	7	125	7.50	8	150	1000	900	400	3
TMJE227K010#C^C	E	220	10	85	7	125	11	8	150	1049	944	420	3
TMJE337K010#CQYA	E	330	10	85	7	125	3.3	8	150	1049	944	420	3
TMJE337K010#C^C	E	330	10	85	7	125	16.5	8	150	1049	944	420	3
TMJU477K010#C^C	U	470	10	85	7	125	23.5	12	200	908	817	363	3
16 Volt @ 85°C													
TMJA225K016#CQXC	A	2.2	16	85	10	125	0.18	6	3500	146	132	59	3
TMJA335K016#CQXC	A	3.3	16	85	10	125	0.26	6	3500	146	132	59	3
TMJA475K016#C^C	A	4.7	16	85	10	125	0.38	6	3500	146	132	59	3
TMJB685K016#C^C	B	6.8	16	85	10	125	0.54	6	1200	266	240	106	3
TMJB106K016#C^C	B	10	16	85	10	125	0.80	6	1200	266	240	106	3
TMJB156K016#C^C	B	15	16	85	10	125	1.20	6	1200	266	240	106	3
TMJC226K016#C^C	C	22	16	85	10	125	1.76	6	350	561	505	224	3
TMJC336K016#C^C	C	33	16	85	10	125	2.64	6	350	561	505	224	3
TMJD476K016#C^C	D	47	16	85	10	125	3.76	6	200	866	779	346	3
TMJD686K016#C^C	D	68	16	85	10	125	5.44	6	200	866	779	346	3
TMJE107K016#C^C	E	100	16	85	10	125	8.00	6	150	1049	944	420	3
TMJE157K016#C^C	E	150	16	85	10	125	12	6	150	1049	944	420	3
TMJU227K016#C^C	U	220	16	85	10	125	17.6	1	200	908	817	363	3
20 Volt @ 85°C													
TMJA155K020#CQXC	A	1.5	20	85	13	125	0.15	6	3000	158	142	63	3
TMJA225K020#CQXC	A	2.2	20	85	13	125	0.22	6	3000	158	142	63	3
TMJA335K020#C^C	A	3.3	20	85	13	125	0.33	6	3000	158	142	63	3
TMJB475K020#C^C	B	4.7	20	85	13	125	0.47	6	1000	292	262	117	3
TMJB685K020#C^C	B	6.8	20	85	13	125	0.68	6	1000	292	262	117	3
TMJC106K020#C^C	C	10	20	85	13	125	1	6	500	469	422	188	3
TMJC156K020#C^C	C	15	20	85	13	125	1.5	6	500	469	422	188	3
TMJC226K020#C^C	C	22	20	85	13	125	2.2	6	500	469	422	188	3
TMJD336K020#C^C	D	33	20	85	13	125	3.3	6	250	775	697	310	3
TMJD476K020#C^C	D	47	20	85	13	125	4.70	6	250	775	697	310	3
TMJE686K020#C^C	E	68	20	85	13	125	6.8	6	200	908	817	363	3
TMJE107K020#C^C	E	100	20	85	13	125	10	6	200	908	817	363	3
TMJU157K020#CQXC	U	150	20	85	13	125	15	12	250	812	731	325	3
25 Volt @ 85°C													
TMJA105K025#CQXC	A	1	25	85	17	125	0.13	4	3000	158	142	63	3
TMJA155K025#CQXC	A	1.5	25	85	17	125	0.19	6	3000	158	142	63	3
TMJB225K025#C^C	B	2.2	25	85	17	125	0.28	6	2000	206	186	82	3
TMJB335K025#C^C	B	3.3	25	85	17	125	0.41	6	2000	206	186	82	3

RATINGS & PART NUMBER REFERENCE

Part Number	Case Size	Capacitance (µF)	Rated Voltage (V)	Rated Temperature (°C)	Category Voltage (V)	Category Temperature (°C)	DCL Max. (µA)	DF Max. (%)	ESR Max. @ 100kHz (mΩ)	100kHz RMS Current (mA)			MSL
										25°C	85°C	125°C	
TMJB475K025#C^C	B	4.7	25	85	17	125	0.59	6	2000	206	186	82	3
TMJC685K025#C^C	C	6.8	25	85	17	125	0.85	6	600	428	385	171	3
TMJC106K025#C^C	C	10	25	85	17	125	1.25	6	600	428	385	171	3
TMJC156K025#C^C	C	15	25	85	17	125	1.88	6	600	428	385	171	3
TMJD226K025#CQYA	D	22	25	85	17	125	0.55	6	400	612	551	245	3
TMJD226K025#C^C	D	22	25	85	17	125	2.75	6	400	612	551	245	3
TMJD336K025#CQYA	D	33	25	85	17	125	0.82	6	400	612	551	245	3
TMJD336K025#C^C	D	33	25	85	17	125	4.13	6	400	612	551	245	3
TMJD476K025#C^C	D	47	25	85	17	125	5.88	6	400	612	551	245	3
TMJU686K025#CQXC	U	68	25	85	17	125	8.5	12	450	606	545	242	3
TMJU107K025#CQXC	U	100	25	85	17	125	12.5	12	450	606	545	242	3
35 Volt @ 85°C													
TMJA334K035#CQXC	A	0.33	35	85	23	125	0.1	4	6000	112	101	45	3
TMJA474K035#CQXC	A	0.47	35	85	23	125	0.1	4	6000	112	101	45	3
TMJA684K035#CQXC	A	0.68	35	85	23	125	0.12	4	6000	112	101	45	3
TMJB105K035#CQXC	B	1	35	85	23	125	0.18	4	2500	184	166	74	3
TMJB155K035#C^C	B	1.5	35	85	23	125	0.26	6	2500	184	166	74	3
TMJB225K035#C^C	B	2.2	35	85	23	125	0.39	6	2500	184	166	74	3
TMJB335K035#C^C	B	3.3	35	85	23	125	0.58	6	2500	184	166	74	3
TMJC475K035#CQYA	C	4.7	35	85	23	125	0.16	6	600	428	385	171	3
TMJC475K035#C^C	C	4.7	35	85	23	125	0.82	6	600	428	385	171	3
TMJC685K035#C^C	C	6.8	35	85	23	125	1.19	6	600	428	385	171	3
TMJC106K035#C^C	C	10	35	85	23	125	1.75	6	600	428	385	171	3
TMJD156K035#CQYA	D	15	35	85	23	125	0.52	6	400	612	551	245	3
TMJD156K035#C^C	D	15	35	85	23	125	2.63	6	400	612	551	245	3
TMJD226K035#CQYA	D	22	35	85	23	125	0.77	6	400	612	551	245	3
TMJD226K035#C^C	D	22	35	85	23	125	3.85	6	400	612	551	245	3
TMJE336K035#CQYA	E	33	35	85	23	125	1.15	6	250	812	731	325	3
TMJE336K035#C^C	E	33	35	85	23	125	5.78	6	250	812	731	325	3
TMJU476K035#CQXC	U	47	35	85	23	125	8.23	12	300	742	667	297	3
TMJU476K035#CQYA	U	47	35	85	23	125	1.64	12	300	742	667	297	3
50 Volt @ 85°C													
TMJA224K050#CQXC	A	0.22	50	85	33	125	0.1	4	7000	104	93	41	3
TMJA334K050#CQXC	A	0.33	50	85	33	125	0.1	4	7000	104	93	41	3
TMJB474K050#CQXC	B	0.47	50	85	33	125	0.12	4	2000	206	186	82	3
TMJB684K050#CQXC	B	0.68	50	85	33	125	0.17	4	2000	206	186	82	3
TMJC105K050#C^C	C	1	50	85	33	125	0.25	4	1500	271	244	108	3
TMJC155K050#C^C	C	1.5	50	85	33	125	0.38	6	1500	271	244	108	3
TMJC225K050#CQYA	C	2.2	50	85	33	125	0.11	6	1500	271	244	108	3
TMJC225K050#C^C	C	2.2	50	85	33	125	0.55	6	1500	271	244	108	3
TMJC335K050#CQYA	C	3.3	50	85	33	125	0.17	6	1500	271	244	108	3
TMJC335K050#C^C	C	3.3	50	85	33	125	0.83	6	1500	271	244	108	3
TMJD475K050#C^C	D	4.7	50	85	33	125	1.18	4.5	600	500	450	200	3
TMJD685K050#C^C	D	6.8	50	85	33	125	1.7	4.5	600	500	450	200	3
TMJE106K050#CQYA	E	10	50	85	33	125	0.5	4.5	400	642	578	257	3
TMJE106K050#C^C	E	10	50	85	33	125	2.5	4.5	400	642	578	257	3
TMJU156K050#CQXC	U	15	50	85	33	125	3.75	12	450	606	545	242	3
TMJU226K050#CQXC	U	22	50	85	33	125	5.5	12	450	606	545	242	3

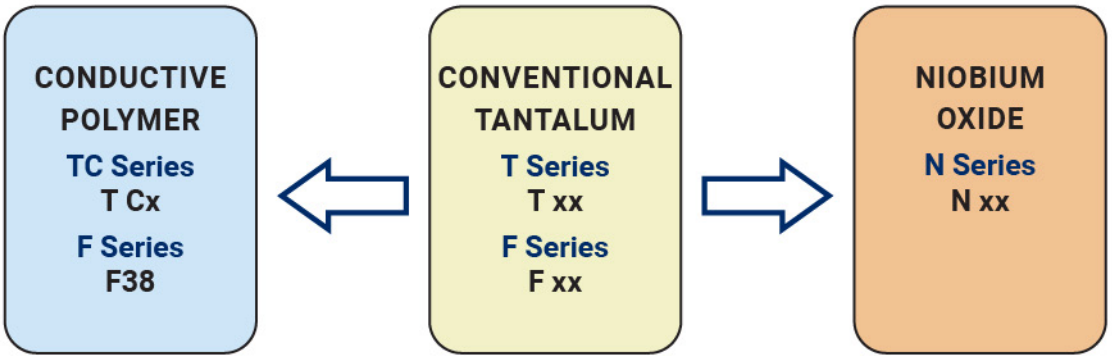
Moisture Sensitivity Level (MSL) is defined according to J-STD-020. All technical data relates to an ambient temperature of +25°C. Capacitance and DF are measured at 120Hz, 0.5V RMS with a maximum DC bias of 2.2 volts. DCL is measured at rated voltage after 5 minutes. The EIA & CECC standards for low ESR Solid Tantalum Capacitors allow an ESR movement to 1.25 times catalogue limit post mounting. For typical weight and composition see page 259.
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.

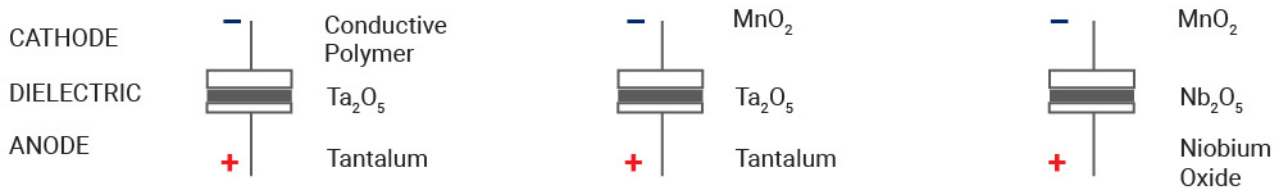
QUALIFICATION TABLE

TEST	TMJ S1gma™ series (Temperature range -55°C to +125°C)								
	Condition			Characteristics					
Endurance	Apply rated voltage (Ur) at 85°C and / or category voltage (Uc) at 125°C for 2000 hours through a circuit impedance of ≤0.1Ω/V. Stabilize at room temperature for 1-2 hours before measuring.			Visual examination	no visible damage				
				DCL	2 x initial limit				
				ΔC/C	within ±10% of initial value				
				DF	initial limit				
				ESR	1.25 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				
				ΔC/C	within ±10% of initial value				
				DF	initial limit				
				ESR	1.25 x initial limit				
Humidity	Store at 65°C and 90 - 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				
				ΔC/C	within ±10% of initial value				
				DF	1.2 x initial limit				
				ESR	1.25 x initial limit				
Biased Humidity	Apply rated voltage (Ur) at 85°C, 85% relative humidity for 1000 hours. Stabilize at room temperature and humidity for 1-2 hours before measuring.			Visual examination	no visible damage				
				DCL	3 x initial limit				
				ΔC/C	within ±10% of initial value				
				DF	1.2 x initial limit				
				ESR	1.25 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*	15 x IL*	1.5 x IL*
	2	-55	15	ΔC/C	n/a	+0/-10%	±5%	+10/-0%	+15/-0%	±5%
	3	+20	15	DF	IL*	1.5 x IL*	IL*	1.5 x IL*	2 x IL*	IL*
	4	+85	15	ESR	1.25xIL*	2.5xIL*	1.25xIL*	1.25xIL*	1.25xIL*	1.25xIL*
	5	+125	15							
	6	+20	15							
Surge Voltage	Apply 1.3x category voltage (Uc) at 125°C for 1000 cycles of duration 6 min (30 sec charge, 5 min 30 sec discharge) through a charge / discharge resistance of 1000Ω			Visual examination	no visible damage				
				DCL	2 x initial limit				
				ΔC/C	within ±5% of initial value				
				DF	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				
				ΔC/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				
				ΔC/C	within ±5% of initial value				
				DF	initial limit				
				ESR	initial limit				

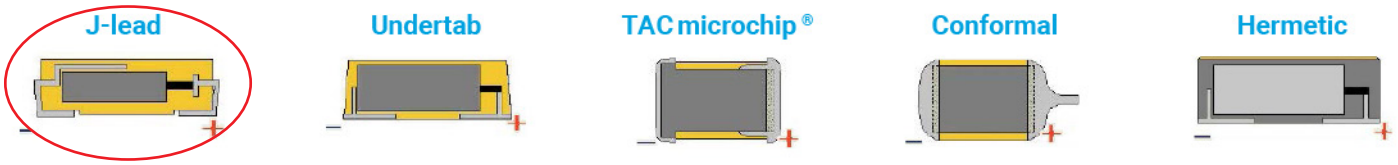
*Initial Limit

SOLID ELECTROLYTIC CAPACITOR ROADMAP





FIVE CAPACITOR CONSTRUCTION STYLES



SERIES LINE UP : CONVENTIONAL SMD MnO_2