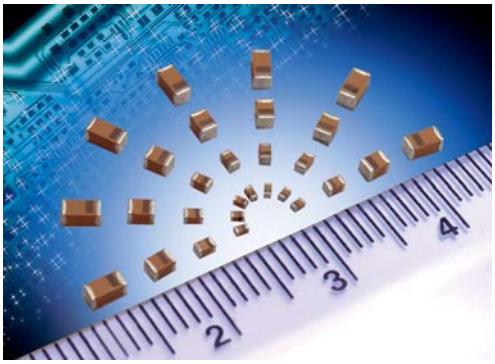
TACmicrochip®

Standard Microchip



FEATURES

- The world's smallest surface mount tantalum capacitor
- CV range: 0.10-150µF / 2-25V
- 5 case sizes available
- Low profile options available
- Industrial and hi-rel medical applications

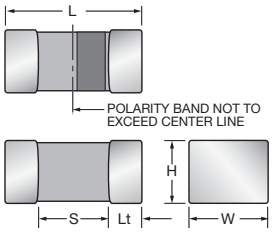
LEAD-FREE

LEAD-FREE COMPATIBLE COMPONENT

RoHS COMPLIANT

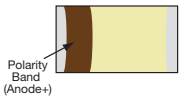
APPLICATIONS

- Hearing Aids, Non-life support medical, Long life miniature designs



MARKING

A, B, K, L, R CASE



CASE DIMENSIONS: millimeters (inches)

Code	EIA Code	EIA Metric	L+0.20 (0.008) -0.00 (0.000)	W+0.15 (0.006) -0.00 (0.000)	H+0.15 (0.006) -0.00 (0.000)	Termination Spacing(S)	Minimum Termination Length (Lt)
A	1206	3216-18	3.20 ± 0.20 (0.126 ± 0.008)	1.60 ± 0.20 (0.060 ± 0.008)	1.60 ± 0.20 (0.063 ± 0.008)	1.80 (0.071) min	0.15 (0.006)
B	1210	3528-15	3.50 ± 0.20 (0.138 ± 0.008)	2.80 +0.20 -0.10 (0.110 +0.008 -0.004)	1.50 (0.059) max	2.00 (0.079) min	0.15 (0.006)
K	0402	1005-07	1.00 (0.039)	0.50 +0.20 -0.00 (0.020 +0.008 -0.000)	0.50 +0.20 -0.00 (0.020 +0.008 -0.000)	0.40 (0.016) min	0.10 (0.004)
L	0603	1608-10	1.60 (0.063)	0.85 (0.033)	0.85 (0.033)	0.55 (0.022) min	0.15 (0.006)
R	0805	2012-15	2.00 (0.079)	1.35 (0.053)	1.35 (0.053)	0.70 (0.027) min	0.15 (0.006)

HOW TO ORDER

TAC — **Type**: TACmicrochip®

L — **Case Size**: See table above

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

***** — **Tolerance**: K=±10%, M=±20%

004 — **Rated DC Voltage**: 002=2Vdc, 003=3Vdc, 004=4Vdc, 006=6.3Vdc, 010=10Vdc, 016=16Vdc, 020=20Vdc, 025=25Vdc

R — **Packaging**: R, P = 7" Standard Tin Termination Plastic Tape; X, Q = 4¼" Standard Tin Termination Plastic Tape; A, M = 7" Gold Termination Plastic Tape; F, N = 4¼" Gold Termination Plastic Tape

TA — **Alternative characters may be used for special requirements**

TECHNICAL SPECIFICATIONS

Technical Data:		All technical data relate to an ambient temperature of +25°C								
Capacitance Range:		0.10 µF to 150 µF								
Capacitance Tolerance:		±10%; ±20%								
Leakage Current DCL:		0.01CV or 0.5µA whichever is the greater								
Rated Voltage (V_R)	≤ +85°C:	2	3	4	6.3	10	16	20	25	
Category Voltage (V_C)	≤ +125°C:	1.3	2	2.7	4	7	10	13	17	
Surge Voltage (V_S)	≤ +85°C:	2.7	3.9	5.2	8	13	20	26	32	
Surge Voltage (V_S)	≤ +125°C:	1.7	2.6	3.2	5	8	12	16	20	
Temperature Range:		-55°C to +125°C								
Reliability:		1% per 1000 hours at 85°C, V_R with 0.1Ω/V series impedance, 60% confidence level								
Termination Finish:		Nickel and Tin Plating (standard), Nickel and Gold Plating option available upon request								

CAPACITANCE AND RATED VOLTAGE RANGE (LETTER DENOTES CASE SIZE)

Capacitance		Voltage Rating DC (V_R) at 85°C							
µF	Code	2.0V	3.0V	4.0V	6.3V	10V	16V	20V	25V
0.10	104						K		
0.15	154					K	K		
0.22	224					K	K	K	
0.33	334					K	K		
0.47	474					K/L	L		
0.68	684					K/L	L		
1.0	105				K/L	K/L/R	L		R
1.5	155			L	L	L			
2.2	225		K/L	L	K/L	L	L		
3.3	335	K/L	K/L	L	L	L/R		R	
4.7	475	K/L	K/L	L	L	L/R		R	
6.8	685	K/L	L	L	L/R	L/R			
10	106	K/L	L	L/R	L/R	L/R	R		
15	156		R	L/R	L/R	R			
22	226	R	L/R	L/R	R	R			
33	336	R	R	R	R	A/R			
47	476	R	R	R	A/R	B			
68	686	R	A/R	A					
100	107		A/R	A/R	A				
150	157	A							
220	227								

ESR limits quoted in brackets (Ohms)

Released codes

Engineering samples - please contact manufacturer

*Codes under development - subject to change.

Standard Height Profile: A, B, K, L, R Case
Low Profile: H, J, T, U, V Case

Note: Voltage ratings are minimum values. AVX reserves the right to supply higher 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)	Rated Temperature (°C)	Category Voltage (V)	Category Temperature (°C)	DCL (µA) Max.	DF % Max.	ESR Max. (Ω) @ 100kHz	MSL	100kHz RMS Current (mA)			Product Category
											25°C	85°C	125°C	
2.5 Volt @ 85°C														
TACK335*002#TA	K	3.3	2	85	1.3	125	0.5	8	15	1	32	28	13	3
TACL335*002#TA	L	3.3	2	85	1.3	125	0.5	6	7.5	1	58	52	23	2
TACK475*002#TA	K	4.7	2	85	1.3	125	0.5	12	15	1	32	28	13	3
TACL475*002#TA	L	4.7	2	85	1.3	125	0.5	6	7.5	1	58	52	23	1
TACK685*002#TA	K	6.8	2	85	1.3	125	0.5	20	15	1	32	28	13	3
TACL685*002#TA	L	6.8	2	85	1.3	125	0.5	6	7.5	1	58	52	23	2
TACK106*002#TA	K	10	2	85	1.3	125	0.5	15	15	1	32	28	13	3
TACL106*002#TA	L	10	2	85	1.3	125	0.5	10	7.5	1	58	52	23	3
TACR226*002#TA	R	22	2	85	1.3	125	0.5	8	5	1	95	85	38	1
TACR336*002#TA	R	33	2	85	1.3	125	0.7	10	5	1	95	85	38	2
TACR476*002#TA	R	47	2	85	1.3	125	0.9	10	5	1	95	85	38	2
TACR686*002#TA	R	68	2	85	1.3	125	1.4	14	5	1	95	85	38	2
TACA157*002#TA	A	150	2	85	1.3	125	3	20	1	1	200	180	80	2
3 Volt @ 85°C														
TACK225*003#TA	K	2.2	3	85	2	125	0.5	6	15	1	32	28	13	2
TACL225*003#TA	L	2.2	3	85	2	125	0.5	6	7.5	1	58	52	23	1
TACK335*003#TA	K	3.3	3	85	2	125	0.5	8	15	1	32	28	13	3
TACL335*003#TA	L	3.3	3	85	2	125	0.5	6	7.5	1	58	52	23	2
TACK475*003#TA	K	4.7	3	85	2	125	0.5	12	15	1	32	28	13	3
TACL475*003#TA	L	4.7	3	85	2	125	0.5	6	7.5	1	58	52	23	1
TACL685*003#TA	L	6.8	3	85	2	125	0.5	6	7.5	1	58	52	23	2
TACL106*003#TA	L	10	3	85	2	125	0.5	10	7.5	1	58	52	23	3
TACR156*003#TA	R	15	3	85	2	125	0.5	8	5	1	95	85	38	1
TACL226*003#TA	L	22	3	85	2	125	0.7	20	7.5	1	58	52	23	3
TACR226*003#TA	R	22	3	85	2	125	0.7	8	5	1	95	85	38	1
TACR336*003#TA	R	33	3	85	2	125	1	10	5	1	95	85	38	2
TACR476*003#TA	R	47	3	85	2	125	1.5	10	5	1	95	85	38	2
TACA686*003#TA	A	68	3	85	2	125	2	15	2	1	141	127	57	1
TACR686*003#TA	R	68	3	85	2	125	2	14	5	1	95	85	38	3
TACA107*003#TA	A	100	3	85	2	125	3	15	1	1	200	180	80	2
TACR107*003#TA	R	100	3	85	2	125	3	30	5	1	95	85	38	3
4 Volt @ 85°C														
TACL155*004#TA	L	1.5	4	85	2.7	125	0.5	6	7.5	1	58	52	23	1
TACL225*004#TA	L	2.2	4	85	2.7	125	0.5	6	7.5	1	58	52	23	1
TACL335*004#TA	L	3.3	4	85	2.7	125	0.5	6	7.5	1	58	52	23	2
TACL475*004#TA	L	4.7	4	85	2.7	125	0.5	6	7.5	1	58	52	23	1
TACL685*004#TA	L	6.8	4	85	2.7	125	0.5	8	7.5	1	58	52	23	2
TACL106*004#TA	L	10	4	85	2.7	125	0.5	10	7.5	1	58	52	23	2
TACR106*004#TA	R	10	4	85	2.7	125	0.5	8	5	1	95	85	38	1
TACL156*004#TA	L	15	4	85	2.7	125	0.6	20	7.5	1	58	52	23	3
TACR156*004#TA	R	15	4	85	2.7	125	0.6	8	5	1	95	85	38	1
TACL226*004#TA	L	22	4	85	2.7	125	0.9	20	7.5	1	58	52	23	3
TACR226*004#TA	R	22	4	85	2.7	125	0.9	8	5	1	95	85	38	1
TACR336*004#TA	R	33	4	85	2.7	125	1.3	10	5	1	95	85	38	2
TACR476*004#TA	R	47	4	85	2.7	125	1.9	14	5	1	95	85	38	3
TACA686*004#TA	A	68	4	85	2.7	125	2.7	15	1	1	200	180	80	1
TACA107*004#TA	A	100	4	85	2.7	125	4	20	1	1	200	180	80	2
TACR107*004#TA	R	100	4	85	2.7	125	4	30	5	1	95	85	38	3
6.3 Volt @ 85°C														
TACK105*006#TA	K	1	6.3	85	4	125	0.5	6	15	1	32	28	13	2
TACL105*006#TA	L	1	6.3	85	4	125	0.5	6	7.5	1	58	52	23	1
TACL155*006#TA	L	1.5	6.3	85	4	125	0.5	6	7.5	1	58	52	23	1
TACK225*006#TA	K	2.2	6.3	85	4	125	0.5	8	15	1	32	28	13	3
TACL225*006#TA	L	2.2	6.3	85	4	125	0.5	6	7.5	1	58	52	23	1
TACL335*006#TA	L	3.3	6.3	85	4	125	0.5	6	7.5	1	58	52	23	2
TACL475*006#TA	L	4.7	6.3	85	4	125	0.5	8	7.5	1	58	52	23	2
TACL685*006#TA	L	6.8	6.3	85	4	125	0.5	10	7.5	1	58	52	23	2
TACR685*006#TA	R	6.8	6.3	85	4	125	0.5	8	5	1	95	85	38	1
TACL106*006#TA	L	10	6.3	85	4	125	0.6	10	6	1	65	58	26	2
TACR106*006#TA	R	10	6.3	85	4	125	0.6	8	5	1	95	85	38	1
TACL156*006#TA	L	15	6.3	85	4	125	0.9	20	7.5	1	58	52	23	3
TACR156*006#TA	R	15	6.3	85	4	125	0.9	8	5	1	95	85	38	1
TACR226*006#TA	R	22	6.3	85	4	125	1.4	10	5	1	95	85	38	1
TACR336*006#TA	R	33	6.3	85	4	125	2.1	12	5	1	95	85	38	2
TACA476*006#TA	A	47	6.3	85	4	125	3	15	1	1	200	180	80	1
TACR476*006#TA	R	47	6.3	85	4	125	3	20	5	1	95	85	38	3
TACA107*006#TA	A	100	6.3	85	4	125	6.3	20	1	1	200	180	80	2
10 Volt @ 85°C														
TACK154*010#TA	K	0.15	10	85	7	125	0.5	6	40	1	19	17	8	1
TACK224*010#TA	K	0.22	10	85	7	125	0.5	6	30	1	22	20	9	1

TACmicrochip®

Standard Microchip

RATINGS & PART NUMBER REFERENCE

AVX Part No.	Case Size	Capacitance (µF)	Rated Voltage (V)	Rated Temperature (°C)	Category Voltage (V)	Category Temperature (°C)	DCL (µA) Max.	DF % Max.	ESR Max. (Ω) @ 100kHz	MSL	100kHz RMS Current (mA)			Product Category
											25°C	85°C	125°C	
TACK334*010#TA	K	0.33	10	85	7	125	0.5	6	20	1	27	25	11	1
TACK474*010#TA	K	0.47	10	85	7	125	0.5	6	15	1	32	28	13	1
TACL474*010#TA	L	0.47	10	85	7	125	0.5	6	7.5	1	58	52	23	1
TACK684*010#TA	K	0.68	10	85	7	125	0.5	8	15	1	32	28	13	2
TACL684*010#TA	L	0.68	10	85	7	125	0.5	6	7.5	1	58	52	23	1
TACK105*010#TA	K	1	10	85	7	125	0.5	6	15	1	32	28	13	2
TACL105*010#TA	L	1	10	85	7	125	0.5	6	7.5	1	58	52	23	1
TACR105*010#TA	R	1	10	85	7	125	0.5	6	7	1	80	72	32	1
TACL155*010#TA	L	1.5	10	85	7	125	0.5	6	7.5	1	58	52	23	1
TACL225*010#TA	L	2.2	10	85	7	125	0.5	6	7.5	1	58	52	23	1
TACL335*010#TA	L	3.3	10	85	7	125	0.5	8	7.5	1	58	52	23	2
TACR335*010#TA	R	3.3	10	85	7	125	0.5	8	5	1	95	85	38	1
TACL475*010#TA	L	4.7	10	85	7	125	0.5	10	6	1	65	58	26	2
TACR475*010#TA	R	4.7	10	85	7	125	0.5	8	6	1	87	78	35	1
TACL685*010#TA	L	6.8	10	85	7	125	0.7	20	7,5	1	58	52	23	3
TACR685*010#TA	R	6.8	10	85	7	125	0.7	8	5	1	95	85	38	1
TACL106*010#TA	L	10	10	85	7	125	1	20	7.5	1	58	52	23	3
TACR106*010#TA	R	10	10	85	7	125	1	8	5	1	95	85	38	1
TACR156*010#TA	R	15	10	85	7	125	1.5	10	5	1	95	85	38	1
TACR226*010#TA	R	22	10	85	7	125	2.2	14	5	1	95	85	38	2
TACA336*010#TA	A	33	10	85	7	125	3.3	12	1	1	200	180	80	1
TACR336*010#TA	R	33	10	85	7	125	3.3	20	5	1	95	85	38	3
TACB476*010#TA	B	47	10	85	7	125	4.7	15	1	1	200	180	80	1
16 Volt @ 85°C														
TACK104*016#TA	K	0.1	16	85	10	125	0.5	6	40	1	19	17	8	1
TACK154*016#TA	K	0.15	16	85	10	125	0.5	6	30	1	22	20	9	1
TACK224*016#TA	K	0.22	16	85	10	125	0.5	6	20	1	27	25	11	1
TACK334*016#TA	K	0.33	16	85	10	125	0.5	6	20	1	27	25	11	1
TACL474*016#TA	L	0.47	16	85	10	125	0.5	6	7.5	1	58	52	23	1
TACL684*016#TA	L	0.68	16	85	10	125	0.5	6	7.5	1	58	52	23	1
TACL105*016#TA	L	1	16	85	10	125	0.5	6	7.5	1	58	52	23	1
TACL225*016#TA	L	2.2	16	85	10	125	0.5	10	7.5	1	58	52	23	1
TACR106*016#TA	R	10	16	85	10	125	1.6	10	5	1	95	85	38	2
20 Volt @ 85°C														
TACK224*020#TA	K	0.22	20	85	13	125	0.5	6	20	1	27	25	11	1
TACR335*020#TA	R	3.3	20	85	13	125	0.7	8	5	1	95	85	38	1
TACR475*020#TA	R	4.7	20	85	13	125	0.9	8	5	1	95	85	38	1
25 Volt @ 85°C														
TACR105*025#TA	R	1	25	85	17	125	0.5	8	5	1	95	85	38	1

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.

For typical weight and composition see page 211.

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.

QUALIFICATION TABLE – CATEGORY 1

TEST	TAC series (Temperature range -55ºC to +125ºC)		
	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 of 125ºC temperature, category voltage for 2000 +48/-0 hours and then leaving 1-2 hours at room temperature. Power supply impedance to be ≤0.1Ω/V.	Visual examination	no visible damage
		DCL	1.25 x initial limit
		ΔC/C	within ±10% of initial value
		DF	1.5 x initial limit
		ESR	1.5 x initial limit
Humidity	Determine after storage without applied voltage at 40±2ºC and 90-95% relative humidity for 1344 +48/-0 hours and then recovery 1-2 hours at room temperature	Visual examination	no visible damage
		DCL	initial limit
		ΔC/C	within ±5% of initial value
		DF	1.2 x initial limit
		ESR	1.2 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

	+20ºC	-55ºC	+20ºC	+85ºC	+125ºC	+20ºC
DCL	IL*	n/a	IL*	10 x IL*	12.5 x IL*	IL*
ΔC/C	n/a	+0/-10%	±5%	+10/-0%	+15/-0%	±5%
DF	IL*	1.5 x IL*	IL*	1.5 x IL*	2 x IL*	IL*
ESR	IL*	1.25 x IL*	IL*	1.25 x IL*	2 x IL*	IL*

Surge Voltage	Test temperature: 85ºC+3/0ºC Test 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 ±10% of initial value
		DF	initial limit
		ESR	initial limit

*Initial Limit

QUALIFICATION TABLE – CATEGORY 2

TEST	TAC series (Temperature range -55ºC to +125ºC)		
	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 of 125ºC temperature, category voltage for 2000 +48/-0 hours and then leaving 1-2 hours at room temperature. Power supply impedance to be ≤0.1Ω/V.	Visual examination	no visible damage
		DCL	1.25 x initial limit
		ΔC/C	within ±15% of initial value
		DF	1.5 x initial limit
		ESR	1.5 x initial limit
Humidity	Determine after storage without applied voltage at 40±2ºC and 90-95% relative humidity for 1344 +48/-0 hours and then recovery 1-2 hours at room temperature	Visual examination	no visible damage
		DCL	initial limit
		ΔC/C	within ±10% of initial value
		DF	1.2 x initial limit
		ESR	1.2 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

	+20ºC	-55ºC	+20ºC	+85ºC	+125ºC	+20ºC
DCL	IL*	n/a	IL*	10 x IL*	12.5 x IL*	IL*
ΔC/C	n/a	+0/-15%	±5%	+15/-0%	+20/-0%	±5%
DF	IL*	1.5 x IL*	IL*	1.5 x IL*	2 x IL*	IL*
ESR	IL*	1.25 x IL*	IL*	1.25 x IL*	2 x IL*	IL*

Surge Voltage	Test temperature: 85ºC+3/0ºC Test 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	1.5 x initial limit
		ΔC/C	within ±15% of initial value
		DF	1.5 x initial limit
		ESR	1.5 x initial limit

*Initial Limit

QUALIFICATION TABLE – CATEGORY 3

<table>
<tr><th>TEST</th><th colspan="8">TAC series (Temperature range -55ºC to +125ºC)</th></tr>
<tr><th></th><th colspan="3">Condition</th><th></th><th colspan="5">Characteristics</th></tr>
<tr><td rowspan="5">Endurance</td><td colspan="3" rowspan="5">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 of 125ºC temperature, category voltage for 2000 +48/-0 hours and then leaving 1-2 hours at room temperature. Power supply impedance to be ≤0.1Ω/V.</td><td>Visual examination</td><td colspan="5">no visible damage</td></tr>
<tr><td>DCL</td><td colspan="5">1.25 x initial limit</td></tr>
<tr><td>ΔC/C</td><td colspan="5">within ±30% of initial value</td></tr>
<tr><td>DF</td><td colspan="5">1.5 x initial limit</td></tr>
<tr><td>ESR</td><td colspan="5">1.5 x initial limit</td></tr>
<tr><td rowspan="5">Humidity</td><td colspan="3" rowspan="5">Determine after storage without applied voltage at 40±2ºC and 90-95% relative humidity for 1344 +48/-0 hours and then recovery 1-2 hours at room temperature</td><td>Visual examination</td><td colspan="5">no visible damage</td></tr>
<tr><td>DCL</td><td colspan="5">2 x initial limit</td></tr>
<tr><td>ΔC/C</td><td colspan="5">within ±30% of initial value</td></tr>
<tr><td>DF</td><td colspan="5">1.5 x initial limit</td></tr>
<tr><td>ESR</td><td colspan="5">1.25 x initial limit</td></tr>
<tr><td rowspan="8">Temperature Stability</td><td>Step</td><td>Temperature°C</td><td>Duration(min)</td><td></td><td>+20ºC</td><td>-55ºC</td><td>+20ºC</td><td>+85ºC</td><td>+125ºC</td><td>+20ºC</td></tr>
<tr><td>1</td><td>+20±2</td><td>15</td><td>DCL</td><td>IL*</td><td>n/a</td><td>IL*</td><td>10 x IL*</td><td>12.5 x IL*</td><td>IL*</td></tr>
<tr><td>2</td><td>-55+0/-3</td><td>15</td><td>ΔC/C</td><td>n/a</td><td>+0/-25%</td><td>±5%</td><td>+20/-0%</td><td>+25/-0%</td><td>±20%</td></tr>
<tr><td>3</td><td>+20±2</td><td>15</td><td>DF</td><td>IL*</td><td>1.5 x IL*</td><td>IL*</td><td>1.5 x IL*</td><td>2 x IL*</td><td>1.5 x IL*</td></tr>
<tr><td>4</td><td>+85+3/-0</td><td>15</td><td>ESR</td><td>IL*</td><td>1.25 x IL*</td><td>IL*</td><td>1.25 x IL*</td><td>2 x IL*</td><td>1.5 x IL*</td></tr>
<tr><td>5</td><td>+125+3/-0</td><td>15</td><td colspan="6"></td></tr>
<tr><td>6</td><td>+20±2</td><td>15</td><td colspan="6"></td></tr>
<tr><td colspan="2"></td><td colspan="6"></td></tr>
<tr><td rowspan="5">Surge Voltage</td><td colspan="3" rowspan="5">Test temperature: 85ºC+3/0ºC
Test 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</td><td>Visual examination</td><td colspan="5">no visible damage</td></tr>
<tr><td>DCL</td><td colspan="5">2 x initial limit</td></tr>
<tr><td>ΔC/C</td><td colspan="5">within ±30% of initial value</td></tr>
<tr><td>DF</td><td colspan="5">2 x initial limit</td></tr>
<tr><td>ESR</td><td colspan="5">2 x initial limit</td></tr>
</table>

*Initial Limit