

## 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



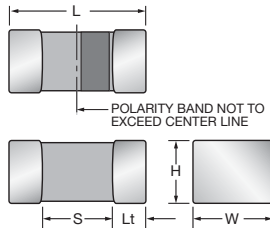
LEAD-FREE  
LEAD-FREE COMPATIBLE  
COMPONENT



RoHS  
COMPLIANT

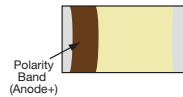
### APPLICATIONS

- 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 (0.063 ± 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 +0.008 -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 +0.008 -0.000	0.50 +0.20 -0.00 +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

<b>TAC</b> Type TACmicrochip®	<b>L</b> Case Size See table above	<b>226</b> Capacitance Code pF code: 1st two digits represent significant figures, 3rd digit represents multiplier (number of zeros to follow)	<b>*</b> Tolerance K=±10% M=±20%	<b>004</b> Rated DC Voltage 002=2Vdc 003=3Vdc 004=4Vdc 006=6.3Vdc 010=10Vdc 016=16Vdc 020=20Vdc 025=25Vdc	<b>R</b> Packaging R, P = 7" Standard Tin Termination Plastic Tape X, Q = 4 1/4" Standard Tin Termination Plastic Tape A, M = 7" Gold Termination Plastic Tape F, N = 4 1/4" Gold Termination Plastic Tape	<b>TA</b> Alternative characters may be used for special requirements
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### 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 <sub>R</sub> )	≤ +85°C:	2	3	4	6.3	10	16	20	25	
Category Voltage (V <sub>C</sub> )	≤ +125°C:	1.3	2	2.7	4	7	10	13	17	
Surge Voltage (V <sub>S</sub> )	≤ +85°C:	2.7	3.9	5.2	8	13	20	26	32	
Surge Voltage (V <sub>S</sub> )	≤ +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 <sub>R</sub> 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 <sub>R</sub> ) 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	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								

Available Ratings

Standard Height Profile: A, B, K, L, R Case

Low Profile: H, I, 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 Max. (µA)	DF Max. (%)	ESR Max. @ 100kHz (Ω)	MSL	100kHz RMS Current (mA)			Product Category
											25°C	85°C	125°C	
<b>2.5 Volt @ 85°C</b>														
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
<b>3 Volt @ 85°C</b>														
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
<b>4 Volt @ 85°C</b>														
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
<b>6.3 Volt @ 85°C</b>														
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
<b>10 Volt @ 85°C</b>														
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

### RATINGS & PART NUMBER REFERENCE

AVX Part No.	Case Size	Capacitance (µF)	Rated Voltage (V)	Rated Temperature (°C)	Category Voltage (V)	Category Temperature (°C)	DCL Max. (µA)	DF Max. (%)	ESR Max. @ 100kHz (Ω)	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
<b>16 Volt @ 85°C</b>														
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
<b>20 Volt @ 85°C</b>														
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
<b>25 Volt @ 85°C</b>														
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 226.

**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 -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 ≤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±2°C 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)		+20°C	-55°C	+20°C	+85°C	+125°C	+20°C	
	1	+20±2	15	DCL	IL*	n/a	IL*	10 x IL*	12.5 x IL*	IL*	
	2	-55+0/-3	15		ΔC/C	n/a	+0/-10%	±5%	+10/-0%	+15/-0%	±5%
	3	+20±2	15	DF		IL*	1.5 x IL*	IL*	1.5 x IL*	2 x IL*	IL*
	4	+85+3/-0	15		ESR	IL*	1.25 x IL*	IL*	1.25 x IL*	2 x IL*	IL*
	5	+125+3/-0	15								
	6	+20±2	15								
Surge Voltage	Test temperature: 85°C+3/0°C 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 -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 ≤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±2°C 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)		+20°C	-55°C	+20°C	+85°C	+125°C	+20°C	
	1	+20±2	15	DCL	IL*	n/a	IL*	10 x IL*	12.5 x IL*	IL*	
	2	-55+0/-3	15		ΔC/C	n/a	+0/-15%	±5%	+15/-0%	+20/-0%	±5%
	3	+20±2	15	DF		IL*	1.5 x IL*	IL*	1.5 x IL*	2 x IL*	IL*
	4	+85+3/-0	15		ESR	IL*	1.25 x IL*	IL*	1.25 x IL*	2 x IL*	IL*
	5	+125+3/-0	15								
	6	+20±2	15								
Surge Voltage	Test temperature: 85°C+3/0°C 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

TEST	TAC series (Temperature range -55°C to +125°C)										
	Condition			Characteristics							
<b>Endurance</b>	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 ≤0.1Ω/V.			Visual examination	no visible damage						
				DCL	1.25 x initial limit						
				ΔC/C	within ±30% of initial value						
				DF	1.5 x initial limit						
				ESR	1.5 x initial limit						
<b>Humidity</b>	Determine after storage without applied voltage at 40±2°C 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	2 x initial limit						
				ΔC/C	within ±30% of initial value						
				DF	1.5 x initial limit						
				ESR	1.25 x initial limit						
<b>Temperature Stability</b>	Step	Temperature°C	Duration(min)		+20°C	-55°C	+20°C	+85°C	+125°C	+20°C	
	1	+20±2	15	DCL	IL*	n/a	IL*	10 x IL*	12.5 x IL*	IL*	
	2	-55+0/-3	15		ΔC/C	n/a	+0/-25%	±5%	+20/-0%	+25/-0%	±20%
	3	+20±2	15	DF		IL*	1.5 x IL*	IL*	1.5 x IL*	2 x IL*	1.5 x IL*
	4	+85+3/-0	15		ESR	IL*	1.25 x IL*	IL*	1.25 x IL*	2 x IL*	1.5 x IL*
	5	+125+3/-0	15								
	6	+20±2	15								
<b>Surge Voltage</b>	Test temperature: 85°C+3/0°C 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	2 x initial limit						
				ΔC/C	within ±30% of initial value						
				DF	2 x initial limit						
				ESR	2 x initial limit						

\*Initial Limit