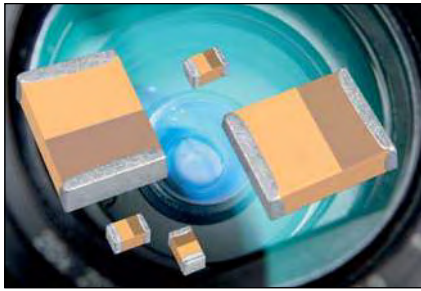


TLC Series

Tantalum Solid Electrolytic Chip Capacitors Consumer Series



FEATURES

- High Capacitance vs. Voltage Ratio
- Super High Volumetric Efficiency
- 100% Surge Current Tested
- CV Range: 0.47-220µF / 2-35V
- 12 Case Sizes Available
- Consumer Applications (Portable Hand-held Electronics, Cellular Phones, Digital Equipment etc.)



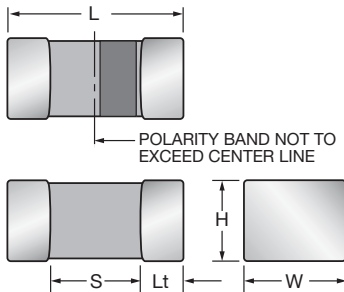
LEAD-FREE

LEAD-FREE COMPATIBLE
COMPONENT



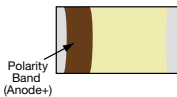
APPLICATIONS

- Consumer Portable Applications with Space Limitations

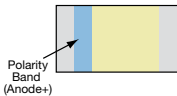


MARKING

D, H, J, K, L, M, R, T, U, V, Z CASE



E 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)
D	1206	3216-06	3.20 ± 0.20 (0.126 ± 0.008)	1.60 ± 0.20 (0.063 ± 0.008)	0.60 (0.024) max	1.80 (0.071) min	0.15 (0.006)
E*	0201	0603-03	0.60 ± 0.12 (0.024 ± 0.005)	0.33 ± 0.02 (0.013 ± 0.001)	0.33 ± 0.02 (0.013 ± 0.001)	0.20 (0.008) min	0.10 (0.004)
H	0805	2012-10	2.00 (0.079)	1.35 (0.053)	1.00 (0.039) max	0.70 (0.028) min	0.15 (0.006)
J	0603	1608-08	1.60 (0.063)	0.85 (0.033)	0.75 (0.030) max	0.55 (0.022) min	0.15 (0.006)
K	0402	1005-07	1.00 (0.039)	0.50 +0.20 -0.10 (0.020 +0.008 -0.004)	0.50 +0.20 -0.10 (0.020 +0.008 -0.004)	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)
M	0803	2008-10	2.00 (0.079)	0.85 (0.033)	0.85 (0.033)	0.70 (0.028) min	0.15 (0.006)
R	0805	2012-15	2.00 (0.079)	1.35 (0.053)	1.35 (0.053)	0.70 (0.028) min	0.15 (0.006)
T	1210	3528-12	3.50 ± 0.20 (0.138 ± 0.008)	2.80 +0.20 -0.10 (0.110 +0.008 -0.004)	1.20 (0.047) max	2.00 (0.079) min	0.15 (0.006)
U	0805	2012-06	2.00 (0.079)	1.35 (0.053)	0.60 (0.024) max	0.70 (0.028) min	0.15 (0.006)
V	1206	3216-08	3.20 ± 0.20 (0.126 ± 0.008)	1.60 ± 0.20 (0.063 ± 0.008)	0.75 (0.030) max	1.80 (0.071) min	0.15 (0.006)
Z	0602	1605-07	1.60 (0.063)	0.50 +0.20 -0.10 (0.020 +0.008 -0.004)	0.50 +0.20 -0.10 (0.020 +0.008 -0.004)	0.55 (0.022) min	0.15 (0.006)

*Please contact AVX, availability upon request

HOW TO ORDER



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
M = ±20%



Rated DC Voltage
002=2Vdc
003=3Vdc
004=4Vdc
006=6.3Vdc
008=8Vdc
010=10Vdc
016=16Vdc
020=20Vdc
025=25Vdc
035=35Vdc



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
H = Chip Tray (waffle)
Only case E



Standard
Suffix
OR

4000

ESR in mΩ

TLC Series

Tantalum Solid Electrolytic Chip Capacitors Consumer Series



TECHNICAL SPECIFICATIONS

Technical Data:	All technical data relate to an ambient temperature of +25°C											
Capacitance Range:	0.47 µF to 220 µF											
Capacitance Tolerance:	±20%											
Rated Voltage (V _R)	-55°C ≤ +40°C:	2	3	4	6.3	8	10	16	20	25	35	
Category Voltage (V _C)	at 85°C:	1	1.5	2	3.2	4	5	8	10	12.5	17.5	
Category Voltage (V _C)	at 125°C:	0.4	0.6	0.8	1.3	1.6	2	3.2	4	5	7	
Temperature Range:	-55°C to +125°C with category voltage											
Reliability:	0.2% per 1000 hours at 85°C, 0.5xV _R with 0.1Ω/V series impedance with 60% confidence level											

CAPACITANCE AND RATED VOLTAGE RANGE

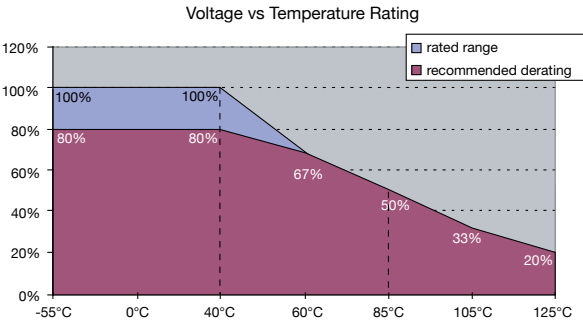
(LETTER DENOTES CASE SIZE)

Capacitance		Voltage Rating DC (V _R) to 40°C									
µF	Code	2.0V	3.0V	4.0V	6.3V	8V	10V	16V	20V	25V	35V
0.47	474				E*			K			
1.0	105				E*			K		L	R
2.2	225						K		H		
3.3	335							L			
4.7	475			K	K/U		J				
6.8	685		K	K			U				
10	106		K	J/K/Z	J/K/Z		U	V	R		
15	156	K		K			H/L				
22	226	J	J	U	L/U		L/M				
33	336			L/U	H/L L(4000)/U/V	L	H				
47	476	L	L/R	H/L	H/L/R/V	D	H/R				
68	686			R	R						
100	107			R	R/T		T				
150	157										
220	227			T							

Released ratings, (ESR ratings in mOhms in parentheses)

*Please contact AVX, availability upon request

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.



TLC Series

Tantalum Solid Electrolytic Chip Capacitors Consumer Series



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)	ESR Max. @100kHz (Ω)	100kHz R MS Current (mA)			MSL	
									25°C	85°C	125°C		
2 Volt @ 40°C													
TLCK156M002#TA	K	15	2	40	0.4	125	0.5	15	32	28	13	3	
TLCJ226M002#TA	J	22	2	40	0.4	125	0.5	7.5	52	46	21	3	
TLCL476M002#TA	L	47	2	40	0.4	125	0.9	7.5	58	52	23	3	
3 Volt @ 40°C													
TLCK685M003#TA	K	6.8	3	40	0.6	125	0.5	15	32	28	13	3	
TLCK106M003#TA	K	10	3	40	0.6	125	0.5	15	32	28	13	3	
TLCJ226M003#TA	J	22	3	40	0.6	125	0.7	7.5	52	46	21	3	
TLCL476M003#TA	L	47	3	40	0.6	125	1.4	7.5	58	52	23	3	
TLCR476M003#TA	R	47	3	40	0.6	125	3.0	7.5	77	70	31	3	
4 Volt @ 40°C													
TLCK475M004#TA	K	4.7	4	40	0.8	125	0.5	15	32	28	13	3	
TLCK685M004#TA	K	6.8	4	40	0.8	125	0.5	15	32	28	13	3	
TLCJ106M004#TA	J	10	4	40	0.8	125	0.5	7.5	52	46	21	3	
TLCK106M004#TA	K	10	4	40	0.8	125	0.5	15	32	28	13	3	
TLCZ106M004#TA	Z	10	4	40	0.8	125	0.5	15	37	33	15	3	
TLCK156M004#TA	K	15	4	40	0.8	125	3.0	15	32	28	13	3	
TLCU226M004#TA	U	22	4	40	0.8	125	0.9	12	54	49	22	3	
TLCL336M004#TA	L	33	4	40	0.8	125	1.3	7.5	58	52	23	3	
TLCU336M004#TA	U	33	4	40	0.8	125	2.6	9	62	56	25	3	
TLCH476M004#TA	H	47	4	40	0.8	125	1.9	5	89	80	36	3	
TLCL476M004#TA	L	47	4	40	0.8	125	1.9	7.5	58	52	23	3	
TLCR686M004#TA	R	68	4	40	0.8	125	2.7	5	95	85	38	3	
TLCR107M004#TA	R	100	4	40	0.8	125	4.0	5	95	85	38	3	
TLCT227M004#TA	T	220	4	40	0.8	125	8.8	1	200	180	80	3	
6.3 Volt @ 40°C													
TLCE474M006HTA*	E	0.47	6.3	40	1.3	125	1.0	60	13	12	5	3	
TLCE105M006HTA*	E	1	6.3	40	1.3	125	1.0	60	13	12	5	3	
TLCK475M006#TA	K	4.7	6.3	40	1.3	125	0.5	15	32	28	13	3	
TLCU475M006#TA	U	4.7	6.3	40	1.3	125	0.5	5	84	75	33	3	
TLCJ106M006#TA	J	10	6.3	40	1.3	125	0.6	7.5	52	46	21	3	
TLCK106M006#TA	K	10	6.3	40	1.3	125	3.1	15	32	28	13	3	
TLCZ106M006#TA	Z	10	6.3	40	1.3	125	0.6	15	37	33	15	3	
TLCL226M006#TA	L	22	6.3	40	1.3	125	1.4	7.5	58	52	23	3	
TLCU226M006#TA	U	22	6.3	40	1.3	125	2.8	12	54	49	22	3	
TLCH336M006#TA	H	33	6.3	40	1.3	125	2.0	5	89	80	36	3	
TLCL336M006#TA	L	33	6.3	40	1.3	125	2.1	7.5	58	52	23	3	
TLCL336M006#4000	L	33	6.3	40	1.3	125	2.1	4	79	71	32	3	
TLCU336M006#TA	U	33	6.3	40	1.3	125	10.4	7.5	68	61	27	3	
TLCV336M006#TA	V	33	6.3	40	1.3	125	4.2	5	84	75	33	3	
TLCH476M006#TA	H	47	6.3	40	1.3	125	3.0	5	89	80	36	3	
TLCL476M006#TA	L	47	6.3	40	1.3	125	29.6	10	50	45	20	3	
TLCR476M006#TA	R	47	6.3	40	1.3	125	6.0	5	95	85	38	3	
TLCH476M006#TA	V	47	6.3	40	1.3	125	6.0	15	48	43	19	3	
TLCR686M006#TA	R	68	6.3	40	1.3	125	4.3	5	95	85	38	3	
TLCR107M006#TA	R	100	6.3	40	1.3	125	6.0	5	95	85	38	3	
TLCT107M006#TA	T	100	6.3	40	1.3	125	31.5	15	52	46	21	3	
8 Volt @ 40°C													
TLCL336M008#TA	L	33	8	40	1.6	125	26.4	10	50	45	20	3	
TLCD476M008#TA	D	47	8	40	1.6	125	18.8	7	71	64	28	3	
10 Volt @ 40°C													
TLCK225M010#TA	K	2.2	10	40	2	125	0.5	15	32	28	13	3	
TLCK475M010#TA	J	4.7	10	40	2	125	0.5	10	45	40	18	3	
TLCU685M010#TA	U	6.8	10	40	2	125	0.7	5	84	75	33	3	
TLCU106M010#TA	U	10	10	40	2	125	1.0	5	84	75	33	3	
TLCH156M010#TA	H	15	10	40	2	125	1.5	5	58	52	23	3	
TLCL156M010#TA	L	15	10	40	2	125	1.5	7.5	89	80	36	3	
TLCL226M010#TA	L	22	10	40	2	125	11	10	50	45	20	3	
TLCL226M010#TA	M	22	10	40	2	125	2.2	7.5	63	57	25	3	
TLCH336M010#TA	H	33	10	40	2	125	3.3	5	89	80	36	3	
TLCH476M010#TA	H	47	10	40	2	125	23.5	7.5	73	66	29	3	
TLCR476M010#TA	R	47	10	40	2	125	4.7	5	95	85	38	3	
TLCT107M010#TA	T	100	10	40	2	125	10	1	200	180	80	3	
16 Volt @ 40°C													
TLCK474M016#TA	K	0.47	16	40	3.2	125	0.5	15	32	28	13	3	
TLCK105M016#TA	K	1	16	40	3.2	125	0.8	15	32	28	13	3	
TLCL335M016#TA	L	3.3	16	40	3.2	125	0.5	7.5	58	52	23	3	
TLCH106M016#TA	V	10	16	40	3.2	125	1.6	2	132	119	53	3	

TLC Series

Tantalum Solid Electrolytic Chip Capacitors Consumer Series



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)	ESR Max. @100kHz (Ω)	100kHz R MS Current (mA)			MSL
									25°C	85°C	125°C	
20 Volt @ 40°C												
TLCH225M020#TA	H	2.2	20	40	4	125	0.5	7.5	89	80	36	3
TLCR106M020#TA	R	10	20	40	4	125	0.6	5	95	85	38	3
25 Volt @ 40°C												
TLCL105M025#TA	L	1.0	25	40	5	125	0.5	7.5	58	85	23	3
35 Volt @ 40°C												
TLCR105M035#TA	R	1.0	35	40	7	125	0.5	5	95	85	38	3

*Please contact AVX, availability upon request

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.

DCL allowed to move up to 2.00 times the limit post mounting.

For typical weight and composition see page 274.

NOTE: 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

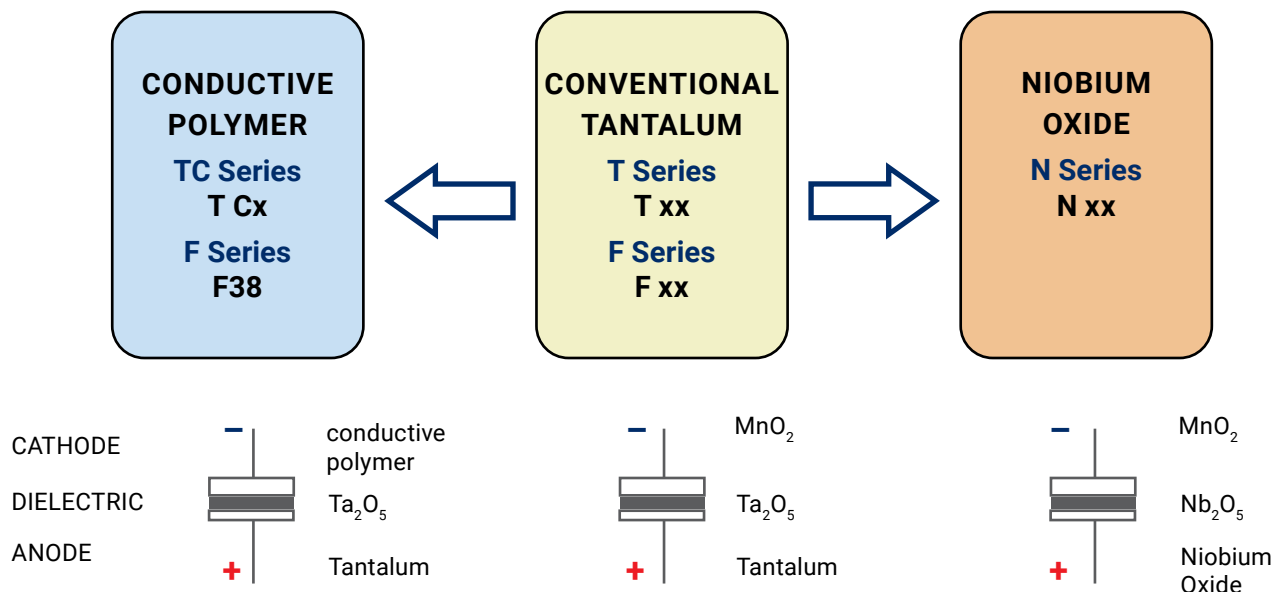
TEST	TLC series (Temperature range -55°C to +125°C)													
	Condition				Characteristics									
Endurance	Apply rated voltage (Ur) at 40°C and / or category voltage (Uc) at 85°C for 2000 hours through a circuit impedance of ≤0.1Ω/V. Stabilize at room temperature for 1-2 hours before measuring.				Visual examination	no visible damage								
					DCL	1.25 x initial limit								
					ΔC/C	within ±30% of initial value								
					ESR	1.5 x initial limit								
Humidity	Store at 40°C and 90-95% relative humidity for 56 days, with no applied voltage. Stabilize at room temperature and humidity for 1-2 hours before measuring.				Visual examination	no visible damage								
					DCL	2 x initial limit								
					ΔC/C	±30% of initial value								
					ESR	1.25 x initial limit								
Temperature Stability	Step	Temperature°C	Duration (min)	Voltage Applied	DCL	+20°C	-55°C	+20°C	+40°C	+60°C	+85°C	+125°C	+20°C	
	1	+20	15	N/A		ΔC/C	IL*	n/a	IL*	1.25 x IL*	1.25 x IL*	1.25 x IL*	1.25 x IL*	IL*
	2	-55	15	N/A			ESR	n/a	+0/-25%	±5%	+10/-0%	+10/-0%	+20/-0%	+20/-10%
	3	+20	15	N/A				IL*	n/a	1.25 x IL*	1.25 x IL*	1.25 x IL*	1.25 x IL*	1.25 x IL*
	4	+40	15	V _B										
	5	+60	15	0.66 x V _R										
	6	+85	15	0.50 x V _R										
	7	+125	15	0.20 x V _R										
	8	+20	15	N/A										
Surge Voltage	Apply 1.3x rated voltage (Ur) at 40°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 ±30% of initial value								
					ESR	1.25 x initial limit								

*Initial Limit

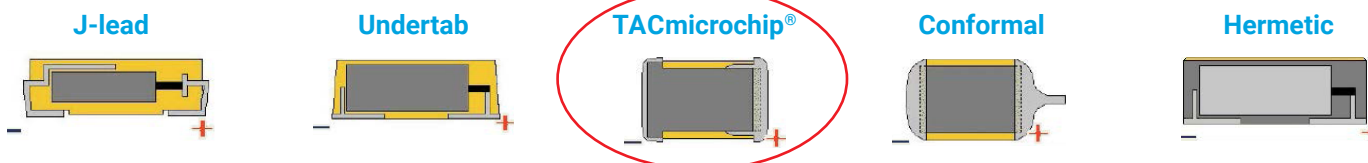
TLC Series

Tantalum Solid Electrolytic Chip Capacitors Consumer Series

AVX SOLID ELECTROLYTIC CAPACITOR ROADMAP



FIVE CAPACITOR CONSTRUCTION STYLES



SERIES LINE UP : CONVENTIONAL SMD MnO2

