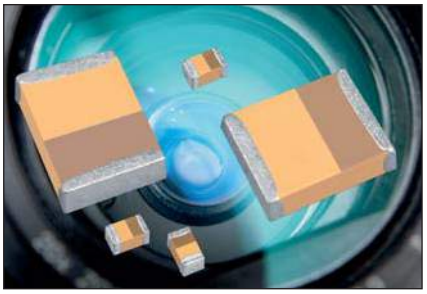
TLC Series

Tantalum Solid Electrolytic Chip Capacitors Consumer Series



FEATURES

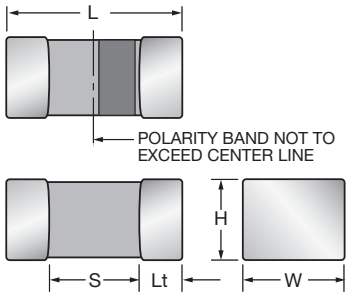
- High capacitance vs. voltage ratio
- Super high volumetric efficiency
- CV range: 0.47-220µF / 2-35V
- 12 case sizes available
- Consumer applications (portable handheld electronics, cellular phones, digital equipments etc.)

LEAD-FREE
LEAD-FREE COMPATIBLE COMPONENT

RoHS COMPLIANT

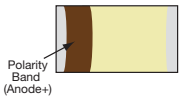
APPLICATIONS

- Consumer portable applications with space limitations

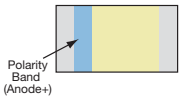


MARKING

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 -0.00 +0.008 (0.020 -0.000)	0.50 +0.20 -0.00 +0.008 (0.020 -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)
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 +0.008 (0.110 -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 -0.00 +0.008 (0.020 -0.000)	0.50 +0.20 -0.00 +0.008 (0.020 -0.000)	0.55 (0.022) min	0.15 (0.006)

*Please contact AVX, availability upon request

HOW TO ORDER

TLC — **Type**

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)

M — **Tolerance**
M=±20%

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

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
H = Chip Tray (waffle) Only case E

TA — **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)

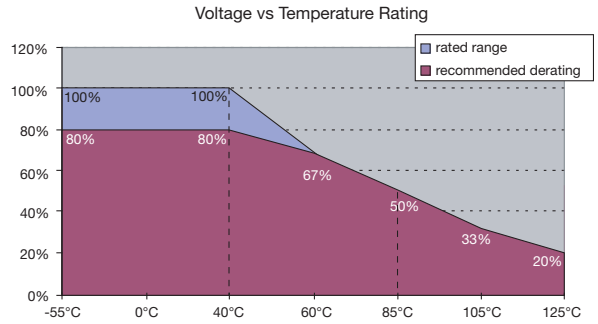
Capacitance		Voltage Rating DC (V_R) to 40°C									
µF	Code	2.0V	3.0V	4.0V	6.3V	8V	10V	16V	20V	25V	35V
0.47	474				E*			K			
1.0	105				E*			K		L	R
2.2	225						K		H		
3.3	335							L			
4.7	475			K	K/U		J				
6.8	685		K	K			U				
10	106		K	J/K/Z	J/K/Z		U	V	R		
15	156	K		K			H/L				
22	226	J	J	U	L/U		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)

Engineering samples - please contact AVX

*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 RMS 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
TLCV476M006#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
TLCJ475M010#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
TLCM226M010#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
TLCV106M016#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 (ºC)	Category Voltage (V)	Category Temperature (ºC)	DCL Max. (µA)	ESR Max. @ 100kHz (Ω)	100kHz RMS Current (mA)			MSL
									25ºC	85ºC	125ºC	
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.

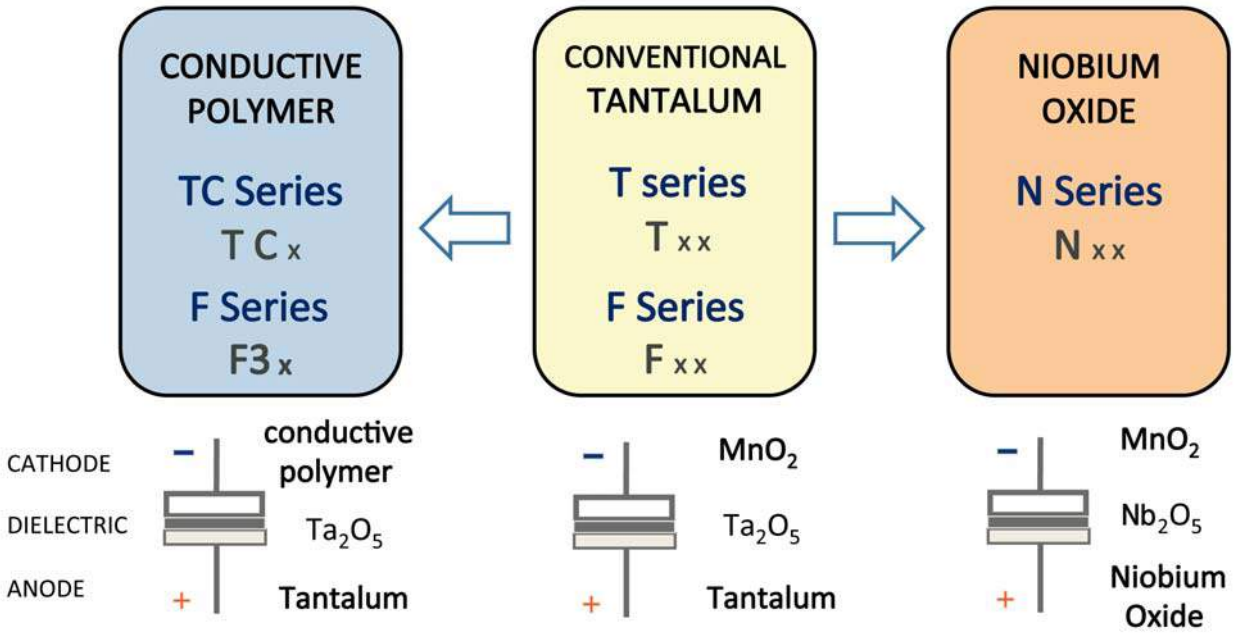
NOTE: AVX reserves the right to supply higher voltage ratings or tighter tolerance part in the same case size, to the same reliability standards.

QUALIFICATION TABLE

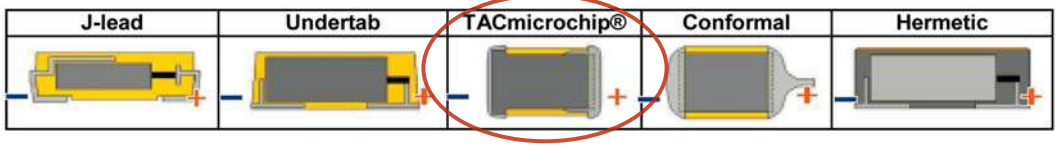
<table>
<tr><th>TEST</th><th colspan="10">TLC series (Temperature range -55ºC to +125ºC)</th></tr>
<tr><th></th><th colspan="4">Condition</th><th colspan="6">Characteristics</th></tr>
<tr><td rowspan="4">Endurance</td><td colspan="4" rowspan="4">Apply rated voltage (Ur) at 40ºC and / or category voltage (Uc) at 85ºC for 2000 hours through a circuit impedance of ≤0.1Ω/V. Stabilize at room temperature for 1-2 hours before measuring.</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>ESR</td><td colspan="5">1.5 x initial limit</td></tr>
<tr><td rowspan="4">Humidity</td><td colspan="4" rowspan="4">Store at 40ºC and 90-95% relative humidity for 56 days, with no applied voltage. Stabilize at room temperature and humidity for 1-2 hours before measuring.</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">±30% of initial value</td></tr>
<tr><td>ESR</td><td colspan="5">1.25 x initial limit</td></tr>
<tr><td rowspan="6">Temperature Stability</td><td>Step</td><td>Temperature°C</td><td>Duration (min)</td><td>Voltage Applied</td><td></td><td>+20ºC</td><td>-55ºC</td><td>+20ºC</td><td>+40ºC</td><td>+60ºC</td><td>+85ºC</td><td>+125ºC</td><td>+20ºC</td></tr>
<tr><td>1</td><td>+20</td><td>15</td><td>N/A</td><td>DCL</td><td>IL*</td><td>n/a</td><td>IL*</td><td>1.25 x IL*</td><td>1.25 x IL*</td><td>1.25 x IL*</td><td>1.25 x IL*</td><td>IL*</td></tr>
<tr><td>2</td><td>-55</td><td>15</td><td>N/A</td><td>ΔC/C</td><td>n/a</td><td>+0/-25%</td><td>±5%</td><td>+10/-0%</td><td>+10/-0%</td><td>+20/-0%</td><td>+25/-0%</td><td>+20/-10%</td></tr>
<tr><td>3</td><td>+20</td><td>15</td><td>N/A</td><td>ESR</td><td>IL*</td><td>n/a</td><td>1.25 x IL*</td><td>1.25 x IL*</td><td>1.25 x IL*</td><td>1.25 x IL*</td><td>1.25 x IL*</td><td>1.25 x IL*</td></tr>
<tr><td>4</td><td>+40</td><td>15</td><td>V_R</td><td colspan="9"></td></tr>
<tr><td>5</td><td>+60</td><td>15</td><td>0.66 x V_R</td><td colspan="9"></td></tr>
<tr><td>6</td><td>+85</td><td>15</td><td>0.50 x V_R</td><td colspan="9"></td></tr>
<tr><td rowspan="4">Surge Voltage</td><td colspan="4" rowspan="4">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</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>ESR</td><td colspan="5">1.25 x initial limit</td></tr>
</table>

*Initial Limit

AVX SOLID ELECTROLYTIC CAPACITOR ROADMAP



Five Capacitor Construction Styles



SERIES LINE UP: CONVENTIONAL SMD MnO_2

