

TLC Series



Tantalum Solid Electrolytic Chip Capacitors Consumer Series



FEATURES

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



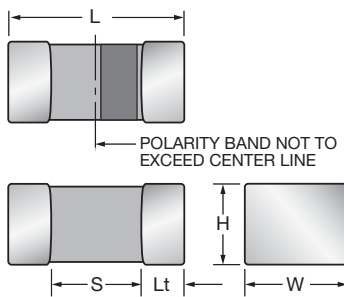
APPLICATIONS

- Consumer portable applications with space limitations

CASE DIMENSIONS: millimeters (inches)

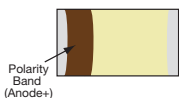
Code	EIA Code	EIA Metric	L+0.20 (0.008) -0.00 (0.000)	W+0.15 (0.006) -0.00 (0.000)	H+0.15 (0.006) -0.00 (0.000)	Termination Spacing(S)	Minimum Termination Length (Lt)
A	1206	3216-18	3.20 \pm 0.20 (0.126 \pm 0.008)	1.60 \pm 0.20 (0.063 \pm 0.008)	1.60 \pm 0.20 (0.063 \pm 0.008)	1.80 (0.071) min	0.15 (0.006)
D	1206	3216-06	3.20 \pm 0.20 (0.126 \pm 0.008)	1.60 \pm 0.20 (0.063 \pm 0.008)	0.60 (0.024) max	1.80 (0.071) min	0.15 (0.006)
E	0201	0603-03	0.60 \pm 0.12 (0.024 \pm 0.005)	0.33 \pm 0.02 (0.013 \pm 0.001)	0.33 \pm 0.02 (0.013 \pm 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 $^{+0.20}_{-0.00}$ (0.020 $^{+0.008}_{-0.000}$)	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)
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 \pm 0.20 (0.138 \pm 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 \pm 0.20 (0.126 \pm 0.008)	1.60 \pm 0.20 (0.063 \pm 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 $^{+0.20}_{-0.00}$ (0.020 $^{+0.008}_{-0.000}$)	0.50 $^{+0.20}_{-0.00}$ (0.020 $^{+0.008}_{-0.000}$)	0.55 (0.022) min	0.15 (0.006)

Under development

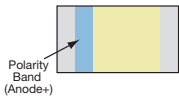


MARKING

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



E CASE



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= \pm 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 = 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)

TA
Standard Suffix
OR
4000
ESR in m Ω



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 μ F to 220 μ F											
Capacitance Tolerance:	\pm 20%											
Rated Voltage (V_R)	-55°C \leq +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, 0.5x V_R with 0.1 Ω/V series impedance with 60% confidence level											

CAPACITANCE AND RATED VOLTAGE RANGE (LETTER DENOTES CASE SIZE)

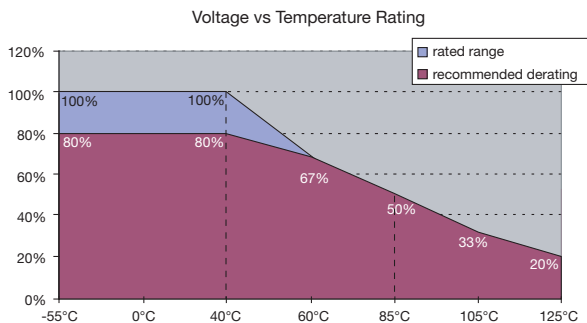
Capacitance		Voltage Rating DC (V_R) to 40°C									
μ F	Code	2.0V	3.0V	4.0V	6.3V	8V	10V	16V	20V	25V	35V
0.47	474				E			K			
1.0	105				E			K		L	R
2.2	225				K		K		H	R	
3.3	335							L			
4.7	475			K	K/U		J				
6.8	685		K	K			U				
10	106		K	J/K/Z	J/K/Z		U	V	R		
15	156	K	K*	K			H/L				
22	226	J	J	K*/U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

Released Codes

Engineering samples - please contact manufacturer

*Codes under development - subject to change.

Note: Voltage ratings are minimum values. AVX reserves the right to supply higher 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 (µA) Max.	ESR Max. (Ω) @ 100kHz	MSL	100kHz RMS Current (mA)		
										25°C	85°C	125°C
2 Volt @ 40°C												
TLCK156M002#TA	K	15	2	40	0.4	125	0.5	15	3	32	28	13
TLCJ226M002#TA	J	22	2	40	0.4	125	0.5	7.5	3	52	46	21
TLCL476M002#TA	L	47	2	40	0.4	125	0.9	7.5	3	58	52	23
TLCR227M002#TA	R	220	2	40	0.4	125	4.4	5	3	95	85	38
3 Volt @ 40°C												
TLCK685M003#TA	K	6.8	3	40	0.6	125	0.5	15	3	32	28	13
TLCK106M003#TA	K	10	3	40	0.6	125	0.5	15	3	32	28	13
TLCK156M003#TA	K	15	3	40	0.6	125	0.5	15	3	32	28	13
TLCJ226M003#TA	J	22	3	40	0.6	125	0.7	7.5	3	52	46	21
TLCL476M003#TA	L	47	3	40	0.6	125	1.4	7.5	3	58	52	23
TLCR476M003#TA	R	47	3	40	0.6	125	3.0	7.5	3	77	70	31
4 Volt @ 40°C												
TLCK475M004#TA	K	4.7	4	40	0.8	125	0.5	15	3	32	28	13
TLCK685M004#TA	K	6.8	4	40	0.8	125	0.5	15	3	32	28	13
TLCJ106M004#TA	J	10	4	40	0.8	125	0.5	7.5	3	52	46	21
TLCK106M004#TA	K	10	4	40	0.8	125	0.5	15	3	32	28	13
TLCZ106M004#TA	Z	10	4	40	0.8	125	0.5	15	3	37	33	15
TLCK156M004#TA	K	15	4	40	0.8	125	3.0	15	3	32	28	13
TLCU226M004#TA	U	22	4	40	0.8	125	0.9	12	3	54	49	22
TLCL336M004#TA	L	33	4	40	0.8	125	1.3	7.5	3	58	52	23
TLCU336M004#TA	U	33	4	40	0.8	125	2.6	9	3	62	56	25
TLCH476M004#TA	H	47	4	40	0.8	125	1.9	5	3	89	80	36
TLCL476M004#TA	L	47	4	40	0.8	125	1.9	7.5	3	58	52	23
TLCR686M004#TA	R	68	4	40	0.8	125	2.7	5	3	95	85	38
TLCR107M004#TA	R	100	4	40	0.8	125	4.0	5	3	95	85	38
TLCR157M004#TA	R	150	4	40	0.8	125	6.0	5	3	95	85	38
TLCR227M004#TA	R	220	4	40	0.8	125	8.8	5	3	95	85	38
TLCT227M004#TA	T	220	4	40	0.8	125	8.8	1	3	200	180	80
6.3 Volt @ 40°C												
TLCE474M006HTA	E	0.47	6.3	40	1.3	125	1.0	60	3	13	12	5
TLCE105M006HTA	E	1	6.3	40	1.3	125	1.0	60	3	13	12	5
TLCK225M006#TA	K	2.2	6.3	40	1.3	125	0.5	15	3	32	28	13
TLCK475M006#TA	K	4.7	6.3	40	1.3	125	0.5	15	3	32	28	13
TLCU475M006#TA	U	4.7	6.3	40	1.3	125	0.5	5	3	84	75	33
TLCJ106M006#TA	J	10	6.3	40	1.3	125	0.6	7.5	3	52	46	21
TLCK106M006#TA	K	10	6.3	40	1.3	125	3.1	15	3	32	28	13
TLCZ106M006#TA	Z	10	6.3	40	1.3	125	0.6	15	3	37	33	15
TLCL226M006#TA	L	22	6.3	40	1.3	125	1.4	7.5	3	58	52	23
TLCU226M006#TA	U	22	6.3	40	1.3	125	2.8	12	3	54	49	22
TLCH336M006#TA	H	33	6.3	40	1.3	125	2.0	5	3	89	80	36
TLCL336M006#TA	L	33	6.3	40	1.3	125	2.1	7.5	3	58	52	23
TLCL336M006#4000	L	33	6.3	40	1.3	125	2.1	4	3	79	71	32
TLCU336M006#TA	U	33	6.3	40	1.3	125	10.4	7.5	3	68	61	27
TLCV336M006#TA	V	33	6.3	40	1.3	125	4.2	5	3	84	75	33
TLCH476M006#TA	H	47	6.3	40	1.3	125	3.0	5	3	89	80	36
TLCR476M006#TA	R	47	6.3	40	1.3	125	6.0	5	3	95	85	38
TLCV476M006#TA	V	47	6.3	40	1.3	125	6.0	15	3	48	43	19
TLCR686M006#TA	R	68	6.3	40	1.3	125	4.3	5	3	95	85	38
TLCR107M006#TA	R	100	6.3	40	1.3	125	6.0	5	3	95	85	38
TLCT107M006#TA	T	100	6.3	40	1.3	125	31.5	15	3	52	46	21
TLCR157M006#TA	R	150	6.3	40	1.3	125	9.5	5	3	95	85	38
8 Volt @ 40°C												
TLCL336M008#TA	L	33	8	40	1.6	125	26.4	10	3	50	45	20
TLCD476M008#TA	D	47	8	40	1.6	125	18.8	7	3	71	64	28
10 Volt @ 40°C												
TLCK225M010#TA	K	2.2	10	40	2	125	0.5	15	3	32	28	13
TLCJ475M010#TA	J	4.7	10	40	2	125	0.5	10	3	45	40	18
TLCU685M010#TA	U	6.8	10	40	2	125	0.7	5	3	84	75	33
TLCU106M010#TA	U	10	10	40	2	125	1.0	5	3	84	75	33
TLCH156M010#TA	H	15	10	40	2	125	1.5	5	3	58	52	23
TLCL156M010#TA	L	15	10	40	2	125	1.5	7.5	3	89	80	36
TLCL226M010#TA	L	22	10	40	2	125	11	10	3	50	45	20
TLCM226M010#TA	M	22	10	40	2	125	2.2	7.5	3	63	57	25
TLCH336M010#TA	H	33	10	40	2	125	3.3	5	3	89	80	36
TLCH476M010#TA	H	47	10	40	2	125	23.5	7.5	3	73	66	29
TLCR476M010#TA	R	47	10	40	2	125	4.7	5	3	95	85	38
TLCR686M010#TA	R	68	10	40	2	125	6.8	5	3	95	85	38
TLCR107M010#TA	R	100	10	40	2	125	10	5	3	95	85	38
TLCT107M010#TA	T	100	10	40	2	125	10	1	3	200	180	80
TLCA157M010#TA	A	150	10	40	2	125	7.5	5	3	89	80	36



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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.	ESR Max. (Ω) @ 100kHz	MSL	100kHz RMS Current (mA)		
										25°C	85°C	125°C
16 Volt @ 40°C												
TLCK474M016#TA	K	0.47	16	40	3.2	125	0.5	15	3	32	28	13
TLCK105M016#TA	K	1	16	40	3.2	125	0.8	15	3	32	28	13
TLCL335M016#TA	L	3.3	16	40	3.2	125	0.5	7.5	3	58	52	23
TLCV106M016#TA	V	10	16	40	3.2	125	1.6	2	3	132	119	53
20 Volt @ 40°C												
TLCH225M020#TA	H	2.2	20	40	4	125	0.5	7.5	3	89	80	36
TLCR106M020#TA	R	10	20	40	4	125	0.6	5	3	95	85	38
25 Volt @ 40°C												
TLCL105M025#TA	L	1.0	25	40	5	125	0.5	7.5	3	58	85	23
TLCR225M025#TA	R	2.2	25	40	5	125	0.6	5	3	95	85	38
35 Volt @ 40°C												
TLCR105M035#TA	R	1.0	35	40	7	125	0.5	5	3	95	85	38

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 214.

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

TEST	TLC series (Temperature range -55°C to +125°C)													
	Condition				Characteristics									
Endurance	Determine after application of rated voltage for 2000 +48/-0 hours at 40±2°C and then leaving 1-2 hours at room temperature. Also determine of 85°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							
					ESR		1.5 x initial limit							
Humidity	Determine after storage without applied voltage at 40±2°C and 90-95% relative humidity for 56 days and then recovery 1-2 hours at room temperature.				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										
	1	+20±2	15	N/A	+20°C	-55°C	+20°C	+40°C	+60°C	+85°C	+125°C	+20°C		
	2	-55+0/-3	15	N/A	DCL		IL*	n/a	IL*	1.25 x IL*	1.25 x IL*	1.25 x IL*	1.25 x IL*	IL*
	3	+20±2	15	N/A	ΔC/C		n/a	+0/-25%	±5%	+10/-0%	+10/-0%	+20/-0%	+25/-0%	+20/-10%
	4	+40+2/-0	15	V _R	ESR		IL*	n/a	1.25 x IL*	1.25 x IL*	1.25 x IL*	1.25 x IL*	1.25 x IL*	1.25 x IL*
	5	+60+2/-0	15	0.66 x V _R										
	6	+85+3/-0	15	0.50 x V _R										
	7	+125+3/-0	15	0.20 x V _R										
8	+20±2	15	N/A											
Surge Voltage	Test temperature: 40°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							
					ESR		1.25 x initial limit							

*Initial Limit