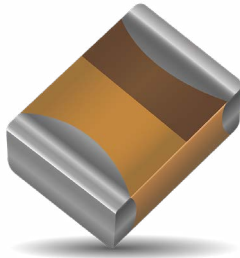


TLC Series

Tantalum Solid Electrolytic Chip Capacitors Consumer Series



FEATURES

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

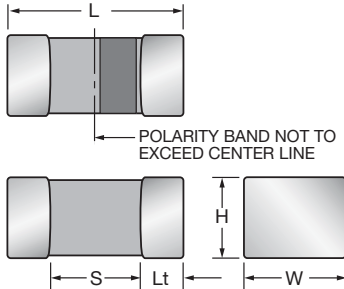


LEAD-FREE
LEAD-FREE COMPATIBLE
COMPONENT



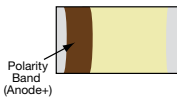
APPLICATIONS

- Consumer Portable Applications with Space Limitations

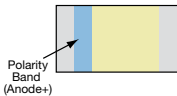


MARKING

D, H, K, L, R, T, U, V 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 $\pm$ 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)
K	0402	1005-07	1.00 (0.039)	0.50 $\pm$ 0.20 (0.020 $\pm$ 0.008)	0.50 $\pm$ 0.20 (0.020 $\pm$ 0.008)	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 (0.028) min	0.15 (0.006)
T	1210	3528-12	3.50 $\pm$ 0.20 (0.138 $\pm$ 0.008)	2.80 $\pm$ 0.20 (0.110 $\pm$ 0.008)	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)

*Please contact KYOCERA AVX, availability upon request

HOW TO ORDER

TLC	L	226	M	006	R	TA	4000
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 = $\pm$ 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	ESR in m Ω

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)

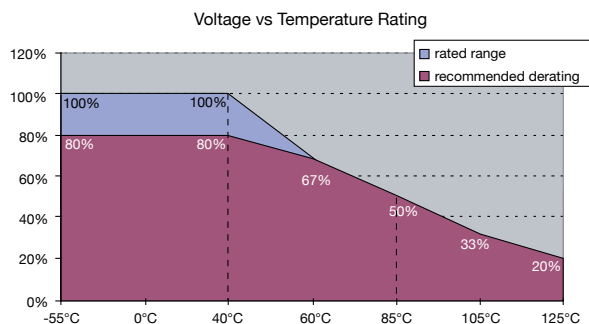
Capacitance		Voltage Rating DC (V _R) to 40°C									
µF	Code	2.0V	3.0V	4.0V	6.3V	8V	10V	16V	20V	25V	35V
0.47	474				E*			K			
1.0	105				E*			K		L	R
2.2	225						K		H		
3.3	335							L			
4.7	475			K	K/U						
6.8	685		K	K			U				
10	106		K	K	K		U	V	R		
15	156	K		K			H/L				
22	226			U	L/U		L				
33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

*Please contact KYOCERA AVX, availability upon request

Note: Voltage ratings are minimum values. KYOCERA 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

Part Number	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
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
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
TLCK106M004#TA	K	10	4	40	0.8	125	0.5	15	32	28	13	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
TLCK106M006#TA	K	10	6.3	40	1.3	125	3.1	15	32	28	13	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
TLCU685M010#TA	U	6.8	10	40	2	125	0.7	5	84	75	33	3
TLCKU106M010#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	1.1	10	50	45	20	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

Part Number	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 KYOCERA 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 259.

NOTE: KYOCERA 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

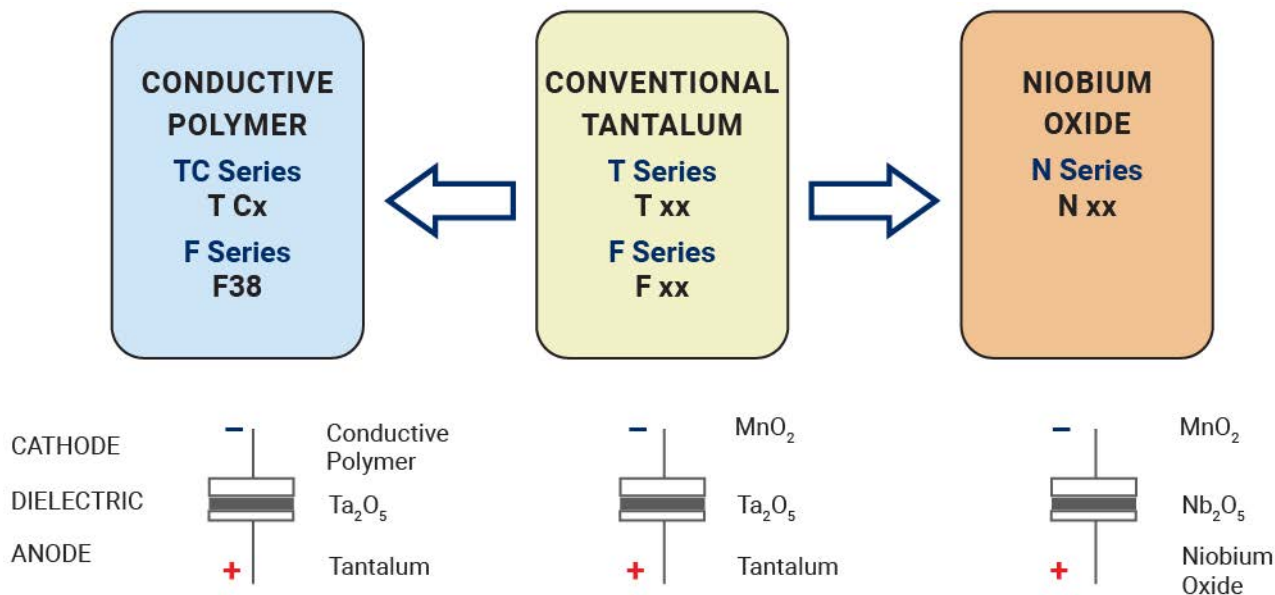
TEST	TLC series (Temperature range -55°C to +125°C)														
	Condition				Characteristics										
Endurance	Apply rated voltage (Ur) at 40°C and / or category voltage (Uc) at 85°C for 2000 hours through a circuit impedance of ≤0.1Ω/V. Stabilize at room temperature for 1-2 hours before measuring.				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%	+25/-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*	1.25 x IL*
	4	+40	15	V _R											
	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

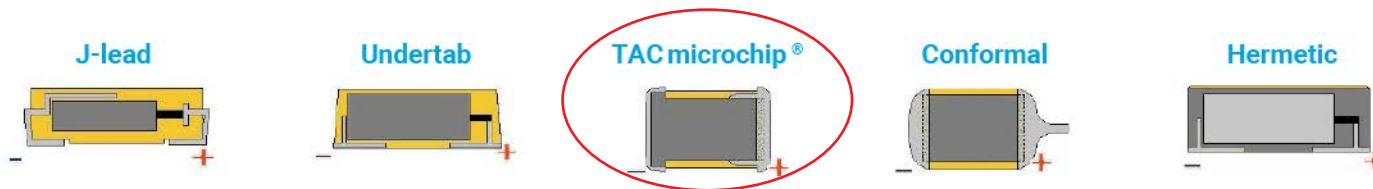
TLC Series

Tantalum Solid Electrolytic Chip Capacitors Consumer Series

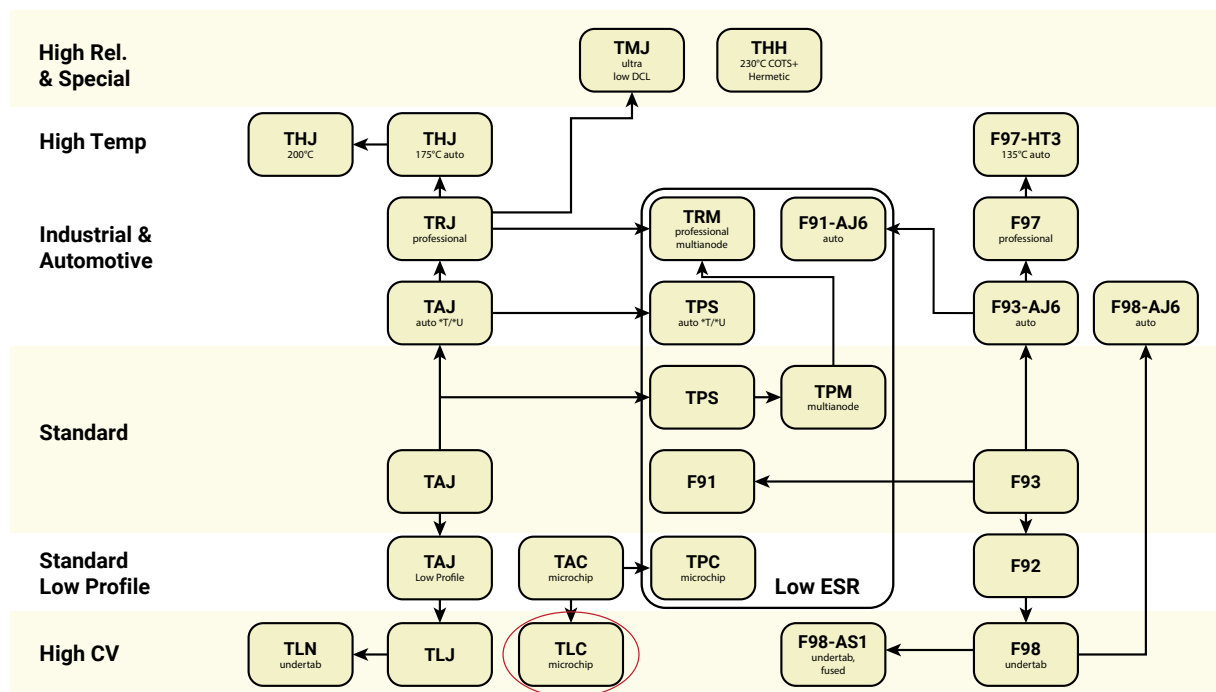
SOLID ELECTROLYTIC CAPACITOR ROADMAP



FIVE CAPACITOR CONSTRUCTION STYLES



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[TLCK105M016PTA](#) [TLCR686M006XTA](#) [TLCV336M006XTA](#) [TLCV476M006XTA](#)