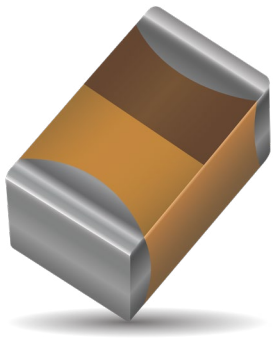
TPC Series

Low ESR TACmicrochip®



FEATURES

- Low ESR TACmicrochip® Capacitor
- Smallest and Low Profile Tantalum
- 100% Surge Current Tested
- CV Range: 1.0-100µF / 3-25V
- 4 Case Sizes Available
- Power Supply Applications

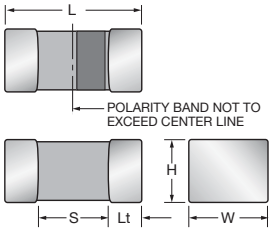
LEAD-FREE

LEAD-FREE COMPATIBLE COMPONENT

RoHS COMPLIANT

APPLICATIONS

- Portable Controller with Elevated Power Requirements

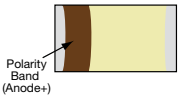


CASE DIMENSIONS: millimeters (inches)

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)
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)	$0.50^{+0.20}_{-0.00}$ ($0.020^{+0.008}_{-0.000}$)	$0.50^{+0.20}_{-0.00}$ ($0.020^{+0.008}_{-0.000}$)	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)
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)

MARKING

H, K, L, R CASE



HOW TO ORDER

TPC	R	106	*	010	R	1800
Type	**Case Size**	**Capacitance Code**	**Tolerance**	**Rated DC Voltage**	**Packaging**	**ESR in mΩ**
TACmicrochip®	See table above	pF code: 1st two digits represent significant figures, 3rd digit represents multiplier (number of zeros to follow)	K=±10% M=±20%	003=3Vdc 004=4Vdc 006=6.3Vdc 010=10Vdc 016=16Vdc 020=20Vdc 025=25Vdc	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	

TECHNICAL SPECIFICATIONS

Technical Data:		All technical data relate to an ambient temperature of +25°C						
Capacitance Range:		1.0 µF to 100 µF						
Capacitance Tolerance:		±10%; ±20%						
Leakage Current DCL:		0.01CV or 0.5µA whichever is the greater						
Rated Voltage (V_R)	≤ +85°C:	3	4	6.3	10	16	20	25
Category Voltage (V_C)	≤ +125°C:	2	2.7	4	7	10	13	17
Surge Voltage (V_S)	≤ +85°C:	3.9	5.2	8	13	20	26	32
Surge Voltage (V_S)	≤ +125°C:	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_R with 0.1Ω/V series impedance, 60% confidence level						
Termination Finish:		Tin Plating over Nickel (standard), Gold Plating over Nickel option available upon request						

The Important Information/Disclaimer is incorporated in the catalog where these specifications came from or available online at www.kyocera-avx.com/disclaimer/ by reference and should be reviewed in full before placing any order.

Downloaded from Arrow.com.

CAPACITANCE AND RATED VOLTAGE RANGE (LETTER DENOTES CASE SIZE)

Capacitance		Voltage Rating DC (V_R) at 85°C						
µF	Code	3.0V	4.0V	6.3V	10V	16V	20V	25V
1.0	105				L(5000)			R(3000)
1.5	155							
2.2	225			K(8000)/L(5000)	L(5000)	L(5000)		
3.3	335				L(5000)			
4.7	475	K(8000)			L(5000)		R(2000)	
6.8	685							
10	106			L(4000)	H(2500) L(4000),R(1800)	R(1800)		
15	156			R(1800)	R(1500)			
22	226		L(5000)/R(1800)	R(1500)	R(1500)			
33	336	R(1800)	H(1500)/R(1500)		R(1500)			
47	476	R(1500)		R(1800)				
68	686							
100	107		R(1000)					

Codes shown are examples of ESR values offered on certain CV and case size. Other codes and ESR values available upon request.

Released ratings, (ESR ratings in mOhms in parentheses)

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.

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)	DF Max. (%)	ESR Max. @ 100kHz (mΩ)	100kHz RMS Current (A)			Product Category	MSL
										25°C	85°C	125°C		
3 Volt @ 85°C														
TPCK475*003#8000	K	4.7	3	85	2	125	0.5	12	8000	0.043	0.039	0.017	3	1
TPCR336*003#1800	R	33	3	85	2	125	1.0	10	1800	0.158	0.142	0.063	2	1
TPCR476*003#1500	R	47	3	85	2	125	1.5	10	1500	0.173	0.156	0.069	3	1
4 Volt @ 85°C														
TPCL226*004#5000	L	22	4	85	2.7	125	0.9	6	5000	0.071	0.064	0.028	3	1
TPCR226*004#1800	R	22	4	85	2.7	125	0.9	8	1800	0.158	0.142	0.063	1	1
TPCH336*004#1500	H	33	4	85	2.7	125	1.3	14	1500	0.163	0.147	0.065	3	1
TPCR336*004#1500	R	33	4	85	2.7	125	1.3	10	1500	0.173	0.156	0.069	2	1
TPCR107*004#1000	R	100	4	85	2.7	125	4.0	30	1000	0.212	0.191	0.085	3	1
6.3 Volt @ 85°C														
TPCK225*006#8000	K	2.2	6.3	85	4	125	0.5	8	8000	0.043	0.039	0.017	3	1
TPCL225*006#5000	L	2.2	6.3	85	4	125	0.5	6	5000	0.071	0.064	0.028	1	1
TPCL106*006#4000	L	10	6.3	85	4	125	0.6	10	4000	0.079	0.071	0.032	3	1
TPCR156*006#1800	R	15	6.3	85	4	125	0.9	8	1800	0.158	0.142	0.063	1	1
TPCR226*006#1500	R	22	6.3	85	4	125	1.4	10	1500	0.173	0.156	0.069	1	1
TPCR476*006#1800	R	47	6.3	85	4	125	3.0	20	1800	0.158	0.142	0.063	3	1
10 Volt @ 85°C														
TPCL105*010#5000	L	1.0	10	85	7	125	0.5	6	5000	0.071	0.064	0.028	1	1
TPCL225*010#5000	L	2.2	10	85	7	125	0.5	6	5000	0.071	0.064	0.028	1	1
TPCL335*010#5000	L	3.3	10	85	7	125	0.5	8	5000	0.071	0.064	0.028	2	1
TPCL475*010#5000	L	4.7	10	85	7	125	0.5	10	5000	0.071	0.064	0.028	2	1
TPCH106*010#2500	H	10	10	85	7	125	1.0	8	2500	0.126	0.113	0.050	2	1
TPCL106*010#4000	L	10	10	85	7	125	1.0	20	4000	0.079	0.071	0.032	3	1
TPCR106*010#1800	R	10	10	85	7	125	1.0	8	1800	0.158	0.142	0.063	1	1
TPCR156*010#1500	R	15	10	85	7	125	1.5	10	1500	0.173	0.156	0.069	1	1
TPCR226*010#1500	R	22	10	85	7	125	2.2	14	1500	0.173	0.156	0.069	2	1
TPCR336*010#1500	R	33	10	85	7	125	3.3	20	1500	0.173	0.156	0.069	3	1
16 Volt @ 85°C														
TPCL225*016#5000	L	2.2	16	85	10	125	0.5	10	5000	0.071	0.064	0.028	1	1
TPCR106*016#1800	R	10	16	85	10	125	1.6	10	1800	0.158	0.142	0.063	2	1
20 Volt @ 85°C														
TPCR475*020#2000	R	4.7	20	85	13	125	0.9	8	2000	0.150	0.135	0.060	1	1
25 Volt @ 85°C														
TPCR105*025#3000	R	1.0	25	85	17	125	0.5	8	3000	0.122	0.110	0.049	1	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, refer to the *Product Safety Information Datasheet* at the end of the Polymer, Tantalum and Niobium Oxide Capacitors catalog.
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.

The Important Information/Disclaimer is incorporated in the catalog where these specifications came from or available online at www.kyocera-avx.com/disclaimer/ by reference and should be reviewed in full before placing any order.

Downloaded from Arrow.com.

QUALIFICATION TABLE – CATEGORY 1

TEST	TPC series (Temperature range -55°C to +125°C)											
	Condition				Characteristics							
Endurance	Apply rated voltage (Ur) at 85°C and / or category voltage (Uc) at 125°C for 2000 hours through a circuit impedance of ≤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	Store at 40°C and 90-95% relative humidity for 1344 hours, with no applied voltage.			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	15	DCL	IL*	n/a	IL*	10 x IL*	12.5 x IL*	IL*		
	2	-55	15	ΔC/C	n/a	+0/-10%	±5%	+10/-0%	+15/-0%	±5%		
	3	+20	15	DF	IL*	1.5xIL*	IL*	1.5xIL*	2xIL*	IL*		
	4	+85	15	ESR	IL*	1.25 x IL*	IL*	1.25 x IL*	2 x IL*	IL*		
	5	+125	15									
	6	+20	15									
Surge Voltage	Apply 1.3x rated voltage (Ur) at 85°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	initial limit							
				ΔC/C	within ±10% of initial value							
				DF	initial limit							
				ESR	initial limit							

*Initial Limit

QUALIFICATION TABLE – CATEGORY 2

TEST	TPC series (Temperature range -55°C to +125°C)											
	Condition				Characteristics							
Endurance	Apply rated voltage (Ur) at 85°C and / or category voltage (Uc) at 125°C for 2000 hours through a circuit impedance of ≤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	Store at 40°C and 90-95% relative humidity for 1344 hours, with no applied voltage.			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	15	DCL	IL*	n/a	IL*	10 x IL*	12.5 x IL*	IL*		
	2	-55	15	ΔC/C	n/a	+0/-15%	±5%	+15/-0%	+20/-0%	±5%		
	3	+20	15	DF	IL*	1.5xIL*	IL*	1.5xIL*	2xIL*	IL*		
	4	+85	15	ESR	IL*	1.25 x IL*	IL*	1.25 x IL*	2 x IL*	IL*		
	5	+125	15									
	6	+20	15									
Surge Voltage	Apply 1.3x rated voltage (Ur) at 85°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	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

Downloaded from Arrow.com.

QUALIFICATION TABLE – CATEGORY 3

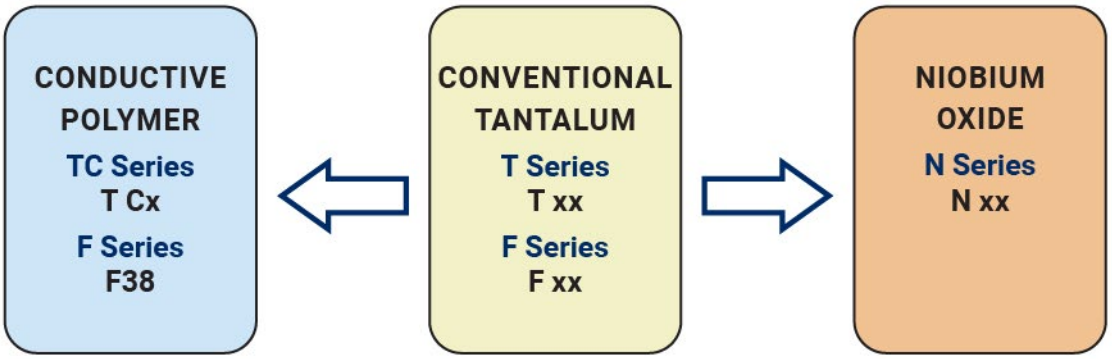
<table>
<tr><th rowspan="2">TEST</th><th colspan="8">TPC series (Temperature range -55°C to +125°C)</th></tr>
<tr><th colspan="4">Condition</th><th colspan="4">Characteristics</th></tr>
<tr><td>Endurance</td><td colspan="4" rowspan="5">Apply rated voltage (Ur) at 85°C and / or category voltage (Uc) at 125°C for 2000 hours through a circuit impedance of ≤0.1Ω/V.</td><td>Visual examination</td><td colspan="4">no visible damage</td></tr>
<tr><td></td><td>DCL</td><td colspan="4">1.25 x initial limit</td></tr>
<tr><td></td><td>ΔC/C</td><td colspan="4">within ±30% of initial value</td></tr>
<tr><td></td><td>DF</td><td colspan="4">1.5 x initial limit</td></tr>
<tr><td></td><td>ESR</td><td colspan="4">1.5 x initial limit</td></tr>
<tr><td>Humidity</td><td colspan="4" rowspan="5">Store at 40°C and 90-95% relative humidity for 1344 hours, with no applied voltage.</td><td>Visual examination</td><td colspan="4">no visible damage</td></tr>
<tr><td></td><td>DCL</td><td colspan="4">2 x initial limit</td></tr>
<tr><td></td><td>ΔC/C</td><td colspan="4">within ±30% of initial value</td></tr>
<tr><td></td><td>DF</td><td colspan="4">1.5 x initial limit</td></tr>
<tr><td></td><td>ESR</td><td colspan="4">1.25 x initial limit</td></tr>
<tr><td rowspan="8">Temperature Stability</td><td>Step</td><td>Temperature°C</td><td>Duration(min)</td><td></td><td></td><td>+20°C</td><td>-55°C</td><td>+20°C</td><td>+85°C</td><td>+125°C</td><td>+20°C</td></tr>
<tr><td>1</td><td>+20</td><td>15</td><td rowspan="6"></td><td>DCL</td><td>IL*</td><td>n/a</td><td>IL*</td><td>10 x IL*</td><td>12.5 x IL*</td><td>IL*</td></tr>
<tr><td>2</td><td>-55</td><td>15</td><td>ΔC/C</td><td>n/a</td><td>+0/-25%</td><td>±5%</td><td>+20/-0%</td><td>+25/-0%</td><td>±20%</td></tr>
<tr><td>3</td><td>+20</td><td>15</td><td>DF</td><td>IL*</td><td>1.5xIL*</td><td>IL*</td><td>1.5xIL*</td><td>2xIL*</td><td>1.5xIL*</td></tr>
<tr><td>4</td><td>+85</td><td>15</td><td>ESR</td><td>IL*</td><td>1.25 x IL*</td><td>IL*</td><td>1.25 x IL*</td><td>2 x IL*</td><td>1.5 x IL*</td></tr>
<tr><td>5</td><td>+125</td><td>15</td></tr>
<tr><td>6</td><td>+20</td><td>15</td></tr>
<tr><td>Surge Voltage</td><td colspan="4">Apply 1.3x rated voltage (Ur) at 85°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="4">no visible damage</td></tr>
<tr><td></td><td>DCL</td><td colspan="4">2 x initial limit</td></tr>
<tr><td></td><td>ΔC/C</td><td colspan="4">within ±30% of initial value</td></tr>
<tr><td></td><td>DF</td><td colspan="4">2 x initial limit</td></tr>
<tr><td></td><td>ESR</td><td colspan="4">2 x initial limit</td></tr>
</table>

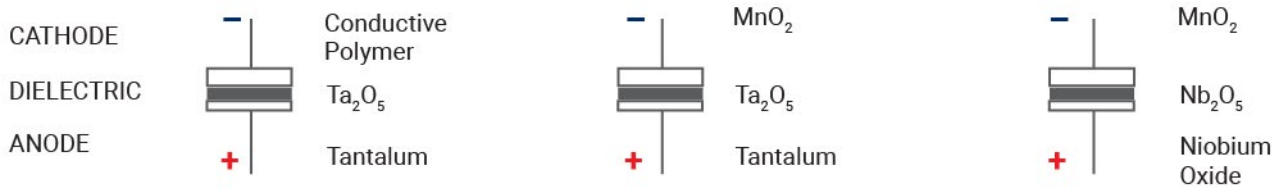
*Initial Limit

The Important Information/Disclaimer is incorporated in the catalog where these specifications came from or available online at www.kyocera-avx.com/disclaimer/ by reference and should be reviewed in full before placing any order.

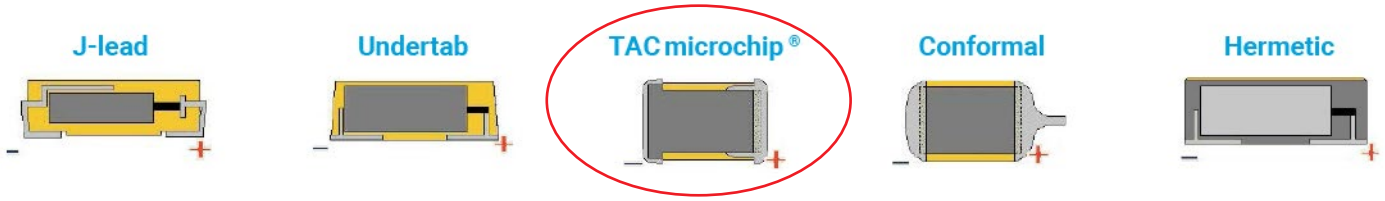
Downloaded from Arrow.com.

SOLID ELECTROLYTIC CAPACITOR ROADMAP

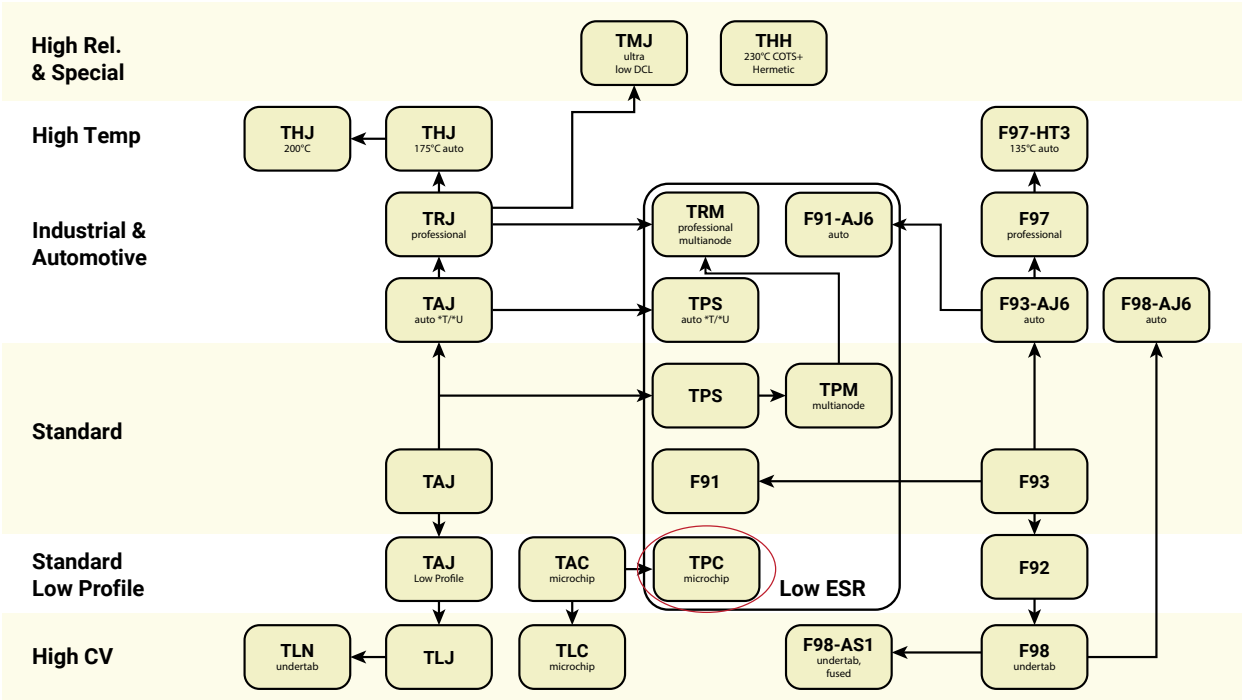




FIVE CAPACITOR CONSTRUCTION STYLES



SERIES LINE UP : CONVENTIONAL SMD MnO_2



Downloaded from Arrow.com.