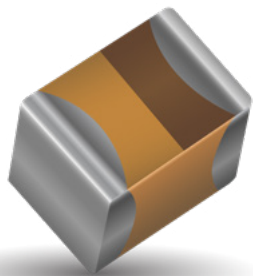


## T4C HRC4000 Implantable Non Life Support and Non Implantable Life Support



The T4C microchip medical series is designed for use in Implantable - Non-Life support or Non-Implantable - Life support medical applications with space limits. These components are screened using our newly designed Q-Process to effectively remove components that may experience parametric shifts through customer processing or display instability through life testing.

### FEATURES

- Dedicated to medical applications
- HRC4000 - Implantable, Non-Life support  
- Non-Implantable, Life support
- -55 to +125°C operation temperature
- Basic reliability better than 0.1%/1000hours
- Custom DCL / ESR options on selected parts



For RoHS compliant products, please select correct termination style.

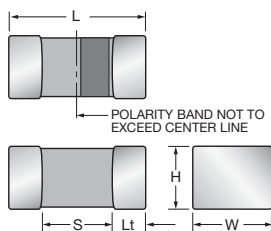
T4C Standard - Standard option DCL and ESR limits including Q-Process screening.

T4C Custom – A custom option where specific DCL and ESR parameter limits can be agreed based Q-Process statistical screening. DCL down to 0.005CV on selected codes

### APPLICATIONS

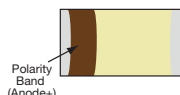
- Medical, Implantable - Non-Life support and Non-Implantable - Life support

For additional information on Q-process please consult the KYOCERA AVX technical publication "Reaching the Highest Reliability for Tantalum Capacitors" (see the link: <http://www.avx.com/docs/techinfo/Qprocess.pdf>)



### MARKING

#### K, L, R 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)
<b>K</b>	0402	1005-07	1.00 (0.039)	0.50 <sup>+0.20</sup> <sub>-0.00</sub> (0.020 <sup>+0.008</sup> <sub>-0.000</sub> )	0.50 <sup>+0.20</sup> <sub>-0.00</sub> (0.020 <sup>+0.008</sup> <sub>-0.000</sub> )	0.40 (0.016) min	0.10 (0.004)
<b>L</b>	0603	1608-10	1.60 (0.063)	0.85 (0.033)	0.85 (0.033)	0.55 (0.022) min	0.15 (0.006)
<b>R</b>	0805	2012-15	2.00 (0.079)	1.35 (0.053)	1.35 (0.053)	0.70 (0.028) min	0.15 (0.006)

## CAPACITANCE AND RATED VOLTAGE RANGE (LETTER DENOTES CASE SIZE)

Capacitance		Rated Voltage DC (V <sub>R</sub> ) to 85°C (Voltage Code)			
µF	Code	4V (G)	6.3V (J)	10V (A)	16V (C)
0.33	334				
0.47	474			K	
1.0	105	K	K	L	L
2.2	225			L	
3.3	335				
4.7	475	K			
10	106			L <sup>(M)</sup> ,R	
15	156				
22	226		R		

Available Ratings <sup>(M tolerance only)</sup>

Please contact the factory for codes not listed in the table.

Note: Voltage ratings are minimum values. KYOCERA AVX reserves the right to supply higher ratings in the same case size, to the same reliability standards with customer written approval.

## T4C HRC4000 Implantable Non Life Support and Non Implantable Life Support

### HOW TO ORDER

<b>T4C</b>	<b>R</b>	<b>105</b>	<b>*</b>	<b>006</b>	<b>C</b>		<b>L</b>	<b>Q</b>	<b>4</b>	<b>^</b>	<b>00</b>
Type	Case Size	Capacitance Code	Capacitance Tolerance	Voltage Code	Standard or Low ESR Range	Packaging	Inspection Level	Reliability Grade	Qualification Level	Termination Finish	Suffix
		pF code: 1st two digits represent significant figures 3rd digit represents multiplier (number of zeros to follow)	M = ±20% K = ±10%	004 = 4Vdc 006 = 6.3Vdc 010 = 10Vdc 016 = 16Vdc	C = Std ESR	R, P = 7" Reel X, Q = 4 1/4" Reel B = Bulk	L = Lab Inspection	Q = Q-Process Screening	4 = HRC4000	7 = 100% Tin 9 = Gold Plated H = SnPb Non RoHS H, 9 = (Contact Manufacturer)	00 = Standard XX = Custom

### TECHNICAL SPECIFICATIONS

Technical Data:	All technical data relate to an ambient temperature of +25°C				
Capacitance Range:	0.47 µF to 22 µF (for extended range contact manufacturer)				
Capacitance Tolerance:	±10%; ±20%				
Leakage Current DCL:	0.01CV or 0.3µA whichever is the greater				
Rated Voltage (V <sub>R</sub> )	≤ +85°C:	4	6.3	10	16
Category Voltage (V <sub>C</sub> )	≤ +125°C:	2.7	4	6.7	10
Surge Voltage (V <sub>S</sub> )	≤ +85°C:	5.2	8	13	20
Surge Voltage (V <sub>S</sub> )	≤ +125°C:	3.2	5	8	13
Temperature Range:	-55°C to +125°C				
Reliability:	0.1% per 1000 hours at 25°C, V <sub>R</sub> with 0.1Ω/V series impedance, 90% confidence level				

### RATINGS & PART NUMBER REFERENCE

Part No.	Case Size	Capacitance (µF)	Rated Voltage (V)	Rated Temperature (°C)	Category Voltage (V)	Category Temperature (°C)	DCL Max. (µA)	DF Max. (%)	ESR Max. @ 100kHz (Ω)	MSL	100kHz RMS Current (mA)		
											25°C	85°C	125°C
<b>4 Volt @ 85°C</b>													
T4CK105*004C□LQ4*00	K	1	4	85	2.7	125	0.3	6	15	3	32	28	13
T4CK475*004C□LQ4*00	K	4.7	4	85	2.7	125	0.3	20	15	3	32	28	13
<b>6.3 Volt @ 85°C</b>													
T4CK105*006C□LQ4*00	K	1	6.3	85	4	125	0.3	6	15	3	32	28	13
T4CR226*006C□LQ4*00	R	22	6.3	85	4	125	1.4	10	5	3	95	85	38
<b>10 Volt @ 85°C</b>													
T4CK474*010C□LQ4*00	K	0.47	10	85	6.7	125	0.3	6	15	3	32	28	13
T4CL105*010C□LQ4*00	L	1	10	85	6.7	125	0.3	6	7.5	3	58	52	23
T4CL225*010C□LQ4*00	L	2.2	10	85	6.7	125	0.3	6	7.5	3	58	52	23
T4CL106M010C□LQ4*00	L	10	10	85	6.7	125	1	20	7.5	3	58	52	23
T4CR106*010C□LQ4*00	R	10	10	85	6.7	125	1	8	5	3	95	85	38
<b>16 Volt @ 85°C</b>													
T4CL105*016C□LQ4*00	L	1	16	85	10	125	0.3	6	7.5	3	58	52	23

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.

The EIA & CECC standards for low ESR Solid Tantalum Capacitors allow an ESR movement to 1.25 times catalogue limit post mounting.

**NOTICE:** The specifications set forth herein are subject to change without notice and are typical and may not apply to all applications. KYOCERA AVX does not warrant or guarantee any aspect of the operation or use of any product except as explicitly set forth in the product specification. Unless specifically agreed to in writing. Seller has not tested or certified its products, services or deliverables for use in high risk applications including medical life support, medical device, direct physical patient contact, water treatment, nuclear facilities, weapon systems, mass and air transportation control, flammable environments, or any other potentially life critical uses. By ordering or using KYOCERA AVX products, the user understands and agrees that KYOCERA AVX makes no assurances that the products, services or deliverables are suitable for any high risk uses.

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T4C HRC4000 Implantable Non Life Support and Non Implantable Life Support

QUALIFICATION TABLE

TEST	T4C HRC4000 (Temperature range -55°C to +125°C)										
	Condition			Characteristics							
Endurance	Determine after application of rated voltage for 2000 +48/-0 hours at 85±2°C and then leaving 1-2 hours at room temperature. Also determine of 125°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 ±10% of initial value					
				DF		initial limit					
				ESR		1.25 x initial limit					
Storage Life	125°C, 0V, 2000h			Visual examination		no visible damage					
				DCL		1.25 x initial limit					
				ΔC/C		within ±10% of initial value					
				DF		initial limit					
				ESR		1.25 x initial limit					
Temperature Stability	Step	Temperature°C	Duration (min)								
	1	+20±2	15	DCL		IL*	n/a	IL*	10 x IL*	12.5 x IL*	IL*
	2	-55+0/-3	15	ΔC/C		n/a	+0/-10%	±5%	+10/-0%	+12/-0%	±5%
	3	+20±2	15	DF		IL*	1.5 x IL*	IL*	1.5 x IL*	2 x IL*	IL*
	4	+85+3/-0	15	ESR		1.25 x IL*	2.5 x IL*	1.25 x IL*	1.25 x IL*	1.25 x IL*	1.25 x IL*
	5	+125+3/-0	15								
	6	+20±2	15								
Surge Voltage	Test temperature: 85°C+3/0°C Test voltage: Rated voltage at 85°C Surge voltage: 1.3x rated voltage at 85°C Series protection resistance 1000±100Ω Discharge resistance: 1000Ω Number of cycles: 1000x Cycle duration: 6min; 30 sec charge, 5min 30 sec discharge			Visual examination		no visible damage					
				DCL		initial limit					
				ΔC/C		within ±5% of initial value					
				DF		initial limit					
				ESR		1.25 x initial limit					

\*Initial Limit

LOT ACCEPTANCE TESTING

TEST	T4C HRC4000 (Temperature range -55°C to +125°C)		
	Condition	Characteristics	
Lot Acceptance Test	25 Pieces from each lot • Read and Record Initial Electricals • Bake Out @ 125°C for 2 Hours • Mount using KYOCERA AVX recommended profile • Read and Record Post Mounting Electricals • Life Test: 6 hours, 2/3 R.V., 125°C • Read and Record Post Electricals	DCL	initial limit
		ΔC/C	within ±5% of initial value
		DF	initial limit
		ESR	1.25 x initial limit
		0 Failures Allowed	