

# Tantalum Chip Capacitors

## TCR series

### Low ESR & High Ripple Current

Low ESR & High Ripple Current. High Resistance against Rush current.

Lower failure even at low impedance Circuits. Failure Rate: 0.5% or less/1000 hrs.

Capacitance up to 1000µF in E case.

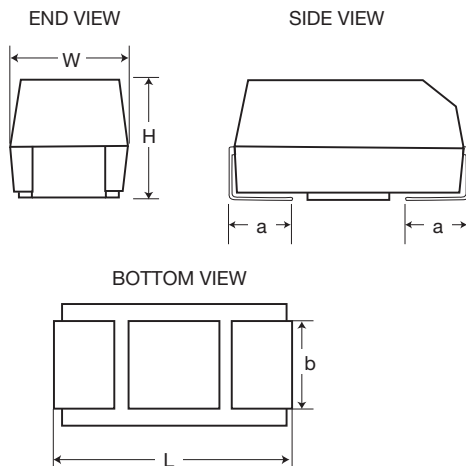
## Specifications

Operating Temperature Range	-55°~+125°C
Maximum Operating Temperature at Rated Voltage	+85°C
Capacitance Tolerance	±20% (M), ±10% (K) at 120Hz
Dissipation Factor (Tan )	As per the following table
ESR & Maximum Ripple Current	As per the following table
DC Leakage Current	As per the following table
Resistance to Rush Current	Rated Voltage applied, 5A/ON • OFF 10,000 cycle
Solderability	260°C 10 Sec. (Dip or Reflow) Within 5% of recorded value before test.
Humidity Test	60°C, 90 – 95%RH 5000 hrs.
High Temp Load Test	85°C, Rated Voltage Applied for 2,000 hrs. or 125°C, Derated Voltage Applied for 2,000 hrs.
Failure Rate	0.5% or less/1,000 hrs after solder (60% CL)
Conformity	JIS-C-5143 Performance HB, EIA-535BAAC etc.

## Standard Ratings and Case Codes

W.V. ▶	4	6.3	10	16	20	25	35	50
Cap. (µF) ▼								
0.47						A	B	
0.68								
1					A		A,B	C
1.5								
2.2						C	B,C	D
3.3				A		C	B,C	D
4.7			A,B	A,B		C	B,C	D,E
6.8			A,B	C		B,C	D,E	D
10		A	B	B	B,C	C	D,E	E
15			B,C	A,B	C,D	D,E	D,E	E
22			B,C	C	D	C,D,E	D,E	
33		B	B	C,D	D	D,E	E	
47		B,C	B,C	C,D	D,E	D,E	E	
68		D	B,C,D,E	D	D,E	D,E		
100	B	B,C,D	D,E	D,E	E			
150	B,C	C,D,E	D,E	D,E				
220	D	C,D,E	D,E	E				
330	C,D	D,E	D,E					
470	D,E	D,E	E					
680	E							
1000								

## Dimensions



Case Code	L	W	H	a	b
A	3.2 ± 0.2 (0.126 ± 0.008)	1.6 ± 0.2 (0.063 ± 0.008)	1.6 ± 0.2 (0.063 ± 0.008)	0.8 ± 0.3 (0.031 ± 0.012)	1.2 ± 0.2 (0.047 ± 0.008)
B	3.5 ± 0.2 (0.138 ± 0.008)	2.8 ± 0.2 (0.110 ± 0.008)	1.9 ± 0.2 (0.075 ± 0.008)	0.8 ± 0.3 (0.031 ± 0.012)	2.2 ± 0.2 (0.087 ± 0.008)
C	6.0 ± 0.3 (0.236 ± 0.012)	3.2 ± 0.3 (0.126 ± 0.012)	2.5 ± 0.3 (0.098 ± 0.012)	1.3 ± 0.3 (0.051 ± 0.012)	2.2 ± 0.2 (0.087 ± 0.008)
D	7.3 ± 0.3 (0.287 ± 0.012)	4.3 ± 0.3 (0.169 ± 0.012)	2.8 ± 0.3 (0.110 ± 0.012)	1.3 ± 0.3 (0.051 ± 0.012)	2.4 ± 0.2 (0.094 ± 0.008)
E	7.3 ± 0.3 (0.287 ± 0.012)	4.3 ± 0.3 (0.169 ± 0.012)	4.0 ± 0.3 (0.157 ± 0.012)	1.3 ± 0.3 (0.051 ± 0.012)	2.4 ± 0.2 (0.094 ± 0.008)

Unit: mm (inch)

5900 Shepherd Mountain Cove • Austin, TX 78730

Phone: 512 / 794-0081 • Fax: 512 / 794-0087 • Toll Free: 800 / 950-8365

e-mail: sales@venkel.com • www.venkel.com



VENKEL LTD.

# Tantalum Chip Capacitors

## TCR SERIES DATA TABLE (Low ESR) Standard Part Numbers & Data

Cap. $\mu$ F	Case Code	Catalogue P/N	Max. DCL @ +25°C ( $\mu$ A)	Max. DF @ +25°C 120 Hz (%)	Max. ESR 100 kHz ( $\Omega$ )	Max. Ripple Current (mA@25°C)
<b>4.0V DC</b>						
100	B	TA4R0TCR107 K or M BR	4	8	0.5	412
150	B	TA4R0TCR157 K or M BR	6	12	0.9	307
150	C	TA4R0TCR157 K or M CR	6	8	0.25	663
220	D	TA4R0TCR227 K or M DR	8	8	0.1	1225
330	C	TA4R0TCR337 K or M CR	13.2	12	0.7	396
330	D	TA4R0TCR337 K or M DR	13.2	8	0.05	1826
470	D	TA4R0TCR477 K or M DR	18.8	12	0.1	1225
470	E	TA4R0TCR477 K or M ER	18.8	8	0.1	1285
1000	E	TA4R0TCR108 K or M ER	40	12	0.07	1535
<b>6.3V DC</b>						
10	A	TA6R3TCR106 K or M AR	0.6	6	2	220
33	B	TA6R3TCR336 K or M BR	2	6	0.6	410
47	B	TA6R3TCR476 K or M BR	3	6	0.45	435
47	C	TA6R3TCR476 K or M CR	2.9	6	0.25	663
68	D	TA6R3TCR686 K or M DR	3.3	4	0.18	926
100	B	TA6R3TCR107 K or M BR	6.3	15	0.7	348
100	C	TA6R3TCR107 K or M CR	6	8	0.15	856
100	D	TA6R3TCR107 K or M DR	6	8	0.15	1000
150	C	TA6R3TCR157 K or M CR	9	8	0.2	742
150	D	TA6R3TCR157 K or M DR	9	6	0.13	1095
150	E	TA6R3TCR157 K or M ER	7.2	6	0.1	1285
220	C	TA6R3TCR227 K or M CR	13.9	10	0.23	700
220	D	TA6R3TCR227 K or M DR	13.9	8	0.1	1225
220	E	TA6R3TCR227 K or M ER	13.2	8	0.1	1285
330	D	TA6R3TCR337 K or M DR	20.8	8	0.1	1225
330	E	TA6R3TCR337 K or M ER	19.8	8	0.1	1285
470	D	TA6R3TCR477 K or M DR	29.6	12	0.13	1095
470	E	TA6R3TCR477 K or M ER	28.2	10	0.07	1593

## TCR SERIES DATA TABLE (Low ESR) Standard Part Numbers & Data

Cap. $\mu$ F	Case Code	Catalogue P/N	Max. DCL @ +25°C ( $\mu$ A)	Max. DF @ +25°C 120 Hz (%)	Max. ESR 100 kHz ( $\Omega$ )	Max. Ripple Current (mA@25°C)
<b>10V DC</b>						
4.7	A	TA010TCR475 K or M AR	0.5	6	1.3	240
4.7	B	TA010TCR475 K or M BR	0.5	15	1.3	256
6.8	A	TA010TCR685 K or M AR	1	6	1.8	204
6.8	B	TA010TCR685 K or M BR	1	6	0.9	307
10	B	TA010TCR106 K or M BR	1	6	0.75	337
15	B	TA010TCR156 K or M BR	1.5	6	0.5	412
15	C	TA010TCR156 K or M CR	1.5	6	0.48	481
22	B	TA010TCR226 K or M BR	2.2	6	0.7	410
22	C	TA010TCR226 K or M CR	2.2	6	0.35	565
33	B	TA010TCR336 K or M BR	3.3	6	0.45	435
47	B	TA010TCR476 K or M BR	4.7	6	0.5	412
47	D	TA010TCR476 K or M DR	3.8	4	0.2	866
68	B	TA010TCR686 K or M BR	6.8	10	0.9	307
68	C	TA010TCR686 K or M CR	6.8	6	0.23	700
68	D	TA010TCR686 K or M DR	6.8	6	0.15	1000
68	E	TA010TCR686 K or M ER	5.4	4	0.15	1049
100	D	TA010TCR107 K or M DR	10	8	0.1	1220
100	E	TA010TCR107 K or M ER	8	6	0.1	1285
150	D	TA010TCR157 K or M DR	15	8	0.1	1225
150	E	TA010TCR157 K or M ER	15	8	0.1	1285
220	D	TA010TCR227 K or M DR	22	8	0.13	1095
220	E	TA010TCR227 K or M ER	22	8	0.1	1285
330	D	TA010TCR337 K or M DR	33	10	0.15	1000
330	E	TA010TCR337 K or M ER	33	10	0.1	1284
470	E	TA010TCR477 K or M ER	47	10	0.2	908
<b>16V DC</b>						
3.3	A	TA016TCR335 K or M AR	0.5	6	3	158
4.7	A	TA016TCR475 K or M AR	0.8	6	2	194
4.7	B	TA016TCR475 K or M BR	0.8	6	0.7	348
6.8	C	TA016TCR685 K or M CR	1.1	6	0.75	383
10	B	TA016TCR106 K or M BR	1.6	6	0.8	410
15	B	TA016TCR156 K or M BR	2.4	6	0.8	326
15	A	TA016TCR156 K or M AR	2.4	8	2.5	173
22	C	TA016TCR226 K or M CR	3.6	6	0.35	660
33	C	TA016TCR336 K or M CR	5.3	6	0.28	632
33	D	TA016TCR336 K or M DR	4.2	4	0.23	816
47	C	TA016TCR476 K or M CR	7.5	6	0.35	561
47	D	TA016TCR476 K or M DR	7.5	6	0.15	1000

# Tantalum Chip Capacitors

## TCR SERIES DATA TABLE (Low ESR) Standard Part Numbers & Data

Cap. $\mu\text{F}$	Case Code	Catalogue P/N	Max. DCL @ +25°C ( $\mu\text{A}$ )	Max. DF @ +25°C 120 Hz (%)	Max. ESR 100 kHz ( $\Omega$ )	Max. Ripple Current (mA@25°C)
<b>16V DC (continued)</b>						
68	D	TA016TCR686 K or M DR	10.9	6	0.15	1000
100	D	TA016TCR107 K or M DR	16	8	0.13	1095
100	E	TA016TCR107 K or M ER	16	8	0.1	1285
150	D	TA016TCR157 K or M DR	24	8	0.15	1000
150	E	TA016TCR157 K or M ER	24	8	0.1	1285
220	E	TA016TCR227 K or M ER	35.2	8	0.1	1284
<b>20V DC</b>						
1	A	TA020TCR105 K or M AR	0.2	4	3	158
10	B	TA020TCR106 K or M BR	2	6	1	292
10	C	TA020TCR106 K or M CR	2	6	0.48	481
15	C	TA020TCR156 K or M CR	3	6	0.38	542
15	D	TA020TCR156 K or M DR	2.4	4	0.28	738
22	D	TA020TCR226 K or M DR	3.5	4	0.23	816
33	D	TA020TCR336 K or M DR	6.6	6	0.2	866
47	D	TA020TCR476 K or M DR	9.4	6	0.18	926
47	E	TA020TCR476 K or M ER	7.5	4	0.15	1049
68	D	TA020TCR686 K or M DR	13.6	8	0.15	1000
68	E	TA020TCR686 K or M ER	13.6	6	0.15	1049
100	E	TA020TCR107 K or M ER	20	8	0.15	1049
<b>25V DC</b>						
0.47	A	TA025TCR474 K or M AR	0.5	4	4.5	129
2.2	C	TA025TCR225 K or M CR	0.6	6	1.3	291
3.3	C	TA025TCR335 K or M CR	0.9	6	0.75	383
4.7	C	TA025TCR475 K or M CR	1.2	6	0.58	437
6.8	B	TA025TCR685 K or M BR	1.7	6	1.5	238
6.8	C	TA025TCR685 K or M CR	1.7	6	0.5	469
10	C	TA025TCR106 K or M CR	2.5	6	0.45	494
15	D	TA025TCR156 K or M DR	3.8	6	0.28	738
15	E	TA025TCR156 K or M ER	3	4	0.2	908
22	C	TA025TCR226 K or M CR	5.5	6	0.9	350
22	D	TA025TCR226 K or M DR	5.5	6	0.2	866
22	E	TA025TCR226 K or M ER	4.4	4	0.23	856
33	D	TA025TCR336 K or M DR	8.3	6	0.3	707
33	E	TA025TCR336 K or M ER	8.3	4	0.2	908
47	D	TA025TCR476 K or M DR	11.8	10	0.25	775
47	E	TA025TCR476 K or M ER	11.8	6	0.2	908
68	D	TA025TCR686 K or M DR	17	10	0.2	866
68	E	TA025TCR686 K or M ER	17	8	0.2	908

All components in this section are RoHS compliant per the EU directives and definitions.

5900 Shepherd Mountain Cove • Austin, TX 78730  
 Phone: 512 / 794-0081 • Fax: 512 / 794-0087 • Toll Free: 800 / 950-8365  
 e-mail: sales@venkel.com • www.venkel.com



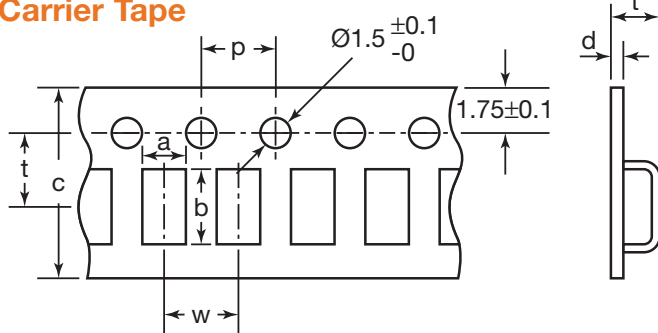
VENKEL LTD.

## TCR SERIES DATA TABLE (Low ESR) Standard Part Numbers & Data

Cap. $\mu\text{F}$	Case Code	Catalogue P/N	Max. DCL @ +25°C ( $\mu\text{A}$ )	Max. DF @ +25°C 120 Hz (%)	Max. ESR 100 kHz ( $\Omega$ )	Max. Ripple Current (mA@25°C)
<b>35V DC</b>						
0.47	B	TA035TCR474 K or M BR	0.5	4	2.2	197
1	A	TA035TCR105 K or M AR	0.4	4	3	158
1	B	TA035TCR105 K or M BR	0.5	4	1.7	224
2.2	B	TA035TCR225 K or M BR	0.8	6	1.5	238
2.2	C	TA035TCR225 K or M CR	0.8	6	0.75	383
3.3	B	TA035TCR335 K or M BR	1.2	6	0.9	307
3.3	C	TA035TCR335 K or M CR	1.2	6	0.6	428
4.7	B	TA035TCR475 K or M BR	1.6	6	0.9	292
4.7	C	TA035TCR475 K or M CR	1.7	6	0.6	428
6.8	D	TA035TCR685 K or M DR	2.4	6	0.4	612
6.8	E	TA035TCR685 K or M ER	1.9	4	0.3	742
10	D	TA035TCR106 K or M DR	3.5	6	0.3	707
10	E	TA035TCR106 K or M ER	2.8	4	0.25	812
15	D	TA035TCR156 K or M DR	5.3	6	0.3	707
15	E	TA035TCR156 K or M ER	5.3	6	0.23	856
22	D	TA035TCR226 K or M DR	7.7	6	0.3	707
22	E	TA035TCR226 K or M ER	7.7	6	0.28	775
33	E	TA035TCR336 K or M ER	11.6	6	0.2	1000
47	E	TA035TCR476 K or M ER	16.5	8	0.3	742
<b>50V DC</b>						
1	C	TA050TCR105 K or M CR	0.5	4	1.3	291
2.2	D	TA050TCR225 K or M DR	1.1	6	0.6	500
3.3	D	TA050TCR335 K or M DR	1.7	6	0.7	463
4.7	D	TA050TCR475 K or M DR	2.4	6	0.3	707
4.7	E	TA050TCR475 K or M ER	1.9	4	0.3	742
6.8	D	TA050TCR685 K or M DR	3.4	8	0.3	700
10	E	TA050TCR106 K or M ER	5	6	0.3	741
15	E	TA050TCR156 K or M ER	7.5	8	0.3	742

## Taping Specifications

### Carrier Tape



### Carrier Tape Dimensions

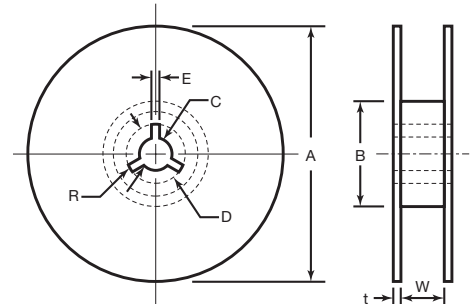
(Unit: mm)

CASE	a $\pm 0.1$	b $\pm 0.1$	c $\pm 0.2$	t $\pm 0.1$	p $\pm 0.1$	w $\pm 0.1$	d
A	1.9	3.9	8.0	2.0	4.0	4.0	0.2
B	3.1	3.9	8.0	2.3	4.0	4.0	0.2
C	3.9	6.3	12.0	2.7	4.0	8.0	0.3
D	4.6	7.7	12.0	3.3	4.0	8.0	0.3
E	4.6	7.7	12.0	4.2	4.0	8.0	0.3

### Quantity per reel

Case Size	Reel Size	
	7"	13"
A	2,000 pcs	10,000 pcs
B	2,000 pcs	7,500 pcs
C, D, E	500 pcs	2,500 pcs
E	400 pcs	2,000 pcs

### Reel



### Reel Dimensions

Case Size	A $+0$ $-3.0$	B $-0$	C $\pm 0.2$	D $\pm 0.8$	E $\pm 0.5$	W $\pm 0.3$	t $\pm 0.5$	R
A, B,	180	60	13.0	21.0	2.0	9.0	2.0	1.0
C, D, E	330	60	13.0	21.0	2.0	13.0	2.0	1.0

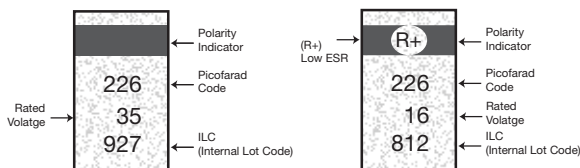
## How To Order

TA	035	TCM	105	M	B	R	-13
Tantalum	Rated Voltage 6.3V-006 (TCM series) 6.3V-6R3 (TCR series) 35V-035	Series TCM TCR	Capacitance in picofarads First two figures are significant. Third is the number of zeros to follow. 1.0 $\mu$ F - 105, 22 $\mu$ F - 226, 100 $\mu$ F - 107	Capacitance Tolerance $\pm 20\%$ : M $\pm 10\%$ : K	Case Code A, B, C, D, E	Packaging Tape	For 13 inch reels add -13, leave blank for standard 7 inch reels

### Marking\*

(1) A, B, C, D, E Case  
(For TCM Series)

(2) A, B, C, D, E Case  
(For TCR Series)



Standard termination finish for this product is 100% matte Tin (Sn)

\* All 6.3V rated Tantalums will typically be marked as 6 or 6V.

All components in this section are RoHS compliant per the EU directives and definitions.

Please Note: Venkel offers Engineering Kits for this product. See page 120 for details.

5900 Shepherd Mountain Cove • Austin, TX 78730  
Phone: 512 / 794-0081 • Fax: 512 / 794-0087 • Toll Free: 800 / 950-8365  
e-mail: sales@venkel.com • www.venkel.com



VENKEL LTD.