

# TANTALUM ELECTROLYTIC CAPACITORS

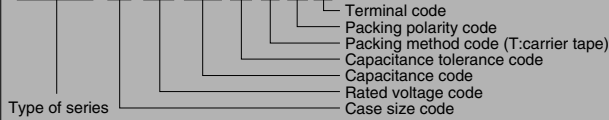
## TMCM Series (Miniaturized Tantalum Chip Capacitors with Extended Capacitance Range)

### Features

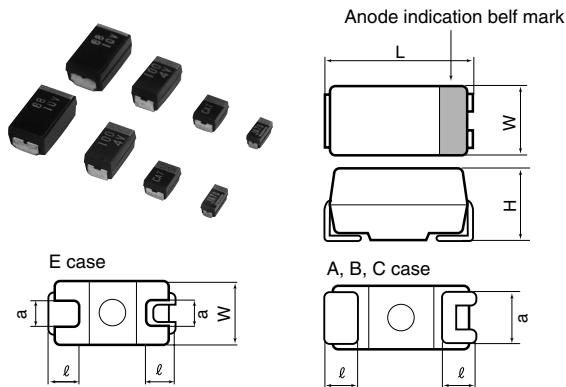
- A model type miniaturized chip capacitor developed on the basis of TMCS production technology ideal for high density component mounting applied in AV equipment.
- Super compact : Reduced size 1/2 to 1/3 in comparison with TMCS.

Product symbol : (Example) TMCM Series A case 7V 10 $\mu$ F  $\pm$ 20%

**TMCM A 0J 106 M T R F**



### Outline of drawings and dimensions



### Dimensions (Unit : mm)

Case code	Case size				
	L $\pm$ 0.2	W $\pm$ 0.2	H $\pm$ 0.2	$\phi$ $\pm$ 0.3	a $\pm$ 0.2
A	3.2	1.6	1.6	0.7	1.2
B	3.5	2.8	1.9	0.8	2.2
C	5.8	3.2	2.5	1.3	2.2
E	7.3	4.3 $\pm$ 0.3	2.8	1.3	2.4

### Standard value and case size

Capacitance	Code	Rated voltage (V.DC)							
		2.5	4	6.3 (7)	10	16	20	25	35
$\mu$ F		0E	0G	0J	1A	1C	1D	1E	1V
0.47	474								A
0.68	684							A	A
1.0	105							A	A
1.5	155							A	B
2.2	225						A	A,B	B
3.3	335					A	A	B	B
4.7	475				A	A	A,B	B	C
6.8	685				A	A	B	C	C
10	106				A	A,B	B,C	C	C,E
15	156		A		A	A,B	C	C,E	E
22	226		A	A	A,B	B,C	C,E	E	E
33	336	A	A	A	B	B,C	(C)E	E	
47	476	A	A	A,B	B,C	C,E	E		
68	686	A,B	A,B	B,C	B,C	E	(E)		
100	107	(A)B,C	(A)B,C	B,C	C	E			
150	157	B,C	B,C	C	E				
220	227	B,C	B,C	C,E	E				
330	337	C,E	C,E	E	(E)				
470	477	E	E	E					

( ): Under Developing

For ratings not covered the table, consult Hitachi AIC.

Product specifications	TMCM				Test conditions JIS C5101-3-1998	
Operating temperature range	-55°C ~ +125°C					
Rated voltage	DC2.5 ~ 35V				85°C	
Surge voltage	DC3.2 ~ 45V				85°C	
Derated voltage	DC1.6 ~ 22V				125°C	
Capacitance	0.47 ~ 470 $\mu$ F					
Capacitance tolerance	$\pm$ 10% or 20%				Paragraph 7.8, 120 Hz	
Leakage current	Refer to table standard product table				Paragraph 7.7, in 5 minutes after the rated voltage is applied.	
tan $\delta$	Refer to table standard product table				Paragraph 7.9, 120Hz	
Surge withstanding voltage	$\Delta$ C/C $\pm$ 5% or less tan $\delta$ Specified initial value or less LC Specified initial value or less				Paragraph 7.14	
Temperature characteristics		Specified initial value	-55	85	125	Paragraph 7.12
$\Delta$ C/C	-	-10 - 0%	0 ~ +10%	0 ~ +12%		
tan $\delta$	0.04	0.09	0.07	0.09		
Leakage current or less	0.06	0.10	0.08	0.10		
	0.08	0.12	0.10	0.12		
	0.10	0.14	0.12	0.14		
	0.12	0.16	0.14	0.16		
	0.16	0.20	0.18	0.20		
	0.18	0.34	0.20	0.22		
LC	0.01CV or 0.5 $\mu$ A or less	-	0.1CV or 5 $\mu$ A or less	0.125CV or 6.25 $\mu$ A or less		
Solder heat resistance	$\Delta$ C/C $\pm$ 5% or less tan $\delta$ Specified initial value or less LC Specified initial value or less				Dip 260 $\pm$ 5°C A, B case C, E case 10 $\pm$ 1 sec. 5 $\pm$ 0.5 sec. Reflow-260°C 10 $\pm$ 1 sec.	
Moisture resistance leaving	$\Delta$ C/C $\pm$ 10% or less tan $\delta$ Specified initial value or less LC Specified initial value or less				Paragraph 9.5, 40°C 90 ~ 95%RH, 500h	
High-temperature load	$\Delta$ C/C $\pm$ 10% or less tan $\delta$ Specified initial value or less LC 125% Specified initial value or less				Paragraph 9.10, 85°C The rated voltage is applied for 2000 hours.	
Thermal shock	$\Delta$ C/C $\pm$ 10% or less tan $\delta$ Specified initial value or less LC Specified initial value or less				Leave at -55°C, normal temperature, 125°C, and normal temperature for 30 min., 3 min., 30 min., and 3 min. Repeat this operation 20 times running.	
Moisture resistance load	$\Delta$ C/C $\pm$ 10% or less tan $\delta$ 150% Specified initial value or less LC 200% Specified initial value or less				40°C, humidity 90 to 95%RH The rated voltage is applied for 500 hours.	
Failure rate	1% / 1000h				85°C. The rated voltage is applied (through a protective resistor of 1 $\Omega$ /V).	

# TANTALUM ELECTROLYTIC CAPACITORS

## Standard product tables - TCM series

Standard product table - TCM series

Rated voltage V. DC	Capacitance μF	tanδ	Leakage current μA	Case code	Product name
2.5	33	0.08	0.8	A	TMCMA0E336
	47	0.12	1.2	A	TMCMA0E476
		0.18	1.7	A	TMCMA0E686
	68	0.08	1.7	B	TMCMB0E686
		(0.18)	(5.0)	(A)	TMCMA0E107
	100	0.12	2.5	B	TMCMB0E107
		0.08	2.5	C	TMCMB0E107
		0.08	3.8	B	TMCMB0E157
	150	0.08	3.8	C	TMCMC0E157
		0.08	3.8	E	TMCME0E157
		0.18	5.5	B	TMCMB0E227
	220	0.08	5.5	C	TMCMC0E227
		0.08	5.5	E	TMCME0E227
		0.18	8.3	C	TMCME0E337
	330	0.10	8.3	E	TMCME0E337
		0.10	11.8	E	TMCME0E477
4	15	0.08	0.6	A	TMCMA0G156
	22	0.08	0.9	A	TMCMA0G226
	33	0.08	1.3	A	TMCMA0G336
	47	0.12	1.9	A	TMCMA0G476
	68	0.12	5.4	A	TMCMA0G686
		0.08	2.7	B	TMCMB0G686
	100	0.12	4.0	B	TMCMB0G107
		0.08	4.0	C	TMCMC0G107
	150	0.18	6.0	B	TMCMB0G157
		0.08	6.0	C	TMCMC0G157
	220	0.18	17.6	B	TMCMB0G227
		0.12	8.8	C	TMCMC0G227
	330	0.18	13.2	C	TMCMC0G337
		0.10	13.2	E	TMCME0G337
	470	0.10	18.8	E	TMCME0G477
	6.3 (7)	22	0.08	1.5	A
33		0.10	2.3	A	TMCMA0J336
		0.12	5.9	A	TMCMA0J476
47		0.08	3.3	B	TMCMB0J476
		0.10	4.8	B	TMCMB0J686
68		0.08	4.8	C	TMCMC0J686
		0.12	7.0	B	TMCMB0J107
100		0.08	7.0	C	TMCMC0J107
		0.10	10.5	C	TMCMC0J157
220		0.18	15.4	C	TMCMC0J227
		0.08	15.4	E	TMCME0J227
330		0.10	23.1	E	TMCME0J337
470	0.20	32.9	E	TMCME0J477	
10	4.7	0.06	0.5	A	TMCMA1A475
	6.8	0.06	0.7	A	TMCMA1A685
	10	0.08	1.0	A	TMCMA1A106
	15	0.08	1.5	A	TMCMA1A156
		0.12	4.4	A	TMCMA1A226
	22	0.08	2.2	B	TMCMB1A226
		0.08	3.3	B	TMCMB1A336
	47	0.10	4.7	B	TMCMB1A476
		0.08	4.7	C	TMCMC1A476
	68	0.08	6.8	C	TMCMC1A686
100	0.10	10.0	C	TMCMC1A107	
220	0.08	22.0	E	TMCME1A227	

Rated voltage V. DC	Capacitance μF	tanδ	Leakage current μA	Case code	Product name
16	3.3	0.06	0.5	A	TMCMA1C335
	4.7	0.06	0.8	A	TMCMA1C475
		0.06	1.1	A	TMCMA1C685
	6.8	0.08	1.6	A	TMCMA1C106
		0.08	1.6	B	TMCMB1C106
	10	0.08	2.4	B	TMCMB1C156
	15	0.08	3.5	B	TMCMB1C226
		0.08	3.5	C	TMCMC1C226
	22	0.08	5.3	C	TMCMC1C336
		0.08	7.5	C	TMCMC1C476
	47	0.08	7.5	E	TMCME1C476
		0.08	10.9	E	TMCME1C686
	68	0.08	16.0	E	TMCME1C107
		100	0.08	16.0	E
20	2.2	0.06	0.5	A	TMCMA1D225
	3.3	0.06	0.7	A	TMCMA1D335
		0.06	0.9	A	TMCMA1D475
	4.7	0.06	0.9	B	TMCMB1D475
		0.06	1.4	B	TMCMB1D685
	6.8	0.08	2.0	B	TMCMB1D106
		0.08	2.0	C	TMCMC1D106
	10	0.08	4.4	C	TMCMC1D226
		0.08	4.4	E	TMCME1D226
	47	0.08	9.4	E	TMCME1D476
25	0.68	0.04	0.5	A	TMCMA1E684
	1.0	0.04	0.5	A	TMCMA1E105
	1.5	0.06	0.5	A	TMCMA1E155
	2.2	0.06	0.6	B	TMCMB1E225
	3.3	0.06	0.8	B	TMCMB1E335
	4.7	0.06	1.2	B	TMCMB1E475
	6.8	0.06	1.7	C	TMCMC1E685
		0.08	2.5	C	TMCMC1E106
	10	0.08	3.8	C	TMCMC1E156
		0.08	3.8	E	TMCME1E156
	22	0.08	5.5	E	TMCME1E226
	33	0.08	8.3	E	TMCME1E336
35	0.47	0.04	0.5	A	TMCMA1V474
	0.68	0.04	0.5	A	TMCMA1V684
	1.0	0.04	0.5	A	TMCMA1V105
	1.5	0.06	0.5	B	TMCMB1V155
	2.2	0.06	0.8	B	TMCMB1V225
	3.3	0.06	1.2	B	TMCMB1V335
	4.7	0.06	1.6	C	TMCMC1V475
		0.06	2.4	C	TMCMC1V685
	6.8	0.08	3.5	C	TMCMC1V106
		0.08	3.5	E	TMCME1V106
	10	0.08	5.3	E	TMCME1V156
		0.08	7.7	E	TMCME1V226

Lot indication

Year	Month											
	1	2	3	4	5	6	7	8	9	10	11	12
2002	N	P	Q	R	S	T	U	V	W	X	Y	Z
2003	a	b	c	d	e	f	g	h	j	k	l	m
2004	n	p	q	r	s	t	u	v	w	x	y	z
2005	A	B	C	D	E	F	G	H	J	K	L	M

Marking indication TCM series

	TCM * △ □ □ □ ○ ○ ○	TCM * △ □ □ □ ○ ○ ○ F
A, B case	<p>Simplified code of rated voltage (G : 4V) Anode indication belt mark Lot indication (for manufacturing in January, 2001) Simplified code of nominal capacitance (A7 : 10μF) *The simplified code is subject to JIS C 5143, paragraph 10 and EIAJ RC-3813, paragraph 7.</p>	<p>Anode indication belt mark Simplified code of rated voltage (G : 4V) Lot indication (for manufacturing in January, 2001) Simplified code of nominal capacitance (A7 : 10μF) *The simplified code is subject to JIS C 5143, paragraph 10 and EIAJ RC-3813, paragraph 7.</p>
C, E case	<p>Nominal capacitance Value (15μF) Anode indication belt mark Lot indication (for manufacturing in January, 2001) Rated voltage (16V)</p>	<p>Anode indication belt mark Nominal capacitance Value (15μF) Lot indication (for manufacturing in January, 2001) Rated voltage (16V)</p>