

## 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.

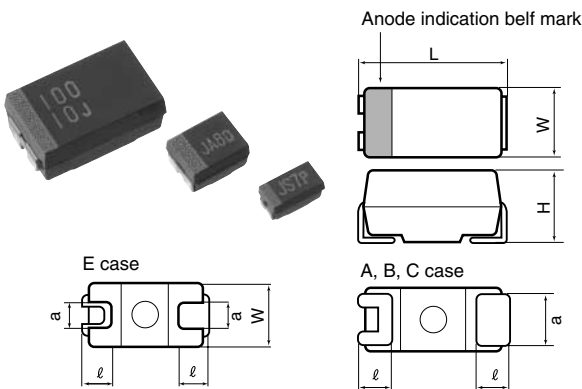
Product symbol : (Example) TMCM Series A case 7V 10 $\mu$ F  $\pm$ 20%

**TMCM A OJ 106 M T R F**

- Terminal code
- Packing polarity code
- Packing method code (T:carrier tape)
- Capacitance tolerance code (M :  $\pm$  20%)
- Capacitance code
- Rated voltage code
- Case size code

Type of series

### Outline of drawings and dimensions



### Dimensions (Unit : mm)

Case code	Case size				
	L $\pm$ 0.2	W $\pm$ 0.2	H $\pm$ 0.2	$\ell$ $\pm$ 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	$\mu$ F	Code	Rated voltage (V.DC)							
			2.5	4	6.3 (7)	10	16	20	25	35
			0E	0G	0J	1A	1C	1D	1E	1V
0.47	474									A
0.68	684								A	A
1.0	105							A	A	A
1.5	155					A	A	A	A	A,B
2.2	225				A	A	A	A,B	A,B	A,B
3.3	335			A	A	A	A,B	A,B	A,B	B
4.7	475		A	A	A	A,B	A,B	A,B	A,B	C
6.8	685	A	A	A	A,B	A,B	A,B	A,B	C,B	C
10	106	A	A	A,B	A,B	A,B	B	C	C	C,E
15	156	A	A,B	A,B	A,B	A,B,C	B,C	C,E	C,E	E
22	226	A,B	A,B	A,B	A,B,C	A,B,C	B,C,E	C,E	C,E	E
33	336	A,B	A,B	A,B,C	A,B,C	B,C,E	C,E	E	E	
47	476	A,B	A,B,C	A,B,C	A,B,C,E	B,C,E	E	E	E	
68	686	A,B,C	A,B,C	A,B,C,E	B,C,E	C,E	E	E	E	
100	107	A,B,C	A,B,C,E	A,B,C,E	B,C,E	C,E				
150	157	A,B,C,E	A,B,C,E	B,C,E	C,E					
220	227	A,B,C,E	A,B,C,E	B,C,E	E					
330	337	B,C,E	B,C,E	C,E	E					
470	477	B,C,E	E	E						

For ratings not covered the table, consult Holy Stone Polytech.

Product specifications	TMCM	Test conditions JIS C5101-1:1998																																																						
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 4.7, 120 Hz																																																						
Leakage current	Refer to table standard product table	Paragraph 4.9, in 5 minutes after the rated voltage is applied.																																																						
tan $\delta$	Refer to table standard product table	Paragraph 4.8, 120Hz																																																						
Temperature characteristics	<table border="1"> <thead> <tr> <th>Specified initial value</th> <th>-55</th> <th>85</th> <th>125</th> </tr> </thead> <tbody> <tr> <td><math>\Delta</math>C/C</td> <td>-</td> <td>-10 ~ 0%</td> <td>0 ~ +10%</td> <td>0 ~ +12%</td> </tr> <tr> <td>tan<math>\delta</math></td> <td>0.04</td> <td>0.09</td> <td>0.07</td> <td>0.09</td> </tr> <tr> <td>Value in table or less</td> <td>0.06</td> <td>0.10</td> <td>0.08</td> <td>0.10</td> </tr> <tr> <td></td> <td>0.08</td> <td>0.12</td> <td>0.10</td> <td>0.12</td> </tr> <tr> <td></td> <td>0.10</td> <td>0.14</td> <td>0.12</td> <td>0.14</td> </tr> <tr> <td></td> <td>0.12</td> <td>0.16</td> <td>0.14</td> <td>0.16</td> </tr> <tr> <td></td> <td>0.16</td> <td>0.20</td> <td>0.18</td> <td>0.20</td> </tr> <tr> <td></td> <td>0.18</td> <td>0.34</td> <td>0.20</td> <td>0.22</td> </tr> <tr> <td></td> <td>0.20</td> <td>0.36</td> <td>0.22</td> <td>0.24</td> </tr> <tr> <td></td> <td>0.30</td> <td>0.60</td> <td>0.30</td> <td>0.40</td> </tr> </tbody> </table>	Specified initial value	-55	85	125	$\Delta$ C/C	-	-10 ~ 0%	0 ~ +10%	0 ~ +12%	tan $\delta$	0.04	0.09	0.07	0.09	Value in table 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		0.20	0.36	0.22	0.24		0.30	0.60	0.30	0.40	Paragraph 4.24
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LC	Refer to standard product table	100% or less / 250% or less specified initial value 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	Solder 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 no load	$\Delta$ C/C $\pm$ 10% or less tan $\delta$ Specified initial value or less LC Specified initial value or less	Paragraph 4.22, 40°C 90 ~ 95%RH,500hours																																																						
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 4.23, 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 5 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% / 1000hours	85°C. The rated voltage is applied (through a protective resistor of 1 $\Omega$ /V).																																																						

※ This catalog is designed for providing general information. Please inquire of our Sales Department to confirm specifications prior to use.

## Standard product tables - TCMC series

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Rated voltage V.DC	Capacitance $\mu F$	$\tan\delta$	Leakage current $\mu A$	Case code	Product name	ESR 100kHz $\Omega$	
2.5	6.8	0.06	0.5	A	TMCMA0E685	4.0	
		0.08	0.5	A	TMCMA0E106	2.0	
		0.08	0.5	A	TMCMA0E156	2.9	
	22	0.08	0.6	A	TMCMA0E226	2.0	
		0.08	0.6	B	TMCMB0E226	1.1	
	33	0.08	0.8	A	TMCMA0E336	2.0	
		0.08	0.8	B	TMCMB0E336	1.1	
	47	0.12	1.2	A	TMCMA0E476	2.0	
		0.08	1.2	B	TMCMB0E476	1.1	
	68	0.18	1.7	A	TMCMA0E686	2.0	
		0.08	1.7	B	TMCMB0E686	1.1	
		0.08	1.7	C	TMCMC0E686	1.1	
	100	0.18	5.0	A	TMCMA0E107	1.1	
		0.12	2.5	B	TMCMB0E107	1.1	
		0.08	2.5	C	TMCMC0E107	1.1	
		0.30	7.5	A	TMCMA0E157	1.8	
	150	0.18	3.8	B	TMCMB0E157	1.1	
		0.08	3.8	C	TMCMC0E157	1.1	
		0.08	3.8	E	TMCME0E157	0.3	
	220	0.30	27.5	A	TMCMA0E227	1.8	
		0.18	5.5	B	TMCMB0E227	1.1	
		0.08	5.5	C	TMCMC0E227	1.1	
		0.08	5.5	E	TMCME0E227	0.3	
	330	0.30	16.5	B	TMCMB0E337	1.1	
		0.18	8.3	C	TMCMC0E337	1.1	
		0.10	8.3	E	TMCME0E337	0.3	
	470	0.30	58.8	B	TMCMB0E477	1.1	
		0.18	11.8	C	TMCMC0E477	1.1	
		0.10	11.8	E	TMCME0E477	0.2	
	4	4.7	0.06	0.5	A	TMCMA0G475	4.0
			0.06	0.5	A	TMCMA0G685	4.0
		10	0.08	0.5	A	TMCMA0G106	2.0
			0.08	0.6	A	TMCMA0G156	2.9
		22	0.08	0.6	B	TMCMB0G156	1.7
			0.08	0.9	A	TMCMA0G226	1.8
		33	0.08	0.9	B	TMCMB0G226	1.1
			0.08	1.3	A	TMCMA0G336	2.0
		47	0.08	1.3	B	TMCMB0G336	1.1
			0.12	1.9	A	TMCMA0G476	2.0
		68	0.08	1.9	B	TMCMB0G476	1.1
			0.08	1.9	C	TMCMC0G476	1.1
			0.12	5.4	A	TMCMA0G686	2.0
		100	0.08	2.7	B	TMCMB0G686	1.1
			0.08	2.7	C	TMCMC0G686	1.1
			0.30	8.0	A	TMCMA0G107	1.1
150		0.12	4.0	B	TMCMB0G107	1.1	
		0.08	4.0	C	TMCMC0G107	1.1	
		0.08	4.0	E	TMCME0G107	0.6	
		0.30	60.0	A	TMCMA0G157	1.8	
220		0.18	6.0	B	TMCMB0G157	1.1	
		0.08	6.0	C	TMCMC0G157	1.1	
		0.08	6.0	E	TMCME0G157	0.3	
		0.30	88.0	A	TMCMA0G227	1.8	
330		0.18	17.6	B	TMCMB0G227	1.1	
		0.12	8.8	C	TMCMC0G227	1.1	
		0.08	8.8	E	TMCME0G227	0.3	
470		0.30	26.4	B	TMCMB0G337	1.1	
		0.18	13.2	C	TMCMC0G337	1.1	
		0.10	13.2	E	TMCME0G337	0.3	
6.3 (7)		3.3	0.06	0.5	A	TMCMA0J335	4.0
			0.06	0.5	A	TMCMA0J475	4.0
			0.06	0.5	A	TMCMA0J685	4.0
		10	0.08	0.7	A	TMCMA0J106	2.9
			0.08	0.7	B	TMCMB0J106	1.7
		15	0.08	1.1	A	TMCMA0J156	4.0
			0.08	1.1	B	TMCMB0J156	1.7
		22	0.08	1.5	A	TMCMA0J226	1.8
			0.08	1.5	B	TMCMB0J226	1.1
		33	0.10	2.3	A	TMCMA0J336	2.0
			0.08	2.3	B	TMCMB0J336	1.1
			0.08	2.3	C	TMCMC0J336	1.1
		47	0.12	5.9	A	TMCMA0J476	1.8
			0.08	3.3	B	TMCMB0J476	1.1

Rated voltage V.DC	Capacitance $\mu F$	$\tan\delta$	Leakage current $\mu A$	Case code	Product name	ESR 100kHz $\Omega$	
6.3 (7)	47	0.08	3.3	C	TMCMC0J476	1.1	
		0.18	8.6	A	TMCMA0J686	2.0	
		0.10	4.8	B	TMCMB0J686	1.1	
		0.08	4.8	C	TMCMC0J686	1.1	
		0.08	4.8	E	TMCME0J686	0.6	
	68	0.30	31.5	A	TMCMA0J107	1.8	
		0.12	7.0	B	TMCMB0J107	1.1	
		0.08	7.0	C	TMCMC0J107	1.1	
		0.08	7.0	E	TMCME0J107	0.6	
		0.18	18.9	B	TMCMB0J157	1.1	
	100	0.10	10.5	C	TMCMC0J157	1.1	
		0.08	10.5	E	TMCME0J157	0.3	
		0.30	27.7	B	TMCMB0J227	1.1	
	220	0.18	15.4	C	TMCMC0J227	1.1	
		0.10	15.4	E	TMCME0J227	0.3	
		0.30	23.1	C	TMCMC0J337	1.1	
	330	0.10	23.1	E	TMCME0J337	0.2	
		0.20	32.9	E	TMCME0J477	0.3	
	10	2.2	0.06	0.5	A	TMCMA1A225	4.4
			0.06	0.5	A	TMCMA1A335	4.0
			0.06	0.5	A	TMCMA1A475	4.0
		4.7	0.06	0.7	A	TMCMA1A685	4.0
			0.06	0.7	B	TMCMB1A685	2.8
		6.8	0.08	1.0	A	TMCMA1A106	2.9
			0.08	1.0	B	TMCMB1A106	1.7
		10	0.08	1.5	A	TMCMA1A156	2.9
			0.08	1.5	B	TMCMB1A156	1.7
15		0.12	4.4	A	TMCMA1A226	2.4	
		0.08	2.2	B	TMCMB1A226	1.1	
		0.08	2.2	C	TMCMC1A226	1.7	
22		0.18	6.6	A	TMCMA1A336	2.0	
		0.08	3.3	B	TMCMB1A336	1.1	
		0.08	3.3	C	TMCMC1A336	1.1	
33		0.20	9.4	A	TMCMA1A476	2.6	
		0.10	4.7	B	TMCMB1A476	1.1	
		0.08	4.7	C	TMCMC1A476	1.1	
47		0.08	4.7	E	TMCME1A476	0.9	
		0.18	6.8	B	TMCMB1A686	1.1	
		0.08	6.8	C	TMCMC1A686	1.1	
68		0.08	6.8	E	TMCME1A686	0.6	
		0.30	20.0	B	TMCMB1A107	1.7	
		0.10	10.0	C	TMCMC1A107	1.1	
100		0.08	10.0	E	TMCME1A107	0.6	
		0.18	15.0	C	TMCMC1A157	1.1	
		0.08	15.0	E	TMCME1A157	0.3	
150	0.12	22.0	E	TMCME1A227	0.2		
	0.30	33.0	E	TMCME1A337	0.3		
16	1.5	0.06	0.5	A	TMCMA1C155	6.6	
		0.06	0.5	A	TMCMA1C225	6.6	
		0.06	0.5	A	TMCMA1C335	4.0	
	3.3	0.06	0.8	A	TMCMA1C475	4.0	
		0.06	0.8	B	TMCMB1C475	2.8	
	4.7	0.06	1.1	A	TMCMA1C685	4.0	
		0.06	1.1	B	TMCMB1C685	2.8	
	6.8	0.08	1.6	A	TMCMA1C106	2.9	
		0.08	1.6	B	TMCMB1C106	1.7	
	10	0.12	2.4	A	TMCMA1C156	2.9	
		0.08	2.4	B	TMCMB1C156	1.7	
		0.08	2.4	C	TMCMC1C156	1.7	
	15	0.16	7.0	A	TMCMA1C226	2.9	
		0.08	3.5	B	TMCMB1C226	1.7	
		0.08	3.5	C	TMCMC1C226	1.1	
	22	0.12	5.3	B	TMCMB1C336	1.1	
		0.08	5.3	C	TMCMC1C336	1.1	
		0.08	5.3	E	TMCME1C336	0.9	
	33	0.20	7.5	B	TMCMB1C476	1.7	
		0.08	7.5	C	TMCMC1C476	2.2	
		0.08	7.5	E	TMCME1C476	0.9	
	47	0.20	10.9	C	TMCMC1C686	1.1	
		0.08	10.9	E	TMCME1C686	0.6	
		0.20	16.0	C	TMCMC1C107	1.7	
	100	0.08	16.0	E	TMCME1C107	0.6	
		1	0.04	0.5	A	TMCMA1D105	6.6
	20	1.5	0.06	0.5	A	TMCMA1D155	4.4

## Standard product table - TCMC series

Rated voltage V.DC	Capacitance μF	tanδ	Leakage current μA	Case code	Product name	ESR 100kHz Ω
20	2.2	0.06	0.5	A	TMCMA1D225	4.4
		0.06	0.7	A	TMCMA1D335	4.0
	3.3	0.06	0.7	B	TMCMB1D335	3.9
		0.06	0.9	A	TMCMA1D475	4.0
	4.7	0.06	0.9	B	TMCMB1D475	2.8
		0.06	1.4	B	TMCMB1D685	2.2
	6.8	0.08	2.0	B	TMCMB1D106	2.2
		0.08	2.0	C	TMCME1D106	1.7
	10	0.08	3.0	B	TMCMB1D156	1.1
		0.08	3.0	C	TMCME1D156	1.7
	15	0.08	4.4	B	TMCMB1D226	1.7
		0.08	4.4	C	TMCME1D226	1.7
		0.08	4.4	E	TMCME1D226	0.9
	22	0.08	6.6	C	TMCME1D336	1.0
		0.08	6.6	E	TMCME1D336	0.9
	33	0.08	9.4	E	TMCME1D476	0.9
		0.08	13.6	E	TMCME1D686	0.5
	25	0.68	0.04	0.5	A	TMCMA1E684
1		0.04	0.5	A	TMCMA1E105	6.6
1.5		0.06	0.5	A	TMCMA1E155	4.4
		0.06	0.6	A	TMCMA1E225	4.4
2.2		0.06	0.6	B	TMCMB1E225	3.9
		0.06	0.8	A	TMCMA1E335	2.8
3.3		0.06	0.8	B	TMCMB1E335	3.9
		0.08	1.2	A	TMCMA1E475	6.6
4.7		0.06	1.2	B	TMCMB1E475	2.8
		0.08	1.7	B	TMCMB1E685	2.8
6.8		0.06	1.7	C	TMCME1E685	1.7
		0.08	2.5	C	TMCME1E106	1.7
10		0.08	3.8	C	TMCME1E156	1.7
		0.08	3.8	E	TMCME1E156	0.9
15		0.08	5.5	C	TMCME1E226	1.1
		0.08	5.5	E	TMCME1E226	0.9
22		0.08	8.3	E	TMCME1E336	0.9
		0.08	11.8	E	TMCME1E476	0.9
35	0.47	0.04	0.5	A	TMCMA1V474	16.5
	0.68	0.04	0.5	A	TMCMA1V684	9.7
	1	0.04	0.5	A	TMCMA1V105	6.6
	1.5	0.06	0.5	A	TMCMA1V155	4.4
		0.06	0.5	B	TMCMB1V155	3.9
	2.2	0.08	0.8	A	TMCMA1V225	4.4
		0.06	0.8	B	TMCMB1V225	5.5
	3.3	0.06	1.2	B	TMCMB1V335	3.9
		0.06	1.6	C	TMCME1V475	2.8
	4.7	0.06	2.4	C	TMCME1V685	1.7
		0.08	3.5	C	TMCME1V106	1.7
	6.8	0.08	3.5	E	TMCME1V106	1.1
		0.08	5.3	E	TMCME1V156	0.9
	10	0.08	7.7	E	TMCME1V226	0.9

## Marking code

Month	1	2	3	4	5	6	7	8	9	10	11	12
Year												
2011	a	b	c	d	e	f	g	h	j	k	l	m
2012	n	p	q	r	s	t	u	v	w	x	y	z
2013	A	B	C	D	E	F	G	H	J	K	L	M
2014	N	P	Q	R	S	T	U	V	W	X	Y	Z

## Marking indication TCMC series

TCMC * △ □ □ □ ○ ○ ○ F	
A, B case	<p>① Anode indication belt mark ② Simplified code of rated voltage (G : 4V) ③ Simplified code of nominal capacitance (A7 : 10μF) ④ Marking code</p>
C, E case	<p>① Anode indication belt mark ② Nominal capacitance Value (15μF) ③ Rated voltage (16V) ④ Marking code</p>