

Chip Solid MnO₂ Tantalum Capacitors – TC2 Series

Operating temp. : -55°C ~ +125°C



- FEATURES**
- ◆ Meets or exceeds EIA-535BAAC standard
 - ◆ Self-healing capability, high reliability
 - ◆ Excellent stability of capacitance during operating temperature range
 - ◆ High volumetric efficiency
 - ◆ 100% surge current test

- APPLICATIONS**
- ◆ Communication
 - ◆ Consumer electronics
 - ◆ Instruments
 - ◆ Medical electronics

PRODUCT IDENTIFICATION



1 Type

TC	Solid Tantalum Chip Capacitor
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2 Series

211	Industrial
212	Low ESR

3 External Dimensions (L×W) (mm)

A	3.2×1.6
B	3.5×2.8
C	6.0×3.2
D/E	7.3×4.3

4 Nominal Capacitance

Example	Nominal Value
105	1.0μF
106	1.0μF

6 Rated DC Voltage

002	2.5Vdc
004	4Vdc
006	6.3Vdc
010	10Vdc
016	16Vdc
020	20Vdc
025	25Vdc
035	35Vdc
050	50Vdc

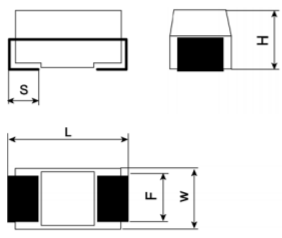
5 Capacitance Tolerance

K	±10%
M	±20%

7 Internal Code

B	Black Molded Case, Laser Marking
Y	Yellow Molded Case, Laser Marking

SHAPE AND DIMENSIONS



Unit: mm [inch]

Case	EIA	L	W	H	F	S
A	3216-18	3.20±0.20 [.126±.008]	1.60±0.20 [.063±.008]	1.60±0.20 [.063±.008]	1.20±0.10 [.040±.004]	0.80±0.30 [.031±.012]
B	3528-21	3.50±0.20 [.138±.008]	2.80±0.20 [.110±.008]	1.90±0.20 [.075±.008]	2.20±0.10 [.087±.004]	0.80±0.30 [.030±.012]
C	6032-28	6.00±0.30 [.236±.012]	3.20±0.30 [.126±.012]	2.50±0.30 [.098±.012]	2.20±0.10 [.087±.004]	1.30±0.30 [.051±.012]
D	7343-31	7.30±0.30 [.287±.012]	4.30±0.30 [.169±.012]	4.30±0.30 [.169±.012]	2.40±0.10 [.094±.004]	1.30±0.30 [.051±.012]
E	7343-43	7.30±0.30 [.287±.012]	4.30±0.30 [.169±.012]	4.00±0.30 [.161±.012]	2.40±0.10 [.094±.004]	1.30±0.30 [.051±.012]

Chip Solid MnO₂ Tantalum Capacitor
Chip Solid Polymer Tantalum Capacitor
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TECHNICAL SPECIFICATION

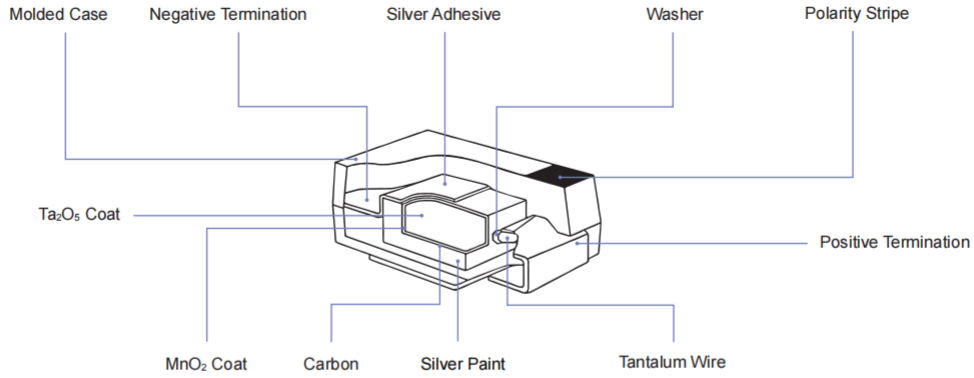
Item	SPEC										Test Condition
Operating Temp	-55°C ~+125°C										/
C _R Range	0.15μF~680μF										25°C , 120Hz
C _R Tolerance	±10% or ±20%										25°C , 120Hz
Rated Voltage (V _R)	2.5V	4V	6.3V	10V	16V	20V	25V	35V	50V	85°C	
Category Voltage (V _C)	1.6V	2.5V	4V	6.3V	10V	13V	16V	20V	32V	125°C	
Surge Voltage (V _S)	3.3V	5.2V	8V	13V	20V	26V	32V	46V	65V	85°C	
Surge Voltage (V _S)	2.2V	3.4V	5V	8V	13V	16V	20V	28V	40V	125°C	

STANDARD C-V VALUE BY CASE CODE

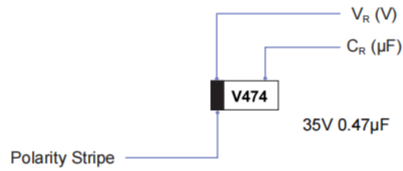
Rated Voltage (V _R)	2.5	4	6.3	10	16	20	25	35	50	
Voltage Code	e	G	J	A	C	D	E	V	T	
C _R (μF)	C Code	Case Code								
0.15	154								B	
0.22	224								B/A	
0.33	334						A	A	B/A	
0.47	474						A	B/A	C/B/A	
0.68	684					A	A	B/A	C/B/A	
1.0	105			A	A	A	A	B/A	B/A	C/B
1.5	155			A	A	A	B/A	B/A	C/B	C/B
2.2	225		A	A	A	B/A	B/A	C/B/A	C/B/A	D/C/B
3.3	335		A	A	A	B/A	B/A	C/B/A	C/B	D/C/B
4.7	475		A	A	B/A	C/B/A	C/B/A	C/B/A	D/C/B	D
6.8	685		A	B/A	B/A	C/B/A	D/C/B/A	D/C/B	D/C	D
10	106	A	B/A	B/A	C/B/A	C/B/A	D/C/B	D/C/B	E/D/C	E/D
15	156	B/A	B/A	B/A	C/B/A	C/B	D/C	D/C/B	E/D	E
22	226	A	B/A	B/A	C/B/A	D/C/B/A	D/C/B	D/C	E/D	
33	336	A	C/B/A	C/B/A	D/C/B/A	D/C/B	D/C	E/D	E	
47	476	A	C/B/A	C/B/A	D/C/B/A	D/C/B	E/D/C	E/D	E	
68	686	B/A	D/C/B	D/C/B	D/C/B	D	E/D	E		
100	107	B/A	D/C/B/A	D/C/B/A	D/C/B	D/C	E/D			
150	157	B	D/C/B	D/C/B	E/D/C	E/D	E			
220	227	B	D/C/B	E/D/C	E/D	E/D				
330	337		E/D/C/B	E/D	E/D	E				
470	477		E	E/D	E					
680	687		E							

※: The first case code is standard product and the others are expansion products.

CONSTRUCTION



MARKING



A/B/C/D/E Case Marking

Rated Voltage Code

Rated Voltage (V _R)	2.5	4	6.3	10	16	20	25	35	50
Code	e	G	J	A	C	D	E	V	T

Capacitance Code

Capacitance (μF)	0.1	0.15	0.22	0.33	0.47	0.68	1.0	1.5	2.2	3.3	4.7	6.8
Code (A/B/C/D/E Case)	104	154	224	334	474	684	105	155	225	335	475	685
Capacitance (μF)	10	15	22	33	47	68	100	150	220	330	470	680
Code (A/B/C/D/E Case)	106	156	226	336	476	686	107	157	227	337	477	687

SPECIFICATIONS

TC211 TYPE

Rated Cap (uF)	Case	Part Number	DCL(μA) +25°C Max.	DF(%) +25°C 120Hz Max.	ESR(Ω) +25°C 100kHz Max.	Rated Cap (uF)	Case	Part Number	DCL(μA) +25°C Max.	DF(%) +25°C 120Hz Max.	ESR(Ω) +25°C 100kHz Max.
2.5V, +85°C (1.6V @ +125°C)											
10	A	TC211A106	0.5	6.0	5.0	1.5	A	TC211A155	0.5	6.0	8.0
15	A	TC211A156	0.5	6.0	6.0	2.2	A	TC211A225	0.5	6.0	8.0
15	B	TC211B156	0.5	6.0	4.0	3.3	A	TC211A335	0.5	6.0	8.0
22	A	TC211A226	0.6	6.0	4.0	4.7	A	TC211A475	0.5	6.0	6.0
33	A	TC211A336	0.8	6.0	4.0	6.8	A	TC211A685	0.5	6.0	6.0
47	A	TC211A476	1.2	10.0	4.0	6.8	B	TC211B685	0.5	6.0	3.5
68	A	TC211A686	1.7	10.0	3.0	10	A	TC211A106	0.6	6.0	4.0
68	B	TC211B686	1.7	6.0	2.0	10	B	TC211B106	0.6	6.0	3.5
100	A	TC211A107	2.5	20.0	2.5	15	A	TC211A156	0.9	6.0	4.0
100	B	TC211B107	2.5	8.0	1.5	15	B	TC211B156	0.9	6.0	3.5
150	B	TC211B157	3.8	10.0	2.0	22	A	TC211A226	1.3	6.0	4.0
220	B	TC211B227	5.5	18.0	2.0	22	B	TC211B226	1.3	6.0	3.5
4V, +85°C (2.5V @ +125°C)											
2.2	A	TC211A225	0.5	6.0	8.0	33	A	TC211A336	2.1	8.0	4.5
3.3	A	TC211A335	0.5	6.0	8.0	33	B	TC211B336	2.1	6.0	3.0
4.7	A	TC211A475	0.5	6.0	8.0	33	C	TC211C336	2.1	6.0	1.8
6.8	A	TC211A685	0.5	6.0	6.0	47	A	TC211A476	3.0	8.0	3.5
10	A	TC211A106	0.5	6.0	6.0	47	B	TC211B476	3.0	6.0	3.0
10	B	TC211B106	0.5	6.0	3.5	47	C	TC211C476	3.0	6.0	1.6
15	A	TC211A156	0.6	6.0	4.0	68	B	TC211B686	4.3	10.0	1.2
15	B	TC211B156	0.6	6.0	3.5	68	C	TC211C686	4.3	6.0	1.2
22	A	TC211A226	0.9	6.0	4.0	68	D	TC211D686	4.3	6.0	0.8
22	B	TC211B226	0.9	6.0	3.5	100	A	TC211A107	6.3	20.0	4.0
33	A	TC211A336	1.3	6.0	4.0	100	B	TC211B107	6.3	10.0	3.0
33	B	TC211B336	1.3	6.0	3.5	100	C	TC211C107	6.3	8.0	1.2
33	C	TC211C336	1.3	6.0	1.8	100	D	TC211D107	6.3	8.0	0.8
47	A	TC211A476	1.9	6.0	3.0	150	B	TC211B157	9.5	15.0	1.0
47	B	TC211B476	1.9	6.0	3.0	150	C	TC211C157	9.5	8.0	1.2
47	C	TC211C476	1.9	6.0	1.8	150	D	TC211D157	9.5	8.0	0.8
68	B	TC211B686	2.7	6.0	3.5	220	B	TC211B227	39.9	18.0	1.0
68	C	TC211C686	2.7	6.0	1.6	220	C	TC211C227	13.9	8.0	1.2
68	D	TC211D686	2.7	6.0	0.8	220	D	TC211D227	13.9	8.0	0.7
100	A	TC211A107	4.0	18.0	5.0	220	E	TC211E227	13.9	8.0	0.5
100	B	TC211B107	4.0	8.0	2.0	330	D	TC211D337	20.8	8.0	0.5
100	C	TC211C107	4.0	8.0	1.3	330	E	TC211E337	20.8	8.0	0.5
100	D	TC211D107	4.0	8.0	0.8	470	D	TC211D477	29.6	12.0	0.4
150	B	TC211B157	6.0	15.0	2.0	470	E	TC211E477	29.6	10.0	0.5
150	C	TC211C157	6.0	8.0	1.2	10V, +85°C (6.3V @ +125°C)					
150	D	TC211D157	6.0	8.0	0.8	1.0	A	TC211A105	0.5	4.0	13.0
220	B	TC211B227	8.8	18.0	0.5	1.5	A	TC211A155	0.5	6.0	8.0
220	C	TC211C227	8.8	8.0	1.0	2.2	A	TC211A225	0.5	6.0	8.0
220	D	TC211D227	8.8	8.0	0.8	3.3	A	TC211A335	0.5	6.0	6.0
330	B	TC211B337	13.2	18.0	1.2	4.7	A	TC211A475	0.5	6.0	6.0
330	C	TC211C337	13.2	8.0	1.2	4.7	B	TC211B475	0.5	6.0	3.5
330	D	TC211D337	13.2	8.0	0.7	6.8	A	TC211A685	0.7	6.0	6.0
330	E	TC211E337	13.2	8.0	0.8	6.8	B	TC211B685	0.7	6.0	3.5
470	E	TC211E477	18.8	8.0	0.8	10	A	TC211A106	1.0	6.0	4.0
680	E	TC211E687	27.2	8.0	0.5	10	B	TC211B106	1.0	6.0	3.5
6.3V, +85°C (4.0V @ +125°C)											
1	A	TC211A105	0.5	6.0	14.0	10	C	TC211C106	1.0	6.0	1.8
						15	A	TC211A156	1.5	6.0	6.0
						15	B	TC211B156	1.5	6.0	3.5
						15	C	TC211C156	1.5	6.0	1.8

SPECIFICATIONS

TC211 TYPE

Rated Cap (uF)	Case	Part Number	DCL(μA) +25°C Max.	DF(%) +25°C 120Hz Max.	ESR(Ω) +25°C 100kHz Max.
22	A	TC211A226	2.2	8.0	4.0
22	B	TC211B226	2.2	6.0	3.3
22	C	TC211C226	2.2	6.0	1.8
33	A	TC211A336	3.3	15.0	6.0
33	B	TC211B336	3.3	6.0	3.5
33	C	TC211C336	3.3	6.0	1.6
33	D	TC211D336	3.3	6.0	0.8
47	A	TC211A476	4.7	15.0	4.0
47	B	TC211B476	4.7	6.0	1.0
47	C	TC211C476	4.7	6.0	1.2
47	D	TC211D476	4.7	6.0	0.8
68	B	TC211B686	6.8	10.0	3.0
68	C	TC211C686	6.8	6.0	1.2
68	D	TC211D686	6.8	6.0	0.8
100	B	TC211B107	10.0	15.0	1.5
100	C	TC211C107	10.0	8.0	1.2
100	D	TC211D107	10.0	8.0	0.7
150	C	TC211C157	15.0	10.0	0.9
150	D	TC211D157	15.0	8.0	0.7
150	E	TC211E157	15.0	8.0	0.5
220	D	TC211D227	22.0	8.0	0.5
220	E	TC211E227	22.0	8.0	0.5
330	D	TC211D337	33.0	10.0	0.5
330	E	TC211E337	33.0	10.0	0.5
470	E	TC211E477	47.0	10.0	0.5
16V, +85°C (10V @ +125°C)					
1	A	TC211A105	0.5	4.0	10.0
1.5	A	TC211A155	0.5	6.0	8.0
2.2	A	TC211A225	0.5	6.0	6.0
2.2	B	TC211B225	0.5	6.0	4.0
3.3	A	TC211A335	0.52	6.0	6.0
3.3	B	TC211B335	0.5	6.0	3.5
4.7	A	TC211A475	0.8	6.0	6.0
4.7	B	TC211B475	0.8	6.0	3.5
4.7	C	TC211C475	0.8	6.0	2.4
6.8	A	TC211A685	1.1	6.0	7.0
6.8	B	TC211B685	1.1	6.0	3.5
6.8	C	TC211C685	1.1	6.0	2.0
10	A	TC211A106	1.6	8.0	7.0
10	B	TC211B106	1.6	6.0	2.8
10	C	TC211C106	1.6	6.0	1.8
15	B	TC211B156	2.4	6.0	3.0
15	C	TC211C156	2.4	6.0	1.8
22	A	TC211A226	3.5	15.0	4.0
22	B	TC211B226	3.5	8.0	2.2
22	C	TC211C226	3.5	6.0	1.6
22	D	TC211D226	3.5	6.0	0.8
33	B	TC211B336	5.3	8.0	2.0
33	C	TC211C336	5.3	6.0	1.2
33	D	TC211D336	5.3	6.0	0.8
47	B	TC211B476	7.5	18.0	1.0

Rated Cap (uF)	Case	Part Number	DCL(μA) +25°C Max.	DF(%) +25°C 120Hz Max.	ESR(Ω) +25°C 100kHz Max.
47	C	TC211C476	7.5	6.0	1.2
47	D	TC211D476	7.5	6.0	0.8
68	D	TC211D686	10.8	6.0	0.8
100	C	TC211C107	16.0	10.0	1.0
100	D	TC211D107	16.0	8.0	0.7
150	D	TC211D157	24.0	12.0	0.7
150	E	TC211E157	24.0	8.0	0.5
220	D	TC211D227	35.2	15.0	0.9
220	E	TC211E227	35.2	10.0	0.5
330	E	TC211E337	52.8	10.0	0.5
20V, +85°C (13V @ +125°C)					
0.68	A	TC211A684	0.5	4.0	12.0
1	A	TC211A105	0.5	4.0	10.0
1.5	A	TC211A155	0.5	6.0	8.0
1.5	B	TC211B155	0.5	6.0	5.0
2.2	A	TC211A225	0.5	6.0	7.0
2.2	B	TC211B225	0.5	6.0	3.5
3.3	A	TC211A335	0.7	6.0	7.0
3.3	B	TC211B335	0.7	6.0	3.5
4.7	A	TC211A475	0.9	6.0	4.0
4.7	B	TC211B475	0.9	6.0	3.5
4.7	C	TC211C475	0.9	6.0	2.4
6.8	A	TC211A685	1.4	8.0	6.0
6.8	B	TC211B685	1.4	6.0	3.5
6.8	C	TC211C685	1.4	6.0	2.0
6.8	D	TC211D685	1.4	6.0	1.9
10	B	TC211B106	2.0	6.0	3.0
10	C	TC211C106	2.0	6.0	1.8
10	D	TC211D106	2.0	6.0	1.0
15	C	TC211C156	3.0	6.0	1.7
15	D	TC211D156	3.0	6.0	1.0
22	B	TC211B226	4.4	8.0	4.0
22	C	TC211C226	4.4	6.0	1.2
22	D	TC211D226	4.4	6.0	0.8
33	C	TC211C336	6.6	6.0	1.2
33	D	TC211D336	6.6	6.0	0.8
47	C	TC211C476	9.4	10.0	1.0
47	D	TC211D476	9.4	6.0	0.8
47	E	TC211E476	9.4	6.0	0.8
68	D	TC211D686	13.6	6.0	0.8
68	E	TC211E686	13.6	6.0	0.8
100	D	TC211D107	20.0	8.0	0.6
100	E	TC211E107	20.0	8.0	0.5
150	E	TC211E157	30.0	8.0	0.5
25V, +85°C (16V @ +125°C)					
0.33	A	TC211A334	0.5	4.0	15.0
0.47	A	TC211A474	0.5	4.0	14.0
0.68	A	TC211A684	0.5	4.0	10.0
1	A	TC211A105	0.5	4.0	8.0
1	B	TC211B105	0.5	4.0	5.0
1.5	A	TC211A155	0.5	6.0	10.0

Chip Solid MnO2
Tantalum Capacitor
Chip Solid Polymer
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Chip Solid MnO2
Tantalum Capacitor
Chip Solid Polymer
Tantalum Capacitor

SPECIFICATIONS

TC211 TYPE

Rated Cap (uF)	Case	Part Number	DCL(μA) +25°C Max.	DF(%) +25°C 120Hz Max.	ESR(Ω) +25°C 100kHz Max.
1.5	B	TC211B155 Ⓞ 025 □	0.5	6.0	5.0
2.2	A	TC211A225 Ⓞ 025 □	0.6	6.0	6.0
2.2	B	TC211B225 Ⓞ 025 □	0.6	6.0	4.5
2.2	C	TC211C225 Ⓞ 025 □	0.6	6.0	3.5
3.3	A	TC211A335 Ⓞ 025 □	0.8	6.0	7.0
3.3	B	TC211B335 Ⓞ 025 □	0.8	6.0	3.5
3.3	C	TC211C335 Ⓞ 025 □	0.8	6.0	2.5
4.7	A	TC211A475 Ⓞ 025 □	1.2	8.0	6.0
4.7	B	TC211B475 Ⓞ 025 □	1.2	6.0	2.0
4.7	C	TC211C475 Ⓞ 025 □	1.2	6.0	2.4
6.8	B	TC211B685 Ⓞ 025 □	1.7	6.0	3.0
6.8	C	TC211C685 Ⓞ 025 □	1.7	6.0	1.9
6.8	D	TC211D685 Ⓞ 025 □	1.7	6.0	1.2
10	B	TC211B106 Ⓞ 025 □	2.5	6.0	3.0
10	C	TC211C106 Ⓞ 025 □	2.5	6.0	1.5
10	D	TC211D106 Ⓞ 025 □	2.5	6.0	1.0
15	B	TC211B156 Ⓞ 025 □	3.8	8.0	4.0
15	C	TC211C156 Ⓞ 025 □	3.8	6.0	1.5
15	D	TC211D156 Ⓞ 025 □	3.8	6.0	1.0
22	C	TC211C226 Ⓞ 025 □	5.5	6.0	1.4
22	D	TC211D226 Ⓞ 025 □	5.5	6.0	0.8
33	D	TC211D336 Ⓞ 025 □	8.3	6.0	0.8
33	E	TC211E336 Ⓞ 025 □	8.3	6.0	0.7
47	D	TC211D476 Ⓞ 025 □	11.7	6.0	0.8
47	E	TC211E476 Ⓞ 025 □	11.7	6.0	0.7
68	E	TC211E686 Ⓞ 025 □	17.0	6.0	0.7
35V, +85°C (20V @ +125°C)					
0.33	A	TC211A334 Ⓞ 035 □	0.5	4.0	15.0
0.47	A	TC211A474 Ⓞ 035 □	0.5	4.0	14.0
0.47	B	TC211B474 Ⓞ 035 □	0.5	4.0	8.0
0.68	A	TC211A684 Ⓞ 035 □	0.5	4.0	10.0
0.68	B	TC211B684 Ⓞ 035 □	0.5	4.0	6.5
1	A	TC211A105 Ⓞ 035 □	0.5	4.0	10.0
1	B	TC211B105 Ⓞ 035 □	0.5	4.0	5.0
1.5	B	TC211B155 Ⓞ 035 □	0.5	6.0	5.0
1.5	C	TC211C155 Ⓞ 035 □	0.5	6.0	4.5
2.2	A	TC211A225 Ⓞ 035 □	0.8	6.0	6.0
2.2	B	TC211B225 Ⓞ 035 □	0.8	6.0	4.0
2.2	C	TC211C225 Ⓞ 035 □	0.8	6.0	3.5
3.3	B	TC211B335 Ⓞ 035 □	1.2	6.0	3.5
3.3	C	TC211C335 Ⓞ 035 □	1.2	6.0	2.5

Rated Cap (uF)	Case	Part Number	DCL(μA) +25°C Max.	DF(%) +25°C 120Hz Max.	ESR(Ω) +25°C 100kHz Max.
4.7	B	TC211B475 Ⓞ 035 □	1.6	6.0	3.0
4.7	C	TC211C475 Ⓞ 035 □	1.6	6.0	2.5
4.7	D	TC211D475 Ⓞ 035 □	1.6	6.0	1.5
6.8	C	TC211C685 Ⓞ 035 □	2.4	6.0	2.0
6.8	D	TC211D685 Ⓞ 035 □	2.4	6.0	1.5
10	C	TC211C106 Ⓞ 035 □	3.5	6.0	2.0
10	D	TC211D106 Ⓞ 035 □	3.5	6.0	1.0
10	E	TC211E106 Ⓞ 035 □	3.5	6.0	1.0
15	D	TC211D156 Ⓞ 035 □	5.3	6.0	1.0
15	E	TC211E156 Ⓞ 035 □	5.3	6.0	0.9
22	D	TC211D226 Ⓞ 035 □	7.7	6.0	0.8
22	E	TC211E226 Ⓞ 035 □	7.7	6.0	0.7
33	E	TC211E336 Ⓞ 035 □	11.0	6.0	0.6
47	E	TC211E476 Ⓞ 035 □	16.5	8.0	0.6
50V, +85°C (32V @ +125°C)					
0.15	B	TC211B154 Ⓞ 050 □	0.5	4.0	16.0
0.22	A	TC211A224 Ⓞ 050 □	0.5	4.0	18.0
0.22	B	TC211B224 Ⓞ 050 □	0.5	4.0	14.0
0.33	A	TC211A334 Ⓞ 050 □	0.5	4.0	15.0
0.33	B	TC211B334 Ⓞ 050 □	0.5	4.0	10.0
0.47	A	TC211A474 Ⓞ 050 □	0.5	4.0	12.0
0.47	B	TC211B474 Ⓞ 050 □	0.5	4.0	9.0
0.47	C	TC211C474 Ⓞ 050 □	0.5	4.0	8.0
0.68	A	TC211A684 Ⓞ 050 □	0.5	4.0	10.0
0.68	B	TC211B684 Ⓞ 050 □	0.5	4.0	8.0
0.68	C	TC211C684 Ⓞ 050 □	0.5	4.0	7.0
1	B	TC211B105 Ⓞ 050 □	0.5	6.0	6.0
1	C	TC211C105 Ⓞ 050 □	0.5	4.0	5.5
1.5	B	TC211B155 Ⓞ 050 □	0.8	6.0	4.5
1.5	C	TC211C155 Ⓞ 050 □	0.8	6.0	3.5
2.2	B	TC211B225 Ⓞ 050 □	1.1	6.0	2.0
2.2	C	TC211C225 Ⓞ 050 □	1.1	6.0	3.5
2.2	D	TC211D225 Ⓞ 050 □	1.1	6.0	2.5
3.3	B	TC211B335 Ⓞ 050 □	1.7	6.0	5.0
3.3	C	TC211C335 Ⓞ 050 □	1.7	6.0	3.0
3.3	D	TC211D335 Ⓞ 050 □	1.7	6.0	2.0
4.7	D	TC211D475 Ⓞ 050 □	2.4	6.0	1.5
6.8	D	TC211D685 Ⓞ 050 □	3.4	6.0	1.2
10	D	TC211D106 Ⓞ 050 □	5.0	6.0	1.0
10	E	TC211E106 Ⓞ 050 □	5.0	6.0	0.7
15	E	TC211E156 Ⓞ 050 □	7.5	6.0	0.7

SPECIFICATIONS

TC212 TYPE

Rated Cap (uF)	Case	Part Number	DCL(μA) +25°C Max.	DF(%) +25°C 120Hz Max.	ESR(Ω) +25°C 100kHz Max.
2.5V, +85°C (1.6V @ +125°C)					
10	A	TC212A106	0.5	6.0	4.0
15	A	TC212A156	0.5	6.0	4.0
15	B	TC212B156	0.5	6.0	3.0
22	A	TC212A226	0.6	6.0	3.0
33	A	TC212A336	0.8	6.0	3.0
47	A	TC212A476	1.2	10.0	3.0
68	A	TC212A686	1.7	10.0	2.5
68	B	TC212B686	1.7	6.0	1.8
100	A	TC212A107	2.5	20.0	2.0
100	B	TC212B107	2.5	8.0	1.0
150	B	TC212B157	3.8	10.0	1.5
220	B	TC212B227	5.5	18.0	1.5
4V, +85°C (2.5V @ +125°C)					
2.2	A	TC212A225	0.5	6.0	6.0
3.3	A	TC212A335	0.4	5.0	6.0
4.7	A	TC212A475	0.5	6.0	5.0
6.8	A	TC212A685	0.5	6.0	4.0
10	A	TC212A106	0.5	6.0	3.0
10	B	TC212B106	0.5	6.0	1.5
15	A	TC212A156	0.6	6.0	1.5
15	B	TC212B156	0.6	6.0	1.2
22	A	TC212A226	0.9	6.0	1.5
22	B	TC212B226	0.9	6.0	0.6
33	A	TC212A336	1.3	6.0	2.5
33	B	TC212B336	1.3	6.0	0.5
33	C	TC212C336	1.3	6.0	0.8
47	A	TC212A476	1.9	6.0	2.0
47	B	TC212B476	1.9	6.0	0.8
47	C	TC212C476	1.9	6.0	1.0
68	B	TC212B686	2.7	6.0	2.5
68	C	TC212C686	2.7	6.0	0.5
68	D	TC212D686	2.7	6.0	0.5
100	A	TC212A107	4.0	18.0	3.0
100	B	TC212B107	4.0	8.0	1.0
100	C	TC212C107	4.0	8.0	0.35
100	D	TC212D107	4.0	8.0	0.2
150	B	TC212B157	6.0	15.0	1.0
150	C	TC212C157	6.0	8.0	0.3
150	D	TC212D157	6.0	8.0	0.2
220	B	TC212B227	8.8	18.0	0.4
220	C	TC212C227	8.8	8.0	0.5
220	D	TC212D227	8.8	8.0	0.3
330	B	TC212B337	13.2	18.0	0.7
330	C	TC212C337	13.2	8.0	0.8
330	D	TC212D337	13.2	8.0	0.2
330	E	TC212E337	13.2	8.0	0.2
470	E	TC212E477	18.8	8.0	0.2
680	E	TC212E687	27.2	8.0	0.2
6.3V, +85°C (4.0V @ +125°C)					
1	A	TC212A105	0.5	6.0	10.0

Rated Cap (uF)	Case	Part Number	DCL(μA) +25°C Max.	DF(%) +25°C 120Hz Max.	ESR(Ω) +25°C 100kHz Max.
1.5	A	TC212A155	0.5	6.0	6.0
2.2	A	TC212A225	0.5	6.0	6.0
3.3	A	TC212A335	0.5	6.0	6.0
4.7	A	TC212A475	0.5	6.0	4.0
6.8	A	TC212A685	0.5	6.0	3.5
6.8	B	TC212B685	0.5	6.0	3.0
10	A	TC212A106	0.6	6.0	2.0
10	B	TC212B106	0.6	6.0	1.0
15	A	TC212A156	0.9	6.0	2.0
15	B	TC212B156	0.9	6.0	0.7
22	A	TC212A226	1.4	6.0	2.5
22	B	TC212B226	1.4	6.0	0.8
33	A	TC212A336	2.1	8.0	1.5
33	B	TC212B336	2.1	6.0	0.8
33	C	TC212C336	2.1	6.0	0.3
47	A	TC212A476	2.9	8.0	2.5
47	B	TC212B476	2.9	6.0	0.5
47	C	TC212C476	2.9	6.0	0.3
68	B	TC212B686	4.3	10.0	0.65
68	C	TC212C686	4.3	6.0	0.3
68	D	TC212D686	4.3	6.0	0.2
100	A	TC212A107	6.3	20.0	2.0
100	B	TC212B107	6.3	10.0	1.5
100	C	TC212C107	6.3	8.0	0.3
100	D	TC212D107	6.3	8.0	0.2
150	B	TC212B157	9.5	15.0	0.6
150	C	TC212C157	9.5	8.0	0.3
150	D	TC212D157	9.5	8.0	0.2
220	B	TC212B227	39.9	18.0	0.7
220	C	TC212C227	13.9	8.0	0.3
220	D	TC212D227	13.9	8.0	0.15
220	E	TC212E227	13.9	8.0	0.15
330	D	TC212D337	20.8	8.0	0.15
330	E	TC212E337	20.8	8.0	0.15
470	D	TC212D477	29.6	12.0	0.15
470	E	TC212E477	29.6	10.0	0.12
10V, +85°C (6.3V @ +125°C)					
1	A	TC212A105	0.5	4.0	8.0
1.5	A	TC212A155	0.5	6.0	6.0
2.2	A	TC212A225	0.5	6.0	6.0
3.3	A	TC212A335	0.5	6.0	4.0
4.7	A	TC212A475	0.5	6.0	3.0
4.7	B	TC212B475	0.5	6.0	1.5
6.8	A	TC212A685	0.7	6.0	3.0
6.8	B	TC212B685	0.7	6.0	1.2
10	A	TC212A106	1.0	6.0	1.8
10	B	TC212B106	1.0	6.0	0.8
10	C	TC212C106	1.0	6.0	0.6
15	A	TC212A156	1.5	6.0	4.0
15	B	TC212B156	1.5	6.0	0.7
15	C	TC212C156	1.5	6.0	0.5

Chip Solid MnO2 Tantalum Capacitor
Chip Solid Polymer Tantalum Capacitor
Chip Solid MnO2 Tantalum Capacitor
Chip Solid Polymer Tantalum Capacitor

SPECIFICATIONS

TC212 TYPE

Rated Cap (uF)	Case	Part Number	DCL(μA) +25°C Max.	DF(%) +25°C 120Hz Max.	ESR(Ω) +25°C 100kHz Max.
22	A	TC212A226 Ⓞ 010 □	2.2	8.0	2.5
22	B	TC212B226 Ⓞ 010 □	2.2	6.0	1.0
22	C	TC212C226 Ⓞ 010 □	2.2	6.0	0.4
33	A	TC212A336 Ⓞ 010 □	3.3	15.0	4.0
33	B	TC212B336 Ⓞ 010 □	3.3	6.0	1.0
33	C	TC212C336 Ⓞ 010 □	3.3	6.0	0.4
33	D	TC212D336 Ⓞ 010 □	3.3	6.0	0.25
47	A	TC212A476 Ⓞ 010 □	4.7	15.0	1.5
47	B	TC212B476 Ⓞ 010 □	4.7	6.0	0.65
47	C	TC212C476 Ⓞ 010 □	4.7	6.0	0.3
47	D	TC212D476 Ⓞ 010 □	4.7	6.0	0.22
68	B	TC212B686 Ⓞ 010 □	6.8	10.0	1.5
68	C	TC212C686 Ⓞ 010 □	6.8	6.0	0.3
68	D	TC212D686 Ⓞ 010 □	6.8	6.0	0.2
100	B	TC212B107 Ⓞ 010 □	10.0	15.0	1.0
100	C	TC212C107 Ⓞ 010 □	10.0	8.0	0.3
100	D	TC212D107 Ⓞ 010 □	10.0	8.0	0.15
150	C	TC212C157 Ⓞ 010 □	15.0	10.0	0.7
150	D	TC212D157 Ⓞ 010 □	15.0	8.0	0.15
150	E	TC212E157 Ⓞ 010 □	15.0	8.0	0.15
220	D	TC212D227 Ⓞ 010 □	22.0	8.0	0.15
220	E	TC212E227 Ⓞ 010 □	22.0	8.0	0.15
330	D	TC212D337 Ⓞ 010 □	33.0	10.0	0.15
330	E	TC212E337 Ⓞ 010 □	33.0	10.0	0.2
470	E	TC212E477 Ⓞ 010 □	47.0	10.0	0.2
16V, +85°C (10V @ +125°C)					
1	A	TC212A105 Ⓞ 016 □	0.5	4.0	8.0
1.5	A	TC212A155 Ⓞ 016 □	0.5	6.0	6.0
2.2	A	TC212A225 Ⓞ 016 □	0.5	6.0	4.0
2.2	B	TC212B225 Ⓞ 016 □	0.5	6.0	3.0
3.3	A	TC212A335 Ⓞ 016 □	0.5	6.0	5.0
3.3	B	TC212B335 Ⓞ 016 □	0.5	6.0	2.5
4.7	A	TC212A475 Ⓞ 016 □	0.8	6.0	5.0
4.7	B	TC212B475 Ⓞ 016 □	0.8	6.0	2.5
4.7	C	TC212C475 Ⓞ 016 □	0.8	6.0	1.5
6.8	A	TC212A685 Ⓞ 016 □	1.1	6.0	5.0
6.8	B	TC212B685 Ⓞ 016 □	1.1	6.0	2.5
6.8	C	TC212C685 Ⓞ 016 □	1.1	6.0	1.0
10	A	TC212A106 Ⓞ 016 □	1.6	8.0	3.0
10	B	TC212B106 Ⓞ 016 □	1.6	6.0	0.8
10	C	TC212C106 Ⓞ 016 □	1.6	6.0	1.5
15	B	TC212B156 Ⓞ 016 □	2.4	6.0	2.0
15	C	TC212C156 Ⓞ 016 □	2.4	6.0	1.2
22	A	TC212A226 Ⓞ 016 □	3.5	15.0	2.0
22	B	TC212B226 Ⓞ 016 □	3.5	8.0	1.5
22	C	TC212C226 Ⓞ 016 □	3.5	6.0	1.2
22	D	TC212D226 Ⓞ 016 □	3.5	6.0	0.6
33	B	TC212B336 Ⓞ 016 □	5.3	8.0	1.0
33	C	TC212C336 Ⓞ 016 □	5.3	6.0	1.0
33	D	TC212D336 Ⓞ 016 □	5.3	6.0	0.5

Rated Cap (uF)	Case	Part Number	DCL(μA) +25°C Max.	DF(%) +25°C 120Hz Max.	ESR(Ω) +25°C 100kHz Max.
47	B	TC212B476 Ⓞ 016 □	7.5	18.0	0.7
47	C	TC212C476 Ⓞ 016 □	7.5	6.0	0.8
47	D	TC212D476 Ⓞ 016 □	7.5	6.0	0.5
68	D	TC212D686 Ⓞ 016 □	10.8	6.0	0.5
100	C	TC212C107 Ⓞ 016 □	16.0	10.0	0.7
100	D	TC212D107 Ⓞ 016 □	16.0	8.0	0.5
150	D	TC212D157 Ⓞ 016 □	24.0	12.0	0.4
150	E	TC212E157 Ⓞ 016 □	24.0	8.0	0.15
220	D	TC212D227 Ⓞ 016 □	35.2	15.0	0.6
220	E	TC212E227 Ⓞ 016 □	35.2	10.0	0.2
330	E	TC212E337 Ⓞ 016 □	52.8	10.0	0.2
20V, +85°C (13V @ +125°C)					
0.68	A	TC212A684 Ⓞ 020 □	0.5	4.0	10.0
1	A	TC212A105 Ⓞ 020 □	0.5	4.0	8.0
1.5	A	TC212A155 Ⓞ 020 □	0.5	6.0	4.5
1.5	B	TC212B155 Ⓞ 020 □	0.5	6.0	1.5
2.2	A	TC212A225 Ⓞ 020 □	0.5	6.0	4.0
2.2	B	TC212B225 Ⓞ 020 □	0.5	6.0	3.0
3.3	A	TC212A335 Ⓞ 020 □	0.7	6.0	6.0
3.3	B	TC212B335 Ⓞ 020 □	0.7	6.0	2.5
4.7	A	TC212A475 Ⓞ 020 □	0.9	6.0	3.5
4.7	B	TC212B475 Ⓞ 020 □	0.9	6.0	2.5
4.7	C	TC212C475 Ⓞ 020 □	0.9	6.0	1.2
6.8	A	TC212A685 Ⓞ 020 □	1.4	8.0	3.0
6.8	B	TC212B685 Ⓞ 020 □	1.4	6.0	2.5
6.8	C	TC212C685 Ⓞ 020 □	1.4	6.0	1.2
6.8	D	TC212D685 Ⓞ 020 □	1.4	6.0	0.8
10	B	TC212B106 Ⓞ 020 □	2.0	6.0	2.0
10	C	TC212C106 Ⓞ 020 □	2.0	6.0	1.2
10	D	TC212D106 Ⓞ 020 □	2.0	6.0	0.8
15	C	TC212C156 Ⓞ 020 □	3.0	6.0	1.2
15	D	TC212D156 Ⓞ 020 □	3.0	6.0	0.8
22	B	TC212B226 Ⓞ 020 □	4.4	8.0	3.0
22	C	TC212C226 Ⓞ 020 □	4.4	6.0	0.4
22	D	TC212D226 Ⓞ 020 □	4.4	6.0	0.5
33	C	TC212C336 Ⓞ 020 □	6.6	6.0	0.6
33	D	TC212D336 Ⓞ 020 □	6.6	6.0	0.4
47	C	TC212C476 Ⓞ 020 □	9.4	10.0	0.8
47	D	TC212D476 Ⓞ 020 □	9.4	6.0	0.6
47	E	TC212E476 Ⓞ 020 □	9.4	6.0	0.3
68	D	TC212D686 Ⓞ 020 □	13.6	6.0	0.4
68	E	TC212E686 Ⓞ 020 □	13.6	6.0	0.3
100	D	TC212D107 Ⓞ 020 □	20.0	8.0	0.2
100	E	TC212E107 Ⓞ 020 □	20.0	8.0	0.2
150	E	TC212E157 Ⓞ 020 □	30.0	8.0	0.2
25V, +85°C (16V @ +125°C)					
0.33	A	TC212A334 Ⓞ 025 □	0.5	4.0	12.0
0.47	A	TC212A474 Ⓞ 025 □	0.5	4.0	10.0
0.68	A	TC212A684 Ⓞ 025 □	0.5	4.0	6.0
1	A	TC212A105 Ⓞ 025 □	0.5	4.0	6.0

SPECIFICATIONS

TC212 TYPE

Rated Cap (uF)	Case	Part Number	DCL(μA) +25°C Max.	DF(%) +25°C 120Hz Max.	ESR(Ω) +25°C 100kHz Max.
1.0	B	TC212B105 ○ 025 □	0.5	4.0	4.0
1.5	A	TC212A155 ○ 025 □	0.5	6.0	5.0
1.5	B	TC212B155 ○ 025 □	0.5	6.0	3.5
2.2	A	TC212A225 ○ 025 □	0.6	6.0	4.0
2.2	B	TC212B225 ○ 025 □	0.6	6.0	3.0
2.2	C	TC212C225 ○ 025 □	0.6	6.0	2.0
3.3	A	TC212A335 ○ 025 □	0.8	6.0	3.0
3.3	B	TC212B335 ○ 025 □	0.8	6.0	2.5
3.3	C	TC212C335 ○ 025 □	0.8	6.0	2.0
4.7	A	TC212A475 ○ 025 □	1.2	8.0	3.0
4.7	B	TC212B475 ○ 025 □	1.2	6.0	1.0
4.7	C	TC212C475 ○ 025 □	1.2	6.0	0.6
6.8	B	TC212B685 ○ 025 □	1.7	6.0	1.2
6.8	C	TC212C685 ○ 025 □	1.7	6.0	0.8
6.8	D	TC212D685 ○ 025 □	1.7	6.0	0.5
10	B	TC212B106 ○ 025 □	2.5	6.0	2.0
10	C	TC212C106 ○ 025 □	2.5	6.0	1.4
10	D	TC212D106 ○ 025 □	2.5	6.0	0.8
15	B	TC212B156 ○ 025 □	3.8	8.0	3.0
15	C	TC212C156 ○ 025 □	3.8	6.0	1.2
15	D	TC212D156 ○ 025 □	3.8	6.0	0.8
22	C	TC212C226 ○ 025 □	5.5	6.0	1.0
22	D	TC212D226 ○ 025 □	5.5	6.0	0.6
33	D	TC212D336 ○ 025 □	8.3	6.0	0.6
33	E	TC212E336 ○ 025 □	8.3	6.0	0.5
47	D	TC212D476 ○ 025 □	11.7	6.0	0.4
47	E	TC212E476 ○ 025 □	11.7	6.0	0.4
68	E	TC212E686 ○ 025 □	17.0	6.0	0.3
35V, +85°C (20V @ +125°C)					
0.33	A	TC212A334 ○ 035 □	0.5	4.0	12.0
0.47	A	TC212A474 ○ 035 □	0.5	4.0	10.0
0.47	B	TC212B474 ○ 035 □	0.5	4.0	6.0
0.68	A	TC212A684 ○ 035 □	0.5	4.0	6.0
0.68	B	TC212B684 ○ 035 □	0.5	4.0	6.0
1	A	TC212A105 ○ 035 □	0.5	4.0	8.0
1	B	TC212B105 ○ 035 □	0.5	4.0	2.0
1.5	B	TC212B155 ○ 035 □	0.5	6.0	4.0
1.5	C	TC212C155 ○ 035 □	0.5	6.0	3.0
2.2	A	TC212A225 ○ 035 □	0.8	6.0	3.0
2.2	B	TC212B225 ○ 035 □	0.8	6.0	3.0
2.2	C	TC212C225 ○ 035 □	0.8	6.0	2.5
3.3	B	TC212B335 ○ 035 □	1.2	6.0	3.0

Rated Cap (uF)	Case	Part Number	DCL(μA) +25°C Max.	DF(%) +25°C 120Hz Max.	ESR(Ω) +25°C 100kHz Max.
3.3	C	TC212C335 ○ 035 □	1.2	6.0	2.0
4.7	B	TC212B475 ○ 035 □	1.6	6.0	2.0
4.7	C	TC212C475 ○ 035 □	1.6	6.0	2.0
4.7	D	TC212D475 ○ 035 □	1.6	6.0	1.0
6.8	C	TC212C685 ○ 035 □	2.4	6.0	1.2
6.8	D	TC212D685 ○ 035 □	2.4	6.0	0.8
10	C	TC212C106 ○ 035 □	3.5	6.0	1.5
10	D	TC212D106 ○ 035 □	3.5	6.0	0.6
10	E	TC212E106 ○ 035 □	3.5	6.0	0.6
15	D	TC212D156 ○ 035 □	5.25	6.0	0.8
15	E	TC212E156 ○ 035 □	5.3	6.0	0.6
22	D	TC212D226 ○ 035 □	7.7	6.0	0.6
22	E	TC212E226 ○ 035 □	7.7	6.0	0.3
33	E	TC212E336 ○ 035 □	11.0	6.0	0.5
47	E	TC212E476 ○ 035 □	16.5	8.0	0.5
50V, +85°C (32V @ +125°C)					
0.15	B	TC212B154 ○ 050 □	0.5	4.0	12.0
0.22	A	TC212A224 ○ 050 □	0.5	4.0	15.0
0.22	B	TC212B224 ○ 050 □	0.5	4.0	12.0
0.33	A	TC212A334 ○ 050 □	0.5	4.0	12.0
0.33	B	TC212B334 ○ 050 □	0.5	4.0	8.0
0.47	A	TC212A474 ○ 050 □	0.5	4.0	8.0
0.47	B	TC212B474 ○ 050 □	0.5	4.0	6.0
0.47	C	TC212C474 ○ 050 □	0.5	4.0	5.0
0.68	A	TC212A684 ○ 050 □	0.5	4.0	8.0
0.68	B	TC212B684 ○ 050 □	0.5	4.0	5.0
0.68	C	TC212C684 ○ 050 □	0.5	4.0	4.0
1	B	TC212B105 ○ 050 □	0.5	6.0	4.0
1	C	TC212C105 ○ 050 □	0.5	4.0	3.5
1.5	B	TC212B155 ○ 050 □	0.8	6.0	3.5
1.5	C	TC212C155 ○ 050 □	0.8	6.0	2.5
2.2	B	TC212B225 ○ 050 □	1.1	6.0	1.5
2.2	C	TC212C225 ○ 050 □	1.1	6.0	3.0
2.2	D	TC212D225 ○ 050 □	1.1	6.0	2.0
3.3	B	TC212B335 ○ 050 □	1.7	6.0	3.0
3.3	C	TC212C335 ○ 050 □	1.7	6.0	2.0
3.3	D	TC212D335 ○ 050 □	1.7	6.0	1.0
4.7	D	TC212D475 ○ 050 □	2.4	6.0	0.8
6.8	D	TC212D685 ○ 050 □	3.4	6.0	0.7
10	D	TC212D106 ○ 050 □	5.0	6.0	0.7
10	E	TC212E106 ○ 050 □	5.0	6.0	0.4
15	E	TC212E156 ○ 050 □	7.5	6.0	0.4

※ ○ :Capacitance tolerance code (K=±10%, M=±20%); □ : Internal code (B=Black molded case, Laser marking; Y=Yellow molded case, Laser marking).

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TYPICAL FREQUENCY CHARACTERISTICS

