Chip Solid MnO_2 Tantalum Capacitors – TM Series

Operating Temp

- -55℃ ~+125℃

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
- Thinning

Applications

- Communication products
- Consumer electronics
- Instruments
- Medical electronics
- Civil explosion products
- Servers

Product Identification

1	2	3	4	5	6	7
TM	336	B20	K	020	B	600

1 Type	
TM	Solid MnO_2 Tantalum Chip Capacitor

2 Nominal Capacitance	
Example	Nominal Value
106	10μF
336	33μF
107	100μF

3 External Dimensions (L×W×H) (mm)	
B20	3.5×2.8×2.0
C25	6.0×3.2×2.5
D20	7.3×4.3×2.0
D40	7.3×4.3×4.0

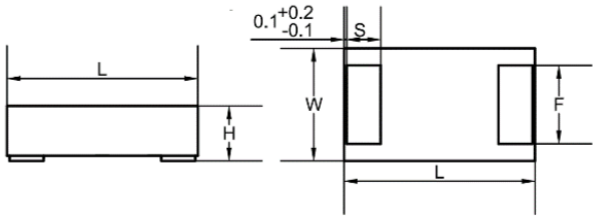
4 Capacitance Tolerance	
K	±10%
M	±20%

5 Rated DC Voltage	
2R5	2.5Vdc
004	4Vdc
6R3	6.3Vdc
010	10Vdc
020	20Vdc
050	50Vdc

6 Internal Code	
B	Black Molded Case, Laser Marking

7 ESR	
150	150mΩ
300	300mΩ
600	600mΩ
1K0	1000mΩ

Shape and Dimensions

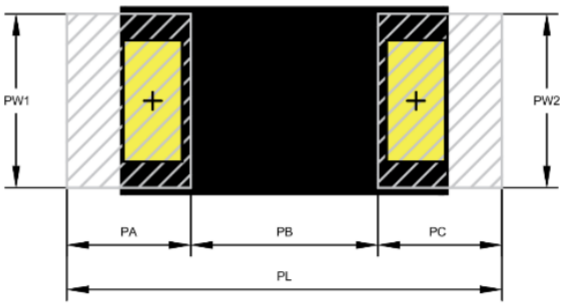


Main view Bottom view

Standard case dimensions: Unit: mm [inch]

Case Code	EIA	L	W	H	F	S
A16	3216-18	3.20±0.20 [.126±.008]	1.60±0.20 [.063±.008]	1.60±0.20 [.063±.008]	1.20±0.10 [.047±.004]	0.80±0.30 [.031±.012]
B20	3528-20	3.50±0.20 [.138±.008]	2.80±0.20 [.11±.008]	1.90±0.10 [.075±.004]	2.20±0.10 [.087±.004]	0.80±0.30 [.031±.012]
C20	6032-19	6.00±0.30 [.236±.012]	3.20±0.20 [.126±.008]	1.90±0.10 [.075±.004]	2.20±0.10 [.087±.004]	1.30±0.30 [.051±.012]
C25	6032-28	6.00±0.30 [.236±.012]	3.20±0.20 [.126±.008]	2.50±0.30 [.098±.012]	2.20±0.10 [.087±.004]	1.30±0.30 [.051±.012]
D20	7343-20	7.30±0.30 [.287±.012]	4.30±0.30 [.169±.012]	1.90±0.10 [.075±.004]	2.40±0.10 [.094±.004]	1.30±0.30 [.051±.012]
D28	7343-31	7.30±0.30 [.287±.012]	4.30±0.30 [.169±.012]	2.80±0.30 [.11±.012]	2.40±0.10 [.094±.004]	1.30±0.30 [.051±.012]
D40	7343-43	7.30±0.30 [.287±.012]	4.30±0.30 [.169±.012]	4.00±0.30 [.157±.012]	2.40±0.10 [.094±.004]	1.30±0.30 [.051±.012]

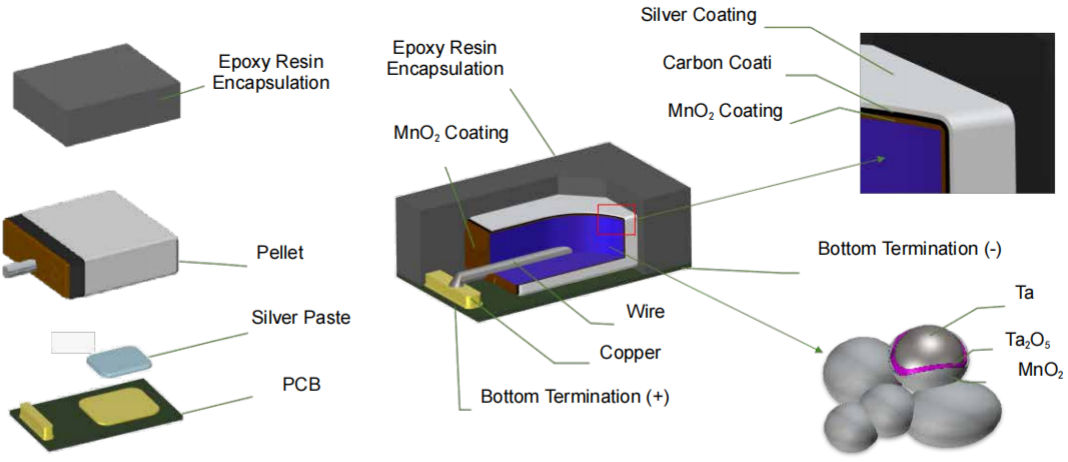
PCB Pads



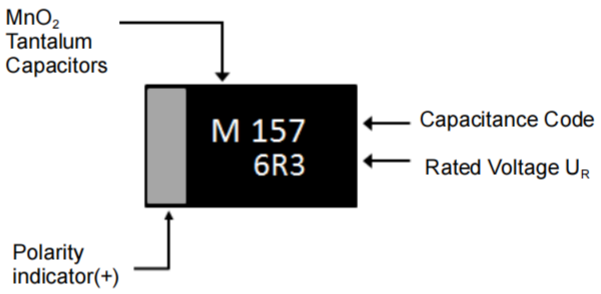
Unit: mm [inch]

Case Code	EIA	PL	PW1	PW2	PA	PB	PC
A16	3216	3.80 [0.15]	1.50 [0.06]	1.50 [0.06]	1.35 [0.05]	1.10 [0.04]	1.35 [0.05]
B20	3528	4.10 [0.16]	2.70 [0.11]	2.70 [0.11]	1.35 [0.05]	1.40 [0.06]	1.35 [0.05]
C20、C25	6032	6.90 [0.27]	2.70 [0.11]	2.70 [0.11]	2.00 [0.08]	2.90 [0.11]	2.00 [0.08]
D20、D28、D40	7343	8.20 [0.32]	2.90 [0.11]	2.90 [0.11]	2.05 [0.08]	4.10 [0.16]	2.05 [0.08]

Construction



Marking



Rated Voltage Code

Rated Voltage (V)	2.5	4	6.3	10	16	20	25	35	50
Voltage Code	2R5	4V	6R3	10V	16V	20V	25V	35V	50V

Capacitance Code

Capacitance (μF)	1.0	1.5	2.2	3.3	4.7	6.8	10	15	22
Capacitance Code	105	155	225	335	475	685	106	156	226
Capacitance (μF)	33	47	68	100	150	220	330	470	680
Capacitance Code	336	476	686	107	157	227	337	477	687

Specifications

Rated Voltage VDC	Rated Cap	Case Code/ Case size	Part Number	DCL +25°C 5 Mins Max.	DF +25°C 120Hz Max.	ESR +25°C 100kHz Max.	Ripple Current(rms) +45°C 100 kHz Max.
V	μF	-	-	μA	%	mΩ	mA
2.5	10	A16/3216-18	TM106A16 ◎ 2R5B4K0	0.5	6	4000	123
2.5	15	A16/3216-18	TM156A16 ◎ 2R5B4K0	0.5	6	4000	123
2.5	15	B20/3528-20	TM156B20 ◎ 2R5B3K0	0.5	6	3000	151
2.5	22	A16/3216-18	TM226A16 ◎ 2R5B3K0	0.55	6	3000	142
2.5	33	A16/3216-18	TM336A16 ◎ 2R5B3K0	0.83	6	3000	142
2.5	47	A16/3216-18	TM476A16 ◎ 2R5B3K0	1.18	10	3000	142
2.5	68	A16/3216-18	TM686A16 ◎ 2R5B2K5	1.7	10	2500	156
2.5	68	B20/3528-20	TM686B20 ◎ 2R5B1K8	1.7	6	1800	196
2.5	100	A16/3216-18	TM107A16 ◎ 2R5B2K0	2.5	20	2000	174
2.5	100	B20/3528-20	TM107B20 ◎ 2R5B1K0	2.5	8	1000	262
2.5	150	B20/3528-20	TM157B20 ◎ 2R5B1K5	3.75	10	1500	214
2.5	220	B20/3528-20	TM227B20 ◎ 2R5B1K5	5.5	18	1500	214
4	2.2	A16/3216-18	TM225A16 ◎ 004B6K0	0.5	6	6000	101
4	3.3	A16/3216-18	TM335A16 ◎ 004B6K0	0.5	6	6000	101
4	4.7	A16/3216-18	TM475A16 ◎ 004B5K0	0.5	6	5000	110
4	6.8	A16/3216-18	TM685A16 ◎ 004B4K0	0.5	6	4000	123
4	10	A16/3216-18	TM106A16 ◎ 004B3K0	0.5	6	3000	142
4	10	B20/3528-20	TM106B20 ◎ 004B1K5	0.5	6	1500	214
4	15	A16/3216-18	TM156A16 ◎ 004B1K5	0.6	6	1500	201
4	15	B20/3528-20	TM156B20 ◎ 004B1K2	0.6	6	1200	240
4	22	A16/3216-18	TM226A16 ◎ 004B1K5	0.88	6	1500	201
4	22	B20/3528-20	TM226B20 ◎ 004B600	0.88	6	600	339
4	33	A16/3216-18	TM336A16 ◎ 004B2K5	1.32	6	2500	156
4	33	B20/3528-20	TM336B20 ◎ 004B500	1.32	6	500	371
4	47	A16/3216-18	TM476A16 ◎ 004B2K0	1.88	6	2000	174
4	47	B20/3528-20	TM476B20 ◎ 004B800	1.88	6	800	293
4	68	B20/3528-20	TM686B20 ◎ 004B2K5	2.72	6	2500	166
4	68	C20/6032-19	TM686C20 ◎ 004B500	2.72	6	500	402
4	68	C25/6032-28	TM686C25 ◎ 004B500	2.72	6	500	422
4	100	A16/3216-18	TM107A16 ◎ 004B3K0	4	18	3000	142
4	100	B20/3528-20	TM107B20 ◎ 004B1K0	4	8	1000	262
4	100	C20/6032-19	TM107C20 ◎ 004B350	4	8	350	481
4	100	C25/6032-28	TM107C25 ◎ 004B350	4	8	350	505
4	150	B20/3528-20	TM157B20 ◎ 004B1K0	6	15	1000	262
4	150	C20/6032-19	TM157C20 ◎ 004B300	6	8	300	520
4	150	C25/6032-28	TM157C25 ◎ 004B300	6	8	300	545
4	150	D20/7343-20	TM157D20 ◎ 004B200	6	8	200	712
4	150	D28/7343-31	TM157D28 ◎ 004B200	6	8	200	779
4	220	B20/3528-20	TM227B20 ◎ 004B400	8.8	18	400	415
4	220	C20/6032-19	TM227C20 ◎ 004B500	8.8	8	500	402
4	220	C25/6032-28	TM227C25 ◎ 004B500	8.8	8	500	422
4	220	D20/7343-20	TM227D20 ◎ 004B300	8.8	8	300	581
4	220	D28/7343-31	TM227D28 ◎ 004B300	8.8	8	300	636
4	330	B20/3528-20	TM337B20 ◎ 004B700	13.2	18	700	314
4	330	C20/6032-19	TM337C20 ◎ 004B800	13.2	8	800	318
4	330	C25/6032-28	TM337C25 ◎ 004B800	13.2	8	800	334
4	330	D20/7343-20	TM337D20 ◎ 004B200	13.2	8	200	712
4	330	D28/7343-31	TM337D28 ◎ 004B200	13.2	8	200	779
4	470	D28/7343-31	TM477D28 ◎ 004B200	18.8	8	200	779
4	470	D40/7343-43	TM477D40 ◎ 004B200	18.8	8	200	817
4	680	D28/7343-31	TM687D28 ◎ 004B200	27.2	8	200	779
4	680	D40/7343-43	TM687D40 ◎ 004B200	27.2	8	200	817
6.3	1	A16/3216-18	TM105A16 ◎ 6R3B10K	0.5	6	10000	78

Specifications

Rated Voltage VDC	Rated Cap	Case Code/ Case size	Part Number	DCL +25°C 5 Mins Max.	DF +25°C 120Hz Max.	ESR +25°C 100kHz Max.	Ripple Current(rms) +45°C 100 kHz Max.
V	μF	-	-	μA	%	mΩ	mA
6.3	1.5	A16/3216-18	TM155A16 ◎ 6R3B6K0	0.5	6	6000	101
6.3	2.2	A16/3216-18	TM225A16 ◎ 6R3B6K0	0.5	6	6000	101
6.3	3.3	A16/3216-18	TM335A16 ◎ 6R3B6K0	0.5	6	6000	101
6.3	4.7	A16/3216-18	TM475A16 ◎ 6R3B4K0	0.5	6	4000	123
6.3	6.8	A16/3216-18	TM685A16 ◎ 6R3B3K5	0.5	6	3500	132
6.3	6.8	B20/3528-20	TM685B20 ◎ 6R3B3K0	0.5	6	3000	151
6.3	10	A16/3216-18	TM106A16 ◎ 6R3B2K0	0.63	6	2000	174
6.3	10	B20/3528-20	TM106B20 ◎ 6R3B1K0	0.63	6	1000	262
6.3	15	A16/3216-18	TM156A16 ◎ 6R3B2K0	0.95	6	2000	174
6.3	15	B20/3528-20	TM156B20 ◎ 6R3B700	0.95	6	700	314
6.3	22	A16/3216-18	TM226A16 ◎ 6R3B2K5	1.39	6	2500	156
6.3	22	B20/3528-20	TM226B20 ◎ 6R3B800	1.39	6	800	293
6.3	33	A16/3216-18	TM336A16 ◎ 6R3B1K5	2.08	8	1500	201
6.3	33	B20/3528-20	TM336B20 ◎ 6R3B800	2.08	6	800	293
6.3	33	C20/6032-19	TM336C20 ◎ 6R3B300	2.08	6	300	520
6.3	33	C25/6032-28	TM336C25 ◎ 6R3B300	2.08	6	300	545
6.3	47	A16/3216-18	TM476A16 ◎ 6R3B2K5	2.96	8	2500	156
6.3	47	B20/3528-20	TM476B20 ◎ 6R3B500	2.96	6	500	371
6.3	47	C20/6032-19	TM476C20 ◎ 6R3B300	2.96	6	300	520
6.3	47	C25/6032-28	TM476C25 ◎ 6R3B300	2.96	6	300	545
6.3	68	B20/3528-20	TM686B20 ◎ 6R3B650	4.28	10	650	325
6.3	68	C20/6032-19	TM686C20 ◎ 6R3B300	4.28	6	300	520
6.3	68	C25/6032-28	TM686C25 ◎ 6R3B300	4.28	6	300	545
6.3	68	D20/7343-20	TM686D20 ◎ 6R3B200	4.28	6	200	712
6.3	68	D28/7343-31	TM686D28 ◎ 6R3B200	4.28	6	200	779
6.3	100	A16/3216-18	TM107A16 ◎ 6R3B2K0	6.3	20	2000	174
6.3	100	B20/3528-20	TM107B20 ◎ 6R3B1K5	6.3	10	1500	214
6.3	100	C20/6032-19	TM107C20 ◎ 6R3B300	6.3	8	300	520
6.3	100	C25/6032-28	TM107C25 ◎ 6R3B300	6.3	8	300	545
6.3	100	D20/7343-20	TM107D20 ◎ 6R3B200	6.3	8	200	712
6.3	100	D28/7343-31	TM107D28 ◎ 6R3B200	6.3	8	200	779
6.3	150	B20/3528-20	TM157B20 ◎ 6R3B600	9.45	15	600	339
6.3	150	C20/6032-19	TM157C20 ◎ 6R3B300	9.45	8	300	520
6.3	150	C25/6032-28	TM157C25 ◎ 6R3B300	9.45	8	300	545
6.3	150	D20/7343-20	TM157D20 ◎ 6R3B200	9.45	8	200	712
6.3	150	D28/7343-31	TM157D28 ◎ 6R3B200	9.45	8	200	779
6.3	220	B20/3528-20	TM227B20 ◎ 6R3B700	13.86	18	700	314
6.3	220	C20/6032-19	TM227C20 ◎ 6R3B300	13.86	8	300	520
6.3	220	C25/6032-28	TM227C25 ◎ 6R3B300	13.86	8	300	545
6.3	220	D20/7343-20	TM227D20 ◎ 6R3B150	13.86	8	150	822
6.3	220	D28/7343-31	TM227D28 ◎ 6R3B150	13.86	8	150	900
6.3	330	D20/7343-20	TM337D20 ◎ 6R3B150	20.79	8	150	822
6.3	330	D28/7343-31	TM337D28 ◎ 6R3B150	20.79	8	150	900
6.3	330	D40/7343-43	TM337D40 ◎ 6R3B150	20.79	8	150	944
6.3	470	D28/7343-31	TM477D28 ◎ 6R3B150	29.61	12	150	900
6.3	470	D40/7343-43	TM477D40 ◎ 6R3B150	29.61	12	150	944
10	1	A16/3216-18	TM105A16 ◎ 010B8K0	0.5	4	8000	87
10	1.5	A16/3216-18	TM155A16 ◎ 010B6K0	0.5	6	6000	101
10	2.2	A16/3216-18	TM225A16 ◎ 010B6K0	0.5	6	6000	101
10	3.3	A16/3216-18	TM335A16 ◎ 010B4K0	0.5	6	4000	123
10	4.7	A16/3216-18	TM475A16 ◎ 010B3K0	0.5	6	3000	142
10	4.7	B20/3528-20	TM475B20 ◎ 010B1K5	0.5	6	1500	214
10	6.8	A16/3216-18	TM685A16 ◎ 010B3K0	0.68	6	3000	142

Specifications

Rated Voltage VDC	Rated Cap	Case Code/ Case size	Part Number	DCL +25°C 5 Mins Max.	DF +25°C 120Hz Max.	ESR +25°C 100kHz Max.	Ripple Current(rms) +45°C 100 kHz Max.
V	μF	-	-	μA	%	mΩ	mA
10	6.8	B20/3528-20	TM685B20 ◎ 010B1K2	0.68	6	1200	240
10	10	A16/3216-18	TM106A16 ◎ 010B1K8	1	6	1800	184
10	10	B20/3528-20	TM106B20 ◎ 010B800	1	6	800	293
10	10	C20/6032-19	TM106C20 ◎ 010B600	1	6	600	367
10	10	C25/6032-28	TM106C25 ◎ 010B600	1	6	600	385
10	15	A16/3216-18	TM156A16 ◎ 010B4K0	1.5	6	4000	123
10	15	B20/3528-20	TM156B20 ◎ 010B700	1.5	6	700	314
10	15	C20/6032-19	TM156C20 ◎ 010B500	1.5	6	500	402
10	15	C25/6032-28	TM156C25 ◎ 010B500	1.5	6	500	422
10	22	A16/3216-18	TM226A16 ◎ 010B2K5	2.2	8	2500	156
10	22	B20/3528-20	TM226B20 ◎ 010B1K0	2.2	6	1000	262
10	22	C20/6032-19	TM226C20 ◎ 010B400	2.2	6	400	450
10	22	C25/6032-28	TM226C25 ◎ 010B400	2.2	6	400	472
10	33	A16/3216-18	TM336A16 ◎ 010B4K0	3.3	15	4000	123
10	33	B20/3528-20	TM336B20 ◎ 010B1K0	3.3	6	1000	262
10	33	C20/6032-19	TM336C20 ◎ 010B400	3.3	6	400	450
10	33	C25/6032-28	TM336C25 ◎ 010B400	3.3	6	400	472
10	33	D20/7343-20	TM336D20 ◎ 010B250	3.3	6	250	636
10	47	A16/3216-18	TM476A16 ◎ 010B1K5	4.7	15	1500	201
10	47	B20/3528-20	TM476B20 ◎ 010B650	4.7	6	650	325
10	47	C20/6032-19	TM476C20 ◎ 010B300	4.7	6	300	520
10	47	C25/6032-28	TM476C25 ◎ 010B300	4.7	6	300	545
10	47	D20/7343-20	TM476D20 ◎ 010B220	4.7	6	220	678
10	68	B20/3528-20	TM686B20 ◎ 010B1K5	6.8	10	1500	214
10	68	C20/6032-19	TM686C20 ◎ 010B300	6.8	6	300	520
10	68	C25/6032-28	TM686C25 ◎ 010B300	6.8	6	300	545
10	68	D20/7343-20	TM686D20 ◎ 010B200	6.8	6	200	712
10	68	D28/7343-31	TM686D28 ◎ 010B200	6.8	6	200	779
10	100	B20/3528-20	TM107B20 ◎ 010B1K0	10	15	1000	262
10	100	C20/6032-19	TM107C20 ◎ 010B300	10	8	300	520
10	100	C25/6032-28	TM107C25 ◎ 010B300	10	8	300	545
10	100	D20/7343-20	TM107D20 ◎ 010B150	10	8	150	822
10	100	D28/7343-31	TM107D28 ◎ 010B150	10	8	150	900
10	150	C20/6032-19	TM157C20 ◎ 010B700	15	10	700	340
10	150	C25/6032-28	TM157C25 ◎ 010B700	15	10	700	357
10	150	D20/7343-20	TM157D20 ◎ 010B150	15	8	150	822
10	150	D28/7343-31	TM157D28 ◎ 010B150	15	8	150	900
10	150	D40/7343-43	TM157D40 ◎ 010B150	15	8	150	944
10	220	D28/7343-31	TM227D28 ◎ 010B150	22	8	150	900
10	220	D40/7343-43	TM227D40 ◎ 010B150	22	8	150	944
10	330	D28/7343-31	TM337D28 ◎ 010B150	33	10	150	900
10	330	D40/7343-43	TM337D40 ◎ 010B150	33	10	150	944
10	470	D40/7343-43	TM477D40 ◎ 010B150	47	10	150	944
16	1	A16/3216-18	TM105A16 ◎ 016B8K0	0.5	4	8000	87
16	1.5	A16/3216-18	TM155A16 ◎ 016B6K0	0.5	6	6000	101
16	2.2	A16/3216-18	TM225A16 ◎ 016B4K0	0.5	6	4000	123
16	2.2	B20/3528-20	TM225B20 ◎ 016B3K0	0.5	6	3000	151
16	3.3	A16/3216-18	TM335A16 ◎ 016B5K0	0.53	6	5000	110
16	3.3	B20/3528-20	TM335B20 ◎ 016B2K5	0.53	6	2500	166
16	4.7	A16/3216-18	TM475A16 ◎ 016B5K0	0.75	6	5000	110
16	4.7	B20/3528-20	TM475B20 ◎ 016B2K5	0.75	6	2500	166
16	6.8	A16/3216-18	TM685A16 ◎ 016B5K0	1.09	6	5000	110
16	6.8	B20/3528-20	TM685B20 ◎ 016B2K5	1.09	6	2500	166

Specifications

Rated Voltage VDC	Rated Cap	Case Code/ Case size	Part Number	DCL +25°C 5 Mins Max.	DF +25°C 120Hz Max.	ESR +25°C 100kHz Max.	Ripple Current(rms) +45°C 100 kHz Max.
V	μF	-	-	μA	%	mΩ	mA
16	10	A16/3216-18	TM106A16 ◎ 016B3K0	1.6	8	3000	142
16	10	B20/3528-20	TM106B20 ◎ 016B800	1.6	6	800	293
16	10	C20/6032-19	TM106C20 ◎ 016B1K5	1.6	6	1500	232
16	10	C25/6032-28	TM106C25 ◎ 016B1K5	1.6	6	1500	244
16	15	B20/3528-20	TM156B20 ◎ 016B2K0	2.4	6	2000	186
16	15	C20/6032-19	TM156C20 ◎ 016B1K2	2.4	6	1200	260
16	15	C25/6032-28	TM156C25 ◎ 016B1K2	2.4	6	1200	272
16	22	A16/3216-18	TM226A16 ◎ 016B2K0	3.52	15	2000	174
16	22	B20/3528-20	TM226B20 ◎ 016B1K5	3.52	8	1500	214
16	22	C20/6032-19	TM226C20 ◎ 016B1K2	3.52	6	1200	260
16	22	C25/6032-28	TM226C25 ◎ 016B1K2	3.52	6	1200	272
16	33	B20/3528-20	TM336B20 ◎ 016B1K0	5.28	8	1000	262
16	33	C20/6032-19	TM336C20 ◎ 016B1K0	5.28	6	1000	285
16	33	C25/6032-28	TM336C25 ◎ 016B1K0	5.28	6	1000	298
16	33	D20/7343-20	TM336D20 ◎ 016B500	5.28	6	500	450
16	33	D28/7343-31	TM336D28 ◎ 016B500	5.28	6	500	493
16	47	B20/3528-20	TM476B20 ◎ 016B700	7.52	18	700	314
16	47	C20/6032-19	TM476C20 ◎ 016B800	7.52	6	800	318
16	47	C25/6032-28	TM476C25 ◎ 016B800	7.52	6	800	334
16	47	D20/7343-20	TM476D20 ◎ 016B500	7.52	6	500	450
16	47	D28/7343-31	TM476D28 ◎ 016B500	7.52	6	500	493
16	68	D20/7343-20	TM686D20 ◎ 016B500	10.88	6	500	450
16	68	D28/7343-31	TM686D28 ◎ 016B500	10.88	6	500	493
16	100	C25/6032-28	TM107C25 ◎ 016B700	16	10	700	357
16	100	D20/7343-20	TM107D20 ◎ 016B500	16	8	500	450
16	100	D28/7343-31	TM107D28 ◎ 016B500	16	8	500	493
16	100	D40/7343-43	TM107D40 ◎ 016B500	16	8	500	517
16	150	D28/7343-31	TM157D28 ◎ 016B400	24	12	400	551
16	150	D40/7343-43	TM157D40 ◎ 016B400	24	12	400	578
16	220	D28/7343-31	TM227D28 ◎ 016B600	35.2	15	600	450
16	220	D40/7343-43	TM227D40 ◎ 016B500	35.2	15	500	517
16	330	D40/7343-43	TM337D40 ◎ 016B200	52.8	10	200	817
20	1	A16/3216-18	TM105A16 ◎ 020B8K0	0.5	4	8000	87
20	1.5	A16/3216-18	TM155A16 ◎ 020B4K5	0.5	6	4500	116
20	1.5	B20/3528-20	TM155B20 ◎ 020B1K5	0.5	6	1500	214
20	2.2	A16/3216-18	TM225A16 ◎ 020B4K0	0.5	6	4000	123
20	2.2	B20/3528-20	TM225B20 ◎ 020B3K0	0.5	6	3000	151
20	3.3	A16/3216-18	TM335A16 ◎ 020B6K0	0.66	6	6000	101
20	3.3	B20/3528-20	TM335B20 ◎ 020B2K5	0.66	6	2500	166
20	4.7	A16/3216-18	TM475A16 ◎ 020B3K5	0.94	6	3500	132
20	4.7	B20/3528-20	TM475B20 ◎ 020B2K5	0.94	6	2500	166
20	6.8	A16/3216-18	TM685A16 ◎ 020B3K0	1.36	8	3000	142
20	6.8	B20/3528-20	TM685B20 ◎ 020B2K5	1.36	6	2500	166
20	6.8	C20/6032-19	TM685C20 ◎ 020B1K2	1.36	6	1200	260
20	10	B20/3528-20	TM106B20 ◎ 020B2K0	2	6	2000	186
20	10	C20/6032-19	TM106C20 ◎ 020B1K2	2	6	1200	260
20	10	C25/6032-28	TM106C25 ◎ 020B1K2	2	6	1200	272
20	15	C20/6032-19	TM156C20 ◎ 020B1K2	3	6	1200	260
20	15	C25/6032-28	TM156C25 ◎ 020B1K2	3	6	1200	272
20	15	D20/7343-20	TM156D20 ◎ 020B800	3	6	800	356
20	15	D28/7343-31	TM156D28 ◎ 020B800	3	6	800	390
20	22	B20/3528-20	TM226B20 ◎ 020B3K0	4.4	8	3000	151
20	22	C20/6032-19	TM226C20 ◎ 020B400	4.4	6	400	450

Specifications

Rated Voltage VDC	Rated Cap	Case Code/ Case size	Part Number	DCL +25°C 5 Mins Max.	DF +25°C 120Hz Max.	ESR +25°C 100kHz Max.	Ripple Current(rms) +45°C 100 kHz Max.
V	μF	-	-	μA	%	mΩ	mA
20	22	C25/6032-28	TM226C25 ◎ 020B400	4.4	6	400	472
20	22	D20/7343-20	TM226D20 ◎ 020B500	4.4	6	500	450
20	22	D28/7343-31	TM226D28 ◎ 020B500	4.4	6	500	493
20	33	B20/3528-20	TM336B20 ◎ 020B600	6.6	8	600	339
20	33	C20/6032-19	TM336C20 ◎ 020B600	6.6	6	600	367
20	33	C25/6032-28	TM336C25 ◎ 020B600	6.6	6	600	385
20	33	D20/7343-20	TM336D20 ◎ 020B400	6.6	6	400	503
20	33	D28/7343-31	TM336D28 ◎ 020B400	6.6	6	400	551
20	47	B20/3528-20	TM476B20 ◎ 020B600	9.4	10	600	339
20	47	C25/6032-28	TM476C25 ◎ 020B800	9.4	10	800	334
20	47	D20/7343-20	TM476D20 ◎ 020B600	9.4	6	600	411
20	47	D28/7343-31	TM476D28 ◎ 020B600	9.4	6	600	450
20	68	C25/6032-28	TM686C25 ◎ 020B450	13.6	8	450	445
20	68	C25/6032-28	TM686C25 ◎ 020B600	13.6	8	600	385
20	68	D28/7343-31	TM686D28 ◎ 020B400	13.6	6	400	551
20	68	D40/7343-43	TM686D40 ◎ 020B400	13.6	6	400	578
20	100	D28/7343-31	TM107D28 ◎ 020B200	20	8	200	779
20	100	D40/7343-43	TM107D40 ◎ 020B200	20	8	200	817
20	150	D40/7343-43	TM157D40 ◎ 020B200	30	8	200	817
20	220	D40/7343-43	TM227D40 ◎ 020B200	44	8	200	817
25	1	A16/3216-18	TM105A16 ◎ 025B6K0	0.5	4	6000	101
25	1	B20/3528-20	TM105B20 ◎ 025B4K0	0.5	4	4000	131
25	1.5	A16/3216-18	TM155A16 ◎ 025B5K0	0.5	6	5000	110
25	1.5	B20/3528-20	TM155B20 ◎ 025B3K5	0.5	6	3500	140
25	2.2	A16/3216-18	TM225A16 ◎ 025B4K0	0.55	6	4000	123
25	2.2	B20/3528-20	TM225B20 ◎ 025B3K0	0.55	6	3000	151
25	3.3	A16/3216-18	TM335A16 ◎ 025B3K0	0.83	6	3000	142
25	3.3	B20/3528-20	TM335B20 ◎ 025B2K5	0.83	6	2500	166
25	3.3	C20/6032-19	TM335C20 ◎ 025B2K0	0.83	6	2000	201
25	3.3	C25/6032-28	TM335C25 ◎ 025B2K0	0.83	6	2000	211
25	4.7	A16/3216-18	TM475A16 ◎ 025B3K0	1.18	8	3000	142
25	4.7	B20/3528-20	TM475B20 ◎ 025B1K0	1.18	6	1000	262
25	4.7	C20/6032-19	TM475C20 ◎ 025B600	1.18	6	600	367
25	4.7	C25/6032-28	TM475C25 ◎ 025B600	1.18	6	600	385
25	6.8	B20/3528-20	TM685B20 ◎ 025B1K2	1.7	6	1200	240
25	6.8	C20/6032-19	TM685C20 ◎ 025B800	1.7	6	800	318
25	6.8	C25/6032-28	TM685C25 ◎ 025B800	1.7	6	800	334
25	10	B20/3528-20	TM106B20 ◎ 025B2K0	2.5	6	2000	186
25	10	C20/6032-19	TM106C20 ◎ 025B1K4	2.5	6	1400	241
25	10	C25/6032-28	TM106C25 ◎ 025B1K4	2.5	6	1400	252
25	15	B20/3528-20	TM156B20 ◎ 025B3K0	3.75	8	3000	151
25	15	C20/6032-19	TM156C20 ◎ 025B1K2	3.75	6	1200	260
25	15	C25/6032-28	TM156C25 ◎ 025B1K2	3.75	6	1200	272
25	15	D20/7343-20	TM156D20 ◎ 025B800	3.75	6	800	356
25	15	D28/7343-31	TM156D28 ◎ 025B800	3.75	6	800	390
25	22	C20/6032-19	TM226C20 ◎ 025B1K0	5.5	6	1000	285
25	22	C25/6032-28	TM226C25 ◎ 025B1K0	5.5	6	1000	298
25	22	D20/7343-20	TM226D20 ◎ 025B600	5.5	6	600	411
25	22	D28/7343-31	TM226D28 ◎ 025B600	5.5	6	600	450
25	33	C25/6032-28	TM336C25 ◎ 025B500	8.25	6	500	422
25	33	D20/7343-20	TM336D20 ◎ 025B600	8.25	6	600	411
25	33	D28/7343-31	TM336D28 ◎ 025B600	8.25	6	600	450
25	47	D28/7343-31	TM476D28 ◎ 025B400	11.75	6	400	551

Specifications

Rated Voltage VDC	Rated Cap	Case Code/ Case size	Part Number	DCL +25°C 5 Mins Max.	DF +25°C 120Hz Max.	ESR +25°C 100kHz Max.	Ripple Current(rms) +45°C 100 kHz Max.
V	μF	-	-	μA	%	mΩ	mA
25	47	D40/7343-43	TM476D40 ◎ 025B400	11.75	6	400	578
25	68	D40/7343-43	TM686D40 ◎ 025B300	17	6	300	667
25	100	D40/7343-43	TM107D40 ◎ 025B300	25	6	300	667
35	1	A16/3216-18	TM105A16 ◎ 035B8K0	0.5	4	8000	87
35	1	B20/3528-20	TM105B20 ◎ 035B2K0	0.5	4	2000	186
35	1.5	B20/3528-20	TM155B20 ◎ 035B4K0	0.53	6	4000	131
35	1.5	C20/6032-19	TM155C20 ◎ 035B3K0	0.53	6	3000	164
35	1.5	C25/6032-28	TM155C25 ◎ 035B3K0	0.53	6	3000	172
35	2.2	A16/3216-18	TM225A16 ◎ 035B3K0	0.77	6	3000	142
35	2.2	B20/3528-20	TM225B20 ◎ 035B3K0	0.77	6	3000	151
35	2.2	C20/6032-19	TM225C20 ◎ 035B2K5	0.77	6	2500	180
35	2.2	C25/6032-28	TM225C25 ◎ 035B2K5	0.77	6	2500	189
35	3.3	B20/3528-20	TM335B20 ◎ 035B3K0	1.16	6	3000	151
35	3.3	C20/6032-19	TM335C20 ◎ 035B2K0	1.16	6	2000	201
35	3.3	C25/6032-28	TM335C25 ◎ 035B2K0	1.16	6	2000	211
35	4.7	B20/3528-20	TM475B20 ◎ 035B2K0	1.65	6	2000	186
35	4.7	C20/6032-19	TM475C20 ◎ 035B2K0	1.65	6	2000	201
35	4.7	C25/6032-28	TM475C25 ◎ 035B2K0	1.65	6	2000	211
35	4.7	D20/7343-20	TM475D20 ◎ 035B1K0	1.65	6	1000	318
35	4.7	D28/7343-31	TM475D28 ◎ 035B1K0	1.65	6	1000	349
35	6.8	C20/6032-19	TM685C20 ◎ 035B1K2	2.38	6	1200	260
35	6.8	C25/6032-28	TM685C25 ◎ 035B1K2	2.38	6	1200	272
35	6.8	D20/7343-20	TM685D20 ◎ 035B800	2.38	6	800	356
35	6.8	D28/7343-31	TM685D28 ◎ 035B800	2.38	6	800	390
35	10	C25/6032-28	TM106C25 ◎ 035B1K5	3.5	6	1500	244
35	10	D20/7343-20	TM106D20 ◎ 035B600	3.5	6	600	411
35	10	D28/7343-31	TM106D28 ◎ 035B600	3.5	6	600	450
35	15	D28/7343-31	TM156D28 ◎ 035B800	5.25	6	800	390
35	15	D40/7343-43	TM156D40 ◎ 035B800	5.25	6	800	409
35	22	D28/7343-31	TM226D28 ◎ 035B600	7.7	6	600	450
35	22	D40/7343-43	TM226D40 ◎ 035B600	7.7	6	600	472
35	33	D28/7343-31	TM336D28 ◎ 035B500	11.55	6	500	493
35	33	D40/7343-43	TM336D40 ◎ 035B500	11.55	6	500	517
35	47	D40/7343-43	TM476D40 ◎ 035B500	16.45	8	500	517
35	68	D40/7343-43	TM686D40 ◎ 035B500	23.8	6	500	517
50	1	B20/3528-20	TM105B20 ◎ 050B4K0	0.5	6	4000	131
50	1	C20/6032-19	TM105C20 ◎ 050B3K5	0.5	4	3500	152
50	1	C25/6032-28	TM105C25 ◎ 050B3K5	0.5	4	3500	160
50	1.5	B20/3528-20	TM155B20 ◎ 050B3K5	0.75	6	3500	140
50	1.5	C20/6032-19	TM155C20 ◎ 050B2K5	0.75	6	2500	180
50	1.5	C25/6032-28	TM155C25 ◎ 050B2K5	0.75	6	2500	189
50	2.2	B20/3528-20	TM225B20 ◎ 050B1K5	1.1	6	1500	214
50	2.2	C20/6032-19	TM225C20 ◎ 050B3K0	1.1	6	3000	164
50	2.2	C25/6032-28	TM225C25 ◎ 050B3K0	1.1	6	3000	172
50	2.2	D20/7343-20	TM225D20 ◎ 050B2K0	1.1	6	2000	225
50	2.2	D28/7343-31	TM225D28 ◎ 050B2K0	1.1	6	2000	246
50	3.3	B20/3528-20	TM335B20 ◎ 050B3K0	1.65	6	3000	151
50	3.3	C25/6032-28	TM335C25 ◎ 050B2K0	1.65	6	2000	211
50	3.3	D20/7343-20	TM335D20 ◎ 050B1K0	1.65	6	1000	318
50	3.3	D28/7343-31	TM335D28 ◎ 050B1K0	1.65	6	1000	349
50	4.7	D20/7343-20	TM475D20 ◎ 050B800	2.35	6	800	356
50	4.7	D28/7343-31	TM475D28 ◎ 050B800	2.35	6	800	390
50	6.8	D28/7343-31	TM685D28 ◎ 050B700	3.4	6	700	417

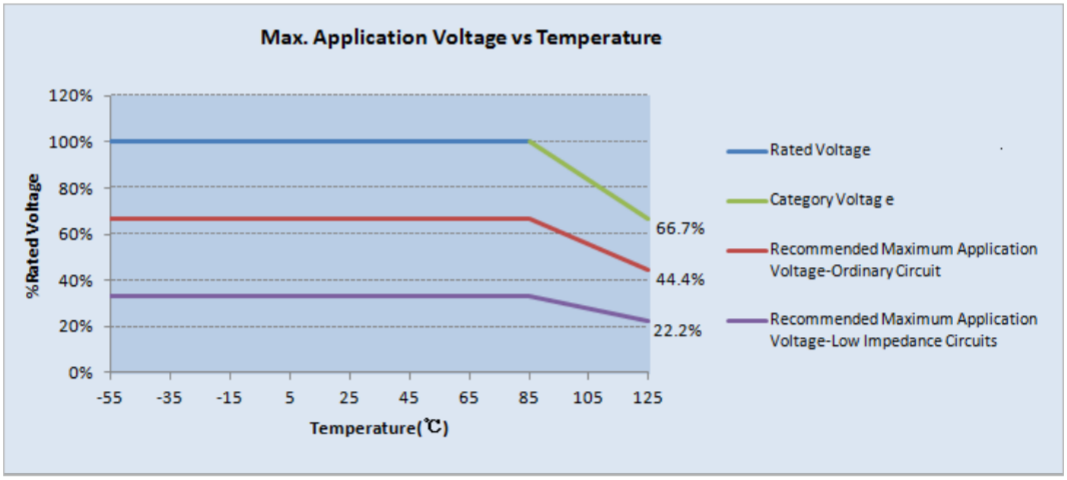
Specifications

Rated Voltage VDC	Rated Cap	Case Code/ Case size	Part Number	DCL +25°C 5 Mins Max.	DF +25°C 120Hz Max.	ESR +25°C 100kHz Max.	Ripple Current(rms) +45°C 100 kHz Max.
V	μF	-	-	μA	%	mΩ	mA
50	6.8	D40/7343-43	TM685D40 ◎ 050B700	3.4	6	700	437
50	10	D28/7343-31	TM106D28 ◎ 050B700	5	6	700	417
50	10	D40/7343-43	TM106D40 ◎ 050B700	5	6	700	437
50	15	D40/7343-43	TM156D40 ◎ 050B400	7.5	6	400	578
50	22	D40/7343-43	TM226D40 ◎ 050B400	11	6	400	578

※ ◎ : Capacitance tolerance code (K=±10%, M=±20%);
※Note: TM series' moisture sensitivity level (MSL): 1.
※: Products with other electrical characteristics can be provided upon customer's request. Please contact your local sales.

Derating Guidelines

TM capacitors are solid state capacitors that demonstrate no wearout mechanism when operated within their recommended guidelines. While the TM capacitors can be operated at full rated voltage, most circuit designers want a minimum level of assurance in long term reliability, which should be demonstrated with data. A voltage derating can provide the desired level of demonstrated reliability based on industry accepted acceleration models. Since most applications do require long term reliability, it is recommended that designers consider voltage derating, as shown in the figure blow, for the maximum steady state voltage.
a. Rated voltage
Rated voltage is the maximum DC operating voltage for continuous duty at -55°C ~85°C ,which is shown in the figure.
b. Category voltage
Category voltage is the maximum DC operating voltage for continuous operation at 85°C ~125°C ,which is shown in the figure.
c. Recommended maximum application voltage in ordinary circuit
The ratio of operating voltage to rated voltage has a great influence on capacitor failures. Please take all specified reliabilities in to account and derate operating voltage appropriately when a practical circuit is designed. Recommended maximum application voltage ordinary circuit is shown in figure.
d. Recommended maximum application voltage in low impedance circuits
The operating voltage of tantalum capacitors used in low impedance circuits, such as filters for power supplies (particularly switching power supplies), should be derated to less than one-third of rated voltage, which is shown as recommended maximum application voltage-low impedance circuits curve in the figure.



Reverse Voltage

Since tantalum capacitor has polarity, do not apply a reverse voltage to it. Do not apply capacitor to a circuit which only has alternating current.
a. If there is no alternation, applying a low reverse voltage which is listed below to capacitor in a short time is approved:
At 25°C : ≤10%UR (rated voltage) or 1V (whichever is lower);
At 85°C : ≤5%UR (rated voltage) or 0.5V (whichever is lower);
At 125°C : 1% of rated voltage, 0.1V for max.
b. In principle, testing a circuit with tantalum capacitor or capacitor itself by using a resistor gear of millimeters in ignorance of polarity is forbidden
c. During measurement and application, if the tantalum capacitor is subjected to an undesirable reverse voltage due to carelessness, please dispose it, even if its electrical characteristics are still qualified.

Surge Voltage

Surge voltage is the maximum voltage to which capacitors may be subjected under any momentary conditions, including the maximum AC pulse voltage, DC bias voltage and any momentary voltage. Refer to the table below for detail data.

Rated Voltage (U_R)	2.5V	4V	6.3V	10V	16V	20V	25V	35V	50V
Surge Voltage (U_S) @-55°C ~85°C	3.3V	5.2V	8V	13V	20V	26V	32V	46V	65V
Surge Voltage (U_S) @ +125°C	2.2V	3.4V	5V	8V	13V	16V	20V	28V	40V

Ripple Voltage and Ripple Current

Please use the capacitor within permissible ripple voltage
a. The sum of DC bias voltage and the maximum AC branch voltage should not exceed rated voltage during operation.
b. The sum of negative peak AC value and DC bias voltage should not exceed the specified reverse voltage.
c. Ripple current applied to capacitor will generate active power loss, which will raise the rate of the failure caused by heat due to self-heat generation of capacitor. Therefore, ripple current and permissible power loss must be in control.
d. The maximum ripple current of the capacitor is calculated using the formula：

$$I_p = K*F*\sqrt{P/ESR}$$

Where:
Ip=rms ripple current, amperes, and shall not exceed 3A
ESR= equivalent series resistance, ohms;
K= Temperature correction factor for ripple current：

Temp°C	Correction Factor for ripple current K
25°C	1.00
85°C	0.90
125°C	0.40

Ripple Voltage and Ripple Current

F=Frequency correction factor for ripple current：

Frequency	Frequency correction factor for ripple current F
10kHz	0.80
100kHz	1.00
500kHz	1.15
1MHz	1.20

P= Max. power dissipation of capacitor (W)：

Case Size	Power dissipation（W@100kHZ/25°C）
A16	0.075
B20	0.085
C20	0.100
C25	0.110
D20	0.125
D28	0.150
D40	0.165