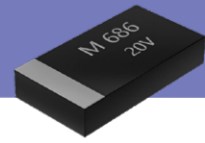


固体片式 MnO₂ 钽电容器—TM 系列

Chip Solid MnO₂ Tantalum Capacitors – TM Series



工作温度
Operating Temp

- ◆ -55°C ~+125°C

特征
Features

- ◆ 达到或超过电子工业协会 EIA-535BAAC 标准
- ◆ 自愈修复能力, 可靠性高
- ◆ 操作温度范围内极佳的容量稳定性
- ◆ 高体积效率比
- ◆ 通过 100% 冲击电流测试
- ◆ 薄型化
- ◆ 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

用途
Applications

- ◆ 通讯产品
- ◆ 消费类电子
- ◆ 仪器仪表
- ◆ 医疗电子
- ◆ 民爆
- ◆ 服务器
- ◆ Communication products
- ◆ Consumer electronics
- ◆ Instruments
- ◆ Medical electronics
- ◆ Civil explosion products
- ◆ Servers

产品型号
Product Identification

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

1	分类 Type
TM	片式 MnO ₂ 钽电容 Solid MnO ₂ Tantalum Chip Capacitor

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

3	外形尺寸 (L×W×H) (mm) 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	电容公差 Capacitance Tolerance
K	±10%
M	±20%

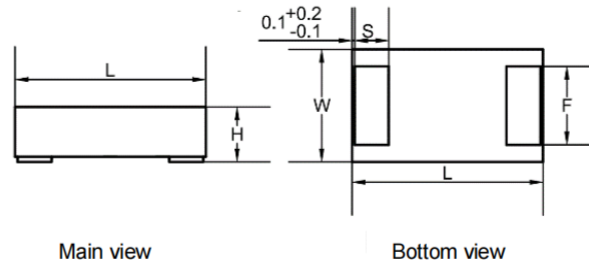
5	额定电压 Rated DC Voltage
2R5	2.5Vdc
004	4Vdc
6R3	6.3Vdc
010	10Vdc
020	20Vdc
050	50Vdc

7	等效串联电阻 ESR
150	150mΩ
300	300mΩ
600	600mΩ
1K0	1000mΩ

6	内部代码 Internal Code
B	黑色树脂封装、激光标识 Black Molded Case, Laser Marking

外观尺寸

Shape and Dimensions



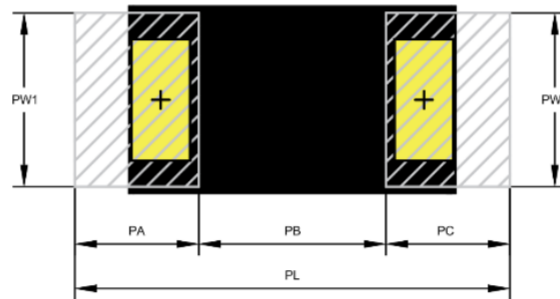
标准尺寸 Standard case dimensions:

Unit: mm [inch]

外壳尺寸 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 焊盘

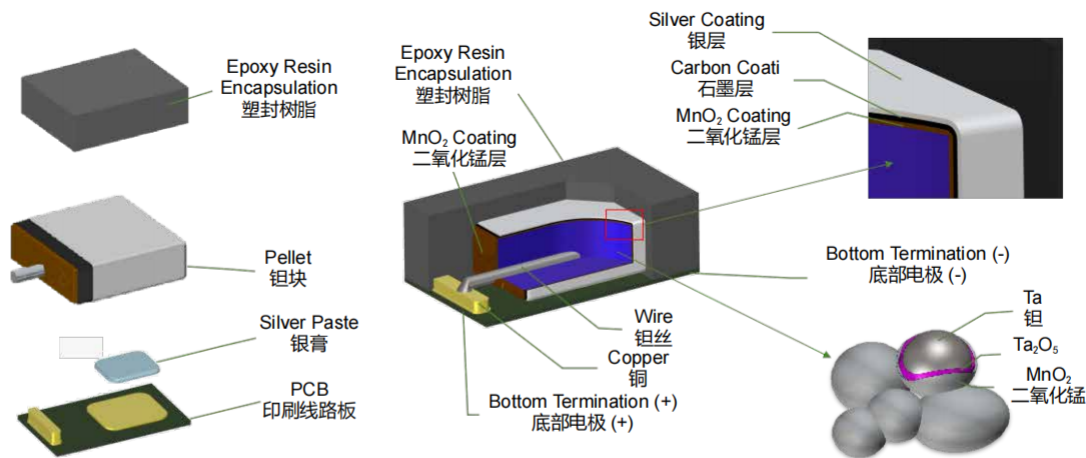
PCB Pads



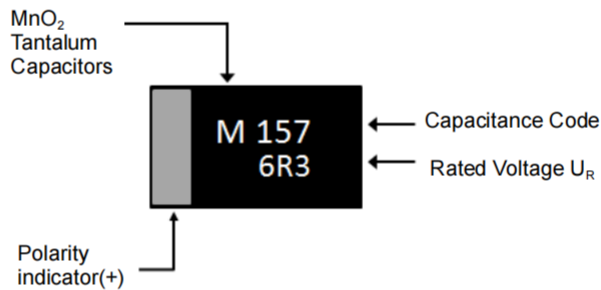
Unit: mm [inch]

外壳尺寸 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]

结构图
Construction



标记
Marking



额定电压代号 Rated Voltage Code

额定电压 Rated Voltage (V)	2.5	4	6.3	10	16	20	25	35	50
电压代码 Voltage Code	2R5	4V	6R3	10V	16V	20V	25V	35V	50V

标称电容量代号 Capacitance Code

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

规格特性 Specifications

Rated Voltage VDC 额定电压	Rated Cap 电容量	Case Code/ Case size 壳号 / 尺寸	Part Number 型号	DCL 漏电流 +25°C 5 Mins Max.	DF 损耗 +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

规格特性 Specifications

Rated Voltage VDC 额定电压	Rated Cap 电容量	Case Code/ Case size 壳号 / 尺寸	Part Number 型号	DCL 漏电 +25°C 5 Mins Max.	DF 损耗 +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

Chip Solid MnO₂
Tantalum Capacitor

Chip Solid Polymer
Tantalum Capacitor

规格特性 Specifications

Rated Voltage VDC 额定电压	Rated Cap 电容量	Case Code/ Case size 壳号 / 尺寸	Part Number 型号	DCL 漏电 +25°C 5 Mins Max.	DF 损耗 +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

规格特性 Specifications

Rated Voltage VDC 额定电压	Rated Cap 电容量	Case Code/ Case size 壳号 / 尺寸	Part Number 型号	DCL 漏电 +25°C 5 Mins Max.	DF 损耗 +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

Chip Solid MnO₂
Tantalum Capacitor

Chip Solid Polymer
Tantalum Capacitor

规格特性 Specifications

Rated Voltage VDC 额定电压	Rated Cap 电容量	Case Code/ Case size 壳号 / 尺寸	Part Number 型号	DCL 漏电 +25°C 5 Mins Max.	DF 损耗 +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

规格特性 Specifications

Rated Voltage VDC 额定电压	Rated Cap 电容量	Case Code/ Case size 壳号 / 尺寸	Part Number 型号	DCL 漏电 +25°C 5 Mins Max.	DF 损耗 +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

Chip Solid MnO₂
Tantalum Capacitor

Chip Solid Polymer
Tantalum Capacitor

规格特性 Specifications

Rated Voltage VDC 额定电压	Rated Cap 电容量	Case Code/ Case size 壳号 / 尺寸	Part Number 型号	DCL 漏电 +25°C 5 Mins Max.	DF 损耗 +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

※ ○表示产品容量精度 (K=±10%, M=±20%);

※ ◎ : Capacitance tolerance code (K=±10%, M=±20%);

※ 备注 : TM 系列湿度敏感等级 (MSL) : 1。

※Note: TM series' moisture sensitivity level (MSL): 1.

※: 可根据客户需求提供其他电气特性产品, 请联系您当地的销售人员。

※: Products with other electrical characteristics can be provided upon customer's request. Please contact your local sales.

降额指引 Derating Guidelines

TM 系列电容是固态电容器, 在推荐的应用电压范围内工作不会出现失效。虽然 TM 电容可以在满额定电压下工作, 但根据经验数据证明, 大多数电路设计人员希望在长期可靠性方面有最低限度的保证。基于行业公认的加速模型, 电压降额可以提供所需可靠性水平证明。由于大多数应用需要长期可靠性保证, 建议设计人员考虑如图所示的电压降额, 以获得最大稳态电压。

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. 额定电压

a. Rated voltage

额定电压是 -55°C ~85°C连续工作时的最大直流工作电压, 如图所示。

Rated voltage is the maximum DC operating voltage for continuous duty at -55°C ~85°C, which is shown in the figure.

b. 类别电压

b. Category voltage

类别电压是在 85°C ~125°C下连续工作的最大直流工作电压, 如图所示。

Category voltage is the maximum DC operating voltage for continuous operation at 85°C ~125°C, which is shown in the figure.

c. 普通电路中推荐的最大工作电压

c. Recommended maximum application voltage in ordinary circuit

工作电压与额定电压的比值对电容器故障有很大影响。请考虑所有特殊可靠性, 并在设计实际电路时适当降低工作电压。推荐普通电路的最大应用电压如图所示。

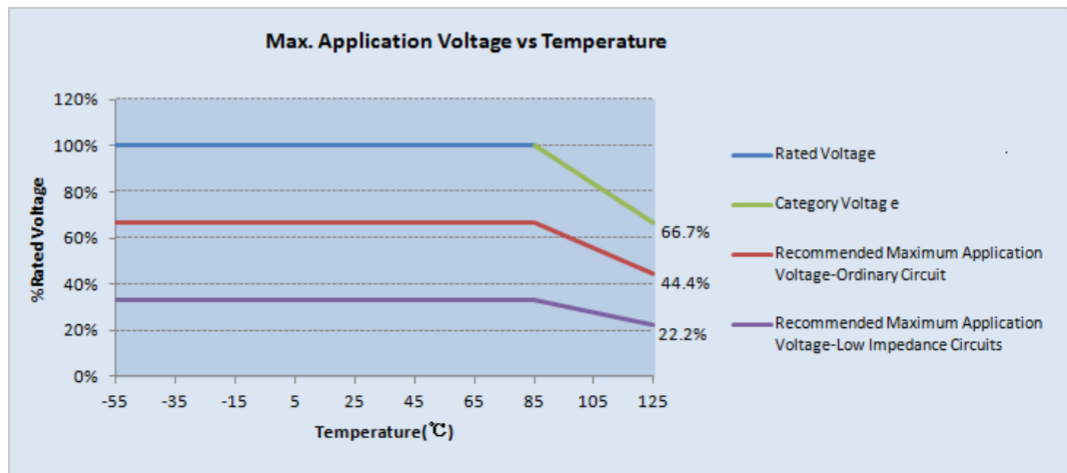
The ratio of operating voltage to rated voltage has a great influence on capacitor failures. Please take all specified reliabilities in to account and derate operating voltage appropriately when a practical circuit is designed. Recommended maximum application voltage ordinary circuit is shown in figure.

d. 低阻抗电路中的建议最大应用电压

d. Recommended maximum application voltage in low impedance circuits

用于电源 (尤其是开关电源) 滤波等低阻抗电路中的钽电容器的工作电压应降至额定电压的三分之一以下, 推荐低阻抗电路的最大应用电压如图所示。

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.



反向电压 Reverse Voltage

- 由于钽电容器具有极性，因此请勿对其施加反向电压。不要将电容器应用于只有交流电的电路。
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.
- 如果没有发生交变，则可以在短时间内向电容器施加下列低反向电压：
 - 25℃时：≤10%UR（额定电压）或 1V（以较低者为准）；
 - 85℃时：≤5%UR（额定电压）或 0.5V（以较低者为准）；
 - 125℃时：额定电压的 1%，最大为 0.1V。
 - If there is no alternation, applying a low reverse voltage which is listed below to capacitor in a short time is approved:
 - At 25℃: ≤10%UR (rated voltage) or 1V (whichever is lower);
 - At 85℃: ≤5%UR (rated voltage) or 0.5V (whichever is lower);
 - At 125℃: 1% of rated voltage, 0.1V for max.
 - 原则上，在测试有应用钽电容器的电路或电容器本身时，禁止忽略极性而使用毫米级电阻。
 - In principle, testing a circuit with tantalum capacitor or capacitor itself by using a resistor gear of millimeters in ignorance of polarity is forbidden
 - 在测量和应用过程中，如果因疏忽而使钽电容器受到不良反向电压的影响，即使其电气特性仍然合格，也请将其丢弃。
 - 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.

浪涌电压 Surge Voltage

浪涌电压是电容器在任何瞬时条件下可能承受的最大电压，包括最大交流脉冲电压、直流偏置电压和任何瞬时电压。有关详细数据，请参阅下面的表格。
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.

额定电压 (U _R) Rated Voltage (U _R)	2.5V	4V	6.3V	10V	16V	20V	25V	35V	50V
浪涌电压 (U _S) Surge Voltage (U _S) @-55℃~85℃	3.3V	5.2V	8V	13V	20V	26V	32V	46V	65V
浪涌电压 (U _S) Surge Voltage (U _S) @ +125℃	2.2V	3.4V	5V	8V	13V	16V	20V	28V	40V

纹波电压 / 纹波电流 Ripple Voltage and Ripple Current

- 请在允许的纹波电压范围内使用电容器
Please use the capacitor within permissible ripple voltage
- The sum of DC bias voltage and the maximum AC branch voltage should not exceed rated voltage during operation.
 - 负峰值交流电压加上直流偏置电压不应超过反向电压的允许限值。
 - The sum of negative peak AC value and DC bias voltage should not exceed the specified reverse voltage.
 - 施加到电容器上的纹波电流会产生有功功率损耗，由于电容器的自身发热，导致发热引起的故障率升高。因此，纹波电流和允许的功率损耗必须得到控制。
 - 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.
 - 电容器的最大纹波电流使用以下公式计算：
 - The maximum ripple current of the capacitor is calculated using the formula：

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

其中：
Where:
I_p 为纹波电流，单位安培，不得超过 3A；
I_p=rms ripple current, amperes, and shall not exceed 3A
ESR 为等效串联电阻，单位欧姆；
ESR= equivalent series resistance, ohms;
K 为纹波电流的温度校正系数：
K= Temperature correction factor for ripple current：

温度℃ Temp℃	纹波电流温度校正系数 K Correction Factor for ripple current K
25℃	1.00
85℃	0.90
125℃	0.40

纹波电压 /
纹波电流
Ripple Voltage
and Ripple
Current

F 为纹波电流的频率校正系数
F=Frequency correction factor for ripple current :

频率 Frequency	纹波电流的频率校正系数 F Frequency correction factor for ripple current F
10kHz	0.80
100kHz	1.00
500kHz	1.15
1MHz	1.20

P 为电容器的最大功率损耗
P= Max. power dissipation of capacitor (W) :

表壳尺寸 Case Size	功率损耗 (W@100kHz/25℃) Power dissipation (W@100kHz/25℃)
A16	0.075
B20	0.085
C20	0.100
C25	0.110
D20	0.125
D28	0.150
D40	0.165