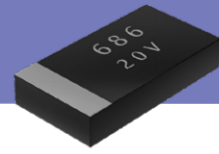


固体片式聚合物钽电容—TP 系列

Chip Solid Polymer Tantalum Capacitors – TP Series



工作温度
Operating Temp

◆ -55°C ~+125°C

特征 Features

- ◆ 聚合物阴极, 安全失效模式
- ◆ 超低 ESR
- ◆ 自修复能力, 高可靠性
- ◆ 工作温度范围内极佳的容量稳定性
- ◆ 高体积利用率
- ◆ 超低漏电流
- ◆ 薄型化
- ◆ Polymer cathode technology, safe failure mode
- ◆ Ultra-low ESR
- ◆ Self-healing capability, high reliability
- ◆ Excellent stability of capacitance within operating temperature range
- ◆ High volume utilization
- ◆ Ultra-low leakage current
- ◆ Thinning

应用 Applications

- ◆ 通讯
- ◆ 消费类电子
- ◆ 仪器仪表
- ◆ AI 服务器
- ◆ 大数据
- ◆ Communication products
- ◆ Consumer electronics
- ◆ Instrumentations
- ◆ AI Servers
- ◆ Big data

产品型号 Product Identification

1	2	3	4	5	6	7
TP	157	D20	M	6R3	B	045

1	分类 Type
TP	聚合物片式钽电容 Polymer Solid Tantalum Chip Capacitor

4	电容公差 Capacitance Tolerance
K	±10%
M	±20%

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

2	电容量 Nominal Capacitance
Example	Nominal Value
155	1.5μF
106	10μF
157	150μF

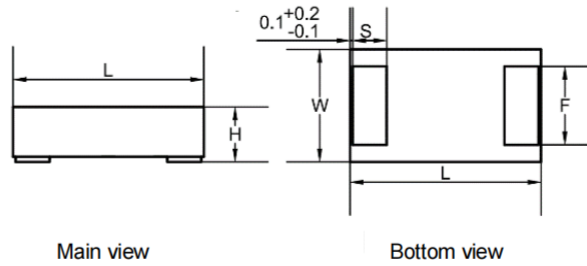
5	额定电压 Rated DC Voltage
2R0	2Vdc
004	4Vdc
6R3	6.3Vdc
010	10Vdc
016	16Vdc
063	63Vdc

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

7	等效串联电阻 ESR
045	45mΩ
050	50mΩ
100	100mΩ

外观尺寸

Shape and Dimensions



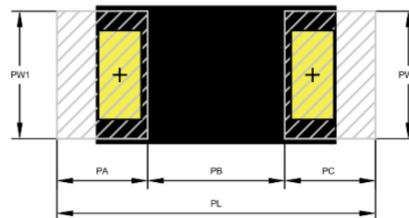
标准尺寸 Standard case dimensions:

Unit: mm [inch]

外壳尺寸 Case Code	EIA	L	W	H	F	S
B12	3528-12	3.50±0.20 [.138±.008]	2.80±0.20 [.11±.008]	1.10±0.10 [.043±.004]	2.20±0.10 [.087±.004]	0.80±0.30 [.031±.012]
B15	3528-15	3.50±0.20 [.138±.008]	2.80±0.20 [.11±.008]	1.40±0.10 [.055±.004]	2.20±0.10 [.087±.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]	1.80±0.10 [.071±.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]
D15	7343-15	7.30±0.30 [.287±.012]	4.30±0.30 [.169±.012]	1.40±0.10 [.055±.004]	2.40±0.10 [.094±.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]
F20	7360-20	7.30±0.30 [.287±.012]	6.00±0.30 [.236±.012]	1.90±0.10 [.075±.004]	3.00±0.10 [.118±.004]	1.50±0.30 [.059±.012]
F35	7360-37	7.30±0.30 [.287±.012]	6.00±0.30 [.236±.012]	3.50±0.20 [.138±.012]	3.00±0.10 [.118±.004]	1.50±0.30 [.059±.012]

PCB 焊盘

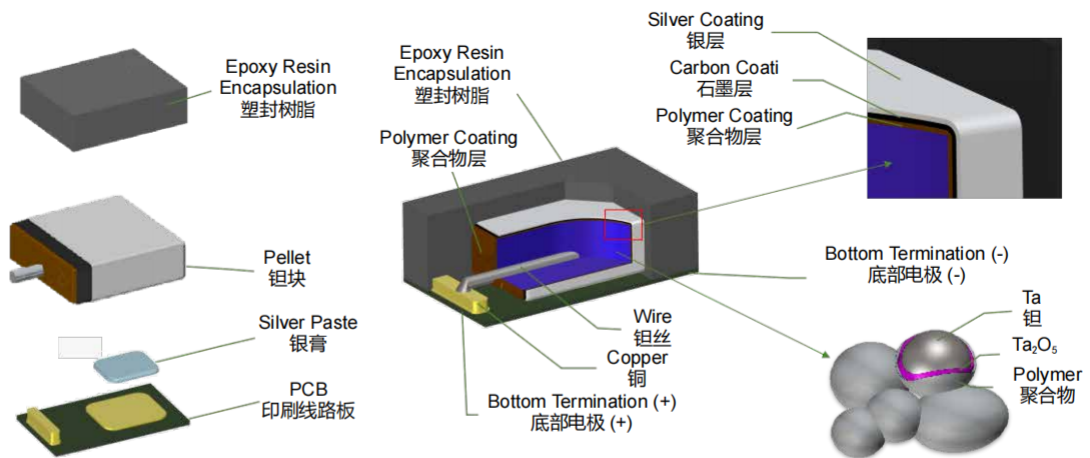
PCB Pads



Unit: mm [inch]

外壳尺寸 Case Code	EIA	PL	PW1	PW2	PA	PB	PC
B12、B15、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]
D15、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]
F20、F35、	7360	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

	2.0	2.5	4	6.3	8.0	10	16	20	25	35	50	63	75	100
电压代码 Voltage Code	2R0	2R5	4V	6R3	8R0	10V	16V	20V	25V	35V	50V	63V	75V	100V

标称电容量代号 Capacitance Code

容量 Capacitance (μF)	1.0	3.3	4.7	6.8	10	15	22	33	47	68
容量代码 Capacitance Code	105	335	475	685	106	156	226	336	476	686
容量 Capacitance (μF)	100	150	220	330	470	680	1000	1200	1500	/
容量代码 Capacitance Code	107	157	227	337	477	687	108	128	158	/

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℃ 5 Mins Max.	DF 损耗 +25℃ 120Hz Max.	ESR +25℃ 100kHz Max.	Ripple Current (rms) +45℃ 100 kHz Max.	Maximum Operating Temperature 最高操作温度	Derating Category 降额类别
V	μF	-	-	μA	%	mΩ	mA	℃	-
2	470	D20/7343-20	TP477D20 ◎ 2R0B040	94	10	40	2600	105	2
2.5	100	B12/3528-12	TP107B12 ◎ 2R5B070	25	8	70	1300	105	2
2.5	100	B20/3528-20	TP107B20 ◎ 2R5B070	25	8	70	1700	105	2
2.5	220	B12/3528-12	TP227B12 ◎ 2R5B070	55	10	70	1300	105	2
2.5	220	B20/3528-20	TP227B20 ◎ 2R5B070	55	10	70	1700	105	2
2.5	220	C25/6032-28	TP227C25 ◎ 2R5B045	55	8	45	2400	105	2
2.5	220	D15/7343-15	TP227D15 ◎ 2R5B040	55	10	40	2500	105	2
2.5	220	D20/7343-20	TP227D20 ◎ 2R5B040	55	10	40	2600	105	2
2.5	220	D28/7343-31	TP227D28 ◎ 2R5B040	55	10	40	2800	105	2
2.5	330	B20/3528-20	TP337B20 ◎ 2R5B070	82.5	8	70	2100	105	2
2.5	330	C20/6032-19	TP337C20 ◎ 2R5B045	82.5	8	45	2200	105	2
2.5	330	C25/6032-28	TP337C25 ◎ 2R5B045	82.5	8	45	2400	105	2
2.5	330	D15/7343-15	TP337D15 ◎ 2R5B040	82.5	10	40	2500	105	2
2.5	330	D20/7343-20	TP337D20 ◎ 2R5B040	82.5	10	40	2600	105	2
2.5	330	D28/7343-31	TP337D28 ◎ 2R5B040	82.5	10	40	2800	105	2
2.5	470	D20/7343-20	TP477D20 ◎ 2R5B040	117.5	10	40	2600	105	2
2.5	470	D28/7343-31	TP477D28 ◎ 2R5B040	117.5	10	40	2800	105	2
2.5	680	D28/7343-31	TP687D28 ◎ 2R5B040	170	10	40	2800	105	2
2.5	680	D40/7343-43	TP687D40 ◎ 2R5B040	170	10	40	3200	105	2
2.5	1000	D40/7343-43	TP108D40 ◎ 2R5B040	250	10	40	3200	105	2
4	47	B12/3528-12	TP476B12 ◎ 004B070	18.8	8	70	1300	105	2
4	68	B20/3528-20	TP686B20 ◎ 004B070	27.2	8	70	1700	105	2
4	100	B12/3528-12	TP107B12 ◎ 004B150	40	8	150	900	105	2
4	100	B12/3528-12	TP107B12 ◎ 004B070	40	8	70	1300	105	2
4	100	B20/3528-20	TP107B20 ◎ 004B070	40	8	70	1700	105	2
4	150	B20/3528-20	TP157B20 ◎ 004B070	60	8	70	1700	105	2
4	150	C25/6032-28	TP157C25 ◎ 004B100	60	8	100	1600	105	2
4	150	C25/6032-28	TP157C25 ◎ 004B050	60	8	50	2200	105	2
4	220	B20/3528-20	TP227B20 ◎ 004B070	88	8	70	1700	105	2
4	220	C25/6032-28	TP227C25 ◎ 004B055	88	8	55	2100	105	2
4	220	D15/7343-15	TP227D15 ◎ 004B050	88	10	50	2300	105	2
4	220	D20/7343-20	TP227D20 ◎ 004B050	88	10	50	2300	105	2
4	220	D20/7343-20	TP227D20 ◎ 004B045	88	10	45	2400	105	2
4	330	C25/6032-28	TP337C25 ◎ 004B055	132	8	55	2100	105	2
4	330	D20/7343-20	TP337D20 ◎ 004B045	132	10	45	2400	105	2
4	330	D28/7343-31	TP337D28 ◎ 004B050	132	10	50	2500	105	2
4	470	D28/7343-31	TP477D28 ◎ 004B050	188	10	50	2500	105	2
4	470	D40/7343-43	TP477D40 ◎ 004B050	188	10	50	2800	105	2
4	680	D40/7343-43	TP687D40 ◎ 004B050	272	10	50	2800	105	2
6.3	15	B12/3528-12	TP156B12 ◎ 6R3B100	9.5	8	100	1100	105	2
6.3	22	B12/3528-12	TP226B12 ◎ 6R3B100	13.9	8	100	1100	105	2
6.3	33	B12/3528-12	TP336B12 ◎ 6R3B070	20.8	8	70	1300	105	2
6.3	33	B15/3528-15	TP336B15 ◎ 6R3B070	20.8	8	70	1500	105	2
6.3	33	C20/6032-19	TP336C20 ◎ 6R3B100	20.8	8	100	1500	105	2
6.3	47	B12/3528-12	TP476B12 ◎ 6R3B070	29.6	8	70	1300	105	2
6.3	47	B15/3528-15	TP476B15 ◎ 6R3B070	29.6	8	70	1500	105	2
6.3	68	B12/3528-12	TP686B12 ◎ 6R3B150	42.8	8	150	900	105	2
6.3	68	B15/3528-15	TP686B15 ◎ 6R3B070	42.8	8	70	1500	105	2
6.3	68	C25/6032-28	TP686C25 ◎ 6R3B100	42.8	8	100	1600	105	2
6.3	100	B12/3528-12	TP107B12 ◎ 6R3B070	63	8	70	1300	105	2
6.3	100	B20/3528-20	TP107B20 ◎ 6R3B070	63	8	70	1700	105	2
6.3	100	C20/6032-19	TP107C20 ◎ 6R3B045	63	8	45	2200	105	2

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.	Maximum Operating Temperature 最高操作温度	Derating Category 降额类别
V	μF	-	-	μA	%	mΩ	mA	°C	-
6.3	100	D15/7343-15	TP107D15 ◎ 6R3B040	63	10	40	2500	105	2
6.3	150	B12/3528-12	TP157B12 ◎ 6R3B060	94.5	8	60	1400	105	2
6.3	150	B15/3528-15	TP157B15 ◎ 6R3B200	94.5	8	200	900	105	2
6.3	150	B15/3528-15	TP157B15 ◎ 6R3B070	94.5	8	70	1500	105	2
6.3	150	B20/3528-20	TP157B20 ◎ 6R3B070	94.5	8	70	1700	105	2
6.3	150	C20/6032-19	TP157C20 ◎ 6R3B045	94.5	8	45	2200	105	2
6.3	150	C25/6032-28	TP157C25 ◎ 6R3B055	94.5	8	55	2100	105	2
6.3	150	D15/7343-15	TP157D15 ◎ 6R3B040	94.5	10	40	2500	105	2
6.3	150	D20/7343-20	TP157D20 ◎ 6R3B045	94.5	10	45	2400	105	2
6.3	150	D28/7343-31	TP157D28 ◎ 6R3B055	94.5	10	55	2400	105	2
6.3	220	C25/6032-28	TP227C25 ◎ 6R3B045	138.6	8	45	2400	105	2
6.3	220	D20/7343-20	TP227D20 ◎ 6R3B040	138.6	10	40	2600	105	2
6.3	220	D28/7343-31	TP227D28 ◎ 6R3B050	138.6	10	50	2500	105	2
6.3	330	D20/7343-20	TP337D20 ◎ 6R3B045	207.9	10	45	2400	105	2
6.3	330	D28/7343-31	TP337D28 ◎ 6R3B045	207.9	10	45	2600	105	2
6.3	330	D40/7343-43	TP337D40 ◎ 6R3B040	207.9	10	40	3200	105	2
6.3	470	D15/7343-15	TP477D15 ◎ 6R3B055	296.1	10	55	2200	85	1
6.3	470	D20/7343-20	TP477D20 ◎ 6R3B055	296.1	10	55	2200	105	1
6.3	470	D40/7343-43	TP477D40 ◎ 6R3B040	296.1	10	40	3200	105	2
6.3	680	D40/7343-43	TP687D40 ◎ 6R3B035	428.4	10	35	3400	105	2
6.3	1000	F20/7360-20	TP108F20 ◎ 6R3B060	630	20	60	2700	85	1
6.3	1200	F35/7360-37	TP128F35 ◎ 6R3B070	756	20	70	2700	85	1
6.3	1500	F35/7360-37	TP158F35 ◎ 6R3B055	945	20	55	3000	85	1
8	22	B12/3528-12	TP226B12 ◎ 008B070	17.6	8	70	1300	105	2
8	33	B15/3528-15	TP336B15 ◎ 008B070	26.4	8	70	1500	105	2
8	47	B15/3528-15	TP476B15 ◎ 008B070	37.6	8	70	1500	105	2
8	150	D20/7343-20	TP157D20 ◎ 008B040	120	10	40	2600	105	2
8	150	D28/7343-31	TP157D28 ◎ 008B055	120	10	55	2400	105	2
10	33	B12/3528-12	TP336B12 ◎ 010B070	33	8	70	1300	105	2
10	33	B20/3528-20	TP336B20 ◎ 010B070	33	8	70	1700	105	2
10	47	B20/3528-20	TP476B20 ◎ 010B070	47	8	70	1700	105	2
10	47	C25/6032-28	TP476C25 ◎ 010B100	47	8	100	1600	105	2
10	68	C25/6032-28	TP686C25 ◎ 010B045	68	8	45	2400	105	2
10	68	D15/7343-15	TP686D15 ◎ 010B040	68	10	40	2500	105	2
10	68	D20/7343-20	TP686D20 ◎ 010B100	68	10	100	1600	105	2
10	68	D20/7343-20	TP686D20 ◎ 010B045	68	10	45	2400	105	2
10	68	D20/7343-20	TP686D20 ◎ 010B040	68	10	40	2600	105	2
10	100	B20/3528-20	TP107B20 ◎ 010B070	100	8	70	1700	105	2
10	100	C25/6032-28	TP107C25 ◎ 010B045	100	8	45	2400	105	2
10	100	D15/7343-15	TP107D15 ◎ 010B040	100	10	40	2500	105	2
10	100	D20/7343-20	TP107D20 ◎ 010B055	100	10	55	2200	105	2
10	100	D20/7343-20	TP107D20 ◎ 010B050	100	10	50	2300	105	2
10	100	D20/7343-20	TP107D20 ◎ 010B045	100	10	45	2400	105	2
10	100	D28/7343-31	TP107D28 ◎ 010B080	100	10	80	2000	105	2
10	150	C25/6032-28	TP157C25 ◎ 010B055	150	8	55	2100	105	2
10	150	D20/7343-20	TP157D20 ◎ 010B040	150	10	40	2600	105	2
10	150	D28/7343-31	TP157D28 ◎ 010B040	150	10	40	2800	105	2
10	220	D20/7343-20	TP227D20 ◎ 010B045	220	10	45	2400	105	2
10	220	D20/7343-20	TP227D20 ◎ 010B040	220	10	40	2600	105	2
10	220	D28/7343-31	TP227D28 ◎ 010B040	220	10	40	2800	105	2
10	220	D40/7343-43	TP227D40 ◎ 010B040	220	10	40	3200	105	2
10	330	D40/7343-43	TP337D40 ◎ 010B040	330	10	40	3200	105	2

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 漏电流 +25℃ 5 Mins Max.	DF 损耗 +25℃ 120Hz Max.	ESR +25℃ 100kHz Max.	Ripple Current (rms) +45℃ 100 kHz Max.	Maximum Operating Temperature 最高操作温度	Derating Category 降额类别
V	μF	-	-	μA	%	mΩ	mA	℃	-
10	470	D40/7343-43	TP477D40 ◎ 010B040	470	10	40	3200	105	2
16	10	B20/3528-20	TP106B20 ◎ 016B100	16	8	100	1400	125	4
16	15	B20/3528-20	TP156B20 ◎ 016B090	24	8	90	1500	125	4
16	22	B20/3528-20	TP226B20 ◎ 016B090	35.2	8	90	1500	125	4
16	22	C25/6032-28	TP226C25 ◎ 016B080	35.2	8	80	1800	125	4
16	33	D15/7343-15	TP336D15 ◎ 016B045	52.8	10	45	2400	125	4
16	33	D20/7343-20	TP336D20 ◎ 016B070	52.8	10	70	2000	125	4
16	33	D20/7343-20	TP336D20 ◎ 016B045	52.8	10	45	2400	125	4
16	47	D15/7343-15	TP476D15 ◎ 016B045	75.2	10	45	2400	125	4
16	47	D20/7343-20	TP476D20 ◎ 016B045	75.2	10	45	2400	125	4
16	68	D15/7343-15	TP686D15 ◎ 016B100	108.8	10	100	1600	125	4
16	68	D15/7343-15	TP686D15 ◎ 016B070	108.8	10	70	1900	125	4
16	68	D15/7343-15	TP686D15 ◎ 016B050	108.8	10	50	2300	125	4
16	68	D20/7343-20	TP686D20 ◎ 016B050	108.8	10	50	2300	125	4
16	100	D15/7343-15	TP107D15 ◎ 016B100	160	10	100	1600	125	4
16	100	D15/7343-15	TP107D15 ◎ 016B070	160	10	70	1900	125	4
16	100	D20/7343-20	TP107D20 ◎ 016B050	160	10	50	2300	125	4
16	100	D28/7343-31	TP107D28 ◎ 016B050	160	10	50	2500	125	4
16	150	D20/7343-20	TP157D20 ◎ 016B070	240	10	70	2000	125	4
16	150	D28/7343-31	TP157D28 ◎ 016B050	240	10	50	2500	125	4
16	150	D40/7343-43	TP157D40 ◎ 016B040	240	10	40	3200	125	4
16	150	D40/7343-43	TP157D40 ◎ 016B080	240	10	80	2200	125	4
16	220	D20/7343-20	TP227D20 ◎ 016B050	352	10	50	2300	125	4
16	220	D28/7343-31	TP227D28 ◎ 016B070	352	10	70	2100	85	1
16	220	D40/7343-43	TP227D40 ◎ 016B050	352	10	50	2800	85	1
16	220	F20/7360-20	TP227F20 ◎ 016B070	352	10	70	2500	85	1
16	330	F20/7360-20	TP337F20 ◎ 016B070	528	10	70	2500	85	1
20	10	B20/3528-20	TP106B20 ◎ 020B100	20	10	100	1400	125	4
20	15	B20/3528-20	TP156B20 ◎ 020B090	30	10	90	1500	125	4
20	22	B20/3528-20	TP226B20 ◎ 020B090	44	8	90	1500	125	4
20	22	D15/7343-15	TP226D15 ◎ 020B070	44	10	70	1900	125	4
20	22	D15/7343-15	TP226D15 ◎ 020B055	44	10	55	2200	125	4
20	22	D20/7343-20	TP226D20 ◎ 020B055	44	10	55	2200	125	4
20	33	B20/3528-20	TP336B20 ◎ 020B090	66	10	90	1500	125	4
20	47	D15/7343-15	TP476D15 ◎ 020B055	94	9	55	2200	125	4
20	47	D20/7343-20	TP476D20 ◎ 020B055	94	9	55	2200	125	4
20	68	D20/7343-20	TP686D20 ◎ 020B100	136	10	100	1600	125	4
20	68	D20/7343-20	TP686D20 ◎ 020B050	136	10	50	2300	125	4
20	100	D15/7343-15	TP107D15 ◎ 020B100	200	10	100	1600	125	4
20	100	D20/7343-20	TP107D20 ◎ 020B100	200	10	100	1600	125	4
20	100	D28/7343-31	TP107D28 ◎ 020B055	200	10	55	2400	125	4
20	150	D20/7343-20	TP157D20 ◎ 020B100	300	10	100	1600	125	4
20	150	D28/7343-31	TP157D28 ◎ 020B100	300	10	100	1800	125	4
25	6.8	B12/3528-12	TP685B12 ◎ 025B100	17	8	100	1100	125	4
25	10	B12/3528-12	TP106B12 ◎ 025B100	25	8	100	1100	125	4
25	10	B20/3528-20	TP106B20 ◎ 025B100	25	8	100	1400	125	4
25	15	B20/3528-20	TP156B20 ◎ 025B100	37.5	8	100	1400	125	4
25	22	B20/3528-20	TP226B20 ◎ 025B100	55	8	100	1400	125	4
25	22	D15/7343-15	TP226D15 ◎ 025B070	55	10	70	1900	125	4
25	22	D20/7343-20	TP226D20 ◎ 025B070	55	10	70	2000	125	4
25	33	D15/7343-15	TP336D15 ◎ 025B070	82.5	10	70	1900	125	4
25	33	D20/7343-20	TP336D20 ◎ 025B070	82.5	10	70	2000	125	4

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.	Maximum Operating Temperature 最高操作温度	Derating Category 降额类别
V	μF	-	-	μA	%	mΩ	mA	°C	-
25	33	D28/7343-31	TP336D28 ◎ 025B070	82.5	10	70	2100	125	4
25	47	D15/7343-15	TP476D15 ◎ 025B100	117.5	10	100	1600	125	4
25	47	D20/7343-20	TP476D20 ◎ 025B100	117.5	10	100	1600	125	4
25	47	D28/7343-31	TP476D28 ◎ 025B100	117.5	10	100	1800	125	4
25	68	D20/7343-20	TP686D20 ◎ 025B070	170	10	70	2000	125	4
25	68	D28/7343-31	TP686D28 ◎ 025B070	170	10	70	2100	125	4
25	100	D20/7343-20	TP107D20 ◎ 025B070	250	10	70	2000	125	4
25	100	D28/7343-31	TP107D28 ◎ 025B070	250	10	70	2100	125	4
25	100	D40/7343-43	TP107D40 ◎ 025B050	250	10	50	2800	125	4
25	150	D28/7343-31	TP157D28 ◎ 025B090	375	10	90	1900	125	4
25	150	D40/7343-43	TP157D40 ◎ 025B060	375	10	60	2600	125	4
35	1	B12/3528-12	TP105B12 ◎ 035B600	3.5	8	600	400	125	4
35	3.3	B20/3528-20	TP335B20 ◎ 035B200	11.6	8	200	1000	125	4
35	3.3	B20/3528-20	TP335B20 ◎ 035B150	11.6	8	150	1200	125	4
35	4.7	B20/3528-20	TP475B20 ◎ 035B200	16.5	8	200	1000	125	4
35	4.7	B20/3528-20	TP475B20 ◎ 035B150	16.5	8	150	1200	125	4
35	6.8	B20/3528-20	TP685B20 ◎ 035B200	23.8	8	200	1000	125	4
35	6.8	B20/3528-20	TP685B20 ◎ 035B150	23.8	8	150	1200	125	4
35	10	B20/3528-20	TP106B20 ◎ 035B200	35	8	200	1000	125	4
35	10	B20/3528-20	TP106B20 ◎ 035B150	35	8	150	1200	125	4
35	22	D15/7343-15	TP226D15 ◎ 035B100	77	10	100	1600	125	4
35	22	D20/7343-20	TP226D20 ◎ 035B100	77	10	100	1600	125	4
35	22	D28/7343-31	TP226D28 ◎ 035B100	77	10	100	1800	125	4
35	33	D20/7343-20	TP336D20 ◎ 035B100	115.5	10	100	1600	125	4
35	33	D28/7343-31	TP336D28 ◎ 035B100	115.5	10	100	1800	125	4
35	47	D15/7343-15	TP476D15 ◎ 035B100	164.5	10	100	1600	125	4
35	47	D15/7343-15	TP476D15 ◎ 035B090	164.5	10	90	1700	125	4
35	47	D20/7343-20	TP476D20 ◎ 035B100	164.5	10	100	1600	125	4
35	47	D28/7343-31	TP476D28 ◎ 035B070	164.5	10	70	2100	125	4
35	68	D20/7343-20	TP686D20 ◎ 035B100	238	10	100	1600	125	4
35	68	D28/7343-31	TP686D28 ◎ 035B100	238	10	100	1800	125	4
35	68	D40/7343-43	TP686D40 ◎ 035B100	238	10	100	2000	125	4
50	3.3	B20/3528-20	TP335B20 ◎ 050B450	16.5	6	450	700	125	4
63	1	B20/3528-20	TP105B20 ◎ 063B450	6.3	6	450	700	125	4
63	4.7	C25/6032-28	TP475C25 ◎ 063B200	29.6	6	200	1100	125	4
75	4.7	D20/7343-20	TP475D20 ◎ 075B200	35.3	10	200	1200	125	4
75	10	D20/7343-20	TP106D20 ◎ 075B150	75	10	150	1300	125	4
100	3.3	D28/7343-31	TP335D28 ◎ 100B600	33	10	600	700	125	4

※ ◎：产品容量精度 (K=±10%, M=±20%)；

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

※ 备注：TP 系列湿度敏感等级 (MSL)：3，如有需要更详细信息，请参考产品包装注意事项；

※Note: TP series' moisture sensitivity level (MSL): 3, for more details, please refer to the cautions on the package bag of products；

※ 降额类别说明请参考降额指引部分。

※The derating category, please refer to the derating guidelines.

※：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。

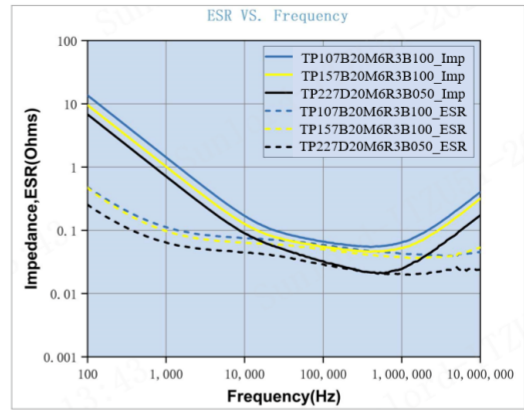
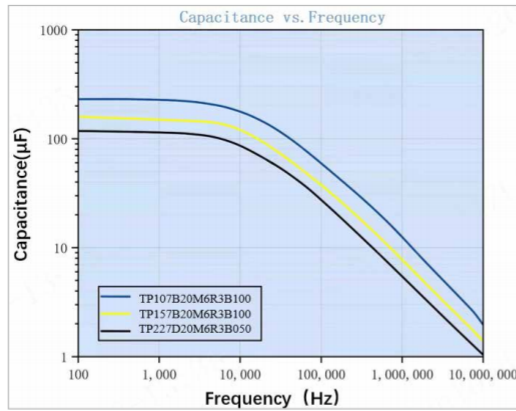
※: Products with other electrical characteristics can be provided upon customer's request. Please contact your local sales.

Chip Solid MnO₂
Tantalum Capacitor

Chip Solid Polymer
Tantalum Capacitor

电气特性

Electrical Characteristics

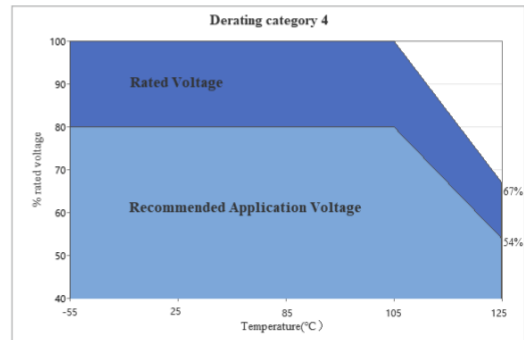
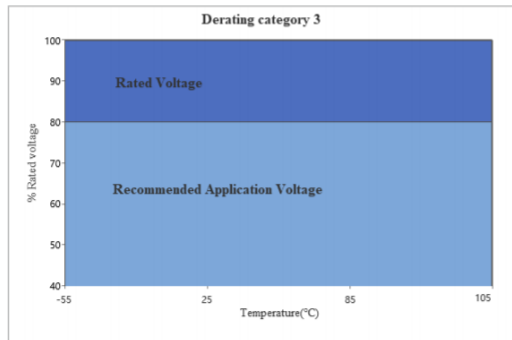
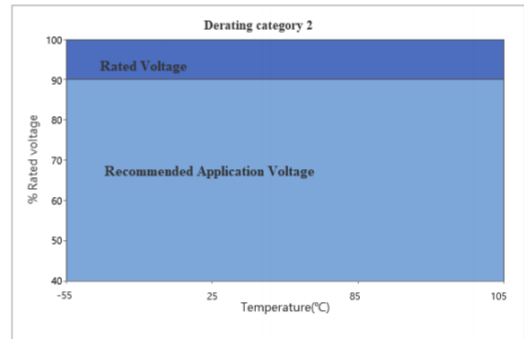
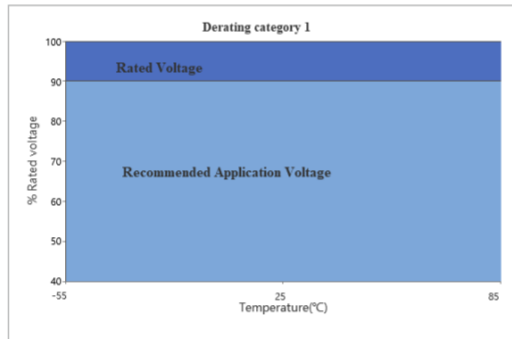


降额指引

Derating Guidelines

TP 系列聚合物钽电容是固态电容器，在推荐的应用电压范围内工作不会出现失效。虽然 TP 系列聚合物钽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。

TP capacitors are solid state capacitors that demonstrate no wearout mechanism when operated within their recommended guidelines. While the TP 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 graph, for the maximum steady state voltage.



纹波电压 / 纹波电流

Ripple Voltage and Ripple Current

允许的交流纹波电压和电流与器件的等效串联电阻 (ESR) 和功率损耗有关。可施加的允许交流纹波电压受两个标准的限制：Permissible AC ripple voltage and current are related to equivalent series resistance (ESR) and the power dissipation capabilities of the device. Permissible AC ripple voltage, which may be applied is limited by two criteria:

a. 正峰值交流电压加上直流偏压 (如有) 不得超过电容器的直流额定电压。

a. The positive peak AC voltage plus the DC bias voltage, if any, must not exceed the DC voltage rating of the capacitor.

b. 负峰值交流电压和偏置电压 (如有) 不得超过反向电压的允许限值。

b. The negative peak AC voltage, in combination with bias voltage, if any, must not exceed the allowable limits specified for reverse voltage.

随着工作环境温度的升高, 必须降低最大功耗。温度补偿要求见下表。

The maximum power dissipation must be reduced with increasing environmental operating temperatures. Refer to the table below for temperature compensation requirements.

纹波电流最大值的温度补偿倍数 Temperature Compensation Multipliers for Maximum Ripple Current				
Max Operational Temperature (Series)	-55°C ≤ T ≤ 45°C	45°C < T ≤ 85°C	85°C < T ≤ 105°C	105°C < T ≤ 125°C
85°C	1	0.7	-	-
105°C	1	0.7	0.25	-
125°C	1	1	0.7	0.25

T= 环境温度 Environmental Temperature

Case Code	EIA Case Code	45°C下温升 30°C的最大功耗 (Pmax) 毫瓦 Maximum Power Dissipation (Pmax) mWatts at 45°C with +30°C Rise
B12	3528-12	120
B15	3528-15	160
B20	3528-20	200
C20	6032-19	220
C25	6032-28	250
D15	7343-15	255
D20	7343-20	270
D28	7343-31	315
D40	7343-43	400
F20	7360-20	440
F35	7360-37	500

浪涌电压

Surge Voltage

浪涌电压是可以施加到电容器的最大电压 (峰值)。浪涌电压不得用于正常运行过程中的定期充电和放电, 也不能作为施加电压的一部分。浪涌电压能力通过在工作温度下应用 1000 次循环来证明。这些部件在每个周期内通过 33 欧姆的电阻器充电 30 秒, 然后通过 33 欧姆电阻器放电。

Surge voltage is the maximum voltage (peak value) which may be applied to the capacitor. The surge voltage must not be applied for periodic charging and discharging in course of normal operation and cannot be part of the application voltage. Surge voltage capability is demonstrated by application of 1,000 cycles at operating temperature. The parts are charged through a 33 Ohm resistor for 30 seconds and then discharged through a 33 Ohm resistor for each cycle.

Rated Voltage (V)	Surge Voltage (V)	Category Voltage (V)	Category Surge Voltage (V)
-55°C to 105°C		up to 125°C	
2.0	2.6	-	-
2.5	3.3	-	-
4.0	5.2	-	-
6.3	8.2	-	-
8.0	10.4	-	-
10	13.0	-	-
16	20.8	-	-
20	26.0	13.4	17.4
25	32.5	16.8	21.8
35	45.5	23.5	30.5
50	65.0	33.5	43.6
63	81.9	42.2	54.9
75	97.5	50.3	65.3
100	110	75.0	87.1

电气特性

Electrical Characteristics

聚合物电解电容器是极性器件，如果极性连接错误，可能会永久损坏。如下表所示，这些器件只允许在短时间内承受较小程度的瞬态电压反转。

Polymer electrolytic capacitors are polar devices and may be permanently damaged or destroyed if connected in the wrong polarity. As shown in the table below, these devices will withstand a small degree of transient voltage reversal for short periods.

Temperature	允许瞬态反向电压 Permissible Transient Reverse Voltage
25°C	15% of Rated Voltage
55°C	10% of Rated Voltage
85°C	5% of Rated Voltage
105°C	3% of Rated Voltage
125°C	1% of Rated Voltage

可靠性

Reliability

当应用电压 U_A 和应用温度 T_A 低于 U_C 和 T_C 时，TP 系列聚合物钽电容的实际寿命预期会增加。一般来说，当 $U_A < 0.9 \cdot U_C$ 和 $T_A < 85^\circ\text{C}$ 时，预期寿命通常会超过大多数硬件的使用寿命（>10 年）。

The actual life expectancy of TP polymer capacitors increases when application voltage, U_A , and application temperature, T_A , are lower than U_C and T_C . As a general guideline, when $U_A < 0.9 \cdot U_C$ and $T_A < 85^\circ\text{C}$, the life expectancy will typically exceed the useful lifetime of most hardware (> 10 years).

TP 系列聚合物钽电容在特定应用电压和温度下的寿命可以使用以下方程进行模拟计算。通过足够的电流来烧断 1 安培的保险丝作为失效的定义。该计算是基于经验结果的估计值，不能作为结果保证。

The lifetime of a TP polymer capacitor at a specific application voltage and temperature can be modeled using the following equations. A failure is defined as passing enough current to blow a 1-amp fuse. The calculation is an estimation based on empirical results and is not a guarantee.

$VAF = \left(\frac{U_C}{U_A}\right)^n$ 其中：where: VAF = 电压引起的加速系数，无单位 acceleration factor due to voltage, unitless U_C = 类别电压，单位 V category voltage, volt U_A = 应用电压，单位 V application voltage, volt $n = 16$ 指数 exponent	$TAF = e^{\left[\frac{E_a}{k} \left(\frac{1}{273+T_A} - \frac{1}{273+T_C}\right)\right]}$ 其中：where: TAF = 估计寿命应用电压和温度，单位年 acceleration factor due to temperature, unitless E_a = 活化能，1.4eV activation energy, 1.4 eV k = 玻尔兹曼常数，$8.617\text{E-}5$ eV/K Boltzmann's constant, $8.617\text{E-}5$ eV/K T_A = 应用温度，$^\circ\text{C}$ application temperature, $^\circ\text{C}$, T_C = 类别温度，$^\circ\text{C}$ category temperature, $^\circ\text{C}$
$AF = VAF * TAF$ 其中：where: AF = 加速系数，无单位 acceleration factor, unitless TAF = 因温度引起的加速系数，无单位 acceleration factor due to temperature, unitless VAF = 因电压引起的加速系数，无单位 acceleration factor due to voltage, unitless	$Life_{U_A, T_A} = Life_{U_C, T_C} * AF$ 其中：where: TAF = 估计寿命应用电压和温度，单位年 acceleration factor due to temperature, unitless E_a = 活化能，1.4eV activation energy, 1.4 eV k = 玻尔兹曼常数，$8.617\text{E-}5$ eV/K Boltzmann's constant, $8.617\text{E-}5$ eV/K T_A = 应用温度，$^\circ\text{C}$ application temperature, $^\circ\text{C}$, T_C = 类别温度，$^\circ\text{C}$ category temperature, $^\circ\text{C}$

Terms:

类别电压 U_C ：在类别温度 T_C 下连续运行的最大推荐峰值 DC 工作电压。

Category voltage, U_C : maximum recommended peak DC operating voltage for continuous operation at the category temperature, T_C .

额定电压 U_R ：在额定温度 T_R 下连续运行的最大推荐峰值 DC 工作电压。

Rated voltage, U_R : maximum recommended peak DC operating voltage for continuous operation up to the rated temperature, T_R .

类别温度 T_C ：最高推荐工作温度。 T_C 温度下电压需要降额使用。

Category temperature, T_C : maximum recommended operating temperature. Voltage derating may be required at T_C .

额定温度 T_R ：无电压降额时的最大推荐工作温度。 T_R 等于或低于 T_C 。

Rated temperature, T_R : maximum recommended operating temperature without voltage derating. T_R is equal to or lower than T_C .

可靠性
Reliability

可靠性表格—常见温度范围分类 Reliability Table – Common temperature range classifications															
85°C (T _R)/ 85°C (T _C)	Rated Voltage (U _R)	2.5	4.0	6.3	8.0	10.0	12.5	16.0	20.0	25.0	35.0	50.0	63.0	75.0	100.0
	Category Voltage (U _C)	2.5	4.0	6.3	8.0	10.0	12.5	16.0	20.0	25.0	35.0	50.0	63.0	75.0	100.0
105°C (T _R)/ 105°C (T _C)	Rated Voltage (U _R)	2.5	4.0	6.3	8.0	10.0	12.5	16.0	20.0	25.0	35.0	50.0	63.0	75.0	100.0
	Category Voltage (U _C)	2.5	4.0	6.3	8.0	10.0	12.5	16.0	20.0	25.0	35.0	50.0	63.0	75.0	100.0
105°C (T _R)/ 125°C (T _C)	Rated Voltage (U _R)	2.5	4.0	6.3	8.0	10.0	12.5	16.0	20.0	25.0	35.0	50.0	63.0	75.0	100.0
	Category Voltage (U _C)	1.7	2.7	4.2	5.4	6.7	8.4	10.7	13.4	16.8	23.5	33.5	42.2	50.3	66.7

Chip Solid MnO₂
Tantalum Capacitor

Chip Solid Polymer
Tantalum Capacitor