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TCK Series 105°C V- chip Aluminum Electrolytic Capacitor

Operating with wide temperature range -40~+105°C
Load life of 1000~2000 hours
Comply with the RoHS directive

SPECIFICATIONS

Items	Characteristics
Operation Temperature Range	-40 ~ +105°C
Voltage Range	4 ~ 450V
Capacitance Range	0.1 ~ 6800μF
Capacitance Tolerance	±20% at 120Hz, 20°C

Leakage Current

Rated Voltage	6.3 ~ 100V		160 ~ 450V
Case size	∅4~∅10	∅12.5~∅16	∅6.3~∅16
Time	after 2 min. (application of rated voltage)	after 1 min. (application of rated voltage)	after 5 min. (application of rated voltage)
Leakage current	≤0.01CV or 3μA, whichever is greater	≤0.03CV or 4μA, whichever is greater	≤0.04CV+100μA, whichever is greater

Dissipation Factor (tan δ)

Measurement frequency: 120Hz, Temperature

Rated Voltage (V)		4	6.3	10	16	25	35	50	63	100	160~250	350~450
tan δ (max.)	∅4~∅10	0.42	0.30	0.26	0.22	0.16	0.14	0.12	0.10	0.10	0.20	0.25
	∅12.5~∅16	0.45	0.38	0.34	0.30	0.26	0.22	0.18	0.14	0.10	0.20	0.25

Stability at Low Temperature

Measurement frequency : 120Hz

Rated Voltage (V)			4	6.3	10	16	25	35	50~63	100	160~250	350~450
Impedance Ratio ZT/Z20 (max.)	∅4~∅10	Z(-25°C)/Z(20°C)	7	4	3	2	2	2	2	3	2	3
		Z(-40°C)/Z(20°C)	15	8	6	4	4	3	3	4	3	6
	∅12.5~∅16	Z(-25°C)/Z(20°C)	7	5	4	3	2	2	2	2	2	4
		Z(-40°C)/Z(20°C)	17	12	10	8	5	4	3	3	6	10

Load Life

After 2000 hrs. (1000 hrs. for ∅4~∅6.3×5.4) application of the rated voltage at 105°C, they meet the characteristics listed below.

Capacitance Change	Within ±20% of initial value for capacitors of 10V or more (Within ±30% of initial value for capacitors of 4V or less)
Dissipation Factor	200% or less of initial specified value
Leakage Current	initial specified value or less

Shelf Life

After leaving capacitors under no load at 105°C for 1000 hours, they meet the specified value for load life characteristics listed above.

Resistance to Soldering Heat

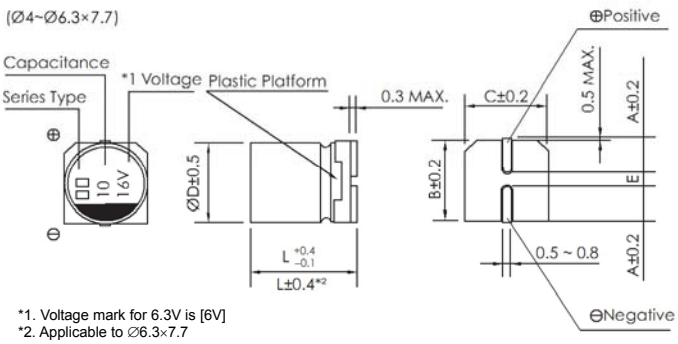
After reflow soldering and restored at room temperat ure, they meet the characteristics listed below.

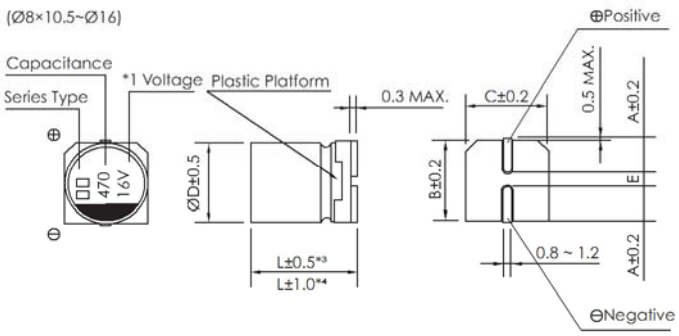
Capacitance Change	Within ±10% of initial value
Dissipation Factor	initial specified value or less
Leakage Current	initial specified value or less

Marking

Black print on the case top.

DRAWING (Unit: mm)





*1. Voltage mark for 6.3V is [6V]
*2. Applicable to ∅6.3×7.7
*3. Applicable to ∅8×10.5~∅10
*4. Applicable to ∅12.5~∅16

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DIMENSIONS (Unit: mm)

ØD x L	4 x 5.4	5 x 5.4	6.3 x 5.4	6.3 x 7.7	8 x 10.5	10 x 10.5	10 x 13.5	12.5 x 13.5	12.5 x 16	16 x 16.5
A	2.0	2.2	2.6	2.6	3.0	3.3	3.3	4.9	4.9	5.8
B	4.3	5.3	6.6	6.6	8.4	10.4	10.4	13.0	13.0	17.0
C	4.3	5.3	6.6	6.6	8.4	10.4	10.4	13.0	13.0	17.0
E ± 0.2	1.0	1.4	1.9	1.9	3.1	4.7	4.7	4.7	4.7	6.4
L	5.4	5.4	5.4	7.7	10.5	10.5	13.5	13.5	16.0	16.5

DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

•Case size ØD×L(mm), ripple current (mA rms) at 105°C, 120Hz

WV / Code / μF		4V		6.3 V		10 V		16 V		25 V	
		Size	Ripple current	Size	Ripple current	Size	Ripple current	Size	Ripple current	Size	Ripple current
4.7	475									4 × 5.4	13
10	106							4 × 5.4	18	5 × 5.4 (4 × 5.4)	20 (14)
22	226			4 × 5.4	22	5 × 5.4 (4 × 5.4)	25 (20)	5 × 5.4 (4 × 5.4)	27 (20)	6.3 × 5.4 (5 × 5.4)	36 (25)
33	336	5 × 5.4 (4 × 5.4)	30 (18)	5 × 5.4 (4 × 5.4)	27 (22)	5 × 5.4 (4 × 5.4)	30 (22)	6.3 × 5.4 (5 × 5.4)	40 (28)	6.3 × 5.4 (5 × 5.4)	44 (29)
47	476	5 × 5.4 (4 × 5.4)	36 (24)	5 × 5.4 (4 × 5.4)	33 (25)	5 × 5.4	30	6.3 × 5.4 (5 × 5.4)	48 (31)	6.3 × 5.4	48
100	107	6.3 × 5.4 (5 × 5.4)	60 (43)	6.3 × 5.4 (5 × 5.4)	50 (39)	6.3 × 5.4 (5 × 5.4)	53 (45)	6.3 × 5.4	60	6.3 × 7.7	91
150	157	6.3 × 5.4	52	6.3 × 5.4	55	6.3 × 5.4	62	6.3 × 7.7	95	8 × 10.5 (6.3 × 7.7)	140 (100)
220	227	6.3 × 5.4	57	6.3 × 7.7 (6.3 × 5.4)	105 (67)	6.3 × 7.7	105	8 × 10.5 (6.3 × 7.7)	150 (105)	8 × 10.5	175
330	337	6.3 × 7.7	100	6.3 × 7.7	105	8×10.5	196	8 × 10.5	195	10 × 10.5 (8 × 10.5)	240 (220)
470	477	6.3 × 7.7	105	8 × 10.5 (6.3 x 7.7)	210 (120)	10 × 10.5 (8 × 10.5)	260 (210)	10 × 10.5 (8 × 10.5)	295 (230)	10 × 10.5	280
680	687	8 × 10.5	210	8 × 10.5	210	10 × 10.5	270	10 × 10.5	315	10 × 13.5	400
1000	108	8 × 10.5	230	10 × 10.5 (8 × 10.5)	300 (230)	10 × 10.5	315	12.5 × 13.5 (10 × 13.5) (10 × 10.5)	500 (390) (340)	12.5 × 13.5	580
1500	158	10 × 10.5	315	10 × 13.5 (10 × 10.5)	450 (315)	10 × 13.5	460	12.5 × 13.5	550	12.5 × 16	850
2200	228	10 × 13.5 (10 × 10.5)	440 （340）	12.5 × 13.5 (10 × 13.5)	620 (500)	12.5 × 13.5	680	16 × 16.5 (12.5 × 16)	950 (750)	16 × 16.5	1050
3300	338	10 × 13.5	490	12.5 × 16 (12.5 × 13.5)	700 (660)	16 × 16.5	1000	16 × 16.5	1000		
4700	478	12.5 × 13.5	600	16 × 16.5	1000						
6800	688	16 × 16.5 (12.5 × 16)	950 （650）								

WV / Code / μF		35 V		50 V		63 V		100 V	
		Size	Ripple current	Size	Ripple current	Size	Ripple current	Size	Ripple current
0.1	104			4 × 5.4	0.7	4 × 5.4	0.7		
0.22	224			4 × 5.4	1.6	4 × 5.4	1.6		
0.33	334			4 × 5.4	2.5	4 × 5.4	2.5		
0.47	474			4 × 5.4	3.5	4 × 5.4	3.5		
1	105			4 × 5.4	7	4 × 5.4	7	4 × 5.4	7
2.2	225			4 × 5.4	11	4 × 5.4	11	6.3 × 5.4	14
3.3	335	4 × 5.4	13	4 × 5.4	13	5 × 5.4	13	6.3 × 7.7 (6.3 × 5.4)	32 (20)
4.7	475	4 × 5.4	14	5 × 5.4 (4 × 5.4)	16 (13)	5 × 5.4	16	6.3 × 7.7 (6.3 × 5.4)	35 (21)
10	106	5 × 5.4 (4 × 5.4)	21 (14)	6.3 × 5.4	24	6.3 × 7.7 (6.3 × 5.4)	39 (24)	8 × 10.5 (6.3 × 7.7)	77 (35)
22	226	6.3 × 5.4 (5 × 5.4)	38 (30)	6.3 × 7.7 (6.3 × 5.4)	51 (42)	8 × 10.5 (6.3 × 7.7)	98 (49)	10 × 10.5 (8 × 10.5)	126 (84)
33	336	6.3 × 5.4	42	6.3 × 7.7	60	8 × 10.5	112	10 × 10.5	133
47	476	6.3 × 7.7 (6.3 × 5.4)	70 (50)	8 × 10.5 (6.3 × 7.7)	120 (63)	10 × 10.5 (8 × 10.5)	160 (119)	12.5 × 13.5 (10 × 13.5) (10 × 10.5)	250 (160) (140)
68	686					Case size	Ripple current	12.5 x 13.5 (10 x 13.5)	300 (180)

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DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

Case size ∅D×L(mm), ripple current (mA rms) at 105°C, 120Hz

WV / Code / μF		35 V		50 V		63 V		100 V		160 V	
		Size	Ripple current	Size	Ripple current	Size	Ripple current	Size	Ripple current	Size	Ripple current
22	226									10 × 13.5	50
33	336									12.5 × 13.5	95
47	476									12.5 × 13.5 (16 × 16.5)	205 (240)
100	107	8 × 10.5 (6.3 × 7.7)	120 (84)	10 × 10.5 (8 × 10.5)	170 (140)	12.5 × 13.5 (10 × 13.5) (10 × 10.5)	270 (210) (196)	16 × 16.5 (12.5 x 13.5)	450 (380)	16 × 16.5	250
150	157	8 × 10.5	155	10 × 10.5	170	10 × 13.5	225				
220	227	10 × 10.5 (8 × 10.5)	220 (190)	10 × 13.5 (10 × 10.5)	280 (220)	16 × 16.5 (12.5 × 13.5)	560 (470)	16 × 16.5	550		
330	337	10 × 10.5	245	16 × 16.5 (12.5 × 13.5) (10 x 13.5)	600 (420) (295)	16 × 16.5 (12.5 × 16)	700 (510)				
470	477	12.5 × 13.5 (10 × 13.5)	520 (375)	16 × 16.5 (12.5 × 16)	700 (520)	16 × 16.5	750				
680	687	12.5 × 13.5	530	16 × 16.5	750						
1000	108	16 × 16.5 (12.5 × 16)	750 (600)								

WV / Code / μF		200 V		250 V		350 V		400 V		450 V	
		Size	Ripple current	Size	Ripple current	Size	Ripple current	Size	Ripple current	Size	Ripple current
3.3	335							10 × 13.5	40	10 × 13.5	40
4.7	475			10 × 13.5		10 × 13.5	85	10 × 13.5 (12.5 × 13.5)	45 (48)	10 × 13.5 (12.5 × 13.5)	42 45
10	106	10 × 13.5	75	10 × 13.5	75	12.5 × 13.5	105	12.5 × 13.5	50	12.5 × 13.5	55
22	226	12.5 × 13.5	105	12.5 × 13.5	105	16 × 16.5	130	16 × 16.5	85	16 × 16.5	85
33	336	12.5 × 13.5	120	16 × 16.5	135						
47	476	16 × 16.5	220								
100	107										

FREQUENCY COEFFICIENT OF ALLOWABLE RIPPLE CURRENT

Frequency			50Hz	120Hz	300Hz	1KHz	10KHz~
Coefficient	∅4 ~ ∅10	0.1 ~ 68μF	0.70	1.00	1.17	1.36	1.50
		100 ~ 3300μF	0.85	1.00	1.08	1.20	1.30
	∅12.5 ~ ∅16	~ 68μF	0.75	1.00	1.35	1.57	2.00
		100 ~ 680μF	0.80	1.00	1.23	1.34	1.50
		1000 ~ 6800μF	0.85	1.00	1.10	1.13	1.15

■ Package Quantity

Size ∅D × L (mm)	Quantity per Reel	Reels in Box	Quantity in Box/Pcs	3 Inbox per cartons (pcs)
4 × 5.4/5.8	2,000	6	12,000	36,000
5 × 5.4/5.8	1,000	6	6,000	18,000
6.3 × 5.4/5.8	1,000	5	5,000	15,000
6.3 × 7.7	1,000	5	5,000	15,000
8 × 10.5	500	4	2,000	6,000
10 × 10.5	500	4	2,000	6,000
10 × 13.5	500	4	2,000	6,000
12.5 × 13.5	250	3	750	2,250
12.5 × 16	200/150*	3	600/450*	1,800/1,350*