

TCS Series 85°C V- chip Aluminum Electrolytic Capacitor

Designed for surface mounting on high density circuit board.

Operating with general temperature range -55~+85°C

Endurance 2000 hours

RoHS & REACH compliant, Halogen-free

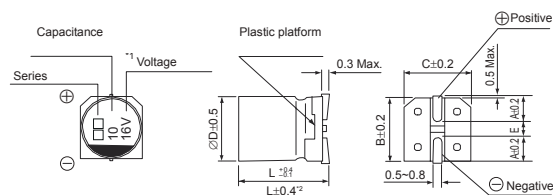


SPECIFICATIONS

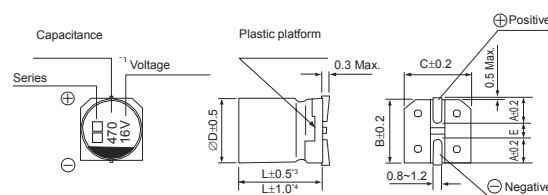
Items	Characteristics												
Operation Temperature Range	-55 ~ +85°C				-40 ~ +85°C				-25 ~ +85°C				
Voltage Range	4 ~ 100V				160 ~ 400V				450V				
Capacitance Range	0.1 ~ 10000μF				3.3 ~ 100μF				3.3 ~ 33μF				
Capacitance Tolerance	±20% at 120Hz, 20°C												
Leakage Current	Rated Voltage	6.3 ~ 100V								160 ~ 450V			
	Case size	Ø4~Ø10				Ø12.5~Ø18				Ø6.3~Ø18			
	Time	After 2 min. application of rated voltage at 20°C				After 1 min. application of rated voltage at 20°C				After 5 min. application of rated voltage at 20°C			
	Leakage current	≤0.01CV or 3μA, whichever is greater				≤0.03CV or 4μA, whichever is greater				≤0.04CV+100μA, whichever is greater			
C: Nominal capacitance (μF) , V: Rated voltage (V)													
Dissipation Factor (tan δ)	Measurement frequency : 120Hz, Temperature: 20°C												
	Rated Voltage (V)	4	6.3	10	16	25	35	50	63	100	160~250	350~450	
	tan δ (max.)	Ø4~Ø10	0.42	0.28	0.24	0.20	0.14	0.12	0.12	0.10	0.10	0.20	0.25
		Ø12.5~Ø18	0.45	0.38	0.34	0.30	0.28	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	50~100	160~250	350~450		
	Impedance Ratio ZT/Z20 (max.)	Ø4~Ø10	Z(-25°C)/Z(20°C)	7	4	3	2	2	2	2	2	3	
			Z(-55°C)/Z(20°C)	15	8	6	4	4	3	3	3	6	
		Ø12.5~Ø18	Z(-25°C)/Z(20°C)	7	5	4	3	2	2	2	2	2	4
Z(-55°C)/Z(20°C)			17	12	10	8	5	4	3	6	10		
Load Life	After 2000 hours application of the rated voltage at 85°C, they meet the characteristics listed below.												
	Capacitance Change		Within ±20% of initial value (Within ±30% of initial value for 4V)										
	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 85°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 temperature, 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)

(Ø4~Ø6.3×7.7)



(Ø8×10.5~Ø18)



*1. Voltage mark for 6.3V is [6V]

*2. Applicable to Ø6.3×7.7

*3. Applicable to Ø8×10.5~Ø10

*4. Applicable to Ø12.5~Ø18

DIMENSIONS (Unit: mm)

ØD x L	4 x 5.4	5 x 5.4	6.3 x 5.4 / 7.7	8 x 10.5	10 x 10.5 / 13.5	12.5 x 13.5 / 16	16 x 16.5	18 x 16.5 / 18.5
A	2.0	2.2	2.6	3.0	3.3	4.9	5.8	6.2
B	4.3	5.3	6.6	8.4	10.4	13.0	17.0	19.0
C	4.3	5.3	6.6	8.4	10.4	13.0	17.0	19.0
E ± 0.2	1.0	1.4	1.9	3.1	4.7	4.7	6.4	6.4
L	5.4	5.4	5.4 / 7.7	10.5	10.5 / 13.5	13.5 / 16.0	16.5	16.5 / 18.5

DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV µF Code	4		6.3		10		16		25	
	Size	Ripple current	Size	Ripple current	Size	Ripple current	Size	Ripple current	Size	Ripple current
4.7 475									4 x 5.4	19
10 106							4 x 5.4	25	5 x 5.4 (4 x 5.4)	28 (20)
15 156							4 x 5.4	28	5 x 5.4	34
22 226			4 x 5.4	31	5 x 5.4 (4 x 5.4)	35 (28)	5 x 5.4 (4 x 5.4)	39 (28)	6.3 x 5.4 (5 x 5.4)	52 (35)
33 336	4 x 5.4	26	5 x 5.4 (4 x 5.4)	39 (31)	5 x 5.4 (4 x 5.4)	43 (32)	6.3 x 5.4 (5 x 5.4)	57 (40)	6.3 x 5.4 (5 x 5.4)	63 (42)
47 476	4 x 5.4	34	5 x 5.4 (4 x 5.4)	47 (36)	5 x 5.4	43	6.3 x 5.4 (5 x 5.4)	68 (44)	6.3 x 5.4	68
56 566	4 x 5.4	39	5 x 5.4	46	6.3 x 5.4	57	6.3 x 5.4	74	6.3 x 5.4	82
68 686	5 x 5.4	45	6.3 x 5.4 (5 x 5.4)	62 (52)	6.3 x 5.4	72	6.3 x 5.4	80	6.3 x 5.4	94
100 107	5 x 5.4	61	6.3 x 5.4 (5 x 5.4)	71 (55)	6.3 x 5.4 (5 x 5.4)	76 (70)	6.3 x 5.4	86	6.3 x 7.7	130
150 157	6.3 x 5.4	74	6.3 x 5.4	78	6.3 x 5.4	88	6.3 x 7.7	135	8 x 10.5 (6.3 x 7.7)	200 (130)
220 227	6.3 x 5.4	82	6.3 x 5.4	95	6.3 x 7.7	150	8 x 10.5 (6.3 x 7.7)	215 (150)	8 x 10.5	250
330 337	6.3 x 7.7	150	6.3 x 7.7	150	8 x 10.5	280	8 x 10.5	280	10 x 10.5 (8 x 10.5)	340 (310)
470 477	6.3 x 7.7	150	8 x 10.5 (6.3 x 7.7)	300 (150)	10 x 10.5 (8 x 10.5)	320 (300)	10 x 10.5 (8 x 10.5)	420 (330)	10 x 10.5	400
680 687	8 x 10.5	300	8 x 10.5	300	10 x 10.5	380	10 x 10.5	450	10 x 13.5	550
1000 108	8 x 10.5	330	10 x 10.5 (8 x 10.5)	430 (330)	10 x 10.5	450	12.5 x 13.5 (10 x 13.5) (10 x 10.5)	710 (550) (490)	12.5 x 13.5	820
1500 158	10 x 10.5	450	10 x 13.5 (10 x 10.5)	650 (450)	10 x 13.5	650	12.5 x 13.5	750	12.5 x 16	1000
2200 228	10 x 13.5 (10 x 10.5)	620 (480)	12.5 x 13.5 (10 x 13.5)	890 (720)	12.5 x 13.5	960	16 x 16.5 (12.5 x 16)	1150 (1000)	16 x 16.5	1250
3300 338	10 x 13.5	700	12.5 x 16 (12.5 x 13.5)	1000 (900)	16 x 16.5 (12.5 x 16)	1300 (1050)	16 x 16.5	1350	18 x 16.5	1450
4700 478	12.5 x 13.5	850	16 x 16.5	1400	16 x 16.5	1450	18 x 16.5	1600	18 x 18.5	1750
6800 688	16 x 16.5 (12.5 x 16)	1350 (900)	18 x 16.5	1700	18 x 16.5	1700	18 x 18.5	2000		
10000 109			18 x 18.5	2000	18 x 18.5	2000				

WV µF Code	35		50		63		100	
	Size	Ripple current	Size	Ripple current	Size	Ripple current	Size	Ripple current
0.1 104			4 x 5.4	1.0	4 x 5.4	1.0		
0.22 224			4 x 5.4	2.3	4 x 5.4	2.3		
0.33 334			4 x 5.4	3.5	4 x 5.4	3.5		
0.47 474			4 x 5.4	5.0	4 x 5.4	5.0		
1 105			4 x 5.4	10	4 x 5.4	10	4 x 5.4	10
1.5 155			4 x 5.4	12	4 x 5.4	12	6.3 x 5.4	15
2.2 225			4 x 5.4	15	4 x 5.4	15	6.3 x 5.4	20
3.3 335	4 x 5.4	18	4 x 5.4	18	5 x 5.4	20	6.3 x 7.7 (6.3 x 5.4)	45 (28)
4.7 475	4 x 5.4	20	5 x 5.4 (4 x 5.4)	23 (19)	5 x 5.4	23	6.3 x 7.7 (6.3 x 5.4)	50 (30)
10 106	5 x 5.4 (4 x 5.4)	30 (20)	6.3 x 5.4 (5 x 5.4)	34 (27)	6.3 x 7.7 (6.3 x 5.4)	55 (34)	8 x 10.5 (6.3 x 7.7)	110 (50)
22 226	6.3 x 5.4 (5 x 5.4)	54 (42)	6.3 x 5.4	60	8 x 10.5 (6.3 x 7.7)	140 (70)	10 x 10.5 (8 x 10.5)	180 (120)
33 336	6.3 x 5.4	60	6.3 x 7.7	85	8 x 10.5 (6.3 x 7.7)	160 (85)	10 x 10.5	190
47 476	6.3 x 5.4 (6.3 x 7.7)	70 (165)	10 x 10.5 (8 x 10.5) (6.3 x 7.7)	130 (110) (90)	10 x 10.5 (8 x 10.5)	230 (170)		

•Case size ØD×L(mm), ripple current (mA rms) at 85°C, 120Hz

DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV μF	Code	35		50		63		100		160	
		Size	Ripple current	Size	Ripple current	Size	Ripple current	Size	Ripple current	Size	Ripple current
22	226									10 × 13.5	100
33	336									12.5 × 13.5	290
47	476							(10 × 10.5)	(240)	12.5 × 13.5 (16 × 16.5)	300 (370)
56	566	6.3 × 7.7	80	6.3 × 7.7	110	10 × 10.5	250			12.5 × 16	390
68	686	6.3 × 7.7	110	8 × 10.5	170	10 × 10.5	260			16 × 16.5	500
100	107	8 × 10.5 (6.3 × 7.7)	175 (120)	10 × 10.5 (8 × 10.5)	240 (200)	12.5 × 13.5 (10 × 13.5) (10 × 10.5)	380 (290) (280)	12.5 × 13.5	440	16 × 16.5 (18 × 16.5)	650 (690)
150	157	8 × 10.5	220	10 × 10.5	240	10 × 13.5	310	12.5 × 13.5	540		
220	227	10 × 10.5 (8 × 10.5)	310 (270)	10 × 13.5 (10 × 10.5)	400 (320)	12.5 × 13.5	580	16 × 16.5	700		
330	337	10 × 10.5	350	12.5 × 13.5 (10 × 13.5)	600 (420)	16 × 16.5 (12.5 × 16)	820 (720)	18 × 16.5	780		
470	477	12.5 × 13.5 (10 × 13.5) (10 × 10.5)	600 (530) (400)	16 × 16.5 (12.5 × 16)	850 (740)	16 × 16.5	950				
680	687	12.5 × 13.5	750	16 × 16.5	950	18 × 16.5	1100				
1000	108	16 × 16.5 (12.5 × 16)	1100 (800)	18 × 16.5	1350						
2200	228	18 × 16.5	1450								
3300	338	18 × 18.5	1750								

WV μF	Code	200		250		350		400		450	
		Size	Ripple current	Size	Ripple current	Size	Ripple current	Size	Ripple current	Size	Ripple current
3.3	335							10 × 13.5	80	10 × 13.5	80
4.7	475					10 × 13.5	115	10 × 13.5 (12.5 × 13.5)	100 (120)	10 × 13.5 (12.5 × 13.5)	100 (120)
10	106	10 × 13.5	135	10 × 13.5	135	12.5 × 13.5	120	12.5 × 13.5	120	12.5 × 13.5 (12.5 × 16)	120 (130)
22	226	12.5 × 13.5	240	12.5 × 13.5	150	16 × 16.5	140	16 × 16.5	140	16 × 16.5	140
33	336	12.5 × 13.5	300	12.5 × 16 (16 × 16.5)	240 (300)	16 × 16.5	140	16 × 16.5	140	18 × 16.5	180
47	476	16 × 16.5	420	16 × 16.5	340	18 × 16.5	280	18 × 16.5	280		
100	107	16 × 16.5	420	18 × 16.5	440	18 × 18.5	350	18 × 18.5	350		

•Case size ØD×L(mm), ripple current (mA rms) at 85°C, 120Hz

FREQUENCY COEFFICIENT OF ALLOWABLE RIPPLE CURRENT

Frequency			50Hz	120Hz	300Hz	1KHz	10KHz~
Coefficient	Ø4 ~ Ø10	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
	Ø12.5 ~ Ø18	~ 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

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5~10°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.

How to order

TCS	A	106	M	0035	0505	R	000
Type	Material Code	Capacitance Code	Tolerance	Rated Voltage	Size Code	Package Code	Suffix Indicate Special Requirement
TCS	A: Aluminum Cap	pF Code: 1st two digits	M: +/-20%	Code 0035: 35VDC	Code 0505: Size 5x5.4mm	R: Tape & Reel	000: Indicating Standard
	For TCS, TCK TFZ TKZ....etc.	represent significant figures 3rd digit represents multiplier (number of zeros to follow) 106 = 10uF 107 = 100uF		<u>For DC Voltage</u> 0006: 6.3VDC 0035: 35VDC 0100: 100VDC	<u>Size Code for V-chip E-cap</u> 0405: Size 4x5.4mm 0605: Size 6.3x5.4mm 0607: Size 6.3x7.7mm 1010: Size 10x10.5mm		