

TWA SERIES

COTS-Plus – Wet Electrolytic Tantalum Capacitor

GENERAL DESCRIPTION

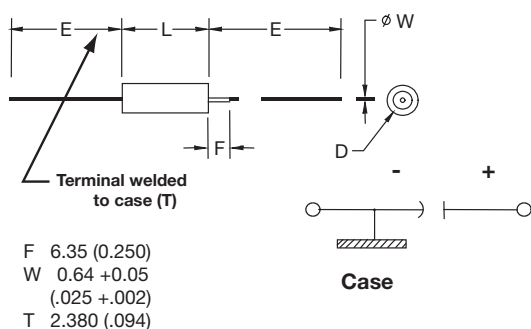
The TWA series is an axial leaded wet electrolytic tantalum capacitor with a unique cathode system that promotes very high CV (Capacitance/Voltage) per cc in traditional MIL-PRF-39006 case sizes.

The series also utilizes a welded tantalum can and header assembly to provide a hermetic seal and subsequent long operating lifetime.

The construction is similar to DLA 93026 with capability of meeting harsh shock and vibration conditions.



OUTLINE DIMENSIONS



CASE DIMENSIONS: millimeters (inches)

DLA Case Size	Case Size	L +0.79 (0.031) -0.41 (0.016)	D Without Insulating Sleeve ±0.41 (0.016)	D With Insulating Sleeve Max	E ±6.35 (0.250)
T1	A	11.51 (0.453)	4.78 (0.188)	5.56 (0.219)	38.10 (1.500)
T2	B	16.28 (0.641)	7.14 (0.281)	7.92 (0.312)	57.15 (2.250)
T3	D	19.46 (0.766)	9.52 (0.375)	10.31 (0.406)	57.15 (2.250)
T4	E	26.97 (1.062)	9.52 (0.375)	10.31 (0.406)	57.15 (2.250)

VOLTAGE RATINGS (Operating Temperature -55°C to 125°C)

Voltage (DC)									
Rated Voltage: (V _R)	85°C	15	25	30	50	60	75	100	125
Derated Voltage: (V _D)	125°C	10	15	20	30	40	50	65	85
Surge Voltage: (V _S)	85°C	17.3	28.8	34.5	57.5	69	86.3	115	144

HOW TO ORDER PART NUMBER:

TWA	E	407	*	100		B	#	Z	0	^	00
Type	Case Size	Capacitance Code pF code: 1st two digits represent significant figures 3rd digit represents multiplier (number of zeros to follow)	Capacitance Tolerance K = ±10% M = ±20%	Voltage Code	Insulation Sleeve C = Without Sleeve S = With Sleeve	Packaging B = Tray Pack	Qualification E = Extended range S = COTS+ L = Group A	Reliability Z = Non-ER	Qualification Level 0 = N/A	Termination Finish 0 = Sn/Pb 60/40 7 = Matte tin	Custom Test Options 00 = Standard 01 = Random vibration*



* Please contact the factory for additional details and availability.

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RIPPLE CURRENT MULTIPLIERS vs. Frequency, temperature and applied voltage^{1/2/}

Frequency of Applied Ripple Current		120Hz				800Hz				1kHz			
Ambient Still Air Temperature (°C)		≤55	85	105	125	≤55	85	105	125	≤55	85	105	125
% of 85°C	100%	0.60	0.39	—	—	0.71	0.43	—	—	0.72	0.45	—	—
	90%	0.60	0.46	—	—	0.71	0.55	—	—	0.72	0.55	—	—
Rated	80%	0.60	0.52	0.35	—	0.71	0.62	0.42	—	0.72	0.62	0.42	—
Peak Voltage	70%	0.60	0.58	0.44	—	0.71	0.69	0.52	—	0.72	0.70	0.52	—
	66-2/3%	0.60	0.60	0.46	0.27	0.71	0.71	0.55	0.32	0.72	0.72	0.55	0.32

Frequency of Applied Ripple Current		10kHz				40kHz				100kHz			
Ambient Still Air Temperature (°C)		≤55	85	105	125	≤55	85	105	125	≤55	85	105	125
% of 85°C	100%	0.88	0.55	—	—	1.00	0.63	—	—	1.10	0.69	—	—
	90%	0.88	0.67	—	—	1.00	0.77	—	—	1.10	0.85	—	—
Rated	80%	0.88	0.76	0.52	—	1.00	0.87	0.59	—	1.10	0.96	0.65	—
Peak Voltage	70%	0.88	0.85	0.64	—	1.00	0.97	0.73	—	1.10	1.07	0.80	—
	66-2/3%	0.88	0.88	0.68	0.40	1.00	1.00	0.77	0.45	1.10	1.10	0.85	0.50

1/ At 125°C the rated voltage of the capacitors decreases to 66 2/3 of the 85°C rated voltage.

2/ The peak of the applied ac ripple voltage plus the applied dc voltage must not exceed the dc voltage rating of the capacitors.

CAPACITANCE AND RATED VOLTAGE, V_R (VOLTAGE CODE) RANGE (LETTER DENOTES CASE SIZE)

Capacitance		Rated Voltage DC (VR) to 85°C							
µF	Code	15V	25V	30V	50V	60V	75V	100V	125V
10	106							A ^(M)	A
15	156							A	
22	226							B	
27	276								B
33	336						A		
47	476				B	A			B
68	686		A		A		A ^(M)	B	
82	826								E
100	107			A	A ^(M)	B	B		D
110	117						B		
120	127		A		B				D
150	157				B	B		D	E
220	227			B	B		E	D,E	E
270	277		B						
330	337		B		E		D,E	E	E
390	397	D				D			
400	407							E	
470	477			B	D,E		E	E	
560	567		B			E		E	
660	667						E		
680	687		E	D,E	E	E	E		
750	757		D,E	D,E	E	E	E	E	
1000	108		D,E	D,E	D,E	E	E		
1200	128		D		E				
1500	158		E	E	E				
1800	188		E						
2200	228		E			E ^(M)			
3000	308				E				
4700	478		E						
5600	568								

Available Ratings ^(M tolerance only)

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COTS-Plus – Wet Electrolytic Tantalum Capacitor



RATINGS & PART NUMBER REFERENCE

Part Number	Cap (µF) at 120Hz	DC Rated Voltage (V) at 85°C	ESR max (ohms) at 120Hz	DC Leakage max (µA)		Impedance max (Ohms) -55°C at 120Hz	Maximum Capacitance Change (%)			AC Ripple (mA rms) 85°C at 40kHz	Case Size	
				+25°C	+85°C & +125°C		-55°C	+85°C	+125°C		KAVX	DLA
15 Volts												
TWAD397*015□BSZ0*00	390	15	1.7	7	28	48	-70	25	25	1396	D	T3
25 Volts												
TWAA686*025□BEZ0*00	68	25	2.5	0.6	3	45	-40	12	15	850	A	T1
TWAA127*025□BSZ0000	120	25	1.3	1	5	25	-42	8	12	1250	A	T1
TWAA127*025□BEZ0*00*	120	25	2.3	2	10	35	-42	20	25	1250	A	T1
TWAB277*025□BEZ0*00	270	25	0.9	4	20	17.5	-50	18	28	1800	B	T2
TWAB337*025□BEZ0*00	330	25	1.3	2	20	25	-60	10	15	1550	B	T2
TWAB567*025□BSZ0*00	560	25	0.83	2	10	12	-65	10	15	2100	B	T2
TWAE687*025□BEZ0*00	680	25	0.75	3	12	12	-50	8	15	2100	E	T4
TWAD757*025□BEZ0*00	750	25	1	3	25	15	-50	8	15	2000	D	T3
TWAE757*025□BEZ0*00	750	25	0.75	3.5	16	9	-55	10	18	2200	E	T4
TWAD108*025□BEZ0*00	1000	25	1	4	30	15	-50	8	15	2300	D	T3
TWAE108*025□BEZ0*00	1000	25	0.7	4	20	9	-55	10	18	2400	E	T4
TWAD128*025□B#Z0*00	1200	25	0.65	5	20	7	-70	12	18	2600	D	T3
TWAE158*025□BEZ0*00	1500	25	0.5	6	24	7	-65	15	20	2850	E	T4
TWAE188*025□BSZ0*00	1800	25	0.5	6	25	7	-75	12	20	3100	E	T4
TWAE228*025□BSZ0*00	2200	25	0.5	10	80	10	-90	30	50	3200	E	T4
TWAE478*025□B#Z0*00	4700	25	0.5	30	180	5	-90	60	80	4250	E	T4
30 Volts												
TWAA107*030□BSZ0000	100	30	1.3	1	5	25	-38	8	12	1200	A	T1
TWAA107*030□BEZ0*00*	100	30	2.3	2	10	35	-38	20	25	1200	A	T1
TWAB227*030□BEZ0*00	220	30	2	1.9	10	40	-40	18	28	1200	B	T2
TWAB477*030□BSZ0*00	470	30	0.85	2	10	15	-65	10	18	1800	B	T2
TWAD687*030□BEZ0*00	680	30	1	3.3	25	15	-50	8	15	1900	D	T3
TWAE687*030□BEZ0*00	680	30	0.8	4.5	18	10	-60	8	15	2100	E	T4
TWAD757*030□BEZ0*00	750	30	1	3.6	30	15	-50	8	15	2000	D	T3
TWAE757*030□BEZ0*00	750	30	0.8	5	20	10	-65	10	18	2200	E	T4
TWAD108*030□B#Z0*00	1000	30	0.7	7	25	7	-70	10	18	2500	D	T3
TWAE108*030□BEZ0*00	1000	30	0.7	5	20	7	-70	10	18	2500	E	T4
TWAE158*030□BSZ0*00	1500	30	0.6	12	35	6	-72	10	20	3000	E	T4
50 Volts												
TWAB476*050□BSZ0*00	47	50	3	0.8	8	70	-28	13	15	1155	B	T2
TWAA686*050□BSZ0000	68	50	1.5	1	5	35	-25	8	15	1050	A	T1
TWAA686*050□BEZ0*00*	68	50	2.5	2	10	45	-25	20	25	1050	A	T1
TWAA107M050□BSZ0*00	100	50	5	2	15	70	-45	50	95	1500	A	T1
TWAB127*050□BEZ0*00	120	50	2	2	10	40	-45	8	15	1200	B	T2
TWAB157*050□BEZ0*00	150	50	2	2	10	25	-50	8	15	1400	B	T2
TWAB227*050□BSZ0*00	220	50	0.9	2	10	17.5	-50	8	15	1800	B	T2
TWAB227*050□BEZ0*00*	220	50	0.9	4	20	17.5	-50	18	28	1800	B	T2
TWAE337*050□B#Z0*00	330	50	0.8	2.5	25	15	-50	8	15	1900	E	T4
TWAD477*050□BSZ0*00	470	50	0.75	3	25	10	-50	8	15	2100	D	T3
TWAD477*050□BEZ0*00*	470	50	1	3	25	11	-50	8	15	2100	D	T3
TWAE477*050□B#Z0*00	470	50	0.75	3	30	10	-50	8	15	2200	E	T4
TWAE687*050□B#Z0*00	680	50	0.7	5	40	8	-58	10	20	2750	E	T4
TWAE757*050□BEZ0*00	750	50	0.6	12	60	8	-50	15	20	2800	E	T4
TWAD108*050□BEZ0*00	1000	50	1.5	20	125	12	-90	100	140	2500	D	T3
TWAE108*050□BSZ0*00	1000	50	1.0	12	90	20	-90	30	50	3200	E	T4
TWAE108*050□BEZ0*00*	1000	50	0.7	11	110	20	-70	30	40	3200	E	T4
TWAE128*050□BSZ0*00	1200	50	1.0	12	90	20	-90	30	50	3200	E	T4
TWAE158*050□BSZ0*00	1500	50	1	35	130	6	-75	45	55	3500	E	T4
TWAE308M050□B#Z0*00	3000	50	0.3	30	150	3.5	-80	60	85	3100	E	T4
TWAE308K050□BSZ0*00	3000	50	0.6	30	150	5	-90	90	100	3100	E	T4
60 Volts												
TWAA476*060□BSZ0000	47	60	2	1	5	44	-25	8	12	1050	A	T1
TWAA476*060□BEZ0*00*	47	60	2	2	10	55	-25	15	25	1050	A	T1
TWAB107*060□BSZ0*00	100	60	1.5	1.7	10	30	-35	12	20	1650	B	T2
TWAB107*060□BEZ0*00*	100	60	2.5	1.7	10	40	-40	8	15	1100	B	T2
TWAB157*060□BSZ0000	150	60	1.1	2	10	20	-40	8	15	1650	B	T2
TWAB157*060□BEZ0*00*	150	60	1.5	2	10	30	-35	12	20	1650	B	T2
TWAD397*060□B#Z0*00	390	60	0.9	3	25	15	-60	8	15	2100	D	T3
TWAE567*060□B#Z0*00	560	60	0.8	5	40	10	-58	8	15	2750	E	T4
TWAE687*060□BEZ0*00	680	60	0.6	13	65	8	-50	15	20	2800	E	T4
TWAE757*060□BEZ0*00	750	60	0.6	15	75	8	-50	15	20	2800	E	T4
TWAE108*060□BSZ0*00	1000	60	1	12	90	20	-90	30	50	3200	E	T4

ENERGY

Energy (mJ)	Energy / volume (mJ/mm³)
33.78	0.024
13.29	0.064
23.46	0.114
23.46	0.114
52.79	0.081
64.52	0.099
109.48	0.168
132.94	0.069
146.63	0.106
146.63	0.076
195.50	0.141
195.50	0.102
234.60	0.169
293.25	0.153
351.90	0.183
430.10	0.224
918.85	0.479
28.35	0.137
28.35	0.137
62.37	0.096
133.25	0.205
192.78	0.139
192.78	0.100
212.63	0.154
212.63	0.111
283.50	0.205
283.50	0.148
425.25	0.222
37.39	0.057
54.09	0.262
54.09	0.262
79.55	0.385
95.46	0.147
119.33	0.183
175.01	0.269
175.01	0.269
262.52	0.137
373.89	0.270
373.89	0.270
373.89	0.195
540.94	0.282
596.63	0.311
795.50	0.575
795.50	0.415
795.50	0.415
954.60	0.498
1193.25	0.622
2386.50	1.244
2386.50	1.244
53.93	0.261
53.93	0.261
114.75	0.176
114.75	0.176
172.13	0.264
172.13	0.264
447.53	0.323
642.60	0.335
780.30	0.407
860.63	0.449
1147.50	0.598

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COTS-Plus Wet Electrolytic Tantalum Capacitor of Contents



RATINGS & PART NUMBER REFERENCE

ENERGY

Part Number	Cap (µF) 25°C at 120Hz	DC Rated Voltage (V) at 85°C	ESR max (ohms) at 120Hz	DC Leakage max (µA)		Impedance max (Ohms) -55°C at 120Hz	Maximum Capacitance Change (%)			AC Ripple (mA rms) 85°C at 40kHz	Case Size		Energy (mJ)	Energy / volume (mJ/mm³)
				+25°C	+85°C & +125°C		-55°C	+85°C	+125°C		KAVX	DLA		
TWAE108*060□BEZ0*00*	1000	60	0.5	20	60	4.5	-70	30	60	3200	E	T4	1147.50	0.598
TWAE228M060□BEZ0*00	2200	60	0.5	40	120	3.0	-80	60	80	3000	E	T4	2524.50	1.316
75 Volt														
TWAA336*075□BSZ0000	33	75	2.5	1	5	66	-25	5	9	1050	A	T1	59.25	0.287
TWAA336*075□BEZ0*00*	33	75	2.5	2	10	70	-25	15	25	1050	A	T1	59.25	0.287
TWAA686M075□BSZ0*00	68	75	5	2	15	70	-45	50	95	1500	A	T1	122.09	0.591
TWAB107*075□BEZ0*00	100	75	2.5	2	10	40	-35	6	10	1400	B	T2	179.55	0.276
TWAB117*075□BSZ0000	110	75	1.3	2	10	24	-35	6	10	1650	B	T2	197.51	0.303
TWAB117*075□BEZ0*00*	110	75	1.5	2	10	30	-35	12	20	1650	B	T2	197.51	0.303
TWAE227*075□B#Z0*00	220	75	1.1	2.5	30	20	-50	6	10	1800	E	T4	395.01	0.206
TWAD337*075□BSZ0*00	330	75	1	3	30	12	-45	6	10	2100	D	T3	592.52	0.428
TWAD337*075□BEZ0*00*	330	75	1.2	3	30	15	-60	10	20	2100	D	T3	592.52	0.428
TWAE357*075□BEZ0*00*	330	75	1	3	40	12	-50	6	10	2200	E	T4	592.52	0.309
TWAE477*075□B#Z0*00	470	75	0.9	5	50	12	-55	6	10	2750	E	T4	843.89	0.440
TWAE667*075□BSZ0*00	660	75	0.7	12	120	10	-70	30	40	2750	E	T4	1185.03	0.418
TWAE687*075□BEZ0*00*	680	75	0.9	11	110	10	-70	30	40	2750	E	T4	1220.94	0.636
TWAE757*075□B#Z0*00	750	75	0.7	12	120	10	-70	30	40	3800	E	T4	1346.63	0.702
TWAE108*075□BEZ0*00	1000	75	0.5	30	90	4.5	-70	30	60	3500	E	T4	1795.50	0.936
100 Volt														
TWAA106M100□BSZ0*00	10	100	3.5	5	25	190	-18	10	30	1050	A	T1	31.96	0.155
TWAA156*100□BSZ0000	15	100	3.5	1	5	125	-18	3	10	1050	A	T1	47.93	0.232
TWAA156*100□BEZ0*00*	15	100	5.5	7	35	140	-18	10	30	1050	A	T1	47.93	0.232
TWAB226*100□BSZ0*00	22	100	4	1	5	100	-10	8	15	1065	B	T2	70.30	0.108
TWAB686*100□BSZ0000	68	100	2.1	2	10	37	-30	4	12	1650	B	T2	217.29	0.334
TWAB686*100□BEZ0*00*	68	100	2.5	2	10	37	-30	4	12	1650	B	T2	217.29	0.334
TWAD157*100□B#Z0*00	150	100	1.6	3	25	22	-35	6	12	2100	D	T3	479.33	0.346
TWAD227*100□BEZ0*00	220	100	1.4	5	25	18	-50	10	15	2500	D	T3	703.01	0.508
TWAE227*100□B#Z0*00	220	100	1.2	5	50	15	-40	6	12	2750	E	T4	703.01	0.366
TWAE337*100□B#Z0*00	330	100	0.8	6	60	10	-45	7	20	3600	E	T4	1054.52	0.550
TWAE407*100□B#Z0*00	400	100	0.8	10	150	10	-50	10	35	4100	E	T4	1278.20	0.666
TWAE477*100□BSZ0*00	470	100	0.7	15	150	10	-50	10	35	4100	E	T4	1501.89	0.783
TWAE567*100□BSZ0*00	560	100	1.0	25	200	10	-60	45	110	4100	E	T4	1789.48	0.933
TWAE757*100□BEZ0*00	750	100	0.6	30	150	5	-60	50	120	4200	E	T4	2396.63	1.249
125 Volt														
TWAA106*125□BSZ0000	10	125	5.5	1	5	175	-15	3	10	1050	A	T1	49.96	0.242
TWAA106M125□BEZ0*00*	10	125	5.5	1	5	190	-15	10	30	1050	A	T1	49.96	0.242
TWAB276*125□BSZ0*00	27	125	4	2	10	100	-10	8	15	1200	B	T2	134.88	0.207
TWAB476*125□B#Z0*00	47	125	2.3	2	10	47	-25	5	12	1650	B	T2	234.79	0.360
TWAE826*125□BSZ0*00	82	125	1.6	2	10	39	-24	10	20	1900	E	T4	409.63	0.213
TWAD107*125□B#Z0*00	100	125	1.8	3	25	35	-35	5	12	2100	D	T3	499.55	0.361
TWAD127*125□BEZ0*00	120	125	1.8	3	25	35	-35	5	12	2100	D	T3	599.46	0.433
TWAE157*125□B#Z0*00	150	125	1.6	5	50	20	-35	6	12	2750	E	T4	749.33	0.391
TWAE227*125□BEZ0*00	220	125	1.4	10	50	12	-40	8	15	3600	E	T4	1099.01	0.573
TWAE337*125□B#Z0*00	330	125	1	15	150	20	-60	20	60	2500	E	T4	1648.52	0.859

Energy is calculated by this formula (consider derating factor):

$$\text{Energy} = \frac{1}{2} C \times ((V_r \times X)^2 - V_x^2)$$

where C = Capacitance

V_r = Rated Voltage

X = Recommended derating factor

V_x = 3V (invariable)

All technical data relates to an ambient temperature of +25°C. Capacitance and DF are measured at 120Hz, 0.5RMS with DC bias of 2.2V. DCL is measured at rated voltage after 5 minutes.

NOTE: KYOCERA AVX reserves the rights to supply higher voltage rating in the same case size, to the same reliability standards.

*Not recommended for new designs, for new design use part number with Inspection level "S" – COTS-Plus

$$\text{DF} = 2\pi fC \times (\text{ESR})$$

$$2\pi = 6.28$$

$$f = 120\text{Hz}$$

C = Actual measured capacitance

ESR = Actual measured ESR