

# TWA SERIES

## COTS-Plus – Wet Electrolytic Tantalum Capacitor

### GENERAL DESCRIPTION

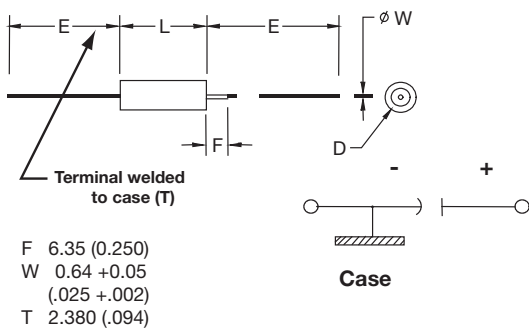
The TWA series is an axial leaded wet electrolytic tantalum capacitor with a unique cathode system that promotes very high CV (Capacitance/Voltage) per cc in traditional MIL-PRF-39006 case sizes.

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:

<b>TWA</b>	<b>E</b>	<b>407</b>	<b>*</b>	<b>100</b>	<b>□</b>	<b>B</b>	<b>#</b>	<b>Z</b>	<b>0</b>	<b>^</b>	<b>00</b>
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*



For RoHS compliant products, please select correct termination style.

\* Please contact the factory for additional details and availability.

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### RIPPLE CURRENT MULTIPLIERS vs. Frequency, temperature and applied voltage<sup>1/2/</sup>

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 Peak Voltage	80%	0.60	0.52	0.35	–	0.71	0.62	0.42	–	0.72	0.62	0.42	–
	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 Peak Voltage	80%	0.88	0.76	0.52	–	1.00	0.87	0.59	–	1.10	0.96	0.65	–
	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<sub>R</sub> (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 <sup>(M)</sup>	A
15	156							A	
22	226							B	
27	276								B
33	336						A		
47	476				B	A			B
68	686		A		A		A <sup>(M)</sup>	B	
82	826								E
100	107			A	A <sup>(M)</sup>	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	E
560	567		B			E		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 <sup>(M)</sup>			
3000	308				E				
4700	478		E						
5600	568								

Available Ratings <sup>(M tolerance only)</sup>

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### RATINGS & PART NUMBER REFERENCE

### ENERGY

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		Energy (mJ)	Energy / volume (mJ/mm <sup>3</sup> )
				+25°C	+85°C & +125°C		-55°C	+85°C	+125°C		KAVX	DLA		
<b>15 Volts</b>														
TWAD397*015□BSZ0*00	390	15	1.7	7	28	48	-70	25	25	1396	D	T3	33.78	0.024
<b>25 Volts</b>														
TWAA686*025□BEZ0*00	68	25	2.5	0.6	3	45	-40	12	15	850	A	T1	13.29	0.064
TWAA127*025□BSZ0000	120	25	1.3	1	5	25	-42	8	12	1250	A	T1	23.46	0.114
TWAA127*025□BEZ0*00*	120	25	2.3	2	10	35	-42	20	25	1250	A	T1	23.46	0.114
TWAB277*025□BEZ0*00	270	25	0.9	4	20	17.5	-50	18	28	1800	B	T2	52.79	0.081
TWAB337*025□BEZ0*00	330	25	1.3	2	20	25	-60	10	15	1550	B	T2	64.52	0.099
TWAB567*025□BSZ0*00	560	25	0.83	2	10	12	-65	10	15	2100	B	T2	109.48	0.168
TWAE687*025□BEZ0*00	680	25	0.75	3	12	12	-50	8	15	2100	E	T4	132.94	0.069
TWAD757*025□BEZ0*00	750	25	1	3	25	15	-50	8	15	2000	D	T3	146.63	0.106
TWAE757*025□BEZ0*00	750	25	0.75	3.5	16	9	-55	10	18	2200	E	T4	146.63	0.076
TWAD108*025□BSZ0*00	1000	25	1	4	30	15	-50	8	15	2300	D	T3	195.50	0.141
TWAE108*025□BEZ0*00	1000	25	0.7	4	20	9	-55	10	18	2400	E	T4	195.50	0.102
TWAD128*025□B#Z0*00	1200	25	0.65	5	20	7	-70	12	18	2600	D	T3	234.60	0.169
TWAE158*025□BEZ0*00	1500	25	0.5	6	24	7	-65	15	20	2850	E	T4	293.25	0.153
TWAE188*025□BSZ0*00	1800	25	0.5	6	25	7	-75	12	20	3100	E	T4	351.90	0.183
TWAE228*025□BSZ0*00	2200	25	0.5	10	80	10	-90	30	50	3200	E	T4	430.10	0.224
TWAE478*025□B#Z0*00	4700	25	0.5	30	180	5	-90	60	80	4250	E	T4	918.85	0.479
<b>30 Volts</b>														
TWAA107*030□BSZ0000	100	30	1.3	1	5	25	-38	8	12	1200	A	T1	28.35	0.137
TWAA107*030□BEZ0*00*	100	30	2.3	2	10	35	-38	20	25	1200	A	T1	28.35	0.137
TWAB227*030□BEZ0*00	220	30	2	1.9	10	40	-40	18	28	1200	B	T2	62.37	0.096
TWAB477*030□BSZ0*00	470	30	0.85	2	10	15	-65	10	18	1800	B	T2	133.25	0.205
TWAD687*030□BEZ0*00	680	30	1	3.3	25	15	-50	8	15	1900	D	T3	192.78	0.139
TWAE687*030□BEZ0*00	680	30	0.8	4.5	18	10	-60	8	15	2100	E	T4	192.78	0.100
TWAD757*030□BEZ0*00	750	30	1	3.6	30	15	-50	8	15	2000	D	T3	212.63	0.154
TWAE757*030□BEZ0*00	750	30	0.8	5	20	10	-65	10	18	2200	E	T4	212.63	0.111
TWAD108*030□B#Z0*00	1000	30	0.7	7	25	7	-70	10	18	2500	D	T3	283.50	0.205
TWAE108*030□BEZ0*00	1000	30	0.7	5	20	7	-70	10	18	2500	E	T4	283.50	0.148
TWAE158*030□BSZ0*00	1500	30	0.6	12	35	6	-72	10	20	3000	E	T4	425.25	0.222
<b>50 Volts</b>														
TWAB476*050□BSZ0*00	47	50	3	0.8	8	70	-28	13	15	1155	B	T2	37.39	0.057
TWAA686*050□BSZ0000	68	50	1.5	1	5	35	-25	8	15	1050	A	T1	54.09	0.262
TWAA686*050□BEZ0*00*	68	50	2.5	2	10	45	-25	20	25	1050	A	T1	54.09	0.262
TWAA107M050□BSZ0*00	100	50	5	2	15	70	-45	50	95	1500	A	T1	79.55	0.385
TWAB127*050□BEZ0*00	120	50	2	2	10	40	-45	8	15	1200	B	T2	95.46	0.147
TWAB157*050□BEZ0*00	150	50	2	2	10	25	-50	8	15	1400	B	T2	119.33	0.183
TWAB227*050□BSZ0000	220	50	0.9	2	10	17.5	-50	8	15	1800	B	T2	175.01	0.269
TWAB227*050□BEZ0*00*	220	50	0.9	4	20	17.5	-50	18	28	1800	B	T2	175.01	0.269
TWAE337*050□B#Z0*00	330	50	0.8	2.5	25	15	-50	8	15	1900	E	T4	262.52	0.137
TWAD477*050□BSZ0*00	470	50	0.75	3	25	10	-50	8	15	2100	D	T3	373.89	0.270
TWAD477*050□BEZ0*00*	470	50	1	3	25	11	-50	8	15	2100	D	T3	373.89	0.270
TWAE477*050□B#Z0*00	470	50	0.75	3	30	10	-50	8	15	2200	E	T4	373.89	0.195
TWAE687*050□B#Z0*00	680	50	0.7	5	40	8	-58	10	20	2750	E	T4	540.94	0.282
TWAE757*050□BEZ0*00	750	50	0.6	12	60	8	-50	15	20	2800	E	T4	596.63	0.311
TWAD108*050□BEZ0*00	1000	50	1.5	20	125	12	-90	100	140	2500	D	T3	795.50	0.575
TWAE108*050□BSZ0*00	1000	50	1.0	12	90	20	-90	30	50	3200	E	T4	795.50	0.415
TWAE108*050□BEZ0*00*	1000	50	0.7	11	110	20	-70	30	40	3200	E	T4	795.50	0.415
TWAE128*050□BSZ0*00	1200	50	1.0	12	90	20	-90	30	50	3200	E	T4	954.60	0.498
TWAE158*050□BSZ0*00	1500	50	1	35	130	6	-75	45	55	3500	E	T4	1193.25	0.622
TWAE308M050□B#Z0*00	3000	50	0.3	30	150	3.5	-80	60	85	3100	E	T4	2386.50	1.244
TWAE308K050□BSZ0*00	3000	50	0.6	30	150	5	-90	90	100	3100	E	T4	2386.50	1.244
<b>60 Volts</b>														
TWAA476*060□BSZ0000	47	60	2	1	5	44	-25	8	12	1050	A	T1	53.93	0.261
TWAA476*060□BEZ0*00*	47	60	2	2	10	55	-25	15	25	1050	A	T1	53.93	0.261
TWAB107*060□BSZ0*00	100	60	1.5	1.7	10	30	-35	12	20	1650	B	T2	114.75	0.176
TWAB107*060□BEZ0*00*	100	60	2.5	1.7	10	40	-40	8	15	1100	B	T2	114.75	0.176
TWAB157*060□BSZ0000	150	60	1.1	2	10	20	-40	8	15	1650	B	T2	172.13	0.264
TWAB157*060□BEZ0*00*	150	60	1.5	2	10	30	-35	12	20	1650	B	T2	172.13	0.264
TWAD397*060□B#Z0*00	390	60	0.9	3	25	15	-60	8	15	2100	D	T3	447.53	0.323
TWAE567*060□B#Z0*00	560	60	0.8	5	40	10	-58	8	15	2750	E	T4	642.60	0.335
TWAE687*060□BEZ0*00	680	60	0.6	13	65	8	-50	15	20	2800	E	T4	780.30	0.407
TWAE757*060□BEZ0*00	750	60	0.6	15	75	8	-50	15	20	2800	E	T4	860.63	0.449
TWAE108*060□BSZ0*00	1000	60	1	12	90	20	-90	30	50	3200	E	T4	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/mm <sup>3</sup> )
				+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
<b>75 Volt</b>														
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
TWAE337*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
<b>100 Volt</b>														
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
<b>125 Volt</b>														
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
TWAE477*125□BSZ0*00	470	125	1	30	160	25	-70	30	70	3500	E	T4	2347.89	1.224
TWAE567*125□BSZ0*00	560	125	1	30	160	25	-70	40	120	4200	E	T4	2797.48	1.458

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<sub>r</sub> = Rated Voltage

X = Recommended derating factor

V<sub>x</sub> = 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

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

$$2\pi = 6.28$$

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

C = Actual measured capacitance

ESR = Actual measured ESR