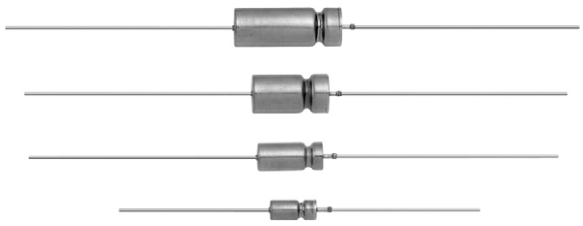
Wet Tantalum Capacitors, Space Level, Established Reliability, DLA Drawing 20001



LINKS TO ADDITIONAL RESOURCES

3D Models

FEATURES

- Screened for space level applications
- Tantalum case, hermetically sealed, axial leaded
- Screened M39006/33 capacitors
  - Established failure rate
  - "H" or high shock and vibration rated
  - Enhanced 100 % or group A testing
  - Enhanced production lot testing - group B prior to shipment
- Stability
- Thermal shock
- 1000 h life at +85 °C
- Reverse voltage rating at +85 °C is 3 V_{DC} and at +125 °C is 2 V_{DC}

CROSS REFERENCE		
DLA DRAWING	**MIL SPECIFICATION**	**STYLE**
DLA 20001	M39006/33	CLR93

Established Reliability "Space Level" Wet Tantalum Capacitors

In accordance with the DLA 20001 drawing, all parts are up-screened from "M" failure rate, "H" characteristic, MIL-PRF-39006/33 capacitors.

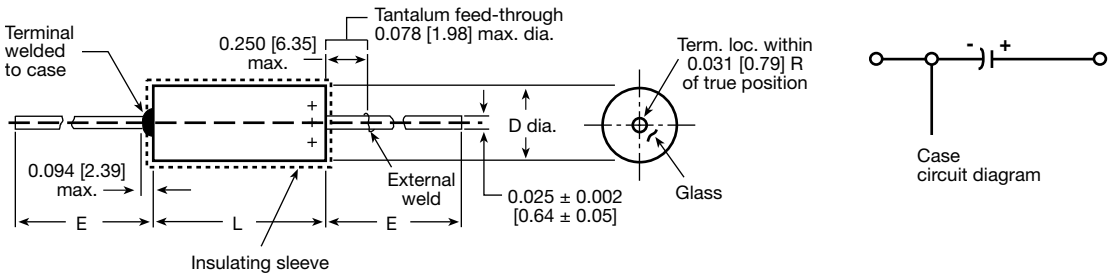
Parts are marked with the DLA 20001 drawing number and PIN (dash number).

For information on the exact performance of these capacitors, please refer to the latest issue of the DLA 20001 drawing and M39006/33 specification.

ORDERING INFORMATION

20001-	XXXXH
DLA DRAWING NUMBER	PIN OR DASH NUMBER (see Standard Ratings table)

DIMENSIONS in inches [millimeters]



CASE CODE	BASIC CASE		INSULATED CASE	E
	L (1) + 0.031 [0.79] / - 0.016 [0.41]	D ± 0.016 [0.41]	D max.	± 0.250 [6.35]
T1	0.453 [11.51]	0.188 [4.78]	0.219 [5.56]	1.500 [38.10]
T2	0.641 [16.28]	0.281 [7.14]	0.312 [7.92]	2.250 [57.15]
T3	0.766 [19.46]	0.375 [9.52]	0.406 [10.31]	2.250 [57.15]
T4	1.062 [26.97]	0.375 [9.52]	0.406 [10.31]	2.250 [57.15]

Note

(1) Length of basic case sleeving shall be as specified in MIL-PRF-39006

STANDARD RATINGS

CAPACITANCE (µF)	CASE CODE	CAP. TOL. (± %)	PIN FOR DLA 20001	MAX. DCL (µA) AT		MAX. ESR AT +25 °C 120 Hz (Ω)	MAX. DF [1] AT +25 °C 120 Hz (%)	MAX. IMP. AT -55 °C 120 Hz (Ω)	MAX. CAPACITANCE CHANGE (%) AT			MAX. RIPPLE CURRENT [2] AT +85 °C 40 kHz (mA_{RMS})
				+25 °C	+85 °C +125 °C				-55 °C	+85 °C	+125 °C	
50 V_{DC} AT +85 °C; 30 V_{DC} AT +125 °C												
68	T1	20	0021H	1	5	1.5	9.2	35	-25	8	15	1050
68	T1	10	0022H	1	5	1.5	9.2	35	-25	8	15	1050
220	T2	20	0023H	2	10	0.9	17.9	17.5	-50	8	15	1800
220	T2	10	0024H	2	10	0.9	17.9	17.5	-50	8	15	1800
470	T3	20	0027H	3	25	0.75	31.9	10	-50	8	15	2100
470	T3	10	0028H	3	25	0.75	31.9	10	-50	8	15	2100
680	T4	20	0029H	5	40	0.7	43.1	10	-58	10	20	2750
680	T4	10	0030H	5	40	0.7	43.1	10	-58	10	20	2750
60 V_{DC} AT +85 °C; 40 V_{DC} AT +125 °C												
47	T1	20	0031H	1	5	2	8.5	44	-25	8	12	1050
47	T1	10	0032H	1	5	2	8.5	44	-25	8	12	1050
150	T2	20	0033H	2	10	1.1	14.9	20	-40	8	15	1650
150	T2	10	0034H	2	10	1.1	14.9	20	-40	8	15	1650
390	T3	20	0037H	3	25	0.9	31.8	15	-60	8	15	2100
390	T3	10	0038H	3	25	0.9	31.8	15	-60	8	15	2100
560	T4	20	0039H	5	40	0.8	40.5	10	-58	8	15	2750
560	T4	10	0040H	5	40	0.8	40.5	10	-58	8	15	2750
75 V_{DC} AT +85 °C; 50 V_{DC} AT +125 °C												
33	T1	20	0041H	1	5	2.5	7.5	66	-25	5	9	1050
33	T1	10	0042H	1	5	2.5	7.5	66	-25	5	9	1050
110	T2	20	0043H	2	10	1.3	12.9	24	-35	6	10	1650
110	T2	10	0044H	2	10	1.3	12.9	24	-35	6	10	1650
330	T3	20	0047H	3	30	1.0	29.9	12	-45	6	10	2100
330	T3	10	0048H	3	30	1.0	29.9	12	-45	6	10	2100
470	T4	20	0049H	5	50	0.9	38.3	12	-55	8	12	2750
470	T4	10	0050H	5	50	0.9	38.3	12	-55	8	12	2750
100 V_{DC} AT +85 °C; 65 V_{DC} AT +125 °C												
15	T1	20	0051H	1	5	3.5	4.8	125	-18	3	10	1050
15	T1	10	0052H	1	5	3.5	4.8	125	-18	3	10	1050
68	T2	20	0053H	2	10	2.1	12.9	37	-30	4	12	1650
68	T2	10	0054H	2	10	2.1	12.9	37	-30	4	12	1650
150	T3	20	0057H	3	25	1.6	21.7	22	-35	6	12	2100
150	T3	10	0058H	3	25	1.6	21.7	22	-35	6	12	2100
220	T4	20	0059H	5	50	1.2	23.9	15	-40	6	12	2750
220	T4	10	0060H	5	50	1.2	23.9	15	-40	6	12	2750

Notes

- Letter “H” in the dash number indicates high vibration and shock requirements (i.e., 53.79 *g*’s random vibration, 80 *g*’s sinusoidal vibration, and 500 *g*’s shock)

(1) DF is calculated from ESR and is for reference only

(2) For ripple current limits at various temperatures, voltages, and frequencies, see “Ripple Current” table

RIPPLE CURRENT MULTIPLIERS VS. FREQUENCY, TEMPERATURE, AND APPLIED PEAK VOLTAGE																									
FREQUENCY OF APPLIED RIPPLE CURRENT		120 Hz				800 Hz				1 kHz				10 kHz				40 kHz				100 kHz			
AMBIENT STILL AIR		TEMP °C				TEMP °C				TEMP °C				TEMP °C				TEMP °C				TEMP °C			
		≤ 55	85	105	125	≤ 55	85	105	125	≤ 55	85	105	125	≤ 55	85	105	125	≤ 55	85	105	125	≤ 55	85	105	125
% OF APPLIED VOLTAGE	100 %	0.60	0.39	-	-	0.71	0.43	-	-	0.72	0.46	-	-	0.88	0.55	-	-	1.0	0.63	-	-	1.1	0.69	-	-
	90 %	0.60	0.46	-	-	0.71	0.55	-	-	0.72	0.55	-	-	0.88	0.67	-	-	1.0	0.77	-	-	1.1	0.85	-	-
	80 %	0.60	0.52	0.35	-	0.71	0.62	0.42	-	0.72	0.62	0.42	-	0.88	0.76	0.52	-	1.0	0.87	0.59	-	1.1	0.96	0.65	-
	70 %	0.60	0.58	0.44	-	0.71	0.69	0.52	-	0.72	0.70	0.52	-	0.88	0.85	0.64	-	1.0	0.97	0.73	-	1.1	1.07	0.80	-
	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	0.88	0.88	0.68	0.40	1.0	1.0	0.77	0.45	1.1	1.1	0.85	0.50

Notes

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 capacitor either forward or reverse
3. The ripple current listed represents a rating calculated using a maximum internal temperature rise (ΔT) of +50 °C at 40 kHz at +85 °C ambient with a maximum peak rated voltage of 66 2/3 % of the +85 °C peak voltage rating
4. The maximum allowable internal temperature rise (ΔT) decreases linearly to a calculated +10 °C rise at +125 °C ambient
5. The internal temperature rise is directly proportional to the equivalent series resistance of the capacitor and equivalent series resistance increases with decreasing frequency

GROUP A INSPECTION AND GROUP B INSPECTION PER DLA 20001

GROUP A INSPECTION		
TEST / INSPECTION	**REQUIREMENT PARAGRAPH**	**SAMPLE PROCEDURE**
SUBGROUP 1		
Thermal shock (10 cycles)	3.2	100 %
Constant voltage conditioning (168 h)	3.3	
DC leakage at +25 °C	3.1.9	
DC leakage at +85 °C	3.1.9	
Capacitance	3.1.7	
ESR	3.1.11	
Seal, condition C	3.4	
Seal, condition A or D	3.5	
SUBGROUP 2		
Mechanical examination (dimensions only)	3.1.1	See Table IV of DLA20001
SUBGROUP3		
Solderability	3.6	5 samples, 0 failures
SUBGROUP4		
Visual inspection	3.8g	13 samples, 0 failures
Materials	3.9	
Marking	3.10	
Workmanship	3.15	

GROUP B INSPECTION		
TEST / INSPECTION	**REQUIREMENT PARAGRAPH**	**SAMPLE PROCEDURE**
SUBGROUP 1		
Stability at low and high temperatures	3.7	13 samples, 0 failures
SUBGROUP 2		
Thermal shock (30 cycles)	3.2	10 samples, 0 failures
Life (1000 h at +85 °C)	3.8	
DC leakage at +25 °C	3.1.9	
DC leakage at +85 °C	3.1.9	
Capacitance	3.1.7	
ESR	3.1.11	

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