Wet Tantalum Capacitors, Military Established Reliability, MIL-PRF-39006/09/21 Qualified Styles CLR65, CLR69



FEATURES

- Hermetically sealed
- Metal cased
- Axial lead
- Tubular

STYLE, MILITARY SPECIFICATION

- CLR65, M39006/09 MIL-PRF-39006/09
- CLR69, M39006/21 MIL-PRF-39006/21

LINKS TO ADDITIONAL RESOURCES

3D Models

PERFORMANCE CHARACTERISTICS

Operating Temperature: -55 °C to +125 °C
(above 85 °C, voltage derating is required)

Capacitance Range: M39006/09 - 1.7 µF to 1200 µF;
M39006/21 - 6.8 µF to 2200 µF

Capacitance Tolerance: ± 5 %, ± 10 %, ± 20 %

Voltage Rating: 6 V_{DC} to 125 V_{DC}

Established Reliability Tantalum Capacitors to Military Specification MIL-PRF-39006: in accordance with the military specification MIL-PRF-39006 all capacitors are marked with the military part number (M39006/xx-xxxx) rather than the older style designation (CLR65, CLR69) and should be ordered as such.

For information on the performance characteristics of these capacitors, please refer to the latest issue of the military specification.

Each order for military style capacitors requiring government inspection must state whether inspection is to be at the destination or at the Vishay plant. Orders requiring source inspection cannot be shipped until this has been accomplished.

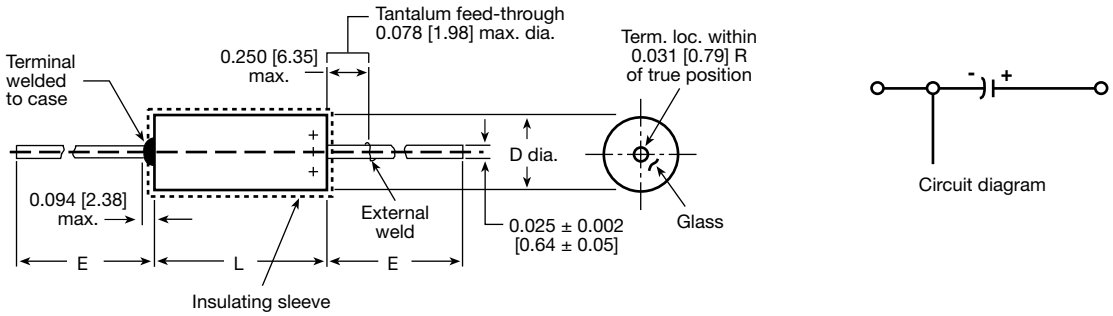
ORDERING INFORMATION

M39006	/09	-8005
BASIC DOCUMENT NUMBER	SLASH SHEET	DASH NUMBER
Indicates the basic specification; in this case MIL-PRF-39006	Indicates the specification sheet of the basic military specification	Taken from Standard/Extended Ratings tables

For technical questions, contact: tantalum@vishay.com
THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000

DIMENSIONS in inches [millimeters]

Style CLR65
Style CLR69



CASE CODE	BARE CASE		WITH INSULATING SLEEVE		E LEAD LENGTH	WEIGHT (oz./g) (MAX.)
	D	L	D (MAX.)	L (1)		
T1	0.188 ± 0.016 [4.78 ± 0.41]	0.453 + 0.031/- 0.016 [11.51 + 0.79/- 0.41]	0.219 [5.56]	0.595 [15.11]	1.500 ± 0.250 [38.10 ± 6.35]	0.07 [2.0]
T2	0.281 ± 0.016 [7.14 ± 0.41]	0.641 + 0.031/- 0.016 [16.28 + 0.79/- 0.41]	0.312 [7.92]	0.785 [19.94]	2.250 ± 0.250 [57.15 ± 6.35]	0.18 [5.1]
T3	0.375 ± 0.016 [9.53 ± 0.41]	0.766 + 0.031/- 0.016 [19.46 + 0.79/- 0.41]	0.406 [10.31]	0.92 [23.37]	2.250 ± 0.250 [57.15 ± 6.35]	0.36 [10.2]
T4	0.375 ± 0.016 [9.53 ± 0.41]	1.062 + 0.031/- 0.016 [26.97 + 0.79/- 0.41]	0.406 [10.31]	1.225 [31.11]	2.250 ± 0.250 [57.15 ± 6.35]	0.49 [13.9]

Note

(1) Typical length, for reference only

RATINGS AND CASE CODES - M39006/09

µF	6	8	10	15	25	30	50	60	75	100	125
1.7											T1
2.5										T1	
3.5									T1		
3.6											T1
4.0								T1			
4.7										T1	
5.0							T1				
6.8									T1		
8.0						T1					
8.2								T1			
9.0											T2
10					T1		T1				
11										T2	
15				T1		T1			T2		
20			T1					T2			
22					T1					T2	
25		T1					T2				T3
30	T1									T3	
33				T1					T2		
39								T2			
40						T2			T3		
43										T3	
47			T1				T2				
50								T3			
56		T1							T3		T4
60							T3				
68	T1					T2		T3			
70				T2							
82							T3				
86										T4	
100			T2		T2	T3					

For technical questions, contact: tantalum@vishay.com

THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000

RATINGS AND CASE CODES - M39006/09											
µF	**6**	**8**	**10**	**15**	**25**	**30**	**50**	**60**	**75**	**100**	**125**
110									T4		
120				T2							
140	T2							T4			
150						T3					
160							T4				
170				T3							
180			T2		T3						
220		T2									
250			T3								
270	T2			T3							
300						T4					
330	T3										
350					T4						
390			T3								
430		T3									
540				T4							
560	T3										
750			T4								
850		T4									
1200	T4										

RATINGS AND CASE CODES - M39006/21											
µF	**6**	**8**	**10**	**15**	**25**	**30**	**50**	**60**	**75**	**100**	**125**
6.8											T1
10										T1	
22									T1		
27								T1			T2
33							T1				
39										T2	
47											T3
56						T1					
68					T1					T3	
82									T2		T4
100				T1				T2			
120							T2			T4	
150			T1								
180		T1							T3		
220	T1					T2		T3	T4		
270					T2		T3	T4			
330							T4				
390				T2							
470						T3					
560			T2		T3	T4					
680		T2			T4						
820	T2			T3							
1000				T4							
1200			T3								
1500	T3	T3	T4								
1800		T4									
2200	T4										

For technical questions, contact: tantalum@vishay.com
THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000

STANDARD RATINGS/EXTENDED RATINGS: CLR65 [1], M39006/09-XXXX

CAPACITANCE (µF)	CASE CODE	CAP. TOL. (± %)	PART NO. M39006/09- FAILURE RATE LEVEL (%/1000 h)		MAX. DCL (µA) AT		MAX. DF AT +25 °C (%)	MAX. IMP. AT -55 °C (Ω)	MAX. CAPACITANCE CHANGE (%) AT		
			L 2.0	M 1.0	+25 °C	+85 °C +125 °C			-55 °C	+85 °C	+125 °C
6 V_{DC} AT +85 °C; 4 V_{DC} AT +125 °C											
30	T1	20	8001	8206	1	2	9.1	100	-40	+10.5	+12
30	T1	10	8002	8207	1	2	9.1	100	-40	+10.5	+12
30	T1	5	8003	8208	1	2	9.1	100	-40	+10.5	+12
68	T1	20	8004	8209	1	2	20.4	60	-40	+14	+16
68	T1	10	8005	8210	1	2	20.4	60	-40	+14	+16
68	T1	5	8006	8211	1	2	20.4	60	-40	+14	+16
140	T2	20	8007	8212	1	3	21.3	40	-40	+14	+16
140	T2	10	8008	8213	1	3	21.3	40	-40	+14	+16
140	T2	5	8009	8214	1	3	21.3	40	-40	+14	+16
270	T2	20	8010	8215	1	6.5	81.8	25	-44	+17.5	+20
270	T2	10	8011	8216	1	6.5	81.8	25	-44	+17.5	+20
270	T2	5	8012	8217	1	6.5	81.8	25	-44	+17.5	+20
330	T3	20	8013	8218	2	7.9	49.6	20	-44	+14	+16
330	T3	10	8014	8219	2	7.9	49.6	20	-44	+14	+16
330	T3	5	8015	8220	2	7.9	49.6	20	-44	+14	+16
560	T3	20	8016	8221	2	13	128	25	-64	+17.5	+20
560	T3	10	8017	8222	2	13	128	25	-64	+17.5	+20
560	T3	5	8018	8223	2	13	128	25	-64	+17.5	+20
1200	T4	20	8019	8224	3	14	144.4	20	-80	+25	+25
1200	T4	10	8020	8225	3	14	144.4	20	-80	+25	+25
8 V_{DC} AT +85 °C; 5 V_{DC} AT +125 °C											
25	T1	20	8021	8226	1	2	7.6	100	-40	+10.5	+12
25	T1	10	8022	8227	1	2	7.6	100	-40	+10.5	+12
25	T1	5	8023	8228	1	2	7.6	100	-40	+10.5	+12
56	T1	20	8024	8229	1	2	17	59	-40	+14	+16
56	T1	10	8025	8230	1	2	17	59	-40	+14	+16
56	T1	5	8026	8231	1	2	17	59	-40	+14	+16
220	T2	20	8027	8232	1	7	66.4	30	-44	+17.5	+20
220	T2	10	8028	8233	1	7	66.4	30	-44	+17.5	+20
220	T2	5	8029	8234	1	7	66.4	30	-44	+17.5	+20
430	T3	20	8030	8235	2	14	91.5	25	-64	+17.5	+20
430	T3	10	8031	8236	2	14	91.5	25	-64	+17.5	+20
430	T3	5	8032	8237	2	14	91.5	25	-64	+17.5	+20
850	T4	20	8033	8238	4	16	65.8	22	-80	+25	+25
850	T4	10	8034	8239	4	16	65.8	22	-80	+25	+25
10 V_{DC} AT +85 °C; 7 V_{DC} AT +125 °C											
20	T1	20	8035	8240	1	2	6.1	175	-32	+10.5	+12
20	T1	10	8036	8241	1	2	6.1	175	-32	+10.5	+12
20	T1	5	8037	8242	1	2	6.1	175	-32	+10.5	+12
47	T1	20	8038	8243	1	2	18.1	100	-36	+14	+16
47	T1	10	8039	8244	1	2	18.1	100	-36	+14	+16
47	T1	5	8040	8245	1	2	18.1	100	-36	+14	+16
100	T2	20	8041	8246	1	4	15.2	60	-36	+14	+16
100	T2	10	8042	8247	1	4	15.2	60	-36	+14	+16
100	T2	5	8043	8248	1	4	15.2	60	-36	+14	+16
180	T2	20	8044	8249	1	7	54.4	40	-36	+14	+16
180	T2	10	8045	8250	1	7	54.4	40	-36	+14	+16
180	T2	5	8046	8251	1	7	54.4	40	-36	+14	+16
250	T3	20	8047	8252	2	10	37.8	30	-40	+14	+16
250	T3	10	8048	8253	2	10	37.8	30	-40	+14	+16
250	T3	5	8049	8254	2	10	37.8	30	-40	+14	+16

Note

[1] Style CLR65 is inactive for new military design. For new design use style CLR79

For technical questions, contact: tantalum@vishay.com
THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000

STANDARD RATINGS/EXTENDED RATINGS: CLR65 [1], M39006/09-XXXX

CAPACITANCE (µF)	CASE CODE	CAP. TOL. (± %)	PART NO. M39006/09- FAILURE RATE LEVEL (%/1000 h) L 2.0	PART NO. M39006/09- FAILURE RATE LEVEL (%/1000 h) M 1.0	MAX. DCL (µA) AT +25 °C	MAX. DCL (µA) AT +85 °C +125 °C	MAX. DF AT +25 °C (%)	MAX. IMP. AT -55 °C (Ω)	MAX. CAPACITANCE CHANGE (%) AT -55 °C	MAX. CAPACITANCE CHANGE (%) AT +85 °C	MAX. CAPACITANCE CHANGE (%) AT +125 °C
10 V_{DC} AT +85 °C; 7 V_{DC} AT +125 °C											
390	T3	20	8050	8255	2	16	87.6	25	-64	+17.5	+20
390	T3	10	8051	8256	2	16	87.6	25	-64	+17.5	+20
390	T3	5	8052	8257	2	16	87.6	25	-64	+17.5	+20
750	T4	20	8053	8258	4	16	56.5	23	-80	+25	+25
750	T4	10	8054	8259	4	16	56.5	23	-80	+25	+25
15 V_{DC} AT +85 °C; 10 V_{DC} AT +125 °C											
15	T1	20	8055	8260	1	2	5.7	155	-24	+10.5	+12
15	T1	10	8056	8261	1	2	5.7	155	-24	+10.5	+12
15	T1	5	8057	8262	1	2	5.7	155	-24	+10.5	+12
33	T1	20	8058	8263	1	2	12.5	90	-28	+14	+16
33	T1	10	8059	8264	1	2	12.5	90	-28	+14	+16
33	T1	5	8060	8265	1	2	12.5	90	-28	+14	+16
70	T2	20	8061	8266	1	4	13.1	75	-28	+14	+16
70	T2	10	8062	8267	1	4	13.1	75	-28	+14	+16
70	T2	5	8063	8268	1	4	13.1	75	-28	+14	+16
120	T2	20	8064	8269	1	7	36.8	50	-28	+17.5	+20
120	T2	10	8065	8270	1	7	36.8	50	-28	+17.5	+20
120	T2	5	8066	8271	1	7	36.8	50	-28	+17.5	+20
170	T3	20	8067	8272	2	10	25.4	35	-32	+14	+16
170	T3	10	8068	8273	2	10	25.4	35	-32	+14	+16
170	T3	5	8069	8274	2	10	25.4	35	-32	+14	+16
270	T3	20	8070	8275	2	16	60.9	30	-56	+17.5	+20
270	T3	10	8071	8276	2	16	60.9	30	-56	+17.5	+20
270	T3	5	8072	8277	2	16	60.9	30	-56	+17.5	+20
540	T4	20	8073	8278	6	24	49	23	-80	+25	+25
540	T4	10	8074	8279	6	24	49	23	-80	+25	+25
25 V_{DC} AT +85 °C; 15 V_{DC} AT +125 °C											
10	T1	20	8075	8280	1	2	4.6	220	-16	+8	+9
10	T1	10	8076	8281	1	2	4.6	220	-16	+8	+9
10	T1	5	8077	8282	1	2	4.6	220	-16	+8	+9
22	T1	20	8078	8283	1	2	8.3	140	-20	+10.5	+12
22	T1	10	8079	8284	1	2	8.3	140	-20	+10.5	+12
22	T1	5	8080	8285	1	2	8.3	140	-20	+10.5	+12
100	T2	20	8081	8286	1	10	31.4	50	-28	+13	+15
100	T2	10	8082	8287	1	10	31.4	50	-28	+13	+15
100	T2	5	8083	8288	1	10	31.4	50	-28	+13	+15
180	T3	20	8084	8289	2	18	54.3	32	-48	+13	+15
180	T3	10	8085	8290	2	18	54.3	32	-48	+13	+15
180	T3	5	8086	8291	2	18	54.3	32	-48	+13	+15
350	T4	20	8087	8292	7	28	35	24	-70	+25	+25
350	T4	10	8088	8293	7	28	35	24	-70	+25	+25
30 V_{DC} AT +85 °C; 20 V_{DC} AT +125 °C											
8.0	T1	20	8089	8294	1	2	4.5	275	-16	+8	+12
8.0	T1	10	8090	8295	1	2	4.5	275	-16	+8	+12
8.0	T1	5	8091	8296	1	2	4.5	275	-16	+8	+12
15	T1	20	8092	8297	1	2	9.1	175	-20	+10.5	+12
15	T1	10	8093	8298	1	2	9.1	175	-20	+10.5	+12
15	T1	5	8094	8299	1	2	9.1	175	-20	+10.5	+12
40	T2	20	8095	8300	1	5	12.2	65	-24	+10.5	+12
40	T2	10	8096	8301	1	5	12.2	65	-24	+10.5	+12
40	T2	5	8097	8302	1	5	12.2	65	-24	+10.5	+12

Note

[1] Style CLR65 is inactive for new military design. For new design use style CLR79

For technical questions, contact: tantalum@vishay.com
THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000

STANDARD RATINGS/EXTENDED RATINGS: CLR65 [1], M39006/09-XXXX

CAPACITANCE (µF)	CASE CODE	CAP. TOL. (± %)	PART NO. M39006/09- FAILURE RATE LEVEL (%/1000 h) L 2.0	PART NO. M39006/09- FAILURE RATE LEVEL (%/1000 h) M 1.0	MAX. DCL (µA) AT +25 °C	MAX. DCL (µA) AT +85 °C +125 °C	MAX. DF AT +25 °C (%)	MAX. IMP. AT -55 °C (Ω)	MAX. CAPACITANCE CHANGE (%) AT -55 °C	MAX. CAPACITANCE CHANGE (%) AT +85 °C	MAX. CAPACITANCE CHANGE (%) AT +125 °C
30 V_{DC} AT +85 °C; 20 V_{DC} AT +125 °C											
68	T2	20	8098	8303	1	8	31	60	-24	+13	+15
68	T2	10	8099	8304	1	8	31	60	-24	+13	+15
68	T2	5	8100	8305	1	8	31	60	-24	+13	+15
100	T3	20	8101	8306	2	12	19	40	-28	+10.5	+12
100	T3	10	8102	8307	2	12	19	40	-28	+10.5	+12
100	T3	5	8103	8308	2	12	19	40	-28	+10.5	+12
150	T3	20	8104	8309	2	18	46	35	-48	+13	+15
150	T3	10	8105	8310	2	18	46	35	-48	+13	+15
150	T3	5	8106	8311	2	18	46	35	-48	+13	+15
300	T4	20	8107	8312	8	32	35	25	-60	+25	+25
300	T4	10	8108	8313	8	32	35	25	-60	+25	+25
50 V_{DC} AT +85 °C; 30 V_{DC} AT +125 °C											
5.0	T1	20	8109	8314	1	2	3.4	400	-16	+5	+6
5.0	T1	10	8110	8315	1	2	3.4	400	-16	+5	+6
5.0	T1	5	8111	8316	1	2	3.4	400	-16	+5	+6
10	T1	20	8112	8317	1	2	6	250	-24	+8	+9
10	T1	10	8113	8318	1	2	6	250	-24	+8	+9
10	T1	5	8114	8319	1	2	6	250	-24	+8	+9
25	T2	20	8115	8320	1	5	11.2	95	-20	+10.5	+12
25	T2	10	8116	8321	1	5	11.2	95	-20	+10.5	+12
25	T2	5	8117	8322	1	5	11.2	95	-20	+10.5	+12
47	T2	20	8118	8323	1	9	21.4	70	-28	+13	+15
47	T2	10	8119	8324	1	9	21.4	70	-28	+13	+15
47	T2	5	8120	8325	1	9	21.4	70	-28	+13	+15
60	T3	20	8121	8326	2	12	13.6	45	-16	+10.5	+12
60	T3	10	8122	8327	2	12	13.6	45	-16	+10.5	+12
60	T3	5	8123	8328	2	12	13.6	45	-16	+10.5	+12
82	T3	20	8124	8329	2	16	24.9	45	-32	+13	+15
82	T3	10	8125	8330	2	16	24.9	45	-32	+13	+15
82	T3	5	8126	8331	2	16	24.9	45	-32	+13	+15
160	T4	20	8127	8332	8	32	25.7	27	-50	+25	+25
160	T4	10	8128	8333	8	32	25.7	27	-50	+25	+25
60 V_{DC} AT +85 °C; 40 V_{DC} AT +125 °C											
4.0	T1	20	8129	8334	1	2	3	550	-16	+5	+6
4.0	T1	10	8130	8335	1	2	3	550	-16	+5	+6
4.0	T1	5	8131	8336	1	2	3	550	-16	+5	+6
8.2	T1	20	8132	8337	1	2	5	275	-24	+8	+9
8.2	T1	10	8133	8338	1	2	5	275	-24	+8	+9
8.2	T1	5	8134	8339	1	2	5	275	-24	+8	+9
20	T2	20	8135	8340	1	5	7.6	105	-16	+10.5	+12
20	T2	10	8136	8341	1	5	7.6	105	-16	+10.5	+12
20	T2	5	8137	8342	1	5	7.6	105	-16	+10.5	+12
39	T2	20	8138	8343	1	9	20.7	90	-28	+10.5	+12
39	T2	10	8139	8344	1	9	20.7	90	-28	+10.5	+12
39	T2	5	8140	8345	1	9	20.7	90	-28	+10.5	+12
50	T3	20	8141	8346	2	12	15.3	50	-16	+10.5	+12
50	T3	10	8142	8347	2	12	15.3	50	-16	+10.5	+12
50	T3	5	8143	8348	2	12	15.3	50	-16	+10.5	+12
68	T3	20	8144	8349	2	16	30.7	50	-32	+10.5	+12
68	T3	10	8145	8350	2	16	30.7	50	-32	+10.5	+12
68	T3	5	8146	8351	2	16	30.7	50	-32	+10.5	+12
140	T4	20	8147	8352	8	32	25.7	28	-40	+20	+20
140	T4	10	8148	8353	8	32	25.7	28	-40	+20	+20

Note

[1] Style CLR65 is inactive for new military design. For new design use style CLR79

For technical questions, contact: tantalum@vishay.com
THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000

STANDARD RATINGS/EXTENDED RATINGS: CLR65 [1], M39006/09-XXXX

CAPACITANCE (µF)	CASE CODE	CAP. TOL. (± %)	PART NO. M39006/09- FAILURE RATE LEVEL (%/1000 h) L 2.0	PART NO. M39006/09- FAILURE RATE LEVEL (%/1000 h) M 1.0	MAX. DCL (µA) AT +25 °C	MAX. DCL (µA) AT +85 °C +125 °C	MAX. DF AT +25 °C (%)	MAX. IMP. AT -55 °C (Ω)	MAX. CAPACITANCE CHANGE (%) AT -55 °C	MAX. CAPACITANCE CHANGE (%) AT +85 °C	MAX. CAPACITANCE CHANGE (%) AT +125 °C
75 V_{DC} AT +85 °C; 50 V_{DC} AT +125 °C											
3.5	T1	20	8149	8354	1	2	2.5	650	-16	+5	+6
3.5	T1	10	8150	8355	1	2	2.5	650	-16	+5	+6
3.5	T1	5	8151	8356	1	2	2.5	650	-16	+5	+6
6.8	T1	20	8152	8357	1	2	4.1	300	-20	+8	+9
6.8	T1	10	8153	8358	1	2	4.1	300	-20	+8	+9
6.8	T1	5	8154	8359	1	2	4.1	300	-20	+8	+9
15	T2	20	8155	8360	1	5	7.5	150	-16	+8	+9
15	T2	10	8156	8361	1	5	7.5	150	-16	+8	+9
15	T2	5	8157	8362	1	5	7.4	150	-16	+8	+9
33	T2	20	8158	8363	1	10	17.5	90	-24	+10.5	+15
33	T2	10	8159	8364	1	10	17.5	90	-24	+10.5	+15
33	T2	5	8160	8365	1	10	17.5	90	-24	+10.5	+15
40	T3	20	8161	8366	2	12	15.2	60	-16	+10.5	+12
40	T3	10	8162	8367	2	12	15.2	60	-16	+10.5	+12
40	T3	5	8163	8368	2	12	15.2	60	-16	+10.5	+12
56	T3	20	8164	8369	2	17	26	60	-28	+10.5	+15
56	T3	10	8165	8370	2	17	26	60	-28	+10.5	+15
56	T3	5	8166	8371	2	17	26	60	-28	+10.5	+15
110	T4	20	8167	8372	9	36	25.7	29	-35	+20	+20
110	T4	10	8168	8373	9	36	25.7	29	-35	+20	+20
100 V_{DC} AT +85 °C; 65 V_{DC} AT +125 °C											
2.5	T1	20	8169	8374	1	2	5	950	-16	+7	+8
2.5	T1	10	8170	8375	1	2	5	950	-16	+7	+8
2.5	T1	5	8171	8376	1	2	5	950	-16	+7	+8
4.7	T1	20	8172	8377	1	2	3.6	500	-16	+7	+8
4.7	T1	10	8173	8378	1	2	3.6	500	-16	+7	+8
4.7	T1	5	8174	8379	1	2	3.6	500	-16	+7	+8
11	T2	20	8175	8380	1	4	5	200	-16	+7	+8
11	T2	10	8176	8381	1	4	5	200	-16	+7	+8
11	T2	5	8177	8382	1	4	5	200	-16	+7	+8
22	T2	20	8178	8383	1	9	11.8	100	-16	+7	+8
22	T2	10	8179	8384	1	9	11.8	100	-16	+7	+8
22	T2	5	8180	8385	1	9	11.8	100	-16	+7	+8
30	T3	20	8181	8386	2	12	9.1	80	-16	+7	+8
30	T3	10	8182	8387	2	12	9.1	80	-16	+7	+8
30	T3	5	8183	8388	2	12	9.1	80	-16	+7	+8
43	T3	20	8184	8389	2	17	19.7	70	-20	+7	+8
43	T3	10	8185	8390	2	17	19.7	70	-20	+7	+8
43	T3	5	8186	8391	2	17	19.7	70	-20	+7	+8
86	T4	20	8187	8392	9	36	20.7	30	-25	+15	+15
86	T4	10	8188	8393	9	36	20.7	30	-25	+15	+15

Note

[1] Style CLR65 is inactive for new military design. For new design use style CLR79

For technical questions, contact: tantalum@vishay.com
THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000

STANDARD RATINGS/EXTENDED RATINGS: CLR65 [1], M39006/09-XXXX

CAPACITANCE (µF)	CASE CODE	CAP. TOL. (± %)	PART NO. M39006/09- FAILURE RATE LEVEL (%/1000 h)		MAX. DCL (µA) AT		MAX. DF AT +25 °C (%)	MAX. IMP. AT -55 °C (Ω)	MAX. CAPACITANCE CHANGE (%) AT		
			L 2.0	M 1.0	+25 °C	+85 °C +125 °C			-55 °C	+85 °C	+125 °C
125 V_{DC} AT +85 °C; 85 V_{DC} AT +125 °C											
1.7	T1	20	8189	8394	1	2	7	1250	-16	+7	+8
1.7	T1	10	8190	8395	1	2	7	1250	-16	+7	+8
1.7	T1	5	8191	8396	1	2	7	1250	-16	+7	+8
3.6	T1	20	8192	8397	1	2	4.1	600	-16	+7	+8
3.6	T1	10	8193	8398	1	2	4.1	600	-16	+7	+8
3.6	T1	5	8194	8399	1	2	4.1	600	-16	+7	+8
9.0	T2	20	8195	8400	1	5	10.2	240	-16	+7	+8
9.0	T2	10	8196	8401	1	5	10.2	240	-16	+7	+8
9.0	T2	5	8197	8402	1	5	10.2	240	-16	+7	+8
25	T3	20	8204	8409	2	13	19	93	-16	+7	+8
25	T3	10	8205	8410	2	13	19	93	-16	+7	+8
25	T3	5	9026	9029	2	13	19	93	-16	+7	+8
56	T4	20	9027	9030	10	40	17.5	32	-25	+15	+15
56	T4	10	9028	9031	10	40	17.5	32	-25	+15	+15

Note

[1] Style CLR65 is inactive for new military design. For new design use style CLR79

STANDARD RATINGS / EXTENDED RATINGS: CLR69 [1], M39006/21-XXXX

CAPACITANCE (µF)	CASE CODE	CAP. TOL. (± %)	PART NO. M39006/21- FAILURE RATE LEVEL (%/1000 h)		MAX. DCL (µA) AT		MAX. DF AT +25 °C (%)	MAX. IMP. AT -55 °C (Ω)	MAX. CAPACITANCE CHANGE (%) AT		
			L 2.0	M 1.0	+25 °C	+85 °C +125 °C			-55 °C	+85 °C	+125 °C
6 V_{DC} AT +85 °C; 4 V_{DC} AT +125 °C											
220	T1	20	0001	0089	2	9	50	36	-64	+13	+16
220	T1	10	0002	0090	2	9	50	36	-64	+13	+16
820	T2	20	0003	0091	3	14	155	18	-88	+16	+20
820	T2	10	0004	0092	3	14	155	18	-88	+16	+20
1500	T3	20	0005	0093	5	20	172	18	-90	+20	+25
1500	T3	10	0006	0094	5	20	172	18	-90	+20	+25
2200	T4	20	0007	0095	6	24	170	13	-90	+25	+30
2200	T4	10	0008	0096	6	24	170	13	-90	+25	+30
8 V_{DC} AT +85 °C; 5 V_{DC} AT +125 °C											
180	T1	20	0009	0097	2	9	41	45	-60	+13	+16
180	T1	10	0010	0098	2	9	41	45	-60	+13	+16
680	T2	20	0011	0099	3	14	130	22	-83	+16	+20
680	T2	10	0012	0100	3	14	130	22	-83	+16	+20
1500	T3	20	0013	0101	5	20	170	18	-90	+20	+25
1500	T3	10	0014	0102	5	20	170	18	-90	+20	+25
1800	T4	20	0015	0103	7	25	138	14	-90	+25	+30
1800	T4	10	0016	0104	7	25	138	14	-90	+25	+30

Note

[1] Style CLR69 is inactive for new military design. For new design use style CLR81

For technical questions, contact: tantalum@vishay.com
THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000

STANDARD RATINGS / EXTENDED RATINGS: CLR69 [1], M39006/21-XXXX

CAPACITANCE (µF)	CASE CODE	CAP. TOL. (± %)	PART NO. M39006/21- FAILURE RATE LEVEL (%/1000 h) L 2.0	PART NO. M39006/21- FAILURE RATE LEVEL (%/1000 h) M 1.0	MAX. DCL (µA) AT +25 °C	MAX. DCL (µA) AT +85 °C +125 °C	MAX. DF AT +25 °C (%)	MAX. IMP. AT -55 °C (Ω)	MAX. CAPACITANCE CHANGE (%) AT -55 °C	MAX. CAPACITANCE CHANGE (%) AT +85 °C	MAX. CAPACITANCE CHANGE (%) AT +125 °C
10 V_{DC} AT +85 °C; 7 V_{DC} AT +125 °C											
150	T1	20	0017	0105	2	9	34	54	-55	+13	+16
150	T1	10	0018	0106	2	9	34	54	-55	+13	+16
560	T2	20	0019	0107	3	16	106	27	-77	+16	+20
560	T2	10	0020	0108	3	16	106	27	-77	+16	+20
1200	T3	20	0021	0109	5	20	137	18	-88	+20	+25
1200	T3	10	0022	0110	5	20	137	18	-88	+20	+25
1500	T4	20	0023	0111	7	25	114	15	-88	+25	+30
1500	T4	10	0024	0112	7	25	114	15	-88	+25	+30
15 V_{DC} AT +85 °C; 10 V_{DC} AT +125 °C											
100	T1	20	0025	0113	2	9	30	72	-44	+13	++16
100	T1	10	0026	0114	2	9	30	72	-44	+13	+16
390	T2	20	0027	0115	3	16	74	31	-66	+16	+20
390	T2	10	0028	0116	3	16	74	31	-66	+16	+20
820	T3	20	0029	0117	6	24	111	22	-77	+20	+25
820	T3	10	0030	0118	6	24	111	22	-77	+20	+25
1000	T4	20	0031	0119	8	32	92	17	-77	+25	+30
1000	T4	10	0032	0120	8	32	92	17	-77	+25	+30
25 V_{DC} AT +85 °C; 15 V_{DC} AT +125 °C											
68	T1	20	0033	0121	2	9	22	90	-40	+12	+15
68	T1	10	0034	0122	2	9	22	90	-40	+12	+15
270	T2	20	0035	0123	3	16	55	33	-62	+13	+16
270	T2	10	0036	0124	3	16	55	33	-62	+13	+16
560	T3	20	0037	0125	7	28	76	24	-72	+20	+25
560	T3	10	0038	0126	7	28	76	24	-72	+20	+25
680	T4	20	0039	0127	8	32	63	19	-72	+25	+30
680	T4	10	0040	0128	8	32	63	19	-72	+25	+30
30 V_{DC} AT +85 °C; 20 V_{DC} AT +125 °C											
56	T1	20	0041	0129	2	9	22	100	-38	+12	+15
56	T1	10	0042	0130	2	9	22	100	-38	+12	+15
220	T2	20	0043	0131	3	16	42	36	-60	+13	+16
220	T2	10	0044	0132	3	16	42	36	-60	+13	+16
470	T3	20	0045	0133	8	32	64	25	-65	+20	+25
470	T3	10	0046	0134	8	32	64	25	-65	+20	+25
560	T4	20	0047	0135	9	36	55	20	-65	+25	+30
560	T4	10	0048	0136	9	36	55	20	-65	+25	+30
50 V_{DC} AT +85 °C; 30 V_{DC} AT +125 °C											
33	T1	20	0049	0137	2	9	12.3	135	-29	+10	+12
33	T1	10	0050	0138	2	9	12.3	135	-29	+10	+12
120	T2	20	0051	0139	4	24	22.5	49	-42	+12	+15
120	T2	10	0052	0140	4	24	22.5	49	-42	+12	+15
270	T3	20	0053	0141	8	32	37	29	-46	+20	+25
270	T3	10	0054	0142	8	32	37	29	-46	+20	+25
330	T4	20	0055	0143	9	36	38	22	-46	+25	+30
330	T4	10	0056	0144	9	36	38	22	-46	+25	+30
60 V_{DC} AT +85 °C; 40 V_{DC} AT +125 °C											
27	T1	20	0057	0145	3	12	10.2	144	-24	+10	+12
27	T1	10	0058	0146	3	12	10.2	144	-24	+10	+12
100	T2	20	0059	0147	4	20	19	54	-36	+12	+15
100	T2	10	0060	0148	4	20	19	54	-36	+12	+15
220	T3	20	0061	0149	8	32	30	29	-40	+16	+20
220	T3	10	0062	0150	8	32	30	29	-40	+16	+20
270	T4	20	0063	0151	9	36	27	23	-45	+20	+25
270	T4	10	0064	0152	9	36	27	23	-45	+20	+25

Note

[1] Style CLR69 is inactive for new military design. For new design use style CLR81

For technical questions, contact: tantalum@vishay.com
THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000

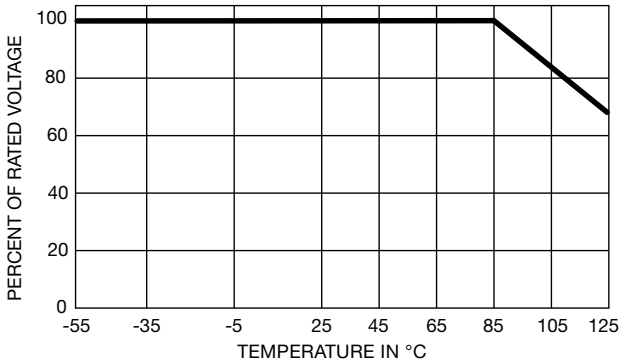
STANDARD RATINGS / EXTENDED RATINGS: CLR69 (1), M39006/21-XXXX

CAPACITANCE (µF)	CASE CODE	CAP. TOL. (± %)	PART NO. M39006/21- FAILURE RATE LEVEL (%/1000 h) L 2.0	PART NO. M39006/21- FAILURE RATE LEVEL (%/1000 h) M 1.0	MAX. DCL (µA) AT +25 °C	MAX. DCL (µA) AT +85 °C +125 °C	MAX. DF AT +25 °C (%)	MAX. IMP. AT -55 °C (Ω)	MAX. CAPACITANCE CHANGE (%) AT -55 °C	MAX. CAPACITANCE CHANGE (%) AT +85 °C	MAX. CAPACITANCE CHANGE (%) AT +125 °C
75 V_{DC} AT +85 °C; 50 V_{DC} AT +125 °C											
22	T1	20	0065	0153	3	12	8.5	157	-19	+10	+12
22	T1	10	0066	0154	3	12	8.5	157	-19	+10	+12
82	T2	20	0067	0155	4	24	15.2	63	-30	+12	+15
82	T2	10	0068	0156	4	24	15.2	63	-30	+12	+15
180	T3	20	0069	0157	9	36	24.4	30	-35	+16	+20
180	T3	10	0070	0158	9	36	24.4	30	-35	+16	+20
220	T4	20	0071	0159	10	40	37	24	-40	+20	+25
220	T4	10	0072	0160	10	40	37	24	-40	+20	+25
100 V_{DC} AT +85 °C; 65 V_{DC} AT +125 °C											
10	T1	20	0073	0161	3	12	4.5	200	-17	+10	+12
10	T1	10	0074	0162	3	12	4.5	200	-17	+10	+12
39	T2	20	0075	0163	5	24	10.4	80	-20	+12	+15
39	T2	10	0076	0164	5	24	10.4	80	-20	+12	+15
68	T3	20	0077	0165	10	40	11.3	40	-30	+14	+16
68	T3	10	0078	0166	10	40	11.3	40	-30	+14	+16
120	T4	20	0079	0167	12	48	25	30	-35	+15	+17
120	T4	10	0080	0168	12	48	25	30	-35	+15	+17
125 V_{DC} AT +85 °C; 85 V_{DC} AT +125 °C											
6.8	T1	20	0081	0169	3	12	6	300	-14	+10	+12
6.8	T1	10	0082	0170	3	12	6	300	-14	+10	+12
27	T2	20	0083	0171	5	24	7.2	90	-18	+12	+15
27	T2	10	0084	0172	5	24	7.2	90	-18	+12	+15
47	T3	20	0085	0173	10	40	7.9	50	-26	+14	+16
47	T3	10	0086	0174	10	40	7.9	50	-26	+14	+16
82	T4	20	0087	0175	12	48	17.4	32	-30	+15	+17
82	T4	10	0088	0176	12	48	17.4	32	-30	+15	+17

Note

(1) Style CLR69 is inactive for new military design. For new design use style CLR81

VOLTAGE DERATING WITH TEMPERATURE



For technical questions, contact: tantalum@vishay.com
THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000

Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, “Vishay”), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and / or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Hyperlinks included in this datasheet may direct users to third-party websites. These links are provided as a convenience and for informational purposes only. Inclusion of these hyperlinks does not constitute an endorsement or an approval by Vishay of any of the products, services or opinions of the corporation, organization or individual associated with the third-party website. Vishay disclaims any and all liability and bears no responsibility for the accuracy, legality or content of the third-party website or for that of subsequent links.

Vishay products are not designed for use in life-saving or life-sustaining applications or any application in which the failure of the Vishay product could result in personal injury or death unless specifically qualified in writing by Vishay. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.

© 2026 VISHAY INTERTECHNOLOGY, INC. ALL RIGHTS RESERVED

THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000