

## Wet Tantalum Capacitors, Military Established Reliability, MIL-PRF-39006 Qualified Styles CLR65, 79, 81, 90, 91



### FEATURES

- Hermetically sealed
- Metal cased
- Axial lead
- Tubular

### SPECIFICATIONS

- Style CLR65, M39006/09
- Style CLR69, M39006/21
- Style CLR79, M39006/22
- Style CLR81, M39006/25
- Style CLR90, M39006/30
- Style CLR91, M39006/31

**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 (CLRxxxxxxxx) 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. MIL-PRF-39006 establishes 1000 h failure rate levels of 2 %, 1 %, 0.1 %, and 0.01 %. When ordering these parts, care must be exercised that the correct part number expressing the appropriate failure level be specified.

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



**Note**

The material in this section has been abstracted from MIL-PRF-39006/09/22/25/30/31.



CASE CODE	BARE CASE		WITH INSULATING SLEEVE		E LEAD LENGTH	WEIGHT (oz./g) (Max.)
	D	L	D (Max.)	L (Max.)		
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]	0.515 [13.08]	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]	0.704 [17.88]	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]	0.828 [21.03]	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]	1.126 [28.60]	2.250 ± 0.250 [57.15 ± 6.35]	0.49 [13.9]



CASE CODE	BARE CASE		WITH INSULATING SLEEVE		E LEAD LENGTH	WEIGHT (oz./g) (Max.)
	D	L	D (Max.)	L (Max.)		
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]	0.515 [13.08]	1.500 ± 0.250 [38.10 ± 6.35]	0.09 [2.6]
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]	0.704 [17.88]	2.250 ± 0.250 [57.15 ± 6.35]	0.22 [6.2]
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]	0.828 [21.03]	2.250 ± 0.250 [57.15 ± 6.35]	0.41 [11.6]
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]	1.126 [28.60]	2.250 ± 0.250 [57.15 ± 6.35]	0.62 [17.7]

















<b>STANDARD/EXTENDED RATINGS: CLR79, M39006/22-XXXX</b>													
CAPACITANCE ( $\mu$ F)	CASE CODE	CAP. TOL. ( $\pm$ %)	PART NO. M39006/22-* FAILURE RATE LEVEL (%/1000 h)			MAX. DCL ( $\mu$ A) at		MAX. DF	MAX. IMP.	MAX. CAPACITANCE CHANGE (%) at			MAX.** RIPPLE CURRENT
			M	P	R	+ 25 °C	+ 85 °C + 125 °C	+ 25 °C	- 55 °C	- 55 °C	+ 85 °C	+ 125 °C	at + 85 °C
			1.0	0.1	0.01	( $\Omega$ )	(%)	( $\Omega$ )					40 kHz (mA)
<b>6 WVDC at + 85 °C . . . 4 WVDC at + 125 °C</b>													
30.0	T1	20	0001	0221	0441	1.0	2.0	9	100	- 40	+ 10.5	+ 12	820
30.0	T1	10	0002	0222	0442	1.0	2.0	9	100	- 40	+ 10.5	+ 12	820
30.0	T1	5	0003	0223	0443	1.0	2.0	9	100	- 40	+ 10.5	+ 12	820
68.0	T1	20	0004	0224	0444	1.0	2.0	15	60	- 40	+ 14	+ 16	960
68.0	T1	10	0005	0225	0445	1.0	2.0	15	60	- 40	+ 14	+ 16	960
68.0	T1	5	0006	0226	0446	1.0	2.0	15	60	- 40	+ 14	+ 16	960
140.0	T2	20	0007	0227	0447	1.0	3.0	21	40	- 40	+ 14	+ 16	1200
140.0	T2	10	0008	0228	0448	1.0	3.0	21	40	- 40	+ 14	+ 16	1200
140.0	T2	5	0009	0229	0449	1.0	3.0	21	40	- 40	+ 14	+ 16	1200
270.0	T2	20	0010	0230	0450	1.0	6.5	45	25	- 44	+ 17.5	+ 20	1375
270.0	T2	10	0011	0231	0451	1.0	6.5	45	25	- 44	+ 17.5	+ 20	1375
270.0	T2	5	0012	0232	0452	1.0	6.5	45	25	- 44	+ 17.5	+ 20	1375
330.0	T3	20	0013	0233	0453	2.0	7.9	36	20	- 44	+ 14	+ 16	1800
330.0	T3	10	0014	0234	0454	2.0	7.9	36	20	- 44	+ 14	+ 16	1800
330.0	T3	5	0015	0235	0455	2.0	7.9	36	20	- 44	+ 14	+ 16	1800
560.0	T3	20	0016	0236	0456	2.0	13.0	55	25	- 64	+ 17.5	+ 20	1900
560.0	T3	10	0017	0237	0457	2.0	13.0	55	25	- 64	+ 17.5	+ 20	1900
560.0	T3	5	0018	0238	0458	2.0	13.0	55	25	- 64	+ 17.5	+ 20	1900
1200.0	T4	20	0019	0239	0459	3.0	14.0	90	20	- 80	+ 25	+ 25	2265
1200.0	T4	10	0020	0240	0460	3.0	14.0	90	20	- 80	+ 25	+ 25	2265
<b>8 WVDC at + 85 °C . . . 5 WVDC at + 125 °C</b>													
25.0	T1	20	0021	0241	0461	1.0	2.0	7.5	100	- 40	+ 10.5	+ 12	820
25.0	T1	10	0022	0242	0462	1.0	2.0	7.5	100	- 40	+ 10.5	+ 12	820
25.0	T1	5	0023	0243	0463	1.0	2.0	7.5	100	- 40	+ 10.5	+ 12	820
56.0	T1	20	0024	0244	0464	1.0	2.0	14	59	- 40	+ 14	+ 16	900
56.0	T1	10	0025	0245	0465	1.0	2.0	14	59	- 40	+ 14	+ 16	900
56.0	T1	5	0026	0246	0466	1.0	2.0	14	59	- 40	+ 14	+ 16	900
120.0	T2	20	0027	0247	0467	1.0	2.0	20	50	- 44	+ 17.5	+ 20	1220
120.0	T2	10	0028	0248	0468	1.0	2.0	20	50	- 44	+ 17.5	+ 20	1220
120.0	T2	5	0029	0249	0469	1.0	2.0	20	50	- 44	+ 17.5	+ 20	1220
220.0	T2	20	0030	0250	0470	1.0	7.0	37	30	- 44	+ 17.5	+ 20	1370
220.0	T2	10	0031	0251	0471	1.0	7.0	37	30	- 44	+ 17.5	+ 20	1370
220.0	T2	5	0032	0252	0472	1.0	7.0	37	30	- 44	+ 17.5	+ 20	1370
290.0	T3	20	0033	0253	0473	2.0	6.0	34	25	- 64	+ 17.5	+ 20	1770
290.0	T3	10	0034	0254	0474	2.0	6.0	34	25	- 64	+ 17.5	+ 20	1770
290.0	T3	5	0035	0255	0475	2.0	6.0	34	25	- 64	+ 17.5	+ 20	1770
430.0	T3	20	0036	0256	0476	2.0	14.0	46	25	- 64	+ 17.5	+ 20	1825
430.0	T3	10	0037	0257	0477	2.0	14.0	46	25	- 64	+ 17.5	+ 20	1825
430.0	T3	5	0038	0258	0478	2.0	14.0	46	25	- 64	+ 17.5	+ 20	1825
850.0	T4	20	0039	0259	0479	4.0	16.0	60	22	- 80	+ 25	+ 25	2330
850.0	T4	10	0040	0260	0480	4.0	16.0	60	22	- 80	+ 25	+ 25	2330
<b>10 WVDC at + 85 °C . . . 7 WVDC at + 125 °C</b>													
20.0	T1	20	0041	0261	0481	1.0	2.0	6	175	- 32	+ 10.5	+ 12	820
20.0	T1	10	0042	0262	0482	1.0	2.0	6	175	- 32	+ 10.5	+ 12	820
20.0	T1	5	0043	0263	0483	1.0	2.0	6	175	- 32	+ 10.5	+ 12	820
47.0	T1	20	0044	0264	0484	1.0	2.0	13	100	- 36	+ 14	+ 16	855
47.0	T1	10	0045	0265	0485	1.0	2.0	13	100	- 36	+ 14	+ 16	855
47.0	T1	5	0046	0266	0486	1.0	2.0	13	100	- 36	+ 14	+ 16	855
100.0	T2	20	0047	0267	0487	1.0	4.0	15	60	- 36	+ 14	+ 16	1200
100.0	T2	10	0048	0268	0488	1.0	4.0	15	60	- 36	+ 14	+ 16	1200
100.0	T2	5	0049	0269	0489	1.0	4.0	15	60	- 36	+ 14	+ 16	1200
180.0	T2	20	0050	0270	0490	1.0	7.0	30	40	- 36	+ 14	+ 16	1365

**Notes**

\* Dash number will include the letter "H" to indicate the optional vibration and shock requirements (i.e., 51 g random vibration, 80 g sinusoidal vibration and 500 g shock).

\*\* For ripple current limits at various temperatures, voltages and frequencies, see Ripple Current Table.



<b>STANDARD/EXTENDED RATINGS: CLR79, M39006/22-XXXX</b>													
CAPACITANCE (µF)	CASE CODE	CAP. TOL. (± %)	PART NO. M39006/22-*			MAX. DCL (µA)		MAX. DF at + 25 °C (%)	MAX. IMP. at - 55 °C (Ω)	MAX. CAPACITANCE CHANGE (%) at			MAX.** RIPPLE CURRENT at + 85 °C 40 kHz (mA)
			FAILURE RATE LEVEL (%/1000 h)			at				at			
			M 1.0	P 0.1	R 0.01	+ 25 °C	+ 85 °C + 125 °C			- 55 °C	- 55 °C	+ 85 °C	
<b>10 WVDC at + 85 °C . . . 7 WVDC at + 125 °C</b>													
180.0	T2	10	0051	0271	0491	1.0	7.0	30	40	- 36	+ 14	+ 16	1365
180.0	T2	5	0052	0272	0492	1.0	7.0	30	40	- 36	+ 14	+ 16	1365
250.0	T3	20	0053	0273	0493	2.0	10.0	30	30	- 40	+ 14	+ 16	1720
250.0	T3	10	0054	0274	0494	2.0	10.0	30	30	- 40	+ 14	+ 16	1720
250.0	T3	5	0055	0275	0495	2.0	10.0	30	30	- 40	+ 14	+ 16	1720
390.0	T3	20	0056	0276	0496	2.0	16.0	44	25	- 64	+ 17.5	+ 20	1800
390.0	T3	10	0057	0277	0497	2.0	16.0	44	25	- 64	+ 17.5	+ 20	1800
390.0	T3	5	0058	0278	0498	2.0	16.0	44	25	- 64	+ 17.5	+ 20	1800
750.0	T4	20	0059	0279	0499	4.0	16.0	50	23	- 80	+ 25	+ 25	2360
750.0	T4	10	0060	0280	0500	4.0	16.0	50	23	- 80	+ 25	+ 25	2360
<b>15 WVDC at + 85 °C . . . 10 WVDC at + 125 °C</b>													
15.0	T1	20	0061	0281	0501	1.0	2.0	5	155	- 24	+ 10.5	+ 12	780
15.0	T1	10	0062	0282	0502	1.0	2.0	5	155	- 24	+ 10.5	+ 12	780
15.0	T1	5	0063	0283	0503	1.0	2.0	5	155	- 24	+ 10.5	+ 12	780
33.0	T1	20	0064	0284	0504	1.0	2.0	10	90	- 28	+ 14	+ 16	820
33.0	T1	10	0065	0285	0505	1.0	2.0	10	90	- 28	+ 14	+ 16	820
33.0	T1	5	0066	0286	0506	1.0	2.0	10	90	- 28	+ 14	+ 16	820
70.0	T2	20	0067	0287	0507	1.0	4.0	13	75	- 28	+ 14	+ 16	1150
70.0	T2	10	0068	0288	0508	1.0	4.0	13	75	- 28	+ 14	+ 16	1150
70.0	T2	5	0069	0289	0509	1.0	4.0	13	75	- 28	+ 14	+ 16	1150
120.0	T2	20	0070	0290	0510	1.0	7.0	18	50	- 28	+ 17.5	+ 20	1450
120.0	T2	10	0071	0291	0511	1.0	7.0	18	50	- 28	+ 17.5	+ 20	1450
120.0	T2	5	0072	0292	0512	1.0	7.0	18	50	- 28	+ 17.5	+ 20	1450
170.0	T3	20	0073	0293	0513	2.0	10.0	25	35	- 32	+ 14	+ 16	1480
170.0	T3	10	0074	0294	0514	2.0	10.0	25	35	- 32	+ 14	+ 16	1480
170.0	T3	5	0075	0295	0515	2.0	10.0	25	35	- 32	+ 14	+ 16	1480
270.0	T3	20	0076	0296	0516	2.0	16.0	32	30	- 56	+ 17.5	+ 20	1740
270.0	T3	10	0077	0297	0517	2.0	16.0	32	30	- 56	+ 17.5	+ 20	1740
270.0	T3	5	0078	0298	0518	2.0	16.0	32	30	- 56	+ 17.5	+ 20	1740
540.0	T4	20	0079	0299	0519	6.0	24.0	40	23	- 80	+ 25	+ 25	2330
540.0	T4	10	0080	0300	0520	6.0	24.0	40	23	- 80	+ 25	+ 25	2330
<b>25 WVDC at + 85 °C . . . 15 WVDC at + 125 °C</b>													
10.0	T1	20	0081	0301	0521	1.0	2.0	4	220	- 16	+ 8	+ 9	715
10.0	T1	10	0082	0302	0522	1.0	2.0	4	220	- 16	+ 8	+ 9	715
10.0	T1	5	0083	0303	0523	1.0	2.0	4	220	- 16	+ 8	+ 9	715
22.0	T1	20	0084	0304	0524	1.0	2.0	6.6	140	- 20	+ 10.5	+ 12	825
22.0	T1	10	0085	0305	0525	1.0	2.0	6.6	140	- 20	+ 10.5	+ 12	825
22.0	T1	5	0086	0306	0526	1.0	2.0	6.6	140	- 20	+ 10.5	+ 12	825
50.0	T2	20	0087	0307	0527	1.0	2.0	11.0	70	- 28	+ 13	+ 15	1130
50.0	T2	10	0088	0308	0528	1.0	2.0	11.0	70	- 28	+ 13	+ 15	1130
50.0	T2	5	0089	0309	0529	1.0	2.0	11.0	70	- 28	+ 13	+ 15	1130
100.0	T2	20	0090	0310	0530	1.0	10.0	15	50	- 28	+ 13	+ 15	1435
100.0	T2	10	0091	0311	0531	1.0	10.0	15	50	- 28	+ 13	+ 15	1435
100.0	T2	5	0092	0312	0532	1.0	10.0	15	50	- 28	+ 13	+ 15	1435
120.0	T3	20	0093	0313	0533	2.0	6.0	21	38	- 32	+ 13	+ 15	1450
120.0	T3	10	0094	0314	0534	2.0	6.0	21	38	- 32	+ 13	+ 15	1450
120.0	T3	5	0095	0315	0535	2.0	6.0	21	38	- 32	+ 13	+ 15	1450
180.0	T3	20	0096	0316	0536	2.0	18.0	26	32	- 48	+ 13	+ 15	1525
180.0	T3	10	0097	0317	0537	2.0	18.0	26	32	- 48	+ 13	+ 15	1525
180.0	T3	5	0098	0318	0538	2.0	18.0	26	32	- 48	+ 13	+ 15	1525
350.0	T4	20	0099	0319	0539	7.0	28.0	35	24	- 70	+ 25	+ 25	1970
350.0	T4	10	0100	0320	0540	7.0	28.0	35	24	- 70	+ 25	+ 25	1970

**Notes**

\* Dash number will include the letter "H" to indicate the optional vibration and shock requirements (i.e., 51 g random vibration, 80 g sinusoidal vibration and 500 g shock).

\*\* For ripple current limits at various temperatures, voltages and frequencies, see Ripple Current Table.



<b>STANDARD/EXTENDED RATINGS: CLR79, M39006/22-XXXX</b>													
CAPACITANCE (µF)	CASE CODE	CAP. TOL. (± %)	PART NO. M39006/22-* FAILURE RATE LEVEL (%/1000 h)			MAX. DCL (µA) at		MAX. DF at + 25 °C (%)	MAX. IMP. at - 55 °C (Ω)	MAX. CAPACITANCE CHANGE (%) at			MAX.** RIPPLE CURRENT at + 85 °C 40 kHz (mA)
			M	P	R	+ 25 °C	+ 85 °C + 125 °C			- 55 °C	+ 85 °C	+ 125 °C	
			1.0	0.1	0.01								
<b>30 WVDC at + 85 °C . . . 20 WVDC at + 125 °C</b>													
8.0	T1	20	0101	0321	0541	1.0	2.0	4	275	- 16	+ 8	+ 12	640
8.0	T1	10	0102	0322	0542	1.0	2.0	4	275	- 16	+ 8	+ 12	640
8.0	T1	5	0103	0323	0543	1.0	2.0	4	275	- 16	+ 8	+ 12	640
15.0	T1	20	0104	0324	0544	1.0	2.0	5	175	- 20	+ 10.5	+ 12	780
15.0	T1	10	0105	0325	0545	1.0	2.0	5	175	- 20	+ 10.5	+ 12	780
15.0	T1	5	0106	0326	0546	1.0	2.0	5	175	- 20	+ 10.5	+ 12	780
40.0	T2	20	0107	0327	0547	1.0	5.0	10	65	- 24	+ 10.5	+ 12	1120
40.0	T2	10	0108	0328	0548	1.0	5.0	10	65	- 24	+ 10.5	+ 12	1120
40.0	T2	5	0109	0329	0549	1.0	5.0	10	65	- 24	+ 10.5	+ 12	1120
68.0	T2	20	0110	0330	0550	1.0	8.0	13	60	- 24	+ 13	+ 15	1285
68.0	T2	10	0111	0331	0551	1.0	8.0	13	60	- 24	+ 13	+ 15	1285
68.0	T2	5	0112	0332	0552	1.0	8.0	13	60	- 24	+ 13	+ 15	1285
100.0	T3	20	0113	0333	0553	2.0	12.0	17	40	- 28	+ 10.5	+ 12	1450
100.0	T3	10	0114	0334	0554	2.0	12.0	17	40	- 28	+ 10.5	+ 12	1450
100.0	T3	5	0115	0335	0555	2.0	12.0	17	40	- 28	+ 10.5	+ 12	1450
150.0	T3	20	0116	0336	0556	2.0	18.0	23	35	- 48	+ 13	+ 15	1525
150.0	T3	10	0117	0337	0557	2.0	18.0	23	35	- 48	+ 13	+ 15	1525
150.0	T3	5	0118	0338	0558	2.0	18.0	23	35	- 48	+ 13	+ 15	1525
300.0	T4	20	0119	0339	0559	8.0	32.0	31	25	- 60	+ 25	+ 25	1950
300.0	T4	10	0120	0340	0560	8.0	32.0	31	25	- 60	+ 25	+ 25	1950
<b>50 WVDC at + 85 °C . . . 30 WVDC at + 125 °C</b>													
5.0	T1	20	0121	0341	0561	1.0	2.0	3	400	- 16	+ 5	+ 6	580
5.0	T1	10	0122	0342	0562	1.0	2.0	3	400	- 16	+ 5	+ 6	580
5.0	T1	5	0123	0343	0563	1.0	2.0	3	400	- 16	+ 5	+ 6	580
10.0	T1	20	0124	0344	0564	1.0	2.0	4	250	- 24	+ 8	+ 9	715
10.0	T1	10	0125	0345	0565	1.0	2.0	4	250	- 24	+ 8	+ 9	715
10.0	T1	5	0126	0346	0566	1.0	2.0	4	250	- 24	+ 8	+ 9	715
25.0	T2	20	0127	0347	0567	1.0	5.0	8	95	- 20	+ 10.5	+ 12	1005
25.0	T2	10	0128	0348	0568	1.0	5.0	8	95	- 20	+ 10.5	+ 12	1005
25.0	T2	5	0129	0349	0569	1.0	5.0	8	95	- 20	+ 10.5	+ 12	1005
47.0	T2	20	0130	0350	0570	1.0	9.0	11	70	- 28	+ 13	+ 15	1155
47.0	T2	10	0131	0351	0571	1.0	9.0	11	70	- 28	+ 13	+ 15	1155
47.0	T2	5	0132	0352	0572	1.0	9.0	11	70	- 28	+ 13	+ 15	1155
60.0	T3	20	0133	0353	0573	2.0	12.0	12	45	- 16	+ 10.5	+ 12	1335
60.0	T3	10	0134	0354	0574	2.0	12.0	12	45	- 16	+ 10.5	+ 12	1335
60.0	T3	5	0135	0355	0575	2.0	12.0	12	45	- 16	+ 10.5	+ 12	1335
82.0	T3	20	0136	0356	0576	2.0	16.0	15	45	- 32	+ 13	+ 15	1400
82.0	T3	10	0137	0357	0577	2.0	16.0	15	45	- 32	+ 13	+ 15	1400
82.0	T3	5	0138	0358	0578	2.0	16.0	15	45	- 32	+ 13	+ 15	1400
160.0	T4	20	0139	0359	0579	8.0	32.0	17	27	- 50	+ 25	+ 25	1900
160.0	T4	10	0140	0360	0580	8.0	32.0	17	27	- 50	+ 25	+ 25	1900
<b>60 WVDC at + 85 °C . . . 40 WVDC at + 125 °C</b>													
4.0	T1	20	0141	0361	0581	1.0	2.0	2.8	550	- 16	+ 5	+ 6	525
4.0	T1	10	0142	0362	0582	1.0	2.0	2.8	550	- 16	+ 5	+ 6	525
4.0	T1	5	0143	0363	0583	1.0	2.0	2.8	550	- 16	+ 5	+ 6	525
8.2	T1	20	0144	0364	0584	1.0	2.0	4	275	- 24	+ 8	+ 9	625
8.2	T1	10	0145	0365	0585	1.0	2.0	4	275	- 24	+ 8	+ 9	625
8.2	T1	5	0146	0366	0586	1.0	2.0	4	275	- 24	+ 8	+ 9	625
20.0	T2	20	0147	0367	0587	1.0	5.0	7	105	- 16	+ 10.5	+ 12	930
20.0	T2	10	0148	0368	0588	1.0	5.0	7	105	- 16	+ 10.5	+ 12	930
20.0	T2	5	0149	0369	0589	1.0	5.0	7	105	- 16	+ 10.5	+ 12	930
39.0	T2	20	0150	0370	0590	1.0	9.0	10	90	- 28	+ 10.5	+ 12	1110

**Notes**

\* Dash number will include the letter "H" to indicate the optional vibration and shock requirements (i.e., 51 g random vibration, 80 g sinusoidal vibration and 500 g shock).

\*\* For ripple current limits at various temperatures, voltages and frequencies, see Ripple Current Table.



<b>STANDARD/EXTENDED RATINGS: CLR79, M39006/22-XXXX</b>													
CAPACITANCE ( $\mu$ F)	CASE CODE	CAP. TOL. ( $\pm$ %)	PART NO. M39006/22-*			MAX. DCL ( $\mu$ A)		MAX. DF at + 25 °C (%)	MAX. IMP. at - 55 °C ( $\Omega$ )	MAX. CAPACITANCE CHANGE (%) at			MAX.** RIPPLE CURRENT at + 85 °C 40 kHz (mA)
			FAILURE RATE LEVEL (%/1000 h)			at				+ 25 °C + 85 °C + 125 °C			
			M 1.0	P 0.1	R 0.01	+ 25 °C	+ 85 °C + 125 °C	- 55 °C	+ 25 °C	+ 85 °C	+ 125 °C		
<b>60 WVDC at + 85 °C . . . 40 WVDC at + 125 °C</b>													
39.0	T2	10	0151	0371	0591	1.0	9.0	10	90	- 28	+ 10.5	+ 12	1110
39.0	T2	5	0152	0372	0592	1.0	9.0	10	90	- 28	+ 10.5	+ 12	1110
50.0	T3	20	0153	0373	0593	2.0	12.0	10	50	- 16	+ 10.5	+ 12	1330
50.0	T3	10	0154	0374	0594	2.0	12.0	10	50	- 16	+ 10.5	+ 12	1330
50.0	T3	5	0155	0375	0595	2.0	12.0	10	50	- 16	+ 10.5	+ 12	1330
68.0	T3	20	0156	0376	0596	2.0	16.0	13	50	- 32	+ 10.5	+ 12	1365
68.0	T3	10	0157	0377	0597	2.0	16.0	13	50	- 32	+ 10.5	+ 12	1365
68.0	T3	5	0158	0378	0598	2.0	16.0	13	50	- 32	+ 10.5	+ 12	1365
140.0	T4	20	0159	0379	0599	8.0	32.0	16	28	- 40	+ 20	+ 20	1850
140.0	T4	10	0160	0380	0600	8.0	32.0	16	28	- 40	+ 20	+ 20	1850
<b>75 WVDC at + 85 °C . . . 50 WVDC at + 125 °C</b>													
3.5	T1	20	0161	0381	0601	1.0	2.0	2.5	650	- 16	+ 5	+ 6	525
3.5	T1	10	0162	0382	0602	1.0	2.0	2.5	650	- 16	+ 5	+ 6	525
3.5	T1	5	0163	0383	0603	1.0	2.0	2.5	650	- 16	+ 5	+ 6	525
6.8	T1	20	0164	0384	0604	1.0	2.0	3.5	300	- 20	+ 8	+ 9	610
6.8	T1	10	0165	0385	0605	1.0	2.0	3.5	300	- 20	+ 8	+ 9	610
6.8	T1	5	0166	0386	0606	1.0	2.0	3.5	300	- 20	+ 8	+ 9	610
15.0	T2	20	0167	0387	0607	1.0	5.0	6	150	- 16	+ 8	+ 9	890
15.0	T2	10	0168	0388	0608	1.0	5.0	6	150	- 16	+ 8	+ 9	890
15.0	T2	5	0169	0389	0609	1.0	5.0	6	150	- 16	+ 8	+ 9	890
33.0	T2	20	0170	0390	0610	1.0	10.0	10	90	- 24	+ 10.5	+ 15	1000
33.0	T2	10	0171	0391	0611	1.0	10.0	10	90	- 24	+ 10.5	+ 15	1000
33.0	T2	5	0172	0392	0612	1.0	10.0	10	90	- 24	+ 10.5	+ 15	1000
40.0	T3	20	0173	0393	0613	2.0	12.0	9	60	- 16	+ 10.5	+ 12	1250
40.0	T3	10	0174	0394	0614	2.0	12.0	9	60	- 16	+ 10.5	+ 12	1250
40.0	T3	5	0175	0395	0615	2.0	12.0	9	60	- 16	+ 10.5	+ 12	1250
56.0	T3	20	0176	0396	0616	2.0	17.0	11	60	- 28	+ 10.5	+ 15	1335
56.0	T3	10	0177	0397	0617	2.0	17.0	11	60	- 28	+ 10.5	+ 15	1335
56.0	T3	5	0178	0398	0618	2.0	17.0	11	60	- 28	+ 10.5	+ 15	1335
110.0	T4	20	0179	0399	0619	9.0	36.0	12	29	- 35	+ 20	+ 20	1850
110.0	T4	10	0180	0400	0620	9.0	36.0	12	29	- 35	+ 20	+ 20	1850
<b>100 WVDC at + 85 °C . . . 65 WVDC at + 125 °C</b>													
2.5	T1	20	0181	0401	0621	1.0	2.0	2	950	- 16	+ 7	+ 8	505
2.5	T1	10	0182	0402	0622	1.0	2.0	2	950	- 16	+ 7	+ 8	505
2.5	T1	5	0183	0403	0623	1.0	2.0	2	950	- 16	+ 7	+ 8	505
4.7	T1	20	0184	0404	0624	1.0	2.0	3	500	- 16	+ 7	+ 8	565
4.7	T1	10	0185	0405	0625	1.0	2.0	3	500	- 16	+ 7	+ 8	565
4.7	T1	5	0186	0406	0626	1.0	2.0	3	500	- 16	+ 7	+ 8	565
11.0	T2	20	0187	0407	0627	1.0	4.0	5	200	- 16	+ 8	+ 8	835
11.0	T2	10	0188	0408	0628	1.0	4.0	5	200	- 16	+ 8	+ 8	835
11.0	T2	5	0189	0409	0629	1.0	4.0	5	200	- 16	+ 8	+ 8	835
22.0	T2	20	0190	0410	0630	1.0	9.0	7.5	100	- 16	+ 8	+ 8	965
22.0	T2	10	0191	0411	0631	1.0	9.0	7.5	100	- 16	+ 8	+ 8	965
22.0	T2	5	0192	0412	0632	1.0	9.0	7.5	100	- 16	+ 8	+ 8	965
30.0	T3	20	0193	0413	0633	2.0	12.0	7	80	- 16	+ 8	+ 8	1240
30.0	T3	10	0194	0414	0634	2.0	12.0	7	80	- 16	+ 8	+ 8	1240
30.0	T3	5	0195	0415	0635	2.0	12.0	7	80	- 16	+ 8	+ 8	1240
43.0	T3	20	0196	0416	0636	2.0	17.0	8.5	70	- 20	+ 8	+ 8	1335
43.0	T3	10	0197	0417	0637	2.0	17.0	8.5	70	- 20	+ 8	+ 8	1335
43.0	T3	5	0198	0418	0638	2.0	17.0	8.5	70	- 20	+ 8	+ 8	1335
86.0	T4	20	0199	0419	0639	9.0	36.0	10	30	- 25	+ 15	+ 15	1800
86.0	T4	10	0200	0420	0640	9.0	36.0	10	30	- 25	+ 15	+ 15	1800

**Notes**

- \* Dash number will include the letter "H" to indicate the optional vibration and shock requirements (i.e., 51 g random vibration, 80 g sinusoidal vibration and 500 g shock).
- \*\* For ripple current limits at various temperatures, voltages and frequencies, see Ripple Current Table.



<b>STANDARD/EXTENDED RATINGS: CLR79, M39006/22-XXXX</b>													
CAPACITANCE ( $\mu$ F)	CASE CODE	CAP. TOL. ( $\pm$ %)	PART NO. M39006/22-* FAILURE RATE LEVEL (%/1000 h)			MAX. DCL ( $\mu$ A) at		MAX. DF at + 25 °C (%)	MAX. IMP. at - 55 °C ( $\Omega$ )	MAX. CAPACITANCE CHANGE (%) at			MAX.** RIPPLE CURRENT at + 85 °C 40 kHz (mA)
			M	P	R	+ 25 °C	+ 85 °C + 125 °C			- 55 °C	+ 85 °C	+ 125 °C	
			1.0	0.1	0.01								
<b>125 WVDC at + 85 °C . . . 85 WVDC at + 125 °C</b>													
1.7	T1	20	0201	0421	0641	1.0	2.0	2	1250	- 16	+ 7	+ 8	415
1.7	T1	10	0202	0422	0642	1.0	2.0	2	1250	- 16	+ 7	+ 8	415
1.7	T1	5	0203	0423	0643	1.0	2.0	2	1250	- 16	+ 7	+ 8	415
3.6	T1	20	0204	0424	0644	1.0	2.0	2.7	600	- 16	+ 7	+ 8	520
3.6	T1	10	0205	0425	0645	1.0	2.0	2.7	600	- 16	+ 7	+ 8	520
3.6	T1	5	0206	0426	0646	1.0	2.0	2.7	600	- 16	+ 7	+ 8	520
9.0	T2	20	0207	0427	0647	1.0	5.0	5	240	- 16	+ 7	+ 8	755
9.0	T2	10	0208	0428	0648	1.0	5.0	5	240	- 16	+ 7	+ 8	755
9.0	T2	5	0209	0429	0649	1.0	5.0	5	240	- 16	+ 7	+ 8	755
14.0	T2	20	0210	0430	0650	1.0	7.0	6	167	- 16	+ 7	+ 8	860
14.0	T2	10	0211	0431	0651	1.0	7.0	6	167	- 16	+ 7	+ 8	860
14.0	T2	5	0212	0432	0652	1.0	7.0	6	167	- 16	+ 7	+ 8	860
18.0	T3	20	0213	0433	0653	2.0	9.0	5	129	- 16	+ 7	+ 8	1130
18.0	T3	10	0214	0434	0654	2.0	9.0	5	129	- 16	+ 7	+ 8	1130
18.0	T3	5	0215	0435	0655	2.0	9.0	5	129	- 16	+ 7	+ 8	1130
25.0	T3	20	0216	0436	0656	2.0	13.0	6	93	- 16	+ 7	+ 8	1200
25.0	T3	10	0217	0437	0657	2.0	13.0	6	93	- 16	+ 7	+ 8	1200
25.0	T3	5	0218	0438	0658	2.0	13.0	6	93	- 16	+ 7	+ 8	1200
56.0	T4	20	0219	0439	0659	10.0	40.0	6.5	32	- 25	+ 15	+ 15	1800
56.0	T4	10	0220	0440	0660	10.0	40.0	6.5	32	- 25	+ 15	+ 15	1800

**Notes**

\* Dash number will include the letter "H" to indicate the optional vibration and shock requirements (i.e., 51 g random vibration, 80 g sinusoidal vibration and 500 g shock).

\*\* For ripple current limits at various temperatures, voltages and frequencies, see Ripple Current Table.

<b>STANDARD/EXTENDED RATINGS: CLR81, M39006/25-XXXX</b>													
CAPACITANCE ( $\mu$ F)	CASE CODE	CAP. TOL. ( $\pm$ %)	PART NO. M39006/25-* FAILURE RATE LEVEL (%/1000 h)			MAX. DCL ( $\mu$ A) at		MAX. DF at + 25 °C (%)	MAX. IMP. at - 55 °C ( $\Omega$ )	MAX. CAPACITANCE CHANGE (%) at			MAX.** RIPPLE CURRENT at + 85 °C 40 kHz (mA)
			M	P	R	+ 25 °C	+ 85 °C + 125 °C			- 55 °C	+ 85 °C	+ 125 °C	
			1.0	0.1	0.01								
<b>6 WVDC at + 85 °C . . . 4 WVDC at + 125 °C</b>													
220.0	T1	20	0001	0089	0177	2.0	9.0	50	36	- 64	+ 13	+ 16	1000
220.0	T1	10	0002	0090	0178	2.0	9.0	50	36	- 64	+ 13	+ 16	1000
820.0	T2	20	0003	0091	0179	3.0	14.0	155	18	- 88	+ 16	+ 20	1500
820.0	T2	10	0004	0092	0180	3.0	14.0	155	18	- 88	+ 16	+ 20	1500
1500.0	T3	20	0005	0093	0181	5.0	20.0	172	18	- 90	+ 20	+ 25	1900
1500.0	T3	10	0006	0094	0182	5.0	20.0	172	18	- 90	+ 20	+ 25	1900
2200.0	T4	20	0007	0095	0183	6.0	24.0	170	13	- 90	+ 25	+ 30	2300
2200.0	T4	10	0008	0096	0184	6.0	24.0	170	13	- 90	+ 25	+ 30	2300
<b>8 WVDC at + 85 °C . . . 5 WVDC at + 125 °C</b>													
180.0	T1	20	0009	0097	0185	2.0	9.0	41	45	- 60	+ 13	+ 16	1000
180.0	T1	10	0010	0098	0186	2.0	9.0	41	45	- 60	+ 13	+ 16	1000
680.0	T2	20	0011	0099	0187	3.0	14.0	130	22	- 83	+ 16	+ 20	1500
680.0	T2	10	0012	0100	0188	3.0	14.0	130	22	- 83	+ 16	+ 20	1500
1500.0	T3	20	0013	0101	0189	5.0	20.0	170	18	- 90	+ 20	+ 25	1900
1500.0	T3	10	0014	0102	0190	5.0	20.0	170	18	- 90	+ 20	+ 25	1900
1800.0	T4	20	0015	0103	0191	7.0	25.0	138	14	- 90	+ 25	+ 30	2300
1800.0	T4	10	0016	0104	0192	7.0	25.0	138	14	- 90	+ 25	+ 30	2300

**Notes**

\* Dash number will include the letter "H" to indicate the optional vibration and shock requirements (i.e., 51 g random vibration, 80 g sinusoidal vibration and 500 g shock).

\*\* For ripple current limits at various temperatures, voltages and frequencies, see Ripple Current Table.



<b>STANDARD/EXTENDED RATINGS: CLR81, M39006/25-XXXX</b>													
CAPACITANCE (µF)	CASE CODE	CAP. TOL. (± %)	PART NO. M39006/25-*			MAX. DCL (µA)		MAX. DF at + 25 °C	MAX. IMP. at - 55 °C	MAX. CAPACITANCE CHANGE (%) at			MAX.** RIPPLE CURRENT at + 85 °C 40 kHz (mA)
			FAILURE RATE LEVEL (%/1000 h)			at				+			
			M	P	R	+ 25 °C	+ 85 °C + 125 °C	+ 25 °C (%)	- 55 °C (Ω)	- 55 °C	+ 85 °C	+ 125 °C	
<b>10 WVDC at + 85 °C . . . 7 WVDC at + 125 °C</b>													
150.0	T1	20	0017	0105	0193	2.0	9.0	34	54	- 55	+ 13	+ 16	900
150.0	T1	10	0018	0106	0194	2.0	9.0	34	54	- 55	+ 13	+ 16	900
560.0	T2	20	0019	0107	0195	3.0	16.0	106	27	- 77	+ 16	+ 20	1450
560.0	T2	10	0020	0108	0196	3.0	16.0	106	27	- 77	+ 16	+ 20	1450
1200.0	T3	20	0021	0109	0197	5.0	20.0	137	18	- 88	+ 20	+ 25	1850
1200.0	T3	10	0022	0110	0198	5.0	20.0	137	18	- 88	+ 20	+ 25	1850
1500.0	T4	20	0023	0111	0199	7.0	25.0	114	15	- 88	+ 25	+ 30	2300
1500.0	T4	10	0024	0112	0200	7.0	25.0	114	15	- 88	+ 25	+ 30	2300
<b>15 WVDC at + 85 °C . . . 10 WVDC at + 125 °C</b>													
100.0	T1	20	0025	0113	0201	2.0	9.0	30	72	- 44	+ 13	+ 16	900
100.0	T1	10	0026	0114	0202	2.0	9.0	30	72	- 44	+ 13	+ 16	900
390.0	T2	20	0027	0115	0203	3.0	16.0	74	31	- 66	+ 16	+ 20	1450
390.0	T2	10	0028	0116	0204	3.0	16.0	74	31	- 66	+ 16	+ 20	1450
820.0	T3	20	0029	0117	0205	6.0	24.0	111	22	- 77	+ 20	+ 25	1800
820.0	T3	10	0030	0118	0206	6.0	24.0	111	22	- 77	+ 20	+ 25	1800
1000.0	T4	20	0031	0119	0207	8.0	32.0	92	17	- 77	+ 25	+ 30	2300
1000.0	T4	10	0032	0120	0208	8.0	32.0	92	17	- 77	+ 25	+ 30	2300
<b>25 WVDC at + 85 °C . . . 15 WVDC at + 125 °C</b>													
68.0	T1	20	0033	0121	0209	2.0	9.0	22	90	- 40	+ 12	+ 15	850
68.0	T1	10	0034	0122	0210	2.0	9.0	22	90	- 40	+ 12	+ 15	850
270.0	T2	20	0035	0123	0211	3.0	16.0	55	33	- 62	+ 13	+ 16	1400
270.0	T2	10	0036	0124	0212	3.0	16.0	55	33	- 62	+ 13	+ 16	1400
560.0	T3	20	0037	0125	0213	7.0	28.0	76	24	- 72	+ 20	+ 25	1750
560.0	T3	10	0038	0126	0214	7.0	28.0	76	24	- 72	+ 20	+ 25	1750
680.0	T4	20	0039	0127	0215	8.0	32.0	63	19	- 72	+ 25	+ 30	2100
680.0	T4	10	0040	0128	0216	8.0	32.0	63	19	- 72	+ 25	+ 30	2100
<b>30 WVDC at + 85 °C . . . 20 WVDC at + 125 °C</b>													
56.0	T1	20	0041	0129	0217	2.0	9.0	22	100	- 38	+ 12	+ 15	800
56.0	T1	10	0042	0130	0218	2.0	9.0	22	100	- 38	+ 12	+ 15	800
220.0	T2	20	0043	0131	0219	3.0	16.0	42	36	- 60	+ 13	+ 16	1200
220.0	T2	10	0044	0132	0220	3.0	16.0	42	36	- 60	+ 13	+ 16	1200
470.0	T3	20	0045	0133	0221	8.0	32.0	64	25	- 65	+ 20	+ 25	1500
470.0	T3	10	0046	0134	0222	8.0	32.0	64	25	- 65	+ 20	+ 25	1500
560.0	T4	20	0047	0135	0223	9.0	36.0	55	20	- 65	+ 25	+ 30	2000
560.0	T4	10	0048	0136	0224	9.0	36.0	55	20	- 65	+ 25	+ 30	2000
<b>50 WVDC at + 85 °C . . . 30 WVDC at + 125 °C</b>													
33.0	T1	20	0049	0137	0225	2.0	9.0	12.3	135	- 29	+ 10	+ 12	700
33.0	T1	10	0050	0138	0226	2.0	9.0	12.3	135	- 29	+ 10	+ 12	700
120.0	T2	20	0051	0139	0227	4.0	24.0	22.5	49	- 42	+ 12	+ 15	1200
120.0	T2	10	0052	0140	0228	4.0	24.0	22.5	49	- 42	+ 12	+ 15	1200
270.0	T3	20	0053	0141	0229	8.0	32.0	37	29	- 46	+ 20	+ 25	1450
270.0	T3	10	0054	0142	0230	8.0	32.0	37	29	- 46	+ 20	+ 25	1450
330.0	T4	20	0055	0143	0231	9.0	36.0	38	22	- 46	+ 25	+ 30	1900
330.0	T4	10	0056	0144	0232	9.0	36.0	38	22	- 46	+ 25	+ 30	1900
<b>60 WVDC at + 85 °C . . . 40 WVDC at + 125 °C</b>													
27.0	T1	20	0057	0145	0233	3.0	12.0	10.2	144	- 24	+ 10	+ 12	700
27.0	T1	10	0058	0146	0234	3.0	12.0	10.2	144	- 24	+ 10	+ 12	700
100.0	T2	20	0059	0147	0235	4.0	20.0	19	54	- 36	+ 12	+ 15	1100
100.0	T2	10	0060	0148	0236	4.0	20.0	19	54	- 36	+ 12	+ 15	1100
220.0	T3	20	0061	0149	0237	8.0	32.0	30	29	- 40	+ 16	+ 20	1400
220.0	T3	10	0062	0150	0238	8.0	32.0	30	29	- 40	+ 16	+ 20	1400
270.0	T4	20	0063	0151	0239	9.0	36.0	27	23	- 45	+ 20	+ 25	1850
270.0	T4	10	0064	0152	0240	9.0	36.0	27	23	- 45	+ 20	+ 25	1850

**Notes**

\* Dash number will include the letter "H" to indicate the optional vibration and shock requirements (i.e., 51 g random vibration, 80 g sinusoidal vibration and 500 g shock).

\*\* For ripple current limits at various temperatures, voltages and frequencies, see Ripple Current Table.



<b>STANDARD/EXTENDED RATINGS: CLR81, M39006/25-XXXX</b>													
CAPACITANCE ( $\mu$ F)	CASE CODE	CAP. TOL. ( $\pm$ %)	PART NO. M39006/25-*			MAX. DCL ( $\mu$ A)		MAX. DF at + 25 °C (%)	MAX. IMP. at - 55 °C ( $\Omega$ )	MAX.. CAPACITANCE CHANGE (%) at			MAX.** RIPPLE CURRENT at + 85 °C 40 kHz (mA)
			FAILURE RATE LEVEL (%/1000 h)			at				+ 25 °C + 85 °C + 125 °C			
			M	P	R	+ 25 °C	+ 85 °C + 125 °C			- 55 °C	+ 85 °C	+ 125 °C	
<b>75 WVDC at + 85 °C . . . 50 WVDC at + 125 °C</b>													
22.0	T1	20	0065	0153	0241	3.0	12.0	8.5	157	- 19	+ 10	+ 12	600
22.0	T1	10	0066	0154	0242	3.0	12.0	8.5	157	- 19	+ 10	+ 12	600
82.0	T2	20	0067	0155	0243	4.0	24.0	15.2	63	- 30	+ 12	+ 15	1000
82.0	T2	10	0068	0156	0244	4.0	24.0	15.2	63	- 30	+ 12	+ 15	1000
180.0	T3	20	0069	0157	0245	9.0	36.0	24.4	30	- 35	+ 16	+ 20	1300
180.0	T3	10	0070	0158	0246	9.0	36.0	24.4	30	- 35	+ 16	+ 20	1300
220.0	T4	20	0071	0159	0247	10.0	40.0	37.0	24	- 40	+ 20	+ 25	1800
220.0	T4	10	0072	0160	0248	10.0	40.0	37.0	24	- 40	+ 20	+ 25	1800
<b>100 WVDC at + 85 °C . . . 65 WVDC at + 125 °C</b>													
10.0	T1	20	0073	0161	0249	3.0	12.0	4.5	200	- 17	+ 10	+ 12	800
10.0	T1	10	0074	0162	0250	3.0	12.0	4.5	200	- 17	+ 10	+ 12	800
39.0	T2	20	0075	0163	0251	5.0	24.0	10.4	80	- 20	+ 12	+ 15	1300
39.0	T2	10	0076	0164	0252	5.0	24.0	10.4	80	- 20	+ 12	+ 15	1300
68.0	T3	20	0077	0165	0253	10.0	40.0	11.3	40	- 30	+ 14	+ 16	1600
68.0	T3	10	0078	0166	0254	10.0	40.0	11.3	40	- 30	+ 14	+ 16	1600
120.0	T4	20	0079	0167	0255	12.0	48.0	25	30	- 35	+ 15	+ 17	2000
120.0	T4	10	0080	0168	0256	12.0	48.0	25	30	- 35	+ 15	+ 17	2000
<b>125 WVDC at + 85 °C . . . 85 WVDC at + 125 °C</b>													
6.8	T1	20	0081	0169	0257	3.0	12.0	6.0	300	- 14	+ 10	+ 12	700
6.8	T1	10	0082	0170	0258	3.0	12.0	6.0	300	- 14	+ 10	+ 12	700
27.0	T2	20	0083	0171	0259	5.0	24.0	7.2	90	- 18	+ 12	+ 15	1200
27.0	T2	10	0084	0172	0260	5.0	24.0	7.2	90	- 18	+ 12	+ 15	1200
47.0	T3	20	0085	0173	0261	10.0	40.0	7.9	50	- 26	+ 14	+ 16	1500
47.0	T3	10	0086	0174	0262	10.0	40.0	7.9	50	- 26	+ 14	+ 16	1500
82.0	T4	20	0087	0175	0263	12.0	48.0	17.4	32	- 30	+ 15	+ 17	1900
82.0	T4	10	0088	0176	0264	12.0	48.0	17.4	32	- 30	+ 15	+ 17	1900

**Notes**

- \* Dash number will include the letter "H" to indicate the optional vibration and shock requirements (i.e., 51 g random vibration, 80 g sinusoidal vibration and 500 g shock).
- \*\* For ripple current limits at various temperatures, voltages and frequencies, see Ripple Current Table.

<b>CLR79, CLR81 RIPPLE CURRENT MULTIPLIERS VS. FREQUENCY, TEMPERATURE AND APPLIED PEAK VOLTAGE</b>																									
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							
		≤ 55	85	105	125	≤ 55	85	105	125	≤ 55	85	105	125	≤ 55	85	105	125	≤ 55	85	105	125	≤ 55	85	105	125
<b>% of APPLIED VOLTAGE</b>	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**

- At + 125 °C the rated voltage of the capacitors decreases to 66 2/3 percent of the + 85 °C rated voltage.
- 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.
- The ripple current listed represents a rating calculated using a maximum internal temperature rise ( $\Delta$ T) of + 50 °C at 40 kHz at + 85 °C ambient with a maximum peak rated voltage of 66 2/3 percent of the + 85 °C peak voltage rating.
- The maximum allowable internal temperature rise ( $\Delta$ T) decreases linearly to a calculated + 10 °C rise at + 125 °C ambient.
- The internal temperature rise is directly proportional to the equivalent series resistance of the capacitor and equivalent series resistance increases with decreasing frequency.



STANDARD/EXTENDED RATINGS: CLR90, M39006/30-XXXX													
CAPACITANCE (µF)	CASE CODE	CAP. TOL. (± %)	PART NO. M39006/30-* FAILURE RATE LEVEL (%/1000 h)			MAX. DCL (µA) at		MAX. DF at +25 °C (%)	MAX. IMP. at -55 °C (Ω)	MAX. CAPACITANCE CHANGE (%) at			MAX. ESR at +25 °C 120 Hz (Ω)
			M	P	R	+25 °C	+85 °C +125 °C			-55 °C	+85 °C	+125 °C	
			1.0	0.1	0.01								
<b>6 WVDC at +85 °C . . . 4 WVDC at +125 °C</b>													
30.0	T1	20	0001	0221	0441	1.0	2.0	4.5	100	-40	+10.5	+12	1.99
30.0	T1	10	0002	0222	0442	1.0	2.0	4.5	100	-40	+10.5	+12	1.99
30.0	T1	5	0003	0223	0443	1.0	2.0	4.5	100	-40	+10.5	+12	1.99
68.0	T1	20	0004	0224	0444	1.0	2.0	7.5	60	-40	+14	+16	1.58
68.0	T1	10	0005	0225	0445	1.0	2.0	7.5	60	-40	+14	+16	1.58
68.0	T1	5	0006	0226	0446	1.0	2.0	7.5	60	-40	+14	+16	1.58
140.0	T2	20	0007	0227	0447	1.0	3.0	10.5	40	-40	+14	+16	0.99
140.0	T2	10	0008	0228	0448	1.0	3.0	10.5	40	-40	+14	+16	0.99
140.0	T2	5	0009	0229	0449	1.0	3.0	10.5	40	-40	+14	+16	0.99
270.0	T2	20	0010	0230	0450	1.0	6.5	22.5	25	-44	+17.5	+20	1.11
270.0	T2	10	0011	0231	0451	1.0	6.5	22.5	25	-44	+17.5	+20	1.11
270.0	T2	5	0012	0232	0452	1.0	6.5	22.5	25	-44	+17.5	+20	1.11
330.0	T3	20	0013	0233	0453	2.0	7.9	18.0	20	-44	+14	+16	0.73
330.0	T3	10	0014	0234	0454	2.0	7.9	18.0	20	-44	+14	+16	0.73
330.0	T3	5	0015	0235	0455	2.0	7.9	18.0	20	-44	+14	+16	0.73
560.0	T3	20	0016	0236	0456	2.0	13.0	27.5	25	-64	+17.5	+20	0.65
560.0	T3	10	0017	0237	0457	2.0	13.0	27.5	25	-64	+17.5	+20	0.65
560.0	T3	5	0018	0238	0458	2.0	13.0	27.5	25	-64	+17.5	+20	0.65
1200.0	T4	20	0019	0239	0459	3.0	14.0	45.0	20	-80	+25	+25	0.50
1200.0	T4	10	0020	0240	0460	3.0	14.0	45.0	20	-80	+25	+25	0.50
<b>8 WVDC at +85 °C . . . 5 WVDC at +125 °C</b>													
25	T1	20	0021	0241	0461	1.0	2.0	3.75	100	-40	+10.5	+12	1.99
25	T1	10	0022	0242	0462	1.0	2.0	3.75	100	-40	+10.5	+12	1.99
25	T1	5	0023	0243	0463	1.0	2.0	3.75	100	-40	+10.5	+12	1.99
56	T1	20	0024	0244	0464	1.0	2.0	7.0	59	-40	+14	+16	1.66
56	T1	10	0025	0245	0465	1.0	2.0	7.0	59	-40	+14	+16	1.66
56	T1	5	0026	0246	0466	1.0	2.0	7.0	59	-40	+14	+16	1.66
120	T2	20	0027	0247	0467	1.0	2.0	10.0	50	-44	+17.5	+20	1.11
120	T2	10	0028	0248	0468	1.0	2.0	10.0	50	-44	+17.5	+20	1.11
120	T2	5	0029	0249	0469	1.0	2.0	10.0	50	-44	+17.5	+20	1.11
220	T2	20	0030	0250	0470	1.0	7.0	18.5	30	-44	+17.5	+20	1.12
220	T2	10	0031	0251	0471	1.0	7.0	18.5	30	-44	+17.5	+20	1.12
220	T2	5	0032	0252	0472	1.0	7.0	18.5	30	-44	+17.5	+20	1.12
290	T3	20	0033	0253	0473	2.0	6.0	17.0	25	-64	+17.5	+20	0.78
290	T3	10	0034	0254	0474	2.0	6.0	17.0	25	-64	+17.5	+20	0.78
290	T3	5	0035	0255	0475	2.0	6.0	17.0	25	-64	+17.5	+20	0.78
430	T3	20	0036	0256	0476	2.0	14.0	23.0	25	-64	+17.5	+20	0.71
430	T3	10	0037	0257	0477	2.0	14.0	23.0	25	-64	+17.5	+20	0.71
430	T3	5	0038	0258	0478	2.0	14.0	23.0	25	-64	+17.5	+20	0.71
850	T4	20	0039	0259	0479	4.0	16.0	30.0	22	-80	+25	+25	0.47
850	T4	10	0040	0260	0480	4.0	16.0	30.0	22	-80	+25	+25	0.47
<b>10 WVDC at +85 °C . . . 7 WVDC at +125 °C</b>													
20	T1	20	0041	0261	0481	1.0	2.0	3.0	175	-32	+10.5	+12	1.99
20	T1	10	0042	0262	0482	1.0	2.0	3.0	175	-32	+10.5	+12	1.99
20	T1	5	0043	0263	0483	1.0	2.0	3.0	175	-32	+10.5	+12	1.99
47	T1	20	0044	0264	0484	1.0	2.0	6.5	100	-36	+14	+16	1.84
47	T1	10	0045	0265	0485	1.0	2.0	6.5	100	-36	+14	+16	1.84
47	T1	5	0046	0266	0486	1.0	2.0	6.5	100	-36	+14	+16	1.84
100	T2	20	0047	0267	0487	1.0	4.0	7.5	60	-36	+14	+16	0.99
100	T2	10	0048	0268	0488	1.0	4.0	7.5	60	-36	+14	+16	0.99
100	T2	5	0049	0269	0489	1.0	4.0	7.5	60	-36	+14	+16	0.99
180	T2	20	0050	0270	0490	1.0	7.0	15.0	40	-36	+14	+16	1.11
180	T2	10	0051	0271	0491	1.0	7.0	15.0	40	-36	+14	+16	1.11
180	T2	5	0052	0272	0492	1.0	7.0	15.0	40	-36	+14	+16	1.11
250	T3	20	0053	0273	0493	2.0	10.0	15.0	30	-40	+14	+16	0.80
250	T3	10	0054	0274	0494	2.0	10.0	15.0	30	-40	+14	+16	0.80
250	T3	5	0055	0275	0495	2.0	10.0	15.0	30	-40	+14	+16	0.80
390	T3	20	0056	0276	0496	2.0	16.0	22.0	25	-64	+17.5	+20	0.75

**Note**

\* Dash number will include the letter "H" to indicate the optional vibration and shock requirements (i.e., 51 g random vibration, 80 g sinusoidal vibration and 500 g shock).











<b>STANDARD/EXTENDED RATINGS: CLR91, M39006/31-XXXX</b>													
CAPACITANCE ( $\mu$ F)	CASE CODE	CAP. TOL. ( $\pm$ %)	PART NO. M39006/31-*			MAX. DCL ( $\mu$ A)		MAX. DF at + 25 °C	MAX. IMP. at - 55 °C	MAX.. CAPACITANCE CHANGE (%) at			MAX. ESR at + 25 °C 120 Hz ( $\Omega$ )
			FAILURE RATE LEVEL (%/1000 h)			at				+ 25 °C	+ 85 °C + 125 °C	- 55 °C	
			M 1.0	P 0.1	R 0.01			(%)	( $\Omega$ )				
<b>6 WVDC at + 85 °C . . . 4 WVDC at + 125 °C</b>													
220	T1	20	0001	0089	0177	2	9	25	36	- 64	13	16	1.51
220	T1	10	0002	0090	0178	2	9	25	36	- 64	13	16	1.51
820	T2	20	0003	0091	0179	3	14	77.5	18	- 88	16	20	1.26
820	T2	10	0004	0092	0180	3	14	77.5	18	- 88	16	20	1.26
1500	T3	20	0005	0093	0181	5	20	86	18	- 90	20	25	0.76
1500	T3	10	0006	0094	0182	5	20	86	18	- 90	20	25	0.76
2200	T4	20	0007	0095	0183	6	24	85	13	- 90	25	30	0.52
2200	T4	10	0008	0096	0184	6	24	85	13	- 90	25	30	0.52
<b>8 WVDC at + 85 °C . . . 5 WVDC at + 125 °C</b>													
180	T1	20	0009	0097	0185	2	9	20.5	45	- 60	13	16	1.51
180	T1	10	0010	0098	0186	2	9	20.5	45	- 60	13	16	1.51
680	T2	20	0011	0099	0187	3	14	65	22	- 83	16	20	1.27
680	T2	10	0012	0100	0188	3	14	65	22	- 83	16	20	1.27
1500	T3	20	0013	0101	0189	5	20	85	18	- 90	20	25	0.75
1500	T3	10	0014	0102	0190	5	20	85	18	- 90	20	25	0.75
1800	T4	20	0015	0103	0191	7	25	69	14	- 90	25	30	0.51
1800	T4	10	0016	0104	0192	7	25	69	14	- 90	25	30	0.51
<b>10 WVDC at + 85 °C . . . 7 WVDC at + 125 °C</b>													
150	T1	20	0017	0105	0193	2	9	17	54	- 55	13	16	1.51
150	T1	10	0018	0106	0194	2	9	17	54	- 55	13	16	1.51
560	T2	20	0019	0107	0195	3	16	53	27	- 77	16	20	1.26
560	T2	10	0020	0108	0196	3	16	53	27	- 77	16	20	1.26
1200	T3	20	0021	0109	0197	5	20	68.5	18	- 88	20	25	0.76
1200	T3	10	0022	0110	0198	5	20	68.5	18	- 88	20	25	0.76
1500	T4	20	0023	0111	0199	7	25	57	15	- 88	25	30	0.51
1500	T4	10	0024	0112	0200	7	25	57	15	- 88	25	30	0.51
<b>15 WVDC at + 85 °C . . . 10 WVDC at + 125 °C</b>													
100	T1	20	0025	0113	0201	2	9	15	72	- 44	13	16	1.99
100	T1	10	0026	0114	0202	2	9	15	72	- 44	13	16	1.99
390	T2	20	0027	0115	0203	3	16	37	31	- 66	16	20	1.26
390	T2	10	0028	0116	0204	3	16	37	31	- 66	16	20	1.26
820	T3	20	0029	0117	0205	6	24	55.5	22	- 77	20	25	0.9
820	T3	10	0030	0118	0206	6	24	55.5	22	- 77	20	25	0.9
1000	T4	20	0031	0119	0207	8	32	46	17	- 77	25	30	0.61
1000	T4	10	0032	0120	0208	8	32	46	17	- 77	25	30	0.61
<b>25 WVDC at + 85 °C . . . 15 WVDC at + 125 °C</b>													
68	T1	20	0033	0121	0209	2	9	11	90	- 40	12	15	2.15
68	T1	10	0034	0122	0210	2	9	11	90	- 40	12	15	2.15
270	T2	20	0035	0123	0211	3	16	27.5	33	- 62	13	16	1.35
270	T2	10	0036	0124	0212	3	16	27.5	33	- 62	13	16	1.35
560	T3	20	0037	0125	0213	7	28	38	24	- 72	20	25	0.9
560	T3	10	0038	0126	0214	7	28	38	24	- 72	20	25	0.9
680	T4	20	0039	0127	0215	8	32	31.5	19	- 72	25	30	0.62
680	T4	10	0040	0128	0216	8	32	31.5	19	- 72	25	30	0.62
<b>30 WVDC at + 85 °C . . . 20 WVDC at + 125 °C</b>													
56	T1	20	0041	0129	0217	2	9	11	100	- 38	12	15	2.61
56	T1	10	0042	0130	0218	2	9	11	100	- 38	12	15	2.61
220	T2	20	0043	0131	0219	3	16	21	36	- 60	13	16	1.27
220	T2	10	0044	0132	0220	3	16	21	36	- 60	13	16	1.27
470	T3	20	0045	0133	0221	8	32	32	25	- 65	20	25	0.91
470	T3	10	0046	0134	0222	8	32	32	25	- 65	20	25	0.91
560	T4	20	0047	0135	0223	9	36	27.5	20	- 65	25	30	0.65
560	T4	10	0048	0136	0224	9	36	27.5	20	- 65	25	30	0.65

**Note**  
\* Dash number will include the letter "H" to indicate the optional vibration and shock requirements (i.e., 51 g random vibration, 80 g sinusoidal vibration and 500 g shock).



STANDARD/EXTENDED RATINGS: CLR91, M39006/31-XXXX													
CAPACITANCE (μF)	CASE CODE	CAP. TOL. (± %)	PART NO. M39006/31-* FAILURE RATE LEVEL (%/1000 h)			MAX. DCL (μA) at		MAX. DF	MAX. IMP.	MAX. CAPACITANCE CHANGE (%) at			MAX. ESR
			M	P	R	+ 25 °C		+ 25 °C	at	- 55 °C + 85 °C + 125 °C			at + 25 °C
			1.0	0.1	0.01	+ 25 °C	+ 85 °C + 125 °C	(%)	- 55 °C (Ω)				
<b>50 WVDC at + 85 °C . . . 30 WVDC at + 125 °C</b>													
33	T1	20	0049	0137	0225	2	9	6.15	135	- 29	10	12	2.48
33	T1	10	0050	0138	0226	2	9	6.15	135	- 29	10	12	2.48
120	T2	20	0051	0139	0227	4	24	11.3	49	- 42	12	15	1.25
120	T2	10	0052	0140	0228	4	24	11.3	49	- 42	12	15	1.25
270	T3	20	0053	0141	0229	8	32	18.5	29	- 46	20	25	0.91
270	T3	10	0054	0142	0230	8	32	18.5	29	- 46	20	25	0.91
330	T4	20	0055	0143	0231	9	36	19	22	- 46	25	30	0.77
330	T4	10	0056	0144	0232	9	36	19	22	- 46	25	30	0.77
<b>60 WVDC at + 85 °C . . . 40 WVDC at + 125 °C</b>													
27	T1	20	0057	0145	0233	3	12	5.1	144	- 24	10	12	2.51
27	T1	10	0058	0146	0234	3	12	5.1	144	- 24	10	12	2.51
100	T2	20	0059	0147	0235	4	20	9.5	54	- 36	12	15	1.26
100	T2	10	0060	0148	0236	4	20	9.5	54	- 36	12	15	1.26
220	T3	20	0061	0149	0237	8	32	15	29	- 40	16	20	0.91
220	T3	10	0062	0150	0238	8	32	15	29	- 40	16	20	0.91
270	T4	20	0063	0151	0239	9	36	13.5	23	- 45	20	25	0.67
270	T4	10	0064	0152	0240	9	36	13.5	23	- 45	20	25	0.67
<b>75 WVDC at + 85 °C . . . 50 WVDC at + 125 °C</b>													
22	T1	20	0065	0153	0241	3	12	4.25	157	- 19	10	12	2.57
22	T1	10	0066	0154	0242	3	12	4.25	157	- 19	10	12	2.57
82	T2	20	0067	0155	0243	4	24	7.6	63	- 30	12	15	1.23
82	T2	10	0068	0156	0244	4	24	7.6	63	- 30	12	15	1.23
180	T3	20	0069	0157	0245	9	36	12.2	30	- 35	16	20	0.9
180	T3	10	0070	0158	0246	9	36	12.2	30	- 35	16	20	0.9
220	T4	20	0071	0159	0247	10	40	18.5	24	- 40	20	25	1.12
220	T4	10	0072	0160	0248	10	40	18.5	24	- 40	20	25	1.12
<b>100 WVDC at + 85 °C . . . 65 WVDC at + 125 °C</b>													
10	T1	20	0073	0161	0249	3	12	2.25	200	- 17	10	12	2.99
10	T1	10	0074	0162	0250	3	12	2.25	200	- 17	10	12	2.99
39	T2	20	0075	0163	0251	5	24	5.2	80	- 20	12	15	1.77
39	T2	10	0076	0164	0252	5	24	5.2	80	- 20	12	15	1.77
68	T3	20	0077	0165	0253	10	40	5.65	40	- 30	14	16	1.11
68	T3	10	0078	0166	0254	10	40	5.65	40	- 30	14	16	1.11
120	T4	20	0079	0167	0255	12	48	12.5	30	- 35	15	17	1.38
120	T4	10	0080	0168	0256	12	48	12.5	30	- 35	15	17	1.38
<b>125 WVDC at + 85 °C . . . 85 WVDC at + 125 °C</b>													
6.8	T1	20	0081	0169	0257	3	12	3	300	- 14	10	12	5.86
6.8	T1	10	0082	0170	0258	3	12	3	300	- 14	10	12	5.86
27	T2	20	0083	0171	0259	5	24	3.6	90	- 18	12	15	1.77
27	T2	10	0084	0172	0260	5	24	3.6	90	- 18	12	15	1.77
47	T3	20	0085	0173	0261	10	40	3.95	50	- 26	14	16	1.12
47	T3	10	0086	0174	0262	10	40	3.95	50	- 26	14	16	1.12
82	T4	20	0087	0175	0263	12	48	8.7	32	- 30	15	17	1.41
82	T4	10	0088	0176	0264	12	48	8.7	32	- 30	15	17	1.41

**Note**

\* Dash number will include the letter "H" to indicate the optional vibration and shock requirements (i.e., 51 g random vibration, 80 g sinusoidal vibration and 500 g shock).



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