

PERFORMANCE SPECIFICATION SHEET

CAPACITOR, FIXED, ELECTROLYTIC (NONSOLID ELECTROLYTE), TANTALUM
(POLARIZED, SINTERED SLUG), EXTENDED RANGE, +85°C (VOLTAGE DERATED TO +125°C),
ESTABLISHED RELIABILITY,
STYLE CLR69

This specification sheet is approved for use by all Departments
and Agencies of the Department of Defense.

The requirements for acquiring the product described herein
shall consist of this document and [MIL-PRF-39006](#).

INACTIVE FOR NEW DESIGN AFTER
23 JUNE 1981. FOR NEW DESIGN,
USE [MIL-PRF-39006/25](#).

NOTE: The above entry consolidates all previous specification action concerning inactivation. Failure rate level "L" was made inactive for new design on 27 May 1976. All other failure rate levels were inactivated by Notice 1 and 2 dated 9 October 1981 and 11 June 1982, respectively.

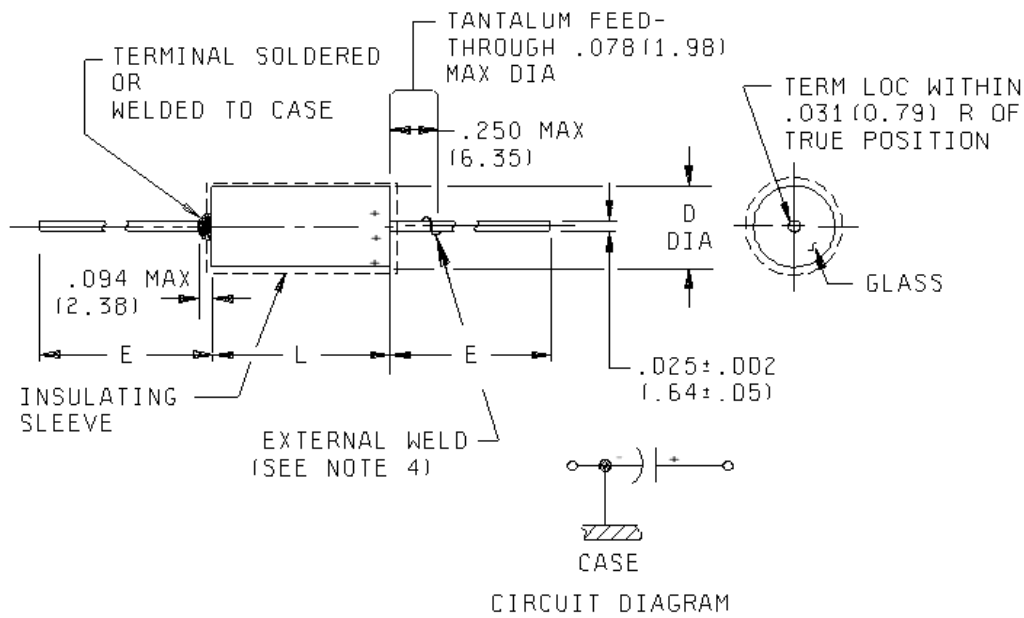


FIGURE 1. Style CLR69 capacitors.

MIL-PRF-39006/21D

Case size	Dimensions			
	Basic case		Insulated case	E ± .250 (6.35)
	L 1/ +.031 (0.79) -.016 (0.41)	D ± .016 (0.41)	D max	
T1	.453 (11.51)	.188 (4.78)	.219 (5.56)	1.500 (38.10)
T2	.641 (16.28)	.281 (7.14)	.312 (7.92)	2.250 (57.15)
T3	.766 (19.46)	.375 (9.53)	.406 (10.31)	2.250 (57.15)
T4	1.062 (26.97) 2/	.375 (9.53)	.406 (10.31)	2.250 (57.15)

1/ Length of basic case; sleeving shall be as specified in MIL-PRF-39006.

2/ For the T4 case size only, the negative L dimension tolerance is -.023 (0.58).

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are in parentheses.
3. Metric equivalents are in millimeters and are given for general information only.
4. The weld shall not be enclosed in the end seal.

FIGURE 1. Style CLR69 capacitors - continued.TABLE I. Capacitor characteristics.

Cap. μF	Cap. tolerance ±%	DC leakage (max)		Dissipation factor (max) %	Impedance (max) Ohms	Capacitance change at			Case size	PIN M39006/21-				
		+25°C	+85°C			-55°C	+85°C	+125°C		Failure rate level (%/1,000 hrs)				
		μA	μA							L(2.0)	M(1.0)	P(0.1)	R(0.01)	S(0.001)
6 V _{dc} at +85°C				4 V _{dc} at +125°C				Surge (+85°C) 6.9 V _{dc}						
220	20	2	9	50	36	-64	+13	+16	T1	0001	0089	0177	0265	0353
220	10	2	9	50	36	-64	+13	+16	T1	0002	0090	0178	0266	0354
820	20	3	14	155	18	-88	+16	+20	T2	0003	0091	0179	0267	0355
820	10	3	14	155	18	-88	+16	+20	T2	0004	0092	0180	0268	0356
1,500	20	5	20	172	18	-90	+20	+25	T3	0005	0093	0181	0269	0357
1,500	10	5	20	172	18	-90	+20	+25	T3	0006	0094	0182	0270	0358
2,200	20	6	24	170	13	-90	+25	+30	T4	0007	0095	0183	0271	0359
2,200	10	6	24	170	13	-90	+25	+30	T4	0008	0096	0184	0272	0360
8 V _{dc} at +85°C				5 V _{dc} at +125°C				Surge (+85°C) 9.2 V _{dc}						
180	20	2	9	41	45	-60	+13	+16	T1	0009	0097	0185	0273	0361
180	10	2	9	41	45	-60	+13	+16	T1	0010	0098	0186	0274	0362
680	20	3	14	130	22	-83	+16	+20	T2	0011	0099	0187	0275	0363
680	10	3	14	130	22	-83	+16	+20	T2	0012	0100	0188	0276	0364
1,500	20	5	20	170	18	-90	+20	+25	T3	0013	0101	0189	0277	0365
1,500	10	5	20	170	18	-90	+20	+25	T3	0014	0102	0190	0278	0366
1,800	20	7	25	138	14	-90	+25	+30	T4	0015	0103	0191	0279	0367
1,800	10	7	25	138	14	-90	+25	+30	T4	0016	0104	0192	0280	0368
10 V _{dc} at +85°C				7 V _{dc} at +125°C				Surge (+85°C) 11.5 V _{dc}						
150	20	2	9	34	54	-55	+13	+16	T1	0017	0105	0193	0281	0369
150	10	2	9	34	54	-55	+13	+16	T1	0018	0106	0194	0282	0370
560	20	3	16	106	27	-77	+16	+20	T2	0019	0107	0195	0283	0371
560	10	3	16	106	27	-77	+16	+20	T2	0020	0108	0196	0284	0372
1,200	20	5	20	137	18	-88	+20	+25	T3	0021	0109	0197	0285	0373
1,200	10	5	20	137	18	-88	+20	+25	T3	0022	0110	0198	0286	0374
1,500	20	7	25	114	15	-88	+25	+30	T4	0023	0111	0199	0287	0375
1,500	10	7	25	114	15	-88	+25	+30	T4	0024	0112	0200	0288	0376

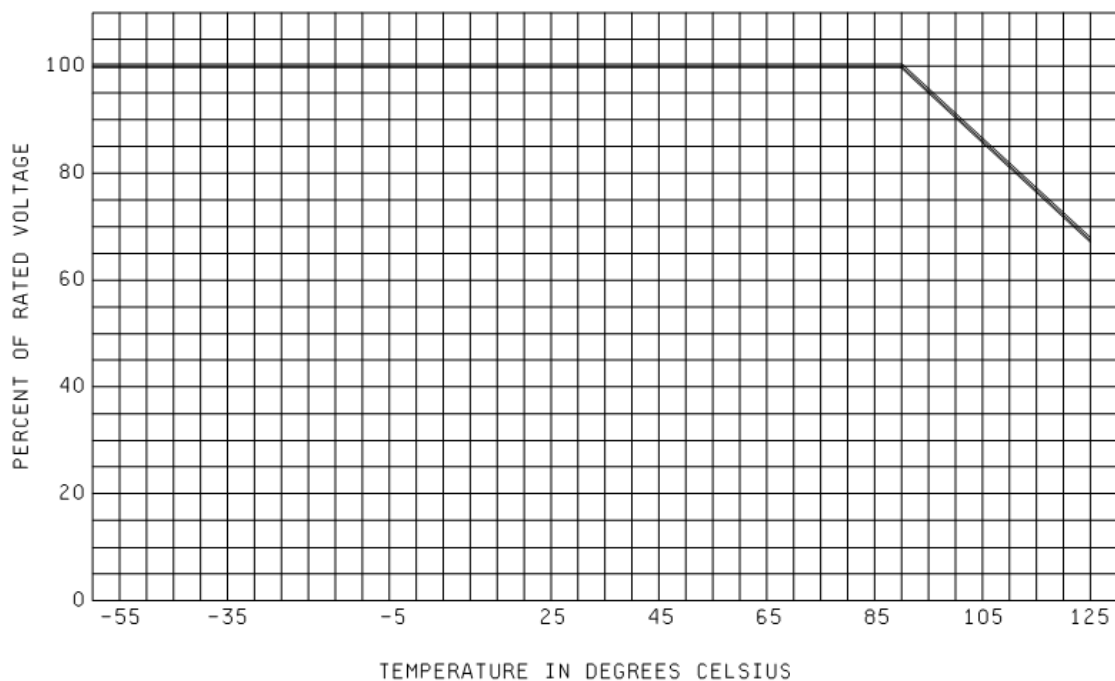
MIL-PRF-39006/21D

TABLE I. Capacitor characteristics - continued.

Cap. μF	Cap. tolerance ±%	DC leakage (max)		Dissipation factor (max) %	Impedance (max) Ohms	Capacitance change at			Case size	PIN M39006/21-				
		+25°C	+85°C +125°C			-55°C	+85°C	+125°C		Failure rate level (%/1,000 hrs)				
		μA	μA			%	%	%		L(2.0)	M(1.0)	P(0.1)	R(0.01)	S(0.001)
15 V _{dc} at +85°C					10 V _{dc} at +125°C					Surge (+85°C) 17.2 V _{dc}				
100	20	2	9	30	72	-44	+13	+16	T1	0025	0113	0201	0289	0377
100	10	2	9	30	72	-44	+13	+16	T1	0026	0114	0202	0290	0378
390	20	3	16	74	31	-66	+16	+20	T2	0027	0115	0203	0291	0379
390	10	3	16	74	31	-66	+16	+20	T2	0028	0116	0204	0292	0380
820	20	6	24	111	22	-77	+20	+25	T3	0029	0117	0205	0293	0381
820	10	6	24	111	22	-77	+20	+25	T3	0030	0118	0206	0294	0382
1,000	20	8	32	92	17	-77	+25	+30	T4	0031	0119	0207	0295	0383
1,000	10	8	32	92	17	-77	+25	+30	T4	0032	0120	0208	0296	0384
25 V _{dc} at +85°C					15 V _{dc} at +125°C					Surge (+85°C) 28.8 V _{dc}				
68	20	2	9	22	90	-40	+12	+15	T1	0033	0121	0209	0297	0385
68	10	2	9	22	90	-40	+12	+15	T1	0034	0122	0210	0298	0386
270	20	3	16	55	33	-62	+13	+16	T2	0035	0123	0211	0299	0387
270	10	3	16	55	33	-62	+13	+16	T2	0036	0124	0212	0300	0388
560	20	7	28	76	24	-72	+20	+25	T3	0037	0125	0213	0301	0389
560	10	7	28	76	24	-72	+20	+25	T3	0038	0126	0214	0302	0390
680	20	8	32	63	19	-72	+25	+30	T4	0039	0127	0215	0303	0391
680	10	8	32	63	19	-72	+25	+30	T4	0040	0128	0216	0304	0392
30 V _{dc} at +85°C					20 V _{dc} at +125°C					Surge (+85°C) 34.5 V _{dc}				
56	20	2	9	22	100	-38	+12	+15	T1	0041	0129	0217	0305	0393
56	10	2	9	22	100	-38	+12	+15	T1	0042	0130	0218	0306	0394
220	20	3	16	42	36	-60	+13	+16	T2	0043	0131	0219	0307	0395
220	10	3	16	42	36	-60	+13	+16	T2	0044	0132	0220	0308	0396
470	20	8	32	64	25	-65	+20	+25	T3	0045	0133	0221	0309	0397
470	10	8	32	64	25	-65	+20	+25	T3	0046	0134	0222	0310	0398
560	20	9	36	55	20	-65	+25	+30	T4	0047	0135	0223	0311	0399
560	10	9	36	55	20	-65	+25	+30	T4	0048	0136	0224	0312	0400
50 V _{dc} at +85°C					30 V _{dc} at +125°C					Surge (+85°C) 57.5 V _{dc}				
33	20	2	9	12.3	135	-29	+10	+12	T1	0049	0137	0225	0313	0401
33	10	2	9	12.3	135	-29	+10	+12	T1	0050	0138	0226	0314	0402
120	20	4	24	22.5	49	-42	+12	+15	T2	0051	0139	0227	0315	0403
120	10	4	24	22.5	49	-42	+12	+15	T2	0052	0140	0228	0316	0404
270	20	8	32	37	29	-46	+20	+25	T3	0053	0141	0229	0317	0405
270	10	8	32	37	29	-46	+20	+25	T3	0054	0142	0230	0318	0406
330	20	9	36	38	22	-46	+25	+30	T4	0055	0143	0231	0319	0407
330	10	9	36	38	22	-46	+25	+30	T4	0056	0144	0232	0320	0408
60 V _{dc} at +85°C					40 V _{dc} at +125°C					Surge (+85°C) 69.0 V _{dc}				
27	20	3	12	10.2	144	-24	+10	+12	T1	0057	0145	0233	0321	0409
27	10	3	12	10.2	144	-24	+10	+12	T1	0058	0146	0234	0322	0410
100	20	4	20	19	54	-36	+12	+15	T2	0059	0147	0235	0323	0411
100	10	4	20	19	54	-36	+12	+15	T2	0060	0148	0236	0324	0412
220	20	8	32	30	29	-40	+16	+20	T3	0061	0149	0237	0325	0413
220	10	8	32	30	29	-40	+16	+20	T3	0062	0150	0238	0326	0414
270	20	9	36	27	23	-45	+20	+25	T4	0063	0151	0239	0327	0415
270	10	9	36	27	23	-45	+20	+25	T4	0064	0152	0240	0328	0416
75 V _{dc} at +85°C					50 V _{dc} at +125°C					Surge (+85°C) 86.2 V _{dc}				
22	20	3	12	8.5	157	-19	+10	+12	T1	0065	0153	0241	0329	0417
22	10	3	12	8.5	157	-19	+10	+12	T1	0066	0154	0242	0330	0418
82	20	4	24	15.2	63	-30	+12	+15	T2	0067	0155	0243	0331	0419
82	10	4	24	15.2	63	-30	+12	+15	T2	0068	0156	0244	0332	0420
180	20	9	36	24.4	30	-35	+16	+20	T3	0069	0157	0245	0333	0421
180	10	9	36	24.4	30	-35	+16	+20	T3	0070	0158	0246	0334	0422
220	20	10	40	37.0	24	-40	+20	+25	T4	0071	0159	0247	0335	0423
220	10	10	40	37.0	24	-40	+20	+25	T4	0072	0160	0248	0336	0424

TABLE I. Capacitor characteristics - continued.

Cap. μF	Cap. toler- ance ±%	DC leakage (max)		Dissipa- tion factor (max) %	Imped- ance (max) Ohms	Capacitance change at			Case size	PIN M39006/21-				
		+25°C	+85°C +125°C			-55°C	+85°C	+125°C		Failure rate level (%/1,000 hrs)				
		μA	μA			%	%	%		L(2.0)	M(1.0)	P(0.1)	R(0.01)	S(0.001)
100 V _{dc} at +85°C						65 V _{dc} at +125°C				Surge (+85°C) 115 V _{dc}				
10	20	3	12	4.5	200	-17	+10	+12	T1	0073	0161	0249	0337	0425
10	10	3	12	4.5	200	-17	+10	+12	T1	0074	0162	0250	0338	0426
39	20	5	24	10.4	80	-20	+12	+15	T2	0075	0163	0251	0339	0427
39	10	5	24	10.4	80	-20	+12	+15	T2	0076	0164	0252	0340	0428
68	20	10	40	11.3	40	-30	+14	+16	T3	0077	0165	0253	0341	0429
68	10	10	40	11.3	40	-30	+14	+16	T3	0078	0166	0254	0342	0430
120	20	12	48	25	30	-35	+15	+17	T4	0079	0167	0255	0343	0431
120	10	12	48	25	30	-35	+15	+17	T4	0080	0168	0256	0344	0432
125 V _{dc} at +85°C						85 V _{dc} at +125°C				Surge (+85°C) 144 V _{dc}				
6.8	20	3	12	6.0	300	-14	+10	+12	T1	0081	0169	0257	0345	0433
6.8	10	3	12	6.0	300	-14	+10	+12	T1	0082	0170	0258	0346	0434
27	20	5	24	7.2	90	-18	+12	+15	T2	0083	0171	0259	0347	0435
27	10	5	24	7.2	90	-18	+12	+15	T2	0084	0172	0260	0348	0436
47	20	10	40	7.9	50	-26	+14	+16	T3	0085	0173	0261	0349	0437
47	10	10	40	7.9	50	-26	+14	+16	T3	0086	0174	0262	0350	0438
82	20	12	48	17.4	32	-30	+15	+17	T4	0087	0175	0263	0351	0439
82	10	12	48	17.4	32	-30	+15	+17	T4	0088	0176	0264	0352	0440

FIGURE 2. Voltage derating with temperature.

REQUIREMENTS:

Design and construction:

Dimensions and configuration: See [figure 1](#).

Case type: Tubular, insulated.

Seal type: Hermetic (glass-to-tantalum anode).

Terminals: Axial-wire lead:

Anode (type N51 of [MIL-STD-1276](#)).

Cathode (type C51 of [MIL-STD-1276](#)).

Rated temperature: -55°C to +85°C, voltage derated to +125°C (see [figure 2](#)).

Rated voltage: See [table I](#).

Capacitance (Cap.) (nom): See [table I](#).

Cap. tolerance: See [table I](#).

FR level: See [table I](#).

Constant voltage conditioning: As specified in [MIL-PRF-39006](#).

DC leakage (DCL) (max) (at +25°C): See [table I](#).

| Cap. (nom): [MIL-STD-202-305](#). See [table I](#).

Dissipation factor (DF) (max): See [table I](#).

| Seal: [MIL-STD-202-112](#), conditions A and C.

| Shock (specified pulse): [MIL-STD-202-213](#), condition I (100 G).

| Vibration, high frequency: [MIL-STD-202-204](#), condition D (20 G).

| Thermal shock: [MIL-STD-202-107](#), condition A (with step 3 at +125°C). Number of cycles = 30.

DCL: 125 percent (max) of +25°C value of [table I](#).

Δ Cap.: Within ± 5 percent of initial measurement.

DF: 115 percent (max) of initial requirement.

| Salt spray (corrosion): [MIL-STD-202-101](#), condition B (48 hours).

| Solderability: [MIL-STD-202-208](#).

Terminal strength:

| Pull: [MIL-STD-202-211](#), condition A.

Wire-lead bend: In accordance with [MIL-PRF-39006](#).

Surge voltage: See [table I](#).

Moisture resistance: [MIL-STD-202-106](#).

DCL: 125 percent (max) of +25°C value of [table I](#).

Δ Cap.: Within ± 8 percent of initial measurement.

DF: 115 percent (max) of initial requirement.

Dielectric withstanding voltage (DWV): [MIL-STD-202-301](#). 2,000 V dc, minimum.

Insulation resistance (IR): [MIL-STD-202-302](#), condition B. 100, megohms, minimum.

Low temperature (storage): Method 502 of [MIL-STD-810](#).

DCL: See [table I](#).

Δ Cap.: Within ± 5 percent of initial measurement.

DF: See [table I](#).

Stability at low and high temperatures:

Step 1 (+25°C):

DCL: See [table I](#).

Δ Cap.: Within tolerance of [table I](#) value.

DF: See [table I](#).

Step 2 (-55°C):

Imp. See [table I](#).

Δ Cap.: See [table I](#).

Step 3 (+25°C):

DCL: See [table I](#).

Δ Cap.: Within ± 5 percent of step 1 value.

DF: See [table I](#).

Step 4 (+85°C):

DCL: See [table I](#).

Δ Cap.: See [table I](#).

DF: See [table I](#).

Step 5 (+125°C):

DCL: See [table I](#).

Δ Cap.: See [table I](#).

DF: See [table I](#).

Step 6 (+25°C):

DCL: See [table I](#).

Δ Cap.: Within ± 5 percent of step 1 value.

DF: See [table I](#).

Reverse voltage: Not applicable.

Life at +85°C: [MIL-STD-202-108](#).

2,000 hours (qualification):

DCL: See [table I](#).

Δ Cap.: Within +10 percent to -25 percent of initial measurement for 6-volt units;
within +10 percent to -20 percent of initial measurement for 8- and 10- volt units;
within +10 percent to -15 percent of initial measurement for 15-volt units; and
within ± 10 percent of initial measurement for all other units.

DF: See [table I](#).

10,000 hours (group B) and extended life:

DCL (+85°C): 125 percent (max) of [table I](#) value.

DCL (+25°C): See [table I](#).

Δ Cap.: Within +10 percent, -60 percent of initial measurement.

DF: 200 percent (max) of [table I](#) value.

DWV: 2,000 V dc, minimum.

IR.: 100 megohms, minimum.

Vacuum life:

DCL: See [table I](#).

Δ Cap.: Within ± 20 percent of initial measurement.

DF: See [table I](#).

Weight loss: 4.1 mg, maximum.

Life at +125°C: [MIL-STD-202-108](#).

DCL: See [table I](#).

ΔCap.: Within +10 percent to -25 percent of initial measurement for 6-volt units;
within +10 percent to -20 percent of initial measurement for 8- and 10- volt units;
within +10 percent to -15 percent of initial measurement for 15-volt units; and
within ± 10 percent of initial measurement for all other units.

DF: See [table I](#).

DWV: 2,000 V dc, minimum.

IR.: 100 megohms, minimum.

2,000 hours (group C):

DCL (+125°C): 125 percent (max) of [table I](#) value.

DCL (+25°C): See [table I](#).

ΔCap.: Within +10 percent, -60 percent of initial measurement.

DF: 200 percent (max) of [table I](#) value.

DWV: 2,000 V dc, minimum.

IR.: 100 megohms, minimum.

Barometric pressure: [MIL-STD-202-105](#), condition E (150,000 feet).

Test voltage: Rated voltage.

Fungus: Method 508 of [MIL-STD-810](#).

Resistance to solvents: [MIL-STD-202-215](#).

Resistance to soldering heat: [MIL-STD-202-210](#), condition B.

DCL: See [table I](#).

ΔCap.: Within ± 5 percent of initial measurement.

DF: See [table I](#).

Marking: In accordance with [MIL-PRF-39006](#).

Polarity: Series of plus (+) symbols encircling positive end (see [figure 1](#)).

Voltage groups (+85°C rated voltage):

- I ----- 6 to 15 V inclusive
- II ----- 25 to 75 V inclusive.
- III ----- 100 V and 125 V.

Changes from previous issue: The margins of this specification sheet are marked with vertical lines to indicate where changes from previous issue were made. This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content irrespective of the marginal notations and relationship to the previous issue.

Referenced documents. In addition to [MIL-PRF-39006](#), this document references the following:

MIL-PRF-39006/25	MIL-STD-202-112	MIL-STD-202-215
MIL-STD-202-101	MIL-STD-202-204	MIL-STD-202-301
MIL-STD-202-105	MIL-STD-202-208	MIL-STD-202-302
MIL-STD-202-106	MIL-STD-202-210	MIL-STD-202-305
MIL-STD-202-107	MIL-STD-202-211	MIL-STD-810
MIL-STD-202-108	MIL-STD-202-213	MIL-STD-1276

Custodians:

Army - CR
Navy - EC
Air Force - 85
DLA - CC

Preparing activity:

DLA - CC

(Project 5910-2024-031)

Review activities:

Navy - AS, MC
Air Force - 19

NOTE: The activities listed above were interested in this document as of the date of this document. Since organizations and responsibilities can change, you should verify the currency of the information above using ASSIST Online database at <https://assist.dla.mil>.