PERFORMANCE SPECIFICATION SHEET

CAPACITOR, FIXED, ELECTROLYTIC (SOLID ELECTROLYTE), TANTALUM (POLARIZED, SINTERED SLUG), ESTABLISHED RELIABILITY, STYLE CSR09

FAILURE RATE LEVELS “M”, “P”, AND “R” ARE INACTIVE FOR NEW DESIGN AFTER 2 FEBRUARY 1984.

FAILURE RATE LEVEL “S” IS INACTIVE FOR NEW DESIGN AFTER 15 AUGUST 1984.

This specification 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 specification sheet and MIL-PRF-39003.

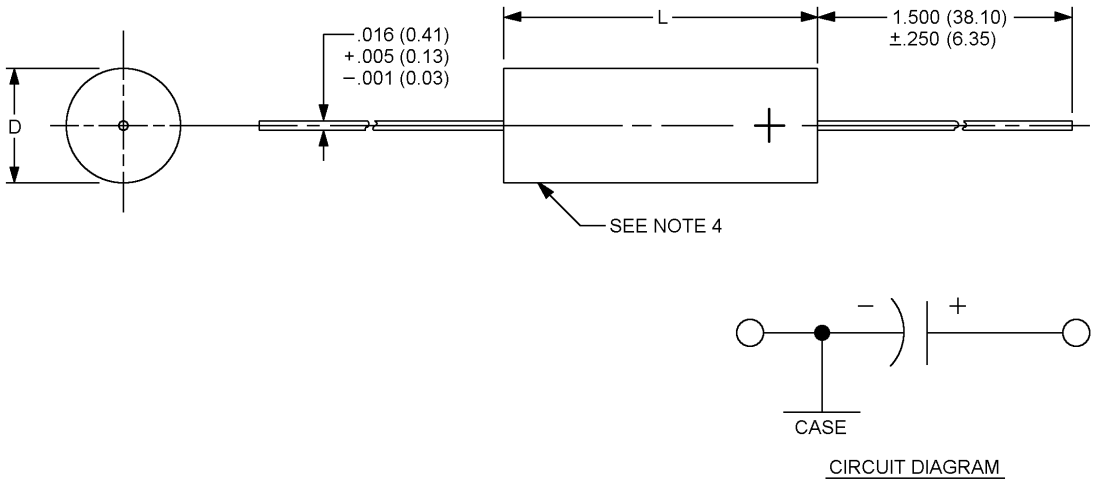

FIGURE 1. Dimensions and configuration.

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

Case size	Dimensions					
	L			D		
	Min	Nom	Max	Min	Nom	Max
A1	.235 (5.97)	.250 (6.35)	.281 (7.14)	.081 (2.06)	.090 (2.29)	.099 (2.51)
B1	.375 (9.52)	.390 (9.91)	.405 (10.29)	.128 (3.25)	.138 (3.51)	.148 (3.76)

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are in parentheses and are given for general information only.
3. These capacitors are not intended to be mounted by their leads.
4. The case insulation shall extend .015 (0.38 mm) minimum beyond each end. However, when a shrink-fitted insulation is used, it shall lap over the ends of the capacitor body.
5. Lead length may be a minimum of 1 inch long for use in tape and reel automatic insertion equipment, when specified.

FIGURE 1. Dimensions and configuration – Continued.

REQUIREMENTS

Requirements: Requirements shall be in accordance with MIL-PRF-39003, and as specified herein.

Design and construction: Capacitors shall be of the design, construction, and physical dimensions specified on figure 1.

Case type: Tubular, insulated.

Material: Metal (alloy unspecified).

Type of seal: Hermetic.

Leads (gold-plated leads optional; see MIL-PRF-39003 acquisition requirements):

Anode lead: Nickel-iron-alloy.

Cathode lead: Nickel-iron-alloy or nickel.

DC rated voltage: See table I. Above 85°C voltage derating is required (see MIL-PRF-39003).

DC leakage (DCL): See table I.

Capacitance (Cap.) (nom): See table I.

Cap. tolerance: 5 or 10 percent, see table I.

Dissipation factor (DF): See table I.

Operating temperature: -55°C to +125°C.

Failure rate level: See table I.

TABLE I. Style CSR09 characteristics and dash numbers.

DC rated voltage	Capacitance (nom)	Capacitance tolerance	DC leakage at			Dissipation factor at			Case size	Dash number M39003/02- 1/ Failure rate level for percent per 1000 hours						
			+25°C	+85°C	+125°C	-55°C	+25°C	+85°C +125°C								
Volts	µF	Percent	µA	µA	µA	%	%	%		M 1.0	P 0.1	R 0.01	S 0.001	B 0.1	C 0.01	D 0.001
6	2.7	5	0.6	6	8	8	6	6	A1	1001-	1061-	1121-	1181-	2001-	3001-	4001-
6	2.7	10	0.6	6	8	8	6	6	A1	0001-	0061-	0121-	0181-	2002-	3002-	4002-
6	18	5	1.4	21.6	36.7	8	6	6	B1	1002-	1062-	1122-	1182-	2003-	3003-	4003-
6	18	10	1.4	21.6	36.7	8	6	6	B1	0002-	0062-	0122-	0182-	2004-	3004-	4004-
10	1.8	5	0.6	6	8	8	6	6	A1	1007-	1067-	1127-	1187-	2005-	3005-	4005-
10	1.8	10	0.6	6	8	8	6	6	A1	0007-	0067-	0127-	0187-	2006-	3006-	4006-
10	2.2	5	0.6	6	8	8	6	6	A1	1008-	1068-	1128-	1188-	2007-	3007-	4007-
10	2.2	10	0.6	6	8	8	6	6	A1	0008-	0068-	0128-	0188-	2008-	3008-	4008-
10	10	5	2.5	20	34	8	6	6	B1	1009-	1069-	1129-	1189-	2009-	3009-	4009-
10	10	10	2.5	20	34	8	6	6	B1	0009-	0069-	0129-	0189-	2010-	3010-	4010-
10	12	5	2.5	24	40.8	8	6	6	B1	1010-	1070-	1130-	1190-	2011-	3011-	4011-
10	12	10	2.5	24	40.8	8	6	6	B1	0010-	0070-	0130-	0190-	2012-	3012-	4012-
10	15	5	2.5	30	51	8	6	6	B1	1011-	1071-	1131-	1191-	2013-	3013-	4013-
10	15	10	2.5	30	51	8	6	6	B1	0011-	0071-	0131-	0191-	2014-	3014-	4014-
15	1	5	0.6	6	8	8	6	6	A1	1012-	1072-	1132-	1192-	2015-	3015-	4015-
15	1	10	0.6	6	8	8	6	6	A1	0012-	0072-	0132-	0192-	2016-	3016-	4016-
15	1.2	5	0.6	6	8	8	6	6	A1	1013-	1073-	1133-	1193-	2017-	3017-	4017-
15	1.2	10	0.6	6	8	8	6	6	A1	0013-	0073-	0133-	0193-	2018-	3018-	4018-
15	1.5	5	0.6	6	8	8	6	6	A1	1014-	1074-	1134-	1194-	2019-	3019-	4019-
15	1.5	10	0.6	6	8	8	6	6	A1	0014-	0074-	0134-	0194-	2020-	3020-	4020-
15	8.2	5	1.8	24.6	42	8	6	6	B1	1015-	1075-	1135-	1195-	2021-	3021-	4021-
15	8.2	10	1.8	24.6	42	8	6	6	B1	0015-	0075-	0135-	0195-	2022-	3022-	4022-
20	0.56	5	0.6	6	8	4	3	4	A1	1016-	1076-	1136-	1196-	2023-	3023-	4023-
20	0.56	10	0.6	6	8	4	3	4	A1	0016-	0076-	0136-	0196-	2024-	3024-	4024-
20	0.68	5	0.6	6	8	4	3	4	A1	1017-	1077-	1137-	1197-	2025-	3025-	4025-
20	0.68	10	0.6	6	8	4	3	4	A1	0017-	0077-	0137-	0197-	2026-	3026-	4026-
20	0.82	5	0.6	6	8	4	3	4	A1	1018-	1078-	1138-	1198-	2027-	3027-	4027-
20	0.82	10	0.6	6	8	4	3	4	A1	0018-	0078-	0138-	0198-	2028-	3028-	4028-
20	1	5	0.6	6	8	4	3	4	A1	1019-	1079-	1139-	1199-	2029-	3029-	4029-
20	1	10	0.6	6	8	4	3	4	A1	0019-	0079-	0139-	0199-	2030-	3030-	4030-
20	3.3	5	1	13.2	22.4	4	3	4	B1	1020-	1080-	1140-	1200-	2031-	3031-	4031-
20	3.3	10	1	13.2	22.4	4	3	4	B1	0020-	0080-	0140-	0200-	2032-	3032-	4032-

See footnote at end of table.

TABLE I. Style CSR09 characteristics and dash numbers – Continued

DC rated voltage	Capacitance (nom)	Capacitance tolerance	DC leakage at			Dissipation factor at			Case size	Dash number M39003/02- 1/ Failure rate level for percent per 1000 hours						
			+25°C	+85°C	+125°C	-55°C	+25°C	+85°C +125°C								
Volts	µF	Percent	µA	µA	µA	%	%	%		M 1.0	P 0.1	R 0.01	S 0.001	B 0.1	C 0.01	D 0.001
20	3.9	5	2	15.6	26.5	4	3	4	B1	1021-	1081-	1141-	1201-	2033-	3033-	4033-
20	3.9	10	2	15.6	26.5	4	3	4	B1	0021-	0081-	0141-	0201-	2034-	3034-	4034-
20	4.7	5	2	18.8	32	4	3	4	B1	1022-	1082-	1142-	1202-	2035-	3035-	4035-
20	4.7	10	2	18.8	32	4	3	4	B1	0022-	0082-	0142-	0202-	2036-	3036-	4036-
20	5.6	5	2	22.4	38.1	4	3	4	B1	1023-	1083-	1143-	1203-	2037-	3037-	4037-
20	5.6	10	2	22.4	38.1	4	3	4	B1	0023-	0083-	0143-	0203-	2038-	3038-	4038-
20	6.8	5	2	27.2	46.2	4	3	4	B1	1024-	1084-	1144-	1204-	2039-	3039-	4039-
20	6.8	10	2	27.2	46.2	4	3	4	B1	0024-	0084-	0144-	0204-	2040-	3040-	4040-
35	0.33	5	0.6	6	8	4	3	4	A1	1025-	1085-	1145-	1205-	2041-	3041-	4041-
35	0.33	10	0.6	6	8	4	3	4	A1	0025-	0085-	0145-	0205-	2042-	3042-	4042-
35	0.39	5	0.6	6	8	4	3	4	A1	1026-	1086-	1146-	1206-	2043-	3043-	4043-
35	0.39	10	0.6	6	8	4	3	4	A1	0026-	0086-	0146-	0206-	2044-	3044-	4044-
35	0.47	5	0.6	6	8	4	3	4	A1	1027-	1087-	1147-	1207-	2045-	3045-	4045-
35	0.47	10	0.6	6	8	4	3	4	A1	0027-	0087-	0147-	0207-	2046-	3046-	4046-
35	2.2	5	1.4	15.4	26.2	4	3	4	B1	1028-	1088-	1148-	1208-	2047-	3047-	4047-
35	2.2	10	1.4	15.4	26.2	4	3	4	B1	0028-	0088-	0148-	0208-	2048-	3048-	4048-
35	2.7	5	1.4	18.9	32.1	4	3	4	B1	1029-	1089-	1149-	1209-	2049-	3049-	4049-
35	2.7	10	1.4	18.9	32.1	4	3	4	B1	0029-	0089-	0149-	0209-	2050-	3050-	4050-
50	0.22	5	0.6	6	8	4	3	4	A1	1030-	1090-	1150-	1210-	2051-	3051-	4051-
50	0.22	10	0.6	6	8	4	3	4	A1	0030-	0090-	0150-	0210-	2052-	3052-	4052-
50	0.27	5	0.6	6	8	4	3	4	A1	1031-	1091-	1151-	1211-	2053-	3053-	4053-
50	0.27	10	0.6	6	8	4	3	4	A1	0031-	0091-	0151-	0211-	2054-	3054-	4054-
50	1.5	5	1.4	15	25.5	4	3	4	B1	1032-	1092-	1152-	1212-	2055-	3055-	4055-
50	1.5	10	1.4	15	25.5	4	3	4	B1	0032-	0092-	0152-	0212-	2056-	3056-	4056-
50	1.8	5	1.4	18	30.6	4	3	4	B1	1033-	1093-	1153-	1213-	2057-	3057-	4057-
50	1.8	10	1.4	18	30.6	4	3	4	B1	0033-	0093-	0153-	0213-	2058-	3058-	4058-
75	0.047	5	0.6	6	8	4	3	4	A1	1034-	1094-	1154-	1214-	2059-	3059-	4059-
75	0.047	10	0.6	6	8	4	3	4	A1	0034-	0094-	0154-	0214-	2060-	3060-	4060-
75	0.056	5	0.6	6	8	4	3	4	A1	1035-	1095-	1155-	1215-	2061-	3061-	4061-
75	0.056	10	0.6	6	8	4	3	4	A1	0035-	0095-	0155-	0215-	2062-	3062-	4062-
75	0.068	5	0.6	6	8	4	3	4	A1	1036-	1096-	1156-	1216-	2063-	3063-	4063-
75	0.068	10	0.6	6	8	4	3	4	A1	0036-	0096-	0156-	0216-	2064-	3064-	4064-

See footnote at end of table.

TABLE I. Style CSR09 characteristics and dash numbers – Continued

DC rated voltage	Capacitance (nom)	Capacitance tolerance	DC leakage at			Dissipation factor at			Case size	Dash number M39003/02- 1/ Failure rate level for percent per 1000 hours						
			+25°C	+85°C	+125°C	-55°C	+25°C	+85°C +125°C								
Volts	µF	Percent	µA	µA	µA	%	%	%		M 1.0	P 0.1	R 0.01	S 0.001	B 0.1	C 0.01	D 0.001
75	0.082	5	0.6	6	8	4	3	4	A1	1037-	1097-	1157-	1217-	2065-	3065-	4065-
75	0.082	10	0.6	6	8	4	3	4	A1	0037-	0097-	0157-	0217-	2066-	3066-	4066-
75	0.1	5	0.6	6	8	4	3	4	A1	1038-	1098-	1158-	1218-	2067-	3067-	4067-
75	0.1	10	0.6	6	8	4	3	4	A1	0038-	0098-	0158-	0218-	2068-	3068-	4068-
75	0.12	5	0.6	6	8	4	3	4	A1	1039-	1099-	1159-	1219-	2069-	3069-	4069-
75	0.12	10	0.6	6	8	4	3	4	A1	0039-	0099-	0159-	0219-	2070-	3070-	4070-
75	0.15	5	0.6	6	8	4	3	4	A1	1040-	1100-	1160-	1220-	2071-	3071-	4071-
75	0.15	10	0.6	6	8	4	3	4	A1	0040-	0100-	0160-	0220-	2072-	3072-	4072-
75	0.18	5	0.6	6	8	4	3	4	A1	1041-	1101-	1161-	1221-	2073-	3073-	4073-
75	0.18	10	0.6	6	8	4	3	4	A1	0041-	0101-	0161-	0221-	2074-	3074-	4074-
75	0.22	5	0.6	6	8	4	3	4	B1	1042-	1102-	1162-	1222-	2075-	3075-	4075-
75	0.22	10	0.6	6	8	4	3	4	B1	0042-	0102-	0162-	0222-	2076-	3076-	4076-
75	0.27	5	0.6	6	8	4	3	4	B1	1043-	1103-	1163-	1223-	2077-	3077-	4077-
75	0.27	10	0.6	6	8	4	3	4	B1	0043-	0103-	0163-	0223-	2078-	3078-	4078-
75	0.33	5	0.6	6	8.4	4	3	4	B1	1044-	1104-	1164-	1224-	2079-	3079-	4079-
75	0.33	10	0.6	6	8.4	4	3	4	B1	0044-	0104-	0164-	0224-	2080-	3080-	4080-
75	0.39	5	0.6	6	9.9	4	3	4	B1	1045-	1105-	1165-	1225-	2081-	3081-	4081-
75	0.39	10	0.6	6	9.9	4	3	4	B1	0045-	0105-	0165-	0225-	2082-	3082-	4082-
75	0.47	5	0.6	7	12	4	3	4	B1	1046-	1106-	1166-	1226-	2083-	3083-	4083-
75	0.47	10	0.6	7	12	4	3	4	B1	0046-	0106-	0166-	0226-	2084-	3084-	4084-
75	0.56	5	0.6	8.4	14.3	4	3	4	B1	1047-	1107-	1167-	1227-	2085-	3085-	4085-
75	0.56	10	0.6	8.4	14.3	4	3	4	B1	0047-	0107-	0167-	0227-	2086-	3086-	4086-
75	0.68	5	0.6	10.2	17.3	4	3	4	B1	1048-	1108-	1168-	1228-	2087-	3087-	4087-
75	0.68	10	0.6	10.2	17.3	4	3	4	B1	0048-	0108-	0168-	0228-	2088-	3088-	4088-
75	0.82	5	0.7	12.3	20.9	4	3	4	B1	1049-	1109-	1169-	1229-	2089-	3089-	4089-
75	0.82	10	0.7	12.3	20.9	4	3	4	B1	0049-	0109-	0169-	0229-	2090-	3090-	4090-
75	1	5	0.9	15	25.5	4	3	4	B1	1050-	1110-	1170-	1230-	2091-	3091-	4091-
75	1	10	0.9	15	25.5	4	3	4	B1	0050-	0110-	0170-	0230-	2092-	3092-	4092-
75	1.2	5	0.9	18	30.6	4	3	4	B1	1051-	1111-	1171-	1231-	2093-	3093-	4093-
75	1.2	10	0.9	18	30.6	4	3	4	B1	0051-	0111-	0171-	0231-	2094-	3094-	4094-

1/ Dash number shall include the letter “H” to indicate an internal construction solder with a minimum melted point of 221°C, or the “H” shall be deleted.

REQUIREMENTS – Continued:

Stability at low and high temperatures: In accordance with MIL-PRF-39003.

Step 1 (+25°C):

DCL: See table I.

Cap.: Within tolerance of table I value.

DF: See table I.

Step 2 (-55°C):

ΔCap.. Shall not change more than ± 8 percent of step 1 measured value.

DF: See table I.

Step 3 (+25°C):

DCL: See table I.

ΔCap. Shall not change more than ± 2 percent of step 1 measured value.

DF: See table I.

Step 4 (+85°C):

DCL: See table I.

ΔCap.: Shall not change more than ± 8 percent of step 1 measured value (6, 10, and 15 volt units).

ΔCap.: Shall not change more than ± 6 percent of step 1 measured value (20 volts and higher).

DF: See table I.

Step 5 (+125°C):

DCL: See table I.

ΔCap.: Shall not change more than ±12 percent of step 1 measured value.

DF: See table I.

Step 6 (+25°C):

DCL: See table I.

ΔCap.: Shall not change more than ± 2 percent of step 1 measured value.

DF: See table I.

Surge voltage: In accordance with MIL-PRF-39003.

DCL: See table I.

ΔCap.: Shall not change more than ± 2 percent from initial measured value.

DF: See table I.

Life: Method 108 of MIL-STD-202.

240, 1,000, and 2,000 hours.

At 25°C (as applicable).

DCL: See table I.

ΔCap.: Not greater than ± 5 percent of initial measured value.

DF: See table I.

At 85°C:

DCL: See table I.

At 125°C:

DCL: See table I.

4,000, 6,000, 8,000, and 10,000 hours (exponential only):

At +25°C (as applicable):

DCL: 200 percent of initial limit.

ΔCap.: Not greater than ± 10 percent of initial measured value.

DF: See table I.

At +85°C:

DCL: 200 percent of initial limit.

At +125°C:

DCL: 200 percent of initial limit.

Marking: In accordance with MIL-PRF-39003.

Part or Identifying Number (PIN): M39003/02-(dash number from table I).

Substitutability data: Substitutability for failure rate levels and capacitance tolerances shall be in accordance with MIL-PRF-39003.

* NOTES:

Reference documents. In addition to MIL-PRF-39003, this specification sheet references the following documents.

DEPARTMENT OF DEFENSE

MIL-STD-202 - Test Method Standard, Electronic and Electrical Component Parts.

(Copies of these documents are available online at http://assist.daps.dla.mil/quicksearch or www.dodssp.daps.mil or from the Standardization Document Order Desk, 700 Robbins Avenue 4D, Philadelphia, PA 19111-5094).

* Changes from previous issue. The margins of this specification are marked with asterisks to indicate where changes from the 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 last previous issue.

Custodians:
Army - CR
Navy - EC
Air Force - 11
DLA - CC

Preparing activity
DLA - CC

(Project 5910-2203-01)

Review activities
Navy - AS, MC, OS, SH
Air Force - 19, 99

* NOTE: the activities listed above were interested in this document as of the date of this document. Since organizations and responsibilities change, you should verify the currency of the information above using the ASSIST Online database at www.dodssp.daps.mil .