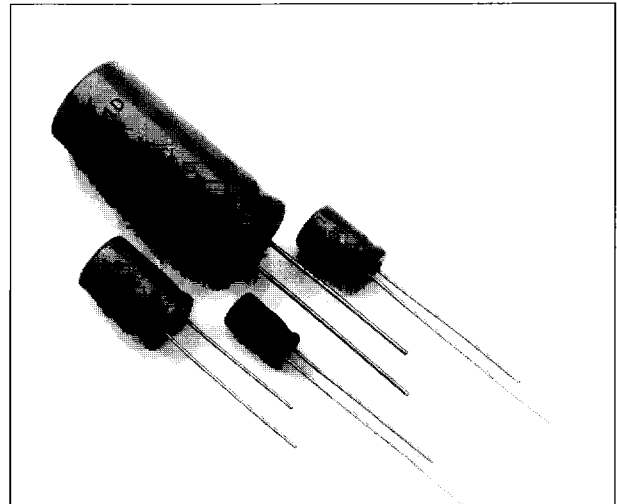


**+ 105°C
General Purpose
Miniature
Radial Lead,
Aluminum Capacitors**



L65-02

Features —

- Increased Capacitance
- New 18mm Diameter Case Size
- 3rd Lead Optional on Diameters \geq 12.5mm
- Resin End Seal Available

General Specifications —

Operating Temperature:
- 40°C to +105°C.
Voltage Range: 6.3 - 250 VDC.
Capacitance Range: 1 μ F - 10,000 μ F.
Capacitance Tolerance: \pm 20%.
Case Size Range: 6 x 11mm - 18 x 36mm.
Termination: 2 or 3 radial leads.

Life Validation Test:

1000 hrs @ +105°C (dia. \leq 8mm):
2000 hrs @ +105°C (dia. $>$ 8mm):
 Δ CAP \leq 15% (6.3 - 16 VDC),
 \leq 10% (25 - 250 VDC)
from initial measurement.

Δ ESR \leq 1.2x initial specified limit.
 Δ DCL \leq initial specified limit.

Shelf Test: 500 hrs @ +105°C:

Δ CAP \leq 10% initial measurement.
 Δ ESR \leq 1.2x initial specified limit.
 Δ DCL \leq 2x initial specified limit.

DC Leakage Current: @ +25°C
after 5 min. charge.
6.3 - 63 VDC 100-250 VDC
I = 0.005CV I = 0.01 CV
I in μ A, C in μ F, V in Volts

Ripple Current Multipliers:

TEMPERATURE

Ambient Temp.	Multipliers
+105°C	0.45
+95°C	0.77
+85°C	1.0
+75°C	1.18
\leq +65°C	1.34

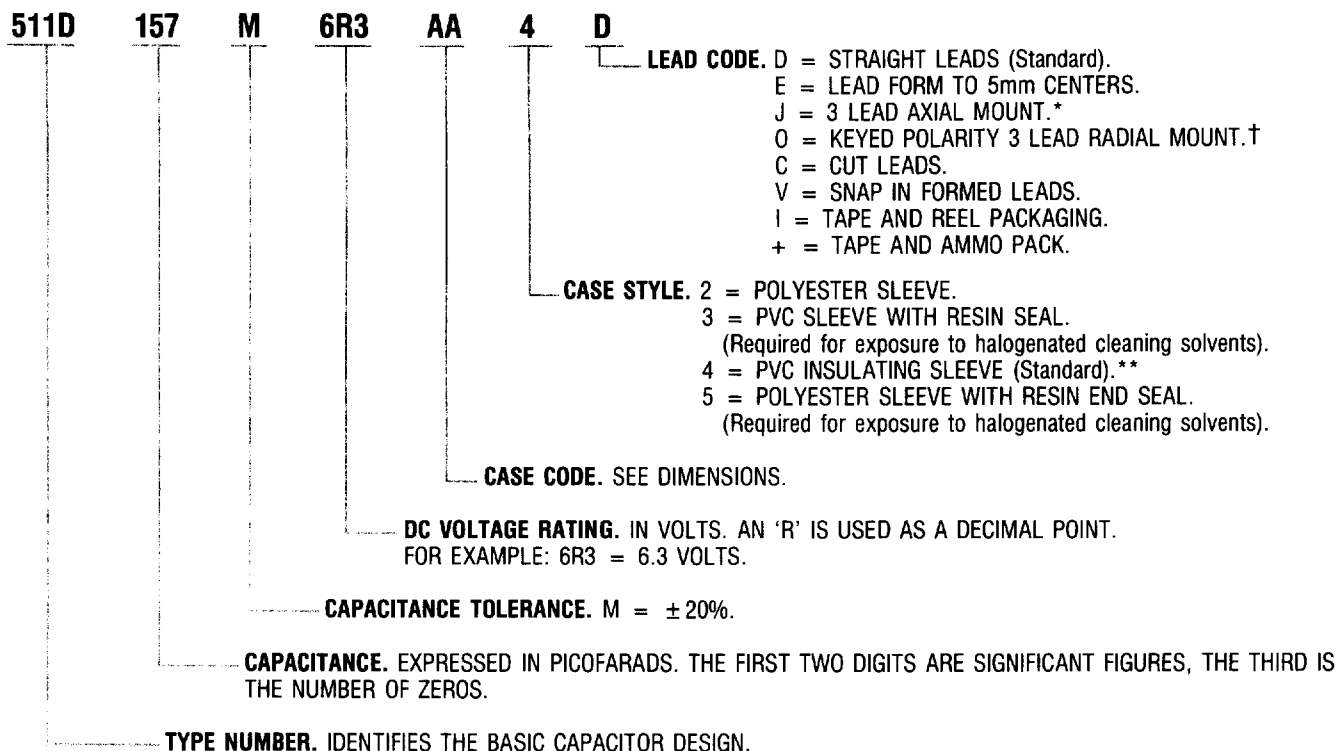
FREQUENCY Hz.

VDC	50-60	100-120	300-400	1K-100K
6.3-25	0.85	1.0	1.05	1.1
26-250	0.80	1.0	1.30	1.4

Performance Characteristics —
SEE PAGE 2.



Catalog Numbering System



*Available for 12.5, 16 and 18mm dia. units.

**Sleeving rated to +105°C.

† Available for 12.5, 16 and 18mm dia. units with resin end seal.

DIMENSIONS IN MILLIMETERS

CASE CODE	NOMINAL		STYLES 2 and 4		STYLES 3 and 5		LEAD SPACING		LEAD DIAMETER (d)		TYPICAL WEIGHT GRAMS
	DIAMETER	LENGTH	D Max.	L Max.	D Max.	L Max.	S, ±.6	T, ±.5	NOM.	AWG NO.	
AA	6	11	6.5	12.0	6.5	13.0	2.5	N/A	0.63	22	0.6
BB	8	12	8.5	13.0	8.5	14.0	3.5	N/A	0.63	22	1.0
CC	10	13	10.5	14.3	10.5	16.0	5.0	N/A	0.63	22	1.7
CD	10	16	10.5	17.0	10.5	18.8	5.0	N/A	0.63	22	2.0
CG	10	20	10.5	21.5	10.5	23.0	5.0	N/A	0.63	22	2.5
DG	12.5	20	13.0	21.5	13.0	23.0	5.0	2.5	0.81	20	3.8
DK	12.5	25	13.0	26.5	13.0	29.0	5.0	2.5	0.81	20	4.5
DM	12.5	26.5	13.0	28.0	13.0	29.5	5.0	2.5	0.81	20	4.7
DT	12.5	33.5	13.0	34.2	13.0	36.0	5.0	2.5	0.81	20	5.8
DS	12.5	42.5	13.0	43.7	13.0	45.5	5.0	2.5	0.81	20	7.3
EK	16	25	16.5	26.2	16.5	27.9	7.5	3.8	0.81	20	7.2
EN	16	32	16.5	33.5	16.5	36.0	7.5	3.8	0.81	20	9.4
ER	16	36	16.5	37.5	16.5	40.0	7.5	3.8	0.81	20	10.6
EU	16	40	16.5	41.7	16.5	42.4	7.5	3.8	0.81	20	11.8
FR	18	36	18.5	37.5	18.5	40.0	7.5	3.8	0.81	20	13.4



MINIATURE RADIAL LEAD CAPACITORS

TYPE 511D

STANDARD RATINGS

μF	Catalog Number	Nominal Case Size (mm)		Max. ESR @ +25°C (Ω)		Max. Ripple Current @ +85°C (A)		Max. Impedance @ +25°C (Ω)
		D	x L	120Hz	20k-40kHz	120Hz	20k-40kHz	100kHz
6.3 VOLTS DC WORKING; 8 VOLTS DC SURGE								
150	511D157M6R3AA4D	6	x 11	3.130	2.720	0.123	0.132	2.800
270	511D277M6R3BB4D	8	x 12	1.518	1.100	0.219	0.257	1.270
560	511D567M6R3CC4D	10	x 13	0.710	0.650	0.383	0.400	0.670
820	511D827M6R3CD4D	10	x 16	0.520	0.400	0.481	0.548	0.400
1200	511D128M6R3CG4D	10	x 20	0.420	0.270	0.590	0.741	0.286
1800	511D188M6R3DG4D	12.5	x 20	0.300	0.190	0.802	1.010	0.200
2700	511D278M6R3DK4D	12.5	x 25	0.204	0.128	1.020	1.280	0.136
4700	511D478M6R3EK4D	16	x 25	0.121	0.075	1.580	2.010	0.090
6800	511D688M6R3EN4D	16	x 32	0.089	0.060	2.040	2.480	0.066
8200	511D828M6R3ER4D	16	x 36	0.078	0.055	2.280	2.720	0.062
10000	511D109M6R3FR4D	18	x 36	0.068	0.050	2.640	3.070	0.061
10 VOLTS DC WORKING; 13 VOLTS DC SURGE								
100	511D107M010AA4D	6	x 11	4.073	2.800	0.108	0.131	2.900
220	511D227M010BB4D	8	x 12	1.855	1.150	0.198	0.252	1.300
390	511D397M010CC4D	10	x 13	1.012	0.625	0.321	0.408	0.650
680	511D687M010CD4D	10	x 16	0.596	0.430	0.449	0.529	0.435
1000	511D108M010CG4D	10	x 20	0.407	0.290	0.603	0.715	0.290
1200	511D128M010DG4D	12.5	x 20	0.371	0.206	0.721	0.968	0.206
1800	511D188M010DK4D	12.5	x 25	0.265	0.138	0.930	1.280	0.138
3300	511D338M010EK4D	16	x 25	0.166	0.086	1.350	1.880	0.094
4700	511D478M010EN4D	16	x 32	0.122	0.060	1.740	2.480	0.067
5600	511D568M010ER4D	16	x 36	0.104	0.056	1.970	2.690	0.063
8200	511D828M010FR4D	18	x 36	0.094	0.056	2.240	2.910	0.063
16 VOLTS DC WORKING; 20 VOLTS DC SURGE								
82	511D826M016AA4D	6	x 11	4.294	2.940	0.106	0.127	2.950
150	511D157M016BB4D	8	x 12	2.433	1.250	0.173	0.241	1.250
270	511D277M016CC4D	10	x 13	1.081	0.685	0.310	0.390	0.680
470	511D477M016CD4D	10	x 16	0.748	0.442	0.419	0.522	0.442
680	511D687M016CG4D	10	x 20	0.521	0.295	0.533	0.709	0.295
820	511D827M016DG4D	12.5	x 20	0.429	0.208	0.671	0.963	0.208
1500	511D158M016DK4D	12.5	x 25	0.243	0.140	0.971	1.270	0.140
2200	511D228M016EK4D	16	x 25	0.176	0.090	1.310	1.840	0.098
3300	511D338M016EN4D	16	x 32	0.147	0.062	1.580	2.440	0.067
3900	511D398M016ER4D	16	x 36	0.125	0.058	1.800	2.650	0.063
5600	511D568M016FR4D	18	x 36	0.100	0.055	2.170	2.930	0.059
25 VOLTS DC WORKING; 32 VOLTS DC SURGE								
47	511D476M025AA4D	6	x 11	6.120	2.940	0.089	0.127	2.950
100	511D107M025BB4D	8	x 12	2.914	1.350	0.158	0.232	1.350
180	511D187M025CC4D	10	x 13	1.590	0.950	0.256	0.331	0.900
270	511D277M025CD4D	10	x 16	1.086	0.550	0.333	0.468	0.500
390	511D397M025CG4D	10	x 20	0.724	0.300	0.452	0.703	0.305
560	511D567M025DG4D	12.5	x 20	0.508	0.208	0.616	0.963	0.205
820	511D827M025DK4D	12.5	x 25	0.351	0.140	0.808	1.270	0.140
1200	511D128M025EK4D	16	x 25	0.239	0.110	1.127	1.660	0.105
1800	511D188M025EN4D	16	x 32	0.194	0.080	1.380	2.150	0.080
2200	511D228M025ER4D	16	x 36	0.162	0.064	1.580	2.520	0.074
3300	511D338M025FR4D	18	x 36	0.150	0.060	1.770	2.810	0.064
35 VOLTS DC WORKING; 44 VOLTS DC SURGE								
33	511D336M035AA4D	6	x 11	6.777	3.600	0.084	0.115	3.500
68	511D686M035BB4D	8	x 12	3.260	1.400	0.149	0.228	1.400
120	511D127M035CC4D	10	x 13	1.830	1.010	0.239	0.323	0.980



STANDARD RATINGS

μF	Catalog Number	Nominal Case Size (mm)		Max. ESR @ +25°C (Ω)		Max. Ripple Current @ +85°C (A)		Max. Impedance @ +25°C (Ω)
		D	x L	120Hz	20k-40kHz	120Hz	20k-40kHz	100kHz
35 VOLTS DC WORKING; 44 VOLTS DC SURGE (Cont.)								
220	511D227M035CD4D	10	x 16	1.016	0.460	0.344	0.512	0.470
330	511D337M035CG4D	10	x 20	0.677	0.305	0.468	0.697	0.310
390	511D397M035DG4D	12.5	x 20	0.554	0.210	0.590	0.959	0.220
680	511D687M035DK4D	12.5	x 25	0.326	0.150	0.838	1.236	0.157
1000	511D108M035EK4D	16	x 25	0.223	0.110	1.170	1.660	0.112
1500	511D158M035EN4D	16	x 32	0.165	0.078	1.490	2.180	0.078
1800	511D188M035ER4D	16	x 32	0.132	0.060	1.760	2.610	0.062
2200	511D228M035FR4D	18	x 36	0.121	0.060	1.980	2.810	0.062
50 VOLTS DC WORKING; 63 VOLTS DC SURGE								
22	511D226M050AA4D	6	x 11	7.330	3.750	0.081	0.113	3.410
47	511D476M050BB4D	8	x 12	3.884	1.510	0.137	0.221	1.450
82	511D826M050CC4D	10	x 13	1.940	1.050	0.232	0.315	1.010
120	511D127M050CD4D	10	x 16	1.320	0.466	0.302	0.509	0.488
180	511D187M050CG4D	10	x 20	0.881	0.311	0.411	0.691	0.321
270	511D277M050DG4D	12.5	x 20	0.601	0.221	0.567	0.937	0.231
390	511D397M050DK4D	12.5	x 25	0.401	0.181	0.756	1.130	0.175
560	511D567M050EK4D	16	x 25	0.281	0.121	1.040	1.590	0.121
820	511D827M050EN4D	16	x 32	0.194	0.083	1.380	2.110	0.083
1000	511D108M050ER4D	16	x 36	0.161	0.065	1.590	2.510	0.068
1500	511D158M050FR4D	18	x 36	0.153	0.065	1.760	2.710	0.068
63 VOLTS DC WORKING; 79 VOLTS DC SURGE								
12	511D126M063AA4D	6	x 11	12.010	4.010	0.064	0.109	3.810
27	511D276M063BB4D	8	x 12	5.450	1.610	0.116	0.214	1.510
47	511D476M063CC4D	10	x 13	3.076	1.170	0.184	0.299	1.110
82	511D826M063CD4D	10	x 16	1.760	0.501	0.262	0.491	0.511
150	511D157M063CG4D	10	x 20	1.010	0.331	0.385	0.671	0.341
150	511D157M063DG4D	12.5	x 20	1.010	0.250	0.439	0.879	0.255
270	511D277M063DK4D	12.5	x 25	0.345	0.201	0.815	1.070	0.211
470	511D477M063EK4D	16	x 25	0.307	0.125	0.995	1.560	0.125
680	511D687M063EN4D	16	x 32	0.214	0.101	1.320	1.930	0.101
820	511D827M063ER4D	16	x 36	0.176	0.071	1.520	2.410	0.072
1200	511D128M063FR4D	18	x 36	0.165	0.065	1.690	2.710	0.068
100 VOLTS DC WORKING; 125 VOLTS DC SURGE								
4.7	511D475M100AA4D	6	x 11	30.79	4.310	0.041	0.106	4.21
10	511D106M100BB4D	8	x 12	14.63	1.810	0.071	0.202	1.71
18	511D186M100CC4D	10	x 13	8.01	1.250	0.114	0.289	1.25
33	511D336M100CD4D	10	x 16	4.44	0.531	0.165	0.477	0.531
56	511D566M100CG4D	10	x 20	2.55	0.351	0.241	0.651	0.351
56	511D566M100DG4D	12.5	x 20	2.55	0.265	0.276	0.854	0.265
120	511D127M100DK4D	12.5	x 25	1.21	0.215	0.437	1.03	0.215
180	511D187M100EK4D	16	x 25	0.801	0.134	0.616	1.51	0.134
270	511D277M100EN4D	16	x 32	0.545	0.108	0.824	1.85	0.108
330	511D337M100ER4D	16	x 36	0.444	0.076	0.958	2.32	0.078
847	511D477M100FR4D	18	x 36	0.361	0.071	1.15	2.61	0.074
160 VOLTS DC WORKING; 185 VOLTS DC SURGE								
1.8	511D185M160AA4D	6	x 11	88.01	27.010	0.023	0.042	26.010
3.9	511D395M160BB4D	8	x 12	40.01	12.250	0.043	0.077	12.010
6.8	511D685M160CC4D	10	x 13	23.57	7.310	0.067	0.119	7.310
10	511D106M160CD4D	10	x 16	16.09	4.910	0.086	0.157	4.910
15	511D156M160CG4D	10	x 20	11.01	3.610	0.116	0.203	3.610



MINIATURE RADIAL LEAD CAPACITORS

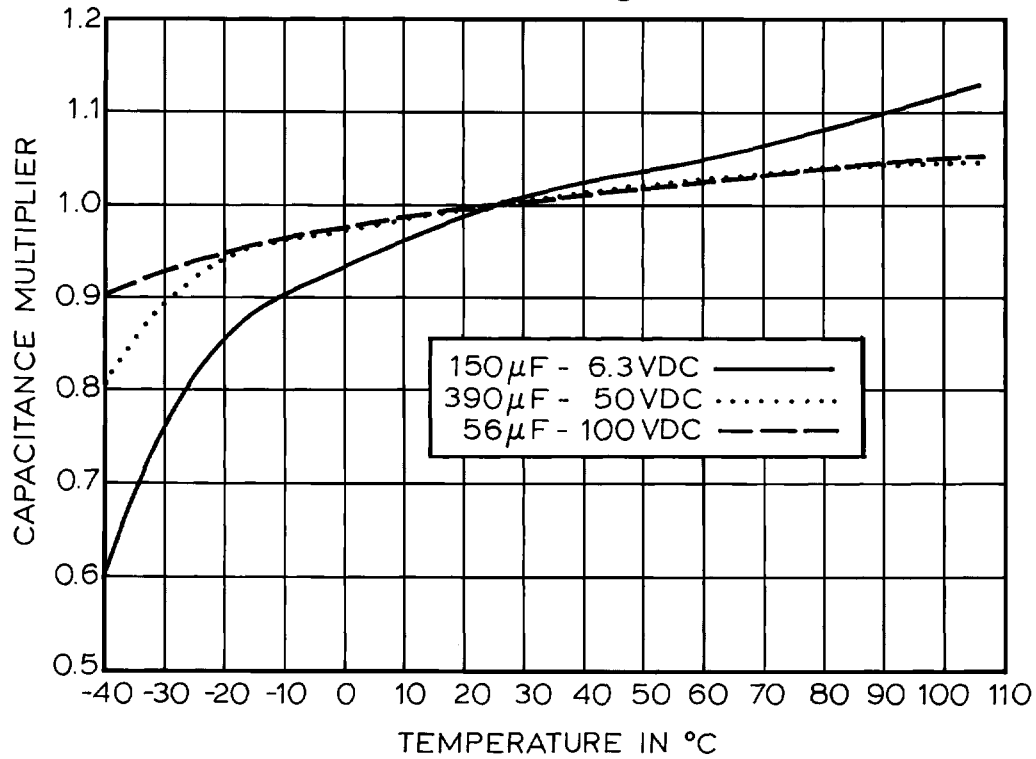
TYPE 511D

STANDARD RATINGS

μF	Catalog Number	Nominal Case Size (mm)		Max. ESR @ +25°C (Ω)		Max. Ripple Current @ +85°C (A)		Max. Impedance @ +25°C (Ω)
		D	L	120Hz	20k-40kHz	120Hz	20k-40kHz	100kHz
160 VOLTS DC WORKING; 185 VOLTS DC SURGE (Cont.)								
22	511D226M160DG4D	12.5	x 20	7.33	3.210	0.162	0.245	3.210
33	511D336M160DK4D	12.5	x 25	4.88	2.250	0.216	0.319	2.250
56	511D566M160EK4D	16	x 25	2.81	1.210	0.329	0.501	1.210
68	511D686M160EN4D	16	x 32	2.35	0.721	0.396	0.717	0.721
100	511D107M160ER4D	16	x 36	1.61	0.531	0.504	0.876	0.531
120	511D127M160FR4D	18	x 36	1.32	0.471	0.598	1.01	0.481
200 VOLTS DC WORKING; 225 VOLTS DC SURGE								
1.5	511D155M200AA4D	6	x 11	110.010	33.110	0.021	0.038	33.010
3.3	511D335M200BB4D	8	x 12	48.810	14.010	0.039	0.072	13.900
5.6	511D565M200CC4D	10	x 13	28.080	8.410	0.061	0.111	8.410
8.2	511D825M200CD4D	10	x 16	19.410	4.910	0.078	0.156	4.910
12	511D126M200CG4D	10	x 20	13.210	3.610	0.106	0.203	3.610
22	511D226M200DG4D	12.5	x 20	7.330	3.210	0.162	0.245	3.210
33	511D336M200DK4D	12.5	x 25	4.880	2.250	0.216	0.319	2.250
47	511D476M200EK4D	16	x 25	3.384	1.210	0.299	0.501	1.210
68	511D686M200EN4D	16	x 32	2.350	0.721	0.396	0.717	0.721
82	511D826M200ER4D	16	x 36	1.940	0.531	0.458	0.876	0.531
120	511D127M200FR4D	18	x 36	1.420	0.481	0.577	0.991	0.491
250 VOLTS DC WORKING; 275 VOLTS DC SURGE								
1.2	511D125M250AA4D	6	x 11	132.010	34.910	0.019	0.037	34.010
2.7	511D275M250AB4D	8	x 12	60.010	15.910	0.035	0.067	15.010
3.9	511D395M250CC4D	10	x 13	40.010	10.610	0.051	0.099	10.010
6.8	511D685M250CD4D	10	x 16	23.570	5.010	0.071	0.155	5.010
10	511D106M250CG4D	10	x 20	16.090	3.760	0.096	0.198	3.760
12	511D126M250DG4D	12.5	x 20	13.200	3.220	0.121	0.245	3.220
18	511D186M250DK4D	12.5	x 25	8.810	2.250	0.161	0.319	2.250
33	511D336M250EK4D	16	x 25	4.880	1.270	0.249	0.489	1.270
47	511D476M250EN4D	16	x 32	3.380	0.721	0.331	0.717	0.721
56	511D566M250ER4D	16	x 32	2.080	0.531	0.381	0.867	0.531
82	511D826M250FR4D	18	x 36	1.940	0.491	0.493	0.983	0.501

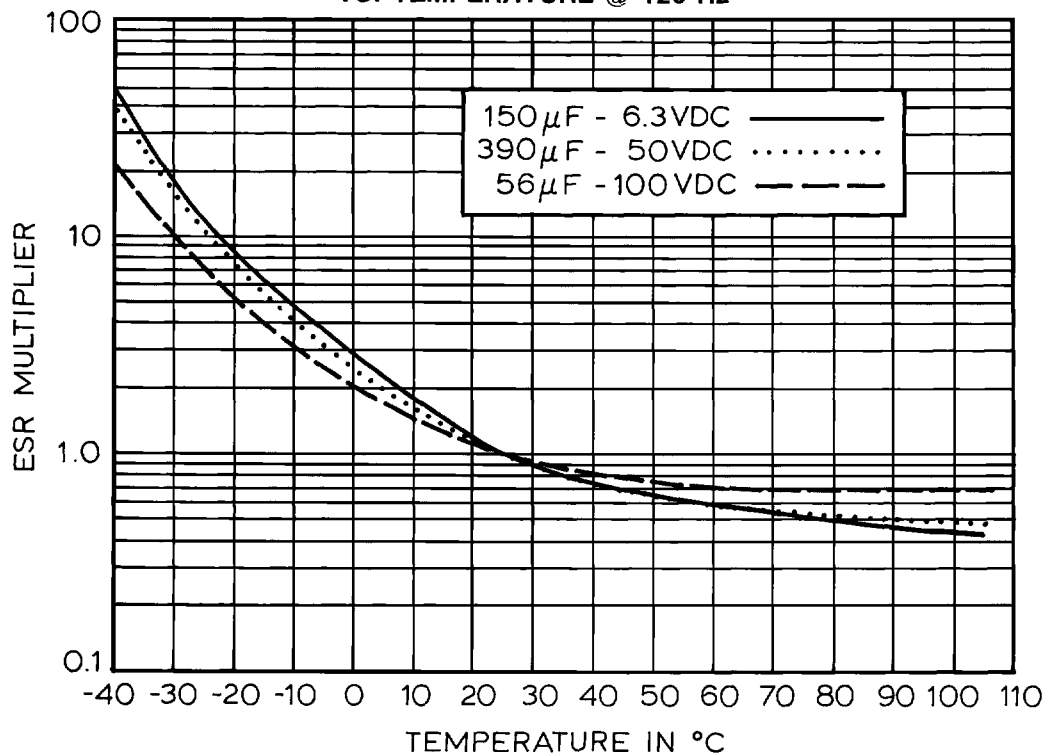
TYPICAL CURVES

**TYPE 511D — TYPICAL CAPACITANCE MULTIPLIER
VS. TEMPERATURE @ 120 Hz**



Dwg. No. A-14,779

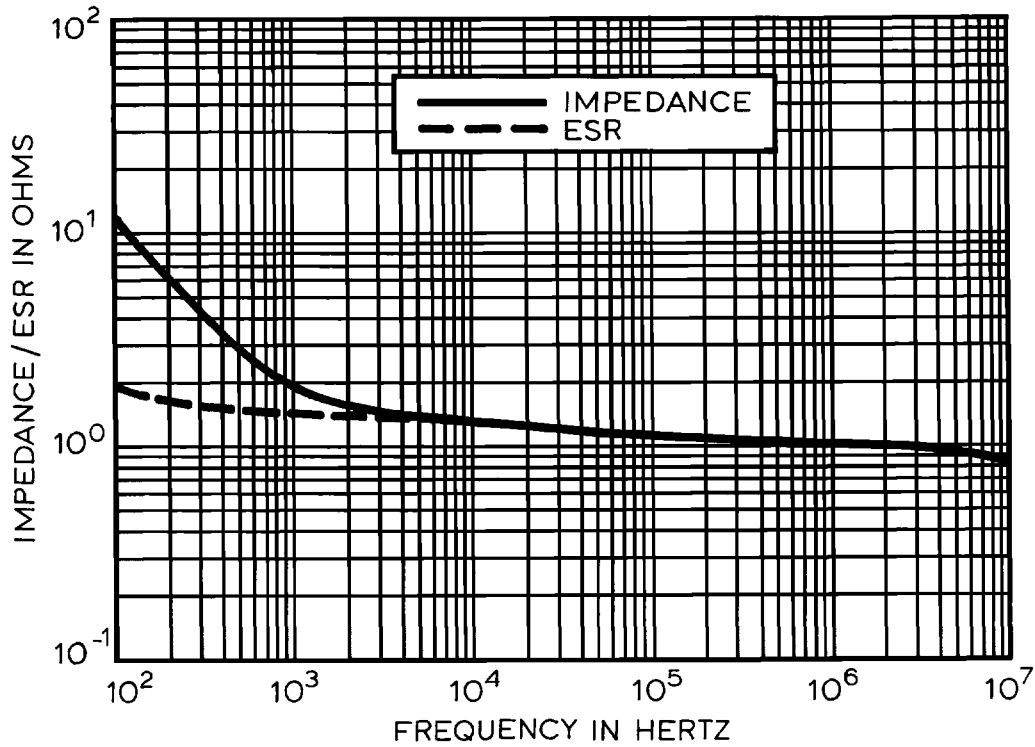
**TYPE 511D — TYPICAL ESR MULTIPLIER
VS. TEMPERATURE @ 120 Hz**



Dwg. No. A-14,778

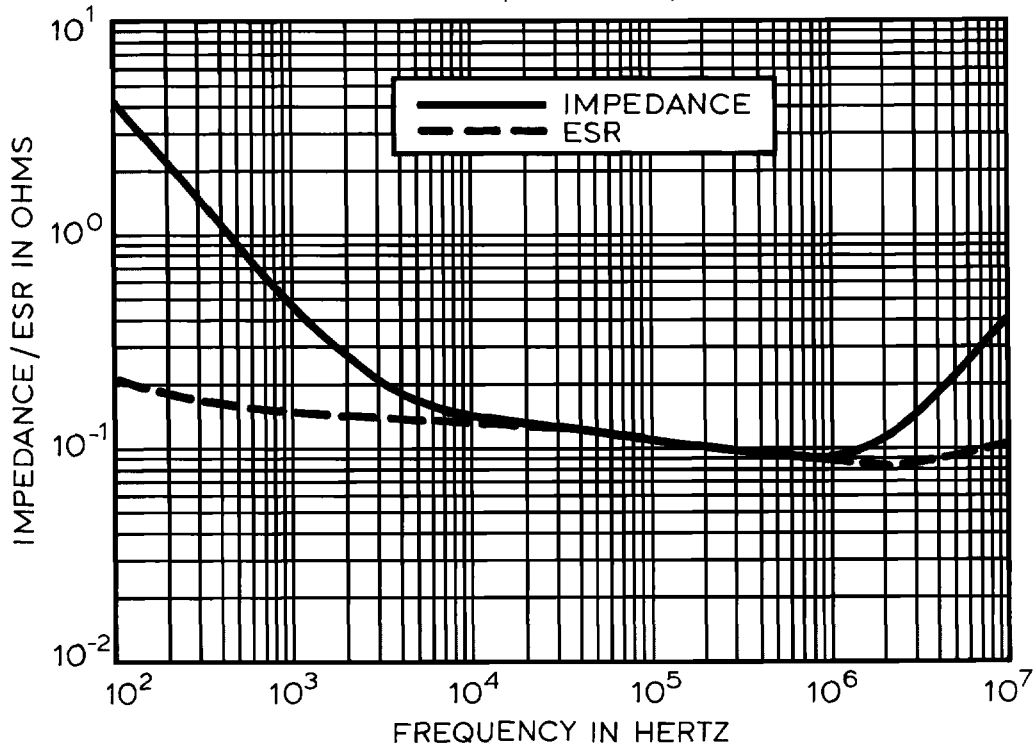
TYPICAL CURVES @ +25°C

TYPE 511D — 150 μ F @ 6.3VDC, AA CASE SIZE



Dwg. No. A-14,739

TYPE 511D — 390 μ F @ 50VDC, DK CASE SIZE

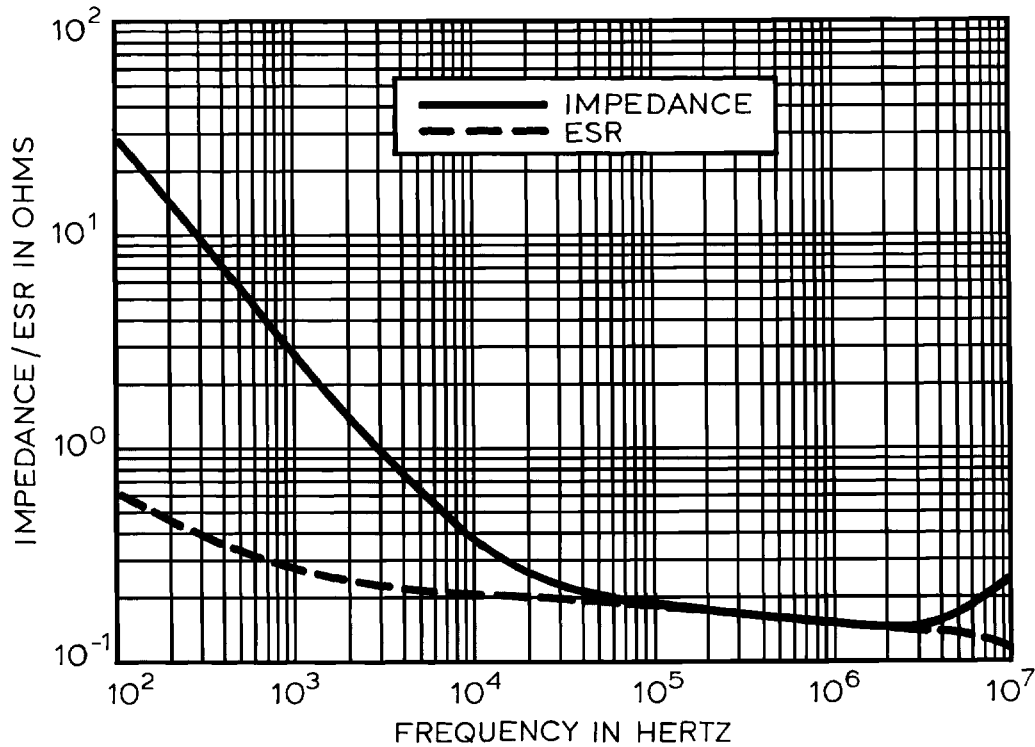


Dwg. No. A-14,737



TYPICAL CURVES @ +25°C

TYPE 511D — 56μF @ 100VDC, CG CASE SIZE



Dwg. No. A-14,738