

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWING, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONFERRING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

1006755

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
H	REPLACES REV G WITH CHANGES PER TDRR 0316F	9/7/63	OK
J	REVISED PER TDRR 03705	8/28/63	WIK
K	REVISED PER TDRR 06011	2/4/64	WIK
L	REVISED PER TDRR 13664	9/20/64	WIK

REQUIREMENTS:

1. GENERAL:

- A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
 - B. THESE CAPACITORS SHALL CONFORM TO THE REQUIREMENTS OF MIL-C-26655 /2B FOR STYLE CS-13, WITH THE EXCEPTIONS AND ADDITIONS SPECIFIED IN THIS DRAWING.
 - C. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS IN ND 1015404, CLASS 2. PERIODIC INSPECTIONS MAY BE SATISFIED BY THE SUBMISSION AND ACCEPTANCE OF CERTIFIED TEST DATA FOR PURCHASED PRODUCTION LOTS.
 - D. CAPACITORS SHALL BE PACKAGED IN ACCORDANCE WITH SUPPLIERS NORMAL COMMERCIAL PRACTICE PER LEVEL C AS DEFINED IN MIL-C-26655.
2. INSPECTION AND ACCEPTANCE:
- A. MECHANICAL DIMENSIONS AND TOLERANCES PER DRAWING.
 - B. LEAD MATERIAL SHALL BE NICKEL IN ACCORDANCE WITH ND PS 1015400. A CERTIFICATE OF COMPLIANCE SHALL ACCOMPANY EACH SHIPMENT.
 - C. EACH CAPACITOR SHALL BE PERMANENTLY AND LEGIBLY MARKED WITH THE MANUFACTURERS NAME AND/OR SYMBOL, TYPE NUMBER, CAPACITANCE VALUE AND TOLERANCE, VOLTAGE RATING AND POLARITY. EACH UNIT PACKAGE AND SHIPPING CONTAINER SHALL ALSO INCLUDE THE NASA DRAWING NUMBER, DASH NUMBER AND REVISION LETTER. PER MIL-STD-129.
 - D. ALL PARTS SHALL BE SERIALIZED. COPIES OF ALL TEST DATA AND X-RAY NEGATIVES SHALL BE FORWARDED WITH PARTS. PARTS WHICH HAVE FAILED NEED NOT BE FORWARDED.
 - E. ELECTRICAL REQUIREMENTS: @ 25°C
 - (1) CAPACITANCE VALUE PER TABLE
 - (2) DISSIPATION FACTOR 6% MAXIMUM FOR VOLTAGE OF 15 VDC OR LESS. 4% MAXIMUM FOR ALL OTHER VOLTAGE RATINGS.
 - F. UNITS SHALL BE SUPPLIED FROM A PRODUCT LINE WHICH IS CONTINUOUSLY MONITORED FOR AND EXHIBITS A FAILURE RATE OF LESS THAN 0.15% PER THOUSAND HOURS AT A 60% CONFIDENCE LEVEL WHEN PLACED ON LIFE TEST UNDER THE FOLLOWING CONDITIONS:

- (1) TEMPERATURE: 85°C
- (2) VOLTAGE: FULL RATED VOLTAGE
- (3) SERIES RESISTANCE (EXTERNAL): 10 OHMS, 1/10 WATT, FUSIBLE
- (4) POWER SUPPLY: 25 AMPERES FOR 1 MINUTE CAPABILITY.

FAILURE RATE DATA FROM A PRODUCT LINE WHOSE ONLY DIFFERENCES ARE:

- (1) THE TYPE OF INSULATION SLEEVING OR (2) LEAD MATERIAL WILL BE ACCEPTABLE FOR THIS REQUIREMENT. A CERTIFICATE OF COMPLIANCE WITH THE FAILURE RATE REQUIREMENTS DERIVED FROM THE MOST CURRENT TEST DATA OF THE PRODUCT LINE SHALL ACCOMPANY EACH SHIPMENT.

3. DESIGN REQUIREMENTS:

- A. UNITS SHALL BE CAPABLE OF MEETING THE REQUIREMENTS OF MIL-C-26655. FOR CONSTRUCTION AND ENVIRONMENT.
- B. OPERATING TEMPERATURE RANGE: -55°C TO +85°C AT FULL RATED VOLTAGE; DERATED TO 2/3 RATED VOLTAGE AT +125°C.
- C. SURGE VOLTAGE: 130% OF RATED VOLTAGE.
- D. STABILITY AT HIGH AND LOW TEMPERATURE: CAPACITANCE SHALL CHANGE FROM 25°C VALUE BY NO MORE THAN -15% AT -55°C AND BY NO MORE THAN +15% AT +85°C.
- E. LEAD BEND AND PULL TEST (DESTRUCTIVE):
 - (1) LEADS SHALL WITHSTAND A 4 POUND AXIAL PULL MINIMUM WITHOUT IMPAIRMENT OF PERFORMANCE.
 - (2) LEADS SHALL WITHSTAND THE BEND TEST AS SPECIFIED IN MIL-C-26655 EXCEPT THE WEIGHT SHALL BE 2 POUNDS.

PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND 1002034 FOR THIS DRAWING.

4. SPECIAL CONDITIONING BY SUPPLIER: (100%)

- A. ALL UNITS SHALL BE X-RAYED PER MIL-STD-202, METHOD 209, PERPENDICULAR TO THE MAJOR AXIS OF THE CAPACITOR. ALL X-RAYS SHALL BE INSPECTED FOR LOOSE SOLDER PARTICLES, INADEQUATE ANODE ANCHORAGE, OR POOR ALIGNMENT.
- B. BURN-IN: EACH UNIT SHALL BE CONNECTED IN SERIES WITH A 3 OHM RESISTOR AND A ONE AMP FUSE. UNITS SHALL BE TESTED AT RATED VOLTAGE AT +125°C FOR A MINIMUM OF 250 HOURS. ALL UNITS WHICH HAVE A BLOWN FUSE OR WHICH ARE OUTSIDE OF ALLOWABLE TOLERANCE FOR CAPACITANCE, DISSIPATION FACTOR, OR LEAKAGE CURRENT WHEN TESTED AT 25°C ON COMPLETION OF BURN-IN SHALL BE DISCARDED. TEST READINGS FOR EACH CAPACITOR TAKEN BEFORE AND AFTER BURN-IN FOR CAPACITANCE, DISSIPATION FACTOR AND LEAKAGE CURRENT SHALL BE SUBMITTED WITH EACH LOT.
- C. EQUIVALENT SERIES RESISTANCE AT 25°C: UNITS SPECIFIED IN TABLE III SHALL BE SCREENED FOR MAXIMUM ESR BY PLACING UNITS IN TEST CIRCUIT AND CALCULATING ESR BY THE FORMULA:

$$ESR = \frac{\left[\frac{E_{C1} R_1}{E_{R1}} \right] \left[\frac{E_{R1}^2 + E_{C1}^2 - E_A^2}{2 E_{R1} E_{C1}} \right]}$$

WHERE
 E_{C1} = AC COMPONENT ACROSS C_1 (RMS)
 E_{R1} = AC COMPONENT ACROSS R_1 (RMS)
 E_A = AC VOLTAGE APPLIED (RMS)
 R_1 = VALUE FROM TABLE I

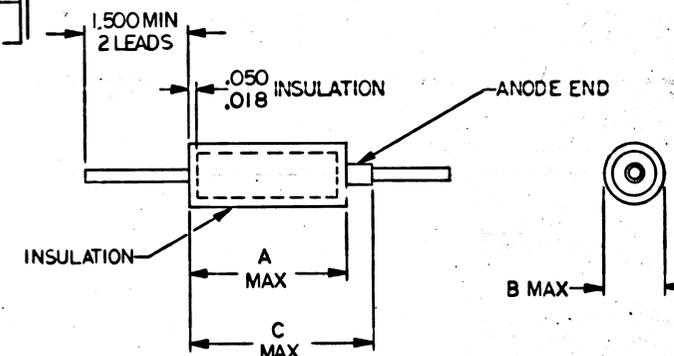


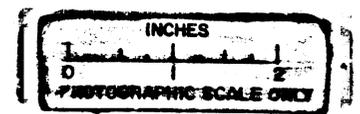
TABLE I

CASE SIZE	NOMINAL LEAD SIZE	DIMENSIONS		
		A	B	C
A	NO. 24 AWG	.384	.151	.422
B	(.020 DIA)	.572	.201	.610
C	NO. 22 AWG	.784	.305	.822
D	(.025 DIA)	.884	.367	.922

Ⓜ REPLACES REV G WITH CHANGES

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES ± ± ±
DO NOT SCALE THIS DRAWING MATERIAL SEE NOTES
HEAT TREATMENT
FINAL FINISH
NEXT ASSY USED ON APPLICATION

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			
MIT INSTRUMENTATION LAB CAMBRIDGE, MASS.		MANNED SPACECRAFT CENTER HOUSTON, TEXAS	
DRAWN <i>R. Kane</i> DATE <i>12/27/63</i>		CAPACITOR FIXED, ELECTROLYTIC, SOLID TANTALUM SPECIFICATION CONTROL DRAWING	
CHECKED <i>[Signature]</i> DATE <i>12/27/63</i>			
APPROVAL <i>[Signature]</i> DATE <i>17 Sept 63</i>		CODE IDENT NO.	NASA DRAWING NO.
NASA APPROVAL <i>[Signature]</i>		C	1006755
MIT APPROVAL <i>[Signature]</i> DATE <i>9/17/63</i>		SCALE NONE	WT SHEET 1 OF 2



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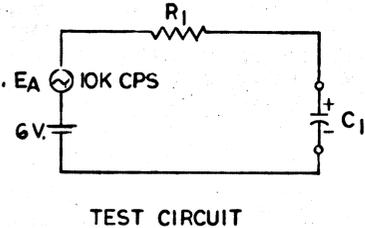
TABLE II

CAP VALUE UF ±10%	RATED CONTINUOUS DC VOLTAGE AT 25°C																	
	6 VDC			10 VDC			15 VDC			20 VDC			35 VDC			50 VDC		
	DASH NO.	I _L	S _C	DASH NO.	I _L	S _C	DASH NO.	I _L	S _C	DASH NO.	I _L	S _C	DASH NO.	I _L	S _C	DASH NO.	I _L	S _C
.0047													- 41	.6	A	- 90	0.1	A
.0056													- 42	.6	A	- 91	0.1	A
.0068													- 43	.6	A	- 92	0.1	A
.0082													- 44	.6	A	- 93	0.1	A
.010													- 45	.6	A	- 94	0.1	A
.012													- 46	.6	A	- 95	0.1	A
.015													- 47	.6	A	- 96	0.1	A
.018													- 48	.6	A	- 97	0.1	A
.022													- 49	.6	A	- 98	0.1	A
.027													- 50	.6	A	- 99	0.1	A
.033													- 51	.6	A	- 100	0.1	A
.039													- 52	.6	A	- 101	0.1	A
.047													- 53	.6	A	- 102	0.1	A
.056													- 54	.6	A	- 103	0.1	A
.068													- 55	.6	A	- 104	0.1	A
.082													- 56	.6	A	- 105	0.1	A
.10													- 57	.6	A	- 106	1.0	A
.12													- 58	.6	A	- 107	1.0	A
.15													- 59	.6	A	- 108	1.0	A
.18													- 60	.6	A	- 109	1.0	A
.22													- 61	.6	A	- 110	1.0	A
.27													- 62	.6	A	- 111	1.0	A
.33													- 63	.6	A	- 112	1.0	A
.39													- 64	.6	A	- 113	1.0	A
.47													- 65	.6	A	- 114	1.0	A
.56													- 66	.6	A	- 115	1.0	A
.68													- 67	.6	A	- 116	2	A
.82													- 68	.6	A	- 117	2	A
1.0													- 69	.6	A	- 118	2	A
1.2									- 26	.6	A	- 70	.6	B	- 119	2	B	
1.5									- 27	.6	A	- 71	.8	B	- 120	2	B	
1.8									- 28	.6	A	- 72	1	B	- 121	2	B	
2.2									- 29	.7	A	- 73	1.2	B	- 122	2	B	
2.7													- 74	1.4	B	- 123	2	B
3.3													- 75	1.7	B	- 124	2	B
3.9													- 76	2	B	- 125	2	B
4.7													- 77	2.5	B	- 126	3	B
5.6	- 1	.6	A										- 78	3	B	- 127	3	C
6.8	- 2	.6	A										- 79	3.5	B	- 128	3	C
8.2													- 80	3.5	C	- 129	3	C
10									- 30	2.5	B	- 81	4	C	- 130	3	C	
12									- 31	3	B	- 82	4	C	- 131	3	C	
15									- 32	3.5	B	- 83	4	C	- 132	6	C	
18									- 33	4	B	- 84	6	C	- 133	6	C	
22									- 20	4	B	- 85	7	C	- 134	6	D	
27									- 21	5	B	- 86	7	D				
33									- 11	4	B	- 87	8	D				
39									- 12	5	B	- 88	10	D				
47	- 3	4	B						- 13	5	B	- 34	5	C	- 89	10	D	
56	- 4	5	B									- 35	6	C				
68									- 22	7	C	- 36	7	C				
82									- 23	9	C	- 37	8.5	D				
100									- 24	9	D	- 38	10	D				
120									- 25	15	D	- 39	12	D				
150	- 5	9	C						- 40	15	D							
180	- 6	11	C															
220																		
270	- 7	16	D															
330	- 8	20	D															

* I_L = MAX LEAKAGE CURRENT AT 25°C IN MICROAMPERES
 ** S_C = CASE SIZE - SEE TABLE I

TABLE III

C ₁	R ₁	ER ₁	ESR, MAX
1006755-134	1Ω ± 1%	1.0 VRMS	0.5Ω
1006755-128	5Ω ± 1%	0.5 VRMS	1.0Ω
1006755-118	15Ω ± 1%	1.5 VRMS	5.0Ω



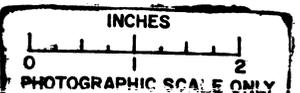
MASTER

REVISIONS

SYM	DESCRIPTION	DATE	APPROVAL
E	REPLACES REV D WITH CHANGES PER TDRR 01161	8/4/63	WJK
F	REVISED PER TDRR 01560	12 Jan 63	P.C.B.
H	REVISED PER TDRR 03168	9/17/63	WJK
J	REVISED PER TDRR 03705	8/26/63	WJK
K	REVISED PER TDRR 06011	2/4/64	WJK
L	REVISED PER TDRR 13664	4/26/64	WJK

ⓔ REPLACES REV D WITH CHANGES

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LIST OF MATERIALS			
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DRAWN C. La Corte AP DATE 2 MAR 63 CHECKED M. Slopas 5 MAR 63		CAPACITOR, FIXED, ELECTROLYTIC, SOLID TANTALUM SPECIFICATION CONTROL DRAWING	
APPROVAL <i>Elden C. Hall 10 June 63</i>			
MATERIAL SEE NOTES		NASA APPROVAL <i>Jack B...</i>	CODE IDENT NO. _____
HEAT TREATMENT _____		MIT APPROVAL <i>W. H. ...</i>	SIZE C
FINAL FINISH _____		NASA DRAWING NO. 1006755	
NEXT ASSY	USED ON	SCALE NONE	WT _____
APPLICATION		SHEET 2 OF 2	



1006755