

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 FOR ANY OMISSIONS, ERRORS, OR DEFICIENCIES, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED SAID DRAWINGS, 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 THEREBY.

B 1006712

REVISIONS 03038			
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 03038	12/2/63	WLR
A	REVISED PER TDRR 06243	1-18-64	WLR
B	REVISED PER TDRR 08861	6/2/64	WLR

NOTES:

- GENERAL REQUIREMENTS:
  - INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
  - SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS CONTAINED IN ND 1015404, CLASS 2.
  - UNITS SHALL BE CAPABLE OF MEETING THE QUALIFICATION REQUIREMENTS AS LISTED IN TABLE III WITH REFERENCES TO MIL-T-23648 AND ND 1002057. ANY UNIT WILL BE CONSIDERED A FAILURE IF ITS

ZERO-POWER RESISTANCE CHANGES BY MORE THAN 0.5% AS A RESULT OF HAVING BEEN SUBJECTED TO ANY OF THE ENVIRONMENTAL TESTS SPECIFIED QUALIFICATION REQUIREMENTS

- MARKING: UNIT PACKAGES SHALL BE PERMANENTLY AND LEGIBLY MARKED, PER MIL-STD-129, WITH THE MANUFACTURER'S NAME AND/OR SYMBOL, LOT CODE OR SERIAL NUMBER, DATE OF MANUFACTURE, AND THE NASA PART NUMBER (DRAWING NUMBER, REVISION LETTER, AND DASH NUMBER).

2. ACCEPTANCE AND INSPECTION REQUIREMENTS (100%)

- MECHANICAL REQUIREMENTS:
  - LEAD MATERIAL: NICKEL (GRADE A) PER ND PS 1015400.
  - PROTECTIVE VARNISH: MOISTURE AND FUNGUS PROOF VARNISH PER MIL-V-173.
  - MATERIAL AND FINISH CERTIFICATION: LEAD MATERIAL AND RESISTOR MOISTURE PROOF VARNISH COMPLIANCE SHALL BE CERTIFIED WITH EACH SHIPMENT.
- ELECTRICAL CHARACTERISTICS (AT 25° ± 0.1°C):
  - ZERO-POWER RESISTANCE VALUE: TABLE I VALUE ± 1%.
  - RESISTANCE-TEMPERATURE CHARACTERISTIC:  $R_T = R_K = R_{298} \cdot e^{\beta(\frac{1}{T} - \frac{1}{298})}$

NOTE: BETA VALUES ARE BASED ON READINGS TAKEN AT +25° & +50°C.

3. DESIGN REQUIREMENTS:

- DISSIPATION CONSTANT: SEE TABLE I FOR THE AMOUNT OF POWER WHICH WILL RAISE THE THERMISTOR ONE DEGREE CENTIGRADE ABOVE AMBIENT.
- TIME CONSTANT: SEE TABLE I FOR THE TIME REQUIRED FOR THE THERMISTOR TO REACH 63% OF THE TEMPERATURE CHANGE FOR A CERTAIN CHANGE IN AMBIENT TEMPERATURE. THE THERMISTOR WILL REACH 98% OF TEMPERATURE CHANGE IN APPROX 5 TIMES THE CONSTANT LISTED.
- STORAGE LIFE: 1 YEAR MINIMUM AT ROOM TEMPERATURE AND HUMIDITY WHEN STORED IN UNOPENED CONTAINERS.
- CONSTRUCTION: RESISTIVE WAFER MATERIAL WITH LEADS SOLDERED IN PLACE.
- ENVIRONMENTAL: CAPABLE OF OPERATION OVER THE AMBIENT TEMPERATURE RANGE OF -55°C TO +105°C.

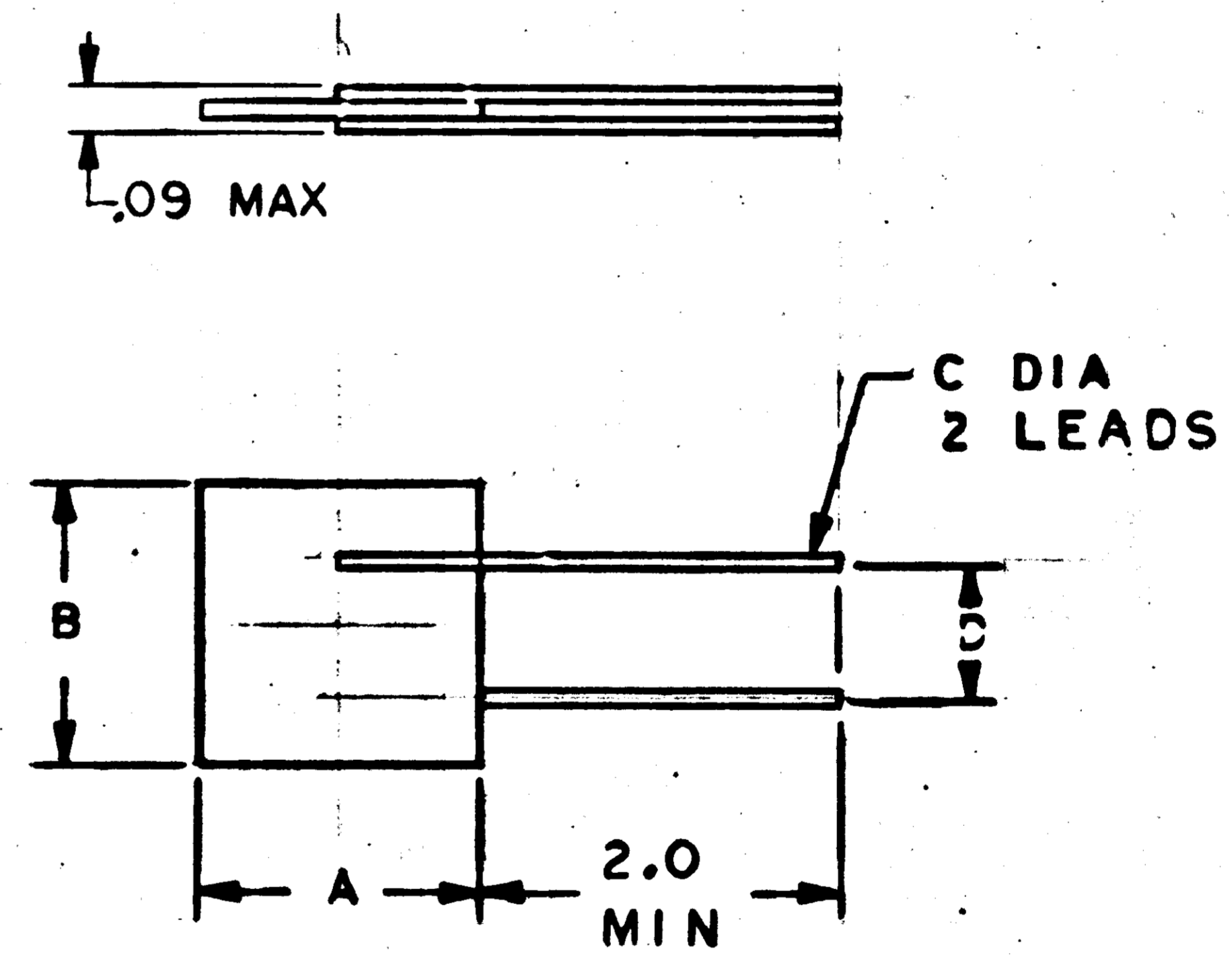
4. SPECIAL CONDITIONING:

- TEMPERATURE CYCLING: RESISTORS SHALL BE TESTED PER MIL-STD-202, METHOD 102, CONDITION C EXCEPT TEMPERATURE EXTREMES OF -55°C AND +105°C. RESISTANCE, ONE HOUR AFTER TESTING, SHALL NOT VARY MORE THAN ± 1% FROM THE INITIAL MEASUREMENT. THERE SHALL BE NO MECHANICAL DAMAGE.
- BURN-IN: RESISTORS SHALL BE BURNED IN NON-OPERATING AT 50°C FOR 100 HOURS. RESISTANCE, ONE HOUR AFTER TESTING SHALL NOT VARY MORE THAN ± 1% FROM THE INITIAL MEASUREMENT. THERE SHALL BE NO MECHANICAL DAMAGE.

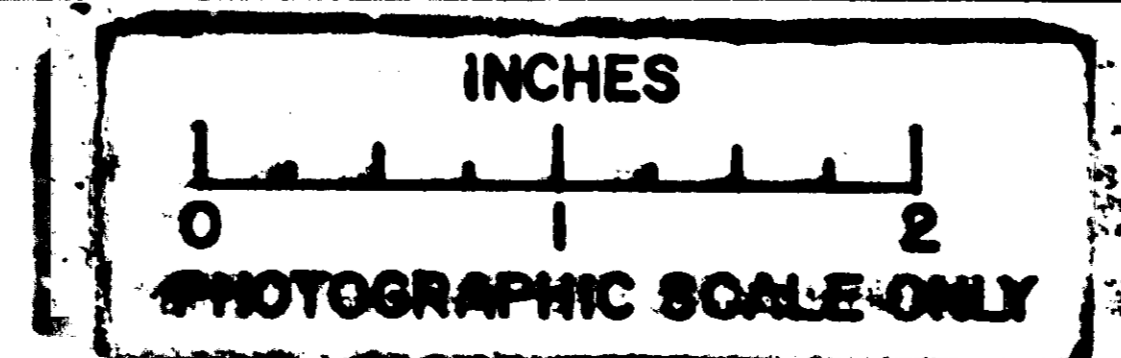
PROCURE ONLY FROM APPROVED SOURCES LISTED IN ND 1002034 FOR THIS DRAWING.

SPECIAL CONDITIONING (CONT'D)

- FOLLOWING BURN-IN. THE ZERO-POWER RESISTANCE OF EACH UNIT SHALL BE MEASURED AT THREE(3) TEMPERATURES; 0° ± 0.1°C, 25° ± 0.1°C, AND 50° ± 0.1°C. THE RESISTANCE MEASURED AT THESE TEMPERATURES SHALL BE SUPPLIED FOR EACH UNIT. A CERTIFICATE OF COMPLIANCE TO THE REQUIREMENTS OF PARA. 4A AND 4B ABOVE SHALL ALSO BE SUPPLIED WITH EACH LOT SHIPPED.



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>Ray Wheeler</i> DATE: <i>Aug 63</i>		RESISTOR, TEMPERATURE SENSITIVE, WAFER	
CHECKED: <i>J. Ruggan</i> DATE: <i>10/1/63</i>		SPECIFICATION CONTROL DRAWING	
APPROVAL: <i>Aug 12 1963</i>		CODE IDENT NO.	NASA DRAWING NO.
APPROVAL: <i>Edwin C. Hall 9/24/63</i>		—	1006712
NASA APPROVAL: <i>9/1/63</i>		SIZE	—
MIT APPROVAL: <i>W. Ruggan 10/1/63</i>		C	—
NEXT ASSY		SCALE NONE	WT
USED ON		SHEET 1 OF 2	
APPLICATION			





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 AND NO OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWING, SPECIFICATION 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 THEREBY.

B 1006712

REVISIONS 03038			
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 03038	10/26/63	WKL
A	REVISED PER TDRR 06243	2-18-64	WKL
B	REVISED PER TDRR 08861	10/2/64	WKL

TABLE I

DASH NO.	NOMINAL ZERO-POWER RESISTANCE OHMS	RESISTANCE -TEMPERATURE CHARACTERISTIC TC/°C NOTE 2.8(2)	DISSIPATION CONSTANT MW/°C MIN	TIME CONSTANT SECONDS MIN	DIMENSIONS			
					A	B	C	D NOM
-1	500	CURVE D	2.25	5.25	.19 .11	.19 .11	.021 .019	.10
-2	1000	CURVE D	1.95	3.75	.13 .07	.13 .07	.021 .019	.10
-3	5000	CURVE F	3.225	8.95	.28 .18	.28 .18	.021 .019	.20

TABLE II

NOMINAL RATIO R <sub>T</sub> /R <sub>25°C</sub>			
TEMP °C	CURVE "D" β = 3900 ± 55		CURVE "F" β = 4320 ± 80
-60	145.2		330.3
-50	68.8		131.6
-40	34.28		56.82
-30	17.92		26.31
-20	9.792		13.20
-10	5.560		6.880
0	3.274		3.93
+10	1.992		2.159
+20	1.250		1.275
+25	1.000		1.000
+30	.8053		.7890
+40	.5316		.5000
+50	.3595		.3260
+60	.2482		.2190
+70	.1747		.1500
+80	.1252		.1050
+90	.0912		.0753
+100	.0675		.0545
+110	.0507		.0407

TABLE III

EXAMINATION OR TEST	REQUIREMENT PARAGRAPHS
GENERAL QUALIFICATION REQUIREMENTS	PARA. 3.2 THROUGH 3.9.2 OF ND - 1002057
GROUP I (ALL SAMPLES) VISUAL & MECHANICAL ZERO-POWER RESISTANCE	PARA 4.2.1 OF ND -1002057 PARA 4.5.2 OF MIL-T-23648 EXCEPT MEASURE AT +25 & +50°C
DISSIPATION CONSTANT THERMAL TIME CONSTANT MAXIMUM POWER RATING	PARA 4.5.4 OF MIL-T-23648 PARA 4.5.5 OF MIL-T-23648 PARA 3.3.7 OF MIL-T-23648 EXCEPT MEASURE POWER THAT PRODUCES TEMPERATURE RISE OF +80°C
GROUP II (1/3 OF SAMPLES) RESISTANCE - TEMPERATURE CHARACTERISTICS TEMPERATURE CYCLING THERMAL STABILITY LOW TEMPERATURE STORAGE	PARA 4.5.11 OF MIL-T-23648 EXCEPT SEQUENCE 7 WILL BE 105°C AND SEQUENCE 8 WILL NOT BE USED. PARA 4.5.8 OF MIL-T-23648 PARA 4.5.6 OF MIL-T-23648 EXCEPT TEMPERATURE IN PARA 4.5.6.2 WILL BE +105 ± 2°C PARA 4.5.7 OF MIL-T-23648 EXCEPT LOW TEMPERATURE WILL BE -55 ± 3°C
TERMINAL STRENGTH	PARA 4.5.10 OF MIL-T-23648
GROUP III (1/3 OF SAMPLES) VIBRATION SHOCK MOISTURE RESISTANCE	PARA 4.2.11 OF ND 1002057 (SEE NOTE 1) PARA 4.2.12 OF ND 1002057 (SEE NOTE 1) PARA 4.5.13 OF MIL-T-23648 (SEE NOTE 2)
GROUP IV (1/3 OF SAMPLES) LOAD LIFE	PARA 4.5.15 OF MIL-T-23648 EXCEPT INITIAL RESISTANCE MAY BE MEASURED PRIOR TO START OF LIFE. MAX OPERATING TEMPERATURE IS +105°C
LEAD COMPOSITION	PARA 4.2.16 OF ND 1002057

NOTE 1

THE AMOUNT OF POWER TO BE APPLIED WILL BE THAT NECESSARY TO RAISE THE THERMISTOR TEMPERATURE TO APPROX. +65°C UNDER NORMAL FREE AIR CONDITIONS. ZERO-POWER RESISTANCE WILL BE MEASURED BEFORE AND AFTER TEST PER PARA. 4.5.2. OF MIL-T-23648.

NOTE 2

INDICATED STEPS (a), (d), AND (f) REPLACED BY (1), (4), AND (7) RESPECTIVELY.

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>Ray M. ...</i> CHECKED <i>S. ...</i> APPROVAL <i>A. Y. ...</i>		RESISTOR, TEMPERATURE SENSITIVE, WAFER SPECIFICATION CONTROL DRAWING	
HEAT TREATMENT FINAL FINISH		NASA APPROVAL <i>...</i>	NASA DRAWING NO. <b>1006712</b>
NEXT ASSY USED ON APPLICATION		CODE IDENT NO. SIZE <b>C</b>	SHEET 2 OF 2
		SCALE NONE	WT

