

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 OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE 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 CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL, ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

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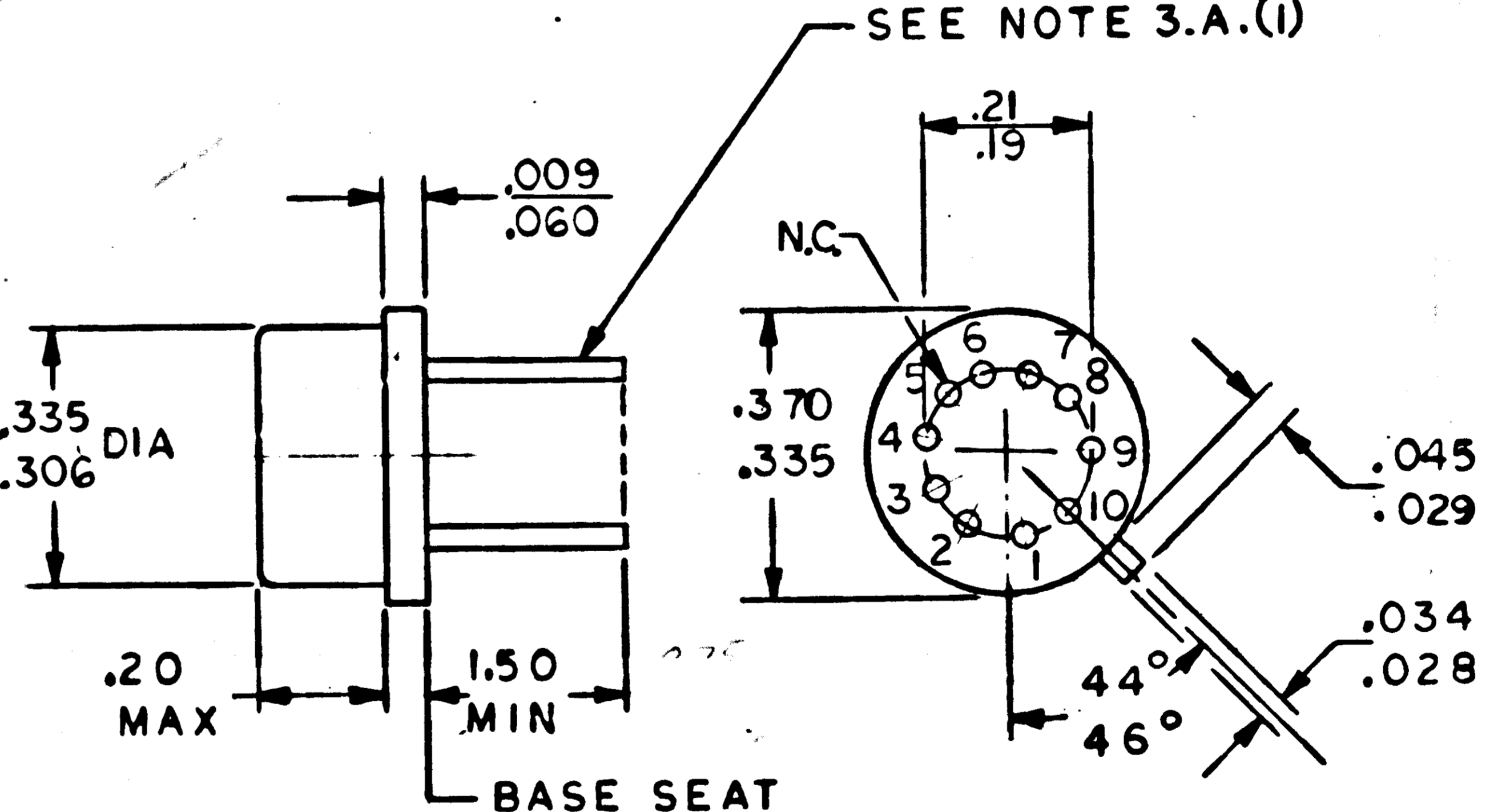
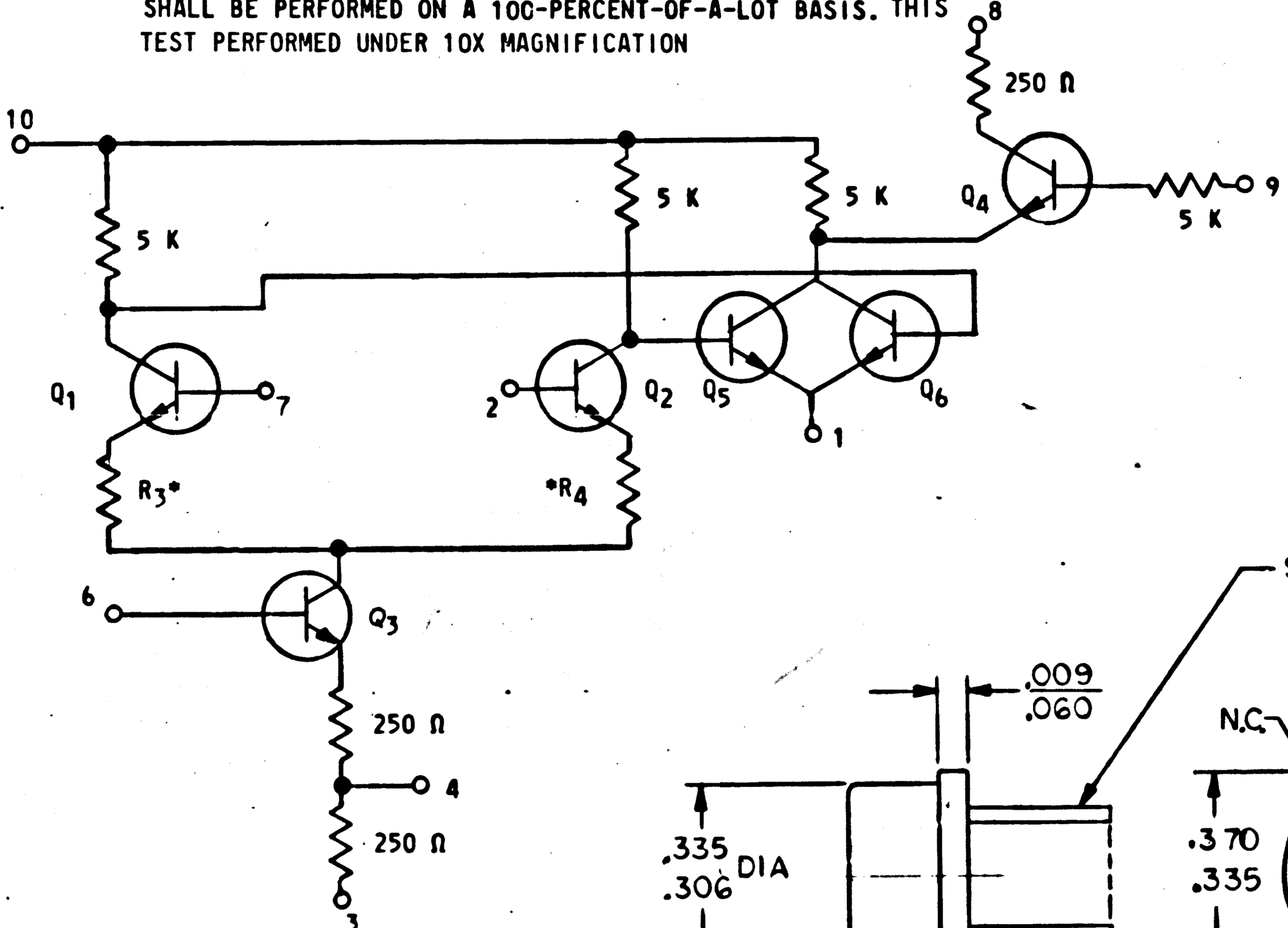
REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
H	REPLACES REV G WITH CHANGES AND UPGRADED TO CLASS A RELEASE PER TDRR 02823	8/28/63	JW
J	REVISED PER TDRR 10117	6/14/62	SW
K	REVISED PER TDRR 11331	8/14/63	WK
L	REVISED PER TDRR 13428	11/20/64	com
REPLACED WITH CHANGE BY REV M PER TDRR 30660		26 SEP 66	B. PF

REQUIREMENTS:

1. GENERAL:
  - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
  - B. UNITS SHALL MEET THE REQUIREMENTS OF MIL-S-19500 WITH THE MODIFICATIONS AND ADDITIONS SPECIFIED HEREIN.
  - C. THE SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN ND 1015404, CLASS 2.
  - D. UNITS SHALL BE CAPABLE OF MEETING THE QUALIFICATION REQUIREMENTS AS CONTAINED IN ND 1002048 UNLESS MODIFIED OR AMENDED BY SECTION 2 OF THIS DRAWING.
  - E. PACKAGING AND PACKING: UNIT PACKAGING AND PACKING SHALL BE IN ACCORDANCE WITH MIL-S-19491, LEVEL A IN BOTH INSTANCES.

- (4) (3) SEAL TEST: THE UNITS SHALL BE SUBJECTED TO A HELIUM OR RADIFLO LEAK DETECTION TEST WITH A SENSITIVITY OF AT LEAST  $1 \times 10^{-6}$  CUBIC CENTIMETERS PER ATMOSPHERE PER SECOND. A LEAKAGE RATE OF THIS VALUE OR GREATER SHALL CONSTITUTE A FAILURE. THIS TEST SHALL BE PERFORMED ON A 100-PERCENT-OF-A-LOT BASIS.
- (4) (4) VISUAL AND MECHANICAL EXAMINATION: MARKING SHALL BE LEGIBLE, THE CASE FINISH SHALL HAVE NO PITS, FLAKING OR CHIPPING, LEADS SHALL BE FREE FROM KINKS AND NICKS AND SHALL COMPLY WITH THE SPECIFIED LEAD MATERIAL REQUIREMENT. GLASS IN HEADER SHALL HAVE NO CRACKS, CHIPS OR BUBBLES. THIS TEST SHALL BE PERFORMED ON A 100-PERCENT-OF-A-LOT BASIS. THIS TEST PERFORMED UNDER 10X MAGNIFICATION

2. ACCEPTANCE AND INSPECTION:
  - A. LOT: A LOT IS DEFINED AS A GROUP OF PARTS IN A SINGLE PROCUREMENT SELECTED FROM A SINGLE CONTINUOUS PRODUCTION RUN USING LIKE MATERIALS WHICH ARE CONTROLLED USING A PROCESS WHICH IS THE SAME FROM THE BEGINNING TO THE END OF THE RUN.
  - B. INSPECTION CONDITIONS: UNLESS OTHERWISE SPECIFIED HEREIN ALL INSPECTIONS SHALL BE MADE AT AN AMBIENT TEMPERATURE OF PLUS 25 DEGREES CENTIGRADE PLUS OR MINUS 3 DEGREES CENTIGRADE.
  - C. ELECTRICAL: 100% TESTING
    - (1) UNITS SHALL BE SUBJECTED TO THE ELECTRICAL TESTS SPECIFIED IN ND 1002017.



- D. MECHANICAL: (REFERENCE MIL-STD-750 AS MODIFIED HEREIN)
  - (1) LEAD FATIGUE (DESTRUCTIVE): LEADS SHALL BE CAPABLE OF WITHSTANDING THE FOLLOWING LEAD BEND TEST. THE UNIT SHALL BE HELD IN A VERTICAL POSITION WITH A ONE-POUND WEIGHT SUSPENDED FROM THE LEAD UNDER TEST. TWO CYCLES OF BENDING SHALL BE PERFORMED, A CYCLE CONSISTING OF MOVING THE BODY OF THE UNIT, WHILE IN THE SAME PLANE, 90 DEGREES FROM THE VERTICAL IN ONE DIRECTION, THEN 180 DEGREES IN THE OPPOSITE DIRECTION AND BACK 90 DEGREES TO THE ORIGINAL POSITION. NO MECHANICAL DAMAGE SHALL BE EVIDENCED AFTER THE TEST. A SAMPLE OF 3 UNITS PER LOT SHALL BE TESTED.
  - (2) LEAD TENSION: EACH LEAD SHALL BE CAPABLE OF WITHSTANDING AN AXIAL PULL OF 4 POUNDS MINIMUM FOR 30 SECONDS. NO MECHANICAL DAMAGE SHALL BE EVIDENCED AFTER THE TEST. A SAMPLE OF 3 UNITS PER LOT SHALL BE TESTED.
  - (3) THE ABOVE MECHANICAL TEST TO BE PERFORMED ON ELECTRICAL REJECTS.

(H) REPLACES REV G WITH CHANGES SUPERSEDED

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

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>C. Coon</i> DATE <i>1/24/62</i>		SEMICONDUCTOR DEVICE, INTEGRATED SENSE AMPLIFIER SPECIFICATION CONTROL DRAWING	
CHECKED <i>J. Ruggen</i> DATE <i>1/24/62</i>			
APPROVAL <i>J. Ruggen</i> DATE <i>2/7/62</i>			
MATERIAL SEE NOTES		CODE IDENT NO.	NASA DRAWING NO.
HEAT TREATMENT		C	1006769
FINAL FINISH		SCALE NONE	SHEET 1 OF 2
NEXT ASSY		MIT APPROVAL <i>J. Nagel</i> DATE <i>1/24/62</i>	
USED ON			
APPLICATION			

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REVISIONS					
SYM	DESCRIPTION	DATE	APPROVAL		
H	THIS SHEET ADDED AND UPGRADED TO CLASS A RELEASE PER TDRR 02823	9/28/63	JH		
J	REVISED PER TDRR 10117	6/16/64	ST		
K	REVISED PER TDRR 11331	8/12/64	WH		
L	REVISED PER TDRR 13428	10/24/64	com		

REQUIREMENTS (CONTINUED):

3. DESIGN:

A. MECHANICAL REQUIREMENTS:

- (1) LEAD MATERIAL SHALL BE IRON-NICKEL-COBALT ALLOY (KOVAR) IN ACCORDANCE WITH NASA DOCUMENT PS 1015402 EXCEPT LEAD DIAMETER SHALL BE AS FOLLOWS: THE LEAD DIAMETER IN THE ZONE BETWEEN .050 AND .250 FROM THE BASE SEAT SHALL BE .016 PLUS .003 MINUS .000, IN THE ZONE BETWEEN .250 AND 1.5 FROM THE BASE SEAT SHALL BE .021 MAXIMUM, AND OF THE REMAINDER OF THE LEAD SHALL BE UNCONTROLLED. A CERTIFICATE OF COMPLIANCE WITH THE LEAD MATERIAL REQUIREMENT SHALL ACCOMPANY EACH SHIPMENT.
- (2) MARKING:
  - (a) UNITS SHALL BE MARKED IN ACCORDANCE WITH ND1002019 WITH THE MANUFACTURER'S IDENTIFICATION, DATE CODE, SERIAL NUMBER AND THE NUMBER 769. PLUS THE REVISION LETTER
  - (b) INTERIOR AND EXTERIOR SHIPPING CONTAINERS SHALL BE MARKED IN ACCORDANCE WITH MIL-STD-129 WITH THE MANUFACTURER'S NAME, LOT OR SERIAL NUMBER, DATE OF MANUFACTURE OR CODING AND THE NASA DRAWING NUMBER AND REVISION LETTER. A TAG MARKED WITH THE FOREGOING INFORMATION SHALL BE INCLUDED IN EACH CONTAINER.
- (3) ENCLOSURE: METAL CASE WITH GLASS HEADER, HERMETICALLY SEALED (REFERENCE JEDEC TO-5 CASE).
- (4) SEMICONDUCTOR MATERIAL: SILICON, NPN, DIFFUSED OXIDE PASSIVATED SURFACE.
- (5) INTERCONNECTIONS: THE DIFFUSED TRANSISTORS AND RESISTORS SHALL BE INTERCONNECTED AS SHOWN IN FIGURE 1.

THE TRANSISTORS SHALL BE SEPARATED FROM EACH OTHER AND FROM RESISTORS BY DIFFUSED ISOLATION REGIONS.

B. ELECTRICAL CHARACTERISTICS:

- (1) THE ELECTRICAL CHARACTERISTICS SHALL BE AS SPECIFIED IN SENSE AMPLIFIER ACCEPTANCE TEST PROCEDURE ND 1002017.
- (2) THE EQUIVALENT CIRCUIT IS SHOWN IN FIG. 1. THE RESISTOR VALUES SHALL BE  $\pm 30\%$ . RESISTOR  $R_3$  AND  $R_4$  SHALL BE GREATER THAN 20 OHMS.

C. ABSOLUTE MAXIMUM RATINGS:

- (1) POWER DISSIPATION: 75 MILLIWATTS MAXIMUM WHILE OPERATING IN THE TEST CIRCUIT OF ND 1002017.
- (2) STORAGE TEMPERATURE: MINUS 65 DEGREES CENTIGRADE TO PLUS 200 DEGREES CENTIGRADE.
- (3) OPERATING TEMPERATURE: MINUS 20 DEGREES CENTIGRADE TO PLUS 125 DEGREES CENTIGRADE.
- (4) THERMAL IMPEDANCE, JUNCTION TO CASE: .087 DEGREE CENTIGRADE PER MILLIWATT.
- (5) VOLTAGES: +20 VOLTS BETWEEN PIN 10 AND PIN 3.

4. SPECIAL CONDITIONING:

- A. HIGH TEMPERATURE STORAGE: ALL UNITS SHALL BE STORED FOR 250 HOURS AT 150 DEGREES CENTIGRADE MIN
- B. ALL UNITS SHALL BE SUBJECTED TO, AND MEET THE REQUIREMENTS OF CONSTANT ACCELERATION TESTS (20,000G) PER MIL-STD-750 METHOD 2006.

C. THE MANUFACTURER SHALL RECORD THE CHARACTERISTICS LISTED IN TABLE I PRIOR TO AND FOLLOWING HIGH TEMPERATURE STORAGE:

D. UNITS WHICH FAIL TO MEET ALL INITIAL REQUIREMENTS OR WHICH EXCEED THE SPECIFIED LIMITS FOR PARAMETRIC CHANGES FOLLOWING HIGH TEMPERATURE STORAGE SHALL NOT BE SHIPPED.

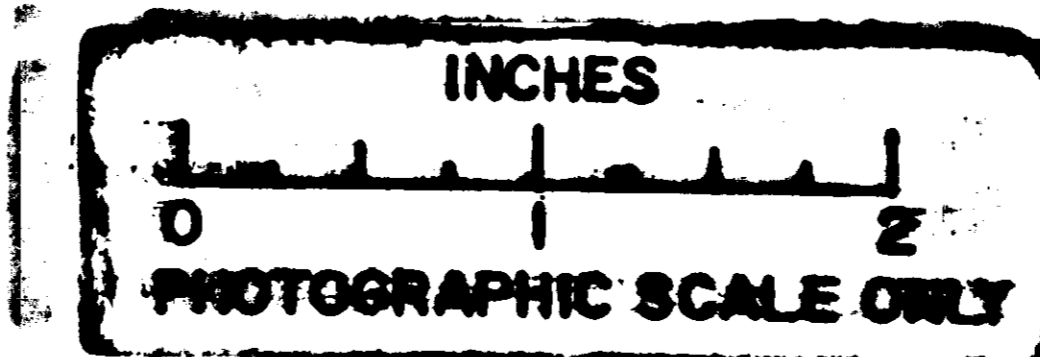
TABLE I  
ELECTRICAL CHARACTERISTICS AS SPECIFIED IN ACCEPTANCE TEST PROCEDURE ND 1002017

SECTION	PARAMETER	CHANGE LIMIT
4.8.1.1	$G_1 = V_{03}$	$\pm 10\%$
4.8.1.2	$G_5 = V_{09}$	$\pm 10\%$
4.8.3	$VR = V_{07-V01}$	$\pm 10\%$

TABLE I: ALLOWABLE PARAMETER CHANGE LIMITS

(H) THIS SHEET ADDED

QTY REQ'D	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			
MIT INSTRUMENTATION LAB CAMBRIDGE, MASS. CONTRACT		MANNED SPACECRAFT CENTER HOUSTON, TEXAS	
DRAWN <i>C. Crisp</i> DATE <i>10/1/63</i>	SEMICONDUCTOR DEVICE, INTEGRATED SENSE AMPLIFIER		
CHECKED <i>J. Ruggan</i> DATE <i>10/1/63</i>	SPECIFICATION CONTROL DRAWING		
APPROVAL <i>E. D. ...</i> DATE <i>27 Aug 63</i>	CODE IDENT NO.	SIZE	NASA DRAWING NO.
APPROVAL <i>E. C. Hall</i> DATE <i>27 Aug 63</i>		C	1006769
HEAT TREATMENT	NASA APPROVAL <i>J. ...</i>	SCALE NONE	WT
FINAL FINISH	MIT APPROVAL <i>J. ...</i>		SHEET 2 OF 2
NEXT ASSY	USED ON		
APPLICATION			



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