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REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
	M	REPLACES REV L WITH CHANGE PER TDRR 30660	26 SEP -66	B. <i>pf</i>

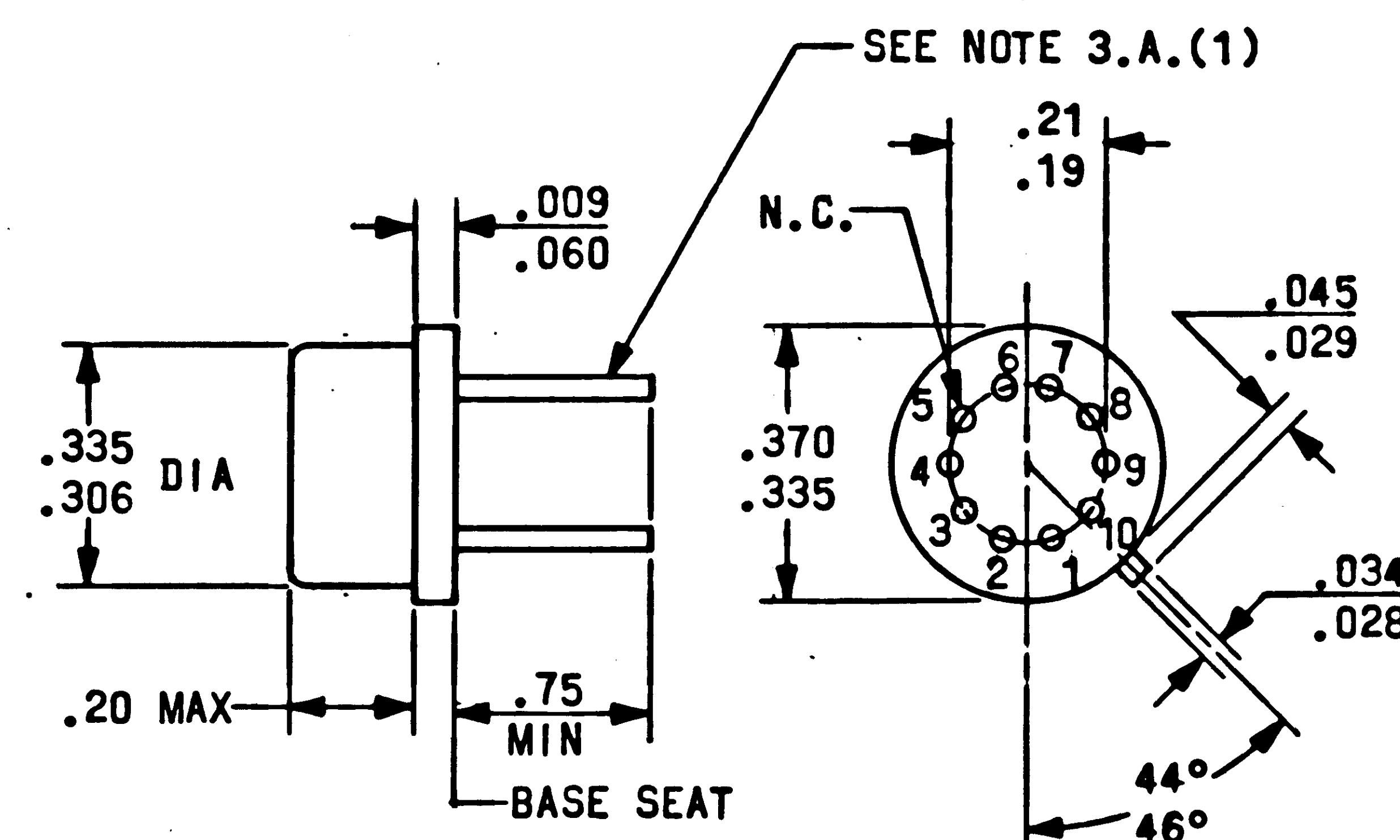
# REQUIREMENTS:

## 1. GENERAL:

- INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
- UNITS SHALL MEET THE REQUIREMENTS OF MIL-S-19500 WITH THE MODIFICATIONS AND ADDITIONS SPECIFIED HEREIN.
- THE SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS CONTAINED IN ND 1015404, CLASS 2.
- UNITS SHALL BE CAPABLE OF MEETING THE QUALIFICATION REQUIREMENTS AS CONTAINED IN ND 1002048 UNLESS MODIFIED OR AMENDED BY SECTION 2 OF THIS DRAWING.
- PACKAGING AND PACKING: UNIT PACKAGING AND PACKING SHALL BE IN ACCORDANCE WITH MIL-S-19491, LEVEL A IN BOTH INSTANCES.
- EACH LOT OF DEVICES AS SPECIFIED BY THIS DRAWING SHALL MEET THE REQUIREMENTS OF ND 1002265 WHEN PROCESSED TO THAT SPECIFICATION IN THE BUYER'S PLANT. LOTS OR SUBLOTS REJECTED BY THE CRITERIA OF ND 1002265 MAY BE RETURNED TO THE VENDOR.

## 2. ACCEPTANCE AND INSPECTION:

- 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.
- 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.
- ELECTRICAL: 100% TESTING.
  - UNITS SHALL BE SUBJECTED TO THE ELECTRICAL TESTS SPECIFIED IN ND 1002017.
- MECHANICAL: (REFERENCE MIL-STD-750 AS MODIFIED HEREIN)
  - 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.
  - 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.
  - THE ABOVE MECHANICAL TEST TO BE PERFORMED ON ELECTRICAL REJECTS.



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

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON		MIT INSTRUMENTATION LAB CAMBRIDGE, MASS		MANNED SPACECRAFT CENTER HOUSTON, TEXAS	
2 PLACE DECIMALS	3 PLACE DECIMALS	ANGLES	DRAWN CRESPI 14 AUG 63	SEMICONDUCTOR DEVICE, INTEGRATED SENSE AMPLIFIER  SPECIFICATION CONTROL DRAWING	
+	+	+	CHECKED RUGGEIN 15 AUG 63		
-	-	-	APPROVAL DRISOLL 27 AUG 63		
DO NOT SCALE THIS DRAWING			CONTRACT NAS 9-497	SIZE CODE IDENT NO.	
MATERIAL SEE REQUIREMENTS			JACK BARNARD NASA APPROVAL I. HAZEL 28 AUG 63	C	80230
APPROVAL			MIT APPROVAL	SCALE NONE	1006769
				SHEET 1 of 3	

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REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
	M	REPLACES REV L WITH CHANGE PER TDAR 30660	26-SEP-66	B. P7

# REQUIREMENTS: (CONTINUED)

- (4) SEAL TEST: THE UNITS SHALL BE SUBJECTED TO A HELIUM OR RADIFLO LEAK DETECTION TEST WITH A SENSITIVITY OF AT LEAST  $5 \times 10^{-8}$  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.
- (5) 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 10 X MAGNIFICATION.

## 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 0.75 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 ND 1002019 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  $\pm 30\%$  AT A TEST CURRENT OF 2.0 MADC. RESISTOR  $R_3$  AND  $R_4$  SHALL BE GREATER THAN 20 OHMS AT A TEST CURRENT OF 1.0 MADC.

### 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:  $\pm 25$  VOLTS BETWEEN PIN 10 AND PIN 3.

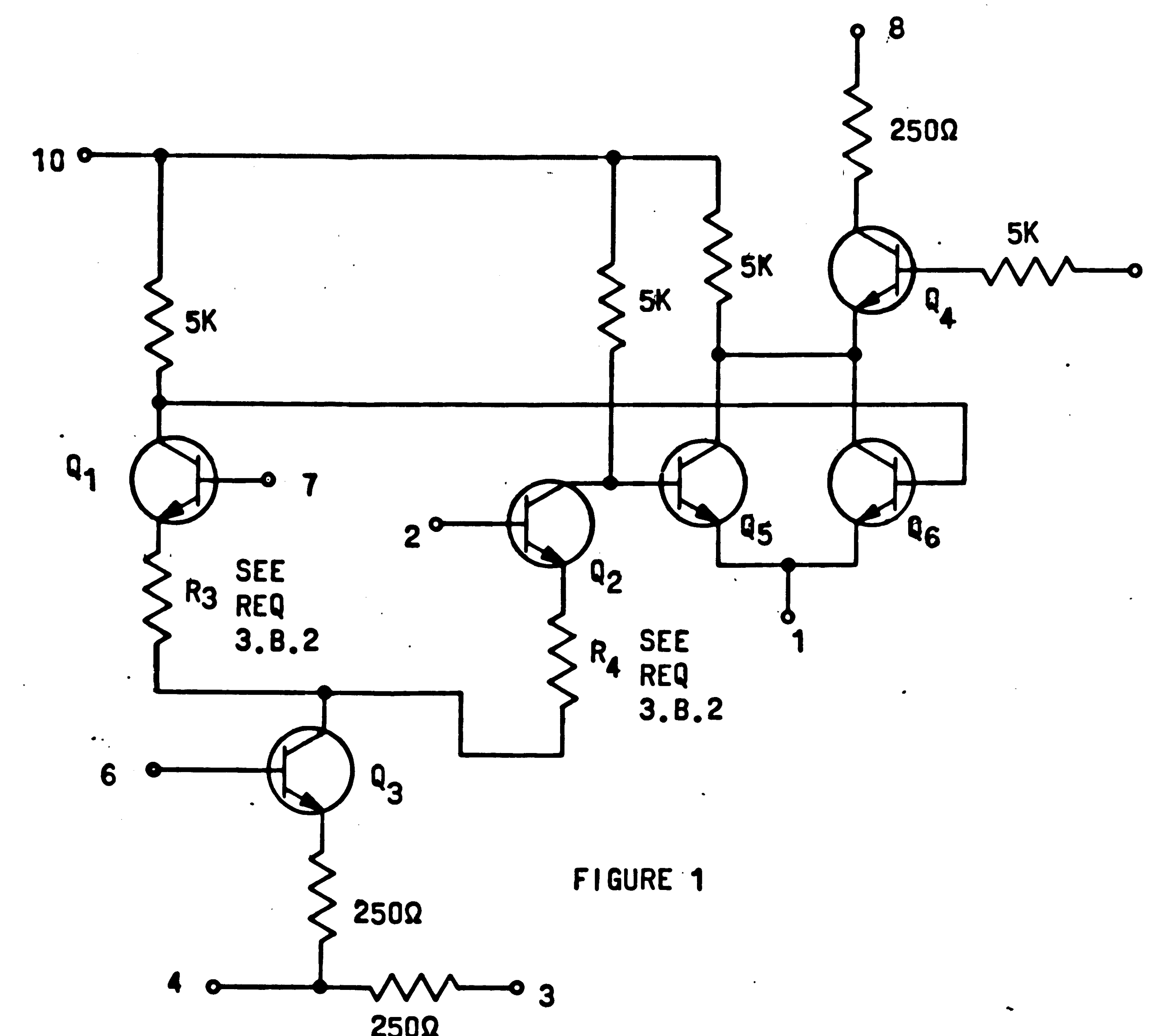


FIGURE 1

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON		M.I.T. INSTRUMENTATION LAB CAMBRIDGE, MASS.		MANNED SPACECRAFT CENTER HOUSTON, TEXAS	
2 PLACE DECIMALS	3 PLACE DECIMALS	ANGLES	DRAWN CRESPI 14 AUG 63	DATE	
+	+	+	CHECKED RUGGEIN 15 AUG 63		
-	-	-	APPROVAL DRISCOLL 27 AUG 63		
DO NOT SCALE THIS DRAWING			CONTRACT NAS 9-497		
MATERIAL			JACK BARNARD		
			NASA APPROVAL		
			I. HAZEL 28 AUG 63		
APPROVAL			MIT APPROVAL		
		SIZE	CODE IDENT NO.		
		C	80230	1006769	
		SCALE		SHEET 2 OF 3	

REVISIONS			
ZONE	LTR	DESCRIPTION	DATE
	M	THIS SHEET ADDED PER TDRR 30660	26- SEP- 66
			APPROVED B. PZ

REQUIREMENTS: (CONTINUED)

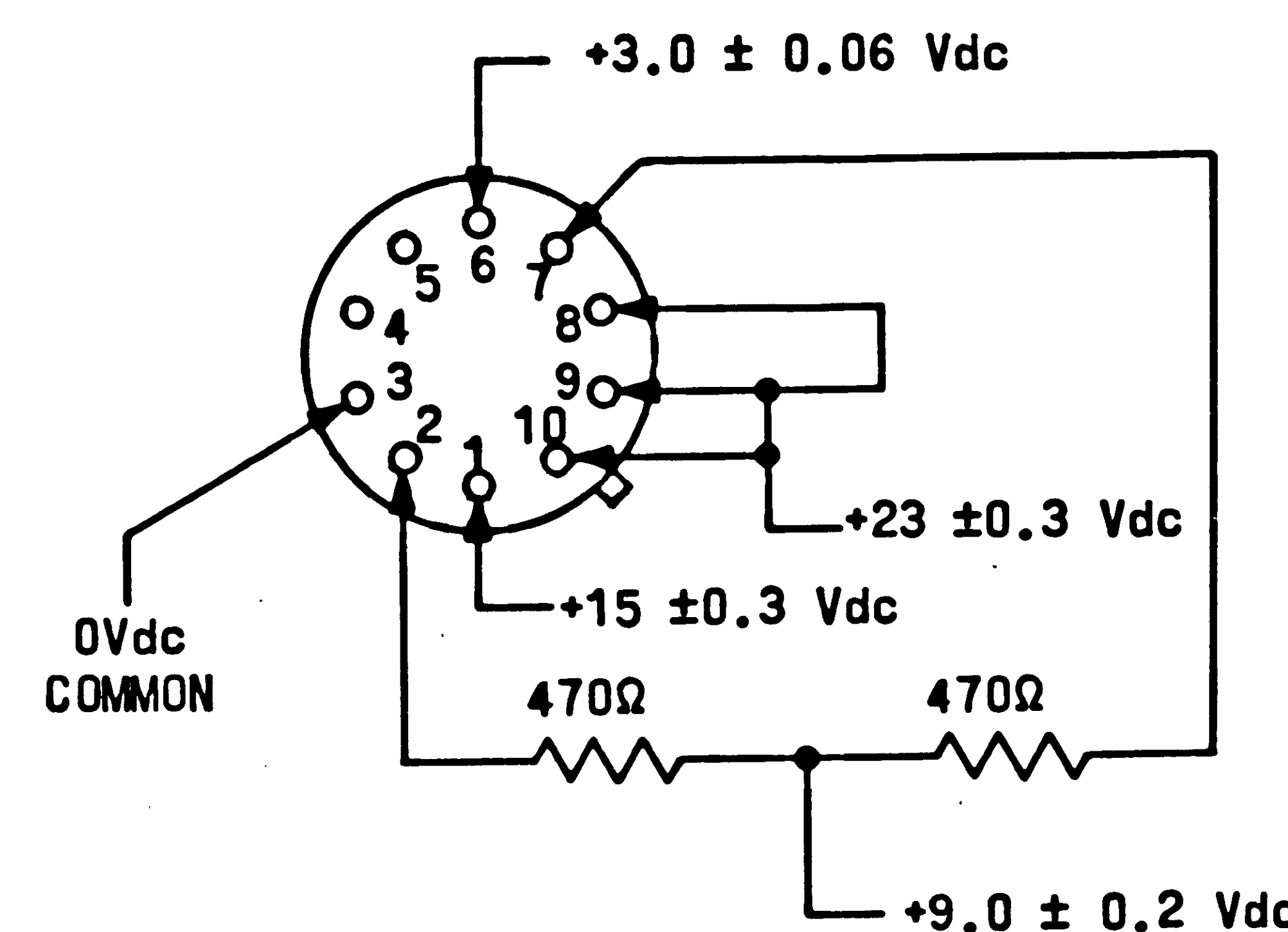
4. SPECIAL CONDITIONING:

- A. HIGH TEMPERATURE STORAGE: ALL UNITS SHALL BE STORED FOR 250 HOURS AT 150 DEGREES CENTIGRADE MIN.
- B. ALL UNITS SHALL BE SUBJECTED TO, A 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 OF ND 1002017 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	$G_1 = V_{02}$	$\pm 10\%$
4.8.1.2	$G_5 = V_{07}$	$\pm 10\%$
4.8.3	$VR = V_{06} - V_{01}$	$\pm 10\%$

TABLE I: ALLOWABLE PARAMETER CHANGE LIMITS



OPERATING LIFE  
TEST CIRCUIT  
FIGURE 11

THIS SHEET ADDED

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON		M I T INSTRUMENTATION LAB CAMBRIDGE, MASS		MANNED SPACECRAFT CENTER HOUSTON, TEXAS	
2 PLACE DECIMALS	3 PLACE DECIMALS	ANGLES	DRAWN <u>Bender</u>	DATE <u>26-SEP-66</u>	SEMICONDUCTOR DEVICE, INTEGRATED SENSE AMPLIFIER SPECIFICATION CONTROL DRAWING
+	+	+	CHECKED <u>Fesler</u>	DATE <u>29 SEP 66</u>	
-	-	-	APPROVAL		
DO NOT SCALE THIS DRAWING			CONTRACT <u>NAS 9-497</u>		SIZE <u>C</u> CODE IDENT NO. <u>80230</u>
MATERIAL			JACK BARNARD		
			NASA APPROVAL I. HAZEL 28 AUG 63		
APPROVAL			MIT APPROVAL		SCALE
					SHEET 3 of 3