

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 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.

V 1199001

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 16585	2-17-65	
A	REVISED PER TDRR 25021	1/11/66	WR

REQUIREMENTS:

1. GENERAL:

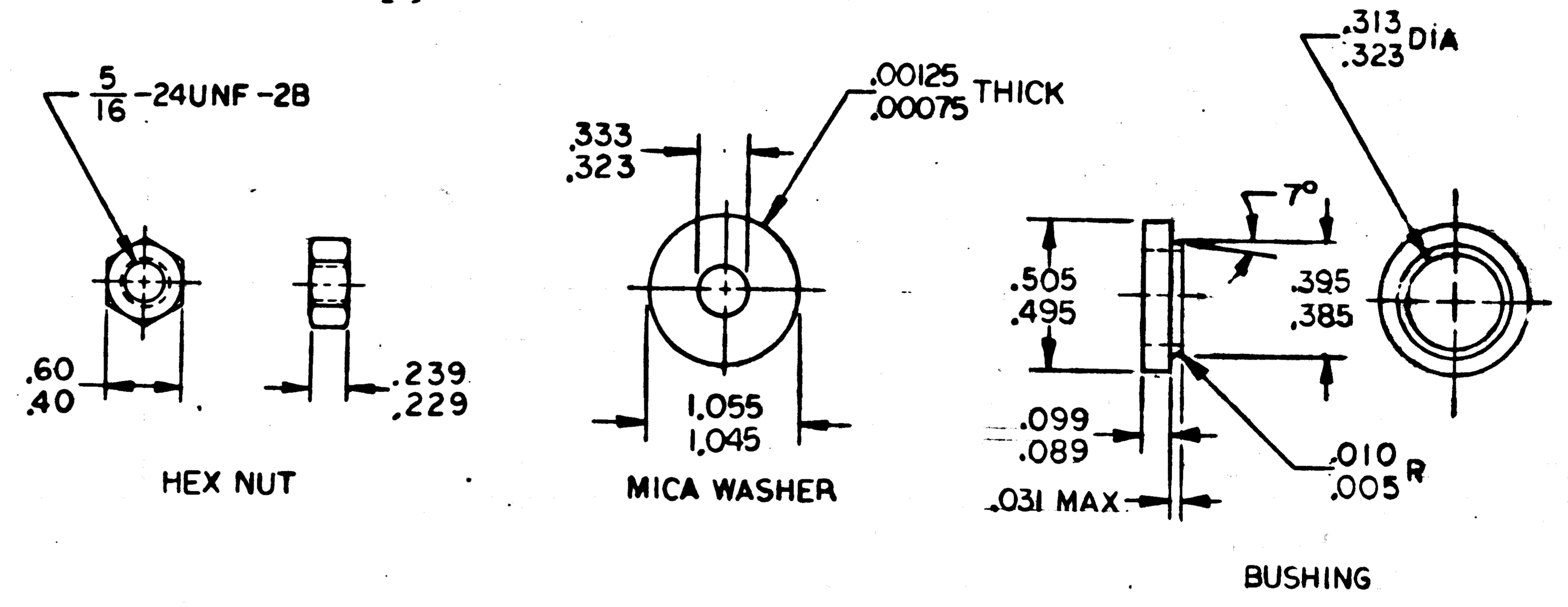
- A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
- B. UNITS SHALL MEET THE REQUIREMENTS OF MIL-S-19500 EXCEPT AS, AND IN ADDITION TO THE REQUIREMENTS, SPECIFIED HEREIN.
- C. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS CONTAINED IN ND 1015404, CLASS 2.
- D. UNITS SHALL BE CAPABLE OF MEETING THE QUALIFICATION REQUIREMENTS OF ND 1002051.
- E. PART MARKING: PARTS SHALL BE PERMANENTLY AND LEGIBLY MARKED, IN ACCORDANCE WITH ND 1002019, WITH THE NASA PART NUMBER (DRAWING NUMBER AND REVISION LETTER), LOT CODE, SERIAL NUMBER AND TERMINAL IDENTIFICATION.
- F. PREPARATION FOR DELIVERY SHALL BE IN ACCORDANCE WITH ND 1002215, CLASS I, CODE 2.
  - (1) MARKING OF SHIPPING CONTAINERS SHALL CONFORM TO THE MARKING OF UNIT AND INTERMEDIATE PACKAGES AND THE METHODS OF MARKING AS SPECIFIED IN ND 1002215.

2. ACCEPTANCE AND INSPECTION:

- A. MECHANICAL REQUIREMENTS (MIL-STD-105D, LEVEL I, AQL = 4.0)
  - (1) DIMENSIONS: AS DELINEATED HEREIN.
  - (2) MOUNTING HARDWARE: THE FOLLOWING PARTS AS DELINEATED SHALL ACCOMPANY EACH TRANSISTOR, PACKAGED IN ACCORDANCE WITH ND 1002215, CLASS I, CODE 1, SEPERATELY.
    - NUT, PLAIN, HEXAGON - CODE 7
    - INSULATOR, WASHER - CODE 4
    - INSULATOR, BUSHING - CODE 4
- B. ELECTRICAL CHARACTERISTICS: THE FOLLOWING PARAMETERS, AS SPECIFIED IN TABLE I, SHALL BE INSPECTED ON 100 PERCENT OF PROCUREMENT.
  - (1) BREAKDOWN VOLTAGE:  $V_{EBO}$ ,  $V_{CBO}$ ,  $V_{CEO}$
  - (2) CUTOFF CURRENT:  $I_{CBO}$
  - (3) STATIC FORWARD CURRENT TRANSFER RATIO:  $h_{FE1}$ ,  $h_{FE2}$ ,  $h_{FE3}$
  - (4) SATURATION VOLTAGE:  $V_{CE(SAT)1}$ ,  $V_{BE(SAT)1}$
- C. VENDOR SUPPLIED DATA: EACH SHIPMENT OF PARTS SHALL BE ACCOMPANIED BY THE FOLLOWING INFORMATION.
  - (1) CERTIFICATE OF COMPLIANCE WITH LEAD MATERIAL REQUIREMENT.
  - (2) CERTIFICATE OF COMPLIANCE WITH ND 1015404, CLASS 2.

3. DESIGN:

- A. STORAGE LIFE: INDEFINITE WHEN STORED AT TEMPERATURES BETWEEN -65°C AND +200°C.
- B. ABSOLUTE MAXIMUM RATINGS (AT +25° ± 3°C UNLESS OTHERWISE SPECIFIED).
  - (1) COLLECTOR-BASE VOLTAGE ( $V_{CB}$ ): 100 VDC
  - (2) COLLECTOR-EMITTER VOLTAGE ( $V_{CE}$ ): 80 VDC
  - (3) EMITTER-BASE VOLTAGE ( $V_{BE}$ ): 8 VDC
  - (4) COLLECTOR CURRENT ( $I_C$ ): 30 AMPERES DC
  - (5) POWER DISSIPATION, TOTAL ( $P_T$ ): 100 WATTS AT +100°C CASE TEMPERATURE.
  - (6) THERMAL RESISTANCE, JUNCTION-CASE ( $\theta_{J-C}$ ): 1°C/WATT
  - (7) JUNCTION OPERATING TEMPERATURE ( $T_J$ ): +200°C
  - (8) STORAGE TEMPERATURE ( $T_{STG}$ ): -65°C TO +200°C
- C. CONSTRUCTION:
  - (1) MATERIAL:
    - LEADS: WELDABLE, GOLD PLATED, ANNEALED IRON-NICKEL-COBALT ALLOY (KOVAR) IN ACCORDANCE WITH ND 1015402 EXCEPT AS FOLLOWS:
      - (a) TERMINAL DIMENSIONS AS SPECIFIED ON DRAWING.
      - (b) PLATING THICKNESS TO BE 175-225 MICROINCHES NICKEL AND 10-20 MICROINCHES OF GOLD.
    - STUD AND NUT: NICKEL PLATED BRASS.
    - INSULATOR, WASHER: 0.00075 ± 0.00050 - 0.00000 THICK NATURAL MICA (MUSCOVITE)
    - INSULATOR, BUSHING: ALUMINA (96%  $Al_2O_3$ )



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

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON	
FRACTIONS    DECIMALS    ANGLES	±                    ±                    ±
DO NOT SCALE THIS DRAWING	
MATERIAL	SEE NOTES
HEAT TREATMENT	NONE
FINAL FINISH	SEE NOTES
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>E. B. Spindler</i> 11/10/64		TRANSISTOR, NPN, SILICON, POWER  SPECIFICATION CONTROL DRAWING	
CHECKED <i>R. T. D...</i> 11/10/64			
APPROVAL <i>E. C. Hall</i> 11/10/64		CODE IDENT NO.	NASA DRAWING NO.
NASA APPROVAL <i>W. J. ...</i>		SIZE <b>C</b>	<b>1006317</b>
MIT APPROVAL <i>W. J. ...</i>		SCALE NONE	WT
		SHEET 1 OF 2	

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1006317

REVISIONS			
BYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TORR 16585	2-17-65	
A	REVISED PER TORR 25021	1/11/66	WR

TABLE I

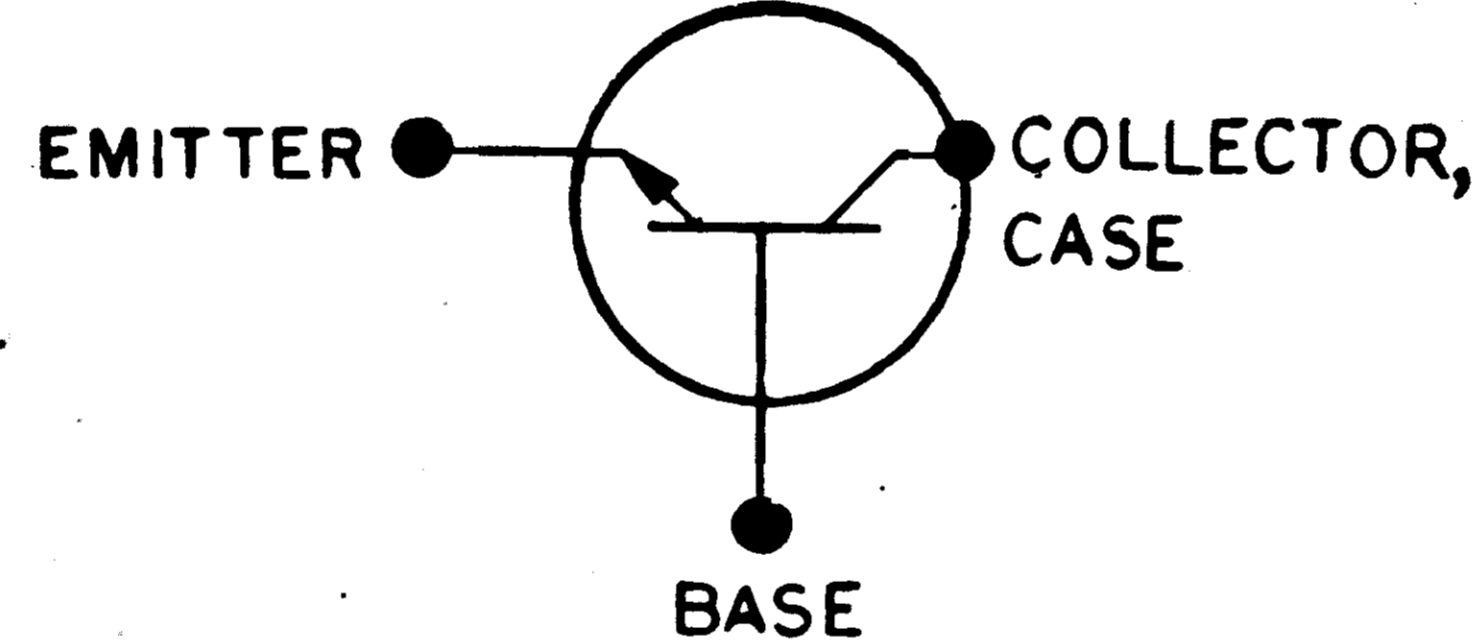
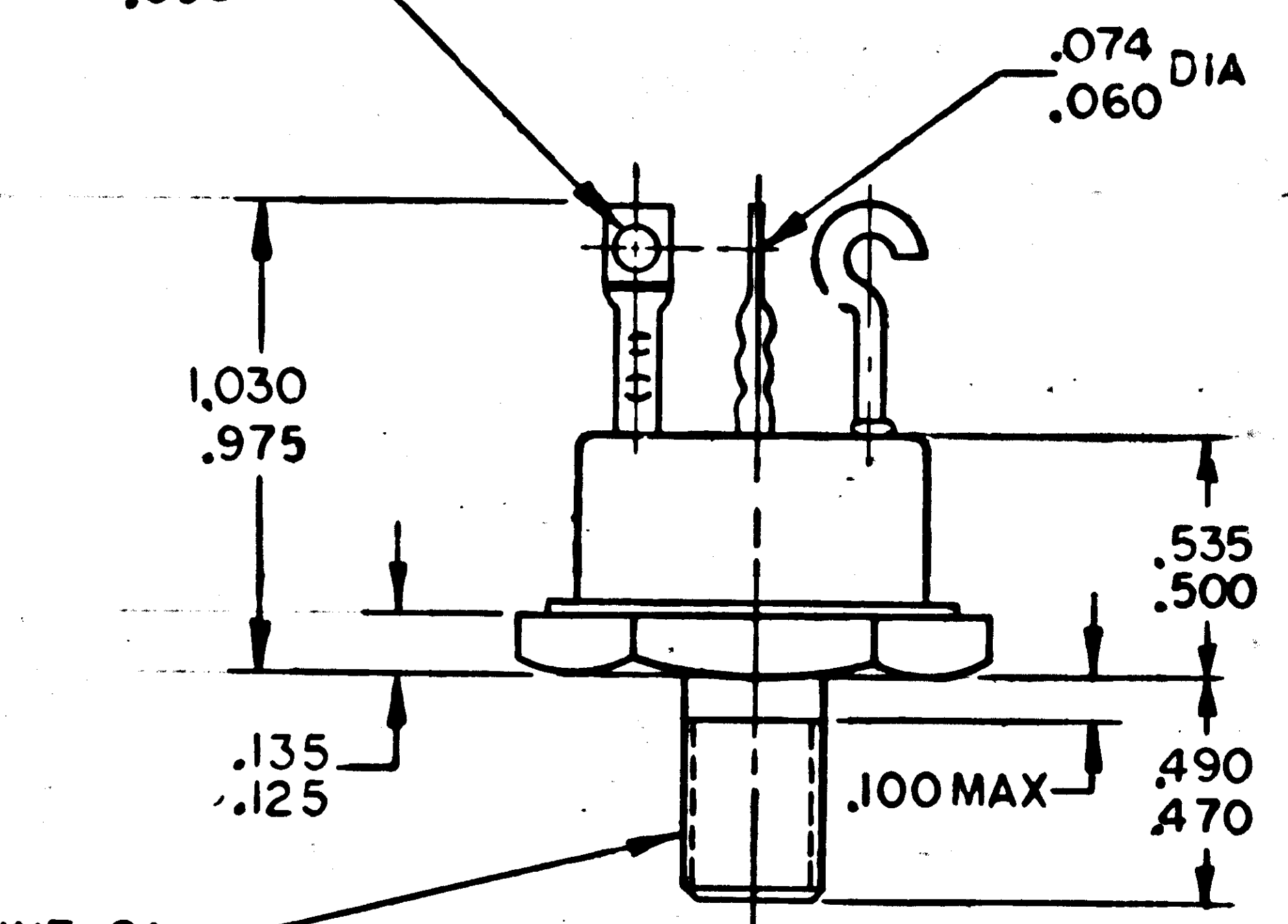
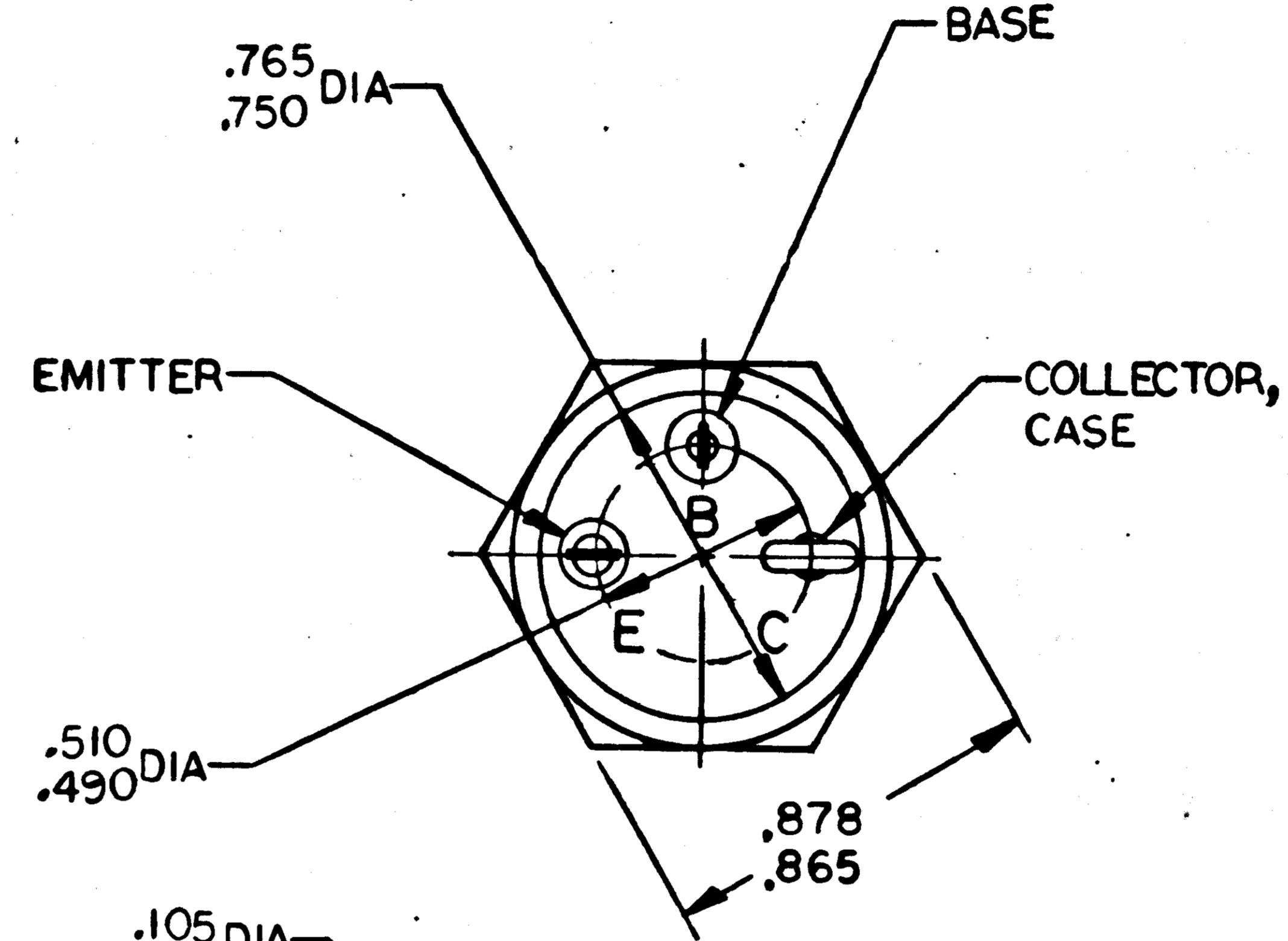
ELECTRICAL CHARACTERISTICS AT TC = +25°C (UNLESS OTHERWISE SPECIFIED)					
PART NO. 1006317-000 PARAMETER	CONDITION	SYMBOL	SPECIFICATION LIMIT		
			MIN	MAX	UNIT
BREAKDOWN VOLTAGE, COLLECTOR-BASE	$I_C=200\mu A, I_E=0$	$BV_{CBO}$	100	-	VDC
BREAKDOWN VOLTAGE, EMITTER-BASE	$I_E=200\mu A, I_C=0$	$BV_{EBO}$	8	-	VDC
BREAKDOWN VOLTAGE, COLLECTOR-EMITTER	$I_C=10MA, I_B=0$	$BV_{CEO}$	80	-	VDC
SUSTAINING VOLTAGE, COLLECTOR-EMITTER	$I_C=100MA, I_B=0$ 1	$LV_{CEO}$	70	-	VDC
CUTOFF CURRENT, COLLECTOR	$V_{CB}=60V, I_E=0$	$I_{CB0}$	-	10	$\mu ADC$
STATIC FORWARD CURRENT TRANSFER RATIO	$V_{CE}=5V, I_C=10MA$	$h_{FE1}$	100	-	-
	$V_{CE}=5V, I_C=10A$ 1	$h_{FE2}$	100	-	-
	$V_{CE}=5V, I_C=20A$ 1	$h_{FE3}$	10	-	-
SATURATION VOLTAGE, COLLECTOR-EMITTER	$I_C=10A, I_B=1A$ 1	$V_{CE(sat)1}$	-	0.5	VDC
SATURATION VOLTAGE, BASE-EMITTER	$I_C=10A, I_B=1A$ 1	$V_{BE(sat)1}$	-	1.2	VDC
GAIN BANDWIDTH PRODUCT	$V_{CE}=10V, I_C=1A$	-	25	-	MC

PART NO. - 1006317-001 SHALL MEET THE CHARACTERISTICS OF TABLE I EXCEPT FOR STATIC FORWARD CURRENT TRANSFER RATIO WHICH SHALL BE WITHIN THE LIMITS SPECIFIED IN TABLE II

TABLE II

STATIC FORWARD CURRENT TRANSFER RATIO	CONDITION	SYMBOL	SPECIFICATION LIMIT		
			MIN	MAX	UNIT
	$V_{CE} = 5V, I_C = 100 MA$	$h_{FE1}$	80	240	-
	$V_{CE} = 2V, I_C = 2AMP$	$h_{FE2}$	80	240	-
	$V_{CE} = 3V, I_C = 10 AMP$	$h_{FE3}$	30	90	-
	$V_{CE} = 3V, I_C = 20 AMP$	$h_{FE4}$	10	-	-

1. PULSE CONDITIONS: WIDTH  $\leq$  300 MICROSECONDS: DUTY CYCLE  $\leq$  2%.



SCHEMATIC

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>E.P. Smith</i> DATE 23 Dec 64 CHECKED <i>R.T. D...</i> 30 Dec 64		TRANSISTOR, NPN, SILICON, POWER	
APPROVAL <i>E.P. Smith</i> E.P. Smith		SPECIFICATION CONTROL DRAWING	
NASA APPROVAL <i>...</i> 2/1/66		CODE IDENT NO.	NASA DRAWING NO.
MIT APPROVAL <i>...</i> 17 Feb 66		SIZE C	1006317
APPLICATION		SCALE NONE	WT
		SHEET 2 OF 2	

POSTER