

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 INCURS NO RESPONSIBILITY FOR ANY OBLIGATION WHATSOEVER. NEITHER 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 CONFERRING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

1010376 E

| REVISIONS |   |           |          |
|-----------|---|-----------|----------|
| SYM       | DESCRIPTION                                   | DATE      | APPROVAL |
| -         | TAKEN FROM BUWEP'S DWG C2318944               |           |          |
| A         | SEE SHEET 2                                   |           | W/R      |
| C         | SEE SHEET 2 00513                             | 6-        | W/R      |
| D         | REVISED PER TDRR 00866                        | 17 Jul 63 | W/R      |
| E         | REPLACED BY REV F WITH CHANGES PER TDRR 01775 | 6-26-63   | W/R      |

**NOTES:**

- GENERAL REQUIREMENTS FOR EACH SECTION, UNLESS OTHERWISE SPECIFIED.
  - UNIT SHALL BE IN ACCORDANCE WITH MIL-S-19500, IN ADDITION TO THE REQUIREMENTS SPECIFIED HEREIN.
  - ABSOLUTE MAXIMUM RATINGS AT 25 ± 3 DEGREES CENTIGRADE, (AMBIENT):  
 COLLECTOR TO EMITTER VOLTAGE (VCE0): 60 VOLTS DC.  
 COLLECTOR TO EMITTER VOLTAGE (VCE): 80 VOLTS DC (RBE < 10Ω).  
 COLLECTOR TO BASE VOLTAGE (VCB0): -100 VOLTS DC.  
 EMITTER TO BASE VOLTAGE (VEB0): 7 VOLTS DC.  
 POWER DISSIPATION: (EACH SECTION)  
   AT 25°C CASE TEMPERATURE: 1.5 WATTS.  
   AT 100°C CASE TEMPERATURE: 860 MILLIWATTS.  
   AT 25°C AMBIENT TEMPERATURE: 500 MILLIWATTS.  
 POWER DISSIPATION (DUAL) TOTAL:  
   AT 25°C CASE TEMPERATURE: 3 WATTS.  
   AT 100°C CASE TEMPERATURE: 1.7 WATTS.  
   AT 25°C AMBIENT TEMPERATURE: 600 MILLIWATTS.
  - TEMPERATURE RANGE:  
 STORAGE: MINUS 65 TO PLUS 200 DEGREES CENTIGRADE.  
 OPERATING JUNCTION: PLUS 200 DEGREES CENTIGRADE, MAX.
  - ELECTRICAL CHARACTERISTICS: PER TABLE I AND II.  
 ITPD: AS SPECIFIED HEREIN WITH MAXIMUM ACCEPTANCE NUMBER 3 PER MIL-S-19500.  
 TEST DATA SHALL BE FURNISHED UPON REQUEST.  
 ORDERS SHALL BE FILLED FROM ONE MANUFACTURING LOT, HOWEVER, ORDERS WHICH ARE GREATER THAN ONE MANUFACTURING LOT MAY BE FILLED FROM ADDITIONAL LOTS. SUPPLIER SHALL CONFORM WITH THE QUALITY ASSURANCE PROVISIONS OF ND1015404 SECTION.

**2. CONSTRUCTION REQUIREMENTS:**

- SEMICONDUCTOR: SILICON, NPN, DOUBLE-DIFFUSED.
  - CASE: METAL, SUITABLY PROTECTED TO WITHSTAND ENVIRONMENTAL REQUIREMENTS.
  - LEADS: SIX (6), SOLDERABLE, FLEXIBLE AND WELDABLE SOLID "KOVAR" CONDUCTORS, GREASE AND OIL FREE; GOLD FLASHED PER ND PS1015402. A CERTIFICATE OF COMPLIANCE FOR LEAD MATERIAL SHALL ACCOMPANY EACH LOT SHIPPED. EACH LEAD SHALL WITHSTAND AN AXIAL PULL OF FOUR (4) POUNDS MINIMUM.
  - HEADER: SHALL BE HERMETICALLY (GLASS-KOVAR) SEALED AND IMPERVIOUS TO LIGHT.
  - MARKING: PER MIL-S-19500 AND SHALL INCLUDE THE MANUFACTURER'S NAME AND OR SYMBOL, DATE CODE, AND TYPE NUMBER. THE NASA NO. SHALL APPEAR ON EACH INTERIOR AND EXTERIOR SHIPPING CONTAINER AS WELL AS ON A TAG TO BE INCLUDED IN EACH SHIPPING CONTAINER.
- ENVIRONMENTAL REQUIREMENTS: SHALL MEET THE REQUIREMENTS OF ND 1002000
  - PULSE CONDITIONS: WIDTH = 300μ sec; DUTY CYCLE < 1%.
  - LOWEST VALUE OF hFE SHALL BE hFE1 (NUMERATOR).
  - ABSOLUTE VALUES: VALUES SHOWN IN PARENTHESES IN TABLES, ARE APPLICABLE ONLY FOR 1010376-3.
  - INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

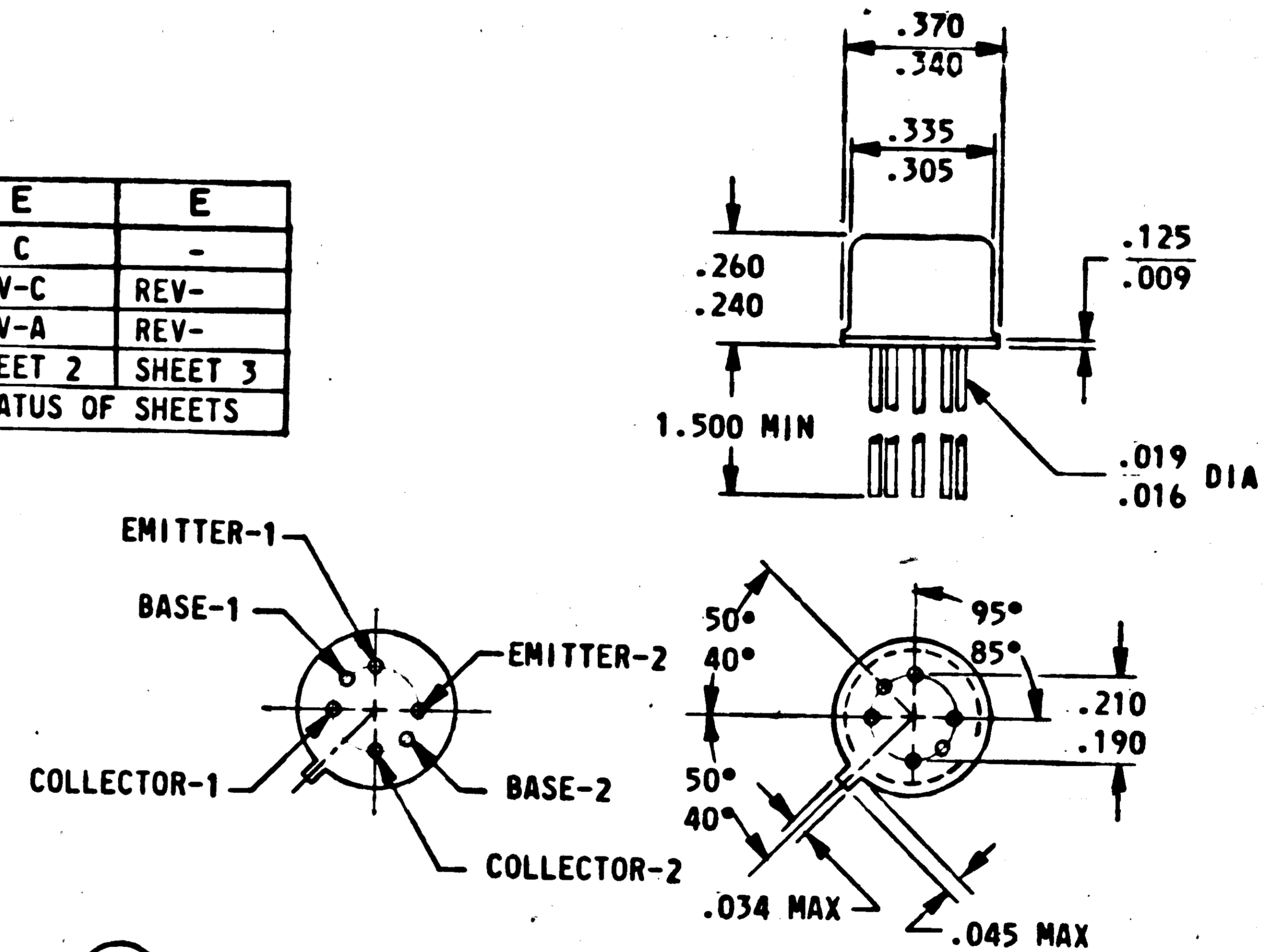
ORIGINAL SOURCE OF SUPPLY:  
 FAIRCHILD SEMICONDUCTOR CORP.  
 545 WHISMAN ROAD  
 MOUNTAIN VIEW, CALIFORNIA

- 1010376-1 TYPE NO. SP-8126  
 1010376-2 TYPE NO. SP8127
- SAME AS 1010376-1 EXCEPT, SUBSTITUTE FOR hfe (1kc) REQUIREMENTS; hfe=80 TO 120 AT VCE=5V; IC=1mA; f=1kc; TA=25°C
- 1010376-3 TYPE NO. SP-8143
- SAME AS 1010376-1, EXCEPT FOR ADDITIONAL REQUIREMENTS: hFE=75 TO 125 AT VCE=10V; IC=300μA; TA=25°C. (SEE NOTE 6)
- 1010376-4 TYPE NO. (TO BE ASSIGNED)
- SAME AS 1010376-1, EXCEPT hFE=50 MIN AT IC=5mA, VCE=1 V AND BVCE0=80 V MIN AT IC=10 mA.
- CONTINUED ON SHEET 2

| E       | E       | E       |
|---------|---------|---------|
| D       | C       | -       |
| REV-C   | REV-C   | REV-    |
| REV-A   | REV-A   | REV-    |
| SHEET 1 | SHEET 2 | SHEET 3 |

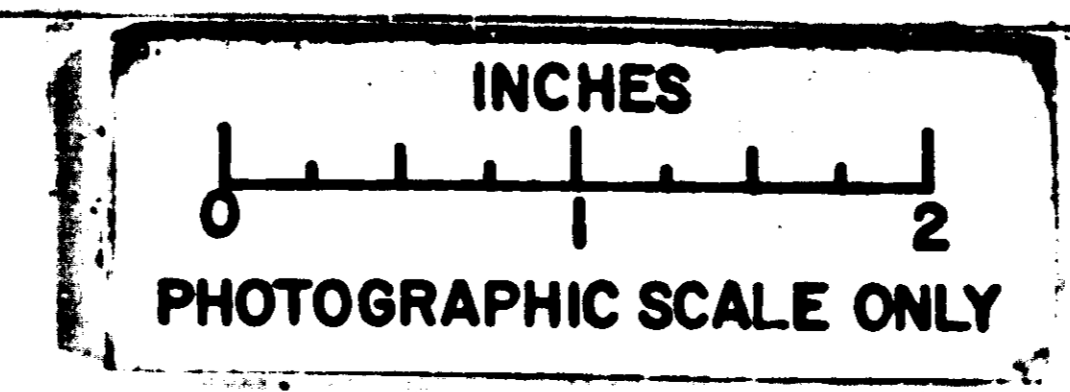
REVISION STATUS OF SHEETS

**FOR INFORMATION ONLY**  
 CLASS B RELEASE TDR No. 00162 DATE 12.12.62



MASTER (E) REPLACED BY REV(F) WITH CHANGES

| QTY REQD   | PART OR IDENTIFYING NO. | NOMENCLATURE OR DESCRIPTION  | FIND NO.         |
|--|-------------------------|--|------------------|
| LIST OF MATERIALS  |                         |  |                  |
| MIT INSTRUMENTATION LAB<br>CAMBRIDGE, MASS   |                         | MANNED SPACECRAFT CENTER<br>HOUSTON, TEXAS   |                  |
| DRAWN <i>Ray Wheeler</i> DATE 3 Dec 62<br>CHECKED <i>B.M. Sleeper</i> 6 DEC 62<br>APPROVAL <i>J. Goshman</i> 10 Dec 62 |                         | <b>SEMICONDUCTOR DEVICE, TRANSISTOR,<br/>SILICON, DUAL SECTION<br/>SPECIFICATION CONTROL DRAWING</b> |                  |
| NASA APPROVAL <i>W.J. R. Davis</i> 12-12-62<br>MIT APPROVAL <i>W.H. Koffler</i> 12/16/62                               |                         |  |                  |
| HEAT TREATMENT<br>NONE   |                         | CODE IDENT NO.   | NASA DRAWING NO. |
| MATERIAL<br>SEE NOTE 2   |                         | SIZE<br>C  | 1010376          |
| FINAL FINISH<br>NONE   |                         | SCALE<br>NONE  | WT               |
| APPLICATION  |                         | SHEET 1 OF 3   |                  |



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1010376 E

| REVISIONS |   |         |          |
|-----------|---|---------|----------|
| SYM       | DESCRIPTION                                   | DATE    | APPROVAL |
| C         | REPLACES REV B WITH CHANGE PER TDRR 00513     | -       | WHL      |
| E         | REPLACED BY REV F WITH CHANGES PER TDRR 01775 | 6-28-63 | WHL      |

TABLE I

| TEST PROCEDURE, INSPECTION & SYMBOLS PER MIL-S-19500                   |  |                    |            |              |                    |               |
|--|--|--------------------|------------|--------------|--------------------|---------------|
| STANDARD TEST CONDITIONS, UNLESS OTHERWISE SPECIFIED: TA = 25°C; f=1kc |  |                    |            |              |                    |               |
| GROUP A  |  |                    |            |              |                    |               |
| PARAMETER  | TEST CONDITIONS                            | SYMBOL             | LIMITS     |              | UNITS              | LTPD (%)      |
|  |  |                    | MIN        | MAX          |                    |               |
| COLLECTOR CUT-OFF CURRENT  | IE=0<br>VCB=80V                            | ICBO               | --         | 2            | 10 <sup>-9</sup> A | 5<br>COMBINED |
| COLLECTOR CUT-OFF CURRENT  | IE=0<br>VCB=80V<br>TA=150°C                | ICBO               | --         | 10           | 10 <sup>-6</sup> A |               |
| EMITTER CUT-OFF CURRENT  | IC=0<br>VEB=5V                             | IEBO               | --         | 2            | nA                 |               |
| BREAKDOWN VOLTAGE  | IE=100uA<br>IC=0                           | BVEBO              | 7          | --           | VOLTS              |               |
| BREAKDOWN VOLTAGE (SEE NOTE 4)   | IC=100mA<br>RBE=10Ω                        | LVCER              | 80         | --           | VOLTS              |               |
| BREAKDOWN VOLTAGE  | IC=100uA<br>IE=0                           | BVCBO              | 100        | --           | VOLTS              |               |
| BREAKDOWN VOLTAGE (SEE NOTE 4)   | IC=30mA<br>IB=0                            | LVCED              | 60         | --           | VOLTS              |               |
| STATIC FORWARD CURRENT TRANSFER RATIO                                  | IC=10uA<br>VCE=10V                         | hFE                | 25<br>(40) | 75<br>(100)  | --                 | 5<br>COMBINED |
| STATIC FORWARD CURRENT TRANSFER RATIO                                  | IC=100uA<br>VCE=10V                        | hFE                | 30<br>(60) | 90<br>(125)  | --                 |               |
| STATIC FORWARD CURRENT TRANSFER RATIO                                  | IC=1mA<br>VCE=10V                          | hFE                | 40<br>(80) | 120<br>(150) | --                 |               |
| STATIC FORWARD CURRENT TRANSFER RATIO (SEE NOTE 4)                     | IC=10mA<br>VCE=10V                         | hFE                | 50<br>(90) | 150<br>(180) | --                 |               |
| STATIC FORWARD CURRENT TRANSFER RATIO, RATIO (SEE NOTE 5)              | IC=1mA<br>VCE=10V                          | hFE 1<br>hFE 2     | .9         | 1            | --                 |               |
| STATIC FORWARD CURRENT TRANSFER RATIO, RATIO (SEE NOTE 5)              | IC=100uA<br>VCE=10V                        | hFE 1<br>hFE 2     | .9         | 1            | --                 |               |
| SATURATION VOLTAGE   | IC=50mA<br>IB=5mA                          | VCE (sat)          | --         | 1.2          | VOLTS              |               |
| SATURATION VOLTAGE   | IC=50mA<br>IB=5mA                          | VBE (sat)          | --         | .9           | VOLTS              |               |
| BASE VOLTAGE DIFFERENTIAL (ABSOLUTE VALUE)                             | IC=1mA<br>VCE=5V                           | VBE 1 -<br>VBE 2   | --         | 5            | mV                 | 5<br>COMBINED |
| BASE VOLTAGE DIFFERENTIAL (ABSOLUTE VALUE)                             | IC=100uA<br>VCE=5V                         | VBE 1 -<br>VBE 2   | --         | 5            | mV                 |               |
| BASE VOLTAGE DIFFERENTIAL CHANGE                                       | IC=100uA<br>VCE=5V<br>TA=-55°C TO<br>125°C | Δ VBE 1 -<br>VBE 2 | --         | 10           | uV/°C              |               |
| SMALL-SIGNAL, SHORT-CIRCUIT INPUT IMPEDANCE                            | IC=1mA<br>VCB=5V                           | hib                | 20         | 30           | OHMS               | 5<br>COMBINED |
| SMALL-SIGNAL, SHORT-CIRCUIT FORWARD CURRENT TRANSFER RATIO             | IC=1mA<br>VCE=5V                           | hfe                | 50<br>(75) | 150<br>(180) | --                 |               |

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 00162 DATE 12.12.62

TABLE I (CONTINUED)

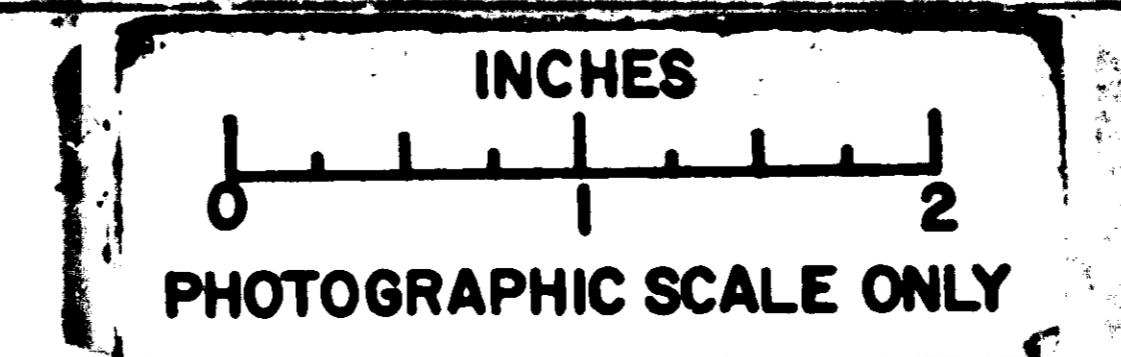
| PARAMETER  | TEST CONDITIONS                         | SYMBOL | LIMITS |                | UNIT | LTPD (%)      |
|--|---|--------|--------|----------------|------|---------------|
|  |   |        | MIN    | MAX            |      |               |
| SMALL-SIGNAL, SHORT-CIRCUIT FORWARD CURRENT TRANSFER RATIO | IC=50mA<br>VCE=10V<br>f=20mc            | hfe    | 3      |                | --   | 5<br>COMBINED |
| SMALL-SIGNAL, SHORT-CIRCUIT INPUT IMPEDANCE                | IC=1mA<br>VCE=5V                        | hie    | 1000   | 4000<br>(5000) | OHMS |               |
| SMALL-SIGNAL, OPEN CIRCUIT OUTPUT ADMITTANCE               | IC=1mA<br>VCE=5V                        | hoe    | 4      | 16<br>(20)     | UMHO |               |
| OUTPUT CAPACITANCE   | IE=0<br>VCB=10V<br>f=140KC              | Cob    | --     | 15             | uuf  | 5<br>COMBINED |
| INPUT CAPACITANCE  | IC=0<br>VEB=0.5V<br>f=140KC             | Cib    | --     | 85             | uuf  |               |
| NOISE FIGURE   | IC=300uA<br>VCE=10V<br>BW=1~<br>Rq=510Ω | Nr     | --     | 10             | db   | 5             |

Ⓒ REPLACES REV B WITH CHANGE  
Ⓔ REPLACED BY REV (F) WITH CHANGES

NOTES

NOTES

| QTY REQD  | PART OR IDENTIFYING NO. | NOMENCLATURE OR DESCRIPTION   | FIND NO.                    |
|---|-------------------------|---|-----------------------------|
| LIST OF MATERIALS   |                         |   |                             |
| MIT INSTRUMENTATION LAB<br>CAMBRIDGE, MASS.   |                         | MANNED SPACECRAFT CENTER<br>HOUSTON, TEXAS  |                             |
| DRAWN <i>Ray W. Barber</i> DATE 3 Dec 62<br>CHECKED <i>D. M. Sluiter</i> 6 DEC 62<br>APPROVAL <i>D. Cushman</i> 10 Dec 62 |                         | SEMICONDUCTOR DEVICE, TRANSISTOR,<br>SILICON, DUAL SECTION<br>SPECIFICATION CONTROL DRAWING |                             |
| NASA APPROVAL <i>W. J. White</i><br>12-12-62<br>MIT APPROVAL <i>W. J. White</i> 12/12/62                                  |                         |   |                             |
| NEXT ASSY   |                         | CODE IDENT NO. SIZE<br>C  | NASA DRAWING NO.<br>1010376 |
| USED ON   |                         | SCALE NONE  | WT                          |
| APPLICATION   |                         | SHEET 2 OF 3  |                             |



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E 1010376

| REVISIONS |   |         |          |
|-----------|---|---------|----------|
| SYM       | DESCRIPTION                                   | DATE    | APPROVAL |
| E         | REPLACED BY REV F WITH CHANGES PER TDRR 01775 | 6-24-62 | Wk.      |

TABLE II

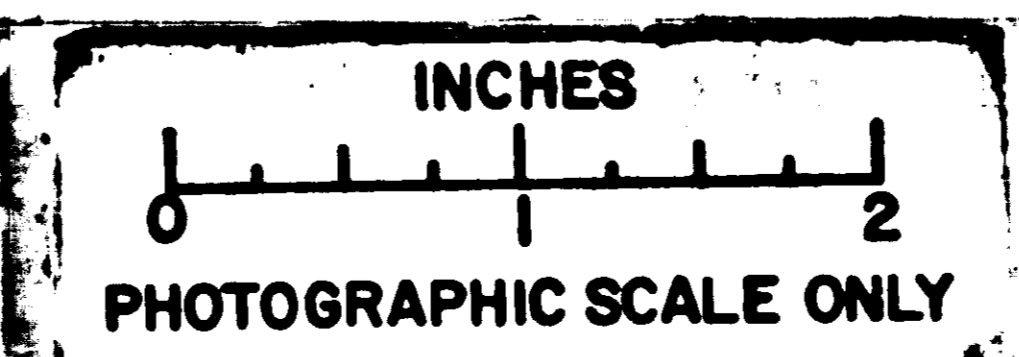
| TEST PROCEDURE, INSPECTION & SYMBOLS PER MIL-S-19500  |   |                |            |              |                    |
|---|---|----------------|------------|--------------|--------------------|
| STANDARD TEST CONDITIONS, UNLESS OTHERWISE SPECIFIED: TA = 25°C   |   |                |            |              |                    |
| GROUP B   |   |                |            |              |                    |
| PARAMETER   | TEST  | LTPD (%)       |            |              |                    |
| SUB GROUP 1:<br>PHYSICAL DIMENSIONS   | PER SKETCH  | 5              |            |              |                    |
| SUB GROUP 2:<br>SOLDERING<br>TEMPERATURE CYCLING<br><br>THERMAL SHOCK<br>MOISTURE RESISTANCE            | PER MIL-S-19500<br>-65 TO +200°C, 3 CYCLES PER MIL-STD-202<br>METHOD 102, TEST CONDITION C<br>100°C TO 0°C<br>PER MIL-S-19500   | 5<br>COMBINED  |            |              |                    |
| SUB GROUP 3:<br>SHOCK<br><br>CONSTANT ACCELERATION<br>VIBRATION FATIGUE<br>VIBRATION VARIABLE FREQUENCY | 1500 G, 0.5m SEC, 5 BLOWS IN X1, Y1, Y2,<br>Z1 DIRECTIONS, 20 BLOWS TOTAL<br>20,000G<br>20G<br>20G FROM 5 TO 2000 CYCLES LIMITED TO<br>.5DA, 3 CYCLES, 15 MINUTES PER CYCLE<br>MINIMUM. | 5              |            |              |                    |
| SUB GROUP 4:<br>LEAD FATIGUE  | PER MIL-S-19500, EXCEPT NO 3/32<br>RESTRICTION  | 5              |            |              |                    |
| SUB GROUP 5:<br>BAROMETRIC PRESSURE<br>(OPERATING)<br>SALT ATMOSPHERE                                   | 200,000 FEET ± 60 SEC. USE ICBO<br>END POINT TEST<br>MIL-S-19500  | 5<br>COMBINED  |            |              |                    |
| SUB GROUP 6:<br>STORAGE LIFE  | Tstg=200°C ±5°C, METHOD B, 1000 HR.   | =5             |            |              |                    |
| SUB GROUP 7:<br>OPERATING LIFE  | P=600mW, VCB=50V MIN., TA=25°C,<br>METHOD B 1000 HR.  | =5             |            |              |                    |
| END POINTS  | TEST CONDITIONS   | SYMBOL         | LIMITS     |              | UNITS              |
| END POINTS FOR SUB GROUPS<br>2,3,5,6 AND 7  | IC=1mA<br>VCE=10V   | hFE            | 36<br>(70) | 160<br>(170) | -                  |
|   | IE=0<br>VCB=80V   | ICBO           | -          | 20           | 10 <sup>-9</sup> A |
| ADDITIONAL<br>END POINTS FOR SUB GROUPS<br>6 AND 7  | 1mA<br>VCB=10V  | hFE 1<br>hFE 2 | .87        | -            | -                  |

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CLASS B RELEASE TDR No. 00162 DATE 12/2/62

(E) REPLACED BY REV (F) WITH CHANGES

| QTY REQD   | PART OR IDENTIFYING NO. | NOMENCLATURE OR DESCRIPTION   | FIND NO.                           |
|--|-------------------------|---|------------------------------------|
| LIST OF MATERIALS  |                         |   |                                    |
| MIT INSTRUMENTATION LAB<br>CAMBRIDGE, MASS.  |                         | MANNED SPACECRAFT CENTER<br>HOUSTON, TEXAS  |                                    |
| DRAWN <i>Ray of Keeler</i> DATE 3 Dec 62<br>CHECKED <i>B.M. Slusher</i> 6 DEC 62<br>APPROVAL <i>S. Cushman</i> 10 Dec 62 |                         | SEMICONDUCTOR DEVICE, TRANSISTOR,<br>SILICON, DUAL SECTION<br>SPECIFICATION CONTROL DRAWING |                                    |
| MATERIAL _____<br>HEAT TREATMENT _____<br>FINAL FINISH _____   |                         |   |                                    |
| NASA APPROVAL <i>W.J. Rhee</i><br>012-12-62  |                         | CODE IDENT NO. _____<br>SIZE <b>C</b>   | NASA DRAWING NO.<br><b>1010376</b> |
| MIT APPROVAL <i>W.J. Rhee</i><br>12/12/62  |                         | SCALE NONE WT   | SHEET 3 OF 3                       |

MASTER



1010376 E