REVISIONS

A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-S-7037.
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 HD 1015404, CLASS 2.
D. UNITS SHALL BE CAPABLE OF MEETING THE QUALIFICATION REQUIREMENTS OF HD 1002091.
E. MARKING:
   (1) PARTS SHALL BE PERMANENTLY AND LEGIBLY MARKED, IN ACCORDANCE WITH HD 1002019, WITH THE NASA PART NUMBER (DRAWING NUMBER AND REVISION LETTER) OR AS MANY SIGNIFICANT DIGITS AS POSSIBLE (E.G. 6110). OTHER MARKING SUCH AS MANUFACTURER'S IDENTIFICATION AND TYPE NUMBER IS PERMISSIBLE.
F. PREPARATION FOR DELIVERY SHALL BE IN ACCORDANCE WITH HD 1002215, CLASS 1, 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 HD 1002215.

2. ACCEPTANCE AND INSPECTION:
A. MECHANICAL PROPERTIES:
   (1) DIMENSIONS: AS DELINEATED HEREIN.
B. SEAL TEST: THE UNITS SHALL BE SUBJECTED TO A HELIUM OR RADIFLO LEAK DETECTION TEST WITH A SENSITIVITY OF AT LEAST 1 X 10-8 CC-ATM/SEC AND A HOT GLYCERINE BUBBLE TEST FOR GROSS LEAK TEST.
   (1) TEST CONDITION C SHALL BE USED FOR THE HELIUM OR RADIFLO TEST. TEST CONDITION A SHALL BE USED FOR THE GROSS LEAK TEST EXCEPT THAT GLYCERINE SHALL REPLACE THE MINERAL OIL. A LEAKAGE RATE OF 1 X 10-8 CC-ATM-SEC OR GREATER SHALL CONSTITUTE A FAILURE.

QUALITY ASSURANCE REQUIREMENTS:
(1) LOT DEFINITION: A GROUP OF PARTS FROM A SINGLE PRODUCTION RUN SELECTED FROM A SINGLE CONTINUOUS PRODUCTION RUN WHICH IS THE SAME FROM THE BEGINNING TO THE END OF THE RUN.
(2) INSPECTION CONDITIONS: UNLESS OTHERWISE SPECIFIED, ALL INSPECTIONS SHALL BE MADE AT AN AMBIENT TEMPERATURE OF +25° ± 3°C.

(2) PRE-ELECTRICAL TEST PROCESSING: ON LOTS OF 500 OR LESS, THE TESTS OF TABLE I SHALL BE PERFORMED IN THE SEQUENCE INDICATED BEFORE THE TESTS OF TABLE II.
(2) ELECTRICAL TESTING: THE TESTS LISTED IN TABLE II SHALL BE PERFORMED AS LISTED BELOW:

COLLECTOR CUTOFF CURRENT
COLLECTOR-BASE BREAKDOWN VOLTAGE
EMITTER-BASE BREAKDOWN VOLTAGE
EMITTER-BASE REVERSE CURRENT
COLLECTOR-EMITTER SUSTAINING VOLTAGE
COLLECTOR-EMITTER CURRENT
COLLECTOR-EMITTER THRESHOLD CURRENT
DIRECT CURRENT GAIN
BASE-EMITTER SATURATION VOLTAGE
COLLECTOR-EMITTER SATURATION VOLTAGE
COLLECTOR CAPACITANCE
TURN-ON AND TURN-OFF TIME
TABLE I

PRE-ELECTRICAL TEST PROCESSING

<table>
<thead>
<tr>
<th>TEST</th>
<th>MIL-STD-750 TEST CONDITIONS</th>
<th>LOT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1 TO 500</td>
</tr>
<tr>
<td>THERMAL SHOCK*</td>
<td>METHOD 1056, CONDITION 8 (+150°C TO -65°C, 5 CYCLES)</td>
<td>100%</td>
</tr>
<tr>
<td>STORAGE LIFE*</td>
<td>METHOD 1051, Test = 150°F ± 5°F, 72 HOURS</td>
<td></td>
</tr>
<tr>
<td>CONSTANT ACCELERATION*</td>
<td>METHOD 2006 (20,000 G)</td>
<td></td>
</tr>
<tr>
<td>POWER, BURN-IN*</td>
<td>METHOD 1026</td>
<td></td>
</tr>
<tr>
<td>STABILIZATION</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

** NOTES:**

- THERMAL SHOCK:
  - Method: 1056, Condition 8
  - Test conditions: (+150°C TO -65°C, 5 CYCLES)

- STORAGE LIFE:
  - Method: 1051
  - Test = 150°F ± 5°F, 72 HOURS

- CONSTANT ACCELERATION:
  - Method: 2006 (20,000 G)

- POWER, BURN-IN:
  - Method: 1026

** TESTS TO BE PERFORMED IN ORDER INDICATED.**

** PULSE ≤ 300 U SECS AT ≤ 2% DUTY CYCLE.**

** LTPD OR PER MIL-S-19500, TABLE CI OR CII**

** THE PARAMETER MEASURED MAY NOT CHANGE ANY GREATER THAN THE PERCENTAGE SPECIFIED BETWEEN THE INITIAL VALUE AND THE END OF TEST VALUE. VALUES OF COLLECTOR AND EMITTER CUTOFF CURRENTS LESS THAN 10 NANOAMPERES MAY BE CONSIDERED TO BE 10 NANOAMPERES FOR CALCULATING PERCENTAGE CHANGE.**

** CURRENTS TO WITHIN ± 10%.**

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** HOUSTON, TEXAS**

** INSTRUMENTATION LAB**

** CAMAROCE, MASS.**

** TOLERANCES ON WORKS: 0. CONTRACT**

** FRACTIONS DECIMALS = ANGLES**

** APPROVAL TYPE PNP, SWITCHING**

** SPECIFICATION CONTROL DRAWING**

** TRANSISTOR, SILICON, TYPE PNP, SWITCHING**

** MASTER**

** UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES.**

** M.T.Y. INSTRUMENTATION LAB**

** SPECIFICATION CONTROL DRAWING**

** CODE IDENT NO. 80230 C 1006310**

** N.A.S.A. DRAWING NO.**

** MASTER**

** NEXT ASSY USED ON APPLICATION**

** FINAL FINISH NONE**

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** N.A.S.A. DRAWING NO.**

** MASTER**

** NEXT ASSY USED ON APPLICATION**

** FINAL FINISH NONE**
### TABLE II

#### ACCEPTANCE INSPECTION

<table>
<thead>
<tr>
<th>TEST</th>
<th>SYMBOL&lt;br&gt;(SEE NOTE 2 A (3))</th>
<th>MIN</th>
<th>MAX</th>
<th>LIMIT&lt;br&gt;LTPD&lt;sup&gt;**&lt;/sup&gt; = 10</th>
<th>LTPD&lt;sup&gt;**&lt;/sup&gt; = 10</th>
<th>LOT&lt;br&gt;MAX ACC NO. = 3</th>
<th>MAX ACC NO. = 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SUBGROUP 1</strong></td>
<td>VE&lt;sub&gt;CB&lt;/sub&gt; = -50 V; Ig = 0</td>
<td>10</td>
<td>NA</td>
<td>100%</td>
<td>LTPD&lt;sup&gt;**&lt;/sup&gt; = 2</td>
<td>(COMBINED)</td>
<td>MAX ACC NO. = 3</td>
</tr>
<tr>
<td><strong>VISUAL AND MECHANICAL EXAMINATION</strong></td>
<td>VCE = 0; VBE = 100 K</td>
<td>10</td>
<td>µA</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>COLLECTOR-CUTOFF CURRENT</strong></td>
<td>VCE = 0; VUB = -50 V</td>
<td>10</td>
<td>NA</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>COLLECTOR-CUTOFF CURRENT 150°C</strong></td>
<td>VCE = -50 V; Ig = 0</td>
<td>10</td>
<td>µA</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>COLLECTOR-BASE BREAKDOWN VOLTAGE</strong></td>
<td>VCE = -10 µA; Ig = 0</td>
<td>60</td>
<td>V</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>EMITTER-BASE REVERSE CURRENT</strong></td>
<td>VCE = -3 V; Ig = 0</td>
<td>5</td>
<td>V</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>EMITTER-BASE BREAKDOWN VOLTAGE</strong></td>
<td>VCE = -10 µA; Ig = 0</td>
<td>60</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>COLLECTOR-EMITTER SUSTAINING VOLTAGE</strong>&lt;sup&gt;**&lt;/sup&gt;</td>
<td>VCE = 20 V; Rce = 100 K</td>
<td>10</td>
<td>µA</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>COLLECTOR-EMITTER CURRENT RES. RETURN</strong></td>
<td>VCE = 0; VCE = 50 V</td>
<td>10</td>
<td>NA</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>COLLECTOR-EMITTER THRESHOLD CURRENT</strong></td>
<td>VCE = -150 m; VCE = -10 V</td>
<td>80</td>
<td>240</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>DC CURRENT GAIN</strong></td>
<td>VCE = -150 m; VCE = -10 V</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>DC CURRENT GAIN</strong></td>
<td>VCE = -150 m; VCE = -10 V</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>DC CURRENT GAIN</strong></td>
<td>VCE = -150 m; VCE = -10 V</td>
<td>30</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>BASE-EMITTER SATURATION VOLTAGE</strong></td>
<td>VCE(sat) = -50 m; Ig = -2.5 µA</td>
<td>0.7</td>
<td>-1.0</td>
<td>V</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>COLLECTOR-EMITTER SATURATION VOLTAGE</strong>&lt;sup&gt;**&lt;/sup&gt;</td>
<td>VCE(sat) = -50 m; Ig = -2.5 µA</td>
<td>0.25</td>
<td>V</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>COLLECTOR-EMITTER SATURATION VOLTAGE</strong>&lt;sup&gt;**&lt;/sup&gt;</td>
<td>VCE(sat) = -150 m; Ig = -15 m</td>
<td>0.4</td>
<td>V</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>COLLECTOR-CAPACITANCE</strong></td>
<td>VCE = -10 V; Ig = 0; P = 0.14 mc</td>
<td>8</td>
<td>PF</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TURN ON TIME</strong></td>
<td>t&lt;sub&gt;on&lt;/sub&gt; ≅ 1000 µsec</td>
<td>40</td>
<td>NSEC</td>
<td>LTPD&lt;sup&gt;**&lt;/sup&gt; = 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TURN OFF TIME</strong></td>
<td>t&lt;sub&gt;off&lt;/sub&gt; ≅ 1000 µsec</td>
<td>100</td>
<td>NSEC</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<sup>**</sup> UNLESS OTHERWISE SPECIFIED.

**DIMENSIONS ARE IN INCHES.

**TOLERANCES ON FRACTIONS DECIMALS ANGLES =±

**DO NOT SCALE THIS DRAWING.

**INSTRUMENTATION LAB MANNED SPACECRAFT CENTER

**CONSTRUCTION BASE

**HOUSTON, TEXAS

**TRANSISTOR, SILICON, TYPE PNP, SWITCHING SPECIFICATION CONTROL DRAWING

**MATERIAL APPROVAL.

**NASA APPROVAL.

**CONTRACT IDENT NO.

**NASA DRAWING NO.

**SHEET 3 OF 4

**MASTER
### TABLE III

**QUALITY DEMONSTRATION TESTS**

<table>
<thead>
<tr>
<th>SUBGROUP 1</th>
<th>MIL-STD-750 TEST CONDITIONS</th>
<th>LOT</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYSICAL DIMENSIONS</td>
<td>METHOD 2066</td>
<td>NO REQUIREMENTS</td>
</tr>
</tbody>
</table>

**SUBGROUP 2**

<table>
<thead>
<tr>
<th>TEST</th>
<th>CONDITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>THERMAL SHOCK</td>
<td>METHOD 1056.1 CONDITION B (+150°C TO -65°C, 5 CYCLES)</td>
</tr>
<tr>
<td>SEAL TEST</td>
<td>METHOD 1031.1</td>
</tr>
<tr>
<td>STORAGE LIFE</td>
<td>METHOD 1036.1</td>
</tr>
<tr>
<td>VIBRATION VARIABLE FREQUENCY</td>
<td>METHOD 2056</td>
</tr>
<tr>
<td>CONSTANT ACCELERATION</td>
<td>METHOD 2006, 20,000 G Y-AXIS</td>
</tr>
</tbody>
</table>

**SUBGROUP 3**

<table>
<thead>
<tr>
<th>TEST</th>
<th>CONDITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>SHOCK</td>
<td>METHOD 1500 ( t_g = 0.5 \text{ m.sec} )</td>
</tr>
<tr>
<td>VIBRATION VARIABLE FREQUENCY</td>
<td>METHOD 2006, 20,000 G Y-AXIS</td>
</tr>
</tbody>
</table>

**SUBGROUP 4**

<table>
<thead>
<tr>
<th>TEST</th>
<th>CONDITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>OPERATION LIFE</td>
<td>METHOD 1026.1</td>
</tr>
<tr>
<td>LEAD TENTION (COND A)</td>
<td>4 POUND LOAD FOR 10 SECONDS</td>
</tr>
<tr>
<td>LEAD FATIGUE (COND E)</td>
<td>3 ARCS</td>
</tr>
</tbody>
</table>

**SUBGROUP 5**

<table>
<thead>
<tr>
<th>TEST</th>
<th>CONDITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>END POINTS FOR COLLECTOR CUTOFF CURRENT</td>
<td>( I_{CB0} )</td>
</tr>
<tr>
<td>Emitter-Base Reverse Current</td>
<td>( I_{EB0} )</td>
</tr>
<tr>
<td>DC CURRENT GAIN</td>
<td>( I_{CE} )</td>
</tr>
</tbody>
</table>

**END POINTS FOR COLLECTOR CUTOFF CURRENT**

- \( I_{CB0} \) = -0.0 V, \( I_{C} \) = 0
- \( I_{EB0} \) = -0.0 V, \( I_{C} \) = 0
- \( I_{CE} \) = \( -10 \) mA

**END POINTS FOR COLLECTOR CUTOFF CURRENT**

- \( I_{CB0} \) = -0.0 V, \( I_{C} \) = 0
- \( I_{EB0} \) = -0.0 V, \( I_{C} \) = 0
- \( I_{CE} \) = \( -10 \) mA

**END POINTS FOR COLLECTOR CUTOFF CURRENT**

- \( I_{CB0} \) = -0.0 V, \( I_{C} \) = 0
- \( I_{EB0} \) = -0.0 V, \( I_{C} \) = 0
- \( I_{CE} \) = \( -10 \) mA

**END POINTS FOR COLLECTOR CUTOFF CURRENT**

- \( I_{CB0} \) = -0.0 V, \( I_{C} \) = 0
- \( I_{EB0} \) = -0.0 V, \( I_{C} \) = 0
- \( I_{CE} \) = \( -10 \) mA

**END POINTS FOR COLLECTOR CUTOFF CURRENT**

- \( I_{CB0} \) = -0.0 V, \( I_{C} \) = 0
- \( I_{EB0} \) = -0.0 V, \( I_{C} \) = 0
- \( I_{CE} \) = \( -10 \) mA

**END POINTS FOR COLLECTOR CUTOFF CURRENT**

- \( I_{CB0} \) = -0.0 V, \( I_{C} \) = 0
- \( I_{EB0} \) = -0.0 V, \( I_{C} \) = 0
- \( I_{CE} \) = \( -10 \) mA

**END POINTS FOR COLLECTOR CUTOFF CURRENT**

- \( I_{CB0} \) = -0.0 V, \( I_{C} \) = 0
- \( I_{EB0} \) = -0.0 V, \( I_{C} \) = 0
- \( I_{CE} \) = \( -10 \) mA

**END POINTS FOR COLLECTOR CUTOFF CURRENT**

- \( I_{CB0} \) = -0.0 V, \( I_{C} \) = 0
- \( I_{EB0} \) = -0.0 V, \( I_{C} \) = 0
- \( I_{CE} \) = \( -10 \) mA

---

**LIST OF MATERIALS**

- **UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES**
- **TOLERANCES ON FRACTIONS DECIMALS ANGLES**
- **SEE NOTE MATERIAL**
- **DO NOT SCALE THIS DRAWING**
- **CHECKED AND APPRoved DATE Unclassified**
- **INSTRUMENTATION LAB**
- **MANNED SPACECRAFT CENTER HOUSTON, TEXAS**
- **TRANSISTOR, SILICON, TYPE PNP SWITCHING SPECIFICATION CONTROL DRAWING**
- **NASA DRAWING NO. 80230**
- **CODE IDENT NO. C 1006310**
- **SHEET 4 OF 4**

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**CONTACT INFO**

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- **INSTRUMENTATION LAB**
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- **SHEET 4 OF 4**

---

**REVISIONS**

- **A UPGRADED TO CLASS A WITH CHANGE PER TDRR 17369**
- **B REVISED PER TDRR 20618**