DEFINITIONS:

(1) A SHIPMENT LOT IS DEFINED AS A GROUP OF PARTS ASSEMBLED FROM DIFFUSION SUB-LOTS AND DATE CODES WHICH ARE SHIPPED AT ONE TIME WHICH HAVE BEEN FABRICATED IN A SINGLE CONTINUOUS PRODUCTION RUN USING LIKE MATERIALS WHICH ARE CONTROLLED USING A CONTROLLED PROCESS. NO PROCESS CHANGES DEFINED AS CRITICAL BY MIL-STD-440A NEGOTIATION MAY BE CHANGED DURING THE FABRICATION OF A SHIPMENT LOT. MAXIMUM NUMBER OF UNITS SHIPPED IN A LOT SHALL BE 5,000. A MAXIMUM OF 100 DIFFUSION SUB-LOTS MAY BE USED TO ASSEMBLE ONE SHIPMENT LOT. A SHIPMENT LOT MAY INCLUDE MORE THAN ONE DATE CODE LOT.

(2) A DIFFUSION SUB-LOT IS DEFINED AS A GROUP OF PARTS FABRICATED FROM MATERIALS WHICH WERE PROCESSED THROUGH DIFFUSION MASKING, ETCHING AND METALLIZATION AT ONE TIME (A SINGLE BATCH). THIS SUB-LOT IDENTIFICATION MUST BE MAINTAINED THROUGH SUBSEQUENT STAGES OF ASSEMBLY AND TEST. A DIFFUSION SUB-LOT SHALL BE SEALED WITH ONLY ONE DATE CODE.

(3) THE NOMINAL LEAD DIMENSIONS AS REQUIRED BY PARAGRAPH 3.C. ARE SHIPPED AT ONE TIME WHICH HAVE BEEN FABRICATED IN A SINGLE CONTINUOUS PRODUCTION RUN USING LIKE MATERIALS WHICH ARE CONTROLLED USING A CONTROLLED PROCESS. NO PROCESS CHANGES DEFINED AS CRITICAL BY MIL-STD-440A NEGOTIATION MAY BE CHANGED DURING THE FABRICATION OF A SHIPMENT LOT. MAXIMUM NUMBER OF UNITS SHIPPED IN A LOT SHALL BE 5,000. A MAXIMUM OF 100 DIFFUSION SUB-LOTS MAY BE USED TO ASSEMBLE ONE SHIPMENT LOT. A SHIPMENT LOT MAY INCLUDE MORE THAN ONE DATE CODE LOT.

(4) THE PRE-SEAL TEST DATA REQUIRED BY PARAGRAPH 4.C.

(5) THE SUBGROUP 1 AND 3 TEST DATA REQUIRED BY TABLE II.

REQUIREMENTS:

1. GENERAL:

A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-STD-440A.

B. UNITS SHALL MEET THE REQUIREMENTS OF MIL-STD-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.


E. PREPARATION FOR DELIVERY SHALL BE IN ACCORDANCE WITH ND 1002215, CLASS 1, CODE 2.

(1) MARKING OF SHIPPING CONTAINERS SHALL CONFORM TO THE MARKINGS OF UNIT AND INTERMEDIATE PACKAGES AND THE METHODS OF MARKING AS SPECIFIED IN ND 1002215.

F. THE SHIPMENT LOTS, MADE UP OF UNITS AS SPECIFIED BY THIS DRAWING, MUST MEET THE REQUIREMENTS OF ND 1002248, WHEN PROCESSED AS SPECIFIED IN ND 1002248, PERFORMED AT THE BUYER'S PLANT.

2. ACCEPTANCE AND INSPECTION: QUALITY DEMONSTRATION PER TABLES I AND II.

A. DEFINITIONS:

(1) THE TESTS AS DEFINED IN TABLE I SHALL BE PERFORMED BY THE QUALITY CONTROL DEPARTMENT OF THE VENDOR.

(2) UNLESS OTHERWISE SPECIFIED HEREIN, ALL ELECTRICAL TESTS MUST BE REFERENCED TO AN AMBIENT TEMPERATURE OF PLUS 25 PLUS OR MINUS 1/2 DEGREE CENTIGRADE.

(3) THE PRE-SEAL TEST PER TABLE I SHALL BE PERFORMED AFTER THE FINAL PRODUCTION INTERNAL VISUAL INSPECTION AND PRIOR TO SEALING.

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

C. VENDOR SUPPLIED INFORMATION: THE FOLLOWING DATA AND INFORMATION IS TO BE SUPPLIED WITH EACH SHIPMENT. ALL INFORMATION SUPPLIED WILL REFERENCE THE UNIT PART NUMBER, APPLICABLE PURCHASE ORDER NUMBER, QUANTITY AND DATE OF SHIPMENT, AND THE APPLICABLE DATE CODES OR DIFFUSION LOT CODES.

(1) A CERTIFICATE OF COMPLIANCE COVERING LEAD MATERIAL REQUIREMENTS OF PARAGRAPH 3.C. (3).

(2) A CERTIFICATE OF COMPLIANCE COVERING THE REQUIREMENTS OF ND 1015404.

(3) THE NOMINAL LEAD DIMENSIONS AS REQUIRED BY PARAGRAPH 3.C.

(4) THE PRE-SEAL INSPECTION DATA REQUIRED BY PARAGRAPH 4.C.

(5) THE SUBGROUP 1 AND 3 TEST DATA REQUIRED BY TABLE II.

D. SELECTION OF UNITS FOR TEST:

(1) THE SAMPLE USED FOR TABLE I IT SHALL BE RANDOMLY SELECTED FROM THE WHOLE GROUP OF UNITS WHICH CONSTITUTE A SHIPMENT LOT.

(2) A SHIPMENT LOT MAY BE RESUBMITTED FOR TABLE II SUBGROUP 1 AND 3. THE REQUIREMENT OF MIL-STD-19500 GROUP 1 & 3 FOR LOT RESUBMITTAL SHALL APPLY WITH THE TIGHTER INSPECTION FOR THE CHARACTERISTICS WHICH FAILED.

E. PREPARATION FOR DELIVERY SHALL BE IN ACCORDANCE WITH...

F. THE SHIPMENT LOTS, MADE UP OF UNITS AS SPECIFIED BY THIS DRAWING, MUST MEET THE REQUIREMENTS OF ND 1002248, WHEN PROCESSED AS SPECIFIED IN ND 1002248, PERFORMED AT THE BUYER'S PLANT.

G. THE SHIPMENT LOTS, MADE UP OF UNITS AS SPECIFIED BY THIS DRAWING, MUST MEET THE REQUIREMENTS OF ND 1002248, WHEN PROCESSED AS SPECIFIED IN ND 1002248, PERFORMED AT THE BUYER'S PLANT.

H. THE SHIPMENT LOTS, MADE UP OF UNITS AS SPECIFIED BY THIS DRAWING, MUST MEET THE REQUIREMENTS OF ND 1002248, WHEN PROCESSED AS SPECIFIED IN ND 1002248, PERFORMED AT THE BUYER'S PLANT.

I. THE SHIPMENT LOTS, MADE UP OF UNITS AS SPECIFIED BY THIS DRAWING, MUST MEET THE REQUIREMENTS OF ND 1002248, WHEN PROCESSED AS SPECIFIED IN ND 1002248, PERFORMED AT THE BUYER'S PLANT.

J. THE SHIPMENT LOTS, MADE UP OF UNITS AS SPECIFIED BY THIS DRAWING, MUST MEET THE REQUIREMENTS OF ND 1002248, WHEN PROCESSED AS SPECIFIED IN ND 1002248, PERFORMED AT THE BUYER'S PLANT.

K. THE SHIPMENT LOTS, MADE UP OF UNITS AS SPECIFIED BY THIS DRAWING, MUST MEET THE REQUIREMENTS OF ND 1002248, WHEN PROCESSED AS SPECIFIED IN ND 1002248, PERFORMED AT THE BUYER'S PLANT.

L. THE SHIPMENT LOTS, MADE UP OF UNITS AS SPECIFIED BY THIS DRAWING, MUST MEET THE REQUIREMENTS OF ND 1002248, WHEN PROCESSED AS SPECIFIED IN ND 1002248, PERFORMED AT THE BUYER'S PLANT.

M. THE SHIPMENT LOTS, MADE UP OF UNITS AS SPECIFIED BY THIS DRAWING, MUST MEET THE REQUIREMENTS OF ND 1002248, WHEN PROCESSED AS SPECIFIED IN ND 1002248, PERFORMED AT THE BUYER'S PLANT.

N. THE SHIPMENT LOTS, MADE UP OF UNITS AS SPECIFIED BY THIS DRAWING, MUST MEET THE REQUIREMENTS OF ND 1002248, WHEN PROCESSED AS SPECIFIED IN ND 1002248, PERFORMED AT THE BUYER'S PLANT.

O. THE SHIPMENT LOTS, MADE UP OF UNITS AS SPECIFIED BY THIS DRAWING, MUST MEET THE REQUIREMENTS OF ND 1002248, WHEN PROCESSED AS SPECIFIED IN ND 1002248, PERFORMED AT THE BUYER'S PLANT.

P. THE SHIPMENT LOTS, MADE UP OF UNITS AS SPECIFIED BY THIS DRAWING, MUST MEET THE REQUIREMENTS OF ND 1002248, WHEN PROCESSED AS SPECIFIED IN ND 1002248, PERFORMED AT THE BUYER'S PLANT.

Q. THE SHIPMENT LOTS, MADE UP OF UNITS AS SPECIFIED BY THIS DRAWING, MUST MEET THE REQUIREMENTS OF ND 1002248, WHEN PROCESSED AS SPECIFIED IN ND 1002248, PERFORMED AT THE BUYER'S PLANT.

R. THE SHIPMENT LOTS, MADE UP OF UNITS AS SPECIFIED BY THIS DRAWING, MUST MEET THE REQUIREMENTS OF ND 1002248, WHEN PROCESSED AS SPECIFIED IN ND 1002248, PERFORMED AT THE BUYER'S PLANT.

S. THE SHIPMENT LOTS, MADE UP OF UNITS AS SPECIFIED BY THIS DRAWING, MUST MEET THE REQUIREMENTS OF ND 1002248, WHEN PROCESSED AS SPECIFIED IN ND 1002248, PERFORMED AT THE BUYER'S PLANT.

T. THE SHIPMENT LOTS, MADE UP OF UNITS AS SPECIFIED BY THIS DRAWING, MUST MEET THE REQUIREMENTS OF ND 1002248, WHEN PROCESSED AS SPECIFIED IN ND 1002248, PERFORMED AT THE BUYER'S PLANT.

U. THE SHIPMENT LOTS, MADE UP OF UNITS AS SPECIFIED BY THIS DRAWING, MUST MEET THE REQUIREMENTS OF ND 1002248, WHEN PROCESSED AS SPECIFIED IN ND 1002248, PERFORMED AT THE BUYER'S PLANT.

V. THE SHIPMENT LOTS, MADE UP OF UNITS AS SPECIFIED BY THIS DRAWING, MUST MEET THE REQUIREMENTS OF ND 1002248, WHEN PROCESSED AS SPECIFIED IN ND 1002248, PERFORMED AT THE BUYER'S PLANT.

W. THE SHIPMENT LOTS, MADE UP OF UNITS AS SPECIFIED BY THIS DRAWING, MUST MEET THE REQUIREMENTS OF ND 1002248, WHEN PROCESSED AS SPECIFIED IN ND 1002248, PERFORMED AT THE BUYER'S PLANT.

X. THE SHIPMENT LOTS, MADE UP OF UNITS AS SPECIFIED BY THIS DRAWING, MUST MEET THE REQUIREMENTS OF ND 1002248, WHEN PROCESSED AS SPECIFIED IN ND 1002248, PERFORMED AT THE BUYER'S PLANT.

Y. THE SHIPMENT LOTS, MADE UP OF UNITS AS SPECIFIED BY THIS DRAWING, MUST MEET THE REQUIREMENTS OF ND 1002248, WHEN PROCESSED AS SPECIFIED IN ND 1002248, PERFORMED AT THE BUYER'S PLANT.

Z. THE SHIPMENT LOTS, MADE UP OF UNITS AS SPECIFIED BY THIS DRAWING, MUST MEET THE REQUIREMENTS OF ND 1002248, WHEN PROCESSED AS SPECIFIED IN ND 1002248, PERFORMED AT THE BUYER'S PLANT.
2. **E. Lead Dimensions:** The parts supplied in any shipment lot must be uniform with respect to lead dimensions. The lead thickness shall be within ±0.005 inches of a nominal value to be specified by the vendor. The lead width shall be within ±0.001 inches of a nominal value also to be supplied. The nominal values for each shipping lot will be supplied with the applicable shipment.

3. **Design:**

   A. Absolute Maximum Ratings at 25°C Ambient:
      
      1. Voltage to Pin 1 to: Plus 10.0 Volts with respect to Pin 5.
      2. Voltage applied to any input pin plus or minus 6 Volts with respect to Pin 5.

   B. Temperature:
      
      1. Temperature range, junction, operating: -55°C to +125°C.
      2. Temperature range, junction, storage: -65°C to +150°C.
      3. Temperature, soldering leads: +260°C (1 minute max).

   C. Construction:
      
      1. Semiconductor: Silicon, NPN.
      2. Enclosure: A Hermetically sealed package electrically isolated from power or ground. The dimensions of which meet the requirements of Figure 1 and Paragraph 2.E.
      3. Leads:
         
         Lead material shall be in accordance with NASA Document PS 105402 with the following exceptions:
         
         Gold plate shall be a minimum of 100 and a maximum of 200 micro inches. The nickel strike under the gold shall be optional but if used shall be a maximum of 100 micro inches. Paragraph 5.4.2 shall not apply. Certificate of Compliance for Lead Material shall accompany each lot shipped.

4. Test Methods: (Ref. MIL-STD-750 with exceptions noted below).

   A. Average Propagation Delay (\(T_{PD}\)): Measurements shall be performed on each input using test circuit specified in Figure 2 made up of acceptable units where \(T_{PD} = (T_{1} + T_{2})/2\). Voltage 4V ± 10% during test all unused bases shall be grounded.

---

**D REPLACES REV(C) WITH CHANGES**

**MATERIAL**

- **UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES, CAPACITOR VALUES ARE IN \(\mu F\), RESISTOR VALUES ARE IN OHMS, TOLERANCE ON FRACTIONS DECIMALS ANGLES DO NOT SCALE THIS DRAWING**

**DRAWING NO.**

- 80230 C

**Drawing No.**

- 1006321

**SPECIFICATION CONTROL DRAWING**

- DUAL NOR GATE (FLAT PACK)

**INSTRUMENTATION LAB**

- CAMBRIDGE, MASS.

**MANNED SPACECRAFT CENTER**

- HOUSTON, TEXAS

**DUAL NOR GATE (FLAT PACK)**

**SPECIFICATION CONTROL DRAWING**

**INSTRUMENTATION LAB**

- CAMBRIDGE, MASS.

**MANNED SPACECRAFT CENTER**

- HOUSTON, TEXAS
9. VISUAL AND MECHANICAL EXTERNAL EXAMINATION:

Markings shall be legible. The case finish shall have no flaking, spattering, chipping, or holes. The glass or ceramic shall have no seal impairing cracks. Re-entrance at the glass, ceramic or solder seal shall not extend to over 5% of the seal width. No foreign matter shall be in or on the seal interface. Leads shall be free from nicks and nicks and shall maintain a uniform thickness within lead specifications. The units shall comply with the specified lead material requirement. Lead section (a) may be cut from the lead preform and shall not be subjected to physical examination. No body paint shall be on the leads or package seal area.

C. PRE-SEAL VISUAL INSPECTION: The pre-seal visual inspection shall be performed using the minimum criteria of MIL-22577 Rev A. The diffusion sublot shall be utilized for sampling specified in Table I. Data shall accompany each shipment covering the number of sub-lots tested, the number of units that failed from each sub-lot, the cause of failure, and the number of times each sub-lot was resubmitted to Table I test.

**TABLE I**

<table>
<thead>
<tr>
<th>TEST</th>
<th>TEST CONDITIONS</th>
<th>DIFFUSION SUB-LOT</th>
</tr>
</thead>
<tbody>
<tr>
<td>VISUAL INTERNAL INSPECTION</td>
<td>SEE NOTE A.2.C.</td>
<td>LTTP = 7</td>
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**TABLE II**

<table>
<thead>
<tr>
<th>PRE-SEAL VISUAL INSPECTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>TEST</td>
</tr>
<tr>
<td>------</td>
</tr>
<tr>
<td>VISUAL INTERNAL</td>
</tr>
</tbody>
</table>

[Diagram and Table]
<table>
<thead>
<tr>
<th>TEST</th>
<th>SYMBOL</th>
<th>TEST CONDITIONS</th>
<th>LIMITS</th>
<th>UNITS</th>
<th>LOT</th>
</tr>
</thead>
<tbody>
<tr>
<td>SUBGROUP 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VISUAL AND MECHANICAL EXAMINATION</td>
<td>-</td>
<td>METHOD DFT</td>
<td>-</td>
<td>-</td>
<td>METHOD 10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SEE NOTE 3 D (a)</td>
<td></td>
<td></td>
<td>MAX. ACC. NO. 3</td>
</tr>
<tr>
<td>SUBGROUP 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BASE CURRENT</td>
<td>Ia</td>
<td>+870Ω/2kΩ</td>
<td>152</td>
<td>µA</td>
<td>1000 TESTING</td>
</tr>
<tr>
<td></td>
<td>Ia</td>
<td>+1800Ω/10kΩ</td>
<td>152</td>
<td>µA</td>
<td>REQUIRED</td>
</tr>
<tr>
<td></td>
<td>Ia</td>
<td>+870Ω/2kΩ</td>
<td>152</td>
<td>µA</td>
<td></td>
</tr>
<tr>
<td>OUTPUT VOLT PIN 1-9</td>
<td>V0</td>
<td>+770Ω/2kΩ OPEN</td>
<td>300</td>
<td>mV</td>
<td></td>
</tr>
<tr>
<td></td>
<td>V0</td>
<td>OPEN</td>
<td>+770Ω/2kΩ OPEN</td>
<td>300</td>
<td>mV</td>
</tr>
<tr>
<td>SAT VOLT PIN 1-9</td>
<td>V5</td>
<td>+770Ω/2kΩ OPEN</td>
<td>220</td>
<td>mV</td>
<td></td>
</tr>
<tr>
<td></td>
<td>V5</td>
<td>OPEN</td>
<td>+770Ω/2kΩ OPEN</td>
<td>220</td>
<td>mV</td>
</tr>
<tr>
<td>OUTPUT CURRENT PIN 1-9</td>
<td>I0</td>
<td>+500Ω/2kΩ OPEN</td>
<td>760</td>
<td>µA</td>
<td></td>
</tr>
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<td>COLLECTOR-EMITTER</td>
<td>ICd</td>
<td>+500Ω/2kΩ OPEN</td>
<td>760</td>
<td>µA</td>
<td></td>
</tr>
<tr>
<td>THRESHOLD CURRENT</td>
<td>IEd=5mA</td>
<td>(PULSED) PINS 1-9 &amp; 5</td>
<td>100</td>
<td>µA</td>
<td>METHOD 5</td>
</tr>
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<td></td>
<td>ICd</td>
<td>OPEN</td>
<td>+55.1V OPEN</td>
<td>100</td>
<td>µA</td>
</tr>
<tr>
<td>INTERFACE TEST</td>
<td>R1</td>
<td>870Ω/2kΩ OPEN</td>
<td>400</td>
<td>mV</td>
<td>MAX. ACC. NO. 3</td>
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<tr>
<td></td>
<td>R2</td>
<td>OPEN</td>
<td>870Ω/2kΩ OPEN</td>
<td>400</td>
<td>mV</td>
</tr>
<tr>
<td>COLLECTOR Emitter Sustaining Voltage</td>
<td>ICd</td>
<td>1µF = 5mS (PULSED) PINS 1-9 &amp; 5</td>
<td>5</td>
<td>mS</td>
<td>MAX. ACC. NO. 3</td>
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<tr>
<td>AVERAGE PROPAGATION DELAY</td>
<td>Tp</td>
<td>SEE NOTE 3 D (a) AND FIGURE 1</td>
<td>24</td>
<td>msec</td>
<td>METHOD 7</td>
</tr>
<tr>
<td>COLLECTOR RESISTANCE</td>
<td>RL</td>
<td>BETWEEN PINS 10 AND 1.9</td>
<td>2.7</td>
<td>KΩ</td>
<td>MAX. ACC. NO. 3</td>
</tr>
<tr>
<td>B.C. CURRENT GAIN</td>
<td>PME</td>
<td>1Ω = 1mA, 1KΩ = 0.5V ALL TRANSISTORS</td>
<td>100</td>
<td>µA</td>
<td>MAX. ACC. NO. 3</td>
</tr>
</tbody>
</table>

* LTPD PER MIL-S-19500C, TABLE IV
** SAMPLE SIZE USED BY THE BUYER AND VENDOR SHALL BE THE SAME AND SHALL CORRESPOND TO THE MAX ACC NUMBER SPECIFIED IN MIL-S-19500C, TABLE IV.
*** MEASUREMENTS TO BE MADE ON GATE 1 AND GATE 2.
**** TEXTRONIX SAMPLING PROBE P6032 WITH 50Ω ATTENUATOR.
***** TEST TO BE PERFORMED IN SEQUENCE INDICATED.