



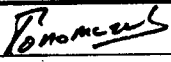
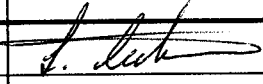
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Pages 1 to 36

**INTEGRATED CIRCUITS, SILICON MONOLITHIC,
QUAD EIA-422/423 LINE RECEIVER WITH
3-STATE OUTPUTS,
BASED ON TYPE AM26LS32
ESA/SCC Detail Specification No. 9403/003**



**space components
coordination group**

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| Issue 1 | February 1993 |  |  |
| | | | |
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SCC

ESA/SCC Detail Specification
No. 9403/003

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DOCUMENTATION CHANGE NOTICE

| Rev. Letter | Rev. Date | Reference | CHANGE Item | Approved DCR No. |
|----------------|--------------|-----------|----------------|---------------------|
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APPENDICES (Applicable to specific Manufacturers only)

None.

**1. GENERAL****1.1 SCOPE**

This specification details the ratings, physical and electrical characteristics, test and inspection data for a silicon monolithic, low power, Quad EIA-422/423 Line Receiver with 3-State Outputs, based on Type AM26LS32. It shall be read in conjunction with ESA/SCC Generic Specification No. 9000, the requirements of which are supplemented herein.

1.2 COMPONENT TYPE VARIANTS

Variants of the basic type integrated circuits specified herein, which are also covered by this specification, are given in Table 1(a).

1.3 MAXIMUM RATINGS

The maximum ratings, which shall not be exceeded at any time during use or storage, applicable to the integrated circuits specified herein, are as scheduled in Table 1(b).

1.4 PARAMETER DERATING INFORMATION

As per Figure 1.

1.5 PHYSICAL DIMENSIONS

As per Figure 2.

1.6 PIN ASSIGNMENT

As per Figure 3(a).

1.7 TRUTH TABLE

As per Figure 3(b).

1.8 CIRCUIT SCHEMATIC

As per Figure 3(c).

1.9 FUNCTIONAL DIAGRAM

As per Figure 3(d).

TABLE 1(a) - TYPE VARIANTS

| VARIANT | BASED ON TYPE | CASE | FIGURE | LEAD MATERIAL AND/OR FINISH |
|---------|---------------|--------------|--------|-----------------------------|
| 01 | AM26LS32 | DIL | 2(a) | G4 |
| 02 | AM26LS32 | FLAT | 2(b) | G4 |
| 03 | AM26LS32 | DIL | 2(c) | G4 |
| 04 | AM26LS32 | CHIP CARRIER | 2(d) | 7 |
| 05 | AM26LS32 | CHIP CARRIER | 2(d) | 4 |

TABLE 1(b) - MAXIMUM RATINGS

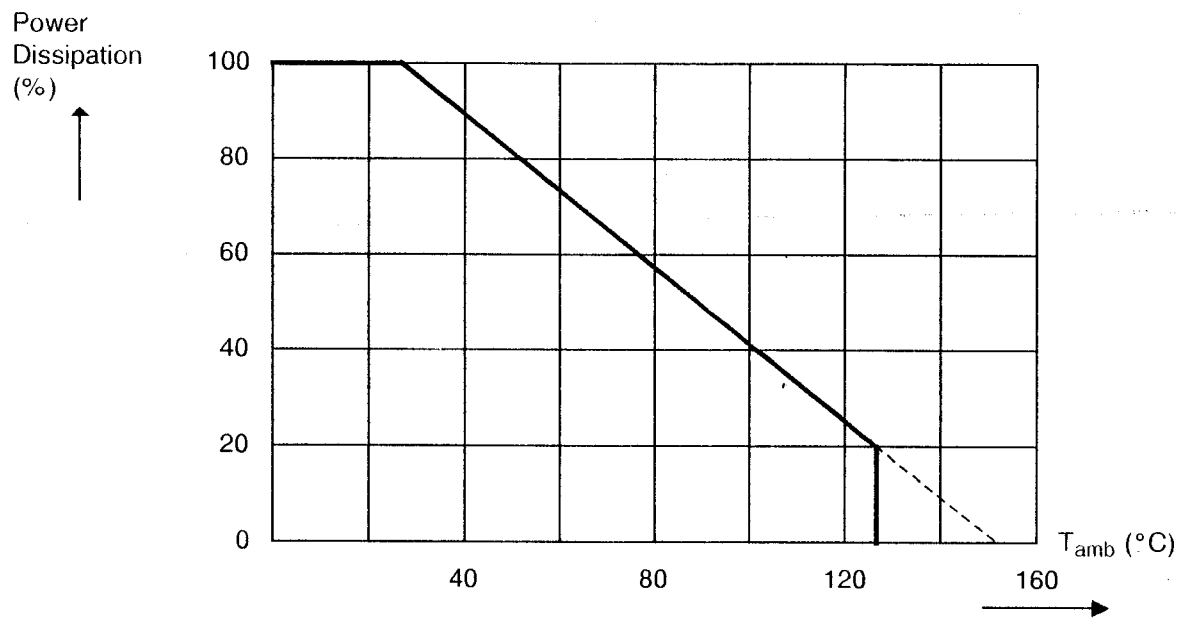
| No. | CHARACTERISTICS | SYMBOL | MAXIMUM RATINGS | UNIT | REMARKS |
|-----|---|----------------|-------------------|---------------|------------------|
| 1 | Supply Voltage | V_{CC} | 7.0 | V | - |
| 2 | Control Input Voltage | V_{CTRL} | 7.0 | V | - |
| 3 | Input Common Mode Voltage | V_{ICM} | ± 25 | V | - |
| 4 | Input Differential Voltage | V_{ID} | ± 25 | V | - |
| 5 | Output Sink Current | I_{OUT} | 50 | mA | - |
| 6 | Power Dissipation Variant 01 Variant 02 Variants 03 to 05 | P_{tot} | 1.2 1.0 1.4 | W | Note 1 |
| 7 | Operating Temperature Range | T_{op} | - 55 to + 125 | $^{\circ}C$ | T_{amb} |
| 8 | Storage Temperature Range | T_{stg} | - 65 to + 150 | $^{\circ}C$ | - |
| 9 | Soldering Temperature For DIL For FP and CCP | T_{sol} | + 300 | $^{\circ}C$ | Note 2 Noté 3 |
| 10 | Junction Temperature | T_J | + 150 | $^{\circ}C$ | - |
| 11 | Thermal Resistance Variant 01 Variant 02 Variants 03 to 05 | $R_{TH (J-A)}$ | 100 125 91 | $^{\circ}C/W$ | |

NOTES

1. At $T_{amb} = +25^{\circ}C$. For derating at $T_{amb} > +25^{\circ}C$, see Figure 1.
2. Duration 10 seconds maximum at a distance of not less than 1.5mm from the package and the same lead shall not be resoldered until 3 minutes have elapsed.
3. Duration 5 seconds maximum at a distance of not less than 1.5mm from the package and the same lead shall not be resoldered until 3 minutes have elapsed.



FIGURE 1 - PARAMETER DERATING INFORMATION

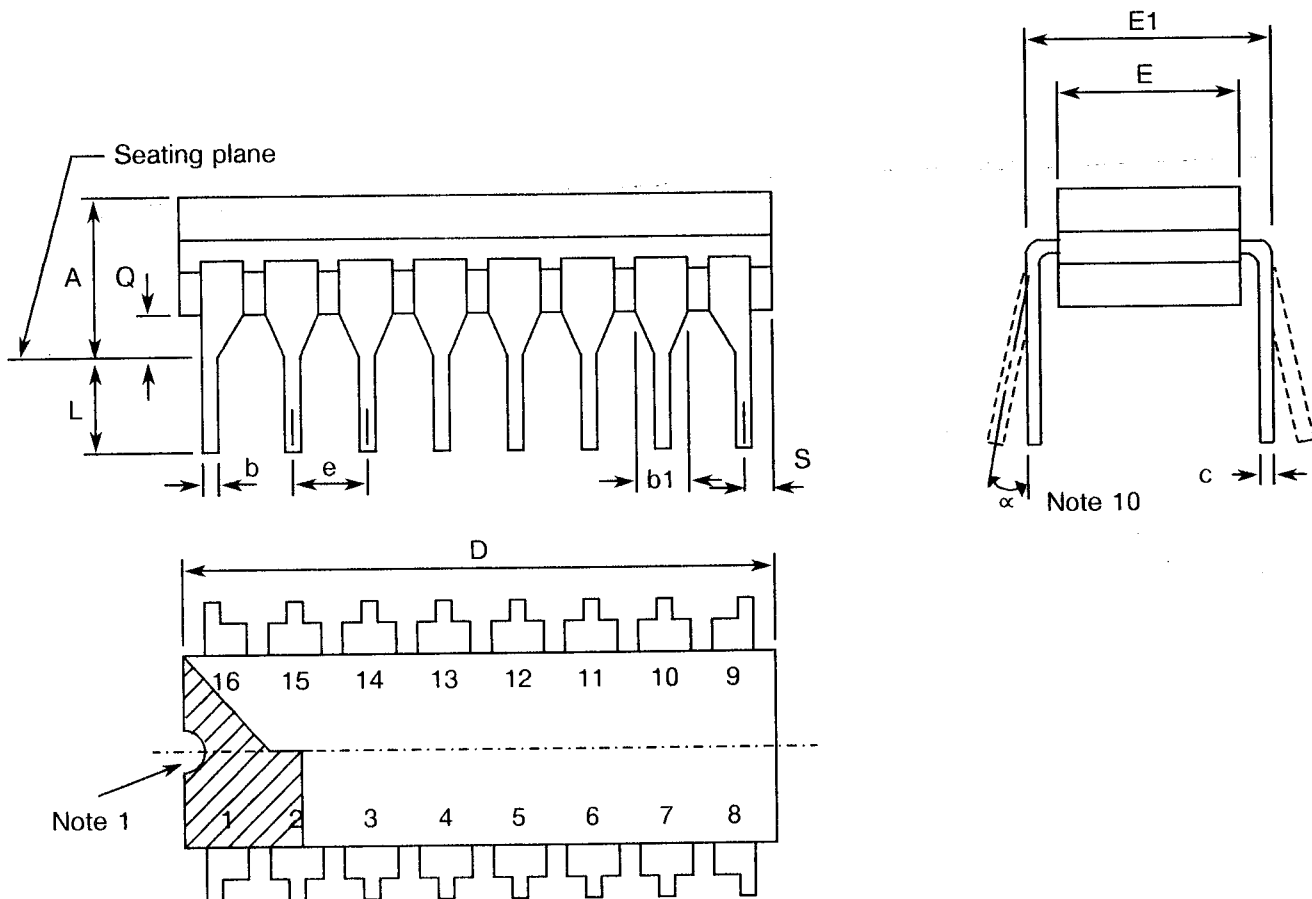


Total Device Dissipation versus Temperature



FIGURE 2 - PHYSICAL DIMENSIONS

FIGURE 2(a) - DUAL-IN-LINE PACKAGE, 16-PIN



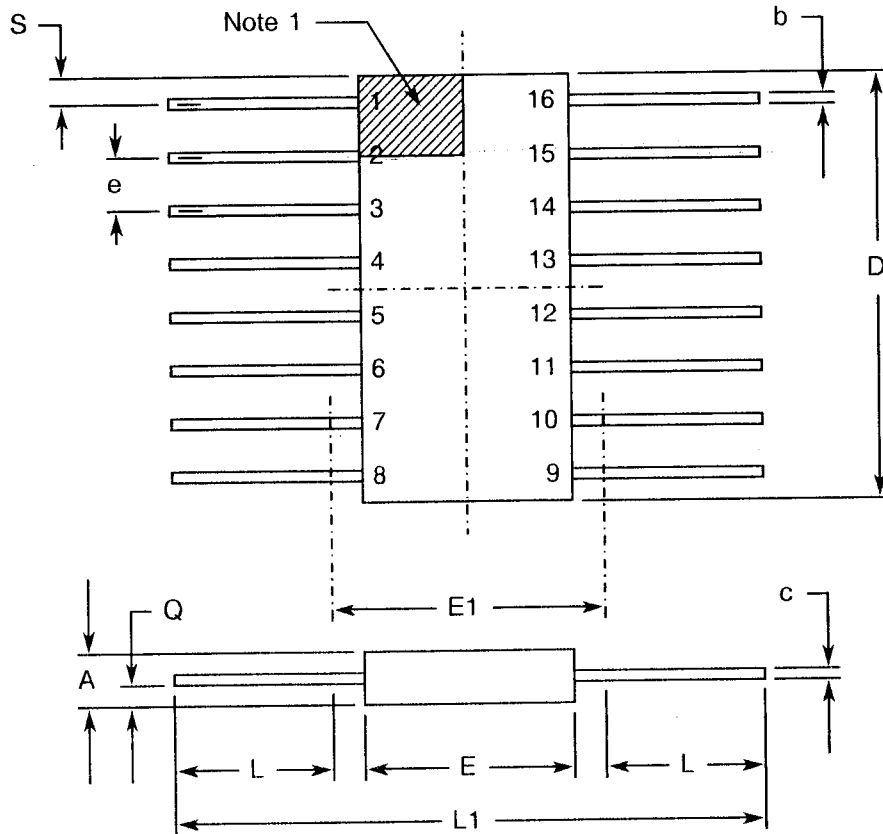
| SYMBOL | MILLIMETRES | | NOTES |
|--------|--------------|-------|-------|
| | MIN | MAX | |
| A | - | 5.08 | |
| b | 0.39 | 0.50 | 8 |
| b1 | 1.40 | 1.65 | 8 |
| c | 0.21 | 0.38 | 8 |
| D | 19.05 | 19.95 | 4 |
| E | 6.10 | 7.49 | 4 |
| E1 | 7.62 TYPICAL | | |
| e | 2.54 TYPICAL | | 6, 9 |
| L | 3.18 | 4.31 | 8 |
| Q | 0.51 | 1.01 | 3 |
| S | 0.40 | 1.10 | 7 |
| a | 0° | 15° | 10 |

NOTES: See Page 12.



FIGURE 2 - PHYSICAL DIMENSIONS (CONTINUED)

FIGURE 2(b) - FLAT PACKAGE, 16-PIN



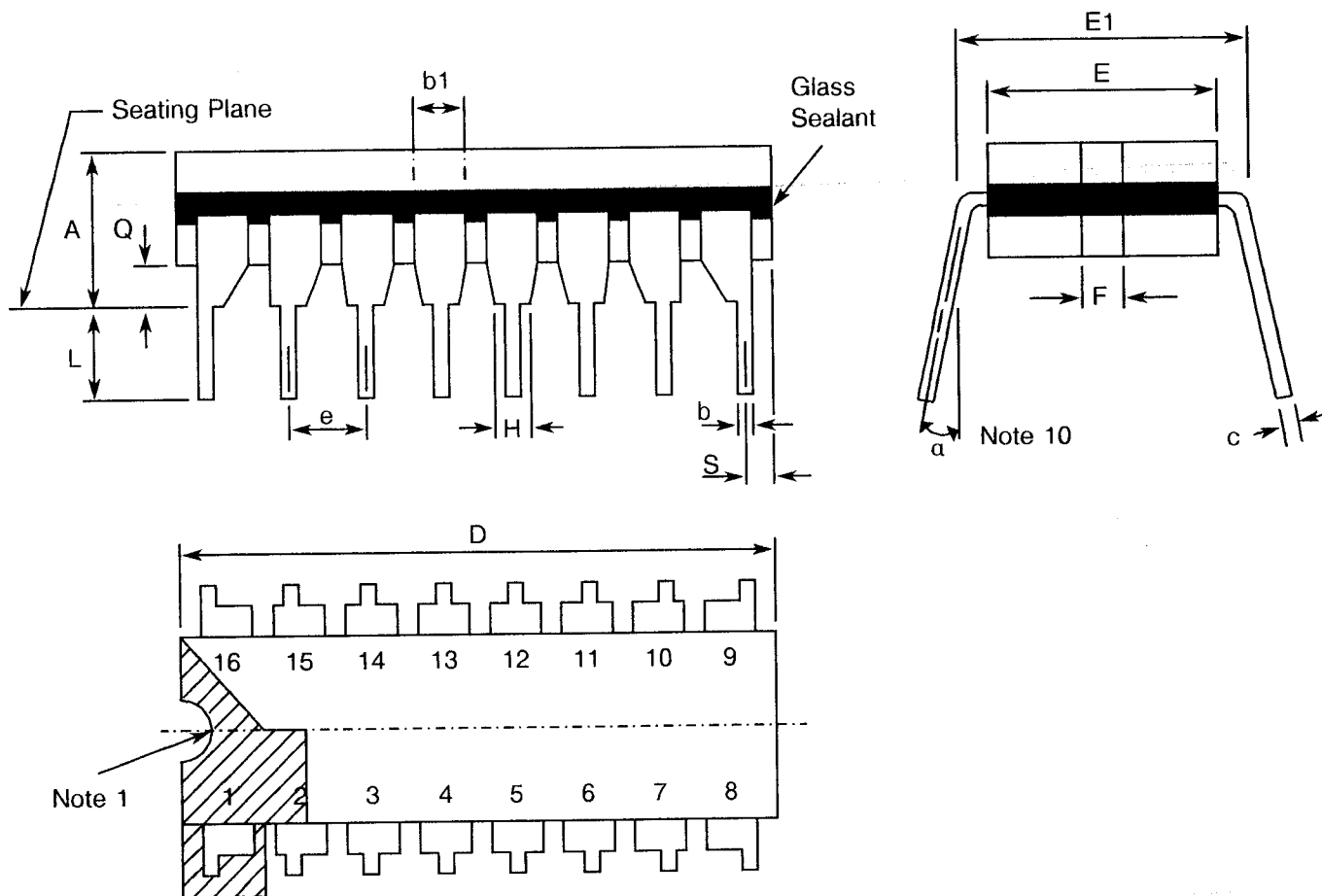
| SYMBOL | MILLIMETRES | | NOTES |
|--------|--------------|-------|-------|
| | MIN | MAX | |
| A | 1.27 | 2.03 | |
| b | 0.38 | 0.56 | 8 |
| c | 0.08 | 0.23 | 8 |
| D | 9.42 | 10.16 | 4 |
| E | 6.27 | 7.24 | |
| E1 | 7.00 TYPICAL | | 4 |
| e | 1.27 TYPICAL | | 5, 9 |
| L | 7.87 | 8.89 | 8 |
| L1 | 23.88 | 24.38 | |
| Q | 0.51 | 1.02 | 2 |
| S | 0.25 | 0.64 | 7 |

NOTES: See Page 12.



FIGURE 2 - PHYSICAL DIMENSIONS (CONTINUED)

FIGURE 2(c) - DUAL-IN-LINE PACKAGE, 16-PIN



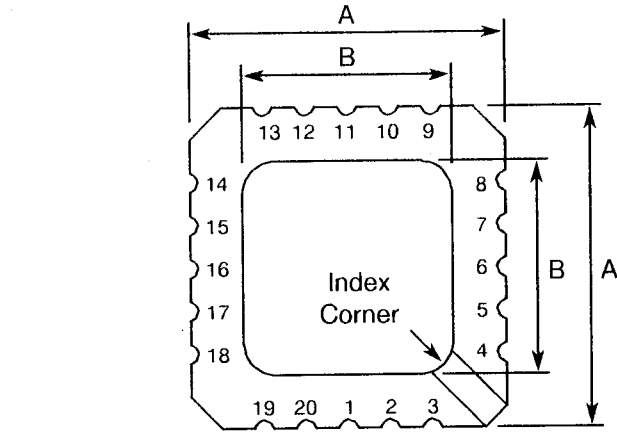
| SYMBOL | MILLIMETRES | | NOTES |
|--------|--------------|-------|-------|
| | MIN | MAX | |
| A | - | 5.08 | |
| b | 0.38 | 0.66 | 8 |
| b1 | - | 1.78 | 8 |
| c | 0.20 | 0.44 | 8 |
| D | 19.18 | 19.94 | 4 |
| E | 6.22 | 7.62 | 4 |
| E1 | 7.37 | 8.13 | |
| e | 2.54 TYPICAL | | 6, 9 |
| F | 1.27 TYPICAL | | |
| H | 0.76 | - | |
| L | 3.30 | 5.08 | 8 |
| Q | 0.51 | - | 3 |
| S | 0.38 | 1.27 | 7 |
| a | 0° | 15° | 10 |

NOTES: See Page 12.

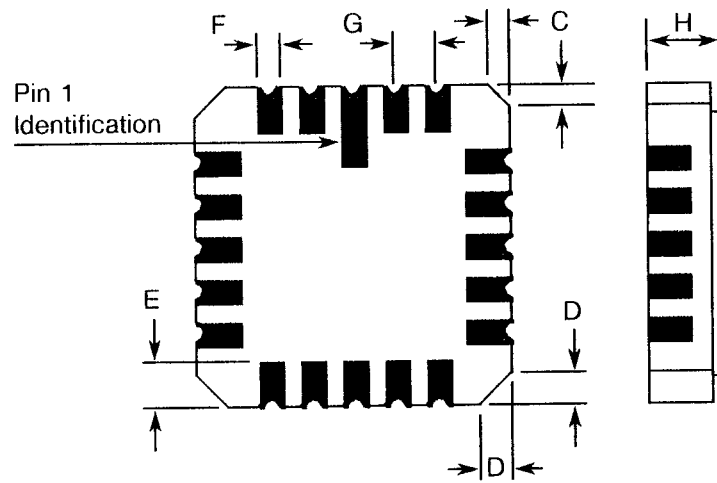


FIGURE 2 - PHYSICAL DIMENSIONS (CONTINUED)

FIGURE 2(d) - SQUARE CHIP CARRIER PACKAGE, 20-TERMINAL



20 TERMINAL



| SYMBOL | MILLIMETRES | | NOTES |
|--------|--------------|------|-------|
| | MIN | MAX | |
| A | 8.69 | 9.09 | |
| B | 7.80 | 9.09 | |
| C | 0.25 | 0.51 | 11 |
| D | 0.89 | 1.14 | 12 |
| E | 1.14 | 1.40 | 8 |
| F | 0.56 | 0.71 | 8 |
| G | 1.27 TYPICAL | | 5, 9 |
| H | 1.63 | 2.54 | |

NOTES: See Page 12.


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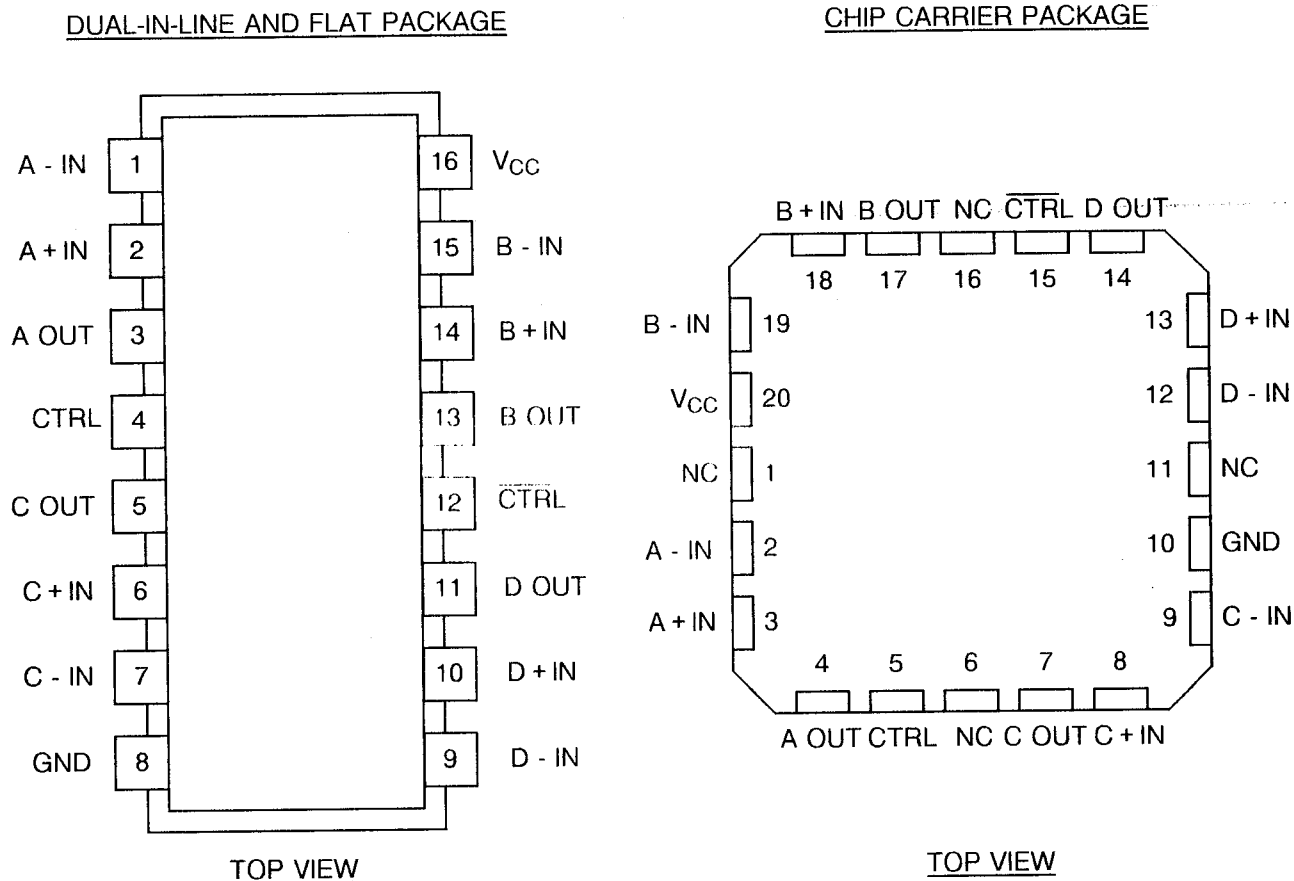
FIGURE 2 - PHYSICAL DIMENSIONS (CONTINUED)

NOTES TO FIGURES 2(a) TO 2(d) INCLUSIVE

1. Index area; a notch or dot shall be located adjacent to Pin 1 and shall be within the shaded area shown. For chip carrier packages the index shall be as defined in Figure 2(d).
2. Dimension Q shall be measured at the point of exit of the lead from the body.
3. The dimension shall be measured from the seating plane to the base plane.
4. This dimension allows for off-centre lids, meniscus and glass overrun.
5. The true position pin or terminal spacing is 1.27mm between centrelines. Each pin or terminal centreline shall be located within $\pm 0.13\text{mm}$ of its true longitudinal position relative to Pins 1 and the highest pin number.
6. The true position pin spacing is 2.54mm between centrelines. Each pin centreline shall be located within $\pm 0.25\text{mm}$ of its true longitudinal position relative to Pins 1 and the highest pin number.
7. Applies to all 4 corners.
8. All leads or terminals.
9. 14 spaces for flat and dual-in-line packages.
16 spaces for chip carrier packages.
10. Lead centre when α is 0° .
11. Index corner only - 2 dimensions.
12. 3 non-index corners - 6 dimensions.



FIGURE 3(a) - PIN ASSIGNMENT



FLAT PACKAGE AND DUAL-IN-LINE TO CHIP CARRIER PIN ASSIGNMENT

| | | | | | | | | | | | | | | | | |
|--|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|
| FLAT PACKAGE AND DUAL-IN-LINE PIN OUTS | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| CHIP CARRIER PIN OUTS | 2 | 3 | 4 | 5 | 7 | 8 | 9 | 10 | 12 | 13 | 14 | 15 | 17 | 18 | 19 | 20 |

FIGURE 3(b) - TRUTH TABLE (EACH RECEIVER)

| DIFFERENTIAL INPUT | ENABLES | | OUTPUT |
|----------------------------------|---------|--------------------------|--------|
| | CTRL | $\overline{\text{CTRL}}$ | |
| $V_{ID} \geq V_{TH}$ | H | X | H |
| | X | L | H |
| $V_{TL} \leq V_{ID} \leq V_{TH}$ | H | X | ? |
| | X | L | ? |
| $V_{ID} \leq V_{TL}$ | H | X | L |
| | X | L | L |
| X | L | H | Z |

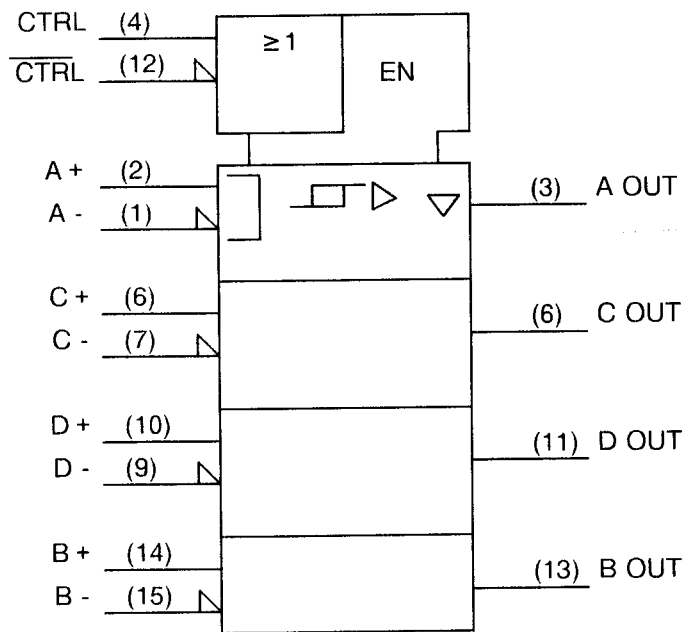
NOTES

- Logic Level Definitions: L = Low Level, H = High Level, X = Irrelevant, Z = High Impedance, ? = Indeterminate.
- V_{ID} = Differential Input Voltage, V_{TH} = Input Threshold Voltage High, V_{TL} = Input Threshold Voltage

FIGURE 3(c) - CIRCUIT SCHEMATIC

Not applicable.

FIGURE 3(d) - FUNCTIONAL DIAGRAM





2. APPLICABLE DOCUMENTS

The following documents form part of this specification and shall be read in conjunction with it:-

- (a) ESA/SCC Generic Specification No. 9000 for Integrated Circuits.
- (b) MIL-STD-883, Test Methods and Procedures for Micro-electronics.

3. TERMS, DEFINITIONS, ABBREVIATIONS, SYMBOLS AND UNITS

For the purpose of this specification, the terms, definitions, abbreviations, symbols and units specified in ESA/SCC Basic Specification No. 21300 shall apply. In addition, the following symbols are used:-

- I_{CC} = Supply Current.
- I_{OZH} = Off-State Output Current, High Level Applied.
- I_{OZL} = Off-State Output Current, Low Level Applied.
- I_{OS} = Output Short Circuit Current.
- V_{IC} = Enable Clamp Voltage.
- V_{OLT} = Output Threshold Low Level Voltage.
- V_{OHT} = Output Threshold High Level Voltage.

4. REQUIREMENTS

4.1 GENERAL

The complete requirements for procurement of the integrated circuits specified herein shall be as stated in this specification and ESA/SCC Generic Specification No. 9000 for Integrated Circuits. Deviations from the Generic Specification, applicable to this specification only, are listed in Para. 4.2.

Deviations from the applicable Generic Specification and this Detail Specification, formally agreed with specific Manufacturers on the basis that the alternative requirements are equivalent to the ESA/SCC requirements and do not affect the components' reliability, are listed in the appendices attached to this specification.

4.2 DEVIATIONS FROM GENERIC SPECIFICATION

4.2.1 Deviations from Special In-process Controls

None.

4.2.2 Deviations from Final Production Tests (Chart II)

None.

4.2.3 Deviations from Burn-in Tests (Chart III)



- (a) Para. 7.1.1(a), High Temperature Reverse Bias test and subsequent electrical measurements related to this test shall be omitted.

4.2.4 Deviations from Qualification Tests (Chart IV)

None.

4.2.5 Deviations from Lot Acceptance Tests (Chart V)

None.

| | | | |
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4.3 MECHANICAL REQUIREMENTS

4.3.1 Dimension Check

The dimensions of the integrated circuits specified herein shall be checked. They shall conform to those shown in Figure 2.

4.3.2 Weight

The maximum weight of the integrated circuits specified herein shall be 2.2 grammes for the dual-in-line package, 0.7 grammes for the flat package and 0.6 grammes for the chip carrier package.

4.4 MATERIALS AND FINISHES

The materials and finishes shall be as specified herein. Where a definite material is not specified, a material which will enable the integrated circuits specified herein to meet the performance requirements of this specification shall be used. Acceptance or approval of any constituent material does not guarantee acceptance of the finished product.

4.4.1 Case

The case shall be hermetically sealed and have a metal body with hard glass seals or a ceramic body and the lids shall be welded, brazed, preform-soldered or glass frit-sealed.

4.4.2 Lead Material and Finish

For dual-in-line and flat packages, the material shall be Type 'G' with Type '4' finish in accordance with the requirements of ESA/SCC Basic Specification No. 23500. For chip carrier packages, the finish shall be Type '4' or Type '7' in accordance with the requirements of ESA/SCC Basic Specification No. 23500. (See Table 1(a) for Type Variants).

4.5 MARKING

4.5.1 General

The marking of all components delivered to this specification shall be in accordance with the requirements of ESA/SCC Basic Specification No. 21700. Each component shall be marked in respect of:-

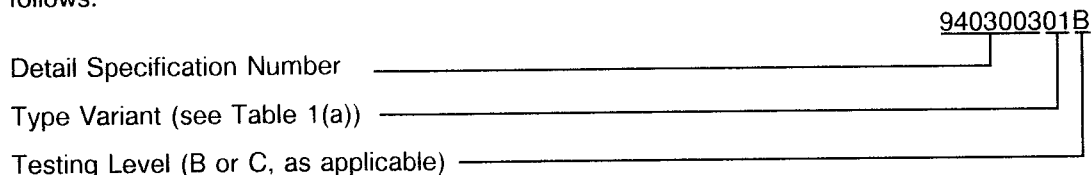
- (a) Lead Identification.
- (b) The SCC Component Number.
- (c) Traceability Information.

4.5.2 Lead Identification

For dual-in-line and flat packages, an index shall be located at the top of the package in the position defined in Note 1 to Figure 2 or, alternatively, a tab may be used to identify Pin No. 1. The pin numbering must be read with the index or tab on the left-hand side. For chip carrier packages, the index shall be as defined by Figure 2(d).

4.5.3 The SCC Component Number

Each component shall bear the SCC Component Number which shall be constituted and marked as follows:



4.5.4 Traceability Information

Each component shall be marked in respect of traceability information in accordance with the requirements of ESA/SCC Basic Specification No. 21700.

4.6 ELECTRICAL MEASUREMENTS

4.6.1 Electrical Measurements at Room Temperature

The parameters to be measured in respect of electrical characteristics are scheduled in Table 2. Unless otherwise specified, the measurements shall be performed at $T_{amb} = +22 \pm 3$ °C.

4.6.2 Electrical Measurements at High and Low Temperatures

The parameters to be measured at high and low temperatures are scheduled in Table 3. The measurements shall be performed at $T_{amb} = +125(+0 - 5)$ °C and $-55(+5 - 0)$ °C respectively.

4.6.3 Circuits for Electrical Measurements

Circuits for use in performing electrical measurements listed in Tables 2 and 3 of this specification are shown in Figure 4.

4.7 BURN-IN TESTS

4.7.1 Parameter Drift Values

The parameter drift values applicable to burn-in are specified in Table 4 of this specification. Unless otherwise stated, measurements shall be performed at $T_{amb} = +22 \pm 3$ °C. The parameter drift values (Δ) applicable to the parameters scheduled, shall not be exceeded. In addition to these drift value requirements, the appropriate limit value specified for a given parameter in Table 2 shall not be exceeded.

4.7.2 Conditions for H.T.R.B. Burn-in

Not applicable.

4.7.3 Conditions for Power Burn-in

The requirements for power burn-in are specified in Section 7 of ESA/SCC Generic Specification No. 9000. The conditions for power burn-in shall be as specified in Table 5 of this specification.

4.7.4 Electrical Circuit for H.T.R.B. Burn-in

Not applicable.

4.7.5 Electrical Circuit for Power Burn-in

A circuit for use in performing the power burn-in tests is shown in Figure 5 of this specification.



TABLE 2 - ELECTRICAL MEASUREMENTS AT ROOM TEMPERATURE - d.c. PARAMETERS

| No. | CHARACTERISTICS | SYMBOL | TEST METHOD MIL-STD 883 | TEST FIG. | TEST CONDITIONS (PINS UNDER TEST D/F = DIP AND FP C = CCP) | LIMITS | | UNIT |
|----------|-----------------------------|--------------------|-------------------------|-----------|--|--------|------|------|
| | | | | | | MIN | MAX | |
| 1 to 16 | Functional Test | - | - | 4(a) | V _{CC} = 5.0V Verify Truth Table with Load. Note 1 | - | - | - |
| 17 | Supply Current | I _{CC} | 3005 | 4(b) | V _{CC} = 5.5V V _{IN(+)} = 0V, V _{IN(-)} = 0V V _{CTRL} = 0V, V _{CTRL} = 2.7V (Pin D/F 16) (Pin C 20) | - | 70 | mA |
| 18 to 19 | Enable Current High Level 1 | I _{ENH1} | 3010 | 4(c) | V _{CC} = 5.5V V _{CTRL} = V _{CTRL} = 2.7V (Pins D/F 4-12) (Pins C 5-15) | - | 20 | μA |
| 20 to 21 | Enable Current High Level 2 | I _{ENH2} | 3010 | 4(c) | V _{CC} = 5.5V V _{CTRL} = V _{CTRL} = 5.5V (Pins D/F 4-12) (Pins C 5-15) | - | 100 | μA |
| 22 to 23 | Enable Current Low Level | I _{ENL} | 3009 | 4(c) | V _{CC} = 5.5V V _{CTRL} = V _{CTRL} = 0.4V (Pins D/F 4-12) (Pins C 5-15) | - | -360 | μA |
| 24 to 27 | Negative Input Current 1 | - I _{IN1} | 3010 | 4(d) | V _{CC} = 5.5V V _{IN(+)} = -10V, V _{IN(-)} = 15V (Pins D/F 1-7-9-15) (Pins C 2-9-12-19) | - | 2.3 | mA |
| 28 to 31 | Negative Input Current 2 | - I _{IN2} | 3010 | 4(d) | V _{CC} = 5.5V V _{IN(+)} = 15V, V _{IN(-)} = 15V (Pins D/F 1-7-9-15) (Pins C 2-9-12-19) | - | 2.3 | mA |
| 32 to 35 | Positive Input Current 1 | + I _{IN1} | 3010 | 4(d) | V _{CC} = 5.5V V _{IN(+)} = 15V, V _{IN(-)} = -10V (Pins D/F 2-6-10-14) (Pins C 3-8-13-18) | - | 2.3 | mA |
| 36 to 39 | Positive Input Current 2 | + I _{IN2} | 3010 | 4(d) | V _{CC} = 5.5V V _{IN(+)} = 15V, V _{IN(-)} = 15V (Pins D/F 2-6-10-14) (Pins C 3-8-13-18) | - | 2.3 | mA |
| 40 to 43 | Input Current 1 | I _{IN1} | 3010 | 4(d) | V _{CC} = 5.5V V _{IN(+)} = 10V, V _{IN(-)} = -15V All other V _{IN(-)} pins = 0V (Pins D/F 1-7-9-15) (Pins C 2-9-12-19) | - | -2.8 | mA |

NOTES: See Page 23.

**TABLE 2 - ELECTRICAL MEASUREMENTS AT ROOM TEMPERATURE - d.c. PARAMETERS (CONT'D)**

| No. | CHARACTERISTICS | SYMBOL | TEST METHOD MIL-STD 883 | TEST FIG. | TEST CONDITIONS (PINS UNDER TEST D/F = DIP AND FP C = CCP) | LIMITS | | UNIT |
|----------|---|-----------|-------------------------|-----------|--|--------|------|---------|
| | | | | | | MIN | MAX | |
| 44 to 47 | Input Current 2 | I_{IN2} | 3010 | 4(e) | $V_{CC} = 5.5V$ $V_{IN(+)} = -15V, V_{IN(-)} = -15V$ All other $V_{IN(-)}$ pins = 0V (Pins D/F 1-7-9-15) (Pins C 2-9-12-19) | - | -2.8 | mA |
| 48 to 51 | Input Current 3 | I_{IN3} | 3010 | 4(e) | $V_{CC} = 5.5V$ $V_{IN(+)} = -15V, V_{IN(-)} = 10V$ All other $V_{IN(+)}$ pins = 0V (Pins D/F 2-6-10-14) (Pins C 3-8-13-18) | - | -2.8 | mA |
| 52 to 55 | Input Current 4 | I_{IN4} | 3010 | 4(e) | $V_{CC} = 5.5V$ $V_{IN(+)} = -15V, V_{IN(-)} = -15V$ All other $V_{IN(+)}$ pins = 0V (Pins D/F 2-6-10-14) (Pins C 3-8-13-18) | - | -2.8 | mA |
| 56 to 59 | Off-State Output Current (Low Level Applied) | I_{OZL} | 3006 | 4(f) | $V_{CC} = 5.5V, V_{OUT} = 0.4V$ $V_{IN(+)} = 1.0V, V_{IN(-)} = 0V$ $V_{CTRL} = 0.8V, V_{CTRL} = 2.0V$ (Pins D/F 3-5-11-13) (Pins C 4-7-14-17) | - | -20 | μA |
| 60 to 63 | Off-State Output Current (High Level Applied) | I_{OZH} | 3006 | 4(f) | $V_{CC} = 5.5V, V_{OUT} = 2.4V$ $V_{IN(+)} = 0V, V_{IN(-)} = 1.0V$ $V_{CTRL} = 0.8V, V_{CTRL} = 2.0V$ (Pins D/F 3-5-11-13) (Pins C 4-7-14-17) | - | 20 | μA |
| 64 to 67 | Output Voltage Low Level 1 | V_{OL1} | 3007 | 4(g) | $V_{CC} = 4.5V, I_{OUT} = 4.0mA$ $V_{IN(+)} = -8.0V, V_{IN(-)} = -7.0V$ $V_{CTRL} = 2.0V, V_{CTRL} = 0.8V$ (Pins D/F 3-5-11-13) (Pins C 4-7-14-17) | - | 0.4 | V |
| 68 to 71 | Output Voltage Low Level 2 | V_{OL2} | 3007 | 4(g) | $V_{CC} = 4.5V, I_{OUT} = 4.0mA$ $V_{IN(+)} = 0V, V_{IN(-)} = 1.0V$ $V_{CTRL} = 2.0V, V_{CTRL} = 0.8V$ (Pins D/F 3-5-11-13) (Pins C 4-7-14-17) | - | 0.4 | V |
| 72 to 75 | Output Voltage Low Level 3 | V_{OL3} | 3007 | 4(g) | $V_{CC} = 4.5V, I_{OUT} = 4.0mA$ $V_{IN(+)} = 7.0V, V_{IN(-)} = 8.0V$ $V_{CTRL} = 2.0V, V_{CTRL} = 0.8V$ (Pins D/F 3-5-11-13) (Pins C 4-7-14-17) | - | 0.4 | V |

NOTES: See Page 23.



TABLE 2 - ELECTRICAL MEASUREMENTS AT ROOM TEMPERATURE - d.c. PARAMETERS (CONT'D)

| No. | CHARACTERISTICS | SYMBOL | TEST METHOD MIL-STD 883 | TEST FIG. | TEST CONDITIONS (PINS UNDER TEST D/F = DIP AND FP C = CCP) | LIMITS | | UNIT |
|------------|--------------------------------------|-------------------|-------------------------|-----------|--|--------|------|------|
| | | | | | | MIN | MAX | |
| 76 to 79 | Output Voltage Low Level 4 | V _{OL4} | 3007 | 4(g) | V _{CC} = 4.5V, I _{OUT} = 8.0mA V _{IN(+)} = - 8.0V, V _{IN(-)} = - 7.0V V _{CTRL} = 2.0V, V _{CTRL} = 0.8V (Pins D/F 3-5-11-13) (Pins C 4-7-14-17) | - | 0.45 | V |
| 80 to 83 | Output Voltage Low Level 5 | V _{OL5} | 3007 | 4(g) | V _{CC} = 4.5V, I _{OUT} = 8.0mA V _{IN(+)} = 0V, V _{IN(-)} = 1.0V V _{CTRL} = 2.0V, V _{CTRL} = 0.8V (Pins D/F 3-5-11-13) (Pins C 4-7-14-17) | - | 0.45 | V |
| 84 to 87 | Output Voltage Low Level 6 | V _{OL6} | 3007 | 4(g) | V _{CC} = 4.5V, I _{OUT} = 8.0mA V _{IN(+)} = 7.0V, V _{IN(-)} = 8.0V V _{CTRL} = 2.0V, V _{CTRL} = 0.8V (Pins D/F 3-5-11-13) (Pins C 4-7-14-17) | - | 0.45 | V |
| 88 to 91 | Output Voltage High Level 1 | V _{OH1} | 3006 | 4(g) | V _{CC} = 4.5V, I _{OUT} = - 440μA V _{IN(+)} = - 7.0V, V _{IN(-)} = - 8.0V V _{CTRL} = 2.0V, V _{CTRL} = 0.8V (Pins D/F 3-5-11-13) (Pins C 4-7-14-17) | 2.5 | - | V |
| 92 to 95 | Output Voltage High Level 2 | V _{OH2} | 3006 | 4(g) | V _{CC} = 4.5V, I _{OUT} = - 440μA V _{IN(+)} = 1.0V, V _{IN(-)} = 0V V _{CTRL} = 2.0V, V _{CTRL} = 0.8V (Pins D/F 3-5-11-13) (Pins C 4-7-14-17) | 2.5 | - | V |
| 96 to 99 | Output Voltage High Level 3 | V _{OH3} | 3006 | 4(g) | V _{CC} = 4.5V, I _{OUT} = - 440μA V _{IN(+)} = 8.0V, V _{IN(-)} = 7.0V V _{CTRL} = 2.0V, V _{CTRL} = 0.8V (Pins D/F 3-5-11-13) (Pins C 4-7-14-17) | 2.5 | - | V |
| 100 to 103 | Output Threshold Voltage Low Level 1 | V _{OLT1} | - | 4(g) | V _{CC} = 4.5V, I _{OUT} = 8.0mA V _{IN(+)} = - 6.9V, V _{IN(-)} = - 6.7V V _{CTRL} = 2.0V, V _{CTRL} = 0.8V (Pins D/F 3-5-11-13) (Pins C 4-7-14-17) | - | 0.45 | V |
| 104 to 107 | Output Threshold Voltage Low Level 2 | V _{OLT2} | - | 4(g) | V _{CC} = 4.5V, I _{OUT} = 8.0mA V _{IN(+)} = 6.7V, V _{IN(-)} = 6.9V V _{CTRL} = 2.0V, V _{CTRL} = 0.8V (Pins D/F 3-5-11-13) (Pins C 4-7-14-17) | - | 0.45 | V |

NOTES: See Page 23.

**TABLE 2 - ELECTRICAL MEASUREMENTS AT ROOM TEMPERATURE - d.c. PARAMETERS (CONT'D)**

| No. | CHARACTERISTICS | SYMBOL | TEST METHOD MIL-STD 883 | TEST FIG. | TEST CONDITIONS (PINS UNDER TEST D/F = DIP AND FP C = CCP) | LIMITS | | UNIT |
|------------|---------------------------------------|------------|-------------------------|-----------|--|--------|-----|------|
| | | | | | | MIN | MAX | |
| 108 to 111 | Output Threshold Voltage High Level 1 | V_{OHT1} | - | 4(g) | $V_{CC} = 4.5V$, $I_{OUT} = -440\mu A$ $V_{IN(+)} = -6.7V$, $V_{IN(-)} = -6.9V$ $V_{CTRL} = 2.0V$, $\overline{V_{CTRL}} = 0.8V$ (Pins D/F 3-5-11-13) (Pins C 4-7-14-17) | 2.5 | - | V |
| 112 to 115 | Output Threshold Voltage High Level 2 | V_{OHT2} | - | 4(g) | $V_{CC} = 4.5V$, $I_{OUT} = -440\mu A$ $V_{IN(+)} = 6.9V$, $V_{IN(-)} = 6.7V$ $V_{CTRL} = 2.0V$, $\overline{V_{CTRL}} = 0.8V$ (Pins D/F 3-5-11-13) (Pins C 4-7-14-17) | 2.5 | - | V |
| 116 to 119 | Output Short Circuit Current 1 | I_{OS1} | 3011 | 4(h) | $V_{CC} = 5.5V$, $V_{OUT} = 0V$ $V_{IN(+)} = 1.0V$, $V_{IN(-)} = 0V$ Note 2 $V_{CTRL} = \overline{V_{CTRL}} = 2.0V$ (Pins D/F 3-5-11-13) (Pins C 4-7-14-17) | -15 | -85 | mA |
| 120 to 123 | Output Short Circuit Current 2 | I_{OS2} | 3011 | 4(h) | $V_{CC} = 5.5V$, $V_{OUT} = 0V$ $V_{IN(+)} = 1.0V$, $V_{IN(-)} = 0V$ $V_{CTRL} = 2.0V$, $\overline{V_{CTRL}} = 0.8V$ Note 2 (Pins D/F 3-5-11-13) (Pins C 4-7-14-17) | -15 | -85 | mA |
| 124 | Enable Clamp Voltage 1 | V_{IC1} | - | 4(i) | $I_{CTRL} = -18mA$, $V_{CC} = 4.5V$ (Pin D/F 4) (Pin C 5) | -1.5 | - | V |
| 125 | Enable Clamp Voltage 2 | V_{IC2} | - | 4(i) | $\overline{I_{CTRL}} = -18mA$, $V_{CC} = 4.5V$ (Pin D/F 12) (Pin C 15) | -1.5 | - | V |

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TABLE 2 - ELECTRICAL MEASUREMENTS AT ROOM TEMPERATURE - a.c. PARAMETERS

| No. | CHARACTERISTICS | SYMBOL | TEST METHOD MIL-STD 883 | TEST FIG. | TEST CONDITIONS (PINS UNDER TEST D/F = DIP AND FP C = CCP) (NOTE 3) | LIMITS | | UNIT |
|------------|---------------------------------------|-------------------|-------------------------|-----------|--|--------|-----|------|
| | | | | | | MIN | MAX | |
| 126 to 129 | Propagation Delay Low to High 1 | t _{PLH1} | 3004 | 4(j) | V _{IN(+)} = 1.5V V _{CTRL} = V _{CTRL} = 2.0V Switches = 00 (Note 4) V _{IN(-)} = PI2, V _{OUT} = PO2 (Pins D/F 3-5-11-13) (Pins C 4-7-14-17) | - | 30 | ns |
| 130 to 133 | Propagation Delay Low to High 2 | t _{PLH2} | 3004 | 4(j) | V _{IN(-)} = 1.5V V _{CTRL} = V _{CTRL} = 2.0V Switches = 00 (Note 4) V _{IN(+)} = PI1, V _{OUT} = PO1 (Pins D/F 3-5-11-13) (Pins C 4-7-14-17) | - | 30 | ns |
| 134 to 137 | Propagation Delay High to Low 1 | t _{PHL1} | 3004 | 4(j) | V _{IN(-)} = 1.5V V _{CTRL} = V _{CTRL} = 2.0V Switches = 00 (Note 4) V _{IN(+)} = PI1, V _{OUT} = PO1 (Pins D/F 3-5-11-13) (Pins C 4-7-14-17) | - | 30 | ns |
| 138 to 141 | Propagation Delay High to Low 2 | t _{PHL2} | 3004 | 4(j) | V _{IN(+)} = 1.5V V _{CTRL} = V _{CTRL} = 2.0V Switches = 00 (Note 4) V _{IN(-)} = PI2, V _{OUT} = PO2 (Pins D/F 3-5-11-13) (Pins C 4-7-14-17) | - | 30 | ns |
| 142 to 145 | Output Disable Time from Low Level 1 | t _{PLZ1} | 3003 | 4(j) | V _{IN(+)} = -1.5V, V _{IN(-)} = 0V V _{CTRL} = PI4, V _{CTRL} = 2.0V Switches = 11 (Note 4) V _{OUT} = PO3 (Pins D/F 3-5-11-13) (Pins C 4-7-14-17) | - | 35 | ns |
| 146 to 149 | Output Enable Time to Low Level 1 | t _{PZL1} | 3003 | 4(j) | V _{IN(+)} = -1.5V, V _{IN(-)} = 0V V _{CTRL} = PI4, V _{CTRL} = 2.0V Switches = 10 (Note 4) V _{OUT} = PO6 (Pins D/F 3-5-11-13) (Pins C 4-7-14-17) | - | 22 | ns |
| 150 to 153 | Output Disable Time from High Level 1 | t _{PHZ1} | 3003 | 4(j) | V _{IN(+)} = 1.5V, V _{IN(-)} = 0V V _{CTRL} = PI4, V _{CTRL} = 2.0V Switches = 11 (Note 4) V _{OUT} = PO4 (Pins D/F 3-5-11-13) (Pins C 4-7-14-17) | - | 30 | ns |

NOTES: See Page 23.

TABLE 2 - ELECTRICAL MEASUREMENTS AT ROOM TEMPERATURE - a.c. PARAMETERS (CONT'D)

| No. | CHARACTERISTICS | SYMBOL | TEST METHOD MIL-STD 883 | TEST FIG. | TEST CONDITIONS (PINS UNDER TEST D/F = DIP AND FP C = CCP) (NOTE 3) | LIMITS | | UNIT |
|------------|---------------------------------------|------------|-------------------------|-----------|---|--------|-----|------|
| | | | | | | MIN | MAX | |
| 154 to 157 | Output Enable Time to High Level 1 | t_{PZH1} | 3003 | 4(j) | $V_{IN(+)} = 1.5V, V_{IN(-)} = 0V$ $V_{CTRL} = PI4, \overline{V_{CTRL}} = 2.0V$ Switches = 01 (Note 4) $V_{OUT} = PO5$ (Pins D/F 3-5-11-13) (Pins C 4-7-14-17) | - | 22 | ns |
| 158 to 161 | Output Disable Time from Low Level 2 | t_{PLZ2} | 3003 | 4(j) | $V_{IN(+)} = -1.5V, V_{IN(-)} = 0V$ $V_{CTRL} = 0V, \overline{V_{CTRL}} = PI3$ Switches = 11 (Note 4) $V_{OUT} = PO3$ (Pins D/F 3-5-11-13) (Pins C 4-7-14-17) | - | 35 | ns |
| 162 to 165 | Output Enable Time to Low Level 2 | t_{PZL2} | 3003 | 4(j) | $V_{IN(+)} = -1.5V, V_{IN(-)} = 0V$ $V_{CTRL} = 0V, \overline{V_{CTRL}} = PI3$ Switches = 10 (Note 4) $V_{OUT} = PO6$ (Pins D/F 3-5-11-13) (Pins C 4-7-14-17) | - | 22 | ns |
| 166 to 169 | Output Disable Time from High Level 2 | t_{PHZ2} | 3003 | 4(j) | $V_{IN(+)} = 1.5V, V_{IN(-)} = 0V$ $V_{CTRL} = 0V, \overline{V_{CTRL}} = PI3$ Switches = 11 (Note 4) $V_{OUT} = PO4$ (Pins D/F 3-5-11-13) (Pins C 4-7-14-17) | - | 30 | ns |
| 170 to 173 | Output Enable Time to High Level 2 | t_{PZH2} | 3003 | 4(j) | $V_{IN(+)} = 1.5V, V_{IN(-)} = 0V$ $V_{CTRL} = 0V, \overline{V_{CTRL}} = PI3$ Switches = 01 (Note 4) $V_{OUT} = PO5$ (Pins D/F 3-5-11-13) (Pins C 4-7-14-17) | - | 22 | ns |

NOTES

1. Go-no-go test with $V_{IL} \leq 0.5V, 2.5V \leq V_{IH} \leq 3.0V$.
 $1.3V < \text{Trip point} < 1.6V$.
 $50\mu A < I_L < 300\mu A$.
2. Only one output may be shorted at a time and only for 1 second maximum.
3. $V_{CC} = 5.0V$.
4. Switches SW1 and SW2 operating status, 0 = Open, 1 = Closed.

**TABLE 3 - ELECTRICAL MEASUREMENTS AT HIGH AND LOW TEMPERATURES**

| No. | CHARACTERISTICS | SYMBOL | TEST METHOD MIL-STD 883 | TEST FIG. | TEST CONDITIONS (PINS UNDER TEST D/F = DIP AND FP C = CCP) | LIMITS | | UNIT |
|----------|-----------------------------|--------------------|-------------------------|-----------|--|--------|------|------|
| | | | | | | MIN | MAX | |
| 1 to 16 | Functional Test | - | - | 4(a) | V _{CC} = 5.0V Verify Truth Table with Load. Note 1 | - | - | - |
| 17 | Supply Current | I _{CC} | 3005 | 4(b) | V _{CC} = 5.5V V _{IN(+)} = 0V, V _{IN(-)} = 0V V _{CTRL} = 0V, V _{CTRL} = 2.7V (Pin D/F 16) (Pin C 20) | - | 70 | mA |
| 18 to 19 | Enable Current High Level 1 | I _{ENH1} | 3010 | 4(c) | V _{CC} = 5.5V V _{CTRL} = V _{CTRL} = 2.7V (Pins D/F 4-12) (Pins C 5-15) | - | 20 | μA |
| 20 to 21 | Enable Current High Level 2 | I _{ENH2} | 3010 | 4(c) | V _{CC} = 5.5V V _{CTRL} = V _{CTRL} = 5.5V (Pins D/F 4-12) (Pins C 5-15) | - | 100 | μA |
| 22 to 23 | Enable Current Low Level | I _{ENL} | 3009 | 4(c) | V _{CC} = 5.5V V _{CTRL} = V _{CTRL} = 0.4V (Pins D/F 4-12) (Pins C 5-15) | - | -360 | μA |
| 24 to 27 | Negative Input Current 1 | - I _{IN1} | 3010 | 4(d) | V _{CC} = 5.5V V _{IN(+)} = -10V, V _{IN(-)} = 15V (Pins D/F 1-7-9-15) (Pins C 2-9-12-19) | - | 2.3 | mA |
| 28 to 31 | Negative Input Current 2 | - I _{IN2} | 3010 | 4(d) | V _{CC} = 5.5V V _{IN(+)} = 15V, V _{IN(-)} = 15V (Pins D/F 1-7-9-15) (Pins C 2-9-12-19) | - | 2.3 | mA |
| 32 to 35 | Positive Input Current 1 | + I _{IN1} | 3010 | 4(d) | V _{CC} = 5.5V V _{IN(+)} = 15V, V _{IN(-)} = -10V (Pins D/F 2-6-10-14) (Pins C 3-8-13-18) | - | 2.3 | mA |
| 36 to 39 | Positive Input Current 2 | + I _{IN2} | 3010 | 4(d) | V _{CC} = 5.5V V _{IN(+)} = 15V, V _{IN(-)} = 15V (Pins D/F 2-6-10-14) (Pins C 3-8-13-18) | - | 2.3 | mA |
| 40 to 43 | Input Current 1 | I _{IN1} | 3010 | 4(d) | V _{CC} = 5.5V V _{IN(+)} = 10V, V _{IN(-)} = -15V All other V _{IN(-)} pins = 0V (Pins D/F 1-7-9-15) (Pins C 2-9-12-19) | - | -2.8 | mA |

NOTES: See Page 23.



TABLE 3 - ELECTRICAL MEASUREMENTS AT HIGH AND LOW TEMPERATURES (CONT'D)

| No. | CHARACTERISTICS | SYMBOL | TEST METHOD MIL-STD 883 | TEST FIG. | TEST CONDITIONS (PINS UNDER TEST D/F = DIP AND FP C = CCP) | LIMITS | | UNIT |
|----------|---|-----------|-------------------------|-----------|---|--------|------|---------|
| | | | | | | MIN | MAX | |
| 44 to 47 | Input Current 2 | I_{IN2} | 3010 | 4(e) | $V_{CC} = 5.5V$ $V_{IN(+)} = -15V, V_{IN(-)} = -15V$ All other $V_{IN(-)}$ pins = 0V (Pins D/F 1-7-9-15) (Pins C 2-9-12-19) | - | -2.8 | mA |
| 48 to 51 | Input Current 3 | I_{IN3} | 3010 | 4(e) | $V_{CC} = 5.5V$ $V_{IN(+)} = -15V, V_{IN(-)} = 10V$ All other $V_{IN(+)}$ pins = 0V (Pins D/F 2-6-10-14) (Pins C 3-8-13-18) | - | -2.8 | mA |
| 52 to 55 | Input Current 4 | I_{IN4} | 3010 | 4(e) | $V_{CC} = 5.5V$ $V_{IN(+)} = -15V, V_{IN(-)} = -15V$ All other $V_{IN(+)}$ pins = 0V (Pins D/F 2-6-10-14) (Pins C 3-8-13-18) | - | -2.8 | mA |
| 56 to 59 | Off-State Output Current (Low Level Applied) | I_{OZL} | 3006 | 4(f) | $V_{CC} = 5.5V, V_{OUT} = 0.4V$ $V_{IN(+)} = 1.0V, V_{IN(-)} = 0V$ $V_{CTRL} = 0.8V, \overline{V_{CTRL}} = 2.0V$ (Pins D/F 3-5-11-13) (Pins C 4-7-14-17) | - | -20 | μA |
| 60 to 63 | Off-State Output Current (High Level Applied) | I_{OZH} | 3006 | 4(f) | $V_{CC} = 5.5V, V_{OUT} = 2.4V$ $V_{IN(+)} = 0V, V_{IN(-)} = 1.0V$ $V_{CTRL} = 0.8V, \overline{V_{CTRL}} = 2.0V$ (Pins D/F 3-5-11-13) (Pins C 4-7-14-17) | - | 20 | μA |
| 64 to 67 | Output Voltage Low Level 1 | V_{OL1} | 3007 | 4(g) | $V_{CC} = 4.5V, I_{OUT} = 4.0mA$ $V_{IN(+)} = -8.0V, V_{IN(-)} = -7.0V$ $V_{CTRL} = 2.0V, \overline{V_{CTRL}} = 0.8V$ (Pins D/F 3-5-11-13) (Pins C 4-7-14-17) | - | 0.4 | V |
| 68 to 71 | Output Voltage Low Level 2 | V_{OL2} | 3007 | 4(g) | $V_{CC} = 4.5V, I_{OUT} = 4.0mA$ $V_{IN(+)} = 0V, V_{IN(-)} = 1.0V$ $V_{CTRL} = 2.0V, \overline{V_{CTRL}} = 0.8V$ (Pins D/F 3-5-11-13) (Pins C 4-7-14-17) | - | 0.4 | V |
| 72 to 75 | Output Voltage Low Level 3 | V_{OL3} | 3007 | 4(g) | $V_{CC} = 4.5V, I_{OUT} = 4.0mA$ $V_{IN(+)} = 7.0V, V_{IN(-)} = 8.0V$ $V_{CTRL} = 2.0V, \overline{V_{CTRL}} = 0.8V$ (Pins D/F 3-5-11-13) (Pins C 4-7-14-17) | - | 0.4 | V |

NOTES: See Page 23.

**TABLE 3 - ELECTRICAL MEASUREMENTS AT HIGH AND LOW TEMPERATURES (CONT'D)**

| No. | CHARACTERISTICS | SYMBOL | TEST METHOD MIL-STD 883 | TEST FIG. | TEST CONDITIONS (PINS UNDER TEST D/F = DIP AND FP C = CCP) | LIMITS | | UNIT |
|------------------|--|------------|-------------------------------|-----------|---|--------|------|------|
| | | | | | | MIN | MAX | |
| 76 to 79 | Output Voltage Low Level 4 | V_{OL4} | 3007 | 4(g) | $V_{CC} = 4.5V$, $I_{OUT} = 8.0mA$ $V_{IN(+)} = -8.0V$, $V_{IN(-)} = -7.0V$ $V_{CTRL} = 2.0V$, $V_{CTRL} = 0.8V$ (Pins D/F 3-5-11-13) (Pins C 4-7-14-17) | - | 0.45 | V |
| 80 to 83 | Output Voltage Low Level 5 | V_{OL5} | 3007 | 4(g) | $V_{CC} = 4.5V$, $I_{OUT} = 8.0mA$ $V_{IN(+)} = 0V$, $V_{IN(-)} = 1.0V$ $V_{CTRL} = 2.0V$, $V_{CTRL} = 0.8V$ (Pins D/F 3-5-11-13) (Pins C 4-7-14-17) | - | 0.45 | V |
| 84 to 87 | Output Voltage Low Level 6 | V_{OL6} | 3007 | 4(g) | $V_{CC} = 4.5V$, $I_{OUT} = 8.0mA$ $V_{IN(+)} = 7.0V$, $V_{IN(-)} = 8.0V$ $V_{CTRL} = 2.0V$, $V_{CTRL} = 0.8V$ (Pins D/F 3-5-11-13) (Pins C 4-7-14-17) | - | 0.45 | V |
| 88 to 91 | Output Voltage High Level 1 | V_{OH1} | 3006 | 4(g) | $V_{CC} = 4.5V$, $I_{OUT} = -440\mu A$ $V_{IN(+)} = -7.0V$, $V_{IN(-)} = -8.0V$ $V_{CTRL} = 2.0V$, $V_{CTRL} = 0.8V$ (Pins D/F 3-5-11-13) (Pins C 4-7-14-17) | 2.5 | - | V |
| 92 to 95 | Output Voltage High Level 2 | V_{OH2} | 3006 | 4(g) | $V_{CC} = 4.5V$, $I_{OUT} = -440\mu A$ $V_{IN(+)} = 1.0V$, $V_{IN(-)} = 0V$ $V_{CTRL} = 2.0V$, $V_{CTRL} = 0.8V$ (Pins D/F 3-5-11-13) (Pins C 4-7-14-17) | 2.5 | - | V |
| 96 to 99 | Output Voltage High Level 3 | V_{OH3} | 3006 | 4(g) | $V_{CC} = 4.5V$, $I_{OUT} = -440\mu A$ $V_{IN(+)} = 8.0V$, $V_{IN(-)} = 7.0V$ $V_{CTRL} = 2.0V$, $V_{CTRL} = 0.8V$ (Pins D/F 3-5-11-13) (Pins C 4-7-14-17) | 2.5 | - | V |
| 100 to 103 | Output Threshold Voltage Low Level 1 | V_{OLT1} | - | 4(g) | $V_{CC} = 4.5V$, $I_{OUT} = 8.0mA$ $V_{IN(+)} = -6.9V$, $V_{IN(-)} = -6.7V$ $V_{CTRL} = 2.0V$, $V_{CTRL} = 0.8V$ (Pins D/F 3-5-11-13) (Pins C 4-7-14-17) | - | 0.45 | V |
| 104 to 107 | Output Threshold Voltage Low Level 2 | V_{OLT2} | - | 4(g) | $V_{CC} = 4.5V$, $I_{OUT} = 8.0mA$ $V_{IN(+)} = 6.7V$, $V_{IN(-)} = 6.9V$ $V_{CTRL} = 2.0V$, $V_{CTRL} = 0.8V$ (Pins D/F 3-5-11-13) (Pins C 4-7-14-17) | - | 0.45 | V |

NOTES: See Page 23.



TABLE 3 - ELECTRICAL MEASUREMENTS AT HIGH AND LOW TEMPERATURES (CONT'D)

| No. | CHARACTERISTICS | SYMBOL | TEST METHOD MIL-STD 883 | TEST FIG. | TEST CONDITIONS (PINS UNDER TEST D/F = DIP AND FP C = CCP) | LIMITS | | UNIT |
|------------|---------------------------------------|------------|-------------------------|-----------|--|--------|-----|------|
| | | | | | | MIN | MAX | |
| 108 to 111 | Output Threshold Voltage High Level 1 | V_{OHT1} | - | 4(g) | $V_{CC} = 4.5V$, $I_{OUT} = -440\mu A$ $V_{IN(+)} = -6.7V$, $V_{IN(-)} = -6.9V$ $V_{CTRL} = 2.0V$, $\overline{V_{CTRL}} = 0.8V$ (Pins D/F 3-5-11-13) (Pins C 4-7-14-17) | 2.5 | - | V |
| 112 to 115 | Output Threshold Voltage High Level 2 | V_{OHT2} | - | 4(g) | $V_{CC} = 4.5V$, $I_{OUT} = -440\mu A$ $V_{IN(+)} = 6.9V$, $V_{IN(-)} = 6.7V$ $V_{CTRL} = 2.0V$, $\overline{V_{CTRL}} = 0.8V$ (Pins D/F 3-5-11-13) (Pins C 4-7-14-17) | 2.5 | - | V |
| 116 to 119 | Output Short Circuit Current 1 | I_{OS1} | 3011 | 4(h) | $V_{CC} = 5.5V$, $V_{OUT} = 0V$ $V_{IN(+)} = 1.0V$, $V_{IN(-)} = 0V$ $V_{CTRL} = \overline{V_{CTRL}} = 2.0V$ Note 2 (Pins D/F 3-5-11-13) (Pins C 4-7-14-17) | -15 | -85 | mA |
| 120 to 123 | Output Short Circuit Current 2 | I_{OS2} | 3011 | 4(h) | $V_{CC} = 5.5V$, $V_{OUT} = 0V$ $V_{IN(+)} = 1.0V$, $\overline{V_{IN(-)}} = 0V$ $V_{CTRL} = 2.0V$, $\overline{V_{CTRL}} = 0.8V$ Note 2 (Pins D/F 3-5-11-13) (Pins C 4-7-14-17) | -15 | -85 | mA |
| 124 | Enable Clamp Voltage 1 | V_{IC1} | - | 4(i) | $I_{CTRL} = -18mA$, $V_{CC} = 4.5V$ (Pin D/F 4) (Pin C 5) | -1.5 | - | V |
| 125 | Enable Clamp Voltage 2 | V_{IC2} | - | 4(i) | $\overline{I_{CTRL}} = -18mA$, $V_{CC} = 4.5V$ (Pin D/F 12) (Pin C 15) | -1.5 | - | V |

NOTES: See Page 23.

FIGURE 4 - CIRCUITS FOR ELECTRICAL MEASUREMENTS

FIGURE 4(a) - FUNCTIONAL TEST

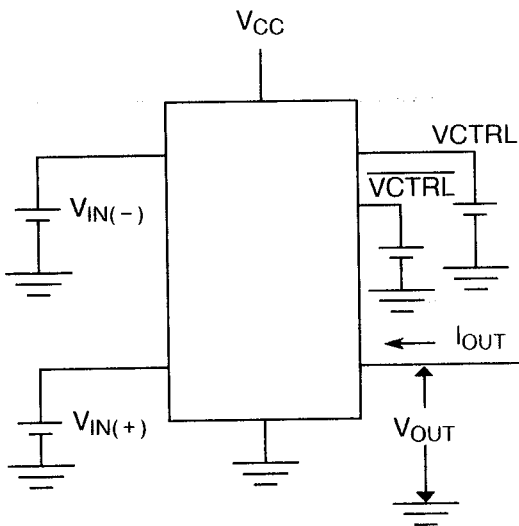


FIGURE 4(b) - SUPPLY CURRENT

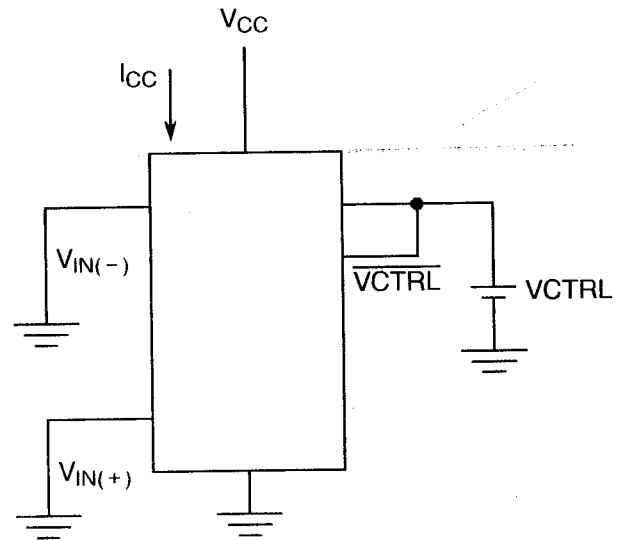


FIGURE 4(c) - ENABLE CURRENT

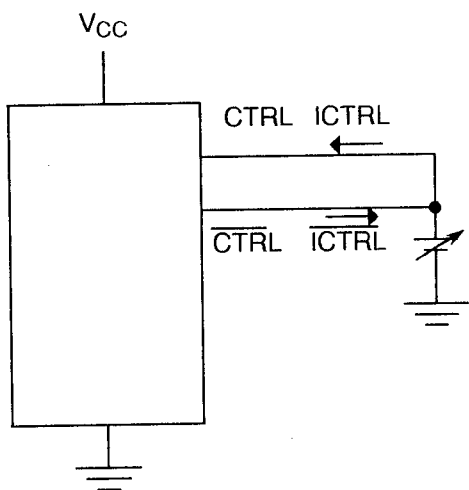
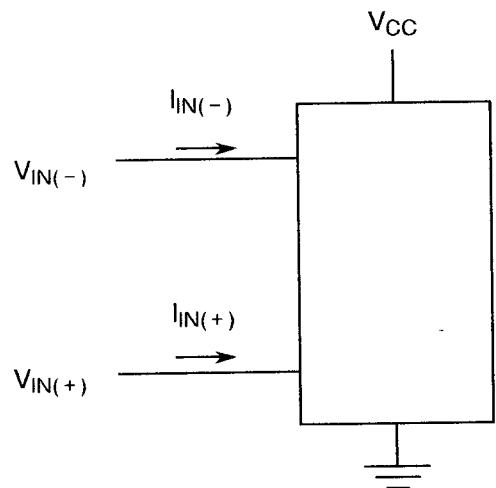


FIGURE 4(d) - INPUT CURRENT



NOTES

1. Each input to be tested separately.

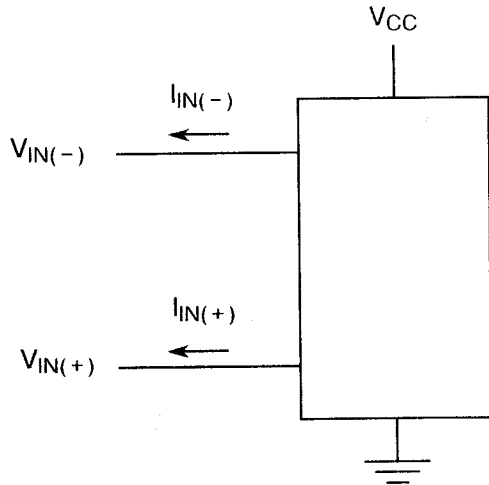
NOTES

1. Each input to be tested separately.



FIGURE 4 - CIRCUITS FOR ELECTRICAL MEASUREMENTS (CONTINUED)

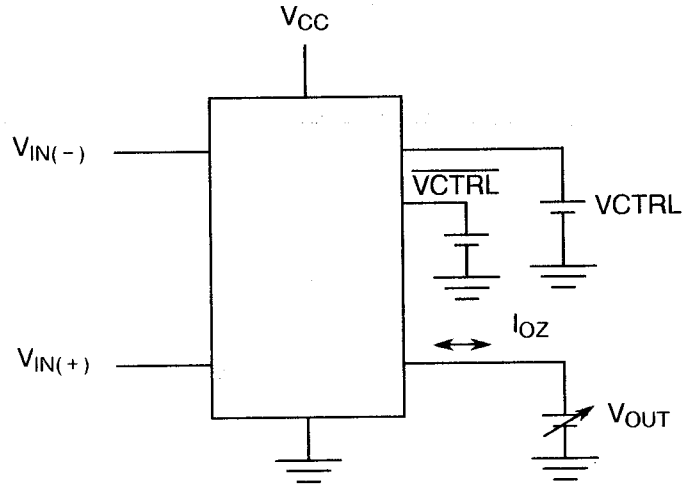
FIGURE 4(e) - INPUT CURRENT



NOTES

1. Each input to be tested separately.

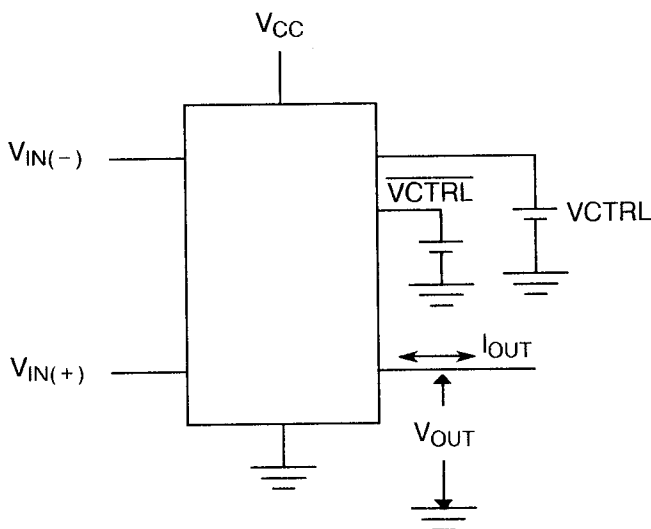
FIGURE 4(f) - OFF-STATE OUTPUT CURRENT



NOTES

1. Each output to be tested separately.

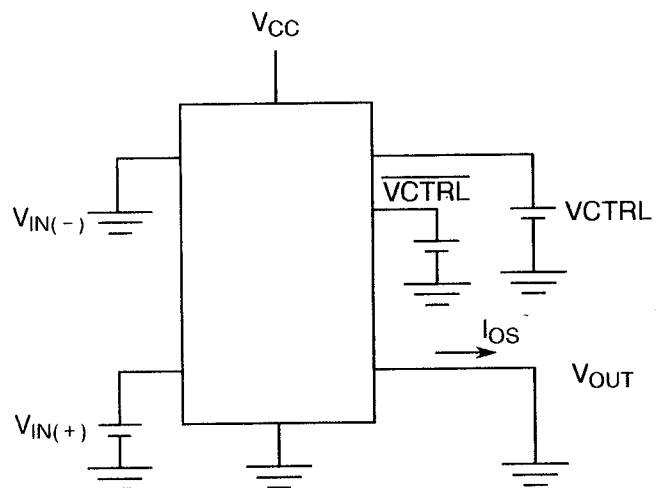
FIGURE 4(g) - OUTPUT LOW LEVEL/
HIGH LEVEL/THRESHOLD VOLTAGE



NOTES

1. Each output to be tested separately.

FIGURE 4(h) - OUTPUT SHORT CIRCUIT CURRENT



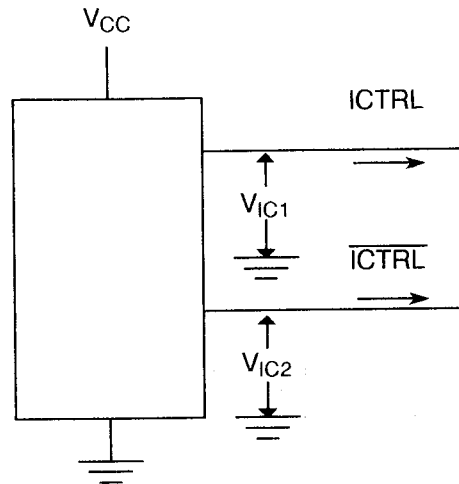
NOTES

1. Each output to be tested separately.



FIGURE 4 - CIRCUITS FOR ELECTRICAL MEASUREMENTS (CONTINUED)

FIGURE 4(i) - ENABLE CLAMP VOLTAGE



NOTES

- 1. Each input to be tested separately.

FIGURE 4(j) - PROPAGATION DELAY

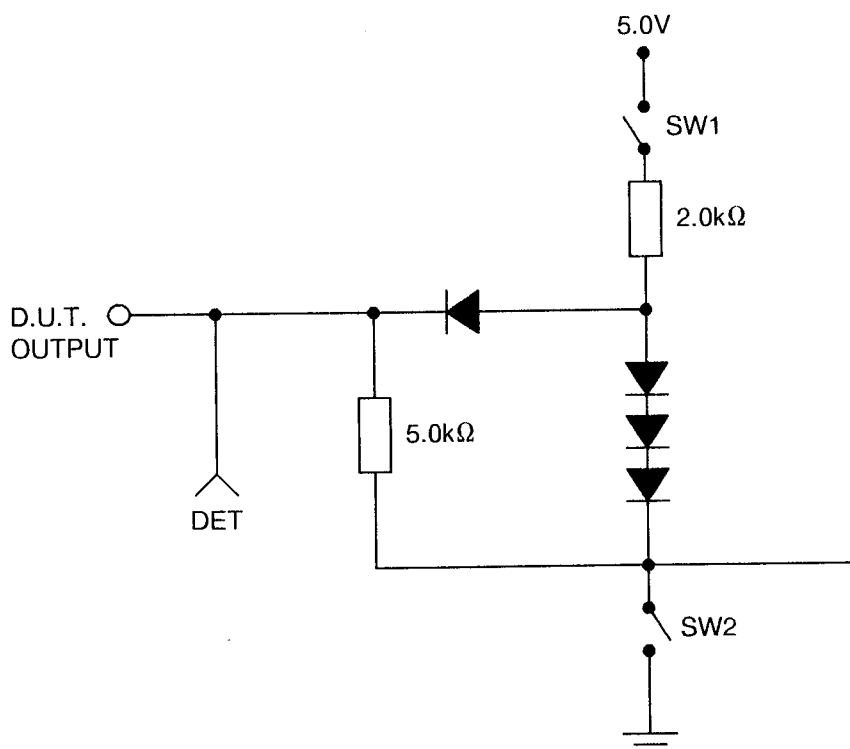
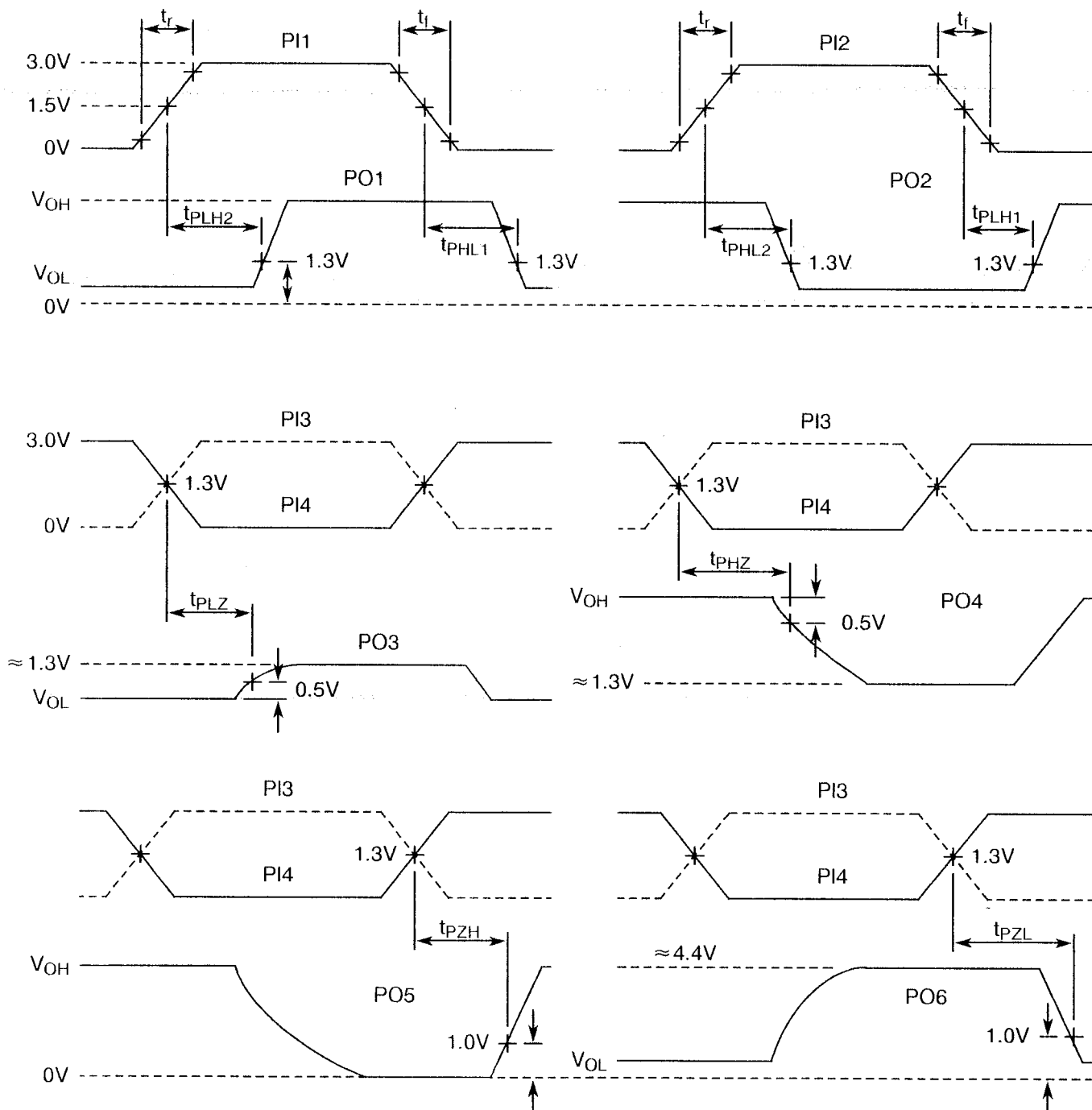




FIGURE 4 - CIRCUITS FOR ELECTRICAL MEASUREMENTS (CONTINUED)

FIGURE 4(j) - PROPAGATION DELAY (CONT'D)

VOLTAGE WAVEFORMS



NOTES

1. Input Waveform (all inputs): $f = 1.0\text{MHz}$, Duty Cycle = 50%, $t_r = t_f = 5.0\text{ns}$ between 10% to 90%.
2. For Input/Output Conditions, see Table 2.

**TABLE 4 - PARAMETER DRIFT VALUES**

| No. | CHARACTERISTICS | SYMBOL | SPEC. AND/OR TEST METHOD | TEST CONDITIONS | CHANGE LIMITS (Δ) | UNIT |
|----------|-----------------------------|------------|--------------------------|-----------------|----------------------------|---------|
| 17 | Supply Current | I_{CC} | As per Table 2 | As per Table 2 | ± 5.0 | mA |
| 20 to 21 | Enable Current High Level 2 | I_{ENH2} | As per Table 2 | As per Table 2 | ± 10 | μA |
| 22 to 23 | Enable Current Low Level | I_{ENL} | As per Table 2 | As per Table 2 | ± 36 | μA |
| 24 to 27 | Negative Input Current 1 | $-I_{IN1}$ | As per Table 2 | As per Table 2 | ± 200 | μA |
| 32 to 35 | Positive Input Current 1 | $+I_{IN1}$ | As per Table 2 | As per Table 2 | ± 200 | μA |
| 40 to 43 | Input Current 1 | I_{IN1} | As per Table 2 | As per Table 2 | ± 200 | μA |
| 44 to 47 | Input Current 2 | I_{IN2} | As per Table 2 | As per Table 2 | ± 200 | μA |
| 76 to 79 | Output Voltage Low Level 4 | V_{OL4} | As per Table 2 | As per Table 2 | ± 45 | mV |
| 84 to 87 | Output Voltage Low Level 6 | V_{OL6} | As per Table 2 | As per Table 2 | ± 45 | mV |
| 88 to 91 | Output Voltage High Level 1 | V_{OH1} | As per Table 2 | As per Table 2 | ± 250 | mV |
| 96 to 99 | Output Voltage High Level 3 | V_{OH3} | As per Table 2 | As per Table 2 | ± 250 | mV |

TABLE 5 - CONDITIONS FOR POWER BURN-IN AND OPERATING LIFE TESTS

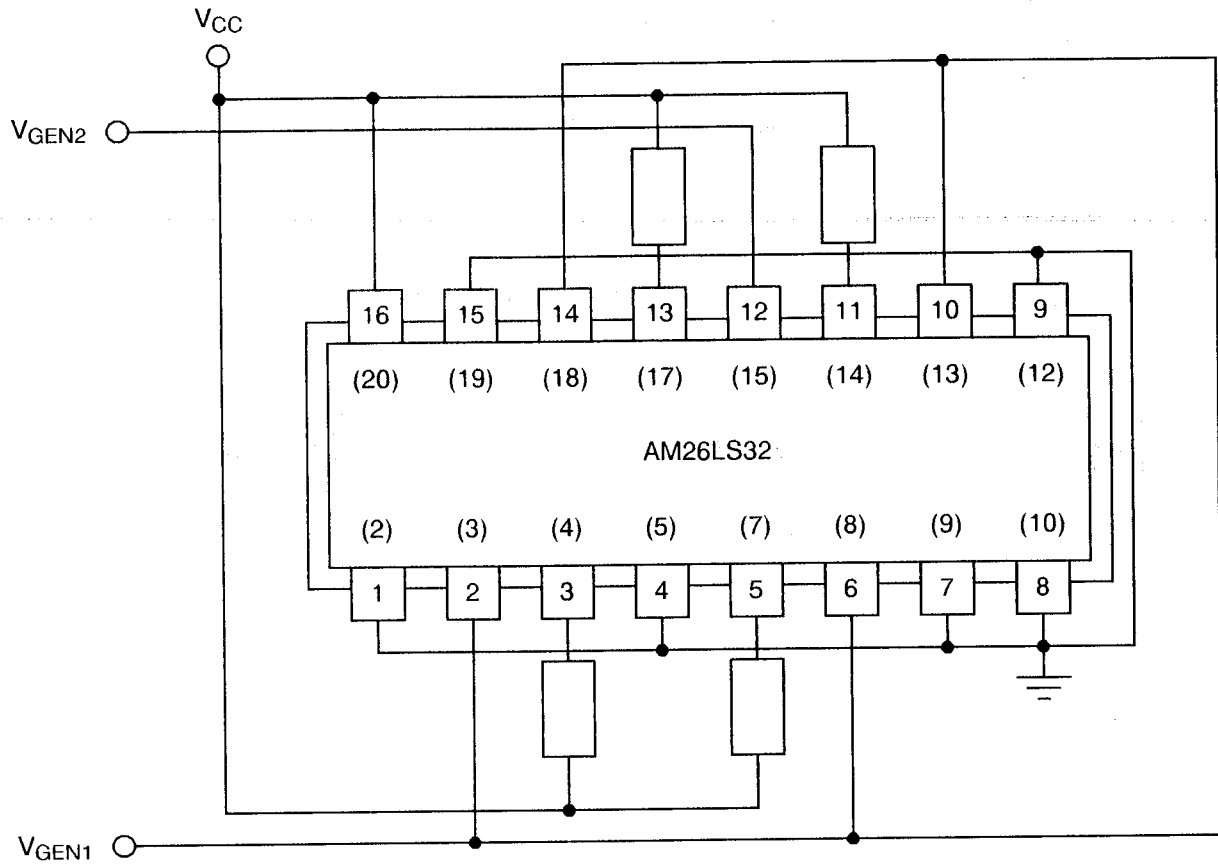
| No. | CHARACTERISTICS | SYMBOL | CONDITION | UNIT |
|-----|--|--------------------------|--|------|
| 1 | Ambient Temperature | T_{amb} | + 125(+ 0 – 5) | °C |
| 2 | Outputs - (Pins D/F 3-5-11-13) - (Pins C 4-7-14-17) | V_{OUT} | V_{CC} | V |
| 3 | Inputs - (Pins D/F 2-6-10-14) - (Pins C 3-8-13-18) | V_{IN} | V_{GEN1} | Vac |
| 4 | Input - (Pin D/F 12) - (Pin C 15) | V_{IN} | V_{GEN2} (Note 1) | Vac |
| 5 | Inputs - (Pins D/F 1-4-7-9-15) - (Pins C 2-5-9-12-19) | V_{IN} | GND | V |
| 6 | Pulse Voltage | V_{GEN1} | (-2.5 to -1.0) to (+ 1.0 to + 2.5) | Vac |
| 7 | Pulse Voltage | V_{GEN2} | 0 to 3.0 | Vac |
| 8 | Pulse Frequency Square Wave | f_{GEN1} f_{GEN2} | 100k 50k 50% Duty Cycle $t_r = t_f \leq 10ns$ | Hz |
| 9 | Positive Supply Voltage (Pin D/F 16) (Pin C 20) | V_{CC} | 5.5(+ 0 – 0.5) | V |
| 10 | Negative Supply Voltage (Pin D/F 8) (Pin C 10) | GND | 0 | V |

NOTES

1. Triggered by V_{GEN1} .
2. Output Load = 1.0k Ω



FIGURE 5 - ELECTRICAL CIRCUIT FOR POWER BURN-IN AND OPERATING LIFE TESTS



NOTES

1. Pin numbers in parenthesis are for the chip carrier package.



- 4.8 ENVIRONMENTAL AND ENDURANCE TESTS (CHARTS IV AND V OF ESA/SCC GENERIC SPECIFICATION NO. 9000)
- 4.8.1 Electrical Measurements on Completion of Environmental Tests
The parameters to be measured on completion of environmental tests are scheduled in Table 6. Unless otherwise stated, the measurements shall be performed at $T_{amb} = +22 \pm 3$ °C.
- 4.8.2 Electrical Measurements at Intermediate Points during Endurance Tests
The parameters to be measured at intermediate points during endurance tests are as scheduled in Table 6 of this specification. Unless otherwise stated, the measurements shall be performed at $T_{amb} = +22 \pm 3$ °C.
- 4.8.3 Electrical Measurements on Completion of Endurance Tests
The parameters to be measured on completion of endurance testing are as scheduled in Table 6 of this specification. Unless otherwise stated, the measurements shall be performed at $T_{amb} = +22 \pm 3$ °C.
- 4.8.4 Conditions for Operating Life Tests
The requirements for operating life testing are specified in Section 9 of ESA/SCC Generic Specification No. 9000. The conditions for operating life testing shall be as specified in Table 5 of this specification.
- 4.8.5 Electrical Circuits for Operating Life Tests
Circuits for use in performing the operating life tests are shown in Figure 5 of this specification.
- 4.8.6 Conditions for High Temperature Storage Test
The requirements for the high temperature storage test are specified in ESA/SCC Generic Specification No. 9000. The temperature to be applied shall be the maximum storage temperature specified in Table 1(b) of this specification.



TABLE 6 - ELECTRICAL MEASUREMENTS ON COMPLETION OF ENVIRONMENTAL TESTS AND AT INTERMEDIATE POINTS AND ON COMPLETION OF ENDURANCE TESTING

| No. | CHARACTERISTICS | SYMBOL | SPEC. AND/OR TEST METHOD | TEST CONDITIONS | CHANGE LIMITS (Δ) | ABSOLUTE | | UNIT |
|----------|---|------------|--------------------------|-----------------|----------------------------|----------|------|---------|
| | | | | | | MIN. | MAX. | |
| 1 to 16 | Functional Test | - | As per Table 2 | As per Table 2 | - | - | - | - |
| 17 | Supply Current | I_{CC} | As per Table 2 | As per Table 2 | ± 5.0 | - | 70 | mA |
| 20 to 21 | Enable Current High Level 2 | I_{ENH2} | As per Table 2 | As per Table 2 | ± 10 | - | 100 | μA |
| 22 to 23 | Enable Current Low Level | I_{ENL} | As per Table 2 | As per Table 2 | ± 36 | - | -360 | μA |
| 24 to 27 | Negative Input Current 1 | $-I_{IN1}$ | As per Table 2 | As per Table 2 | ± 0.2 | - | 2.3 | mA |
| 32 to 35 | Positive Input Current 1 | $+I_{IN1}$ | As per Table 2 | As per Table 2 | ± 0.2 | - | 2.3 | mA |
| 40 to 43 | Input Current 1 | I_{IN1} | As per Table 2 | As per Table 2 | ± 0.2 | - | -2.8 | mA |
| 44 to 47 | Input Current 2 | I_{IN2} | As per Table 2 | As per Table 2 | ± 0.2 | - | -2.8 | mA |
| 56 to 59 | Off-State Output Current (Low Level Applied) | I_{OZL} | As per Table 2 | As per Table 2 | - | - | -20 | μA |
| 60 to 63 | Off-State Output Current (High Level Applied) | I_{OZH} | As per Table 2 | As per Table 2 | - | - | 20 | μA |
| 76 to 79 | Output Voltage Low Level 4 | V_{OL4} | As per Table 2 | As per Table 2 | ± 45 | - | 450 | mV |
| 84 to 87 | Output Voltage Low Level 6 | V_{OL6} | As per Table 2 | As per Table 2 | ± 45 | - | 450 | mV |
| 88 to 91 | Output Voltage High Level 1 | V_{OH1} | As per Table 2 | As per Table 2 | ± 0.25 | 2.5 | - | V |
| 96 to 99 | Output Voltage High Level 3 | V_{OH3} | As per Table 2 | As per Table 2 | ± 0.25 | 2.5 | - | V |