INTEGRATED CIRCUITS, SILICON MONOLITHIC,

BIPOLAR DATA SELECTORS/MULTIPLEXERS

WITH 3-STATE OUTPUTS,

BASED ON TYPE 54LS251

ESCC Detail Specification No. 9202/052

ISSUE 1

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ESA/SCC Detail Specification No. 9202/052

space components
coordination group

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Issue 4	September 1993		
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DOCUMENTATION CHANGE NOTICE

Rev. Letter	Rev. Date	CHANGE		Approved DCR No.
		Reference	Item	
		This issue supersedes Issue 3 and incorporates all modifications defined in Revisions 'A', 'B' and 'C' to Issue 3 and the following DCR's:-		
		Cover page		None
		DCN		None
		Table 1(a)	Lead Material and/or Finish amended for existing Variants	22881
			Variants 11 and 12 added	22881
		Table 1(b)	No. 2, in Remarks, Note No. amended to "1"	23573
			No. 3, in Remarks, Note No. amended to "2"	23573
			No. 6, existing temperature specified for DIL/FP	23573
			, new temperature and Note reference added for CCP	23573
			Note 1 renumbered as "2"	23573
			Note 2 renumbered as "3" and text amended	23573
			Note 3 renumbered as "1"	23573
			New Note 4 added	23573
		Figures 2(a), (b)	Drawing and Table amended	221033
		Figures 2(a), (b), (c)	Imperial dimensions deleted	22881
		Figures 2(b), (c)	Reference to Note 6 amended to "Note 10"	23519
		Figure 2(d)	New figure added	22881
		Notes to Figures	Title of the notes amended	22881
			Note 1, last sentence added	22881
			Note 8, 'or terminals' added	22881
			Note 9, rewritten	22881
			Notes 11 and 12 added	22881
		Figure 3(a)	Figure for chip carrier package added	22881
			Subtitles added above both drawings	22881
			Comparison table added	22881
			Note 1 added	22881
		Para. 4.2.2	PIND deviation deleted, "None" added	21048
		Para. 4.2.4	Deviation deleted, "None" added	22919
		Para. 4.2.5	Deviation deleted, "None" added	22919
		Para. 4.3.2	Paragraph rewritten	23460
		Para. 4.4.2	Paragraph rewritten	22881
		Para. 4.5.2	Paragraph rewritten	22881
		Para. 4.5.3	Paragraph standardised	23519
		Para. 4.6.3	"...and functional test sequence..." deleted	23519
		Para. 4.7.1	"T_{amb}" added before "... $+22 \pm 3$°C"	23519
		Paras. 4.7.2 & 4.7.3	In title and paragraph, "burn-in" amended to read "power burn-in"	23519
		Para. 4.8	Title amended	23519
'A'	Jan. '95	P1. Cover Page		None
		P2. DCN		None
		P16. Para. 4.3.2	Maximum weights amended	221047

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TABLES

FIGURES

APPENDICES (Applicable to specific Manufacturers only)

1. GENERAL

1.1 SCOPE

This specification details the ratings, physical and electrical characteristics, test and inspection data for a silicon monolithic, low power bipolar Schottky Data Selector/Multiplexer with 3-State Outputs, based on Type 54LS251. 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 (FIGURE 1)

Not applicable.

1.5 PHYSICAL DIMENSIONS

The physical dimensions of the integrated circuits specified herein are shown in 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	CASE	FIGURE	LEAD MATERIAL AND/OR FINISH
01	FLAT	2(a)	D7
02	FLAT	2(a)	G4
05	DIL	2(b)	D7
06	DIL	2(b)	G4
07	DIL	2(c)	D7
08	DIL	2(c)	D3 or D4
11	CCP	2(d)	7
12	CCP	2(d)	4

TABLE 1(b) - MAXIMUM RATINGS

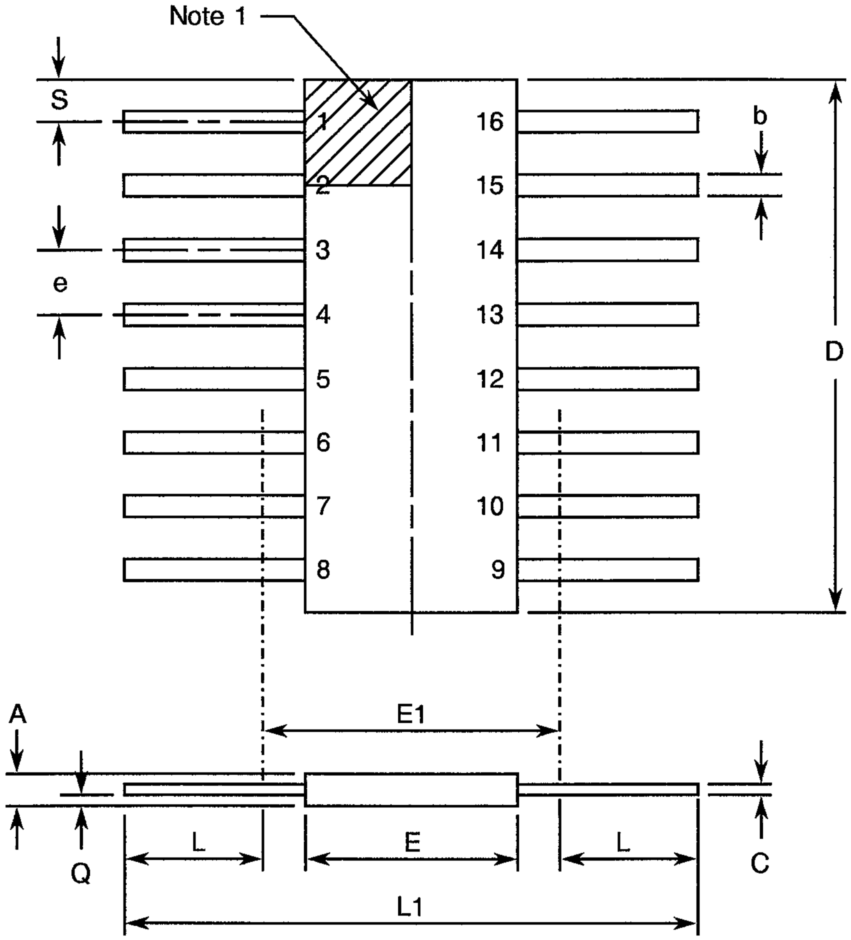
No.	CHARACTERISTICS	SYMBOL	MAXIMUM RATINGS	UNIT	REMARKS
1	Supply Voltage	V_{CC}	−0.5 to 7.0	V	-
2	Input Voltage	V_{IN}	−0.5 to 7.0	V	Note 1
3	Device Dissipation	P_D	66	mWdc	Note 2
4	Operating Temperature Range	T_{op}	−55 to +125	°C	-
5	Storage Temperature Range	T_{stg}	−65 to +150	°C	-
6	Soldering Temperature For FP and DIP For CCP	T_{sol}	 +265 +245	°C	 Note 3 Note 4

NOTES

1. Input current limited to −18mA.
2. Must withstand added P_D due to short circuit conditions (i.e. I_{OS}) at one output for 5 seconds.
3. Duration 10 seconds maximum at a distance of not less than 1.5mm from the device body and the same lead shall not be resoldered until 3 minutes have elapsed.
4. Duration 5 seconds maximum and the same terminal shall not be resoldered until 3 minutes have elapsed.

FIGURE 2 - PHYSICAL DIMENSIONS

FIGURE 2(a) - FLAT PACKAGE

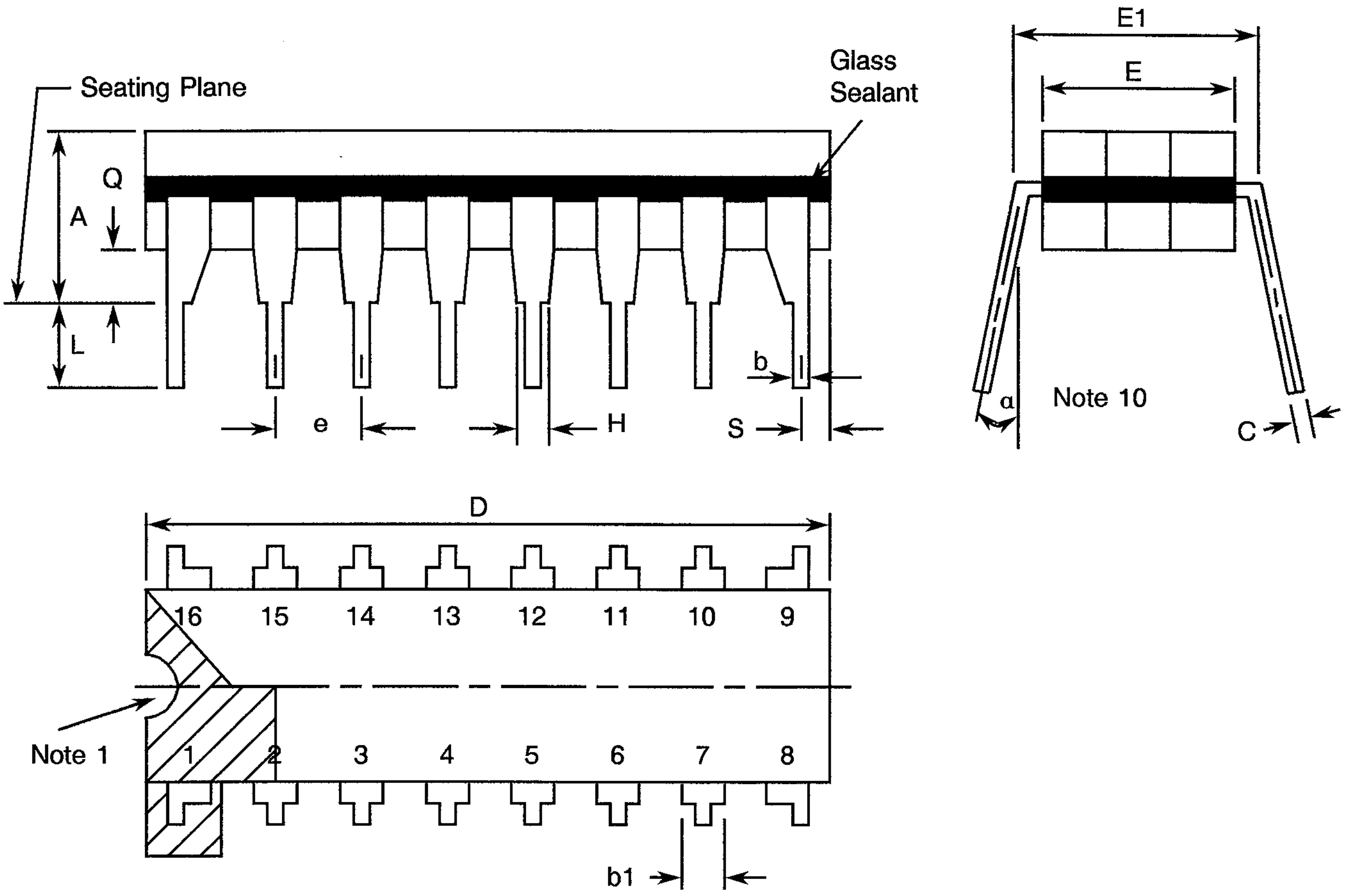


SYMBOL	MILLIMETRES		NOTES
	MIN	MAX	
A	1.27	2.03	
b	0.38	0.56	8
C	0.08	0.23	8
D	9.42	10.16	4
E	6.27	7.24	
E1	7.00 TYPICAL		4
e	1.27 TYPICAL		5, 9
L	7.87	8.89	8
L1	23.88	24.38	
Q	0.51	1.02	2
S	0.25	0.64	7

NOTES: See Page 11.

FIGURE 2 - PHYSICAL DIMENSIONS (CONTINUED)

FIGURE 2(b) - DUAL-IN-LINE PACKAGE

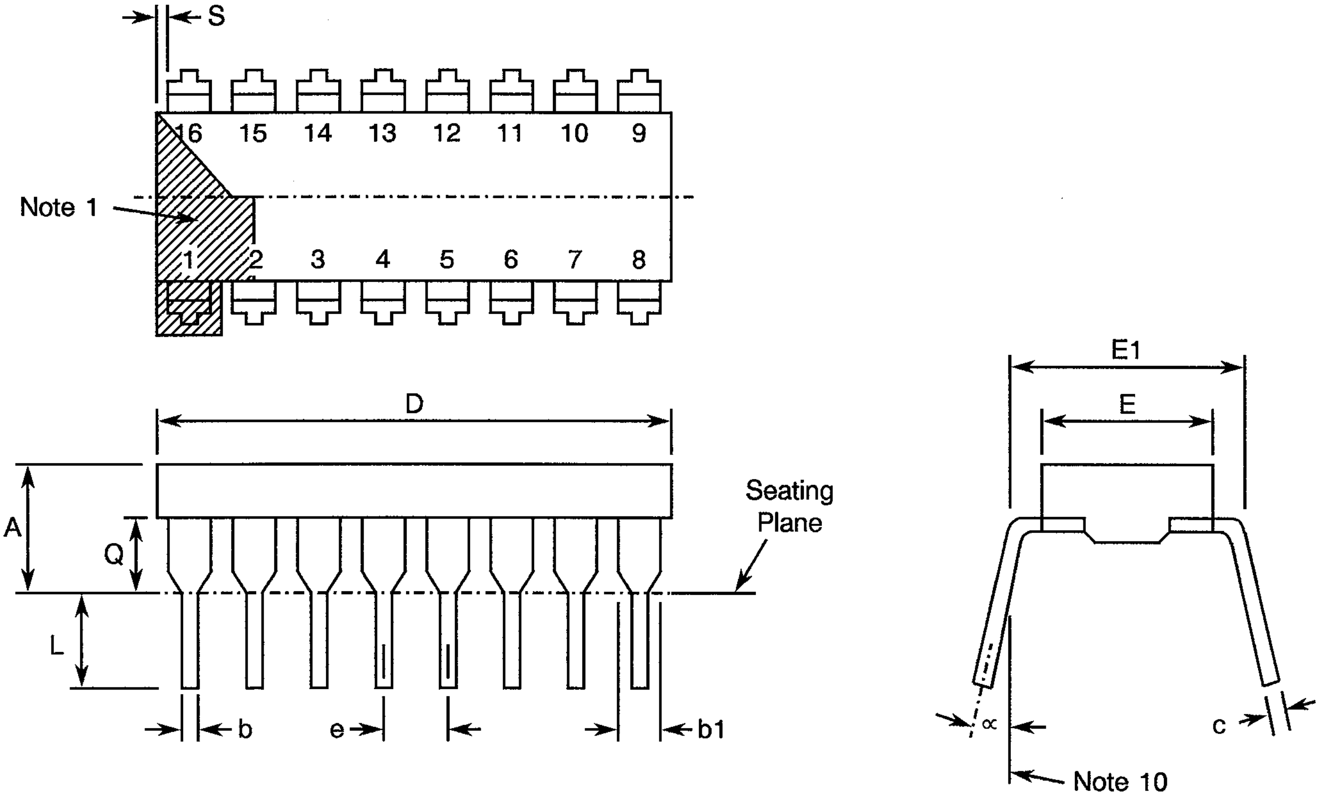


SYMBOL	MILLIMETRES		NOTES
	MIN	MAX	
A	-	5.08	
b	0.38	0.66	8
b1	-	1.78	8
C	0.20	0.44	8
D	19.18	19.94	4
E	6.22	7.62	4
E1	7.37	8.13	
e	2.54 TYPICAL		6, 9
F	1.27 TYPICAL		
H	0.76	-	
L	3.30	5.08	8
Q	0.51	-	3
S	0.38	1.27	7
α	0°	15°	10

NOTES: See Page 11.

FIGURE 2 - PHYSICAL DIMENSIONS (CONTINUED)

FIGURE 2(c) - DUAL-IN-LINE PACKAGE

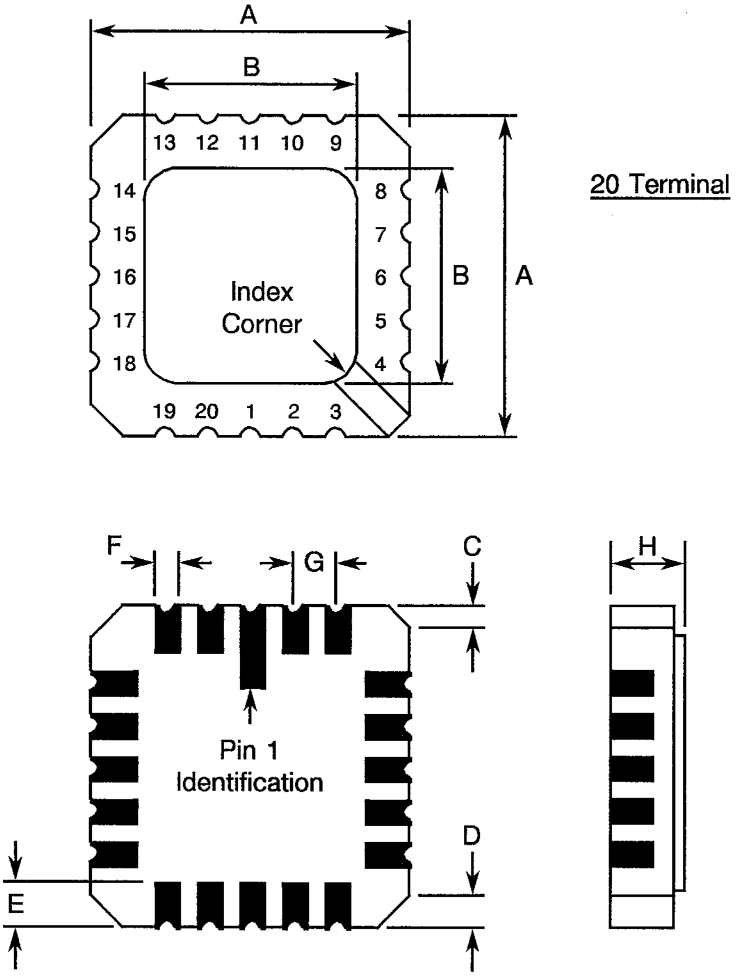


SYMBOL	MILLIMETRES		NOTES
	MIN.	MAX.	
A	-	5.08	-
b	0.36	0.58	8
b1	0.76	1.78	8
c	0.20	0.38	8
D	18.80	22.10	-
E	5.59	7.87	-
E1	7.37	8.13	4
e	2.54 TYPICAL		6, 9
L	3.18	5.08	-
Q	0.38	2.03	3
S	0.25	1.35	7
∝	0°	15°	10

NOTES: See Page 11.

FIGURE 2 - PHYSICAL DIMENSIONS (CONTINUED)

FIGURE 2(d) - SQUARE CHIP CARRIER PACKAGE (3 LAYER BASE)



SYMBOL	MILLIMETRES		NOTES
	MIN.	MAX.	
A	8.687	9.093	-
B	7.798	9.093	-
C	0.250	0.510	11
D	0.889	1.143	12
E	1.140	1.400	8
F	0.559	0.712	8
G	1.27 TYPICAL		5, 9
H	1.630	2.540	-

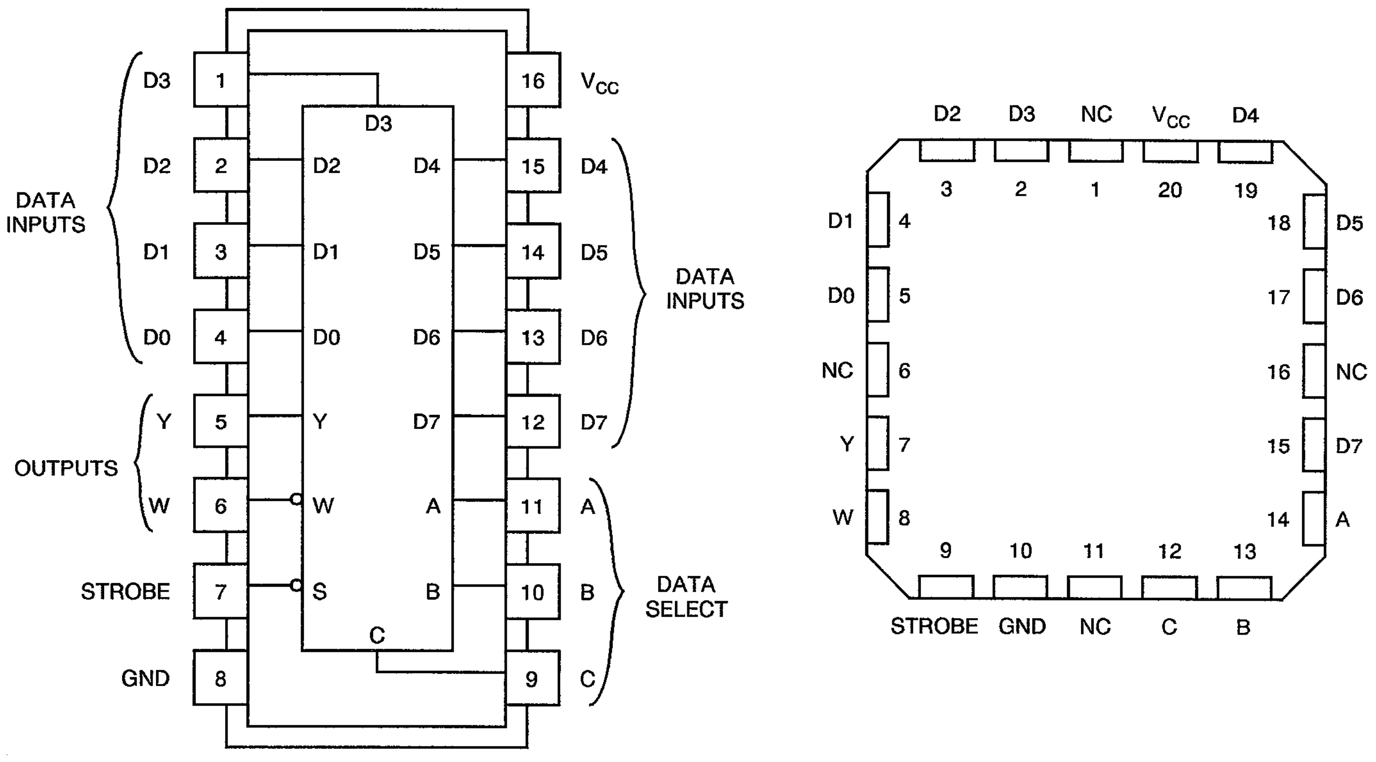
NOTES: See Page 11.

FIGURE 2 - PHYSICAL DIMENSIONS (CONTINUED)

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

1. Index area: a notch or a 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 shown in Figure 2(d).
2. Dimension Q shall be measured at the point of exit of the lead from the body.
3. Dimension Q 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 spacing is 1.27mm between centrelines. Each pin centreline shall be located within ±0.13mm of its true longitudinal position relative to Pins 1 and 16.
6. The true position pin spacing is 2.54mm between centrelines. Each pin centreline shall be located within ±0.25mm of its true longitudinal position relative to Pins 1 and 16.
7. Applies to all four 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



DUAL-IN-LINE AND FLAT PACKAGE

(TOP VIEW)

CHIP CARRIER PACKAGE

(TOP VIEW)

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

NOTES

1. All references throughout this specification relate to FLAT/DIL packages only.

FIGURE 3(b) - TRUTH TABLE (FUNCTION TABLE)

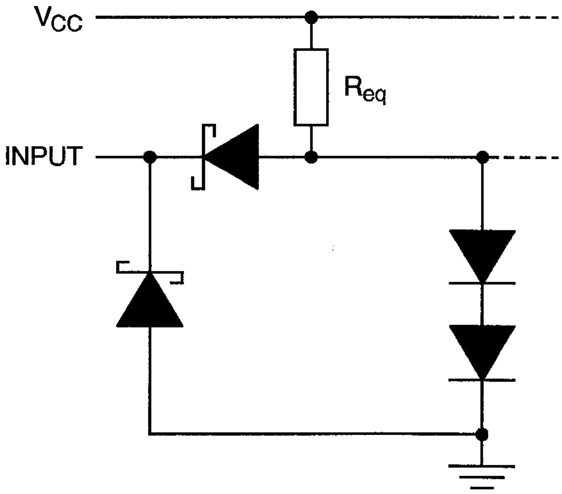
INPUT				OUTPUTS	
SELECT			STROBE	Y	W
C	B	A	S		
X	X	X	H	Z	Z
L	L	L	L	D0	$\overline{D0}$
L	L	H	L	D1	$\overline{D1}$
L	H	L	L	D2	$\overline{D2}$
L	H	H	L	D3	$\overline{D3}$
H	L	L	L	D4	$\overline{D4}$
H	L	H	L	D5	$\overline{D5}$
H	H	L	L	D6	$\overline{D6}$
H	H	H	L	D7	$\overline{D7}$

NOTES

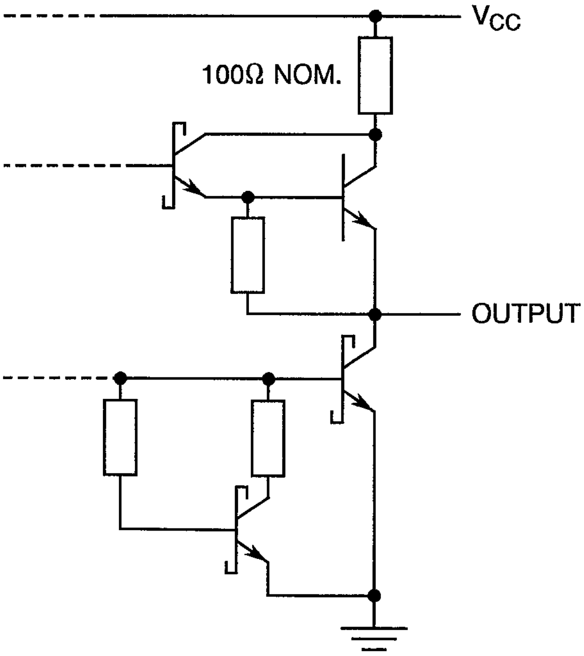
1. Logic Level Definitions: L = Low Level (Steady State), H = High Level (Steady State), X = Don't Care, Z = High Impedance (off).
2. D0, D1 . . . D7 = the level of the respective D input.

FIGURE 3(c) - CIRCUIT SCHEMATIC

EQUIVALENT OF EACH INPUT



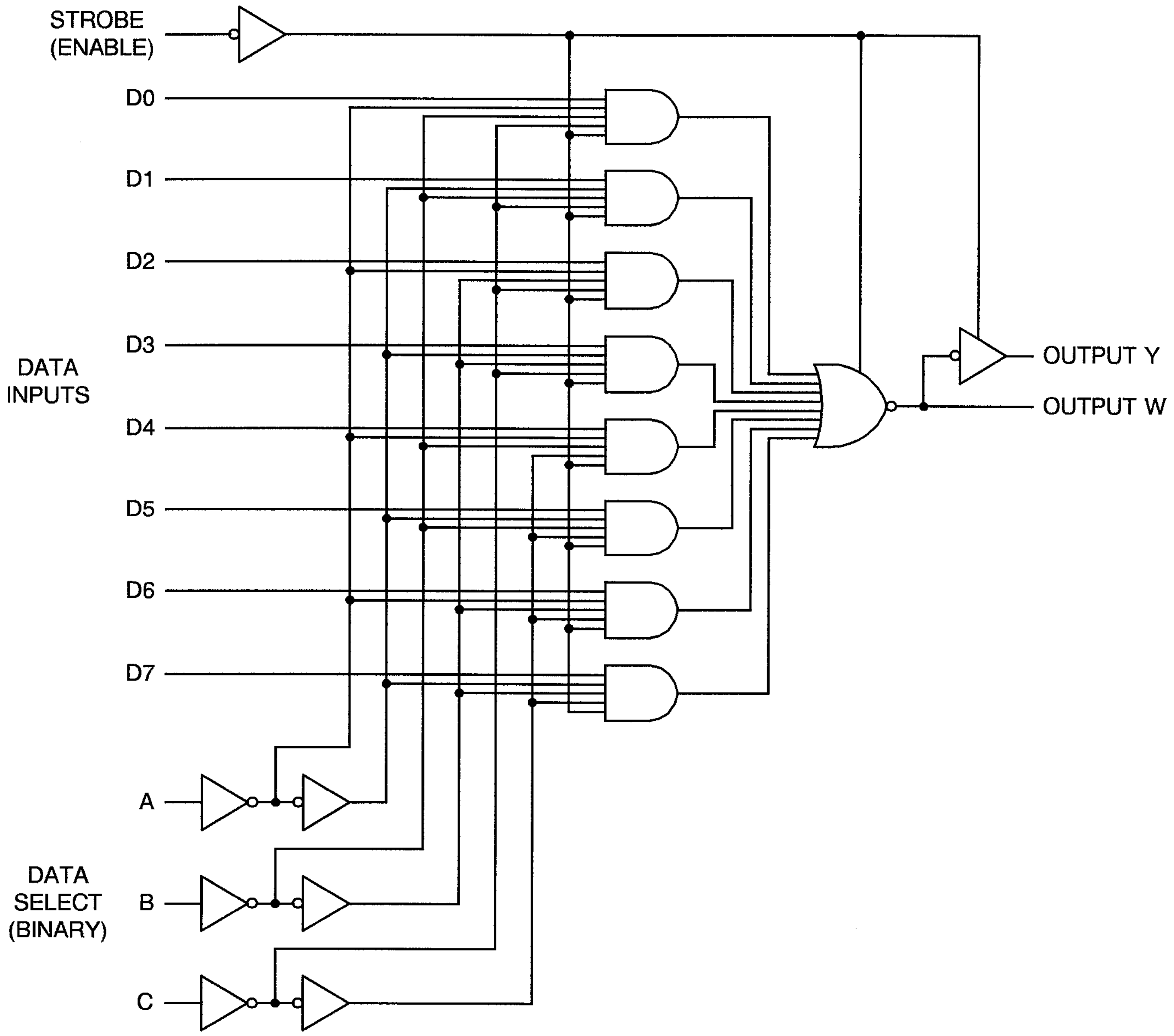
TYPICAL OF ALL OUTPUTS



NOTES

1. A, B, C, S : R_{eq} = 20kΩ NOM.
   D0 thru D7 : R_{eq} = 17kΩ NOM.

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 abbreviations are used:-

V_{IC} = Input Clamp Voltage.
I_{CC} = Supply Current.
V_{CC} = Supply Voltage.

4. REQUIREMENTS

4.1 GENERAL

The complete requirements for procurement of the integrated circuits specified herein are 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 tests and subsequent electrical measurements related to this test shall be omitted.

(b) Para. 9.9.2, Electrical Measurements at High and Low Temperatures: Only a test result summary, based on go-no-go tests and presented in histogram form is required.

4.2.4 Deviations from Qualification Tests (Chart IV)

None.

4.2.5 Deviations from Lot Acceptance Tests (Chart V)

None.

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 0.7 grammes for the flat package, 2.2 grammes for the dual-in-line 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 either Type 'D' or Type 'G' with either Type '3 or 4', Type '4' or Type '7' finish in accordance with the requirements of ESA/SCC Basic Specification No. 23500. For chip carrier packages, the finish shall be either 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:

920205202B

Detail Specification Number
Type Variant (see Table 1(a))
Testing Level (B or C, as applicable)

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 $T_{amb} = +125$ and -55 °C respectively.

4.6.3 Circuits for Electrical Measurements

Circuits for use in performing the 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 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.

4.7.3 Electrical Circuits for Power Burn-in

Circuits for use in performing the power burn-in tests are 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)	LIMITS		UNIT
						MIN	MAX	
1	Functional Test	-	-	3(b)	Verify Truth Table with Load. Note 1	-	-	-
2 to 13	Input Current High Level 1	I_{IH1}	3010	4(a)	$V_{CC} = 5.5V$, $V_{IN} = 2.7V$ (Pins 1-2-3-4-7-9-10-11-12-13-14-15)	-	20	µA
14 to 25	Input Current High Level 2 (Max. Input Voltage)	I_{IH2}	3010	4(a)	$V_{CC} = 5.5V$, $V_{IN} = 7.0V$ (Pins 1-2-3-4-7-9-10-11-12-13-14-15)	-	100	µA
26 to 37	Input Clamp Voltage	V_{IC}	3009	4(b)	$V_{CC} = 4.5V$, $I_{IN} = -18mA$ Note 2 (Pins 1-2-3-4-7-9-10-11-12-13-14-15)	-	−1.5	V
38 to 49	Input Current Low Level	I_{IL}	3009	4(c)	$V_{CC} = 5.5V$, $V_{IN} = 0.4V$ (Pins 1-2-3-4-7-9-10-11-12-13-14-15)	-	−400	µA
50 to 65	Output Voltage Low Level	V_{OL}	3007	4(d)	$V_{CC} = 4.5V$, $V_{IL} = 0.7V$ $V_{IH} = 2.0V$, $I_{OL} = 4.0mA$ (Pins 5-6)	-	0.4	V
66 to 81	Output Voltage High Level	V_{OH}	3006	4(e)	$V_{CC} = 4.5V$, $V_{IL} = 0.7V$ $V_{IH} = 2.0V$, $I_{OH} = -1.0mA$ (Pins 5-6)	2.4	-	V
82 to 83	Short Circuit Output Current	I_{OS}	3011	4(f)	$V_{CC} = 5.5V$ Note 3 (Pins 5-6)	−15	−100	mA
84	Supply Current 1	I_{CC1}	3005	4(g)	$V_{CC} = 5.5V$ Strobe at GND Note 4 (Pin 16)	-	10	mA
85	Supply Current 2	I_{CC1}	3005	4(g)	$V_{CC} = 5.5V$ Strobe at 4.5V Note 4 (Pin 16)	-	12	mA
86 to 87	Off-State Output Current 1 (High Impedance)	I_{OFF1}	3006	4(e)	$V_{CC} = 5.5V$, $V_{IH} = 2.0V$ $V_O = 2.7V$ (Pins 5-6)	-	20	µA
88 to 89	Off-State Output Current 2 (High Impedance)	I_{OFF2}	3006	4(e)	$V_{CC} = 5.5V$, $V_{IH} = 2.0V$ $V_O = 0.4V$ (Pins 5-6)	-	−20	µA

NOTES: See Page 20.

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) (NOTE 5)	LIMITS		UNIT
						MIN	MAX	
90 to 92	Propagation Delay, Low to High Level, A, B or C to Y	t_{PLH}	3003	4(h)	$V_{CC} = 5.0V$ $R_L = 2.0k\Omega$ $C_L = 15pF$ (Pin 5)	-	45	ns
93 to 95	Propagation Delay, High to Low Level, A, B or C to Y	t_{PHL}				-	45	
96 to 98	Propagation Delay, Low to High Level, A, B or C to W	t_{PLH}	3003	4(h)	$V_{CC} = 5.0V$ $R_L = 2.0k\Omega$ $C_L = 15pF$ (Pin 6)	-	33	ns
99 to 101	Propagation Delay, High to Low Level, A, B or C to W	t_{PHL}				-	33	
102 to 109	Propagation Delay, Low to High Level, Any D to Y	t_{PLH}	3003	4(h)	$V_{CC} = 5.0V$ $R_L = 2.0k\Omega$ $C_L = 15pF$ (Pin 5)	-	28	ns
110 to 117	Propagation Delay, High to Low Level, Any D to Y	t_{PHL}				-	28	
118 to 125	Propagation Delay, Low to High Level, Any D to W	t_{PLH}	3003	4(h)	$V_{CC} = 5.0V$ $R_L = 2.0k\Omega$ $C_L = 15pF$ (Pin 6)	-	15	ns
126 to 133	Propagation Delay, High to Low Level, Any D to W	t_{PHL}				-	15	
134	Output Enable Time to High Level Strobe/Y	t_{PZH}	3003	4(h)	$V_{CC} = 5.0V$ $R_L = 2.0k\Omega$ $C_L = 15pF$ (Pin 5)	-	45	ns
135	Output Enable Time to Low Level Strobe/Y	t_{PZL}				-	40	
136	Output Enable Time to High Level Strobe/W	t_{PZH}	3003	4(h)	$V_{CC} = 5.0V$ $R_L = 2.0k\Omega$ $C_L = 15pF$ (Pin 6)	-	27	ns
137	Output Enable Time to Low Level Strobe/W	t_{PZL}				-	40	
138	Output Disable Time from High Level Strobe/Y	t_{PHZ}	3003	4(h)	$V_{CC} = 5.0V$ $R_L = 2.0k\Omega$ $C_L = 5.0pF$ (Pin 5)	-	45	ns
139	Output Disable Time from Low Level Strobe/Y	t_{PLZ}				-	25	

NOTES: See Page 20.

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) (NOTE 5)	LIMITS		UNIT
						MIN	MAX	
140	Output Disable Time from High Level Strobe/W	t_{PHZ}	3003	4(h)	$V_{CC} = 5.0V$ $R_L = 2.0k\Omega$ $C_L = 5.0pF$ (Pin 6)	-	55	ns
141	Output Disable Time from Low Level Strobe/W	t_{PLZ}				-	25	

NOTES

1. Go-no-go test with $V_{IL} = 0.3V$; $V_{IH} = 3.0V$; trip point 1.5V.
2. All inputs and outputs not under test shall be open.
3. No more than one output should be shorted at a time, and only for 1 second maximum.
4. I_{CC} is measured with the outputs open and all data and select inputs at 4.5V.
5. Propagation delay measurements shall be performed as a go-no-go test on a 100% basis. Read-and-record measurements shall be performed on an LTPD7 sample basis following the Chart III Burn-in Test.

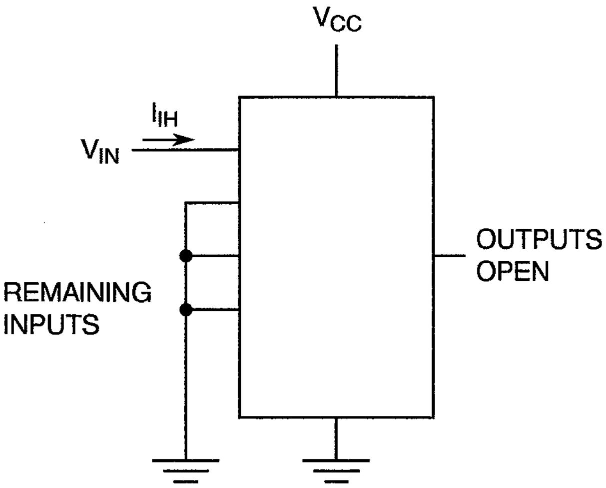
TABLE 3 - ELECTRICAL MEASUREMENTS AT HIGH AND LOW TEMPERATURES, +125(+0−5) °C AND −55(+5−0) °C

No.	CHARACTERISTICS	SYMBOL	TEST METHOD MIL-STD 883	TEST FIG.	TEST CONDITIONS (PINS UNDER TEST)	LIMITS		UNIT
						MIN	MAX	
1	Functional Test	-	-	3(b)	Verify Truth Table with Load. Note 1	-	-	-
2 to 13	Input Current High Level 1	I_{IH1}	3010	4(a)	$V_{CC}=5.5V$, $V_{IN}=2.7V$ (Pins 1-2-3-4-7-9-10-11-12-13-14-15)	-	20	µA
14 to 25	Input Current High Level 2 (Max. Input Voltage)	I_{IH2}	3010	4(a)	$V_{CC}=5.5V$, $V_{IN}=7.0V$ (Pins 1-2-3-4-7-9-10-11-12-13-14-15)	-	100	µA
26 to 37	Input Clamp Voltage	V_{IC}	3009	4(b)	$V_{CC}=4.5V$, $I_{IN}=-18mA$ Note 2 (Pins 1-2-3-4-7-9-10-11-12-13-14-15)	-	−1.5	V
38 to 49	Input Current Low Level	I_{IL}	3009	4(c)	$V_{CC}=5.5V$, $V_{IN}=0.4V$ (Pins 1-2-3-4-7-9-10-11-12-13-14-15)	-	−400	µA
50 to 65	Output Voltage Low Level	V_{OL}	3007	4(d)	$V_{CC}=4.5V$, $V_{IL}=0.7V$ $V_{IH}=2.0V$, $I_{OL}=4.0mA$ (Pins 5-6)	-	0.4	V
66 to 81	Output Voltage High Level	V_{OH}	3006	4(e)	$V_{CC}=4.5V$, $V_{IL}=0.7V$ $V_{IH}=2.0V$, $I_{OH}=-1.0mA$ (Pins 5-6)	2.4	-	V
82 to 83	Short Circuit Output Current	I_{OS}	3011	4(f)	$V_{CC}=5.5V$ Note 3 (Pins 5-6)	−15	−100	mA
84	Supply Current 1	I_{CC1}	3005	4(g)	$V_{CC}=5.5V$ Strobe at GND Note 4 (Pin 16)	-	10	mA
85	Supply Current 2	I_{CC1}	3005	4(g)	$V_{CC}=5.5V$ Strobe at 4.5V Note 4 (Pin 16)	-	12	mA
86 to 87	Off-State Output Current 1 (High Impedance)	I_{OFF1}	3006	4(e)	$V_{CC}=5.5V$, $V_{IH}=2.0V$ $V_O=2.7V$ (Pins 5-6)	-	20	µA
88 to 89	Off-State Output Current 2 (High Impedance)	I_{OFF2}	3006	4(e)	$V_{CC}=5.5V$, $V_{IH}=2.0V$ $V_O=0.4V$ (Pins 5-6)	-	−20	µA

NOTES: See Page 20.

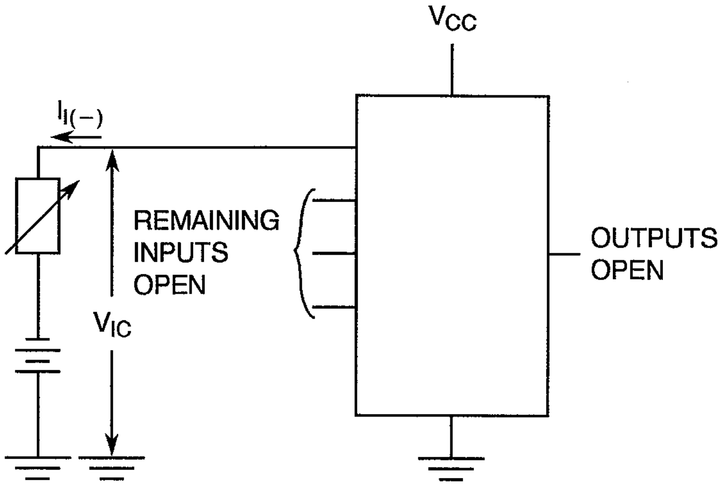
FIGURE 4 - CIRCUITS FOR ELECTRICAL MEASUREMENTS

FIGURE 4(a) - HIGH LEVEL INPUT CURRENT



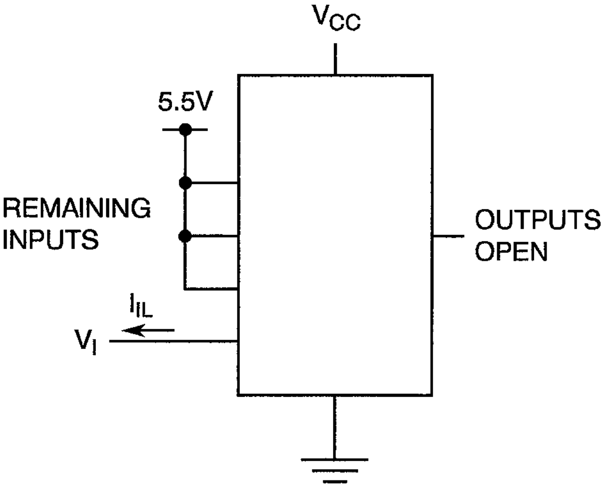
NOTES
1. Each input to be tested separately.

FIGURE 4(b) - INPUT CLAMP VOLTAGE



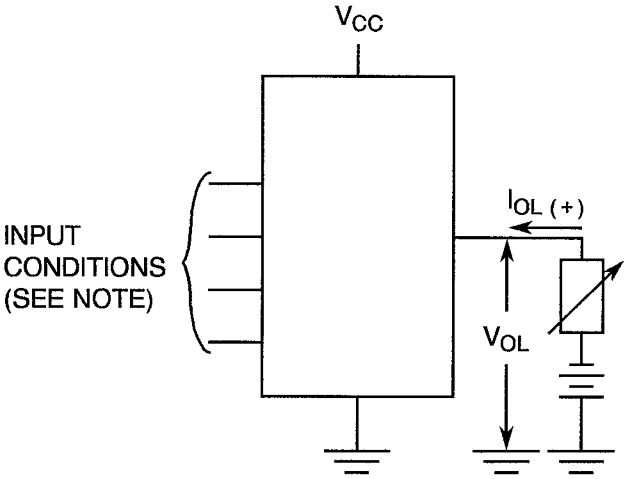
NOTES
1. Each input to be tested separately.

FIGURE 4(c) - LOW LEVEL INPUT CURRENT



NOTES
1. Each input to be tested separately.

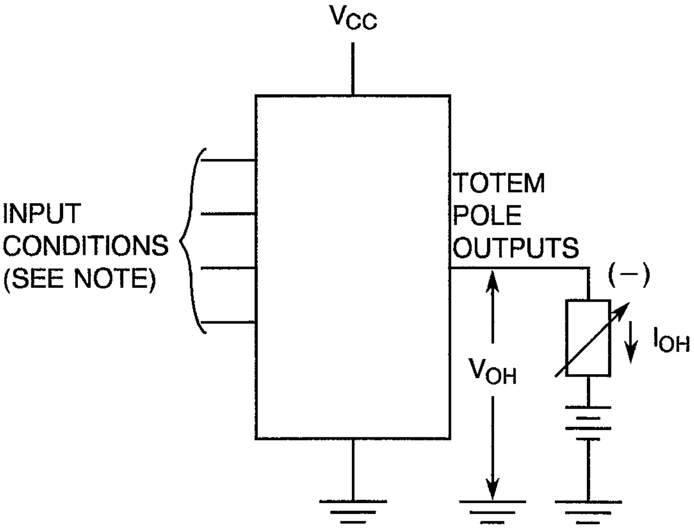
FIGURE 4(d) - LOW LEVEL OUTPUT VOLTAGE



NOTES
1. Test per Truth Table.

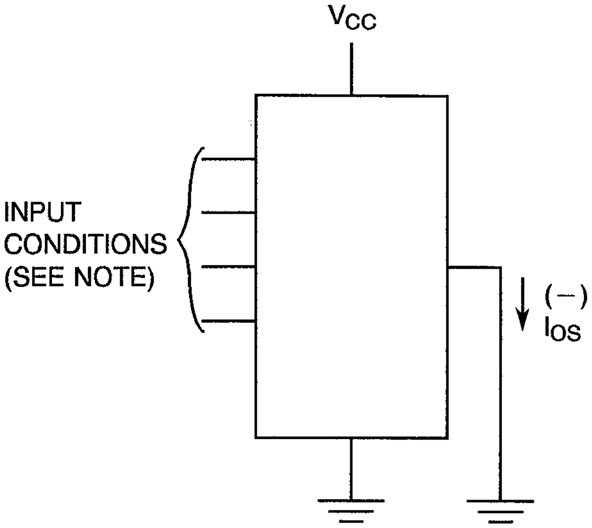
FIGURE 4 - CIRCUITS FOR ELECTRICAL MEASUREMENTS (CONTINUED)

FIGURE 4(e) - HIGH LEVEL OUTPUT VOLTAGE
OFF-STATE OUTPUT CURRENT



NOTES
1. Test per Truth Table.

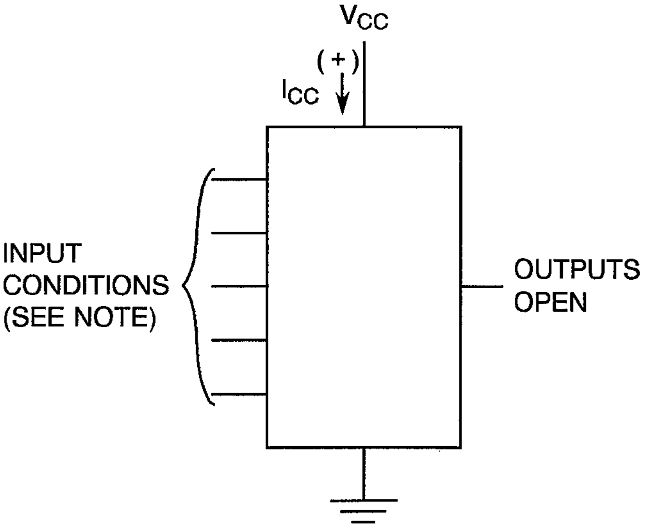
FIGURE 4(f) - SHORT CIRCUIT OUTPUT CURRENT



NOTES
1. No more than one output should be shorted at a time.
2. For Y measurement:
   V_{IN} Data and Select = 5.5V.
   V_{IN} Strobe = 0.

   For W measurement:
   V_{IN} Strobe, Select and D0 = 0V.
   V_{IN} other data inputs = 5.5V.

FIGURE 4(g) - SUPPLY CURRENT

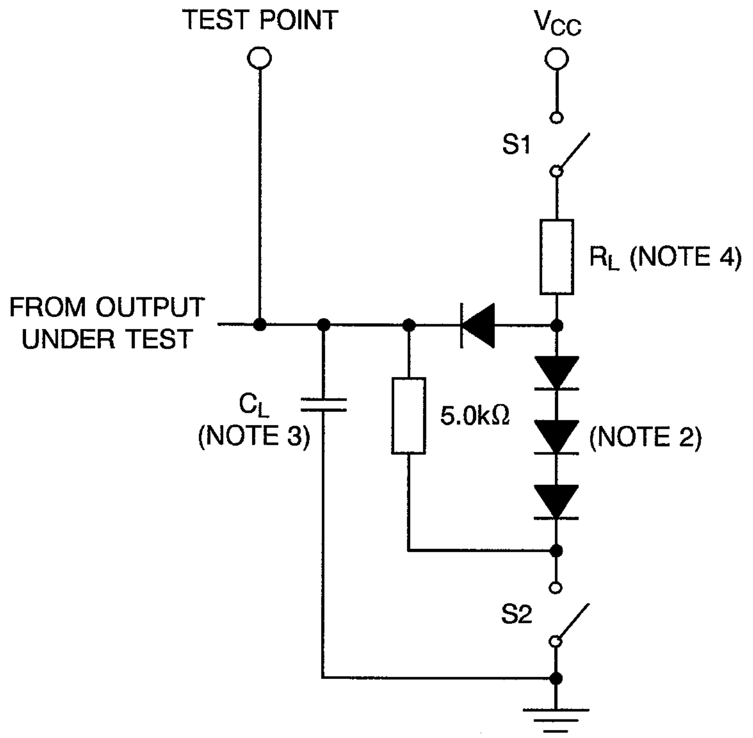


NOTES
1. See Note 4 to Table 2.

FIGURE 4 - CIRCUITS FOR ELECTRICAL MEASUREMENTS (CONTINUED)

FIGURE 4(h) - DYNAMIC TEST AND SWITCHING WAVEFORMS

LOAD CIRCUIT FOR 3-STATE OUTPUTS

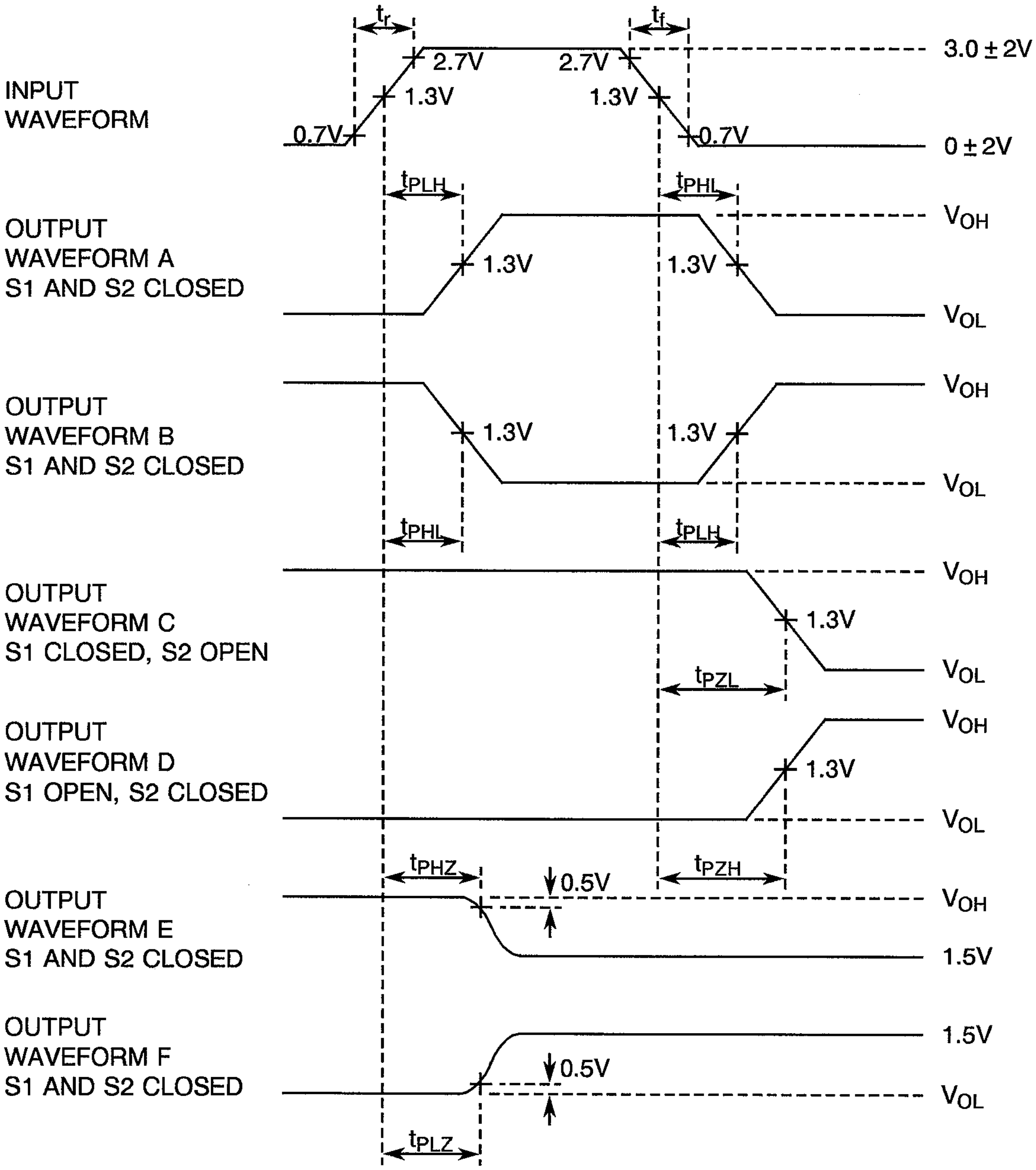


NOTES: See Page 25.

FIGURE 4 - CIRCUITS FOR ELECTRICAL MEASUREMENTS (CONTINUED)

FIGURE 4(h) - DYNAMIC TEST AND SWITCHING WAVEFORMS (CONTINUED)

VOLTAGE WAVEFORMS



NOTES

1. Input pulse characteristics: PRR = 1.0MHz, $t_r \leq 15$ns, $t_f \leq 6.0$ns.
2. All diodes are 1N916 or 1N3064
3. $C_L = 15$pF ± 5% for t_{PLH}, t_{PHL}, t_{PZL} and t_{PZH} tests; $C_L = 5.0$pF ± 5% for t_{PHZ} and t_{PLZ} tests. C_L includes probe and jig capacitance.
4. $R_L = 2.0\text{k}\Omega \pm 5\%$.

TABLE 4 - PARAMETER DRIFT VALUES

No.	CHARACTERISTICS	SYMBOL	SPEC. AND/OR TEST METHOD	TEST CONDITIONS	CHANGE LIMITS (Δ)	UNIT
2 to 13	Input Current High Level 1	I_{IH1}	As per Table 2	As per Table 2	±20 or (1) ±0.5	% µA
38 to 49	Input Current Low Level	I_{IL}	As per Table 2	As per Table 2	±18	µA
50 to 65	Output Voltage Low Level	V_{OL}	As per Table 2	As per Table 2	±60	mV
66 to 81	Output Voltage High Level	V_{OH}	As per Table 2	As per Table 2	±240	mV

NOTES

1. Whichever is greater, referred to the initial value.

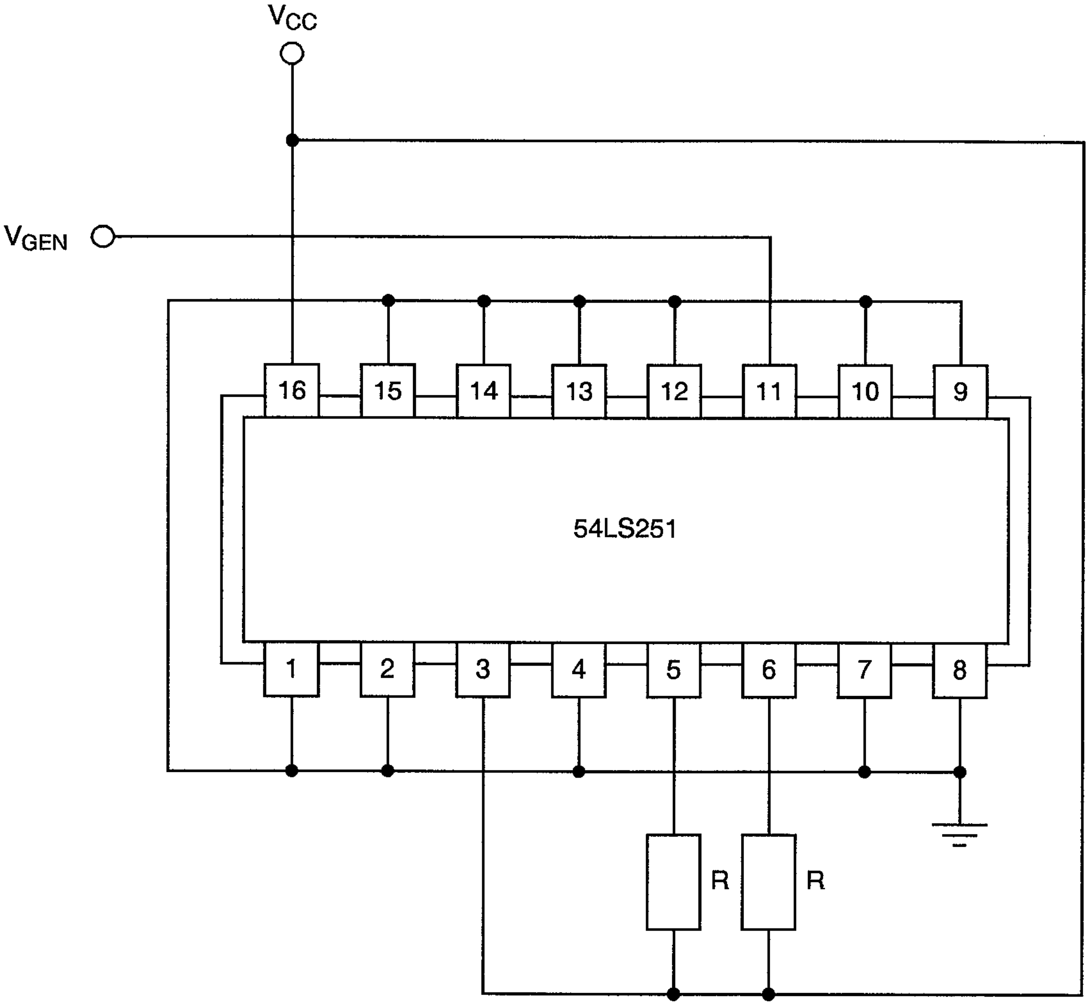
TABLE 5 - CONDITIONS FOR POWER BURN-IN AND OPERATING LIFE TEST

No.	CHARACTERISTICS	SYMBOL	CONDITION	UNIT
1	Ambient Temperature	T_{amb}	+125(+0−5)	°C
2	Power Supply Voltage	V_{CC}	5(+0.5−0)	V
3	Pulse Voltage	V_{GEN}	0.5 max. to 3.0 min.	V
4	Frequency	f	100 (Note 1)	Hz
5	Fan-out	-	10	-
6	Rise Time	t_r	50 max.	µs
7	Fall Time	t_f	50 max.	µs
8	Duty Cycle	-	20 min.	%

NOTES

1. Tolerance ±10%.

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



NOTES
1. R = 1.2kΩ.

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.

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.

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 conditions for high temperature storage shall be $T_{amb} = +150(+0\text{-}5)$ °C.

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

No.	CHARACTERISTICS	SYMBOL	SPEC. AND/OR TEST METHOD	TEST CONDITIONS	CHANGE LIMITS		UNIT
					(Δ)	ABSOLUTE	
2 to 13	Input Current High Level 1	I_{IH1}	As per Table 2	As per Table 2	±1.0	-	μA
14 to 25	Input Current High Level 2	I_{IH2}	As per Table 2	As per Table 2	-	100	μA
38 to 49	Input Current Low Level	I_{IL}	As per Table 2	As per Table 2	±12	-	μA
50 to 65	Output Voltage Low Level	V_{OL}	As per Table 2	As per Table 2	±60	-	mV
66 to 81	Output Voltage High Level	V_{OH}	As per Table 2	As per Table 2	±240	-	mV
84 to 85	Supply Currents	I_{CC}	As per Table 2	As per Table 2	±20	-	%

APPENDIX 'A'

AGREED DEVIATIONS FOR TEXAS INSTRUMENTS (F)

ITEMS AFFECTED	DESCRIPTION OF DEVIATIONS
Para. 4.2.1	Scanning Electron Microscope (SEM) Inspection may be performed using TIF document TIF 3.61.610.001.
Para. 4.2.2	Prior to Die Shear Test TIF may perform a Radiographic Inspection on the randomly chosen samples to be subjected to this test, using TIF document TIF 50.42-3002.
Para. 4.2.3	Radiographic Inspection may be performed using TIF document TIF 50.42-3002.