

REV OR	REV	REF	DESCRIPTION OF CHANGE	CHK BY	DATE

Original

As Per ECN 2301

M. Jaffe 12-13-78

Initial Documentation (30 Pages)

Shirley Spence Math. Hoff
Writer Originator

155-0206-00

PART NUMBER

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THE DRAWING TYPE DESIGNATION AND APPROVED SOURCES OF SUPPLY FOR THIS ITEM ARE LISTED ON THE PURCHASED ITEM SOURCE LIST (PISL) FOR THIS PART NUMBER.



TEKTRONIX, INC.

P. O. BOX 500
BEAVERTON, OREGON U.S.A. 97077

DWN/
WR

**COMP
ENGR**

**CHKR/
COORD**INSTR
DSGN

MATERIAL

FINISH

TITLE

CHANNEL SWITCH: H752

CODE IDENT NO

80009

SIZE

A

PART NUMBER

155-0206-00

REV

OR

SH 1 OF 30

1.0

DESCRIPTION

Hybrid Integrated Circuit, Channel Switch. Initially Designated as H752.

The component consists of two M178 SHF III chips mounted on a 1.75 x 1.75 x .0635 cm Al_2O_3 thin film substrate.

2.0

ABSOLUTE MAXIMUM RATINGS

2.1 Storage Temperature Range (T_{stg}) -55°C to +125°C

2.2 Operating Ambient Temperature (T_A) 0 to +70°C

2.3 Total Device Power Dissipation ($P_{D_{MAX}}$) 2.8 Watts

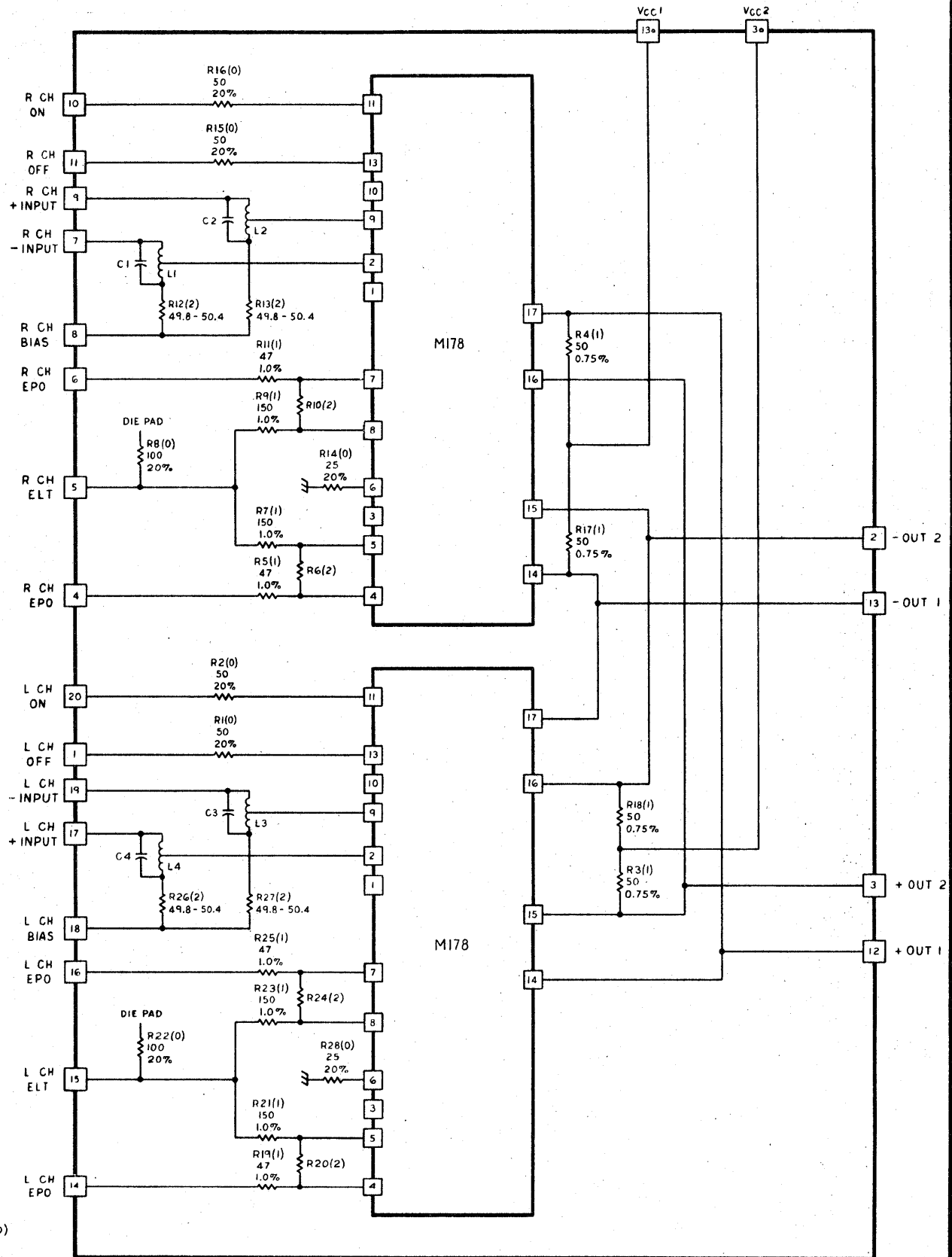
2.3 Maximum Voltage (Pins 2, 3, 12, and 13) 15 Volts
(Referred to Substrate Backplane)

2.4 Maximum Current (Pins 2, 3, 12, and 13) 200 mA

2.5 Maximum Input Signal (Pins 7, 9, 17, and 19) ± 1 Volt
(Referred to Substrate Backplane)

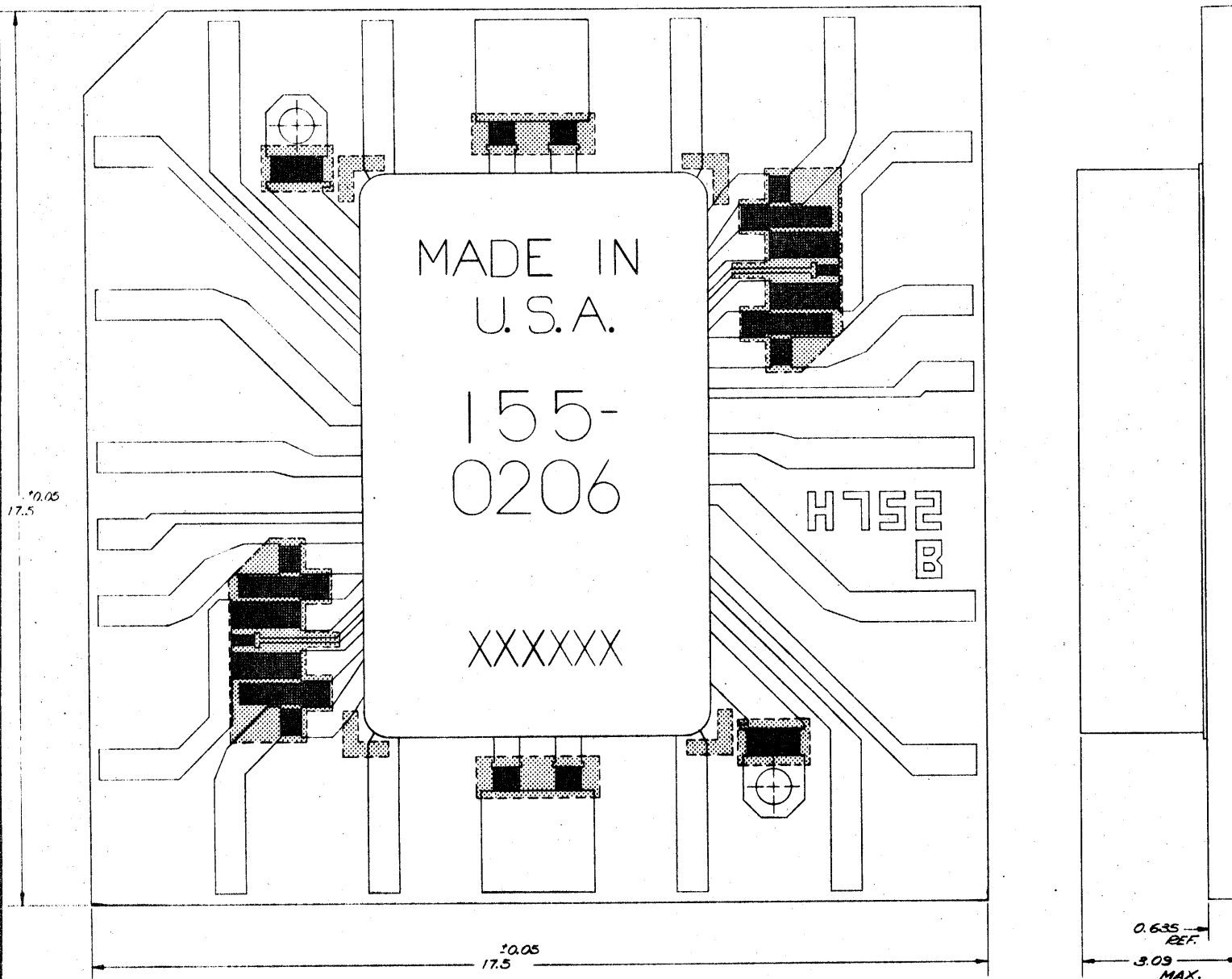
2.6 Electrical Specification

Parameters measured at 25°C substrate backplane temperature.



H752
 7854 CHANNEL SWITCH

3.1 Layout Drawing



2. CONNECTION TO DEVICE TO BE BY HYRON INTERCONNECTION SYSTEM.
 SCALE: 25.4:1 OR (1IN=1mm)
 NOTES:

METRIC

TEKTRONIX, INC. PROPRIETARY ITEM DRAWING		MPD FOR TEKTRONIX	
TEKTRONIX, INC. BEAVERTON, OREGON U.S.A. 97177		P.O. BOX 900	
DATE: 12/1/78	BY: B.E. DODSON	DATE: 12/1/78	BY: B.E. DODSON
CHKD: 12/1/78	APP: 12/1/78	CHKD: 12/1/78	APP: 12/1/78
MATERIAL: 155-0206-47		FINISH: 7854	
TITLE: CHANNEL, SWITCH (TESTED)			
80009	155-0206-00	REV	OR

TEKTRONIX, INC.
BEAVERTON, OREGON

SHT 4 OF 30

CODE IDENT NO
80009

SIZE
A

PART NUMBER

155-0206-00

REV
OR

4.0 PARAMETRIC DEFINITIONS

Refer to Section 5.0 (Parametric Summary)

5.0 PARAMETRIC SUMMARY

Electrical characteristics (for an ambient temperature of 25°C except where a different temperature may be shown).

NO	SYMBOL	PARAMETER	CONDITIONS	MIN	MAX	UNIT
1	I_{CBO} 1-4, 9-12 at 8 Volts	Collector-base leakage of Q1, Q2, Q3, Q4, Q9, Q10, Q11, and Q12 in parallel, emitters open	Pins 7, 8, 9, 17, 18, and 19, back of substrate grounded. Pins 1, 2, 3, 10, 11, 12, 13, and 20 held at +8.8 volts. All other pins open Measure current from +8.8 volt source		50	μA
2	I_{CES} 1-4, 9-12 at 8 Volts	Collector-emitter leakage of Q1, Q2, Q3, Q4, Q9, Q10, Q11, and Q12 in parallel, bases shorted to emitters	Same as in #1 except Pins 4, 5, 6, 14, 15, and 16 grounded		50	μA
3	I_{CBO} 5-8, 13-16 at 12 Volts	Collector-base leakage of Q5, Q6, Q7, Q8, Q13, Q14, Q15, and Q16 in parallel, emitters open	Pins 1, 10, 11, and 20 grounded Pins 2, 3, 12, and 13 held at +12 volts All other pins, substrate backplane open Measure current from +12 volt source		50	μA

5.0 PARAMETRIC SUMMARY (continued)

NO	SYMBOL	PARAMETER	CONDITIONS	MIN	MAX	UNIT
4	I_{CES} 5, 8, 13, 16 at 12 Volts	Collector-emitter leakage of Q5, Q6, Q7, Q8, Q13, Q14, Q15, and Q16 in parallel, base shorted to emitters	Pins 1, 4, 5, 6, 10, 11, 14, 15, 16, and 20 grounded Pins 2, 3, 12, and 13 held at +12 volts Pins 7, 8, 9, 17, 18, and 19, back of substrate connected to positive current source of 500 μ A Measure current from +12 volt source		50	μ A
5	I_{EBO} 6-7, 14-15	Emitter-base leakage of Q6, Q7, Q14, and Q15 in parallel, with collectors open	Pins 1 and 11 grounded Pins 10 and 20 held at 1.6 volts All other pins, substrate backplane open Measure current from 1.6 volt source		10	μ A
6	I_{EBO} 5, 8, 13, 16	Emitter-base leakage of Q5, Q8, Q13, and Q16 in parallel, with collectors open	Pins 10 and 20 grounded Pins 1 and 11 held at +1.6 volts All other pins, substrate backplane open Measure current from 1.6 volt source		10	μ A

5.0 PARAMETRIC SUMMARY (continued)

NO	SYMBOL	PARAMETER	CONDITIONS	MIN	MAX	UNIT
7	I_{in7}	Pin 7 input bias current with total emitter current at 80 mA per channel	Pins 1 and 11 held at +2.0 volts Pins 10 and 20 held at +2.6 volts Pins 12 and 13 through 50 Ω resistors to +9.8V Pins 2 and 3 through 50 Ω resistors to +5.8V Pins 4, 6, 14, and 16 through 103 Ω resistors to -3.95 volts Pins 5 and 15 to -3.95V Pins 8 and 18 grounded Pins 7, 9, 17, and 19, substrate backplane held at 0.0 volts Measure current delivered by source connected to Pin 7	80	450	μ A
8	I_{in9}	Pin 9 input bias current with total emitter current of 80 mA per channel	Same as #7 except measure current delivered by source connected to Pin 9	80	450	μ A
9	$I_{in\text{Substrate}}$	Q2, Q3, Q10, and Q11 input bias current with total emitter current of 80 mA per channel	Same as in #7 except measure current delivered by source connected to substrate backplane	0.320	1.800	mA
10	$I_{in10(ON)}$	Pin 10 input bias current with channel "on" and total emitter current of 80 mA per channel	Same as #7 except measure current delivered by source connected to Pin 10	0.320	1.800	mA
11	$I_{in11(ON)}$	Pin 11 input bias current with channel "on" and total emitter current of 80 mA per channel	Same as #7 except measure current delivered by source connected to Pin 11	-10	+10	μ A

5.0 PARAMETRIC DEFINITIONS (continued)

NO	SYMBOL	PARAMETER	CONDITIONS	MIN	MAX	UNIT
12	I_{in17}	Pin 17 input bias current with total emitter current of 80 mA per channel	Same as #7 except measure current delivered by source connected to Pin 17	80	450	μA
13	I_{in19}	Pin 19 input bias current with total emitter current of 80 mA per channel	Same as #7 except measure current delivered to by source connected to Pin 19	80	450	μA
14	$I_{in20(N)}$	Pin 20 bias current with channel "on" and total emitter current of 80 mA per channel	Same as #7 except measure current delivered by source connected to Pin 20	0.320	1.800	mA
15	$I_{in1(ON)}$	Pin 1 bias current with channel "on" and total emitter current of 80 mA per channel	Same as #7 except measure current delivered by source connected to Pin 1	-10	+10	μA
16	$I_{in20(OFF)}$	Pin 20 bias current with channel "off" and total emitter current of 80 mA per channel	Same as #7 except: Pin 1 held at +2.6V Pin 20 held at +2.0V Pin 11 held at +2.6V Pin 10 held at +2.0V Pin 2 through 50 Ω to +9.8 volts Pin 3 through 50 Ω to +9.8 volts Pin 12 through 50 Ω to +5.8 volts Pin 13 through 50 Ω to 5.8 volts Measure current delivered by source connected to Pin 20	-10	+10	μA
17	$I_{in10(OFF)}$	Pin 10 bias current with channel "off" and total emitter current of 80 mA per channel	Same as #16 except measure current delivered by source connected to Pin 10	-10	+10	μA

5.0 PARAMETRIC SUMMARY (continued)

NO	SYMBOL	PARAMETER	CONDITIONS	MIN	MAX	UNIT
18	$I_{in11(OFF)}$	Pin 11 bias current with channel "off" and total emitter current of 80 mA per channel	Same as #16 except measure current delivered by source to Pin 11	0.320	1.800	mA
19	$I_{in1(OFF)}$	Pin 1 bias current with channel "off" and total emitter current of 80 mA per channel	Same as #16 except measure current delivered by source connected to Pin 1	0.320	1.800	mA
20	$V_{OUT 1(ADD)}$	Common mode DC output voltage, ADD mode	Pins 7, 9, 17, and 19 open Pins 10 and 20 to 2.6 volts Pin 3 through 50 Ω to +5.8 volts Pin 4 through 103 Ω to -3.95 volts Pins 5 and 15 to -3.95 volts Pin 6 through 103 Ω to -3.95 volts Pins 8 and 18, substrate backplane grounded Pins 1 and 11 to 2.0 volts Pin 2 through 50 Ω to +5.8 volts Pin 14 through 103 Ω to -3.95 volts Pin 16 through 103 Ω to -3.95 volts Pin 12 through 50 Ω to +9.8 volts Pin 13 through 50 Ω to +9.8 volts Measure average of voltages at Pins 12 and 13	5.6	5.8	V

5.0 PARAMETRIC SUMMARY (continued)

NO	SYMBOL	PARAMETER	CONDITIONS	MIN	MAX	UNIT
21	$V_{OUT\ 2(OFF)}$	Common mode DC output voltage, OFF mode	Same as #20 except: Pins 10 and 20 to +2.0 volts Pins 1 and 11 to +2.6 volts Pin 12 through 50 Ω to +5.8 volts Pin 13 through 50 Ω to +5.8 volts Pin 3 through 50 Ω to +9.8 volts Pin 2 through 50 Ω to +9.8 volts Measure average of voltages at Pins 2 and 3	5.6	5.8	V
22	$V_{OS\ 1(L)}$	Output #1 offset voltage, LEFT mode	Same as #20 except: Pin 10 to +2.0 volts Pin 11 to +2.6 volts Pin 2 through 50 Ω to +7.8 volts Pin 3 through 50 Ω to +7.8 volts Pin 12 through 50 Ω to +7.8 volts Pin 13 through 50 Ω to +7.8 volts Measure voltage at Pin 12 with respect to Pin 13	-100	+100	mV
23	$V_{OS\ 1(R)}$	Output #1 offset voltage, RIGHT mode	Same as #22 except: Pins 1 and 10 to +2.6 volts Pins 11 and 20 to +2.0 volts	-100	+100	mV

5.0 PARAMETRIC SUMMARY (continued)

NO	SYMBOL	PARAMETER	CONDITIONS	MIN	MAX	UNIT
24	$V_{OS\ 1(ADD)}$	Output #1 offset voltage, ADD mode	Same as #20 except measure voltage at Pin 12 with respect to Pin 13	-100	+100	mV
25	$V_{OS\ 1(L-ADD)}$	Output #1 offset voltage between modes, LEFT-ADD	$V_{OS\ 1(L-ADD)} = V_{OS\ 1(L)} - V_{OS\ 1(ADD)}$	-50	+50	mV
26	$V_{OS\ 1(R-L)}$	Output #1 offset voltage between modes, RIGHT-LEFT	$V_{OS\ 1(R-L)} = V_{OS\ 1(R)} - V_{OS\ 1(L)}$	-50	+50	mV
27	$V_{OS\ 1(R-ADD)}$	Output #1 offset voltage between modes, RIGHT-ADD	$V_{OS\ 1(R-ADD)} = V_{OS\ 1(R)} - V_{OS\ 1(ADD)}$	-50	+50	mV
28	$V_{OS\ 2(L)}$	Output #2 offset voltage, LEFT mode	Same as #22 except measure voltage at Pin 3 with respect to Pin 2	-100	+100	mV
29	$V_{OS\ 2(R)}$	Output #2 offset voltage, RIGHT mode	Same as #23 except measure voltage at Pin 3 with respect to Pin 2	-100	+100	mV
30	$V_{OS\ 2(OFF)}$	Output #2 offset voltage, OFF mode	Same as #21 except measure voltage at Pin 3 with respect to Pin 2	-100	+100	mV
31	$V_{OS\ 2(L-OFF)}$	Output #2 offset voltage between modes, LEFT-OFF	$V_{OS\ 2(L-OFF)} = V_{OS\ 2(L)} - V_{OS\ 2(OFF)}$	-50	+50	mV
32	$V_{OS\ 2(R-L)}$	Output #2 offset voltage between modes, RIGHT-LEFT	$V_{OS\ 2(R-L)} = V_{OS\ 2(R)} - V_{OS\ 2(L)}$	-50	+50	mV
33	$V_{OS\ 2(R-OFF)}$	Output #2 offset voltage between modes, RIGHT-OFF	$V_{OS\ 2(R-OFF)} = V_{OS\ 2(R)} - V_{OS\ 2(OFF)}$	-50	+50	mV

5.0 PARAMETRIC SUMMARY (continued)

NO	SYMBOL	PARAMETER	CONDITIONS	MIN	MAX	UNIT
34	$R_{IN7(ADD)}$	Input resistance Pin 7 to ground, ADD mode	<p>Pins 1 and 11 to +2.0 volts</p> <p>Pin 10 and 20 to +2.6 volts</p> <p>Pins 12 and 13 to +9.8 volts through 50 Ω resistors</p> <p>Pins 2 and 3 to +5.8 volts through 50 Ω resistors</p> <p>Pins 4, 6, 14, and 16 through separate 103 Ω resistors to -3.95 volts</p> <p>Pins 5 and 15 to -3.95 volts</p> <p>Pins 8 and 18, back-plane of substrate grounded</p> <p>Pins 7 and 17 connected to current sources of +1 mA then -1 mA</p> <p>Pins 9 and 19 connected to current sources of -1 mA then +1 mA</p> <p>Measure voltage from Pin 7 to ground.</p> <p>Voltage difference between application of +1.0 mA and -1.0 mA divided by 2.0 mA is R_{IN}</p>	49.70	50.50	Ω
35	$R_{IN9(ADD)}$	Input resistance Pin 9 to ground, ADD mode	Same as #34 except measure voltage from Pin 9 to ground	49.70	50.50	Ω
36	$R_{IN17(ADD)}$	Input resistance Pin 17 to ground, ADD mode	Same as #34 except measure voltage from Pin 17 to ground	49.70	50.50	Ω
37	$R_{IN19(ADD)}$	Input resistance Pin 19 to ground, ADD mode	Same as #34 except measure voltage from Pin 19 to ground	49.70	50.50	Ω

5.0 PARAMETRIC SUMMARY (continued)

NO	SYMBOL	PARAMETER	CONDITIONS	MIN	MAX	UNIT
38	R _{OUT} 1 (ADD)	Output resistance, Pin 12 to Pin 13, ADD mode	<p>Pins 1 and 11 to +2.0 volts</p> <p>Pin 13 held at +5.55 volts (case 1), then +6.05 volts (case 2) by current through 50 Ω resistor</p> <p>Pin 4 through 103 Ω to -3.95 volts</p> <p>Pins 5 and 15 to -3.95 volts</p> <p>Pin 6 through 103 Ω to -3.95 volts</p> <p>Pin 7 through 50 Ω to ground</p> <p>Pins 8 and 18 back-plane of substrate ground</p> <p>Pin 9 through 50 Ω to ground</p> <p>Pins 10 and 20 to +2.6 volts</p> <p>Pin 12 held at +6.05 volts (case 1) then +5.55 volts (case 2) by current through 50 Ω resistor</p> <p>Pin 14 through 103 Ω to -3.95 volts</p> <p>Pin 16 through 103 Ω to -3.95 volts</p> <p>Pin 17 through 50 Ω to ground</p> <p>Pin 19 through 50 Ω to ground</p> <p>Pin 3 through 50 Ω to +5.8 volts</p> <p>Pin 2 through 50 Ω to +5.8 volts</p>	99.50	101.5	Ω

Continued on Page 14

5.0 PARAMETRIC SUMMARY (continued)

NO	SYMBOL	PARAMETER	CONDITIONS	MIN	MAX	UNIT
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38	Continued		Measure the currents in the 50 Ω resistors connected to Pins 12 and 13 for case 1 and case 2			
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Measure the currents in the 50 Ω resistors connected to Pins 12 and 13 for case 1 and case 2

Compute R_{OUT} as follows;

$$\frac{1}{R_{OUT}} = \left[\frac{I_{12}^1 - I_{13}^1}{2} - \frac{I_{12}^2 - I_{13}^2}{2} \right] / 1V$$

39	$R_{OUT} 2(OFF)$	Output resistance, Pin 3 to Pin 2, OFF mode	Same as #38 except; Pins 10 and 20 to +2.0 volts Pins 1 and 11 held at 2.6 volts Pin 2 held at +5.55 volts (case 1) then +6.05 volts (case 2) by current through 50 Ω resistor Pin 3 held at +6.05 volts (case 1) then +5.55 volts (case 2) by current through 50 Ω resistor. Pin 12 through 50 Ω to +5.8 volts Pin 13 through 50 Ω to +5.8 volts Measure the currents in the 50 Ω resistors connected to Pins 2 and 3 for case 1 and case 2 Compute R_{OUT} as follows;	99.50	101.5	Ω
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Output resistance, Pin 3 to Pin 2, OFF mode

Same as #38 except;

99.50 101.5 Ω

Pins 10 and 20 to +2.0 volts

Pins 1 and 11 held at 2.6 volts

Pin 2 held at +5.55 volts (case 1) then +6.05 volts (case 2) by current through 50 Ω resistor

Pin 3 held at +6.05 volts (case 1) then +5.55 volts (case 2) by current through 50 Ω resistor.

Pin 12 through 50 Ω to +5.8 volts

Pin 13 through 50 Ω to +5.8 volts

Measure the currents in the 50 Ω resistors connected to Pins 2 and 3 for case 1 and case 2

Compute R_{OUT} as follows;

$$\frac{1}{R_{OUT}} = \left[\frac{I_2^1 - I_2^1}{2} - \frac{I_3^2 - I_2^2}{2} \right] / 1V$$

5.0 PARAMETRIC SUMMARY (continued)

NO	SYMBOL	PARAMETER	CONDITIONS	MIN	MAX	UNIT
40	$A_{iL\ 1(L)}$	Current gain from LEFT input, LEFT mode, measured at Output #1	<p>Pins 4, 6, 14, and 16 through separate 103 Ω resistors to -3.95 volts</p> <p>Pins 5 and 15 to -3.95 volts</p> <p>Pins 8 and 18, back-plane of substrate grounded</p> <p>Pins 1 and 10 to +2.0 volts</p> <p>Pins 11 and 20 to 2.6 volts</p> <p>Pins 2, 3, 12, and 13 through separate 50 Ω resistors to +7.8 volts</p> <p>Connect Pins 7 and 17 to current sources of +1.0 mA and Pins 9 and 19 to current sources of -1.0 mA (Condition #1)</p> <p>Then connect Pins 7 and 17 to current sources of -1.0 mA and Pins 9 and 19 to current sources of +1.0 mA (Condition #2)</p> <p>Current gain is determined by measuring the voltage difference of Pin 12 with respect to Pin 13 for Conditions #1 and #2 and performing the following calculation:</p> <p>Current gain =</p> $\frac{V_{(Condition\ #1)} - V_{(Condition\ #2)}}{200\ mV}$	2.33	2.38	

5.0 PARAMETRIC SUMMARY (continued)

NO	SYMBOL	PARAMETER	CONDITIONS	MIN	MAX	UNIT
41	$A_{iR} 2(L)$	Current gain from RIGHT input, LEFT mode measured at Output #2	Same as #40 except measure voltage difference of Pin 2 with respect to Pin 3	2.33	2.38	
42	$A_{iR} 1(R)$	Current gain from RIGHT input, RIGHT mode measured at Output #1	Same as #40 except: Pins 1 and 10 to +2.6 volts Pins 11 and 20 to +2.0 volts Measure voltage difference of Pin 13 with respect to Pin 12	2.33	2.38	
43	$A_{iL} 2(R)$	Current gain from LEFT input, RIGHT mode measured at Output #2	Same as #42 except measure voltage difference of Pin 3 with respect to Pin 2	2.33	2.38	
44	$A_{iL} 1(ADD)$	Current gain from LEFT input, ADD mode measured at Output #1	Same as #40 except: Pin 10 to +2.6 volts Pin 11 to +2.0 volts Pins 7 and 9 open Pins 12 and 13 through 50 Ω resistors to +9.8 volts Pins 2 and 3 through 50 Ω resistors to +5.8 volts	2.33	2.38	
45	$A_{iR} 1(ADD)$	Current gain from RIGHT input, ADD mode measured at Output #1	Same as #42 except: Pin 1 to +2.0 volts Pin 20 to +2.6 volts Pins 17 and 19 open Pins 12 and 13 through 50 Ω resistors to +9.8 volts Pins 2 and 3 through 50 Ω resistor to +5.8 volts	2.33	2.38	

5.0 PARAMETRIC SUMMARY (continued)

NO	SYMBOL	PARAMETER	CONDITIONS	MIN	MAX	UNIT
46	ADD Accuracy	Rejection of equal but opposite polarity input signals measured at Output #1, ADD mode	Same as #42 except: Pin 1 to +2.0 volts Pin 20 to +2.6 volts Pins 12 and 13 through 50 Ω resistors to +9.8 volts Pins 2 and 3 through 50 Ω resistors to +5.8 volts Add Accuracy is current gain measured then divided by 2.355 with the result expressed as a percentage	-0.5	0.5	%
47	A_{iL} 2(OFF)	Current gain from LEFT input, OFF mode, measured at Output #2	Same as #42 except: Pin 10 to +2.0 volts Pin 11 to +2.6 volts Pins 12 and 13 through 50 Ω resistors to +5.8 volts Pins 2 and 3 through 50 Ω resistors to +9.8 volts Pins 7 and 9 open Measure voltage difference of Pin 3 with respect to Pin 2	2.33	2.38	
48	A_{iR} 2(OFF)	Current gain from RIGHT input, OFF mode, measured at Output #2	Same as #42 except: Pin 10 to +2.0 volts Pin 11 to +2.6 volts Pins 12 and 13 through 50 Ω resistors to +5.8 volts Pins 2 and 3 through 50 Ω resistors to +5.8 volts Pins 17 and 19 open Measure voltage difference of Pin 2 with respect to Pin 3	2.33	2.38	

5.0 PARAMETRIC SUMMARY (continued)

NO	SYMBOL	PARAMETER	CONDITIONS	MIN	MAX	UNIT
49	OFF Accuracy	Rejection of equal but opposite polarity input signals measured at Output #2, OFF mode	<p>Same as #42 except:</p> <p>Pin 10 to +2.0 volts</p> <p>Pin 11 to +2.6 volts</p> <p>Pins 12 and 13 through 50 Ω resistors to +5.8 volts</p> <p>Pins 2 and 3 through 50 Ω resistors to +9.8 volts</p> <p>Measure voltage difference of Pin 2 with respect to Pin 3</p> <p>Calculated current gain divided by 2.355 and expressed as a percentage is OFF Accuracy</p>	-0.5	0.5	%
50	Output-to-Output Accuracy, LEFT Input	Difference in gains of LEFT input to Output #1 or Output #2	$(A_{iL\ 1(L)} - A_{iL\ 2(R)}) / 2.355 = \text{Output-to-Output Accuracy, LEFT Input}$ <p>Express result as a percentage</p>	-0.5	0.5	%
51	Output-to-Output Accuracy, RIGHT Input	Difference in gains of RIGHT input to Output #1 or Output #2	$(A_{iR\ 1(R)} - A_{iR\ 2(L)}) / 2.355 = \text{Output-to-Output Accuracy, RIGHT Input}$ <p>Express result as a percentage</p>	-0.5	0.5	%
52	Left to ADD Accuracy, Output #1	Change in gain of a signal from the LEFT input directed to Output #1 when the mode is changed from LEFT to ADD	$(A_{iL\ 1(L)} - A_{iL\ A(ADD)}) / 2.355$ <p>Express in percent</p>	-0.5	0.5	%

5.0 PARAMETRIC SUMMARY (continued)

NO	SYMBOL	PARAMETER	CONDITIONS	MIN	MAX	UNIT
53	Right to ADD Accuracy, Output #1	Change in gain of a signal from the RIGHT input directed to Output #1 when the mode is changed from RIGHT to ADD	$(A_{iR\ 1(R)} - A_{iR\ 1(ADD)}) / 2.355$ Express in percent	-0.5	0.5	%
54	Left to OFF Accuracy, Output #2	Change in gain of a signal from the RIGHT input directed to Output #2 when the mode is changed from LEFT to OFF	$(A_{iR\ 2(L)} - A_{iR\ 2(OFF)}) / 2.355$ Express in percent	-0.5	0.5	%
55	Right to OFF Accuracy, Output #2	Change in gain of a signal from the LEFT input directed to Output #2 when the mode is changed from RIGHT to OFF	$(A_{iL\ 2(R)} - A_{iL\ 2(OFF)}) / 2.355$ Express in percent	-0.5	0.5	%
56	$A_{iL\ 1(R)}$	Current gain from LEFT input, RIGHT mode, measured at Output #1	Same as #42 except: Pins 7 and 9 open Pin 17 connected to a current source of -7.5 mA then +7.5 mA and Pin 19 connected to a current source of +7.5 mA then -7.5 mA Measure the voltage difference between Pins 12 and 13 The change in voltage difference between application of -7.5 mA and +7.5 mA divided by 1.5 volts then 2.355 and expressed in dB is the current gain	-66		dB

5.0 PARAMETRIC SUMMARY (continued)

NO	SYMBOL	PARAMETER	CONDITIONS	MIN	MAX	UNITS
57	$A_{iR} 1(L)$	Current gain from RIGHT input, LEFT mode, measured at Output #1	Same as #56 except; Pins 1 and 10 to +2.0 volts Pins 11 and 20 to +2.6 volts Pins 17 and 19 open Pin 7 connected to a current source of -7.5 mA then +7.5 mA and Pin 9 connected to a current source of +7.5 ma then -7.5 mA		-66	dB
58	$A_{ir} 1(OFF)$	Current gain from RIGHT input, OFF mode, measured at Output #1	Same as #57 except; Pin 1 to +2.6 volts Pin 20 to +2.0 volts Pin2 12 and 13 through 50 Ω resistors to +5.8 volts Pins 2 and 3 through 50 Ω resistors to +9.8 volts		-66	dB
59	$A_{iL} 1(OFF)$	Current gain from LEFT input, OFF mode, measured at Output #1	Same as #56 except Pin 10 to +2.0 volts Pin 11 to +2.6 volts Pins 12 and 13 through 50 Ω resistor to +5.8 volts Pins 2 and 3 through 50 Ω resistor to +9.8 volts		-66	dB
60	$A_{iR} 2(R)$	Current gain from RIGHT input, RIGHT mode, measured at Output #2	Same as #57 except; Pins 11 and 20 to +2.0 volts Pins 1 and 10 to +2.6 volts Measure voltage difference between Pins 3 and 2		-66	dB

5.0 PARAMETRIC SUMMARY (continued)

NO	SYMBOL	PARAMETER	CONDITIONS	MIN	MAX	UNITS
61	$A_{iL} 2(L)$	Current gain from LEFT input, LEFT mode, measured at Output #2	Same as #56 except; Pins 1 and 10 to +2.0 volts Pins 11 and 20 to +2.6 volts Measure voltage difference between Pins 3 and 2		-66	dB
62	$A_{iR} 2(ADD)$	Current gain from RIGHT input, ADD mode, measured at Output #2	Same as #57 except; Pin 10 to +2.6 volts Pin 11 to +2.0 volts Pins 2 and 13 through 50 Ω resistors to +5.8 volts Pins 3 and 12 through 50 Ω resistors to +5.8 volts Measure voltage difference between Pins 3 and 2		-66	dB
63	$A_{iL} 2(ADD)$	Current gain from LEFT input, ADD mode, measured at Output #2	Same as #56 except; Pin 20 to +2.6 volts Pin 1 to +2.0 volts Pins 12 and 13 through 50 Ω resistors to +9.8 volts Pins 2 and 3 through 50 Ω resistors to +5.8 volts Measure voltage difference between Pins 3 and 2		-66	dB

5.0 PARAMETRIC SUMMARY (continued)

NO	SYMBOL	PARAMETER	CONDITIONS	MIN	MAX	UNIT
64	CMRR 1(R)	Common-mode rejection ratio, RIGHT mode, measured at Output #1	<p>Pins 4, 6, 14, and 15 through separate 103 Ω resistors to -3.95 volts</p> <p>Pins 5 and 15 to -3.95 volts</p> <p>Pins 8 and 18 back-plane of substrate grounded</p> <p>Pins 1 and 10 to +2.6 volts</p> <p>Pins 11 and 20 to +2.0 volts</p> <p>Pins 2, 3, 12, and 13 through separate 50 Ω resistors to +7.8 volts</p> <p>Pins 7 and 9 each connected through 50 Ω resistors to a common current source of +4.0 mA, then -4.0 mA</p> <p>Pins 17 and 19 open</p> <p>Measure the voltage difference between Pins 12 and 13. The change in voltage difference between application of +4.0 mA and -4.0 mA divided by 200 mV, the result being divided into 2.355 is CMRR</p>	100		
65	CMRR 1(L)	Common-mode rejection ratio, LEFT mode, measured at Output #1	<p>Same as #64 except;</p> <p>Pins 1 and 10 to +2.0 volts</p> <p>Pins 11 and 20 to +2.6 volts</p> <p>Pins 7 and 9 open</p> <p>Pins 17 and 19 each connected through 50 Ω resistors to a common source of +4.0 mA, then -4.0 mA</p>	100		

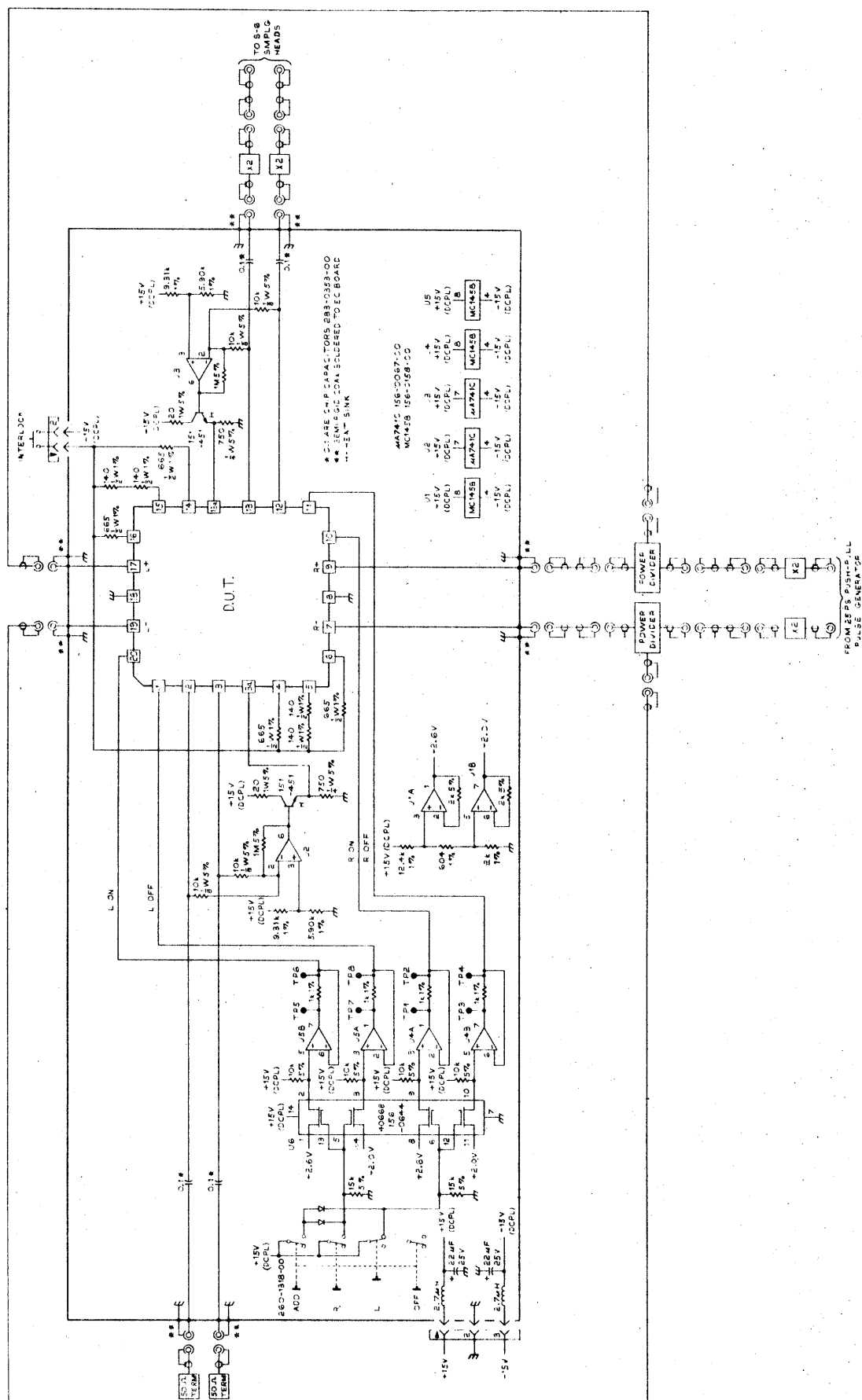
5.0 PARAMETRIC SUMMARY (continued)

NO	SYMBOL	PARAMETER	CONDITIONS	MIN	MAX	UNIT
66	CMRR 2(R)	Common-mode rejection ratio, RIGHT mode, measured at Output #1	Same as #64 except; Pins 1 and 10 to +2.0 volts Pins 11 and 20 to +2.6 volts Pins 7 and 9 open Pins 17 and 19 each connected through 50 Ω resistors to a common current source of +4.0 mA, then -4.0 mA	100		
67	CMRR 2(L)	Common-mode rejection ratio, LEFT mode, measured at Output #2	Same as #64 except; Pins 1 and 10 to +2.0 volts Pins 11 and 20 to +2.6 volts Measure the voltage difference between Pins 3 and 2	100		
68	T_r	Risetime of a pulse at either output which is the result of a pulse at either input	Use the test fixture as shown in Section 5.1 Measure the system risetime, T_s , using a feedthrough substrate 100% is defined as the amplitude 1 ms after the mid-point of rise of the pulse T_d is the displayed 10% to 90% risetime of the system and D.U.T $T_r = \sqrt{T_d^2 - T_s^2}$ T_s must be less than 80 ps	200		ps

5.0 PARAMETRIC SUMMARY (continued)

NO	SYMBOL	PARAMETER	CONDITIONS	MIN	MAX	UNITS
69	Aberration	Peak-to-peak aberrations of a pulse at Output #1 which is the result of a pulse at either input	Use the test fixture as shown in Section 5.1 Express the measured amplitude as a percentage of the reference (100%) amplitude defined in #68		15	%
70	Aberration	Peak-to-peak aberrations of a pulse at Output #2 which is the result of a pulse at either input	Same as #69		30	%
71	X-Talk (Add-Off)	Feedthrough of a pulse signal present at one output into the other output with channel switch in ADD or OFF mode	Use the test fixture as shown in Section 5.1 Measure peak-to-peak amplitude and express as a percentage of the reference (100%) amplitude (as defined in #68) of the pulse present on the adjacent output		3	%
72	X-Talk (L-R)	Feedthrough of a pulse signal present at one output into the other output with channel switch in LEFT or RIGHT mode	Same as #71		6.5	%

5.1



6.0 PACKAGING

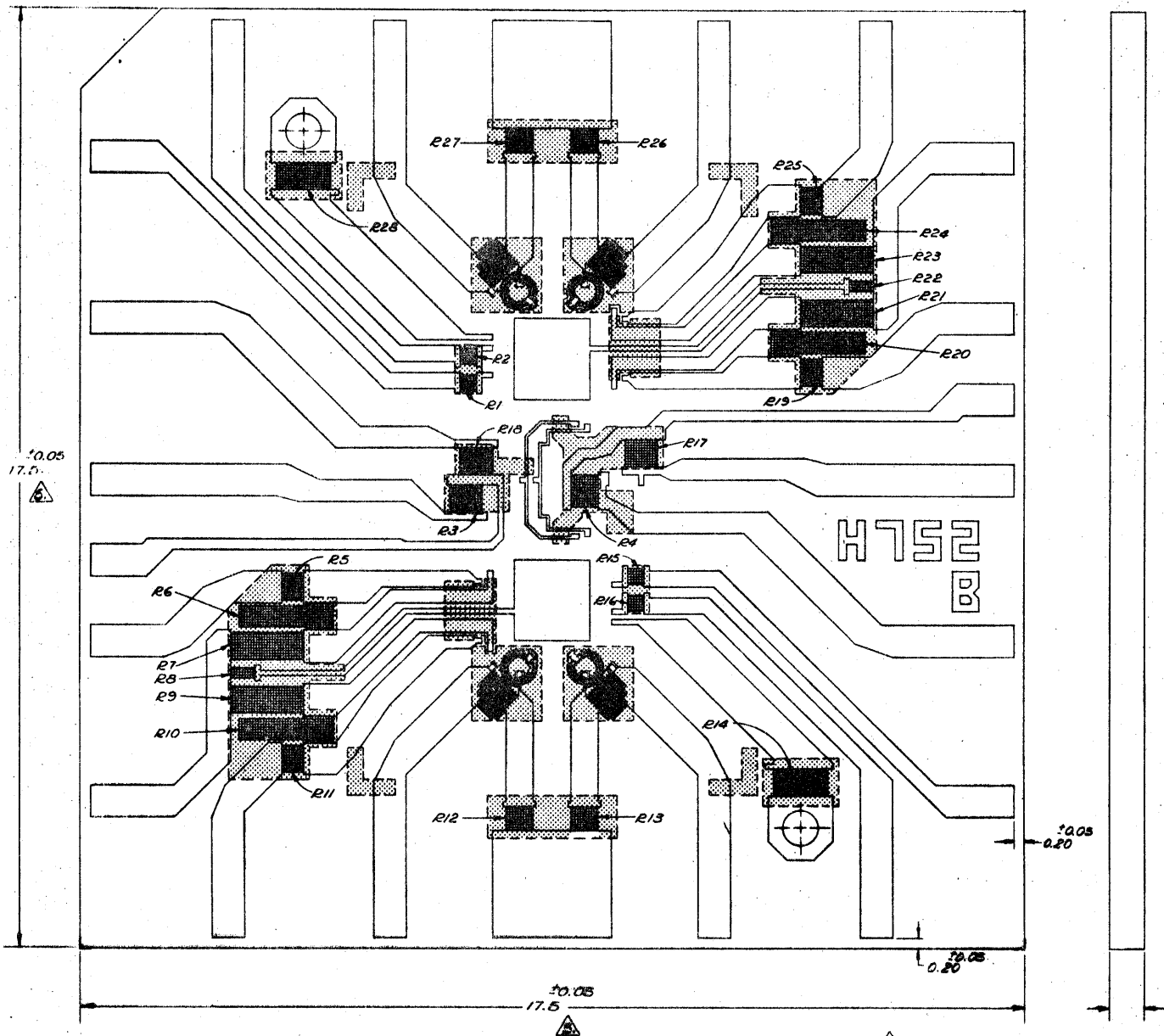
1.75 cm x 1.75 cm Al_2O_3 (805) substrate with 22 pin HYPCON connector.

6.1 Terminal Identification

PIN NUMBER	INPUT/OUTPUT
1	Left Channel OFF
2	-Output #2
3	+Output #2
3a	$+V_{CC}^2$
4	Right Channel Emitter Pick-Off
5	Right Channel Emitter Longtail
6	Right Channel Emitter Pick-Off
7	Right Channel -Input
8	Right Channel Bias
9	Right Channel +Input
10	Right Channel ON
11	Right Channel OFF
12	+Output #1
13	-Output #1
13a	$+V_{CC}^1$
14	Left Channel Emitter Pick-Off
15	Left Channel Emitter Longtail
16	Left Channel Emitter Pick-Off
17	Left Channel +Input
18	Left Channel Bias
19	Left Channel -Input
20	Left Channel ON

6.1

Outline Drawing



REFERENCE	
L	VALUE
42,96	5.5

REFERENCE	
C	VALUE MICROBARD
1, 2, 3, 4	0.4

P/N#	REFERENCE RESISTOR VALUES.			
	AS PROCESSED		AS TESTED E. O. L.	
	VALUE	TOL.	VALUE	TOL.
1, 2, 15, 16	50Ω	±20%	50Ω	±20%
3, 4, 17, 18	416Ω	±12%	50Ω	±15%
5, 11, 13, 25	40Ω	±12%	47Ω	±15%
6, 10, 20, 21	35Ω	±12%		
7, 3, 21, 25	135Ω	±12%	150Ω	±15%
8, 22	100Ω	±20%	100Ω	±20%
12, 13, 26, 27	43Ω	±12%		
14, 28	25Ω	±20%	25Ω	±20%

7. FUNCTIONAL TRIM AFTER DIE ATTACH.
COVER OPERATIONS ARE COMPLETED.
(REFERENCE DRAWING 133-0206-97
SHEET 1.)

6. TEST PER ICM MANUFACTURING SPECIFICATION.

△ 5. VERIFY SIZE & THICKNESS.

4.50 Ω PER SQ. NICHROME PROCESS (REF.)

3 FULL GROUND PLANE - FAR SIDE (REF.)

2. SCALE = 25.4:1 OR (1 in = 1 mm)

1. BREAK ON LASER SCRIBED LINES AND SEPARATE INTO INDIVIDUAL PARTS AS THE ONE SHOWN ON THIS DRAWING.

NOTES:

7/10/50

METRIC

☐ CONDUCTORS

ALYSTOPS

ASSASSINATION

0.635

[illegible]

TEKTRONIX, INC.
BEAVERTON, OREGON

SNT 27 OF 30

CODE IDENT NO
80009

SIZE
A

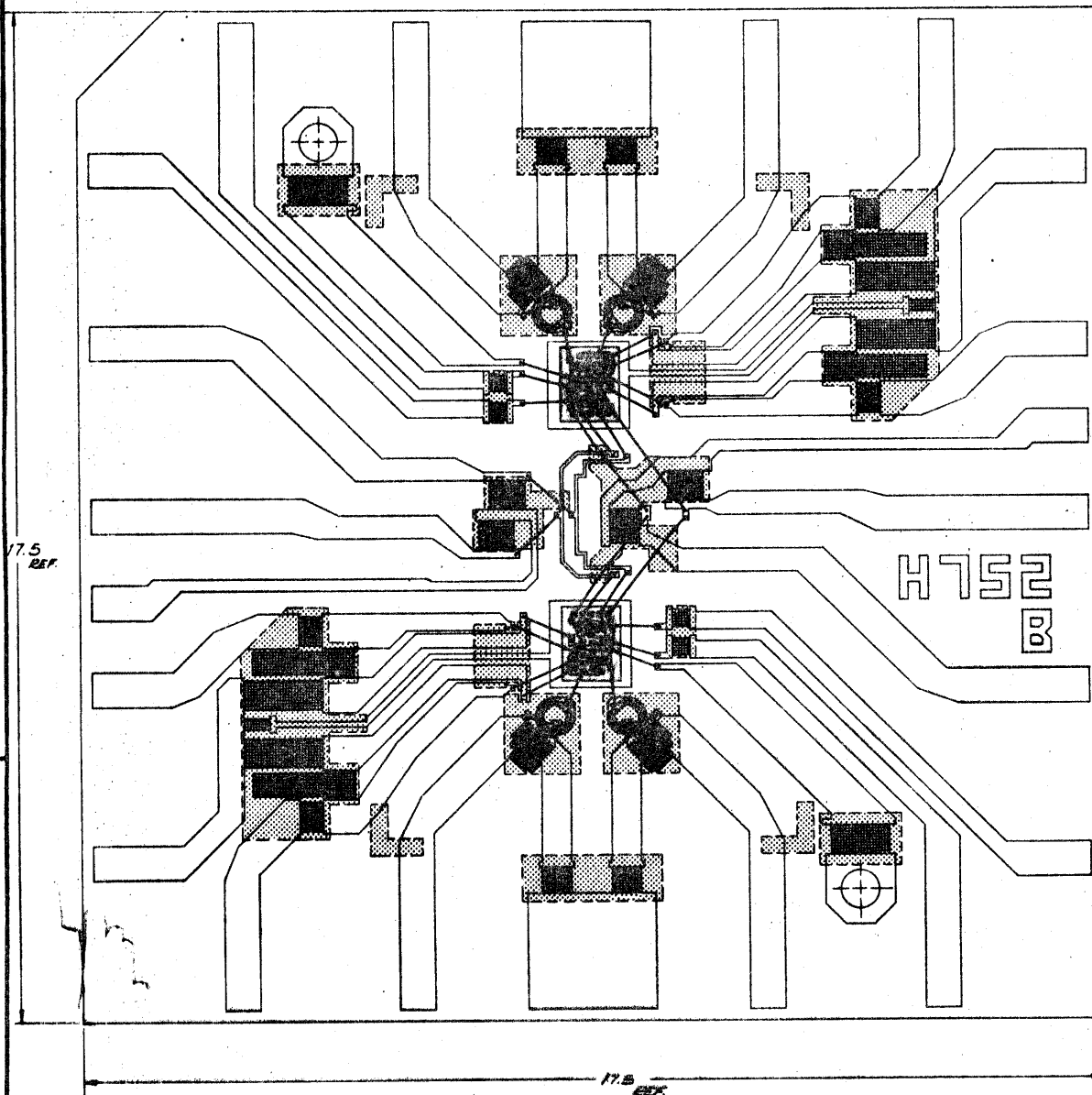
PART NUMBER

155-0206-00

REV
OR

6.2

Hybrid Substrate Pattern



2. ASSEMBLE PER ICM PROCESS.
 SCALE: 25.4:1 OR (1in.=1cm).

NOTES:

H-752

METRIC

ITEM	PART NUMBER	QTY.	DESCRIPTION
3	203-0178-90	418	.001 GOLD WIRE
2	176-0243-00	2	M178A DIE
1	307-1132-02	1	SUBSTRATE

LIST OF MATERIALS

TEKTRONIX, INC. PROPRIETARY (FOR DRAWING)		H-752	
<input checked="" type="checkbox"/> REV BY TEKTRONIX <input type="checkbox"/> REV FOR TEKTRONIX		P. O. BOX 999 BEAVERTON, OREGON U.S.A. 97007	
DESIGNED BY: DOUGLAS J. JAMES DRAWN BY: John H. Helle		CHECKED BY: 7854 DATE: 29 July 78	
PROD. MATERIAL: 7854		FIRST USED ON: 7854	
SEE LIST OF MATERIALS			
TITLE: CHANNEL SWITCH (UNTESTED)			
DES. CONTROL: 80009		DES. CONTROL: 155-0206-07	

TEKTRONIX, INC.
 BEAVERTON, OREGON

SMT 28 OF 30

CODE IDENT NO

80009

SIZE

A

PART NUMBER

155-0206-00

REV
 OR

6.3 Thermal Characteristics

For 1.64W total M178 power, $\Delta T_{J-Die\ Pad} = 18.7^{\circ}C$

For 2.01W total substrate power, $\Delta T_{Die\ Pad-Ambient} = 62.0^{\circ}C$
(EC Board Mounting)

ΔT_J M178 Ambient = $80.7^{\circ}C$ (EC Board Mounting)

T_J M178 (For $T_{Ambient} = 65^{\circ}C$) = $145.7^{\circ}C$

7.0 RELIABILITY STATEMENT Based on the H442 - No Test Done on the H752

7.1 Reliability Goal

λ , Failure Rate $\leq .7\%/1K$ Hours at $145^{\circ}C T_J$

λ , Failure Rate $\leq .0026\%/1K$ Hours at $75^{\circ}C T_J$

MTTF $\geq 143K$ Hours at $145^{\circ}C T_J$

Expected Instrument Life; 10K Hours

7.2 Life Test Results

90% Confidence Level

λ , .25%/1K Hours at $145^{\circ}C T_J$

λ , .00093%/1K Hours at $75^{\circ}C T_J$

Life Test Report #RA-32

8.0

APPLICATIONS INFORMATION

The circuit receives analog input data at differential input RIGHT and at differential input LEFT. The outputs select the inputs according to the following schedule:

MODE*	MODE**	PIN 1	PIN 20	PIN 11	PIN 10
LEFT	RIGHT	2.0 Volts	2.6 Volts	2.6 Volts	2.0 Volts
RIGHT	LEFT	2.6 Volts	2.0 Volts	2.0 Volts	2.6 Volts
ADD	OFF	2.0 Volts	2.6 Volts	2.0 Volts	2.6 Volts
OFF	ADD	2.6 Volts	2.0 Volts	2.6 Volts	2.0 Volts

*Referenced to Output #1: All of the preceeding mode designations are referenced to Output #1

**Referenced to Output #2

9.0

REFERENCE LIST

SPEC NO	TITLE	SOURCE
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