REVISION RECORD

REV	DESCRIPTION	DATE
0	INITIAL RELEASE	06/12/96
A	• PAGE 2, ADDED PARAGRAPHS 3.2.1 AND 3.2.2 TO IDENTIFY "01" AND "02" AS PACKAGE OPTIONS. CHANGED THE PART NUMBER FROM"RH1014MWB14 TO "RH1014MWB". • PAGE 5, PARAGRAPH 5.6.10, NOTE – CORRECTED TYPO ON ITEM PARAGRAPH NUMBER FROM"4.6.1" TO"5.6.1" AND "4.6.10" TO "5.6.10". • PAGE 6 AND 7 – ADDED θja AND θjc , Tj MAX TO CASE OUTLINES. CHANGED THE "WB14" TO "WB" ON FIGURE 2 CASE OUTLINE. • PAGE 8 – CHANGED TERMINAL CONNECTIONS DWG FOR "WB" PACKAGE, OPTION 2.	05/12/97
B	• PAGE 4, PARAGRAPH 5.4.2, GROUP B INSPECTION WAS REDEFINED. PARAGRAPH 5.4.3, GROUP D INSPECTION WAS REDEFINED. PARAGRAPH 5.5.1, SOURCE INSPECTION WAS REDEFINED. • PAGE 8, FIGURE 4 – CORRECTED TYPO ON PIN 11 CONNECTION: SHOULD BE "V^-".	10/08/97
C	• PAGE 2, PARAGRAPH 3.2.2 – CHANGED PACKAGE TYPE FROM 14 LEAD BOTTOM BRAZED FLATPACK TO 14 LEAD FLATPACK, GLASS SEAL. • PAGE 3, ADDED PARAGRAPH 3.8.1 AND 3.8.2 • PAGE 7, FIGURE 2, PAGE 8, FIGURE 4, PAGE 11, FIGURE 7, PAGE 12, FIGURE 8, CHANGED PACKAGE TYPE FROM 14 LEAD BOTTOM BRAZED FLATPACK TO 14 LEAD CERPAK.	11/25/97
D	• PAGE 16, CHANGED VOS MIN DELTA LIMIT FROM –60 µV TO –200 µV, AND CHANGED VOS MAX DELTA LIMIT FROM 60 µV TO 200 µV.	12/18/97
E	• PAGE 2, WAS ADDED TO ACCOMMODATE REVISION RECORD. • PAGE 4, CORRECTED OPTION NUMBER FROM "02" to "01", PARA 3.8.1 AND CORRECTED OPTION NUMBER FROM "03" TO "02", PARA 3.8.2. • PAGE 5, AMENDED PARAGRAPHS 4.1 AND 4.1.1. TAKING EXCEPTION TO ANALYSIS OF CATASTROPHIC FAILURES.	03/13/98
F	• PAGE 17, CHANGED DELTA LIMITS ON +IB FROM –3 AND 3 TO –4 AND 4. CHANGED DELTA LIMITS ON –IB FROM –3 AND 3 TO –4 AND 4.	05/15/98
G	• PAGE 8, CORRECTED PACKAGE OUTLINE DRAWING FOR FIGURE 2 CASE OUTLINE, (W) FLAT PACK 14 LEAD GLASS SEAL.	01/11/99
H	• PAGE 7, 8, FIGURE 1, 2, CHANGED θja AND θjc.	09/29/99
J	• PAGE 3, PARAGRAPH 3.2.1, 3.2.2, HAD FIGURES 1 AND 2 REMOVED. • PAGE 4, PARAGRAPH 3.7 CHANGED VERBIAGE FROM "SPECIFIED IN TABLE III" TO "AND AS SPECIFIED IN TABLE III HEREIN", LINE 2. PARAGRAPH 3.9, ADDED "HEREIN" AFTER "TABLE II", LINE 2. • PAGE 5, PARAGRAPH 4.3, ADDED "HEREIN" AFTER "TABLE III", LINE 2. PARAGRAPH 4.4.1, ADDED "HEREIN" AFTER "TABLE II", LINE 2. **CONTINUED ON NEXT PAGE…**	11/17/99

REVISION RECORD AND DESCRIPTION CONTINUED ON NEXT PAGE.

CAUTION: ELECTROSTATIC DISCHARGE SENSITIVE PART

REVISION	PAGE NO.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
INDEX	REVISION	**V**	**V**	**V**	**V**	**V**	**V**	**V**	**V**	**V**	**V**	**V**	**V**	**V**	**V**	**V**	**V**	**V**
REVISION	PAGE NO.	18																
INDEX	REVISION	**V**																

	ORIG			**LINEAR TECHNOLOGY CORPORATION** **MILPITAS, CALIFORNIA**
	DSGN			
	ENGR			TITLE:
	MFG			**MICROCIRCUIT, LINEAR,**
	CM			**RH1014M, QUAD PRECISION**
	QA			**OPERATIONAL AMPLIFIER**
	PROG			SIZE / CAGE CODE: **64155** / DRAWING NUMBER: **05-08-5014** / REV: **V**
	FUNCT			
APPLICATION		SIGNOFFS	DATE	CONTRACT:

FOR OFFICIAL USE ONLY

REVISION RECORD		
REV	DESCRIPTION	DATE
J	PARAGRAPH 4.4.2.2, CHANGED VERBIAGE I LINE 1 FROM “ALL FOOTNOTES OF TABLE IIA OF MIL-STD-883” TO “ALL FOOTNOTES PERTAINING TO TABLE IIA IN MIL-STD-883”. PARAGRAPH 4.4.3.2, CHANGED VERBIAGE IN LINE 1 FROM “ALL FOOTNOTES OF TABLE IV OF MIL-STD-883” TO “ALL FOOTNOTES PERTAINING TO TABLE IV IN MIL-STD-883”.	11/17/99
K	• PAGE 8, CHANGED THETA JA TO θJA=160°C/W AND THETA JC TO θJC=40°C/W FROM θJA=160°C/W, θJC=40°C/W.	08/30/00
L	• CORRECTION TO REVISION K, REVISION RECORD. SHOULD BE PAGE 8, CHANGED THETA JA TO θJA=160°C/W AND THETA JC TO θJC=40°C/W FROM θJA=165°C/W, θJC=13°C/W. • ADDED PAGE 3 WAS ADDED TO ACCOMMODATE REVISION RECORDS. • CONVERSION FROM WORD PERFECT TO MICROSOFT WORD. REDUCED SPEC PAGES TO 14 TOTAL. • PAGE 4: PARAGRAPH 3.2.1 AND 3.2.2, ADDED THE WORD “OPTION” PRECEDING THE NUMBER OF EACH LTC PART NUMBER FOR BETTER CUSTOMER ORDERING CONVENIENCE. • PAGE 5: PARAGRAPH 3.6, CHANGED “TABLE IA” TO “TABLE II”. PARAGRAPH 3.7, CHANGED “TABLE III” TO “TABLE IV”. PARAGRAPHS 3.8.1 AND 3.8.2, ADDED THE PACKAGE TYPES AND OPTIONS AFTER EACH FIGURE. PARAGRAPH 3.9, CHANGED “TABLE II” TO “TABLE III”. PARAGRAPHS 3.10.1 AND 3.10.2, ADDED THE PACKAGE TYPES AFTER EACH FIGURE. PARAGRAPHS 3.10.3, REMOVED REFERENCE TO GOLD PLATED (WB) PACKAGE. PARAGRAPH 3.11.1 WAS CHANGED FROM “…dosage rate of approximately 20 Rads per second” TO “…dosage rate of less than or equal to 10 Rads per second”. • PAGE 6: PARAGRAPHS 4.1 THROUGH 4.4.2.1 CHANGES WERE DONE TO CLARIFY GROUP SAMPLING. • PAGE 7: PARAGRAPH 4.4.3 CHANGE WAS DONE TO CLARIFY GROUP SAMPLING. PARAGRAPHS 4.5 THROUGH 4.5.2, CHANGED PARAGRAPH NUMBERS FROM “5.Ø” TO “4.5”. PARAGRAPHS 4.6 THROUGH 4.6.10, CHANGED PARAGRAPH NUMBERS FROM “6.Ø” TO “4.6 THROUGH “4.6.10” PARAGRAPHS 4.6.2 THROUGH 4.6.4 WERE RE-WRITTEN. THESE DATA PROVIDED, AND DATA AVAILABLE. PARAGRAPH 4.6.10 NOTE, ADDED FURTHER EXPLANATION OF MINIMUM DELIVERED DATA.	03/26/02

REVISION RECORD

REV	DESCRIPTION	DATE
L	• PARAGRAPH 5.Ø CHANGED PARAGRAPH NUMBER FROM “7.Ø” TO “5.Ø”. • PAGES 8 THROUGH 15, ALL FIGURE TITLES CHANGED TO HAVE DEVICE OPTIONS AND PACKAGE TYPES AT TOP OF PAGE, AND HAVE ALL FIGURES AT BOTTOM OF PAGE. • PAGE 12, NOTE 2 WAS CHANGED FROM 171°C TO +152°C, NOTE 3 WAS CHANGED FROM 150°C TO +125°C, NOTE 4 HAD A FREQUENCY LIMIT ADDED, NOTES 5 AND 6 WERE DELETED AND REPLACE WITH A NEW NOTE 5. • PAGES 16 THROUGH 18, SCANNED DIRECTLY FROM DATA SHEET.	3/26/02
M	PAGE 1: • CORRECTED THE CAGE CODE NUMBER FROM 94155 TO 64155. PAGE 9: • CORRECTED OPTION 2, FIGURE 2 HEADER, CASE OUTLINE, FROM W10 GLASS SEALED FLATPACK / 10 LEADS CASE OUTLINE TO W14 GLASS SEALED FLATPACK / 14 LEADS CASE OUTLINE. PAGE 10: • CORRECTED OPTION 2, FIGURE 4, TERMINAL CONNECTION, FROM WB PACKAGE 14-LEAD METAL SEALED BOTTOM BRAZED TO W PACKAGE 14 LEAD FLATPACK GLASS SEALED.	5/30/02
N	PAGE 5: • CHANGED INITIAL RATE OF RADS TO 240 RADS/SEC.	3/16/05
P	• PAGE 6, CHANGED IN BOTH PARAGRAPHS 4.2, 4.3 IN CONJUNCTION TO 3.3 CHANGED TO 3.4 AND PARAGRAPH 4.3 CHANGED 3.1.1 TO 3.1 AND 3.2.1 TO 3.1.1	12/10/07
R	• PAGE 5, PARAGRAPH 3.103 CHANGED TO ALLOY 42 PACKAGE REQUIREMENT. PARAGRAPH 3.11.1 CHANGED VERBIAGE.	05/01/08
S	• PAGE 5, ADDED PARAGRAPH 3.10 FOR 60 TEMP. CYCLES AT EOL. REST OF THE PARAGRAPHS WERE RE-NUMBERED.	02/12/09
T	• PAGE 12, CORRECTED BURN-IN NEGATAIVE VOLTAGE FROM V1 TO V2.	03/08/12
U	• Changed the $+I_B$ and $-I_B$ ‘Max Endpoint Limit’ from 0 to +30 on page 18.	08/28/13
V	**Removed & replace figure 2 package drawing on pg 9**	**12/13/16**

1.0 SCOPE:

1.1 This specification defines the performance and test requirements for a microcircuit processed to a space level manufacturing flow.

2.0 APPLICABLE DOCUMENTS:

2.1 Government Specifications and Standards: the following documents listed in the Department of Defense Index of Specifications and Standards, of the issue in effect on the date of solicitation, form a part of this specification to the extent specified herein.

SPECIFICATIONS:

MIL-PRF-38535 Integrated Circuits (Microcircuits) Manufacturing, General Specification for

MIL-STD-883 Test Method and Procedures for Microcircuits

MIL-STD-1835 Microcircuits Case Outlines

2.2 Order of Precedence: In the event of a conflict between the documents referenced herein and the contents of this specification, the order of precedence shall be this specification, MIL-PRF-38535 and other referenced specifications.

3.0 REQUIREMENTS:

3.1 General Description: This specification details the requirements for the RH1014, Operational Amplifier, processed to space level manufacturing flow.

3.2 Part Number:

3.2.1 Option 1 – RH1014MJ (CERDIP, 14 LEAD)

3.2.2 Option 2 – RH1014MW (FLATPACK, GLASS SEAL, 14 LEAD)

3.3 Part Marking Includes:

3.3.1 LTC Logo

3.3.2 LTC Part Number (See Paragraph 3.2)

3.3.3 Date Code

3.3.4 Serial Number

3.3.5 ESD Identifier per MIL-PRF-38535, Appendix A

3.4 The Absolute Maximum Ratings:

Supply Voltage . . . . ±22V
Differential Input Voltage . . . . ±30V
Input Voltage . . . . Equal to Positive Supply Voltage
. . . . 5V Below Negative Supply Voltage
Output Short Circuit Duration 1/ . . . . Indefinite
Operating Temperature Range . . . . -55°C to 125°C
Storage Temperature Range . . . . -65°C to 150°C
Lead Temperature (Soldering, 10 sec.) . . . . 300°C
1/ Parameter is guaranteed by design, characterization, or correlation to other tested parameters.

3.5 Electrostatic discharge sensitivity, ESDS, shall be Class 1.

3.6 Electrical Performance Characteristics: The electrical performance characteristics shall be as specified in Table I and Table II.

3.7 Electrical Test Requirements: Screening requirements shall be in accordance with 4.1 herein, MIL-STD-883, Method 5004, and as specified in Table IV herein.

3.8 Burn-In Requirement:

3.8.1 Option 1 (Ceramic Dip) Static Burn-In, Figure 5; Dynamic Burn-In, Figure 6.

3.8.2 Option 2 (Glass Sealed Flatpack) : Static Burn-In, Figure 7; Dynamic Burn-In, Figure 8.

3.9 Delta Limit Requirement: Delta limit parameters are specified in Table III herein, are calculated after each burn-in, and the delta rejects are included in the PDA calculation.

3.10 Part Number Option 2: The manufacturer performs 60 Temperature Cycles per MIL-STD-883, TM1010, Condition C at end of line testing.

3.11 Design, Construction, and Physical Dimensions: Detail design, construction, physical dimensions, and electrical requirements shall be specified herein.

3.11.1 Mechanical / Packaging Requirements: Case outlines and dimensions are in accordance with Figure 1 (Ceramic Dip/14 Leads) and Figure 2 (Glass Sealed Flatpack/14 Leads).

3.11.2 Terminal Connections: The terminal connections shall be as specified in Figure 3 (Ceramic Dip/14 Leads) and Figure 4 (Glass Sealed Flatpack/14 Leads).

3.11.3 Lead Material and Finish: The lead material shall be Alloy 42 for option 1, 2. The lead finishes shall be hot solder dip (Finish letter A) in accordance with MIL-PRF-38535.

3.12 Radiation Hardness Assurance (RHA):

3.12.1 The manufacturer shall perform a lot sample test as an internal process monitor for total dose radiation tolerance. The sample test is performed with MIL-STD-883 TM1019 Condition A as a guideline.

3.12.2 For guaranteed radiation performance to MIL-STD-883, Method 1019, total dose irradiation, the manufacturer will provide certified RAD testing and report through an independent test laboratory when required as a customer purchase order line item.

3.12.3 Total dose bias circuit is specified in Figure 9.

3.13 Wafer Lot Acceptance: Wafer lot acceptance shall be in accordance with MIL-PRF-38535, Appendix A, except for the following: Topside glassivation thickness shall be a minimum of 4KÅ.

3.14 Wafer Lot Acceptance Report: SEM is performed per MIL-STD-883, Method 2018 and copies of SEM photographs shall be supplied with the Wafer Lot Acceptance Report as part of a Space Data Pack when specified as a customer purchase order line item.

4.0 VERIFICATION (QUALITY ASSURANCE PROVISIONS)

4.1 Quality Assurance Provisions: Quality Assurance provisions shall be in accordance with MIL-PRF-38535. Linear Technology is a QML certified company and all Rad Hard candidates are assembled on qualified Class S manufacturing lines.

4.2 Sampling and Inspection: Sampling and Inspection shall be in accordance with MIL-STD-883, Method 5005 with QML allowed and TRB approved deviations in conjunction with paragraphs 3.1.1, 3.2.1, and 3.4 of the test method.

4.3 Screening: Screening requirements shall be in accordance with MIL-STD-883, Method 5004 with QML allowed and TRB approved deviations in conjunction with paragraphs 3.1, 3.1.1, and 3.4 of the test method. Electrical testing shall be as specified in Table IV herein.

4.3.1 Analysis of catastrophic (open/short) failures from burn-in will be conducted only when a lot fails the burn-in or re-burn-in PDA requirements.

4.4 Quality Conformance Inspection: Quality conformance inspection shall be in accordance with 4.2 and 4.3 herein and as follows:

4.4.1 Group A Inspection: Group A inspection shall be performed in accordance with 4.1 herein, per MIL-STD-883, Method 5005, and specified in Table IV herein.

4.4.2 Group B Inspection: When purchased, a full Group B is performed on an inspection lot. As a minimum, Subgroup B2 (Resistance to Solvents / Mark Permanency) and Subgroup B3 (Solderability) are performed prior to the first shipment from any inspection lot and Attributes provided when a Full Space Data Pack is ordered. Subgroup B5 (Operating Life) is performed on each wafer lot. This subgroup may or may not be from devices built in the same package style as the current inspection lot. Attributes and variables data for this subgroup will be provided upon request at no charge.

4.4.2.1 Group B, Subgroup 2c = 10%

Group B, Subgroup 3 = 10%

Group B, Subgroup 4 = 5%

Group B, Subgroup 5 = *5% (*per wafer or inspection lot whichever is the larger quantity)

Group B, Subgroup 6 = 15%

4.4.2.2 All footnotes pertaining to Table IIa in MIL-STD-883, Method 5005 apply. The quantity (accept number) of all other subgroups are per MIL-STD-883, Method 5005, Table IIa.

4.4.3 Group D Inspection: When purchased, a full Group D is performed on an inspection lot. As a minimum, periodic full Group D sampling is performed on each package family for each assembly location every 26 weeks. A generic Group D Summary is provided when a full Space Data Pack is ordered.

4.4.3.1 Group D, Subgroups 3, 4 and 5 = 15% each (Sample Size Series).

4.4.3.2 All footnotes pertaining to Table IV in MIL-STD-883, Method 5005 apply. The quantity (accept number) or sample number and accept number of all other subgroups are per MIL-STD-883, Method 5005, Table IV.

4.5 Source Inspection:

4.5.1 The manufacturer will coordinate Source Inspection at wafer lot acceptance and pre-seal internal visual.

4.5.2 The procuring activity has the right to perform source inspection at the supplier's facility prior to shipment for each lot of deliverables when specified as a customer purchase order line item. This may include wafer lot acceptance and final data review.

4.6 Deliverable Data: Deliverable data that will ship with devices when a Space Data Pack is ordered:

4.6.1 Lot Serial Number Sheets identifying all devices accepted through final inspection by serial number.

4.6.2 100% attributes (completed lot specific traveler; includes Group A Summary)

4.6.3 Burn-In Variables Data and Deltas (if applicable)

4.6.4 Group B2, B3, and B5 Attributes (Variables data, if performed on lot shipping)

4.6.5 Generic Group D data (4.4.3 herein)

4.6.6 SEM photographs (3.13 herein)

4.6.7 Wafer Lot Acceptance Report (3.13 herein)

4.6.8 X-Ray Negatives and Radiographic Report

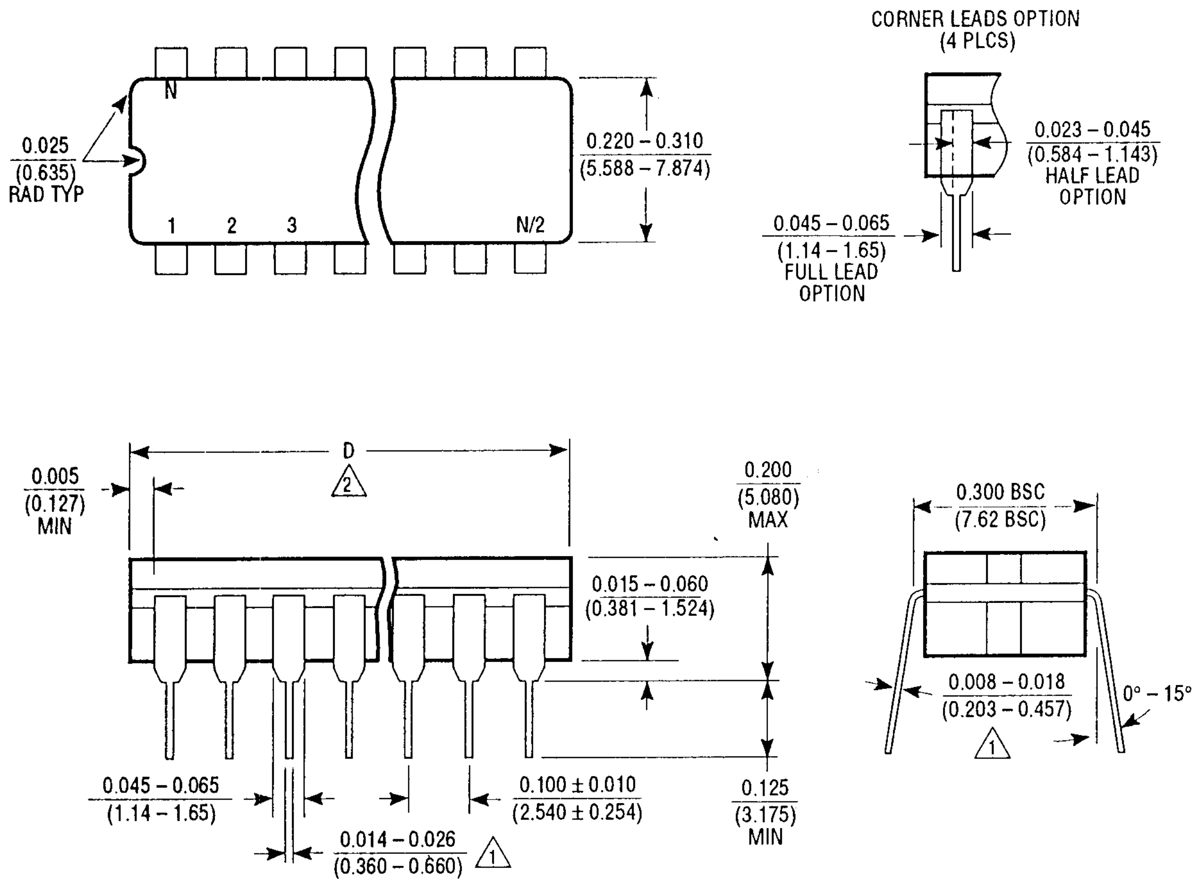
4.6.9 A copy of outside test laboratory radiation report if ordered

4.6.10 Certificate of Conformance certifying that the devices meet all the requirements of this specification and have successfully completed the mandatory tests and inspections herein.

Note: Items 4.6.1 and 4.6.10 will be delivered as a minimum, with each shipment. This is noted on the Purchase Order Review Form as "No Charge Data".

5.0 Packaging Requirements: Packaging shall be in accordance with Appendix A of MIL-PRF-38535. All devices shall be packaged in conductive material or packaged in anti-static material with an external conductive field shielding barrier.

DEVICE OPTION 1
CERAMIC DIP / 14 LEADS CASE OUTLINE



LEAD COUNT, N	D MAX
14	Ø.785 (19.939)

NOTE: 1. LEAD DIMENSIONS APPLY TO SOLDER DIP OR TIN PLATE LEADS.
2. THIS DIMENSION ALLOWS FOR OFF-CENTER LID, MENISCUS, AND GLASS OVERRUN.

θja = 95°C/W
θjc = 25°C/W
Tj Max = 174°C

FIGURE 1

DEVICE OPTION 2

W14, GLASS SEALED FLATPACK / 14 LEADS CASE OUTLINE

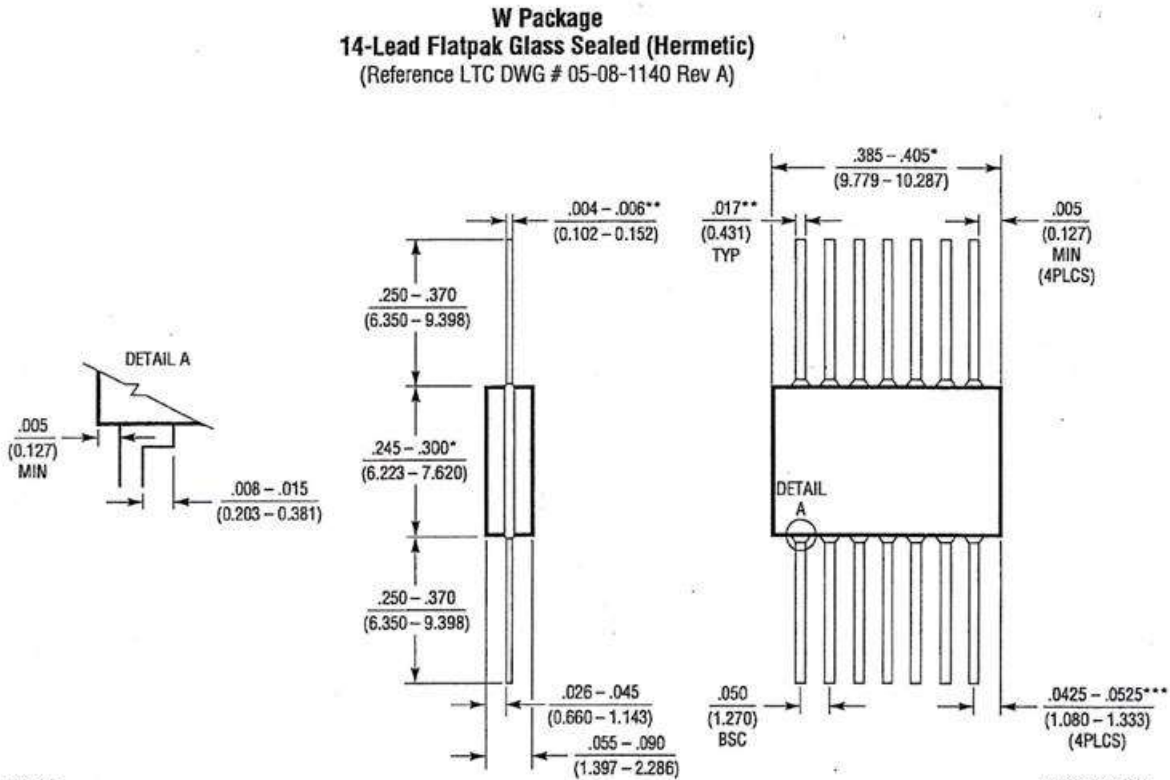


FIGURE 2

TERMINAL CONNECTIONS

OPTION 1, CERAMIC DIP / 14 LEAD

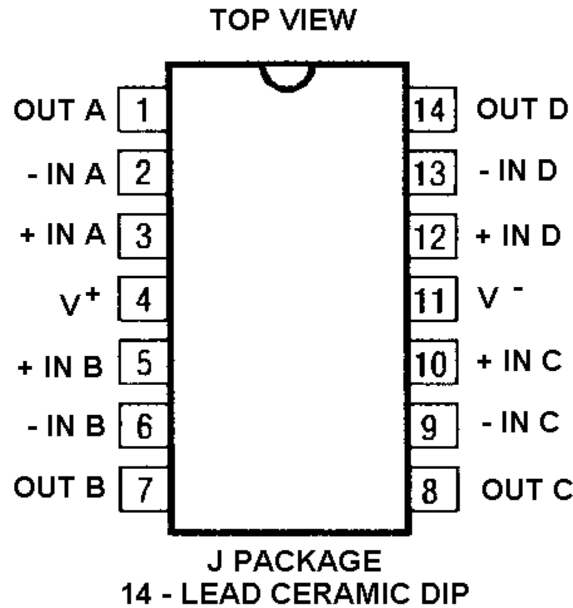


FIGURE 3

OPTION 2, GLASS SEALED FLATPACK / 14 LEADS

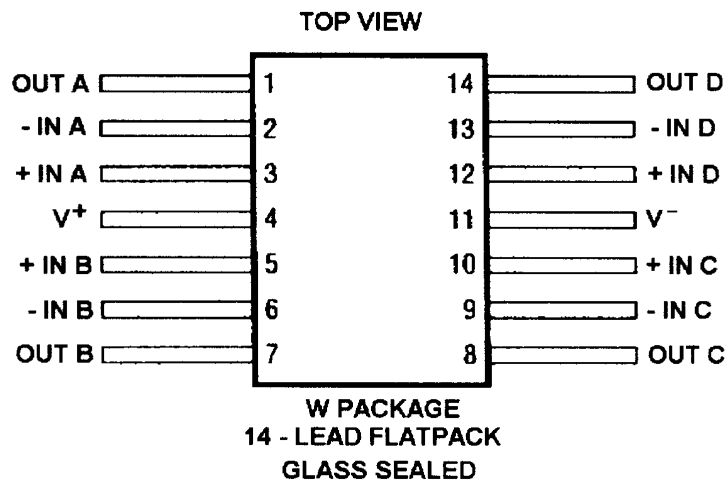
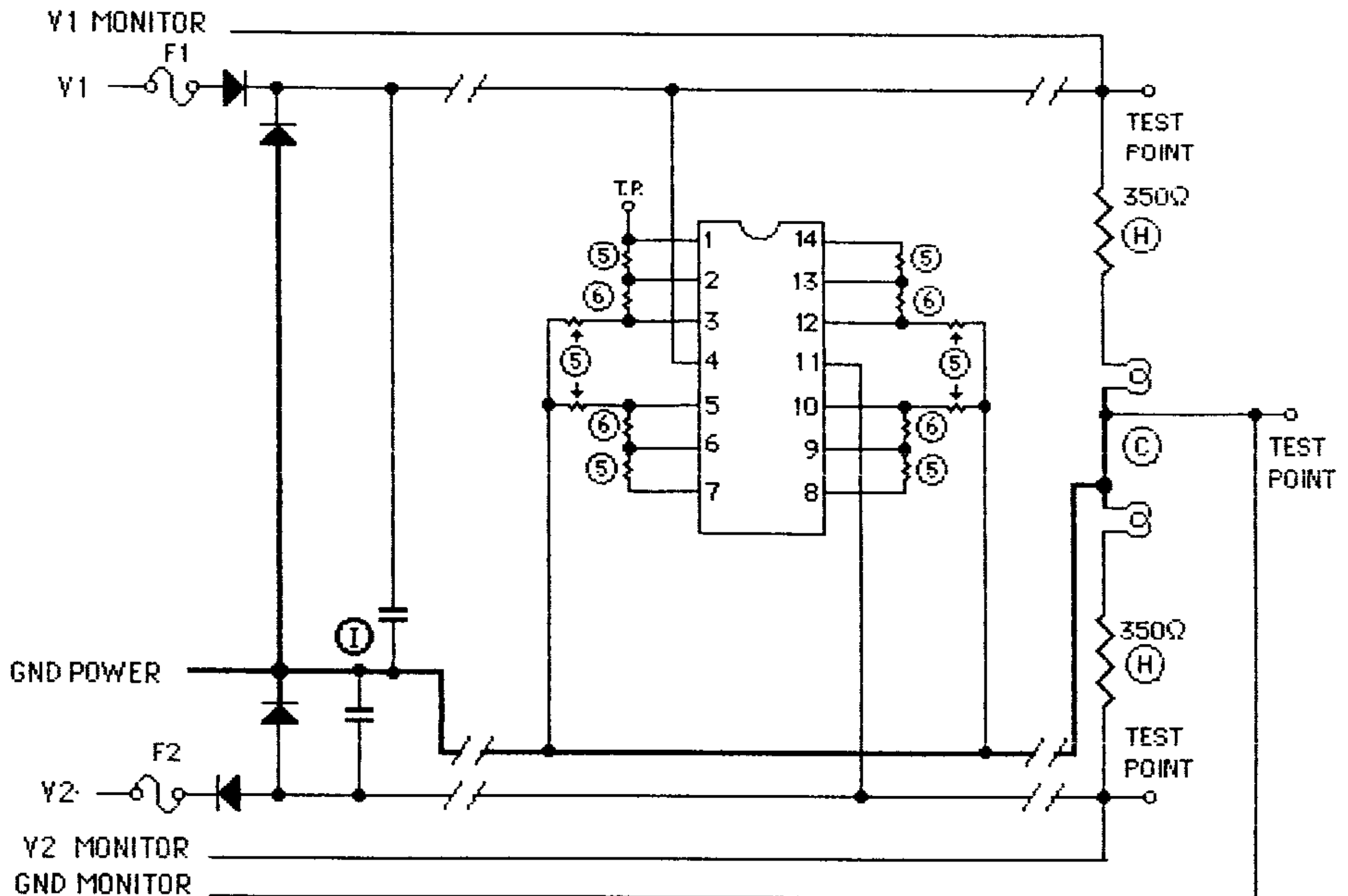


FIGURE 4

STATIC BURN-IN CIRCUIT
OPTION 1, CERAMIC DIP / 14 LEADS

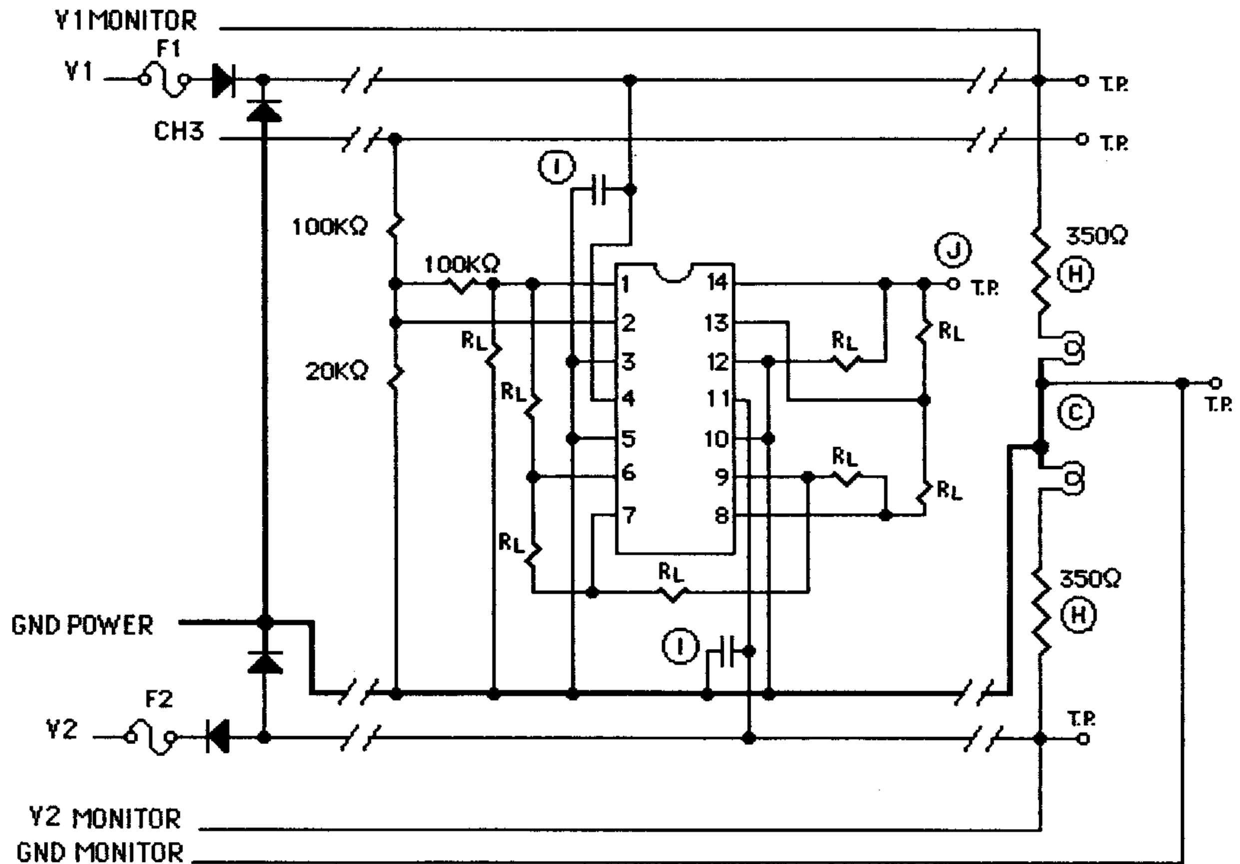


NOTES:

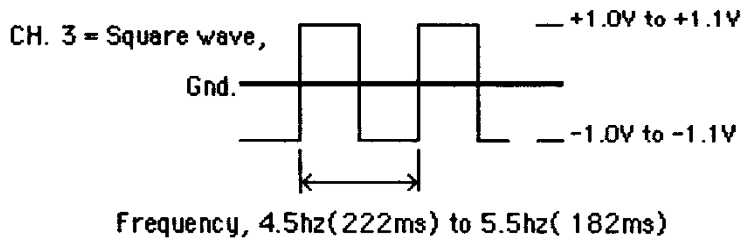
1. Unless otherwise specified, component tolerances shall be per military specification.
2. Tj = 172 °C maximum.
3. Ta = 150 °C.
4. Burn-in Voltages: V1 = +20V to +22V
   V2 = -20V to -22V
5. Resistors to be 1/2 watt, 49.9KΩ per specification.
6. Resistors to be 1/2 watt, 100Ω per specification.

FIGURE 5

DYNAMIC BURN-IN CIRCUIT
OPTION 1, CERAMIC DIP / 14 LEADS



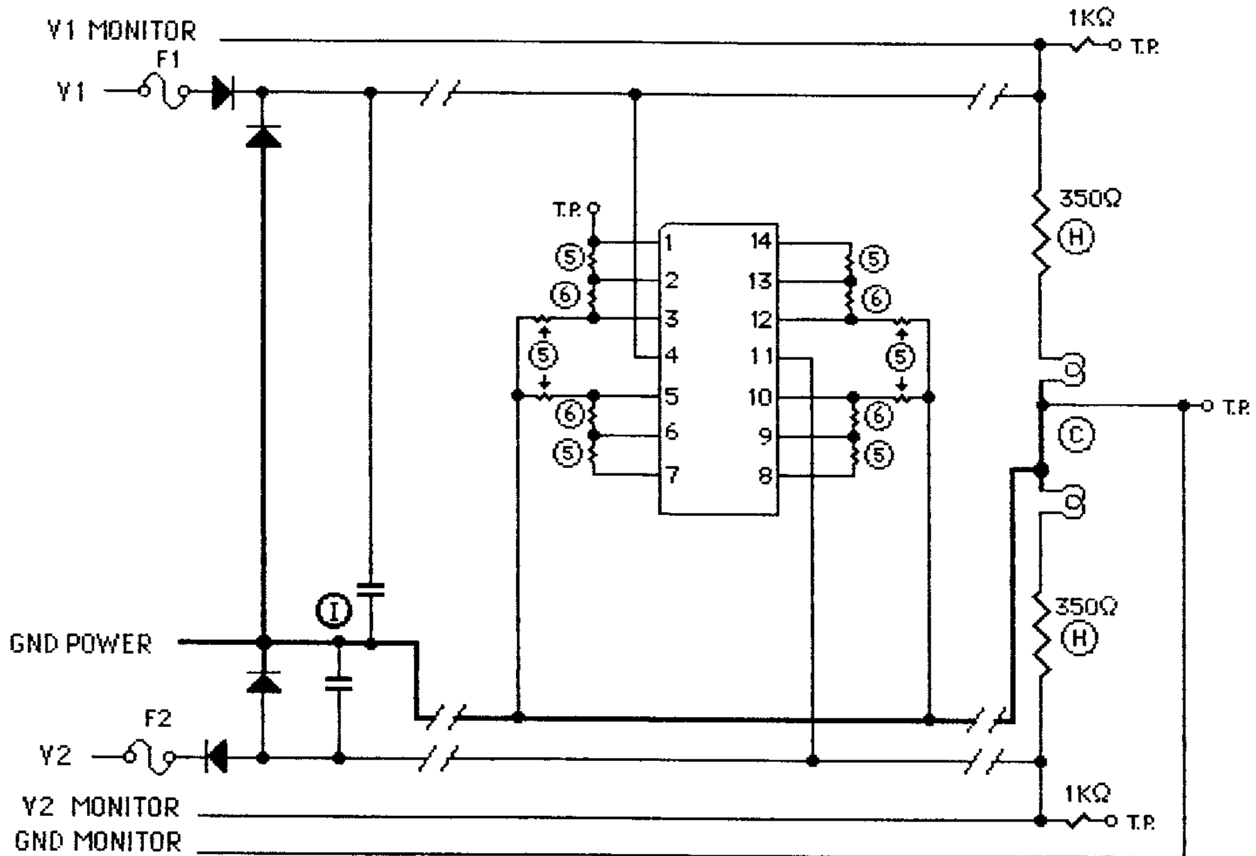
NOTES:
1. **Unless otherwise specified, component tolerances shall be per military specification.**
2. **T_j = +152°C maximum**
3. **T_a = +125°C.**
4. **Burn-in Voltages: V1 = +20V to +22V**
   V2 = -20V to –22V



5. **R_L = 715**

FIGURE 6

STATIC BURN-IN CIRCUIT
OPTION 2, FLATPACK, GLASS SEAL / 14 LEADS

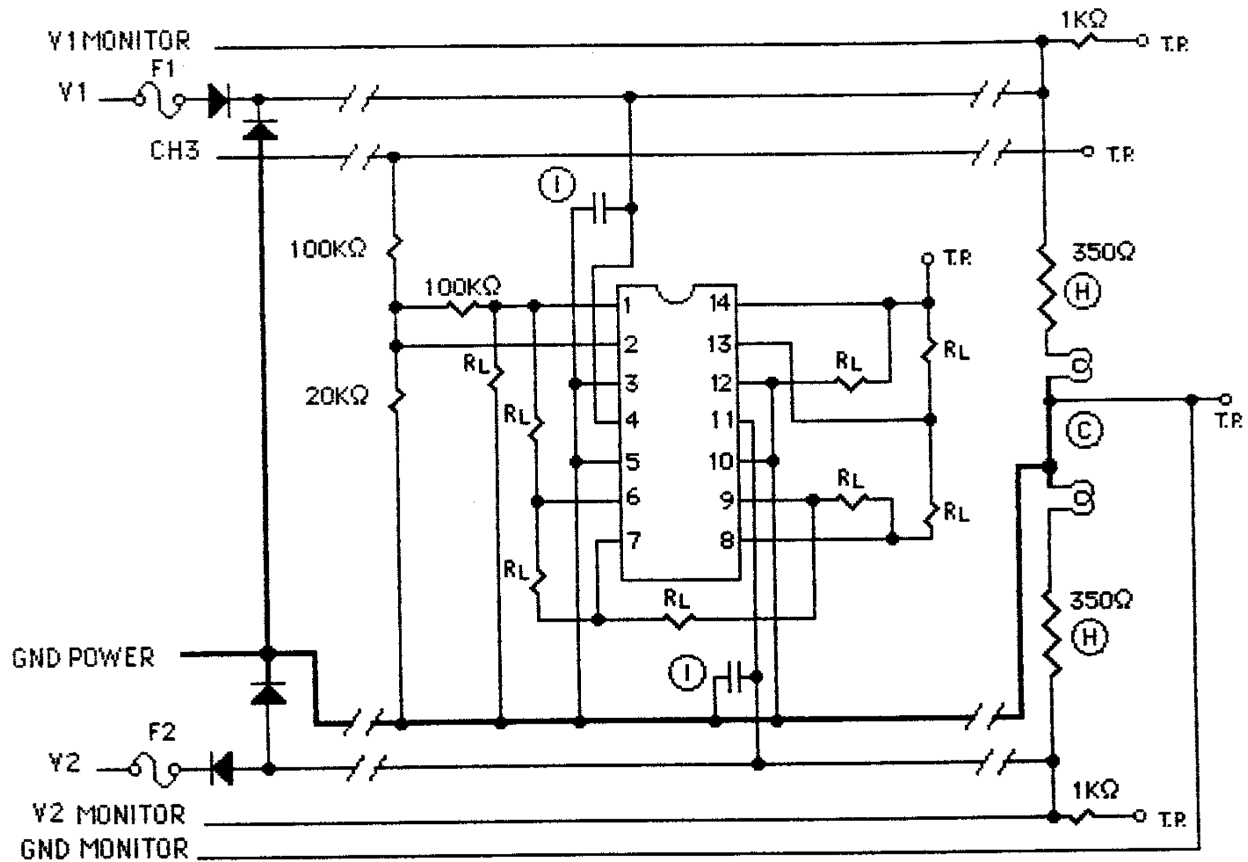


NOTES:

1. Unless otherwise specified, component tolerances shall be per military specification.
2. Tj = 171 °C maximum.
3. Ta= 150 °C.
4. Burn-in Voltages: V1 = +20V to +22V
   V2 = -20V to -22V
5. Resistors to be 1/2 watt, 49.9KΩ per specification.
6. Resistors to be 1/2 watt, 100Ω per specification.

FIGURE 7

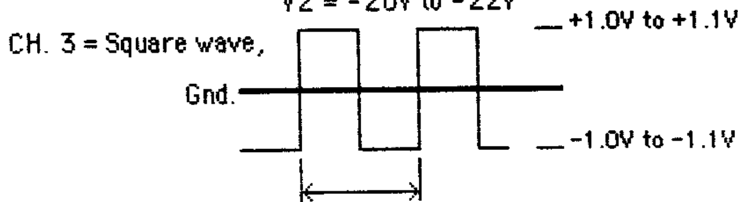
DYNAMIC BURN-IN CIRCUIT
OPTION 2, FLATPACK, GLASS SEAL / 14 LEADS



NOTES:

1. Unless otherwise specified, component tolerances shall be per military specification.
2. Tj = 166°C maximum.
3. Ta = 125°C.
4. Burn-in voltages: V1 = +20V to +22V
   V2 = -20V to -22V

CH. 3 = Square wave,



Frequency, 4.5hz(222ms) to 5.5hz(182ms)

5. RL = 715Ω

FIGURE 8

TOTAL DOSE BIAS CIRCUIT

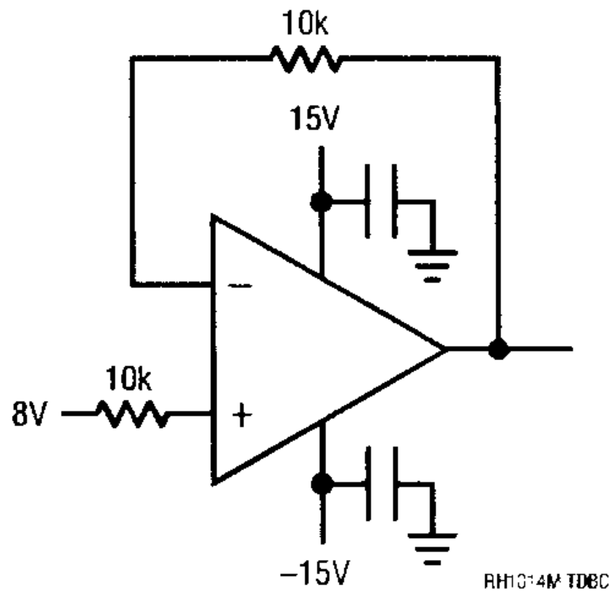


FIGURE 9

TABLE I: ELECTRICAL CHARACTERISTICS (PRE-IRRADIATION)

V_S = ±15V, V_{CM} = 0V, unless otherwise noted.

SYMBOL	PARAMETER	CONDITIONS	NOTES	T_A = 25°C			SUB-GROUP	−55°C ≤ T_A ≤ 125°C			SUB-GROUP	UNITS
				MIN	TYP	MAX		MIN	TYP	MAX		
V_{OS}	Input Offset Voltage					300	1			550	2,3	µV
			2			450	1			750	3	µV
		V_{CM} = 0.1V, T_A = 125°C	2							750	2	µV
$\frac{\Delta V_{OS}}{\Delta Temp}$	Average Tempco of Offset Voltage		1							2.5		µV/°C
$\frac{\Delta V_{OS}}{\Delta Time}$	Long Term V_{OS} Stability				0.5							µV/Mo
I_{OS}	Input Offset Current					10	1			20	2,3	nA
			2			10	1			20	2,3	nA
I_B	Input Bias Current					30	1			45	2,3	nA
			2			50	1			120	2,3	nA
e_n	Input Noise Voltage	0.1Hz to 10Hz			0.55							μV_{P-P}
	Input Noise Voltage Density	f_O = 10Hz			24							nV/√Hz
		f_O = 1000Hz			22							nV/√Hz
i_n	Input Noise Current Density	f_O = 10Hz			0.07							pA/√Hz
R_{IN}	Input Resistance	Differential	1	70								MΩ
		Common Mode			4							GΩ
A_{VOL}	Large-Signal Voltage Gain	V_O = ±10V, R_L ≥ 2k		1.2			4	0.25			5,6	V/µV
		V_O = ±10V, R_L ≥ 600Ω		0.5			4					V/µV
		V_O = 5mV to 4V, R_L = 500Ω	2		1							V/µV
	Input Voltage Range		1	13.5								V
			1	−15.0								V
			1,2	3.5								V
			1,2	0								V
CMRR	Common-Mode Rejection Ratio	V_{CM} = 13.5V, −15V		97			1					dB
		V_{CM} = 13V, −14.9V						94			2,3	dB
PSRR	Power Supply Rejection Ratio	V_S = ±2V to ±18V		100			1	97			2,3	dB
	Channel Separation	V_O = ±10V, R_L = 2k		120			1					dB
V_{OUT}	Output Voltage Swing	R_L ≥ 2k		±12.5			4	±11.5			5,6	V
		Output Low, No Load	2			25	4					mV
		Output Low, 600Ω to GND	2			10	4			18	5,6	mV
		Output Low, I_{SINK} = 1mA	2			350	4					mV
		Output High, No Load	2	4.0			4					V
		Output High, 600Ω to GND	2	3.4			4	3.1			5,6	V
SR	Slew Rate			0.2			4					V/µs
I_S	Supply Current	Per Amplifier				0.55	1			0.70	2,3	mA
			2			0.50	1			0.65	2,3	mA

See Applicable notes on next page.

TABLE II: ELECTRICAL CHARACTERISTICS (POST-IRRADIATION)

V_S = ±15V, V_{CM} = 0V, T_A = 25°C, unless otherwise noted.

SYMBOL	PARAMETER	CONDITIONS	NOTES	10KRAD(Si) MIN	MAX	20KRAD(Si) MIN	MAX	50KRAD(Si) MIN	MAX	100KRAD(Si) MIN	MAX	200KRAD(Si) MIN	MAX	UNITS
V_{OS}	Input Offset Voltage				450		450		600		750		900	µV
			2		600		600		750		900			µV
I_{OS}	Input Offset Current				10		10		15		20		25	nA
			2		10		10		15		20			nA
I_B	Input Bias Current				60		75		100		175		250	nA
			2		80		100		125		200			nA
	Input Voltage Range		1	13.5		13.5		13.5		13.5		13.5		V
			1	−15.0		−15.0		−15.0		−15.0		−15.0		V
			2	3.5		3.5		3.5		3.5				V
			2	0		0		0		0				V
CMRR	Common-Mode Rejection Ratio	V_{CM} = 13V, −15V		97		97		94		90		86		dB
PSRR	Power Supply Rejection Ratio	V_S = ±10V to ±18V		100		98		94		86		80		dB
A_{VOL}	Large-Signal Voltage Gain	R_L 10k, V_O = ±10V		500		200		100		50		25		V/mV
V_{OUT}	Maximum Output Voltage Swing	R_L 10k		±12.5		±12.5		±12.5		±12.5		±12.5		V
		Output Low, No Load	2		25		30		40		50			mV
		Output Low, 600 to GND	2		10		10		10		10			mV
		Output Low, I_{SINK} = 1mA	2		0.6		0.8		1.0		1.6			V
		Output High, No Load	2	4.0		4.0		4.0		4.0				V
		Output High, 600 to GND	2	3.4		3.2		3.0		2.8				V
SR	Slew Rate	R_L 10k		0.13		0.12		0.11		0.07		0.01		V/µs
I_S	Supply Current	Per Amplifier			0.55		0.55		0.55		0.55		0.55	mA
			2		0.50		0.50		0.50		0.50			mA

Note 1: Guaranteed by design, characterization, or correlation to other tested parameters..

Note 2: Specification applies for V_S^+ = 5V, V_S^- = 0V, V_{CM} = 0V, V_{OUT} = 1.4V.

TABLE III: POST BURN-IN ENDPOINTS AND DELTA LIMIT REQUIREMENTS

T_A = 25°C, V_S = ±15V, V_{CM} = 0V unless otherwise noted

	ENDPOINT LIMIT		DELTA		
PARAMETER	MIN	MAX	MIN	MAX	UNITS
V_{OS}	-300	300	-200	200	µV
$+I_B$	-30	**+30**	-4	4	nA
$-I_B$	-30	**+30**	-4	4	nA

TABLE IV: ELECTRICAL TEST REQUIREMENTS

MIL-STD-883 TEST REQUIREMENTS	SUBGROUP
Final Electrical Test Requirements (Method 5004)	1*,2,3,4,5,6
Group A Test Requirements (Method 5005)	1,2,3,4,5,6
Group B and D for Class S End Point Electrical Parameters (Method 5005)	1,2,3

* PDA applies to subgroup 1. See PDA Test Notes

PDA Test Notes

The PDA is specified as 5% based on failures from group A, subgroup 1, tests after cooldown as the final electrical test in accordance with method 5004 of MIL-STD-883. The verified failures of group A, subgroup 1, after burn-in divided by the total number of devices submitted for burn-in in that lot shall be used to determine the percent for the lot.

Linear Technology Corporation reserves the right to test to tighter limits than those given.