National Semiconductor

MICROCIRCUIT DATA SHEET

MJLM1558-X REV 1A1

Original Creation Date: 09/18/95
Last Update Date: 06/24/03
Last Major Revision Date: 06/03/03

DUAL OPERATIONAL AMPLIFIER-INTERNALLY COMPENSATED

General Description

The LM1558 is a general purpose dual operational amplifier. The two amplifiers share a common bias network and power supply leads. Otherwise, their operation is completely independent.

Industry Part Number

LM1558

NS Part Numbers

JL1558BGA

Prime Die

LM1558

Controlling Document

38510/10108, AMEND. 1 REV G

Processing

MIL-STD-883, Method 5004

Quality Conformance Inspection

MIL-STD-883, Method 5005

Subgrp	Description	Temp (°C)
1	Static tests at	+25
2	Static tests at	+125
3	Static tests at	-55
4	Dynamic tests at	+25
5	Dynamic tests at	+125
6	Dynamic tests at	-55
7	Functional tests at	+25
8A	Functional tests at	+125
8B	Functional tests at	-55
9	Switching tests at	+25
10	Switching tests at	+125
11	Switching tests at	-55

Features

- No frequency compensation required
- Short-circuit protection
- Wide common-mode and differential voltage ranges
- Low-power consumption
- 8-lead can
- No latch up when input common mode range is exceeded

(Absolute Maximum Ratings)
(Note 1)

Supply Voltage	±22V
Power Dissipation METAL CAN	500mW
Differential Input Voltage	±30V
Input Voltage (Note 2)	±15V
Output Short-Circuit Duration	Continuous
Operating Temperature Range	-55 C to +125 C
Maximum Junction Temperature	150 C
Storage Temperature Range	-65 C ≤ Ta ≤ +150 C
Lead Temperature (Soldering 10 seconds)	260 C
Thermal Resistance ThetaJA METAL CAN (Still Air) (500LF/Min Air flow)	 TBD TBD
ThetaJC METAL CAN	 TBD
ESD Tolerance (Note 3)	300V

Note 1: Absolute Maximum Ratings indicate limits beyond which damage to the device may occur. Operating Ratings indicate conditions for which the device is intended to be functional, but do not guarantee specific performance limits. For guaranteed specifications and test conditions, see the Electrical Characteristics. The guaranteed specifications apply only for the test conditions listed.
Note 2: For supply voltages less than ±15V, the absolute maximum input voltage is equal to the supply voltage.
Note 3: Human body model, 1.5K ohms in series with 100pF.

Electrical Characteristics

DC PARAMETERS

(The following conditions apply to all the following parameters, unless otherwise specified.)
DC: ±Vcc = ±20V, Vcm = 0

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
Vio	Input Offset Voltage	+Vcc = 35V, -Vcc = -5V, Vcm = -15V			-3	+3	mV	1
					-4	+4	mV	2, 3
		+Vcc = 5V, -Vcc = -35V, Vcm = +15V			-3	+3	mV	1
					-4	+4	mV	2, 3
		Vcm = 0			-3	+3	mV	1
					-4	+4	mV	2, 3
		+Vcc = 5V, -Vcc = -5V, Vcm = 0V			-3	+3	mV	1
					-4	+4	mV	2, 3
Iio	Input Offset Current	+Vcc = 35V, -Vcc = -5V, Vcm = -15V			-30	+30	nA	1, 2
					-70	+70	nA	3
		+Vcc = 5V, -Vcc = -35V, Vcm = +15V			-30	+30	nA	1, 2
					-70	+70	nA	3
		Vcm = 0V			-30	+30	nA	1, 2
					-70	+70	nA	3
		+Vcc = 5V, -Vcc = -5V, Vcm = 0V			-30	+30	nA	1, 2
					-70	+70	nA	3
-Iib	Input Bias Current	+Vcc = 35V, -Vcc = -5V, Vcm = -15V			-0.1	110	nA	1, 2
					-0.1	265	nA	3
		+Vcc = 5V, -Vcc = -35V, Vcm = +15V			-0.1	110	nA	1, 2
					-0.1	265	nA	3
		Vcm = 0V			-0.1	110	nA	1, 2
					-0.1	265	nA	3
		+Vcc = 5V, -Vcc = -5V, Vcm = 0V			-0.1	110	nA	1, 2
					-0.1	265	nA	3

Electrical Characteristics

DC PARAMETERS(Continued)

(The following conditions apply to all the following parameters, unless otherwise specified.)
DC: ±Vcc = ±20V, Vcm = 0

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
+Iib	Input Bias Current	+Vcc = 35V, -Vcc = -5V, Vcm = -15V			-0.1	110	nA	1, 2
					-0.1	265	nA	3
		+Vcc = 5V, -Vcc = -35V, Vcm = +15V			-0.1	110	nA	1, 2
					-0.1	265	nA	3
		Vcm = 0V			-0.1	110	nA	1, 2
					-0.1	265	nA	3
		+Vcc = 5V, -Vcc = -5V, Vcm = 0V			-0.1	110	nA	1, 2
					-0.1	265	nA	3
+PSRR	Power Supply Rejection Ratio	+Vcc = 10V, -Vcc = -20V			-50	50	uV/V	1
					-100	100	uV/V	2, 3
-PSRR	Power Supply Rejection Ratio	+Vcc = 20V, -Vcc = -10V			-50	50	uV/V	1
					-100	100	uV/V	2, 3
CMRR	Common Mode Rejection Ratio	Vcm = ±15V, Vcc = ±35V to ±5V			80		dB	1, 2, 3
Ios+	Output Short Circuit Current	+Vcc = +15V, -Vcc = -15V, Vcm = -15V, t ≤ 25mS			-60		mA	1, 2, 3
Ios-	Output Short Circuit Current	+Vcc = +15V, -Vcc = -15V, Vcm = 15V, t ≤ 25mS				+60	mA	1, 2, 3
Icc	Power Supply Current	+Vcc = +15V, -Vcc = -15V				7.6	mA	1
						6.8	mA	2
						8.4	mA	3
Delta Vio/Delta T	Temperature Coefficient of Input Offset Voltage	25 C ≤ TA ≤ 125 C	1		-15	+15	uV/ C	2
		-55 C ≤ TA ≤ 25 C	1		-20	+20	uV/ C	3
Delta Iio/Delta T	Temperature Coefficient of Input Offset Current	25 C ≤ TA ≤ 125 C	1		-200	200	pA/ C	2
		-55 C ≤ TA ≤ 25 C	1		-500	500	pA/ C	3
Avs+	Large Signal (Open Loop) Voltage Gain	Vout = +15V, RL = 2K			50		V/mV	4
					25		V/mV	5, 6
		Vout = +15V, RL = 10K			50		V/mV	4
					25		V/mV	5, 6

Electrical Characteristics

DC PARAMETERS(Continued)

(The following conditions apply to all the following parameters, unless otherwise specified.)
DC: ±Vcc = ±20V, Vcm = 0

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
Avs-	Large Signal (Open Loop) Voltage Gain	Vout = -15V, RL = 2K			50		V/mV	4
					25		V/mV	5, 6
		Vout = -15V, RL = 10K			50		V/mV	4
					25		V/mV	5, 6
Avs	Large Signal (Open Loop) Voltage Gain	±Vcc = ±5V, Vout = ±2V, RL = 2K			10		V/mV	4, 5, 6
		±Vcc = ±5V, Vout = ±2V, RL = 10K			10		V/mV	4, 5, 6
+Vop	Output Voltage Swing	RL = 10K			+16		V	4, 5, 6
		RL = 2K			+15		V	4, 5, 6
-Vop	Output Voltage Swing	RL = 10K				-16	V	4, 5, 6
		RL = 2K				-15	V	4, 5, 6

AC PARAMETERS

(The following conditions apply to all the following parameters, unless otherwise specified.)
AC: ±Vcc = ±20V, Vcm = 0

TR(tr)	Rise Time	RL = 2K Ohms, CL = 100pF, Vin = +50mV, Av = 1, f < 1KHz				800	nS	7, 8A, 8B
TR(os)	Overshoot	RL = 2K Ohms, CL = 100pF, Vin = +50mV, Av = 1, f < 1KHz				25	%	7, 8A, 8B
Sr+	Slew Rate (Rise)	Av = 1, Vin = -5V to +5V			0.4		V/uS	7, 8A, 8B
Sr-	Slew Rate (Fall)	Av = 1, Vin = +5V to -5V			0.4		V/uS	7, 8A, 8B
NI(BB)	Noise Input Broadband	Bw = 10Hz to 5KHz, Rs = 0 Ohms	2			15	uVrms	7
NI(PC)	Noise Input Popcorn	Bw = 10Hz to 5KHz, Rs = 20K Ohms	2			40	uVpk	7
Cs	Channel Separation		2		80		dB	7

Electrical Characteristics

DC PARAMETERS: DRIFT VALUES

(The following conditions apply to all the following parameters, unless otherwise specified.)
DC: ±Vcc = ±20V, Vcm = 0. "Delta calculations performed on JAN S and QMLV devices at group B, subgroup 5 only".

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
Vio	Input Offset Voltage	Vcm = 0			-0.5	0.5	mV	1
-Iib	Input Bias Current	Vcm = 0V			-12	12	nA	1
+Iib	Input Bias Current	Vcm = 0V			-12	12	nA	1

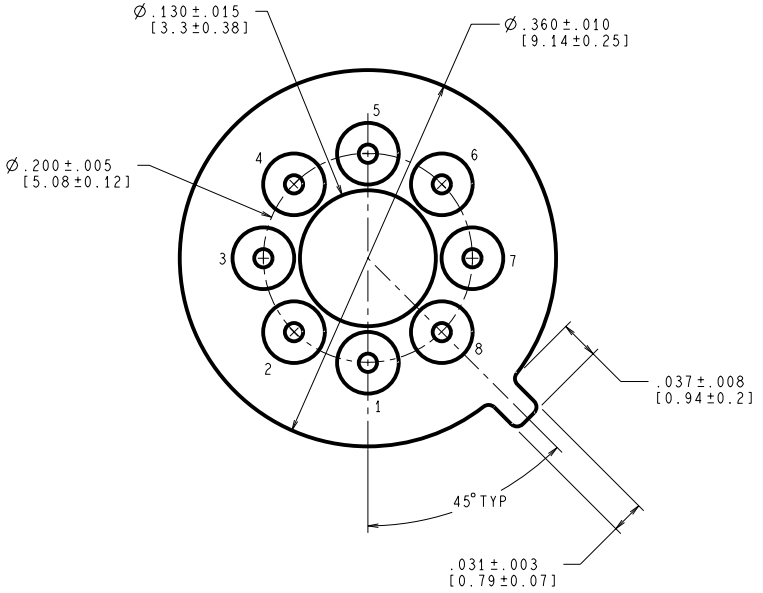
Note 1: Calculated parameter. For Delta Vio/Delta T use test number's 103, 203 and Delta Iio/Delta T use test number's 116, 216.
Note 2: Test on A360, J273 or bench test.

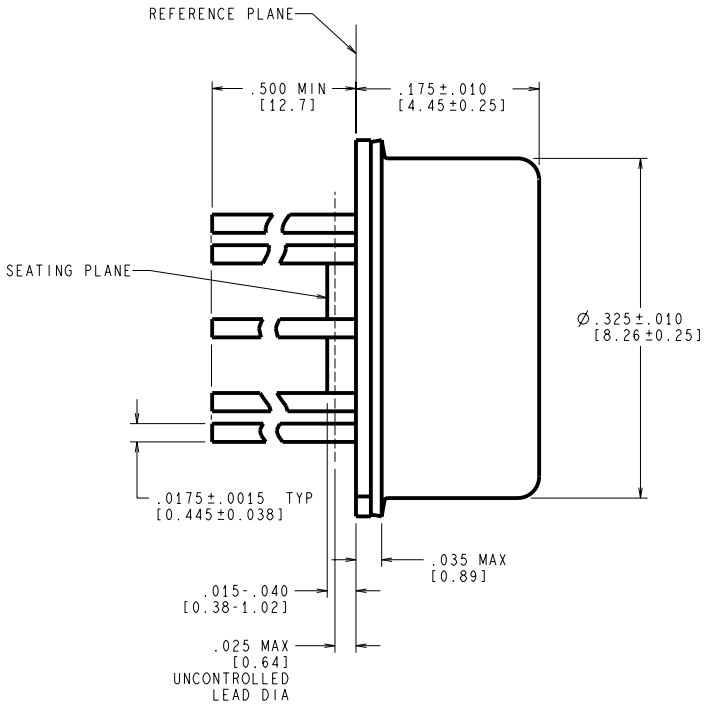
Graphics and Diagrams

GRAPHICS#	DESCRIPTION
05633HRA2	METAL CAN (H), TO-99, 8LD .200 DIA P.C. (B/I CKT)
H08CRF	METAL CAN (H), TO-99, 8LD .200 DIA P.C. (P/P DWG)
P000187A	METAL CAN (H), TO-99, 8LD .200 DIA P.C. (PINOUT)

See attached graphics following this page.

REVISIONS				
LTR	DESCRIPTION	E.C.N.	DATE	BY/APP'D
F	REVISE & REDRAW PER CURRENT STANDARD; UPDATE MIL/AERO STAMP & TITLE.	11002	06/22/95	MS/





CONTROLLING DIMENSION IS INCH
VALUES IN [] ARE MILLIMETERS

MIL-I-38535
CONFIGURATION CONTROL

NOTES: UNLESS OTHERWISE SPECIFIED

1. LEADS TO BE LOCATED WITHIN .007 IN/ 0.18 mm OF THEIR TRUE POSITIONS RELATIVE TO A MAXIMUM WIDTH TAB.
2. STANDARD METAL CAN TYPE: SOLID BASE WITH CERAMIC STANDOFF.
3. APPLIES TO MIL-AERO AND LINEAR PRODUCTS.
4. REFERENCE JEDEC REGISTRATION TO-99, JEDEC PUBLICATION No.95.

APPROVALS	DATE
DRAWN: MARTA SUCHY	06/22/95
DFTG. CHK.	
ENGR. CHK.	

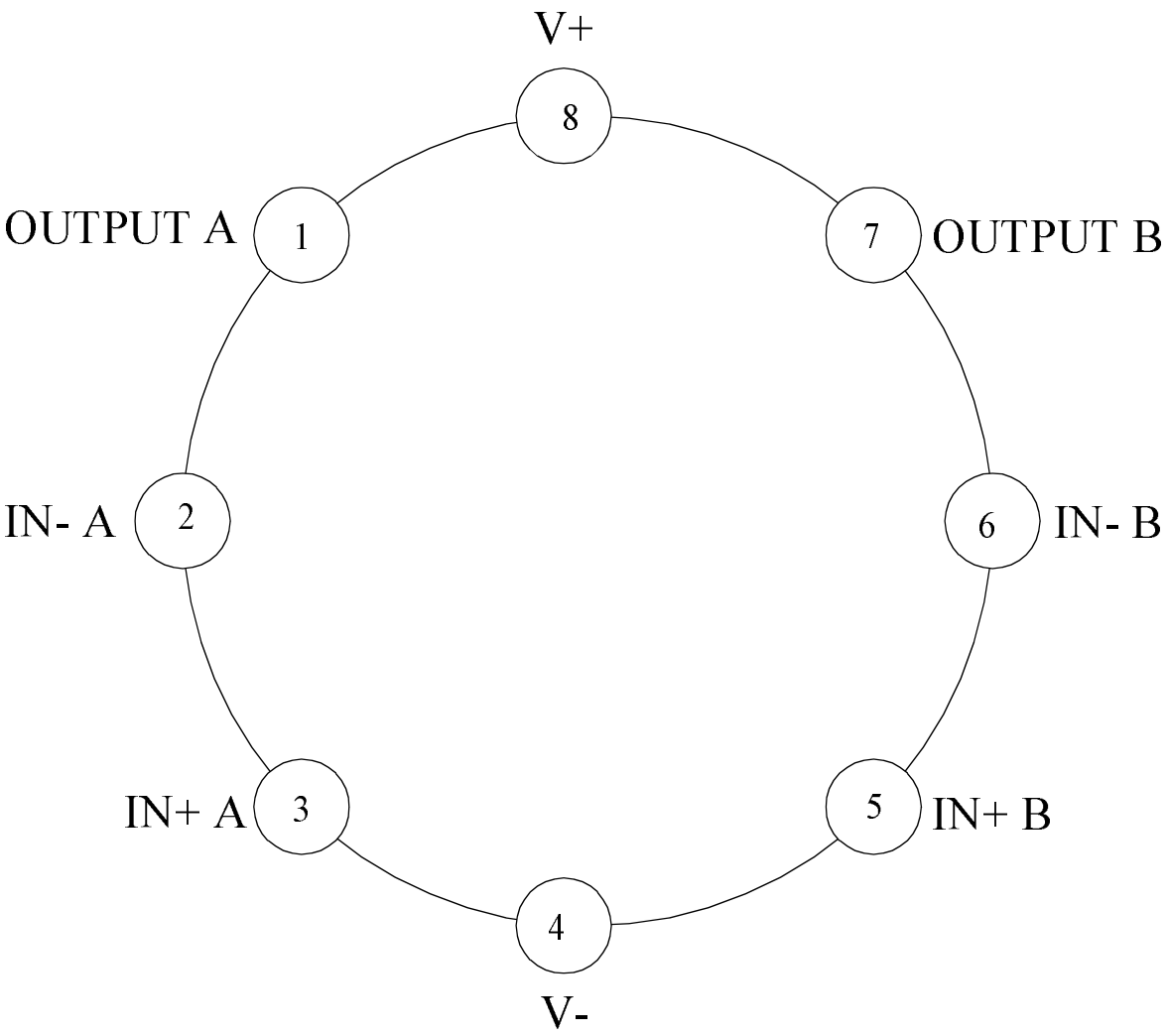
National Semiconductor
2900 Semiconductor dr, Santa Clara, CA 95052-8090

METAL CAN, TO-99, 8 LEAD, .200 DIA P.C.

PROJECTION — INCH [MM]

SCALE	SIZE	DRAWING NUMBER	REV
N/A	C	MKT-H08C	F

DO NOT SCALE DRAWING — SHEET 1 of 1



LM1558H
8 - PIN METAL CAN
CONNECTION DIAGRAM
TOP VIEW
P000187A

National Semiconductor™
MIL/AEROSPACE OPERATIONS
2900 SEMICONDUCTOR DRIVE
SANTA CLARA, CA 95050

Revision History

Rev	ECN #	Rel Date	Originator	Changes
1A1	M0004174	06/24/03	Rose Malone	Update MDS: MJLM1558-X, Rev. 0B0 to MJLM1558-X, Rev. 1A1. Changed Electrical Section parameter Delta Vio/Delta T limit condition -55 C <<Ta< 25 C from -15 to +15u/V C to -20 to +20u/V C. Deleted reference to J pkg and updated Graphics Section.