National Semiconductor

MICROCIRCUIT DATA SHEET

MNLF442M-X REV 0A1

Original Creation Date: 06/21/95
Last Update Date: 08/02/01
Last Major Revision Date: 06/27/01

DUAL LOW POWER JFET INPUT OPERATIONAL AMPLIFIER

General Description

The LF442 dual low power operational amplifier provides many of the same AC characteristic as the industry standard LM1458 while greatly improving the DC characteristics of the LM1458. The amplifier has the same bandwidth, slew rate and gain(10kohms) as the LM1458 and only draws one tenth the supply current of the LM1458. In addition the well matched high voltage JFET input devices of the LF442 reduce the input bias and offset currents by a factor of 100,000 over the LM1458. A combination of careful layout design and internal trimming guarantees very low input offset voltage and voltage drift. The LF442 also has a very low equivalent input noise voltage for a low power amplffier.

The LF442 is pin compatible with LM1458 allowing an immediate 10 times reduction in power drain in many applications. The LF442 should be used where low power dissipation and good electrical characteristics are the major considerations.

Industry Part Number

LF442

NS Part Numbers

LF442MH/883

Prime Die

LF442

Controlling Document

SEE FEATURES SECTION

Processing

MIL-STD-883, Method 5004

Quality Conformance Inspection

MIL-STD-883, Method 5005

Subgrp	Description	Temp (^{O}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

- 1/10 supply current of a LM1458	400uA
- Low input bias current	10pA
- Low input offset voltage	1mV
- Low input offset voltage drift	7uV/ C
- High gain bandwidth	1MHz
- High slew rate	1V/uS
- Low noise voltage for low power	35nV/Root Hz
- Low input noise current	0.01pA/Root Hz
- High input impedance	10e12 Ohms

CONTROLLING DOCUMENT:

LF442MH/883 5962-9763301QGA

(Absolute Maximum Ratings)

(Note 1)

Supply Voltage	±18V
Differiential Input Voltage	±30V
Input Voltage Range (Note 3)	±15V
Output Short Circuit Duration (Note 4)	Continuous
Maximum Power Dissipation (Note 2)	900mW
Tjmax	150 C
Thermal Resistance	
ThetaJA	
(Still Air)	161 C/W
(500LF/Min Air flow)	87 C/W
ThetaJC	33 C/W
Operating Temperature Range	-55 C ≤ Ta ≤ +125 C
Storage Temperature Range	-65 C ≤ Ta ≤ 150 C
Lead Temperature (Soldering, 10 Sec.)	260 C
ESD Tolerance (Note 5)	500V

Note 1: Absolute Maximum Ratings indicate limits beyond which damage to the device may occur. Operating Ratings indicate conditions for which the device is 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. Some performance characteristics may degrade when the device is not operated under the listed test conditions.

Note 2: The maximum power dissipation must be derated at elevated temperatures and is dictated by Tjmax (maximum junction temperature), ThetaJA (package junction to ambient thermal resistance), and TA (ambient temperature). The maximum allowable power dissipation at any temperature is Pdmax = (Tjmax - TA) /ThetaJA or the number given in the Absolute Maximum Ratings, whichever is lower.

Note 3: Unless otherwise specified the absolute maximum negative input voltage is equal to the negative power supply voltage.

Note 4: Any of the amplifier outputs can be shorted to ground indefinitely, however, more than one should not be simultaneously shorted as the maximum junction temperature will be exceeded.

Note 5: Human body model, 100pF discharged through 1.5K Ohms.

Electrical Characteristics

DC PARAMETERS:

(The following conditions apply to all the following parameters, unless otherwise specified.)
DC: Vs = ±15V, Vcm = 0, Rs = 0

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
Icc	Supply Current					500	uA	1, 2, 3
Vio	Input Offset Voltage	Rs = 10K Ohms			-5	5	mV	1
					-7.5	7.5	mV	2, 3
±Iib	Input Bias Current					0.1	nA	1
±Iib	Input Bias Current					20	nA	2
Iio	Input Offset Current				-0.05	0.05	nA	1
					-10	10	nA	2
CMRR	Common Mode Rejection Ratio	Vcm = ±11V, Rs = 10K			70		dB	1, 2, 3
PSRR	Power Supply Rejection Ratio	Vs+ = +15V to +6V, Vs- = -15V			70		dB	1, 2, 3
		Vs- = -15V to -6V, Vs+ = +15V			70		dB	1, 2, 3
+AVS	Large Signal Voltage Gain	Vo = 0V to +10V, Rl = 10K Ohms	2		25		V/mV	4
			2		15		V/mV	5, 6
-AVS	Large Signal Voltage Gain	Vo = 0V to -10V, Rl = 10K Ohms	2		25		V/mV	4
			2		15		V/mV	5, 6
Vo+	Output Voltage Swing	Vin = ±11V, Rl = 10K			12		V	4, 5, 6
Vo-	Output Voltage Swing	Vin = ±11V, Rl = 10K				-12	V	4, 5, 6
Vcm	Input Common Mode Voltage Range		1		±11		V	4, 5, 6

AC PARAMETERS:

(The following conditions apply to all the following parameters, unless otherwise specified.)
AC: Vs = ±15V, Vcm = 0, Rs = 0

Sr+	Slew Rate	Vout = -5V to +5V, Av = 1, Rl = 2K Ohms, Cl - 100pF			0.6		V/uS	7
Sr-	Slew Rate	Vout = +5V to -5V, Av = 1, Rl = 2K Ohms, Cl - 100pF			0.6		V/uS	7
Gbw	Gain Band Width	Vin = 50mV, f = 20KHz			0.6		MHz	7

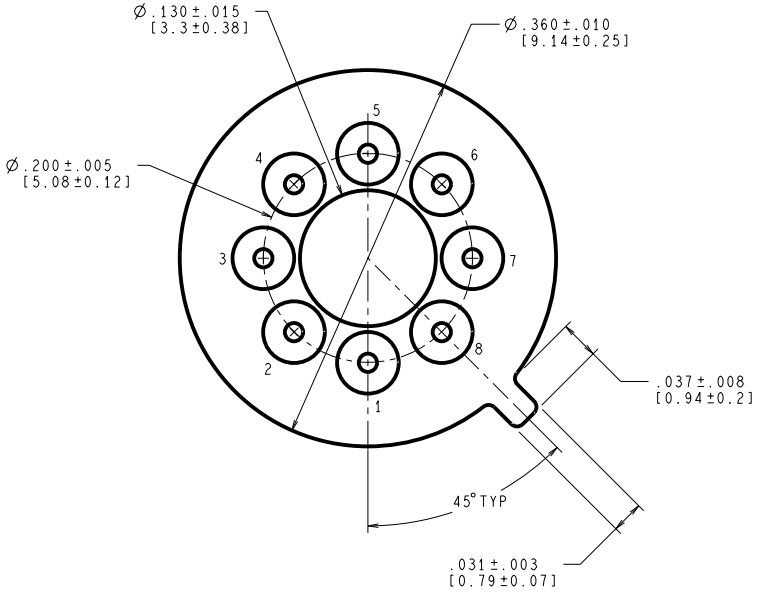
Note 1: Parameter tested go-no-go only, guaranteed by CMRR test.
Note 2: V/mV in units column is equivalent to K in datalog.

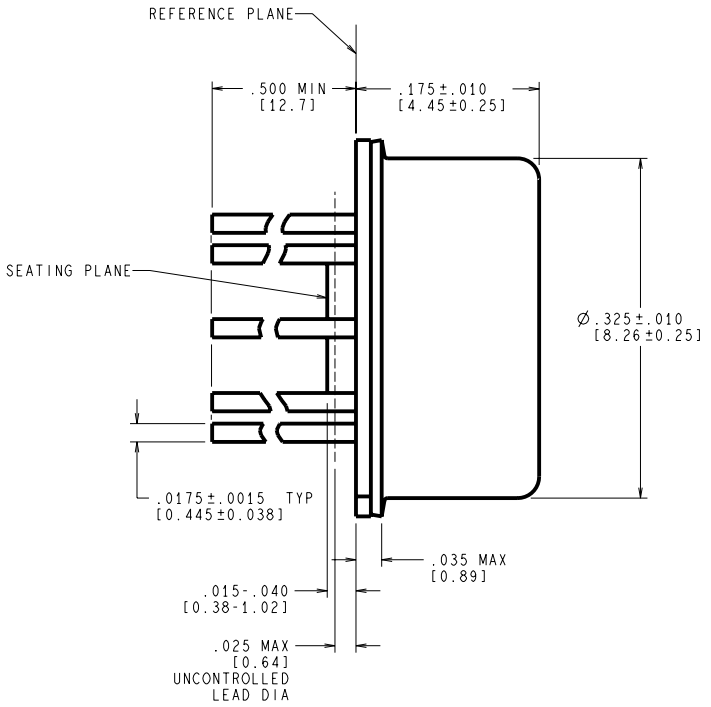
Graphics and Diagrams

GRAPHICS#	DESCRIPTION
05487HRA3	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)
P000297A	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.	

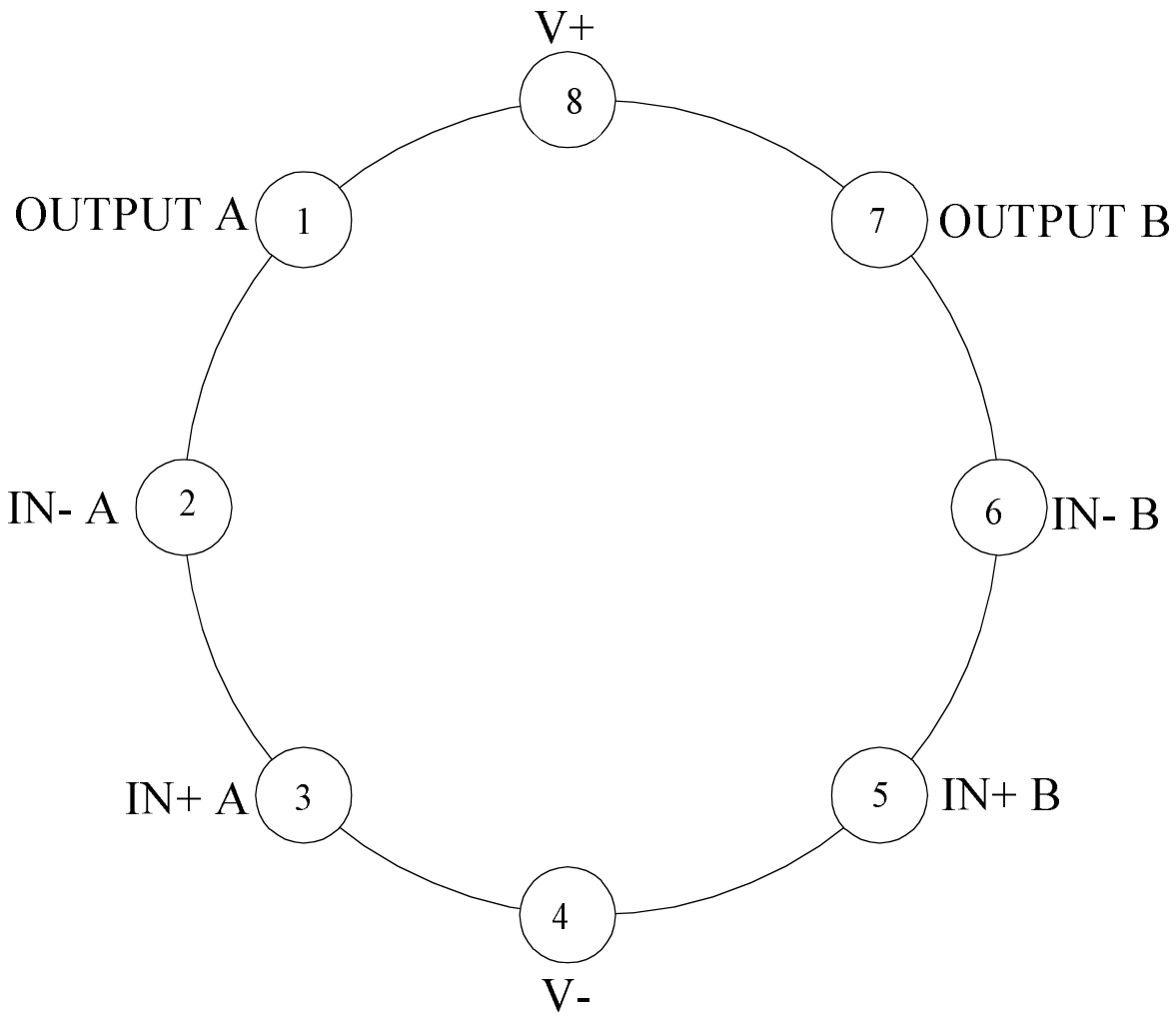
National Semiconductor
2900 Semiconductor dr, Santa Clara, CA 95052-8090

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



LF442H
8 - PIN METAL CAN
CONNECTION DIAGRAM
TOP VIEW
P000297A

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

Revision History

Rev	ECN #	Rel Date	Originator	Changes
0A1	M0003820	08/02/01	Rose Malone	Update MDS: MNLF442M-X, Rev. 0BL to Fully Released MDS MNLF442M-X, Rev. 0A1.