National Semiconductor

MILITARY DATA SHEET

MNLM6182AM-X REV 0A0

Original Creation Date: 04/18/94
Last Update Date: 04/18/94
Last Major Revision Date: 04/18/94

HIGH OUTPUT CURRENT, HIGH FREQUENCY CURRENT FEEDBACK AMPLIFIER

General Description

The LM6182 dual current feedback amplifier offers an unparalleled combination of bandwidth, slew-rate, and output current. Each amplifier can directly drive a 2V signal into a 50 Ohm or 75 Ohm back-terminated coax cable system over the full military temperature range. This represents a radical enhancement in output drive capability for a 14-pin high-speed amplifier making it ideal for video applications.

Built on National's advanced high-speed VIP(TM) II (Vertically Integrated PNP) process, the LM6182 dynamic performance makes it ideal for data acquisition, high speed ATE, and precision pulse amplifier applications.

Industry Part Number

LM6182AM

NS Part Numbers

LM6182AMJ/883

Prime Die

LM6182

Controlling Document

5962-94603

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

(Absolute Maximum Ratings)

Supply Voltage Note 1	±18V
Differential Input Voltage Note 1	±6V
Input Voltage Note 1	±Supply Voltage
Inverting Input Current Note 1	15mA
Soldering Information (NOTE 1) Dual-In-Line Package Soldering (10 sec.)	260 C
Output Current Note 1 & 2	
Storage Temperature Range Note 1	-65 C≤Ta≤ +150 C
Maximum Junction Temperature Note 1 & 4	150 C
ESD Rating Note 1 & 3	±3500V

Note 1: Absolute Maximum Ratings indicate limits beyond which damage to the device may occur. Operating ratings indicate conditions the device is intended to be functional, but device parameter specifications may not be guaranteed under these conditions. For guaranteed specifications and test conditions, see the Electrical Characteristics.
Note 2: Continuous short circuit operation at elevated ambient temperature can result in exceeding the maximum allowed junction temperature of 150 C. Each amplifier of the LM6182 is short circuit current limited to 100mA typical.
Note 3: Human body model 100pF and 1.5K Ohms.
Note 4: The junction-to-ambient thermal resistance in the ceramic DIP(J) package is 84 C/W at 0.5W, no airflow and 44 C/W at 0.5W, 500LFPM airflow. The typical junction-to-case thermal resistance in the ceramic DIP(J) package is 4.6 C/W at 2.3W.

Recommended Operating Conditions

Supply Voltage Range	8V to 32V
Ambient Temperature Range	-55 C≤Ta≤ +125 C

Electrical Characteristics

(Continued)

(The following conditions apply to all the following parameters, unless otherwise specified.)
DC: Vcc = ± 15V, RL=1K Ohm
AC: Vcc = ± 15V, RL=1K Ohm

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
Vio	Input Offset Voltage					3.0	mV	1
						4.0	mV	2, 3
		Vcc = ±5V, RL=1K Ohm				2.0	mV	1
		Vcc = ±5V, RL=1K Ohm				3.0	mV	2, 3
-Iib	Inverting Input Bias Current					5.0	uA	1
						12.0	uA	2, 3
		Vcc = ±5V, RL=1K Ohm				10.0	uA	1
		Vcc = ±5V, RL=1K Ohm				22.0	uA	2, 3
+Iib	Non-Inverting Input Bias Current					2.0	uA	1
						4.0	uA	2, 3
		Vcc = ±5V, RL=1K Ohm				1.5	uA	1
		Vcc = ±5V, RL=1K Ohm				3.0	uA	2, 3
-Iib PSR	Inverting Input Bias Current Power Supply Rejection	±4.5V </= Vcc </= ±16V				0.5	uA/V	1
		±4.5V </= Vcc </= ±16V				3.0	uA/V	2, 3
		Vcc = ±5V, RL=1K Ohm, ±4.0V </= Vcc </= ±6.0V				0.5	uA/V	1
		Vcc = ±5V, RL=1K Ohm, ±4.0V </= Vcc </= ±6.0V				1.0	uA/V	2, 3
+Iib PSR	Non-Inverting Input Bias Current Power Supply Rejection	±4.5V </= Vcc </= ±16V				0.5	uA/V	1
		±4.5V </= Vcc </= ±16V				1.5	uA/V	2, 3
		Vcc = ±5V, RL=1K Ohm, ±4.0V </= Vcc </= ±6.0V				0.5	uA/V	1
		Vcc = ±5V, RL=1K Ohm, ±4.0V </= Vcc </= ±6.0V				1.0	uA/V	2, 3
-Iib CMR	Inverting Input Bias Current Common Mode Rejection	-10V <= Vcm <= +10V				0.5	uA/V	1
						1.0	uA/V	2, 3
		Vcc = ±5V, RL=1K Ohm, -2.5V <= Vcm <= +2.5V				0.5	uA/V	1
		Vcc = ±5V, RL=1K Ohm, -2.5V <= Vcm <= +2.5V				1.0	uA/V	2, 3

Electrical Characteristics

(Continued)

(The following conditions apply to all the following parameters, unless otherwise specified.)
DC: Vcc = ± 15V, RL=1K Ohm
AC: Vcc = ± 15V, RL=1K Ohm

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
+Iib CMR	Non-Inverting Input Bias Current Common Mode Rejection	-10V <= Vcm <= +10V				0.5	uA/V	1
						1.0	uA/V	2, 3
		Vcc = 5V, RL=1K Ohm, -2.5V <= Vcm <= +2.5V				0.5	uA/V	1
						1.0	uA/V	2, 3
CMRR	Common Mode Rejection Ratio	-10V <= Vcm <= +10V			50.0		dB	1
					47.0		dB	2, 3
		Vcc = 5V, RL=1K Ohm, -2.5V <= Vcm <= +2.5V			50.0		dB	1
					47.0		dB	2, 3
PSRR	Power Supply Rejection Ratio	±4.5V </= Vcc <= ±16V			70.0		dB	1
		±4.5V </= Vcc <= ±16V			67.0		dB	2, 3
		Vcc = 5V, RL=1K Ohm, ±4.0V </= Vcc <= ±6.0V			70.0		dB	1
		Vcc = 5V, RL=1K Ohm, ±4.0V </= Vcc <= ±6.0V			67.0		dB	2, 3
Rin	Non-Inverting Input Resistance				1.0		MOhm	1, 2, 3
		Vcc = ±5V, RL=1K Ohm			0.5		MOhm	1, 2, 3
Io	Output Current	Vout to Rail, RL=10 Ohms to Ground	1		70.0		mA	1
			1		37.5		mA	2, 3
		Vcc = ±5V, RL=1K Ohm, Vout to Rail, RL=10 Ohms to Ground	1		65.0		mA	1
		Vcc = ±5V, RL=1K Ohm, Vout to Rail, RL=10 Ohms to Ground	1		35.0		mA	2, 3
Zt	Transimpedance	RL = 1K Ohm			1.0		MOhm	1
					0.4		MOhm	2, 3
		RL = 150 Ohms			0.8		MOhm	1
					0.3		Mohm	2, 3
		Vcc = ±5V, RL = 1K Ohm			0.75		MOhm	1
		Vcc = ±5V, RL = 1K Ohm			0.3		MOhm	2, 3
		Vcc = ±5V, RL = 150 Ohms			0.5		MOhm	1
		Vcc = ±5V, RL = 150 Ohms			0.2		MOhm	2, 3

Electrical Characteristics

(Continued)

(The following conditions apply to all the following parameters, unless otherwise specified.)
DC: Vcc = ± 15V, RL=1K Ohm
AC: Vcc = ± 15V, RL=1K Ohm

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
Icc	Supply Current	No Load, Vin = 0V				20.0	mA	1
						22.0	mA	2, 3
		Vcc = ±5V, RL=1K Ohm, No Load, Vin = 0V				17.0	mA	1
		Vcc = ±5V, RL=1K Ohm, No Load, Vin = 0V				18.5	mA	2, 3
Vop	Output Voltage Swing	RL = 1K Ohm			11.0		V	4
					10.0		V	5, 6
		RL = 150 Ohm			9.5		V	4
					5.6		V	5, 6
		Vcc = ±5V, RL = 1K Ohm			2.25		V	4
		Vcc = ±5V, RL = 1K Ohm			2.00		V	5, 6
		Vcc = ±5V, RL = 150 Ohms			2.0		V	4
		Vcc = ±5V, RL = 150 Ohms			1.8		V	5, 6
Avol	Gain	RL = 1K Ohm			50		K	4, 5, 6
		RL = 150 Ohms			15		K	4, 5, 6
		Vcc = ±5V, RL = 1K Ohms			30		K	4
		Vcc = ±5V, RL = 1K Ohms			7.5		K	5, 6
		Vcc = ±5V, RL = 150 Ohms			7.5		K	4
		Vcc = ±5V, RL = 150 Ohms			5.0		K	5, 6
Vcm	Input Common Mode Voltage Range		2		-10	10	V	4, 5, 6
		Vcc = ±5V	2		-2.5	2.5	V	4, 5, 6
BW	Closed Loop Bandwidth -3 dB	Avs = -1			75		MHz	7
					65		MHz	8A, 8B
		Avs = -10			35		MHz	7, 8A, 8B
		Vcc = ±5V, Avs = -1			30		MHz	7, 8A, 8B
		Vcc = ±5V, Avs = -10			20		MHz	7, 8A, 8B

Electrical Characteristics

(Continued)

(The following conditions apply to all the following parameters, unless otherwise specified.)
DC: Vcc = ± 15V, RL=1K Ohm
AC: Vcc = ± 15V, RL=1K Ohm

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
SR	Slew Rate	Avs = -1, Vo = ± 10V, RL=150 Ohms	3		1000		V/uS	7, 8A, 8B
		Vcc = ±5V, Avs = -1, Vo = ± 2V, RL=150 Ohms	3		375		V/uS	7
		Vcc = ±5V, Avs = -1, Vo = ± 2V, RL=150 Ohms	3		300		V/uS	8A, 8B
tS	Settling Time (0.1%)	Avs = -1V, Vo = ± 5V, RL=150 Ohm				85	nS	7
		Avs = -1V, Vo = ± 5V, RL=150 Ohm				115	nS	8A, 8B
		Vcc = ±5V, Avs = -1V, Vo = ± 2V, RL=150 Ohm				85	nS	7
		Vcc = ±5V, Avs = -1V, Vo = ± 2V, RL=150 Ohm				125	nS	8A, 8B

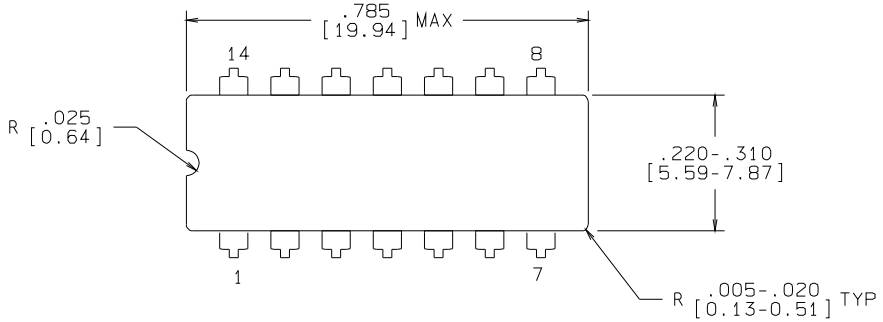
Note 1: Continuous short circuit operation at elevated ambient temperature can result in exceeding the maximum allowed junction temperature of 150 C. Each amplifier of the LM6182 is short circuit limited to 100mA typical.
Note 2: Guaranteed by CMRR test
Note 3: Measured from +25% to +75% of output waveform.

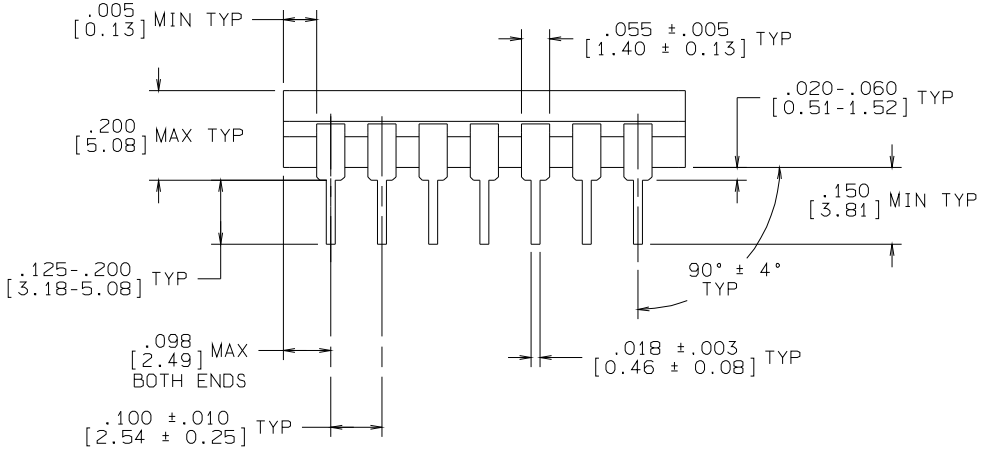
Graphics and Diagrams

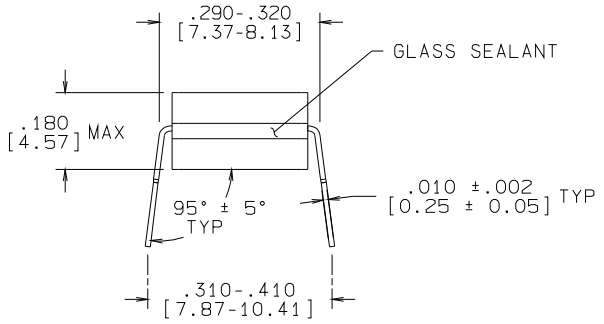
GRAPHICS#	DESCRIPTION
6307HRB1	CERDIP (J), 14 LEAD (B/I CKT)
J14ARH	CERDIP (J), 14 LEAD (P/P DWG)
P000002A	CERDIP (J), 14LD (PIN OUT)

See attached graphics following this page.

REVISIONS				
LTR	DESCRIPTION	E.C.N.	DATE	BY/APP'D
H	REVISE PER CURRENT STD; REDRAW	10001	09/15/93	TL/







MIL/AERO CONFIGURATION CONTROL

MIL-M-38510 CONFIGURATION CONTROL

CONTROLLING DIMENSION: INCH

NOTES: UNLESS OTHERWISE SPECIFIED

1. LEAD FINISH TO BE 200 MICROINCHES / 5.08 MICROMETERS MINIMUM SOLDER MEASURED AT THE CREST OF THE MAJOR FLATS.
2. JEDEC REGISTRATION MO-036, VARIATION AB, DATED 04/1981.

APPROVALS	DATE
DRAWN T. LEQUANG	09/15/93
DFTG. CHK.	
ENGR. CHK.	
APPROVAL	

PROJECTION

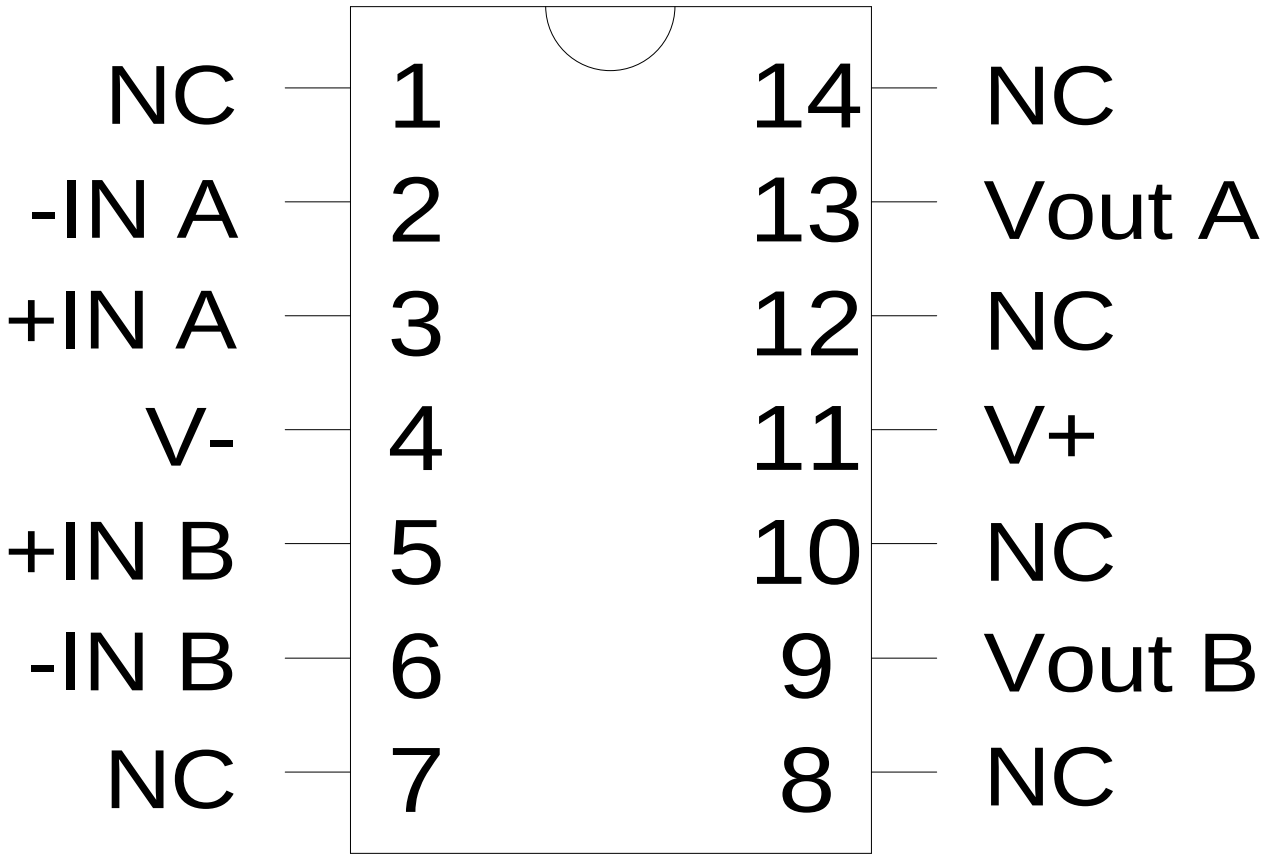
INCH [MM]

NATIONAL SEMICONDUCTOR CORPORATION
2900 Semiconductor Drive, Santa Clara, CA 95052-8090

CERDIP (J), 14 LEAD,

SCALE	SIZE	DRAWING NUMBER	REV
N/A	B	MKT-J14A	H

DO NOT SCALE DRAWING | SHEET 1 OF 1



LM6182AMJ/883
CONNECTION DIAGRAM
14 - LEAD DIP
(TOP VIEW)
P000002A