

**MNLM107-X REV 0CL**

Original Creation Date: 06/23/95

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Last Major Revision Date: 08/20/01

**OPERATIONAL AMPLIFIER**
**General Description**

The LM107 series are complete, general purpose operational amplifiers, with the necessary frequency compensation built into the chip. Advanced processing techniques make the input currents a factor of ten lower than industry standards like the 709. Yet, they are a direct, plug-in replacement for the 709, LM101A and 741.

The LM107 series offers the features of the LM101A, which makes its application nearly foolproof. In addition, the device provides better accuracy and lower noise in high impedance circuitry. The low input currents also make it particularly well suited for long interval integrators or timers, sample and hold circuits and low frequency waveform generators. Further, replacing circuits where matched transistor pairs buffer the inputs of conventional IC op amps, it can give lower offset voltage and drift at a lower cost.

The LM107 is guaranteed over a -55C to + 125C temperature range, the LM207 from -25C to +85C and the LM307 from 0C to + 70C.

**Industry Part Number**

LM107

**NS Part Numbers**

LM107H/883

**Prime Die**

LM107

**Controlling Document**

SEE FEATURES SECTION

**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**

CONTROLLING DOCUMENT:

- LM107H/883      5962-8958901GA

**(Absolute Maximum Ratings)**

(Note 1)

Supply Voltage	± 22V
Power Dissipation (Note 2, 3)	500 mW
Differential Input Voltage	± 30V
Input Voltage (Note 3)	± 15V
Output Short Circuit Duration	Continuous
Operating Temperature Range (TA)	-55 C to + 125 C
Storage Temperature Range	-65 C to +150 C
Lead Temperature (Soldering, 10 seconds)	260 C
ESD	Rating to be determined

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  $T_{jmax}$  (maximum junction temperature),  $\theta_{JA}$  (package junction to ambient thermal resistance), and  $T_A$  (ambient temperature). The maximum allowable power dissipation at any temperature is  $P_{dmax} = (T_{jmax} - T_A)/\theta_{JA}$  or the number given in the Absolute Maximum Ratings, whichever is lower.

Note 3: For supply voltages less than ±15V, the absolute maximum input voltage is equal to the supply voltage.

## Electrical Characteristics

### DC PARAMETERS

(The following conditions apply to all the following parameters, unless otherwise specified.)

DC:  $V_{cc} = \pm 20V$ ,  $V_{cm} = 0V$ ,  $R_s = 50 \text{ Ohms}$

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS		
Vio	Input Offset Voltage	$V_{cm} = \pm 15V$			-2	2	mV	1		
					-3	3	mV	2, 3		
		$V_{cc} = \pm 5V$			-2	2	mV	1		
					-3	3	mV	2, 3		
		Iio	Input Offset Current	$V_{cm} = \pm 15V$			-10	10	nA	1
							-20	20	nA	2, 3
$V_{cc} = \pm 5V$					-10	10	nA	1		
					-20	20	nA	2, 3		
$\pm I_{ib}$	Input Bias Current			$V_{cm} = \pm 15V$			1	75	nA	1
$\pm I_{ib}$	Input Bias Current			$V_{cm} = \pm 15V$			1	100	nA	2, 3
$\pm I_{ib}$	Input Bias Current				1	75	nA	1		
$\pm I_{ib}$	Input Bias Current				1	100	nA	2, 3		
$\pm I_{ib}$	Input Bias Current	$V_{cc} = \pm 5V$			1	75	nA	1		
$\pm I_{ib}$	Input Bias Current	$V_{cc} = \pm 5V$			1	100	nA	2, 3		
Icc	Supply Current					3	mA	1		
						2.5	mA	2		
						3.5	mA	3		
Ios-	Short Circuit Current				7	45	mA	1		
					5	45	mA	2		
					7	50	mA	3		
Ios+	Short Circuit Current				-45	-7	mA	1		
					-45	-5	mA	2		
					-50	-7	mA	3		

## Electrical Characteristics

### DC PARAMETERS (Continued)

(The following conditions apply to all the following parameters, unless otherwise specified.)  
DC:  $V_{cc} = \pm 20V$ ,  $V_{cm} = 0V$ ,  $R_s = 50 \text{ Ohms}$

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
PSRR+	Supply Voltage Rejection Ratio	+Vcc = 20V to 5V			80		dB	1, 2, 3
PSRR-	Supply Voltage Rejection Ratio	-Vcc = -20V to -5V			80		dB	1, 2, 3
CMRR	Common Mode rejection Ratio	-15V <= Vcm <= +15V			80		dB	1, 2, 3
Rin	Input Resistance				1.5		MOhms	1
Vir	Input Voltage Range		1		-15	+15	V	1, 2, 3
Avs-	Large Signal Voltage Gain	Vcc = $\pm 15V$ , Vout = 0 to -12V, Rl = 10K Ohms			50		V/mV	4
					25		V/mV	5, 6
		Vcc = $\pm 15V$ , Vout = 0 to -10V, Rl = 2K Ohms			50		V/mV	4
					25		V/mV	5, 6
Avs+	Large Signal Voltage Gain	Vcc = $\pm 15V$ , Vout = 0 to 12V, Rl = 10K Ohms			50		V/mV	4
					25		V/mV	5, 6
		Vcc = $\pm 15V$ , Vout = 0 to 10V, Rl = 2K Ohms			50		V/mV	4
					25		V/mV	5, 6
Vop+	Output Voltage Swing	Vcc = $\pm 15V$ , Rl = 10K Ohms			12		V	4, 5, 6
		Vcc = $\pm 15V$ , Rl = 2K Ohms			10		V	4, 5, 6
		Rl = 10K Ohms			16		V	4, 5, 6
		Rl = 2K Ohms			15		V	4, 5, 6
Vop-	Output Voltage Swing	Vcc = $\pm 15V$ , Rl = 10K Ohms				-12	V	4, 5, 6
		Vcc = $\pm 15V$ , Rl = 2K Ohms				-10	V	4, 5, 6
		Rl = 10K Ohms				-16	V	4, 5, 6
		Rl = 2K Ohms				-15	V	4, 5, 6

## Electrical Characteristics

### AC PARAMETERS

(The following conditions apply to all the following parameters, unless otherwise specified.)  
 AC:  $V_{cc} = \pm 20V$ ,  $V_{cm} = 0V$

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
Sr+	Slew Rate	$V_{in} = -5V$ to $+5V$ , $A_v=1$ , $R_l=2K$			0.2		V/uS	7
Sr-	Slew Rate	$V_{in} = +5V$ to $-5V$ , $A_v=1$ , $R_l=2K$			0.2		V/uS	7
Gbw	Gain Bandwidth	$V_{in} = 50mV_{rms}$ , $f = 20Khz$ , $R_l=2K\Omega$			250		Khz	7

Note 1: Guaranteed by CMRR.

### Graphics and Diagrams

GRAPHICS#	DESCRIPTION
09413HR	(blank)
MKT-H08CRE	(blank)
MKT-J08ARL	(blank)

See attached graphics following this page.

**Revision History**

Rev	ECN #	Rel Date	Originator	Changes
0CL	M0004057	09/04/02	Rose Malone	Update MDS: MNLM107-X, Rev. 0BL to MNLM107-X, Rev. 1CL. Deleted from Main Table reference to NSID's LM107J-14/883 and LM107J/883. NSID's no longer avtive.