National Semiconductor

MICROCIRCUIT DATA SHEET

MNLM611AM-X REV 0BL

Original Creation Date: 08/02/95
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OPERATIONAL AMPLIFIER AND ADJUSTABLE REFERENCE

Industry Part Number

LM611

NS Part Numbers

LM611AMJ/883

Prime Die

LM611

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

Electrical Characteristics

DC PARAMETERS

(The following conditions apply to all the following parameters, unless otherwise specified.)
DC: V-=Gnd=0V, V+=5V, Vcm=Vout=V+/2, Ir = 100uA Feedback Pin Shorted to Gnd

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
Icc	Total Supply Current	Rload = Infinity, 4V <= V+ <= 36V				300	uA	1
						320	uA	2, 3
Vs	Supply Voltage Range				2.8	36	V	1
					3.0	36	V	2, 3

DC PARAMETERS: Operational Amplifier

(The following conditions apply to all the following parameters, unless otherwise specified.)
DC: V-=Gnd=0V, V+=5V, Vcm=Vout=V+/2, Ir = 100uA Feedback Pin Shorted to Gnd

Vio1	Offset Voltage Over V+ Range	4V <= V+ <= 36V			-3.5	3.5	mV	1
					-6.0	6.0	mV	2, 3
Vio2	Offset Voltage Over Vcm Range	Vcm=0V through Vcm=(V+ -1.4V) Room, (V+ -1.8V) Hot and Cold.			-3.5	3.5	mV	1
					-6.0	6.0	mV	2, 3
Iib	Input bias Current				-25	25	nA	1
					-30	30	nA	2, 3
Iio	Input Offset Current				-4	4	nA	1
					-5	5	nA	2, 3
CMRR	Common-Mode Rejection Ratio	V+=30V, 0V <= Vcm <= 1.4V(Room) and <= Vcm <=1.8V(Over Temp) CMRR = 20log(Delta Vcm/Delta Vio)			80		dB	1
					75		dB	2, 3
PSRR	Power Supply Rejection Ratio	4V <= V+ <= 30V, Vcm = V+/2 PSRR=20log (Delta V+/Delta Vio)			80		dB	1
					75		dB	2, 3
Iout	Output Source Current	Vout=V+ -2.5V, V+in = 0V, V-in = -0.3V				-20	mA	1
						-13	mA	2, 3
Isink	Output Sink Current	Vout=1.6V, V+in = 0V, V-in = 0.3V			14		mA	1
					8		mA	2, 3
Ishort	Short Circuit Current	Vout=0V, V+in = 3V, V-in = 2V, Source				50	mA	1
						60	mA	2, 3
		Vout=5V, V+in = 2V, V-in = 3V, Sink				60	mA	1
						80	mA	2, 3

Electrical Characteristics

DC PARAMETERS: Voltage Reference

(The following conditions apply to all the following parameters, unless otherwise specified.)
DC: V-=Gnd=0V, V+=5V, Vcm=Vout=V+/2, Ir = 100uA Feedback Pin Shorted to Gnd

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
Vr	Voltage Reference		1		1.2365	1.2515	V	1
Delta Vr/Delta Ir	Vr Change with Current	Vr(100uA) - Vr(17uA)			-1	1	mV	1
					-1.1	1.1	mV	2, 3
		Vr(10mA) - Vr(100uA)	2		-5	5	mV	1
			2		-5.5	5.5	mV	2, 3
R	Resistance	Delta Vr(10mA to 100uA)/9.9mA	3			0.51	Ohms	1
			3			0.56	Ohms	2, 3
		Delta Vr(100uA to 17uA)/83uA	3			12	Ohms	1
			3			13	Ohms	2, 3
Delta Vr/Delta Vro	Vr Change with High Vro	Vr(Vro=Vr)-Vr(Vro=6.3V) (5.06V between Anode and FEEDBACK)				7	mV	1
						10	mV	2, 3
Delta Vr/Delta V+	Vr Change with V+ Change	Vr(V+=5V)-Vr(V+=36V)			-1.2	1.2	mV	1
					-1.3	1.3	mV	2, 3
		Vr(V+=5V)-Vr(V+=3V)			-1	1	mV	1
					-1.5	1.5	mV	2, 3
Delta Vr/DeltaVanode	Vr Change with Vanode Change	V+= V+max, Delta Vr=Vr(at Vanode=V-=Gnd) -Vr(at Vanode=V+ -1.0V)				1.5	mV	1
						3.0	mV	2, 3
Ib(If)	FEEDBACK Bias Current	Ifb; Vanode <= Vfb <= 5.06V				35	nA	1
						40	nA	2, 3

DC PARAMETERS: Operational Amplifiers

(The following conditions apply to all the following parameters, unless otherwise specified.)
DC: V-=Gnd=0V, V+=5V, Vcm=Vout=V+/2, Ir = 100uA Feedback Pin Shorted to Gnd

Av	Open Loop Voltage Gain	Rl=10KOhms, V+=30V, 5V <= Vout <= 25V			100		V/mV	4
					40		V/mV	5, 6
Vo1	Output Voltage Swing High	Rl = 10K Ohms, V+ = 36V			V+-1.7		V	4
					v+-1.9		V	5, 6
Vo2	Output Voltage Swing Low	Rl = 10K Ohms to V+, V+ = 36V				V-+0.9	V	4
						V-+1.0	V	5, 6

Electrical Characteristics

AC PARAMETERS

(The following conditions apply to all the following parameters, unless otherwise specified.)
AC: V-=Gnd=0V, V+=5V, Vcm=Vout=V+/2, Ir = 100uA Feedback Pin Shorted to Gnd

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
Sr	Slew Rate	V+ = 30V	4		0.55		V/uS	7
			4		0.45		V/uS	8A, 8B

Note 1: Vro is the reference output voltage, which may be set for 1.2V to 6.3V. Vr is the Vro-to Feedback voltage (nominally 1.244V).
Note 2: Low contact resistance is required for accurate measurement.
Note 3: Guaranteed by Vr change with current.
Note 4: Slew rat is measured with the op amp in a voltage follower configuration. For rising slew rate, the input voltage is driven from 5V to 25V, and the output voltage transition is sampled at 10V and 20V. For falling slew rate, the input voltage is driven from 25V to 5V, and the output voltage transition is sampled at 20V and 10V.

Revision History

Rev	ECN #	Rel Date	Originator	Changes
0BL	M0001697	11/12/98	Barbara Lopez	Changed: MNLM611AM-X Rev. 0AL to MNLM611AM-X Rev. 0BL.