National Semiconductor

MICROCIRCUIT DATA SHEET

MNLM131A-X REV 0BL

Original Creation Date: 07/07/95
Last Update Date: 10/23/97
Last Major Revision Date: 07/07/95

PRECISION VOLTAGE-TO-FREQUENCY CONVERTERS

Industry Part Number

LM131

NS Part Numbers

LM131AH/883

Prime Die

LM131

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: 4V ≤ Vcc ≤ 40V

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
Vio	Input Comparator Offset Voltage	Vcc = 5V			-10	10	mV	1, 2, 3
Iio	Input Comparator Offset Current	Vcc = 5V			-100	100	nA	1
					-150	150	nA	2, 3
Iib	Input Comparator Bias Current	Vcc = 5V			-300		nA	1
					-500		nA	2, 3
Vcm	Common Mode Voltage Range		4		-.2	Vcc-2	V	1, 2, 3
Vth	Timer Threshold Voltage Pin 5		4		63	70	%ofVcc	1
Iib	Timer Input Bias Current, Pin 5	Vcc = 5V, Vpin 5 ≤ 3V			-.1	.1	uA	1
		Vcc = 5V, Vpin 5 ≤ 3V			-.2	.2	uA	2, 3
		Vcc = 5V, Vpin 5 ≤ 3.7V				.5	uA	1
		Vcc = 5V, Vpin 5 ≤ 3.7V				2	uA	2, 3
Vsat	Pin 5 Saturation Voltage	Vcc = 5V, Ipin 5 = 5mA				.5	V	1, 2, 3
Iout	Output Current, Pin 1	Vcc = 5V, Vpin 1 = 0V, Rs=13.6K Ohms			-126	-144	uA	1
					-132	-146	uA	2, 3
		Vcc = 40V, Vpin 1 = 0V, Rs=13.6K Ohms			-126	-144	uA	1
					-132	-146	uA	2, 3
Delta Iout	Output Current Change	Vcc = 40V				1	uA	1
						1.5	uA	2, 3
Ioff	Off State Output Leakage	Vcc = 5V			-6	6	nA	1
					-50	50	nA	2, 3
		Vcc = 40V			-6	6	nA	1
					-50	50	nA	2, 3
Vref	Reference Voltage, Pin 2	Vcc = 5V			1.76	2.02	V	1, 2, 3
		Vcc = 40V			1.76	2.02	V	1, 2, 3
Vsat	Frequency Output Saturation Voltage	Vcc = 5V, Ipin 3 = 5mA				.5	V	1, 2, 3
		Ipin 3 = 3.2mA	4			.4	V	1, 2, 3

Electrical Characteristics

DC PARAMETERS(Continued)

(The following conditions apply to all the following parameters, unless otherwise specified.)
DC: 4V ≤ Vcc ≤ 40V

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
Ioff	Off State Output Leakage, Pin 3	Vcc = 5V				1	uA	1
						1.2	uA	2, 3
		Vcc = 40V				1	uA	1
						1.2	uA	2, 3
Icc	Power Supply Current	Vcc = 5V			2	4	mA	1
					1.8	5.2	mA	2, 3
		Vcc = 40V			2.5	6	mA	1
					1.5	7	mA	2, 3

AC PARAMETERS

	VFC Non-Linearity	Vcc = 15V, 5.5V ≤ Vin ≤ 11V	2, 3, 5		-0.1	.01	% FS	4
		Vcc = 15V, 5.5V ≤ Vin ≤ 11V	2, 3, 5		-0.2	.02	% FS	5, 6
		Vcc = 15V, f = 10Hz to 11KHz	1, 5		-.14	.14	% FS	4
Av	Conversion Accuracy Scale Factor	Vcc = 15V, Vin=-10V, Rs=14K Ohms	5		.95	1.05	KHz/V	4
			5		.945	1.055	KHz/V	5, 6
TcAv	Temperature Stability of Gain	Vcc = 15V, Vin=-10V, Rs=14K Ohms	5		-50	50	ppm/C	4, 5, 6
Delta Av	Change of Gain With Vcc	15V ≤ Vcc ≤ 20V	5		-.06	.06	%/V	4
Pfs	Rated Full Scale Frequency	Vcc = 15V, Vin = -10V	1, 5		10		KHz	4
Delta Pfs	Overrange Frequency	Vcc = 15V, Vin = -11V	1, 5		10		%	4

Note 1: Parameter tested go-no-go only.
Note 2: Tested at 25 C, guaranteed but not tested at +125C and -55C.
Note 3: Non-linearity is defined as the deviation of fOUT from Vin X (10KHz/-10Vdc) when the circuit has been trimmed for zero error at 10Hz and 10KHz, over the frequency range 10Hz to 11KHz. For the timing capacitor (CT) use NOP ceramic, Teflon TM or Polystyrene TM.
Note 4: Guaranteed parameter, not tested.
Note 5: Bench tested per RPI-3-295.

Revision History

Rev	ECN #	Rel Date	Originator	Changes
0BL	M0002522	10/23/97	Barbara Lopez	Update MDS: MNLM131A-X Rev. 0AL to MNLM131A-X Rev. 0BL for Lifetime Buy.