National Semiconductor

MICROCIRCUIT DATA SHEET

MNLM555-X REV 0B0

Original Creation Date: 08/02/95
Last Update Date: 02/17/97
Last Major Revision Date: 08/02/95

PRECISION TIMER

General Description

The LM555 is a highly stable device for generating accurate time delays or oscillation. Additional terminals are provided for triggering or resetting if desired. In the time delay mode of operation, the time is precisely controlled by one external resistor and capacitor. For astable operation as an oscillator, the free running frequency and duty cycle are accurately controlled with two external resistors and one capacitor. The circuit may be triggered and reset on falling waveforms, and the output circuit can source or sink up to 200mA or drive TTL circuits.

Industry Part Number

LM555

NS Part Numbers

LM555H/883
LM555J/883

Prime Die

LM555

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

- Direct replacement for SE555/NE555
- Timing from microseconds through hours
- Operates in both astable and monostable modes
- Adjustable duty cycle
- Output can source or sink 200mA
- Output and supply TTL compatible
- Temperature stability better than 0.005% per degrees C
- Normally on and normally off output

Applications

- Precision timing
- Pulse generation
- Sequential timing
- Time delay generation
- Pulse width modulation
- Pulse position modulation
- Linear ramp generator

(Absolute Maximum Ratings)

(Note 1)

Supply Voltage		+18V
Power Dissipation (Note 2)		
LM555H		760 mW
LM555J		1180mW
Operating Temperature Range		-55 C to +125 C
Maximum Junction Temperature		150 C
Storage Temperature Range		-65 C to +150 C
Soldering Information		
Dual-In-Line Package		
(Soldering, 10 seconds)		260 C
Thermal Resistance		
ThetaJA		
CERDIP	(Still Air)	125 C/W
	(500LF/Min Air flow)	71 C/W
METAL CAN	(Still Air)	176 C/W
	(500LF/Min Air flow)	96 C/W
ThetaJC		
CERDIP		20 C/W
METAL CAN		42 C/W
ESD Tolerance (Note 3)		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: Human body model, 1.5K Ohms in series with 100pF.

Electrical Characteristics

DC PARAMETERS

(The following conditions apply to all the following parameters, unless otherwise specified.)
DC: +5V <= Vcc <= +15V

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
IccL	Supply Current Low State	Vcc = 5V, RL = Infinity				5.0	mA	1
		Vcc = 15V, RL = Infinity				12.0	mA	1
		Vcc = 18V, RL = Infinity, V2 = V6 = 18V				18.5	mA	1
IL7	Leakage Current Pin 7	Vcc = 18V, V7 = 18V, V2 = V6 = 0				100	nA	1
Vsat	Saturation Voltage Pin 7	Vcc = 15V, I7 = 15mA, V2=V6=12V				240	mV	1
		Vcc = 4.5V, I7 = 4.5mA				80	mV	1
Vco	Control Voltage	Vcc = 5V, V2 = V6 = 4V			2.9	3.8	V	1, 2, 3
		Vcc = 15V, V2 = V6 = 12V			9.6	10.4	V	1, 2, 3
Vth	Threshold Voltage				9.5	10.5	V	1
Ith	Threshold Current	V6 = VTH, V2 = 7.5V, VTH = T17 Reading				250	nA	1
ITRIG	Trigger Current	V2 = 0				500	nA	1
VTRIG	Trigger Voltage	Vcc = 15V			4.8	5.2	V	1
					3.0	6.0	V	2, 3
		Vcc = 5V	1		1.45	1.9	V	1, 2, 3
Ireset	Reset Current	V2 = V6 = GND				0.4	mA	1
Vreset	Reset Voltage				0.4	1.0	V	1
Vol	Output Voltage Drop Low	Vcc = 5V, Isink = +8mA, V7=5V, V6=5V				250	mV	1, 2, 3
		Vcc = 15V, Isink = +10mA, V2=V6=15V				150	mV	1
						250	mV	2, 3
		Vcc = 15V, Isink = +50mA, V2=V6=15V				500	mV	1
						800	mV	2, 3
		Vcc = 15V, Isink = +85mA, V2=V6=15V				2.2	V	1, 2, 3
Voh	Output Voltage Drop High	Vcc = 15V, Isource = 85mA			13		V	1
					12.75		V	2, 3
		Vcc = 5V, Isource = 85mA			3		V	1
					2.75		V	2, 3

Electrical Characteristics

DC PARAMETERS(Continued)

(The following conditions apply to all the following parameters, unless otherwise specified.)
DC: +5V <= Vcc <= +15V

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
AFREQ	A Stable Frequency		2		45	51	KHz	1
Et	Timing Error	Vcc = 5V	2			±2	%	1, 2, 3
		Vcc = 15V, 1K<=RA<=100K, (Timing error decreases with an increase in Vcc)	2			±2	%	1, 2, 3
Delta Et/ Delta Vcc	Timing Drift with Supply	5V <= Vcc <= 15V	2			0.2	%/V	1, 2, 3

AC PARAMETERS

(The following conditions apply to all the following parameters, unless otherwise specified.)
AC: +5V <= Vcc <= +15V

tR	Rise Time	VTRIG = 5V	2			250	nS	9, 10
			2			400	nS	11
tF	Fall Time	VTRIG = 5V	2			250	nS	9, 10
			2			400	nS	11

DC PARAMETERS: DRIFT VALUES

(The following conditions apply to all the following parameters, unless otherwise specified.)
DC: +5V <= Vcc <= +15V. "Delta not required on B-Level product. Deltas required for S-Level product ONLY as specified on Internal Processing Instructions (IPI)".

Vco	Control Voltage	Vcc = 5V, V2=V6=4V			-0.1	0.1	V	1
		Vcc = 15V, V2=V6=12V			-0.1	0.1	V	1
Vol	Output Voltage Drop Low	Vcc = 15V, Isink = +10mA, V2=V6=15V			-50	50	mV	1
		Vcc = 15V, Isink = +50mA, V2=V6=15V			-50	50	mV	1
Voh	Output Voltage Drop High	Vcc = 15V, Isource = 85mA			-0.26	0.26	V	1

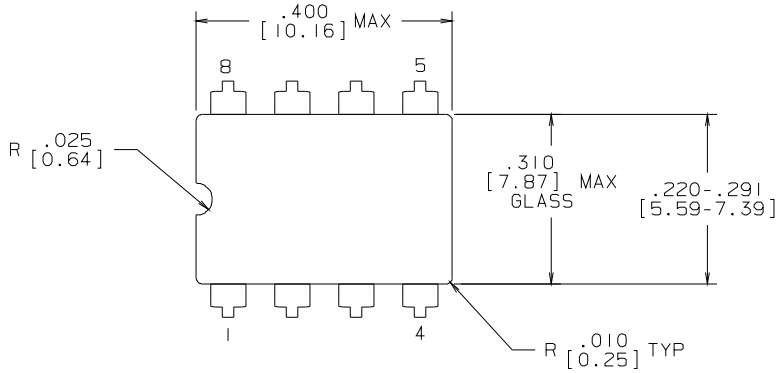
Note 1: Guaranteed by tests at Vcc = 15V.
Note 2: Guaranteed parameter , Not tested.

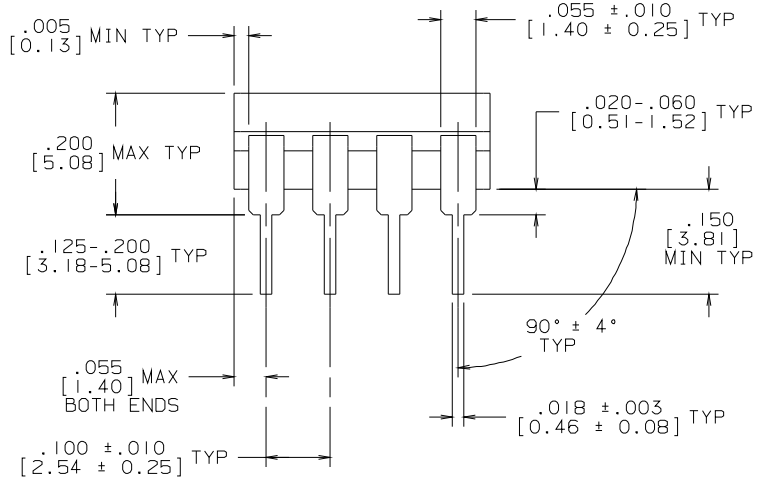
Graphics and Diagrams

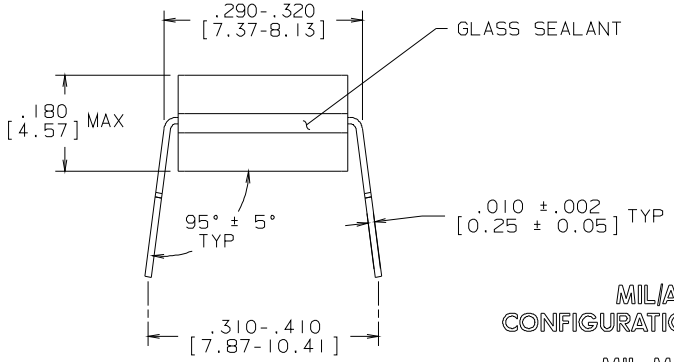
GRAPHICS#	DESCRIPTION
H08CRE	(blank)
J08ARL	CERDIP (J), 8 LEAD (P/P DWG)

See attached graphics following this page.

REVISIONS				
LTR	DESCRIPTION	E.C.N.	DATE	BY/APP'D
L	REVISE PER CURRENT STD; REDRAW	10002	09/21/93	TL/







MIL/AERO
CONFIGURATION CONTROL

MIL-M-38510
CONFIGURATION CONTROL

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 AA, DATED 04/1981.

CONTROLLING DIMENSION: INCH

APPROVALS	DATE
DRAWN T. LEQUANG	09/21/93
DFTG. CHK.	
ENGR. CHK.	
APPROVAL	

PROJECTION

INCH
[MM]

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

CERDIP (J), 8 LEAD

SCALE	SIZE	DRAWING NUMBER	REV
N/A	B	MKT-J08A	L

DO NOT SCALE DRAWING | SHEET 1 OF 1