

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 (°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 T_{jmax} (maximum junction temperature), Θ_{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: 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 ≤ V_{CC} ≤ +15V

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
I _{ccL}	Supply Current Low State	V _{CC} = 5V, R _L = Infinity				5.0	mA	1
		V _{CC} = 15V, R _L = Infinity				12.0	mA	1
		V _{CC} = 18V, R _L = Infinity, V ₂ = V ₆ = 18V				18.5	mA	1
I _{L7}	Leakage Current Pin 7	V _{CC} = 18V, V ₇ = 18V, V ₂ = V ₆ = 0				100	nA	1
V _{sat}	Saturation Voltage Pin 7	V _{CC} = 15V, I ₇ = 15mA, V ₂ =V ₆ =12V				240	mV	1
		V _{CC} = 4.5V, I ₇ = 4.5mA				80	mV	1
V _{co}	Control Voltage	V _{CC} = 5V, V ₂ = V ₆ = 4V			2.9	3.8	V	1, 2, 3
		V _{CC} = 15V, V ₂ = V ₆ = 12V			9.6	10.4	V	1, 2, 3
V _{th}	Threshold Voltage				9.5	10.5	V	1
I _{th}	Threshold Current	V ₆ = V _{TH} , V ₂ = 7.5V, V _{TH} = T17 Reading				250	nA	1
I _{TRIG}	Trigger Current	V ₂ = 0				500	nA	1
V _{TRIG}	Trigger Voltage	V _{CC} = 15V			4.8	5.2	V	1
					3.0	6.0	V	2, 3
		V _{CC} = 5V	1		1.45	1.9	V	1, 2, 3
I _{reset}	Reset Current	V ₂ = V ₆ = GND				0.4	mA	1
V _{reset}	Reset Voltage				0.4	1.0	V	1
V _{ol}	Output Voltage Drop Low	V _{CC} = 5V, I _{sink} = +8mA, V ₇ =5V, V ₆ =5V				250	mV	1, 2, 3
		V _{CC} = 15V, I _{sink} = +10mA, V ₂ =V ₆ =15V				150	mV	1
						250	mV	2, 3
		V _{CC} = 15V, I _{sink} = +50mA, V ₂ =V ₆ =15V				500	mV	1
						800	mV	2, 3
		V _{CC} = 15V, I _{sink} = +85mA, V ₂ =V ₆ =15V				2.2	V	1, 2, 3
V _{oh}	Output Voltage Drop High	V _{CC} = 15V, I _{source} = 85mA			13		V	1
					12.75		V	2, 3
		V _{CC} = 5V, I _{source} = 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 ≤ V_{CC} ≤ +15V

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

AC PARAMETERS

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

AC: +5V ≤ V_{CC} ≤ +15V

t _R	Rise Time	V _{TRIG} = 5V	2			250	nS	9, 10
			2			400	nS	11
t _F	Fall Time	V _{TRIG} = 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 ≤ V_{CC} ≤ +15V. "Delta not required on B-Level product. Deltas required for S-Level product ONLY as specified on Internal Processing Instructions (IPI)".

V _{CO}	Control Voltage	V _{CC} = 5V, V ₂ =V ₆ =4V			-0.1	0.1	V	1
		V _{CC} = 15V, V ₂ =V ₆ =12V			-0.1	0.1	V	1
V _{OL}	Output Voltage Drop Low	V _{CC} = 15V, I _{sink} = +10mA, V ₂ =V ₆ =15V			-50	50	mV	1
		V _{CC} = 15V, I _{sink} = +50mA, V ₂ =V ₆ =15V			-50	50	mV	1
V _{OH}	Output Voltage Drop High	V _{CC} = 15V, I _{source} = 85mA			-0.26	0.26	V	1

Note 1: Guaranteed by tests at V_{CC} = 15V.

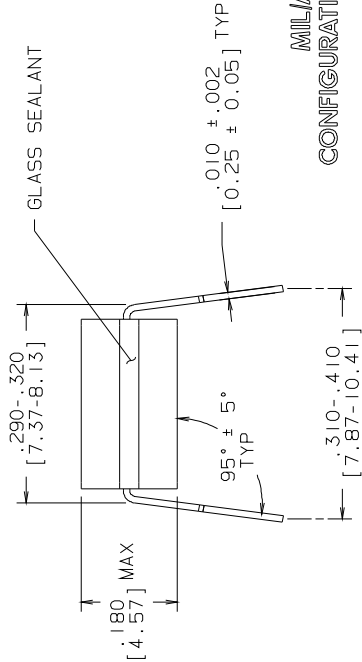
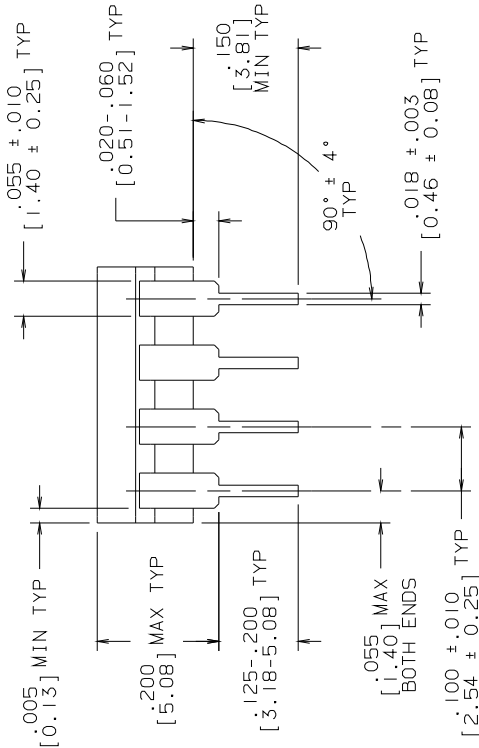
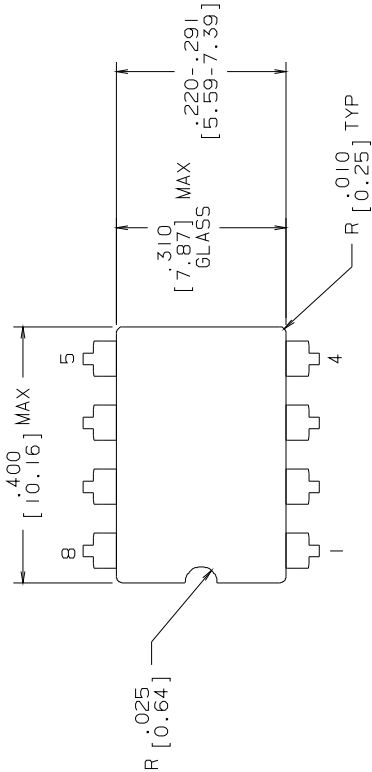
Note 2: Guaranteed parameter, Not tested.

Graphics and Diagrams

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

See attached graphics following this page.

R E V I S I O N S				
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

CONTROLLING DIMENSION: INCH				
APPROVALS	DATE	NATIONAL SEMICONDUCTOR CORPORATION		
DRAWN LEQUANG	09/21/93	2900 Semiconductor Drive, Santa Clara, CA 95052-8090		
DFTG. CHK.		CERDIP (J) ,		
ENGR. CHK.		8 LEAD		
APPROVAL				
 INCH [MM]	PROJECTION	SCALE	SIZE	DRAWING NUMBER
		N/A	B	MKT-J08A
DO NOT SCALE DRAWING		SHEET	1	OF 1
		REV	L	

- NOTES: UNLESS OTHERWISE SPECIFIED
1. LEAD FINISH TO BE 200 MICRONS / 5.08 MICROMETERS MINIMUM SOLDER MEASURED AT THE CREST OF THE MAJOR FLATS.
 2. JEDEC REGISTRATION MO-036, VARIATION AA, DATED 04/1981.