NTE ELECTRONICS, INC.
44 FARRAND STREET
BLOOMFIELD, NJ 07003
(973) 748–5089

NTE978/NTE978C/NTE978SM
Integrated Circuit
Dual Timer

Description:

The NTE978 series dual timing circuit is a highly stable controller capable of producing accurate time delays or oscillation. The NTE978 is a dual NTE955. Timing is provided by an external resistor and capacitor for each timing function. The two timers operate independently of each other sharing only V_{CC} and GND. The circuits may be triggered and reset on falling waveforms. The output structures may sink or source 200mA.

Features:

- Direct Replacement for 556 Timers
- Replaces Two 555 Timers
- 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 °C
- Normally On and Normally Off Output
- Available in Three Types:

NTE978	14–Lead DIP
NTE978C	14–Lead DIP (CMOS)
NTE978SM	SOIC–14 (Surface Mount)

Applications:

- Precision Timing
- Pulse Generation
- Sequential Timing
- Time Delay Generation
- Pulse Width Modulation
- Pulse Position Modulation
- Linear Ramp Generator

Absolute Maximum Ratings:

Supply Voltage, V_{CC} . . . . +18V
Power Dissipation (Note 1), P_D 1620mW
Operating Temperature Range, T_A . . . . 0° to +70°C
Storage Temperature Range, T_{stg} . . . . –65° to +150°C
Lead Temperature (During Soldering, 10sec Max), T_L . . . . +260°C

Note 1. For operating at elevated temperaturesthe device must be derated based on a +150°C maximum junction temperature and a thermal resistance of +77°C/W for NTE978 and NTE978C and +110°C/W for NTE978SM.

Electrical Characteristics: (T_A = +25°C, V_{CC} = +5V to +15V, unless otherwise specified)

Parameter	Symbol	Test Conditions		Min	Typ	Max	Unit
Supply Voltage	V_{CC}			4.5	–	16	V
Supply Current (Each Timer Section)	I_{CC}	Low State, Note 2	V_{CC} = 5V, $R_L = \infty$	–	3	6	mA
			V_{CC} = 15V, $R_L = \infty$	–	10	14	mA
Timing Error, Monostable Initial Accuracy		R_A = 1k to 100kΩ, C = 0.1µF, Note 3		–	0.75	–	%
Drift with Temperature				–	50	–	ppm/°C
Accuracy over Temperature				–	1.5	–	%
Drift with Supply				–	0.1	–	%/V
Timing Error, Astable Initial Accuracy		R_A, R_B = 1k to 100kΩ, C = 0.1µF, Note 3		–	2.25	–	%
Drift with Temperature				–	150	–	ppm/°C
Accuracy over Temperature				–	3.0	–	%
Drift with Supply				–	0.30	–	%/V
Trigger Voltage	V_T	V_{CC} = 15V		4.5	5.0	5.5	V
		V_{CC} = 5V		1.25	1.67	2.0	V
Trigger Current	I_T			–	0.2	1.0	µA
Reset Voltage	V_R	Note 4		0.4	0.5	1.0	V
Reset Current	I_R			–	0.1	0.6	mA
Threshold Current	I_{TH}	V_{TH} = V–Control, Note 5		–	0.03	0.1	µA
		V_{TH} = 11.2V		–	–	250	nA
Control Voltage Level and Threshold Voltage	V_{CL} V_{TH}	V_{CC} = 15V		9	10	11	V
		V_{CC} = 5V		2.6	3.33	4.0	V
Pin1, Pin13 Leakage Output High	I_{dis}			–	1	100	nA
Pin1, Pin13 Saturation Output Low		Note 6	V_{CC} = 15V, I = 15mA	–	180	300	mV
			V_{CC} = 4.5V, I = 4.5mA	–	80	200	mV
Output Voltage Drop (Low)	V_{OL}	V_{CC} = 15V	I_{SINK} = 10mA	–	0.1	0.25	V
			I_{SINK} = 50mA	–	0.4	0.75	V
			I_{SINK} = 100mA	–	2.0	2.75	V
			I_{SINK} = 200mA	–	2.5	–	V
		V_{CC} = 5V	I_{SINK} = 5mA	–	0.25	0.35	V
Output Voltage Drop (High)	V_{OH}	V_{CC} = 15V	I_{SOURCE} = 200mA	–	12.5	–	V
			I_{SOURCE} = 100mA	12.75	13.3	–	V
		V_{CC} = 5V		2.75	3.3	–	V
Rise Time of Output	t_{OLH}			–	100	–	ns
Fall Time of Output	t_{OHL}			–	100	–	ns
Matching Characteristics Initial Timing Accuracy		Note 7		–	0.1	2.0	%
Timing Druft with Temperature				–	±10	–	ppm/°C
Drift with Supply Voltage				–	0.2	0.5	%/V

Note 2. Supply current when output high typically 1mA less at V_{CC} = 5V.

Note 3. Tested at V_{CC} = 5V and V_{CC} = 15V.

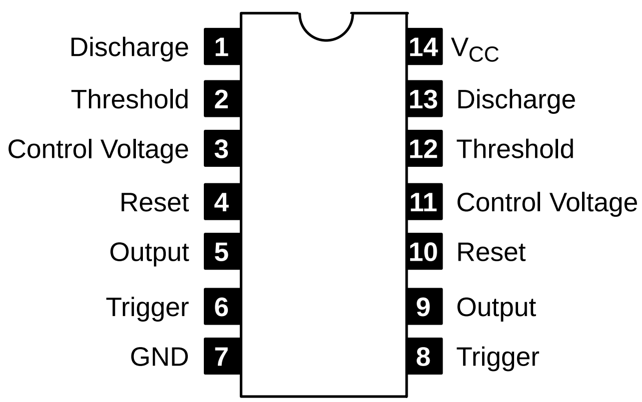
Note 4. As reset voltage lowers, timing is inhibited and then the output goes low.

Note 5. This will determine the maximum value of $R_A + R_B$ for 15V operation. The maximum total ($R_A + R_B$) is 20MΩ.

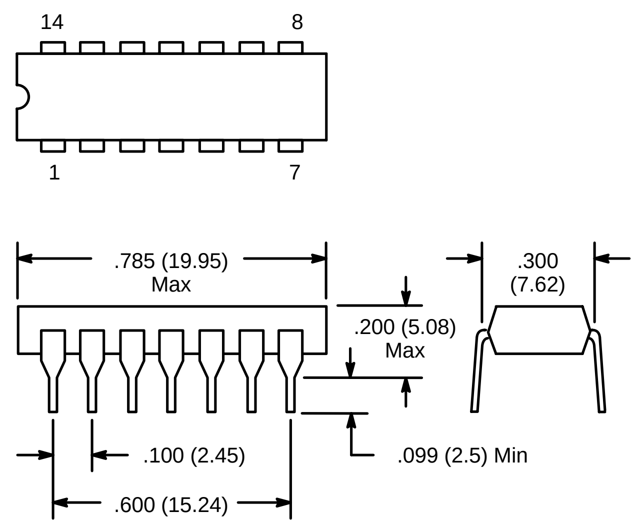
Note 6. No protection against excessive Pin1, Pin13 current is necessary providing the package dissipation rating will not be exceeded.

Note 7. Matching characteristics refer to, the difference between performance characteristics of each timer section.

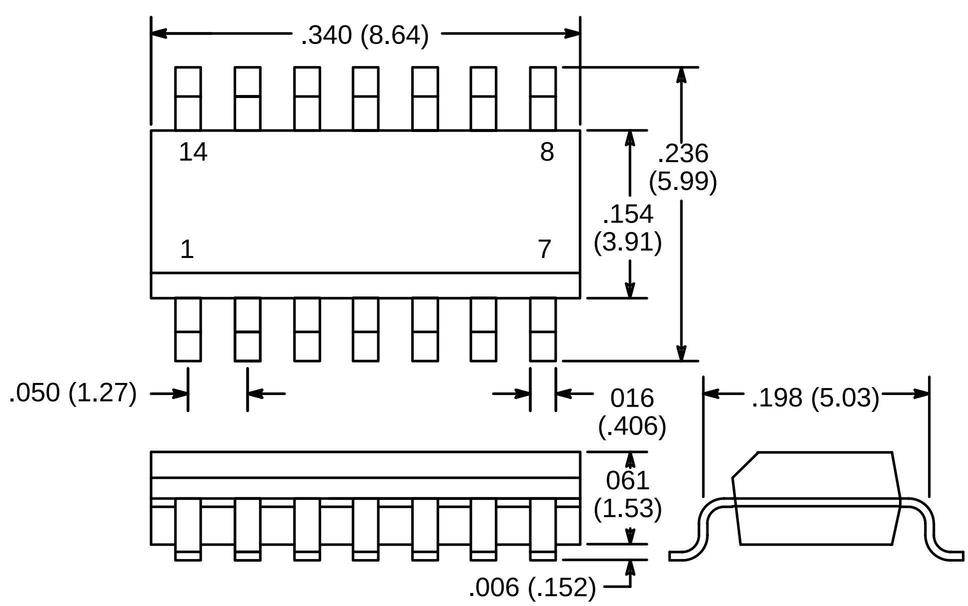
Pin Connection Diagram



NTE978, NTE978C



NTE978SM



NOTE: Pin1 on Beveled Edge