

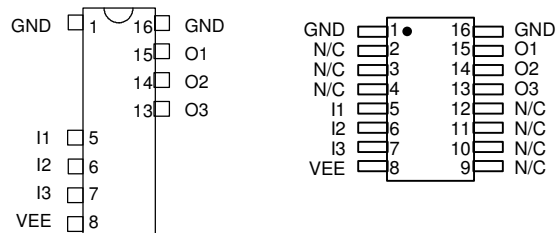
# TRIPLE, ECL-INTERFACED FIXED DELAY LINE (SERIES MDU13H)



## FEATURES

- Three independent delay lines
- Fits standard 16-pin DIP socket
- Auto-insertable
- Input & outputs fully 10KH-ECL interfaced & buffered

## PACKAGES



MDU13H-xx DIP      MDU13H-xxC3 SMD  
MDU13H-xxM Military DIP      MDU13H-xxMC3 Mil SMD

## FUNCTIONAL DESCRIPTION

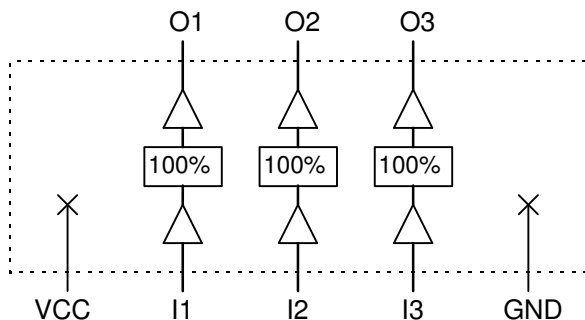
The MDU13H-series device is a 3-in-1 digitally buffered delay line. The signal inputs (I1-I3) are reproduced at the outputs (O1-O3), shifted in time by an amount determined by the device dash number (See Table). The delay lines function completely independently of each other.

## PIN DESCRIPTIONS

I1-I3      Signal Inputs  
O1-O3      Signal Outputs  
VEE      -5 Volts  
GND      Ground

## SERIES SPECIFICATIONS

- **Minimum input pulse width:** 50% of total delay
- **Output rise time:** 2ns typical
- **Supply voltage:** -5VDC  $\pm$  5%
- **Power dissipation:** 200mw typical (no load)
- **Operating temperature:** -30° to 85° C
- **Temp. coefficient of total delay:** 100 PPM/°C



Functional block diagram

## DASH NUMBER SPECIFICATIONS

| Part Number | Delay Per Line (ns) |
|-------------|---------------------|
| MDU13H-3    | 3 $\pm$ 1.0         |
| MDU13H-4    | 4 $\pm$ 1.0         |
| MDU13H-5    | 5 $\pm$ 1.0         |
| MDU13H-10   | 10 $\pm$ 1.0        |
| MDU13H-15   | 15 $\pm$ 1.0        |
| MDU13H-20   | 20 $\pm$ 1.0        |
| MDU13H-25   | 25 $\pm$ 2.0        |
| MDU13H-30   | 30 $\pm$ 2.0        |
| MDU13H-35   | 35 $\pm$ 2.0        |
| MDU13H-40   | 40 $\pm$ 2.0        |
| MDU13H-45   | 45 $\pm$ 2.2        |
| MDU13H-50   | 50 $\pm$ 2.5        |

\* Total delay is referenced to first tap output  
Input to first tap = 1.5ns  $\pm$  1ns

NOTE: Any dash number between 3 and 50 not shown is also available.

## APPLICATION NOTES

### HIGH FREQUENCY RESPONSE

The MDU13H tolerances are guaranteed for input pulse widths and periods greater than those specified in the test conditions. Although the device will function properly for pulse widths as small as 50% of the total delay and periods as small as 100% of the total delay (for a symmetric input), the delays may deviate from their values at low frequency. However, for a given input condition, the deviation will be repeatable from pulse to pulse. Contact technical support at Data

Delay Devices if your application requires device testing at a specific input condition.

### POWER SUPPLY BYPASSING

The MDU13H relies on a stable power supply to produce repeatable delays within the stated tolerances. A 0.1 $\mu$ f capacitor from VEE to GND, located as close as possible to the VEE pin, is recommended. A wide VEE trace and a clean ground plane should be used.

## DEVICE SPECIFICATIONS

**TABLE 1: ABSOLUTE MAXIMUM RATINGS**

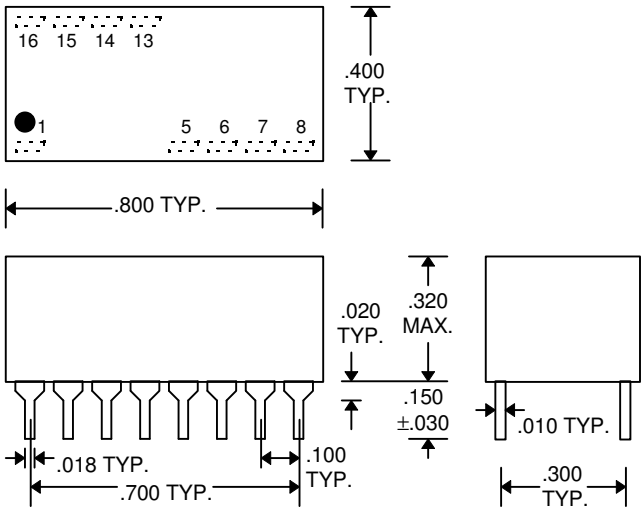
| PARAMETER           | SYMBOL            | MIN                   | MAX | UNITS | NOTES  |
|---------------------|-------------------|-----------------------|-----|-------|--------|
| DC Supply Voltage   | V <sub>EE</sub>   | -7.0                  | 0.3 | V     |        |
| Input Pin Voltage   | V <sub>IN</sub>   | V <sub>EE</sub> - 0.3 | 0.3 | V     |        |
| Storage Temperature | T <sub>STRG</sub> | -55                   | 150 | C     |        |
| Lead Temperature    | T <sub>LEAD</sub> |                       | 300 | C     | 10 sec |

**TABLE 2: DC ELECTRICAL CHARACTERISTICS**

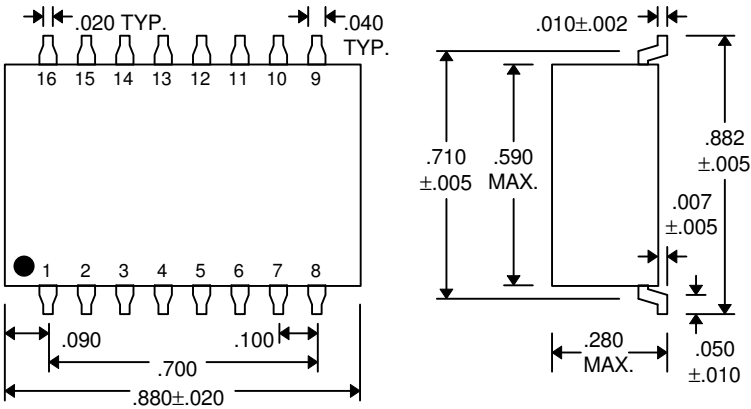
(0C to 75C)

| PARAMETER                 | SYMBOL          | MIN    | TYP | MAX    | UNITS   | NOTES                                     |
|---------------------------|-----------------|--------|-----|--------|---------|-------------------------------------------|
| High Level Output Voltage | V <sub>OH</sub> | -1.020 |     | -0.735 | V       | V <sub>IH</sub> = MAX, 50 $\Omega$ to -2V |
| Low Level Output Voltage  | V <sub>OL</sub> | -1.950 |     | -1.600 | V       | V <sub>IL</sub> = MIN, 50 $\Omega$ to -2V |
| High Level Input Voltage  | V <sub>IH</sub> |        |     | -1.070 | V       |                                           |
| Low Level Input Voltage   | V <sub>IL</sub> | -1.480 |     |        | V       |                                           |
| High Level Input Current  | I <sub>IH</sub> |        |     | 475    | $\mu$ A | V <sub>IH</sub> = MAX                     |
| Low Level Input Current   | I <sub>IL</sub> | 0.5    |     |        | $\mu$ A | V <sub>IL</sub> = MIN                     |

# PACKAGE DIMENSIONS



**MDU13H-xx (Commercial DIP)**  
**MDU13H-xxM (Military DIP)**



**MDU13H-xxC3 (Commercial SMD)**  
**MDU13H-xxMC3 (Military SMD)**

## DELAY LINE AUTOMATED TESTING

### TEST CONDITIONS

#### INPUT:

**Ambient Temperature:**  $25^{\circ}\text{C} \pm 3^{\circ}\text{C}$

**Supply Voltage (Vcc):**  $-5.0\text{V} \pm 0.1\text{V}$

**Input Pulse:** Standard 10KH ECL levels

**Source Impedance:**  $50\Omega$  Max.

**Rise/Fall Time:** 2.0 ns Max. (measured between 20% and 80%)

**Pulse Width:**  $PW_{IN} = 1.5 \times \text{Total Delay}$

**Period:**  $PER_{IN} = 10 \times \text{Total Delay}$

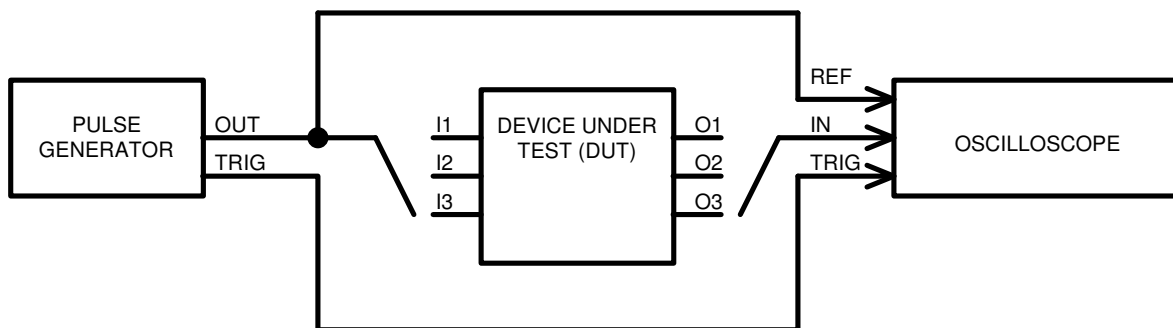
#### OUTPUT:

**Load:**  $50\Omega$  to  $-2\text{V}$

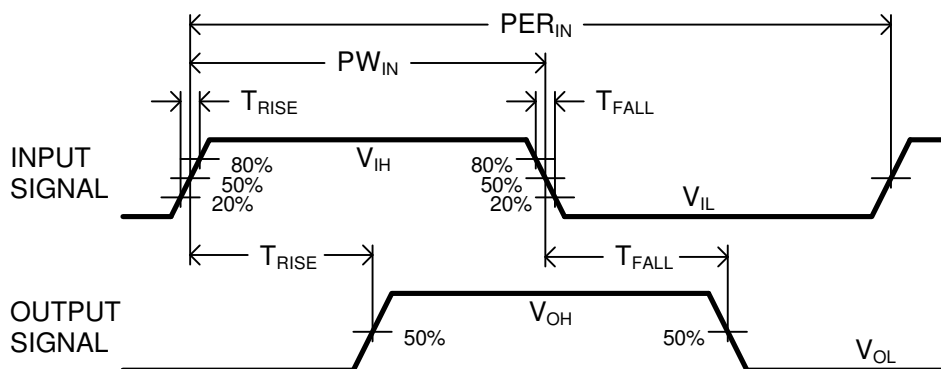
**C<sub>load</sub>:**  $5\text{pf} \pm 10\%$

**Threshold:**  $(V_{OH} + V_{OL}) / 2$   
(Rising & Falling)

**NOTE:** The above conditions are for test only and do not in any way restrict the operation of the device.



Test Setup



Timing Diagram For Testing