

# TRIPLE, HCMOS-INTERFACED FIXED DELAY LINE (SERIES MDU3C)

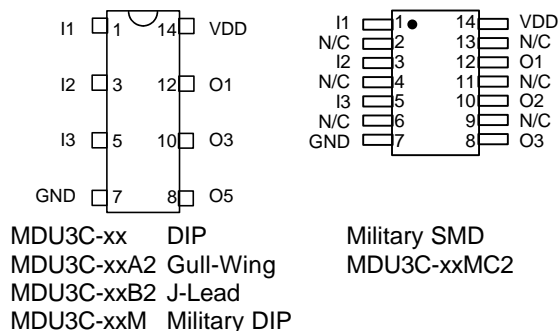
**data  
delay  
devices, inc.**



## FEATURES

- Three independent delay lines
- Fits standard 14-pin DIP socket
- Low profile
- Auto-insertable
- Input & outputs fully CMOS interfaced & buffered
- 10 T<sup>2</sup>L fan-out capability

## PACKAGES



## FUNCTIONAL DESCRIPTION

The MDU3C-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  
VDD +5 Volts  
GND Ground

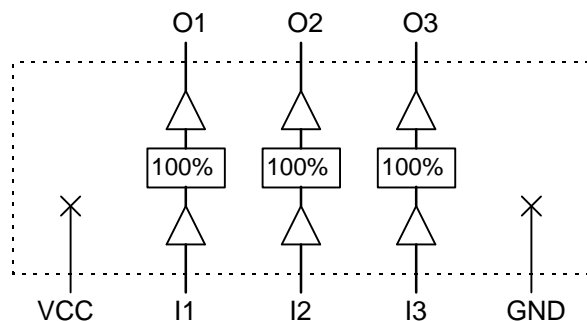
## SERIES SPECIFICATIONS

- **Minimum input pulse width:** 100% of total delay
- **Output rise time:** 8ns typical
- **Supply voltage:** 5VDC  $\pm$  5%
- **Supply current:** I<sub>CCL</sub> = 40 $\mu$ a typical  
I<sub>CCH</sub> = 60ma typical
- **Operating temperature:** 0° to 70° C
- **Temp. coefficient of total delay:** 300 PPM/°C

## DASH NUMBER SPECIFICATIONS

| Part Number | Delay Per Line (ns) |
|-------------|---------------------|
| MDU3C-10    | 10 $\pm$ 2.0        |
| MDU3C-15    | 15 $\pm$ 2.0        |
| MDU3C-20    | 20 $\pm$ 2.0        |
| MDU3C-25    | 25 $\pm$ 2.0        |
| MDU3C-30    | 30 $\pm$ 2.0        |
| MDU3C-40    | 40 $\pm$ 2.0        |
| MDU3C-50    | 50 $\pm$ 2.5        |
| MDU3C-60    | 60 $\pm$ 3.0        |
| MDU3C-75    | 75 $\pm$ 3.7        |
| MDU3C-100   | 100 $\pm$ 5.0       |

**NOTE:** Any dash number between 10 and 100 not shown is also available.



**Functional block diagram**

## APPLICATION NOTES

### HIGH FREQUENCY RESPONSE

The MDU3C 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 100% of the total delay and periods as small as 200% 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 MDU3C relies on a stable power supply to produce repeatable delays within the stated tolerances. A 0.1uf capacitor from VDD to GND, located as close as possible to the VDD pin, is recommended. A wide VDD trace and a clean ground plane should be used.

## DEVICE SPECIFICATIONS

**TABLE 1: ABSOLUTE MAXIMUM RATINGS**

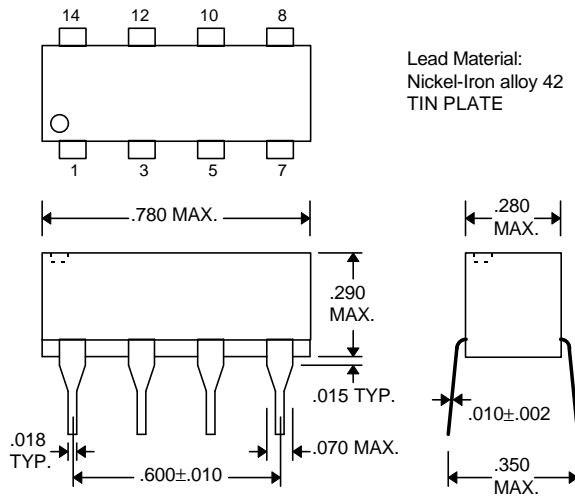
| PARAMETER           | SYMBOL     | MIN  | MAX          | UNITS | NOTES  |
|---------------------|------------|------|--------------|-------|--------|
| DC Supply Voltage   | $V_{DD}$   | -0.3 | 7.0          | V     |        |
| Input Pin Voltage   | $V_{IN}$   | -0.3 | $V_{DD}+0.3$ | V     |        |
| Storage Temperature | $T_{STRG}$ | -55  | 150          | C     |        |
| Lead Temperature    | $T_{LEAD}$ |      | 300          | C     | 10 sec |

**TABLE 2: DC ELECTRICAL CHARACTERISTICS**

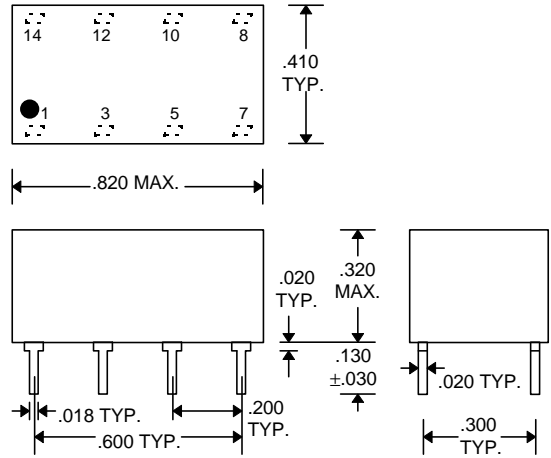
(0C to 70C, 4.75V to 5.25V)

| PARAMETER                 | SYMBOL   | MIN  | TYP  | MAX  | UNITS   | NOTES  |
|---------------------------|----------|------|------|------|---------|--|
| High Level Output Voltage | $V_{OH}$ | 3.98 | 4.4  |      | V       | $V_{DD} = 5.0, I_{OH} = MAX$<br>$V_{IH} = MIN, V_{IL} = MAX$ |
| Low Level Output Voltage  | $V_{OL}$ |      | 0.15 | 0.26 | V       | $V_{DD} = 5.0, I_{OL} = MAX$<br>$V_{IH} = MIN, V_{IL} = MAX$ |
| High Level Output Current | $I_{OH}$ |      |      | -4.0 | mA      |  |
| Low Level Output Current  | $I_{OL}$ |      |      | 4.0  | mA      |  |
| High Level Input Voltage  | $V_{IH}$ | 3.15 |      |      | V       |  |
| Low Level Input Voltage   | $V_{IL}$ |      |      | 1.35 | V       |  |
| Input Current             | $I_{IH}$ |      |      | 0.10 | $\mu A$ | $V_{DD} = 5.0$   |

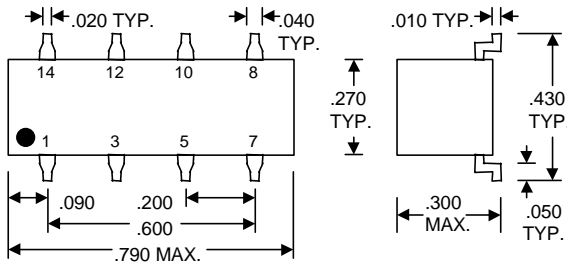
**PACKAGE DIMENSIONS**



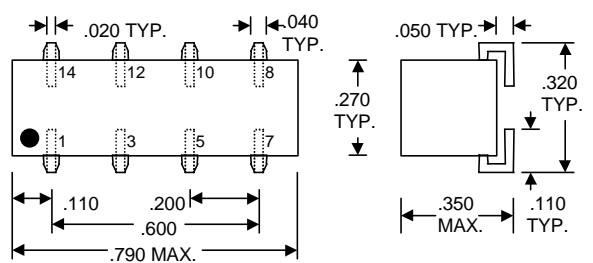
**MDU3C-xx (Commercial DIP)**



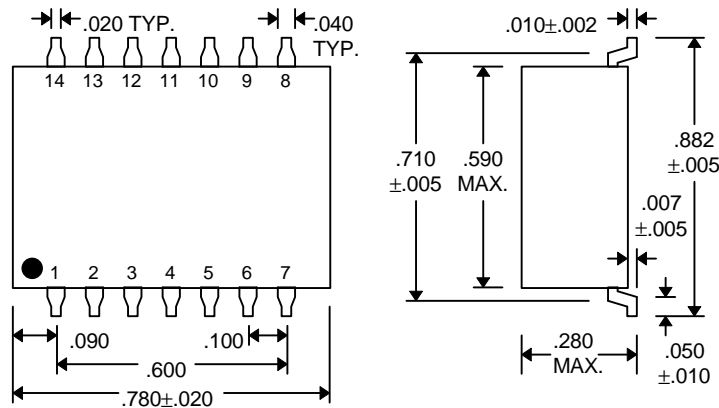
**MDU3C-xxM (Military DIP)**



**MDU3C-xxA2 (Commercial Gull-Wing)**



**MDU3C-xxB2 (Commercial J-Lead)**



**MDU3C-xxMC2 (Military SMD)**

## DELAY LINE AUTOMATED TESTING

### TEST CONDITIONS

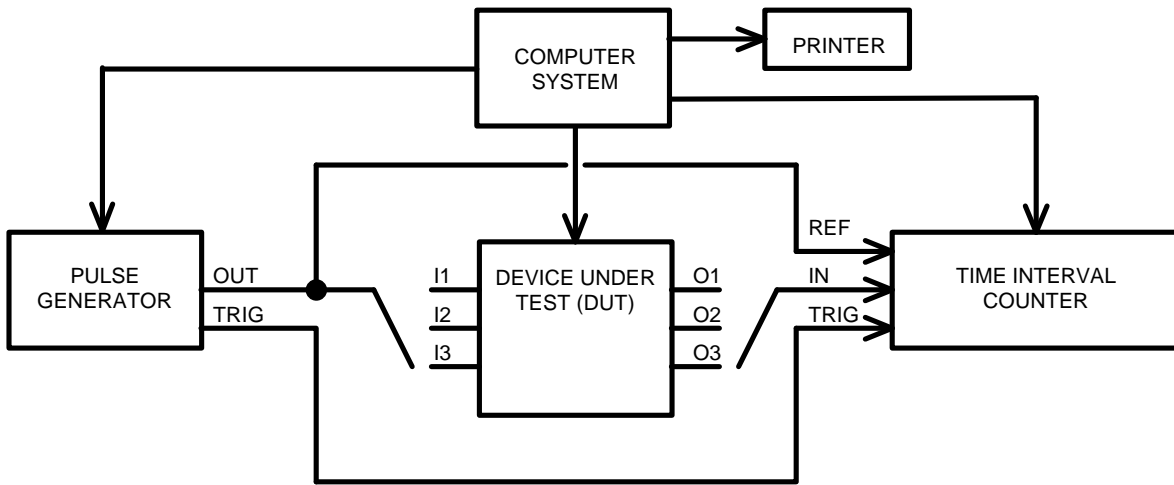
**INPUT:**

**Ambient Temperature:**  $25^{\circ}\text{C} \pm 3^{\circ}\text{C}$   
**Supply Voltage (VDD):**  $5.0\text{V} \pm 0.1\text{V}$   
**Input Pulse:** High =  $5.0\text{V} \pm 0.1\text{V}$   
 Low =  $0.0\text{V} \pm 0.1\text{V}$   
**Source Impedance:**  $50\Omega$  Max.  
**Rise/Fall Time:**  $5.0\text{ ns Max.}$  (measured between  $0.5\text{V}$  and  $4.5\text{V}$ )  
**Pulse Width:**  $\text{PW}_{\text{IN}} = 1.5 \times \text{Total Delay}$   
**Period:**  $\text{PER}_{\text{IN}} = 10 \times \text{Total Delay}$

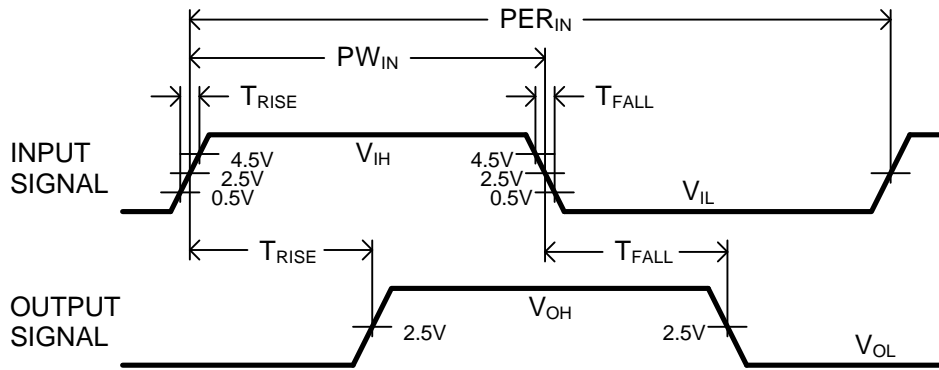
**OUTPUT:**

**Load:** 1 FAST-TTL Gate  
**C<sub>load</sub>:**  $5\text{pf} \pm 10\%$   
**Threshold:**  $2.5\text{V}$  (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**