10-TAP, TTL-INTERFACED
FIXED DELAY LINE
(SERIES DDU7F)

FEATURES
- Ten equally spaced outputs
- Fits standard 14-pin DIP socket
- Low profile
- Auto-insertable
- Input & outputs fully TTL interfaced & buffered
- 10 T^2L fan-out capability

FUNCTIONAL DESCRIPTION
The DDU7F-series device is a 10-tap digitally buffered delay line. The signal input (IN) is reproduced at the outputs (T1-T10), shifted in time by an amount determined by the device dash number. The nominal tap-to-tap delay increment is given by 1/10 of the dash number. For dash numbers less than 50, the total delay of the line is measured from T1 to T10, with the nominal value given by 9 times the increment. The inherent delay from IN to T1 is nominally 3.5ns. For dash numbers greater than or equal to 50, the total delay of the line is measured from IN to T10, with the nominal value given by the dash number.

SERIES SPECIFICATIONS
- Minimum input pulse width: 20% of total delay
- Output rise time: 2ns typical
- Supply voltage: 5VDC ± 5%
- Supply current: \( I_{CC} = 50\text{ma} \) typical
  \( I_{CH} = 15\text{ma} \) typical
- Operating temperature: 0° to 70° C
- Temp. coefficient of total delay: 100 PPM/°C

PIN DESCRIPTIONS
- IN Signal Input
- T1-T10 Tap Outputs
- VCC +5 Volts
- GND Ground

DASH NUMBER SPEC.'S

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Total Delay (ns)</th>
<th>Delay Per Tap (ns)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DDU7F-10</td>
<td>9 ± 2.0 *</td>
<td>1.0 ± 0.5</td>
</tr>
<tr>
<td>DDU7F-20</td>
<td>18 ± 2.0 *</td>
<td>2.0 ± 1.0</td>
</tr>
<tr>
<td>DDU7F-25</td>
<td>22.5 ± 2.0 *</td>
<td>2.5 ± 1.0</td>
</tr>
<tr>
<td>DDU7F-50</td>
<td>50 ± 2.5</td>
<td>5.0 ± 2.0</td>
</tr>
<tr>
<td>DDU7F-100</td>
<td>100 ± 5.0</td>
<td>10.0 ± 3.0</td>
</tr>
<tr>
<td>DDU7F-150</td>
<td>150 ± 7.5</td>
<td>15.0 ± 3.0</td>
</tr>
<tr>
<td>DDU7F-200</td>
<td>200 ± 10.0</td>
<td>20.0 ± 3.0</td>
</tr>
<tr>
<td>DDU7F-250</td>
<td>250 ± 12.5</td>
<td>25.0 ± 3.0</td>
</tr>
<tr>
<td>DDU7F-300</td>
<td>300 ± 15.0</td>
<td>30.0 ± 3.0</td>
</tr>
<tr>
<td>DDU7F-400</td>
<td>400 ± 20.0</td>
<td>40.0 ± 4.0</td>
</tr>
<tr>
<td>DDU7F-500</td>
<td>500 ± 25.0</td>
<td>50.0 ± 5.0</td>
</tr>
</tbody>
</table>

* Total delay is referenced to first tap input to first tap = 3.5ns ± 1ns

NOTE: Any dash number between 10 and 500 not shown is also available.
APPLICATION NOTES

HIGH FREQUENCY RESPONSE

The DDU7F 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 20% of the total delay and periods as small as 40% 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 DDU7F relies on a stable power supply to produce repeatable delays within the stated tolerances. A 0.1uf capacitor from VCC to GND, located as close as possible to the VCC pin, is recommended. A wide VCC trace and a clean ground plane should be used.

DEVICE SPECIFICATIONS

TABLE 1: ABSOLUTE MAXIMUM RATINGS

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>SYMBOL</th>
<th>MIN</th>
<th>TYP</th>
<th>MAX</th>
<th>UNITS</th>
<th>NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC Supply Voltage</td>
<td>VCC</td>
<td>-0.3</td>
<td></td>
<td>7.0</td>
<td>V</td>
<td></td>
</tr>
<tr>
<td>Input Pin Voltage</td>
<td>VIN</td>
<td>-0.3</td>
<td></td>
<td>VCC+0.3</td>
<td>V</td>
<td></td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>TSTRG</td>
<td>-55</td>
<td></td>
<td>150</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>Lead Temperature</td>
<td>TLEAD</td>
<td>300</td>
<td></td>
<td></td>
<td>C</td>
<td>10 sec</td>
</tr>
</tbody>
</table>

TABLE 2: DC ELECTRICAL CHARACTERISTICS

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

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>SYMBOL</th>
<th>MIN</th>
<th>TYP</th>
<th>MAX</th>
<th>UNITS</th>
<th>NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Level Output Voltage</td>
<td>VOH</td>
<td>2.5</td>
<td>3.4</td>
<td></td>
<td>V</td>
<td>VCC = MIN, IOH = MAX VIH = MIN, VIL = MAX</td>
</tr>
<tr>
<td>Low Level Output Voltage</td>
<td>VOL</td>
<td>0.35</td>
<td>0.5</td>
<td></td>
<td>V</td>
<td>VCC = MIN, IOL = MAX VIL = MIN, VIH = MAX</td>
</tr>
<tr>
<td>High Level Output Current</td>
<td>IOH</td>
<td>-1.0</td>
<td></td>
<td></td>
<td>mA</td>
<td></td>
</tr>
<tr>
<td>Low Level Output Current</td>
<td>IOL</td>
<td>20.0</td>
<td></td>
<td></td>
<td>mA</td>
<td></td>
</tr>
<tr>
<td>High Level Input Voltage</td>
<td>VIH</td>
<td>2.0</td>
<td></td>
<td></td>
<td>V</td>
<td></td>
</tr>
<tr>
<td>Low Level Input Voltage</td>
<td>VIL</td>
<td>0.8</td>
<td></td>
<td></td>
<td>V</td>
<td></td>
</tr>
<tr>
<td>Input Clamp Voltage</td>
<td>VIK</td>
<td>-1.2</td>
<td></td>
<td></td>
<td>V</td>
<td>VCC = MIN, I = IIK</td>
</tr>
<tr>
<td>Input Current at Maximum Input Voltage</td>
<td>IINH</td>
<td>0.1</td>
<td></td>
<td></td>
<td>mA</td>
<td>VCC = MAX, V = 7.0V</td>
</tr>
<tr>
<td>High Level Input Current</td>
<td>IIN</td>
<td>20</td>
<td></td>
<td></td>
<td>µA</td>
<td>VCC = MAX, V = 2.7V</td>
</tr>
<tr>
<td>Low Level Input Current</td>
<td>IIL</td>
<td>-0.6</td>
<td></td>
<td></td>
<td>mA</td>
<td>VCC = MAX, V = 0.5V</td>
</tr>
<tr>
<td>Short-circuit Output Current</td>
<td>IOS</td>
<td>-60</td>
<td></td>
<td>-150</td>
<td>mA</td>
<td>VCC = MAX</td>
</tr>
<tr>
<td>Output High Fan-out</td>
<td></td>
<td>25</td>
<td></td>
<td></td>
<td>Unit</td>
<td></td>
</tr>
<tr>
<td>Output Low Fan-out</td>
<td></td>
<td>12.5</td>
<td></td>
<td></td>
<td>Load</td>
<td></td>
</tr>
</tbody>
</table>
PACKAGE DIMENSIONS

DDU7F-xx (Commercial DIP)

- Lead Material: Nickel-Iron alloy 42
- TIN PLATE

DDU7F-xxM (Military DIP)

- .780 MAX.
- .290 MAX.
- .015 TYP.
- .010 ± .002
- .350 MAX.
- .600 MAX.
- .830 MAX.
- .020 TYP.
- .030 ± .005
- .290 MAX.
- .195 ± .010
- .010 TYP.
- .300 TYP.

DDU7F-xxA2 (Commercial Gull-Wing)

- .790 MAX.
- .430 TYP.
- .020 TYP.
- .010 ± .002
- .300 MAX.
- .590 MAX.
- .882 ± .005
- .007 ± .005
- .280 MAX.
- .50 ± .010

DDU7F-xxB2 (Commercial J-Lead)

- .790 MAX.
- .320 TYP.
- .020 TYP.
- .010 ± .002
- .790 MAX.
- .710 ± .005
- .590 MAX.
- .882 ± .005
- .007 ± .005
- .280 MAX.
DELAY LINE AUTOMATED TESTING

TEST CONDITIONS

INPUT:
Ambient Temperature: 25°C ± 3°C
Supply Voltage (Vcc): 5.0V ± 0.1V
Input Pulse:  
High = 3.0V ± 0.1V
Low = 0.0V ± 0.1V
Source Impedance: 50Ω Max.
Rise/Fall Time: 3.0 ns Max. (measured between 0.6V and 2.4V)
Pulse Width: PW_IN = 1.5 x Total Delay
Period: PER_IN = 10 x Total Delay

OUTPUT:
Load: 1 FAST-TTL Gate
C_load: 5pf ± 10%
Threshold: 1.5V (Rising & Falling)

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