

# MECHANICALLY VARIABLE TTL DELAY LINE (SERIES DDU47F)

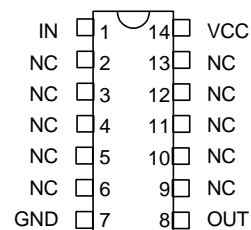
**data  
delay  
devices, inc.**



## FEATURES

- Ideal for "Set and Forget" applications
- Multi-turn adjustment screw (approx. 15 turns)
- Surface-mount package
- Input & output fully TTL interfaced & buffered  
(10 T<sup>2</sup>L fan-out capability)
- **Resolution:** 0.25ns typical
- **Adjustment range:** 5ns to 25ns
- **Output rise time:** 2ns typical
- **Min. input pulse width:** 10ns
- **Power dissipation:** 230mW maximum
- **Operating temperature:** 0° to 70°C (Commercial)  
-55° to 125°C (Military)

## PACKAGES



DDU47F (Commercial)  
DDU47FM (Military)

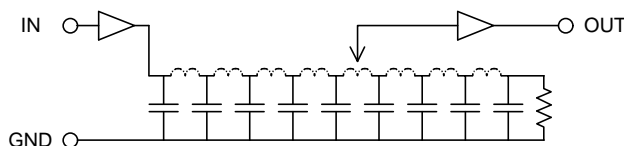
## FUNCTIONAL DESCRIPTION

The DDU47F-series device is a mechanically variable, FAST-TTL interfaced delay line. The signal input (IN) is reproduced at the tap output (OUT), shifted by an amount which can be adjusted between 5ns and 25ns. The device operates from a single 5V supply and is TTL interfaced, capable of driving up to 10 TTL loads.

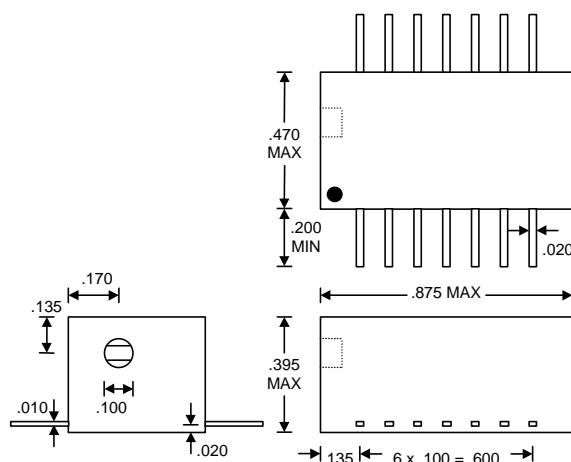
## PIN DESCRIPTIONS

IN Signal Input  
OUT Fixed Output  
VCC +5V  
GND Ground  
NC No connection

## SERIES SPECIFICATIONS



Functional Diagram



Package Dimensions

## APPLICATION NOTES

### HIGH FREQUENCY RESPONSE

The DDU47F 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 10ns and periods as small 20ns (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 DDU47F 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**

PARAMETER	SYMBOL	MIN	MAX	UNITS	NOTES
DC Supply Voltage	$V_{CC}$	-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	$V_{OH}$	2.5	3.4		V	$V_{CC} = \text{MIN}, I_{OH} = \text{MAX}$ $V_{IH} = \text{MIN}, V_{IL} = \text{MAX}$
Low Level Output Voltage	$V_{OL}$		0.35	0.5	V	$V_{CC} = \text{MIN}, I_{OL} = \text{MAX}$ $V_{IH} = \text{MIN}, V_{IL} = \text{MAX}$
High Level Output Current	$I_{OH}$			-1.0	mA	
Low Level Output Current	$I_{OL}$			20.0	mA	
High Level Input Voltage	$V_{IH}$	2.0			V	
Low Level Input Voltage	$V_{IL}$			0.8	V	
Input Clamp Voltage	$V_{IK}$			-1.2	V	$V_{CC} = \text{MIN}, I_1 = I_{IK}$
Input Current at Maximum Input Voltage	$I_{IHH}$			0.1	mA	$V_{CC} = \text{MAX}, V_1 = 7.0V$
High Level Input Current	$I_{IH}$			20	$\mu A$	$V_{CC} = \text{MAX}, V_1 = 2.7V$
Low Level Input Current	$I_{IL}$			-0.6	mA	$V_{CC} = \text{MAX}, V_1 = 0.5V$
Short-circuit Output Current	$I_{OS}$	-60		-150	mA	$V_{CC} = \text{MAX}$
Output High Fan-out				25	Unit	
Output Low Fan-out				12.5	Load	

## DELAY LINE AUTOMATED TESTING

### TEST CONDITIONS

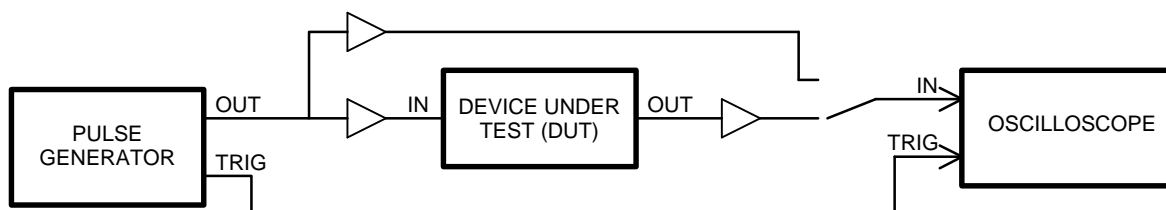
**INPUT:**
**Ambient Temperature:**  $25^{\circ}\text{C} \pm 3^{\circ}\text{C}$ 
**Supply Voltage (Vcc):**  $5.0\text{V} \pm 0.1\text{V}$ 
**Input Pulse:** High =  $3.0\text{V} \pm 0.1\text{V}$   
Low =  $0.0\text{V} \pm 0.1\text{V}$ 
**Source Impedance:**  $50\Omega$  Max.

**Rise/Fall Time:**  $3.0\text{ ns Max.}$  (measured between  $0.6\text{V}$  and  $2.4\text{V}$ )

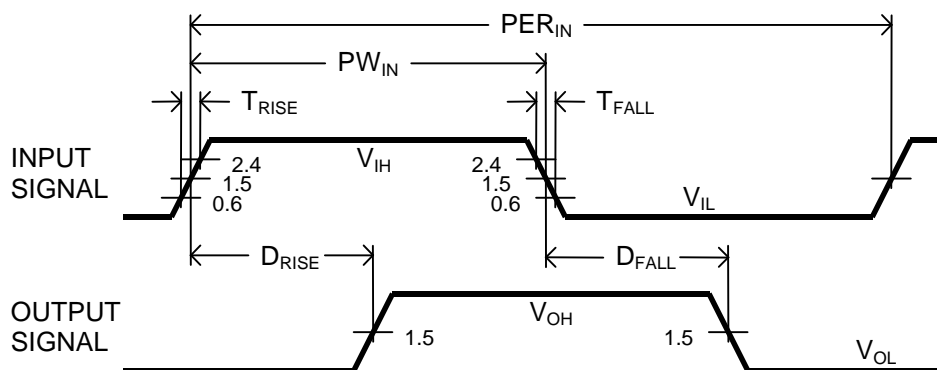
**Pulse Width:**  $100\text{ns}$ 
**Period:**  $1000\text{ns}$ 
**OUTPUT:**
**Load:** 1 FAST-TTL Gate

**C<sub>load</sub>:**  $5\text{pf} \pm 10\%$ 
**Threshold:**  $1.5\text{V}$  (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**