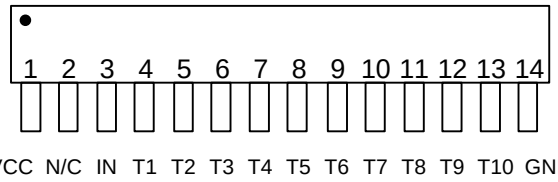
10-TAP, TTL-INTERFACED FIXED DELAY LINE (SERIES DDU224F)

data delay devices, inc.

FEATURES

- Ten equally spaced outputs
- Very narrow device (SIP package)
- Stackable for PC board economy
- Input & outputs fully TTL interfaced & buffered
- 10 T^2L fan-out capability

PACKAGES



DDU224F-xx Commercial
DDU224F-xxM Military

FUNCTIONAL DESCRIPTION

The DDU224F-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.

PIN DESCRIPTIONS

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

SERIES SPECIFICATIONS

- **Minimum input pulse width:** 20% of total delay
- **Output rise time:** 2ns typical
- **Supply voltage:** 5VDC ± 5%
- **Supply current:** I_{CCL} = 50ma typical
  I_{CCH} = 15ma typical
- **Operating temperature:** 0° to 70° C
- **Temp. coefficient of total delay:** 100 PPM/°C

DASH NUMBER SPECIFICATIONS

Part Number	Total Delay (ns)	Delay Per Tap (ns)
DDU224F-10	9 ± 2.0 *	1.0 ± 0.5
DDU224F-20	18 ± 2.0 *	2.0 ± 1.0
DDU224F-25	22.5 ± 2.0 *	2.5 ± 1.0
DDU224F-50	50 ± 2.5	5.0 ± 2.0
DDU224F-100	100 ± 5.0	10.0 ± 3.0
DDU224F-150	150 ± 7.5	15.0 ± 3.0
DDU224F-200	200 ± 10.0	20.0 ± 3.0
DDU224F-250	250 ± 12.5	25.0 ± 3.0
DDU224F-300	300 ± 15.0	30.0 ± 3.0
DDU224F-400	400 ± 20.0	40.0 ± 4.0
DDU224F-500	500 ± 25.0	50.0 ± 5.0

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

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

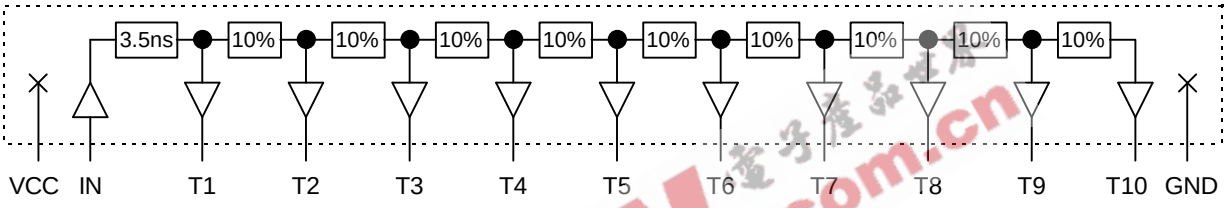
APPLICATION NOTES

HIGH FREQUENCY RESPONSE

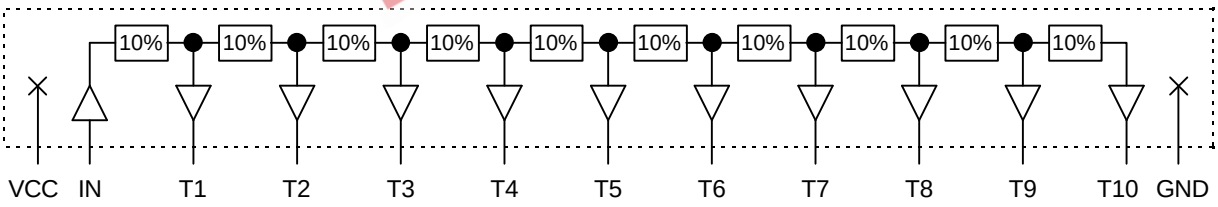
The DDU224F tolerances are guaranteed for input pulse widths and periods greater than those specified in the test conditions. Although the device will function properly for pulse widths as small as 20% of the total delay and periods as small as 40% of the total delay (for a symmetric input), the delays 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 DDU224F 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.



Functional diagram for dash numbers < 50



Functional diagram for dash numbers >= 50

DEVICE SPECIFICATIONS

TABLE 1: ABSOLUTE MAXIMUM RATINGS

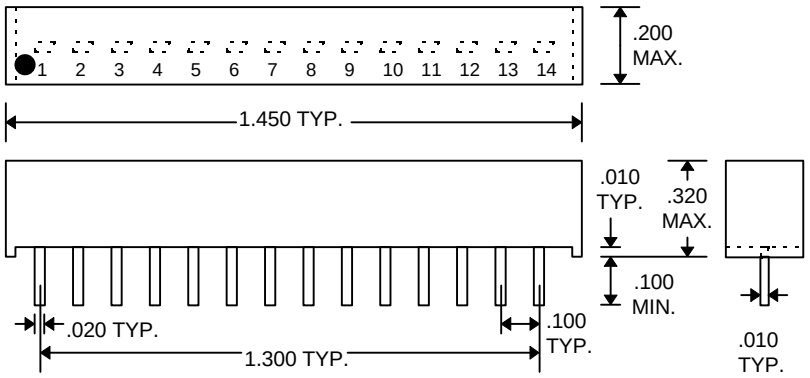
PARAMETER	SYMBOL	MIN	MAX	UNITS	NOTES
DC Supply Voltage	V_{CC}	-0.3	7.0	V	
Input Pin Voltage	V_{IN}	-0.3	V_{DD}+0.3	V	
Storage Temperature	T_{STRG}	-55	150	C	
Lead Temperature	T_{LEAD}		300	C	10 sec

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} = MIN, I_{OH} = MAX V_{IH} = MIN, V_{IL} = MAX
Low Level Output Voltage	V_{OL}		0.35	0.5	V	V_{CC} = MIN, I_{OL} = MAX V_{IH} = MIN, V_{IL} = 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} = MIN, I_I = I_{IK}
Input Current at Maximum Input Voltage	I_{IHH}			0.1	mA	V_{CC} = MAX, V_I = 7.0V
High Level Input Current	I_{IH}			20	µA	V_{CC} = MAX, V_I = 2.7V
Low Level Input Current	I_{IL}			-0.6	mA	V_{CC} = MAX, V_I = 0.5V
Short-circuit Output Current	I_{OS}	-60		-150	mA	V_{CC} = MAX
Output High Fan-out				25	Unit Load	
Output Low Fan-out				12.5		

PACKAGE DIMENSIONS



DDU224F-xx (Commercial)
DDU224F-xxM (Military)

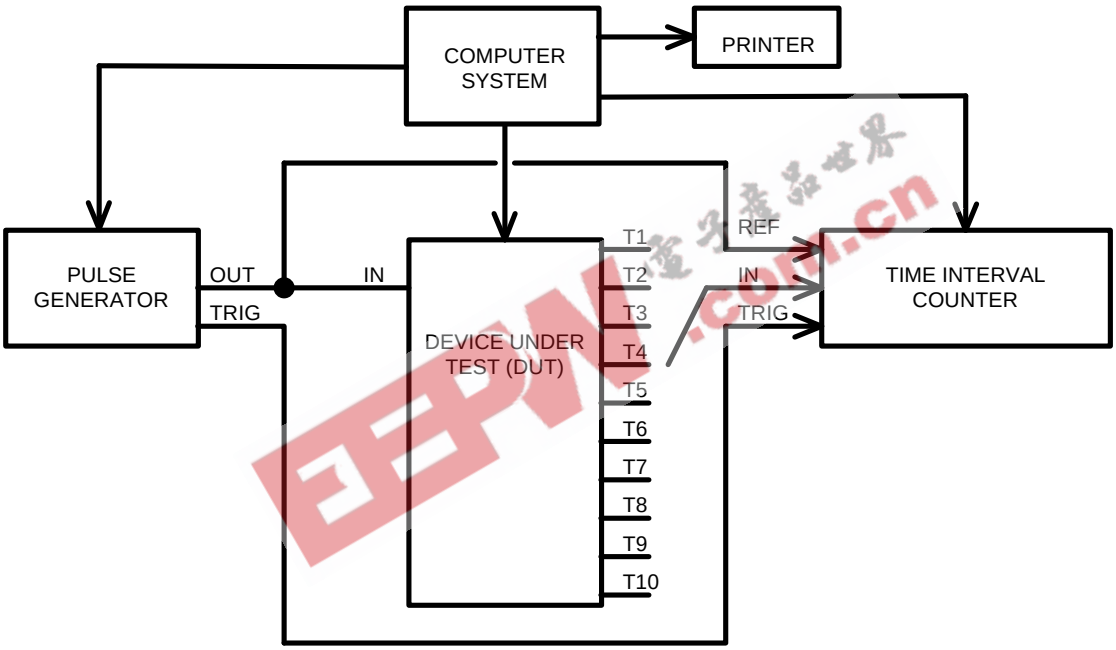
DELAY LINE AUTOMATED TESTING

TEST CONDITIONS

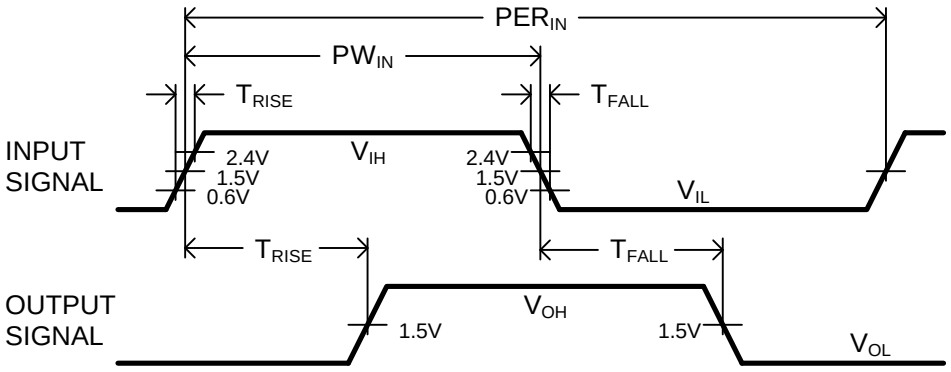
INPUT:
Ambient Temperature: 25°C ± 3°C
Supply Voltage (Vcc): 5.0V ± 0.1V
Input Pulse: High = 3.0V ± 0.1V
Low = 0.0V ± 0.1V
Source Impedance: 50Ω Max.
Rise/Fall Time: 3.0 ns Max. (measured between 0.6V and 2.4V)
Pulse Width: PW_{IN} = 1.5 x Total Delay
Period: PER_{IN} = 10 x Total Delay

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.



Test Setup



Timing Diagram For Testing