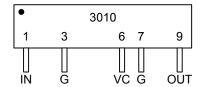
# **VOLTAGE-VARIABLE DELAY LINE** $T_R < 1ns$ **SERIES 3010)**



## **FEATURES**

- Varactor Technology
- Fast rise time for high frequency applications
- Delay continuously adjustable from 2.4ns to 3.4ns
- Very narrow device (SIP package)
- Stackable for PC board economy
- Epoxy encapsulated
- Meets or exceeds MIL-D-23859C

## **PACKAGE**



3010-P: Positive control voltage 3010-N: Negative control voltage

## **FUNCTIONAL DESCRIPTION**

The 3010-series devices are continuously variable, single-input, singleoutput, passive delay lines. The signal input (IN) is reproduced at the output (OUT), shifted by a time (T<sub>D</sub>) which is adjusted via an applied control voltage (VC). This control voltage is positive for the 3010-P and negative for the 3010-N. The characteristic impedance of the line is

PIN DESCRIPTIONS

IN Signal Input OUT Signal Output VC Control Voltage G Ground

nominally 50 ohms. The rise time (T<sub>R</sub>) of the lines is no more than 1ns, resulting in a 3dB bandwidth of at least 300MHz. The delay resolution is limited only by that of the control voltage.

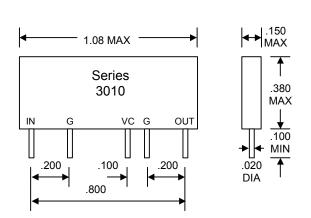
#### SERIES SPECIFICATIONS

Varactor voltage range (3010-P): 1.3V (max T<sub>D</sub>) to 11.3V (min T<sub>D</sub>)

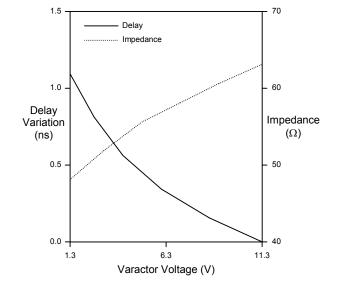
Varactor voltage range (3010-N): -1.3V (max T<sub>D</sub>) to -11.3V (min T<sub>D</sub>)

Range of delay variation: 1.0ns minimum Minimum delay:  $2.4 \text{ns} \pm 0.25 \text{ns}$  $45\Omega - 68\Omega$ Impedance: Output rise time: 1.0ns max Bandwidth: 300MHz min Overshoot/preshoot:  $\pm$  20% max

Operating temperature: -10°C to +80°C Temperature coefficient: 1000 PPM/°C max



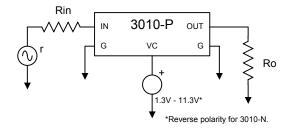
**Package Dimensions** 



Typical Delay/Impedance Variation

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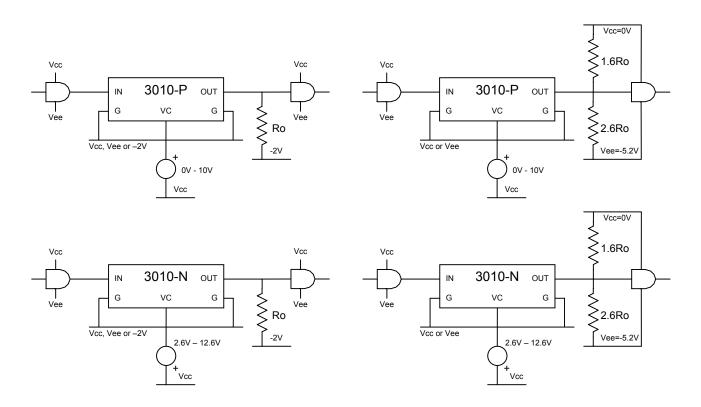
# **TYPICAL APPLICATIONS**



r: Signal source impedance Rin: Input termination resistor Ro: Output termination resistor

- Set Ro to the median impedance value within the delay adjustment range (50 $\Omega$  60  $\Omega)$
- Set Rin = Rout r

# **Analog Interface**



**ECL** with -2V Termination

**ECL** without -2V Termination

Note: The varicap voltage is referenced to the DC level of the input signal. In the case of ECL applications, a voltage of 0V to 10V (2.6V to 12.6V for the 3010-N) should be applied at pin 6, because the signal line has –1.3V DC level. This assumes the ECL signal has approximately 50% duty cycle.

# **PASSIVE DELAY LINE TEST SPECIFICATIONS**

## **TEST CONDITIONS**

INPUT: OUTPUT:

Ambient Temperature:  $25^{\circ}\text{C} \pm 3^{\circ}\text{C}$  R<sub>load</sub>:  $50\Omega$  Input Pulse: High = 1.8V typical C<sub>load</sub>: <10pf

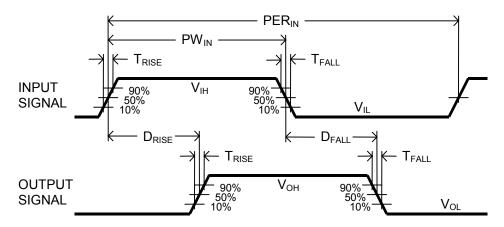
Low = 0.8V typical Threshold: 50% (Rising & Falling)

Source Impedance:  $50\Omega$  Max.

Rise/Fall Time: 3.0 ns Max. (measured at 10% and 90% levels)

**Pulse Width:**  $PW_{IN} = 500 ns$  **Period:**  $PER_{IN} = 1000 ns$ 

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



**Timing Diagram For Testing** 

