

# Model TD2000 Ultra Fast Timing Discriminator with GHz LE operation



## FEATURES

- -2.0 to +3.0V input range
- $\pm 1.25V$  input threshold range
- GHz operation capability
- 750ps min. output pulse width
- Four outputs
- Fast VETO input
- Shaped output pulse widths <1ns to >350ns
- Unshaped output bandwidth 2.4GHz (3dB)

## APPLICATIONS

- Ultra high count rate Single Photon Counting
- LIDAR
- TOF Mass-Spectrometry
- Ultra high count rate Multiscaling

## DESCRIPTION

Probably the fastest leading edge discriminator available today. The unshaped outputs can be used at rates in the GHz range (ref. Fig 3).

A fast NIM VETO input provides for inhibiting the shaped outputs.

The fast NIM outputs exhibit fall times of <200ps.

The shaped fast NIM output has a minimum pulse width of typ. 750ps only.

Even the positive output has a fast rise time of approx.

500ps. Thus, pulse widths as low as 2ns can be achieved at full amplitude.

## SPECIFICATIONS

### General:

Input to unshaped output delay: approx. 1.7ns  
 Input to shaped output delay: approx. 3.3ns

### Inputs:

Signal: BNC, 50 $\Omega$ , direct coupled, -2.0 to +3.0V, sensitivity <10mV, slew rate requirement  $\geq 5V/\mu s$

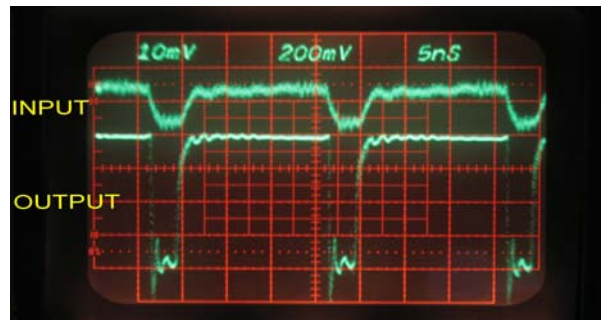


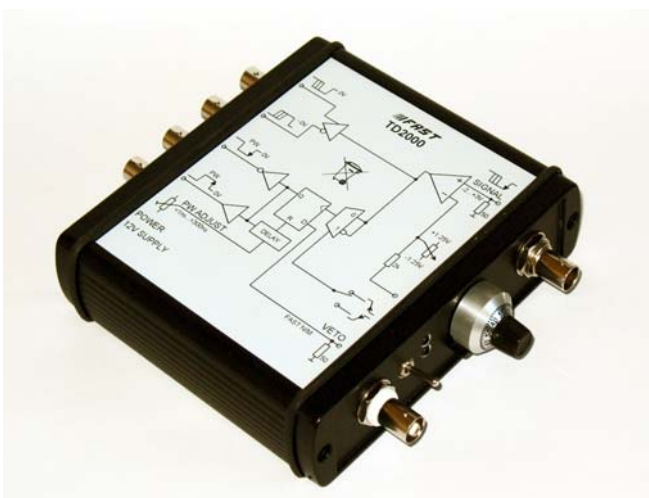
Fig 1: Input sensitivity

Threshold:  $\pm 1.25V$ , 10-turn precision potentiometer, 2mm monitor test point for voltmeters

Veto: BNC, 50 $\Omega$ , direct coupled, -300mV threshold, fast NIM compatible, slew rate requirement  $\geq 5V/\mu s$

### Outputs:

Unshaped: 2x BNC, 50 $\Omega$  back-terminated, fast NIM current mode, -16mA into external 50 $\Omega$ , inverting & non-inverting, 2.4GHz (3dB) bandwidth



TD2000 17042007

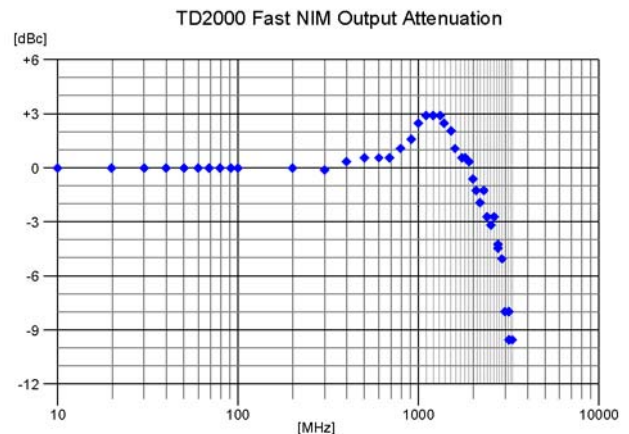


Fig 2: FAST NIM attenuation (dBc)

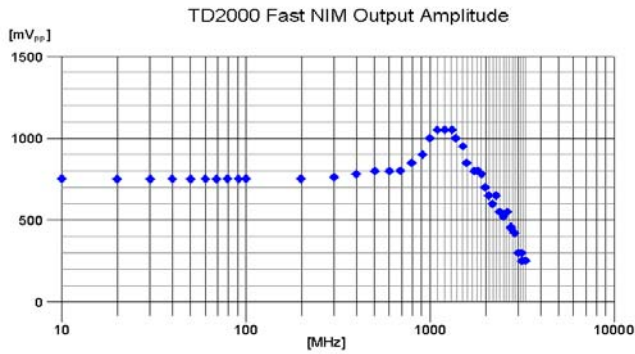


Fig 3:FAST NIM output amplitude



Fig 4 FAST NIM fall time

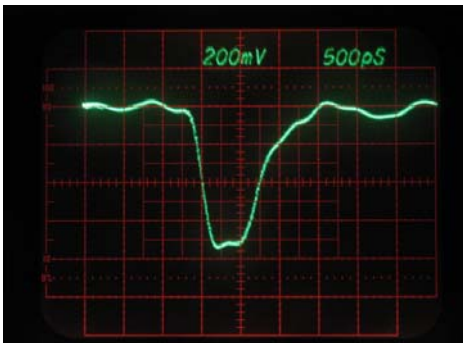


Fig 5: Minimum pulse width

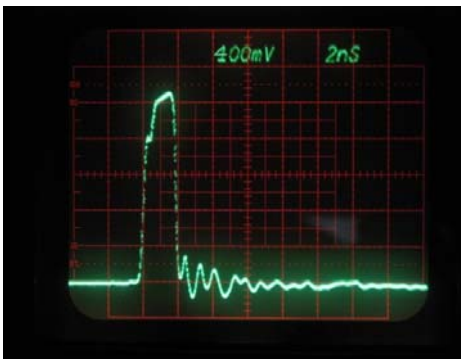


Fig 6: Small positive output pulse

Oscilloscope shots are taken with a 14 GHz sampling head

Shaped: 2x BNC, pulse width 10-turn screwdriver adjustable, <1ns to >350ns, input edge sensitivity rising/falling iiiiiiiswitch selectable  
a) 1x negative fast NIM current mode, 50Ω back-terminated, -16mA into external 50Ω, 400MHz continuous rate  
b) 1x positive voltage follower mode,  
 $V_{OL} < 0.5V$ ,  $V_{OH} > +2.0V$  into external 50Ω (for widths > 2ns)

**Physical:**

Case: extruded aluminium sheath  
Al Mg Si 0.5  
Lid: die cast, GD-Al Si 12  
Size: 121/153 x 142 x 37 mm  
Weight: 500 g

**Power Requirements:**

Connector: 2.1 mm center pin  
Supply Voltage: nominal +12V  
voltage range +10 ... +18V  
Supply Power: 6W  
Reverse polarity protected

**Absolute maximum ratings:**

Supply: 25V (100ms max.)  
Signal input: -3V ... +4.0V  
EDS rating 1,500V HBM

**Accessories:**

- External wall power supply (included)
- Precision screwdriver (included)