

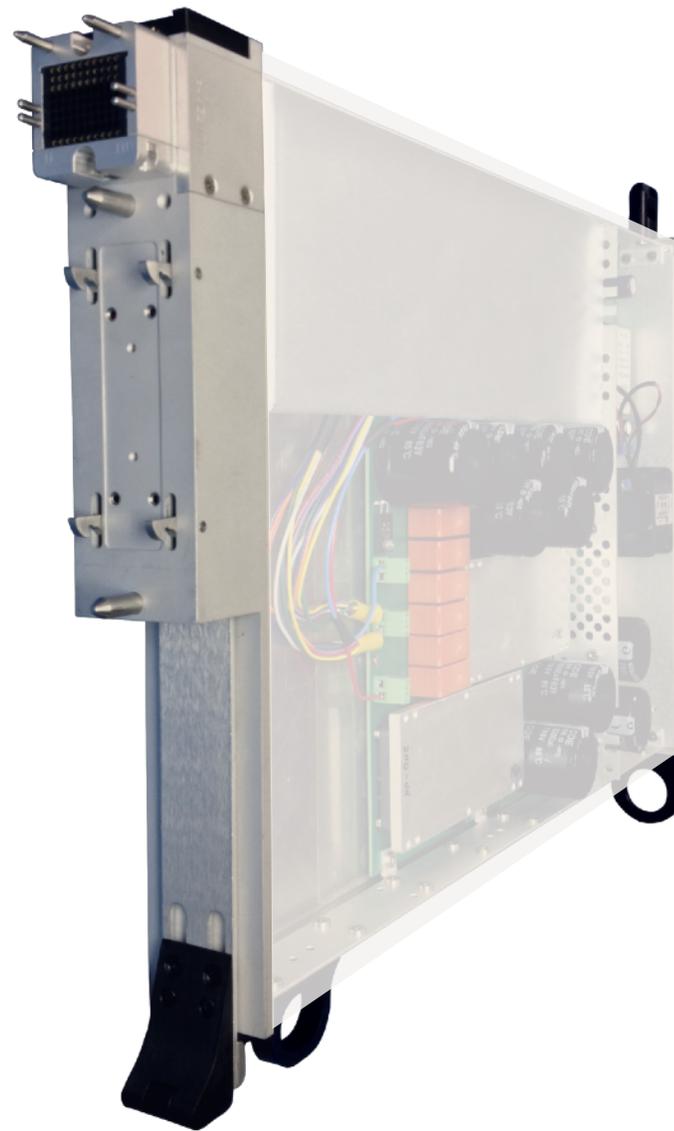
DESCRIPTION

This application note provides example test panels and descriptions of the instrument setup and measurement capabilities of the RI8589B Fet Pulser TIM.

New features for the RI8589B include:

- High-speed digitizer for capturing pulse profiles of voltage and current
- Real-time FPGA averaging with increased capacity and speed
- Improved dynamic range for near-zero voltage measurements
- Enhanced voltage/current supply set resolution

NOTE: *The RI8589B requires patch GF10RC2A.317 'RI8589B FET Pulser TIM' [version 15 or later].*



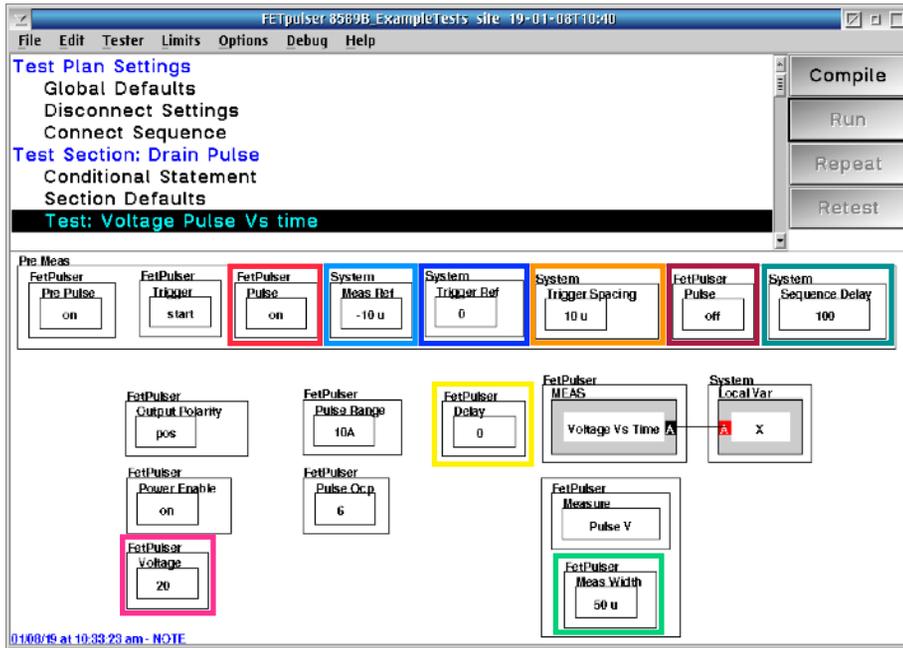


Figure 1: Capture Pulse Voltage Profile

The High-I V_{dd} resource is set to 20V (**Voltage** button) with a maximum current capacity limited to 6A maximum (**Pulse OCP: 6**) buttons. The premeasure sequence is then executed as follows:

The **Pre Pulse: on** button setting provides a load condition to stabilize current settings below 10A. The **Trigger: start** initiates the trigger for the **Voltage vs Time** measurement capture with a capture window of 50µs defined by the **Meas Width** button. The pulse is then initiated with the **Pulse: on** button. The **Trigger Ref** and **Trigger Spacing** buttons together define a precision pulse width by adding a delay between the **Pulse: on** and **Pulse: off** buttons (Sequence Delays incur an additional 5µs execution delay). The **Trigger Ref** marks the preceding button as the start point for the applied delay of 10µs defined by the **Trigger Spacing** button. The **Pulse: off** button is followed by an additional 100µs delay to maintain the **Pulse: off** state of the pulse instrument for the remaining duration of the measurement window. The resulting current measurement profile data is captured and stored in a **Local Var** save.

The minimum pulse width achievable with the RI8589B is ~5µs.

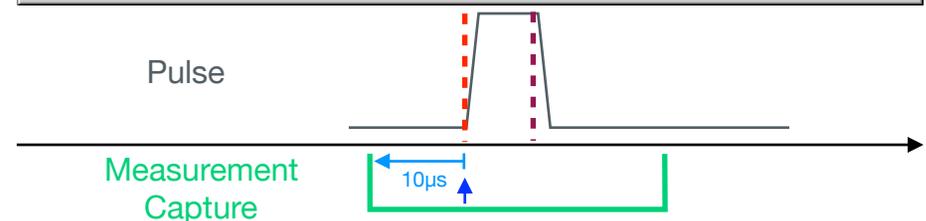
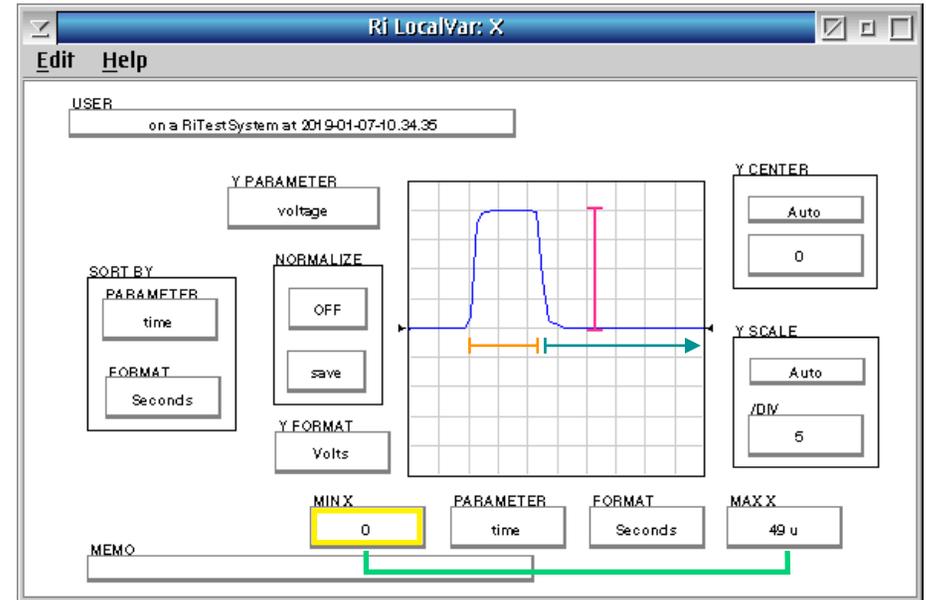


Figure 2: Pulse Profile Capture

The measurement capture window is defined by three buttons: **Meas Width**, **Delay**, and **Meas Ref**. The **Meas Width** button defines the duration of the capture in units of seconds at a fixed capture rate of 1MSPS. The **Delay** button value defines the duration of time between the **Trigger: start** and the **Voltage vs. Time** measurement capture start. The value of the **Delay** button therefore defines the MIN X value of the plot window. The **Meas Ref** button marks the preceding button in the premeasure sequence as the start of the capture window with an offset time value (in the example, 10 µs before the **Pulse: on** button).

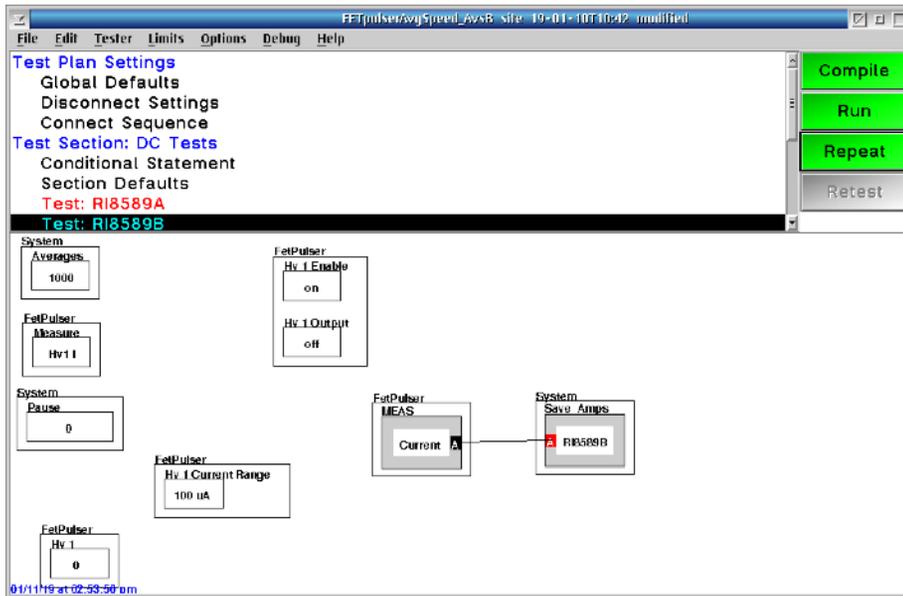


Figure 3: Leakage Measurement with RI8589B/

Figure 3 shows the identical setup for measuring leakage current on the RI8589A and RI8589B Fet Pulsers. The RI8589B utilizes a faster sample rate digitizer with a higher precision ADC, FPGA-based hardware averaging, and bipolar IC for improved dynamic range in near zero voltage/current applications. Since the RI8589B has a larger measurement bandwidth, the software automatically increases the number of samples of a user-specified average by 10x to provide equivalent noise floor performance to the RI8589A, see Figure 5 and Figure 6. The measurement time for the above examples are 40 ms for the RI8589A and 12.5 ms RI8589B, providing a 3x test time improvement. Comparing the A and B versions with an equivalent number of sample averages (RI8589B **Averages:100**), the test time of the RI8589A remains 40 ms and the RI8589B test time is 3.9 ms providing a 10x improvement in test time.

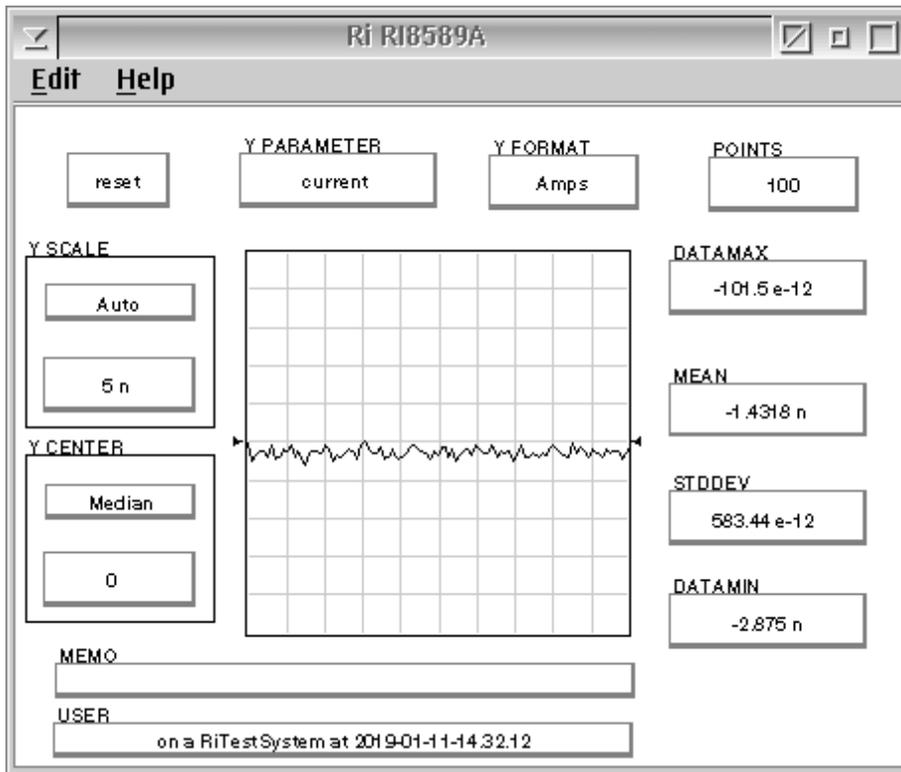


Figure 5: RI8589A Leakage Measurement

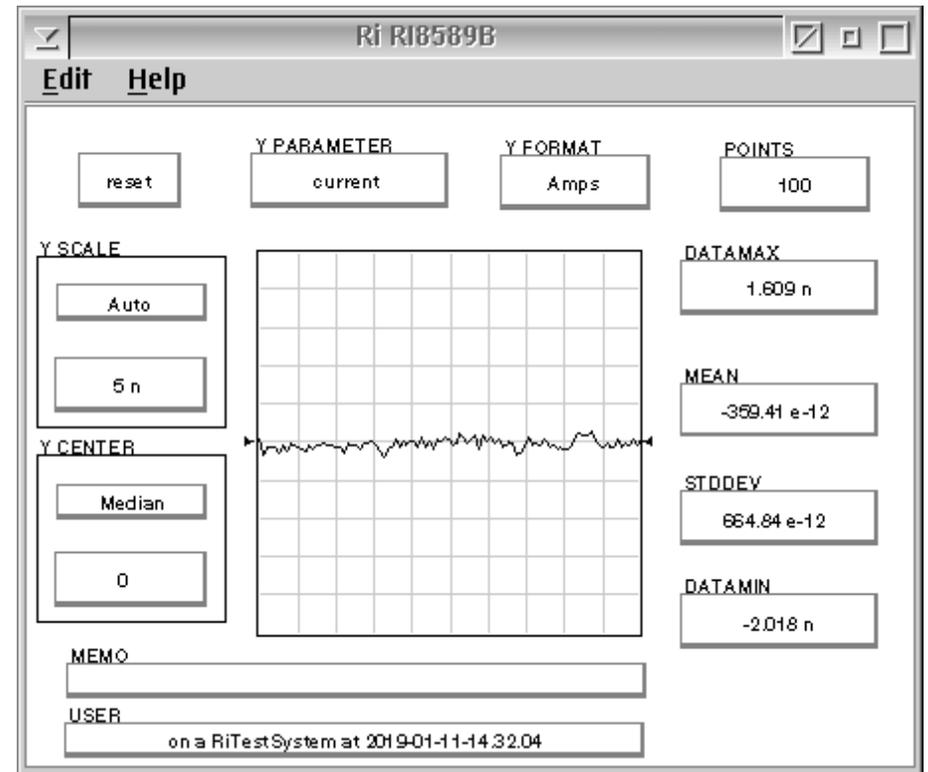


Figure 6: RI8589B Leakage Measurement