



PCT-2025 High Current IV Tracer FAQs

Is the PCT-2025 a TLP?

No, the PCT-2025 uses a different method of producing the IV curve than a TLP (Transmission Line Pulser) does.

How does the PCT-2025 differ from a TLP?

A TLP uses a series of very short (100 nanoseconds or less) voltage pulses with current limited by a resistance. The pulse voltage is increased for successive pulses. After settling, the voltage across the DUT (Device Under Test) and the current through the DUT are recorded for each pulse.

The PCT-2025 uses a short (10 microseconds) current ramp into the DUT. During the ramp the voltage across the DUT and the current through the DUT are sampled as the current increases.

What are some of the advantages of one method versus the other?

The very short pulses of the TLP are about the same duration as ESD (ElectroStatic Discharge) events. For that reason a TLP is an excellent tool to use to characterize the behavior of devices subjected to ESD stresses.

The longer pulses of the PCT-2025 are about the same duration as surge stress events. The PCT-2025 is the tool to use to characterize the behavior of devices subjected to surges.

Although the power in the DUT from the PCT-2025 is higher than that from a TLP due to the longer pulse width, it is still low enough that in many cases the PCT-2025 can be used in place of a TLP to characterize ESD behavior.

The PCT-2025 shows device snapback sharper than a TLP does because the output impedance of the PCT-2025's current source is much higher than that of the pulse generator of a TLP.

The PCT-2025 is much faster than a TLP, taking less than one second to take and display an IV curve compared to several minutes for a TLP. This makes the PCT-2025 ideal for quickly testing a large quantity of devices.

What is the theory of operation?

Briefly, the PCT-2025 uses a voltage across an inductor to produce a current ramp. This current ramp is applied to the DUT while a high speed digitizer records the voltage across the DUT and the current through the DUT, producing the IV curve.

How much energy is the DUT subjected to?

That depends on the breakdown voltage of the DUT and the peak pulse current. As an example, for a device such as a 1N6373 TVS (Transient Voltage Suppressor) that has a 7.5 V breakdown, plotting it out to 18 A will subject it to about 675 μJ .

For comparison purposes, the 18 A, 100 ns pulse of a TLP will subject the DUT to about 13.5 μJ and the 18 A, 1 ms pulse of a conventional curve tracer will subject the DUT to about 135,000 μJ . You can see that the energy from the PCT-2025 is much closer to that of a TLP than to that of a conventional curve tracer.

How does the cabling affect the curve?

Because the PCT-2025 sees the DUT in series with the cables, both the resistance and the inductance of the cabling can affect the results. For this reason the PCT-2025 has routines to characterize the cables and remove the effects of the cables from the final IV plot. This is referred to as de-embedding the cables. Moving the cables changes their inductance, so it is important to characterize the cables in their final configuration.

What are the limits on allowed cabling?

As the cable resistance and inductance increases, the peak current through the DUT is reduced. Practically speaking, about 1 Ω and about 2 μH are good limits.

Can the PCT-2025 be used with a probe station?

Yes. Keep in mind that the stress current can be many amperes; keep the cables as short as possible and use appropriate probes.

Do I need to own a copy of LabVIEW?

No. The PCT-2025 software comes with a run-time version of LabVIEW. Load the PCT-2025 software on your PC and it is ready to run.

Can I modify the program?

Yes, but you will need your own copy of LabVIEW to do this. The source code is provided so you can make any modifications you like, such as customizing the plot titles with your company's name.

What if something happens to you?

This is a good question that you should ask! I admit at the moment Marum Consulting is a one person company and if anything should incapacitate me your PCT-2025 will be an "orphan". Shipped with every PCT-2025 will be everything an electronic technician needs to perform standard maintenance and even repairs should the unit fail. The high speed digitizer is a commercial, replaceable unit and the custom PC board is thru-hole construction. Schematics and source code are provided.

What is provided with the PCT-2025?

The following items are included:

- PCT-2025 hardware
- Power supply
- Standard test leads
- USB cable
- Run-time control software
- LabVIEW source code for the run-time software
- User's manual
- Calibration instructions
- Theory of operation
- Schematic of the hardware

If the PCT-2025 breaks, how are repairs handled?

Using the provided documentation you can probably make repairs yourself on-site. If you prefer you can ship the PCT-2025 to me and I will repair it.

What is the warrantee?

There is a 90 day warrantee against any manufacturing defects.

How is the PCT-2025 calibrated?

Calibration is straightforward. Instructions are provided and calibration can be performed by whoever calibrates your other test equipment.

What are the computer requirements?

Any PC running Windows XP or newer is suitable. A display size of 1366*768 or greater is recommended.

What are the power requirements?

Part of the PCT-2025 circuitry is USB powered; the high current pulse generator is powered by a supplied 5 V power adaptor.