

S50 – Transient Load Stepping Probe

High Current Browser

S50 Load Current Stepper

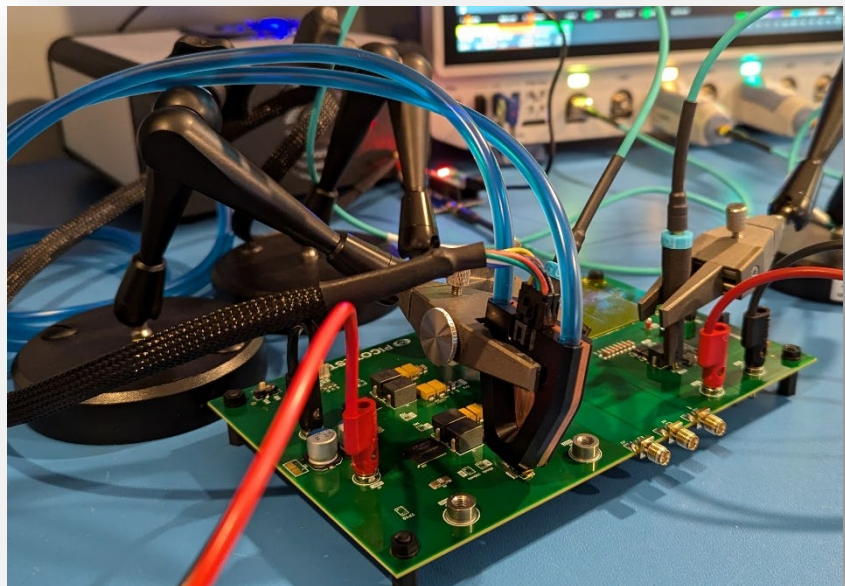
Up to 50A Steps

Customized GaN Load Stepper

High Bandwidth

Low Capacitance/Inductance

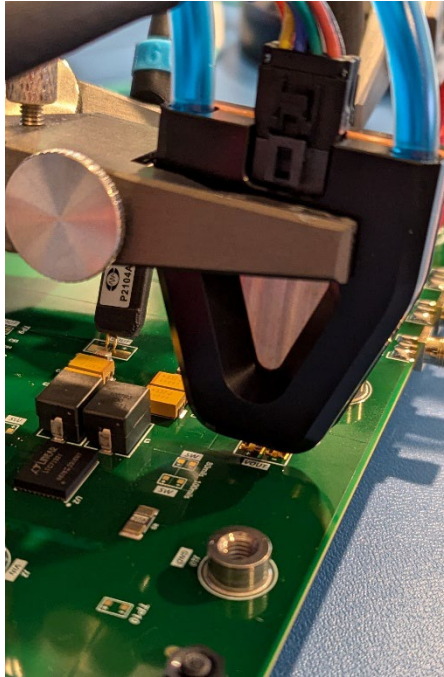
User Controlled Load Profiles



Load Stepper Probes

Transient load current step testing is a critical part of power system design, test, and verification. No matter the architecture, design make-up, or power levels, transient testing is key to evaluating many aspects including power integrity, power distribution network (PDN) validation, Voltage Regulation Module (VRM) stability and transient response, noise, large-signal control loop stability, input filter stability, load emulation, thermal (TDP) testing, and IC package performance.

What makes Picotest's line of transient steppers different is our unique GaN switching technology and probe head design. The S50 enables very fast load current transitions with high peak and average power. The special probe head design brings the step right onto your board, eliminating interconnect inductance for sub ns switching times. In particular, demanding low-voltage, high-current applications including those found in data centers, AI, graphics, EV, and servers can now be tested, including crosstalk, thermal performance and EMI, long before the final ASIC is even available.



Measurement Demands New Probe Capabilities

The S50 probe can be used to perform transient load current step testing up to 50A. It uses a water-cooled browser-style probe format with 6 user pre-defined current steps (6-bit logic level control). The current step (current sinking into the positive pin) is controlled by a control wire pair. This is a 6-bit control bus with 3.3V or 5V logic level. Each current switch in the head can be turned on or off and each can have a level set at the time of manufacturing. So, there are 6 discrete levels that can be switched individually or combined to achieve up to 50Amps. The current levels are dependent on the voltage of the power rail and sized based on six resistors predefined at the time of purchase.

USAGE

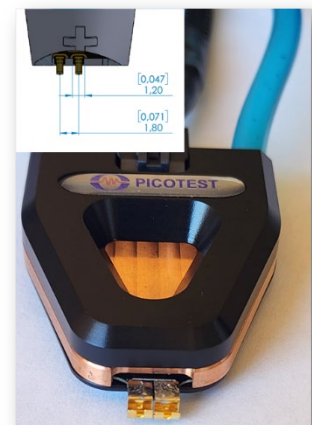
The probe head is connected to a water pump for cooling. A molex connector with an eight (8) wire breakout cable is also plugged into the back of the head as illustrated below. The probe head itself comes with

S50 FEATURES:

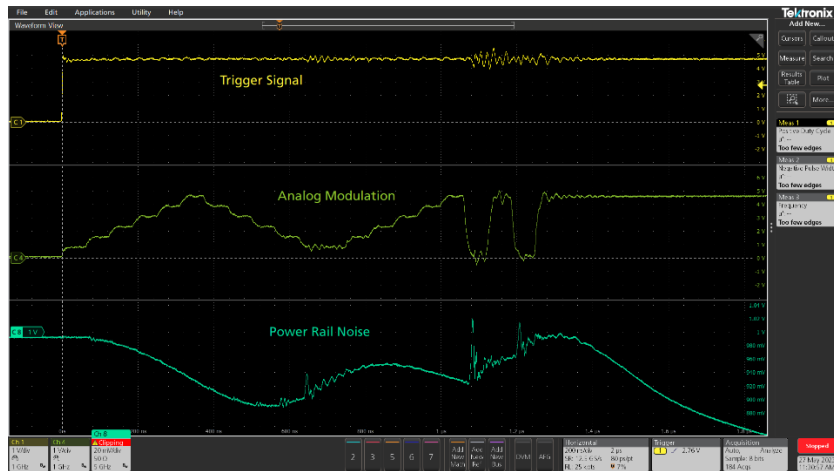
- Browser probe style
- Up to 50A (peak and average), Voltage 0.6V–72V
- Direct control of load current profile, Six steps (defined at the time of purchase), scales with power rail voltage
- Water-cooled, Very high-power density
- Custom-designed six (6) resistor solution
- 100% Duty Cycle. Enables infinite dwell time for slow load line loop testing and thermal (TDP) testing
- High speed load current pulse, < 500ps Switching
- Wattage < 50W average/peak
- GaN-enabled—Orders of magnitude faster edge speeds than other solutions, nS load steps possible

BENEFITS/APPLICATIONS:

- High-speed excitation for tight spaces
- Load emulation and transient testing for FPGA, AI, Big Data, Graphics and Servers
- Power Supply Testing and Measurement
- VRM and PDN Validation
- Rail noise evaluation
- Transient load step (large signal)
- SPICE/ADS State Space Average Model Development
- Verify large signal control loop stability. Pairs with SEPIA
- Thermal (TDP) testing
- IC Package evaluation



spring tips (or solder tabs optional) to facilitate connection to pads on the PCB.



The S50 can be modulated by a user defined analog source to create a wide variety of load patterns. Any sequence of the 6 pre-programmed currents can be turned on or off

Water-Cooled Browser Probe (S50)

The S50 provides load step testing orders of magnitude faster and higher than previously available. The open loop stepper is essentially a signal level voltage controlled switch that opens or closes a path from the power rail through a GaN FET and custom resistor. So, while the probe can be moved to rails of different voltages the step current will vary based on the power rail voltage.

The S50 probe comes with two break-out boards. One board turns on and off all load current levels together. The second board allows control of each level individually. But any form of control system can be used to control the probe current levels.

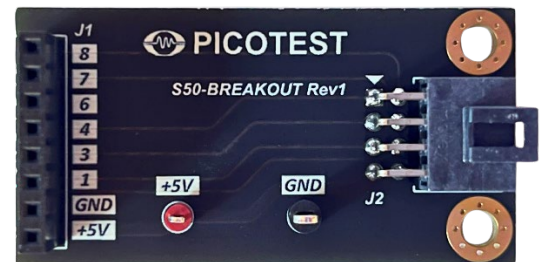
SPECIFICATIONS

S50 Probe	
Characteristic	Rating
Edge Rate (R/F time)	<500ps switching *
Repetition Rate	DC-50MHz (Limited by average power and dwell time)
Control	User Supplied – Digital logic generator or Micro-controller (3.3V or 5V)
Maximum Dwell Time	Up to 100%
Input voltage rating	Based on custom resistor *
Output current rating	Based on resistor up to 50A
Wattage	<50W avg.
Voltage	0.6V – 72V
Connector Type	SMPM pulse, spring tip

* Final signal edge speed is dependent on the load board design, voltage, and current. A 6-position water-cooled sub-ns browser step load probe. Resistance is set at the time of manufacturing. Any of the 6 resistors can be any value, they do not need to be the same.

WHAT's Included S50 Stepper

- S50 Water-Cooled Stepper Probe with six (6) customized load steps
- Cooling Tube
- Molex Cable
- PCOOLV1 Cooling Unit
- S50COMMON and S50BREAKOUT Controller Breakout Boards



The S50 probe comes with a water cooling pump, a control cable (black) and two breakout boards for simplified load step checkout and control.

For more information on Picotest products, applications, or services, please contact Picotest at info@picotest.com.

This information is subject to change without notice.

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Published in USA, 4/26
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