SpikeSafe SMU: Precision pulsed/DC current source with low noise digitizer, optimized for optoelectronic testing

20A High Current SpikeSafe SMU Source Measure Unit

- Fast, accurate pulses keep DUT junction temperature rise low, enhancing light measurement accuracy
- Hardware timing/triggering improves measurement repeatability
- Integrated true-differential digitizer supports sub-millivolt Vf measurements to 400V
- Optional BIAS source supports JEDEC junction temperature measurements
- Automatically project Vf(0) or generate IV plots using Vektrex Control Panel software Software

CONFIGURATION

1 source channel

DRIVE CAPABILITY

DC, SINGLE PULSE, CONTINUOUS PULSE, MONOPULSE, SWEEP, QCW and BIAS
20A
180V max compliance

MEASURE CAPABILITY

4 wire measure, ranges 10V, 100V and 400V

OVERVIEW

The SpikeSafe SMU is a precision pulsed source measure unit that precisely sources pulsed current and simultaneously digitizes voltage. It has fast rise/fall times, programmable load tuning and on-the-fly pulse width correction. Together, these features support short-pulse testing methods that subject devices under test (DUTs) to less heating and more uniform heating. The result is unmatched measurement stability - described by one customer as “crazy stable.” Continuous Power Conversion gives the SMU the power to drive DUTs for short periods or at DC – with no duty cycle limitations. The SMU’s true-differential digitizer easily captures millivolt forward voltage changes that provide insight into device characteristics such as thermal resistance. Finally, with Spikesafe protecting your devices, never again be concerned that your SMU will blow up your device, your wafer or itself.

ACCURATE AND REPEATABLE PULSING - AVAILABLE IN THREE VERSIONS

All SpikeSafe SMU models share the precision pulsing, programmable load tuning, and digital triggering features needed for accurate high-power optoelectronic testing. The 50μs SMU is an economical choice that provides pulsing from DC to 50μs. This model is ideal for millisecond-duration testing that is common in production binning. The 10μs model extends performance down to 10μs; it is a good choice for R&D parametric tests such as curve tracing, as its shorter pulses minimize junction temperature rise. The fastest 1μs SMU includes tweaks that improve pulse accuracy to better than +/-50ns, to support the most temperature sensitive devices like VCSELs.

EASILY AND RAPIDLY GENERATE IV AND LI CURVES

The SpikeSafe SMU’s include pulsed and QCW pulse modes that are ideal for I-V and L-I curve tracing. Narrow pulses combined with hardware timing mean the curves generated reflect the DUT’s characteristics at a constant junction temperature. The SMU’s high-power capability allows it to test devices such as MOSFETs at high currents just at the threshold of operation. Vektrex’s Control Panel software makes it easy to connect and operate the SMU.

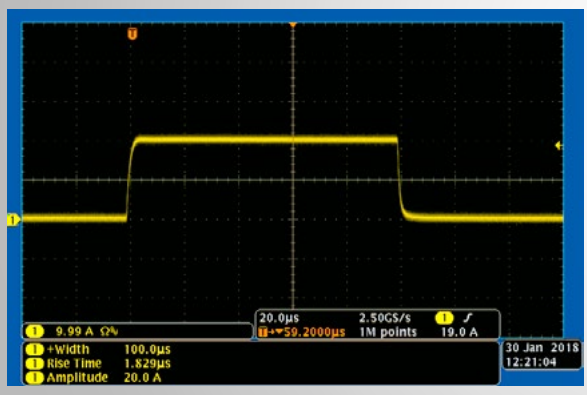
TRUE DIFFERENTIAL DIGITIZER

General-purpose SMUs typically make single-point voltage measurements, often with loosely specified timing. Digitizing voltmeters make sequential, timed measurements, but each is referenced to a common ground. This ground reference allows noise, such as power line noise, to mix with the desired signal, often completely masking the signal of interest. Vektrex’s SMU uses a balanced True Differential front-end to feed its 500ksps 18bit low-noise ADC. The balanced approach dramatically reduces common mode noise, allowing the SMU to measure small VF changes such as a 200uV shift in a high voltage LED caused by heating.

APPLICATIONS

- Measurements in constant current and pulsed modes
- Device Characterization
- High Speed Production
- Measurement Repeatability
- Calibration Applications
- In-Situ Junction Temperature Measurements
- Easily generate IV curves

20A SpikeSafe SMU



Precision pulsing plus a low noise digitizer allows you to see what you couldn't see.

The SMU's precise pulsing combined with its low-noise digitizer reduces noise and temperature effects that can mask signals and distort measurements. Using the SpikeSafe SMU, you can test your devices at greater power density levels, see their true performance, and make the accurate, repeatable measurements needed to improve device performance.

CURRENT SOURCE PERFORMANCE

Modes	DC, Single Pulse, Continuous Pulse, Monopulse, Sweep, Bias
Max Output Current	20A
Maximum Compliance Voltage	180V
Max DC Output Power	500W (Max 3.2kW m aux power)
Max Pulsed Output Power	1350W
Output Current Accuracy	0.04%+700µA (Low Range) 0.08%+4mA (High Range)

MEASURE PERFORMANCE

Measure Method	4 wire
Ranges	3 Ranges, 10V, 100V and 400V
Input Impedance	1MΩ -1.4MΩ
Coupling	DC Coupled, All Ranges
Maximum Common Mode	Sense+ or Sense- must be <420VDC from Chassis Ground or Force+ or Force-
ADC Sample Rate	500,000 samples/second, continuous sampling
Digitizer Type	True Differential
Resolution	18 Bits
Programmable Measurement Aperture	2µs to 400ms, 500kHz samples boxcar averaged to form measurement points
Measurement Trigger	Software or hardware
Hardware Trigger Edge Polarity	Programmable
Trigger Delay	Programmable 0 to 400ms, 2µs resolution
Measurement Points Per Acquisition	1 to 525
Autozero Function	Reduces measurement offset

PULSE PERFORMANCE

Time Base Accuracy	50ppm
Pulse Width Range	Min (1µs, 10µs, 50µs) to 15000s
Pulse Width Resolution	1µs (11ns with pulse width offset)
Pulse Width Accuracy	1.3µs (50ns with pulse width offset)
Pulse Period Range	30µs-30000s
Duty Cycle Range	0-100%
Pulse Width Jitter	<30ns typical
Rise/Fall Time	350ns to 4.5µs
Sweep Steps	3-10000 (Pulsed Sweep mode)

TRIGGER IN

Signal Type	3.3V logic (5V tolerant)
Polarity	Programmable
Programmable Delay	Programmable delay, 0µs to 30s
Delay Programming Resolution	1µs
Delay Jitter	Multiple Pulse Mode: 3.5

TRIGGER OUT

Signal Type	5V logic, 50Ω pull-up and open collector outputs
Polarity	Programmable
Trigger Jitter	<10ns typical
Programmable Delay	Programmable delay, 0µs to 30s

Follow this link to access complete specifications for the High Current SpikeSafe SMU.

VEKTREX