PVX-2505

50V, 10A PRECISION PULSED I-V PULSE GENERATOR

- **Output Voltage To +50V**
- **Output Current To 10A**
- **50% Maximum Duty Cycle**
- **Pulse widths from <1µS to 100µS**
- **Instrument-quality analog voltage and current monitors for data acquisition**
- **Designed for precision pulsing of semiconductor devices for pulsed I-V characterization**

The PVX-2505 pulse generator is designed for pulsed I-V (current-voltage) characterization of semiconductor devices at up to 50 Volts and 10 Amps. It is also well suited for other applications requiring high current, precision voltage pulses.

The I-V characteristics of semiconductor devices are functions of frequency and temperature. Curve tracers and other "DC" test systems typically step through a range of gate voltages and, at each gate voltage, sweep the drain voltage over the measurement range. The device essentially reaches thermal equilibrium and electronic (semiconductor-trap) equilibrium at each point, yielding different test characteristics than actual RF operational characteristics.

By pulsing the device using the PVX-2505 and taking a measurement during the pulse, the measurements can be taken before the device heats up. This circumvents the thermal effects associated with conventional "DC" testing, more closely approximates the characteristics of the device when operating at high frequencies, and doesn't activate the semiconductor "traps".

The PVX-2505 is designed using a bi-directional MOSFET output stage using DEI's DE-Series Fast Power MOSFETs. This design provides fast rise and fall times, with minimal overshoot, undershoot and ringing and fast settling times. This controlled voltage waveform allows the device under test (DUT) to stabilize at voltage within a few hundred nanoseconds, allowing I-V measurements to be made before device heating begins.

A quiescent (bias) voltage may be applied to the pulse generator, allowing the DUT to be held at a voltage other than zero, then pulsed above or below this voltage.

The PVX-2505 requires an input gate signal, pulse (VHIGH) and optional quiescent (VLOW) DC power supply inputs. The output pulse width and frequency are controlled by the input gate signal. The output voltage amplitude is controlled by the amplitude of the input VHIGH and optional VLOW DC power supply amplitudes.

The front panel controls and monitors provide the flexibility to operate in pulsed mode, or to switch to DC mode, in which the DC voltage generated by the VHIGH power supply is applied directly to the DUT. Integral instrument-quality voltage and current probes are provided to facilitate pulse data acquisition.

The output pulse is launched on an innovative, low-impedance cable. The design of this cable maintains the fidelity of the output pulse without introducing pulse distortion or ringing, and provides a convenient means of connecting the pulse generator to the DUT or bias tee.

The pulse generator is a direct-coupled, air-cooled solid-state design, offering equally fast pulse rise and fall times, low power dissipation, and minimal over-shoot, under-shoot or ringing. It has over-current detection and shut-down circuitry to protect the pulse generator from potential damage due to arcs and shorts in the load or interconnect cable.

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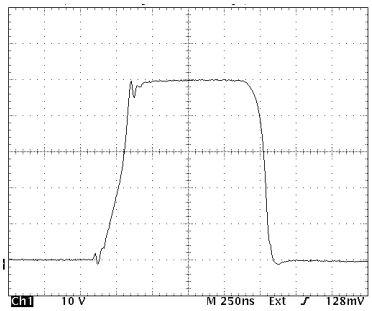
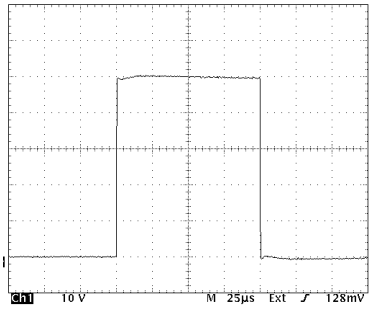
SPECIFICATIONS (All specifications measured into a 5Ω load connected with 4 feet (~1.2M) 5Ω coaxial cable)

PULSE (VHIGH) and QUIESCENT (VLOW) PULSE VOLTAGE INPUTS	
Maximum Value	75 volts DC, Floating
Minimum Value	0 volts DC
Input Connector	Screw terminals, Rear Panel
OUTPUT	
Maximum Value	50 volts at 10 A
Minimum Value	0 volts
Maximum Current	10 Amperes
Means of Adjustment	Controlled By Pulse Input Voltage
Pulse Rise Time	<200ns 50V (10%-90%)
Typical Settling Time (1)	<400ns, including rise time
Pulse Width	<1µs to 100µs, controlled by input gate
Pulse Recurrence Frequency	Single Shot to 50KHz, controlled by input gate
Maximum Duty Cycle	0.50 (50%)
Output Connector	15 pin D-sub, front panel. Pins 1-8 are pulse return and pins 9-15 are pulse output
MONITOR OUTPUTS	
Voltage Monitor	1V/V into 1MΩ, accuracy <±3% of the actual output voltage
Voltage Monitor Connector	Type BNC, Front Panel
Current Monitor	0.1V/A into 1MΩ, accuracy <±3% of the actual output current
Current Monitor Connector	Type BNC, Front Panel
CONTROL PULSE INPUT	
Source	External
Input Level	+5V ±1V into 50Ω
Rise Time	<20ns
Gate Input Connector	Type BNC, Front Panel
GENERAL	
Size	19” (48.25cm) W x 5.2” (13.2cm) H x 13” (33cm) D
Support Power	100-240VAC, 50/60Hz
SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE	

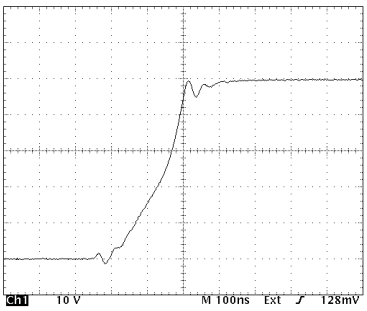
(1) Settling time is defined as the time from the 10% point to the 99% point of the pulse. Pulsed IV data acquisition of both current and voltage waveforms is most optimum when both derivatives are at or near zero. Therefore the data acquisition point should be set beyond the settling time of the pulse.



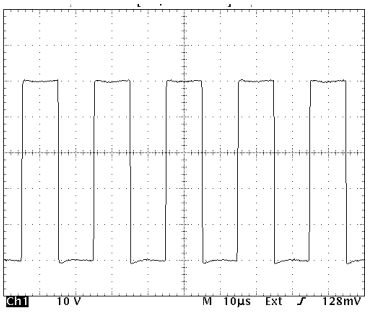
Typical 1µs Output Waveform, 50V 10A
(5Ω Load, 250ns/Div Horizontal Scale,
10V/Div Vertical Scale)



Typical 100µs Output Waveform, 50V 10A
(5Ω Load, 25µs/Div Horizontal Scale,
10V/Div Vertical Scale)



Typical Rise And Settling Times, 50V 10A
(5Ω Load, 100ns/Div Horizontal Scale,
10V/Div Vertical Scale)



50% Duty Cycle, 50KHz, 50V 10A
(5Ω Load, 10µs/Div Horizontal Scale,
10V/Div Vertical Scale)

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