4205-PG2

Dual-Channel Pulse Generator

- **Frequency range of 1Hz–50MHz**
- **Pulse width programmable from 10ns to near DC**
- **Dual independent channels**
- **Pulse amplitude range: 100mV–20V into 50Ω, 100mV–40V into 1MΩ**
- **Programmable parameters: Pulse width, duty cycle, rise time, fall time, amplitude, offset, delay, and pulse count**

The Model 4205-PG2 dual-channel pulse generator is an option for the Model 4200-SCS semiconductor characterization system. This pulse generator produces voltage pulses as short as 10ns or up to ±20V (into 50). Two pulse generators on one card provides you with the flexibility to apply pulses to two points on a DUT, such as the gate and the drain, simultaneously.

Using a supplied User Test Module, it is simple to incorporate pulse generation into KITE test sequences. The pulse generator can also be used as a stand-alone pulse generator using the pulse generator's Windows® GUI. This GUI can control a wide range of variables, including pulse frequency, duty cycle, rise/fall time, amplitude, offset, delay, and the ability to trigger single pulses and/or pulse chains.

The dual-channel pulse generator has a wide range of uses. Typical applications include:

- Charge pumping to characterize interface state densities in MOSFET devices
- Using AC stress pulses of varying frequencies to simulate real-world AC signals applied to clocked devices
- Basic clock generation for test vectoring and failure analysis
- Digital triggering

The pulse generator can be purchased as an upgrade to existing 4200-SCS systems (KTEI version 6.0 or above required) or as an option for new 4200-SCS systems.

Pulse I-V Solution Packages

Keithley also offers three complete pulse I-V packages for the Model 4200-SCS. These tightly integrated packages are turnkey solutions.

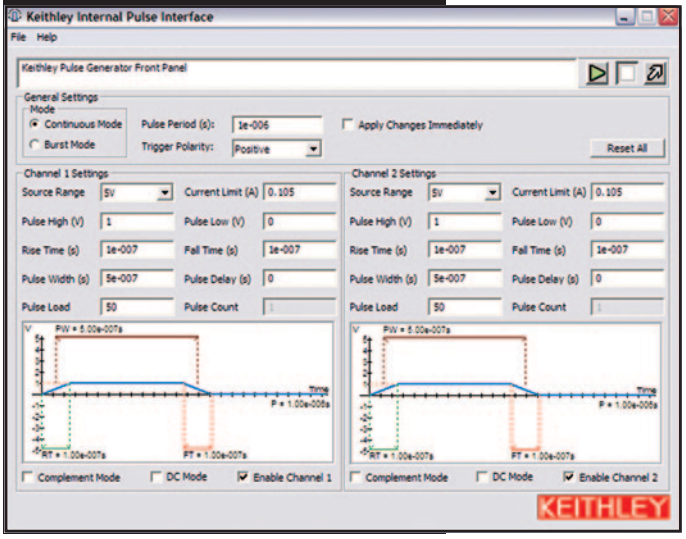
- 4200-PIV-A package performs charge trapping and isothermal testing for leading-edge CMOS research. It provides the functionality of a dual-channel pulse generator, dual-channel digital oscilloscope, specialized interconnect, and patent-pending pulse I-V software. All required connectors and cables are included.

  The specialized interconnect supports pulse I-V testing with either DC or RF cables, connectors, probes, etc. The interconnect also combines pulse and DC sources to a single DUT pin to allow both DC and pulse characterization without recabling or switching.

- 4200-PIV-Q package is designed for higher power pulse testing in III-V, LDMOS, and other high frequency and higher power FET devices. This package includes multiple 4205-PG2 pulse generators and a 4200-SCP2HR dual-channel digital oscilloscope, and it offers capabilities such as dual-channel pulsing, higher power pulsing than the 4200-PIV-A package, pulsing from a non-zero quiescent point, and pulse widths that can be adjusted from 500ns to near DC.

- 4200-FLASH package tests floating gate FLASH and embedded NVM memory. It uses the patent-pending Segment ARB™ waveform generator to test single FLASH memory cells or small arrays quickly and easily using four (or up to eight optional) independent, but synchronized, multi-level pulse channels. It also supplies the higher pulse voltages that are important for MLC technologies.

  It includes all the code and interconnect needed to perform a standard set of FLASH memory tests for NAND and NOR technologies.



For more information about the Model 4205-PG2, 4200-PIV-A, 4200-PIV-Q, 4200-FLASH, and Model 4200-SCS, see page 293.

4205-PG2 Dual-Channel Pulse Generator

4205-PG2 Specifications[1]

CHANNELS: Two.

PULSE/LEVEL[2]

		High Speed	High Voltage
Amplitude	**50Ω into 50Ω**	100 mV p-p to 10 V p-p	10 V p-p to 40 V p-p
	50Ω into 1MΩ	200 mV p-p to 20 V p-p	20 V p-p to 80 V p-p
DC Level		–5.0 V to +5.0 V	–20.0 V to +20.0 V
	Accuracy	±(3% + 50 mV)	±(3% + 100 mV)
Amplitude/Level Resolution			
	50Ω into 50Ω	1 mV	10 mV
	50Ω into 1MΩ	2 mV	20 mV
Output Connectors		SMA	SMA
Source Impedance		50Ω nominal	
	Accuracy	±0.5%	
Short Circuit Current		±200 mA	±800 mA peak
Baseline Noise		±(0.1 % + 5 mV) RMS typical	±(0.1 % + 5 mV) RMS typical
Overshoot/Pre-shoot/Ringing		±5% of amplitude ±20 mV[3]	±5% of amplitude ±80 mV
Output Limit		Programmable high and low voltage output levels	

TIMING

	High Speed	High Voltage
Frequency Range	1 Hz to 50 MHz	1 Hz to 2 MHz
Timing Resolution	10 ns	10 ns
RMS Jitter (period, width)	0.01% + 200 ps typical	0.01% + 200 ps typical
Period Range	20 ns to 1 s	500 ns to 1 s
Accuracy	±1% + 200 ps	±1%
Pulse Width Range	10 ns to (period – 10 ns)	250 ns to (period – 10 ns)
Accuracy	±3% + 200 ps	±(3% + 5 ns)
Transition Time (rise/fall time)	10 ns – 1 s variable	150 ns – 1 s variable
Resolution	10 ns	10 ns
Transition Slew Rate	10 nV/ns to 0.5 V/ns	40 nV/ns to 0.2V/ns
Accuracy	±1% for transition time ≥1 V/100 ns	±1% for transition time ≥0.4 V/100 ns
Linearity	3% for transition time ≥100 ns	3% for transition time ≥100 ns
Output Timing Fidelity	Pulse period and width are variable in 10ns steps without any output glitches or dropouts (outside the 10ns to 100ns window)	

NOTES

1. Unless specified otherwise, all specifications assume a 50Ω termination.
2. Level specs are valid after 50ns typical settling time (after slewing) for the high speed mode and after 500ns typical settling time (after slewing) for the high voltage mode.
3. For transition time >60ns.