

Semiconductor Curve Tracer CS-3000 Series

CS-3100

CS-3200

CS-3300

Best suited for measuring characteristics of different types of semiconductors including IGBTs, MOSFETs, transistors, and diodes

- Maximum peak voltage: 3,000 V (High voltage mode for all models)
- Maximum peak current: 1,000 A (CS-3300 High-current mode)
- All models support the Leakage mode (cursor resolution: 1 pA)
- USB for Screen copy and saving setups
- LAN interface for remote control



CS-3200 / CS-3300

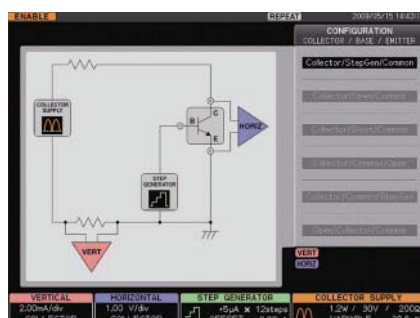


CS-3100

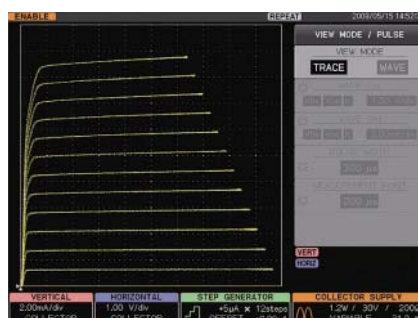
Lineup

	Product name	Model number	Remark
Main unit	Semiconductor curve tracer	CS-3100	3,000V / without HC mode - CS-301 / CS-500
	Semiconductor curve tracer	CS-3200	3,000V / 400A (HC mode) - CS-302 / CS-500
	Semiconductor curve tracer	CS-3300	3,000V / 1,000A (HC mode) - CS-302 / CS-500
Fixture	Fixture S	CS-301	Standard for CS-3100.
	Fixture M	CS-302	Standard for CS-3200 / CS-3300.
Test adapter	Test adapter	CS-500	1 test adapter comes with the main unit.
	TO type test adapter	CS-501	Socket suited to the TO type package (with 3 terminals)
Alligator clip	Small alligator clip (red) x 10	CS-001	Option for CS-302 M: CS-302.
	Small alligator clip (black) x 10	CS-002	Option for CS-302 M: CS-302.
Software option	Semiconductor parameter search	CS-800	This is a software option to be installed in the CS-3000 series.
	Semiconductor parameter measurement	CS-810	This option can be used on the (optional) PC when the CS-800 is installed in the main unit.

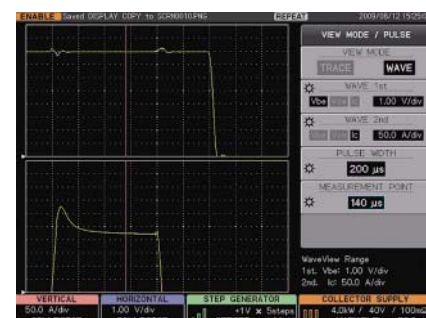
User-friendly measurement screen



Graphical configuration selection



Transistor V-I characteristic example (TRACE mode)



Vbe and Ic waveforms in the High-current pulse mode (WAVE mode)

Support of the maximum peak voltage of 3,000 V and the maximum peak current of 1,000 A

●Display

The 8.4-inch clear screen displays the waveform details. This large screen displays the menu and parameters without limiting the waveform grid.

●Connectivity

The CS-3000 series features a USB port on the front panel, facilitating report creation. Screen images can be saved to a USB device by pressing the COPY button.

●Readout

The readout display, which is color-coded by function, displays operation settings in an easy-to-understand way.

●Breaker

Breakers for high voltage and high current (CS-3200/3300) are provided on the front panel.

●Fast activation

●Menu operation section

Use the function knob and function keys to operate the menu.

●COPY button

●CONFIGURATION button
This shows the connection and signal application status on the display.

●Step generator

The step setting and offset can be manipulated using this dedicated knob.



●VIEW/PULSE button

This is used to switch between the TRACE and WAVE views. In the WAVE view, the screen displays the time axis waveform of the applied voltage and current, which conventional curve tracers could not be used to observe.

●VERTICAL and HORIZONTAL knobs
These dedicated knobs are located in an easily accessible position.

●VARIABLE knob

This is used to adjust the output voltage of the collector supply. A durable knob is designed due to frequent use.

Standard accessories for CS-3100



CS-301 fixture S



CS-500 blank test adapter

When the CS-510 is mounted

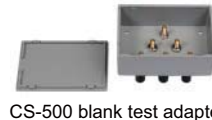


*CS-501 is optional.

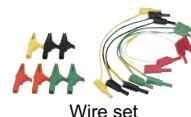
Standard accessories for CS-3200 and CS-3300



CS-302 fixture M



CS-500 blank test adapter



Wire set

When the patch panel is removed



CS-500 test adapter

CS-500 Blank Test adapter comes with the product. Use this adapter to connect the prepared jig by customer to the fixture.



CS-501 TO type test adapter

This socket is suited to the TO type package (with 3 terminals). The supported lead distance is from 1.52 to 4.57 mm.



CS-001 (red x 10pcs.), CS-002 (black x 10pcs.) Small alligator clip

These small alligator clips can be attached to the wire set supplied with the CS-302 fixture.



Power curve tracer (Custom made)

Ideal for measuring power device characteristics

High voltage mode

Output voltage : 500 V to 10 kV
Output current : Up to 500 mA
Output pulse width : 700 to 4,500 μ s (in 1 μ s steps)

High current mode

Output voltage: 0 V to 50 V
Output current: Up to 8,000 A can be supported.
Output pulse width: 700 μ s (fixed)



10 kV curve tracer (Custom made)

Ideal for measuring the withstand voltage characteristic of high voltage diode thyristors

Output section

Voltage waveform: Commercial power supply half-wave rectification waveform
Maximum voltage: 10 kV at peak (without load)
Maximum current: 100 mA at peak

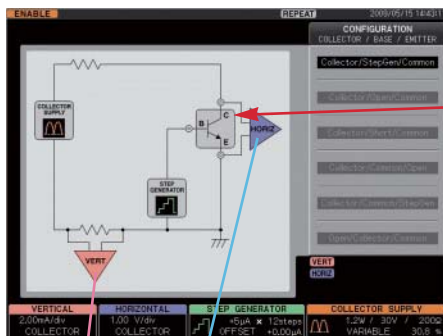
Display section

Voltage axis sensitivity: 50 V/div to 1,000 V/div, 5 ranges at 1-2-5 step
Current axis sensitivity: 0.1 mA/div to 10 mA/div, 7 ranges at 1-2-5 step



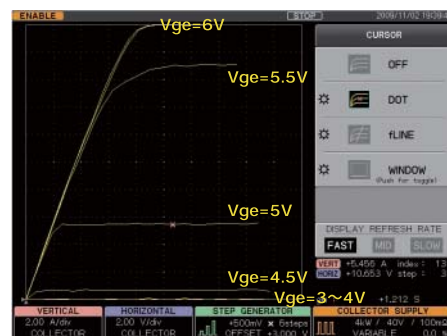
Observation of V-I curves as well as applied waveforms of voltage and current

Application of the current and voltage pulses in the high current mode

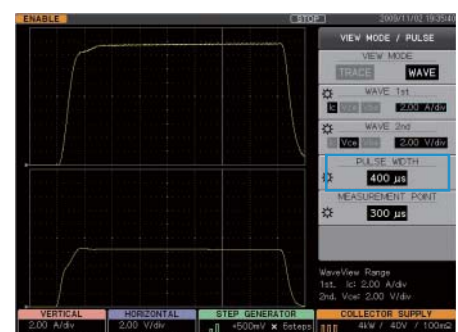
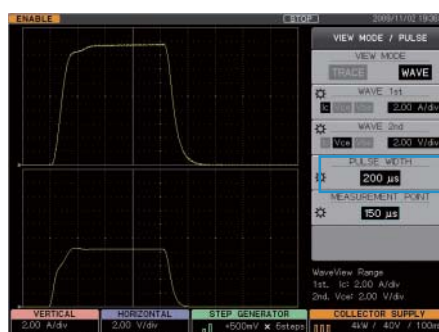
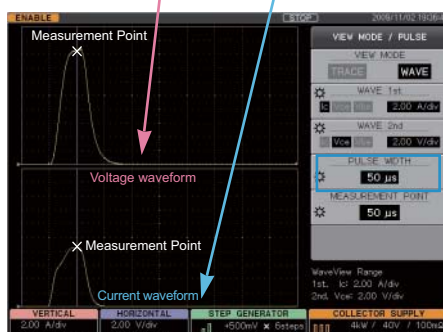


connection
status of
a measurement
device

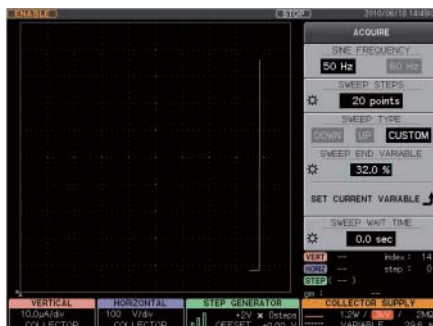
Example of measuring MOSFET “current - voltage” characteristics



The pulse widths of the applied current and voltage and the measurement point can be specified in the range from 50μs to 400 μs (CS-3200 and CS-3300).



SWEEP TYPE can be selected from DOWN, UP, and CUSTOM (all models).
With CUSTOM specified, the range between specified values can be swept.



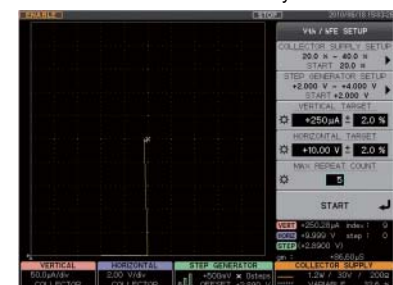
CS-800 semiconductor parameter search (optional)



This is the main unit software option that supports the voltage and current limit function, as well as automatic Vth measurement.

Vth and hFE SETUP

V_{th} and h_{FE} can be automatically measured.



Example of automatic Vth measurement

Remote tool

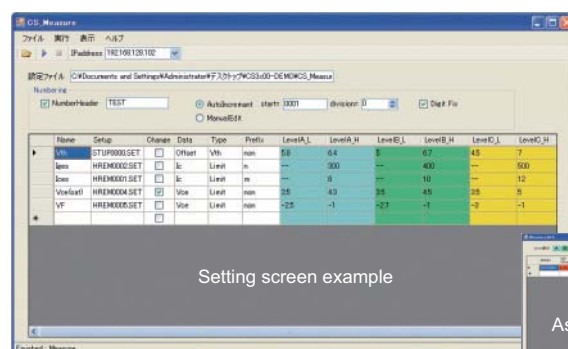
If the use of USB memory is not permitted for security reasons, a copy of the screen, measurement results in the CSV format, and other data can be directly transferred to the PC via LAN.

*The remote software is provided at free. However, an NI VISA library (which is not free) is necessary to use this software.



CS-810 semiconductor parameter measurement (optional)

This is a PC application used to connect the main unit incorporating CS-800 and an (optional) PC by LAN. This application automatically performs measurement by applying the measurement conditions specified using the PC to determine whether data is appropriate.



Setting screen example

Assessment example

Semiconductor Curve Tracer CS-3000 Series

Model		CS-3100	CS-3200		CS-3300	
Collector supply						
Mode	High voltage	AC, ± Rectified SIN, ± DC, ± LEAKAGE				
	High current	—		Pulse only		
Maximum peak power	120 mW, 1.2 W, 12 W, 120 W, 390 W *390 W can be selected excluding the maximum peak voltage setting at 3,000 V range.					
	—		High current mode (400 W, 4 kW)		High current mode (400 W, 4 kW, 10 kW)	
High voltage mode			Maximum peak current(maximum peak pulse current)		Maximum peak voltage	
			75 mA (150 mA)		3,000 V (2,500 V for AC)	
			750 mA (1.5 A)		300 V	
			7.5 A (15 A)		30 V	
Loop compensation	The floating capacitance between the collector terminal and the ground of the fixture is compensated by the hardware in the high voltage mode. Digital compensation is also available.					
High current mode (pulse only)	—		Maximum peak current		Maximum peak voltage	
			400 A		40 V	
			40 A		40 V	
Pulse width/measurement point	—		The pulse width is variable in the range from 50μs to 400 μs. Measurement points can be specified (with a resolution of 10 μs/step).			
Maximum data points	20 to 1,000 points can be specified per trace.					
Step generator						
Current mode	Amplitude range: 50 nA to 200 mA, 21 ranges, 1-2-5 step Maximum current: ±2A / Offset: ±10 times STEP AMPLITUDE setting					
Voltage mode	Amplitude range: 50 mV to 2 V, 6 ranges, at 1-2-5 step Maximum voltage:±40V / Offset: ±10 times STEP AMPLITUDE setting					
Step rate	Staircase wave: 2times of 50 Hz or 60 Hz (50 Hz or 60 Hz in the AC mode)		Staircase wave: 2times of 50 Hz or 60 Hz (50 Hz or 60 Hz in the AC mode) Pulse: The pulse changes in the range from 80ms to 1,000 ms. (The lowest frequency limited by the maximum peak power consumption setting.)			
Pulse step	The pulse width is variable in the range from 50 μs to 400 μs at 10μs resolution.					
Number of steps	0 to 20steps					
AUX output						
Range	OFF, -40 to +40 V, variable with at 100mV resolution					
Vertical axis						
Collector current	Range	High voltage mode: 1 μA/div to 2 A/div, 20 steps, 1-2-5 switching				
		—	High current mode: 100 mA/div to 50 A/div, 9 ranges, at 1-2-5 step		High current mode: 100 mA/div to 100 A/div, 10 ranges, at 1-2-5 step	
	Accuracy	2% of readout + 0.05 × VERT/div setting or better (The internal loop correction error below must be added to the formula.) 3 kV range: 6 μA, 300 V range: 1 μA, 30 V range: 0.5 μA (Defined for the current level of 10% or larger of each voltage range.)				
Emitter current (LEAKAGE)	Range	1 nA/div - 2 mA/div, 20 ranges, at 1-2-5 steps				
	Accuracy	2% of readout + 0.05 × VERT/div setting +1nA or lower				
Horizontal axis						
Collector voltage	Range	High voltage mode: 50 mV/div to 500 V/div, 13 ranges, at 1-2-5 step				
		—	High current mode: 50 mV/div to 5 V/div, 7 ranges, at 1-2-5 step			
	Accuracy	2% of readout + 0.05 × HORIZ/div setting or better				
Base/emitter voltage	Range	50 mV/div to 5 V/div, 7 ranges, at 1-2-5 step				
	Accuracy	2% of readout + 0.05 × HORIZ/div setting or better				
Miscellaneous						
Display	8.4-inch color TFT-LCD (SVGA 800 x 600 pixels)					
Data save / recall	Internal: Memory (setup: 256, REF waveform: 4) External: Removable storage connected to the USB port (setup, waveform save / recall, screen hard copy)					
USB	1 port (USB1.1)					
Remote control	Remote control by LAN: 1 port (100BASE-TX)					
Power supply/Power consumption	Power supply input range: 100V to 240 V AC, 50/60 Hz/ Power consumption: 500 VA					
Accessories	CS-301 (fixture S) / CS-500 (blank test adapter) / operation manual, power cord		CS-302 (fixture M) / CS-500 (blank test adapter) / wire set, operation manual, power cord			
Mechanism section						
Dimensions (mm)	424 (W) x 555.2 (L) x 221 (H) (without the external projection portion)		424 (W) x 555.2 (L) x 354.5 (H) (without the external projection portion)			
Weight	Approx. 28 kg (without optional accessories)		Approx. 43 kg (without optional accessories)			
Environmental conditions	Operating temperature: 0 to +40 °C, performance guarantee temperature: +10 to +35 °C					