IWATSU

Semiconductor Curve tracer

CS-10000 Series
10kV～15kV ～8,000A

CS-5000 Series
5kV ～1,500A

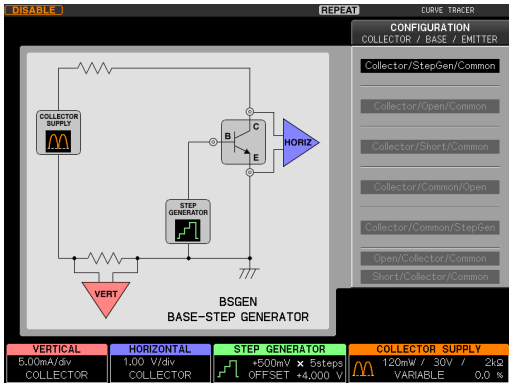
CS-3000 Series
3kV ～1,000A

Multipurpose Unit Measures
Leakage Current and High Current.
Auto Measurement Supported!

The best solution to properly measure semiconductors such as IGBTs, MOSFETs, TRANSISTORs and DIODEs from small to large quantities.

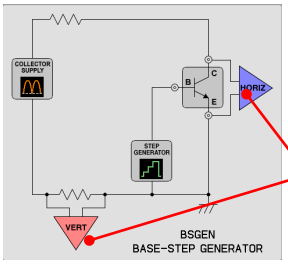
Advanced functions for your ease of use

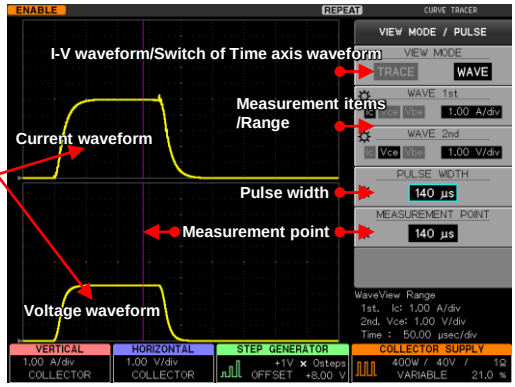
■The configuration is displayed in the setup display area under CONFIGURATION key sets. Appropriate configuration can be selected for each device test.



■Confirm applied voltage and current with waveforms in Wave mode.

- The pulse width and the measurement point can be specified even when you are confirming the applied waveform (current and voltage) to the device based on the time axis as with oscilloscopes.
- By confirming the waveform, appropriate pulse width and measurement timing can be decided.
- Since our products give no waveform influences such as probing of oscilloscopes, etc., abnormal signals are confirmable.
- This function also helps to confirm the anomalies caused by heat such as a oscillation, etc.

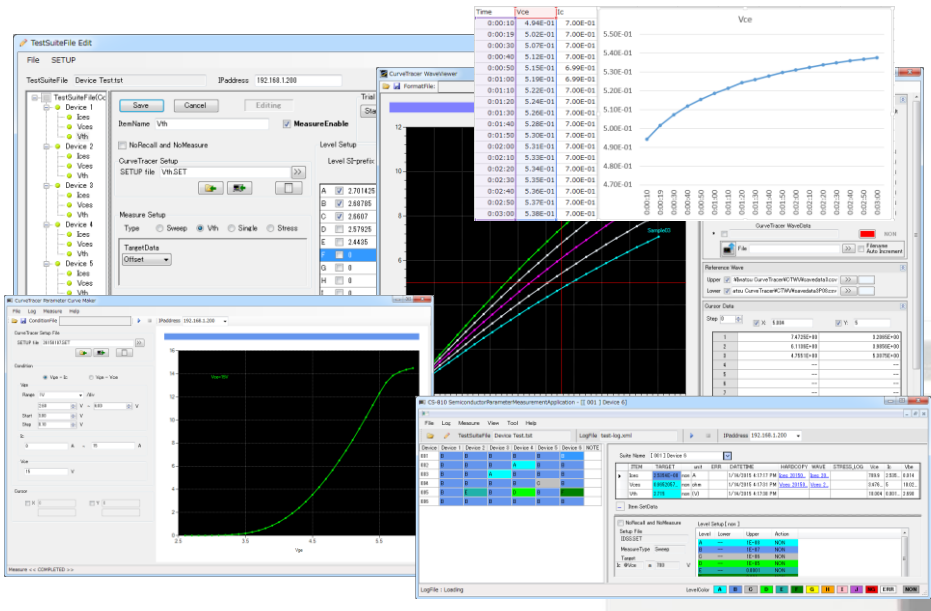




Full detailed automation with PC

■Semiconductor parameter measurement with CS-810 (optional)

This software application performs various kinds of auto measurements through remote control of the main unit.
This software can execute stress test; which is difficult using traditional curve tracers, and can measure temperature characteristics of many devices, while controlling at the same time a hotplate and a thermostatic chamber.

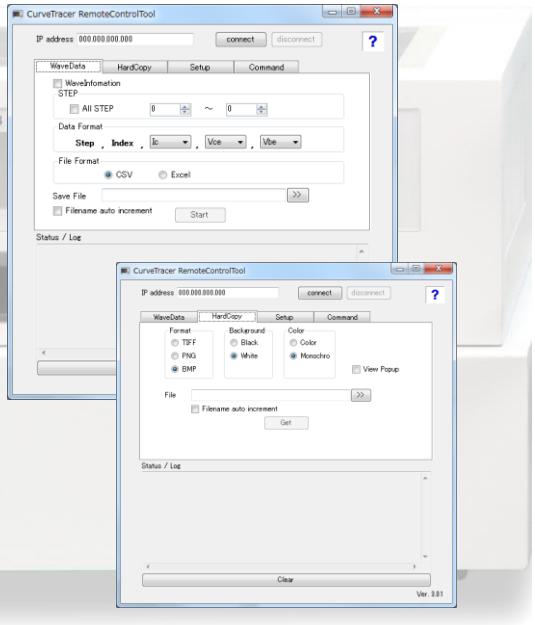


■USB memory:

Graphic Images, Data, and Setup conditions can be saved.
Graphic Images can be saved in various formats: TIFF,BMP,PNG. Black/White selection for color of background, color/monochrome selection are available.
Waveform data can be saved in Text and in Binary at the same time.

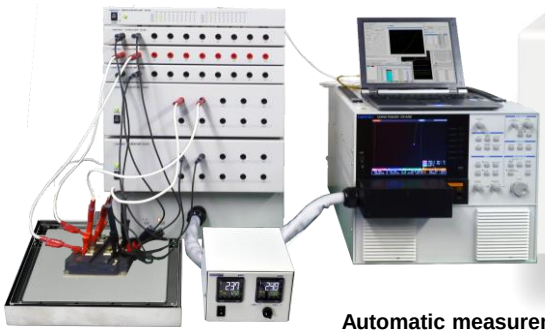
■Remote Control tool (free download)

Where security policy restricts use of USB, the remote control tool for PC can be used.



■Ethernet:

Ethernet socket provided as a standard function (on the back side of Main unit)



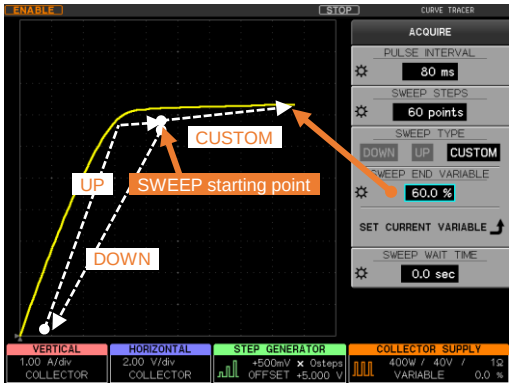
Automatic measurement connecting with PC, Scanner, Thermostatic chamber, etc. are available.

■ Sweep

Number of points, sweeping speed, the resolution, and the direction of sweeping can be configured as needed. The custom sweep mode performs sweeping only on the specified range, high speed resolution measurement is performed at auto-measurement.

■ Limit-SWEEP function (requires optional CS-800)

This function puts limits on current and voltage produced through usual sweep measurement for device protection and stopping the sweep at the targeted value.

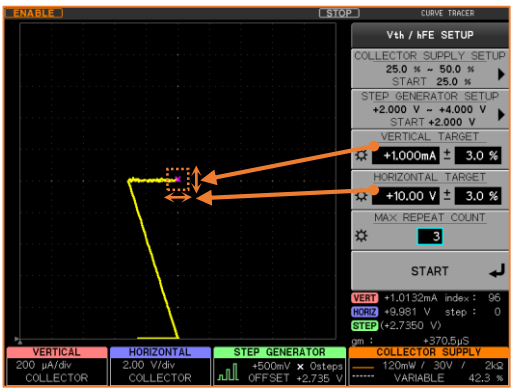


■ CONSTANT function with CS-800 (optional)

Bias constant voltage or constant current.
With combination of semiconductor parameter measurement software CS-810, the curve tracer supports Auto stress test.

■ Vth-hFE auto search function (requires optional CS-800)

This function automatically finds the Vth-hFE. No complicated operations are needed.



Separate knobs for easy operations

CS-5000 Series (5kV)

Best suited for measuring the breakdown of a power device having 3,300V withstanding voltage

- Max. Peak Voltage: 5,000V (High-Voltage mode)
- Max. Peak Current: 1,500A (CS-5400 High-Current mode)
- All models support the LEAKAGE mode (Cursor resolution:1pA)

CS-5400

5kV
CS-5400 1,500A (HC mode pulse)

CS-5200/5300

5kV
CS-5300 1,000A (HC mode pulse)
CS-5200　400A (HC mode pulse)

CS-5100

5kV
CS-5100 (HC mode not equipped)

Collector supply HV mode

Model	**CS-5000 series**
Mode/Polarity	Rectified SINE +/-, DC +/-, LEAKAGE +/-, AC
Max. Peak Voltage/Current	Max. Peak Voltage / Max. Peak Current (Max. Peak Pulse Current) 5kV / 25mA (25mA) 300V / 750mA (1.5A) 30V / 7.5A (15A)
Max. Peak Power	At 5kV：320mW/3.2W/32W　At 30V,300V：120mW/1.2W/120W/390W
Horizontal axis range	50mV～500V/div

Collector supply HC mode (CS-5100 does not equip with HC mode)

Model	**CS-5100**	**CS-5200**	**CS-5300**	**CS-5400**
HC mode				
Mode/Polarity		Pulse +/-		
Max. Peak Current Max. Peak Power Max. Peak Voltage	No HC Mode equipped	Max. Peak Current/ Power / Max. Peak Voltage 400A / 4kW / 40V 40A / 400W / 40V	Max. Peak Current/Power / Max. Peak Voltage 1,000A / 10kW / 40V 400A / 4kW / 40V 40A / 400W / 40V	Max. Peak Current/Power / Max. Peak Voltage 1,500A / 12kW / 30V 600A / 4.5kW / 30V 60A / 450W / 30V
Pulse width		Pulse width : variable between 50µs and 400µs (Resolution :10µs)		
Measurement point		Measurement point can be specified. (Resolution :10µs)		
Vertical range		100mA～50A/div	100mA～100A/div	100mA～200A/div
Test Fixture	CS-303			CS-304

CS-3000 Series (3kV)

Standard models suitable for parameter measurement of various semiconductors including IGBTs, MOSFETs, transistors and diodes, etc.

CS-3200/3300

- Max. Peak Voltage 3,000V (High-Voltage mode)
- Max. Peak Current 1,000A (CS-3300 High-Current mode)
- All models support the LEAKAGE mode (Cursor resolution:1pA)

3kV
CS-3300 1,000A (HC mode pulse)
CS-3200 400A (HC mode pulse)

CS-3100

3kV
CS-3100 (HC mode not equipped)

Collector Supply HV mode

Mode	**All CS-3000 Series**
Mode/Polarity	Rectified SINE +/-, DC +/-, LEAKAGE +/-, AC
Max. Peak Voltage/Current	Max. Peak Voltage: 3kV — Max. Peak Current (Max. Peak Pulse Current): 75mA (150mA) Max. Peak Voltage: 300V — Max. Peak Current (Max. Peak Pulse Current): 750mA (1.5A) Max. Peak Voltage: 30V — Max. Peak Current (Max. Peak Pulse Current): 7.5A (15A)
Max. Peak Power	120mW / 1.2W / 120W / 390W* (*Setup is not available when Max. Peak Voltage 3kV is used.)
Horizontal axis Range	50mV～500V/div

Collector Supply HC mode (CS-3100 does not equip with HC mode)

Model		**CS-3100**	**CS-3200**	**CS-3300**
HC Mode				
	Mode/Polarity		Pulse +/-	
	Max. Peak Current Max. Peak Power Max. Peak Voltage	No HC mode equipped	Max. Peak Current/Power: 400A / 4kW — Max. Peak Voltage: 40V Max. Peak Current/Power: 40A / 400W — Max. Peak Voltage: 40V	Max. Peak Current/Power: 1,000A / 10kW — Max. Peak Voltage: 40V Max. Peak Current/Power: 400A / 4kW — Max. Peak Voltage: 40V Max. Peak Current/Power: 40A / 400W — Max. Peak Voltage: 40V
	Pulse width		Pulse width: Changeable between 50μs to 400μs (Resolution: 10μs)	
	Measurement point		Measurement point can be specified. (Resolution: 10μs)	
	Vertical axis range		100mA～50A/div	100mA～100A/div
Test Fixture		CS-301	CS-302	

Analog Curve Tracer (10kV-)

Best suited for the measurement of high voltage diodes and thyristors

Output

Voltage waveform	:	Commercial Power supply half-wave rectification waveform
Max.Voltage	:	10kV Peak (when no loading)
Max. Current	:	100mA Peak or 400mA

Display

Voltage range	:	50V/div～1,000V/div (1-2-5 steps)
Current range	:	0.1mA/div～10mA/div or 50mA/div

Customers' special specifications are welcome.
Please contact us.

CS-10000 Series (10kV, 12kV, 15kV)

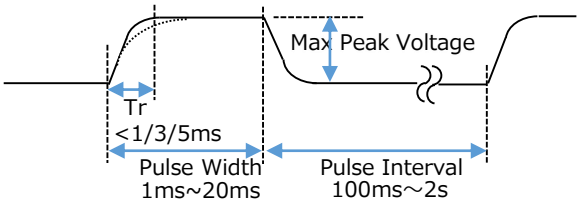
Best suited for the chips with very high voltage and very high current, CS-3100 + UHV + HC

CS-15800 15kV 8,000A
CS-12800 12kV 8,000A
CS-10800 10kV 8,000A
CS-10400 10kV 4,000A

This series is sold-on-demand.
Please confirm the specification and
the delivery date at the time of estimation.
Requests for customization are welcome.

Optional Pulse Unit

This optional unit minimizes parameter variation caused by heat. Pulse rise time can be configured for 1, 3, or 5ms; pulse duration from 1ms to 20ms; and pulse interval from 100ms to 2 seconds. This option is installed at the factory. Any changes desired after purchase will require return to IWATSU factory.



Collector Supply HV mode

Model	**CS-10000 Series**
Model/Polarity	Rectified SINE +/-, DC +/-, LEAKAGE +/-, AC
Max. Peak Voltage/Current	Max. Peak Voltage: 3kV / Max. Peak Current (Max. Peak Pulse Current): 75mA (150mA) Max. Peak Voltage: 300V / Max. Peak Current (Max. Peak Pulse Current): 750mA (1.5A) Max. Peak Voltage: 30V / Max. Peak Current (Max. Peak Pulse Current): 7.5A (15A)
Max. Peak Power	120mW / 1.2W / 120W / 390W* (*Setup is not available when Max. Peak Voltage 3kV is used.)

Collector Supply UHV mode

Model	**CS-10400/CS-10800**	**CS-12800**	**CS-15800**
Mode/Polarity	DC +		
Max. Peak Voltage/Current	Max. Peak Voltage: 10kV / Max. Peak Current: 400mA	Max. Peak Voltage: 12kV / Max. Peak Current: 266mA	Max. Peak Voltage: 15kV / Max. Peak Current: 266mA
Max. Peak Power	40W / 400W / 4kW	32W / 320W / 3.2kW	40W /400W / 4kW

Collector Supply HC mode

Model	**CS-10400**	**CS-10800/12800/15800**
Mode/Polarity	Pulse +/-	
Max. Peak Current Max. Peak Power Max. Peak Voltage	Max. Peak Current / Power: 4,000A / 60kW / Max. Peak Voltage: 60V Max. Peak Current / Power: 400A / 6kW / Max. Peak Voltage: 60V Max. Peak Current / Power: 40A / 600W / Max. Peak Voltage: 60V	Max. Peak Current / Power: 8,000A / 80kW / Max. Peak Voltage: 40V Max. Peak Current / Power: 4,000A / 60kW / Max. Peak Voltage: 60V Max. Peak Current / Power: 400A / 6kW / Max. Peak Voltage: 60V Max. Peak Current / Power: 40A / 600W / Max. Peak Voltage: 60V
Pulse width	50μs~900μs , 50μs~120μs (at 8,000A) (Resolution:10μs)	
Measurement point	Measurement point can be specified. (Resolution :10μs)	
Horizontal axis range	100mA～1,000A/div	

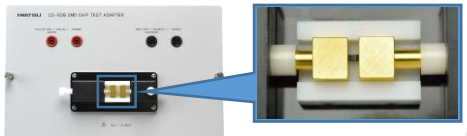
Test adaptors

■ Test adaptors for discrete packages

CS-500 (Standard)
Test adaptor:
Used to connect your tool to Test Fixture.

Heat resistant TO Socket
200℃、350A (500μs)

Test Fixture for TSSOP 14
※Test Fixture
Not for CS-301



CS-508
Adaptor for SMD type
※Test Fixture
Not for CS-301

Connector pins on the bottom of Socket

CS-501A
TO-220/247

CS-502
AXIAL

CS-503
TO-263-3/ D2PAK

CS-504
TO-252-3

CS-505
TO-263-7

CS-506
TO-252-5

CS-507
SC-70-3/ SOT-323-3

CS-509
SC-59A/ SOT-23-3

CS-510
SC-62/ SOT-89

Contact us if other types of sockets are needed.

Standard accessories

Use test adaptors on measurements of devices.
Test Fixtures equips the safety mechanism in which the measurement stops when the cover opens.

Test Fixture S

Test Fixture S
CS-301
(comes with CS-3100)

Test Fixture M

This Test Fixture can measure a device up to 235mm×180mm.
Place the patch panel when TO adaptor used.

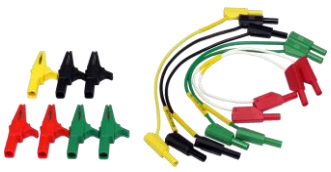
Test Fixture M
CS-302
(comes with CS-3200/3300)
CS-303
(comes with CS-5100/5200/5300)

Test Fixture M
CS-304
(comes with CS-5400)

Example:
Test Fixture attached

(Note: Test adaptor is optional and does not come with the unit.)

Patch-panel for Test Fixture M
(comes with all units except CS-3100)



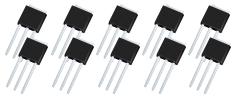
Standard set of leads
CS-005
(comes with all units except for CS-3100)
Banana cables (2 red for HV, 2 green, 2 black, 1 yellow)
Alligator clip (2 Red , 2 green, 2 black, 1 yellow)

Cable for High Current (a set of two)
CS-006
(comes with CS-5400) 20cm
CS-007
(comes with CS-10400/10800/12800/15800) 30cm

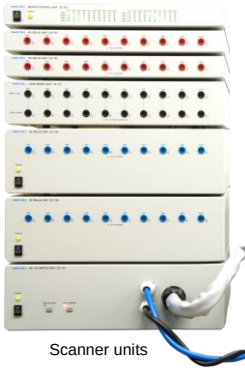
Contact us for custom-made cables. We can change clips, lengths, withstand voltages, etc.

Scanner System : CS-700

The CS-810 software application provides automatic connection for multiple devices in a single package including commonly available modules containing 6 devices. It can also be used to individually connect to and test up to 10 single devices. CS -810 also controls relay units, thermostatic chambers and hot plates, so it can measure the temperature characteristics of each chip in 6 in 1 modules. (CS-800 and CS-810 required for scanner operation)

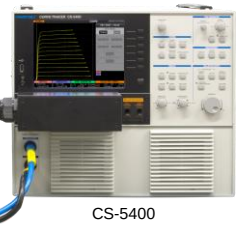


Test Fixture CS-307



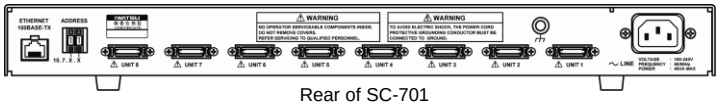
Scanner units

Software Application CS-810



CS-5400

Switch Controlling Unit

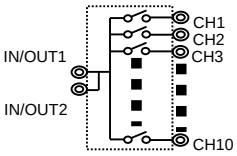


Rear of SC-701

CS-701

SC-701 is required so the CS810 software can control each CS-700 scanner unit up to 8 units, by connecting a PC through Ethernet. Multiple CS-701 (Max.10 units) can operate in parallel if given IP addresses.

Relay Unit

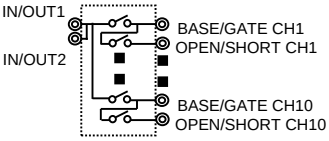


LV Relay Unit
CS-702
300V/7.5A/30A (Pulse)
10CH

HV Relay Unit
CS-703
5kV/0.5A
10CH

HC Relay Unit
CS-704
2kV/7.5A/1,500A (Pulse)
10CH

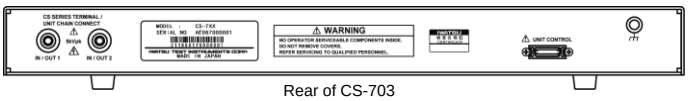
When 6 in 1 module is measured, this unit can short-circuit G and E, or C and G on unused circuits on the device.



Gate/Short Unit
CS-707
Curve tracer side:
300V/7.5A/15A (Pulse)
Device side:
5kV/7.5A/15A (Pulse)
10CH

HV-HC Relay Unit
CS-708
5kV/7.5A/1,500A (Pulse)
2CH

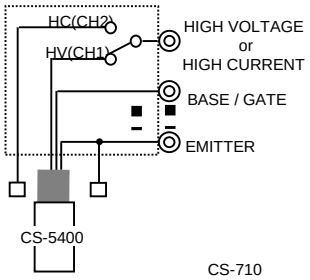
HV-HC Relay Unit
CS-709
5kV/7.5A/1,500A (Pulse)
4CH



Rear of CS-703

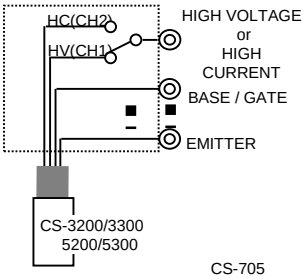
Extension Unit

HV/HC Switch Unit
CS-710
5kV/1,500A (Pulse)
HV/HC switching (Auto/Manual)
supported For CS-5400



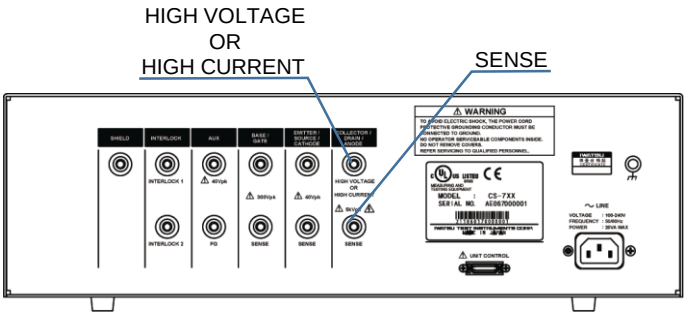
CS-710

HV/HC Switch Unit
CS-705
5kV/1,000A (Pulse)
HV/HC switching (Auto/Manual)
supported For CS-3200/3300/5200/5300

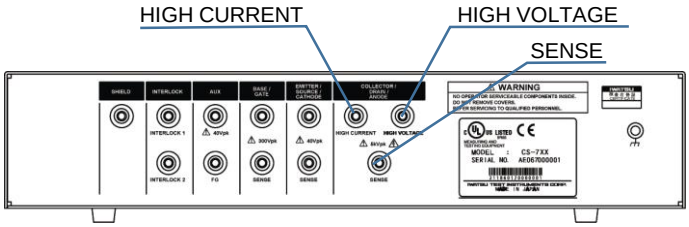


CS-705

Extension Unit
CS-706
5kV/1,000A (Pulse)
In case CS-5400 is used, modifications are required.



Rear of CS-705/710

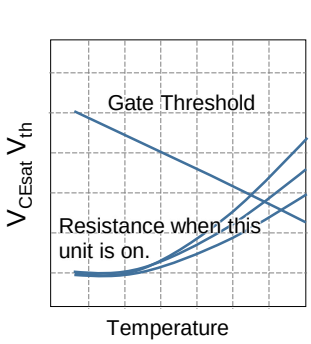


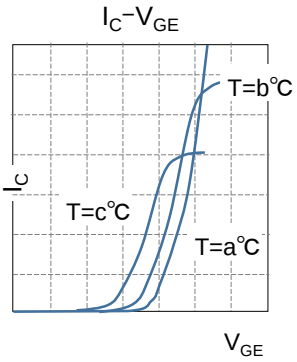
Rear of CS-706

Hotplates, Test Fixtures, thermostatic chambers that support establishment of Automatic temperature measurement system

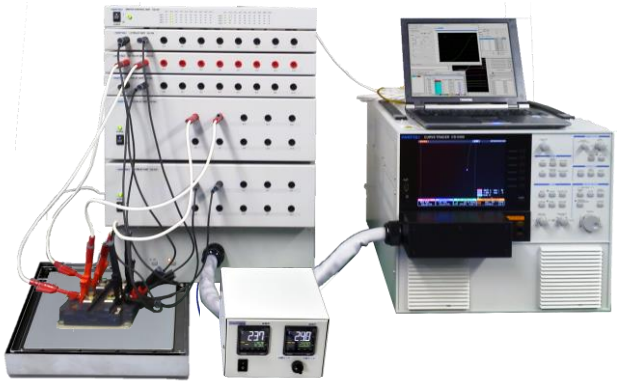
■ Temperature characteristics measurement

CS-810:Parameter measurement of semiconductors automatically measures temperature characteristics, controlling the scanner system and hotplates, etc.





The picture on the right is a hotplate controllable combination of curve tracers, hotplates, and scanners. It provides a means to perform automatic measurement of multiple devices, such as IGBT 6 in 1 module, etc.



Example: connecting the unit to IGBT 2 in 1 module.

Test Fixture with hotplate functions CTJ1050
Maker：CATS Inc.
Max. Temperature：200℃
Max Voltage on devices 5kV
(Insulating surface of heater 5kV)
Max. Current：1,000A
Interlocking
(when you open the cover, curve tracer stops output.)

Hot-Plate PA3020/PA3040
Maker：MSA Factory Co., Ltd.
Max. Temperature：300℃
Hot plate measurement：
PA3020：200×200(mm)
PA3040：200×400(mm)
Monitor Temperature by External temperature sensor.
(Surface of hotplate is not isolated.)

Thermostatic chambers are available.
Contact us for the details.

Prober cable:
This is used to equip terminals of curve tracers inside Probers and Test Fixture L.

Prober cable
CS-308
For CS-5400

Prober cable
CS-306
For CS-3xxx/5xxx
(Except CS-5400)

Internal terminals portion

Test Fixture L
CS-305
Cooling fan, LED light, Warning light, Power supply outlet and Interlock are equipped.
External dimensions:
630Wx520Hx530D(mm)

Test Fixture L
CS-307
Interlock equipped
External dimensions:
500Wx520Hx520D(mm)

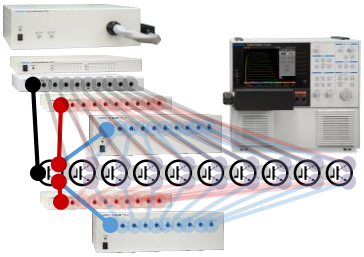
Application software : CS-810 semiconductor

CS-810 is an optional Software application that controls curve tracers, scanners, hotplates performing measurement and thereby automates the measurement. This makes improvement great in work efficiency.

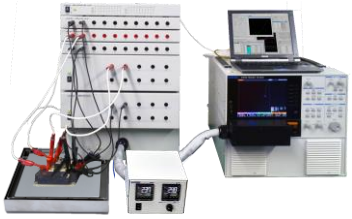
Automates:
Measurement→Recording→Judgment
Improvements in efficiency to replace task that was traditionally performed manually

	Ices	Vces	VF	Vth	・・
Sample-1	*****A	****V	****V	****V	・・
Sample-2	*****A	****V	****V	****V	・・
Sample-3	*****A	****V	****V	****V	・・
:	:	:	:	:	:

Switches automatically multiple-semiconductor modules and discrete devices to be targeted when you perform measurement



Hotplates are also remote-controllable, so Automatic measurement of 6 in 1 module can be performed too.



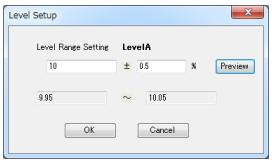
Easy to transfer the configuration measured to PC

By transferring the configuration measured manually on curve tracer to PC, you can set up the sequence. Programming knowledge is not required and anyone can set up it easily.

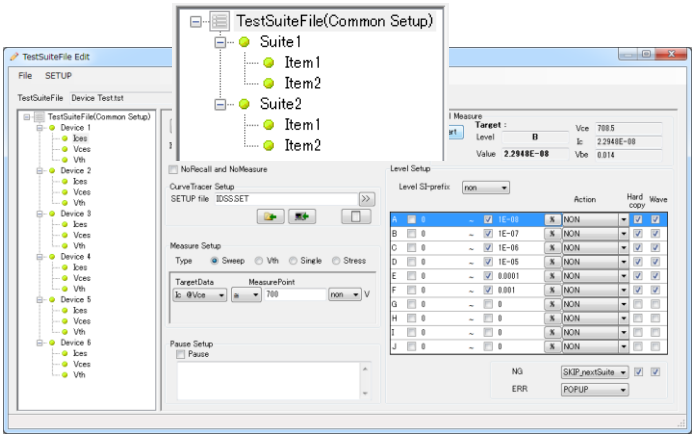

This key copies the configurations in the curve tracer to PC.


This key copies the configurations in PC to the Curve trace.

Categorization to the levels based on the measured value.
You can set 10 levels to which acquired result will be categorized.
For each levels, events to be performed, such as halting the measurement, skipping the measurement of such item
Showing an alert, Copying the waveform as an image, exporting to CSV files.



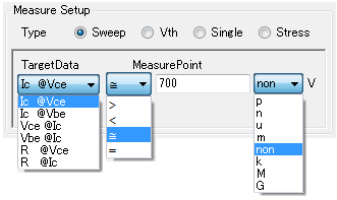
This window is useful when you specify the threshold for the levels.



Measurement of static characteristics (Leakage current, Saturation voltage, VF, Vth, etc.)

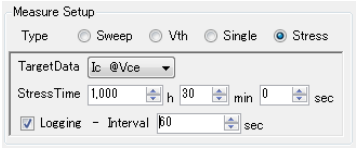
Measurement type : Sweep

- **>** Point with the larger data than the specified value.
- **<** Point with the smaller data than the specified value.
- **≅** Point with the data closer to the specified value.
- **=** Point with data equal to the specified value under interpolation.



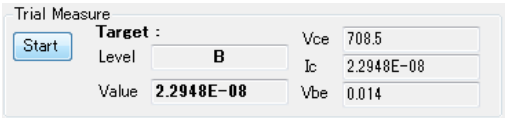
Measurement type : Stress

Logging of voltage or current is available by biasing constant voltage or constant current for a long time.
This is used for Stress test and reliability test.



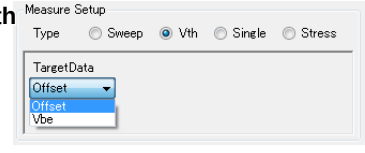
Trial Measurement:

This is a function for debugging and the sequence can be confirmed.



Measurement type : Vth

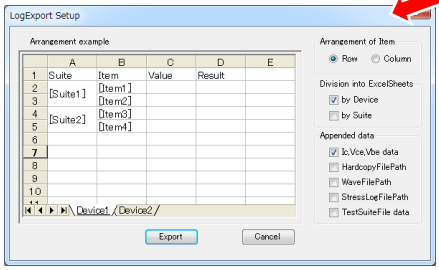
Makes measurement with the curve tracer's Vth Search function.

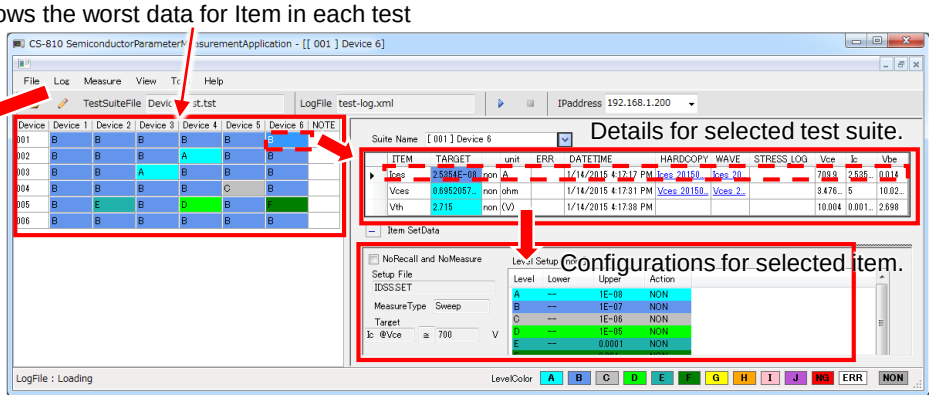


Output Window

Shows the worst data for Item in each test

A selection of export formats For the log file.



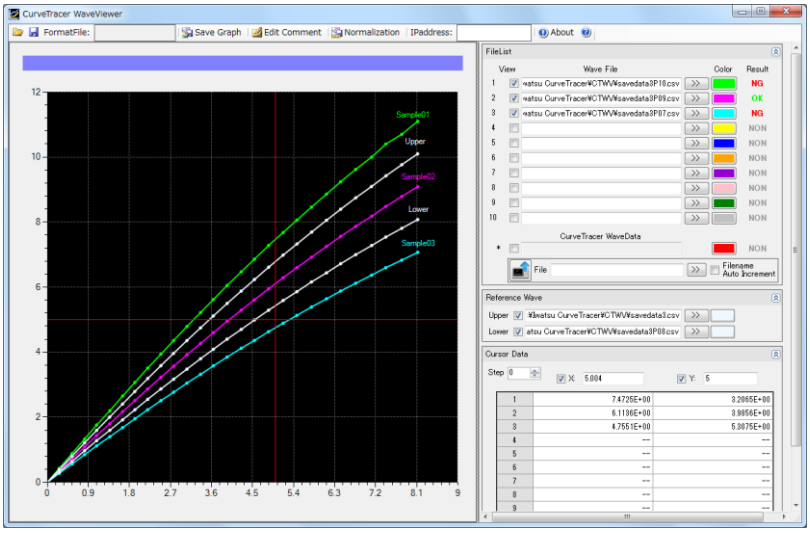


parameter measurement

■ Comparison among the curves

This application can compare a number of waveforms stored for the purpose of analysis of variation of characteristics and defects as well as Pass/Fail judgment.

Comparison between the waveforms and Judgment functions
This application can compare a waveform with reference waveform and judge whether the first waveform meets the specified condition.



Waveforms display
CSV files stored during past use, recall-waveforms stored in Curve tracer, and the waveforms currently monitored can be compared on the same graph up to 10 waveforms at the same time.

Rescaling
The displaying waveform can be stored in a CSV file at an arbitrary interval in voltage axis.

Cursor function
The displaying numerical numbers of waveforms are shown in a list. Besides the sampling points, this function interpolates the measured data.

Annotations
Annotations can be attached to the curves respectively.

Saving the images
Saving the images in various image format (PNG/BMP/JPG/TIFF） with a set of cursor values.

A selection of Graph styles
- Settable items
Chart title, background color, cursor color, line style (solid, dotted, broken)
For X and Y axes: Title, what data to be assigned, Scale (Log, linear) For Y axis only, intervals, min value, max value and grids.

■ The measuring function for the transfer characteristics (V_{GE}-I_C/V_{GE}-V_{CE})

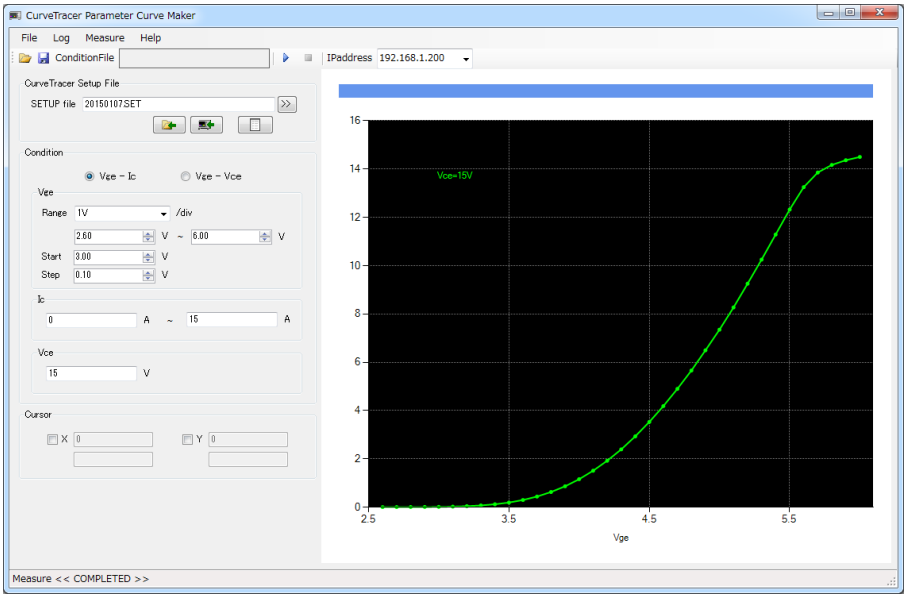
It used to be difficult for a curve tracer to measure transfer characteristics, however IWATSU can measure it now.

Various formats to save curves for characteristics
・Save the measured characteristics to CSV files.
・Save the curve image as PNG/BMP/JPG/TIFF

Cursor function
Cursors are displayed in X axis and Y axis interpolated value is displayed.

Customizable chart area
Chart title, axis label, background-color, and the axis ranges are all customizable.

Load/Save function of Configurations
This software can load/save the configurations for characteristics measurement and the customize done to the chart area.



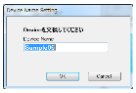
Application software : CS-810 semiconductor

■ Measurement of devices

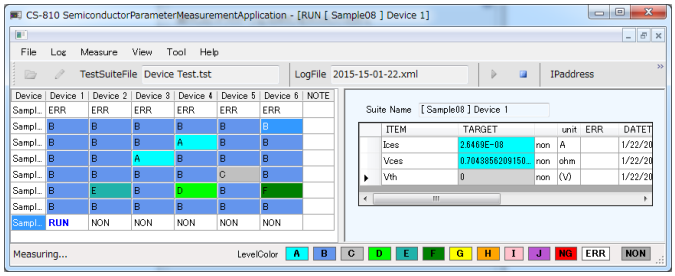
Multiple devices measurement and recordings can be performed in a short time.

This software performs tests for multiple measurement items .
Operator simply need to input sample name according to the device replacements and connection changes, following the instructions on popups, to repeat measurement under the same conditions. Judgments (Pass/Fail) based on the requirements given will be shown for each measurement, and images and waveforms data also will be stored automatically.

1 Input sample name and set it to Test Fixture.



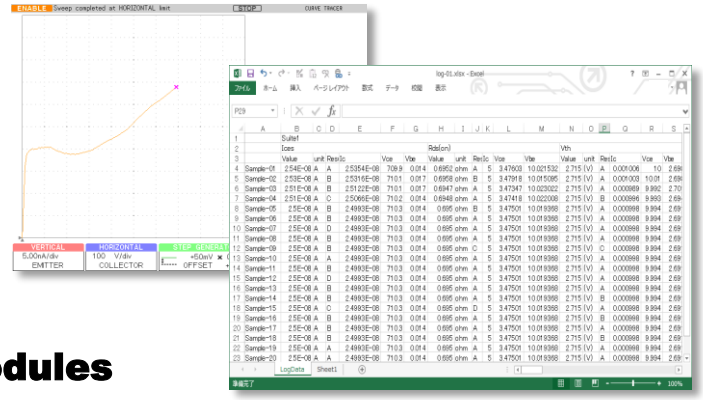
2 Displays the measured value and the judgment results during measurement.



3 Popup stops the measurement or gives instructions based on the measurement results.

4 Popup stops the measurement or gives Instructions based on measured items.

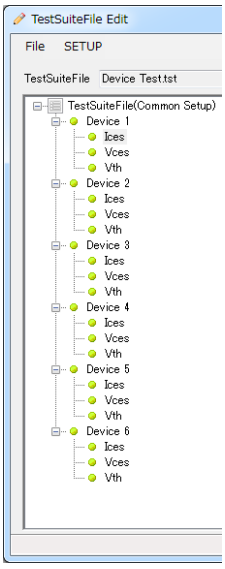
5 Logs on the measurement can be exported to CSV file or Excel file afterwards. Logs on Stress test will be saved on separate files. Re-measurement of the selected item can be performed.



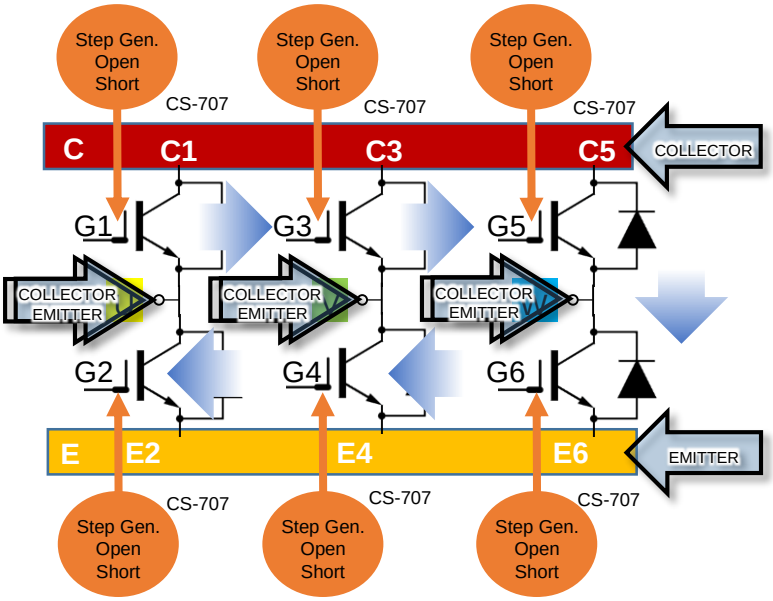
■ Measurement function of circuit modules

This software controls the scanner system as well as the curve tracer. The software also controls open/short and HV/VC. All the measurements for a module can be fully automatically performed without a need for unplugging.

Configuration on one-circuit can be applied to the other circuit as the application supports copy & paste.



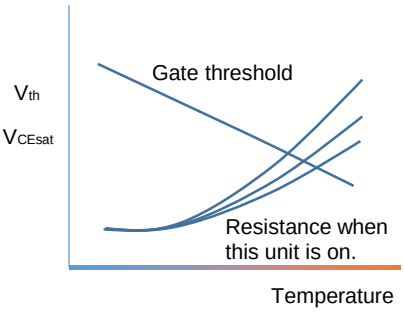
Unused Gates and Emitters can be short-circuited.

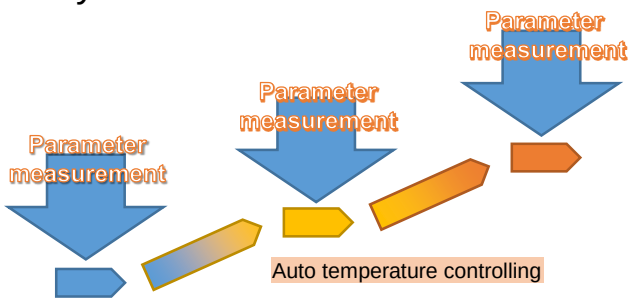


parameter measurement

■ Evaluation of Semiconductor Temperature characteristics measurement

CS-810 controls hotplates too. Even measurement that takes a long time such as per temperature can also be performed automatically.





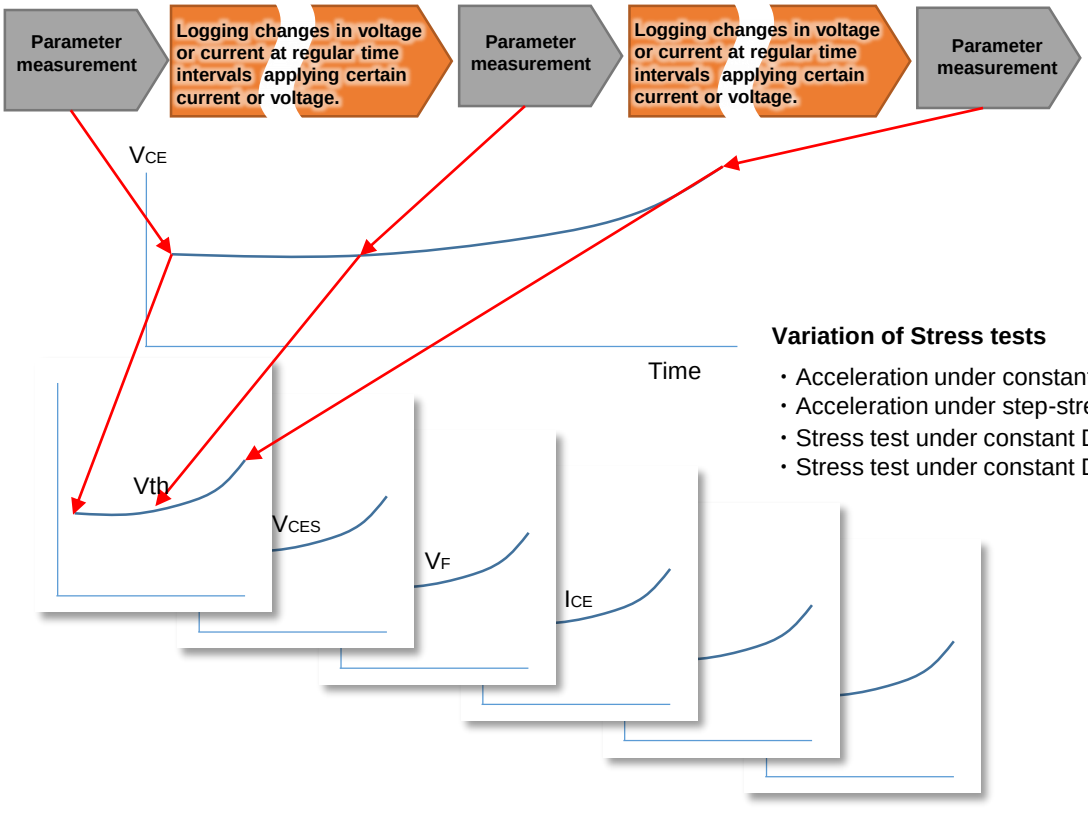
Currently, we just offer test fixtures with hotplates, but we are trying our best to offer a unit simply provides hotplates or fixed-temperature chamber. For details on supported units, feel free to ask us.

■ Stress test

A wide variety of parameters can be incorporated in stress test.

This software supports long-time reliability tests. While the software monitors the voltage and the current via curve traces, differences of those traces are logged.
Auto measurement of a wide variety of parameters is available for the stress test as illustrated below.
The biasing will stop in excess of the limit value which is set for current or voltage as a lower and upper limit.

The software measures Ic or Vce (Interval: 10s to 2h) keeping a certain voltage or current (10s to 1,000h)



Variation of Stress tests

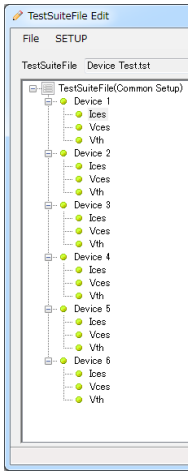
- Acceleration under constant stress
- Acceleration under step-stress
- Stress test under constant DC current
- Stress test under constant DC voltage

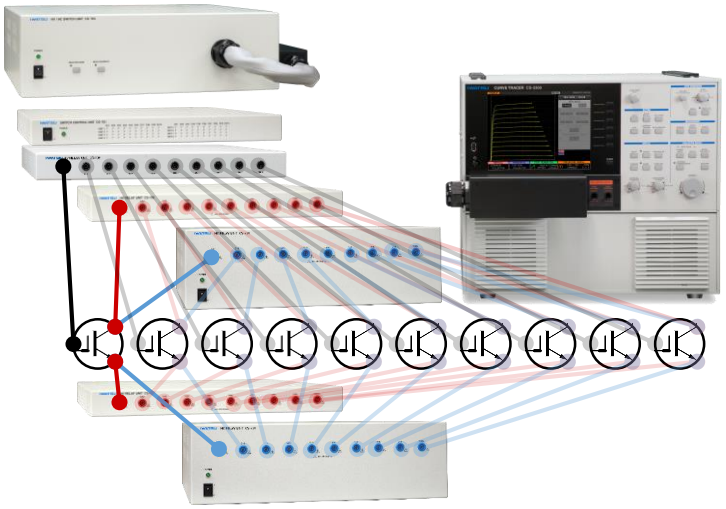
Application software : CS-810 semiconductor parameter measurement

■ Test of Discrete devices

Measurement of multiple devices with one touch operation after cable connection.

CS-810 will let us copy the configuration for one circuits to the others up to 10CH*, making it easier to iterate the circuits and perform measurement for each Circuit.

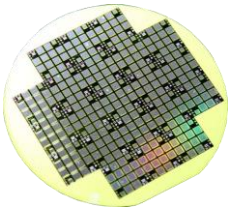




* Up to 10 systems operate in parallel on CS-700 Series.

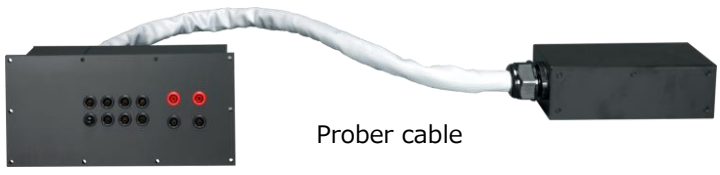
■ Measurement of wafers

Devices on wafers can be measured by connecting a prober system.



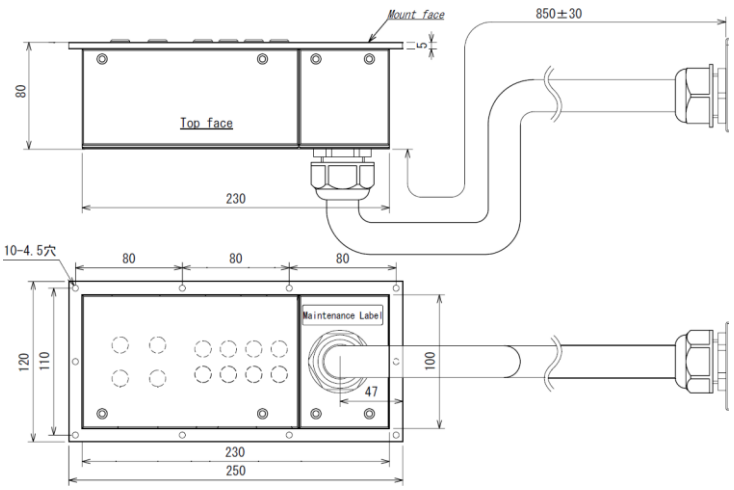
Contact us for customized semiconductor parameter measurement software.

We have cables for connections to probers.
Some terminals have an interlocking feature for safety.



Prober cable

Prober side　　Curve tracer side



Output range for each model

HV mode Max. Peak Voltage/Max. Peak Current (Pulse current)

Model / Mode	CS-3300 CS-3200 CS-3100	CS-5400 CS-5300 CS-5200 CS-5100	CS-10800 CS-10400	CS-12800	CS-15800
+DC	-	-	10kV/400mA	12kV/266mA	15kV/266mA
LEAKAGE/DC Rectified SINE/AC	3kV/75mA (150mA)	5kV/25mA (25mA)	3kV/75mA (150mA)		
	300V/750mA (1.5A)				
	30V/7.5A (15A)				

HC mode Max. Peak Current/Max. Peak Power/Max. Peak Voltage

Model / Mode	CS-5100 CS-3100	CS-5200 CS-3200	CS-5300 CS-3300	CS-5400	CS-10400	CS-10800 CS-12800 CS-15800
±Pulse	- (HC mode not equipped)	-	1,000A/10kW/40V	1,500A/12kW/30V	-	8,000A/80kW/40V
					4,000A/60kW/60V	
		400A/4kW/40V		600A/4.5kW/30V	400A/6kW/60V	
		40A/400W/40V		60A/450W/30V	40A/600W/60V	

Common Specifications

Loop Compensation	Hardware		Correction of floating capacitance between collector supply and ground
	Software		Simulated loop procedure by software thinning process
Step Generator	Offset	Setup range Resolution	-10 times ～+10 times of SETTING UP of STEP AMPLITUDE 1% of SETTING UP of STEP AMPLITUDE
	Current mode	Amplitude range Max. Current Max. Voltage	21 steps /50nA～200mA, 1-2-5 switchable 2A More than 10V
	Voltage mode	Amplitude range Max. Current Max. Voltage	6 steps/50mV～2V, 1-2-5 switchable ±40V 500mA～ (～8V), 200mA～ (～15V), 10mA～ (～40V)
	Step rate		Twice of 50Hz or 60Hz (the same rate when AC mode), Pulse interval when HC mode
	Pulse step	Pulse width	50μs～400μs (10μs step) When HC mode set, approx.100μs wider-pulse width against collector supply pulse
	Number of steps		0～20 steps
AUX Output		Range	OFF, －40V～40V (Switchable at 100mV step)
Measurement Mode			REPEAT, STOP/SINGLE, SWEEP
Vertical axis (Full scale:10div)	Collector current	Range	HV Mode：1μA/div～2A/div, 20steps 1-2-5 switchable (HC mode written separately)
		Accuracy	Add 2% of Readout+0.05×VERT/div to the loop correction error of the following max. peak voltage 0.5μA (30V), 1μA (300V), 6μA (3kV), 12μA (5kV) 30V,300V,3kV More than 10% of Max. Peak voltage, More than 30% (5kV)
	Emitter current (LEAKAGE)	Range	1nA/div～2mA/div, 20steps 1-2-5 switchable (Collector Supply mode: LEAKAGE)
		Accuracy	2% of Readout + 0.05×VERT/div + less than 1nA
Horizontal axis (Full scale:10div)	Collector voltage	Range	HC mode：50mV/div～5V/div, 7 steps 1-2-5 switchable (HV mode written separately)
		Accuracy	2% of Readout less than +0.05×HORIZ/div
	Base/Emitter voltage	Range	50mV/div～5V/div, 7 steps 1-2-5 switchable
		Accuracy	2% of Readout less than +0.05×HORIZ/div
Screen	Display		8.4 inch TFT LCD
	Number of Data		1,000 points/trace (AC, Full-wave rectification) 20～1,000 points/trace (SWEEP mode)
	Trace display		Interpolation display between points, Dot display
	Average		OFF, 2～255 times
	Persistence		OFF, SHORT, LONG, unlimited length
	Internal waveform storage (REF)		4 screens
Cursor measurement	DOT		Vert, Horiz, β or gm
	fLINE		Vert, Horiz, 1/grad, intercept
	FREE		Vert, Horiz, β or gm
	WINDOW		Vert in WINDOW area, Horiz, β or gm
Data recording/Readout	Internal memory		Setup:256, REF：4 screens
	External memory		USB1.1：Setup, Waveform, Screen hardcopy (BMP,TIFF, PNG)
Remote			Remote on LAN 10BASE-T/100BASE-TX 1 port
Power supply	CS-3xxx,5xxx		AC100V-AC240V 50/60Hz, Max Power:500VA (operation), 7W Max (waiting)
	CS-1xxxx		AC200V single phase 50/60Hz, Max Power:10kVA (operation)
External dimensions (mm) (excluding projection portion and accessories) Weight (excluding accessories)	CS-3100,5100		424W x 220H x 555D, approx.28kg
	CS-3200,3300,5200,5300,5400		424W x 354H x 555D, approx.43kg
	CS-10400,10800,12800,15800		1,110W x 1,216H x 1,150D, approx.370kg

Order Information

	Model Name	Model Number	Remarks
Main unit		CS-3100	3kV
		CS-3200	3kV、400A
		CS-3300	3kV、1,000A
		CS-5100	5kV
		CS-5200	5kV、400A
		CS-5300	5kV、1,000A
		CS-5400	5kV、1,500A
		CS-10400	10kV、4,000A
		CS-10800	10kV、8,000A
		CS-12800	12kV、8,000A
		CS-15800	15kV、8,000A
Test Fixture	Test Fixture S	CS-301	for CS-3100
	Test Fixture M	CS-302	for CS-3200/3300
		CS-303	for CS-5100/5200/5300
		CS-304	for CS-5400
	Test Fixture L	CS-305	
		CS-307	
Prober Cable	Prober cable	CS-306	for CS-3100/3200/3300/5100/5200/5300
		CS-308	for CS-5400
Alligator Clip	Small alligator clip Red 10pcs	CS-001	
	Small alligator clip Black 10pcs	CS-002	
Cable	High voltage wire Red 5pcs	CS-003	Banana clip, 5kV, 30cm
	Wire Black 5pcs	CS-004	Banana clip, 30cm
	Standard Lead 1set	CS-005	Come with Main unit except CS-3100, Banana cable 30cm (Red 2pcs, Green 2pcs, Black 2pcs, and Yellow 1pc for HV. Alligator Clip (Red 2pcs, Green 2pcs, Black 2pcs, and Yellow 1pc)
	Cable for High Current	CS-006	20cm,2pcs come with CS-5400
		CS-007	30cm,2pcs come with CS-10400/10800
Software	Semi-conductor parameter search	CS-800	Built in Main unit
	Semi-conductor parameter measurement	CS-810	Install in PC
Test Adapter	Test adaptor	CS-500	Comes with all main units
	TO type test adaptor	CS-501A	
	AXIAL type adaptor	CS-502	
	TO-263-3(D2PAK) type adaptor	CS-503	
	TO-252-3 type adaptor	CS-504	
	TO-263-7 type adaptor	CS-505	
	TO-252-5 type adaptor	CS-506	
	SC-70-3(SOT-323-3) type adaptor	CS-507	
	Adaptor for SMD type	CS-508	Not for CS-301
	SC-59A (SOT-23-3) type adaptor	CS-509	
	SC-62 (SOT-89) type adaptor	CS-510	
Scanner unit	Switch control unit	CS-701	Integrated controller for each unit , Ethernet is equipped
	LV Relay unit	CS-702	300V/7.5A/30A(Pulse) 10CH
	HV Relay unit	CS-703	5kV/0.5A 10CH
	HC Relay unit	CS-704	2kV/7.5A/1,500A(Pulse) 10CH
	HV-HC Switch unit	CS-705	5kV/1,000A, Extension unit with HV/HC switch function
	Extension unit	CS-706	5kV/1,000A(Pulse)
	Gate/Short unit	CS-707	Curve tracer side:300V/7.5A/15A(Pulse) Device side:5kV/7.5A(Pulse) 10CH
	HV-HC Relay unit 2CH	CS-708	5kV/7.5A/1,500A(Pulse) 2CH
	HV-HC Relay unit 4CH	CS-709	5kV/7.5A/1,500A(Pulse) 4CH
	HV-HC Switch unit（for CS-5400）	CS-710	5kV/1,500A(Pulse), Extension unit with HV/HC switch function

Model Name	Model Number	Remarks
Test Fixture with hotplate function	CTJ1050	Heater surface 5kV insulating, Max. Temperature:200℃, Interlock function
Hotplate	PA3020	Dimension of Plate portion:200×200mm
	PA3040	Dimension of Plate portion:200×400mm

8511-3110-1
CS(IG)1502-844-2-00
CS14050E-114

IWATSU http://www.iti.iwatsu.co.jp/
IWATSU TEST INSTRUMENTS CORP.

Sales Dept.
International Sales Section
7-41, 1-Chome Kugayama, Suginami-Ku,
Tokyo,168-8511 Japan
Tel: +81-3-5370-5483 Fax: +81-3-5370-5492