

**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.

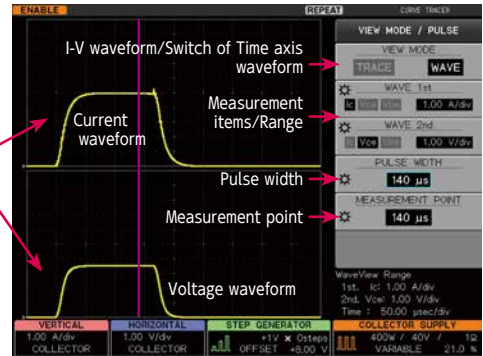
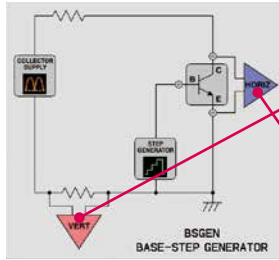
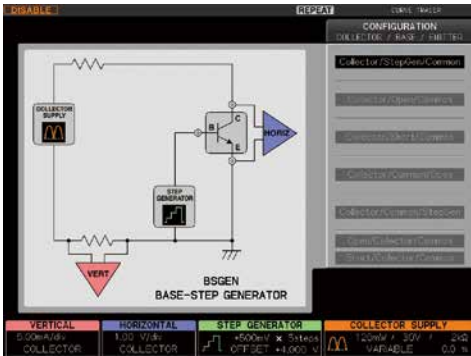


# Features

## 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.

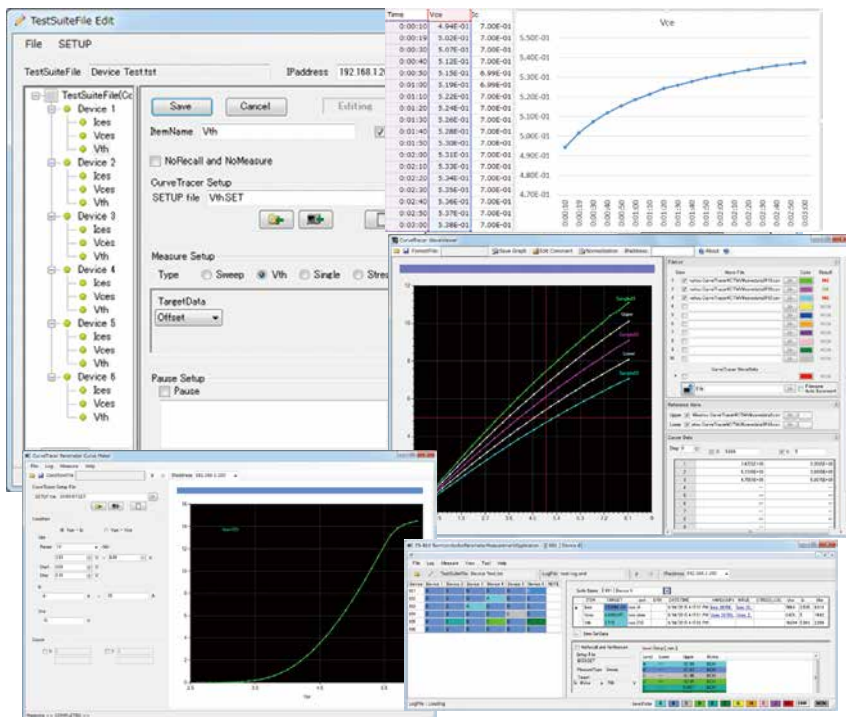
■ Confirm applied voltage and current with waveforms in Wave mode. The pulse width and the measurement point can be specified even when you are confirming the applied waveform (current and voltage) to the device based on the time axis as with oscilloscopes. By confirming the waveform, appropriate pulse 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 abnormalities caused by heat such as a oscillation, etc.



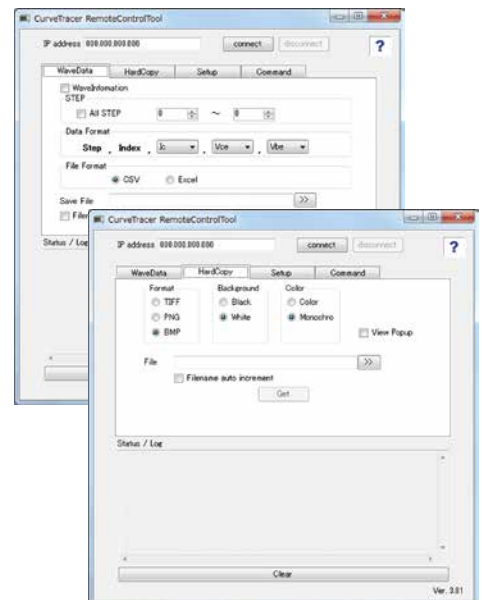
## Full detailed automation with PC

■ Semiconductor parameter measurement with CS-810 (optional) This software application performs various kinds of auto measurements through remote control of the main unit.

■ 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 as standard (rear panel)



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

# CURVE TRACER CS Series

## ■ 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.

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

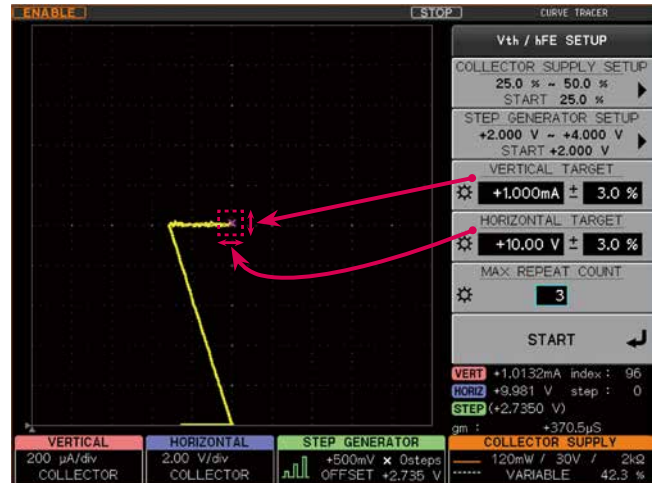
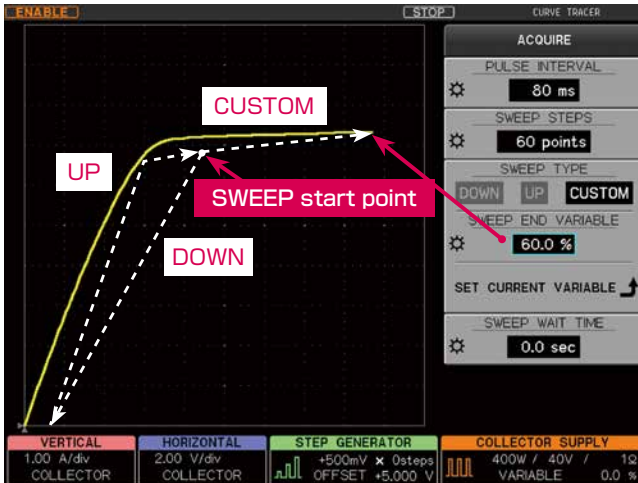
This function automatically finds the Vth-hFE. No complicated operations are needed.

## ■ 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.



## Separate knobs for intuitive operations



**Best for test breakdown voltage at 3,300V devices**

■ **Curve Tracer CS-5400**

Max. Peak Voltage : 5,000V (HV mode)  
 Max. Peak Current : 1,500A (HC mode)



■ **Curve Tracer CS-5300**

Max. Peak Voltage : 5,000V (HV mode)  
 Max. Peak Current : 1,000A (HC mode)



■ **Curve Tracer CS-5200**

Max. Peak Voltage : 5,000V (HV mode)  
 Max. Peak Current : 400A (HC mode)



■ **Curve Tracer CS-5100**

Max. Peak Voltage : 5,000V (HV mode)  
 ※ HC mode not available

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(AC mode 2.5kV)		25mA (25mA*)
	300V		750mA (1.5A*)
	30V		7.5A (15A*)
Max. Peak Power	320mW/3.2W/32W at 5kV range, 120mW/1.2W/12W/120W/390W at 30V and 300V range		
Horizontal range	50mV~500V/div		

\* Available peak current can be varied with test conditions. Measurement can be done within peak pulse current in above.

Model	CS-5100	CS-5200	CS-5300	CS-5400			
HC mode	Pulse + -						
Mode/Polarity	-	Pulse + -					
Max. Peak Current Max. Peak Power Max. Peak Voltage	No HC mode equipped	Max. peak current/ power	Max. peak voltage	Max. peak current/ power	Max. peak voltage		
		400A / 4kW	40V	1,000A / 10kW	40V	1,500A / 12kW	30V
		40A / 400W	40V	400A / 4kW	40V	600A / 4.5kW	30V
				40A / 400W	40V	60A / 450W	30V
Pulse width	-	Pulse width : variable between 50 μs and 400 μs (Resolution :10 μs)					
Measurement point	-	Measurement point can be specified. (Resolution :10 μs)					
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.

### ■ Curve Tracer **CS-3300**

Max. Peak Voltage : 3,000V (HV mode)  
Max. Peak Current : 1,000A (HC mode)

### ■ Curve Tracer **CS-3200**

Max. Peak Voltage : 3,000V (HV mode)  
Max. Peak Current : 400A (HC mode)

### ■ Curve Tracer **CS-3100**

Max. Peak Voltage : 3,000V (HV mode)  
※ HC mode not available



Model	CS-3000 series	
Mode/Polarity	Rectified SINE/+ -, DC/+ -, LEAKAGE/+ -, AC	
Max. Peak Voltage/Current	Max. Peak Voltage	Max. Peak Current (Max. Peak Pulse Current)
	3kV(AC mode 2.5kV)	75mA (150mA*)
	300V	750mA (1.5A*)
	30V	7.5A (15A*)
Max. Peak Power	120mW/1.2W/12W/120W/390W** (**390W is not available at 3kV range)	
Horizontal range	50mV to 500V/div	

\* Available peak current can be varied with test conditions. Measurement can be done within peak pulse current in above.

Model	CS-3100	CS-3200	CS-3300
HC mode	Pulse + -		
Mode/Polarity	-		
Meax. 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
Pulse width	-	Pulse width : variable between 50 $\mu$ s and 400 $\mu$ s (Resolution : 10 $\mu$ s)	
Measurement point	-	Measurement point can be specified. (Resolution : 10 $\mu$ s)	
Vertical 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
	Max. Voltage	10kV Peak (when no loaded)
	Max. Current	100mA Peak
Display	Voltage range	50V/div ~ 1,000V/div (1-2-5 steps)
	Current range	0.1mA/div ~ 10mA/div or 50mA/div



\* Customer's requirements can be discussed.

## CS-10000 Series\* (10kV, 12kV, 15kV)

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

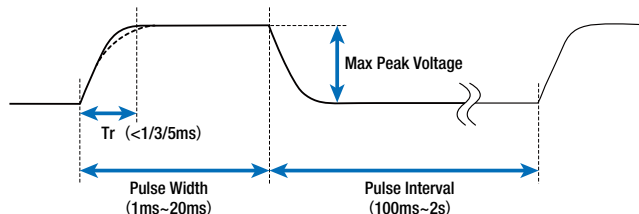


**CS-15800** 15kV, 8,000A  
**CS-12800** 12kV, 8,000A  
**CS-10800** 10kV, 8,000A  
**CS-10400** 10kV, 4,000A

※This series is sold-on-demand. Please contact us for the specification.  
 Requests for customization are welcomed.

### ■Optional Pulse Unit

This optional unit minimizes parameter variation on devices 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 the unit back to IWATSU factory.



### Collector Supply HV mode

Model	CS-10000 series	
Mode/Polarity	Rectified SINE/+-, DC/+-, LEAKAGE/+-, AC	
Max. Peak Voltage/Current	Max. peak voltage	Max. peak current (Max. peak pulse current)
	3kV(AC mode 2.5kV)	75mA (150mA*)
	300V	750mA (1.5A*)
	30V	7.5A (15A*)
Max. Peak Power	120mW/1.2W/12W/120W/390W** (**390W is not available at 3kV range)	
Horizontal range	50mV~500V/div	

\*Available peak current can be varied with test conditions. Measurement can be done within peak pulse current in above.

### Collector UHV mode

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

### Collector HC mode

Model	CS-10400		CS-10800 / CS-12800 / CS-15800	
Mode/Polarity	Pulse +-			
Max. Peak Current Max. Peak Power Max. Peak Voltage	Max. peak current/power	Max. peak voltage	Max. peak current/power	Max. peak voltage
	4,000A / 60kW	60V	8,000A / 80kW	40V
	400A / 6kW	60V	4,000A / 60kW	60V
	40A / 600W	60V	400A / 6kW	60V
Pulse width	50 $\mu$ s to 900 $\mu$ s, 50 $\mu$ s to 1,200 $\mu$ s (at 8,000A range) (10 $\mu$ s resolution)			
Measurement point	Measurement point can be specified. (Resolution :10 $\mu$ s)			
Vertical range	100mA to 1,000A/div			

# Test adaptors

**CS-500** Standard test adaptor  
Used to connect device  
to Test Fixture.



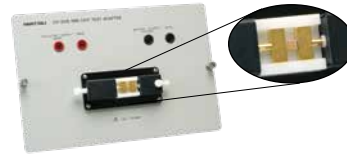
**Heat resistance  
TO socket**  
200°C, 350A (500 μs)



**TSSOP 14**  
※Not available with  
CS-301 test fixture



**SMD type adaptor  
CS-508**  
※Not available with  
CS-301 test fixture



Bottom view  
Banana plug



**CS-501A**  
TO-222/247



**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

## Test Fixture S



CS-501 mounted  
on CS-301 fixture  
※CS-501 is optional.

●Test Fixture S **CS-301**  
(std. 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**  
(std. for CS-3200/3300)

●Test Fixture M **CS-303**  
(std. for CS-5100/5200/5300)

●Test Fixture M **CS-304**  
(std. for CS-5400)

## Patch Panel



(Test adaptor is optional.)



●Patch Panel for test fixture M  
(std. for all test fixtures except CS-3100)

## Standard test lead set



●Standard test lead set **CS-005**  
(std. for all models except CS-3100)

• Banana-banana(4mm) : 30cm  
(Red\*2, Green\*2, Black\*2, Yellow\*1)

• Chrocodile clip (Large)  
(Red\*2, Green\*2, Black\*2, Yellow\*1)

## High voltage(HV) wire set



●HV wire \*5pcs. **CS-003**  
(Red\*5pcs./set)

## Wire set



●Wire \*5pcs. **CS-004**  
(Black\*5pcs./set)

## High Current (HC) cable (Blue\*1,Black\*1)



●HC cable **CS-006**  
(std. for CS-5400)

• Blue\*1 (20cm), Black\*1 (20cm)  
Contact us for asking different type of  
connector, length, maximum voltage,  
withstand voltages, etc.

●HC cable **CS-007**  
(std. for CS-10400/10800/12800/15800)

• Blue\*1 (30cm), Black\*1 (30cm)  
Contact us for asking different type of  
connector, length, maximum voltage.

## Chrocodile clip (small)



●Small chrocodile clip **CS-001**  
(Red\*10pcs/set)



●Small chrocodile clip **CS-002**  
(Black\*10pcs/set)

# 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. 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.



Test fixture L : CS-307



Scanner units



Curve Tracer : CS-5400

Semiconductor parameter measurement : CS-810



## Switch Controlling Unit



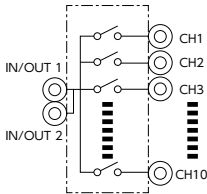
CS-701 rear panel

### CS-701

- Controlling each relay unit
- CS-810 software required
- Max. 8 units can be controlled.

To use with optional software : CS-810, it can control relay unit up to 8units via PC and ethernet. CS-701 can be operated up to 10units parallelly to assign each IP addresses.

## Relay Unit



LV relay unit (10ch)

- **CS-702**
- Max. 300V / 30A
- Switch up to 1 : 10
- CS-701 controls CS-702



HV relay unit (10ch)

- **CS-703**
- Max. 5kV / 0.5A
- Switch up to 1 : 10
- CS-701 controls CS-703



HC relay unit (10ch)

- **CS-704**
- Max. 2kV / 1.5kA.
- Switch up to 1 : 10
- CS-701 controls CS-704



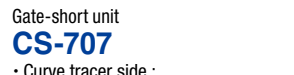
HV/HC relay unit (2CH)

- **CS-708**
- Max. 5kV / 1,500A
- Switch up to 1 : 2
- CS-701 controls CS-708



HV/HC relay unit (4CH)

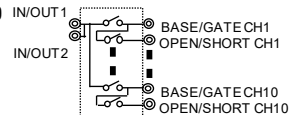
- **CS-709**
- Max. 5kV / 1,500A
- Switch up to 1 : 4
- CS-701 controls CS-709



Gate-short unit  
**CS-707**

- Curve tracer side :  
Max. 300V / 7.5A / 15A(pulse), switch 1:1
- Device side :  
Max. 5kV / 7.5A / 15A(pulse), switch up to 1:10

When 6 in 1 module is measured, this unit can short-circuit G and E, or C and G of unused devies.



## Extention Unit



HV/HC switching unit  
**CS-710** (for CS-5400)

- Max. 5kV / 1,500A for switching HV/HC
- Distributor for HV/HC source to relay units
- CS-701 controls CS-710



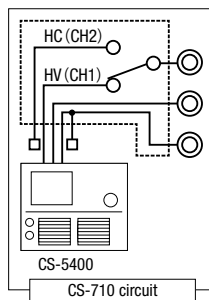
HV/HC switching unit  
**CS-705** (for CS-5300/5200/3300/3200)

- Max. 3kV / 1,500A for switching HV/HC
- Distributor for HV/HC source to relay units
- CS-701 controls CS-705

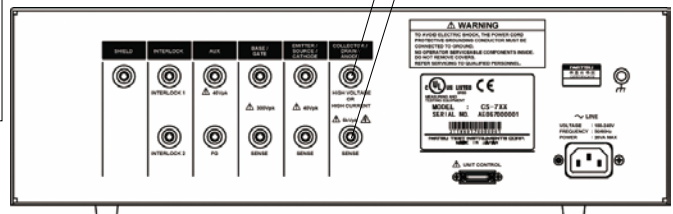


HV extention unit  
**CS-706**

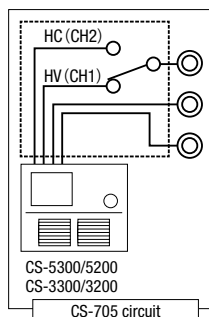
- Max. 5kV / 15A (not for HV/HC switching)
- Distributor for HV source to relay units



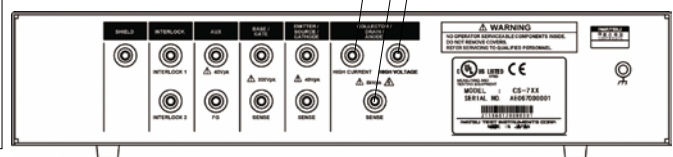
HIGH VOLTAGE or HIGH CURRENT  
BASE / GATE  
EMITTER



HIGH VOLTAGE OR HIGH CURRENT  
SENSE



HIGH VOLTAGE or HIGH CURRENT  
BASE / GATE  
EMITTER



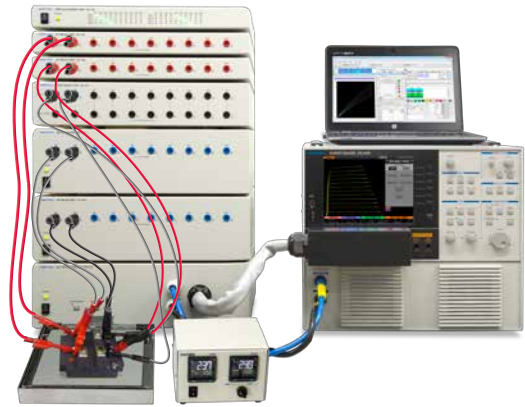
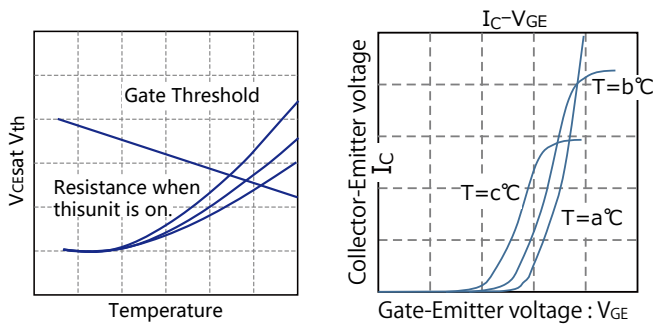
HIGH CURRENT  
SENSE  
HIGH VOLTAGE



# Temperature characteristics measurement

## Temperature characteristics measurement

CS-810 : Semiconductor parameter measurement automatically measures temperature characteristics, controlling the scanner system and hotplates, etc.



## Hotplate / Thermo-streamer / Temperature chamber

Gears controlled by CS-810



### Test Fixture with hot plate CTJ1050

Max. temperature : 200°C  
 Max. Voltage on device : 5kV  
 (Surface plate insulated at 5kV,max.)  
 Max. current : 1,000A  
 Interlocking function  
 (when opening the cover)



### Hotplate PA3020/PA3040/PA4030 (non-isolation)

Temp. control by external sensor and RS485  
 ■Max. temperature : 300°C (PA3020, PA3040)  
 400°C (PA4030)  
 ■CE conformed  
 ■Accessories : Controller, Temperature sensor, RS485-USB converter  
 — Sizes of hotplate / power consumption —  
 PA3020 : 200×200 (mm) / 800W  
 PA3040 : 200×400 (mm) / 1,500W  
 PA4030 : 300×200 (mm) / 1,500W

Adaptors configured with ThermoStream

### Test Fixture for ThermoStream CS-310

CS-310 enables connection with ThermoStream for wide range of temperature measurements.  
 [Size(mm):Approx.300Wx300Dx200H]  
 [Power supply : AC adaptor]



### Test adaptor for ThermoStream

Adaptors attaching with Test Fixture for ThermoStream  
 [Withstanding temperature : -50°C to 200°C]



Model	Device package	Remarks
CS-521	TO-220/TO-247	CS-501A compatible
CS-522*	TO-263-3 (D2PAK)	CS-503 compatible
CS-523*	TO-252-3	CS-504 compatible

※Contact us a made-to-order for another packages  
 \*under development



### Thermoconstant chamber

CS-810 can be modified to control customer's chamber for temperature characteristics measurement  
 ※Contact us for details

### Configuration example



## Prober connection cable

Cable to connect curve tracer and probe station or inside of test fixture L: CS-305/CS-307/CS-307H (Terminal for interlock equipped)



### Prober cable CS-308

(for CS-5400)



### Prober cable CS-306-3k/CS-306-5k

(for CS-3000 / CS-5000 series except CS-5400)

## Test Fixture L

For setting hotplate with interlock function, stopping test upon door open for safety c/w prober connection cable.



Connector for CS-5400



### Test Fixture L CS-305

Signal right, thermo-switch, cooling FAN equipped and LED light  
 Outer size : 630W×530D×520H (mm)

### Test Fixture L CS-307H (for CS-5400)

CS-307 (for CS-3000 / CS-5000 series except CS-5400)

Equipped interlock function, scanner system  
 Outsize 500W×520D×520H (mm)  
 (Prober cable comes as standard accessory.)

## Wagon



### MT-600L

Height : Approx. 850mm  
 Table : 590mm×775mm  
 Carriable : 100kg,max.  
 Weight : 36kg

# Application software : CS-810 semiconductor parameter measurement

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

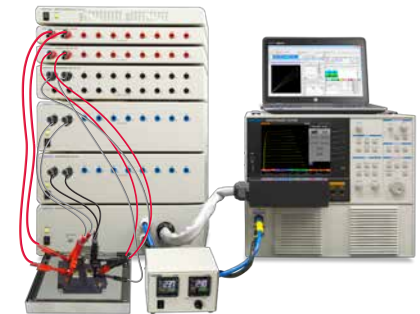
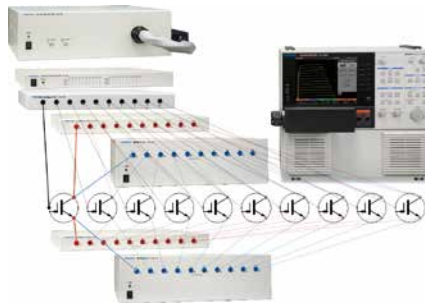
Automation on :

Measurement→Recording→Judgment for efficient task performances

Test switching modules and multiple semiconductor devices automatically

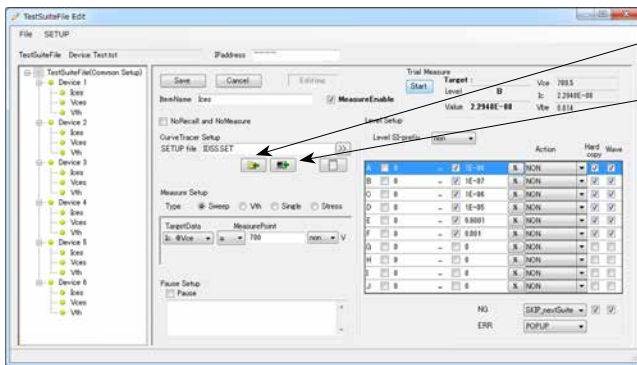
Automated test on 6-in-1 module controlling hotplate temperature

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



## ■ Programming not required

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.



- Getting curve tracer setting in to folder
- Sending stored setting in to curve tracer

**■ Level judgement for Ranking**

Categorization to the levels based on the measured value. You can set 10 levels to which acquired result will be categorized.

Showing an alert, Copying the waveform as an image, exporting to CSV files

## ■ Automated test on Leakage current, Saturation voltage, VF, Vth, etc.

**Measure Setup**

Type: Sweep, Vth, Single, Stress

TargetData: Ic @Vce, Ic @Vbe, Vce @Ic, Vbe @Ic, R @Vce, R @Ic

MeasurePoint: 700, non, V

**Measurement type : Sweep**

- > Higher than threshold
- < Lower than threshold
- ≅ Nearly to equal to threshold
- = Compute two points to compare with threshold

**Measure Setup**

Type: Sweep, Vth, Single, Stress

TargetData: Ic @Vce

StressTime: 1,000 h 30 min 0 sec

Logging - Interval: 60 sec

**Measurement type : Stress**

Logging of voltage or current is available by biasing constant voltage or constant current for long periods. This is used for Stress test and Reliability test.

**Trial Measure**

Start

Target: Vce 708.5, Ic 2.2948E-08, Vbe 0.014

**Debug mode**

Trial measurement for debug purpose for each step

**Measure Setup**

Type: Sweep, Vth, Single, Stress

TargetData: Offset, Vbe

**Measurement type : Vth**

makes measurement with the curve tracer's Vth Search function

## ■ Output window

Various types of log data output

**LogExport Setup**

Arrangement example table with columns A, B, C, D, E and rows 1-10.

Arrangement of Item: Row, Column

Division into ExcelSheets: by Device, by Suite

Appended data: Ic,Vce,Vbe data, HardcopyFilePath, WaveFilePath, SheetLogFilePath, TestSuiteFile data

Display worst value of test result

CS-810 SemiconductorParameterMeasurementApplication - [ 001 ] Device 6

LogFile: test-log.xml

Device	Device 1	Device 2	Device 3	Device 4	Device 5	Device 6	NOTE
001	B	B	B	B	B	B	
002	B	B	B	A	B	B	
003	B	B	B	B	C	B	
004	B	B	B	B	B	B	
005	B	B	B	B	B	B	
006	B	B	B	B	B	B	

Suite Name [ 001 ] Device 6

ITEM	TARGET	Unit	ERR	DATE/TIME	HARDCOPY	WAVE	STRESS/LOG	Use	Use
Vces	8.852957	non (non)		1/14/2015 4:17:31 PM	Uses 23100	Vces_2	3476	5	1802
Vth	2.715	non (V)		1/14/2015 4:17:38 PM			18384	0.001	2458

Level Setup [ non ]

Level	Lower	Upper	Action
A	---	1E-08	NON
B	---	1E-07	NON
C	---	1E-06	NON
D	---	1E-05	NON
E	---	0.0001	NON

# Application software : CS-810 semiconductor 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

### Waveform display

CSV files stored during past tests, recall-waveforms stored in Curve tracer, and the waveforms currently monitored can be compared on the same screen up to 10 waveforms.

### Re-scaling function

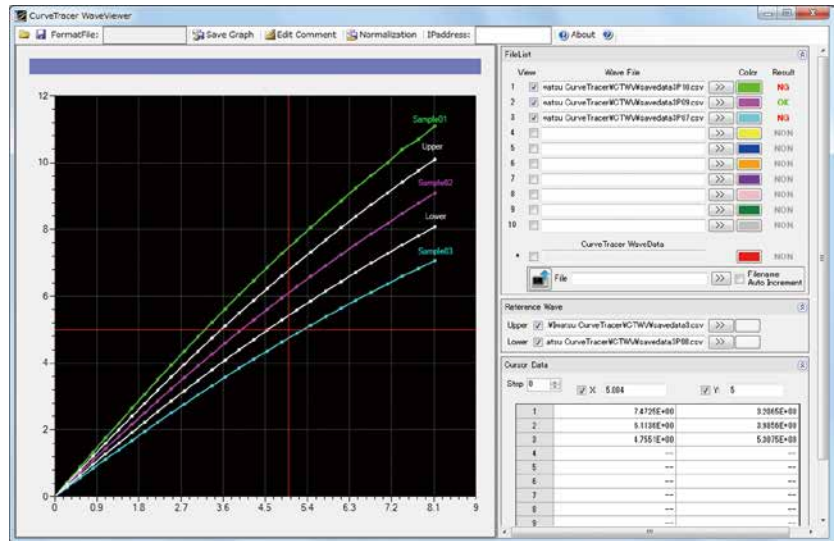
The displaying waveform can be stored in a CSV file at an arbitrary interval in voltage axis.

### 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.



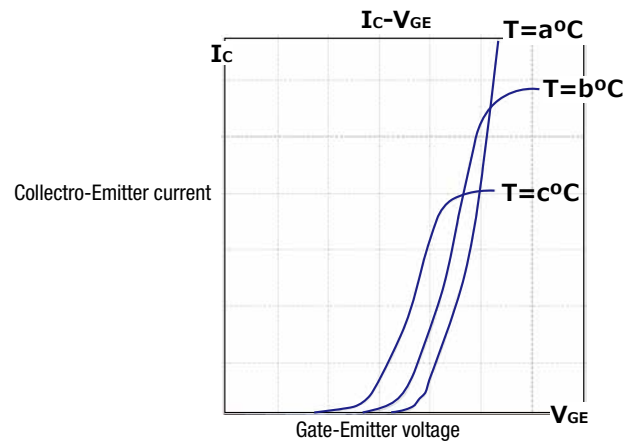
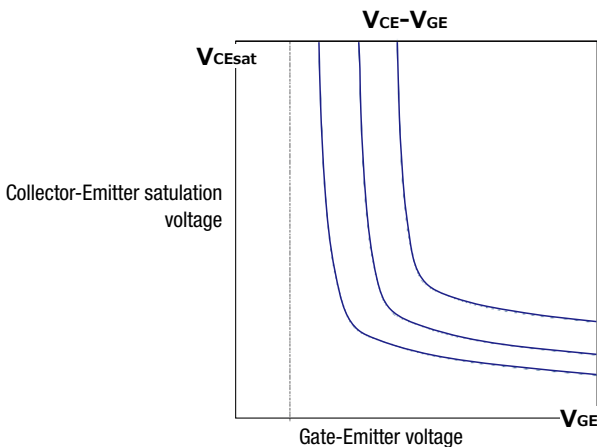
## A selection of Graph styles

- 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.

## Auto measuring function for the transfer characteristics ( $V_{GE-Ic}/V_{GE-V_{CE}}$ )



## 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

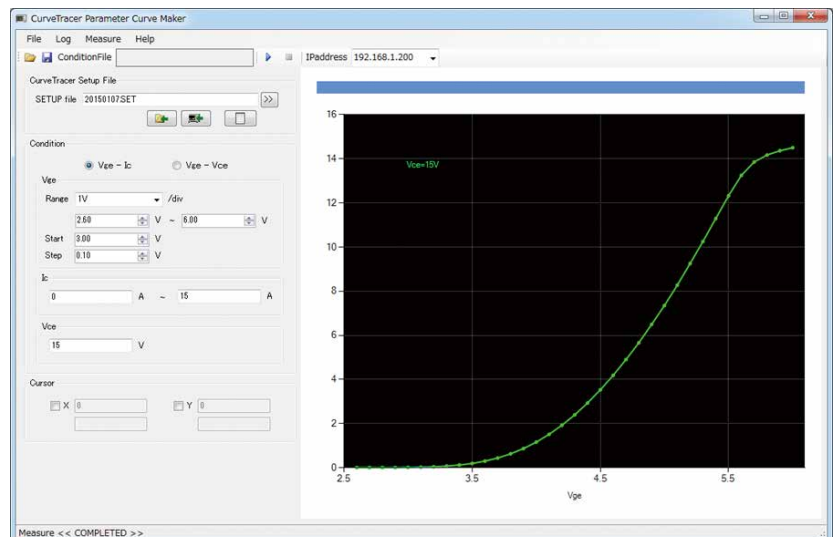
Cursors are displayed in X axis and Y axis interpolated value is displayed.

## Customizable chart area

Chart title, axes label, background-color, and the axes 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 parameter measurement

## Measurement of devices

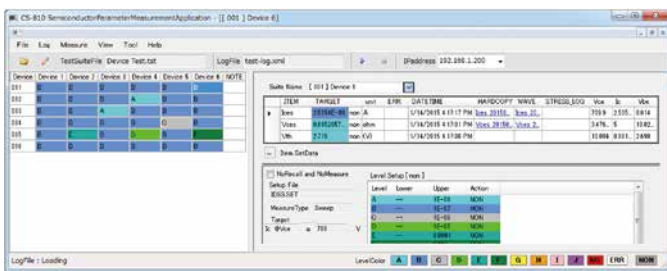
Multiple devices' measurements and data storages can be performed in a short time.

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.



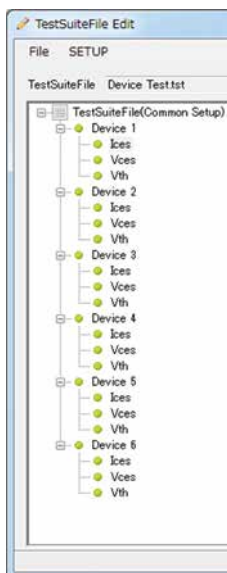
3. Pop-up holds the measurement or gives instructions based on the measurement results.



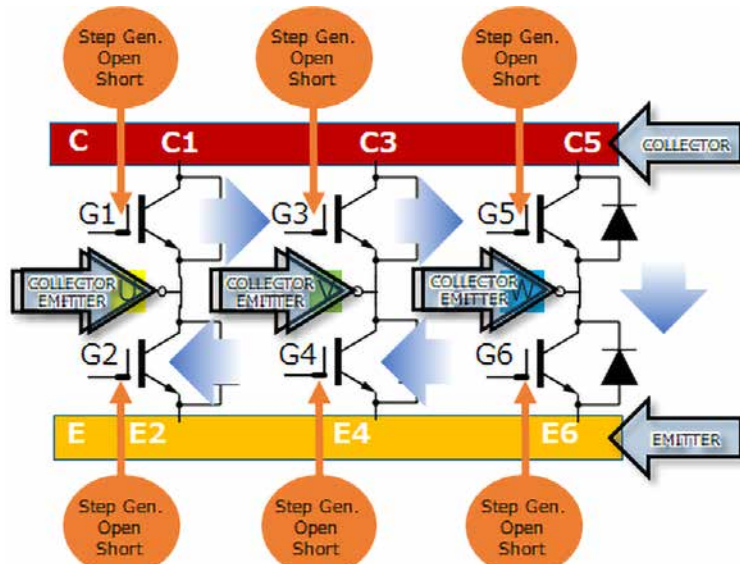
## Measurement function of circuit modules

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

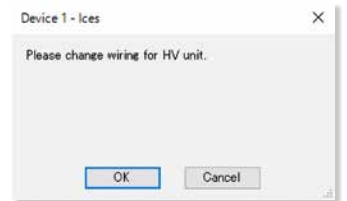
Configuration on one-circuit can be applied to the other circuit as the application supports copy & paste.



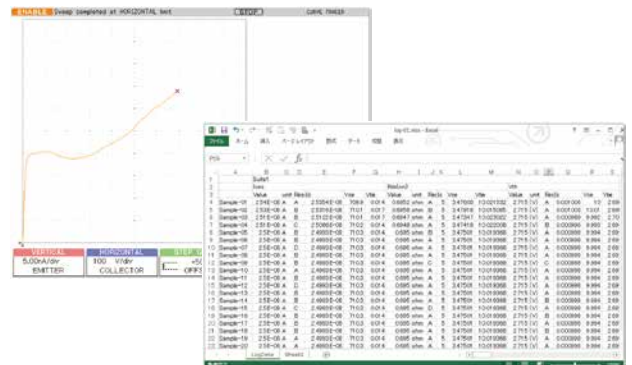
Unused Gates and Emitters can be short-circuited.



4. Pop-up holds 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.

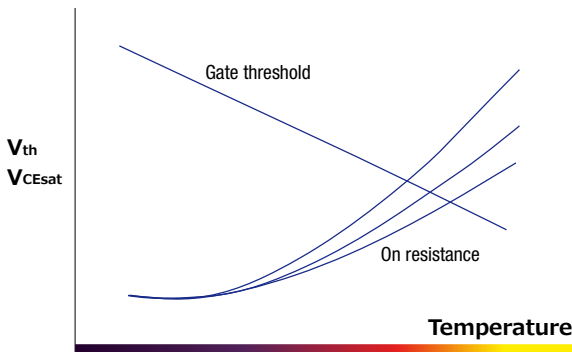




# Application software : CS-810 semiconductor parameter measurement

## Temperature characteristics measurement

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



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 contact us.

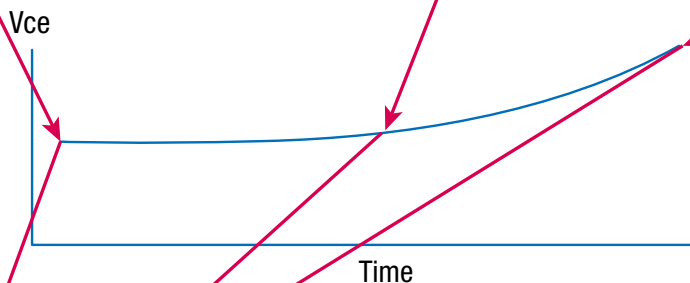
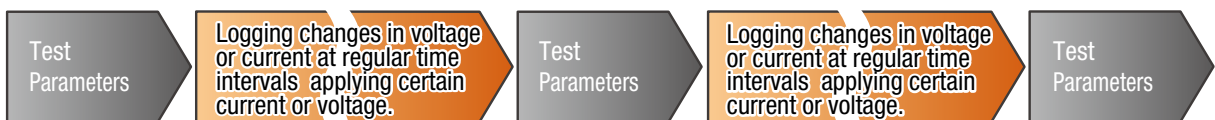


## Stress test

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

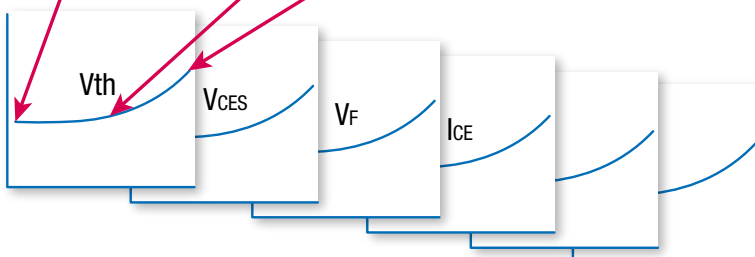
This software supports long-period reliability tests. While the software monitors the voltage and the current via curve tracer, differences of those traces are logged. Auto measurement of a wide variety of parameters is available for the stress test as illustrated below. The biasing will stop in excess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

The software measures  $I_c$  or  $V_{ce}$  (Interval: 10sec to 2hrs) keeping a certain voltage or current (10sec to 1,000hrs)



### Variation of Stress tests

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

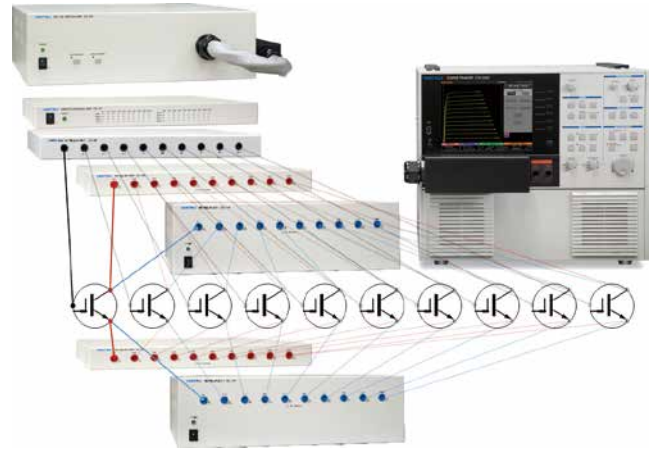


# Application software : CS-810 semiconductor parameter measurement

## Test of Discrete devices

Measurement of multiple devices with one click operation after cabling

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



## External setup panel for direct switching

Intuitive and suitable in production line use without touching mainframe panel for direct switching of setup change

**IE-1310**  
CS Setup Controller



Recalling&Storing panel settings with touching one-finger connecting LAN cable between curve tracer mainframe and CS Setup Controller.

Size (mm) : Approx. 200Wx210Dx107H  
Power supply / Power consumption : AC100 ~ 240V (50/60Hz) / 20VA MAX  
Accessories : Instruction manual, Power cable, LAN cable

## Measurement of wafers

Devices on wafers can be measured by connecting a probe station system.



## Prober Connection Cable CS-306-3k/CS-306-5k/CS-308

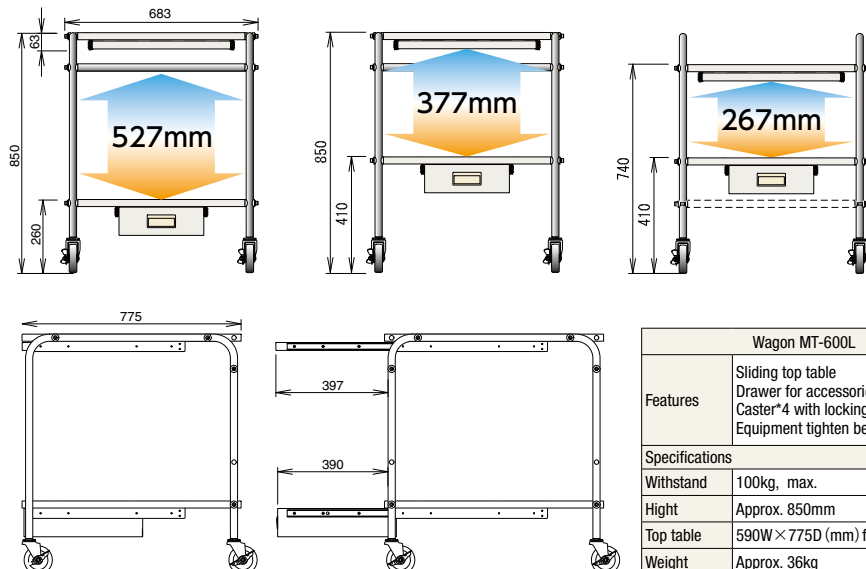
Cables for connections to probe stations c/w interlocking feature for safety



## Wagon MT-600L



MT-600L



Wagon MT-600L	
Features	Sliding top table Drawer for accessories Caster*4 with locking function Equipment tighten belt
Specifications	
Withstand	100kg, max.
Height	Approx. 850mm
Top table	590W×775D (mm) fixed
Weight	Approx. 36kg

# Specifications

## ■ Outputs for each model

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

Mode	CS-3000 series	CS-5000 series	CS-10400 / 10800	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

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

## ■ Common Specifications

Items	Descriptions	
Loop Compensation	Hardware compensation	
	Correction of floating capacitance between collector supply and ground	
Step Generator	Software compensation	
	Simulated loop procedure by software thinning process	
Step Generator	Offset	Range Resolution
	+/- 10times of STEP AMPLITUDE setup 1% STEP AMPLITUDE setup	
	Current mode	Range Current Voltage
	21 steps at 50nA/step to 200mA/step, 1-2-5 switchable 2A,max. 10V,max. or more	
	Voltage model	Range Current Voltage
	6 steps at 50mV/step to 2V/step, 1-2-5 switchable +/- 40V,max. 500mA ~ (~ 8V),max. , 200mA ~ (~ 15V), max., 10mA ~ (~ 40V),max.	
	Step rate	Twice of 50Hz or 60Hz (the same rate when AC mode), Pulse interval when HC mode
Pulse step	Pulse width	
50 μs ~ 400 μs(10 μs/step) When HC mode set, approx.100 μs wider-pulse width against collector supply pulse		
Number of steps	0 ~ 20 steps	
AUX output	Range	OFF, -40V ~ +40V(variable at 100mV/step)
Measurement Mode	REPEAT, STOP/SINGLE, SWEEP	
Vertical axis (Full scale:10div)	Collector current	Range
		Accuracy
	Emitter current (LEAKAGE)	Range
		Accuracy
Horizontal axis (Full scale:10div)	Collector voltage	Range
		Accuracy
	Base/Emitter voltage	Range
		Accuracy
Display	Display	
	8.4 inch TFT LCD	
	Number of data	
	1,000points/trace at AC and Rectified SINE 20points/trace to 1,000 points /trace at SWEEP mode	
	Trace display	
	Interpolation display between points, Dot display	
Average		
OFF, 2 to 255times		
Peasistence		
OFF, SHORT, LONG, infinite		
Internal waveform memory(REF)		
4 kinds		
Cursor measurements	DOT	
	Vert, Horiz, β or gm	
	fLINE	
	Vert, Horiz, 1/grad, intercept	
FREE		
Vert, Horiz, β or gm		
WINDOW		
Vert, Horiz, β or gm in WINDOW area		
Data storage/Readout	Internal memory	
	Panel setup : 256kinds, REF : 4kinds	
External memory		
USB1.1 : Setup, Waveform, Display dump at BMP, TIFF or PNG		
Remote	Remote on LAN 10BASE-T/100BASE-TX 1 port	
Power suply	CS-3000,5000	
	AC100V-AC240V 50/60Hz, Max Power:500VA (operation), 7W Max (save mode)	
CS-10000		AC200V single phase 50/60Hz, Max Power:10kVA (operation)
External dimensions (mm) (excluding projection portion and accessories)	CS-3100,5100	
	424W x 555D x 220H, approx. 28kg	
	CS-3200,3300,5200,5300,5400	
424W x 555D x 354H, approx. 43kg		
Weight (excluding accessories)	CS-10400,10800,12800,15800	
1,110W x 1,150D x 1,216H, approx. 370kg		

# Ordering information

Items	Description	Model	REmarks
Mainframe	Semiconductor curve tracer	CS-3100	3kV
		CS-3200	3kV, 400A
		CS-3300	3kV, 1000A
		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	Standard for CS-3100
	Test fixture M	CS-302	Standard for CS-3300/CS-3200
		CS-303	Standard for CS-5300/CS-5200/CS-5100
		CS-304	Standard for CS-5400
	Test fixture L	CS-305	Signal light, Thermo switch, Cooling fan, LED room light, Interlock function
		CS-307	Simplified version of CS-305 for CS-3000 series / CS-5100/5200/5300
		CS-307H	Simplified version of CS-305 for CS-5400
Test fixture with hotplate	CTJ1050	Surface temperature : 200°C ,max.	
Setup controller	Setup controller	IE-1310	External setup panel for direct switching
Hot plate	Hotplate PA3020	PA3020	Surface temperature : 300°C ,max., plate size : 200×200(mm)
	Hotplate PA3040	PA3040	Surface temperature : 300°C ,max., plate size : 200×400(mm)
	Hotplate PA4030	PA4030	Surface temperature : 400°C ,max., plate size : 300×200(mm)
Prober cable	Prober cable	CS-306-3k	For CS-3000 series
		CS-306-5k	For CS-5100/5200/5300(except CS-5400)
		CS-308	For CS-5400
Chrocodile clip	Chrocodile clip S*10pcs/set(red)	CS-001	Small chrocodile clip*10pcs/set(red)
	Chrocodile clip S*10pcs/set(blk)	CS-002	Small chrocodile clip*10pcs/set(black)
Test wire/cable	HV wire (red) *5pcs/set	CS-003	Standard wire set for high voltage
	Wire(blk)*5pcs/set	CS-004	Standard wire set for voltage
	Std. wire set	CS-005	Standard wire set for CS-3000
	High Current cable	CS-006	High current wire set for 20 c m *2pcs/set. standard for CS-5400
	High Current cable	CS-007	Hlgh current wire set for 30 c m *2pcs/set. standard for CS-10400/10800
Application software	Semiconductor parameter search	CS-800	Built in Main unit
	Double sweep function	CS-801	Built in Main unit
	Semiconductor parameter measurement	CS-810	Install on laptop PC
Options for ThermoStream	Test fixture for ThermoStream	CS-310	Enable to connect to ThermoStream with CS-521 adaptor
	Test adaptor for ThermoStream	CS-521	Adaptor for test fixture : CS-310
		CS-522	T0-263-3 / D2PAK (temperature withstanding version of CS-503, under development)
		CS-523	T0252-3 (temperature withstanding version of CS-504, underdevelopment)
Test adaptor	Test adaptor	CS-500	Standard for each curve tracer adaptor for customization
	T0-type test adaptor	CS-501A	T0-220, T0247
	AXIAL-type test adaptor	CS-502	Axial type
	T0-263-3(D2PAK)-type test adaptor	CS-503	T0-263-3 / D2PAK
	T0-252-3-type test adaptor-type test adaptor	CS-504	T0252-3
	T0-263-7-type test adaptor	CS-505	T0263-7
	T0-252-5-type test adaptor	CS-506	T0252-5 ※Provide pin assignment at ordering point
	SC-70-3(SOT-323-3)-type test adaptor	CS-507	SC-70-3, OT-323-3
	SMD-type test adaptor	CS-508	SMD(two contacts)
	SC-59A-type test adaptor	CS-509	SC-59A/SOT-23-3
SC-62-type test adaptor	CS-510	SC-62/SOT-89	
Scanner unit	Switch control unit	CS-701	Control relay unit and switching unit
	LV relay unit	CS-702	300V / 30A, 10CH
	HV relay unit	CS-703	5kV / 3A, 10CH
	HC relay unit	CS-704	2kV / 1,000A, 10CH
	HV-HC switch unit	CS-705	Extention unit at 5kV/1,000A HV/HC switching
	Extention unit	CS-706	5kV/15A
	Gate-short unit	CS-707	Curve tracer side : 300V/8A, device side : 5kV/8A 10CH
	HV-HC 2CH relay unit	CS-708	5kV/1,500A 2CH
	HV-HC 4CH relay unit	CS-709	5kV/1,500A 4CH
	HV-HC switch unit for CS-5400	CS-710	Extention unit at 5kV/1,500A HV/HC switching
	Control cable	-	Connecting CS-701 and each unit(necessary 2pcs. for CS-707)
	Low voltage connection cable	-	made-to-order
	High voltage connection cable	-	made-to-order
	High current connection cable	-	made-to-order
High temperature connection cabl	-	made-to-order	
Others	Wagonk	MT-600L	Maximum load : 100kg

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