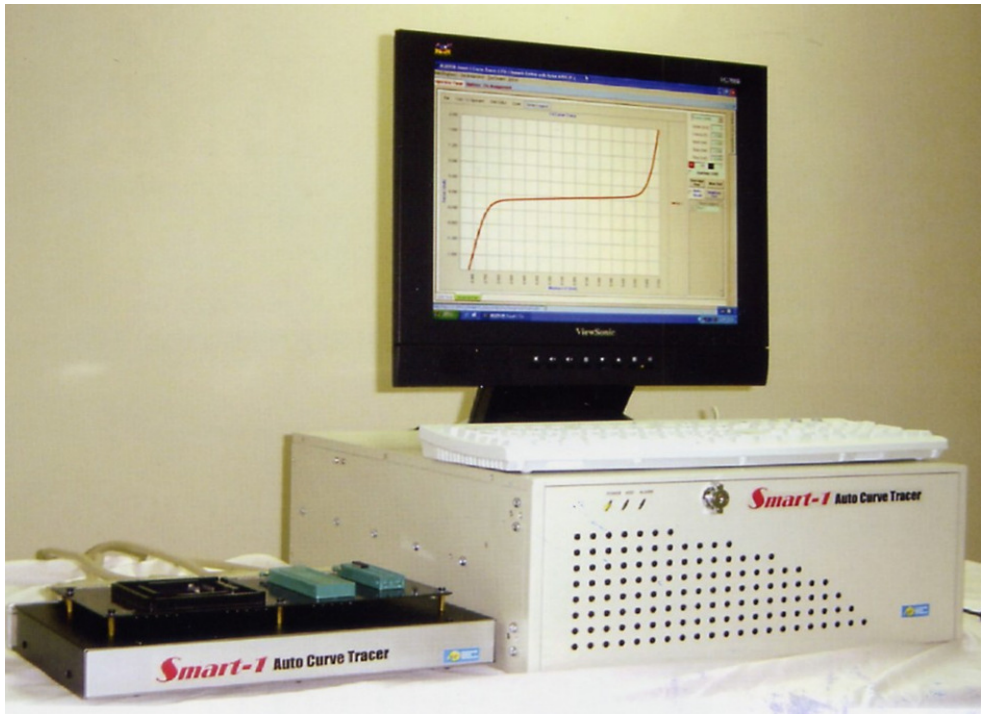
Auto curve tracer

Main Function

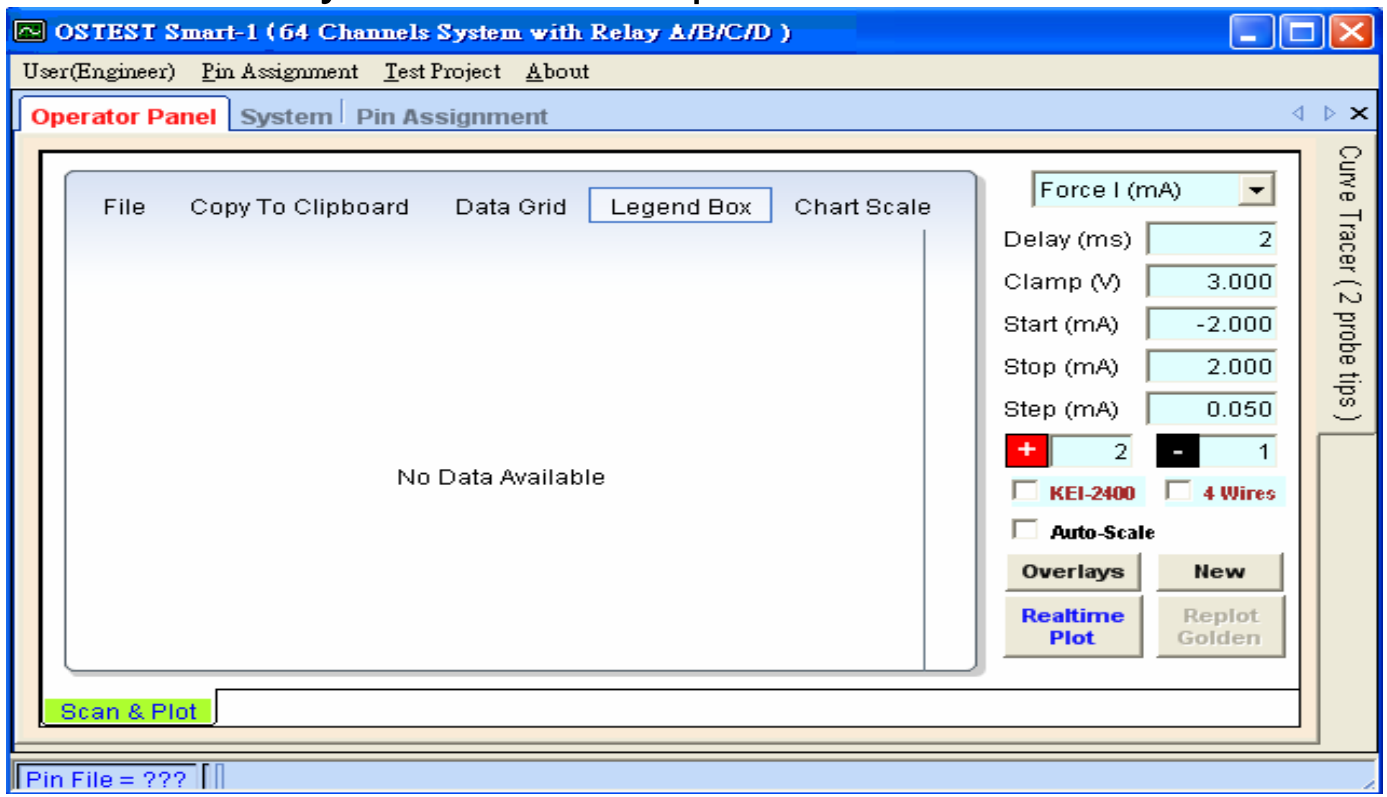
- *Open /Short Test*
- ***I / V** Curve tracer Analysis*
- *Idd Measuring*
- *Power Leakage Test*



Software function

Curve Tracer (2 Probe Tips) for Failure Analysis

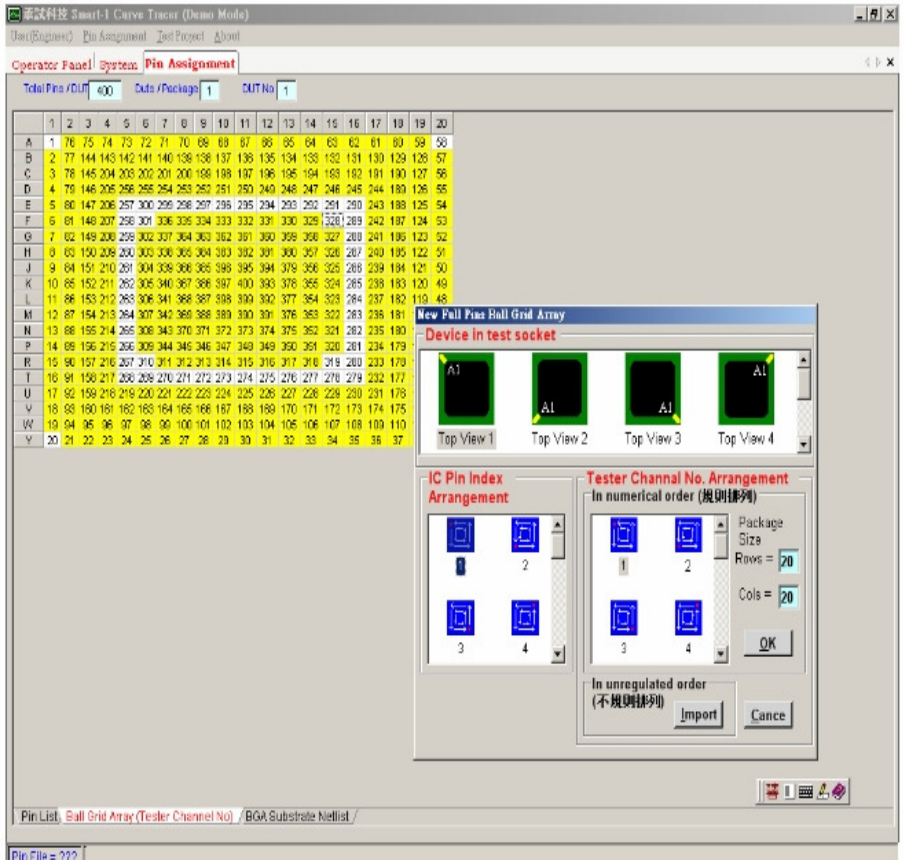
- On this failure analysis application, only two probe tips are need. System offers four specific channels, CH1 (F-) / CH2 (F+) / CH3 (S-) / CH4 (S+), to complete this requirement without the pin assignment definition.
  User can easy to find out fail pins I/V curve situation.

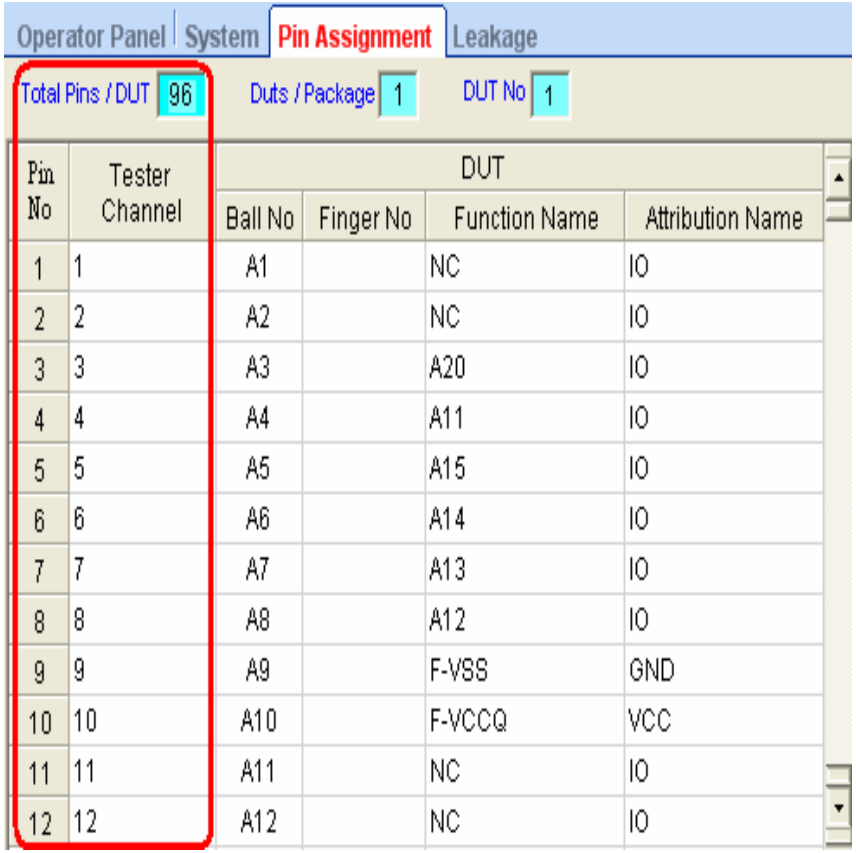


Software function

.Easy to set up Pin assignment :

Pin assignment is easily set by a mouse click on the window –based

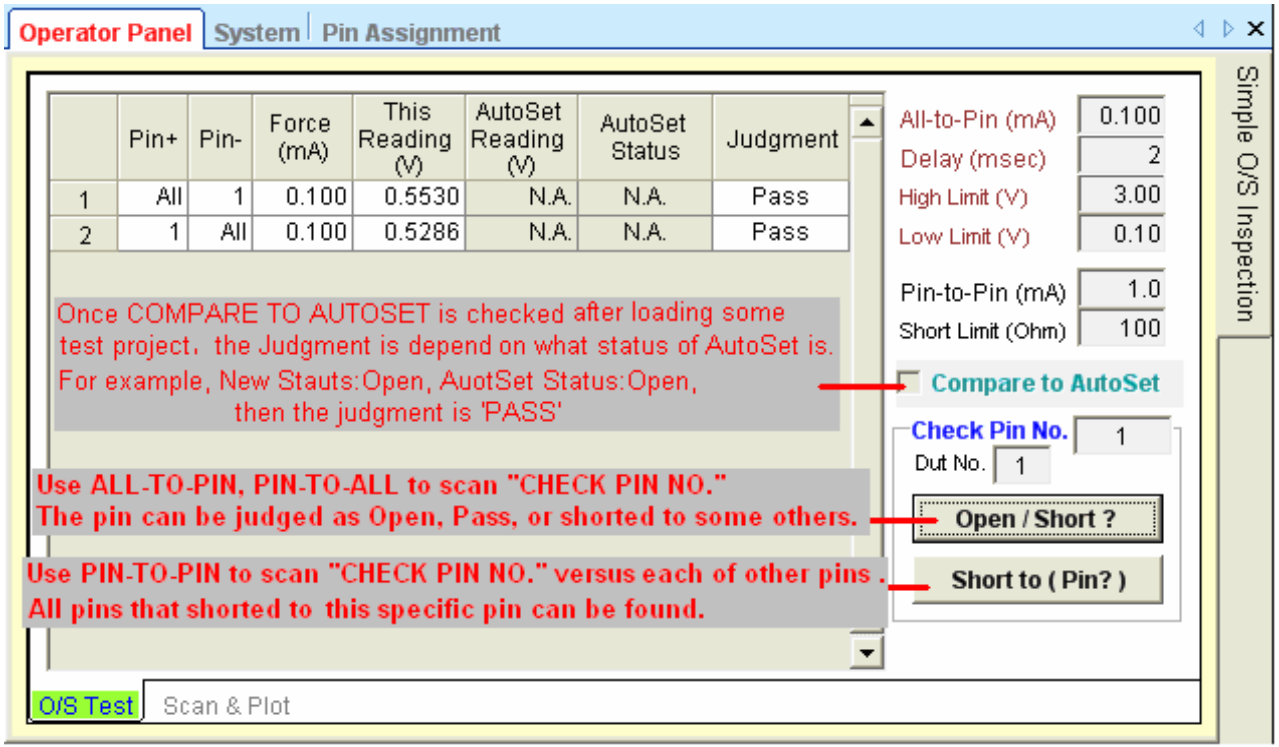




Pin No	Tester Channel	DUT			
		Ball No	Finger No	Function Name	Attribution Name
1	1	A1		NC	IO
2	2	A2		NC	IO
3	3	A3		A20	IO
4	4	A4		A11	IO
5	5	A5		A15	IO
6	6	A6		A14	IO
7	7	A7		A13	IO
8	8	A8		A12	IO
9	9	A9		F-VSS	GND
10	10	A10		F-VCCQ	VCC
11	11	A11		NC	IO
12	12	A12		NC	IO

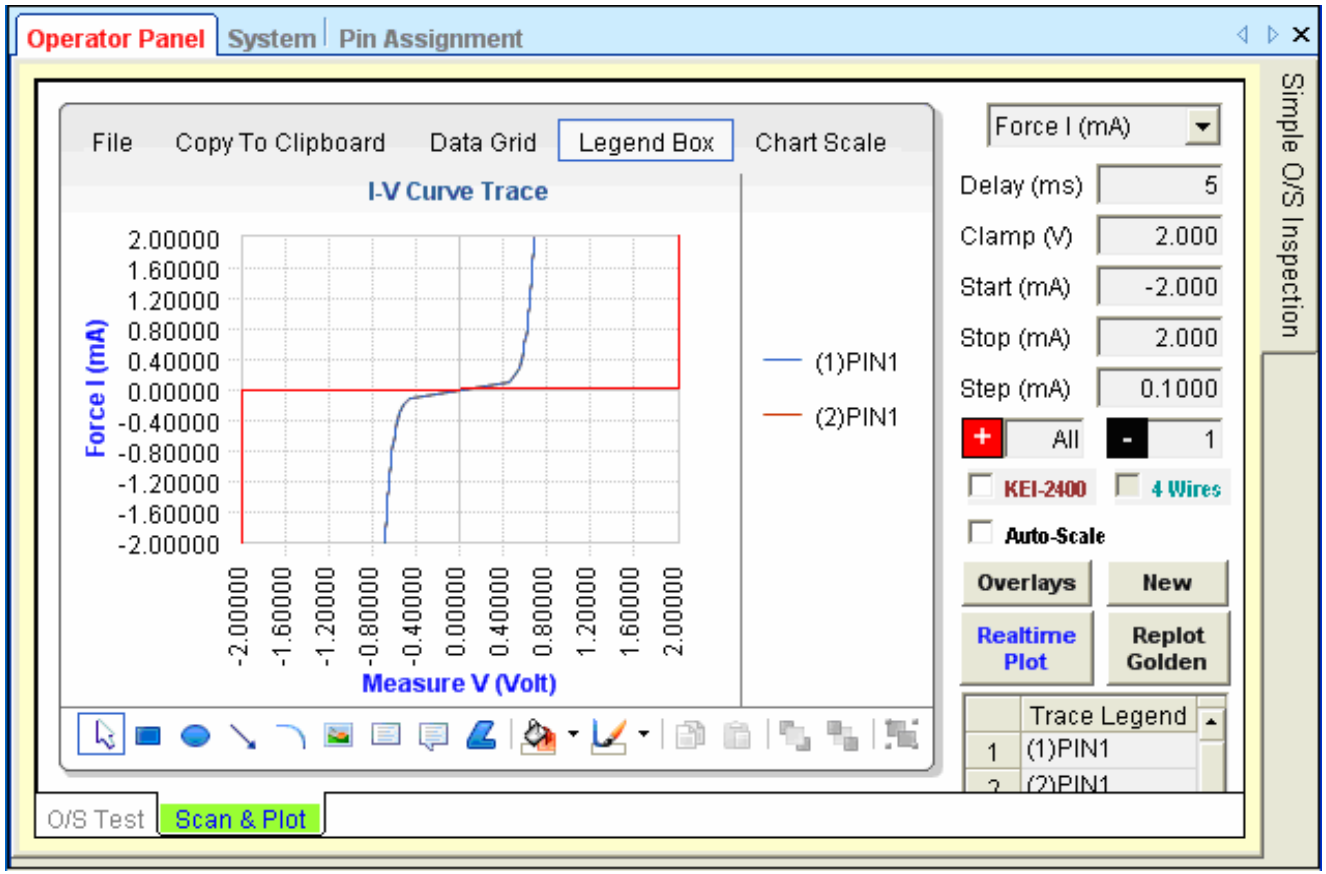
Software function

- **Simple O/S Inspection**
- any tested pins can be selected by software as “All-Pin”, “Pin-All” and “Pin-Pin”.



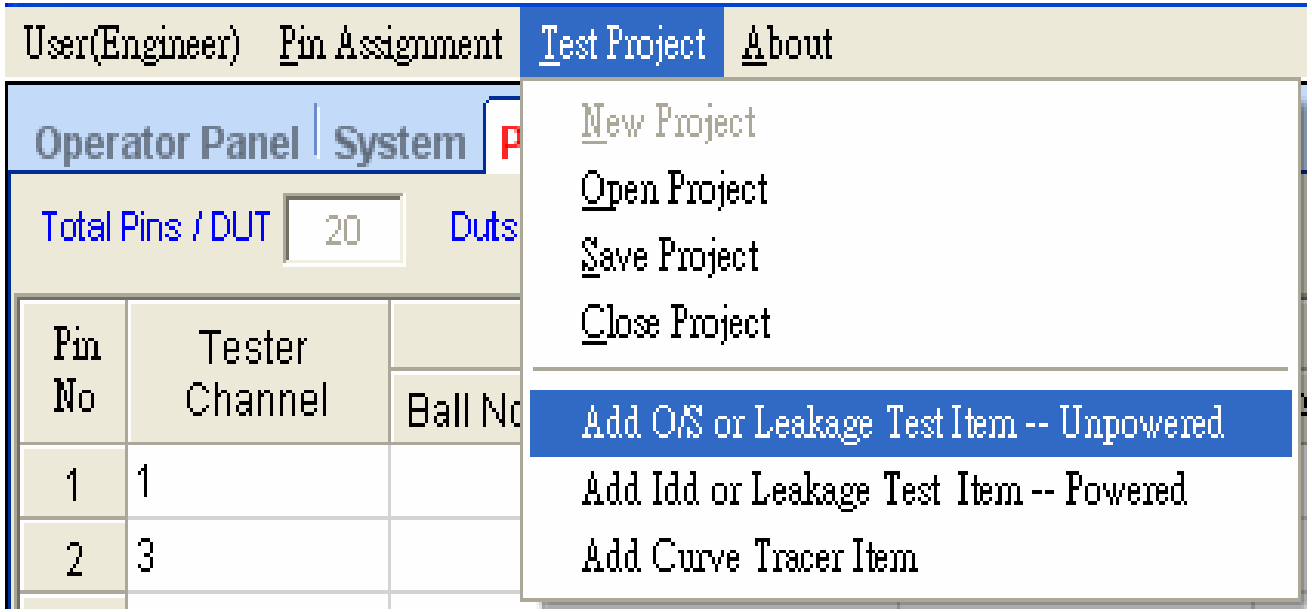
Software function

- **User can memorize the I/V curve of one golden device and compare with the unknown devices, so it becomes very simple and quick to find out problem samples.**



Software function

- **‘O/S Test or Leakage test item -(Unpowered)’**
- After executing “Test Project > New Project” menu and loading the relative pin assignment file, please execute the below menu to open “O/S & LK (Unpowered)” tab.



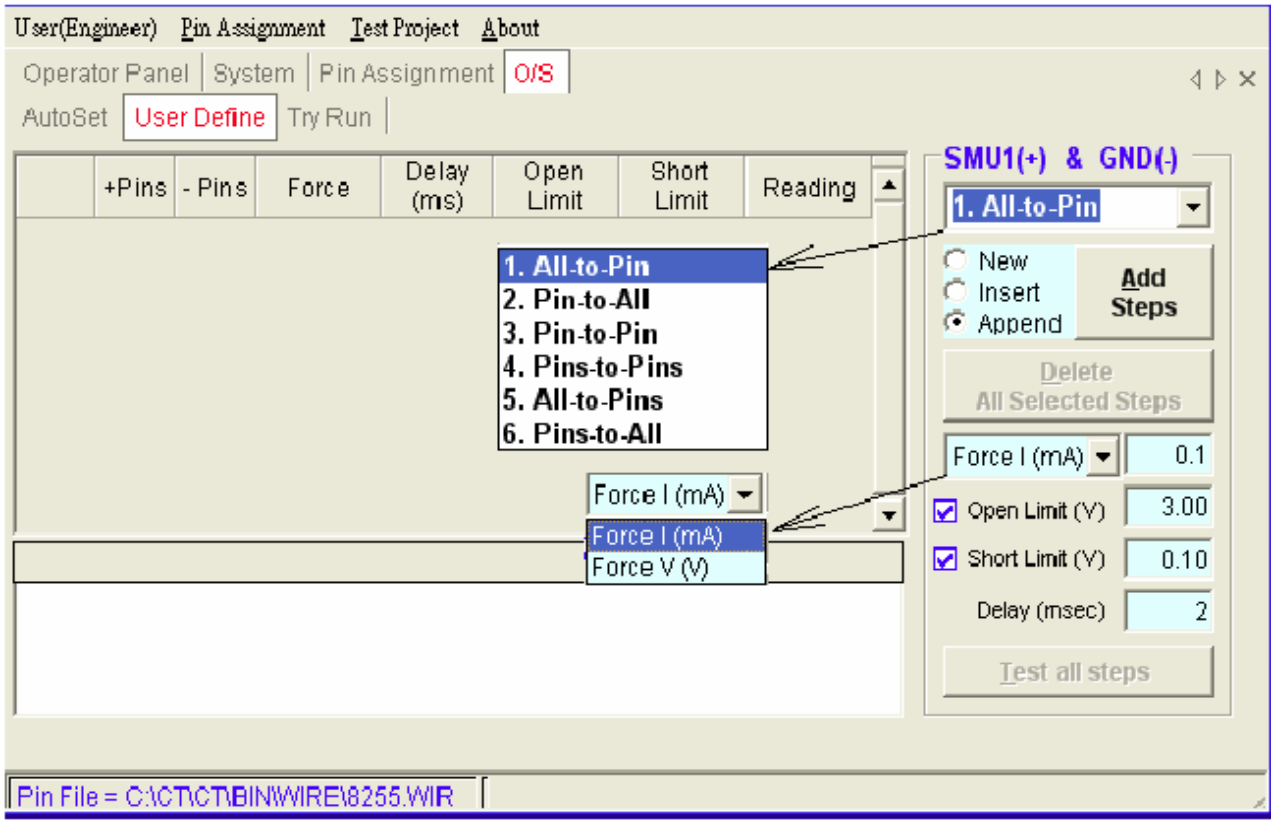
Software function

Open /short test :

- Autoset
- (1).All to pin
- (2).pin to All
- (3) Pin to pin

- User define

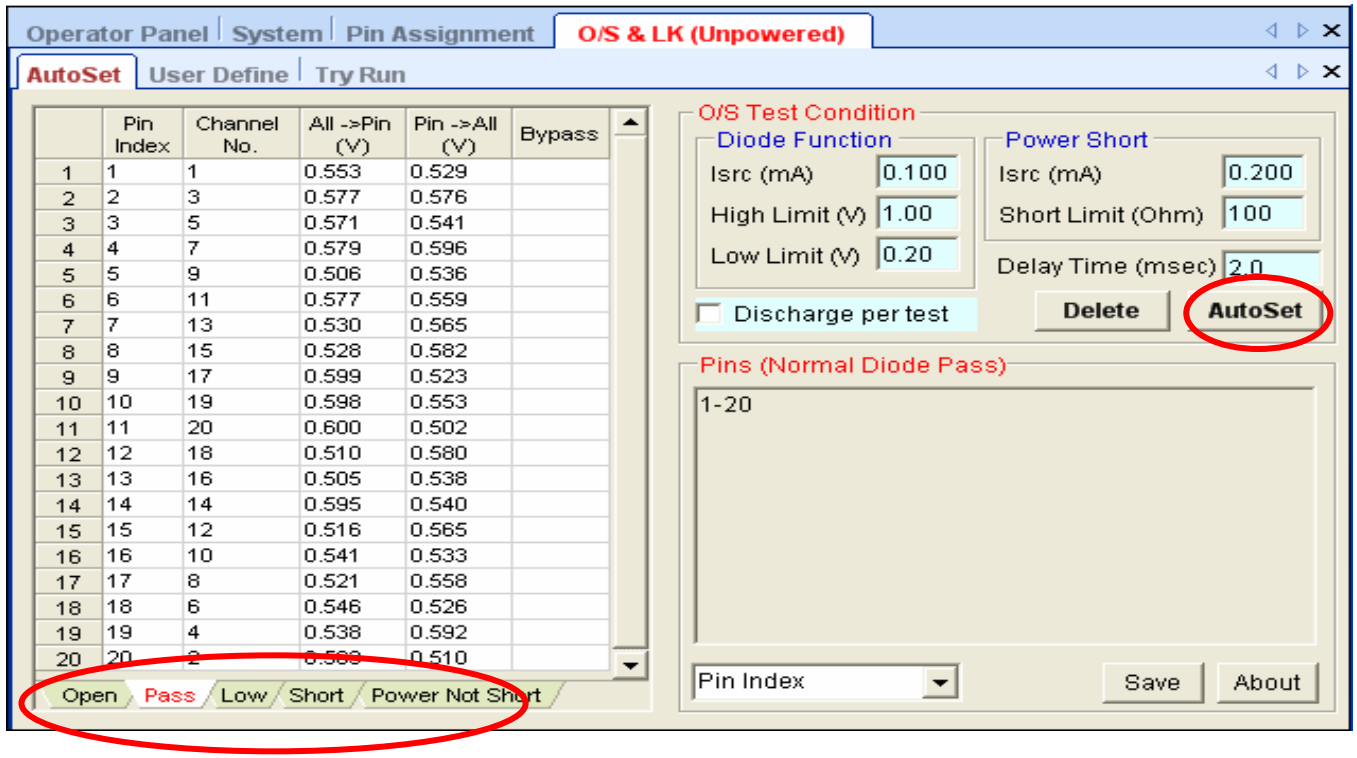
- (1).All to Pin
- (2).Pin to All
- (3).Pins to Pins
- (4).Pins to Pins
- (5).All to pins
- (6).Pins to All



Software function

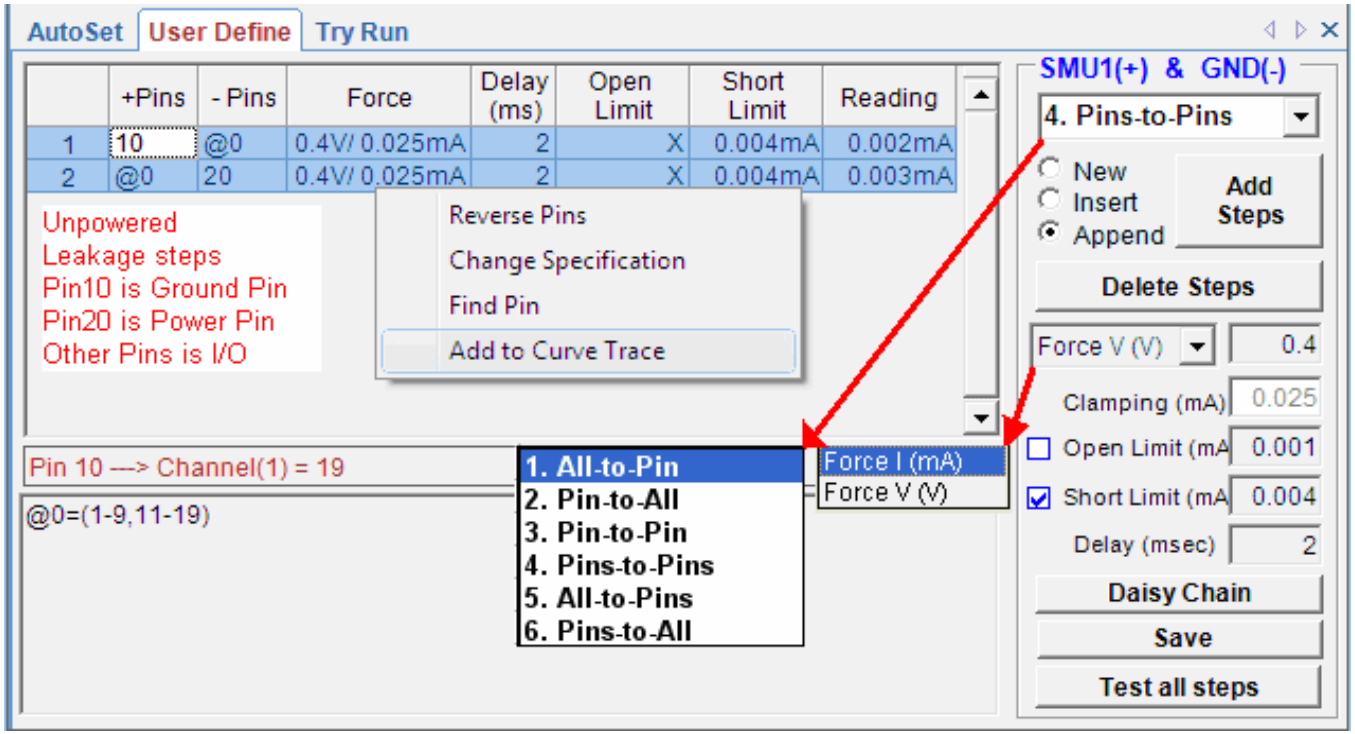
- Autoset

Most of user from the IC packaging manufactory click "AutoSet" button to create test steps that learn from the golden device according to the test condition (Current source, Diode High limit, Diode Low Limit, Power short limit, Source delay time) you set.
Max. Current Source =10mA, 0.01V <= Diode Low Limit < Diode High Limit <= 9V,
Clamping Voltage = Diode High Limit + 0.5V



Software function

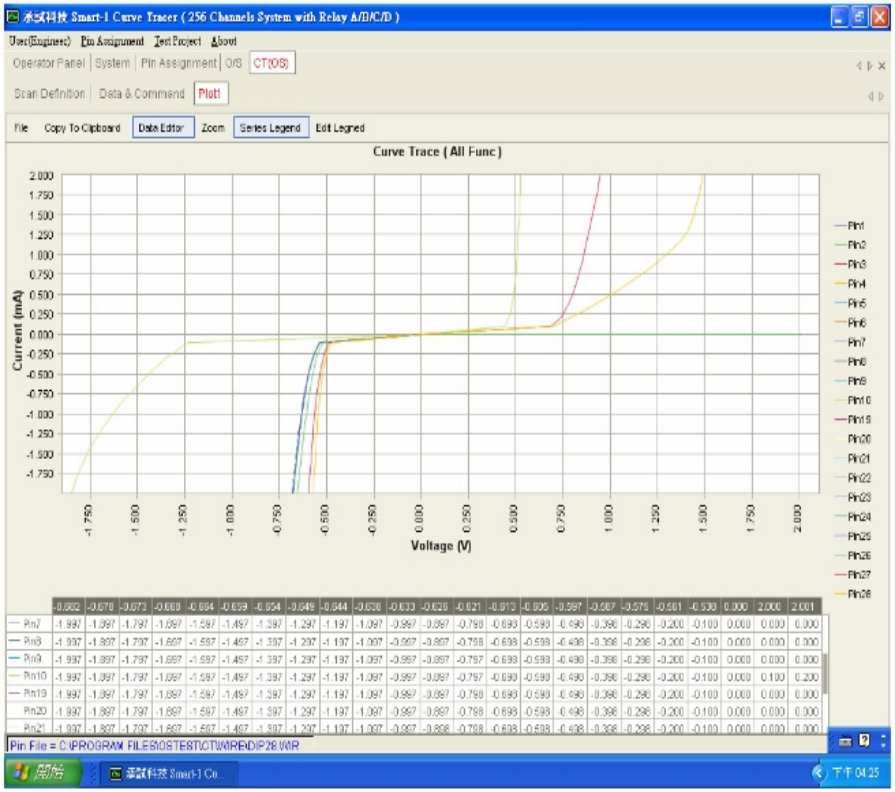
- **Unpowered Leakage Test (Force 0.2~0.4V, Short Limit < 0.05mA) for the I/O pins with ESD diode inside.**
- **Ground Pins→ I/O Pins, I/O Pins → Power Pins**
- ***One example to setup unpowered leakage test steps is as below.***

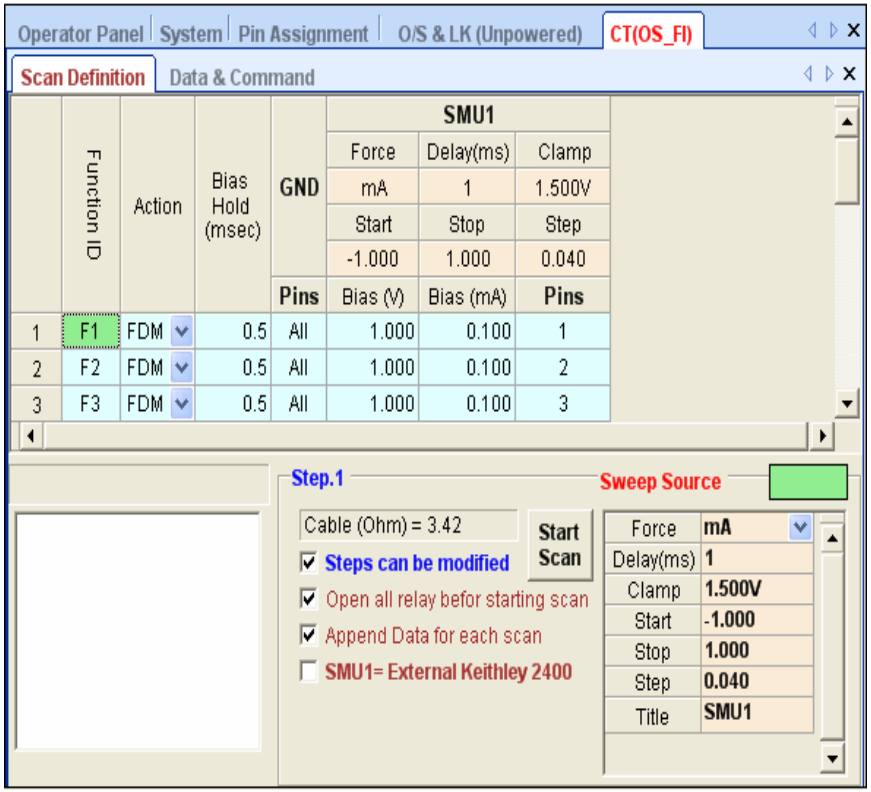


Software Function--- Auto I / V curve tracer Analysis

Automatic /Manual plot is available

Can use simple curve tracer function to measure
I/V curve of all pins





Software function

- Power Curve Tracer
- Step 1→ Add power level to POWER pins, Add precondition level on some input pins,
- Step 2→ Connect SMU1 to the tested pin and force source level from Vss-1V to Vdd+1V for measuring the leakage current.
- Trace1 :(Normal) Trace2 :(Put one 3Mohm resistance between the tested pin and Vss wittingly)

	Function ID	Action	Bias Hold (msec)	GND	SMU1			SMU2			SMU3		
					Force	Delay(ms)	Clamp	Force	Delay(ms)	Clamp	Force	Delay(ms)	Clamp
					V	5	0.100mA	V	5	0.1000mA	V	5	0.1000mA
					Start	Stop	Step	Start	Stop	Step	Start	Stop	Step
					-1.000	6.000	0.001	0	0	0	0	0	0
				Pins	Bias (V)	Bias (mA)	Pins	Bias (V)	Bias (mA)	Pins	Bias (V)	Bias (mA)	Pins
1	B1	Bias	10.0	7	0.000	0.100		5.000	20.000	26	0.000	0.100	
2	F1	FDM	0.5	@0	0.000	0.100	6	5.000	20.000	26	4.800	0.100	@1

@0=(7,36)

@0=(7,36)
@1=(5-6,35)

Step.2

Cable (Ohm) = 1.55

Steps can be modified

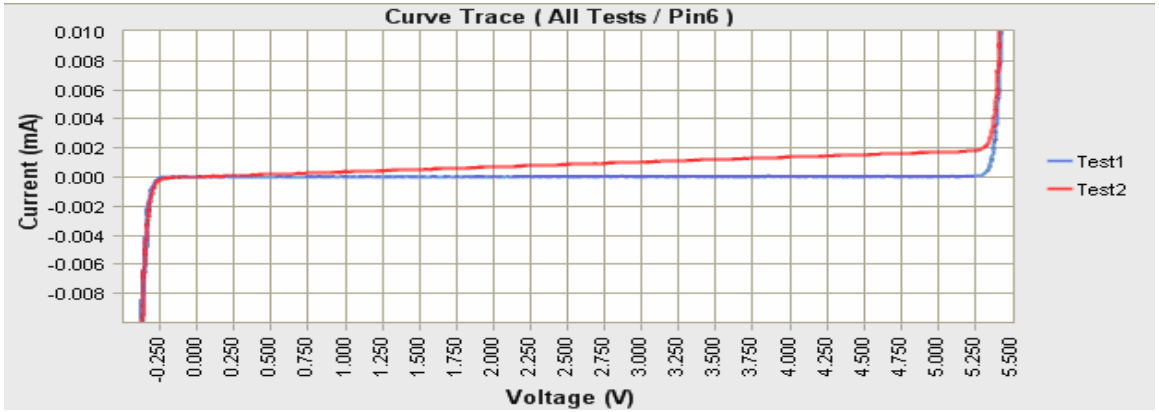
		-1.000V	-0.999V
F1	(V) SMU1-Sweep1	-0.478	-0.467
	(mA) SMU1-Sweep1	-0.0997	-0.0997

Test1 Test2

Traces Definition

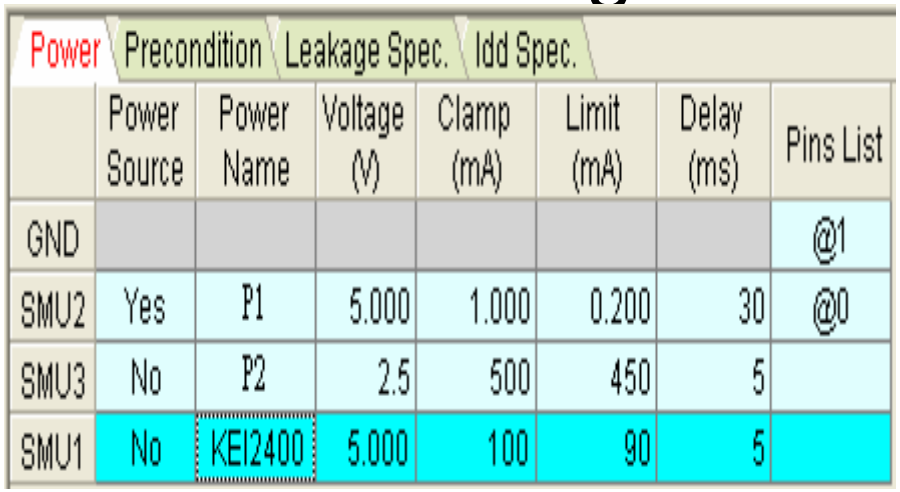
	Test Name	Data Series
X-Axis	All Tests	SMU1-V
Y-Axis	All Tests	SMU1-I

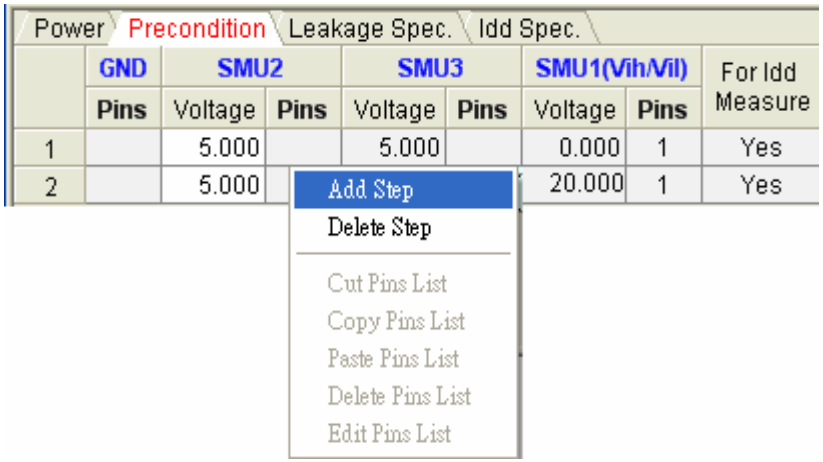
Plot1

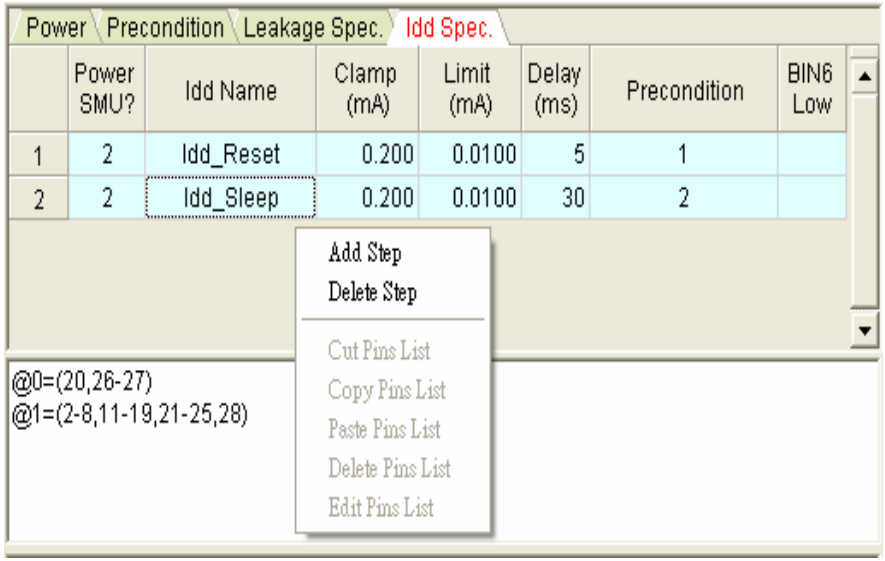


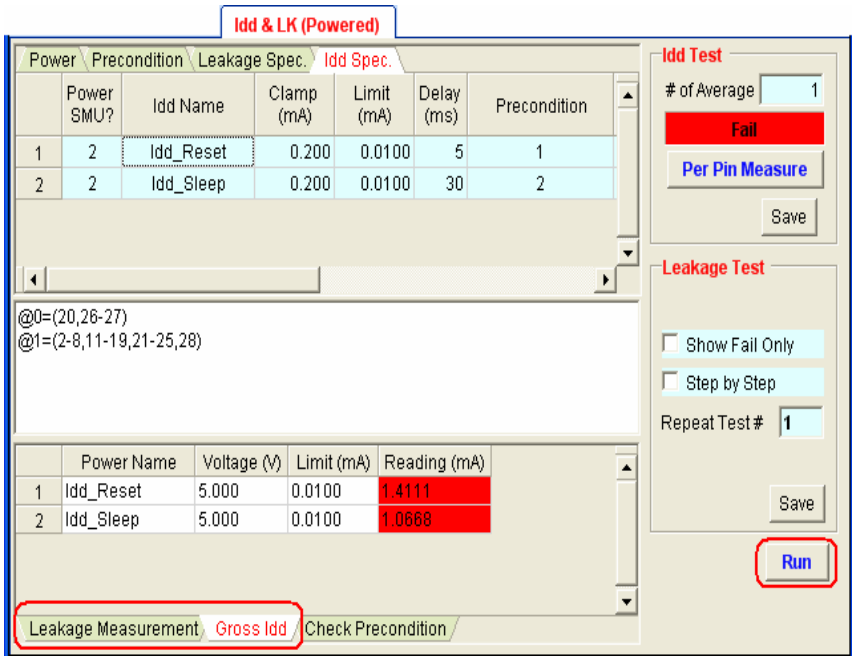
Software function

- Idd Measuring









Software function

- Power Leakage Test
- Create Pin Assignment File for Leakage Test as below.

	Tester Channel	DUT			
		Ball No	Finger No	Function Name	Attribution Name
1	1			PA3	IO
2	3			PA2	IO
3	5			PA1	IO
4	7			PA0	IO
5	9			RD*	IN
6	11			CS*	IN
7	13			GND	GND
8	15			A1	IN
9	17			A0	IN
10	19			PC7	IO
11	21			PC6	IO
12	23			PC5	IO
13	25			PC4	IO
14	27			PC0	IO
15	29			PC1	IO
16	31			PC2	IO
17	33			PC3	IO
18	35			PB0	IO
19	37			PB1	IO
20	39			PB2	IO

	Tester Channel	DUT			
		Ball No	Finger No	Function Name	Attribution Name
21	40			PB3	IO
22	38			PB4	IO
23	36			PB5	IO
24	34			PB6	IO
25	32			PB7	IO
26	30			VCC	VCC
27	28			D7	IOZ
28	26			D6	IOZ
29	24			D5	IOZ
30	22			D4	IOZ
31	20			D3	IOZ
32	18			D2	IOZ
33	16			D1	IOZ
34	14			D0	IOZ
35	12			RESET	IN
36	10			WR*	IN
37	8			PA7	IO
38	6			PA6	IO
39	4			PA5	IO
40	2			PA4	IO

Software function

- Power Leakage Test

	Power Source	Power Name	Voltage (V)	Clamp (mA)	Limit (mA)	Delay (ms)	Pins List
GND							7
SMU2	Yes	VCC	5.000	20.0	10.0	5	26
SMU3	No	P2	2.5	500	450	5	

Power | Precondition | Leakage Specification

	GND	SMU2		SMU3		For Idd Measure
	Pins	Voltage	Pins	Voltage	Pins	
1	36	5.000		4.800	@0	No

Power | Precondition | Leakage Specification

	Tested Group Name	Force (V)	Leakage (uA)	Delay (ms)	Precondition	Method	Pins List
1	LK_IN	4.800	1.0	1.0	1	Serial	@1
2	LK_IN	0.100	1.0	1.0		Serial	@2
3	LK_IO	4.800	1.0	1.0		Serial	@3
4	LK_IO	0.100	1.0	1.0		Serial	@4
5	LK_IOZ	4.800	1.0	1.0		Serial	@5
6	LK_IOZ	0.100	1.0	1.0		Serial	@6

Power | Precondition | Leakage Specification

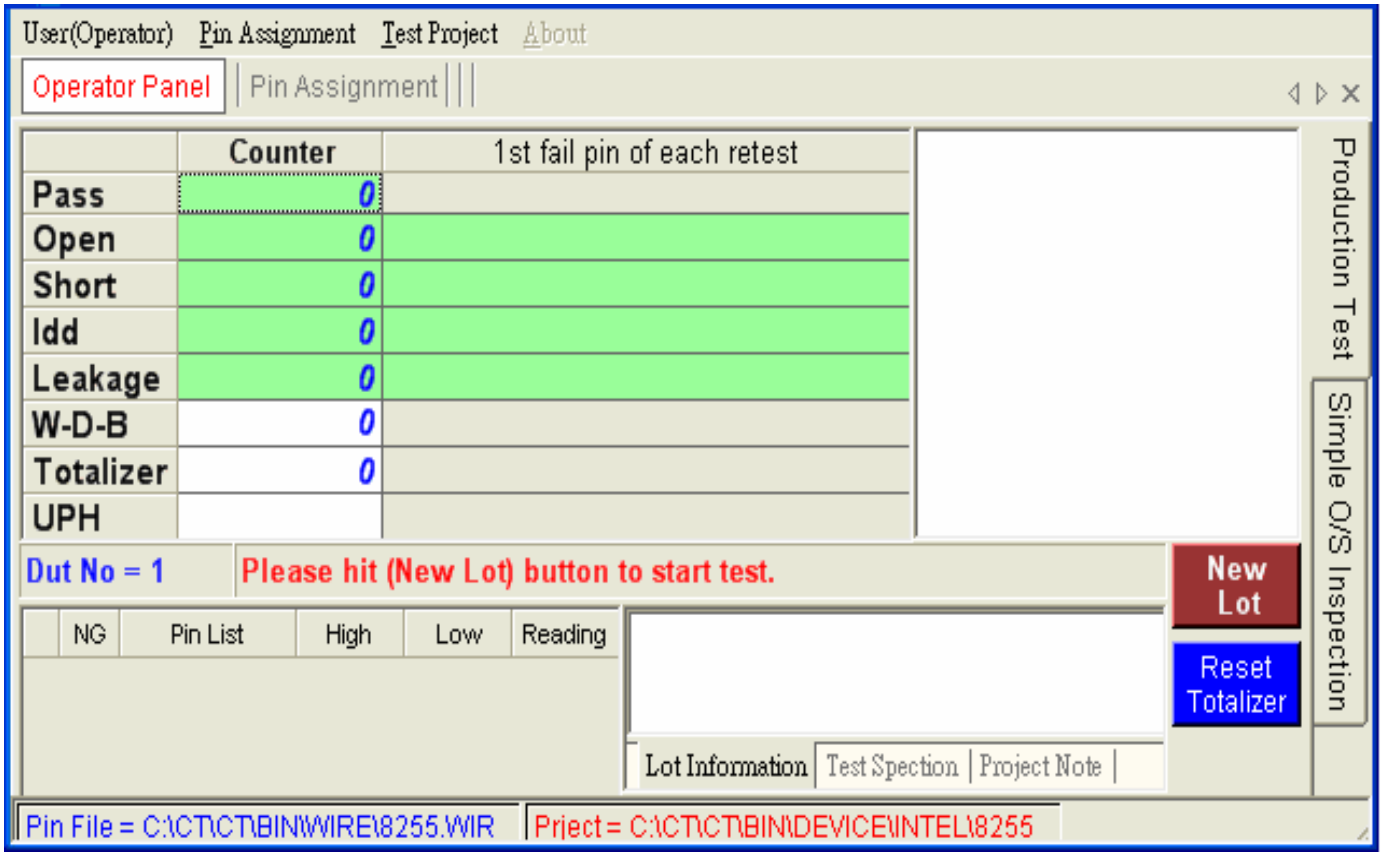
```
@0=(5,35)
@1=(5-6,8-9,35-36)
@2=(5-6,8-9,35-36)
@3=(1-4,10-25,37-40)
@4=(1-4,10-25,37-40)
@5=(27-34)
@6=(27-34)
```

	Tested Group Name	Pins	Function Name	Force (V)	Limit (uA)	Reading (uA)	Bypass
2	LK_IN	5	RD*	4.8	1	0	
3	LK_IN	6	CS*	4.8	1	0	
4	LK_IN	8	A1	4.8	1	0	
5	LK_IN	9	A0	4.8	1	0	
6	LK_IN	35	RESET	4.8	1	0	
7	LK_IN	36	WR*	4.8	1	0	
9	LK_IN	5	RD*	0.1	1	0	
10	LK_IN	6	CS*	0.1	1	0	
11	LK_IN	8	A1	0.1	1	0	
12	LK_IN	9	A0	0.1	1	0	
13	LK_IN	35	RESET	0.1	1	-0.1	
14	LK_IN	36	WR*	0.1	1	0	
16	LK_IO	1	PA3	4.8	1	0	
17	LK_IO	2	PA2	4.8	1	0	
18	LK_IO	3	PA1	4.8	1	0	
19	LK_IO	4	PA0	4.8	1	0	
20	LK_IO	10	PC7	4.8	1	0	
21	LK_IO	11	PC6	4.8	1	0	
22	LK_IO	12	PC5	4.8	1	0	
23	LK_IO	13	PC4	4.8	1	0	
24	LK_IO	14	PC0	4.8	1	0	
25	LK_IO	15	PC1	4.8	1	0	

Leakage Measurement | Gross Idd | Check Precondition

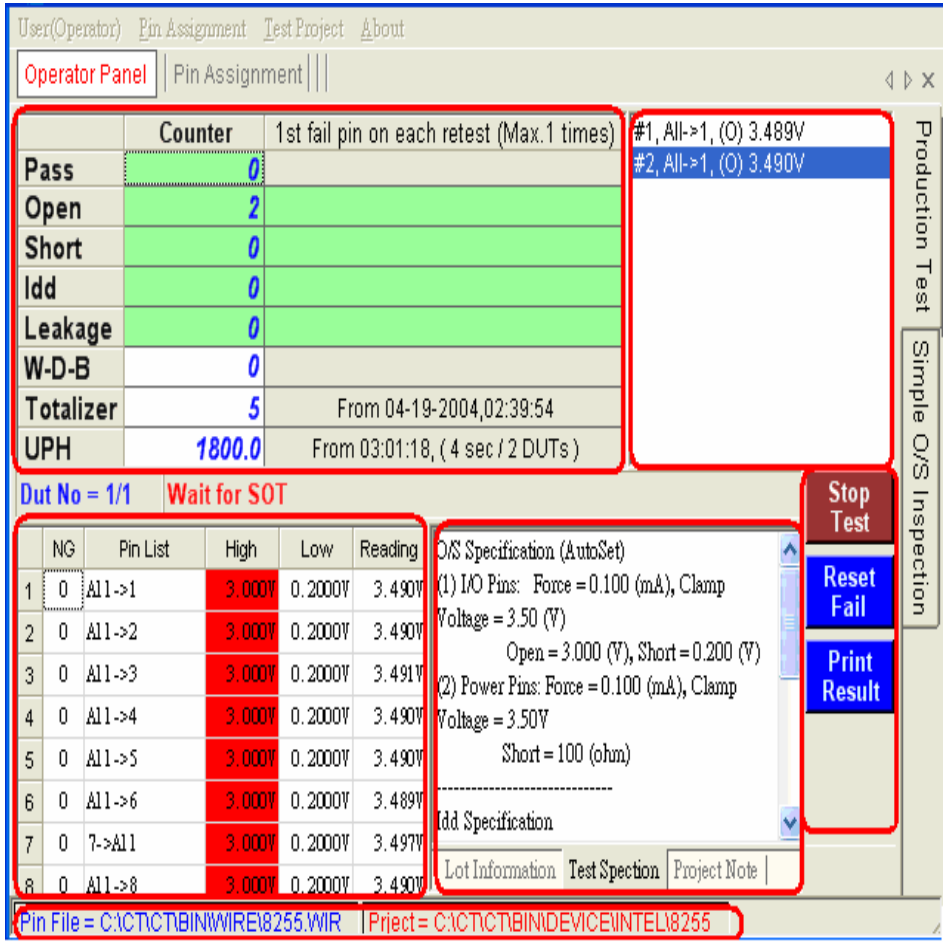
Software function

- **mass production Test to link with hander or by manual test**



Software function

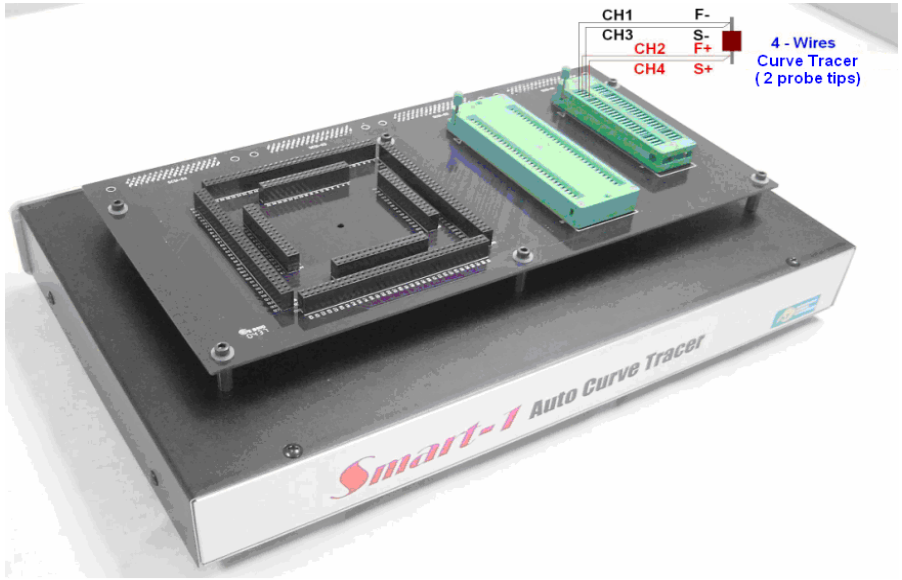
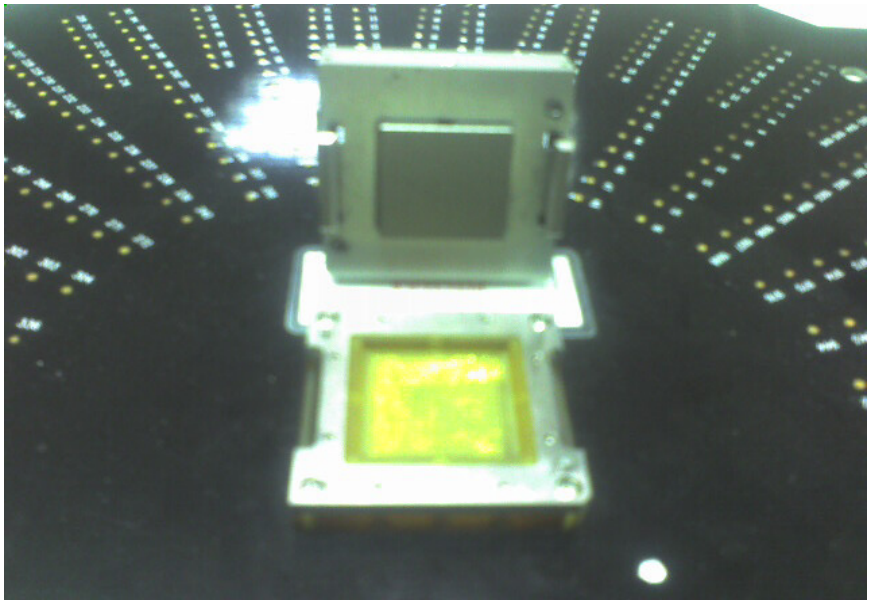
- Production Test




```
        Production Test Result (Smart-1 Curve Tracer: Station=1.1.1)
================================================================================
Lot No. = 1 , Operator = 1 , Time = 01/19/2004,03:01:02
================================================================================
Prject = C:\CT\CT\BIN\DEVICE\INTEL\8255
Pin File = C:\CT\CT\BIN\WIRE\8255.WIR
================================================================================
O/S Specification (AutoSet)
(1) I/O Pins:   Force = 0.100 (mA), Clamp Voltage = 3.50 (V)
                Open = 3.000 (V), Short = 0.200 (V)
(2) Power Pins: Force = 0.100 (mA), Clamp Voltage = 3.50V
               Short = 100 (ohm)
------------------------------
Idd Specification
VCC = 5.000 (V), Clamp = 20.0 (mA), Limit= 10.0 (mA)
------------------------------
Leakage Specification
(1) LK_IN: Force = 4.800 (V), Limit = 1.0 (uA)
(2) LK_IN: Force = 0.100 (V), Limit = 1.0 (uA)
(3) LK_IO: Force = 4.800 (V), Limit = 1.0 (uA)
(4) LK_IO: Force = 0.100 (V), Limit = 1.0 (uA)
(5) LK_IOZ: Force = 4.800 (V), Limit = 1.0 (uA)
(6) LK_IOZ: Force = 0.100 (V), Limit = 1.0 (uA)
================================================================================
#1: Open Pins = 1,2,3,4,5,6,7,8,More
All->1     =3.491V    | All->2     =3.490V    | All->3     =3.490V
All->4     =3.490V    | All->5     =3.489V    | All->6     =3.489V
7->All     =3.497V    | All->8     =3.490V
================================================================================
#2: Open Pins = 1,2,3,4,5,6,7,8,More
All->1     =3.491V    | All->2     =3.490V    | All->3     =3.490V
All->4     =3.490V    | All->5     =3.491V    | All->6     =3.489V
7->All     =3.497V    | All->8     =3.489V
================================================================================
```

Option :

Universal DUT Board (256Pins)

(512Pins)

(1024Pins)