

**IT6412 DC power source**

**Dual-channel bipolar battery , charger simulator**

A photograph of an ITECH IT6412 High Precision DC Source, a piece of electronic test equipment. The device is light gray with a large LCD screen in the center. The screen displays numerical values: 0.000, 0.000, 0.000, 0.0002, and -0.000. To the right of the screen is a keypad with various function buttons. Below the screen are several large knobs and buttons. On the right side, there are four output terminals with red and black probes. The ITECH logo is visible on the bottom right of the device. The background is dark with concentric circles.

# IT6412

is.....

Dual-Channel, Bipolar, Dual-Range

# **Battery Simulator**

**DC Power Source**

CH1 :  $\pm 15\text{V}/\pm 3\text{A}/45\text{W}$   $\pm 9\text{V}/\pm 5\text{A}/45\text{W}$

CH2 :  $0\text{-}15\text{V}/\pm 3\text{A}/45\text{W}$   $0\text{-}9\text{V}/\pm 5\text{A}/45\text{W}$



A photograph of an ITECH IT6412 High Precision DC Source. The device is a light-colored, rectangular unit with a large LCD screen in the center. The screen displays numerical values and some graphical elements. To the right of the screen is a keypad with various buttons. Below the screen are several large knobs and buttons. On the right side, there are four output terminals with colored caps (red, black, red, black). The ITECH logo is visible on the bottom right of the front panel. The background is dark with a large, faint circular graphic.

# IT6412

has.....

# Ultrafast

## Voltage Rising Time

### Up to 500us

Down 500us (full load)



# Highest

Current Read Back Resolution  
100nA

Up to 100nA

# Ultrafast

## Transient Response Time

$< 50\mu\text{S}$



A photograph of an ITECH IT6412 High Precision DC Source. The device is a light-colored, rectangular unit with a large LCD screen in the center. The screen displays numerical values and some graphical elements. To the right of the screen is a keypad with numerous buttons. Below the screen are several large knobs and buttons. On the right side, there are four output terminals with red and black probes. The ITECH logo is visible on the bottom right of the front panel. The entire image is overlaid with a semi-transparent dark circle.

# IT6412

can.....





- ✓ **Dual-channel**
- ✓ **Dual-range**
- ✓ **Bipolar**
- ✓ **Oscilloscope**

**IT6412**

**= DC Power supplies + DC Electronic loads + Oscilloscope**



**Portable battery-powered products test**



**LED test**



**Electronic Components ,DC / DC converter test**



So ,  
We can say.....



# IT6412



**Excellent  
Performance** **+** **Multifunction**



# 1

# New Appearance

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# Traditional Faces of ITECH Products

**IT6533A**



**IT6322B**



**IT6922A**

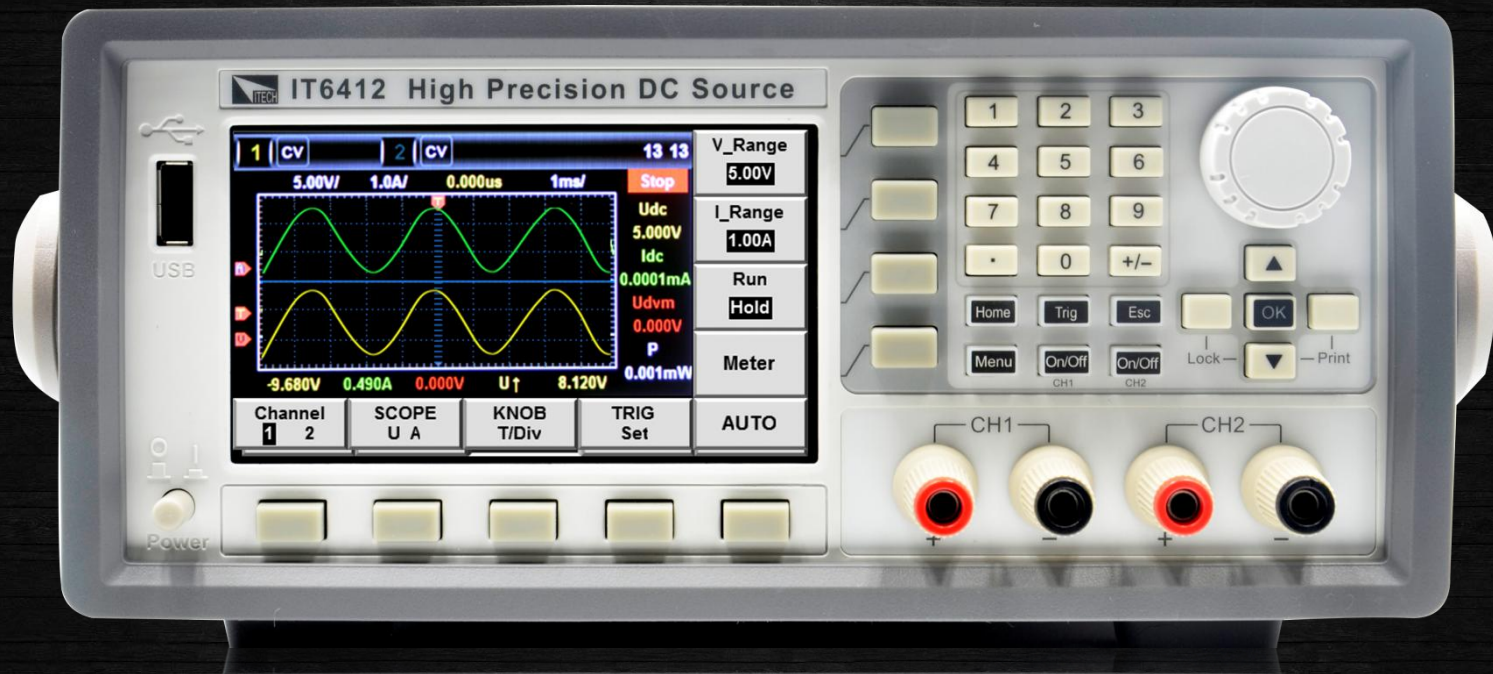


**IT6721**





# IT6412

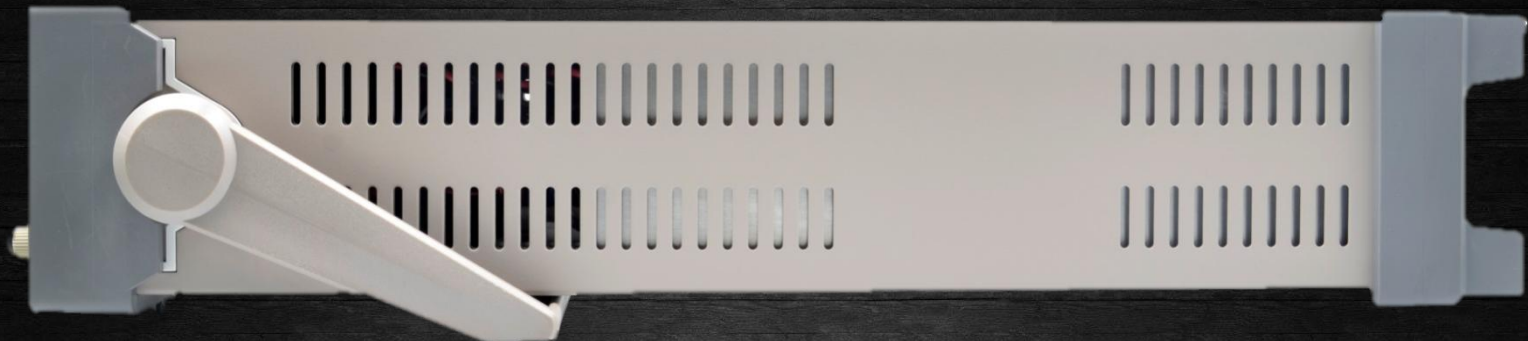


# IT6412

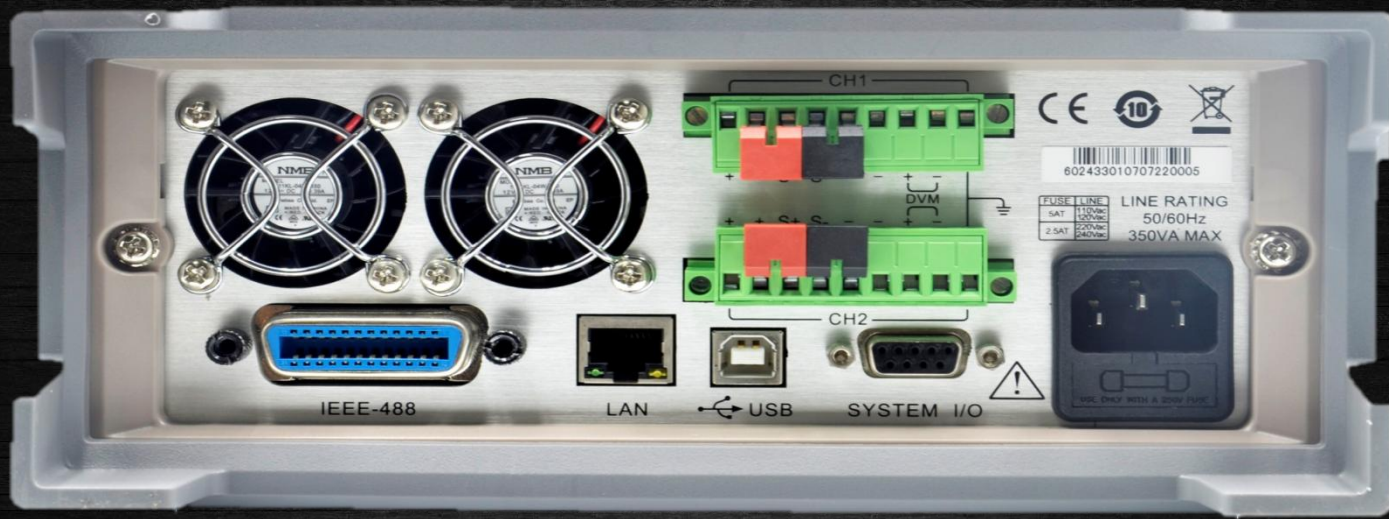




# IT6412







# IT6412



IT6412



A dark, moody background image showing a desk setup. A tablet is in the foreground displaying a map. Behind it is a keyboard, and to the right is a mouse. The entire scene is dimly lit, with the text and logo providing the main visual elements.

# 2

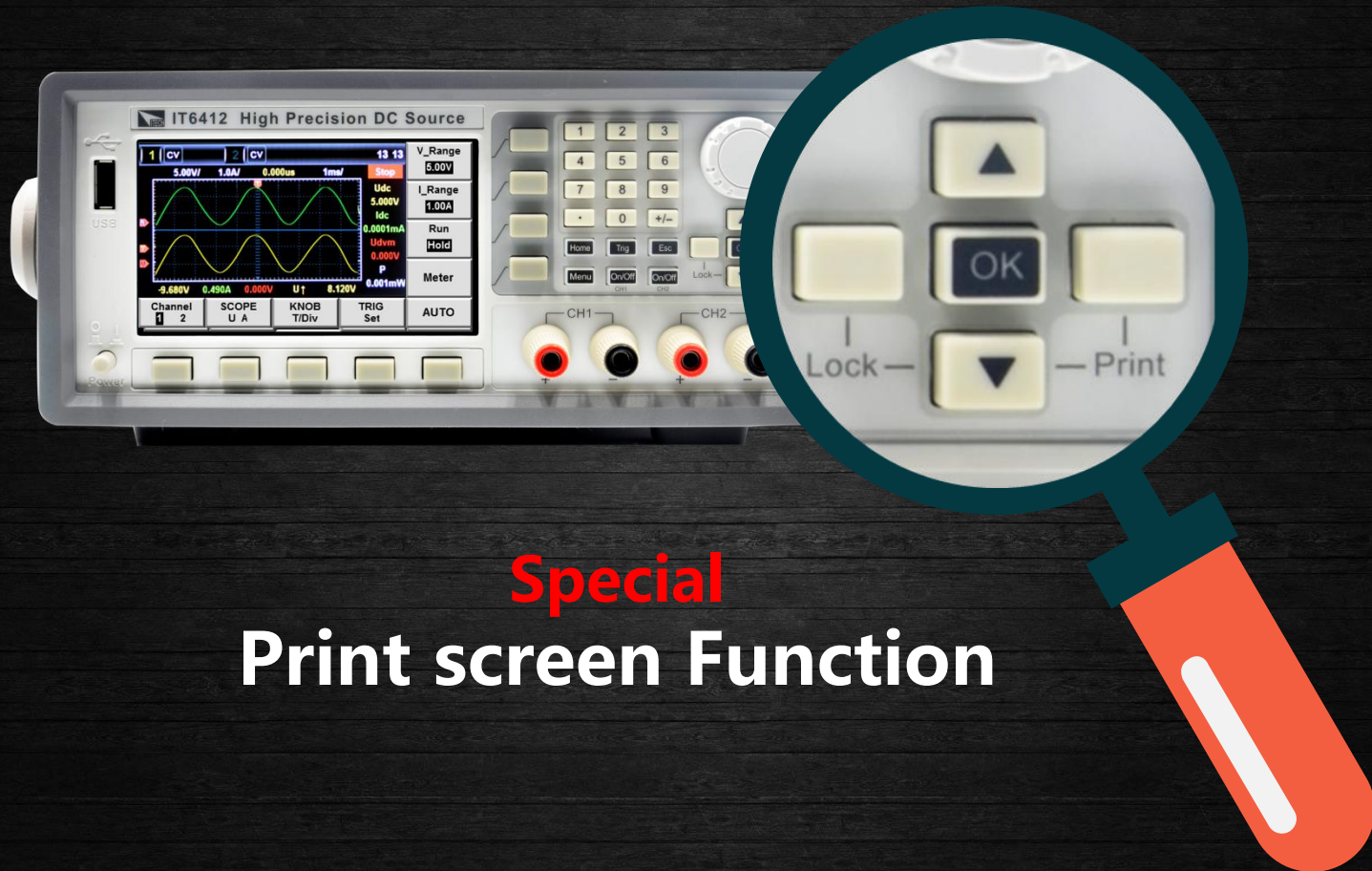
# Multifunction

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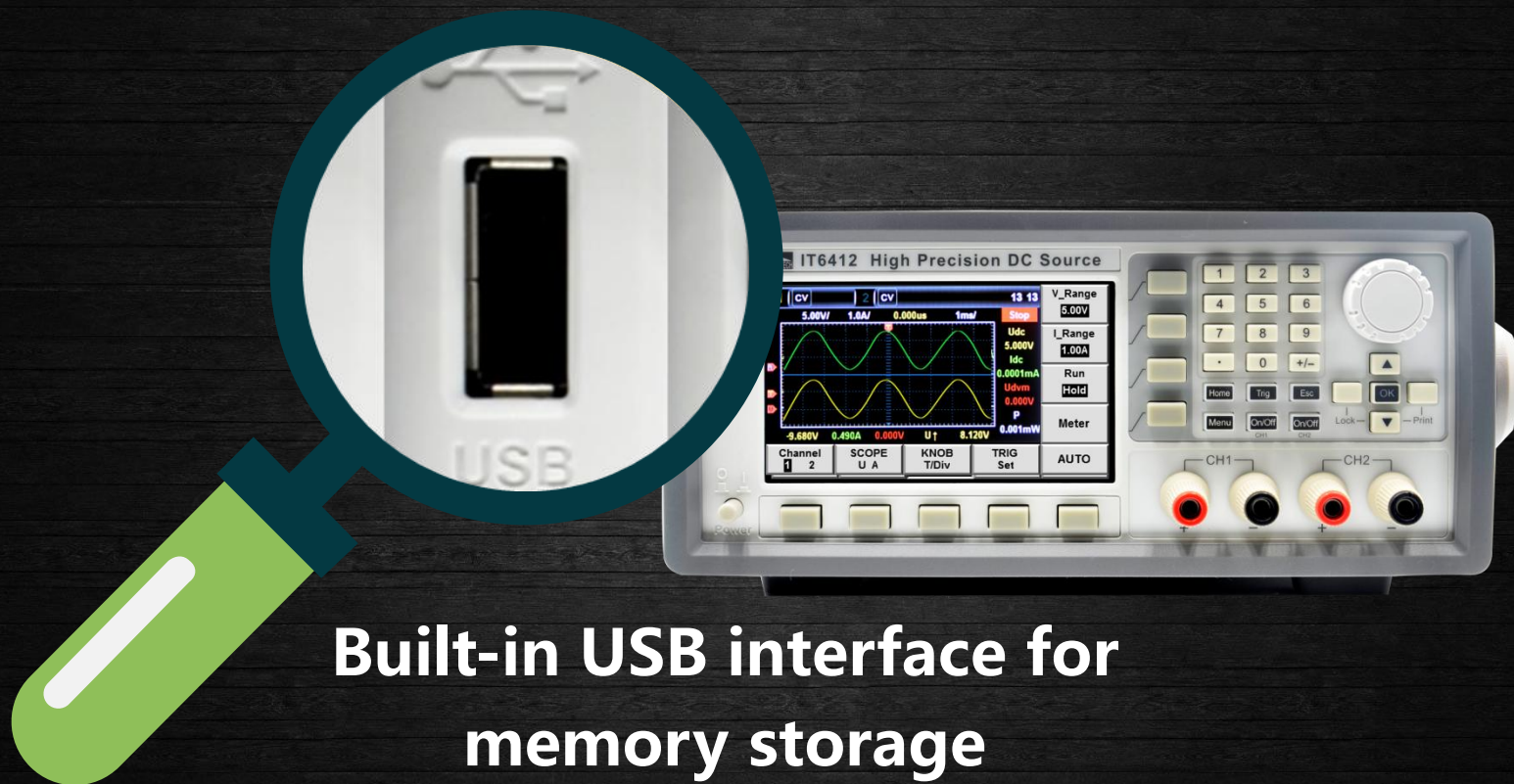
# User-friendly Front Panel Design



**Special**  
**Print screen Function**



# User-friendly Front Panel Design

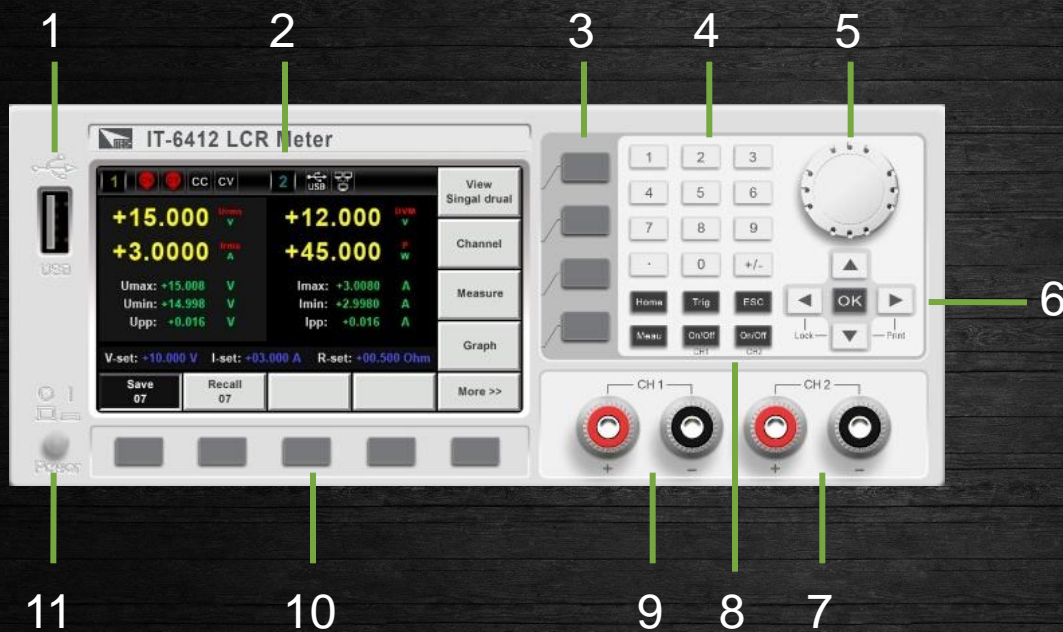


**Built-in USB interface for  
memory storage**





# User-friendly Front Panel Design



- 1 USB interface
- 2 Color screen
- 3 Screen menu buttons
- 4 Numeric keys
- 5 Knobs
- 6 Up/down, Enter
- 7 CH2 output terminal
- 8 Function keys
- 9 CH1 output terminal
- 10 Screen menu buttons
- 11 On/Off



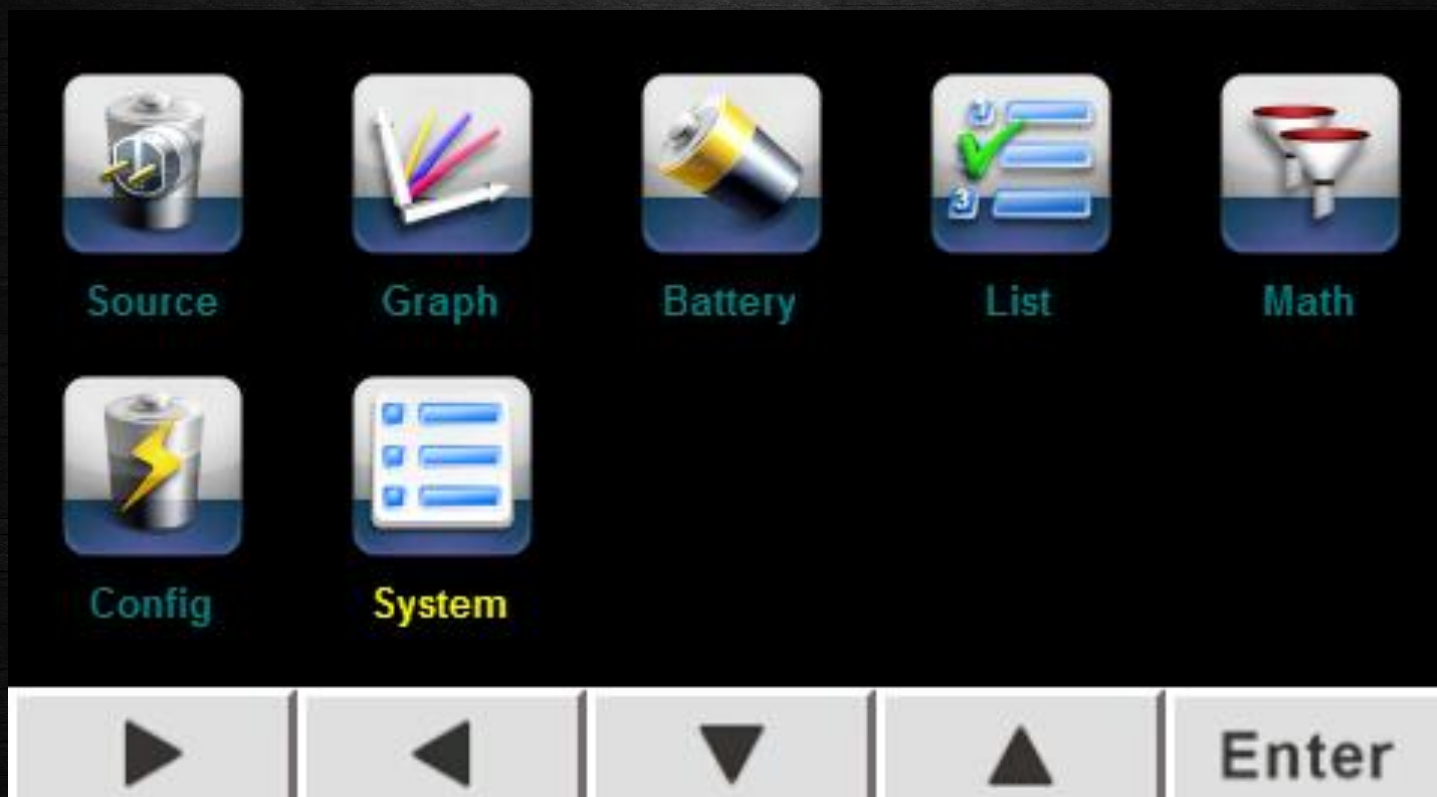
# Startup Screen







# Clearly Function Menu





# Dual-channel Data In-time Display

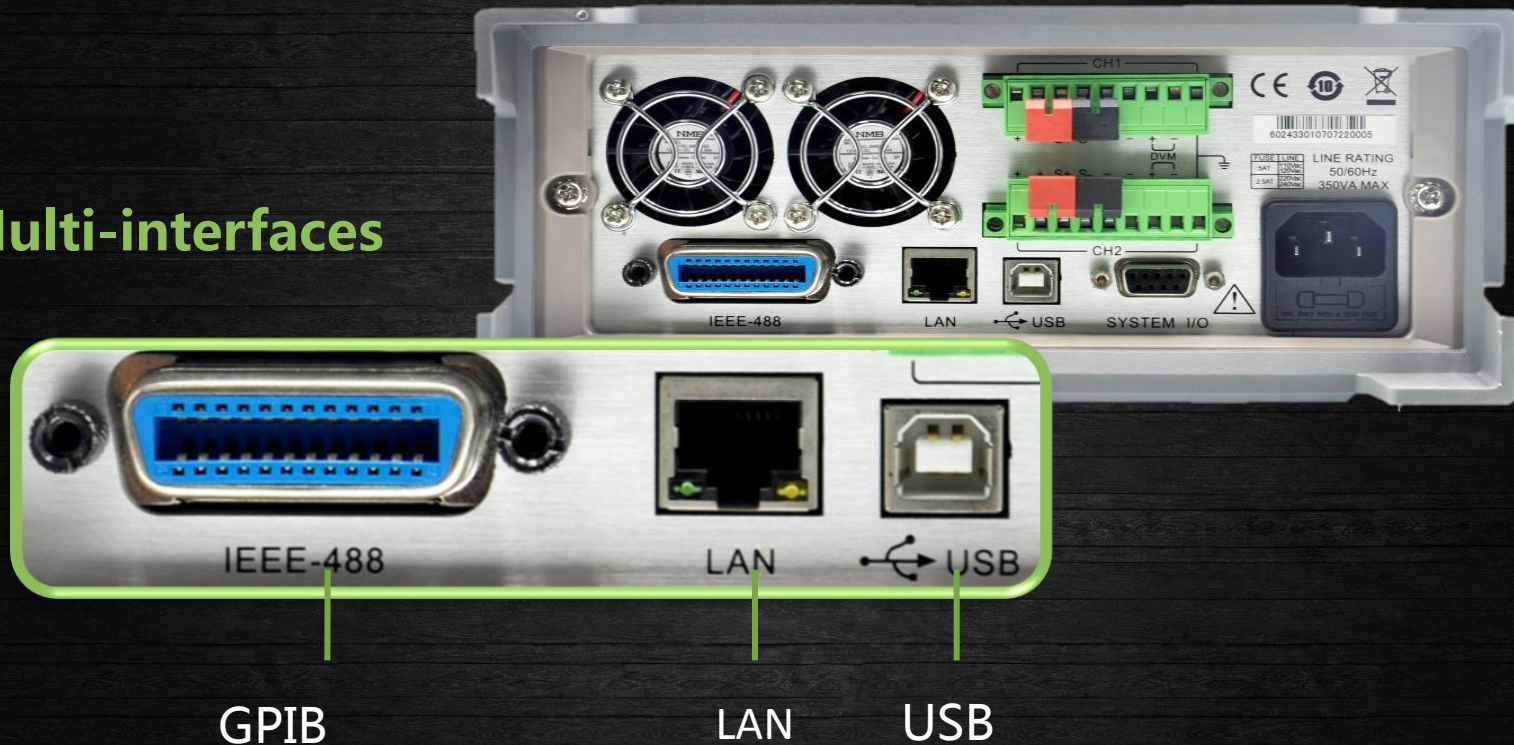






# Fully Equipped Rear Panel

## Multi-interfaces







# Fully Equipped Rear Panel

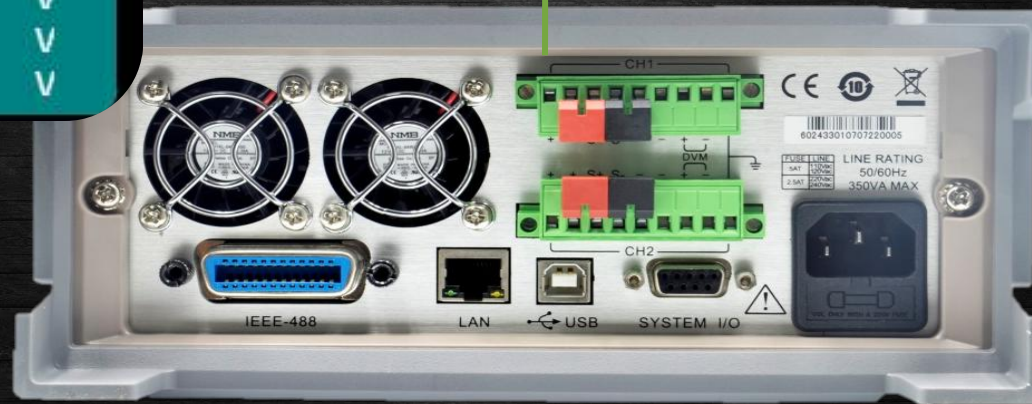
## Built-in high accuracy DVM

Measure range : -20V ~ +20V

Display resolution : 1mV

### Application :

Monitor the voltage of two terminals







# Fully Equipped Rear Panel


## Relay Out Function

Achieves electrical isolation with connected device



### Application:

Avoid secondary discharge for battery. To completely disconnect the connection between battery and resistance inside of the DC source.

The background of the slide is a dark, high-contrast photograph of a desk setup. It includes a tablet displaying a map, a keyboard, and a mouse. The entire scene is overlaid with a large, semi-transparent number '3' and the text 'Excellent Performance'.

# 3

**Excellent Performance**

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# IT6412

**Battery  
simulator**

**High  
accuracy  
DVM**

**Ultrafast transient  
response time < 50 $\mu$ S**

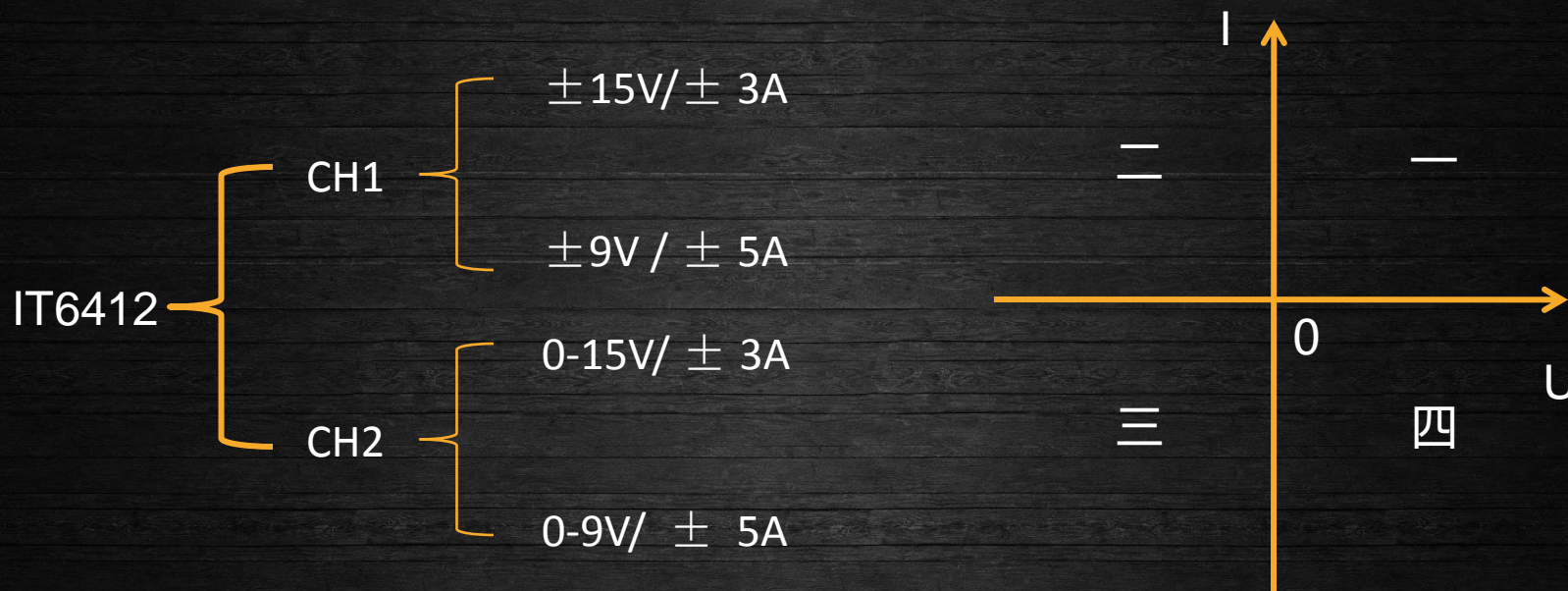
**Current readback  
resolution up to 100nA**

**Oscilloscope  
function**

**Ultrafast voltage  
rising time up to  
500 $\mu$ S**



# Bipolar Output



**Note: Bipolar do not equal to 4 quadrant DC source.**





# Bipolar Output

## Applications : Batteries and chargers testing

### Chargers test

Load mode+ Resistance setting +AD Sampling +Fast response =I/V Characteristics curve

### Batteries cycle life test

After N times 1C charge,1C discharge, the capacity of batteries will be down to 70%.(N is cycle life , international standard is less than 300 times.





# Battery Characteristics Simulation Function

## Applications

### Battery charge and discharge mode

Observing the voltage, current and charge capacity of the batteries

### Battery Characteristics Simulation Function

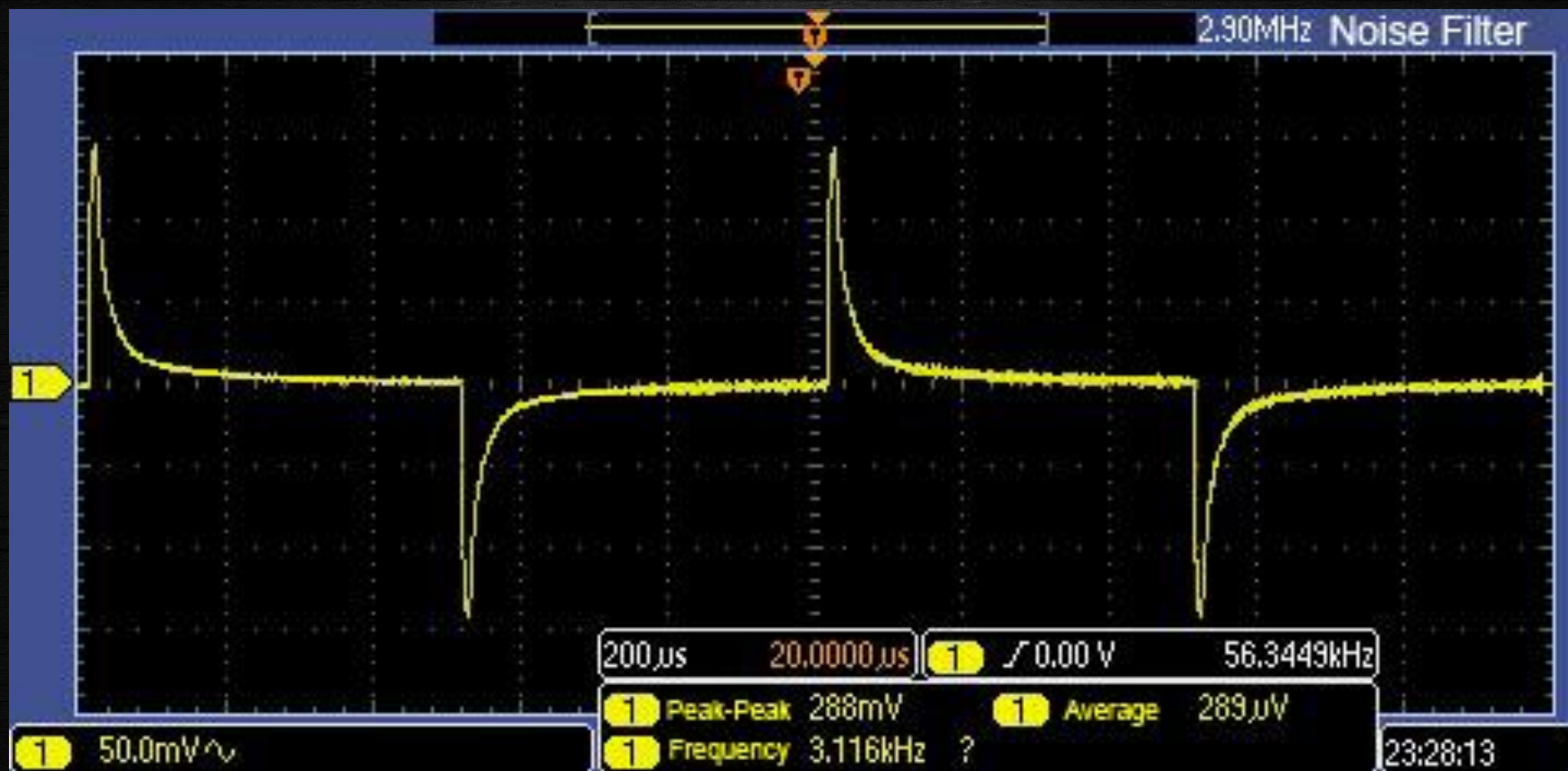
Program the data of battery characteristics as a .csv file and import the data to IT6412, then IT6412 can simulate the battery to test portable devices.







# Ultrafast Transient Response Time $< 50\mu\text{S}$

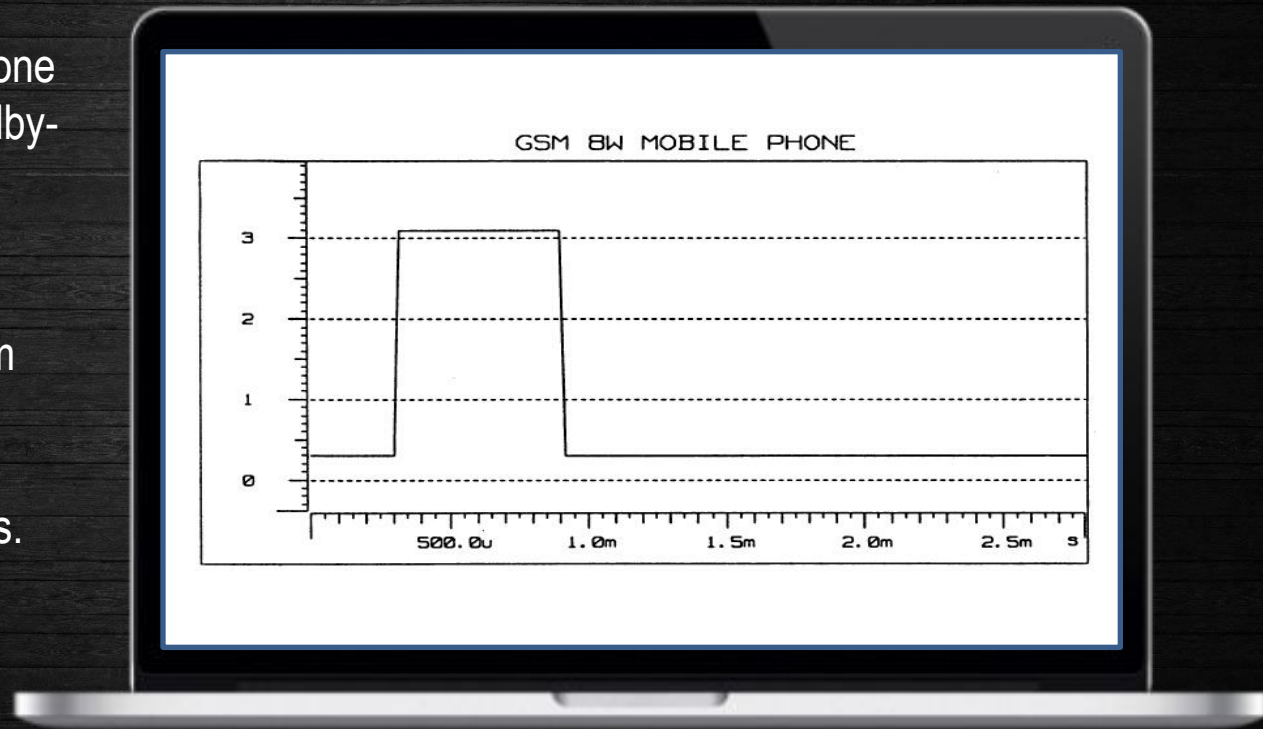




# Ultrafast Transient Response Time < 50 $\mu$ S

## Applications : Transient Response Test

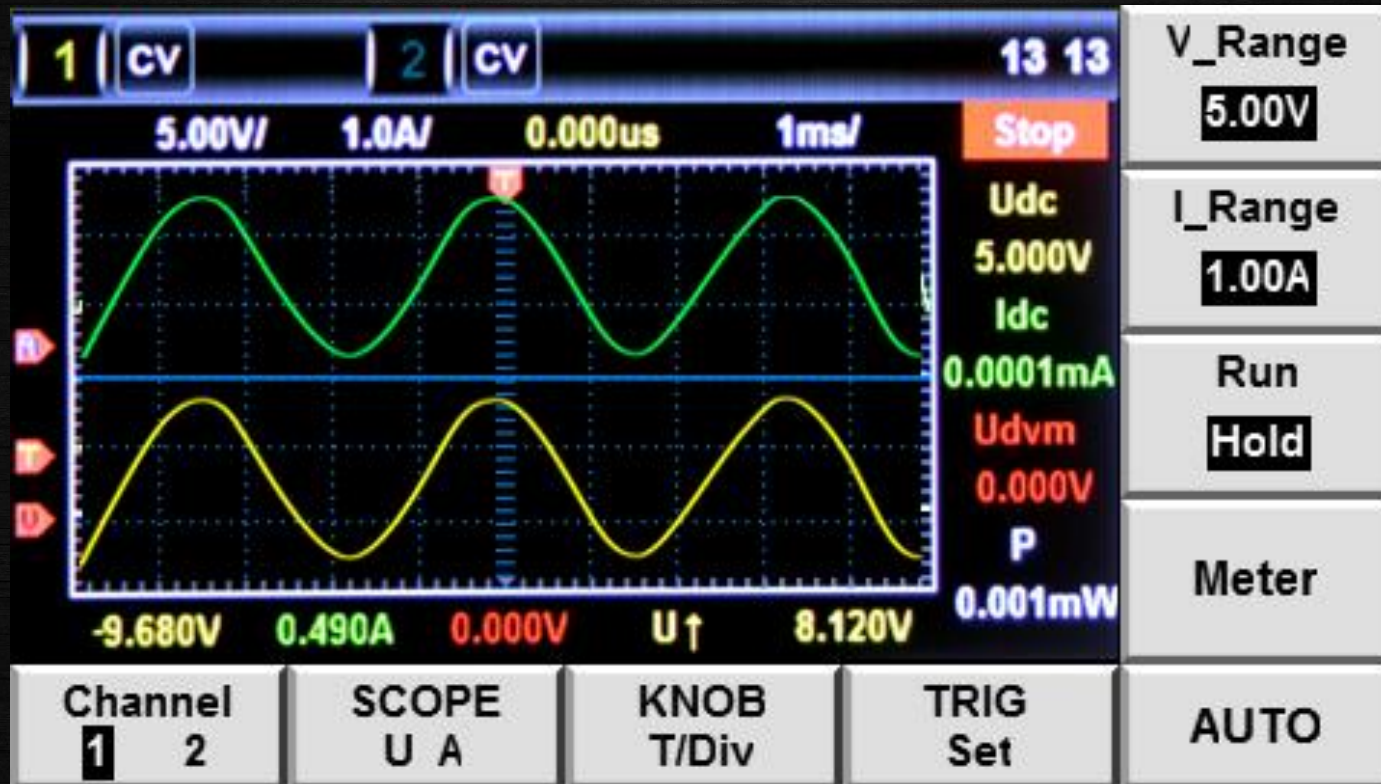
For instance: generally cell phone works under the modes “Standby-Run-Standby”. In these transitions, the time of battery current transient is very short. That means the testing system must include the power source which can response the fast transient of the electronic loads. Such as 576  $\mu$ s







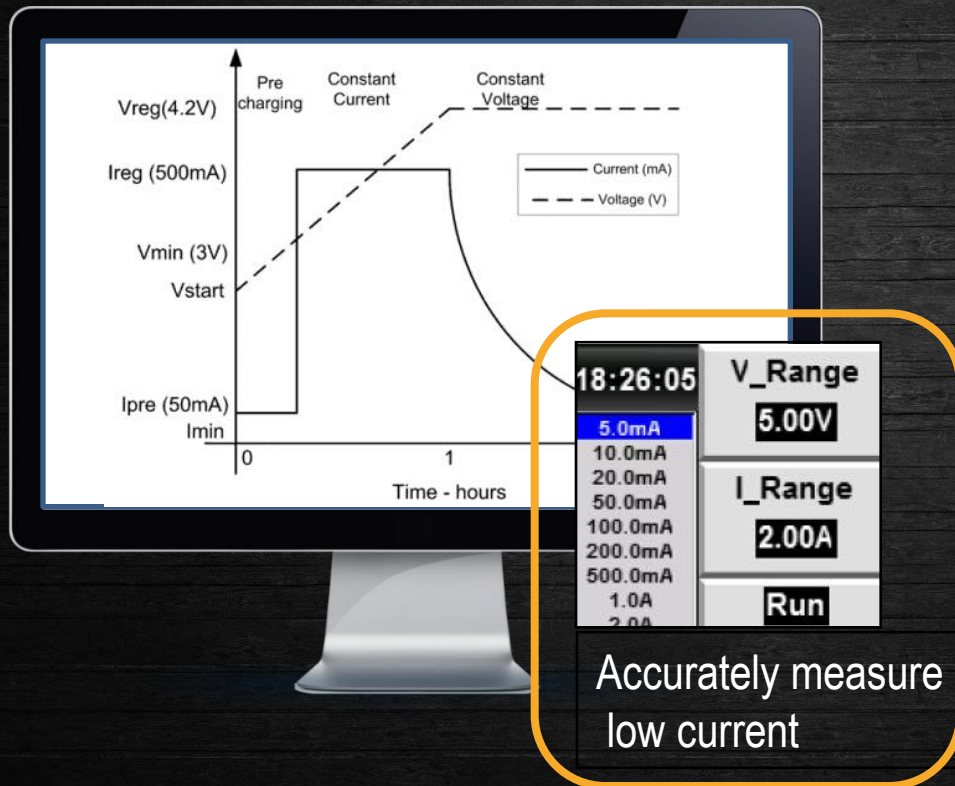
# Oscilloscope Waveform Display (DSO)





# Oscilloscope Waveform Display (DSO)

Application : Monitor Battery charge and discharge curve



Generally, ion batteries adopt charging mode from CC mode to CV mode.

CC Mode

4.2 V

CV Charge

The charge current gradually decreases

Trickle charge





# Ultrafast Voltage rising time up to $500\mu\text{S}$ (full load)



Ultrafast rising time and  
reliable performance.  
The new designed speed  
switch mode makes a fast  
voltage and current rising  
speed and no overshoot.



# Ultrafast Voltage Rising Time

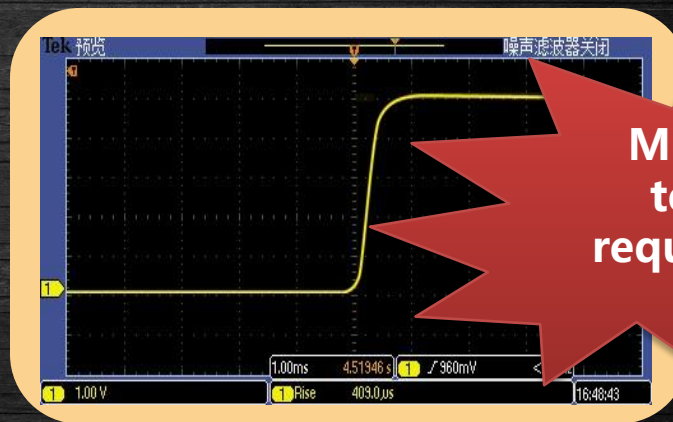
## Applications : Quartz crystal oscillator

Unloaded rising requirement:

Current 1A, within 2ms, the voltage should rise to 5V



IT6121B Unloaded rising time  
8.397ms



Meet the  
testing  
requirement

IT6412 Unloaded rising time  
409uS





# Current Read back Resolution Up To 100nA

Applications: Cell phone standby current testing...



## Applications :

- Cell phone standby current testing
- LED photoelectric performance test ( Reverse current is  $\mu\text{A}$  level )
- Small power solar cell test



# Variable Output Impedance

## Applications : Battery testing field

Variable output impedance, combined with fast transient response, it can simulate different characteristics of batteries in real life.

**Setup range : 0-1  $\Omega$**

**Resolution Min.1m $\Omega$**







The screenshot shows a device interface with a 'List' screen. At the top, there are two channel selectors (1 CV, 2 CV), a USB icon, and a time display (18 23). Below these, the 'List' screen displays 'List 00', 'Period 65535', and 'Total: 15'. Below this, there are four input fields: 'Vset 000.000', 'Iset 0.0000', 'Rset 0.000', and 'Dwell 00.000'. A table with 5 rows and 5 columns is shown. The columns are 'Point', 'Voltage(V)', 'Current(A)', 'Res(Ω)', and 'Dwell(s)'. The rows are numbered 0 to 4. To the right of the table, there are three buttons: 'Insert', 'Delete', and 'Replace'. The 'Insert' button is circled in red. At the bottom, there are four buttons: 'Prev', 'Next', 'Sequence Sel', and 'Clear'.

Point	Voltage(V)	Current(A)	Res(Ω)	Dwell(s)
0	1.000	1.0000	0.0000	0.001
1	2.000	1.0000	0.0000	0.001
2	3.000	1.0000	0.0000	0.001
3	4.000	1.0000	0.0000	0.001
4	5.000	1.0000	0.0000	0.001

Simple operation  
Clear display

A dark, moody background image showing a desk setup. A laptop is partially visible at the top, a keyboard is in the center, a mouse is on the right, and a tablet displaying a map is in the foreground. The overall tone is professional and tech-oriented.

# 4

## Multi-industry Application

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# Battery Testing

## **Portable battery-powered products testing**

Such as : Cell phones ,Tablet Computers , Intelligence  
Wearable devices , E-Book reader,mp3 player, Pacemaker etc.

## **Small power solar cell test**

## **UN38.3 Testing(Lithium batteries)**

## **Battery protection board test**

Used for calibrating power in battery monitor circuit

# Portable Battery Testing



## Applications :

- Design and test low power ,battery-powered device.

## Requirements :

- Bipolar, single channel, can simulate the characteristics of battery charge or discharge
- Simulate battery internal resistance and characteristics by a programmable output resistance.
- When the testing instrument was used as a power source to simulate batteries discharge process, once the internal resistance increase, the output resistance should be changed in time.



# Small Power Solar Cell Test

## Testing Principle :

The power solar cell can produce energy , during the testing process, the actual operating mode of power source is : a positive voltage is applied by the solar across the terminals of the power supply.at the same time, the current flow from the battery, into the terminals of power source . The power source actually play a role as a electronic load.

## Testing Characteristics :

- To achieve positive and negative voltage, positive and negative currents
- High accuracy measurement ( Built-in DVM testing、 min.100nA )
- Adjustable output resistance





# UN38.3 Test ( Lithium battery )

International Air Transport Association ( IATA ) issued ***Dangerous goods rule*** ( DGR ) the 38<sup>th</sup> chapter requires 8 test items, briefly named as UN38.3 tests.



## Over-charge test

To charge battery continuously with double current and double voltage, and overcharge it more than 24 hours (no break-up, no outbreak of fire)

## Forced discharge test

Each cell shall be forced discharged at a ambient temperature by connecting it in series with a 12V D.C. power supply at an initial current equal to the maximum discharge current specified by the manufacturer. (no break-up, no outbreak of fire)



# Work as a calibration power source for battery monitor circuits

## Applications :

Especially suitable for the design and tests of low-power consumption and battery-operated devices, such as 3G mobile phones, smart phones, MP3 players, blue-tooth earphones, PDA and portable GPS receivers.

## Test ways:

There' re two channels, one can simulate the battery, with the other to simulate the charger. Besides, the battery channel can absorb current to simulate a load to do discharge test, so as to test DUT' s charging control circuit.

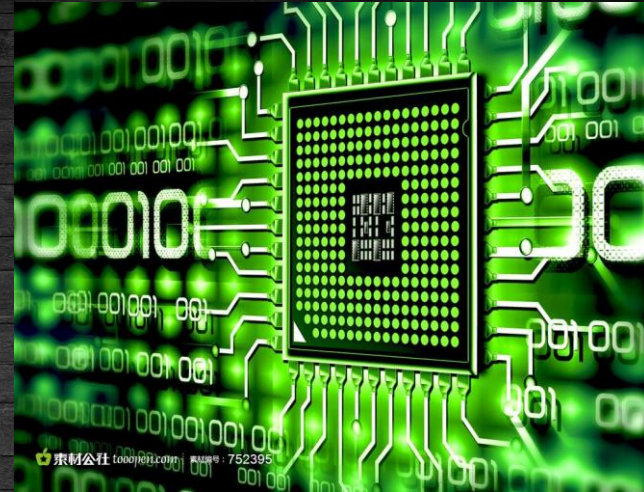
**Variable output resistance, can simulate battery' s functions and features**



# Battery protection board test requirements

## Test items :

- Over-charge protection of voltage' s precision and response time
- Over-charge cancel-recover and response time
- Over-discharge protection of voltage' s precision and response time
- Over-discharge cancel-recover and response time
- Over-current charging protection and response time
- Standby current
- Resistance of protection circuit



## Application features :

- 1-4 channels
- Support current output and absorption
- Output arbitrary wave of voltage, current
- Take samples of voltage, current quickly



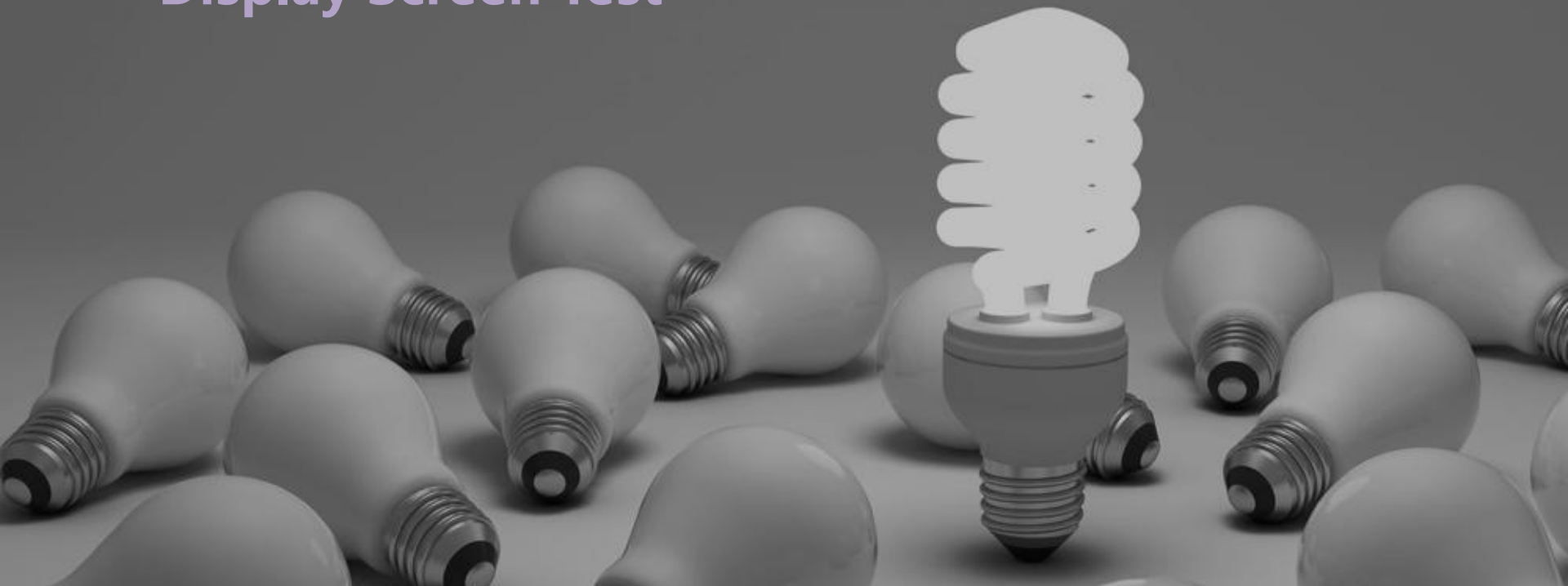


# LED Field Testing

Ultra bright LED Test

LED Lamp Bead Test

Display Screen Test



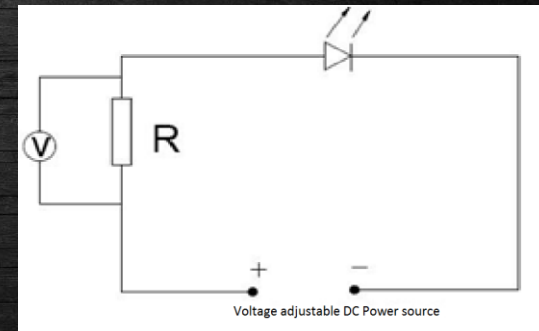
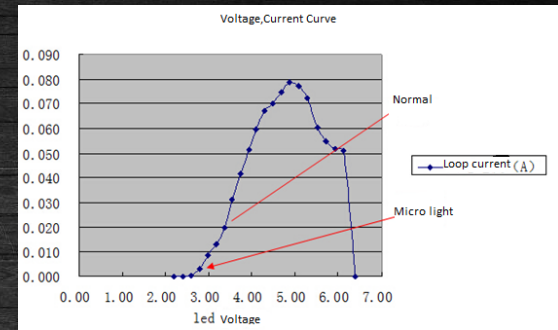
# Ultra-bright LED Test

## Testing procedure

1. Connect equipments as per circuit diagram.
2. Open the switch of DC voltage, and set the voltage to be 2.0V.
3. Adjust the voltage higher and higher with interval 0.2V.  
Observe the brightness changes of LED, and make data records.

## Testing advantages

No overshoot during test, high measuring accuracy ( 100nA ), built-in DVM measurement





# LED Lamp Test



## LED Lamp Advantages

1. Energy-saving. The energy consumption of LED is only 1/10 of incandescent bulbs, and 1/4 of energy-saving lamp.
2. Long service life. The service life is up to 100khrs, 3-5 times of energy-saving lamp.
3. The brightness is 10 times of incandescent bulbs with same power.

Item 项目	Symbol 代号	Absolute Maximum Rating 极限工作参数	Unit 单位
Forward Current 正向电流	IF	20	mA
Peak Forward Current 瞬间脉冲电流	IFP	50	mA

# LED Lamp Bead Test

## Optical Performance Testing :

1. Set the output current of the precision power supply as the rated testing current of LED lamp, without specifications in accordance with the rated current and 50% of the rated current of the lamp beads used for testing, if no specification, pls use the rated current and 50% rated current to do the test.
2. Set the driving voltage as reverse 5V , read the leakage current which through the LED lamp beads in this case.

■ Typical Optical/Electrical Characteristics 光电特性参数							
Item 项目	Symbol 代号	Condition 测试条件	Min 最小值	Typ 典型值	Max 最大值	Unit 单位	
Forward Voltage 正向电压	VF	IF=20mA	3.0	3.1	3.2	V	
Reverse Current 逆向电流	IR	VR=5V	0	2	5	uA	

## Reliability and Lifetime Testing :

Test optical characteristics under the conditions, such as room temperature, high temperature and high humidity, temperature cycling, etc.





# Electronic Component ,DC / DC converter test

- ✓ Power Amplifier test
- ✓ DC/DC converter test
- ✓ Inkjet Technology
- ✓ IC card R&D
- ✓ Capacitor ripple test
- ✓ Relays
- ✓ Diode , silicon-controlled rectifier(SCR) test
- ✓ Micro-motor
- ✓ Mini microphone
- ✓ ( MEMS ) test

The background of the slide is a dark, high-contrast photograph of a desk setup. It includes a laptop, a keyboard, a mouse, and a tablet displaying a map. The entire scene is overlaid with a large, semi-transparent number '5' and the word 'Competitiveness'.

# 5 Competitiveness



# IT6412 Competitors ?

# Main Competitors

Keithly



Keysight



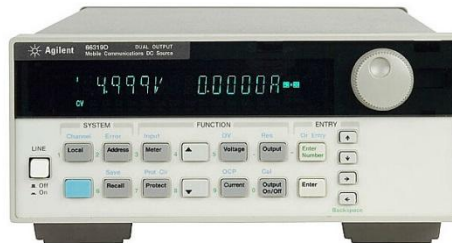
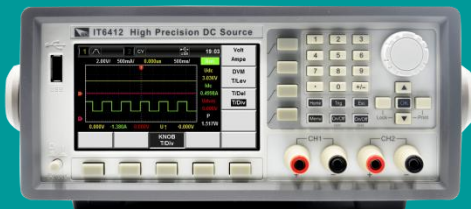


# Competitors of IT6412

IT6412

66309B/D 66319B/D

2306



# IT6412 Strengths ?



# Comparison & Contrast-Basic data

Brand		ITECH				Keysight		Keithly	
Model		IT6412				66309B/D 66319B/D		2306	
Output rating	Voltage	CH1		CH2		CH1	CH2	CH1	CH2
		±15V	±9V	0~15V	0~9V	0~15V	0~12 V	0~15V	0~15V
	Current	±3A	±5A	±3A	±5A	0~3A	0~1.5 A	5A Max	5A Max
	Power	45W				45W	18W	75W	75W

## IT6412 Strength

- 1、 Each channel is dual-range output
- 2、 Voltage and current bipolar output

# Comparison & Contrast-Appearance

Brand	Model	Interfaces	Number of outputs	Size (mm)W*H*D	Waveform display
ITECH	IT6412	GPIB/USB/LAN	2	226*88.2 *476.26	√
Keysight	66309B/D 66319B/D	GPIB	2	212.8*88.1 *435	—
Keithly	2306	GPIB	2	213*89 *411	—

## IT6412 Strength

- 1、 High-performance color LCD display
- 2、 Dual-channel display
- 3、 Oscilloscope waveform display
- 4、 Front panel USB
- 5、 Standard-LAN/USB/GPIB



# Comparison & Contrast-Functions

Brand	Model	Battery Simulation	Relay out	Transient response time	Output impedance	Current read back resolution	Built-in DVM display accuracy
ITECH	IT6412	√	√	50%-100% LOAD Return to 50 mV ≤50μS	Variable	5 Rang : 1mA 5mA Rang : 100nA	0.02% +2mV
Keysight	66309 B/D	√	—	CH1<35μS, CH2<400μS	—	High:213 μA Low:0.6 μA	D:0.04% +5 mV
Keysight	66319 B/D	√	—	CH1<35μS, CH2<400μS	Variable	High:213 μA Low:0.6 μA	D:0.04% +5 mV
Keithly	2306	√	√	CH1 : <40μS or 60μS CH2 : <50μS or 80μS	Variable	High : 55 μA	±(0.05% +3mA)

## IT6412 Strength

- 1、 Relay Out function achieves electrical isolation on terminals
- 2、 High accuracy built-in DVM display
- 3、 Current read back resolution 100nA
- 4、 Ultrafast transient response time < 50 μS

# Comparison & Contrast- Summary

	IT6412	2306	66309B/D	66319B/D
Bipolar output	√	—	—	—
Dual-channel output	√	—	—	—
Oscilloscope waveform display	√	—	—	—
High-performance LCD screen	√	—	—	—
Current read back resolution up to 100nA	√	—	—	—
Variable output impedance (0~1Ω)	√	√	—	√
Transient response time < 50 μS	√	√	CH1	CH1
(Standard ) LAN/USB/GPIB	√	—	—	—
Relay Out	√	√	—	—
Built-in 5 ½ DVM	√	—	—	—





A dark, moody background image showing a desk setup. A laptop is partially visible at the top, with a keyboard and mouse in front of it. A tablet is positioned in the lower left, displaying a map. The overall aesthetic is professional and tech-oriented.

# 6

# Market & Price

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Model	Number of outputs	Bipolar output	Battery simulation	Waveform display	Variable output impedance	Interfaces	Official Price USD
ITECH IT6412	2	✓	✓	✓	✓	GPIB/USB/LAN	?
Keysight 66309D	2	—	✓	—	—	GPIB	3484
Keysight 66319B	2	—	✓	—	✓	GPIB	3279
Keithley 2306	2	—	✓	—	✓	GPIB	3784
Keysight N6784A	1	✓	—	✓ Need Mainframe	—	GPIB、USB、 LAN (Mainframe)	Without Mainframe 4340
Keysight N6781A	1	—	✓	✓ Need Mainframe	✓	GPIB、USB、 LAN ( Mainframe )	Without Mainframe 6191

# IT6412 Battery/Charger Simulator

Dual-channel Bipolar DC Power Source

**STAY TUNED!**

Send an inquiry to ITECH



A photograph of an ITECH IT6412 High Precision DC Source, a piece of electronic test equipment. The device is light gray with a large color LCD screen in the center. The screen displays numerical data in green and blue, including '0.000', '-0.0000', and '0.000'. To the right of the screen is a numeric keypad and several function buttons labeled 'View', 'Signal', 'Channel', 'Measure', 'Graph', and 'Memory'. Below the screen are buttons for 'Save' and 'Recall'. On the right side of the front panel, there are four output terminals with red and black probes. The ITECH logo is visible on the bottom right of the device. The background is dark with concentric circles.

**ITECH can  
help you on...**

**Pictures**

**Videos**

**Ad**

**Promotion**

**E-Mail  
Signature**

**Marketing  
Activities**

**Technical  
Articles**

**Catalog**

**Media  
News**

**Colorful  
pages**


**We  
media**

**Exhibitions**

**B2B**

**Seminar**



A photograph of an ITECH IT6412 High Precision DC Source, a piece of electronic test equipment. The device is light gray with a large color LCD screen in the center. The screen displays two columns of numerical data: the left column shows 0.000, -0.0000, and 0.000; the right column shows 0.000, -0.0002, and -0.000. Below the screen are several control buttons and a numeric keypad. On the right side, there are four output terminals with red and black probes. The ITECH logo is visible on the bottom right of the device's frame.

**ITECH** hope you  
can do... ?

# **1、 Update your website**

**ITECH offer : IT6412 detail and banner**

# **2、 New products training**

**ITECH offer : training video**

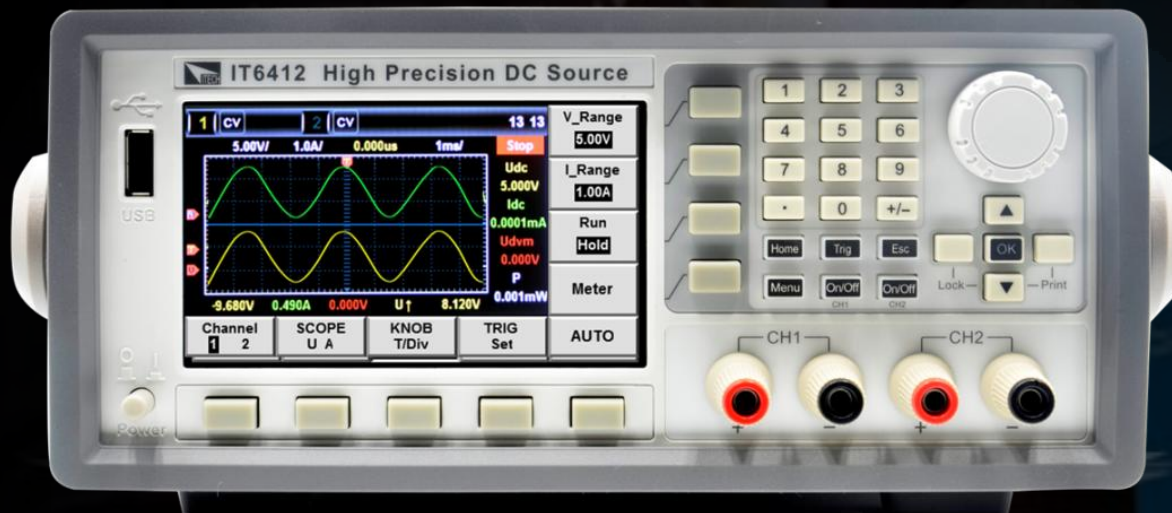
# **3、 Visit your potential customers**

**ITECH offer : special discount demo**

# **4、 Exhibitions etc.**

**ITECH offer : Gifts ,catalogs , demo etc.**





**2015.10**

**Officially on sale**

A photograph of an ITECH IT6412 High Precision DC Source, a piece of electronic test equipment. The device is light gray with a large color LCD screen in the center. The screen displays two channels of data, both showing 0.000. To the right of the screen is a numeric keypad and several function buttons. Below the screen are more buttons, including 'Save' and 'Recall'. On the right side, there are four output terminals with red and black probes. The ITECH logo is visible on the bottom right of the device. The entire image is overlaid with a semi-transparent dark gray circle.

# Thanks

*Your Best Power Solution*