Demo Guide

Keysight Technologies Making Current – Voltage Measurement Using B2901A/02A/11A/12A
B2900A Series Precision Source/Measure Unit

Procedure overview
1. Turn on the Light Emitting Diode (LED) and measure LED current
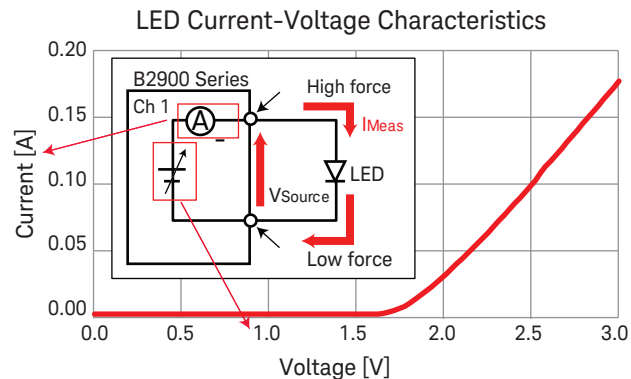2. Make current-voltage (I-V) sweep measurement to get LED I-V characteristics

Objective
This demo shows how easily current-voltage characteristics can be obtained with the B2900A Series through the LED characteristics measurement.

Required Instrument and Accessory

Keysight B2901A/02A/11A/12A Precision Source/Measure Unit

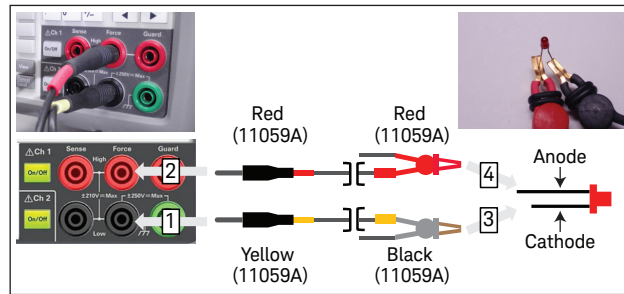Keysight 11059A Kelvin Probe Set

LED lamp

Measurement concept
– Source voltage to turn the LED on.
– Limit value feature prevent the instrument from sourcing too much even if Source value is increased.
– Step voltages from start voltage to stop voltage with making current measurement at each voltage step.
– Voltage steps are sourced from an internal voltage source.
– Current measurements are made by an internal current meter.
– The complicated measurement as above can be configured and made easily with Intuitive Graphical User Interface (GUI).
– Current-voltage curve can be seen easily by changing View mode.

LED Current-Voltage Characteristics

Setup
1. Connect the yellow banana plug to Ch 1 Low Force terminal.
2. Connect the red banana plug to Ch 1 High Force terminal.
3. Clip the LED cathode terminal with the black gold-plated tweezers.
4. Clip the LED anode terminal with the red gold-plated tweezers.
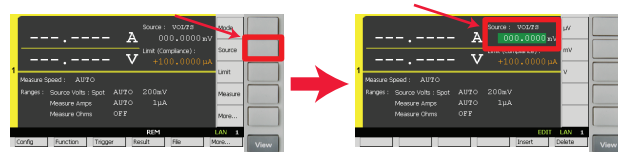

Red (11059A)   Red (11059A)   Anode

Yellow (11059A)   Black (11059A)   Cathode

1. Turn on the LED and measure LED current
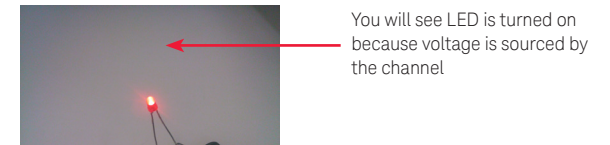
1-1. Change View mode to Single View

a. Press [View] repeatedly until Single View for Channel 1 is shown in the display.

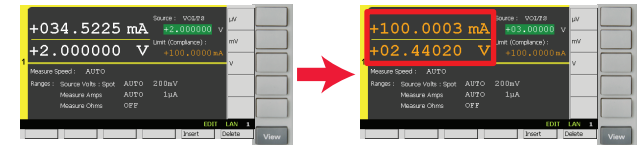### 1-2. Source voltage to turn on the LED

a. Press [Source] to edit Channel 1 Source value, and then enter 2 V to set Source value to 2 V.
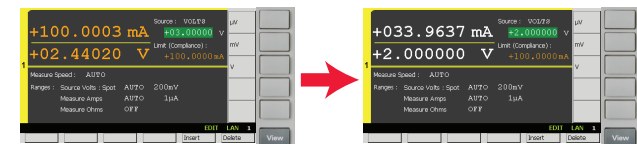

b. Press [Limit] and set Channel 1 Limit value to 100 mA.

c. Press Ch1 [On/Off] to turn on Channel 1 Output relay.

You will see LED is turned on because voltage is sourced by the channel

d. Press [Source] and rotate knob until Source value achieves 3 V. You will see the measurement parameters turn orange, which means they reach Limit value.

e. Rotate knob until Source value achieves 2 V and then press knob to set Source value to 2 V.

KEYSIGHT
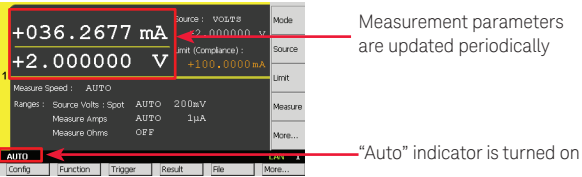TECHNOLOGIES

1-3. Make measurement of the LED current

a. Press [Trigger] to perform a single point measurement.

+033.0157 mA
+2.000000 V

Measurement parameters are updated whenever Trigger Button is pressed

b. Press [Auto] to repeat single point measurements periodically.

+036.2677 mA
+2.000000 V

Measurement parameters are updated periodically

"Auto" indicator is turned on

c. Press [Auto] to stop making measurements periodically.

"Auto" indicator is turned off

1-4. Turn off the channel output

a. Press [Source] to edit Channel 1 Source value, and then enter 0 V to set Source value to 0 V.

b. Press Ch1 [On/Off] to turn off Channel 1 Output relay.

2. Make current – voltage sweep measurement

2-1. Change View mode to Single View

a. Press [View] repeatedly until Single View for Channel 1 is shown in the display.
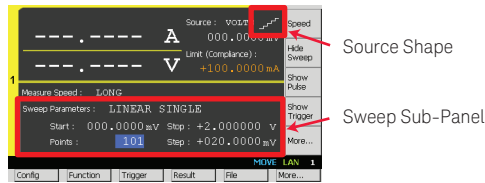
2-2. Configure the condition to source and measure

a. Press [Mode], then press [VOLTS (V)] to set Channel 1 V/I Source Function to V Source. (If [Mode] can't be found on the Assist keys, press [More...] to change the keys.)

b. Press [Limit] and set Channel 1 Limit value to 100 mA.

c. Press [Measure], then press [AMPS (I)] to set Channel 1 Measurement Parameter to Current.

---

d. Press [More...], and then press [Show Sweep] to show Sweep Sub-Panel.

e. Press [⊙], then press [LINEAR SINGLE] to turn on Single Linear Sweep Mode. After turning on Single Linear Sweep Mode, you can see Source Shape which shows the single linear sweep mode.

f. Rotate [⊙] to select Channel 1 Sweep Parameters and set them up as below. (Start: 0 V, Stop: 2 V, Points: 101, Step: 20 mV)

Source Shape

Sweep Sub-Panel

2-3. Change View mode to Graph View

a. Press [View] repeatedly until Graph View is shown in the display.

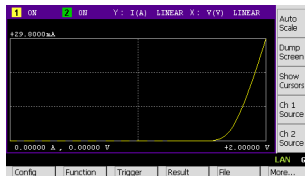### 2-4. Perform the measurement

a. Press Ch1 [On/Off] to turn on Channel 1 Output relay, and then press [Trigger] to perform a sweep measurement. During the measurement, the status ARM will be shown.

2-5. View the measurement result graph

a. Press [Auto Scale] to adjust the scale of the graph after finishing the measurement.
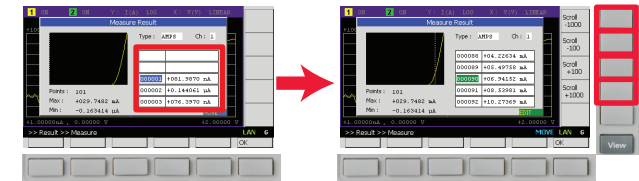

2-6. Change the graph scale

a. To change the graph scaling of Y-axis from LINEAR to LOG, rotate and press [⊙] to select Y-axis scaling.

b. To change the graph scale value of Y-axis, rotate and press [⊙] to modify Y-axis scale value.

2-7. View the list of the measurement data

a. To see the list of the measurement result, press [Result], then press [Measure] to open Measure Result dialogue.

b. Rotate and press [⊙] to select List Area. Then rotate [⊙] to scroll the data list.

For other unlisted countries:
www.keysight.com/find/contactus

www.keysight.con/find/precisionSMU