Solve Power Rail Problems with More Precise Dynamic Current Than Conventional Current Probes

Challenges in Measuring Power Rail Current of IoT and Mobile Devices with a Current Probe

Current probes are useful for dynamic current measurement because of their wide bandwidth and nonintrusive nature.

However, current probes cannot capture sleep current or small changes in the power rail current of Internet of Things (IoT) and mobile devices with enough sensitivity because of their large noise floor.

In addition, you need to cut the power rail and add a lead wire. The residual inductance of this additional wire can cause a voltage drop and waveform fluctuation. That can cause large measurement error, especially when the flowing current exceeds 1 A.

CX3300 Series Captures the Transient of Power Rail Current Precisely

The Keysight CX3300 series device current waveform analyzer has a low noise floor, wide dynamic range, wide bandwidth, high sampling rate, and deep memory depth. As shown in Figure 1, the CX3300 can capture the transient of power rail current that conventional current probes cannot measure clearly because of noise. You can validate and debug your device efficiently with the clear waveform.

Applications and Benefits

- Characterize power rail current and voltage
- Optimize the circuit design against inrush current
- Achieve lower power consumption
- Validate the circuit in various temperature conditions
- Characterize the impedance for power integrity

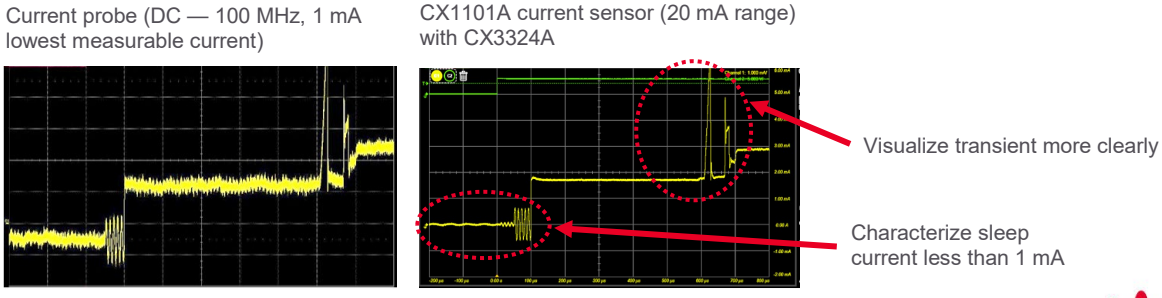


Figure 1. The CX3300 never miss the transient in the power rail current.

For measurements over 1 A, the CX1104A selectable shunt current sensor or the CX1105A ultra-low noise differential sensor can minimize the effect of current sensor insertion.

The CX1104A is configurable with six calibrated resistive sensor heads that have insertion resistance from 5.5 mΩ to 1 Ω. You can select the appropriate head to balance the voltage drop by current sensor insertion and sensitivity.

The CX1105A can measure differential voltage under 1 mV across a shunt resistor on the device-under-test board. You can use a smaller shunt resistor to minimize the voltage drop thanks to the ultra-low noise of CX1105A. In addition, you can minimize the effect of residual inductance of the probing wire because the current flows to the shunt resistor and not into the CX1105A.

CX3300 with CX1105A

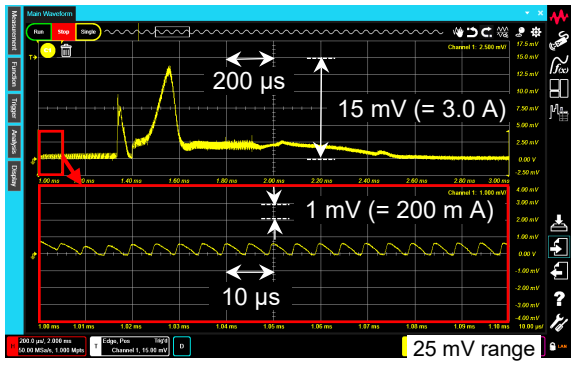


Figure 2. Capture small changes in power rail current with minimal effect from current sensor insertion

CX3300 Series Device Current Waveform Analyzer

The CX3300 series is an all-in-one solution for power rail current and voltage characterization. It enables you to solve circuit power rail problems for IoT, mobile, medical, automotive, and other devices.

Precision scope
- ✓ Wide bandwidth
- ✓ Fast sampling rate

+

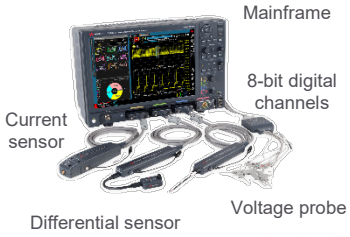
DMM
- ✓ High sensitivity
- ✓ Low noise

+

Data logger
- ✓ Long measurement

=

CX3300 series device current waveform analyzer



Key features

- Maximum 200 MHz bandwidth, 1 GSa/s, 256 Mpts/ch memory depth
- Clearly view the waveform with 14/16-bit high resolution
- Low noise and a wide dynamic range with high sensitivity from sub-nA and sub-µV
- Long-duration measurement — up to 100 hours at 10 MSa/s maximum using a storage device
- Efficient analysis functions — current profiler, waveform playback, waveform analytics, and waveform trend analyzer

Learn more at: www.keysight.com

For more information on Keysight Technologies' products, applications or services, please contact your local Keysight office. The complete list is available at: www.keysight.com/find/contactus

KEYSIGHT TECHNOLOGIES