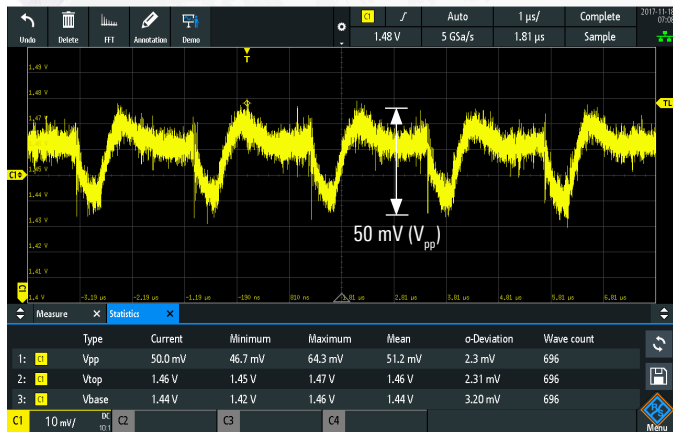


POWER INTEGRITY MEASUREMENTS WITH R&S® RTM3000 AND R&S® RTA4000 OSCILLOSCOPES

Make more accurate power rail measurements.



R&S® RTA4004 oscilloscope

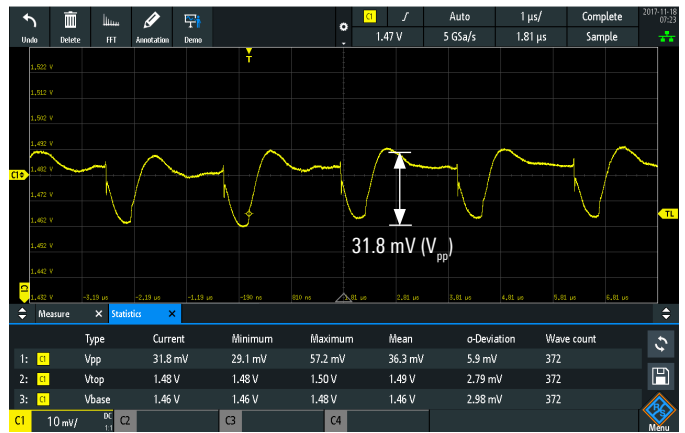


Measurement of a 1.5 V power rail using an R&S® RT-ZP10 10:1, 500 MHz passive probe (50 mV (V_{pp}), noise masks signal details).

Your task

Measuring noise and ripple on power rails with small voltages and increasingly tighter tolerances is a challenge for oscilloscopes. Using a standard 500 MHz passive probe with a 10:1 attenuation results in additional measurement noise, causing overstated peak-to-peak voltage measurements and masking signal details as shown below.

Passive probes with 1:1 attenuation have less noise, but are bandwidth limited to around 35 MHz. They miss higher frequency content that may be riding on the power rail and may understate peak-to-peak-voltages.



Measurement of a 1.5 V power rail using an R&S® RT-ZP1x 1:1 passive, 38 MHz probe (31.8 mV (V_{pp})). Bandwidth limiting eliminates the ability to see higher frequency transients.

Application Card | Version 02.00

ROHDE & SCHWARZ

Make ideas real

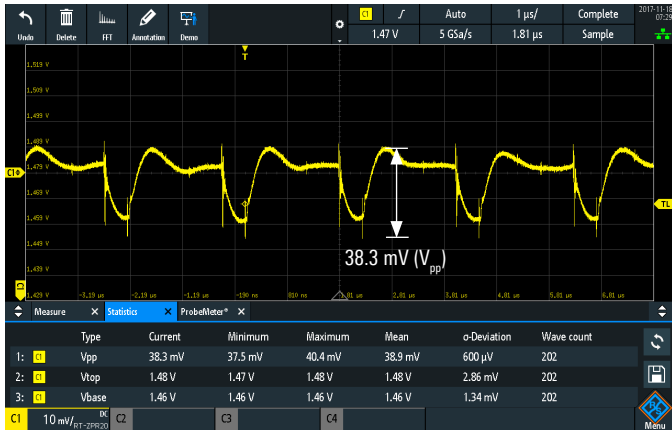


Rohde & Schwarz solution

Combining a low-noise oscilloscope with a power rail probe, developed uniquely for measuring power rails, provides a measurement system that delivers measurements that are more accurate. The R&S®RT-ZPR20 active probe with a 1:1 attenuation ratio has very little noise and enough bandwidth to not attenuate critical signal content.

When combined with an R&S®RTA4000 or R&S®RTM3000 oscilloscope, the R&S®RT-ZPR20 power rail probe provides the following benefits:

- ▶ The probe's 1:1 attenuation provides minimal noise for a system noise of less than 500 μV (at 1 GHz bandwidth and 10 mV/div)
- ▶ With $\pm 60\text{ V}$ of built-in offset, users can center and zoom in a wide variety of DC rail voltage standards without worrying about how much built-in offset the scope has. The offset eliminates the need to use AC coupling or DC blocking capacitors, which impede the ability to see true DC values and drift
- ▶ High-frequency transients and coupled signals are isolated. The probe's rated bandwidth is 2 GHz. When used with an R&S®RTA4000 or R&S®RTM3000, overall bandwidth is set by the oscilloscope bandwidth
- ▶ 50 k Ω DC input impedance minimizes loading, so DC values remain accurate
- ▶ An integrated 16-bit R&S®ProbeMeter provides a simultaneous five-digit readout of each power rail's DC value



Measurement of a 1.5 V power rail using an R&S®RT-ZPR20 1:1 active power rail probe ($-38.3\text{ mV (V}_{pp})$). The captured waveform includes higher frequency transients riding on the rail.



R&S®RT-ZPR20 power rail probe

Ordering information

Designation	Type	Order No.
Oscilloscope, 200 MHz, 4 channels	R&S®RTA4004	1335.7700P04
Power rail probe	R&S®RT-ZPR20	1800.5006.02
Spectrum analysis and spectrogram	R&S®RTA-K37	1335.7981.02

Rohde & Schwarz GmbH & Co. KG
www.rohde-schwarz.com

Rohde & Schwarz training
www.training.rohde-schwarz.com
Rohde & Schwarz customer support
www.rohde-schwarz.com/support

R&S® is a registered trademark of Rohde & Schwarz GmbH & Co. KG
Trade names are trademarks of the owners
PD 3607.7986.92 | Version 02.00 | July 2020 (sk)
Power integrity measurements with R&S®RTM3000 and R&S®RTA4000 oscilloscopes
Data without tolerance limits is not binding | Subject to change
© 2018 - 2020 Rohde & Schwarz GmbH & Co. KG | 81671 Munich, Germany