

# Debugging Fast-Switching Power Electronics Circuits

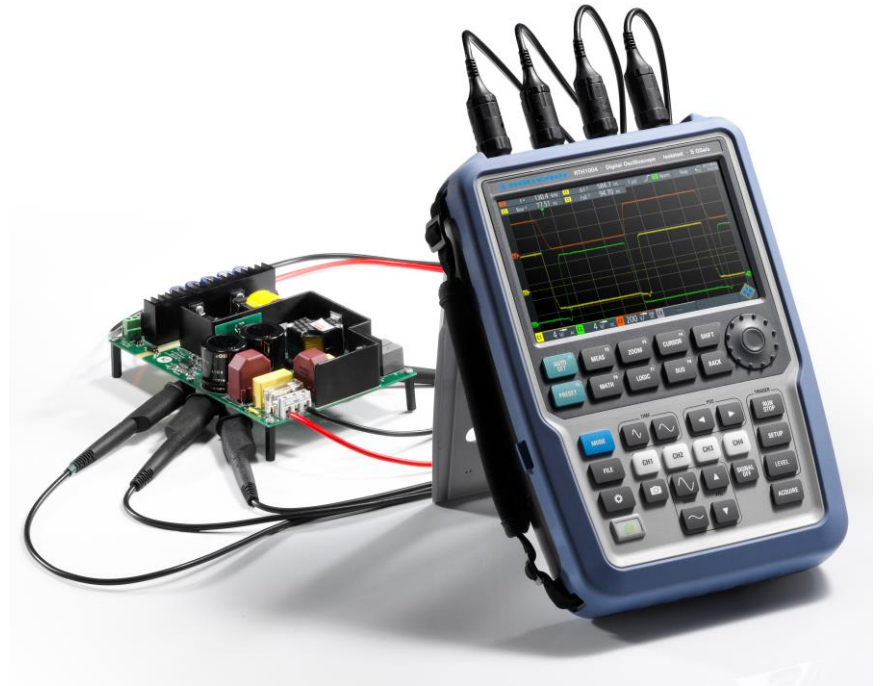
## The advantage of isolated inputs

### Challenge

New semiconductors such as GaN transistors enable higher efficiencies and higher power density than traditional, silicon-based alternatives. Switching times well below 10 ns require a measurement bandwidth greater than 200 MHz. Typically, several floating voltages have to be viewed and analyzed at the same time in order to minimize losses and optimize the design.

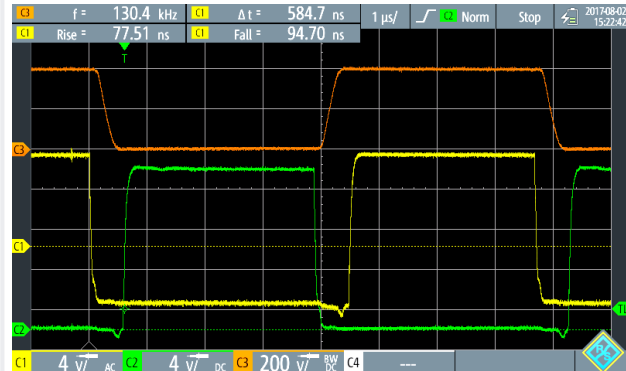
### Solution

The R&S®Scope Rider (R&S®RTH1004) provides 500 MHz bandwidth and four isolated inputs rated for 1000 V (RMS) isolation voltage and is therefore ideal for advanced power electronics applications. Dedicated 10:1 or 100:1 passive probes allow high-quality, cost-effective measurements. Advanced measurement and analysis functions make day-to-day work easy.



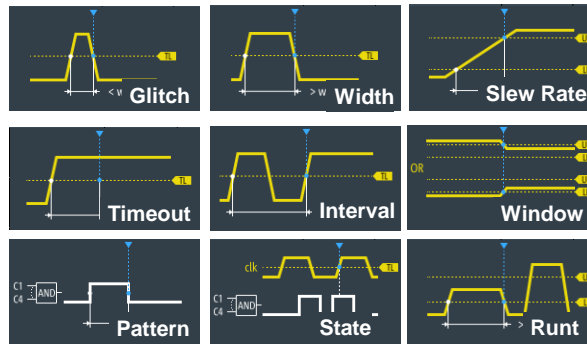
Your benefit	Features
High bandwidth and superior performance	<ul style="list-style-type: none"><li>■ 60 MHz to 500 MHz bandwidth with channel isolation for up to 1000 V (RMS)</li><li>■ High-resolution signal acquisition with 10-bit A/D converter</li><li>■ Excellent sensitivity: 2 mV/div to 100 V/div</li><li>■ Advanced triggering capabilities</li><li>■ 33 automatic measurement functions</li></ul>
Outstanding protection	<ul style="list-style-type: none"><li>■ Isolated input channels: CAT IV 600 V/CAT III 1000 V</li><li>■ IP51 housing that meets military requirements</li></ul>
Dedicated power electronics functions	<ul style="list-style-type: none"><li>■ Automatic harmonics analyzer</li><li>■ 33 automatic measurement functions, including active, apparent and reactive power as well as power factor</li><li>■ User-selectable digital lowpass filter</li></ul>
Ideal for digital power; easily extendable for future needs	<ul style="list-style-type: none"><li>■ Serial trigger &amp; decode options: I<sup>2</sup>C/SPI, UART, CAN/LIN, CAN-FD, SENT</li><li>■ Advanced analysis options: spectrum analyzer, frequency analyzer, logic analyzer</li></ul>

## 500 MHz bandwidth with 1000 V (RMS) channel isolation



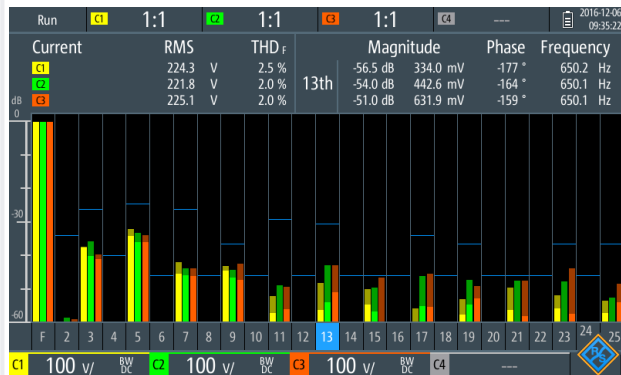
Isolated inputs for up to 1000 V (RMS) floating voltage measurements eliminates the need for differential high-voltage probes.

## Advanced trigger capabilities



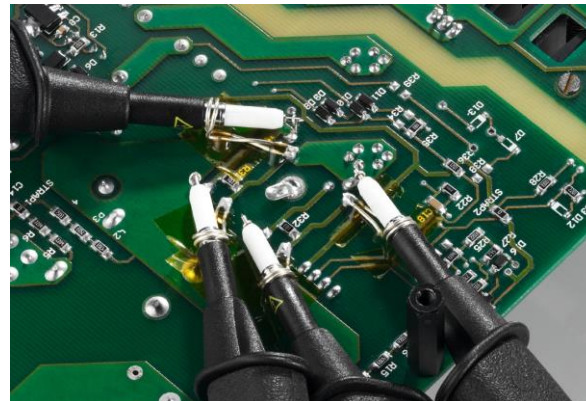
Advanced trigger functions to isolate the event of interest. Combined with the history function, long-term monitoring of signals is an easy task.

## Harmonics analysis function on up to four channels



Harmonics analysis with magnitude, phase and frequency measurements for up to 64 harmonics and automatic limit testing.

## Dedicated passive probes for high-quality measurements



Dedicated 10:1 and 100:1 passive probes allow high-quality floating measurements when connections to the device under test are kept short.

## Ordering information

### Popular options/accessories

#### Bundles

<b>Power electronics bundle</b>	<b>R&amp;S®RTH-PPKWR</b>
- History/segmented memory	- R&S®RTH-K15
- Advanced triggering	- R&S®RTH-K19
- Harmonics analysis	- R&S®RTH-K34

#### Software options

I <sup>2</sup> C/SPI serial trigger & decode	R&S®RTH-K1
UART/RS-232/422/485 serial trigger & decode	R&S®RTH-K2
History/segmented memory	R&S®RTH-K15
Advanced triggering	R&S®RTH-K19
Frequency counter	R&S®RTH-K33
Harmonics analysis	R&S®RTH-K34
Wireless LAN	R&S®RTH-K200 R&S®RTH-K200US
Web interface remote control	R&S®RTH-K201

#### Passive probes

500 MHz, 10:1, isolated, 300 V CAT III, compact lab probe	R&S®RT-ZI10C R&S®RT-ZI10C-2 R&S®RT-ZI10C-4
500 MHz, 100:1, isolated, 600 V CAT IV, 1000 V CAT III (3540 V CAT 0)	R&S®RT-ZI11

#### Current probes

20 kHz, 2000 A, AC/DC	R&S®RT-ZC02
100 kHz, 30 A, AC/DC	R&S®RT-ZC03

#### Accessories

Accessory extension set for R&S®RT-ZI10/ R&S®RT-ZI11 passive probe	R&S®RT-ZA21
Soft carrying bag	R&S®HA-Z220
Hard shell protective carrying case	R&S®RTH-Z4
Car adapter	R&S®HA-Z302
Battery charger for lithium-ion battery	R&S®HA-Z303
Replacement lithium-ion battery pack	R&S®HA-Z306

**Languages supported:** English, German, French, Spanish, Russian, simplified and traditional Chinese, Korean and Japanese.