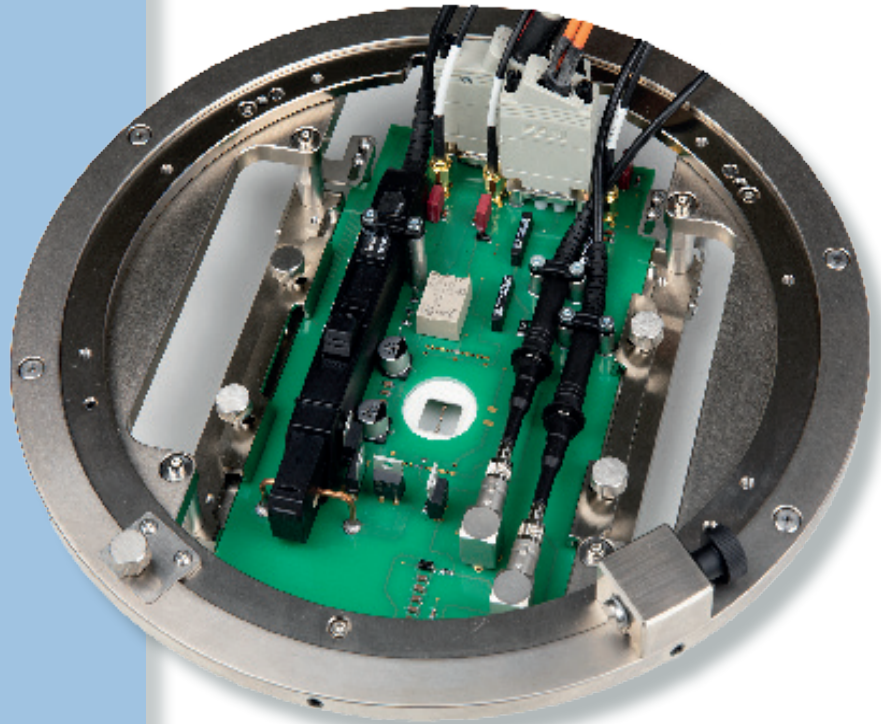


# Ultra Fast Dynamic $R_{DS(on)}$ TEST

## Characterization system for GaN-devices

### FEATURES & BENEFITS

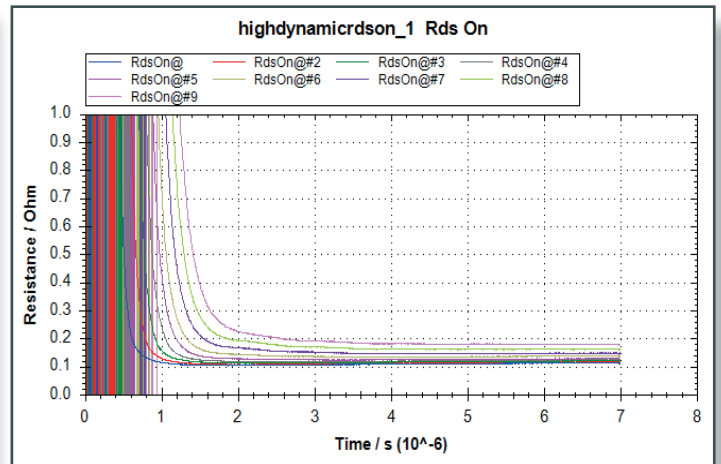
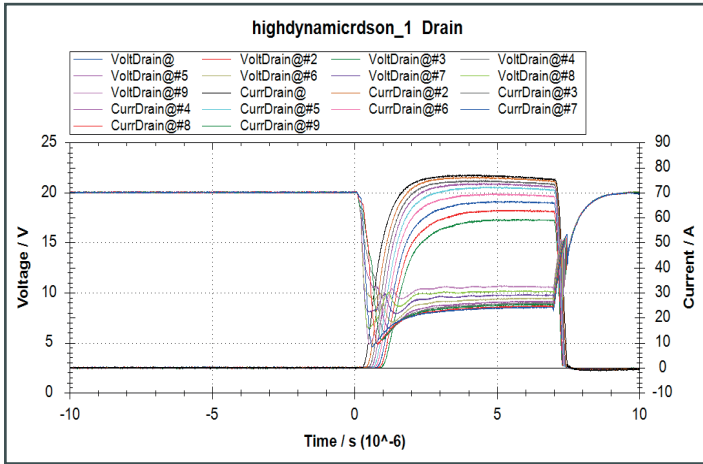
- Off-state 1 kV
- On-state 100 A
- 100 ns sampling time resolution
- Integrated wafer test solution for MPI TS2000-HP & TS3000-HP
- Active probe card
- Gate pulse length 1-100  $\mu$ s
- Unipolar n-channel or p-channel
- Output characteristic
- Transfer characteristic



The Ultra Fast Dynamic  $R_{DS(on)}$  test is designed for characterization of GaN transistors. A critical requirement in power electronics is obtaining a very low ON resistance ( $R_{ON}$ ) immediately after switching from a high-voltage OFF state to a low-voltage ON state.

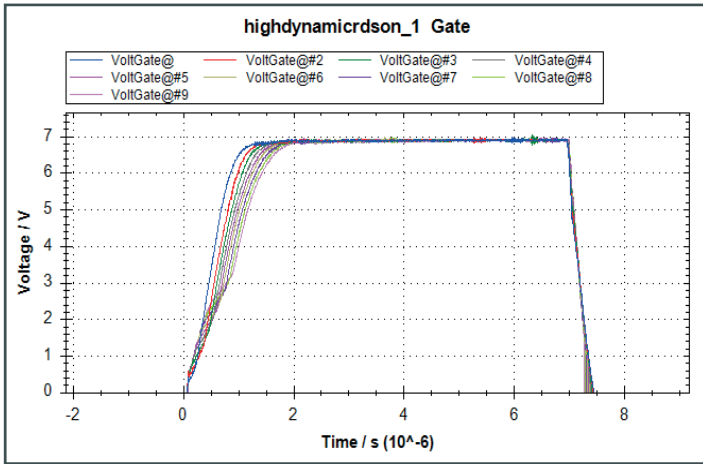
The Ultra Fast Dynamic  $R_{DS(on)}$  test is able to measure the  $R_{DS(on)}$  immediately after switching between OFF state and ON state. The first  $R_{DS(on)}$  value is generated after approx. 1  $\mu$ s. The system is designed for currents up to 100 A (pulsed) and voltages up to 1 kV. Due to the special design of the probecard it is possible to measure further parameters (leakage, and others).

# RDS(on) Switching Characteristics



|                          |            |
|--------------------------|------------|
| Gate on time:            | 7 $\mu$ s  |
| Drain voltage off-state: | 50...450 V |

• IDrain, VDrain for RDS (on)



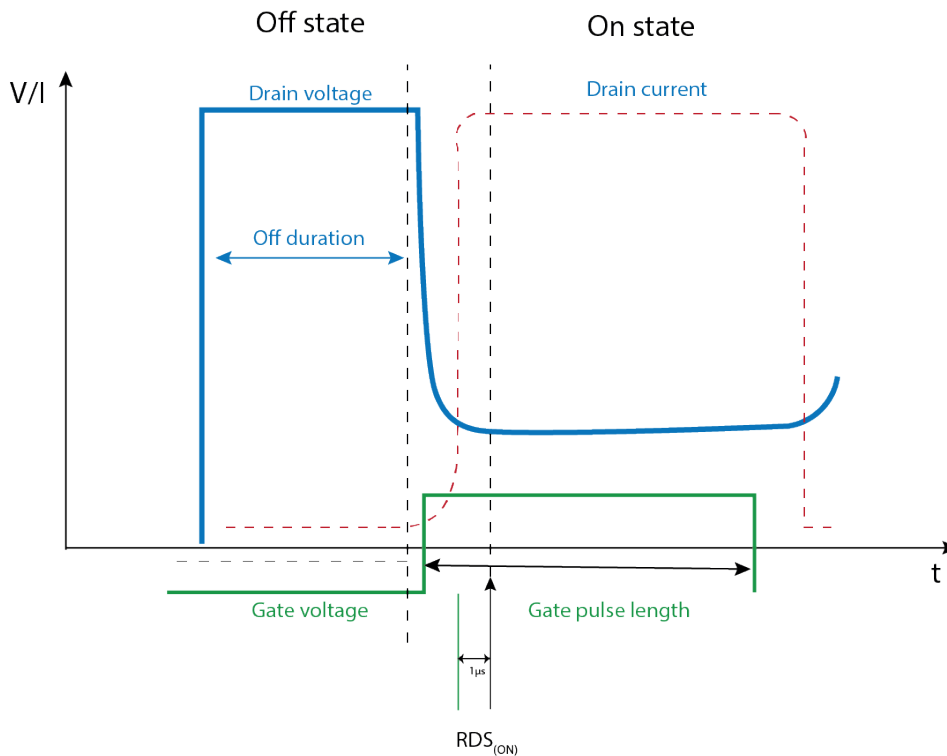
## Off state parameters

|                               |  |
|-------------------------------|--|
| Drain voltage: 0...1000 V     | $I_b$ leakage                            |
| Off duration                  | RDS(on)<br>100 $\mu$ s x [n] @ 1 kV max. |
| On duration                   | 1...100 $\mu$ s, 10...100 A              |
| Gate voltage @ Off $\pm$ 10 V | RDS(on)                                  |

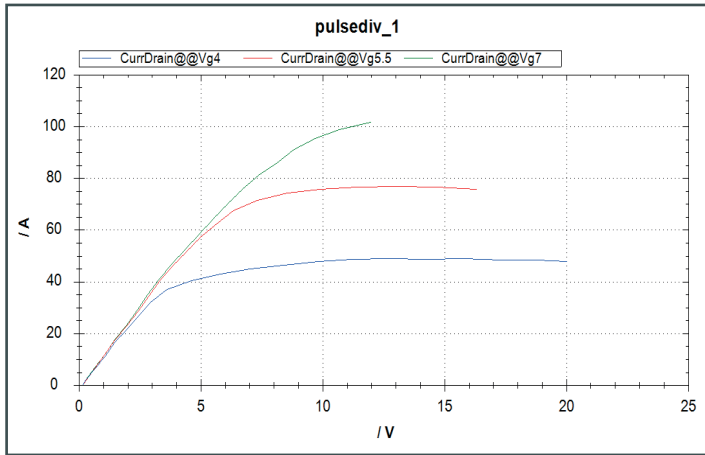
## On state parameters

|                                    |  |
|------------------------------------|--|
| Gate pulse length: 1...100 $\mu$ s | Drain voltage: 80 mV resolution                        |
| Gate pulse voltage: 0 $\pm$ 10 V   | Drain current: 100 A max.                              |
| First RDS(on): 1 $\mu$ s           | RDS(on) settling<br>1 $\mu$ s @ 100 A<br>500 ns @ 10 A |

• Shows the gate pulse shape depend on drain voltage off-state



# Output Characteristics



## PIV

ID: up to 100 A pulsed @ 2  $\mu$ s pulse width  
up to 10 A pulsed @ 1  $\mu$ s pulse width

## DC Pulse

ID: 50 A (100 A) pulsed 400  $\mu$ s

V<sub>ds</sub>:  $\pm$  40 V

## DC

ID: 20 A

V<sub>ds</sub>:  $\pm$  5 V

# System & Software Setup

Display

RIGOL DG1062Z

RIGOL DP8xxA

Tektronix MD03xxx

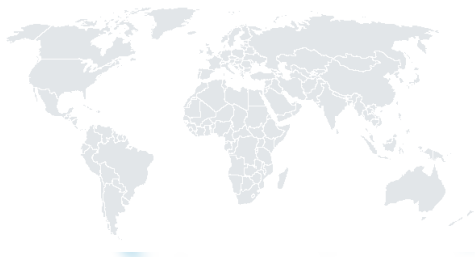
Keithley 2651A

Keithley 2657A

Keithley 2612B

Measmatic

• Based on ATV MeasMatic Framework



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