Gate Resistance Measurement and Procedure for RF GaN Transistor
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INTRODUCTION

This application note outlines a recommended test procedure to accurately measure the gate resistance of a Wolfspeed GaN RF Transistor. The purpose of this measurement is to validate the operational condition of a device prior to installation. The measurement applies to discrete packaged devices. Packaged devices with multiple leads can follow the same procedure by treating each gate lead independently. The use of various digital multimeter settings can greatly vary the measured value. This procedure is the most accurate.

EQUIPMENT AND MATERIALS

The following pieces of equipment or their equivalent are required to accurately measure the gate resistance. Note that substituting or changing the setting on the equipment will yield data that is inaccurate and does not comply with the Wolfspeed specification.

- Fluke 8846A 6.5 Digit Precision Multimeter
- Two Standard Digital Multimeter Leads

PROCEDURE

Note that before beginning measurements proper ESD protocols should be followed to protect the device under test from any damage.

1. Turn on the Fluke 8846A DMM (or equivalent) and connect test leads to the front panel inputs. The designated positive lead should be connected to the port labeled “HI” on the front side of the panel and the negative lead should be connected to the port labeled “LO”.

2. Select the “ohm” symbol for the resistance measurement function on the DMM. Note that this is a two wire measurement and such the “2W 2x4W” should be highlighted on the display or activated using the front panel soft keys.

3. Select the range to be 1 MOhm. This ensures that the source current applied is 10uA. Using auto-range or any other setting will result in a reading that is potentially inaccurate. For those using different multimeters, consult the manual to see which setting provides the correct source current for the measurement.

4. Once setup, place the positive lead on the gate (cut lead) and the negative lead on the source (flange of the device). An undamaged device will have a reading of 10KOhms or higher. It is important to note that a wide range of values above 10KOhms is expected (i.e 1e4 to 1e7). For devices in 1e7 range the DMM may go out of range resulting in an overload reading.