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Dynamic H3TRB & DRB test systems

Application-oriented reliability testing for SiC and GaN power semiconductors

Some effects of new failure mechanisms in wide-bandgap materials like SiC and GaN are not visible with traditional H(3)TRB, but nevertheless have an influence on the real application. This gap in the qualification is closed by dynamic H3TRB (High Humidity High Temperature Reverse Bias) tests or DRB (Dynamic Reverse Bias) according to the definition of AQG 324.

In a setting with a constant temperature and humidity, the DUT is exposed to dynamic drain stimuli with high voltage peaks with a fast rise of voltage.

The voltage shifts lead to fast changes of the magnetic field, which have an impact on corrosion. The procedure accelerates the deterioration of the DUT and possibly also the insulation materials and is the closest to the real-life operational conditions of the DUT.

This test is a prerequisite to make solid statements about the lifetime of SiC and GaN discrete components or modules.



System Features

For dynamic H3TRB tests, NI offers systems that convert the extended requirements from industry into automated dynamic tests. Special focus is put on flexibility in order to be able to quickly cover changing requirements.

	Dynamic H3TRB / DRB test system
Measurement technology	<ul style="list-style-type: none"> • up to 240 DUT channels per system • Vds up to 1500V • Single DUT leakage current measurement (during static H3TRB) <ul style="list-style-type: none"> ◦ up to 240 measuring channels • Single DUT overcurrent protection through switch off <ul style="list-style-type: none"> ◦ Fast hardware based single DUT turn off in stress phase over current protection in read out phase • Single DUT voltage control <ul style="list-style-type: none"> ◦ Active voltage control to compensate burden voltage • Testing in DUT-active and DUT-passive mode possible • Optional tests possible <ul style="list-style-type: none"> ◦ AC-HTC ◦ Dynamic low temperature reverse bias ◦ Dynamic high temperature reverse bias
Dynamic testing output stage	<ul style="list-style-type: none"> • Maximum drain voltage up to 1500V • Configurable output frequency between 0Hz and 500kHz (maximum frequency depending on voltage and DUT capacitance) • Configurable duty cycle settings between 25% and 75% in 5% steps
Software and test procedure	<ul style="list-style-type: none"> • Fully automated test procedure • Measuring data saved in tdms-file • Software based on LabVIEW and TestStand from NI
Environmental conditions	<ul style="list-style-type: none"> • Up to 85°C / 85%rH



Get more information about Dynamic H3TRB & DRB test systems by scanning the QR code or write us an e-mail to set-info@ni.com!